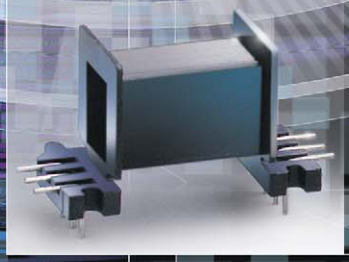
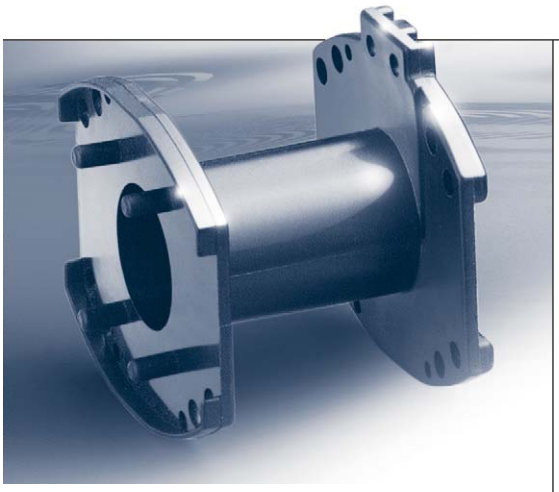
COSMO



Coil Bobbin Catalog and Design Manual

INSIDE



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COSMO CORPORATION maintains an exceptional resource at www.cosmocorp.com. Our entire catalog is online in an interactive format. You can browse the catalog by specifying dimensional limits for all of the important bobbin specifications. When you have narrowed your choices, you can request samples or pricing on line. In addition, a variety of Cosmo documents are available for immediate download.

WORLDWIDE BOBBIN LEADER

COSMO CORPORATION is a worldwide leader in the manufacture and distribution of high quality coil form products for the electrical and electronics industries. Since 1945, Cosmo has been on the cutting edge of advanced engineering, design and manufacturing methods. Our experience, technological capabilities and commitment to customer service allow us to supply the highest quality parts at the lowest cost.

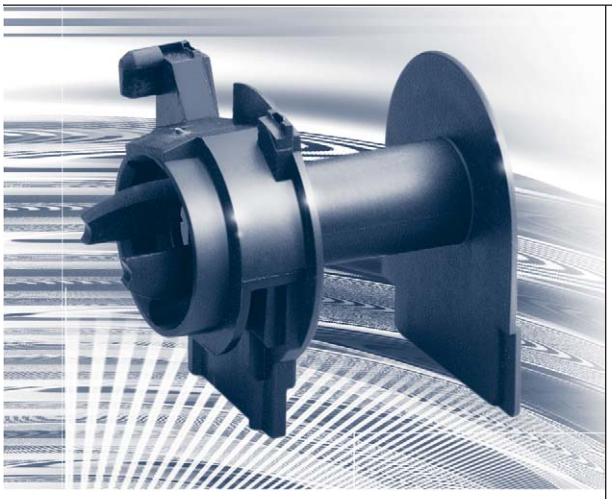
Cosmo has the Largest Capacity in the Industry

Our facilities span two manufacturing plants in Ohio with a total of 150,000 square feet of manufacturing space devoted to molding, assembly, stamping and tool making.

Molding Our molding capacity exceeds 500 million bobbins per year. We operate over 60 molding machines employing screw injection, thermoset injection, transfer and compression molding methods.

Assembly Our terminal assembly capacity exceeds 200 million bobbin assemblies per year. We operate over 100 terminal assembly machines to insert flat terminals and wire formed terminals.

Stamping Our in-house, fully equipped metal stamping facility produces 100% of our stamped solder and quick-disconnect terminals. We operate the latest high speed Minster presses to ensure efficiency and quality.



Tool Making Our in-house tool shop has the capacity to produce over 250 new tools each year. It is also responsible for the manufacture of our proprietary mold bases and the repair of all of our tooling and molds. Our tool making equipment includes a full complement of vertical and horizontal mills, surface grinders, die sinking and wire EDM, and CNC machine tools. These accurate machines are operated by our staff of over 35 highly skilled toolmakers and machinists.

Cosmo is a UL Recognized Molder

Underwriters Laboratories requires that all bobbins molded from polymeric materials must comply with the Standard for Polymeric Materials - Fabricated Parts, UL 746D, and that all parts must be made by a Recognized Molder (QMMY2). Cosmo has been a Recognized Molder (QMMY2) under number E136933 since 1990.

Cosmo is ISO 9001 Registered

All of Cosmo Corporation's facilities are ISO 9001:2000 registered. We received ISO 9002 certification in 1999, and we were recognized ISO 9001:2000 in 2002. Cosmo is listed under certificate number 21651-1.

ABOUT THIS BOBBIN CATALOG AND DESIGN MANUAL

This Bobbin Catalog and Design Manual represents over 58 years of Cosmo's bobbin experience. It contains a newly revised and expanded edition of Cosmo's famous Bobbin Design Manual. The Bobbin Catalog has been expanded with new sections and many new part numbers.

Bobbin Design Manual

Cosmo's Bobbin Design Manual explains many of the principles and specifications of bobbin design and production. There is a complete list of Do's and Don'ts to help the bobbin designer avoid problems in molding. In addition, the section on Bobbin Materials is useful in pinpointing the material that will deliver the right combination of properties to meet the designer's requirements. This reference guide is intended to help design engineers specify requirements without overdesigning and unnecessarily raising product cost. Using the information outlined in this manual helps guarantee that your parts meet the highest quality standards at the lowest possible cost.

Bobbin Catalog

No manufacturer in the world has a larger or more complete line of standard coil bobbins and components than Cosmo:

- Transformer bobbins designed to meet VDE, IEC, CSA, UL and all international standards.
- Surface mount bobbins
- High and low profile PC mount transformer bobbins
- Pot core bobbins, with and without terminals
- Transformer bobbins, with solder or quick-disconnect terminals and without terminals
- Reed relay bobbins, with and without terminals
- Solenoid bobbins
- Shaded pole motor bobbins
- Automotive alternator bobbins
- Square, rectangular, and round core bobbins
- Encapsulation cases

Dimensional Tolerances

All dimensions shown in this catalog are subject to commercial tolerances. The actual dimensional tolerance on catalog items fluctuates due to the variables in molding and depends upon the original tool design, the material type and its corresponding shrinkage rate.

Dimensions and tolerances shown throughout this catalog are subject to change without notice. Cosmo encourages you to request samples to verify current dimensions. Cosmo will not be responsible for typographical errors.

Quick-Ship Program

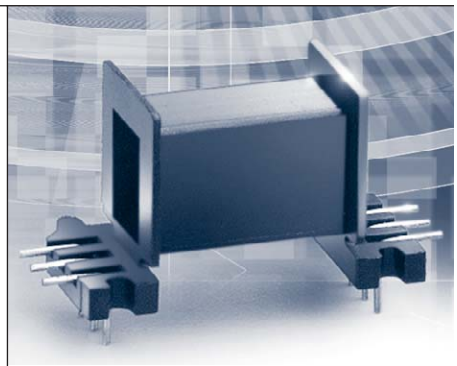
In order to serve our customers better, Cosmo maintains a Quick-Ship Program for selected items. All Quick-Ship parts are stocked and available for next day delivery. This program includes the most popular parts in our catalog in selected materials.

Parts which are available for Quick-Ship are indicated by the Quick-Ship icon ✈.

Contact our customer service department for more information concerning this program and specific material availability.

Cosmo Knob Catalog

Cosmo manufactures Knobs in both thermoplastic and thermosetting materials. We offer a wide variety of grooved, serrated, linear slide, fluted, bar & pointer, and control styles available in various shaft sizes. In addition, we produce a complete line of stud and ball knobs. These items are described in our Knob Catalog. Please request your free copy.



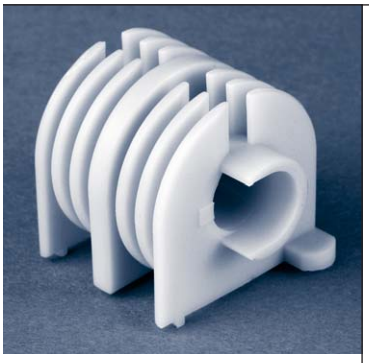
Custom Parts

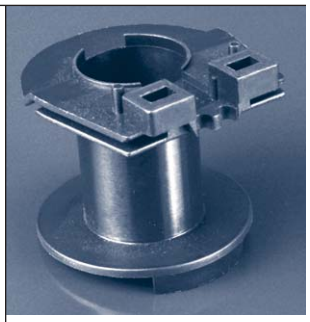
The majority of Cosmo's production consists of custom parts. We have produced over 12,000 different molding tools since 1945. In the process we have been at the forefront of innovation in bobbin design. Bobbin designers worldwide come to Cosmo Corporation to manufacture their most complex designs. For many customers we have created a complete family of related bobbins required for the introduction of a new component line.

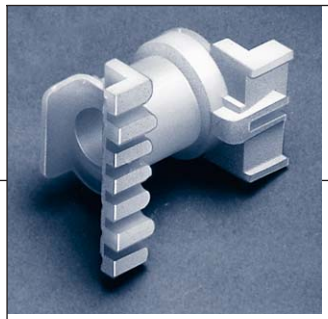
In-house Engineering and Design

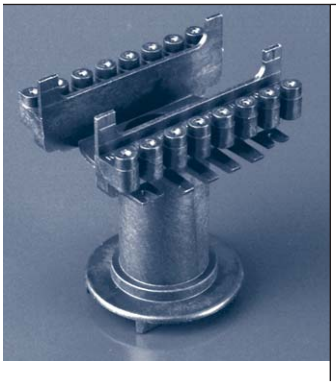
Cosmo maintains a complete Product Engineering Department whose main focus is working with customers in the design and development of coil bobbins for new products. In addition, we are often called upon to aid in the redesign of existing coil bobbins when Continuous Improvement Programs call for changes in bobbin design to achieve higher product capabilities or reduced manufacturing costs.

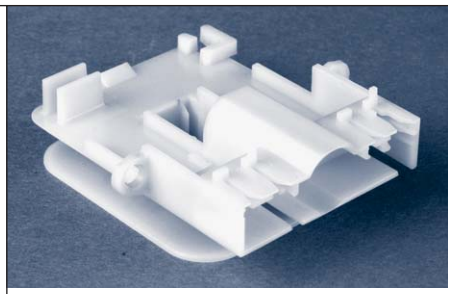
We use sophisticated Computer Aided Design and Manufacturing (CAD/CAM) methods to simulate the results of the design of a mold, including material flow and mold cooling. This allows discovery of problems before the tool has been constructed, and prevents costly rework. The integration of CAD/CAM and our unique tooling methods allow us to provide custom parts at extremely low cost.











Variety of Molding Materials Available

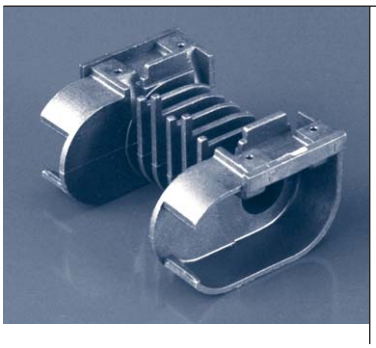
Cosmo is capable of molding coil forms and components in a wide variety of thermoplastic and thermosetting materials most suitable for coil bobbin production and use. Our flexibility allows coil designers to choose from a larger range of materials and part properties in designing products.

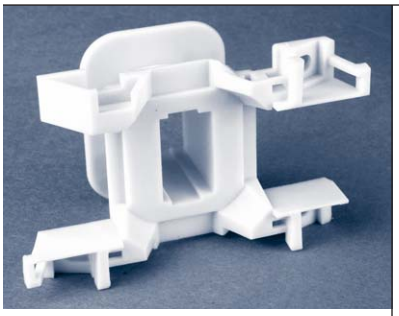
Unit Molding Efficiency

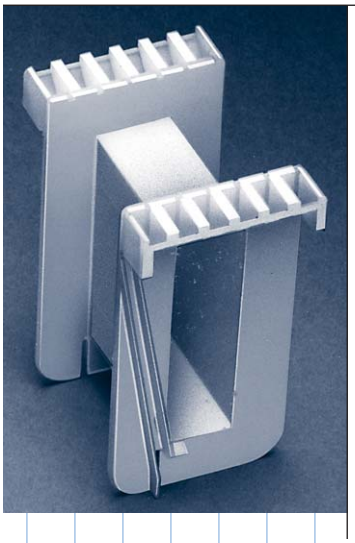
Cosmo introduced the use of the unit mold to bobbin production. We have developed a mold base system that is designed specifically for the efficient production of coil bobbins and other precision molded products. The flexibility of our mold bases provides a range of cavitation options. Benefits include significantly reduced tooling lead time, tooling cost and part price.

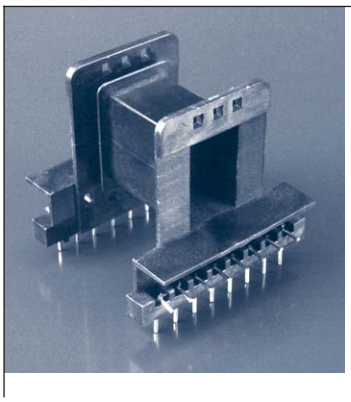
In-House Mold Making Capability

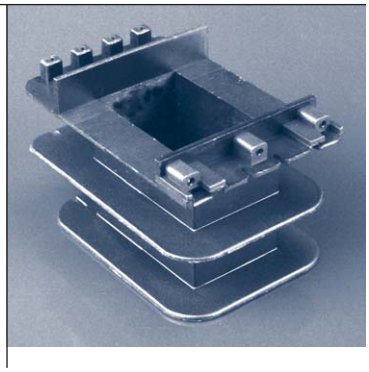
All bobbin molding tools are built in-house in our 15,000 square foot tool room using the latest machine tools operated by our staff of 35 toolmakers, programmers and engineers. We have operated an integrating tooling facility for most of our history, and over the years we have developed ground breaking techniques to produce new bobbin molds accurately and efficiently. Our specialization in bobbins allows us to streamline the tool making process to produce extremely accurate tools at low cost. We have pioneered the use of micro-welding to repair our tools and maintain them in top condition.

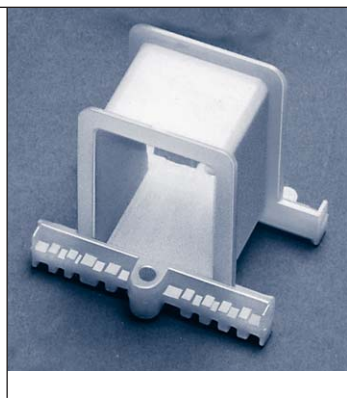












Terminations

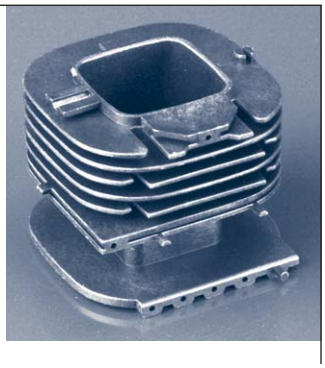
Cosmo is uniquely equipped to supply virtually any type of termination required in a bobbin. Available styles include:

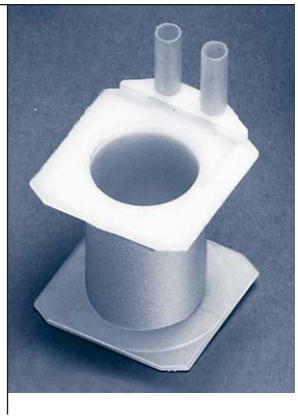
- wire terminals for through-hole printed circuit board and surface mount applications
- flat solder
- quick-disconnect
- insulation displacement
- stamped PC board

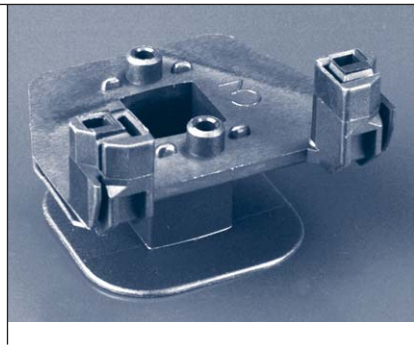
The entire line of Cosmo terminals is built around the idea of insertion interchangeability. On standard terminals, there is usually no charge for terminal insertion equipment. All that is required is a simple holding fixture. Cosmo's terminal insertion capability includes over 700 different terminal styles, which can be applied on our 100+ automatic terminal insertion machines.

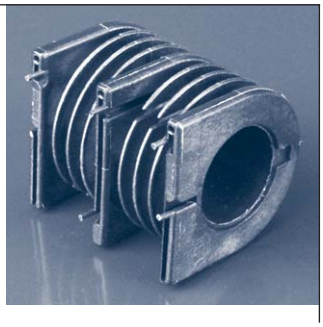
We can also develop custom designed terminals of any type to meet your needs. We stock a wide variety of solder coated wires from which to form almost any shape and length of wire termination. Our in-house stamping facilities produce all of our stamped solder and quick-disconnect terminals.

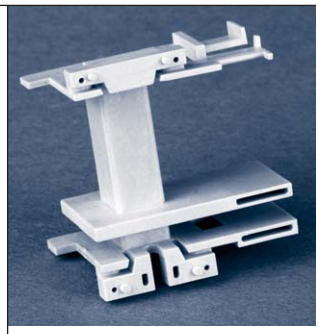
We have designed and built custom machinery for high speed terminal insertion. These automated machines use the latest vision and control systems to ensure accuracy and quality. Our staff of development engineers is continuously designing and developing new types of insertion equipment and applied terminations.

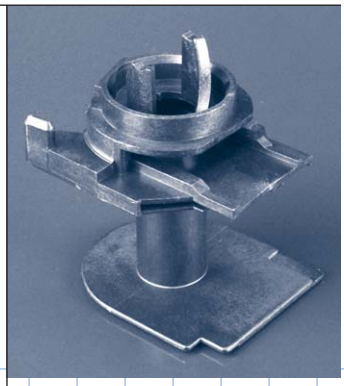


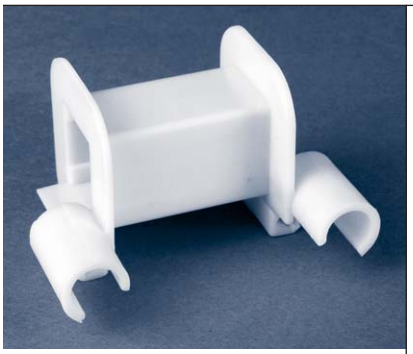












Engineering Design Service

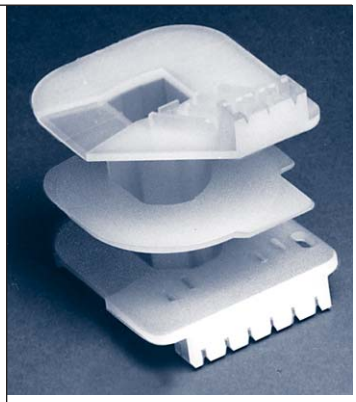
The Cosmo engineering staff has a long history of assisting customers in the development of new and redesigned parts. Cosmo's Engineering Design Service works hand-in-hand with your own design team, and offers the benefits of our 58+ years of specialization in coil form design and manufacturing. Cosmo's design services are offered at no cost and include:

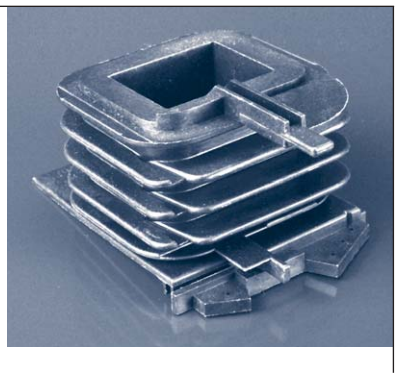
- Full part print layout on CAD.
- Dimensional analysis based upon shrinkage for proper fit of mating parts.
- Part design that optimally meets your needs, requires the least expensive tooling, and creates a part highly suitable for production.
- Material selection assistance.
- Analysis of regulatory requirements.
- Sophisticated CAD/CAM modeling to simulate the results of the mold design, including material flow and mold cooling.

Early Vendor Involvement Program

Cosmo's Early Vendor Involvement program (EVI) brings Cosmo's designers in at the beginning of the development process. By taking advantage of our expertise early in the design phase of your components, you can avoid expensive changes to your mating parts once tooling has been constructed.

EVI also offers the flexibility of electronic sketch, drawing and document exchange to reduce the time between concept and tooling from months to days.





All of COSMO CORPORATION's facilities are ISO 9001:2000 certified and QMMY-2 approved.

Quality Commitment

Cosmo Corporation is committed to supplying the highest quality product to our customers. We are totally dedicated to continuously meeting this objective. To exceed our customers' expectations, reliability and quality are designed into the product from the start. Proper tooling is built and maintained, and manufacturing standards are established to ensure that the requirements of the customer are met or exceeded.

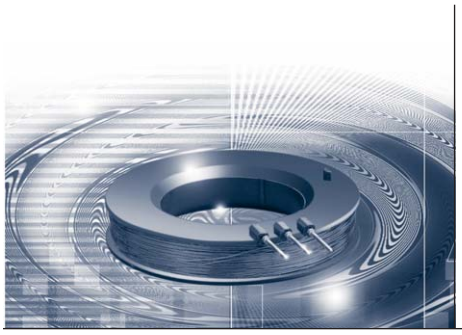
The successful implementation of our Quality Program ultimately depends upon the conscientious application of these principles and procedures by Cosmo's employees. We are confident that our reputation and success in the marketplace is a reflection of our employees' desire to achieve the highest levels of product quality and customer satisfaction.

Cosmo's Quality Assurance Program

Our Quality Assurance Manual outlines the responsibilities and actions necessary to maintain an effective quality program. The responsibilities and actions of all personnel are referenced to applicable detailed instructions.

Cosmo's Quality Assurance System meets the requirements of ANSI/ ISO/ASQ 9001:2000.

The design of this program is based upon consideration of the technical and manufacturing aspects of production, engineering design, and materials. It is intended to assure high quality throughout all areas of design, development, manufacturing, inspection, testing, packaging and delivery.



The following documents, or portions, are a part of the quality system.

- QA Manual (including the quality policy)
- QA Procedures (QAP including objectives)
- Cosmo Work Instructions (CWI)
- ANSI/ISO/ASQ 9001:2000 Quality Management Systems - Requirements
- ANSI/ASQC Z1.4 - Sampling Procedures and Tables for Inspection by Attribute
- ANSI/ASQC M1 - Calibration Systems
- ISO/DIS 19011 - Guidelines for Quality and/or Environmental System Auditing
- ISO 10012-1 - Quality Assurance Requirements for Measuring Equipment
- ASQC Z1.9 - Sampling Procedures and Tables for Inspection by Variables for Percent Nonconforming
- ISO 9000:2000 Fundamentals and Vocabulary
- ANSI/ISO/ASQC 9004 Guidelines for Performance Improvement
- MMPA Standard No. UEI 300

A complete copy of the Quality Assurance Manual is available upon request. The following sections contain excerpts from our Quality Assurance Manual and act as a testimonial to Cosmo's Total Quality Management.

MANAGEMENT RESPONSIBILITY

Quality Policy

Management personnel must be thoroughly familiar with the Quality Assurance Manual, review the Quality Assurance system for their area of responsibility, conduct periodic training sessions to ensure that their subordinates have a complete understanding of the requirements associated with their particular duties, verify implementation of the system requirements within their departments, correct any deficiencies noted, and assist in the development of quality procedures, as required.

The Quality Assurance Manual summarizes the policies and practices exercised by Cosmo to assure and control product quality. Detailed instructions and procedures are subject to continuous review and updating by QA.

The Quality Assurance Administrator maintains and controls distribution of the Quality Assurance Manual.

QUALITY SYSTEM

Quality Assurance Manual

The Quality Assurance manual describes the general system used within Cosmo to assure product quality. Quality Assurance procedures are consistent with the requirements of ANSI/ISO/ASQ 9001:2000. Such procedures include, but are not limited to, detailed descriptions of:

- Material control
- Document control
- Purchasing control
- Manufacturing control
- Inspection and testing
- Record keeping

DOCUMENT CONTROL

All controlled documents are dated when issued. Indices of all controlled documents are maintained in various databases. The issuing department assures that all authorized holders receive changes to controlled documents. Revisions are made in accordance with the document control procedures.

PURCHASING

Vendor Selection

Quality Assurance determines qualified vendors for materials, based on specifications provided by Product Engineering. Purchasing places orders only with approved vendors who meet quality, delivery and price requirements. The vendors must complete a Self-Audit Questionnaire which is evaluated by Quality Assurance and Purchasing.

Performance

Quality Assurance and Purchasing are responsible for monitoring vendor performance. They remove from the approved vendors list any vendor who delivers discrepant material and fails to take corrective action. Previously demonstrated capability will be considered.

Material Purchases

Final decisions relating to sources of supply are made by Purchasing. It is the only department authorized to place purchase orders for materials with vendors.

Certifications

Required certification and vendor test reports must be furnished prior to acceptance of material. Certifications and vendor test reports are approved by Quality Assurance and retained in Purchasing.

PRODUCT I.D. AND TRACEABILITY

Product Identification

Procedures have been established to ensure product part identification from molding, to inspection, packaging and shipment.

Product Traceability

Cosmo's traceability system is in accordance with Underwriter's Laboratories, Fabricated Parts Recognition Designation B-1495 file number E136933 for material traceability.

PROCESS CONTROL

All production is scheduled by the Corporate and Plant Schedulers. Production is carried out under controlled conditions, using appropriately maintained equipment. Controlled conditions include the use of documented procedures to assure quality, monitoring and control of processes and product characteristics during production, and criteria for workmanship.

INSPECTION AND TESTING

Responsibility

All required inspection or testing is performed by, or under the guidance of, the Quality Assurance Administrator. All inspection and test requirements, training, quality standards and procedures, equipment and record keeping are approved by the Quality Assurance Administrator.

Definition

The inspection act consists of:

- Interpretation of product specifications
- Measurement of the product
- Decision - conformance / non-conformance
- Recording of data
- Notifying production

Receiving Inspection and Testing

Raw materials received are checked for condition and quantity. In addition, molding resins and metals used for terminals are supplied with material certification sheets from the vendor. If necessary, materials are sampled for additional analysis in accordance with established procedures. Material not meeting specified requirements is placed in a quarantine area. Approved or rejected status of items is indicated with the appropriate label. If material is needed before being inspected, it is identified and subject to immediate recall if subsequent inspection reveals non-conforming product.

In-process Inspection and Testing

Product physical dimensions are verified daily by the Floor Inspectors. In addition, visual inspections are made at established intervals. Nonconforming products are quarantined and dispositioned in accordance with established procedures. Disposition is recorded on the Floor Inspection Report which is signed by the appropriate inspector(s).

Final Inspection and Testing

Final inspection of product is performed prior to packing. The Quality Assurance Administrator reviews and approves final acceptance inspection procedures to assure they are adequate to satisfy all customer or other applicable requirements. Final acceptance procedures specify any equipment required to perform acceptance tests. Calibration of required test equipment is maintained within specified standards.

Inspection Records

Inspection records show part number, date, shift, machine, operator, nonconformance data, and disposition. Release of product is authorized by the inspector's signature.

Process History

Historical records are maintained, as required, on sampling and in-process inspection. A current file of calibration status and calibration data is maintained by QA for all measuring and test equipment used to qualify product.

INSPECTION, MEASURING AND TEST EQUIPMENT

All inspection gauges and instruments used in evaluating product or process quality are calibrated in accordance with appropriate calibration systems requirements. The Cosmo tag number is used for tracking purposes.

CONTROL OF NON-CONFORMING MATERIAL, PARTS OR COMPONENTS

Definition

A nonconforming item is any material or product in which one or more characteristics do not conform to the requirements specified on the purchase order, specification, standard, or other applicable document.

Notification

Departments that are affected by the nonconformance are notified in accordance with established procedures.

Material Review Board (MRB)

The Material Review Board is chaired by the Quality Assurance Administrator and includes representatives from the engineering and sales departments. The MRB consists of the Administrator and representatives of other departments when required. The MRB's purpose is to provide a disposition for nonconforming material. Authority to ship is based on conformance to specifications and/or customer requirements.

CORRECTIVE AND PREVENTIVE ACTION

Investigation

Nonconformances and noncompliances are documented in accordance with established procedures and forwarded to the MRB. Applicable board members review all data and develop corrective action. The Quality Assurance Administrator is responsible for ensuring that corrective actions have been implemented as specified.

QUALITY ASSURANCE RECORDS

Records that furnish evidence of the performance of activities affecting quality are retained. They are used to manage the Quality Assurance system. Their retention time, filing method and file location are specified in the Quality Assurance Records procedure. Records to be retained include, but are not limited to:

- Customer orders
- Quality audit reports
- External failure reports
- Calibration records
- Customer complaint replies
- Training

INTERNAL QUALITY AUDITS

The Administrator, in accordance with established procedures, plans, coordinates and conducts periodic audits of the complete Cosmo Quality Assurance system to ensure the integrity of the quality system. Internal audits are scheduled based on their importance to maintaining an effective quality system.

Audits are conducted by authorized personnel who are independent of the areas they audit.

Auditors use checklists or similar instructions that are based on the requirements of the Quality Assurance Manual, Quality Assurance procedures, and applicable work instructions.

TRAINING

Procedures have been established that specify the qualifications of personnel performing tasks that affect product quality (job descriptions), how training assessments are conducted, and how training will be conducted to eliminate noted deficiencies.

STATISTICAL TECHNIQUES

If requested by customers, statistical sampling requirements are specified by the Administrator and the customer. Selection of samples and documentation methods will be in accordance with the agreement. Special sampling methods, as determined by the MRB, are used to monitor the effectiveness of corrective actions. Unless otherwise specified, Cosmo maintains the 6 sigma distribution of the measured dimension within 75% of the allowable tolerance range. Sampling requirements are documented in the Additional Manufacturing Specification file. Collected data is stored in Quality Assurance files.

STANDARD NOMENCLATURE

In order to maintain communication, a set of consistent nomenclature has been developed to describe various quality variations. These are listed below and are keyed to Figure 1.

- I.D. standup flash (1)
- I.D. cross flash (2)
- O.D. flash (3)
- Parting line flash (4)
- O.D. mismatch (5)
- Gate protrusion (6)
- Tube wall eccentricity (7)
- Air bubbles
- Burn marks
- Material flow marks
- Weld lines
- Warped or deflected flange

INDUSTRY STANDARD VARIATION LIMITS

Over the past 58+ years of bobbin manufacturing, Cosmo has developed a set of maximum limits that have become the industry standard. These limits cover most details which are generally omitted from customer drawings. (See figure 1.)

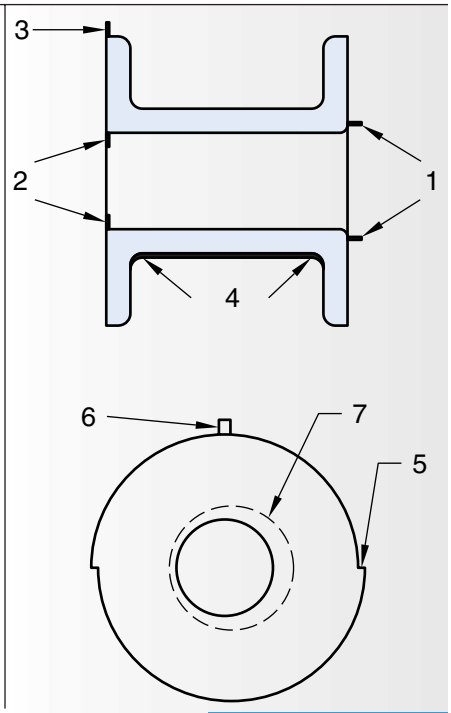


Figure 1

Feature (figure 1 key)	Max limit (inches)
Mismatch (5)	.003
Gate protrusion (6)	.005
Parting line flash (4)	.003
I.D. standup flash (1)	.010
I.D. cross flash (2)	.002
Concentricity (7)	.010

DIMENSIONAL TOLERANCES

Part print tolerances for new tooling are generally ±.005" for dimensions up to one inch. A greater tolerance is required for dimensions over one inch, or for parts with varying wall thickness. Closer tolerances may be possible, but are dependent upon the material type, the part geometry, and the dimensional datums. These can be discussed in more detail with the engineering staff at Cosmo.

There are many plastic compounds available on the market today. Due to the stringent requirements of coils used in industry, only a small number of these materials are appropriate for the manufacture of coil bobbins. This section enables the designer to choose the best material for the application.

Cosmo Standard Molding Materials Property (dry as molded)	ASTM Method	Unfilled nylon 6/6	Glass filled nylon 6/6	Glass filled PBT[a]	Glass filled PET[b]	Glass filled PPS[c]	Liquid crystal polymer	Thermo-setting polyester	Phenolic	Glass filled DAP[d]
Notched izod impact, 73°F, ft-lbs/in.	D-256	1.0/2.1[e]	2.2/2.5[e]	1.3	1.6	1.6	2.4	4.3	.5	.8
Tensile strength, 73°F, psi x 10^3	D-638	12.0/11.2[e]	27/18[e]	19.5	22	22.5	23	6.2	9	12
Elongation, 73°F, %	D-638	60/300+[e]	3/4[e]	1.5	2.3	.9	1.7	-	-	-
Flexural strength, 73°F, psi x 10^3	D-790	-	38	28	32	29.4	31	13	14	19
Compressive strength, psi x 10^3	D-695	4.9	42	18	25	26	18	29.9	40	22
Heat distortion, °F, 264 psi	D-648	194	480	406	435	>500	469	>500	400	400
Heat distortion, °F, 66 psi	D-648	455	500	442	475	>500	543	-	-	-
Thermal expansion, in/in/°C x 10^{-5}	D-696	8.1	2.3	1.4	2.5	2/4[l]	0.6	3.5	1.9	1.9
Volume resistivity, ohm-cm	D-257	1015/1013[e]	1015/109[e]	1015	1015	1016	1015	1014	1013	1015
Dielectric constant, 100 Hz	D-150	4/8[e]	4.5/25[e][f]	3.9	3.6[f]	3.9[f]	4.1[f]	6.3	4.1	4.2/3.5[k]
Dielectric strength, v/mil. 1/8" thick.	D-149	385/773[e][h]	530	490	430/1040[g]	450	1110[j]	436	380	450/726[g]
Oxygen index	D-2873	28/31[e]	24	30	33	47	37	-	-	39
Arc resistance, seconds	D-495	60-120	135	123	117	34	137	>180	>180	130
Water absorption, %, 24 hrs.	D-570	1.2	.7	.07	.05	<.05	.02	.19	.1	.25
Flammability rating	UL-94	V2	HB	V0	V0	V0	V0	HB	V0	V0
Specific gravity	D-792	1.14	1.38	1.66	1.67	1.65	1.61	1.98	1.80	1.87
Hot wire ignition, seconds	UL-746	15	9	73	>300	12/300[i]	<30	-	-	-
Comparative tracking index, seconds	-	>599	400-599	250-399	250-399	100-174	175-259	400-599	175-259	>599
Thermoplastic (P), Thermosetting (S)	-	P	P	P	P	P	P	S	S	S

[a] polybutelene terephthalate
[b] polyethylene terephthalate
[c] polyphenylene sulfide
[d] diallyl phthalate
[e] (dry as molded) / (50% relative humidity)
[f] 1kHz
[g] (.125 inch thick molded) / (.032 inch thick molded)
[h] (.125 inch thick molded) / (.048 inch thick molded) @40% RH
[i] (.028" thick molded) / (>.058 inch thick molded)
[j] .058 inch thick molded
[k] (1kHz) / (1mHz wet)
[l] (axial) / (transverse)

MOLDING PROCESSES

A variety of different molding processes are used to mold bobbins in these materials. A discussion of these molding processes follows. This will help to correlate the materials' physical and thermal properties with the cost of the materials' molding process as a material selection criterion.

Injection Molding

The method that is most widely used today for making bobbins is the injection molding process. The process can be adapted to mold both thermoplastic and thermosetting materials. When molding thermoplastic materials, the material is heated in the cylinder, injected and then cooled in the mold prior to removal of the parts. When using thermosetting materials, relatively cool material is injected into a hot mold, and after a short period of time, the mold is opened and the parts are ejected.

Transfer Molding

Transfer molding is used with thermosetting material only. The molding material is placed into a chamber in the mold prior to the closing of the mold. An external plunger forces the material from the chamber into the mold through a system of runners. Since this all takes place in a hot mold, the material changes chemically and becomes thermally set. After a prescribed time, the mold is open and the part and runner are removed.

Compression Molding

Compression molding is another process used only with thermosetting materials. In this case, while the mold is still open, molding material is manually inserted into each separate cavity within the mold and then the mold is closed. The action of closing the mold causes the material to distribute itself throughout each individual cavity. As in transfer molding, the hot mold causes the material to harden. After a prescribed time, the mold is opened and the parts are removed individually since there is no runner system to hold the parts together.

Generally, transfer and compression molded parts require deflashing as a secondary operation.

MOLDING MATERIAL PROPERTIES

Molding materials used to produce today's parts are categorized by their properties:

- Thermal
- Flammability
- Electrical
- Physical

Thermal Properties

Underwriters Laboratories has segmented the range of practically experienced temperatures into a system of classifications. The molding material suppliers have provided materials that serve the needs of these different classifications.

Each temperature class represents the highest service temperature that the material should be able to withstand over its expected life without degrading the properties beyond the limits that UL has specified. This is the foundation for the insulation systems approvals available from UL (Standard 1446).

The officially assigned temperature classifications do not determine the highest temperature to which any specific product can be approved. UL requires that products be individually approved for the temperature class specified.

Flammability Properties

Flammability ratings assigned by UL represent a material's resistance to burning, not its temperature limit or thermal life. There are five ratings of flammability: one based on horizontal burning tests, HB, and four V ratings based on vertical burning tests. Three of these V ratings relate to the flammability performance of portable end-product appliances and devices. The last vertical burning rating applies to parts with extensive surface area such as housings and enclosures.

HB is assigned to those materials whose test bar burns at a maximum burning rate. This is the lowest rating that UL gives to plastic materials in the flammability classification.

V1 is the first of the ratings that specify a test using a vertical orientation to the test bar. The specimen must be extinguished within 25 seconds and any flaming drops may not ignite cotton.

V2 is a variation on V1 in that the same orientation and time limits apply, but the material is fluid enough that as the material starts to burn, flaming drops will drip away and help carry the flame from the burning part. Ignition of cotton by the flaming drops is permitted. Unfilled nylon is rated in this category.

V0 is the class that is commonly thought of when a material with some semblance of self extinguishing property is required. It will extinguish within 5 seconds and any flaming drops will not ignite cotton.

V5 is the class that applies to those materials that not only self extinguish, but also suffer very little part destruction.

Electrical Properties

There are a number of considerations under the subject of electrical properties. Some are true properties of the material and others are the results of tests conducted by UL under certain physical conditions such as thickness, humidity, etc.

Dielectric Strength of the plastic material is probably one of the more important electrical considerations. The dielectric strength of a material is the total voltage required to break through a molded test sample of that material, causing an electrical failure. The specification for dielectric strength reports the value as voltage per thousandth of an inch (mil) of plastic barrier.

This implies that the voltage to cause dielectric failure varies linearly with the thickness of the plastic barrier. However, voltage per mil is not a constant for a given material. Actually, the voltage varies with the thickness of the material, the temperature, the humidity conditions and the frequency of the current. The molded surfaces of the material provide an initial insulating property that is stronger than the intervening plastic between the two molded surfaces. It will take more voltage per mil to cause an electric failure on something .030 inches thick compared to something .060 inches thick or .125 inches thick.

Ionization, which causes a rapid breakdown of electrical properties, occurs in materials with high moisture content. As the current frequency increases, the dielectric strength decreases. The same reduction in dielectric strength occurs when the coil heats up caused by hot spots in the coil or higher ambient temperature.

Dielectric Constant is another electrical property that should be given consideration. It is a measure of the extent that an insulating material polarizes when placed in an electric field of specified

intensity. A low dielectric constant is particularly desirable for communications and electronic circuits employing a wide range of frequencies that rely on a clear transmission of low intensity signals.

Arc Ignition, Arc Resistance, Arc Tracking, and Comparative Tracking are test results that have meaning within the UL approval process. These tests will be discussed later under the subject of the UL Recognized Component (yellow) Card.

Physical Properties

The physical properties of a plastic material tend to be more nebulous and difficult to correlate with the actual performance of the resulting part.

Flexural Modulus is one of the most important physical properties. This is a measure of the stiffness of a plastic material. This stiffness is necessary to keep the wire that is wound onto the bobbin exactly in position. Also, the wire pressure of the winding must not collapse the core of the bobbin and affect the clearances required for the core member going through the coil.

Coefficient of Linear Expansion is much greater in plastic materials than metals - up to 6 times greater, depending on the plastic. Therefore, as the coil is heated the plastic will expand causing a change in size.

Moisture Absorption is present to a certain extent in all of the plastic materials with which we work. Some materials absorb enough moisture to have a definite affect on the operation of the molded component. The filled versions of these materials will absorb less moisture, since the glass filler used has zero moisture absorption. The humidity conditions in which the final product will operate must be considered.

Crystallinity of plastic materials is usually not considered by most designers. The plastic materials that Cosmo uses to mold bobbins are generally crystalline. This crystallinity exhibits itself by manifesting in the plastic some of the same properties that are attributed to metals, such as increased flexural modulus and higher dimensional stability.

Depending upon the rate of cooling of the parts while still in the mold, and the temperature at which they are held in the mold, differing amounts of crystallinity are developed. Where it is not economically feasible to get maximally crystalline parts in the mold, some materials can have the crystallinity increased by heat-treating the bobbins at an elevated temperature. This process is referred to as annealing.

Conversely, there are some situations where a high crystallinity is not desired; when a more amorphous structure is needed. If this is the case, the parts should be molded in a cool mold, yielding minimal crystallinity.

UNDERWRITERS LABORATORIES

Underwriters Laboratories and their requirements play a large part in most of the bobbin industry. UL oversees many of the components as well as completed products used in the electric and electronic industry.

All materials approved by UL are documented with a yellow Recognized Component Card and have an entry in the UL Recognized Component Directory. The card lists the material along with the properties tested under their guidelines. The actual values required for a given application have usually been established by UL. Shown below (See figure 2, on next page) is an example of a typical UL yellow card.

The items listed on the card are:

❶ Manufacturer's material designation The card only applies to a specific material type made by a specific manufacturer.

❷ Color lists all of the approved pigment additives that do not modify the properties of the material.

❸ Minimum wall thickness applicable to the properties shown.

❹ Flammability classification is the UL classification that indicates whether the material will burn, and if so, the rate of burning.

❺ Relative temperature index (RTI) for electrical and mechanical properties. There are 3 columns of ratings. The first is purely the temperature index for the electrical properties, and the next two columns list the temperature index for mechanical properties with and without impact considered. The material can be used at or below these temperatures without thermal degradation.

❻ Hot wire ignition (HWI) is the number of seconds it takes to ignite the material, when wrapped with a red-hot wire. The longer the number of seconds, the better the material. This represents the material's resistance to the abnormally high temperatures that may result when a conductor carries far in excess of its rated current due to a component failure.

❼ High current arc ignition (HAI) is the number of arc exposures necessary to ignite a material when they are applied to the surface of a material. This rating reflects the ability of a material to withstand arcing on its surface at low voltage/high current levels that might be encountered in the mounting of contacts or the breaking of internal connections.

QMFZ2 **E69578M**
Component—Plastics

**E I DUPONT DE NEMOURS & CO INC POLYMER PRODS
DEPT, ENGR POLYMERS DIV POLYESTER RESINS
WILMINGTON DE 19898**

Mtl Dsg	Col	Min Thk mm	UL94 Flame Class	RTI	RTI with Imp	RTI w/o Imp	HWI	HAI	HVTR	D495	CTI
Polyethylene terepthalate (PETP), glass reinforced, flame retardant, designated "Rynite", furnished in the form of pellets											
FR-530L	BK, NC	0.35	V0	—	—	—	3	1	—	—	—
❶	All	0.81	V0	150	150	150	2	1	1	—	—
	All	1.57	V0	150	150	150	0	1	1	—	—
	NC, BK	1.57	V0	150	150	150	0	1	1	—	—
	❷	❸	❹		❺		❻	❼	❽	❾	❿

Marking: Company name or trade name and material designation on container, wrapper or molded on finished part.

Figure 2

❽ High voltage arc tracking (HVTR) is the rate at which a tracking path is produced using a 5,200 volt arc. This is a test used when the part must support current carrying members; and is only applied for applications where the available power is in excess of 15 watts.

❾ High voltage, low current Dry Arc Resistance (D495) expressed in seconds is the number of seconds required for a surface conducting path to develop when subjected to an intermittently occurring arc of high voltage, low current characteristics.

❿ Comparative tracking index (CTI) is the voltage at which tracking is produced on a wet surface. Usually this test only runs to 500 volts before it is discontinued.

INSULATION SYSTEMS

Insulation systems have been developed for specific combinations of materials used in the manufacture of finished components. These materials have been tested by the manufacturers and include compatibility for everything that goes into making a wound coil, including the plastic materials, wire, varnishes, and tape.

Meeting UL requirements for electrical equipment can be very expensive, both in time and money. Usually thermal aging tests are required to determine the feasibility of the materials that are going to be used. This can take anywhere from 12 to 18 months or more and costs thousands of dollars in related expenses. (UL Standard 1446)

These Insulation Systems give approval for operation using specific material combinations at a maximum temperature. This temperature limit assures that the unit or the materials will not have lost more than an acceptable level of their electrical and mechanical properties. Insulation systems simplify the approval process by reducing the scope of the testing to an audit of the unit's safety features without retesting the material combination. This means substantial savings in the time and expense that would otherwise be expended in securing UL approval.

In the case of interlayer windings, the use of insulation systems and higher temperature bobbin materials, plus the use of specialized terminations, can minimize the cost of the finished coil.

Temperature Classifications

UL will assign a temperature limit of 65°C on almost any unknown insulating material. The following chart shows the temperature classifications that are assigned by UL on some sample materials.

Class	Temp	Typical materials
A	105°C	unfilled nylon 6/6
B	120°C	filled nylon 6/6, PET, PBT
F	155°C	PET and, with some insulation system approvals, PBT
H	180°C	PPS and, with some insulation system approvals, PET
N	200°C	LCP and, with some insulation system approvals, PPS and PET
R	220°C	
S	240°C	
C	>240°C	

Most of the commercially available thermoplastics stop at about the Class N level. The only materials to reach higher are the ceramics and

some exotic materials. Depending upon the application, liquid crystal polymer (LCP) can be used at some higher temperature ratings.

Caution must be exercised in applying these insulation system approvals to real world designs. These insulation system approvals and the temperature limits involved only refer to the degradation properties of the materials and specifically to any potentially harmful interrelationships. This does not mean that your product will be approved by UL to function and be safe at the temperature that the insulation system specifies. The safety audit includes tests designed to determine if your total package will operate at the temperature level implied by the insulation system approval.

A major case in point is the disparity between the temperature classification of the bobbin material and that of the entire insulation system. The material temperature classification is determined by UL when the bobbin material is under a rather low physical load. However, final insulation systems approval is determined under the actual load conditions experienced by the complete component. There have been specific instances where the actual load was higher than expected, and required a bobbin material with a higher heat distortion point. It pays to evaluate all of your temperature requirements to avoid this trap.

MOLDING MATERIALS

There are well over 100 different materials that could be used in molding bobbins. However, the majority of bobbin requirements can be satisfied using one of 10 specific materials.

By specializing in these industry-standard materials, it is possible for Cosmo to eliminate the high cost of changing materials and tools every time a different job is run. However, this does not mean that bobbins cannot be made in a wider variety of materials. In actuality, Cosmo does make bobbins out of many other materials where the requirement is for a very specialized application requiring properties that are not handled by our standard materials.

Thermoplastic vs. Thermosetting

All molding materials can be classified as either thermoplastic or thermosetting. This basic difference is characterized by a material's reaction to the initial and subsequent applications of heat.

Thermoplastic materials, upon the initial application of heat, soften and can be formed into a desired shape. If you desire to reuse the material, the material can be ground, reheated to the softening point, and reused.

Thermosetting materials react chemically upon the application of heat. This reaction is not reversible. When the part is cooled and subsequently reheated, the material will not soften. The result is that if the part is not correct, the material cannot be salvaged.

Thermoplastic materials require the injection molding process. Thermosetting materials can be molded using a thermosetting injection process, transfer molding or compression molding.

When a part molded of a thermoplastic material is removed from the mold, it generally is a clean part, free of flash. Parts molded of thermosetting materials normally exhibit varying amounts of flash that must be removed in a secondary operation. They can be deflashed by various methods depending upon the volume, the kind of material and the amount of flash.

Most of these materials can be purchased from any number of chemical companies under a variety of trade names. Throughout this design manual, we will use the generic names of the materials by which they are known chemically, rather than by the trade name of the materials under which they are marketed.

THERMOPLASTIC MATERIALS

Unfilled Nylon 6/6

Unfilled nylon 6/6 has an outstanding balance of properties combining strength, moderate stiffness, high service temperature and a high level of toughness. It is resistant to impact, has a low coefficient of friction and resists fuels, lubricants and most chemicals. In addition, it is comparatively easily molded, filling thin sections due to the low melt viscosity when molten. It is a crystalline polymer that sets up rapidly. This combination of easy fill and fast set up allows generally fast molding cycles. Unfilled nylon 6/6 absorbs moisture and comes to equilibrium at a moisture content of 2.5%, at 50% relative humidity. This moisture acts as a plasticizer for the nylon, somewhat lowering its strength and stiffness, but increasing its toughness and elongation. Where parts have been fully annealed, a dimensional growth with the application of moisture of .006 inches per inch of length at 50% relative humidity is normal. Of course, if the part is subsequently dehydrated, the process is reversed; stiffness increases and dimensions decrease as the moisture content decreases.

Today, nylon 6/6, both unfilled and glass filled, accounts for approximately 50% of all bobbin production. The combination of high temperature properties, toughness, abrasion resistance, and chemical resistance, along with its electrical properties is adequate for most power frequencies and voltages.

Glass Filled Nylon 6/6

The glass filled nylon normally used in bobbins is the same nylon 6/6 used in the unfilled variety but with the addition of 30 - 35% glass, depending upon each manufacturer's specific formula. Because glass fibers do not absorb any moisture, the moisture absorption of glass filled nylon parts is reduced proportionally.

The addition of glass to the nylon increases the heat distortion point and raises the stiffness considerably. Glass fibers retain a memory of their original orientation even after realignment within the part during molding. After molding, these fibers immediately begin to return to their original shape. Therefore, there is a tendency for more warpage in glass filled nylon parts. However, by varying the molding process, mold design and temperature control, the warpage of the glass filled nylon can be minimized.

By adding glass to the nylon, the material carries a UL heat distortion rating of 120° C. While unfilled nylon has a flammability rating of V2, meaning it has a restricted burning with dripping allowed, glass filled nylon is only classified as HB. The glass fibers act as a mat and will not allow the flaming material to drip away. Therefore, the nylon continues burning until the entire product is consumed.

Glass Filled Thermoplastic Polyester

There are several materials that are classified as thermoplastic polyesters:

- PBT - polybutylene teraphthalate
- PET - polyethylene teraphthalate

These materials have a 30% glass fiber content.

PBT, as formulated for bobbin manufacture, is a flame retardant material with a UL rating of V0. It has a temperature index of 130° C, and an insulation system approval of Class F, 155° C. It has good volume resistivity, low moisture absorption, and is quite stiff.

PET has generally the same properties and flammability rating as PBT. However, PET has a temperature index of 140° C because it is a more stable material with a slightly higher melt temperature. In many cases, PET can receive insulation systems approval for Class H, 180° C and Class N, 200° C.

It is very important to remember that insulation systems approval temperatures only reflect resistance to degradation of the material, and have nothing to do with heat distortion properties.

PBT is a little easier to mold because the material only has to be dried to .02% moisture before it is molded, while PET has to be dried to .01% moisture. It is extremely critical that this lower moisture content be adhered to during the molding process since excess moisture can degrade the physical properties.

Polyphenylene Sulfide

Polyphenylene sulfide (PPS) with its high temperature index is currently the most affordable of the high temperature thermoplastic materials available for molding larger bobbins. Its high crystallinity results in a glass like material that actually sounds like glass when dropped on a hard surface.

PPS has 40% glass fiber content. It carries a UL flammability rating of V0, a temperature index of 200° C, and it has a Class H, 180° C insulation system approval. The high melting point of this material resists the transfer of heat when soldering terminals. This makes PPS a good choice when high temperature soldering is required. Its high heat distortion point makes it a very good choice for highly loaded coils where the plastic will be used as a direct support for current carrying metal parts.

This material is exceedingly stiff and it has a very high resistance to loading, and correspondingly, a very low amount of creep. PPS is also chemically inert. Consequently, it will fulfill the requirements of most high demand applications. The material is a little more expensive, but when you need its superior properties, the benefits far outweigh the extra cost.

Liquid Crystal Polymer

Liquid crystal polymer has the potential to be used in place of some ceramics in very demanding end use applications. This material has an exceptionally strong molecular structure with extremely high tensile strength and stiffness. Instead of having a crystal structure, this material has a linear, rigid, rod-like structure that aligns to a very high degree during flow, making for an ordered structure in the molten state.

This material can be readily injection molded and, inasmuch as the material is extremely liquid in the molten state, it can be molded into extremely thin sections. Like most of the other materials, added glass further enhances the heat-distortion point and stiffness.

Liquid crystal Polymer has a UL flammability rating of VO. It has a very high dielectric strength - in some instances twice as high as most other materials allowing for very thin walls. Moisture absorption is very low, as is the coefficient of thermal expansion. These combined properties make for a material that is dimensionally very stable, and allow for the design of very close tolerance, and extremely small parts.

THERMOSETTING MATERIALS

Diallyl Phthalate

Diallyl phthalate (DAP) can easily be recognized by its characteristic green color and the green dust generated by the required deflashing operation. The material contains a high concentration of glass, and by nature is generally considered brittle.

It is dimensionally very stable and has good electrical properties. When immersed for soldering operations, the material will not soften. This allows a longer dwell time in most soldering operations. However, DAP requires a thermoset method of molding that is a slower and more expensive process. This fact, combined with the high cost of the material and the waste of material in the scrapped runner system, results in high part prices.

Phenolic Resin

Phenolic materials in general, both filled and unfilled, have an advantage over other thermosetting materials in that they are only about one third the cost of high temperature thermoplastic materials. However, the low price of phenolic material is offset by the fact that it is much more expensive to mold, and does require a deflashing step that adds additional cost. Phenolic parts are generally brittle and require more care in handling.

Thermosetting Polyester

The kinds of thermosetting polyesters that are in general use in our industry are called bulk molding compounds. This material is furnished in a very heavy putty-like consistency and requires special methods of feeding the material to the molding machine.

The material flows exceedingly freely and results in heavily flashed parts that require extensive finishing to deflash. Like the rest of the thermosetting materials, thermosetting polyester is dimensionally very stable, but also brittle in thin sections. Therefore, parts made from this material must have a minimum wall thickness of 1/16th inch.

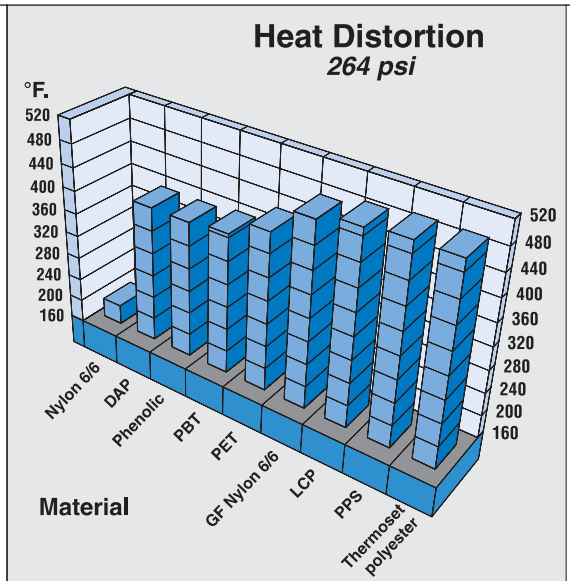
Thermosetting polyester is primarily used for molding the large coil forms required for the high output lighting ballast transformers used in street lighting.

MATERIAL SELECTION CRITERIA

The preceding discussion has provided a basic framework for specific criteria to be considered in the coil bobbin designer's choice of materials. These selection criteria encompass a wide range of physical, manufacturing, and cost considerations. Many are interrelated and often cannot be optimized. Bobbin material selection is always a compromise. The following suggests some of the questions that must be answered in selecting a material for a bobbin. These considerations are listed here without regard for priority, because the priority of any specific item depends upon the use of the component.

The basic criteria include:

- Temperature Limitations
- Termination and Soldering Method
- Flammability
- Electrical Requirements
- Physical Properties
- Dimensional Tolerances
- Insulation Systems
- Material Costs
- Molding Method Costs
- Finish Requirements
- The World Marketplace



Temperature

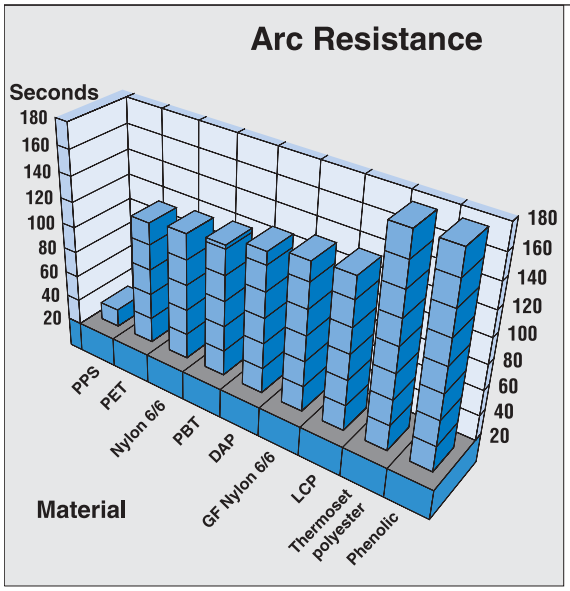
The specific temperature that will actually be experienced by the coil in operation must be considered. Will there be heavy physical loading on this coil that at the elevated temperature could possibly cause the unit to collapse due to the winding pressure? Will the limiting heat distortion point of the material or materials under consideration be exceeded by the heat buildup due to the operation of the coil and perhaps the buildup of heat due to any enclosure around the coil?

Termination And Soldering Method

Will the part be hand soldered with leads, or will terminations inserted into the plastic part be used to electrically connect the coil? If terminals are used, what method of soldering is going to be used: automatic dip soldering, wave soldering or hand soldering? What will be the effect of the transfer of the heat of soldering into the plastic part? Will it distort the part? Will it loosen the terminals?

Flammability

Will UL require that a V0 material be used, or can you get by with HB flammability?

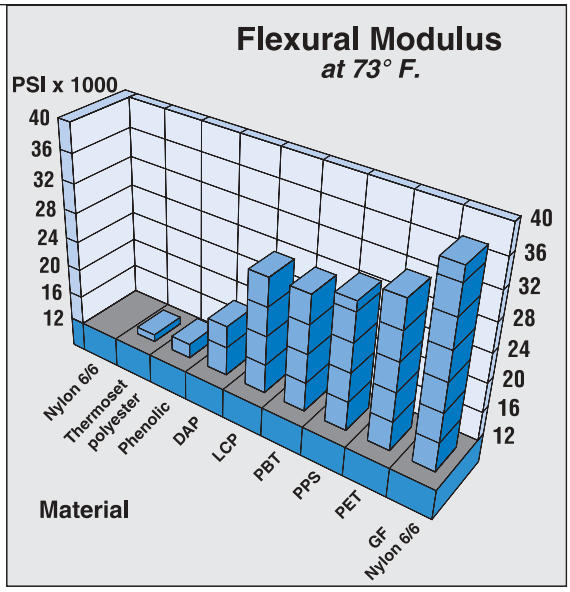


Electrical

What voltages will be encountered? What are the dielectric strengths in volts per mil? What about volume resistivity?

When molding bobbins, the molder must always be concerned with the problem of releasing the parts from the mold. Good mold design should provide for proper part release. However, when a molder with inexperience in the use of bobbins runs into a problem of poor release, a mold release agent may be used. This can have far reaching effects on the electrical properties of the bobbin. Arc tracking resistance and dielectric strength can be affected.

One specific mold release, silicone, has a rather nasty propensity to migrate. It can be deposited anywhere on the surface and at that point the silicone acts like a spider, it starts to crawl, and it never stops, no matter how thin the film. It will crawl into any other part in your unit, and if you have any place where you have contacts making



or breaking, it will crawl over the contact surface and act like an insulator. As a general rule, mold release agents should not be used on bobbins.

Physical

Care must be taken so that when large wire sizes are going to be used, the wall thicknesses are sufficient to prevent flange flaring, or the collapse of the ID of the bobbin. Therefore, the flexural strength of the material should be considered.

Dimensional Requirements

What are the dimensional tolerance requirements related to part function? Is this a coil that has to be in a specific environment where a coil size change of a few thousands of an inch will make a significant difference or will it be used in such a way that the overall envelope size is insignificant? Will this component contain moving parts involving the making and breaking of contacts, where close tolerances are imperative, or will this part be used only to generate a magnetic flux. The use of the part can determine the dimensional tolerances required, and dictate the choice of materials. Alternately, the use of automation in the assembly of the component may be the driving factor in requiring a close tolerance material with good dimensional stability over time.

Insulation Systems

If your product contains a wound coil, and has to be submitted to UL, the use of an insulation system will reduce the cost and the time required for UL testing.

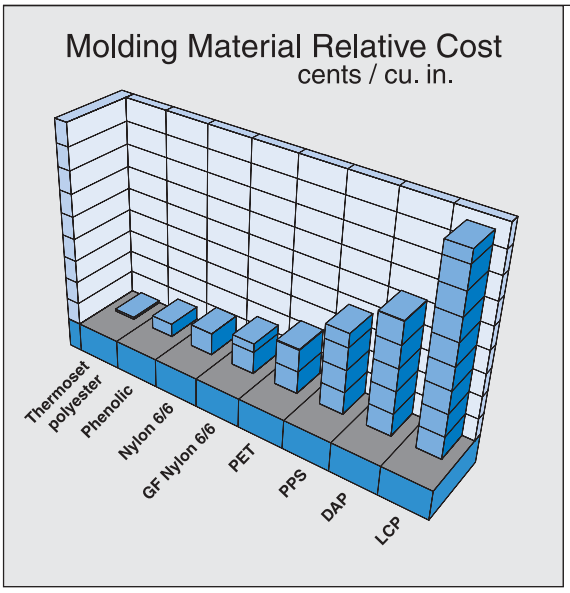
Material Cost

The material cost should be rather low in the list of priorities. Specifically, material cost must be considered per cubic inch because of the wide variety of specific gravities involved. Also, most bobbins, by the very nature of their configuration, have a rather low material content per unit. Often, the improved properties of higher cost materials yield overall cost savings that outweigh the increased cost of the material itself.

Molding Method Cost

The selection of a specific molding material can influence the molding cost by requiring a molding method that may be higher in cost. Some materials are compatible only with more expensive tooling.

Thermoset materials, because of the need to transfer heat from the mold to the material, require a longer mold residence time than thermoplastic materials. In addition, the need for manual introduction of the molding material into the mold in compression and transfer molding further slows the cycle. The end result is that the molding cost per unit of thermosetting materials is typically higher than for thermoplastic materials. It is possible, in some cases, to trade a higher material cost for a lower molding cost with roughly the same properties by switching to one of the new sophisticated thermoplastic materials.



Mold wear, the second source of variation in molding method cost, is typically caused either by chemical corrosion or physical abrasion. Normally, unfilled materials have very little effect on the mold because their abrasion level is very low. Also, very few materials are chemically active enough to cause corrosion. For those few materials that do cause corrosion to the mold surfaces, corrosion resistant steel or a corrosion resistant coating can be used.

The addition of glass to the resin to increase the heat distortion point and flexural modulus increases the abrasiveness of the melt. This tends to wear the mold after a period of time. The main antidote for this problem is the use of high hardness steels in the manufacture of the molds. Also, the alloying of 5% chrome into these steels provides corrosion resistance and increases the wear resistance of the cavity. The air hardening method of heat treating that is employed with these steels reduces the amount of distortion that can be caused by the heat treating process. This reduced distortion enables the construction of more accurate molds.

When using thermosetting materials, the wear rate is significantly higher due to the high abrasiveness of the material and the higher corrosiveness of the gases given off during the chemical reaction that takes place in the mold. Fully chrome plated molds are necessary and their maintenance costs are higher.

Finish Requirements

Winding coils is a very delicate process, especially when using some of the very fine wires that are required. When thermoplastic bobbins are removed from the molding machine, they are usually considered to be a finished part and do not require any further processing to assure smooth bobbins. However, when using ultra fine wires, the finish may not be adequate. In these cases the bobbins can be roto-tumbled using an abrasive media that will hone the surface of the bobbins to a smoother finish, eliminating any possibilities of points of drag that can cause wire snagging and stop the coil winding operation.

The World Marketplace

Will the product be used in the world marketplace? Will it meet foreign regulatory requirements such as VDE Approval? VDE is the German counterpart to Underwriters Labs. VDE stands for the Verband Deutscher Elektrotechniker. In Europe, VDE has such stringent requirements that generally, if parts meet VDE requirements for temperature classification, flammability, insulation approval and safety requirements, it is reasonably assured that they will meet the most stringent world requirements.

The reason for the higher level of requirements of VDE is the fact that typical European household voltage is 240 volts versus the U.S. standard of 120 volts.

TERMINATION MATERIALS

The previous section covered the plastic materials used in bobbins. However, unless connections to the coil will be made with self leads, a metal termination of some sort is also required. These terminations use a variety of materials, of which three are in most common use:

- brass,
- phosphor bronze
- oxygen-free copper

Brass

Brass is essentially 70% copper, 30% zinc. This material is primarily used where flat, stamped terminals are required. It has good conductivity, is readily available and is comparatively inexpensive. A coating is applied to it to make it more solderable. To eliminate the migration of the zinc from the base metal into the solder coating, thereby contaminating it and reducing its solderability, a copper coating is electroplated over the brass to act as a barrier.

Phosphor Bronze

Phosphor bronze is the preferred material for square wire terminals. Since there is no zinc in the phosphor bronze, copper plating is not required; the normal solder coating is all that is needed. This material displays good fatigue resistance, allowing the terminal to be re-bent several times.

Oxygen-Free Copper

Oxygen-free copper is typically specified where a higher electrical conductivity is required. It is less expensive than using silver plated terminals.

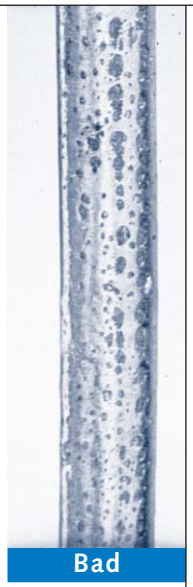
Solderability

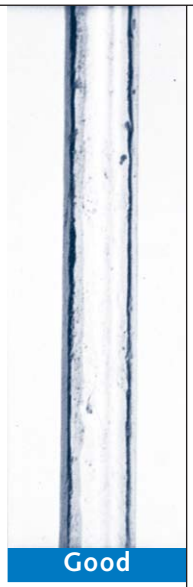
Solder coating is available in the following tin / lead compositions: 90% tin / 10% lead; 95% / 5% and 60% / 40%. The current environmental trend is to use as low a lead content as possible. The higher tin content usually requires slightly higher soldering temperatures. In the electronics industry, soldering is usually done using non-active or non-acid fluxes. If something needs to be soldered to one end of a terminal (such as a reed relay tube) and the other end of the terminal must subsequently be soldered to a PC board, a higher temperature solder (such as 100% tin) can be used for the first soldering operation. In the case of the reed relay, it would be soldered using the 100% tin solder that melts at a higher temperature. The terminal is then soldered to the board using standard solder at a lower temperature, preserving the integrity of the first joint. However, care must be taken when making the first solder joint to prevent too much heat from being transferred to the bobbin, weakening the attachment of the terminal to the bobbin.

Shelf Life

As soon as the solder coating is applied to the terminal material, the coating starts to deteriorate. The shelf life of these coated terminals becomes an important consideration. In order to extend shelf life, care should be taken to ensure that the surface coating of the solder is not contaminated by anything in the atmosphere or anything with which the terminals come in contact. If the parts are to be stored more than 60-90 days without being finish soldered, they should be stored in polyethylene bags to protect them from atmospheric contamination and the sulfur which is usually present in corrugated containers.

There is a test that can be performed to determine the current solderability of a specimen. This test involves the immersion of a sample under specified conditions in a rosin flux for a specified time. After drying, the specimen is immersed in a solder bath also for a specified time. The resulting solder coat is examined under magnification for pits, flaws and voids. Using limiting criteria, the sample then either passes or fails. The use of this test eliminates subsequent rejection of assemblies for bad solder joints.





This design section explains many of the principles of bobbin design that will help a design engineer specify requirements without overdesigning and unnecessarily raising costs.

Difficulties arise when a bobbin is thought of only as a means of insulating a coil of wire from its surroundings. It should be considered as a labor-saving part through which your manufacturing process can be automated.

Proper design can incorporate and combine separate parts into the coil bobbin. Bobbin designs include more than just winding and termination features. They also include bobbin mounting features and component mounting features. Utilizing labor-saving termination and soldering techniques can reduce the cost of the finished product and increase its reliability. These features and other part designs can minimize the number of parts required, along with the time required for component assembly. Coil bobbins should be considered in the total design and assembly of the manufactured product.

This design section explains many of the principles of bobbin design that will help a design engineer specify requirements without overdesigning and unnecessarily raising costs. There are several considerations that must be taken into account, including: the environment in which the finished coil will be required to perform; the physical stress which will be applied during both the manufacturing process and subsequent use; and most importantly, the economic framework within which the product must be produced.

These considerations can be accommodated by proper material selection, bobbin part design, and the bobbin's environment design. The selection of a standard material that will meet or exceed most of the requirements will reduce cost and minimize delays required for special set-ups. Intelligent bobbin designs can incorporate molded features to minimize assembly steps or to increase the speed of assembly. We start by discussing the way the typical mold works, followed by a discussion of various bobbin designs.

MOLD THEORY

Cosmo uses a unique system of molding whereby tools are constructed on a unit mold principle. This consists of building sub-tooling that fits into a master mold. Individual unit cavities are made for each different part. The outside envelope of each unit of tooling is identical so that it will fit in any mold position and can run independently of any other part.

The unit mold has many advantages:

- The cost of a single unit of tooling is much lower than a full mold.
- A single unit can be made for prototype samples.
- The same tool can be used for full production after the design is finalized.
- Increased production requirements can be handled by additional units as required.
- Unit tools can be put into production individually; full molds require all cavities to be completed before production can begin.
- If a tool requires repair, that unit can be removed, replaced with another and production can continue while repairs are made.
- A single die is required to meet most production requirements. Therefore, there are fewer problems with matching multiple cavities after repairs or revision changes.

MOLD OPERATION

Bobbin tooling consists of four basic parts: Cover (A), Slides (B), Core (C), and Stripper (D). (See figure 3).

Cover (A) - This forms the front vertical shutoff parting line (A1). It also contains the runner system that provides the pathway for the plastic molding material. Any projections, tubes or ribs on one flange face are formed into the cover with only slight draft required. The cover remains stationary during the molding operation.

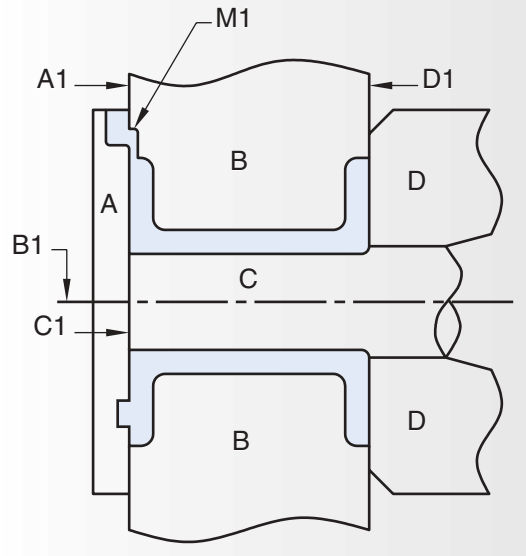


Figure 3

Slides (B) - These are made in two halves, upper and lower, where the flanges and the winding tube are usually formed. In addition, lead slots and terminal pockets and rails must be formed in the direction of the horizontal shutoff parting line (B1). The slides will open up and down respectively at the B1 parting line. The B1 parting line extends from the inner faces of both flanges and along the winding tube. Flash must be held to an absolute minimum on this plane to prevent damage to wire insulation or breakage of fine gauge magnet wire. Later figures in this design section will refer to this B1 parting line.

Core (C) - The core forms the inside of the bobbin and usually shuts off against the flat cover plane (C1) to keep the tube opening flash free. The core usually does not require taper until it reaches 5 or 6 inches, which is not the case in dedicated molds with ejector pins. Taper on the inside of the bobbin can require special winding mandrels and orientation of simple bobbins before winding. This can slow down production of the coil and add non-value cost to the completed parts.

Stripper (D) - This forms the rear vertical parting line (D1) and upon ejection frees the part from the stationary core. This is done by stripping or ejecting against the tube wall of the core. This minimizes the stress on the molded part as compared to a few small ejector pins. Detail in this surface of the mold requires taper to aid the release of the part after it has been stripped from the core.

The action of these four components is as follows: With the mold closed, the plastic material is injected through the runner system to the gate and into the cavity. (M1) After the part has been allowed to setup, the mold opens at the front cover parting line. (A1) This movement will remove any projections that are formed in the cover. The flanges in the slide hold the part in the slides as the detail is pulled out of the cover. After approximately 1/8" horizontal movement, the two slide halves open vertically at the horizontal parting line (B1) until they clear the outside edges of the flange. At this point, the mold is open for the ejection stroke of the mold. The stripper then pushes the bobbin from the core. (D1)

PARTING LINES

Parting lines are the planes that are formed by the faces of the mold components when the mold is closed. In the simplest cases these planes form surfaces on the resulting molded part.

The first step toward a good design is to establish vertical parting lines. The vertical parting lines (A1) and (D1) should form the outside faces of the flanges. This permits radii (R1) on the inside edges and prevents damage to the wire insulation. (See figure 4).

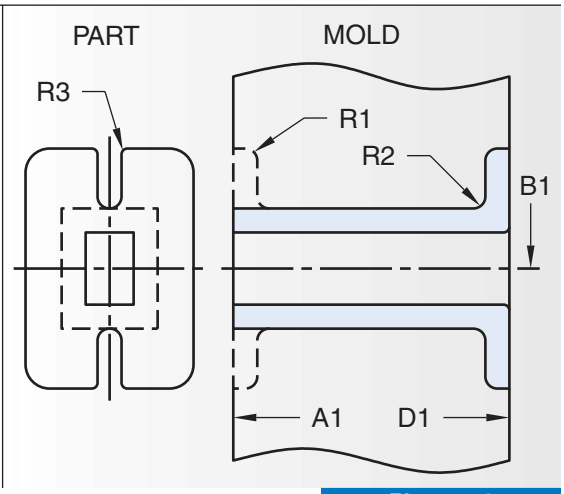


Figure 4

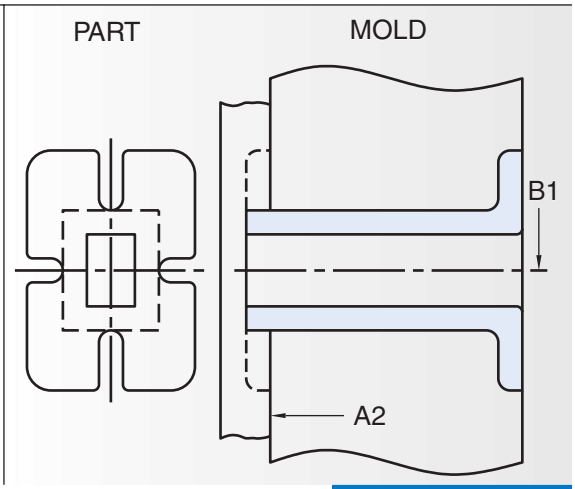


Figure 5

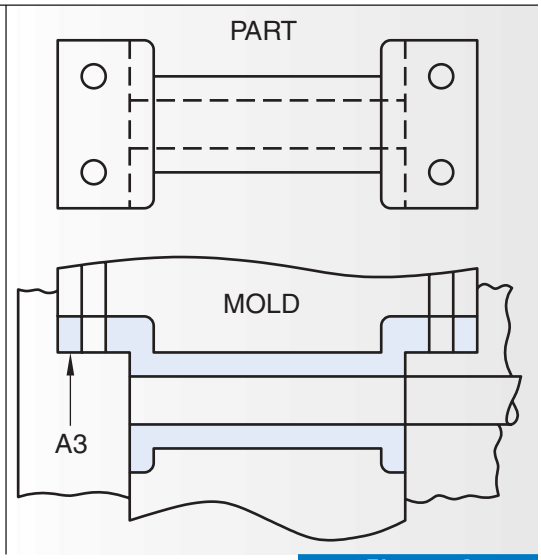


Figure 6

Inasmuch as the entire flange is formed in the slides, all types of slots should be parallel with the direction of slide movement (vertical). The addition of radii (R3) is recommended whenever possible to minimize snag points for the winding operation. To ensure strength and good material flow, radii (R2) should be added where the flanges join the tube. This is especially true for glass filled materials.

If non-parallel or radial slots are required, the flange must be in the cover and/or stripper to permit the slides to open in the mold. The parting line is then located at A2. (See figure 5). In this case the inner edge is sharp, and as a result, extra care is required during the winding operation to prevent damage to the insulation on the magnet wire. This design should be avoided if the coil is intended for use with very fine wire.

When platforms are needed in more complex bobbin designs, vertical parting line steps occur. The slides shutoff on ledges on the cover and stripper (A3) to form projections attached to the flanges. (See figure 6). This allows holes to be molded into the platforms for use in the final assembly or to add terminals if required.

There are many other ideas that relate to the parting line and the mismatch of the parting line that will be discussed in other sections of this design guide. Other specialized shut-offs, parting lines and interlocking mold components, for alignment purposes, can be helpful for demanding designs. These designs must be discussed to ensure compatibility with unit die tooling. It should be noted that these designs will add significantly to the cost of the tooling.

GATES

The gate is the specific location through which the molten plastic flows to fill the mold cavity. Gates are made large enough to fill the cavity but small enough to prevent any projection left in the degating operation from interfering with the winding operation or with mating parts.

The location of the gate or material inlet can be a significant consideration in the final assembly of the coil. The gate is usually located on an outer edge of the bobbin and placed where it will not interfere with the assembly, whenever possible. Any areas where the gate should not be located must be clearly marked on the part drawing. It should be noted that due to the interchangeable nature of the tooling, gateless or hot runner molds are not feasible.

If the gate is located on the flange outside diameter and that dimension is critical, a flat can be added to the diameter so that the gate vestige will not exceed the maximum O.D. The gate flat allows for a flat surface to aid in trimming the part from the runner. (See figure 7).

Another alternative to eliminate the gate protrusion would be to recess the gate below the outside diameter. (See figure 8).

When extremely fine wire is to be wound, an overlay gate can be used. This will allow the gate to be totally removed from the winding area. (See figure 9).

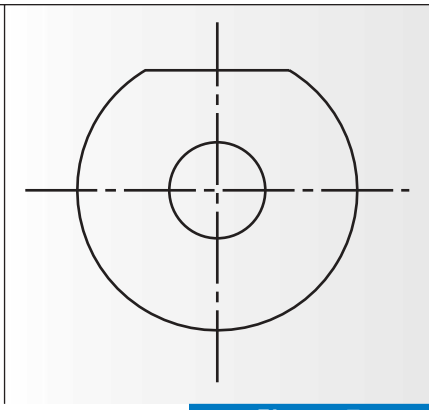


Figure 7

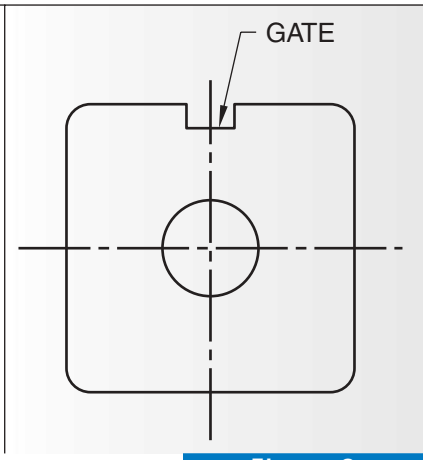


Figure 8

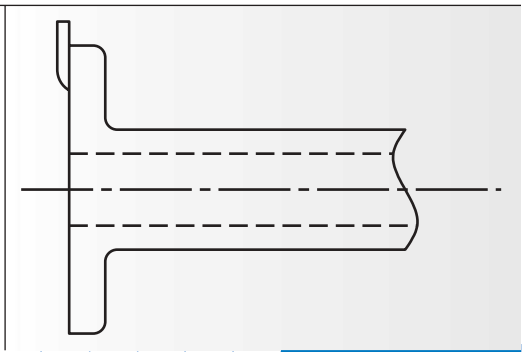


Figure 9

The gate location is first based on the functional design of the part, but it is also dependent upon the mold design and processing requirements for material flow. This sometimes necessitates a compromise in the gate location with regard to the functional design.

WALL THICKNESS

All wall thicknesses should be kept as uniform as possible to decrease potential warpage problems in production. Variations in wall thickness will tend to disrupt shrinkage patterns with the result that close tolerances may be hard to maintain. Varying wall sections of material from thick to thin and back to thick again will also cause mold filling problems and should be avoided.

If thick flanges are required, they may be cored out to reduce their effective thickness. (See figure 10).

When the wall thickness is too thin there will be a tendency for the flanges to flare out, and the tube wall to collapse, reducing the inside diameter during winding. The following chart shows the minimum wall thickness for various materials.

Material	Minimum Wall Thickness
Nylon	.025
Glass filled nylon	.025
Polyphenylene sulfide	.035
Polybutylene terephthalate	.030
Polyethylene terephthalate	.035
Liquid crystal polymer	.012

These thicknesses take into consideration the minimum requirements for molding. The wall thickness for all bobbins must be analyzed on a part by part basis, and is affected by many conditions including the ratio of flange size to core size. Also, as part size increases, the average wall thickness should increase. Trying to use reduced wall sections will generally add to molding problems like nonfilling and warpage. This is especially true in glass filled materials, though there are exceptions.

FLANGE PROJECTIONS

Flange projections or bosses should, if possible, be included only on one flange to reduce problems in the ejection portion of the mold cycle. In this case, they will be formed in the stationary cover. A minimum of draft is required inasmuch as the natural movement of the mold will pull the projection from the cover. This does not allow for undercuts of plastic that would need to be pulled out past undercut steel as the mold opens. (See figure 11).

If projections are required on both flanges, then the projections on the second flange must be formed in the stripper, complicating the ejection process. The stripper side of the mold may require more taper to help release these projections.

The use of ejector pins for the removal of bobbins from the mold is not recommended as they tend to distort surfaces, and are subject to flash as the pin edges break down. They also eliminate the flexibility of tool interchangeability.

TAPER

In most bobbin winding situations, the coil can be wound more efficiently if the flanges are not tapered. Taper on flanges or internal core areas is generally not needed for Cosmo designed tools, but is possible if required.

CORE DESIGN

Inasmuch as the core shuts off on the cover creating a sharp corner at the meeting of the tube and one flange, the standard design is to specify a minimum radius or chamfer at only one end of the inside diameter. (See figure12).

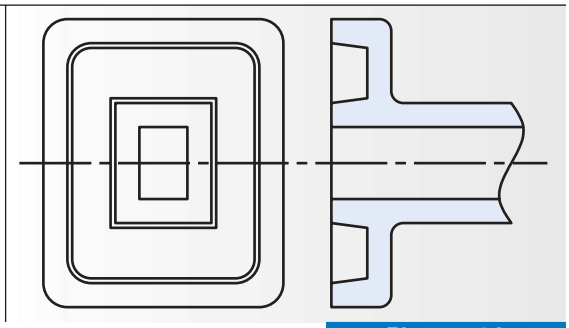


Figure 10

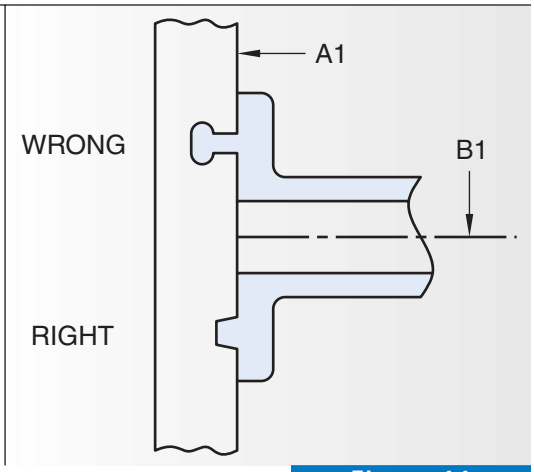


Figure 11

If the design of the bobbin demands radii at both ends of the I.D., a plug is put into the cover to allow the core to shut off within the tube length. This plug must have a diameter that is .005 inch larger than the tube I.D. to prevent I.D. crossflash and to allow for core shift in relation to the cover. (See figure13).

In solenoid applications, a stop can be provided at the end of the core, or at any point along the tube I.D. (See figure14).

Ribs of plastic can be used to make a stop and are preferred to stepping down the entire inside diameter. This will help maintain a consistent wall thickness. (See figure15).

When an extension of the bobbin tube beyond the flange is necessary, the concentricity tolerance must be specified. In addition, the wall thickness of the projection should not be reduced below that which is required to fill the part. (See figure16).

An interference fit on the core I.D. is often required when using mating tubes or mounting posts for relays. Three full length flats on round cores can be used to provide greater interference than an undersize hole which relies on an interference of the full circumference. Using flats, the mating part only contacts on the tangents of three chords. (See figure17).

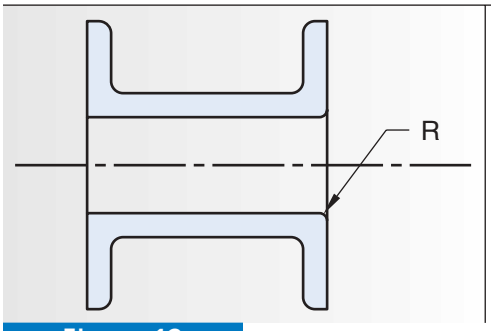


Figure 12

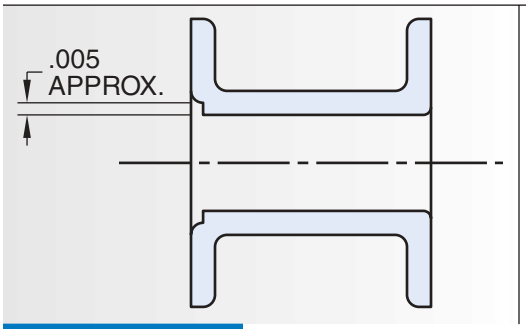


Figure 13

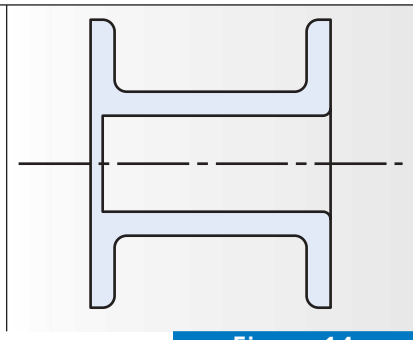


Figure 14

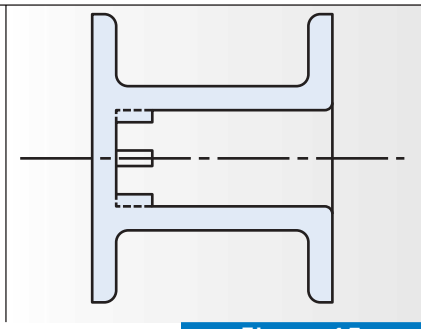


Figure 15

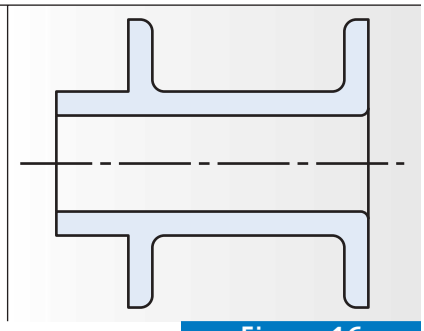


Figure 16

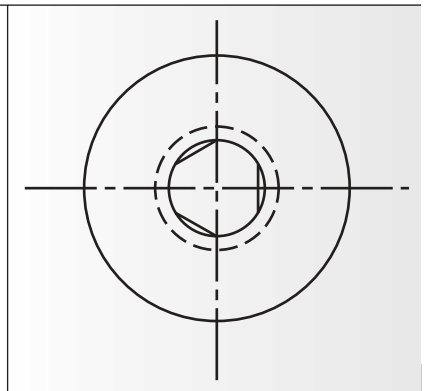


Figure 17

"V" ribs on the ID are used in situations where less force is required for holding, or where threaded cores are going to be used. The "V" rib (or crush rib) will displace the plastic easier than a flat. The thread will usually self tap in the plastic and reduces the cost of tooling compared to providing a threaded core. (See figure18).

When it is necessary to prevent vibration noise in applications such as shaded pole motors or transformers, an interference fit may be designed into a rectangular core through the use of molded ribs. Slight undercuts can be molded into the core if designed properly. Lead angles in the direction of pull are needed to prevent deformation of the undercut during ejection. This technique eliminates the requirement for manual wedging. This may also be used in place of gluing assemblies, or using other mechanical means of mounting the bobbins in place. (See figure19).

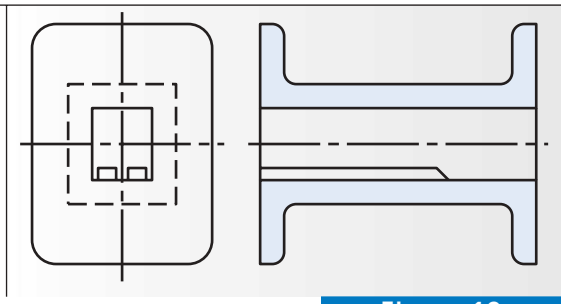


Figure 19

POTTING AND ENCAPSULATION

Flanges can be designed for overmolding of encapsulants. (See figure 20).

If the flanges are to be totally encapsulated, bosses can be added to the face of the flange to center the coil in the encapsulating mold. (See figure 21). If the coil is to be potted instead of encapsulated, matching cases can be designed.

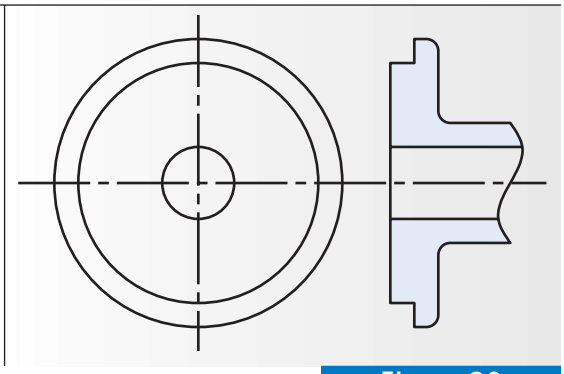


Figure 20

TIE OFFS

In order to prevent the magnet wire from unwinding from the wound coil during handling, tie off points can be added to temporarily hold the end of the wire until the proper connections can be made or secured in the final assembly stages of production. (See figure 22).

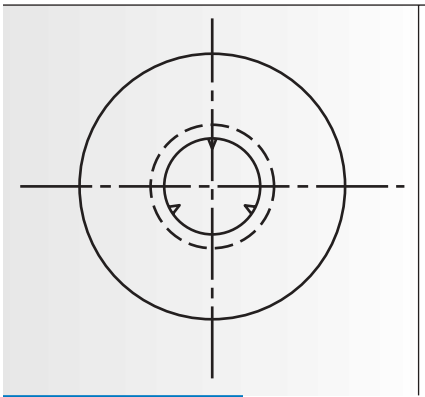


Figure 18

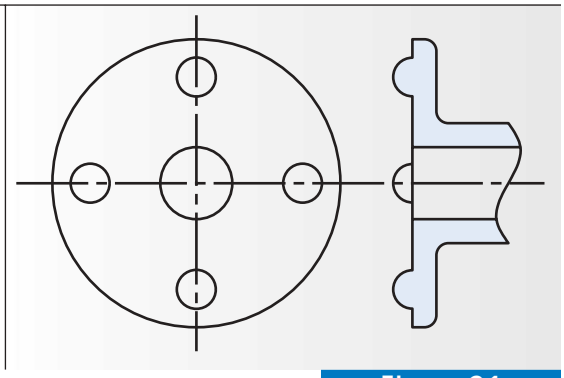


Figure 21

COIL ISOLATION

Bobbins can be designed to provide total coil isolation. In the case of a single coil, a cover can be designed to eliminate the need for taping.

In a transformer, the primary coil can be totally isolated from the secondary coil as well as from the lamination. This type of design, coupled with various styles of inserted terminals also isolated from the lamination, is a very cost effective method of transformer design. It will also satisfy VDE requirements.

Designing bobbins within the core of another bobbin is an isolation alternative to taping between builds. Two piece VDE bobbins can allow for prewound primary and secondary coils to be stocked unassembled, and then matched to provide desired outputs. The result is shorter lead times to customers.

LAYER WINDING

When winding perfect layer coils, each turn of the first layer of magnet wire must be guided into position. This is accomplished by providing grooves on the tube O.D. into which the first layer of wire will fit. Circular grooves are used on round cores and grooves at the corners are used only on rectangular cores. These grooves must be made with extreme accuracy to force the first turns of wire to form a perfect layer. Some winding machine manufacturers suggest a tapered ramp at the end of the first turn. It must be located properly in relation to the start slot. This is used to provide a more uniform build to maximize the available winding space of a coil.

INSULATED START SLOTS

Start lead slots should be tangent to the tube to provide maximum insulation for the first few turns of wire. The insulator flap should be of small area to prevent its distortion. (See figure 23).

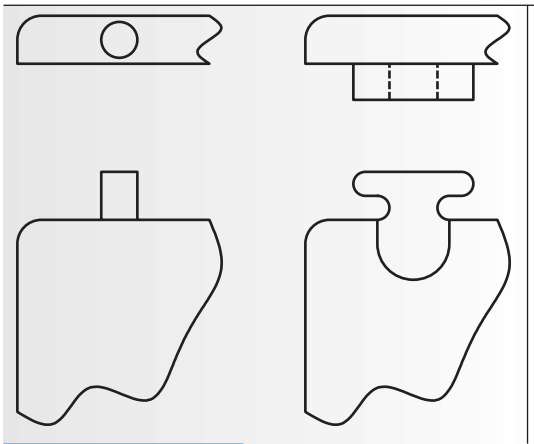


Figure 22

The design of the lead slot is most important when automatic winding equipment will be used in the manufacture of a coil. The top view of figure 24 illustrates the angle of slot opening. This angle aids in the proper alignment of the wire in the start slot groove. (See figure 24).

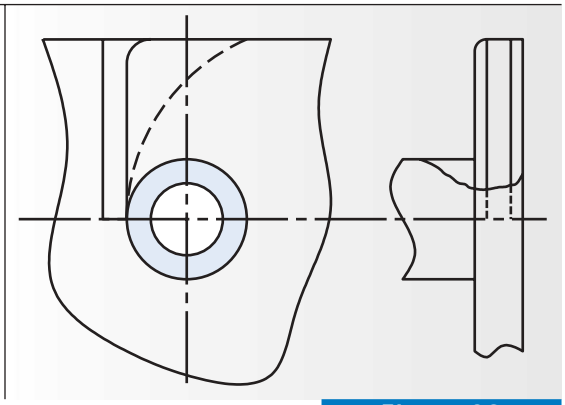


Figure 23

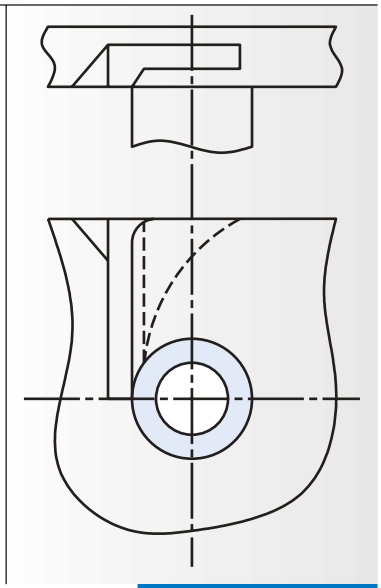


Figure 24

In addition the lead slots should be tangent to the core of the bobbin so that the lead-in wire is totally isolated. Figure 25 shows examples of various lead slot designs.

A hole in the flange can also be used as a means to get the start wire out of the way for winding. (See figure 26).

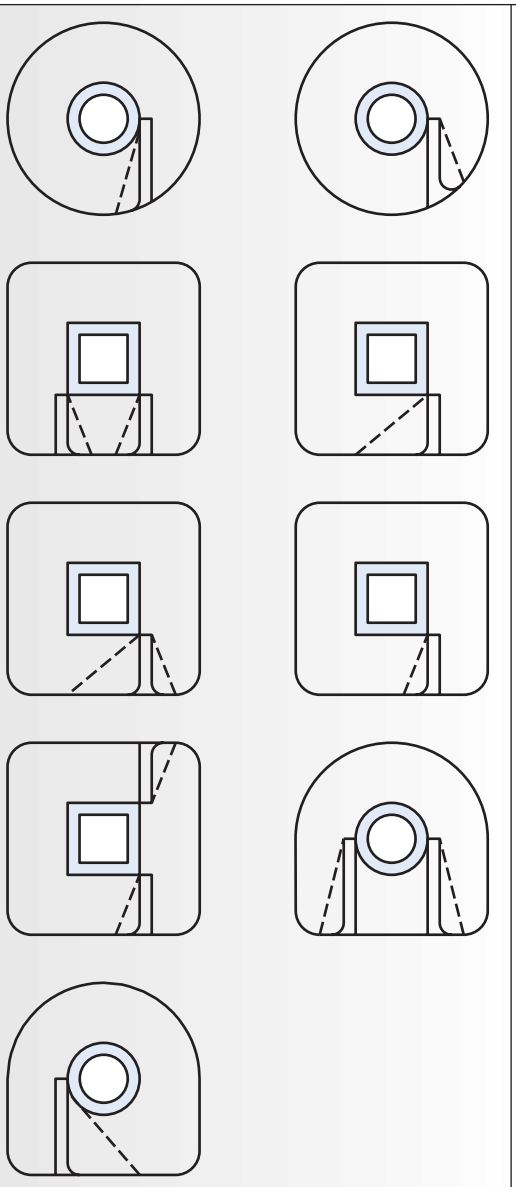


Figure 25

Additionally, a start groove can be used as a less costly tooling alternative to an insulated start slot, and is recommended for low volume applications. The groove allows the wire to be taped out of the way so that the magnet wire insulation is not worn away during the winding process. It also provides insulation or isolation if a ground source exists outside the flange of the coil. A radius on the corners and edges of the slots is important. (See figure 27).

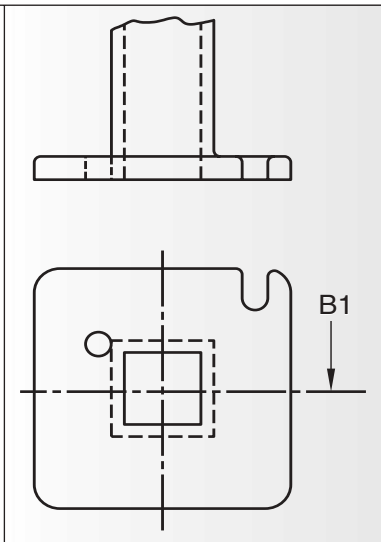


Figure 26

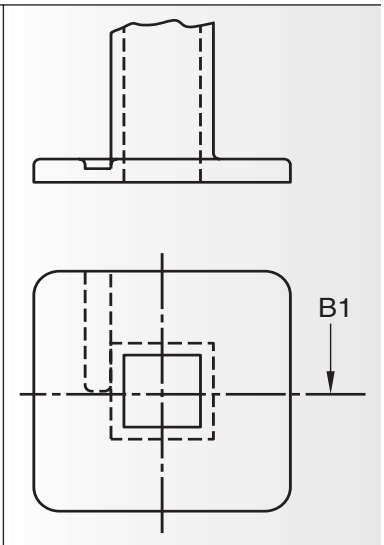


Figure 27

BOBBIN DESIGN ERRORS

The most common design errors are related to the use and location of radii. Radii are often specified on sharp corners created by parting lines. Once the parting lines are established, certain radii are impossible to provide, others may be impractical to provide, and still others would add nothing to the final application.

A full radius is often specified on the outer flange O.D. This could be made, but it would necessitate a split parting line with half of one flange in the cover, and half of the other flange in the stripper. This adds to the tooling cost and should be avoided unless it is necessary. (See figure 28).

The terminal pockets and lead slots should all be in the same plane and centered within the flange thickness. This allows for the proper material flow around the inserts, and minimizes thick and thin wall sections. (See figure 29).

Lead slot flaps should have as small an area as possible. This minimizes distortion and reduces blade breakage due to unbalanced material flow. In addition, the bottom of the slot should not extend below the center parting line of the slide. (See figure 30).

The I.D. radius should be no larger than the tube wall thickness. If the radius is larger, the end flange will be distorted during the ejection process because the ejection force will not be applied in line with the tube wall. (See figure 31).

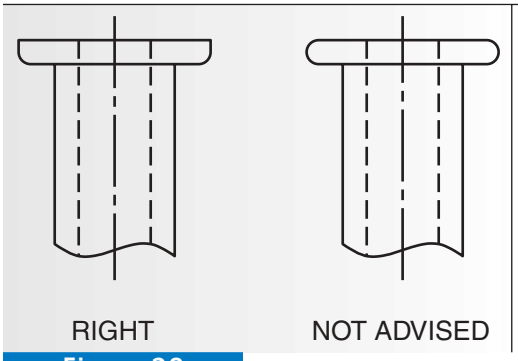


Figure 28

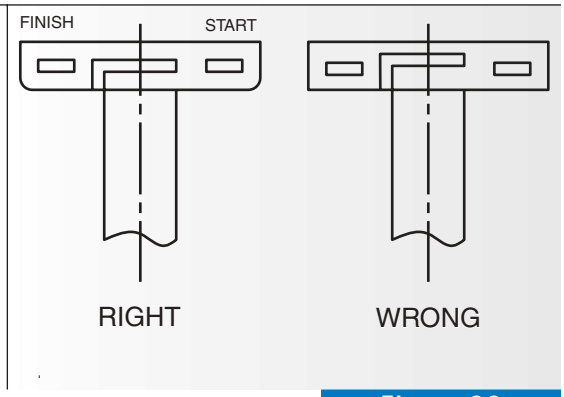


Figure 29

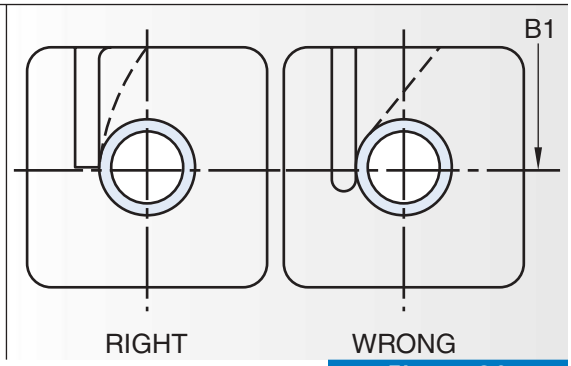


Figure 30

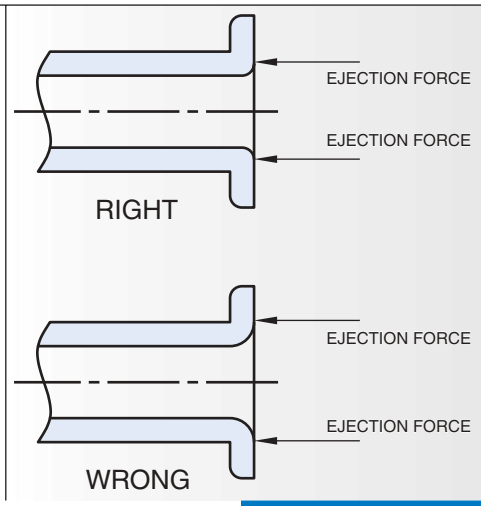


Figure 31

Outside corners of square or rectangular flanges should be made with radii. They eliminate a source of snagged magnet wire and also simplify the manufacture of the tooling. They also help minimize the warpage of the flanges. The farther the plastic travels in an unsupported flat thin section, the more likely it is to warp. The bobbin wire build will not form a sharp corner as the layers build up on the corners. (See figure 32).

Small grooves should be contained within the flange rather than within a projection. This eliminates the need for a stepped parting line and an additional shutoff line. (See figure 33).

Keyhole slots and cross angle slots should be formed as a projection on the flange. The flange can then be put into the slides and the keyhole in the cover. (See figure 34).

This is important in order to provide a radius on the inside of the flanges, and to prevent wire damage. This enables Cosmo to provide a parting line like A1 and not like A2. (Refer to the mold operation section for mold views and parting lines.)

Recessed areas in the flange around the core should be larger than the core I.D. This will allow for core shift in the mold in relation to the cover without blocking the tube I.D. The cross-section of material should not be restricted since this will cause material flow problems in the mold, as well as part strength problems. (See figure 35).

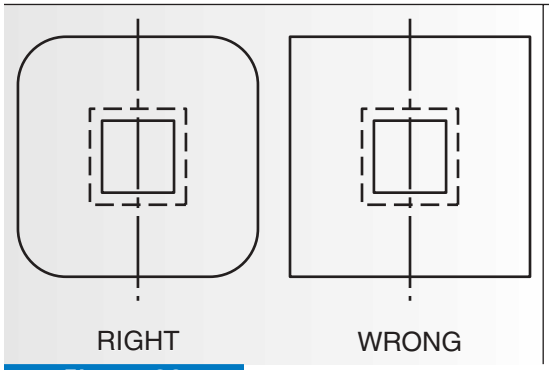


Figure 32

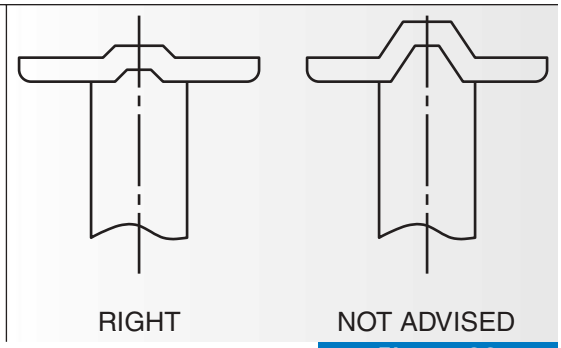


Figure 33

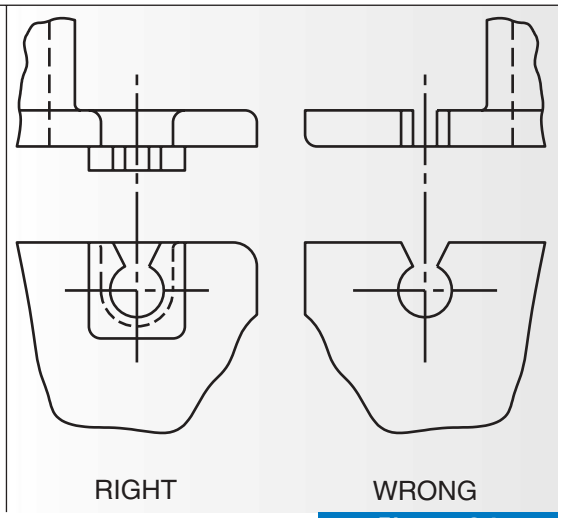


Figure 34

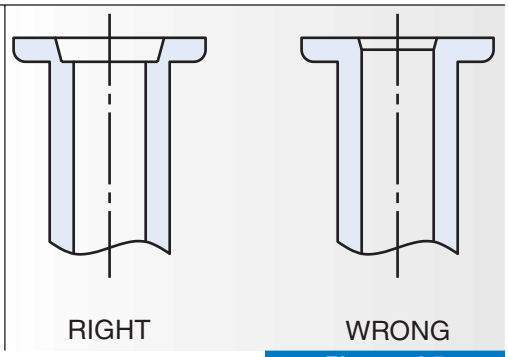


Figure 35

Slots rather than holes should be used on middle flanges, and should be parallel to the slide movement. Radii should be created on the side of the flange facing the smaller diameter wire. In addition, the depth of all slots from the flange O.D. to the tube O.D. should be kept at a minimum to minimize flange warpage. (See figure 36).

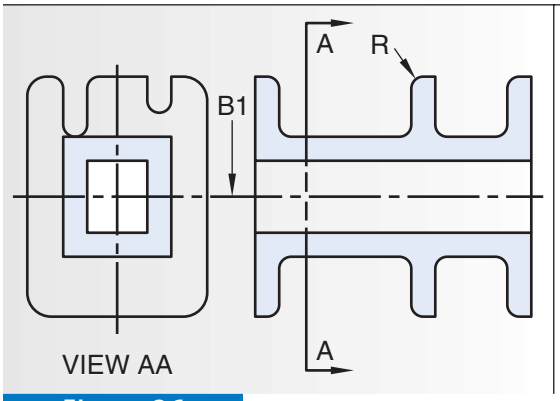


Figure 36

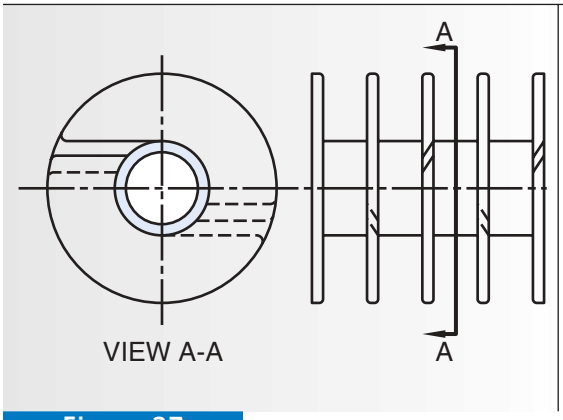


Figure 37

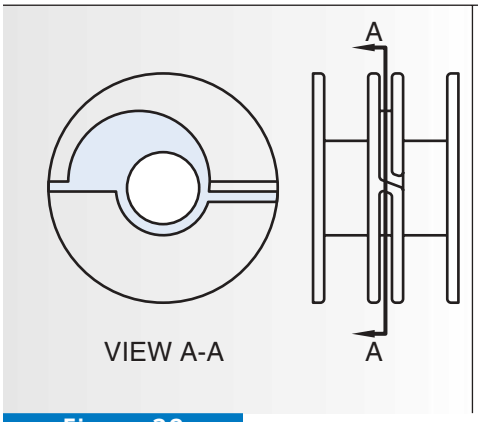


Figure 38

The number of flanges depends on the application. Two sections are used in standard transformers with just primary and secondary windings; multiple sections are used for high voltage type transformers. Some of the high voltage applications require special insulation. Some may need alternating wire slots to provide the proper insulation (see figure 37), or they may require intermediate flanges between windings for increased creepage paths. (See figure 38).

Where space permits, spacing pads on the inside face of the flanges should be provided to prevent the magnet wire from coming into contact with any sharp corners created by parting line shut offs on the flanges or terminal rails. This is especially true where the terminal rails or projections extend out beyond the width of the flange size. These thick sections required for terminals have a greater tendency to warp in toward the winding area. (See figure 39).

In order to provide for a smooth entry into the bobbin of rectangular laminations, flange stiffeners should not extend completely to the tube I.D. Clearance should be provided for mismatch of the cover and stripper. (See figure 40).

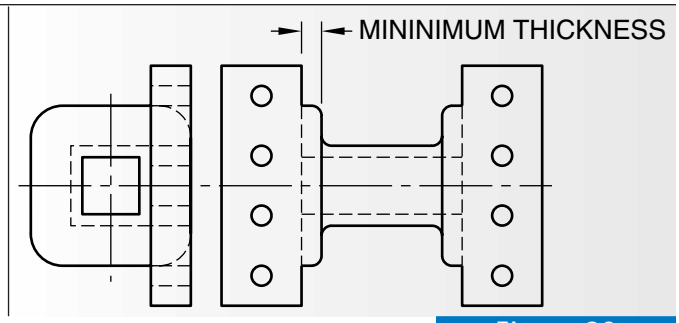


Figure 39

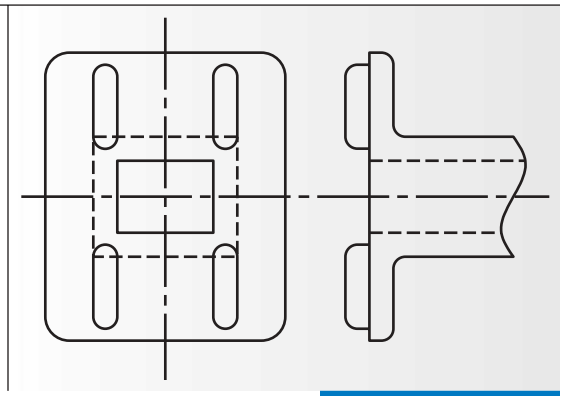


Figure 40

TERMINAL ASSEMBLY DESIGN

The incorporation of terminals into a bobbin design provides the key to good automated coil assembly. There are three methods of attaching terminals to bobbins:

- molded-in
- riveted
- press fit

Molded-in terminals require the insertion of the terminal into the mold during the bobbin molding process. This increases the cost due to the increased molding time required and the increased maintenance required due to insert molding. In addition, there is a tendency for plastic material to cover part of the terminal causing problems during the soldering process.

Riveted terminals require a hole in the bobbin flange through which the terminal is riveted to the flange. This reduces the winding area due to the possibility of some turns coming into contact with the rivet on the inside of the flange. Moreover, any metal case or support on the outside of the flange must be insulated from the terminal. These concerns effectively eliminate riveted terminals as a viable option.

Press fit terminals are inserted into pockets in the bobbin which are completely insulated from the winding area and the outside of the flange. The simplicity of this attachment method has reduced the complexity and cost of attaching terminals. In addition, it lends itself to high volume, low cost production on high speed assembly equipment.

The press fit pockets are sized appropriately to provide an interference fit with the barbed end of the terminals. For square wire, the interference is on the corners; for round wire, it is on the circumference. The round and square wires have additional means for pin retention when required. This interference generates the necessary pull force resistance.

The terminal pockets should be aligned perpendicularly to the vertical axis of the bobbin to allow for the action of the slides. The pockets should be located relative to the start slot such that wire can be automatically terminated through the start slot onto the terminal.

The following questions should be considered when reviewing the requirements for terminal insertion designs. What style of terminal is required for the coil application, and for the pull force that the terminal will experience? What type of plastic material will have the strength to hold the terminals and the ability to resist the heat applied to the terminals in the finishing process? Other areas of concern relate to the mechanical aspect of post insertion of the terminals such as: insertion apparatus clearance, terminal extension tolerances, terminal pocket guiding, and clearances or features required for bending terminals if required.

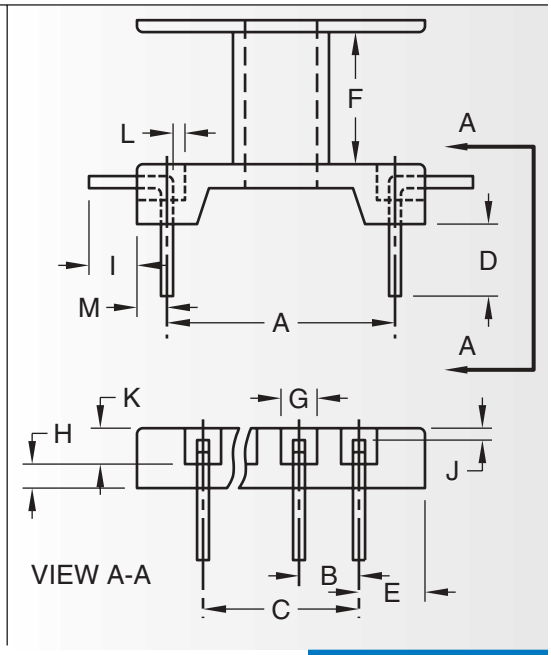


Figure 41

Dimension Limits on Wire-Terminated Assemblies

Dimension	Wire sizes .015 thru .025	Wire sizes .032 thru .051
A max.	4.000	4.000
B min.	.050	.075
C max	1.600	1.600
D max ±.015	1.500	1.500
E min	.060	.060
F min.	.375	.500
G min.	.030	.060
H min.	.120	.150
I max. ±.015	(F dim.) - .062	(F dim.) - .062
J min.	.010	.010
K min.	Wire size + .030	Wire size + .030
L min.	.050	.050
M min.	.050	.070

WIRE TERMINALS

Terminals made from round or square wire are the most economical terminals available today. They do not have to be preformed, but rather are cut and formed automatically at the time of assembly. Multiple terminals can be inserted simultaneously into the bobbin using high-speed equipment. A variety of terminals grouped by lengths can be made very easily at minimal cost. Wire terminals normally have a maximum of 3 lbs. retention.

Square wire terminals have an advantage over round in that after the winding is completed, the magnet wire can be parted automatically against the sharp edge of the terminal. The square wire will also minimize turning and twisting of the terminal in the pocket when stress and heat are applied during soldering.

The design possibilities using these terminals are very broad. Figure 41 illustrates the specifications common to most wire terminal assemblies. Several alternative methods of treating these terminals exist. The proper one to use will be dictated by the requirements of your application.

If there is a need to avoid physical interference with the winding area or the laminations, blind holes can be used to insert the terminals. Note: it is preferable that terminal pockets be open or through-hole. (See figure 42).

If greater pull force is required, the terminal can be staked in place. This provides the highest pull out force, and still offers isolation from the winding area. (See figure 43).

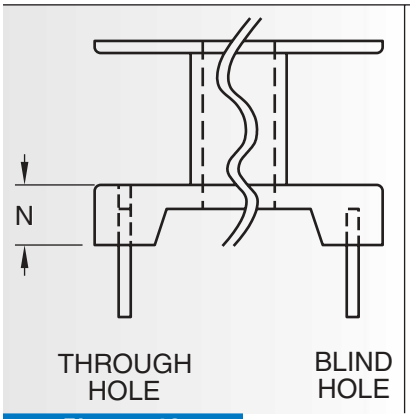


Figure 42

Another method of increasing pull out force is spading or upsetting the terminal. This technique upsets the terminal before being inserted into the pocket. The benefit of this is apparent after the soldering process. The plastic can reflow into the upset area after being heated by the soldering process to form a tighter fit. (See figure 44).

While terminals that are bent above the level of the plastic are possible, this will require special clearances around the terminal, and additional tooling charges. (See figure 45).

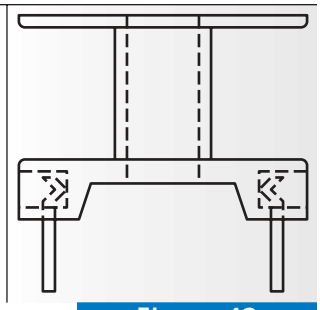


Figure 43

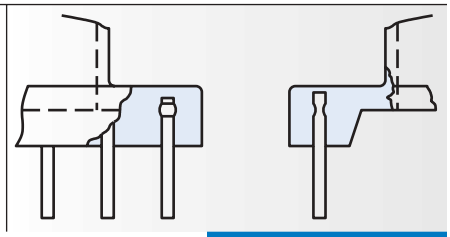


Figure 44

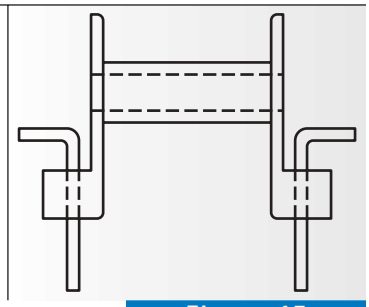


Figure 45

Serrations can be formed into the wire terminal to provide a means of preventing the magnet wire from slipping or moving when wrapped to the terminal. This is most useful if round wire terminals are being used. The serrations must be on the same end of the terminal that is being used to attach the magnet wire. (See figure 46).

It is also helpful to add standoffs to the terminal rail to provide a flat plane for resting on the printed circuit board. The standoffs provide a defined clearance area for finishing the leads. They also help prevent rocking or movement of the bobbin on the board due to uneven soldering or multiple sizes of wire. (See figure 47).

PREFORMED TERMINALS

Solder Tab Style

Solder tab terminals are used primarily when lead wire is soldered directly to the terminal. One end of the terminal is used for the lead wire connection. The middle of the terminal is usually necked down so that the magnet wire can be attached. The other end of the terminal is pressed into a blind pocket in the bobbin. The retention available on this style of terminal is up to 5 pounds. After the magnet wire and lead wires are soldered to the terminal, this pull resistance will usually increase since the heat of soldering remelts and flows the plastic into the terminal barbs within the terminal pocket. A variety of solder tab terminals are shown in this catalog.

Quick-Disconnect Style

Quick-disconnect style terminals have a disconnect end made to fit the standard .110, .187, .205 or .250 inch mating connector. This permits the use of wire harnesses on the final assembly to allow for quick installation of the coil or relay. In field applications, the terminal must be able to withstand repeated disconnections; therefore, higher pull resistance is needed. Pull specifications are usually 8 to 20 pounds depending on size. This is achieved by interference fit between the terminal barbs and the pockets. The bobbin material type will also have an effect on the pull force.

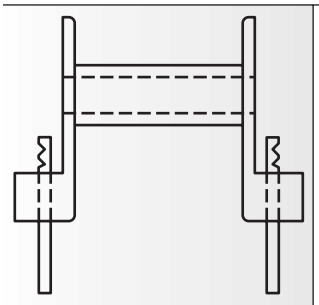


Figure 46

The magnet wire can be attached by hand soldering at the necked area or it can be dip soldered. Since there is a possible danger of excessive solder build-up, another approach wraps the wire around a weld tab included in the terminal and a welding operation makes the connection, thus eliminating the possibility of solder build-up that would hinder the final connection of the harness. This weld tab is available on certain terminal sizes.

When using this type of terminal, the width of the disconnect that will be attached to the terminal must be considered when specifying the inter-terminal spacing distance. Figure 48 illustrates the specifications for weld tab, solder tab, and quick-disconnect terminal blind pockets.

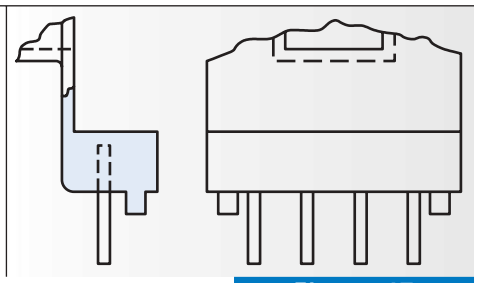


Figure 47

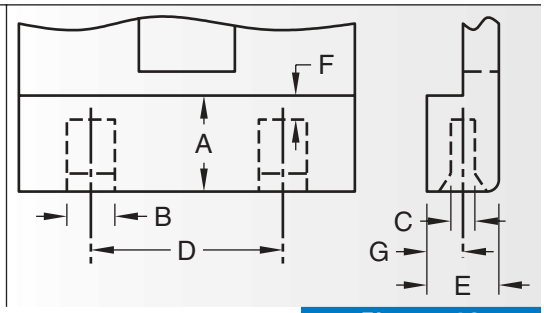


Figure 48

Blind Pocket Terminal Assembly Specifications

	Pocket Style			
Dimension	W	X	Y	Z
A	.290	.202	.345	.345
B	.131	.078	.256	.154
C	.031	.018	.046	.046
D min.	.312	.300	.437	.437
E min.	.090	.070	.150	.150
F min.	.025	.025	.030	.030
G	(1/2)E	(1/2)E	(1/2)E	(1/2)E

Preformed PC Non-Wire Style

Preformed printed circuit style terminals come in many varieties and provide a means of connecting the magnet wire to the printed circuit board. Preformed terminals, while more expensive than wire terminals, have a much higher pull resistance due to the staking system incorporated into their design. Both preformed and wire PC terminals when bent outboard of the wound coil provide a means of soldering a whole row in one soldering operation. However, the insertion fixtures for preformed PC terminals are at least twice as costly as those for wire PC terminals. The terminal rail design for preformed wire terminals is also different and requires additional room to do the special staking operation. New designs with this style of terminal should be discussed before starting.

INSULATION DISPLACEMENT TERMINALS

Although Cosmo does not offer the terminals for this style of connector, we do design and mold bobbins with pockets to accommodate this style of terminal. Insulation displacement style terminals are inserted into the bobbin after the coil is wound and ready for termination. The pockets are usually designed so that the winding equipment will pull the magnet wire up and through the pocket. The wire is held in the pocket by the top slot, which is fitted to the wire size. Multiple wire sizes are not easily accommodated. When the terminal is inserted, the magnet wire insulation is pierced making the electrical connection. The terminal does not require any soldering. Additional leads can also be inserted and connected without soldering. This type of terminal, while more expensive than most others, does save assembly labor. (See figure 49).

Sufficient wall thickness must surround the terminal to provide insulation and to give the necessary pull resistance. The edge of the pocket should have a chamfer to provide a lead angle to guide the terminal into the pocket. The lead slot should be tangent to the tube and should be beveled with the depth of flap held to a minimum. This design allows the wire to seek its way behind the flap and attach to the start terminal at the correct angle. A finish slot can be provided to guide the wire to the finish terminal. If center taps are required, extra terminals can be added with proper slots in the flange.

SURFACE MOUNT TERMINAL STYLES

Surface Mount terminal technology is used for mounting bobbins directly to the surface of the printed circuit (PC) board as implied. This termination style is often used instead of through-board styles for smaller bobbin applications. The terminals are configured such that they have a coplanar (flat) surface to sit on top of the circuit board. (See figure 50). This allows a robot to *pick and place* the bobbin and other components on the board by coordinates. The completed board is then placed in a device to reflow the board solder to make the connections. The material for these applications must be able to withstand the high temperatures required for reflow. Liquid Crystal Polymer (LCP) is the material of choice. The designs for these terminals are usually referred to as *gull wing*, *wrap around*, or *straight coplanar*, with *wrap around* style being favored. The *gull wing* style terminal is used when minimal space or height off the surface of the board is required. (See figure 51).

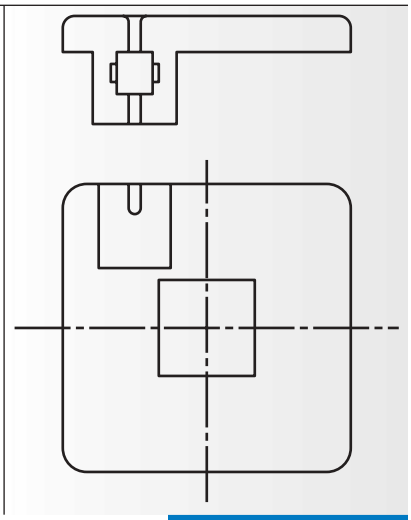


Figure 49

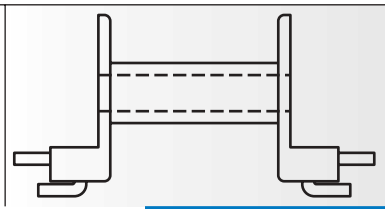


Figure 50

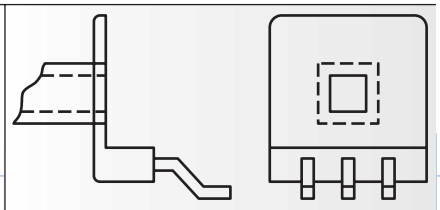


Figure 51

This style of terminal is also used with bobbins that are recessed into a hole in the board. (See figure 52).

Surface mount can also be accomplished with a straight style pin. (See figure 53). The magnet wire is attached to the flat area closest to the bobbin and the outer end is used to mount to the board. This style of terminal does have drawbacks. The most significant is the difficulty in maintaining its coplanarity for surface mounting. Some bending does take place during shipment of the bobbins, and this is compounded by the stress the magnet wire exerts on the pin. The wire pulls on the unsupported terminal during winding tie offs and can move the terminal out of cpolanarity. This becomes more obvious during the soldering of the magnet wire when high heats are used to burn off wire coatings and make the connections. The gull wing also allows the build up of solder, and this effects the coplanarity. These bobbins usually require a final adjustment to guarantee coplanarity after finishing processes are completed.

The *wrap around* terminal style is a better design for surface mount bobbins. (See figure 54). The longer terminal lead on top is used to attach the magnet wire. This allows the use of dip or wave type solder without any solder build up to the mounting side of the terminal. The mounting side of the terminal is supported by plastic and maintains coplanarity in shipping and handling. This reduces rejects, and eliminates the need to realign the terminals. This style of terminal does make visual verification of solder joints more difficult, due to the rail being positioned over the solder joint.

Another, less frequently used, style of surface mount bobbin is for vertical style bobbins. It uses the ends of the terminals to mount the bobbins. (See figure 55).

This does not give a large contact area on the board like the other styles, but it is a more stable pin design than the *gull wings* due to the short terminal length.

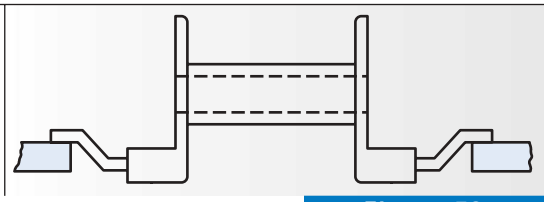


Figure 52

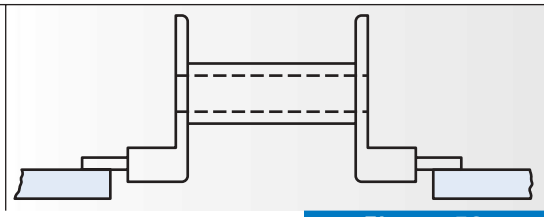


Figure 53

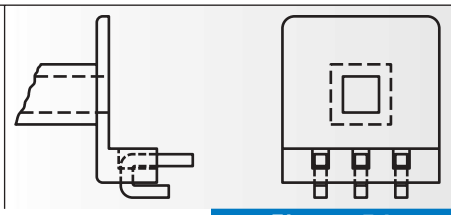


Figure 54

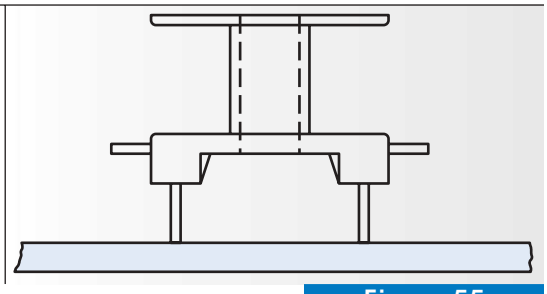


Figure 55

COSMO BOBBIN CATALOG INDEX

BOBBIN FLANGE STYLES

KEY TO PART NUMBERS

Cosmo Corporation's part numbers are descriptive. The following chart describes the part number breakdown.

Cosmo Bobbin Part Number Key AA - BBBBB - B - CCC - DD - E	
AA	Molding Material
BBBBB-B	Basic part number
CCC	Terminal style(s) used
DD	Number of terminals
E	Color or extra feature

Most parts in this catalog are only shown as a basic part number because they are available in a variety of materials and terminal configurations. Terminal style and terminal numbers are only shown when there is a limitation on terminal configurations.

MATERIAL AVAILABILITY

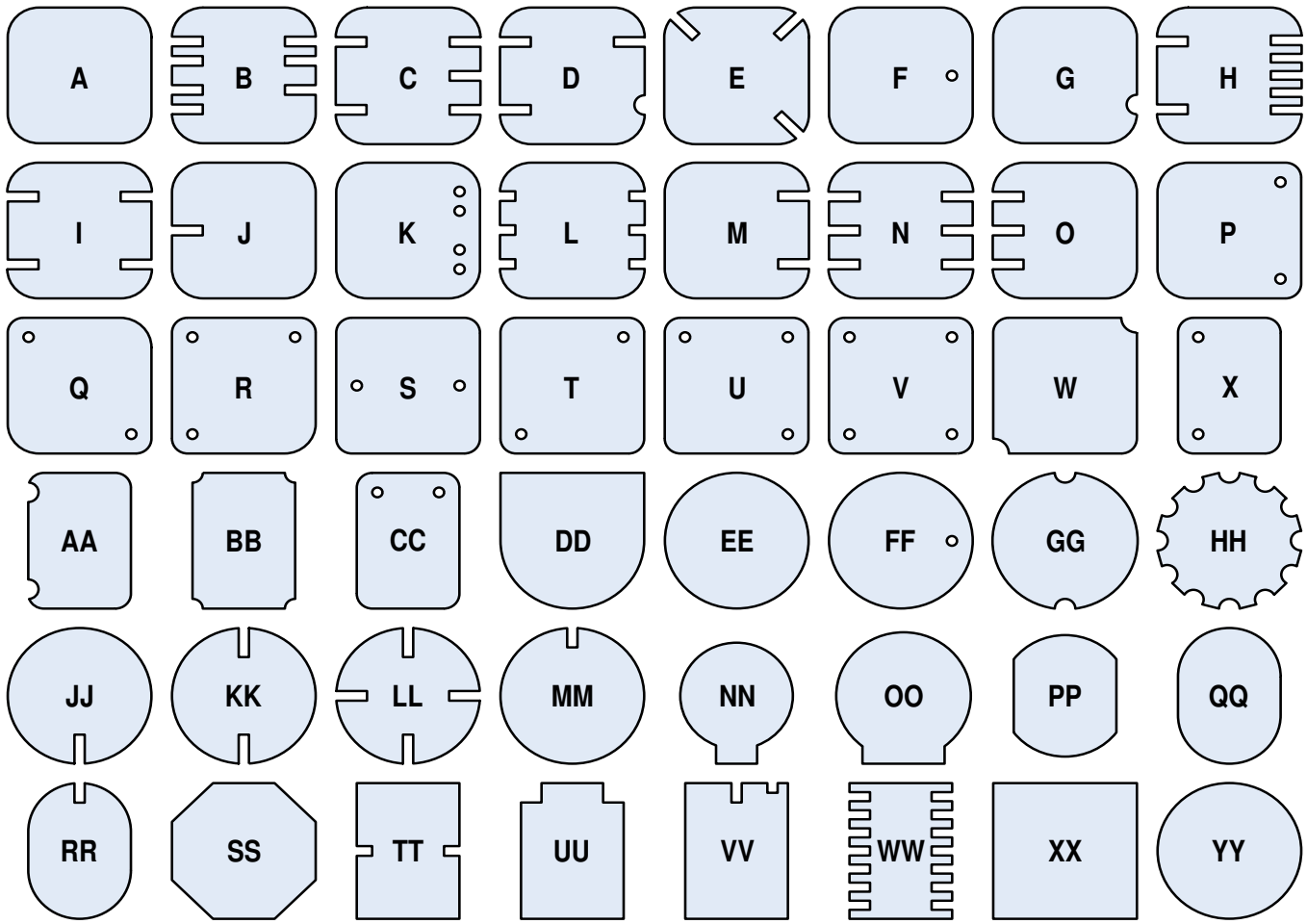
Parts are available in most of our standard materials as described in the Materials section of this catalog. However, dimensions will vary from those shown in the following pages if ordered in other than the material for which the tool was designed. Part numbers 83000 thru 89999 are only available in thermoset materials. All other parts are only available in thermoplastic materials.

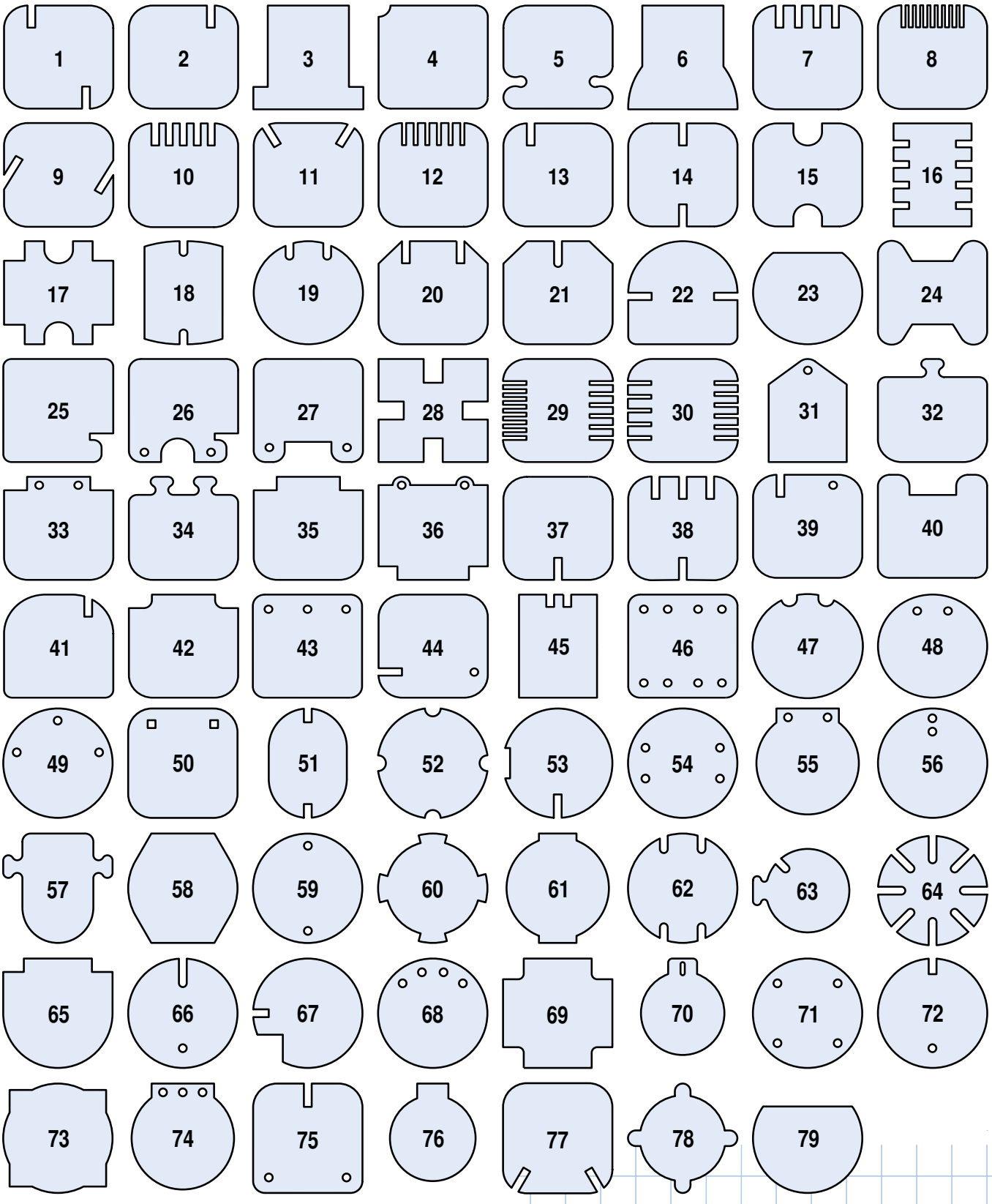
BOBBIN FLANGE STYLES

The Flange Style outlines shown on this and the next page represent the outline of the bobbin flange. The core hole has been omitted due to the fact that it may be round, square or rectangular. The Core Dimensions in the individual tables will indicate the shape and size of the core hole.

DIMENSIONS AND TOLERANCES

Dimensions and tolerances shown throughout this catalog are subject to change without notice. Cosmo encourages you to request samples to verify current dimensions. Cosmo will not be responsible for typographical errors.

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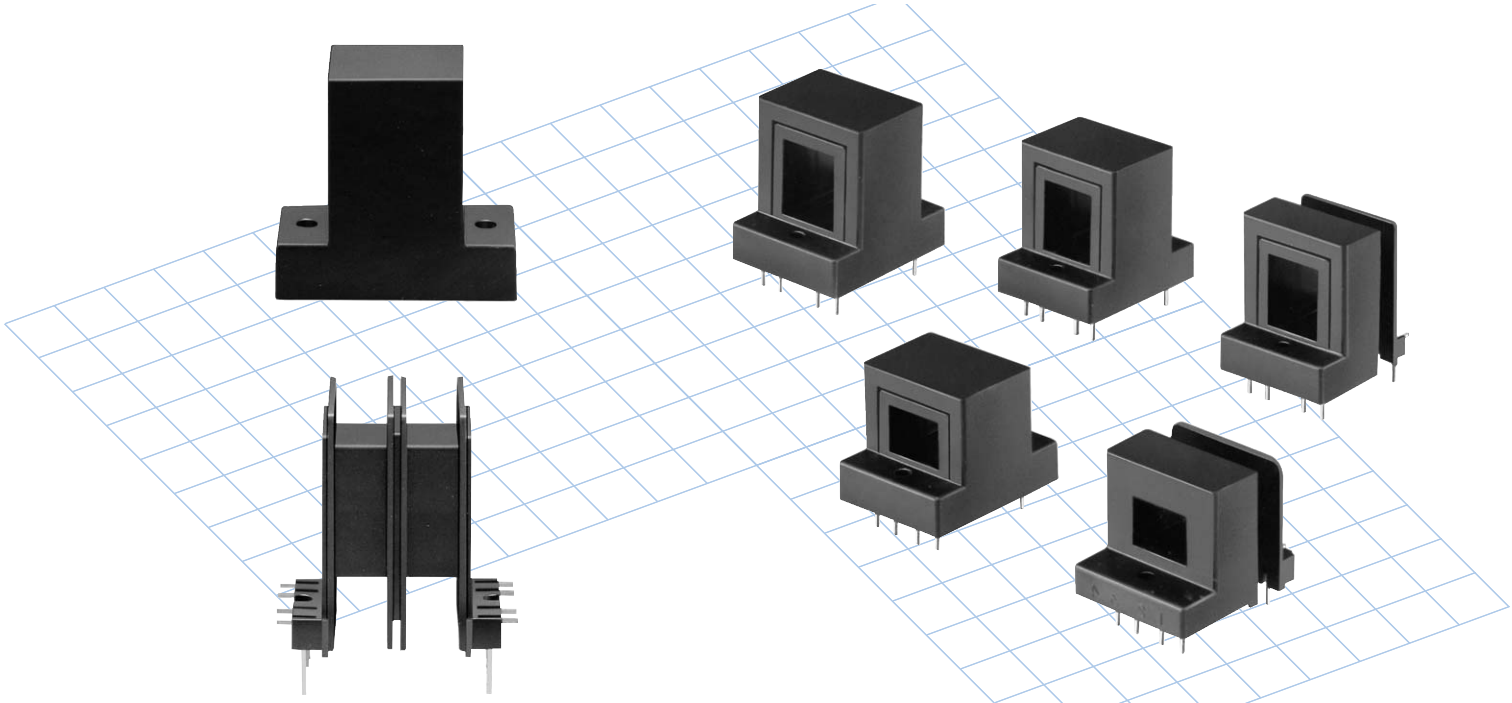
INTERNATIONAL DESIGN TRANSFORMER BOBBINS

- **PC board or chassis mounting**
- **One Piece Bobbin with Full or Half Shroud**
- **Two Piece Bobbin with Full Shroud**
- **High isolation (4000 volts RMS hi-pot)**
- **DuPont FR-530 Rynite® V0 Polyester**
- **Insulation systems approval available**
- **Immediate availability from stock**
- **Patented, U.S. Pat. No.'s 4,716,394 and 4,980,664**

Cosmo's International Design (VDE) Transformer Bobbins are designed to offer the coil winder a higher level of manufacturing efficiency and product reliability. All VDE bobbins are stocked as Quick-Ship items. These bobbins are furnished in DuPont FR-530 Rynite® PET polyester. This material is a stable, stiff, high temperature molding compound with an Underwriters Laboratories flammability rating of V0. Rynite® has been approved by U.L. in a number of different insulation systems for temperatures up to Class N, 200° C. Complete descriptions of these systems and authorizations to use them are available from DuPont.

One Piece Bobbin with Full or Half Shroud

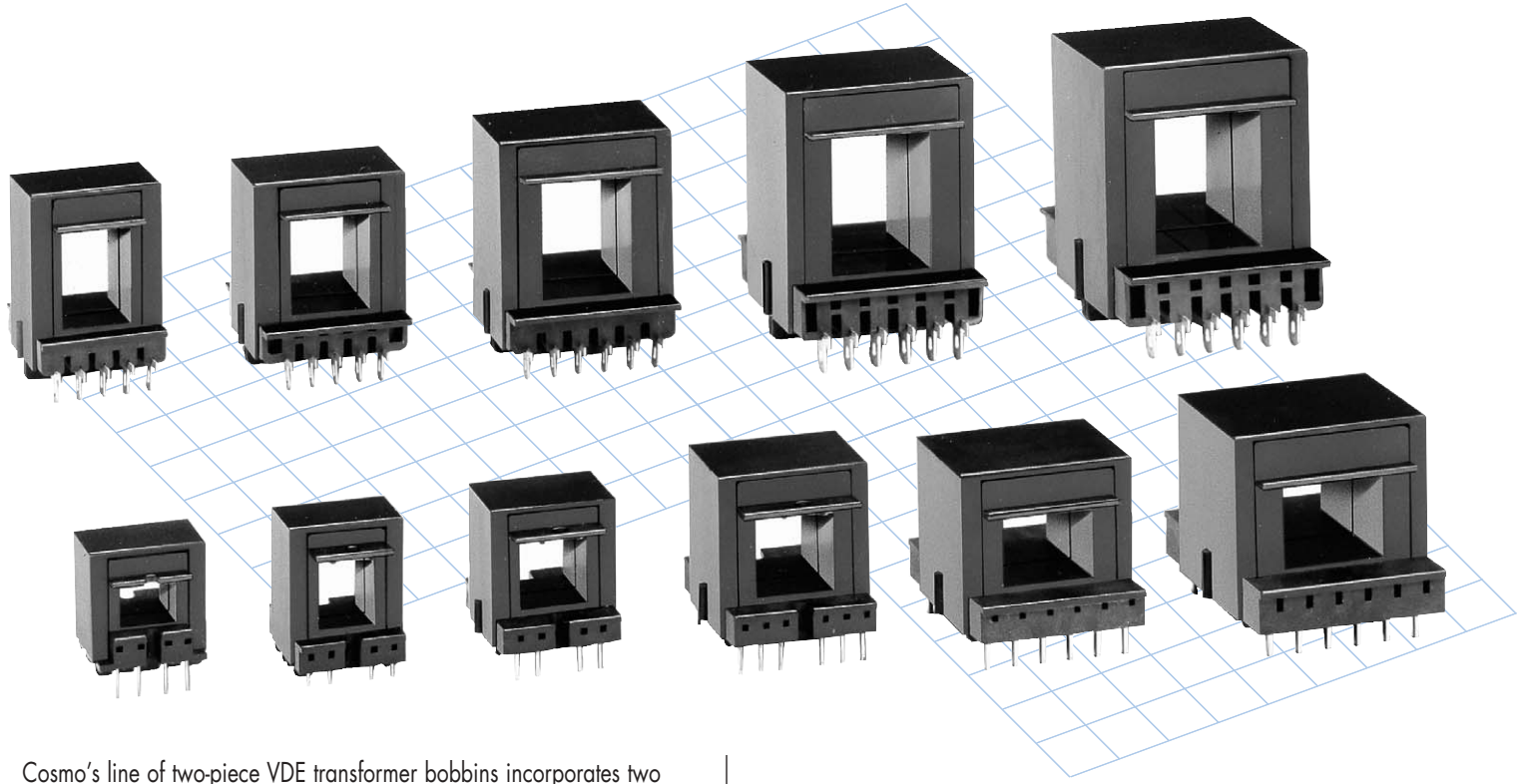


Cosmo's one piece bobbin with a full or half shroud design features a one piece bobbin with increased area in the winding cross sections. This translates into a cost savings by allowing the winder to utilize larger size wire, putting more copper into the winding area. With the increased amount of wire, the lamination grade or gauge becomes less critical. The larger sized wire increases the efficiency of the coil, which in turn reduces the heat generated, allowing the transformer to run cooler.

This bobbin configuration enhances the attachment of the magnet wire by supplying rigid "L" shaped terminals and wire lead-out slots. The terminals provide easy access for dip or automatic soldering of wire leads. Another advantage of the "L" terminal is that the wire is soldered to the protruding horizontal end of the terminal. This helps ensure easy insertion of the coil into the board since any excess solder will not alter the size of the vertical portion of the terminal. Recessed lead-out slots are provided to reduce wire breakage and to support the wire during termination.

Raised standoffs on the bobbin allow for clearance between the finished transformer and the circuit board. This style VDE bobbin is available with a full shroud or a half shroud for EI-21 x 3/8" and EI-21 x 5/8" lamination sizes. Full shrouded EI-625 and EI-100 x 3/4" bobbins are also available.

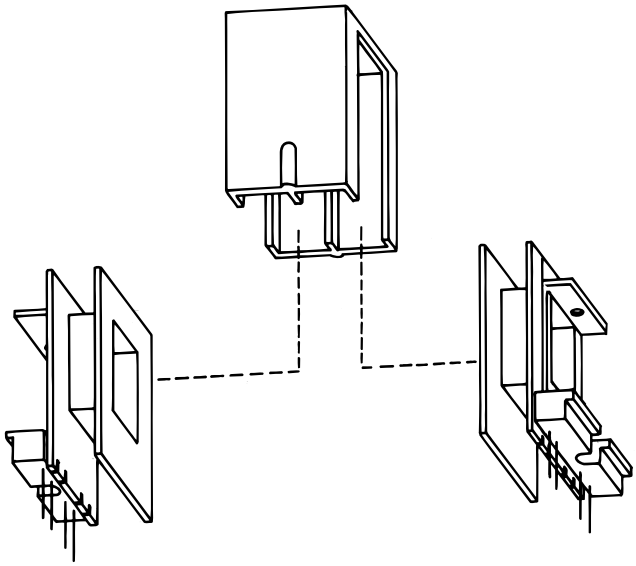
Two Piece Bobbin with Full Shroud



Cosmo's line of two-piece VDE transformer bobbins incorporates two separate bobbins and a matching shroud that provides overall insulation. The use of two separate bobbins for primary and secondary windings allows for the support of each coil as it is wound. Separate primary and secondary windings also allows for flexibility in the inventory of wound bobbin sub-assemblies.

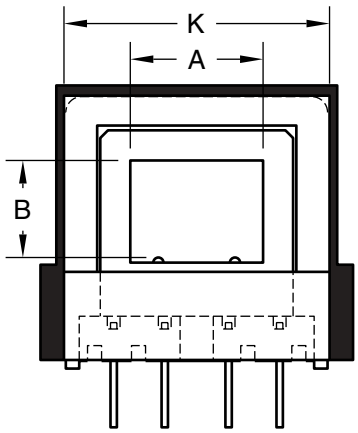
This construction provides very high isolation between primary and secondary windings, and from either winding to the core or ground. The resulting Hi-pot test is 4000 volts RMS. There are two available mounting styles depending on size: printed circuit board and chassis mount.

The bobbin wall incorporates slots which allow for all leads to be brought out of the winding area for termination. This eliminates the need for wire crossovers and insulating pads. The shroud also positions the primary and secondary wound bobbins for efficient magnetic coupling and easy core stacking. The end result is a transformer that can be manufactured at a lower cost.

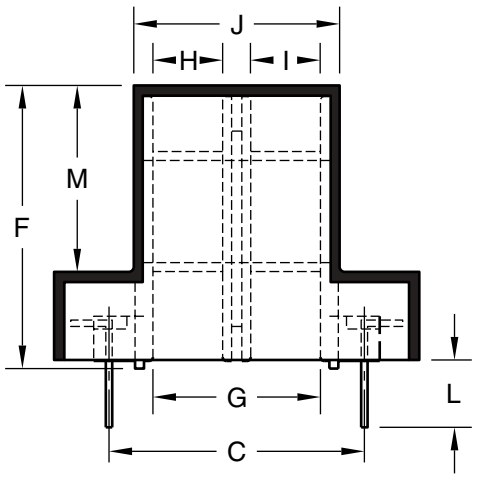


Two piece VDE bobbin with full shroud

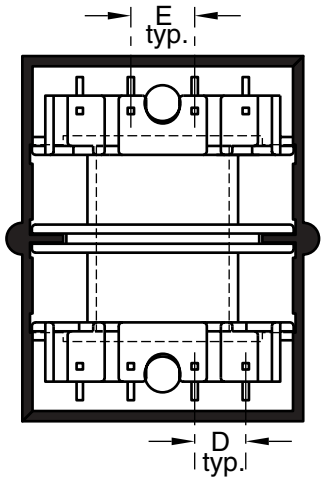
One Piece PC Mounting Bobbin with Full Shroud



Front View



Side View



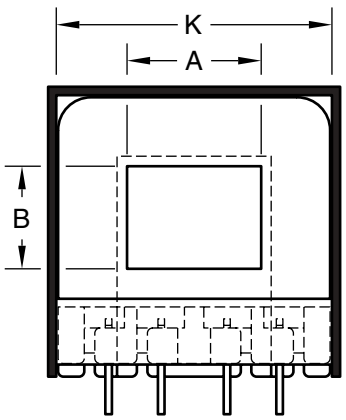
Bottom View

This table is sequenced by Lamination size and then Stack Height.

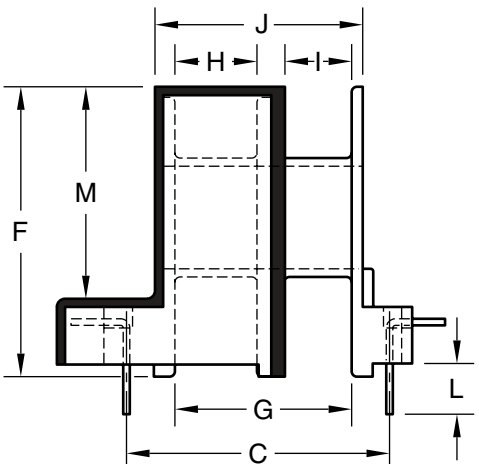
Bobbin p/n	Lamination	Shroud p/n	Terms (max)	A	B	C	D	E	F	G	H	I	J	K	±.015 L	M	Max wind depth	Wire size
6748-0-419	EI-21 x 3/8	6749-0	8	.520	.400	1.000	.200	.250	1.105	.656	.273	.273	.806	1.025	.260	.730	.215	.025sq.
6750-0-419	EI-21 x 5/8	6751-0	8	.520	.655	1.000	.200	.400	1.360	.656	.273	.273	.806	1.025	.260	.995	.215	.025sq.
6808-0-627	EI-625	6809-0	8	.640	.655	1.140	.200	.400	1.375	.770	.330	.330	.920	1.150	.260	.995	.220	.036sq.
7616-0-258	EI-100 x 3/4	7617-0	12	1.016	.782	1.900	.300	.300	1.815	1.330	.610	.610	1.480	1.908	.250	1.288	.400	.045sq.

A complete assembly consists of one bobbin and one shroud.

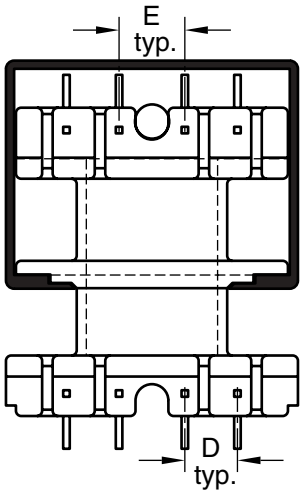
One Piece PC Mounting Bobbin with Half Shroud



Front View



Side View



Bottom View

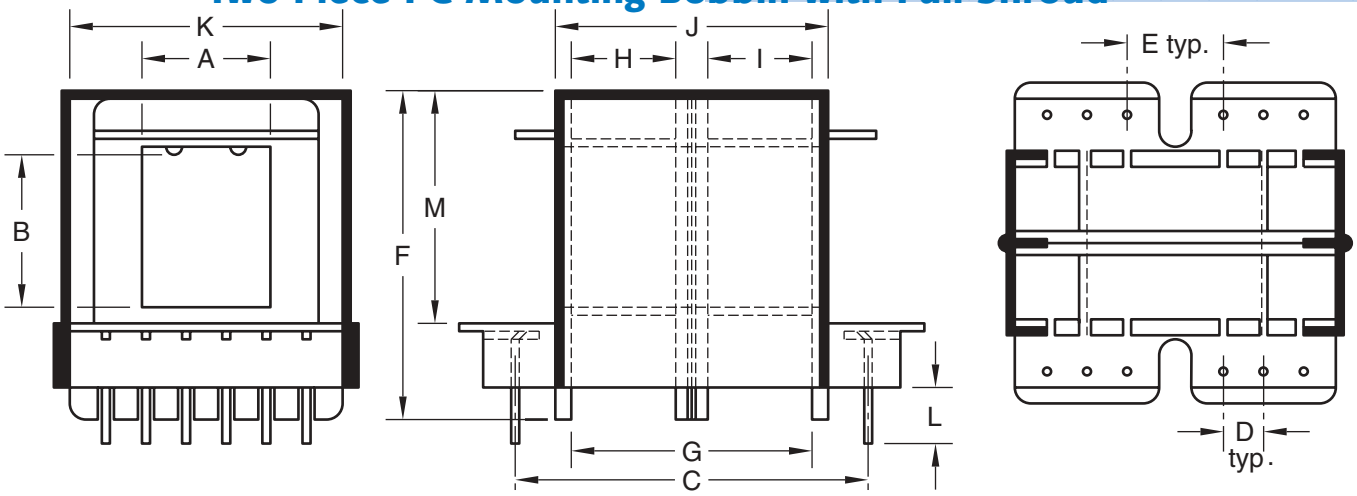
This table is sequenced by Lamination size and then Stack Height.

Bobbin p/n	Lamination	Shroud p/n	Terms (max)	A	B	C	D	E	F	G	H	I	J	K	±.015 L	M	Max wind depth	Wire size
8396-0-418	EI-21 x 3/8	8397-0	8	.510	.390	1.000	.200	.250	1.093	.672	.312	.256	.787	1.034	.250	.806	.231	.025sq.
6780-0-418	EI-21 x 5/8	6781-0	8	.510	.645	1.000	.200	.400	1.348	.672	.312	.256	.787	1.034	.250	1.059	.231	.025sq.

A complete assembly consists of one bobbin and one shroud.

Quick-Ship (see page 2)

Two Piece PC Mounting Bobbin with Full Shroud



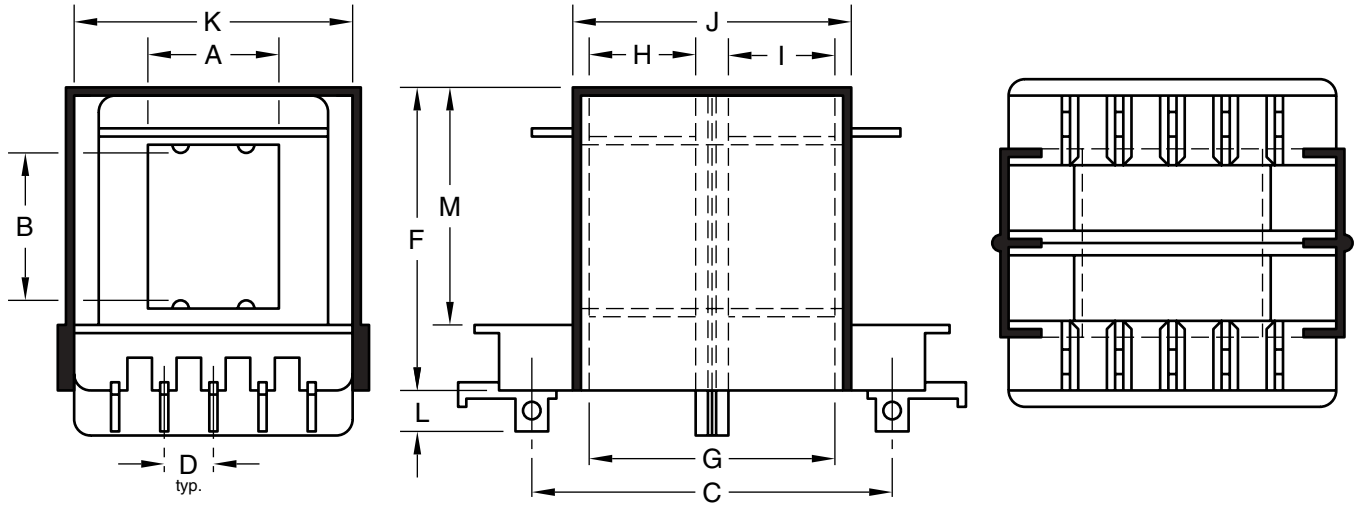
Front View | Side View | Bottom View

This table is sequenced by Lamination size and then Stack Height.

Bobbin p/n	Lamination	Shroud p/n	Terms (max)*	A	B	C	D	E	F	G	H	I	J	K	±.015 L	M	Max wind depth	Wire size
8380-0-418	EI-21 x 3/8	8381-0	4	.519	.390	1.000	.200	.250	1.085	.640	.260	.260	.785	1.026	.300	.704	.218	.025sq.
8382-0-417	EI-21 x 5/8	8383-0	4	.519	.646	1.000	.200	.400	1.340	.640	.260	.260	.785	1.026	.300	1.006	.218	.025sq.
8384-0-708	EI-625	8385-0	8	.640	.640	1.140	.200	.400	1.363	.744	.312	.312	.908	1.150	.300	1.004	.220	.036sq.
8386-0-709	EI-75	8387-0	12	.765	.766	1.460	.200	.400	1.580	.940	.410	.410	1.100	1.408	.300	1.190	.286	.036sq.
8388-0-710	EI-87 x 5/8	6367-0	12	.890	.640	1.680	.275	.275	1.575	1.130	.505	.505	1.300	1.658	.300	1.120	.349	.045sq.
1160-0-712	EI-100 x 3/4	1161-0	12	1.016	.766	1.900	.300	.300	1.819	1.320	.600	.600	1.480	1.908	.300	1.313	.411	.045sq.

A complete assembly consists of two bobbins and one shroud. ***Maximum number of terminals in a two bobbin unit.**

Two Piece Chassis Mounting Bobbin with Full Shroud



Front View | Side View | Bottom View

This table is sequenced by Lamination size and then Stack Height.

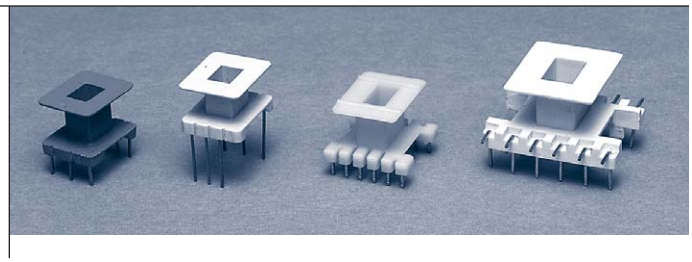
Bobbin p/n	Lamination	Shroud p/n	Terms (max)*	A	B	C	D	F	G	H	I	J	K	±.015 L	M	Max wind depth	Q/D size
8392-0-692	EI-75 x 1 **	6357-0	10	.766	1.022	1.458	.275	1.885	.948	.412	.412	1.104	1.402	.330	1.436	.279	.187
8394-0-692	EI-87 x 1 **	1169-0	10	.890	1.016	1.476	.275	1.894	1.130	.505	.505	1.290	1.658	.330	1.503	.349	.187
1162-0-692	EI-100 x 1-1/4	1163-0	12	1.016	1.257	1.666	.300	2.282	1.320	.600	.600	1.480	1.912	.330	1.810	.411	.187
1164-0-701	EI-112 x 1-1/2	1165-0	12	1.145	1.505	2.134	.325	2.673	1.510	.695	.695	1.670	2.158	.395	2.121	.469	.250
1166-0-701	EI-125 x 1-1/2	1167-0	12	1.260	1.510	2.506	.350	2.800	1.692	.784	.784	1.852	2.405	.395	2.187	.530	.250

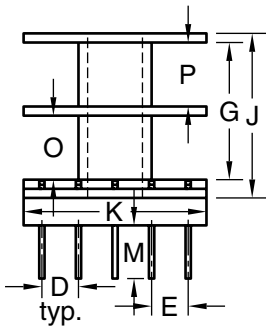
A complete assembly consists of two bobbins and one shroud. ***Maximum number of terminals in a two bobbin unit.**
****Ribs on one side of core hole only on these parts.**

Quick-Ship (see page 2)

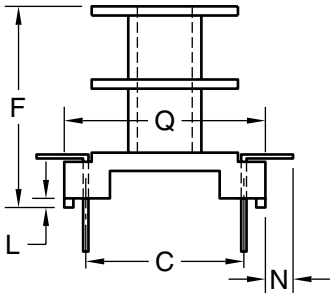
HIGH PROFILE VERTICAL PC TRANSFORMER BOBBINS

High profile vertical PC transformer bobbins are generally used when the height above the circuit board is not restricted but board surface area is limited. Side exiting terminals (as shown in *Side View with "N" Dimension*) allow for production soldering. Bobbins without side exiting terminals (as shown in *Side View without "N" Dimension*) further conserve board space.

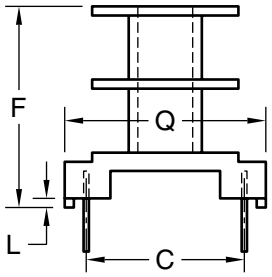




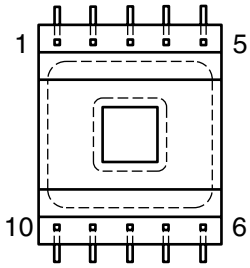
Front View



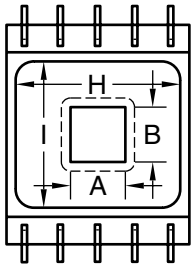
Side View With "N" Dim.



Side View Without "N" Dim.



Bottom View



Top View

This table is sequenced by Lamination size and then Stack Height.

Part number	Lamination	Terms (max)	Lead slot?	A	B	C	D	E	F	G	H	I	J	K	L	M ±.015	N ±.015	O	P	Q	Wire size	Case used
83837-0-658	EI-094	6	Y	.100	.100	.200	.100	.100	.200	.120	.270	.312	.150	.270		.205				.318	.020sq.	
✈ 8329-0-687	EE-28-29	6	N	.130	.130	.340	.100	.100	.410	.255	.365	.365	.300	.375	.030	.200				.450	.020sq.	
8800-0-735	EE-28-29	4	Y	.134	.134	.350	.200	.200	.375	.249	.358	.358	.299	.358		.120				.460	.025sq.	
✈ 5462-0-418	EE-28-29	6	N	.133	.133	.400	.200	.200	.425	.265	.365	.365	.300	.530		.440				.515	.025sq.	
2380-0-636	EE-28-29 x 1/4	6	N	.130	.258	.352	.111	.111	.385	.270	.261	.502	.328	.261		.131	.040			.502	.020sq.	
8320-0-686	EE-28-29 x 1/2	6	N	.133	.506	.600	.115	.115	.383	.265	.372	.750	.290	.370		.125	.075			.750	.020sq.	
83196-0-247	EE-32-33	8	Y	.150	.150	.400	.150	.150	.360	.230	.410	.410	.270	.625		.280				.560	.020sq.	81217
83146-0-248	EE-32-33	10	Y	.150	.150	.400	.150	.150	.410	.257	.403	.403	.308	.800		.330				.530	.020sq.	81149
83174-0-248	EE-32-33	12	Y	.150	.150	.400	.150	.150	.410	.255	.406	.406	.307	.933		.330				.530	.020sq.	81170
83900-0-572	EE-32-33 x 1/4	8	Y	.145	.265	.530	.100	.135	.348	.226	.427	.544	.266	.490		.185				.650	.020sq.	
4122-0-199	EI-186	8	N	.198	.198	.410	.200	.200	.400	.195	.553	.553	.230	.750		.130	.089			.546	.040dia.	
✈ 4122-0-501	EI-186	8	N	.198	.198	.410	.200	.200	.400	.195	.553	.553	.230	.750		.296	.089			.546	.040dia.	
8235-0-720	EI-186	6	N	.200	.200	.469	.235	.235	.355	.190	.550	.550	.245	.630		.330				.656	.025sq.	
8235-1-408	EI-186	6	N	.200	.200	.469	.235	.235	.355	.190	.550	.550	.245	.630	.040	.155				.656	.025sq.	
8336-0-689	EI-186 x 3/8	6	Y	.200	.385	.800	.200	.200	.320	.195	.545	.720	.240	.545		.187	.094			.920	.025dia.	
✈ 5170-0-137	EI-186 x 9/16	10	N	.194	.571	1.100	.150	.150	.319	.195	.554	.975	.234	.735		.265	.186			1.195		
5290-0-339	EI-186 x 3/4	6	N	.195	.750	1.000	.200	.200	.430	.181	.546	1.125	.241	.546		.380	.120			1.125	.025sq.	
5461-0-415	EI-187	6	N	.195	.195	.500	.300	.300	.540	.375	.550	.550	.425	.930		.330				.660	.025sq.	
83481-0-251	EI-187	8	Y	.200	.200	.400	.200	.200	.540	.375	.535	.535	.425	.766		.330				.656	.025sq.	
3548-3-415	EI-187	6	N	.204	.204	.428	.188	.188	.625	.372	.539	.539	.429	.603	.022	.210	.060			.548	.025sq.	
✈ 7150-0-113	EI-187	6	N	.205	.205	.421	.187	.187	.600	.375	.535	.535	.435	.588		.188	.278			.565		
7150-1-113	EI-187	6	N	.205	.205	.421	.187	.187	.600	.375	.535	.535	.435	.588		.188	.278	.175	.175	.565		
3548-1-334	EI-187	6	N	.200	.200	.421	.187	.187	.600	.367	.535	.535	.429	.594		.375	.300			.545	.025sq.	
✈ 3548-1-240	EI-187	6	N	.200	.200	.421	.187	.187	.600	.367	.535	.535	.429	.594		.200	.300			.545	.025sq.	
83237-0-251	EI-187	10	Y	.200	.200	.500	.150	.150	.540	.375	.535	.535	.425	.930		.330				.656	.025sq.	81238

Specify terminal positions desired. Parts listing wire size are available in different terminal lengths (M & N) for a small, one time tool charge.

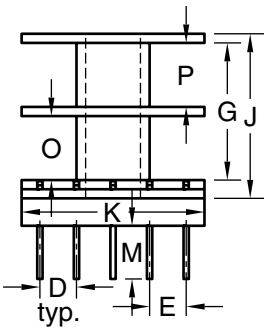
Quick-Ship (see page 2) ✈

This table is sequenced by Lamination size and then Stack Height.

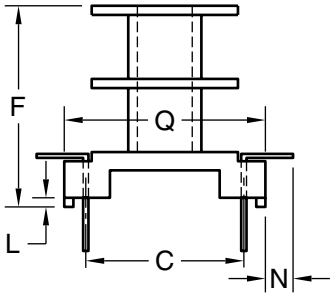
Part number	Lamination	Terms (max)	Lead slot?	A	B	C	D	E	F	G	H	I	J	K	L	±.015 M	±.015 N	O	P	Q	Wire size	Case used
83237-0-562	EI-187	10	Y	.200	.200	.500	.150	.150	.540	.375	.535	.535	.425	.930		.200				.656	.025sq.	81238
83281-0-246	EI-187 x 1/4	6	N	.195	.260	.556	.125	.190	.550	.375	.530	.665	.450	.535		.200				.656	.020sq.	81348
✈ 7152-0-113	EI-187 x 1/4	6	N	.200	.262	.506	.187	.187	.600	.375	.535	.596	.435	.588		.188	.287			.608		
6997-0-408	EI-187 x 3/8	12	Y	.199	.387	.607	.120	.120	.546	.366	.547	.723	.430	.723	.033	.152				.723	.025sq.	
83239-0-251	F-14	10	Y	.200	.200	.500	.150	.150	.367	.194	.554	.554	.245	.930		.330				.656	.025sq.	81240
✈ 7151-0-113	EE-24-25	6	N	.266	.266	.781	.200	.200	.688	.399	.720	.750	.476	.720		.188	.272			.937		
✈ 7153-0-113	EE-24-25	6	Y	.260	.260	.720	.250	.250	.688	.399	.720	.750	.476	.720		.188	.272			.875		
✈ 3461-1-137	EE-24-25	8	N	.266	.256	.774	.150	.150	.610	.429	.735	.735	.478	.735		.215	.078			.900		
3550-1-240	EE-24-25	6	N	.266	.266	.781	.200	.200	.687	.418	.718	.718	.484	.718		.200	.300			.905	.025sq.	
✈ 4564-1-169	EE-24-25	8	N	.263	.263	.500	.200	.200	.620	.420	.742	.735	.480	1.020		.520	.060			.730	.032dia.	
4564-1-585	EE-24-25	8	N	.263	.263	.500	.200	.200	.620	.420	.742	.735	.480	1.020		.405	.060			.730	.032dia.	
4564-2-590	EE-24-25	8	N	.263	.263	.500	.200	.200	.620	.420	.735	.735	.480	1.020		.335	.060			.730	.025sq.	
✈ 4564-3-419	EE-24-25	8	N	.263	.263	.600	.200	.200	.620	.420	.735	.735	.480	.800		.335	.060			.760	.025dia.	
83182-0-252	EE-24-25	8	Y	.263	.263	.500	.200	.200	.700	.420	.735	.735	.480	1.055		.440				.890	.025sq.	81181
83241-0-254	EE-24-25	10	Y	.263	.263	.600	.200	.200	.630	.420	.725	.725	.480	1.210		.330				.812	.036sq.	81242
83241-0-313	EE-24-25	10	Y	.263	.263	.600	.200	.200	.630	.420	.725	.725	.480	1.210		.139				.812	.036sq.	81242
83241-0-310	EE-24-25	10	Y	.263	.263	.600	.200	.200	.630	.420	.725	.725	.480	1.210		.170				.812	.036sq.	81242
✈ 83529-0-251	EE-24-25	22	Y	.263	.263	.600	.100	.100	.630	.420	.725	.725	.480	1.210		.330				.812	.025sq.	81242
4453-0-100	EE-24-25	10	N	.265	.265	.600	.200	.200	.630	.420	.725	.725	.475	1.186		.200				.812	.040dia.	
1299-0-535	EE-24-25	10	N	.265	.265	.600	.200	.200	.630	.425	.735	.735	.485	1.022		.500	.060			.735	.040dia.	
3549-1-240	EE-24-25	6	N	.258	.258	.720	.250	.250	.687	.418	.718	.718	.485	.718		.200	.300			.850	.025sq.	
1299-2-424	EE-24-25	10	N	.268	.268	.594	.200	.200	.636	.425	.737	.737	.493	1.030		.500	.062			.730	.025sq.	
1299-1-535	EE-24-25	10	N	.271	.271	.599	.200	.200	.633	.425	.740	.740	.488	1.026		.498	.062			.732	.040dia.	
5676-0-240	EE-24-25 x 5/16	8	N	.260	.312	.500	.200	.200	.715	.430	.740	.782	.480	1.020		.375	.060			.782	.025sq.	
2381-0-137	EE-24-25 x 3/8	8	N	.265	.383	.905	.150	.150	.595	.415	.740	.805	.485	.740		.220	.085			1.005		
8302-0-419	EE 24-25 x 3/8	12	N	.260	.390	.700	.200	.200	.665	.400	.730	.860	.485	1.120	.125	.250	.115			.860	.025sq.	
✈ 7287-0-113	EE-24-25 x 1/2	6	N	.266	.515	1.030	.200	.200	.688	.420	.720	.970	.476	.720		.188	.272			1.186		
✈ 83243-0-254	EI-375	10	Y	.390	.390	.800	.300	.300	.973	.673	.980	.980	.735	1.562		.330				1.125	.036sq.	81244
✈ 7155-0-113	EI-375	6	Y	.390	.390	1.000	.312	.312	.998	.673	.975	.975	.735	.975	.060	.188	.287			1.126		
7155-1-113	EI-375	6	Y	.390	.390	1.000	.312	.312	.938	.673	.975	.975	.735	.975		.188	.287			1.126		
7155-2-113	EI-375	6	Y	.390	.390	1.000	.312	.312	.963	.673	.975	.975	.735	.975	.025	.188	.287			1.126		
7155-4-113	EI-375	6	Y	.390	.390	1.000	.312	.312	.998	.673	.975	.975	.735	.975	.060	.188	.287	.320	.320	1.126		
7155-5-113	EI-375	6	Y	.390	.390	1.000	.312	.312	.938	.673	.975	.975	.735	.975		.188	.287	.320	.320	1.126		
✈ 4973-0-113	EI-375	8	Y	.390	.390	1.000	.200	.200	.938	.655	.975	.975	.735	.975		.188	.287			1.125		
4780-0-113	EI-375	8	Y	.390	.390	1.000	.250	.250	.944	.673	.975	.975	.735	.975		.188	.287			1.125		
3551-1-425	EI-375	6	Y	.390	.390	1.000	.312	.312	.969	.669	.975	.975	.735	.975		.200	.350			1.125	.025sq.	
5857-0-515	EI-375	10	N	.390	.390	.800	.300	.300	.987	.675	.980	.980	.763	1.560		.180	.125			.980	.036sq.	
✈ 5596-0-113	EI-375 x 1/2	6	N	.390	.515	1.120	.312	.312	.938	.673	.975	1.100	.735	.975		.188	.287			1.245		
5877-0-421	EI-375 x 5/8	12	N	.390	.682	1.100	.100	.150	.970	.670	.970	1.282	.734	.970	.032	.300	.050			1.282	.025sq.	
5857-1-709	EE-26-27	10	N	.391	.391	.796	.303	.303	1.019	.680	.980	.980	.750	1.566	.029	.155	.135			.980	.036sq.	
7156-0-113	EI-21	6	Y	.510	.510	1.100	.400	.400	1.122	.734	1.100	1.100	.796	1.100	.060	.188	.287			1.226		
7156-1-113	EI-21	6	Y	.510	.510	1.100	.400	.400	1.062	.734	1.100	1.100	.796	1.100		.188	.287			1.226		
7156-2-113	EI-21	8	Y	.510	.510	1.100	.250	.250	1.122	.734	1.100	1.100	.796	1.100	.060	.188	.287			1.226		
3529-0-040	EI-21	10	N	.513	.513	1.100	.200	.200	1.067	.734	1.100	1.100	.796	1.100		.187	.344			1.226	.032dia.	

Specify terminal positions desired. Parts listing wire size are available in different terminal lengths (M & N) for a small, one time tool charge.

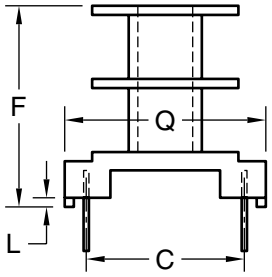
Quick-Ship (see page 2) ✈



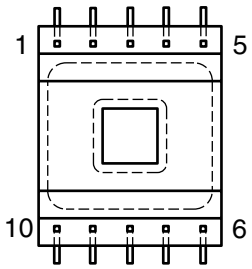
Front View



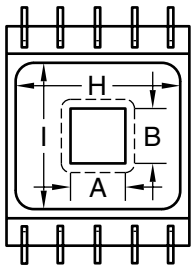
Side View
With "N" Dim.



Side View
Without "N" Dim.



Bottom View



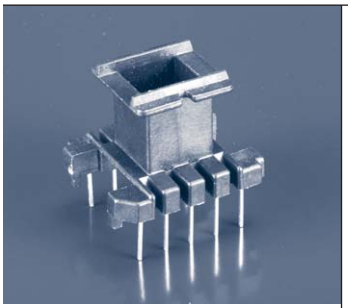
Top View

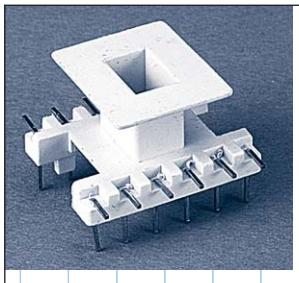
This table is sequenced by Lamination size and then Stack Height.

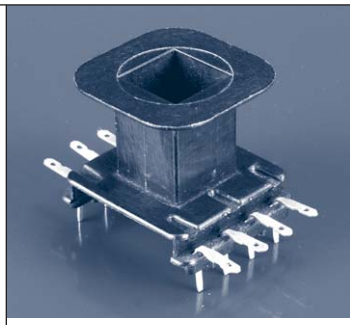
Part number	Lamination	Terms (max)	Lead slot?	A	B	C	D	E	F	G	H	I	J	K	L	±.015 M	±.015 N	O	P	Q	Wire size	Case used
3507-2-098	EI-21	6	Y	.515	.515	1.100	.400	.400	1.093	.737	1.100	1.100	.797	1.100		.200	.350			1.224	.025sq.	
3507-1-331	EI-21	6	Y	.515	.515	1.100	.400	.400	1.093	.737	1.100	1.100	.796	1.100		.200	.350			1.220	.025sq.	
83336-0-255	EI-21	10	Y	.520	.520	.900	.200	.200	1.086	.726	1.100	1.100	.796	1.100		.440				1.190	.036sq.	81337
1612-0-113	EI-21 x 5/8	7	N	.495	.637	1.310	.200	.400	1.433	1.032	1.184	1.184	1.106	1.184		.187	.200			1.435		
✈ 5725-0-113	EI-21 x 1-1/2	10	Y	.510	1.510	2.100	.200	.200	1.062	.724	1.100	2.100	.796	1.100		.188	.287			2.226		
5725-1-113	EI-21 x 1-1/2	8	Y	.510	1.510	2.100	.250	.250	1.062	.724	1.100	2.100	.796	1.100		.188	.287			2.226		
✈ 5725-2-113	EI-21 x 1-1/2	8	Y	.510	1.510	2.100	.250	.250	1.122	.724	1.100	2.100	.796	1.100	.060	.188	.287			2.226		
83496-0-255	EI-625	12	Y	.640	.640	1.000	.200	.200	1.216	.831	1.225	1.225	.921	1.225		.440				1.305	.036sq.	
7157-0-113	EI-625	6	Y	.640	.640	1.300	.400	.400	1.309	.851	1.230	1.230	.921	1.230	.060	.188	.287			1.426		
7157-1-113	EI-625	6	Y	.640	.640	1.300	.400	.400	1.249	.851	1.230	1.230	.921	1.230		.188	.287			1.426		
7157-2-113	EI-625	6	Y	.640	.640	1.300	.400	.400	1.279	.851	1.230	1.230	.921	1.230	.030	.188	.287			1.426		
7157-3-113	EI-625	8	Y	.640	.640	1.300	.250	.250	1.309	.851	1.230	1.230	.921	1.230	.060	.188	.287			1.426		
5724-0-113	EI-625	10	Y	.640	.640	1.300	.200	.200	1.249	.851	1.218	1.218	.921	1.218		.188	.287			1.426		
3552-1-331	EI-625	6	Y	.640	.640	1.300	.400	.400	1.281	.863	1.218	1.218	.923	1.218		.200	.350			1.424	.025sq.	
7276-0-113	EI-625 x 3/4	6	Y	.640	.750	1.425	.400	.400	1.250	.851	1.218	1.343	.921	1.218		.188	.287			1.550		
83851-1-255	EI-87 x 1	10	Y	.898	1.020	1.290	.187	.187	1.658	1.210	1.298	1.500	1.280	1.298		.380				1.500	.036sq.	

Specify terminal positions desired. Parts listing wire size are available in different terminal lengths(M & N) for a small, one time tool charge.

Quick-Ship (see page 2) ✈

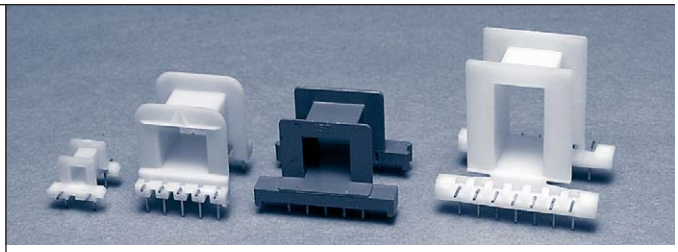






LOW PROFILE HORIZONTAL PC TRANSFORMER BOBBINS

These bobbins are most effective in situations where vertical height is limited and more board surface area is available. Side exiting terminals (as shown in figure 1) allow for production soldering. Bobbins without side exiting terminals (as shown in figure 2) further conserve board space.



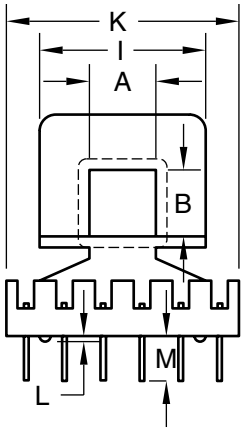


Fig. 1 Front View

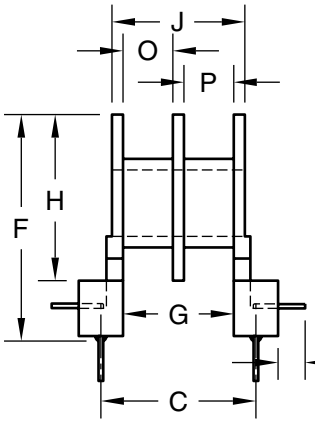


Fig. 1 Side View

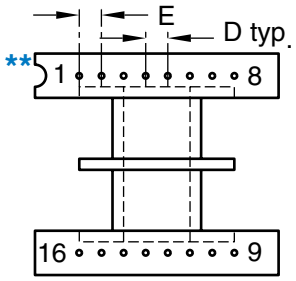


Fig. 1 and Fig. 2 Bottom View

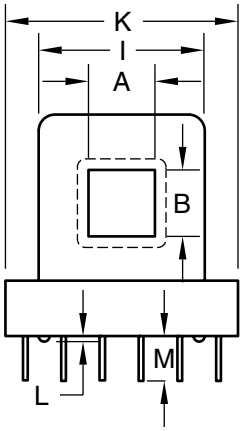


Fig. 2 Front View

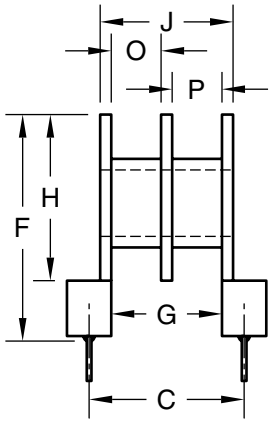


Fig. 2 Side View

This table is sequenced by Lamination size and then Stack Height.

Part number	Lamination	Terms (max)	Fig.	A	B	C	D	E	F	G	H	I	J	K	L	M ±.015	N ±.015	O	P	Wire size	Case used
✈ 4583-0-411	EE-28-29 x 15/64	6	2	.130	.240	.400	.200	.200	.515	.265	.415	.363	.307	.520		.210				.025sq.	
6608-0-408	EI-187 x 3/16	9	2	.202	.188	.510	.150	.200	.400	.374	.294	.530	.430	.750		.172		.173	.173	.025sq.	
8473-0-705	EI-187	8	1	.195	.195	.500	.200	.150	.550	.360	.470	.545	.430	.750		.180	.141			.026dia.	
8629-0-326	EI-187	10	2	.200	.195	.500	.150	.150	.490	.370	.325	.490	.430	.850	.035	.350				.025sq.	
5155-0-105	EI-187	4	2	.200	.200	.440	.334	.334	.669	.372	.397	.535	.430	.535		.227		.134	.210		
6908-0-246	EI-187	6	2	.200	.200	.500	.150	.150	.445	.390	.315	.432	.430	.432		.200		.185	.185	.020sq.	
4143-0-061	EI-187	8	1	.200	.200	.514	.200	.150	.662	.367	.457	.535	.430	.750	.040	.165	.100			.025dia.	4144
✈ 4143-0-220	EI-187	8	1	.200	.200	.514	.200	.150	.662	.367	.457	.535	.430	.750	.040	.175	.100			.025sq.	4144
✈ 4143-1-220	EI-187	8	1	.200	.200	.514	.200	.150	.662	.367	.457	.535	.430	.750	.040	.175	.100	.170	.170	.025sq.	4144
4143-2-220	EI-187	8	1	.200	.200	.514	.200	.150	.662	.367	.457	.535	.430	.750		.175	.100	.170	.170	.025sq.	4144
4143-3-716	EI-187	8	1	.200	.200	.514	.200	.150	.662	.367	.457	.535	.430	.750	.040	.240	.115			.040dia.	4144
✈ 2248-0-414	EI-187	6	2	.200	.200	.600	.156	.156	.610	.400	.368	.535	.430	.535	.100	.280		.170	.170	.025sq.	
83642-0-251	EI-187	5	2	.200	.200	.700	.150	.300	.590	.305	.380	.540	.425	.540	.050	.320		.100	.100	.025sq.	
8625-0-729	EE-24-25 x 3/32	10	1	.257	.105	.580	.150	.150	.380	.430	.330	.702	.490	.702		.200	.095			.025sq.	
3574-4-220	EE-24-25	10	1	.264	.256	.622	.200	.150	.835	.395	.613	.731	.490	.984	.040	.175	.115	.180	.180	.040dia.	
✈ 3574-0-492	EE-24-25	10	1	.266	.260	.630	.200	.150	.837	.403	.612	.730	.480	1.030	.040	.175	.115			.040dia.	3575
✈ 3574-1-220	EE-24-25	10	1	.266	.260	.630	.200	.150	.837	.403	.612	.730	.480	1.030	.040	.175	.125			.025sq.	3575
3574-2-220	EE-24-25	10	1	.266	.260	.630	.200	.150	.837	.403	.612	.730	.480	1.030	.040	.175	.125	.070	.300	.025sq.	3575
✈ 3574-3-220	EE-24-25	10	1	.266	.260	.630	.200	.150	.837	.403	.612	.730	.480	1.030	.040	.175	.125	.180	.180	.025sq.	3575
5767-0-505	EE-24-25	10	1	.260	.260	.650	.200	.200	.790	.430	.590	.730	.480	1.160		.120	.135			.035sq.	
83831-1-312	EE-24-25	10	2	.270	.267	.700	.200	.200	.860	.422	.568	.730	.492	1.100		.220		.196	.196	.045sq.	
4433-0-088	EE-24-25 x 3/8	6	2	.255	.380	.600	.250	.150	.906	.375	.725	.750	.485	.750	.090	.280		.190	.164	.040dia.	
3366-0-492	EE-26-27	12	1	.386	.370	.815	.200	.150	.947	.588	.722	.850	.665	1.400	.040	.165	.125			.040dia.	3367
3366-0-555	EE-26-27	12	1	.386	.370	.815	.200	.150	.947	.588	.722	.850	.665	1.400	.040	.250	.125			.040dia.	3367

Specify terminal positions desired. Parts listing wire size are available in different terminal lengths (M & N) for a small, one time tool charge.

Quick-Ship (see page 2) ✈

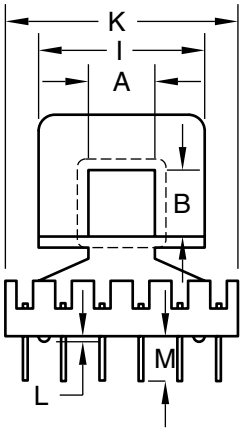


Fig. 1 Front View

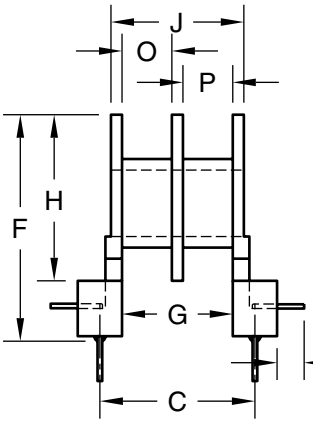


Fig. 1 Side View

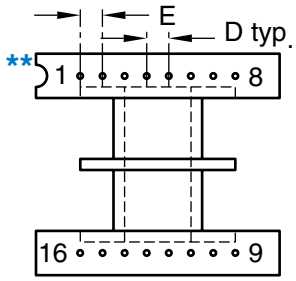


Fig. 1 and Fig. 2
Bottom View

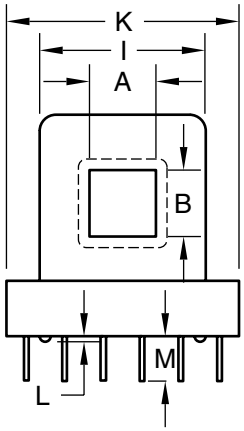


Fig. 2 Front View

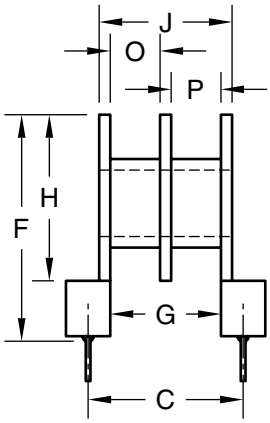


Fig. 2 Side View

This table is sequenced by Lamination size and then Stack Height.

Part number	Lamination	Terms (max)	Fig.	A	B	C	D	E	F	G	H	I	J	K	L	M ±.015	N ±.015	O	P	Wire size	Case used
3490-1-220	EE-26-27	12	1	.380	.380	.800	.200	.150	.915	.622	.730	.860	.682	1.400		.140	.135			.025sq.	3367
✈ 3490-1-358	EE-26-27	12	1	.380	.380	.800	.200	.150	.915	.622	.730	.860	.682	1.400		.175	.135			.025sq.	3367
3490-1-416	EE-26-27	12	1	.380	.380	.800	.200	.150	.915	.622	.730	.860	.682	1.400		.125	.120			.025sq.	3367
8716-0-411	EE-26-27	12	2	.385	.385	.900	.200	.200	.980	.576	.740	.840	.666	1.330	.040	.185				.025sq.	
83184-0-731	EE-26-27	12	2	.385	.385	.900	.200	.200	.980	.575	.740	.840	.670	1.330	.050	.440				.032sq.	81185
83184-0-559	EE-26-27	12	2	.385	.385	.900	.200	.200	.980	.575	.740	.840	.670	1.330	.050	.255				.032sq.	81185
3490-2-417	EI-375	12	1	.380	.380	.800	.200	.200	.915	.622	.730	.860	.682	1.400	.025	.156	.135			.025sq.	
✈ 4992-0-196	EI-375	12	1	.386	.380	.877	.200	.150	1.040	.650	.800	.985	.727	1.475	.040	.165	.100			.025sq.	5298
✈ 4992-1-196	EI-375	12	1	.386	.370	.877	.200	.150	1.040	.650	.800	.985	.727	1.475	.040	.165	.100	.305	.305	.025sq.	5298
✈ 4992-2-196	EI-375	12	1	.386	.380	.877	.200	.150	1.000	.650	.800	.985	.727	1.475		.175	.100			.025sq.	5298
4992-3-717	EI-375	12	1	.386	.380	.877	.200	.150	1.000	.650	.800	.985	.727	1.475	.040	.240	.130			.040dia.	5298
✈ 2097-0-416	EI-375	12	1	.390	.390	.875	.200	.150	.850	.700	.615	.950	.745	1.300		.140	.120			.025sq.	
5425-1-228	EI-375 x 1/2	8	1	.389	.528	1.200	.250	.250	1.173	.660	.762	.974	.740	.974		.250	.270	.312	.308		
83571-0-269	EI-50	11	2	.508	.508	1.000	.200	.200	.950	.667	.735	.980	.733	1.500	.065	.200				.032sq.	
216-0-083	EI-50	10	2	.508	.508	1.000	.200	.200	1.000	.660	.790	.980	.720	.980		.350				.045dia.	
3569-0-083	EI-50	14	2	.510	.510	1.000	.200	.200	1.000	.663	.792	.990	.725	1.390		.350				.045dia.	
4342-0-083	EI-50	14	2	.508	.508	1.000	.200	.200	.980	.738	.790	.980	.798	1.360		.350				.045dia.	
6243-2-228	UI-500 x 1/2	6	1	.510	.510	1.880	.250	.250	1.050	1.430	.760	.985	1.490	.985		.250		.730	.670		
✈ 4764-0-194	EI-21 x 1/4	8	1	.510	.250	1.000	.250	.200	.650	.713	.450	1.100	.790	1.625		.180	.075			.025sq.	
8665-0-083	EI-21 x 3/8	9	2	.510	.385	1.000	.200	.200	1.000	.700	.675	1.100	.780	1.100	.060	.310		.330	.330	.045dia.	
3539-0-099	EI-21	12	1	.510	.510	1.000	.300	.300	1.170	.714	.943	1.100	.790	1.780	.040	.175	.125			.040dia.	3376
✈ 3539-1-098	EI-21	12	1	.510	.510	1.000	.300	.300	1.170	.714	.943	1.100	.790	1.780	.040	.175	.125			.025sq.	3376
3539-1-419	EI-21	12	1	.510	.510	1.000	.300	.300	1.170	.714	.943	1.100	.790	1.780	.040	.250	.125			.025sq.	3376
4293-0-493	EI-21	14	1	.514	.514	1.000	.200	.200	1.050	.722	.858	1.100	.784	1.700		.375	.125			.040dia.	3376
✈ 4293-1-233	EI-21	14	1	.514	.514	1.000	.200	.200	1.050	.722	.858	1.100	.784	1.700		.375	.125			.025sq.	3376
✈ 4293-1-417	EI-21	14	1	.514	.514	1.000	.200	.200	1.050	.722	.858	1.100	.784	1.700		.140	.125			.025sq.	3376
4293-2-493	EI-21	14	1	.514	.514	1.000	.200	.200	1.050	.722	.858	1.100	.784	1.700		.375	.125	.345	.345	.040dia.	3376
4293-3-233	EI-21	14	1	.514	.514	1.000	.200	.200	1.050	.722	.858	1.100	.784	1.700		.375	.125	.345	.345	.025sq.	3376
✈ 4458-0-492	EI-21	12	1	.510	.510	.950	.250	.200	1.140	.713	.943	1.100	.790	1.780	.010	.165	.125			.040dia.	3376
4458-1-220	EI-21	12	1	.510	.510	.950	.250	.200	1.140	.713	.943	1.100	.790	1.780	.010	.135	.110			.025sq.	3376
4458-1-415	EI-21	12	1	.510	.510	.950	.250	.200	1.140	.713	.943	1.100	.790	1.780	.010	.125	.110			.025sq.	3376
✈ 4458-1-358	EI-21	12	1	.510	.510	.950	.250	.200	1.140	.713	.943	1.100	.790	1.780	.010	.185	.135			.025sq.	3376
4458-2-358	EI-21	12	1	.510	.510	.950	.250	.200	1.190	.713	.943	1.100	.790	1.780	.010	.185	.135	.335	.335	.025sq.	3376

Specify terminal positions desired. Parts listing wire size are available in different terminal lengths (M & N) for a small, one time tool charge.

Quick-Ship (see page 2) ✈

This table is sequenced by Lamination size and then Stack Height.

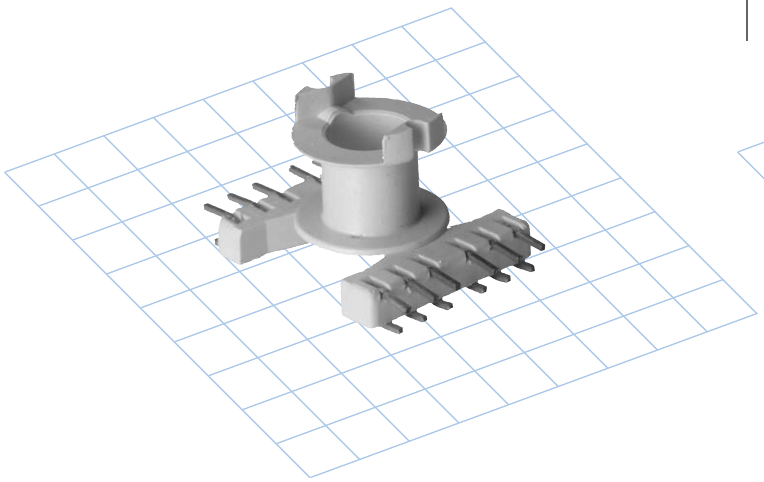
Part number	Lamination	Terms (max)	Fig.	A	B	C	D	E	F	G	H	I	J	K	L	M ±.015	N ±.015	O	P	Wire size	Case used
4598-0-534	EI-21 **	8	1	.510	.510	.950	.250	.250	1.130	.713	.943	1.100	.790	1.100		.270	.125			.040dia.	
4598-0-492	EI-21 **	8	1	.510	.510	.950	.250	.250	1.130	.713	.943	1.100	.790	1.100		.165	.125			.040dia.	
4598-1-417	EI-21 **	8	1	.510	.510	.950	.250	.250	1.130	.713	.943	1.100	.790	1.100		.165	.099			.025sq.	
4598-2-492	EI-21 **	8	1	.510	.510	.950	.250	.250	1.130	.713	.943	1.100	.790	1.100	.040	.165	.125			.040dia.	
1633-0-417	EI-21	8	1	.510	.510	.950	.250	.250	1.130	.737	.943	1.100	.790	1.100		.135	.135			.025sq.	
5923-0-420	EI-21	12	1	.500	.500	1.000	.400	.300	1.170	.714	.943	1.100	.790	2.010	.040	.175	.200			.025sq.	
5894-0-493	EI-21 x 19/32	14	1	.514	.595	1.000	.200	.200	1.193	.722	1.001	1.100	.784	1.700		.375	.125			.040dia.	
1663-0-415	EI-21 x 3/8	8	1	.510	.395	1.000	.250	.200	.795	.710	.595	1.100	.490	1.625		.180	.075			.025sq.	
1241-0-228	EI-21 x 5/8	8	1	.510	.625	.760	.350	.250	1.290	.720	.955	1.095	.800	1.095		.330	.330	.340	.340		
8465-0-413	EI-21 x 5/8	2	1	.510	.665		.350		1.125	.920	.975	1.000	1.000	1.000		.135	.050			.025sq.	
4926-0-202	EI-21 x 5/8	5	2	.522	.655	.824	.400	.470	1.301	.736	1.001	1.098	.796	1.248		.365		.353	.353		
5750-0-515	EI-625 x 3/8	12	1	.640	.385	1.100	.250	.250	1.010	.840	.823	1.230	.920	1.600		.135	.120			.035sq.	
✈ 1319-0-536	EI-625 x 3/8	12	1	.640	.385	1.100	.250	.250	.920	.840	.780	1.230	.920	1.600		.135	.120			.035sq.	
2315-0-623	EI-625 x 29/64	8	1	.640	.460	1.100	.250	.200	.750	.870	.620	1.230	.920	1.500		.187	.135			.025sq.	
8704-0-024	EI-625	3	2	.643	.636		.515	.515	1.259	.841	.951	1.236	.921	1.236		.359		.400	.351		
✈ 1631-0-417	EI-625	12	1	.640	.640	1.100	.300	.200	1.166	.870	1.016	1.230	.920	1.750		.145	.135			.025sq.	
4045-0-037	EI-625	12	1	.640	.640	1.100	.300	.200	1.260	.843	1.073	1.230	.920	1.750		.125	.125			.040dia.	900
4045-0-201	EI-625	12	1	.640	.640	1.100	.300	.200	1.260	.843	1.073	1.230	.920	1.750		.175	.125			.040dia.	900
✈ 4045-1-198	EI-625	12	1	.640	.640	1.100	.300	.200	1.260	.843	1.073	1.230	.920	1.750		.135	.135			.025sq.	900
4045-1-204	EI-625	12	1	.640	.640	1.100	.300	.200	1.260	.843	1.073	1.230	.920	1.750		.185	.135			.025sq.	900
4045-1-351	EI-625	12	1	.640	.640	1.100	.300	.200	1.260	.843	1.073	1.230	.920	1.750		.125	.125			.025sq.	900
4045-2-198	EI-625	12	1	.640	.640	1.100	.300	.200	1.260	.843	1.073	1.230	.920	1.750		.135	.135	.400	.400	.025sq.	900
✈ 4045-2-204	EI-625	12	1	.640	.640	1.100	.300	.200	1.260	.843	1.073	1.230	.920	1.750		.175	.135	.400	.400	.025sq.	900
4045-3-198	EI-625	12	1	.640	.640	1.100	.300	.200	1.310	.843	1.073	1.230	.920	1.750	.050	.135	.135			.025sq.	900
✈ 4045-3-204	EI-625	12	1	.640	.640	1.100	.300	.200	1.310	.843	1.073	1.230	.920	1.750	.050	.185	.135			.025sq.	900
4045-4-198	EI-625	12	1	.640	.640	1.100	.300	.200	1.260	.843	1.073	1.230	.920	1.750		.135	.135	.400	.400	.025sq.	90
8801-0-417	EI-625	8	1	.640	.640	1.100	.300	.300	1.225	.860	1.038	1.230	.930	1.230		.157	.115			.025sq.	
8219-0-416	EI-625 **	8	1	.640	.640	1.100	.300	.300	1.260	.825	1.075	1.225	.905	1.225		.135	.135	.400	.400	.025sq.	
1471-0-416	EI-625 x 3/4	11	1	.640	.750	1.100	.300	.300	1.370	.846	1.182	1.230	.920	1.750		.125	.125			.025sq.	
1471-1-416	EI-625 x 3/4	11	1	.640	.750	1.100	.300	.300	1.370	.846	1.182	1.230	.920	1.750		.125	.125	.402	.402	.025sq.	
✈ 5919-0-418	EI-625 x 7/8	12	1	.640	.875	1.100	.300	.200	1.500	.843	1.308	1.230	.920	1.750		.185	.135			.025sq.	
8893-0-417	EI-75 x 7/16	6	1	.765	.467	1.325	.650	.450	1.362	1.030	1.162	1.485	1.110	1.750		.125	.115	.495	.495	.025sq.	
3311-0-082	EI-75 x 5/8	10	2	.765	.635	1.500	.200	.200	1.140	1.030	.940	1.270	1.090	1.270		.350				.032dia.	
5924-0-420	EI-75	12	1	.764	.764	1.300	.400	.300	1.720	1.030	1.393	1.480	1.100	2.050	.040	.175	.200			.025sq.	
5050-0-220	EI-75	12	1	.764	.764	1.300	.300	.200	1.480	1.030	1.293	1.480	1.100	1.750		.135	.110			.025sq.	
5050-0-418	EI-75	12	1	.764	.764	1.300	.300	.200	1.480	1.030	1.293	1.480	1.100	1.750		.188	.110			.025sq.	
5050-0-424	EI-75	12	1	.764	.764	1.300	.300	.200	1.480	1.030	1.293	1.480	1.100	1.750		.250	.250			.025sq.	
5050-1-220	EI-75	12	1	.764	.764	1.300	.300	.200	1.480	1.030	1.293	1.480	1.100	1.750		.135	.110	.610	.380	.025sq.	
5050-2-220	EI-75	12	1	.764	.764	1.300	.300	.200	1.500	1.030	1.293	1.480	1.100	1.750	.020	.135	.110			.025sq.	
✈ 5050-2-418	EI-75	12	1	.764	.764	1.300	.300	.200	1.500	1.030	1.293	1.480	1.100	1.750	.020	.185	.110			.025sq.	
8130-0-418	EI-75	12	1	.764	.764	1.300	.300	.200	1.540	1.030	1.353	1.480	1.130	1.740		.200	.110	.600	.300	.025sq.	
5050-3-220	EI-75	12	1	.764	.764	1.300	.300	.200	1.480	1.030	1.293	1.480	1.100	1.750		.135	.110	.495	.495	.025sq.	
8298-0-682	EI-75	8	1	.765	.765	1.300	.300	.300	1.500	1.030	1.300	1.485	1.110	1.485		.125	.115	.500	.500	.050dia.	
5050-4-546	EI-75	12	1	.764	.764	1.300	.300	.200	1.540	1.030	1.293	1.480	1.100	1.750		.156	.110			.040dia.	
2275-0-618	EI-75 x 1	12	1	.764	1.014	1.300	.300	.200	1.730	1.020	1.543	1.480	1.110	1.750		.135	.110	.380	.595	.040dia.	
7331-0-632	EI-100	4	2	1.020	1.020	1.505	.510		1.550	1.395	.265	1.550	1.485	1.550		.495					

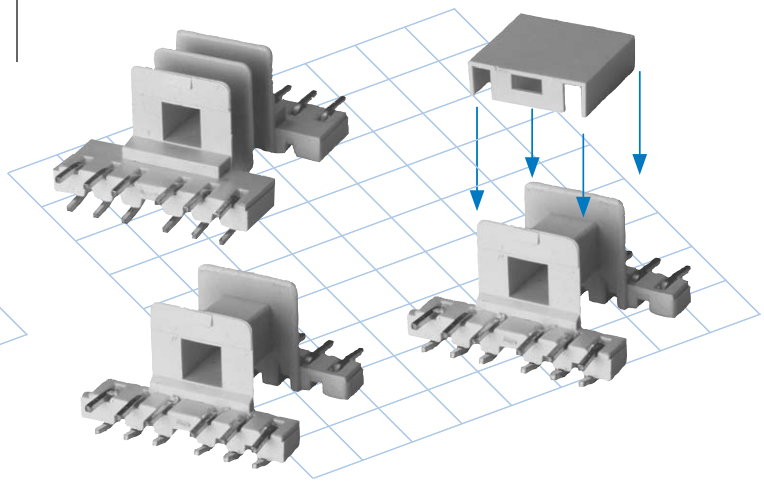
Specify terminal positions desired. Parts listing wire size are available in different terminal lengths (M & N) for a small, one time tool charge.
**** No notch on these parts (see drawing).**

Quick-Ship (see page 2) ✈

SURFACE MOUNT BOBBINS

Surface Mount Technology (SMT) is the mainstay of electronic printed circuit board assembly. Cosmo has developed a line of Liquid Crystal Polymer bobbins for surface mount applications. These small footprint bobbins utilize a unique coplanar terminal format to optimize the placement and soldering process. The bobbins are currently offered in two standard ferrite core sizes. Cosmo's line of SMT bobbins provides assemblers a wide range of advantages:





Liquid Crystal Polymer

Cosmo's standard SMT bobbins are manufactured in liquid crystal polymer. This material has unique properties that make it an excellent choice for SMT applications. Notably, LCP meets the high temperature requirements of infrared, vapor phase or wave soldering. LCP also ensures minimal part warpage and shrinkage rates, while providing excellent insulation properties. LCP offers a Underwriters Laboratory flammability rating of V0.

Coplanar Terminal Design

The unique coplanar terminal design of Cosmo's SMT bobbins provides the assembler with a level surface for parallel positioning of the coil, and ensures maximum solder contact. These bobbins also feature large recessed wire slots parallel to the terminal posts to facilitate easier automated and manual coil winding.

Pick and Place Cover

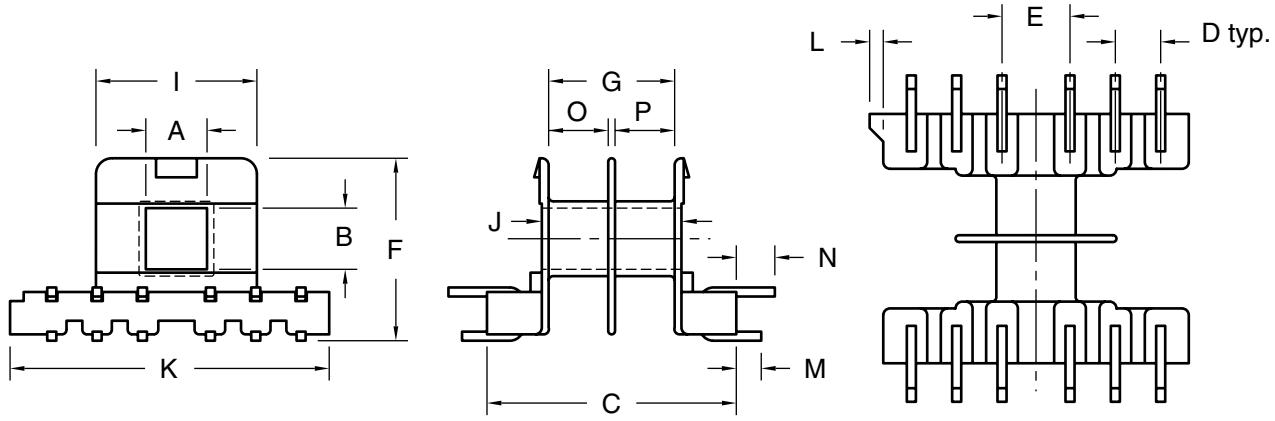
The horizontal bobbins are available with a snap-on cover designed specifically for automatic pick and place processes.

Reduced Lead Times and Part Prices

Cosmo's SMT bobbins are molded and assembled using custom-built robotics. This yields higher quality parts, lower handling costs, and reduced lead times.

Cosmo's line of standard SMT bobbins includes three horizontal styles and one RM style.

Surface Mount Horizontal Style Bobbins for Standard Ferrites



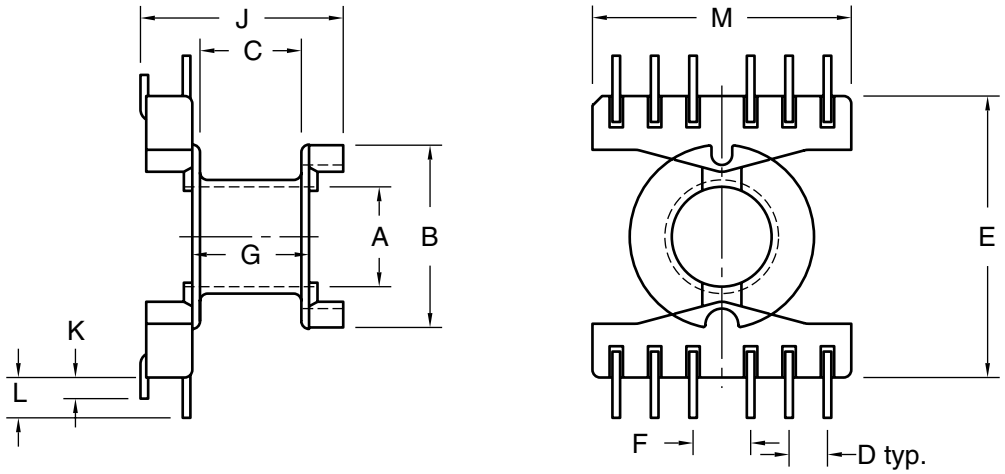
Front View | Side View | Bottom View

This table is sequenced by Core Dimension ("A") then Overall Length ("C").

Part number	Terms (max)	A	B	C	D	E	F ±.010	G	I	J	K	L	M ±.015	N ±.015	O	P	Wire size	Centered 3rd flange?
6970-0-099	12	.134	.134	.550	.100	.150	.403	.272	.355	.308	.674	.012	.055	.085			.020sq.	No
7630-0-099	12	.134	.134	.732	.100	.150	.403	.272	.355	.308	.674	.012	.055	.085			.020sq.	No
7630-1-099	12	.134	.134	.732	.100	.150	.403	.272	.355	.308	.674	.012	.055	.085	.128	.128	.020sq.	Yes

Pick and place cap available for these bobbins.

Surface Mount Bobbin for RM6 Core



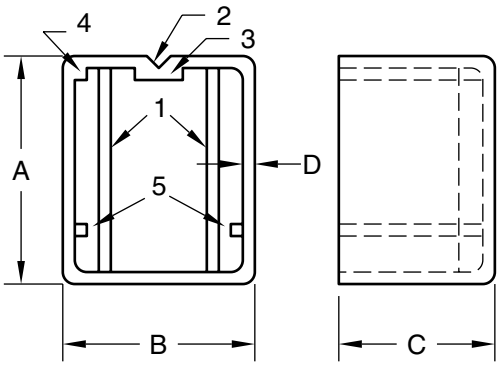
Side View | Top View

Part number	Terms (max)	A	B	C	D	E	F	G	J ±.010	K ±.015	L ±.015	M	Wire size
7634-0-099	12	.260	.480	.264	.100	.733	.150	.304	.528	.055	.105	.674	.020sq.

Quick-Ship (see page 2)

ENCAPSULATION CASES

Cosmo encapsulation cases are designed for precision mounting onto Cosmo bobbins. Our design features make assembly quick and easy while protecting and isolating the internal winding.



Front View Side View

All Cosmo encapsulation cases can be prepared for exterior printing of specification data on the surface of the cover.
Cosmo offers standard cases for:

- High Profile Vertical PC Transformer Bobbins
- Low Profile Horizontal PC Transformer Bobbins

Cosmo is capable of manufacturing custom cases for other applications including:

- Reed Relays
- Relay Dust Covers
- Toroid Cups

This table is sequenced by dimension "A".

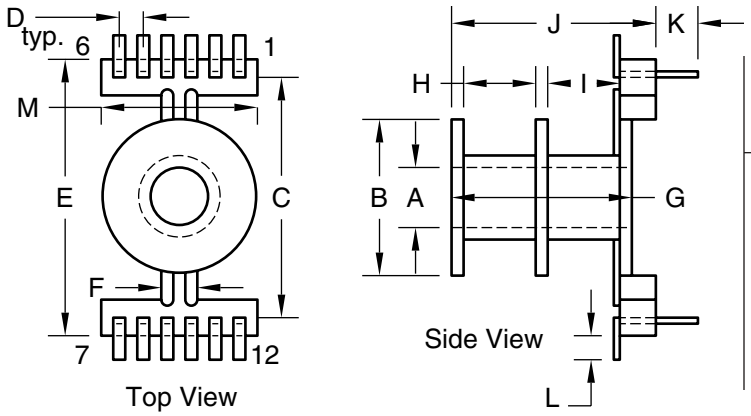
Part number	A	B	C	D	Features
4006-0	.390	1.125	.340	.020	
5833-0	.440	.168	.455	.035	
83518-0	.445	.145	.445	.017	
81346-0	.480	.400	.350	.020	1,2
81150-0	.500	.350	.400	.020	2,3
7377-0	.500	.350	.400	.020	4,3,2
8447-0	.500	.375	.340	.025	4
5488-0	.510	.450	.375	.025	2,4
81347-0	.610	.555	.540	.020	1
81269-0	.620	.575	.610	.025	1,2,3
1357-0	.730	.620	.593	.025	1,2,3
81217-0	.730	.620	.625	.020	1,2,5
5092-0	.740	.420	.345	.020	
81316-0	.810	.600	.635	.025	1,2,3
81149-0	.860	.610	.650	.020	1,2,3
81348-0	.875	.745	.735	.030	1,2
485-0	.877	.808	1.087	.025	5
4493-0	.955	.685	1.200	.030	
4676-0	.970	.670	.795	.040	5
8122-0	1.000	1.000	.475	.040	
81170-0	1.000	.600	.650	.020	2,3
8322-0	1.000	1.000	.600	.050	
6666-0	1.085	.605	.455	.035	
✈ 4144-0	1.010	.831	.675	.030	
4733-0	1.015	.625	.695	.030	
81238-0	1.020	.745	.760	.030	1,3
81240-0	1.020	.745	.575	.030	1,2,3
497-0	1.060	.916	1.073	.030	5
1885-0	1.090	.930	1.040	.040	
8614-0	1.099	1.099	.228	.030	

Part number	A	B	C	D	Features
8459-0	1.103	1.103	.547	.025	
3596-0	1.110	.760	.525	.025	
5675-0	1.110	.975	.900	.025	1,4
8834-0	1.110	1.212	.847	.030	1
5595-0	1.145	.516	.345	.025	
390-0	1.148	.744	.496	.037	
388-0	1.150	.625	.500	.040	
5269-0	1.150	.695	.330	.025	
5270-0	1.150	.900	.330	.025	
8458-0	1.152	1.152	.573	.025	4
5465-0	1.152	.804	.392	.031	
✈ 81181-0	1.155	.980	1.070	.040	IRREGULAR
8460-0	1.158	1.158	.533	.025	
3197-1	1.175	.735	1.110	.030	
3523-1	1.175	.775	1.120	.030	
5407-0	1.179	.793	1.177		
2041-0	1.200	.430	.325	.030	
2042-0	1.200	.580	.325	.030	
6616-0	1.200	1.100	1.050	.035	
✈ 3575-0	1.212	1.110	.847	.030	1,4
5927-0	1.215	.740	1.155	.035	5
1311-0	1.215	.750	1.060	.035	1,5
2902-2	1.215	.750	1.150	.035	5
4738-0	1.235	.750	1.295	.038	
1375-0	1.240	1.220	.540	.045	5
6583-0	1.250	.850	.950	.035	
2178-0	1.304	.515	.515	.020	
81242-0	1.305	.920	.910	.040	1,2,3
4114-0	1.365	.700	1.634	.030	4,5
81185-0	1.420	1.275	1.150	.025	2,3,4

Part number	A	B	C	D	Features
3310-0	1.440	.755	1.110	.040	
4812-0	1.450	1.200	1.100	.040	
3367-0	1.480	1.435	.960	.040	3
1629-0	1.484	1.359	1.178	.040	1,4
5226-0	1.500	.688	.460	.035	
5608-0	1.510	.505	.460	.030	
✈ 5298-0	1.570	1.494	1.075	.040	1,4
4115-0	1.580	.700	1.634	.030	4,5
1601-0	1.615	1.815	1.160	.040	
4523-0	1.637	1.410	1.087	.050	
2332-0	1.640	1.600	1.690	.040	5
338-0	1.650	1.650	1.520	.062	
2338-0	1.660	1.290	1.340	.040	4,4
✈ 81244-0	1.680	1.240	1.285	.040	1,2,3
900-0	1.800	2.100	1.310	.050	1
5788-0	1.830	1.580	1.150	.040	
2235-0	1.830	1.600	1.160	.050	1,3
81337-0	1.860	1.320	1.540	.050	1,2,3,5
2333-0	1.908	1.202	1.705	.050	5
1100-0	1.910	1.725	1.500	.045	5
✈ 3376-0	1.930	1.613	1.190	.050	3
4106-0	1.950	1.670	.965	.035	
83879-0	2.011	1.136	.612	.047	
2336-0	2.030	1.470	1.500	.050	5
938-0	2.100	1.805	1.202	.050	1
3908-0	2.115	.820	.580	.030	
5351-0	2.250	1.250	.750	.050	

Quick-Ship (see page 2) ✈

Pot Core Bobbins with Terminals



Cosmo pot core bobbins fit standard millimeter ferrite cup cores. These bobbins are supplied with terminals suitable for economical production soldering.

This table is sequenced by Pot Core size (mm) and then by the Maximum number of terminals.

Part number	Terms (max)	Pot Core size (mm)	Sections	A	B	C	D	E	F	G	H	I	J	±.015 K	±.015 L	M
✈ 4428-0-121	6	14 x 8	1	.240	.453	.550	.140	.650	.280	.213			.295	.220	.055	.500
✈ 7176-0-121	10	23 x 11	1	.400	.680	.800	.150	.900	.500	.265			.315	.220	.045	.750
✈ 7175-0-121	10	23 x 18	1	.400	.680	.800	.150	.900	.500	.530			.580	.220	.045	.900
3251-0-121	10	30 x 19	1	.537	.976	1.100	.200	1.200	.600	.504			.636	.220	.045	1.100
2386-0-121	10	30 x 19	1	.537	.976	1.100	.200	1.200	.600	.504			.686	.108	.045	1.100
2386-1-121	10	30 x 19	2	.537	.976	1.100	.200	1.200	.600	.504	.205	.205	.686	.108	.045	1.100
1893-0-121	14	30 x 19	1	.537	.976	1.100	.150	1.200	.600	.504			.636	.220	.045	1.200
5570-0-121	12	36 x 22	2	.640	1.165	1.600	.150	1.720	.140	.570	.242	.242	.664	.200	.045	1.150
✈ 5570-1-121	12	36 x 22	1	.640	1.165	1.600	.150	1.720	.140	.570			.664	.200	.045	1.150
5570-2-121	12	36 x 22	1	.640	1.165	1.600	.150	1.720	.140	.280			.664	.200	.045	1.150

Specify number of terminals required.

Pot Core Bobbins without Terminals

Pot core bobbins without terminals require hand soldering. They fit standard millimeter ferrite cores, as indicated.

This table is sequenced by Pot Core size (mm) and then by the number of sections.

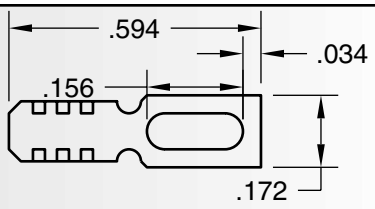
Part number	Pot Core size (mm)	Sections	Core dia.	Flange dia.	Length
1221-0	14 x 8	1	.240	.453	.107
2701-0	14 x 8	1	.240	.453	.216
2702-0	14 x 8	2	.240	.453	.216
2266-0	18 x 11	1	.304	.580	.133
5792-0	18 x 11	1	.307	.579	.148
✈ 2660-0	18 x 11	1	.307	.583	.279
3990-2	18 x 11	2	.304	.583	.276
2703-0	18 x 14	1	.299	.548	.394
2704-0	18 x 14	2	.299	.548	.394
2705-0	18 x 14	3	.299	.548	.394
8738-0	22 x 13	1	.377	.698	.359
2706-0	23 x 17	1	.449	.705	.441
2707-0	23 x 17	2	.449	.705	.441
2708-0	23 x 17	3	.449	.705	.441
7118-0	26 x 16	2	.457	.832	.429

Part number	Pot Core size (mm)	Sections	Core dia.	Flange dia.	Length
7119-0	26 x 16	3	.457	.832	.429
8737-0	26 x 16	1	.459	.826	.429
2709-0	28 x 23	1	.512	.862	.638
2710-0	28 x 23	2	.512	.862	.638
2711-0	28 x 23	3	.512	.862	.638
2712-0	28 x 23	4	.512	.862	.638
2717-0	30 x 19	1	.534	.980	.508
4680-0	30 x 19	1	.534	.980	.250
2713-0	34 x 28	1	.559	1.062	.778
2714-0	34 x 28	2	.559	1.062	.778
2715-0	34 x 28	3	.559	1.062	.778
2716-0	34 x 28	4	.559	1.062	.778
2035-0	36 x 22	1	.649	1.166	.563
4589-0	42 x 29	1	.709	1.394	.780
4781-0	47 x 28	1	.801	1.476	.740

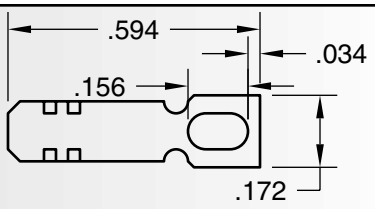
Quick-Ship (see page 2) ✈

FLAT SOLDER TERMINALS

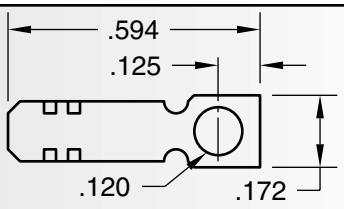
Flat solder terminals are primarily used in manual solder applications. With proper design of start lead slots, winding equipment can automatically tie off to these terminals.



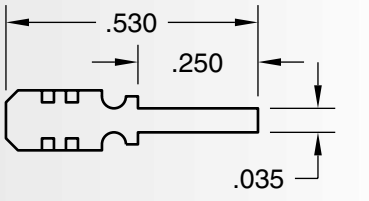
Terminal number 024 Pocket style W



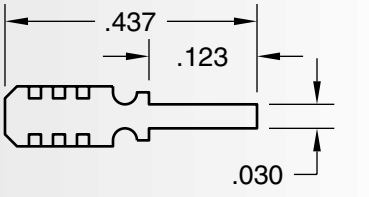
Terminal number 191 Pocket style W



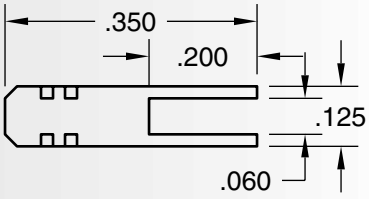
Terminal number 488 Pocket style W



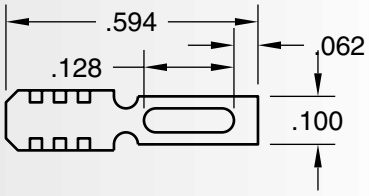
Terminal number 105 Pocket style W



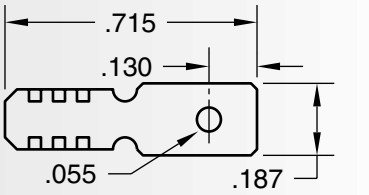
Terminal number 140 Pocket style W



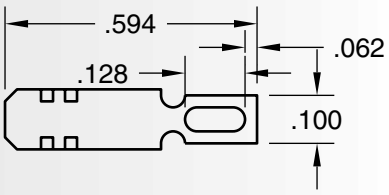
Terminal number 491 Pocket style W



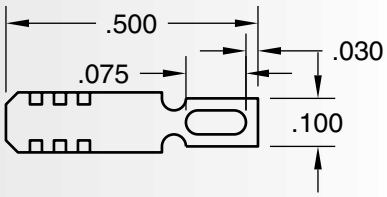
Terminal number 025 Pocket style W



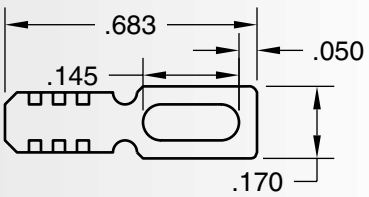
Terminal number 039 Pocket style W



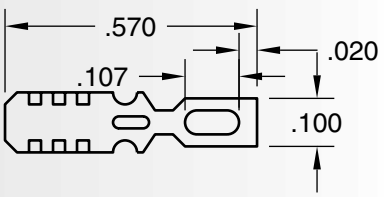
Terminal number 193 Pocket style W



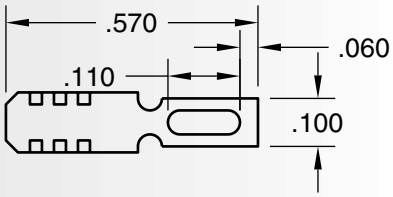
Terminal number 557 Pocket style W



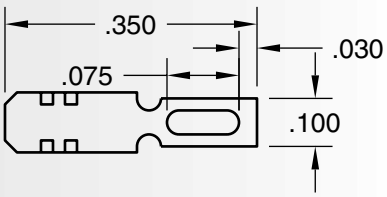
Terminal number 157 Pocket style W



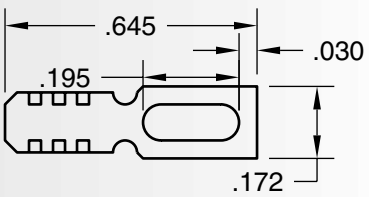
Terminal number 128 Pocket style W



Terminal number 131 Pocket style W

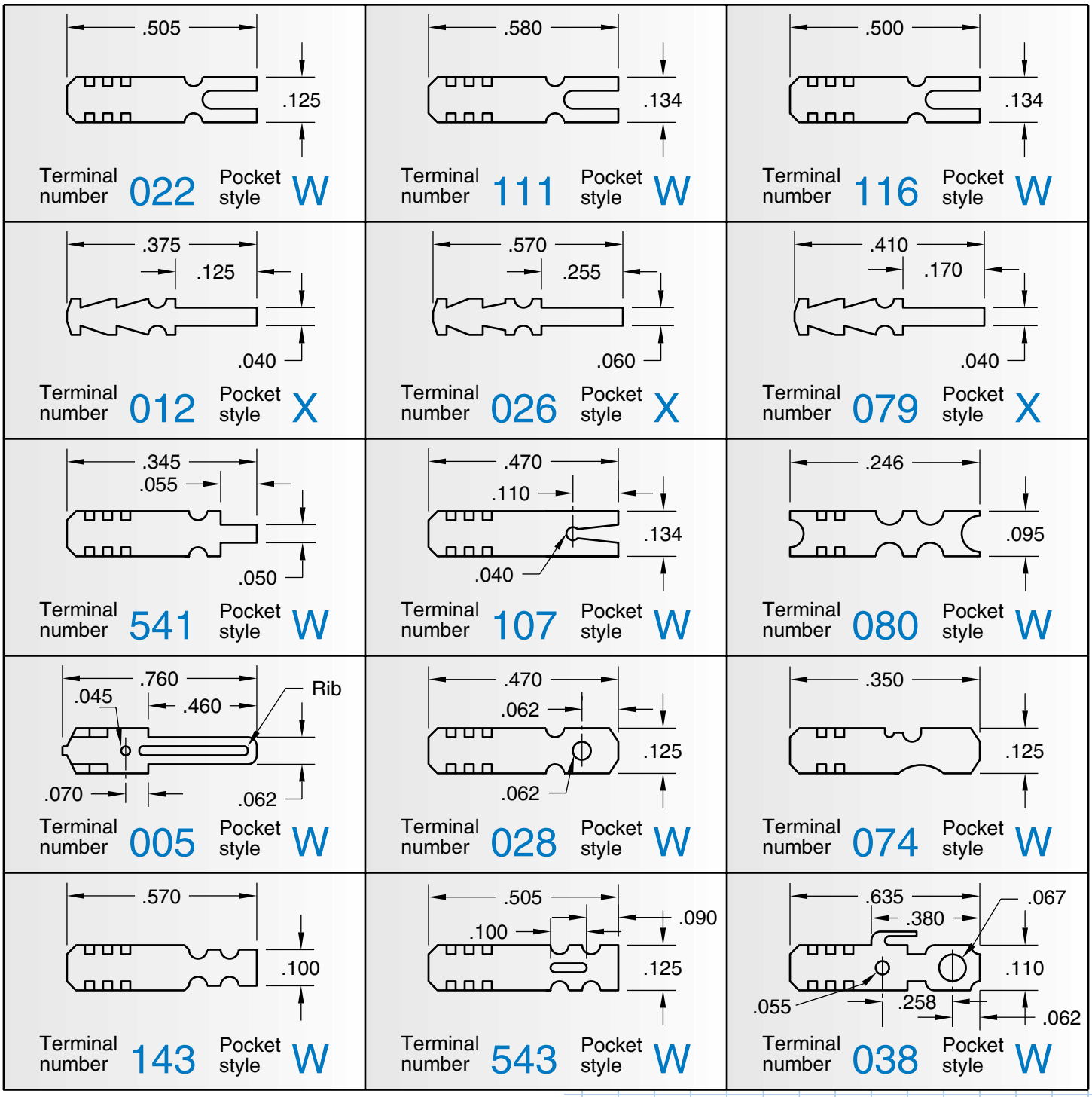


Terminal number 338 Pocket style W



Terminal number 048 Pocket style W

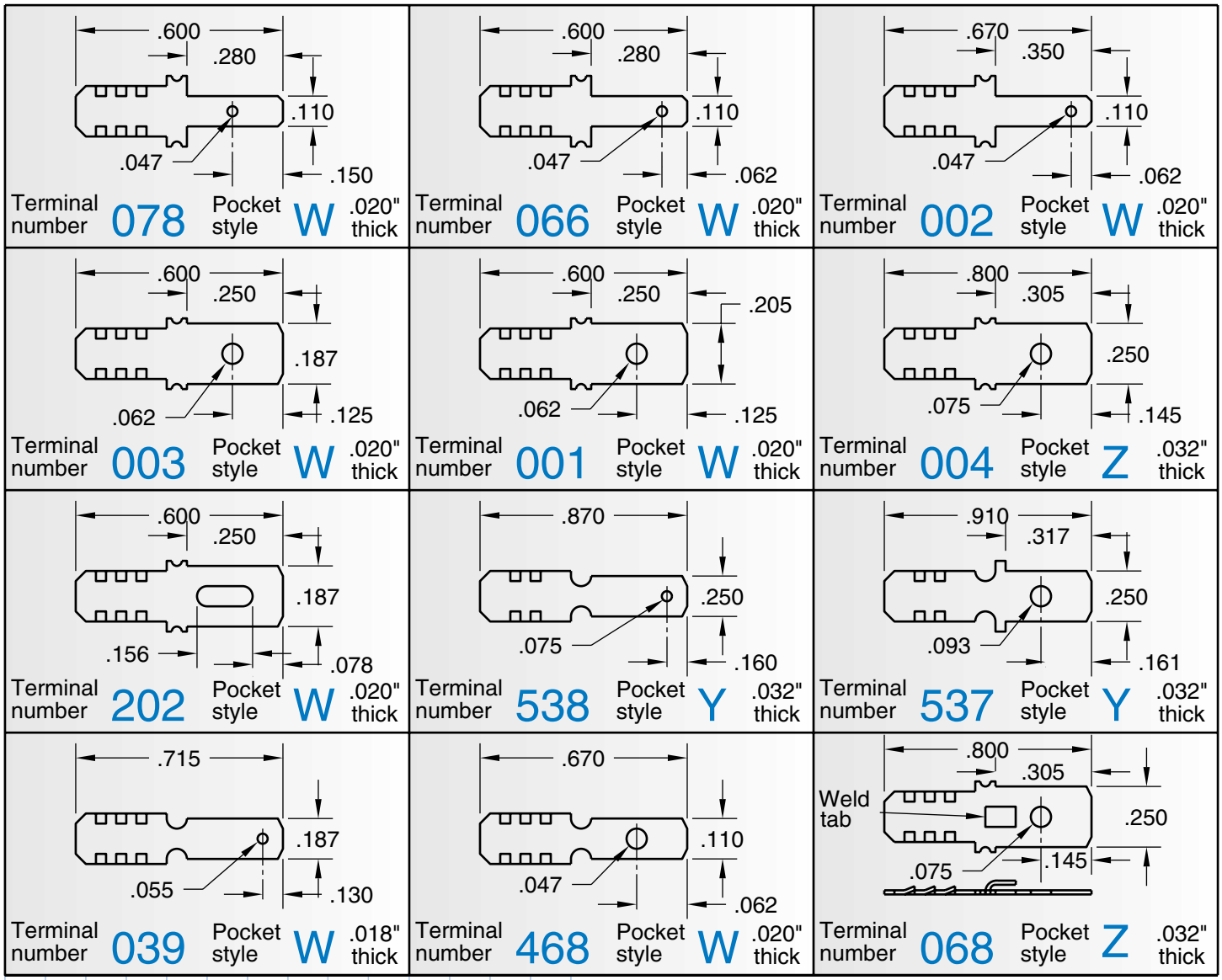
Flat solder terminals are stamped from .018" solder coated alloy stock in our own stamping facilities. The terminal pocket required in the bobbin is indicated by the letter in the lower right corner of each terminal drawing. Refer to the chart on page 34 for blind pocket specifications.



QUICK-DISCONNECT TERMINALS

The primary advantage of quick-disconnect terminals is the ease and speed with which the wound coil can be installed. When multiple sizes of quick-disconnect terminals are required in the same part, Cosmo can insert all the terminals in one operation. This unique fabrication technique helps assure low cost and high reliability.

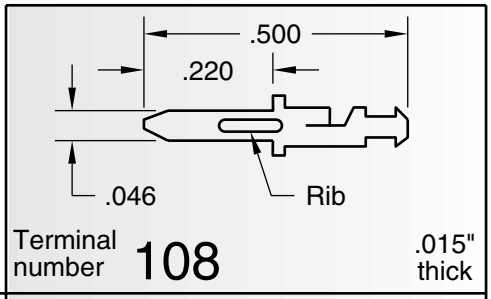
Cosmo's selection of standard quick-disconnect terminals covers the majority of the standard quick-disconnect receptacles. All of these terminals comply with NEMA standards. The terminal pocket required in the bobbin is indicated by the letter in the lower right corner of each terminal drawing. Refer to the chart on page 34 for blind pocket specifications.



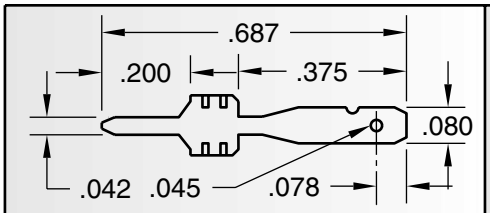
Stamped PC Board Terminals

Stamped flat style PC terminals are available in a number of sizes as shown below. These terminals can support the coil assembly directly on the printed circuit board.

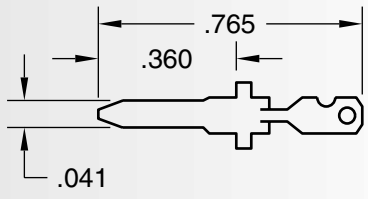
In addition, all magnet wire connections to the PC terminals along one edge of the bobbin can be soldered in one operation.



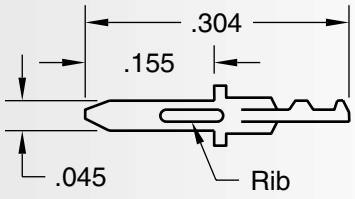
Terminal number 108 — .015" thick



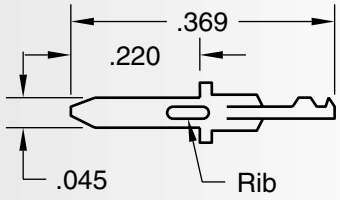
Terminal number 113 — .018" thick



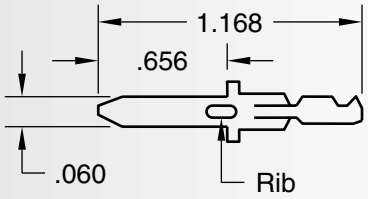
Terminal number 228 — .018" thick



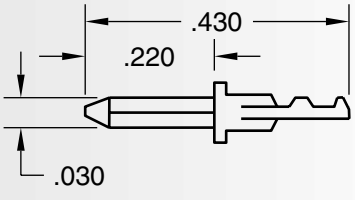
Terminal number 162 — .015" thick



Terminal number 121 — .015" thick



Terminal number 031 — .024" thick



Terminal number 137 — .015" thick

Wire PC Board and Surface Mount Terminals

Wire can be used to create terminations for bobbins for through-hole PC board and surface mount applications. The configurations of the wire are limited only by the insertion methods and bobbin design.

Cosmo stocks both round and square wire in the following cross section sizes. Other sizes may also be available.

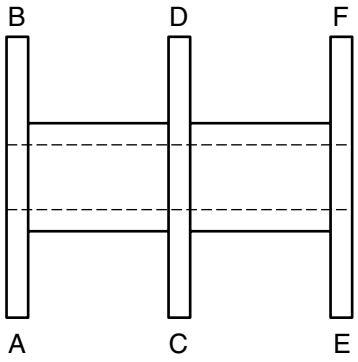
Round wire diameter:

- .016″
- .018″
- .020″
- .022″
- .025″
- .032″
- .036″
- .040″
- .045″
- .051″

Square wire dimension:

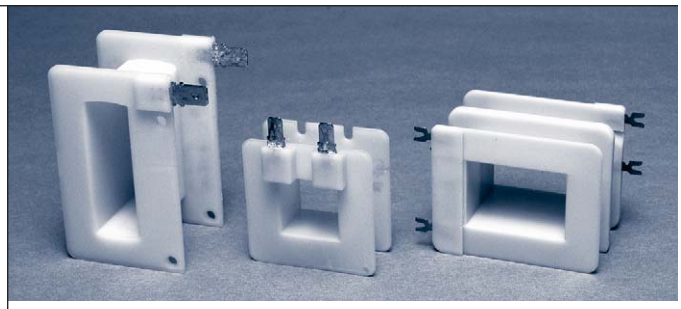
- .012″sq.
- .015″sq.
- .020″sq.
- .025″sq.
- .032″sq.
- .036″sq.
- .045″sq.

TRANSFORMER BOBBINS WITH FLAT SOLDER OR QUICK-DISCONNECT TERMINALS



Terminal Flange Key

These bobbins are primarily used with standard steel laminations in non printed circuit board applications. Soldering of leads is generally a manual operation. Cosmo offers 42 standard flat solder and quick-disconnect terminal styles (shown on pages 54 - 56) for use in these bobbins. Cosmo can also produce custom designed terminals to meet your specifications.



This table is sequenced by Lamination size and then Stack height.

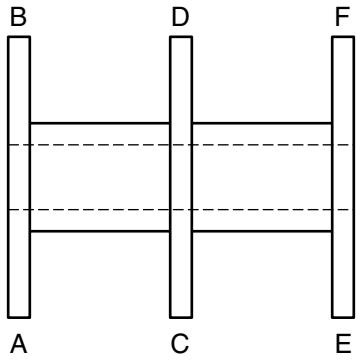
Part number	Lamination	Terms (max)	Terms per flange side A	B	C	D	E	F	Core dimensions	Flange dimensions	Length	Wall	Flange styles
3521-0	EE-24-25	6	3	3					.266 x .266	.730 x .730	.470	.030	A A
2103-0	EE-24-25	4	2	2					.265 x .265	.500 x .540	.478	.031	A A
5640-0	EE-24-25 x 3/8	4	2	2					.262 x .391	.728 x .865	.478	.030	A A
7303-0	EE-24-25 x 1/2	4	1	1			1	1	.260 x .510	.720 x .990	.490	.030	A A
2079-0	EE-26-27 x 1/4	6	3	3					.265 x .390	.850 x .968	.825	.030	A A A
1220-8	EI-375	2	2						.390 x .390	.970 x .970	.730	.030	0 0
3309-0	EI-375	6	3	3					.390 x .390	.980 x 1.000	.734	.035	A M
3309-1	EI-375	6	6						.390 x .390	.980 x 1.000	.734	.025	A M
3309-3	EI-375	5	5						.390 x .390	.980 x 1.000	.735	.035	A M
4782-0	EI-375 x 1/2	4	2	2					.392 x .520	1.105 x .972	.740	.035	A A A
3061-0	EI-21	2	2						.510 x .510	1.000 x 1.100	.796	.023	A A
1289-0	EI-21	6	3	3					.510 x .510	1.100 x 1.125	.796	.040	A A
5777-0	EI-21	6	3				3		.510 x .510	1.100 x 1.125	.796	.040	A A A
5005-0	EI-21	2	2						.510 x .510	1.100 x 1.125	.796	.040	A A
81531-0	EI-21	6	4	2					.515 x .515	1.105 x 1.395	.792	.060	A A
1290-0	EI-21	6	3	3					.516 x .516	1.100 x 1.125	.796	.040	A I
7145-0	EI-21	6	6						.515 x .515	1.103 x 1.120	.800	.040	A A
4541-0	EI-21	6	3	3					.515 x .515	.990 x 1.005	.720	.030	A A
1291-0	EI-21 x 5/8	6	3	3					.516 x .642	1.100 x 1.250	.796	.040	A I
3154-0	EI-21 x 5/8	6	3	3					.516 x .640	1.106 x 1.250	.790	.035	A A
2889-0	EI-21 x 5/8	8	4	4					.510 x .635	1.100 x 1.250	.796	.045	A A
4926-1	EI-21 x 5/8	5	3	2					.520 x .650	.997 x 1.094	.796	.030	3 A 3
1291-1	EI-21 x 5/8	6	6						.516 x .642	1.100 x 1.250	.796	.040	A A
3259-0	EI-21 x 3/4	6	2				2	2	.510 x .760	1.093 x 1.343	.802	.040	A A A
2364-0	EI-21 x 1	2	2						.543 x .919	1.112 x 1.457	.775	.030	5 A
3547-0	EI-625 x 3/8	2	2						.629 x .390	.943 x 1.237	.921	.040	A A
4221-0	EI-625 x 1/2	6	2	1			2	1	.635 x .510	1.218 x 1.093	.921	.040	A A
1653-0	EI-625 x 1/2	2	1	1					.640 x .515	1.230 x 1.109	.920	.040	A A

These bobbins are available with a combination of terminals to the maximum number indicated per flange. Most raised barb terminals will fit. Drawings of standard solder and quick-disconnect terminals are located on pages 54-56. Specify terminal styles(s) and positions desired.

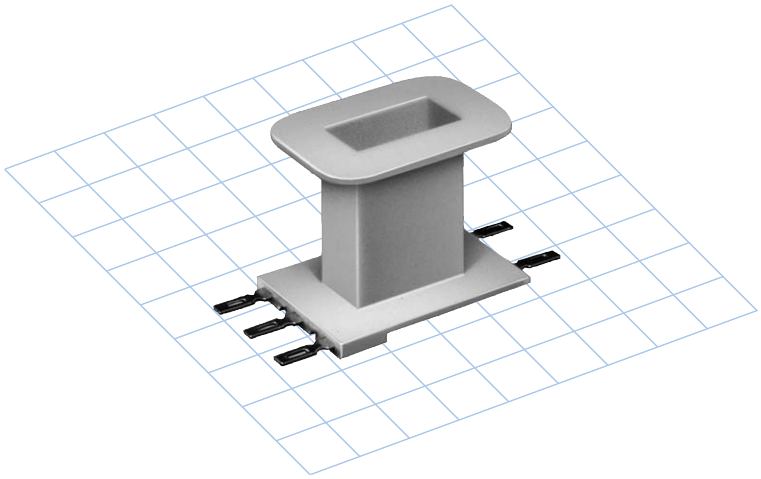
This table is sequenced by Lamination size and then Stack height.

Part number	Lamination	Terms (max)	Terms per flange side A	B	C	D	E	F	Core dimensions	Flange dimensions	Length	Wall	Flange styles
432-0	EI-625	2	2						.640 x .640	1.218 x 1.218	.921	.035	A O
3522-0	EI-625	6	3	3					.635 x .635	1.235 x 1.250	.921	.040	A A
7199-0	EI-625	6	3				3		.640 x .640	1.235 x 1.250	.921	.040	A A
4000-0	EI-625	6	3	3					.635 x .641	1.235 x 1.263	.921	.090	A A A
8704-0	EI-625	3	3						.643 x .636	1.236 x 1.259	.921	.030	A A A
2899-0	EI-625 x 11/16	2			2				.637 x .700	1.218 x 1.373	.915	.035	A A O
1228-4	EI-625 x 3/4	4	2	2					.647 x .750	1.218 x 1.343	.915	.035	A A
454-0	EI-625 x 3/4	5	3				2		.625 x .750	1.218 x 1.343	.921	.035	A A A
3484-0	EI-625 x 3/4	5	3				2		.636 x .750	1.218 x 1.421	.921	.050	A A A
1619-0	EI-625 x 7/8	8	4	4					.650 x .885	1.225 x 1.522	.920	.050	3 A 3
3262-0	EI-75 x 3/8	4	2				2		.765 x .391	1.485 x .961	1.100	.033	A A A
5077-0	EI-75 x 1/2	4	2	2					.760 x .510	1.200 x 1.420	1.110	.035	A A A
3036-0	EI-75 x 5/8	5	3				2		.760 x .635	1.500 x 1.375	1.100	.040	A A A
3258-0	EI-75	8	4	4					.758 x .758	1.485 x 1.485	1.107	.030	A A
3291-0	EI-75	6	3	3					.760 x .760	1.480 x 1.480	1.112	.040	A A
2263-0	EI-75	12	6	6					.760 x .760	1.425 x 1.428	1.115	.040	3 A
433-1	EI-75	2	2						.762 x .762	1.484 x 1.484	1.109	.040	A O
1216-3	EI-75	4	2	2					.765 x .765	1.480 x 1.480	1.108	.040	A J
5996-0	EI-75	12	3	3			3	3	.765 x .765	1.478 x 1.478	1.100	.040	A A A
7512-0	EI-75	9	3	2			3	1	.760 x .760	1.485 x 1.625	1.110	.040	A A A
3016-0	EI-75	6	3	3					.765 x .765	1.480 x 1.600	1.110	.040	A A
2898-0	EI-75 x 13/16	2			2				.762 x .825	1.475 x 1.632	1.100	.040	A A O
3483-1	EI-75 x 7/8	5	3	2					.760 x .875	1.468 x 1.718	1.109	.050	A A A
4718-0	EI-75 x 7/8	4		4					.774 x .873	1.475 x 1.565	1.100	.040	A A A
1341-0	EI-75 x 7/8	5	2				3		.765 x .875	1.480 x 1.678	1.100	.040	A A A
3483-0	EI-75 x 7/8	5	2				3		.760 x .875	1.468 x 1.718	1.109	.050	A A A
5038-0	EI-75 x 1	3	2	1					.770 x 1.020	1.470 x 1.740	1.010	.040	A A
3058-0	EI-75 x 1	2			2				.762 x 1.012	1.475 x 1.780	1.100	.040	A A O
3182-0	EI-75 x 1	3	3						.765 x 1.015	1.500 x 1.750	1.100	.040	A A A
3182-1	EI-75 x 1	6	3				3		.765 x 1.015	1.500 x 1.750	1.100	.040	A A A
1300-0	EI-75 x 1	16	4	4			4	4	.765 x 1.015	1.485 x 1.735	1.090	.040	A A A
5626-0	EI-75 x 1	6	6						.765 x 1.070	1.500 x 1.850	1.100	.040	3 A A
8706-0	EI-75 x 1	2	2						.768 x 1.016	1.490 x 1.734	1.090	.035	A A A
427-0	EI-75 x 1	2	2						.770 x 1.024	1.455 x 1.718	1.150	.040	A A
4204-0	EI-75 x 1	6	3	3					.770 x 1.020	1.470 x 1.720	1.010	.040	A A
4016-0	EI-75 x 1-1/4	5	2				3		.760 x 1.280	1.468 x 2.125	1.109	.050	A A A
4016-1	EI-75 x 1-1/4	4	2		2				.760 x 1.280	1.469 x 2.125	1.109	.050	4 A 4
5382-0	EI-87	2	2						.885 x .885	1.728 x 1.728	1.215	.040	A A
8613-0	EI-87	3	3						.885 x .885	1.730 x 1.730	1.296	.040	A A A
5076-0	EI-87	5	3	2					.885 x .885	1.720 x 1.730	1.300	.030	A A A
1282-0	EI-87	4	2	2					.890 x .890	1.734 x 1.750	1.280	.040	A J
1175-1	EI-87	12	6	6					.892 x .900	1.729 x 1.900	1.286	.030	6 A 6
1175-0	EI-87	12	6	6					.894 x .901	1.732 x 1.902	1.290	.030	6 6
1391-0	EI-87	4	4						.885 x .885	1.740 x 1.745	.700	.035	2 A 2
5249-0	EI-87 x 1	5	3	2					.885 x 1.010	1.730 x 1.855	1.300	.040	A A A

These bobbins are available with a combination of terminals to the maximum number indicated per flange. Most raised barb terminals will fit. Drawings of standard solder and quick-disconnect terminals are located on pages 54-56. Specify terminal styles(s) and positions desired.



Terminal Flange Key



This table is sequenced by Lamination size and then Stack height.

Part number	Lamination	Terms (max)	Terms per flange side A	B	C	D	E	F	Core dimensions	Flange dimensions	Length	Wall	Flange styles
4818-1	EI-87 x 1	7	4	3					.885 x 1.010	1.728 x 1.852	1.280	.040	A A A
764-0	EI-87 x 1	13	7	6					.892 x 1.020	1.717 x 1.845	1.284	.040	A A A
5123-0	EI-87 x 1-1/16	3	2	1					.896 x 1.063	1.693 x 2.007	1.299	.045	2 A M
3091-0	EI-100 x 5/8	2	2						1.012 x .637	1.562 x 1.187	1.485	.040	A J
828-0	EI-100 x 11/16	6	3		3				1.025 x .710	1.770 x 1.980	1.495	.040	A A A
912-0	EI-100 x 13/16	3	3						1.005 x .822	1.900 x 1.930	1.484	.050	A A P
4949-0	EI-100	2	2						1.025 x 1.025	1.975 x 1.975	1.470	.043	A O
4949-1	EI-100	4	2	2					1.025 x 1.025	1.975 x 1.975	1.470	.043	A A
970-0	EI-100	8	4				4		1.020 x 1.020	1.968 x 1.968	1.480	.040	A A A
913-0	EI-100 x 1-1/8	1	1						1.025 x 1.130	1.931 x 2.100	1.485	.050	P A J
832-0	EI-100 x 1-3/16	6	3		3				1.025 x 1.215	1.980 x 2.170	1.495	.040	A A A
4890-0	EI-100 x 1-3/16	3	2	1					1.020 x 1.220	1.565 x 1.935	1.475	.060	M A
1176-1	EI-100 x 1-1/2	12	6	6					1.018 x 1.501	1.978 x 2.627	1.477	.030	6 A 6
1012-0	EI-100 x 1-1/2	8	4				4		1.020 x 1.520	1.968 x 2.468	1.480	.040	A A A
914-0	EI-100 x 1-5/8	1	1						1.025 x 1.630	1.931 x 2.600	1.485	.050	P A J
567-0	EI-100 x 1-3/4	12	6	6					1.023 x 1.818	1.970 x 3.001	1.485	.040	A A
567-1	EI-100 x 1-3/4	12	6	6					1.026 x 1.818	1.986 x 3.020	1.483	.040	A A
765-0	EI-112	13	7	6					1.142 x 1.142	2.220 x 2.220	1.661	.040	A A A
1061-0	EI-125	12	6	6					1.276 x 1.276	2.481 x 2.848	1.860	.040	3 3
1062-0	EI-125 x 1-11/16	12	6	6					1.270 x 1.699	2.470 x 2.993	1.854	.040	3 3
8536-0	EI-138 x 1-5/8	1	1						1.389 x 1.616	2.686 x 3.013	1.203	.040	M A 1
8550-0	EI-138 x 2-13/32	4	4						1.390 x 2.440	2.695 x 3.955	2.052	.040	M A 1
995-0	EI-150	1	1						1.515 x 1.515	2.968 x 2.968	2.218	.040	O A J
767-0	EI-150	13	7	6					1.513 x 1.513	2.969 x 2.969	2.233	.040	A A A
8549-0	EI-175 x 2-1/4	4	4						1.780 x 2.269	3.447 x 4.055	2.570	.065	M A N

These bobbins are available with a combination of terminals to the maximum number indicated per flange. Most raised barb terminals will fit. Drawings of standard solder and quick-disconnect terminals are located on pages 54-56. Specify terminal styles(s) and positions desired.

TRANSFORMER BOBBINS WITHOUT TERMINALS

Transformer bobbins without terminals require soldering of the lead wires directly to the magnet wire using a secondary means of strain relief. Varying stack heights of iron laminations are used with these bobbins.

This table is sequenced by Lamination size and then Stack height.

Part number	Lamination	Core dim.	Flange dim.	Lgth	Wall	Flange styles
7000-0	EI-093	.095 x .095	.270 x .270	.105	.030	A A
7001-0	EI-094	.103 x .103	.270 x .270	.150	.018	A A
2412-0	EI-094 x 9/64	.096 x .142	.270 x .325	.155	.022	BB BB
4713-0	EI-094 x 1/4	.103 x .275	.234 x .406	.149	.020	A A
✈ 7002-0	EE-30-31	.103 x .103	.266 x .305	.275	.020	A A
1260-0	EE-30-31	.108 x .108	.266 x .266	.270	.020	A A
✈ 7049-0	EE-30-31 x 9/64	.101 x .150	.275 x .329	.273	.015	A A
1277-0	DU-124	.125 x .125	.312 x .312	.453	.020	A A
3201-0	DU-124	.145 x .210	.320 x .420	.420	.022	A A
4507-0	DU-124 x 3/4	.130 x .780	.300 x 1.023	.468	.035	A TT
2588-0	UBD	.127 x .194	.314 x .381	.620	.025	A A
1584-0	EE-28-29 x 3/32	.156 x .094	.375 x .312	.304	.022	O O
✈ 1208-0	EE-28-29	.133 x .133	.365 x .365	.307	.022	A A
1208-1	EE-28-29	.130 x .130	.370 x .370	.310	.022	A A A
1208-2	EE-28-29	.130 x .130	.365 x .365	.310	.022	I G I
2545-0	EE-28-29	.156 x .156	.343 x .343	.250	.020	A A
1240-0	EE-28-29	.125 x .125	.375 x .468	.312	.022	U A
81220-0	EE-28-29	.135 x .135	.365 x .365	.305	.030	A A
83220-0	EE-28-29	.135 x .135	.365 x .365	.305	.030	A A
7052-0	EE-28-29 x 3/16	.132 x .192	.360 x .438	.300	.030	A A
1416-0	EE-28-29 x 3/16	.135 x .210	.370 x .500	.306	.020	A V
✈ 2051-0	EE-28-29 x 1/4	.131 x .255	.372 x .500	.309	.020	F A
1594-0	EE-28-29 x 1/4	.125 x .250	.375 x .500	.245	.025	A A
2497-0	EE-28-29 x 1/4	.156 x .255	.300 x .400	.260	.020	A A
✈ 1287-0	EE-28-29 x 1/4	.131 x .255	.372 x .495	.309	.020	A A
81229-0	EE 28-29 x 1/4	.135 x .260	.365 x .490	.305	.020	A A
83229-0	EE 28-29 x 1/4	.135 x .260	.365 x .490	.305	.030	A A
1592-0	EE-28-29 x 1/4	.125 x .263	.305 x .440	.250	.022	J J
81394-0	EE-28-29 x 5/16	.135 x .320	.365 x .490	.260	.010	A A
4578-0	EE-28-29 x 3/8	.130 x .380	.370 x .630	.245	.020	A A
1550-0	EE-28-29 x 7/16	.171 x .437	.375 x .625	.305	.027	A A
4334-0	EE-28-29 x 1/2	.131 x .500	.372 x .750	.309	.030	A A
7005-0	EE-32-33	.145 x .145	.425 x .425	.265	.020	A A
✈ 1246-0	EI-186	.190 x .190	.540 x .540	.245	.025	A A
7006-0	EI-186	.194 x .194	.545 x .545	.245	.030	A A
1246-3	EI-186	.195 x .195	.515 x .515	.245	.025	A A
7008-0	EI-186	.200 x .200	.535 x .535	.233	.015	A A
83263-0	EI-186	.200 x .200	.535 x .535	.233	.025	A A
1246-2	EI-186	.196 x .196	.549 x .549	.243	.022	A I
1246-1	EI-186	.190 x .190	.545 x .545	.245	.025	V A
6512-0	EE-186	.200 x .200	.375 x .535	.675	.025	A A
✈ 5576-0	EI-186 x 9/32	.200 x .290	.540 x .640	.240	.025	A A
2550-0	EI-186 x 3/8	.203 x .375	.546 x .718	.234	.025	A A
1283-0	IB-DU	.200 x .200	.430 x .430	.610	.030	TT TT
7007-0	EI-187	.200 x .200	.531 x .531	.421	.030	I A
✈ 1284-0	EI-187	.200 x .200	.537 x .537	.427	.025	A A
8452-0	EI-187	.203 x .203	.541 x .541	.427	.025	A A
✈ 1204-1	EI-187	.208 x .208	.536 x .536	.425	.025	N N
1204-2	EI-187	.200 x .200	.531 x .531	.425	.025	A N
✈ 1204-0	EI-187	.208 x .208	.545 x .545	.425	.025	A A
1224-1	EI-187	.205 x .205	.531 x .531	.425	.030	L A
1224-2	EI-187	.205 x .205	.531 x .531	.425	.025	L A
1586-0	EI-187	.200 x .200	.535 x .535	.425	.022	S S
1234-0	EI-187	.195 x .195	.535 x .643	.420	.025	N N
2570-0	EI-187	.208 x .208	.430 x .430	.425	.025	A A
4802-0	EI-187	.200 x .200	.535 x .650	.425	.025	I I I
7058-0	EI-187 x 1/4	.200 x .263	.555 x .600	.425	.030	N A
7054-0	EI-187 x 1/4	.200 x .263	.555 x .600	.425	.020	L A
1267-0	EI-187 x 9/32	.195 x .291	.530 x .670	.420	.025	N N
7055-0	EI-187 x 9/32	.200 x .296	.537 x .675	.430	.030	A A
7056-0	EI-187 x 11/32	.200 x .355	.535 x .695	.425	.023	A A
7057-0	EI-187 x 3/8	.200 x .395	.535 x .615	.425	.030	A A
81340-0	EI-187 x 3/8	.200 x .395	.535 x .615	.425	.025	A A
✈ 7059-0	EI-187 x 3/8	.200 x .385	.535 x .720	.425	.030	A A
2488-0	EI-187 x 7/16	.190 x .460	.359 x .625	.422	.025	A A
83602-0	EI-187 x 7/16	.200 x .457	.535 x .720	.425	.025	A A
1597-0	EI-187 x 5/8	.218 x .640	.542 x 1.015	.425	.025	BB BB
3979-0	EI-187 x 23/32	.194 x .715	.548 x .937	.428	.015	A A
8483-0	EE-186-187 x 3/32	.200 x .098	.550 x .230	.675	.020	A A
2499-0	EE-186-187	.187 x .195	.425 x .530	.672	.022	A M
3329-0	EE-186-187	.200 x .200	.550 x .550	.675	.030	A A
7012-0	EE-186-187	.203 x .203	.420 x .420	.670	.030	M M

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Lamination size and then Stack height.

Part number	Lamination	Core dim.	Flange dim.	Lgth	Wall	Flange styles
7012-1	EE-186-187	.200 x .200	.370 x .370	.670	.020	M M
4134-0	EE-186-187	.203 x .203	.537 x .537	.673	.025	N N
2511-0	EE-186-187 x 1/4	.200 x .263	.555 x .600	.675	.020	A L
1519-0	U B E	.255 x 1.130	.750 x 1.625	.250	.024	A A
7229-0	EE-24-25	.260 x .260	.560 x .560	.466	.030	A I
83124-0	EE-24-25	.257 x .257	.595 x .595	.455	.025	A A
83388-0	EE-24-25	.260 x .260	.625 x .625	.475	.020	A J 12
7015-0	EE-24-25	.257 x .257	.656 x .750	.480	.030	G G
7335-0	EE-24-25	.260 x .260	.740 x .760	.476	.025	N N
✈ 7016-0	EE-24-25	.262 x .262	.740 x .740	.476	.030	A A
4803-0	EE-24-25	.262 x .262	.730 x .740	.476	.020	I I
7017-0	EE-24-25	.262 x .262	.640 x .740	.476	.030	A A
5965-0	EE-24-25	.265 x .265	.725 x .725	.475	.028	A B
1206-3	EE-24-25	.266 x .266	.718 x .718	.476	.030	V A
7018-0	EE-24-25	.266 x .266	.720 x .750	.476	.030	A A
7018-1	EE-24-25	.266 x .266	.720 x .720	.476	.030	A A
7019-0	EE-24-25	.266 x .266	.720 x .750	.476	.030	I A I
2597-0	EE-24-25	.256 x .256	.735 x .735	.490	.025	T WW
✈ 1206-0	EE-24-25	.266 x .266	.718 x .718	.476	.030	A A
1206-2	EE-24-25	.268 x .274	.719 x .717	.479	.030	O O
1226-1	EE-24-25	.266 x .266	.718 x .718	.480	.030	L L
1226-2	EE-24-25	.250 x .250	.718 x .718	.480	.031	J J
✈ 1226-3	EE-24-25	.266 x .266	.718 x .718	.480	.030	N N
1226-4	EE-24-25	.260 x .260	.719 x .719	.480	.035	B A
2123-0	EE-24-25	.266 x .266	.740 x .740	.480	.030	M A
1232-0	EE-24-25	.260 x .260	.736 x .736	.488	.022	V V
1232-2	EE-24-25	.260 x .260	.736 x .736	.488	.022	A A
1232-3	EE-24-25	.258 x .260	.744 x .800	.485	.032	N N
83449-0	EE-24-25 x 5/16	.265 x .320	.725 x .780	.475	.030	A A
8411-0	EE-24-25 x 11/32	.280 x .340	.700 x .760	.470	.030	A A
✈ 7063-0	EE-24-25 x 3/8	.266 x .391	.720 x .875	.467	.030	A A
7481-0	EE-24-25 x 3/8	.266 x .391	.720 x .875	.476	.030	N N
1587-0	EE-24-25 x 3/8	.266 x .391	.721 x .855	.476	.030	S S
1587-1	EE-24-25 x 3/8	.266 x .391	.720 x .875	.476	.030	J J
1503-0	EE-24-25 x 1/2	.285 x .500	.687 x 1.125	.464	.030	A CC
83307-0	EE-24-25 x 1/2	.266 x .515	.720 x .970	.460	.032	A A
✈ 7065-0	EE-24-25 x 1/2	.266 x .515	.720 x .970	.480	.030	A A
81307-0	EE-24-25 x 1/2	.266 x .515	.720 x .970	.490	.030	A A
4148-0	EE-24-25 x 1/2	.265 x .517	.720 x .971	.488	.030	N N
✈ 7065-1	EE-24-25 x 1/2	.260 x .525	.725 x .980	.485	.020	A A
✈ 1280-0	EE-24-25 x 3/4	.265 x .750	.727 x 1.235	.480	.030	A A
✈ 3121-0	EE-24-25 x 1	.260 x 1.032	.730 x 1.497	.485	.030	A A
2145-0	EI-25	.265 x .265	.740 x .740	.370	.030	I I
8402-0	EI-201	.266 x .266	1.062 x 1.125	.532	.032	A A
3244-0	EI-370 x 3/32	.253 x .096	.946 x .656	.733	.025	A A
3236-0	EI-370 x 3/8	.265 x .390	.937 x .937	.734	.035	I I
1273-0	AL-4	.266 x .266	.740 x .740	.856	.031	I I

Part number	Lamination	Core dim.	Flange dim.	Lgth	Wall	Flange styles
7061-0	AA-1	.265 x .640	.703 x 1.078	1.120	.030	A A
7062-0	AA-2	.265 x .765	.703 x 1.203	1.120	.030	A A
8311-0	EI-1/4 x 3/8 3PH	.270 x .380	.585 x .700	1.045	.030	A A
1936-0	DU-1	.312 x .695	.998 x 1.381	1.445	.060	R R
1248-0	F-12 x 1/4	.348 x .260	.722 x .812	.734	.030	A A
1248-2	F-12 x 1/4	.355 x .255	.630 x .812	.734	.030	W A
✈ 7021-1	F-12	.348 x .348	.812 x .812	.718	.030	A M
81222-0	F-12	.355 x .355	.818 x .818	.725	.030	A A
1268-0	EE-26-38	.385 x .385	.859 x .859	.484	.030	A A
1590-0	EE-26-27 x 3/16	.390 x .200	.690 x .490	.700	.025	I I
7024-0	EE-26-27	.380 x .380	.860 x .860	.682	.030	A A A
1271-0	EE-26-27	.380 x .380	.860 x .860	.515	.025	A A
1271-1	EE-26-27	.380 x .380	.860 x .860	.515	.025	CC A
1242-0	EE-26-27	.380 x .380	.860 x .860	.680	.031	* A
83221-0	EE-26-27	.390 x .390	.855 x .855	.675	.031	A A
4799-0	EE-26-27	.385 x .385	.855 x 1.050	.675	.030	I I
✈ 1238-0	EE-26-27	.388 x .388	.866 x .866	.680	.025	A A
1238-1	EE-26-27	.388 x .388	.862 x .862	.680	.028	I I
1238-2	EE-26-27	.380 x .380	.860 x .860	.682	.030	O O
✈ 8372-0	EE-26-27 x 1/2	.380 x .505	.860 x .985	.682	.030	A A
1366-0	EE-26-27 x 17/32	.392 x .550	.840 x 1.200	.675	.035	A A A
81375-0	EE-26-27 x 9/16	.390 x .578	.855 x 1.043	.675	.030	A A
81369-1	EE-26-27 x 3/4	.390 x .765	.855 x 1.230	.675	.030	A A
✈ 2886-0	EE-26-27 x 3/4	.406 x .781	.844 x 1.312	.656	.032	A A
3415-0	EE-26-27 x 1-1/2	.415 x 1.520	.854 x 2.264	.650	.050	A A
1689-0	EI-375	.380 x .380	.969 x .969	.734	.030	M A
1244-0	EI-375	.385 x .385	.969 x .969	.365	.020	A A
✈ 1210-0	EI-375	.390 x .390	.968 x .968	.736	.030	A A
3117-0	EI-375	.390 x .390	.980 x .980	.730	.030	A A
8810-0	EI-375	.395 x .395	.970 x .970	.730	.035	N N
7025-0	EI-375	.390 x .390	.968 x .968	.734	.030	I A I
7028-0	EI-375	.390 x .390	.975 x .975	.735	.030	S S
7029-0	EI-375	.390 x .390	.975 x .975	.735	.030	A A
1210-1	EI-375	.390 x .390	.968 x .968	.736	.030	A F
1220-0	EI-375	.395 x .395	.970 x .970	.732	.035	A N
1220-2	EI-375	.395 x .395	.970 x .970	.730	.030	O A
1220-3	EI-375	.395 x .395	.970 x .970	.730	.030	N N
1220-5	EI-375	.390 x .390	.968 x .968	.736	.030	I I
2881-0	EI-375	.390 x .390	.970 x .970	.734	.032	I J I
1223-0	EI-375	.395 x .395	.970 x .970	.734	.035	I I
1220-9	EI-375	.390 x .390	.700 x .968	.730	.030	N N
7343-0	EI-375	.380 x .380	.860 x .860	.682	.030	N N
4800-0	EI-375	.395 x .395	.968 x 1.150	.730	.030	I I
2270-0	EI-375	.390 x .390	.755 x .970	.755	.022	E A M
83267-0	EI-375 x 3PH	.390 x .390	.812 x .812	1.187	.031	A A
1424-0	EI-375 x 7/16	.380 x .445	.875 x .930	.727	.031	A A
1424-1	EI-375 x 7/16	.380 x .445	.875 x .930	.730	.031	I I

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Lamination size and then Stack height.

Part number	Lamination	Core dim.	Flange dim.	Lgth	Wall	Flange styles
✈ 1288-0	EI-375 x 1/2	.390 x .510	.978 x 1.110	.735	.030	A A
3277-0	EI-375 x 1/2	.390 x .510	.985 x 1.110	.735	.040	A F
3277-1	EI-375 x 1/2	.390 x .510	.985 x 1.110	.735	.040	A A A
83306-0	EI-375 x 1/2	.385 x .510	.975 x 1.100	.796	.031	A A
6497-0	EI-375 x 5/8	.390 x .640	.974 x 1.224	.734	.031	A A
✈ 2427-1	EI-375 x 11/16	.375 x .682	.969 x 1.281	.734	.032	A F
2427-2	EI-375 x 11/16	.383 x .688	.970 x 1.280	.735	.030	A A A
81369-0	EI-375 x 3/4	.380 x .765	.840 x 1.230	.673	.040	14 14
8854-0	EI-375 x 3/4	.390 x .766	.974 x 1.350	.734	.031	A A
5350-0	EI-375 x 1	.380 x 1.010	.975 x 1.600	.730	.035	A A A
8144-0	EI-375 x 1-5/32	.380 x 1.150	.968 x 1.738	.730	.030	A A
7468-0	AA-4	.390 x .765	.765 x 1.140	1.370	.025	A A
1591-0	UI-312	.332 x .387	.718 x .781	.937	.025	A A
8418-0	UI-375 x 1-1/4	.390 x 1.270	1.110 x 1.988	1.094	.040	A A
4801-0	52FG x 21/64	.390 x .335	.985 x 1.050	1.000	.025	I I
1540-0	F-20	.390 x .390	.968 x .968	1.125	.040	A A
3402-0	F-20 x 7/16	.388 x .452	.968 x 1.031	1.125	.040	A A
2449-0	F-20 x 9/16	.380 x .566	.859 x 1.045	1.115	.031	A A
✈ 7491-0	EI-3/8 3PH	.390 x .390	.812 x .812	1.187	.030	A A
8221-0	TH-43	.420 x .420	.870 x .870	1.000	.025	A A
1637-0	EI-21 x 1/4	.515 x .275	.970 x .625	.790	.030	A A
6637-0	EI-21 x 5/16	.515 x .312	.970 x .970	.793	.045	A I
1286-0	EI-21 x 3/8	.510 x .385	1.110 x .975	.796	.030	A A
2357-0	EI-21	.508 x .508	.986 x .986	.721	.030	N N
4429-0	EI-21	.500 x .500	1.094 x 1.094	.796	.030	A N
1212-6	EI-21	.515 x .515	1.090 x 1.090	.788	.035	M A M
3292-0	EI-21	.514 x .514	1.105 x 1.105	.796	.036	N N
✈ 7030-0	EI-21	.510 x .510	1.110 x 1.110	.796	.030	A A
7030-1	EI-21	.510 x .510	.960 x .960	.796	.030	A A
7031-0	EI-21	.510 x .510	1.100 x 1.100	.796	.030	M M
7033-0	EI-21	.515 x .515	.890 x .890	.796	.040	A A
✈ 5991-0	EI-21	.515 x .515	.875 x .875	.734	.045	A A
1699-0	EI-21	.515 x .515	.878 x 1.003	.734	.030	A A
1262-1	EI-21	.515 x .500	1.100 x 1.010	.790	.035	D G
83224-0	EI-21	.515 x .515	1.115 x 1.115	.796	.035	A A
81629-0	EI-21	.515 x .515	1.100 x 1.100	.795	.030	A A A
1281-0	EI-21	.500 x .500	1.093 x 1.093	.265	.030	A A
2269-0	EI-21	.518 x .518	1.100 x 1.100	.800	.020	M A 11
✈ 1212-0	EI-21	.518 x .518	1.100 x 1.100	.803	.035	A A
1212-2	EI-21	.518 x .518	1.100 x 1.100	.803	.035	BB BB
1212-3	EI-21	.518 x .518	1.093 x 1.093	.803	.031	M M
1899-0	EI-21	.524 x .524	1.117 x 1.117	.795	.050	J J
1212-4	EI-21	.518 x .518	1.100 x 1.100	.803	.035	A N
81424-0	EI-21 x 19/32	.520 x .600	1.180 x 1.600	.765	.040	A J
1254-0	EI-21 x 5/8	.513 x .650	1.110 x 1.230	.796	.030	A A
1254-1	EI-21 x 5/8	.510 x .650	1.100 x 1.250	.796	.035	A B
1254-2	EI-21 x 5/8	.510 x .650	1.100 x 1.250	.796	.030	A I
1270-0	EI-21 x 5/8	.515 x .625	1.093 x 1.218	.734	.030	A A
8202-0	EI-21 x 5/8	.515 x .630	1.100 x 1.225	.796	.035	H WW
5509-0	EI-21 x 5/8	.508 x .643	1.191 x 1.094	.799	.030	M M
7069-0	EI-21 x 27/32	.511 x .866	1.100 x 1.455	.803	.030	A A
1230-0	EI-21 x 1	.525 x 1.020	1.105 x 1.625	.781	.030	A A
1230-4	EI-21 x 1	.528 x 1.024	1.110 x 1.634	.784	.030	A A
1230-3	EI-21 x 1	.523 x 1.018	1.096 x 1.630	.783	.030	M O
81341-0	EI-21 x 1	.520 x 1.015	1.093 x 1.641	.796	.035	A A
4307-0	EI-21 x 1	.500 x 1.000	1.100 x 1.650	.800	.030	A A
1250-1	EI-21 x 1-1/2	.565 x 1.520	1.093 x 2.125	.796	.040	A A
1275-1	EE-50	.508 x .508	1.250 x 1.250	1.163	.030	N N
1275-0	EE-50	.508 x .508	1.250 x 1.250	1.163	.035	A A
2314-0	EE-50	.550 x .550	1.250 x 1.250	1.180	.040	A A
1269-0	EE-50 x 1	.515 x 1.031	1.468 x 2.062	1.203	.045	N N
1269-1	EE-50 x 1	.515 x 1.031	1.468 x 2.062	1.203	.045	I I
2459-0	EI-8500	.510 x .510	1.119 x 1.119	1.615	.030	A 7
4644-0	EI-8500	.520 x .520	1.110 x 1.110	1.610	.032	A A
2480-0	V-500	.531 x 1.031	1.219 x 1.719	1.468	.030	A A
1575-0	EE-17-18	.587 x .587	1.713 x 1.713	1.028	.050	A A
4191-0	EE-17-18 x 3/4	.614 x .786	1.593 x 1.750	1.046	.040	A A
8124-0	EI-625 x 11/32	.640 x .350	1.228 x .770	.920	.032	A A
✈ 1236-0	EI-625 x 1/2	.647 x .520	1.227 x 1.090	.917	.030	M M
1272-0	EI-625	.640 x .640	1.000 x 1.000	.343	.040	A A
1265-0	EI-625	.650 x .650	1.225 x 1.225	.875	.035	A A
1279-0	EI-625	.640 x .640	1.218 x 1.218	.812	.035	A A
7034-0	EI-625	.640 x .640	1.015 x 1.015	.921	.030	A A
7035-0	EI-625	.640 x .640	1.218 x 1.218	.921	.032	A A
✈ 7036-0	EI-625	.640 x .640	1.218 x 1.218	.921	.030	M M
81412-0	EI-625	.640 x .640	1.225 x 1.225	.920	.035	C C
81225-0	EI-625	.640 x .640	1.225 x 1.225	.920	.035	A A
83225-0	EI-625	.640 x .640	1.225 x 1.225	.920	.035	A A
✈ 1214-0	EI-625	.650 x .650	1.225 x 1.225	.920	.035	A A
1214-4	EI-625	.650 x .650	1.224 x 1.224	.920	.035	N N
✈ 1214-5	EI-625	.650 x .650	1.230 x 1.230	.920	.035	A A A
1214-6	EI-625	.650 x .650	1.225 x 1.434	.920	.035	I A
5805-0	EI-625	.650 x .650	1.225 x 1.225	.920	.035	A H
2292-0	EI-625	.650 x .650	1.225 x 1.225	.920	.035	H O
1214-1	EI-625	.650 x .650	1.220 x 1.220	.921	.035	C M
4744-0	EI-625	.650 x .650	1.232 x 1.232	.924	.034	J E
1214-2	EI-625	.632 x .632	1.218 x 1.218	.921	.035	J A
1214-3	EI-625	.650 x .650	1.218 x 1.218	.921	.035	F A
5289-0	EI-625 x 11/16	.639 x .705	1.335 x 1.222	.915	.034	4 A 7
1673-0	EI-625 x 3/4	.635 x .760	1.218 x 1.343	.921	.030	H H
1228-6	EI-625 x 3/4	.641 x .757	1.222 x 1.317	.917	.032	A A
✈ 1228-0	EI-625 x 3/4	.646 x .758	1.218 x 1.346	.917	.035	A A
1228-2	EI-625 x 3/4	.648 x .761	1.230 x 1.346	.919	.032	A A
1228-3	EI-625 x 3/4	.640 x .760	1.218 x 1.343	.921	.033	H A

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Lamination size and then Stack height.

Part number	Lamination	Core dim.	Flange dim.	Lgth	Wall	Flange styles
81100-0	EI-625 x 3/4	.642 x .760	1.225 x 1.345	.921	.030	A A
83100-0	EI-625 x 3/4	.642 x .760	1.225 x 1.345	.921	.031	A A
1228-5	EI-625 x 3/4	.647 x .760	1.218 x 1.343	.921	.035	A H
✈ 3451-0	EI-625 x 7/8	.640 x .890	1.218 x 1.500	.920	.030	A A
✈ 1285-0	EI-625 x 1	.640 x 1.020	1.210 x 1.600	.920	.030	A A
1365-0	EI-75 x 1/4	.765 x .270	1.245 x .750	1.110	.030	J A
1659-0	EI-75 x 3/8	.760 x .390	1.486 x 1.116	1.110	.030	A A
4406-0	EI-75 x 13/32	.765 x .410	1.250 x .730	1.110	.025	O O
4406-1	EI-75 x 13/32	.765 x .410	1.250 x .730	1.110	.025	O A O
8405-0	EI-75 x 7/16	.762 x .466	1.471 x 1.304	1.113	.040	* M A
4641-0	EI-75 x 15/32	.458 x .760	1.196 x 1.473	1.104	.040	* M A
4405-0	EI-75 x 1/2	.765 x .510	1.485 x 1.125	1.110	.040	O O
✈ 4405-1	EI-75 x 1/2	.765 x .510	1.445 x 1.125	1.110	.040	O A O
1276-0	EI-75 x 5/8	.760 x .635	1.485 x 1.350	1.115	.080	BB BB
8406-0	EI-75 x 5/8	.762 x .627	1.471 x 1.465	1.113	.040	* M A
4642-0	EI-75 x 5/8	.768 x .625	1.481 x 1.373	1.108	.040	* M A
4870-0	EI-75	.770 x .770	1.478 x 1.478	1.110	.040	C C
1216-0	EI-75	.765 x .765	1.480 x 1.480	1.108	.040	A A
7038-0	EI-75	.758 x .758	1.485 x 1.485	1.120	.042	I A
✈ 7039-0	EI-75	.758 x .758	1.485 x 1.485	1.107	.042	A A
7039-1	EI-75	.758 x .758	1.485 x 1.485	1.115	.042	O A O
8987-0	EI-75	.758 x .758	1.485 x 1.485	1.110	.040	M M
7040-0	EI-75	.765 x .765	1.245 x 1.245	1.110	.030	A A
1645-0	EI-75	.765 x .765	1.470 x 1.470	1.110	.040	P A P
1645-1	EI-75	.765 x .765	1.470 x 1.470	1.110	.040	A A A
1216-1	EI-75	.766 x .766	1.484 x 1.484	1.108	.040	C A
1216-2	EI-75	.765 x .765	1.480 x 1.480	1.108	.040	H A
3014-0	EI-75	.765 x .765	1.480 x 1.600	1.110	.050	* *
83226-0	EI-75	.765 x .765	1.480 x 1.480	1.110	.040	A A
✈ 81226-0	EI-75	.765 x .765	1.480 x 1.480	1.110	.042	A A
5736-0	EI-75	.760 x .760	1.490 x 1.490	1.115	.040	13 13
2268-0	EI-75	.760 x .760	1.440 x 1.470	1.120	.030	* A *
1216-4	EI-75	.766 x .766	1.480 x 1.480	1.108	.040	N N
✈ 6290-0	UI-75	.765 x .765	1.470 x 1.470	2.220	.040	A A
✈ 1537-0	EI-75 x 7/8	.765 x .890	1.390 x 1.500	1.062	.040	M A
83631-0	EI-75 x 7/8	.765 x .890	1.390 x 1.500	1.110	.040	A A
6919-0	EI-75 x 1	.770 x 1.020	1.480 x 1.760	1.105	.045	A A A
✈ 1258-0	EI-75 x 1	.765 x 1.015	1.486 x 1.725	1.110	.040	A A
1258-1	EI-75 x 1	.765 x 1.015	1.486 x 1.736	1.110	.040	A C
1258-2	EI-75 x 1	.765 x 1.015	1.486 x 1.736	1.110	.040	A J
1258-3	EI-75 x 1	.765 x 1.015	1.472 x 1.718	1.100	.040	B A O
✈ 1258-4	EI-75 x 1	.765 x 1.015	1.472 x 1.718	1.110	.040	A A A
4643-0	EI-75 x 1-1/8	.762 x 1.128	1.473 x 1.856	1.105	.040	* M A
8407-0	EI-75 x 1-1/8	.762 x 1.131	1.471 x 1.969	1.113	.040	* M A
✈ 8282-0	EI-75 x 1-1/4	.758 x 1.270	1.485 x 1.997	1.115	.040	A A
5304-0	EI-75 x 1-1/4	.765 x 1.265	1.487 x 1.990	1.034	.030	J A
✈ 2589-0	EI-75 x 1-1/2	.760 x 1.510	1.485 x 2.235	1.110	.040	12 12
1126-0	EI-75 x 2	.765 x 2.030	1.486 x 2.736	1.115	.045	A O
8772-0	EI-75 x 2-1/4	.765 x 2.275	1.460 x 3.000	1.110	.040	12 J
933-0	EI-75 x 2-1/2	.785 x 2.270	1.495 x 3.120	1.115	.050	4 4
3853-0	EI-87 x 5/8	.890 x .640	1.718 x 1.468	1.281	.040	A M
✈ 8430-0	EI-87 x 3/4	.881 x .765	1.730 x 1.530	1.265	.040	7 A 7
8344-0	EI-87	.881 x .881	1.730 x 1.730	1.263	.040	A A J
✈ 1218-0	EI-87	.890 x .890	1.729 x 1.729	1.276	.040	A A
81227-0	EI-87	.885 x .885	1.730 x 1.730	1.263	.040	A A
1218-3	EI-87	.885 x .885	1.725 x 1.725	1.277	.040	M A
1218-1	EI-87	.888 x .888	1.720 x 1.720	1.273	.030	O H
1218-2	EI-87	.890 x .890	1.729 x 1.729	1.276	.040	10 7
4871-0	EI-87	.895 x .895	1.725 x 1.725	1.282	.040	C C
5272-0	EI-87 x 1	.890 x 1.015	1.729 x 1.854	1.276	.050	O 7
5272-1	EI-87 x 1	.890 x 1.015	1.730 x 1.855	1.276	.030	D O
✈ 2021-0	EI-87 x 1	.890 x 1.000	1.734 x 1.875	1.296	.040	M A M
2388-0	EI-87 x 1-1/8	.880 x 1.125	1.730 x 1.975	1.300	.040	* *
5122-1	EI-87 x 1-1/8	.895 x 1.137	1.725 x 1.971	1.278	.040	A A
✈ 5122-0	EI-87 x 1-1/8	.895 x 1.140	1.725 x 1.970	1.275	.040	A A A
6704-0	EI-87 x 1-1/8	.895 x 1.140	1.725 x 1.970	1.275	.040	O A O
1051-0	EI-87 x 1-1/4	.900 x 1.270	1.785 x 2.210	1.625	.040	O O
4857-0	EI-87 x 1-1/4	.886 x 1.260	1.730 x 2.095	1.265	.047	A A
3841-0	EI-87 x 1-1/4	.890 x 1.275	1.723 x 2.129	1.281	.040	O A
✈ 1266-0	EI-87 x 1-3/8	.895 x 1.448	1.725 x 2.258	1.276	.037	7 7
8775-0	EI-87 x 1-3/8	.895 x 1.448	1.725 x 2.258	1.276	.042	M A M
1266-1	EI-87 x 1-3/8	.895 x 1.448	1.725 x 2.258	1.276	.037	A A A
✈ 2194-0	EI-87 x 1-1/2	.895 x 1.550	1.730 x 2.365	1.276	.042	A A
694-0	EI-87 x 2-1/8	.885 x 2.125	1.734 x 3.000	1.276	.035	O O
640-0	EI-7/8 x 1-1/4 3PH	.891 x 1.280	1.940 x 2.316	2.376	.040	A A
801-0	UI-BU	1.012 x 1.012	1.984 x 1.984	2.906	.050	A A
✈ 8212-0	EI 100 x 17/32	1.050 x .540	1.930 x 1.420	1.480	.030	A A
✈ 1350-0	EI-100 x 23/32	1.016 x .730	1.968 x 1.725	1.484	.040	A A
6670-0	EI-100 x 23/32	1.010 x .734	1.970 x 1.686	1.480	.042	A A A
83228-0	EI-100	1.016 x 1.016	1.968 x 1.968	1.484	.042	A A
4872-0	EI-100	1.020 x 1.020	1.980 x 1.980	1.472	.040	C C
4011-0	EI-100	1.020 x 1.020	1.500 x 1.550	1.484	.040	TT TT
1252-3	EI-100	1.025 x 1.025	1.960 x 1.960	1.467	.035	J A
1252-4	EI-100	1.023 x 1.023	1.954 x 1.954	1.470	.040	J A
✈ 1252-0	EI-100	1.025 x 1.025	1.975 x 1.975	1.470	.040	A A
1252-2	EI-100	1.028 x 1.028	1.968 x 1.968	1.473	.039	H A
✈ 1252-1	EI-100	1.016 x 1.016	1.937 x 1.937	1.484	.040	A A
7043-0	EI-100	1.020 x 1.020	1.970 x 1.970	1.493	.042	N 14
2244-0	EI-100 x 1-1 /4	1.010 x 1.260	1.970 x 2.240	1.420	.050	M M
604-1	EI-100 x 1-1/4	1.025 x 1.277	2.218 x 2.467	1.839	.040	A A A
1088-0	EI-100 x 1-1/4	1.016 x 1.263	1.964 x 2.215	1.475	.040	10 O
885-0	EI-100 x 1-7/16	1.016 x 1.454	1.968 x 2.770	1.484	.062	A 9
✈ 1003-0	EI-100 x 1-7/16	1.030 x 1.460	1.950 x 2.380	1.470	.050	H H
4924-0	EI-100 x 1-7/16	1.030 x 1.460	1.950 x 2.380	1.470	.045	H H

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Lamination size and then Stack height.

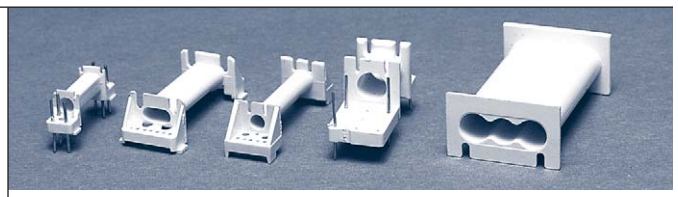
Part number	Lamination	Core dim.	Flange dim.	Lgth	Wall	Flange styles
804-0	EI-100 x 1-1/2	1.020 x 1.500	1.975 x 2.475	1.460	.040	O M
650-0	EI-100 x 1-1/2	1.020 x 1.525	1.980 x 2.480	1.485	.050	N N
1108-0	EI-100 x 1-11/16	1.010 x 1.700	1.990 x 2.680	1.490	.050	WW WW
991-0	EI-100 x 1-3/4	1.020 x 1.800	1.980 x 3.000	1.485	.040	I I
973-0	EI-100 x 1-3/4	1.030 x 1.780	1.970 x 3.000	1.446	.055	1 1
1001-0	EI-100 x 2	1.025 x 2.025	1.980 x 2.980	1.484	.045	A A A
1002-0	EI-100 x 2-15/32	1.030 x 2.480	1.968 x 3.670	1.480	.050	J J
612-0	EI-112	1.150 x 1.150	2.230 x 2.230	1.650	.040	TT TT
612-1	EI-112	1.150 x 1.150	2.230 x 2.230	1.625	.040	TT A TT
915-0	EI-112	1.150 x 1.150	2.215 x 2.485	1.635	.050	G A O
1104-0	EI-112	1.151 x 1.151	2.237 x 2.237	1.635	.040	* *
822-0	EI-112 x 1-1/4	1.155 x 1.270	2.230 x 2.350	1.660	.040	N N
604-0	EI-125 x 1	1.275 x 1.025	2.468 x 2.218	1.843	.040	A A
613-0	EI-125	1.260 x 1.260	2.475 x 2.475	1.843	.040	TT TT
613-1	EI-125	1.260 x 1.260	2.475 x 2.475	1.843	.050	A A
771-0	EI-125 x 1-1/2	1.265 x 1.515	2.468 x 2.718	1.843	.045	7 O
709-0	EI-125 x 1-1/2	1.265 x 1.515	2.484 x 2.734	1.812	.040	C A
1004-0	EI-125 x 1-3/4	1.280 x 1.780	2.440 x 2.940	1.845	.050	B B
886-0	EI-125 x 2	1.265 x 2.015	2.468 x 3.500	1.843	.062	A 9
886-1	EI-125 x 2	1.265 x 2.015	2.468 x 3.500	1.843	.062	A A
8754-0	EI-125 x 2	1.265 x 2.020	2.450 x 3.500	1.843	.060	M A A
6918-0	EI-125 x 2	1.265 x 2.028	2.420 x 3.320	1.846	.060	A A
772-0	EI-138 x 1-1/2	1.390 x 1.522	2.735 x 2.858	2.055	.040	7 O
772-1	EI-138 x 1-1 /2	1.392 x 1.515	2.728 x 2.860	2.050	.055	A A A
775-0	EI-138 x 2	1.420 x 2.000	2.700 x 3.350	2.060	.045	J J
775-1	EI-138 x 2	1.420 x 2.000	2.700 x 3.350	2.060	.055	8 A
704-0	EI-150	1.515 x 1.515	2.980 x 2.980	2.218	.060	A A
704-1	EI-150	1.515 x 1.515	2.980 x 2.980	2.218	.040	M O
1184-0	EI-150 x 1-3/4	1.535 x 1.750	2.382 x 2.660	2.225	.058	A *
1120-0	EI-150 x 2	1.525 x 2.014	2.945 x 3.622	2.210	.043	A J
887-0	EI-150 x 2	1.525 x 2.000	2.968 x 3.625	2.231	.062	M 9
887-1	EI-150 x 2	1.525 x 2.000	2.968 x 3.625	2.231	.062	O M
8518-1	EI-150 x 2-3/8	1.520 x 2.405	2.970 x 4.100	2.220	.060	15 15
8535-0	EI-150 x 3-1/2	1.530 x 3.530	2.960 x 5.100	2.225	.050	A A
8517-1	EI-175 x 2	1.768 x 1.993	4.007 x 3.473	2.602	.060	15 A 15
8518-0	EI-150 x 2-3/8	1.522 x 2.400	2.977 x 4.107	2.224	.060	15 14 15
8517-0	EI-175 x 2	1.770 x 1.980	3.470 x 3.980	2.600	.060	15 15
8511-0	EI-175 x 2-1/2	1.765 x 2.515	3.484 x 4.234	2.562	.062	F A

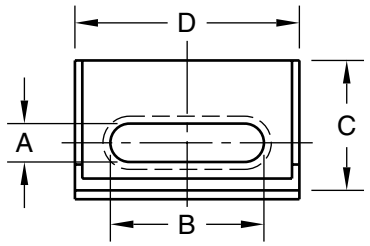
*** Irregular Flange**

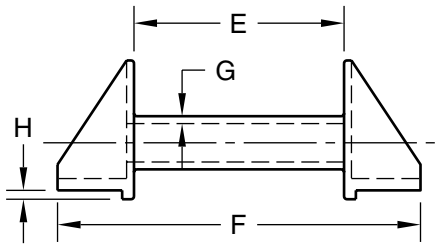
Quick-Ship (see page 2)

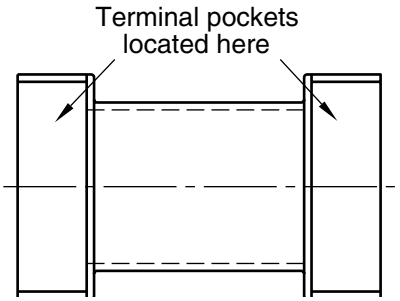
Reed Relay Bobbins with provision for Terminals

Cosmo offers standard reed relay bobbins with a variety of core dimensions suitable for single or multiple glass reed switches. Reed relay bobbins with provision for terminals have vertical holes or slots in the flange platforms to accommodate a variety of wire terminal configurations. Each bobbin can support up to the indicated maximum number of terminals per side.









This table is sequenced by "E" dimension and then by "A" dimension.

Part number	No. of reeds	A dim	B dim	C dim	D dim	E dim	F dim	G dim	H dim	Max terms	Frt terms	Rear terms	Terminal pocket dimensions	Flange styles	
5317-0	1	.105		.170	.165	.400	.765	.013	.020	7	4	3	.023 dia.	DD	DD
5234-0	1	.135		.330	.375	.700	1.130	.020	.020	6	3	3	.026 dia.	M	M
5235-0	2	.136	.236	.330	.475	.700	1.130	.039	.020	8	4	4	.026 dia.	M	M
4828-0	1	.135		.350	.440	.745	1.140	.022	.025	6	3	3	.018 x .062	M	M
4646-0	4	.136	.585	.325	.890	.745	1.140	.025	.025	12	6	6	.018 x .062	M	M
4527-0	2	.110	.220	.300	.440	.750	1.310	.025		13	6	7		M	M
4471-0	3	.112	.224	.326	.440	.750	1.200	.022	.012	8	4	4	.023 x .077	M	M
4756-0	2	.115	.323	.300	.590	.750	1.310	.020		21	10	11	.025 dia.	M	M
81446-0	3	.125	.410	.298	.650	.750	1.090	.012	.020	12	6	6	.025 dia.	M	M
4396-1	4	.125	.510	.326	.738	.750	1.200	.018	.012	14	7	7	.023 x .077	M	M
4424-0	2	.130	.250	.350	.530	.750	1.400	.020	.020	10	5	5	.031 dia.	M	M
4411-0	1	.130		.350	.400	.750	1.400	.020	.020	6	3	3	.020 dia.	M	M
81463-0	1	.130		.285	.330	.750	1.094	.015	.030	10	5	5	.015 x .050	M	M
5746-0	1	.131		.333	.333	.750	1.200	.023		6	3	3	.020 x .080	M	J
5758-0	1	.132		.480	.520	.790	1.220	.020		6	3	3	.025 dia.	M	M
1352-0	2	.110	.320	.380	.595	.800	1.130	.025	.030	10	5	5	.025 dia.	M	M
2132-0	2	.110	.320	.380	.595	.800	1.125	.025	.030	10	5	5	.026 dia.	M	M
3189-0	1	.130		.490	.440	.828	1.085	.025		10	5	5	.022 dia.	M	M
3101-1	1	.106		.305	.370	.840	1.190	.025	.032	6	3	3	.015 x .060	M	M
3101-2	1	.100		.300	.375	.845	1.190	.030	.030	8	4	4	.024 dia.	M	M
5589-0	1	.129		.320	.340	.860	1.140	.020	.030	6	3	3	.025 x .040	M	M
1369-0	4	.130	.530	.320	.755	.860	1.140	.020	.030	14	7	7	.025 x .040	M	M
5741-0	2	.130	.280	.320	.590	.860	1.140	.020	.030	8	4	4	.025 x .040	M	M
5690-0	1	.130		.320	.440	.860	1.150	.020	.030	6	3	3	.025 x .040	M	M
292-0	4	.142	.658	.406	.891	.875	1.375	.029		8	4	4	.035 x .063	DD	DD
276-0	2	.142	.314	.406	.547	.875	1.375	.030		4	2	2	.035 x .063	DD	DD
4005-0	1	.130		.320	.340	.900	1.085	.020	.020	10	5	5	.022 dia.	M	M
6295-0	1	.230		.562	.625	1.100	2.625	.035		12	6	6	.026 dia.	M	M
3111-0	1	.165		.455	.470	1.190	1.590	.030	.030	4	2	2	.020 x .080	M	M
581-0	2	.200	.398	.543	.751	1.500	2.043	.030		16	8	8		M	M

Reed Relay Bobbins with provision for Terminals (continued)

Part number	No. of reeds	A dim	B dim	C dim	D dim	E dim	F dim	G dim	H dim	Max terms	Frt terms	Rear terms	Terminal pocket dimensions	Flange styles	
573-0	1	.226		.607	.686	1.500	2.498	.025		6	3	3		A	A
513-0	2	.230	.470	.562	.864	1.516	2.625	.035		16	8	8	.030 x .090	A	A
515-0	4	.230	.950	.562	1.353	1.516	2.625	.035		24	12	12	.030 x .090	A	A
514-0	3	.230	.710	.562	1.104	1.516	2.625	.035		20	10	10	.030 x .090	A	A
6129-0	2	.215	.430	.650	.890	1.750	2.475	.032	.030	8	4	4	.030 dia.	M	M
533-0	10	.328		.782	.811	1.750	2.930	.032	.031	10	5	5		20	20
534-1	1	.215		.568	.609	1.795	2.640	.030		12	6	6		M	M
537-1	4	.216	.872	.570	1.220	1.795	2.640	.030		24	12	12		M	M
535-1	2	.217	.436	.571	.812	1.795	2.640	.030		16	8	8		M	M
536-0	3	.220	.660	.570	1.022	1.795	2.640	.030		20	10	10		M	M
6024-0	1	.216		.510	.526	1.850	2.750	.030	.017	6	3	3	.018 x .070	21	21
6113-0	1	.220		.590	.590	1.930	2.355	.038	.030	4	2	2	.025 dia.	22	22
548-0	8	.215	1.745	.500	2.138	1.940	2.630	.025		40	20	20	.033 dia.	M	M

Reed Relay Bobbins without Terminals

These reed relay bobbins are for non printed circuit board applications. Core dimensions are suitable for the indicated number of standard glass reed switches.

This table is sequenced by Length and then by Core smaller dimension.

Part number	No. of reeds	Length	Core size	Flange size	Wall	Flange styles	
1670-0	1	.437	.150 dia.	.875 dia.	.032	EE	EE
3975-0	2	.445	.120 x .235	.310 x .420	.020	QQ	QQ
1660-0	1	.495	.251 dia.	.875 dia.	.030	EE	EE
81421-0	2	.504	.150 x .448	.350 x .648	.027	QQ	QQ
81422-0	3	.504	.150 x .598	.350 x .798	.027	QQ	QQ
3974-0	2	.550	.120 x .235	.310 x .420	.020	QQ	QQ
4399-0	2	.556	.102 x .227	.237 x .365	.015	QQ	QQ
5698-0	3	.560	.135 x .420	.278 x .725	.020	DD	DD
1757-0	1	.640	.138 dia.	.472 dia.	.020	EE	EE
3869-0	5	.675	.125 x .650	.375 x .900	.030	QQ	QQ
1970-0	4	.687	.130 x .500	.500 x .937	.024	QQ	QQ
1371-0	4	.687	.130 x .505	.500 x .875	.031	PP	PP
3615-0	1	.687	.156 dia.	.410 dia.	.030	EE	EE
3107-0	4	.696	.130 x .505	.500 x .875	.031	QQ	QQ
3973-0	2	.700	.135 x .265	.310 x .435	.020	QQ	QQ
1763-0	1	.728	.157 dia.	.320 dia.	.030	EE	EE
3093-0	1	.734	.135 dia.	.375 dia.	.035	DD	DD
2604-0	1	.750	.140 dia.	.500 dia.	.025	EE	EE
2697-0	1	.770	.160 dia.	.484 dia.	.020	EE	EE
4942-0	12	.785	.115 x 1.490	.497 x 1.830	.025	QQ	QQ
3069-0	4	.790	.150 x .591	.390 x .830	.025	QQ	QQ
3066-0	2	.797	.115 x .230	.300 x .448	.025	17	17
1973-1	2	.800	.100 x .200	.375 x .510	.040	A	A
2008-0	3	.800	.134 x .400	.295 x .560	.025	18	18
1973-0	2	.800	.135 x .270	.375 x .510	.022	A	A
3169-1	2	.800	.135 x .270	.350 x .485	.025	RR	QQ
4284-0	2	.800	.135 x .270	.375 x .510	.025	RR	RR
3169-0	2	.800	.138 x .273	.350 x .485	.022	QQ	QQ
2624-0	1	.800	.140 dia.	.718 dia.	.030	EE	EE
3690-0	1	.800	.141 dia.	.375 dia.	.025	DD	DD
3068-0	3	.800	.150 x .444	.390 x .680	.025	QQ	QQ
3067-0	2	.800	.150 x .297	.390 x .585	.025	QQ	QQ
2265-0	8	.800	.150 x 1.175	.390 x 1.480	.025	QQ	QQ
4779-0	3	.802	.090 x .270	.379 x .513	.030	A	A
1973-2	2	.803	.137 x .269	.317 x .266	.020	17	17
✈ 1762-0	1	.810	.132 dia.	.500 dia.	.030	EE	EE
1955-0	8	.810	.150 x 1.190	.311 x 1.360	.025	QQ	QQ
3198-0	2	.812	.140 x .350	.375 x .562	.020	A	A

*** Irregular Flange**

Quick-Ship (see page 2) ✈

Reed Relay Bobbins without Terminals (continued)

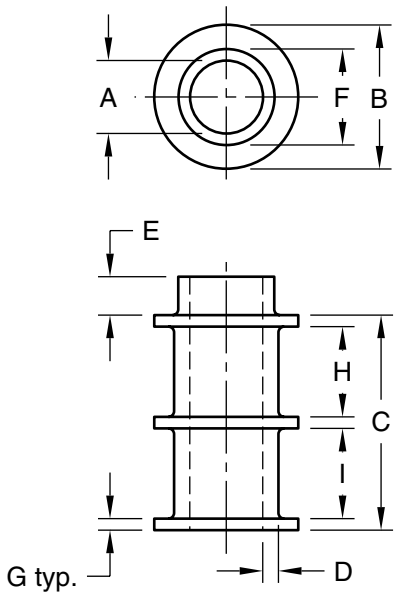
Part number	No. of reeds	Length	Core size	Flange size	Wall	Flange styles	
1825-0	2	.815	.142 x .353	.377 x .558	.022	QQ	QQ
1766-0	1	.841	.113 dia.	.352 dia.	.022	EE	OO
2925-0	4	.855	.137 x .512	.455 x .815	.030	QQ	QQ
2775-0	1	.865	.165 dia.	.620 dia.	.046	EE	FF
2852-0	1	.875	.100 dia.	.375 dia.	.025	A	A
1969-1	1	.875	.135 dia.	.375 dia.	.030	KK	KK
1969-0	1	.875	.135 dia.	.375 dia.	.030	A	KK
2955-0	4	.875	.135 x .500	.375 x .750	.030	QQ	QQ
2954-0	3	.875	.135 x .400	.375 x .640	.030	QQ	QQ
2956-0	5	.875	.135 x .660	.375 x .900	.030	QQ	QQ
1968-0	4	.875	.136 x .525	.406 x .798	.031	QQ	RR
1979-0	3	.880	.128 x .395	.480 x .700	.022	A	A
4004-0	5	.880	.141 x .657	.655 x 1.175	.050	X	X
1745-0	1	.950	.219 dia.	.570 dia.	.025	EE	EE
3729-0	1	.985	.252 dia.	.500 dia.	.031	EE	EE
5644-0	4	.997	.171 x .762	.502 x 1.042	.025	RR	RR
2835-0	2	1.000	.140 x .275	.460 x .580	.020	QQ	QQ
2800-0	4	1.000	.147 x .580	.450 x .879	.027	QQ	QQ
2632-0	1	1.000	.220 dia.	.430 dia.	.020	EE	EE
389-0	3	1.010	.143 x .267	.545 x .416	.020	DD	DD
393-0	3	1.011	.141 x .534	.793 x .415	.020	DD	DD
391-0	3	1.015	.142 x .400	.670 x .415	.020	DD	DD
1356-0	5	1.062	.140 x .625	.406 x .891	.030	QQ	QQ
2619-0	1	1.062	.222 dia.	.656 dia.	.031	EE	OO
2767-0	1	1.067	.230 dia.	.844 dia.	.022	EE	DD
3131-0	2	1.093	.325 x .650	.650 x .995	.030	QQ	QQ
1983-0	14	1.100	.110 x 1.550	.510 x 1.890	.030	QQ	QQ
1727-0	1	1.100	.230 dia.	.680 dia.	.031	EE	EE
1960-0	1	1.115	.260 dia.	.750 dia.	.030	DD	DD
1351-0	2	1.120	.200 x .400	.400 x .600	.020	QQ	QQ
3339-0	2	1.160	.335 x .655	.670 x .970	.020	QQ	QQ
2804-0	4	1.172	.135 x .525	.615 x 1.045	.043	QQ	QQ
1714-0	1	1.187	.226 dia.	.703 dia.	.031	EE	EE
351-0	3	1.228	.170 x .500	.410 x .740	.020	QQ	QQ
3768-0	1	1.250	.255 dia.	.687 dia.	.031	EE	EE
1703-0	1	1.281	.093 dia.	.390 dia.	.025	EE	MM
1995-0	1	1.298	.158 dia.	.450 dia.	.030	RR	RR
2847-0	1	1.306	.113 dia.	.332 dia.	.022	EE	NN
1724-0	1	1.312	.160 dia.	.593 dia.	.040	EE	EE
3043-0	2	1.400	.189 x .375	.696 x .875	.031	RR	RR
1974-1	2	1.430	.196 x .418	.596 x .812	.042	RR	QQ
3088-0	1	1.437	.218 dia.	.468 dia.	.030	DD	DD
2608-0	1	1.437	.225 dia.	.468 dia.	.030	EE	JJ
1974-0	2	1.437	.225 x .450	.620 x .812	.030	RR	QQ
3076-0	2	1.437	.234 x .484	.468 x .734	.030	RR	RR
3076-1	2	1.437	.234 x .484	.468 x .720	.030	RR	RR
1942-0	1	1.450	.255 dia.	.800 dia.	.040	DD	DD
1753-0	1	1.562	.320 dia.	.556 dia.	.040	EE	EE
2856-0	1	1.638	.235 x .250	.600 x .640	.060	A	A
2857-0	2	1.638	.235 x .470	.600 x .840	.060	A	A
2858-0	3	1.638	.235 x .705	.600 x 1.050	.060	A	A
2859-0	4	1.638	.235 x .940	.600 x 1.340	.060	A	A
2860-0	5	1.638	.235 x 1.175	.600 x 1.540	.060	A	A
1752-0	1	1.688	.125 dia.	.625 dia.	.025	EE	EE
1797-0	1	1.718	.259 dia.	.500 dia.	.030	EE	EE
1722-0	1	1.862	.320 dia.	.935 dia.	.035	HH	HH
1761-0	1	1.875	.210 dia.	.438 dia.	.030	EE	EE
881-0	2	2.000	.220 x .440	.506 x .720	.030	QQ	QQ
835-0	1	2.000	.220 dia.	.512 dia.	.030	EE	EE
889-0	3	2.000	.225 x .675	.500 x .955	.030	QQ	QQ
518-0	2	2.054	.320 x .668	1.168 x .811	.030	16	16
883-0	1	2.062	.230 dia.	.500 dia.	.031	A	KK
6122-0	3	2.480	.229 x .675	.500 x .910	.030	PP	PP

*** Irregular Flange**

Quick-Ship (see page 2)

SOLENOID BOBBINS

Bobbins used for solenoid applications characteristically have an extension of the core tube beyond the end of the flange on one end. They can be used in many push and pull solenoid applications such as: open frame, tubular, and magnetic latching.



This table is sequenced by "A" dimension and then by "C" dimension.

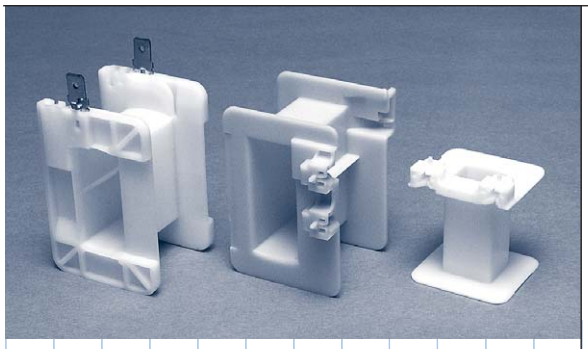
Part number	A dim.	B dim.	C dim.	D dim.	E dim.	F dim.	G dim.	H dim.	I dim.	Flange styles	
5793-0	.167	.429	.561	.027	.198	.223	.030			MM	JJ
4793-0	.193	.500	1.060	.026	.110	.236	.032			EE	EE
5691-0	.196	.435	.330	.030	.100	.245	.036			19	EE
5808-0	.206	.432	.250	.020	.200	.244	.026			EE	EE
6471-0	.250	.760	1.629	.034	.156	.304	.029			EE	EE
4404-0	.257	.555	.578	.025	.165	.294	.024			EE	MM
4955-0	.259	.674	1.239	.030	.125	.314	.027			MM	EE
4701-0	.260	.610	.921	.023	.160	.301	.046			EE	TT
5294-0	.264	.654	.743	.025	.542	.306	.030			MM	MM
8492-0	.267	.754	.784	.020	.097	.311	.030			EE	EE
7707-0	.299	.681	.424	.025	.136	.374	.028			EE	EE
8675-0	.303	.723	.998	.025	.191	.356	.030			EE	EE
7779-0	.312	.720	.493	.025	.194	.357	.030			EE	EE
6377-0	.315	.760	1.217	.025	.187	.365	.030			EE	EE
8835-0	.315	.870	1.296	.030	.108	.371	.025	.331	.950	MM MM	EE
1347-0	.324	.676	1.187	.030	.189	.388	.050			MM	MM
5472-0	.332	.941	1.130	.025	.202	.381	.030			MM	EE
6472-0	.388	1.115	1.833	.034	.172	.444	.030			EE	EE
6044-0	.405	.784	2.333	.036	.137	.480	.040			EE	JJ
6326-0	.425	1.502	1.885	.040	.155	.507	.050			EE	EE
5839-0	.442	.925	.853	.030	.503	.506	.030			MM	MM
6334-0	.458	1.537	1.835	.043	.156	.502	.045			EE	EE
6339-0	.506	1.290	2.734	.042	.108	.590	.120			JJ	EE
6473-0	.506	1.341	2.188	.036	.161	.560	.040			EE	EE
6372-0	.506	1.103	1.897	.045	.100	.597	.080			JJ	EE
6316-0	.509	1.492	2.286	.040	.100	.598	.045			EE	A
6120-0	.510	1.358	2.046	.028	.275	.567	.040			EE	KK
5159-1	.512	1.548	1.226	.038	.112	.557	.096			EE	T
6036-0	.514	1.306	2.401	.040	.105	.594	.040			DD	DD
6178-0	.515	1.416	1.726	.030	.269	.574	.031			EE	EE
5354-0	.537	1.177	.744	.040	.206	.595	.045			NN	EE
4667-0	.565	1.130	1.255	.038	.150	.640	.045			EE	PP
6137-0	.575	1.145	2.026	.040	.180	.650	.040			JJ	EE
6117-0	.575	1.408	1.797	.035	.129	.610	.030			JJ	EE
6054-0	.590	1.738	1.712	.045	.164	.631	.080			EE	EE
4710-0	.598	1.492	.557	.040	.157	.600	.030			EE	EE
2370-0	.622	.948	1.256	.030	.188	.688	.030			EE	EE
6134-0	.635	1.250	2.194	.025	.155	.673	.025			JJ	JJ
6100-0	.670	1.405	1.731	.028	.141	.754	.030			GG	EE
2045-0	.740	1.919	1.248	.079	.254	.821	.130			PP	PP
5140-0	1.380	1.993	1.209	.025	.122	1.426	.058			EE	EE
750-0	2.006	2.990	1.556	.025	.119	2.065	.030			M	EE

SHADED POLE MOTOR BOBBINS

Cosmo's selection of motor bobbins covers the vast majority of pole piece sizes in various stack heights to meet your fractional horsepower needs for A.C. shaded pole motors.

Stack Size	Pole Piece Widths Available						
	.540	.565	.580	.593	.643	.693	.710
5/16					X	X	X
3/8		X	X				
13/32					X		
7/16	X						
1/2		X	X		X	X	
9/16	X						X
19/32					X		
5/8		X	X	X			
11/16	X				X		
3/4		X	X				
25/32					X		
13/16	X					X	
7/8		X			X		
29/32				X			
15/16			X				X
1		X	X		X		
1-1/16	X	X		X		X	
1-1/8		X					
1-5/32					X		
1-1/4			X				X
1-5/16		X				X	
1-11/32					X		
1-1/2		X	X		X		X
1-9/16	X					X	
1-3/4		X	X				
2		X	X		X		
2-3/32						X	
2-1/4		X					

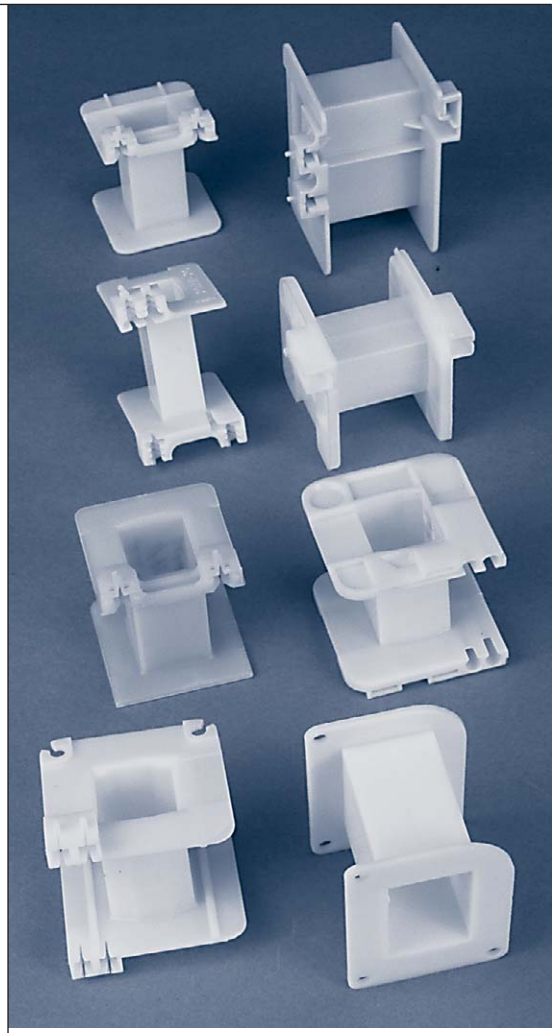
X Indicates available pole piece width and stack size combinations.



These bobbins are used in a wide range of applications including: fan motors, gear motors, vibrators, small appliance motors, pumps, vending applications and others.

They are normally molded of 6/6 glass filled nylon which provides stiffness and high heat distortion. For higher heat applications, DuPont Rynite is also available.

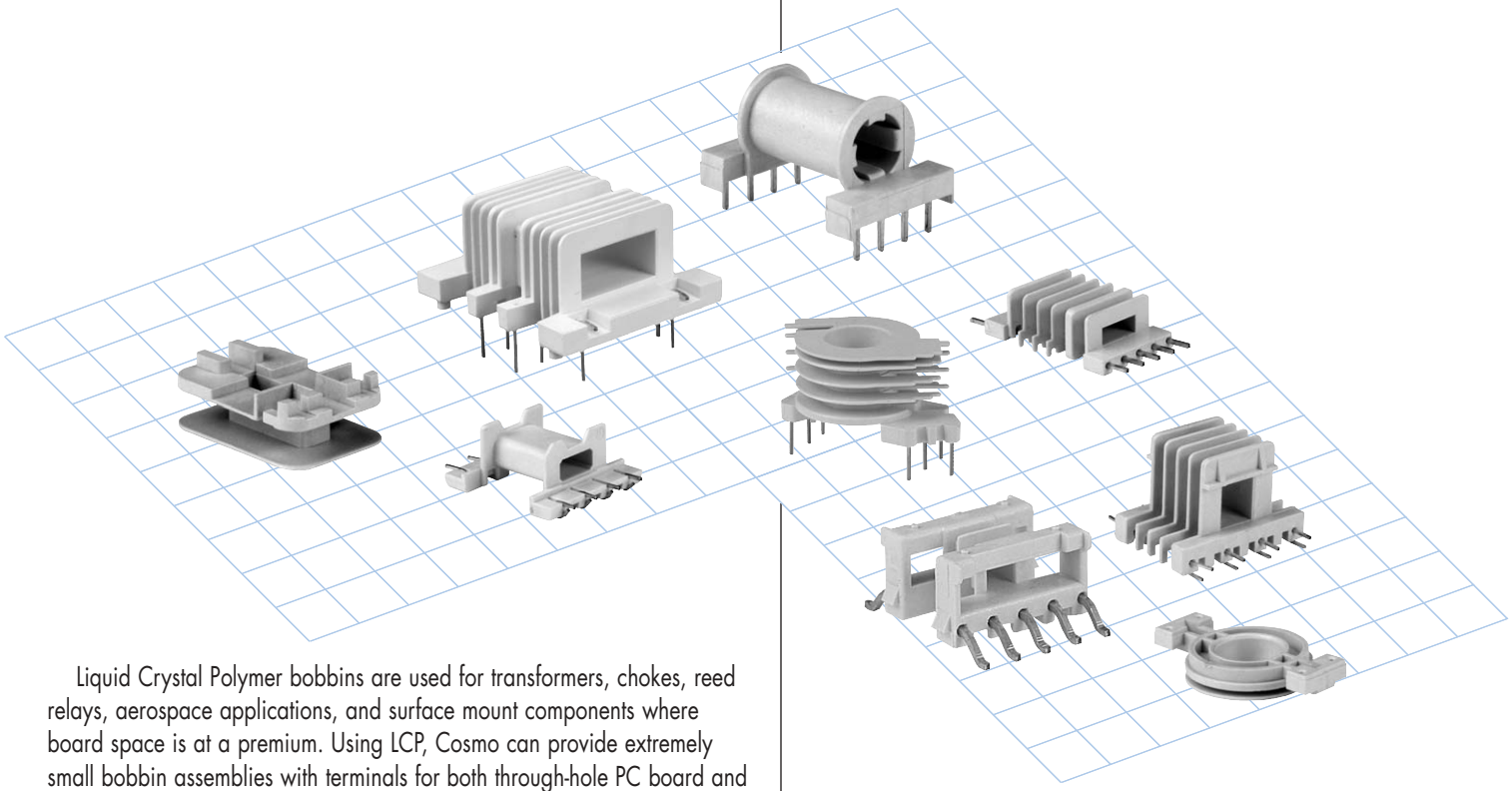
Numerous termination options are available, including: simple flying leads, solder, quick-disconnect and weld-tab terminals. Some bobbins are also available with provisions for insulation displacement terminals.



LIQUID CRYSTAL POLYMER BOBBINS

Liquid Crystal Polymer (LCP) fulfills rigorous requirements for high temperature resistance, high dielectric strength, dimensional stability, mechanical strength over a broad temperature range, and UL V0 recognition. As a result, it is Cosmo Corporation's material of choice for custom design of miniature bobbins.

- **Excellent Insulation Properties**
- **Minimal Warpage**
- **Thin Wall Molding**
- **UL V0 Flammability Rating**
- **Precision Pin Positioning**
- **Suitable for Surface Mount**



Liquid Crystal Polymer bobbins are used for transformers, chokes, reed relays, aerospace applications, and surface mount components where board space is at a premium. Using LCP, Cosmo can provide extremely small bobbin assemblies with terminals for both through-hole PC board and surface mounting.

Cosmo's through-hole PC board mounting bobbins are manufactured utilizing custom designed automated terminal insertion machinery for the precision placement of solder coated wire terminals.

Our surface mount styles include both conventional gull-wing and Cosmo's wraparound terminal style. LCP's high strength in thin walls allows the post-inserted pins to be wrapped around the terminal blocks. The pins' bent ends at the top are for wire attachment; the bottoms are for surface mount. Based on LCP's high strength, dimensional stability, and high temperature resistance, the wraparound style offers a greater degree of control of the coplanarity of the terminals by using the structure of the bobbin material to ensure terminal stability. As a result, the coplanarity is maintained during shipping, manufacturing and soldering.

Our expertise in molding, combined with the unique flow characteristics of LCP, has enabled us to produce bobbins with flange and winding tube wall sections as thin as 0.010 in. (0.25 mm). This has opened up additional space for windings and saved space on the printed circuit board.

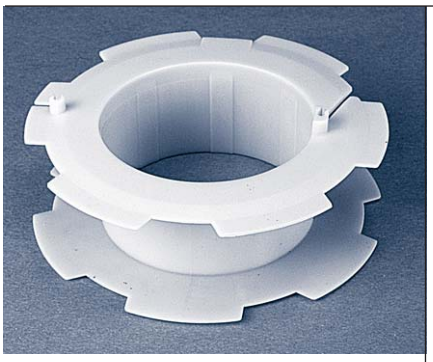
Liquid Crystal Polymer has a UL V0 flammability rating with a heat deflection temperature of over 280°C. This translates into increased material stability during wave, vapor phase, and infrared soldering of terminals. These characteristics allow designers to reduce the amount of material surrounding the terminals without fear of terminals loosening during the soldering process. This further contributes to the ability to design miniature parts.

AUTOMOTIVE ALTERNATOR BOBBINS

Cosmo has the largest selection of molded rotor bobbins for the automotive aftermarket. These bobbins are specifically designed for the rewinder that needs to maintain control of manufacturing costs.

Cosmo's variety includes bobbins for:
- Ford
- Chrysler
- GM

Amperages include:
- 32 amp
- 35 amp
- 37 amp
- 40 amp
- 52 amp
- 59 amp
- 60 amp

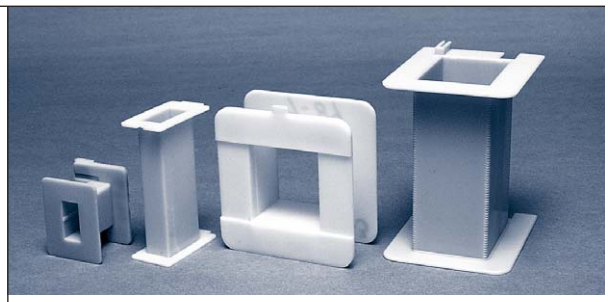


This table is sequenced by Manufacturer and then by Amperage.

Part number	Manufacturer	Amperage	Notes
511-0	Ford	40	
511-0	Ford	52	
8503-0	Chrysler	35	
8505-0	Chrysler	59	I.D. to ribs: 1.992
8510-0	Chrysler	59	I.D. to ribs: 2.195
580-0	GM	32	
580-0	GM	37	
580-0	GM	42	
580-0	GM	52	
8003-0	GM	60	
1063-0	GM		15-SI
8548-0	GM		27-SI
1173-0	GM		12-SI
7777-0	GM		CS-130

SQUARE AND RECTANGULAR CORE BOBBINS

These bobbins share the common characteristic of having a square or rectangular core. There are a wide variety of flange styles represented, keyed to the flange style descriptions on pages 38 - 39. Those bobbins that do not fit into the standard flange styles are indicated as irregular. Please request samples or a drawing to determine adaptability to your application.



This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles	
Core smaller dimension .021 to .060						
2518-0	.045 x .125	.165	.165 x .245	.022	A	A
3991-0	.060 x .160	.180	.300 x .400	.020	*	*
7045-0	.035 x .125	.182	.160 x .265	.030	A	A
1865-0	.050 x .157	.194	.314 x .453	.020	D	D
81350-0	.046 x .062	.281	.250 x .250	.012	A	A
1957-0	.058 x .149	.293	.352 x .460	.022	A	A
2420-0	.060 x .330	.400	.438 x .688	.020	BB	BB
2428-0	.060 x .330	.406	.390 x .670	.020	A	V
8846-0	.060 x .194	.680	.194 x .340	.025	A	A
2153-0	.054 x .165	.725	.335 x .335	.022	FF	FF
4262-0	.040 x .390	.812	.265 x .687	.020	QQ	QQ
2512-0	.055 x .295	.875	.236 x .475	.025	A	A
Core smaller dimension .061 to .080						
2938-0	.070 x .265	.125	.350 x .534	.025	PP	PP
81840-0	.071 x .142	.190	.303 x .336	.016	A	A
81455-0	.070 x .260	.200	.175 x .385	.015	A	A
1541-0	.075 x .256	.218	.405 x .580	.025	A	A
1359-0	.061 x .260	.218	.290 x .465	.025	A	M
7381-0	.072 x .477	.277	.330 x .703	.020	A	A
1454-0	.070 x .127	.285	.340 x .355	.020	A	A
1596-0	.073 x .258	.312	.562 x .750	.025	P	P
5671-0	.065 x .310	.350	.280 x .532	.020	A	A
5670-0	.065 x .310	.350	.280 x .532	.020	A	A
4893-0	.075 x .449	.365	.325 x .625	.020	A	A
7294-0	.075 x .452	.373	.334 x .711	.020	A	A
2885-0	.062 x .280	.374	.312 x .531	.030	QQ	QQ
2471-0	.062 x .156	.375	.406 x .500	.022	A	A
7517-0	.063 x .101	.500	.355 x .400	.020	A	F
7159-0	.075 x .256	.500	.517 x .690	.030	J	J
2879-0	.062 x .275	.560	.295 x .500	.025	QQ	QQ
2378-0	.080 x .250	.615	.516 x .688	.020	A	F
2496-0	.065 x .370	.631	.300 x .600	.025	A	A
7046-0	.064 x .246	.645	.500 x .687	.030	A	A
4409-0	.071 x .111	.650	.350 x .370	.020	A	A
1410-0	.065 x .253	.718	.395 x .625	.022	A	A
5093-0	.071 x .108	.750	.480 x .500	.020	SS	SS
4163-0	.064 x .127	.863	.190 x .253	.012	A	A
3270-0	.065 x .130	.864	.193 x .262	.020	A	A
2551-0	.070 x .510	1.000	1.000 x 1.250	.035	A	A
3591-0	.070 x .324	1.065	.187 x .438	.020	A	A
6538-0	.080 x .140	1.110	.515 x .645	.030	J	J
6038-0	.075 x .495	2.010	.250 x .700	.030	A	A
Core smaller dimension .081 to .100						
7000-0	.095 x .095	.105	.270 x .270	.030	A	A
2412-0	.096 x .142	.155	.270 x .325	.022	BB	BB
1584-0	.094 x .156	.304	.312 x .375	.022	O	O
3983-0	.100 x .500	.375	.687 x 1.203	.025	A	P
3203-0	.098 x .383	.427	.470 x .714	.031	A	A
5753-0	.089 x .240	.473	.236 x .433	.020	A	A
7048-0	.093 x .649	.490	.365 x .919	.030	A	A
7450-0	.090 x .178	.490	.593 x .593	.020	SS	SS
8257-0	.098 x .098	.506	.251 x .251	.025	A	A
2460-0	.095 x .192	.562	.445 x .546	.031	A	A
1441-0	.095 x .420	.600	.500 x .875	.030	P	A
2585-0	.098 x .252	.610	.420 x .544	.020	A	A
2591-0	.097 x 1.020	.625	.422 x 1.342	.020	A	F
5952-0	.093 x .510	.645	.263 x .650	.020	A	A
8288-0	.100 x .520	.650	.275 x .650	.030	A	A
5666-0	.093 x .250	.656	.437 x .500	.031	A	P
8770-0	.082 x .194	.680	.216 x .554	.020	A	A
3244-0	.096 x .253	.733	.656 x .946	.025	A	A
2581-0	.096 x .254	.745	.656 x .937	.020	A	A
1480-0	.100 x .360	.835	.740 x 1.000	.032	A	A
2414-0	.100 x .510	1.156	.288 x .700	.025	A	A
3323-0	.096 x .630	1.281	.375 x .911	.031	A	A
2491-0	.100 x .354	1.350	.750 x 1.000	.035	A	AA
3400-0	.100 x .354	1.563	.750 x 1.000	.031	A	M
Core smaller dimension .101 to .120						
81448-0	.103 x .146	.147	.270 x .320	.020	A	A
4713-0	.103 x .275	.149	.234 x .406	.020	A	A
7001-0	.103 x .103	.150	.270 x .270	.018	A	A
1260-0	.108 x .108	.270	.266 x .266	.020	A	A
7049-0	.101 x .150	.273	.275 x .329	.015	A	A

*** Irregular Flange**

Quick-Ship (see page 2)

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles	
Core smaller dimension .101 to .120 continued						
7002-0	.103 x .103	.275	.266 x .305	.020	A	A
5599-0	.110 x .160	.320	.312 x .375	.025	J	J
3942-0	.105 x .312	.375	.290 x .500	.020	A	J
7495-0	.115 x .180	.420	.298 x .360	.020	14	14
4876-0	.115 x .384	.523	.536 x .880	.030	A	A
2422-0	.120 x .188	.547	.385 x .468	.023	F	F
4099-0	.105 x .755	.687	.380 x 1.031	.030	A	A
3406-0	.113 x .405	.750	.365 x .650	.020	A	A
4050-0	.108 x .172	.812	.420 x .484	.030	A	J
5035-0	.105 x .210	.815	.269 x .484	.030	QQ	QQ
2562-0	.109 x .359	.836	.750 x 1.000	.035	A	A
2577-0	.102 x .210	1.000	.687 x .812	.031	A	J
2571-0	.109 x .265	1.000	.593 x .750	.038	A	A
8015-0	.115 x .375	1.092	.250 x .540	.030	J	J
1561-0	.104 x .490	1.248	.400 x .786	.024	BB	BB
3183-0	.107 x .382	1.250	.890 x 1.200	.031	A	A
2849-0	.108 x .390	1.290	.937 x 1.270	.025	QQ	QQ
2547-0	.114 x .150	1.510	.310 x .374	.020	A	A
Core smaller dimension .121 to .140						
81405-0	.135 x .260	.125	.235 x .380	.010	A	A
7306-0	.132 x .162	.190	.350 x .380	.018	A	F
81454-0	.130 x .260	.200	.240 x .385	.015	A	A
81521-0	.132 x .255	.215	.370 x .485	.020	A	A
8180-0	.140 x .315	.230	.325 x .540	.030	A	J
1594-0	.125 x .250	.245	.375 x .500	.025	A	A
4578-0	.130 x .380	.245	.370 x .630	.020	A	A
1592-0	.125 x .263	.250	.305 x .440	.022	J	J
81394-0	.135 x .320	.260	.365 x .490	.010	A	A
2193-0	.135 x .260	.280	.450 x .575	.025	A	A
8867-0	.137 x .263	.280	.450 x .575	.025	A	A
1566-0	.130 x .395	.281	.625 x .890	.031	A	A
4668-0	.140 x .270	.292	.350 x .480	.020	J	J
4357-0	.131 x .131	.296	.435 x .435	.017	A	A
7052-0	.132 x .192	.300	.360 x .438	.030	A	A
81220-0	.135 x .135	.305	.365 x .365	.030	A	A
1416-0	.135 x .210	.306	.370 x .500	.020	R	V
1208-0	.133 x .133	.307	.365 x .365	.022	A	A
1287-0	.131 x .255	.309	.372 x .495	.020	A	A
2051-0	.131 x .255	.309	.372 x .500	.020	F	A
4334-0	.131 x .500	.309	.372 x .750	.030	A	A
1208-2	.130 x .130	.310	.365 x .365	.022	I G	I
1208-1	.130 x .130	.310	.370 x .370	.022	A A	A
1240-0	.125 x .125	.312	.375 x .468	.022	U	A
2514-0	.128 x .250	.365	.310 x .435	.022	A	A
7494-0	.135 x .260	.375	.325 x .465	.022	A	M
2504-0	.125 x .187	.375	.390 x .476	.031	A	A
3434-0	.131 x .255	.379	.372 x .500	.020	A	A
803-0	.128 x 2.095	.409	.600 x 2.600	.031	A	TT
1277-0	.125 x .125	.453	.312 x .312	.020	A	A
4507-0	.130 x .780	.468	.300 x 1.023	.035	A	TT
3245-0	.127 x .556	.470	.765 x 1.198	.030	A	A
3302-0	.140 x 1.020	.470	.750 x 1.620	.032	A	F
4435-0	.136 x .260	.470	.316 x .466	.030	J	J
81142-0	.132 x .152	.475	.375 x .375	.012	R	R
6474-0	.135 x .390	.476	.325 x .564	.025	A	A
7053-0	.135 x .260	.476	.330 x .455	.020	A	A
4652-0	.135 x .135	.490	.280 x .380	.020	PP	PP
2441-0	.135 x .500	.490	.350 x .798	.020	A	A
4291-0	.125 x .260	.500	.560 x .690	.030	J	J
1567-0	.140 x .568	.500	.750 x 1.203	.050	A	A
5574-0	.130 x .325	.500	.380 x .575	.020	A	A
8138-0	.140 x .140	.520	.560 x .560	.035	A	A
1921-0	.140 x .570	.540	.400 x .870	.030	A	CC
2410-0	.122 x .375	.541	.672 x .904	.020	A	X
4033-0	.130 x .850	.560	.300 x 1.090	.030	A	TT
7050-0	.128 x .222	.605	.391 x .485	.030	A	A
2588-0	.127 x .194	.620	.314 x .381	.025	A	A
80952-0	.140 x .330	.640	.290 x .530	.020	A	A
2583-0	.134 x .503	.650	.458 x .865	.031	A	A
5781-0	.131 x .505	.650	.458 x .800	.020	A	A
5692-0	.131 x .505	.650	.653 x 1.060	.020	A	A
8154-0	.132 x .215	.674	.285 x .366	.020	2	A
3869-0	.125 x .650	.675	.375 x .900	.030	RR	RR
5759-0	.128 x .504	.713	.670 x 1.024	.020	A	A
5854-0	.140 x .515	.734	.500 x .937	.031	A	A
1522-0	.135 x .260	.740	.365 x .490	.030	A	F
1502-0	.125 x .187	.750	.500 x .500	.030	A	A
2519-0	.140 x .358	.840	1.000 x 1.204	.020	A	A
7395-0	.126 x .470	.870	.310 x .720	.016	A	A
3590-0	.129 x .322	.940	.249 x .434	.020	A	A
2424-0	.130 x .320	.940	.400 x .590	.020	A	A
2461-0	.139 x .330	.940	.621 x .820	.020	A	A
4219-0	.129 x .628	.990	.520 x 1.060	.022	A	A
2578-0	.135 x .520	1.093	.687 x .937	.040	A	A
4366-0	.129 x .401	1.140	.345 x .620	.025	A	A
2439-0	.127 x .433	1.290	.335 x .690	.020	A	31
3023-0	.125 x .385	1.338	.937 x 1.187	.033	QQ	QQ
1538-0	.132 x .445	1.359	.437 x .750	.031	A	A
5556-0	.130 x .508	1.410	.500 x .875	.032	A	A
2568-0	.135 x .450	1.508	.630 x .940	.030	A	A
2413-0	.130 x .505	1.851	.375 x .750	.031	A	A
Core smaller dimension .141 to .160						
81457-0	.143 x .310	.225	.420 x .600	.020	A	AA

*** Irregular Flange**

Quick-Ship (see page 2)

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles	
2545-0	.156 x .156	.250	.343 x .343	.020	A	A
2497-0	.156 x .255	.260	.300 x .400	.020	A	A
7005-0	.145 x .145	.265	.425 x .425	.020	A	A
81462-0	.142 x .415	.325	.470 x .800	.020	A	A
2238-0	.160 x .190	.350	.425 x .455	.020	A	A
3201-0	.145 x .210	.420	.320 x .420	.022	A	A
2403-0	.156 x .406	.468	.593 x .859	.020	A	A
2466-0	.143 x .255	.490	.370 x .500	.022	A	A
8110-0	.160 x .280	.500	.640 x .760	.035	A	A
81420-0	.145 x .297	.500	.345 x .495	.025	QQ	QQ
4153-0	.160 x .160	.510	.600 x .600	.020	A	A
5908-0	.160 x .195	.672	.350 x .500	.022	M	M
3403-0	.150 x .375	.715	.695 x .750	.040	A	A
7482-0	.150 x .160	.730	.400 x .500	.030	A	A
2510-0	.160 x .320	.734	.734 x .875	.031	A	P
4378-0	.160 x .504	.750	.530 x .850	.035	A	A
3069-0	.150 x .591	.790	.390 x .830	.025	QQ	QQ
4856-0	.159 x .516	.800	.625 x .920	.031	SS	SS
1595-0	.156 x .343	.997	.370 x .651	.031	J	J
2469-0	.146 x .161	1.000	.625 x .720	.031	M	M
Core smaller dimension .161 to .180						
2397-0	.180 x .393	.215	.580 x .800	.025	A	A
4238-0	.167 x .390	.245	.516 x .734	.025	A	A
1550-0	.171 x .437	.305	.375 x .625	.027	A	A
7768-0	.168 x .168	.343	.281 x .281	.012	JJ	JJ
2401-0	.178 x .594	.402	.825 x 1.150	.025	A	A
4029-0	.180 x .209	.450	.480 x .480	.020	A	A
2516-0	.165 x .195	.495	.329 x .394	.025	A	A
1510-0	.170 x .390	.495	.516 x .734	.029	A	I
1330-0	.170 x .255	.500	.593 x .681	.030	A	A
1505-0	.162 x .162	.522	.557 x .557	.025	A	A
5897-0	.168 x .168	.531	.562 x .562	.025	A	A
4651-0	.162 x .506	.750	.530 x .850	.030	A	A
7301-0	.162 x .506	.750	.530 x .850	.030	A	A
7363-0	.168 x .550	.845	.888 x 1.100	.032	A	A
1521-0	.178 x .385	1.030	.680 x .887	.031	A	A
1460-0	.165 x .518	1.166	.530 x .975	.025	A	AA
1498-0	.177 x .390	1.500	.500 x .750	.031	A	T
2467-0	.179 x .284	1.680	.407 x .548	.020	14	14
Core smaller dimension .181 to .200						
7486-0	.200 x .317	.158	.520 x .640	.020	A	M
7423-0	.182 x .240	.215	.340 x .438	.020	14	14
7008-0	.200 x .200	.233	.535 x .535	.030	A	A
✈ 5576-0	.200 x .290	.240	.540 x .640	.025	A	A
7006-0	.194 x .194	.245	.545 x .545	.030	A	A
1246-3	.195 x .195	.245	.515 x .515	.025	A	A
✈ 1246-0	.190 x .190	.245	.540 x .540	.025	A	A
1246-1	.190 x .190	.245	.545 x .545	.025	V	A
2548-0	.187 x .390	.250	.437 x .843	.025	A	A
8134-0	.200 x .265	.280	.620 x .680	.035	A	A
3213-0	.200 x .317	.284	.522 x .639	.016	A	M
6399-0	.187 x .264	.312	.784 x .785	.025	A	41
81469-0	.200 x .415	.325	.530 x .795	.018	A	A
2586-0	.195 x 2.100	.334	.755 x 2.630	.030	35	36
2486-0	.200 x .500	.395	1.000 x 1.360	.025	A	A
2482-0	.200 x .200	.409	.625 x .625	.030	E	E
1267-0	.195 x .291	.420	.530 x .670	.025	N	N
1234-0	.195 x .195	.420	.535 x .643	.025	N	N
7007-0	.200 x .200	.421	.531 x .531	.030	I	A
2488-0	.190 x .460	.422	.359 x .625	.025	A	A
4802-0	.200 x .200	.425	.535 x .650	.025	I	I I
7057-0	.200 x .395	.425	.535 x .615	.030	A	A
7056-0	.200 x .355	.425	.535 x .695	.023	A	A
7058-0	.200 x .263	.425	.555 x .600	.030	N	A
83602-0	.200 x .457	.425	.535 x .720	.025	A	A
7054-0	.200 x .263	.425	.555 x .600	.030	L	A
✈ 7059-0	.200 x .385	.425	.535 x .720	.030	A	A
1204-2	.200 x .200	.425	.531 x .531	.025	A	N
1586-0	.200 x .200	.425	.535 x .535	.022	S	S
✈ 1284-0	.200 x .200	.427	.537 x .537	.025	A	A
3979-0	.194 x .715	.428	.548 x .937	.015	A	A
83266-0	.200 x .295	.430	.538 x .630	.025	A	A
7055-0	.200 x .296	.430	.537 x .675	.030	A	A
8524-0	.197 x 2.485	.459	.955 x 3.152	.040	A	V
5024-0	.190 x 1.562	.484	.531 x 1.906	.030	A	A
2515-0	.195 x .209	.495	.381 x .391	.025	A	A
8632-0	.200 x .765	.500	.640 x 1.200	.025	M	M
5575-0	.195 x .232	.500	.425 x .462	.020	A	2
4932-0	.198 x .198	.540	.648 x .650	.020	A	A
1283-0	.200 x .200	.610	.430 x .430	.030	TT	TT
7472-0	.198 x .398	.620	.533 x .625	.023	A	A
2081-0	.200 x .390	.620	.320 x .500	.031	A	A
7462-0	.193 x .193	.620	.425 x .425	.023	A	A
2081-1	.199 x .390	.625	.495 x .680	.030	A	A
1362-0	.186 x .510	.645	.356 x .650	.020	A	J
7012-1	.200 x .200	.670	.370 x .370	.020	M	M
8445-0	.190 x .216	.670	.338 x .364	.020	A	J
2499-0	.187 x .195	.672	.425 x .530	.022	A	M
4145-0	.200 x .200	.675	.385 x .535	.030	A	A
2511-0	.200 x .263	.675	.555 x .600	.020	A	L
3329-0	.200 x .200	.675	.550 x .550	.030	A	A
2509-0	.190 x .560	.687	.812 x 1.062	.031	A	P
1590-0	.200 x .390	.700	.490 x .690	.025	I	I
1600-0	.195 x .195	.700	.350 x .350	.020	A	A

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles
	Core smaller dimension .181 to .200 continued				
5544-0	.185 x .310	.730	.530 x .650	.025	A A
1487-0	.195 x .395	.735	.475 x 1.000	.025	A A
5815-0	.200 x .395	.805	.468 x .720	.030	A A
1523-0	.194 x .194	.810	.789 x .789	.035	A A
8340-0	.200 x .225	.850	.500 x .530	.025	A A
1517-0	.184 x .453	.880	.469 x .728	.022	A A
81443-0	.200 x .345	.900	.645 x .685	.020	A A
2215-0	.190 x .640	.925	.360 x .925	.020	A A
1549-0	.186 x .374	.942	.505 x .694	.025	A A
1495-0	.195 x .275	.968	.675 x .750	.040	A A
1568-0	.195 x .235	1.057	.375 x .490	.020	A A
3852-0	.187 x .375	1.065	.484 x .656	.020	QQ QQ
4437-0	.200 x .200	1.110	.434 x .700	.020	J J
264-0	.200 x .334	1.217	.840 x .840	.026	EE 23 EE
3423-0	.195 x .195	1.390	.500 x .500	.025	A A
2479-0	.187 x 1.687	1.500	.687 x 2.250	.031	A A
2582-1	.189 x 1.810	1.810	.788 x 2.248	.040	A A
2582-0	.187 x 1.687	1.812	.680 x 2.250	.040	A A
	Core smaller dimension .201 to .220				
7196-0	.202 x .319	.156	.522 x .639	.038	A M
7408-0	.202 x .319	.170	.476 x .639	.018	A M
7918-0	.201 x .356	.214	.538 x .698	.025	A A
2550-0	.203 x .375	.234	.546 x .718	.025	A A
2074-0	.215 x .315	.250	.440 x .540	.030	J A
1609-0	.205 x .310	.340	.405 x .505	.020	A A
4920-0	.203 x .375	.357	.427 x .599	.020	A A
1224-1	.205 x .205	.425	.531 x .531	.030	L A
1597-0	.218 x .640	.425	.542 x 1.015	.025	BB BB
✈ 1204-1	.208 x .208	.425	.536 x .536	.025	N N
1224-2	.205 x .205	.425	.531 x .531	.025	L A
✈ 1204-0	.208 x .208	.425	.545 x .545	.025	A A
2570-0	.208 x .208	.425	.430 x .430	.025	A A
1486-0	.203 x .385	.432	.875 x 1.000	.030	A A
7263-0	.210 x 1.075	.466	.525 x 1.410	.032	A A
5896-0	.215 x .215	.500	.562 x .562	.025	A A
3123-0	.213 x .213	.510	.630 x .630	.025	YY DD
8276-0	.206 x .482	.517	.403 x .688	.020	A A
2565-0	.220 x .397	.560	.446 x .623	.020	A A
8685-0	.210 x .285	.600	.420 x .490	.025	A A
2549-0	.220 x .410	.605	.660 x .880	.030	SS SS
81430-0	.205 x .265	.655	.330 x .390	.015	A A
7012-0	.203 x .203	.670	.420 x .420	.030	M M
1589-0	.205 x .205	.700	.490 x .490	.025	A A
3078-0	.210 x .255	.780	.645 x .695	.025	A A
7915-0	.202 x .386	.840	.496 x .753	.025	D A
4069-0	.206 x .228	.850	.500 x .525	.025	A A
✈ 2066-0	.218 x .411	.979	.562 x .770	.025	O O
3001-0	.210 x .335	1.140	.850 dia.	.032	EE EE EE
3019-0	.210 x .320	1.218	.858 x .858	.031	YY YY
264-1	.201 x .337	1.234	.858 x .858	.027	EE EE
	Core smaller dimension .221 to .240				
1492-0	.230 x .510	.405	1.062 x 1.375	.035	A A
4070-0	.238 x .268	.440	.465 x .495	.025	A A
4071-0	.238 x .268	.440	.378 x .408	.025	A A
2492-0	.233 x .265	.610	.562 x .593	.030	A A
3192-0	.221 x .387	.750	.483 x .645	.025	EE XX
2468-0	.234 x .250	1.375	.625 x .690	.032	M M
795-0	.225 x .239	2.000	.625 x .690	.032	M M
6294-0	.240 x .885	2.480	.700 x 1.340	.035	A A
	Core smaller dimension .241 to .260				
81520-0	.258 x .258	.215	.485 x .485	.020	A A
2593-0	.250 x .500	.234	.720 x .980	.022	A A
1256-0	.255 x .282	.242	.745 x .745	.028	K A
1554-0	.256 x .500	.244	.735 x .999	.020	I I
1519-0	.255 x 1.130	.250	.750 x 1.625	.024	A A
2560-0	.250 x .500	.312	.718 x 1.000	.030	A A
4552-0	.250 x .343	.421	.718 x .812	.025	A A
7229-0	.260 x .260	.466	.560 x .560	.030	A I
4436-0	.260 x .260	.470	.500 x .500	.030	14 14
83388-0	.260 x .260	.475	.625 x .625	.020	A J 12
7335-0	.260 x .260	.476	.740 x .760	.025	N N
7015-0	.257 x .257	.480	.656 x .750	.030	G G
1226-4	.260 x .260	.480	.719 x .719	.035	B A
1226-2	.250 x .250	.480	.718 x .718	.031	J J
7402-0	.260 x .260	.484	.656 x .750	.031	A AA
✈ 7065-1	.260 x .525	.485	.725 x .980	.020	A A
1232-3	.258 x .260	.485	.744 x .800	.032	N N
✈ 3121-0	.260 x 1.032	.485	.730 x 1.497	.030	A A
1232-2	.260 x .260	.488	.736 x .736	.022	A A
1232-0	.260 x .260	.488	.736 x .736	.022	V V
2597-0	.256 x .256	.490	.735 x .735	.025	T WW
4553-0	.250 x .343	.562	.718 x .812	.025	A A
2094-0	.260 x .384	.625	1.000 x 1.000	.032	EE EE
1248-2	.255 x .355	.734	.630 x .812	.030	W A
1248-0	.260 x .348	.734	.722 x .812	.030	A A
2897-0	.252 x .382	.750	1.312 x 1.312	.031	EE FF
5281-0	.253 x .253	.820	.963 x .963	.030	A A
5228-0	.260 x .260	.860	.584 x .584	.025	A A
8135-0	.250 x .640	.920	.535 x 1.120	.030	A A A
2563-0	.260 x .515	.952	1.000 x 1.250	.032	A X
✈ 7060-0	.255 x .385	1.025	.630 x .820	.030	M I
8620-0	.250 x .440	1.042	.550 x .570	.032	A A
3408-0	.260 x .390	1.100	.562 x .750	.030	J J

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles
7463-0	.257 x .257	1.120	.687 x .687	.020	A A
2525-0	.260 x .260	1.170	.621 x .621	.025	A A
1456-0	.250 x .500	1.272	1.000 x 1.250	.051	A A
1349-0	.255 x 1.005	1.325	.790 x 1.545	.055	A A
	Core smaller dimension .261 to .280				
4039-0	.266 x .515	.155	.722 x .970	.020	A A
3874-0	.261 x .261	.261	.475 x .476	.025	A A
8788-0	.280 x .380	.300	.655 x .755	.035	J J
4040-0	.266 x .515	.315	.722 x .970	.020	J J
8174-0	.265 x .265	.368	.726 x .726	.030	14 A
1333-0	.265 x .265	.370	.740 x .740	.030	N N
✈ 7063-0	.266 x .391	.467	.720 x .875	.030	A A
83449-0	.265 x .320	.475	.725 x .780	.030	A A
5965-0	.265 x .265	.475	.725 x .725	.028	A B
7019-0	.266 x .266	.476	.720 x .750	.030	I A I
✈ 7016-0	.262 x .262	.476	.740 x .740	.030	A A
7017-0	.262 x .262	.476	.640 x .740	.030	A A
7018-0	.266 x .266	.476	.720 x .750	.030	A A
4803-0	.262 x .262	.476	.730 x .740	.020	I I
7018-1	.266 x .266	.476	.720 x .720	.030	A A
7481-0	.266 x .391	.476	.720 x .875	.030	N N
4824-0	.266 x .391	.476	.720 x .875	.030	A I
✈ 1206-0	.266 x .266	.476	.718 x .718	.030	A A
1587-0	.266 x .391	.476	.721 x .855	.030	S S
4469-0	.266 x .266	.477	.480 x .480	.020	A A
2123-0	.266 x .266	.480	.740 x .740	.030	M A
✈ 7065-0	.266 x .515	.480	.720 x .970	.030	A A
✈ 1280-0	.265 x .750	.480	.727 x 1.235	.030	A A
✈ 1226-3	.266 x .266	.480	.718 x .718	.030	N N
1226-1	.266 x .266	.480	.718 x .718	.030	L L
4736-0	.280 x .545	.480	.610 x .865	.020	A A
3204-0	.270 x .662	.620	.710 x 1.100	.030	A N
3236-0	.265 x .390	.734	.937 x .937	.035	I I
4777-0	.265 x .380	.750	.500 x .593	.031	A A
2426-0	.270 x .357	.780	.690 x .755	.031	A A
8160-0	.266 x .266	.790	.750 x .750	.030	A A
1637-0	.275 x .515	.790	.625 x .970	.030	A A
4484-0	.275 x .530	.850	.575 x .830	.025	A A
8467-0	.267 x .395	.856	.503 x .793	.030	40 40
1273-0	.266 x .266	.856	.740 x .740	.031	I I
8111-0	.280 x .280	.860	.760 x .760	.035	A A
5784-0	.261 x .551	.860	.885 x 1.178	.045	A P
2447-0	.265 x .812	.875	.703 x 1.250	.062	A A
1479-0	.266 x .266	.950	.718 x .718	.030	L A L
3440-0	.277 x .386	.960	.540 x .655	.030	A A
2406-0	.280 x .405	.960	.540 x .635	.030	J J
3938-0	.265 x .265	1.030	.780 x .835	.025	* A

Part number	Core size	Length	Flange size	Wall	Flange styles
2450-0	.280 x .300	1.080	1.160 x 1.160	.040	A A
1800-0	.266 x .844	1.093	.593 x 1.170	.025	11 11
1365-0	.270 x .765	1.110	.750 x 1.245	.030	J A
7061-0	.265 x .640	1.120	.703 x 1.078	.030	A A
7062-0	.265 x .765	1.120	.703 x 1.203	.030	A A
5890-0	.270 x 1.025	1.255	.790 x 1.545	.030	A A
1571-0	.270 x .457	1.365	.875 x 1.031	.040	A A
7794-0	.280 x .520	1.390	.580 x .820	.040	M M
83605-0	.280 x .780	1.490	.750 x 1.250	.040	A A
7412-0	.270 x .580	2.000	1.062 x 1.250	.046	A A
800-0	.266 x .328	2.055	.500 x .562	.040	A A
	Core smaller dimension .281 to .300				
1503-0	.285 x .500	.464	.687 x 1.125	.030	A CC
4111-0	.295 x .520	.500	1.000 x 1.220	.025	A A
3257-0	.281 x 1.046	.590	.591 x 1.356	.045	A F
2276-0	.300 x .720	.800	.925 x 1.370	.050	A A
7487-0	.281 x .406	.828	.750 x .875	.030	A A
8607-0	.288 x .288	.833	.521 x .538	.030	I I
1500-0	.286 x .286	.862	.562 x .562	.031	A F
2442-0	.285 x .567	.968	.740 x .995	.030	A A
3196-0	.281 x .505	1.060	.750 x 1.000	.030	A A
4986-0	.297 x 1.109	1.187	.771 x 1.583	.028	A TT
1438-0	.292 x .568	1.330	.625 x .906	.031	A AA
2555-0	.289 x 1.216	1.532	.781 x 1.612	.045	A A
8371-0	.297 x .344	1.791	.607 x .655	.030	M A
6049-0	.281 x .531	3.188	1.250 x 1.500	.031	A A
	Core smaller dimension .301 to .320				
1588-0	.314 x .648	.250	.468 x .906	.021	A CC
7439-0	.317 x .692	.250	.501 x .957	.020	A A
2409-0	.312 x .812	.406	.875 x 1.556	.031	A A
3227-0	.320 x .885	.425	.710 x 1.275	.025	A A
7506-0	.320 x .320	.526	.875 x .875	.031	A A
3460-0	.320 x .400	.680	1.225 x 1.250	.030	J J
3458-1	.320 x .645	.682	.855 x 1.255	.030	A I
3458-0	.320 x .645	.687	.855 x 1.248	.030	A J
4233-0	.320 x 1.008	.880	1.410 x 2.100	.055	A A
✈ 5834-0	.320 x .515	.930	.615 x .800	.027	A A
4753-0	.313 x .450	.953	.914 x 1.212	.050	P A
81123-0	.315 x .630	1.000	1.500 x 1.750	.030	17 17
1922-0	.312 x 1.000	1.000	1.135 x 1.714	.046	A A
4278-0	.320 x .758	1.009	1.000 x 1.438	.020	A A
4873-0	.320 x .765	1.110	.812 x 1.484	.040	C L
1915-0	.312 x .565	1.175	1.125 x 1.425	.032	P P
4265-0	.320 x .702	1.412	1.115 x 1.325	.045	CC CC
1936-0	.312 x .695	1.445	.998 x 1.381	.060	R R

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles
	Core smaller dimension .321 to .380				
2430-0	.330 x .605	.145	.600 x .875	.015	J J
81374-0	.345 x .565	.150	.812 x 1.000	.015	A V
7437-0	.330 x .580	.343	.756 x 1.006	.031	G A
2522-0	.330 x .635	.375	.750 x 1.055	.030	A A
1484-0	.360 x .412	.400	.630 x .682	.035	A A
1482-0	.360 x .412	.400	.796 x .858	.035	A A
2540-0	.380 x .510	.406	.875 x .968	.030	A A
2400-0	.380 x .510	.410	.656 x .750	.030	A A
1444-0	.380 x .510	.410	.850 x .990	.025	A A
8201-0	.380 x 1.250	.495	.860 x 1.750	.020	A TT
1402-0	.375 x .438	.500	.969 x 1.062	.031	A A
1271-2	.380 x .380	.514	.860 x .860	.025	A J
1271-0	.380 x .380	.515	.860 x .860	.025	A A
1271-1	.380 x .380	.515	.860 x .860	.025	CC A
1472-0	.375 x .562	.625	.750 x 1.000	.030	A A
7022-0	.380 x .380	.625	.620 x .620	.030	A A
2458-0	.344 x .467	.632	.762 x .885	.031	A A
1242-0	.380 x .380	.680	.860 x .860	.031	* A
7024-0	.380 x .380	.682	.860 x .860	.030	A A A
7343-0	.380 x .380	.682	.860 x .860	.030	N N
✈ 7021-1	.348 x .348	.718	.812 x .812	.030	A M
81222-0	.355 x .355	.725	.818 x .818	.030	A A
1424-0	.380 x .445	.727	.875 x .930	.031	A A
✈ 2427-1	.375 x .682	.734	.969 x 1.281	.032	A F
1578-0	.375 x .544	.750	1.250 x 1.438	.040	A K
2440-0	.375 x .823	.764	1.039 x 1.478	.027	A A
3293-0	.375 x .465	.920	.865 x .935	.028	A A
4190-0	.380 x .472	.924	.814 x .880	.030	A A
1591-0	.332 x .387	.937	.718 x .781	.025	A A
4510-0	.350 x .385	.945	1.060 dia.	.022	EE EE
1536-0	.330 x .470	.968	.750 x .875	.025	A A
2552-0	.349 x .447	.977	1.187 x 1.406	.055	P P
2463-0	.378 x .866	.980	.702 x 1.190	.030	A J
7067-0	.340 x .390	1.000	.985 x 1.040	.030	A A
4801-0	.335 x .390	1.000	.985 x 1.050	.025	I I
2089-0	.343 x .437	1.000	.970 x 1.030	.031	A P
2517-0	.348 x .448	1.012	.760 x .866	.031	A A
1432-0	.322 x .756	1.031	.920 x 1.332	.058	A A
2579-0	.364 x .584	1.040	.835 x 1.040	.020	W W
1552-0	.375 x .688	1.072	1.062 x 1.406	.031	A A
5800-0	.380 x .380	1.100	.540 x .540	.030	A M
2449-0	.380 x .566	1.115	.859 x 1.045	.031	A A
1848-0	.325 x .325	1.218	.968 x .968	.032	YY YY
3234-0	.375 x .812	1.250	1.000 x 1.438	.030	A A
2854-0	.360 x .386	1.281	.915 x 1.000	.032	P P
2592-0	.380 x .575	1.350	1.031 x 1.187	.060	P P
5571-0	.375 x 1.020	1.500	1.550 x 2.200	.055	A A
6083-0	.375 x .719	1.812	.844 x 1.188	.047	J J
6083-1	.375 x .718	1.815	.848 x 1.191	.050	J J
6031-0	.378 x .378	2.000	1.223 x 1.223	.060	A A
6914-0	.343 x .781	2.225	.910 x 1.350	.040	A A
	Core smaller dimension .381 to .400				
1518-0	.400 x .440	.250	.840 x .880	.025	A U
1945-0	.390 x .580	.328	.985 x 1.250	.040	V A
1501-0	.390 x .687	.328	.968 x 1.277	.042	A B
1534-0	.390 x 1.062	.328	.968 x 1.642	.042	A V
6837-0	.390 x .390	.345	.890 x .890	.030	A A
1244-1	.382 x .382	.364	.966 x .966	.022	J A
1244-0	.385 x .385	.365	.969 x .969	.020	A A
1220-7	.390 x .390	.469	.968 x .968	.030	J J
5364-0	.381 x .381	.484	.968 x .968	.032	A A
1268-0	.385 x .385	.484	.859 x .859	.030	A A
4947-0	.390 x .640	.500	.840 x 1.020	.030	SS SS
4681-0	.390 x .390	.593	.875 x .875	.025	M M
4682-0	.390 x .510	.593	.710 x .835	.025	M M
81249-0	.390 x .510	.620	.615 x .740	.030	A A
83221-0	.390 x .390	.675	.855 x .855	.031	A A
4799-0	.385 x .385	.675	.855 x 1.050	.030	I I
81375-0	.390 x .578	.675	.855 x 1.043	.030	A A
1366-0	.392 x .550	.675	.840 x 1.200	.035	A A A
81369-1	.390 x .765	.675	.855 x 1.230	.030	A A
✈ 1238-0	.388 x .388	.680	.866 x .866	.025	A A
8697-0	.392 x .554	.693	.855 x 1.025	.030	A A A
4612-0	.385 x .508	.713	.984 x 1.109	.047	A A
8810-0	.395 x .395	.730	.970 x .970	.035	N N
4800-0	.395 x .395	.730	.968 x 1.150	.030	I I
1220-2	.395 x .395	.730	.970 x .970	.030	O A
1220-9	.390 x .390	.730	.700 x .968	.030	N N
1220-3	.395 x .395	.730	.970 x .970	.030	N N
1220-0	.395 x .395	.732	.970 x .970	.035	A N
7025-0	.390 x .390	.734	.968 x .968	.030	I A I
1223-0	.395 x .395	.734	.970 x .970	.035	I I
7028-0	.390 x .390	.735	.975 x .975	.030	S S
3277-0	.390 x .510	.735	.985 x 1.110	.040	A F
✈ 1288-0	.390 x .510	.735	.978 x 1.110	.030	A A
7029-0	.390 x .390	.735	.975 x .975	.030	A A
3277-1	.390 x .510	.735	.985 x 1.110	.040	A A A
4661-0	.390 x .515	.735	.975 x 1.100	.030	A N
5103-0	.390 x .483	.735	.975 x 1.068	.031	A A
1210-1	.390 x .390	.736	.968 x .968	.030	A F
✈ 1210-0	.390 x .390	.736	.968 x .968	.030	A A
1220-5	.390 x .390	.736	.968 x .968	.030	I I
2831-0	.391 x .391	.745	1.195 x 1.334	.035	37 PP

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles
2329-0	.400 x .770	.750	1.500 x 1.875	.050	A A
7372-0	.390 x .515	.770	1.406 x 1.500	.035	42 42
1543-0	.391 x .516	.781	1.406 x 1.500	.040	AA AA
7026-0	.390 x .390	.796	.709 x .875	.030	A A
1286-0	.385 x .510	.796	.975 x 1.110	.030	A A
1507-0	.385 x 1.030	.812	1.062 x 1.960	.062	A A
7068-0	.385 x .510	.830	.850 x 1.100	.030	I I
3956-0	.382 x .382	.839	1.055 x 1.055	.030	YY YY
1838-0	.385 x .385	.843	.968 dia.	.030	EE EE
81114-0	.390 x .390	.875	.730 x .730	.025	A A
3142-0	.390 x .390	.924	1.040 x 1.040	.030	A A
2521-0	.385 x .510	.955	1.035 x 1.160	.078	A A
2463-1	.383 x .875	.996	.725 x 1.215	.038	A A
2084-0	.390 x .862	1.050	1.040 x 1.520	.060	A A
4579-0	.397 x .607	1.076	1.022 x 1.235	.050	A A
1659-0	.390 x .760	1.110	1.116 x 1.486	.030	A A
5967-0	.390 x .688	1.115	.775 x 1.145	.031	E M
3402-0	.388 x .452	1.125	.968 x 1.031	.040	A A
1540-0	.390 x .390	1.125	.968 x .968	.040	A A
1809-0	.395 x .416	1.165	.744 x .838	.032	M A *
1808-0	.400 x .643	1.175	1.125 x 1.415	.032	P P
8662-0	.395 x .765	1.185	.835 x 1.205	.035	A A
✈ 7491-0	.390 x .390	1.187	.812 x .812	.030	A A
4976-0	.388 x .508	1.190	.850 x .932	.030	A A
5491-0	.386 x .782	1.214	.850 x 1.454	.040	A A
1801-0	.390 x 1.031	1.218	.875 x 1.406	.025	M M
2271-0	.390 x .765	1.220	.835 x 1.220	.035	A A
5470-0	.390 x .687	1.220	.860 x 1.157	.030	I I
8307-0	.385 x .635	1.235	.865 x 1.115	.040	A A
5045-0	.393 x .650	1.312	1.125 x 1.372	.040	A A
7468-0	.390 x .765	1.370	.765 x 1.140	.025	A A
2432-0	.391 x .891	1.375	.938 x 1.312	.047	A A
1508-0	.390 x .450	1.380	.817 x .880	.040	A A
5684-0	.390 x .630	1.470	.969 x 1.224	.030	A A
6836-0	.390 x .390	1.610	.968 x .968	.030	A A
8484-0	.391 x .430	1.702	1.306 dia.	.035	PP PP
7245-0	.385 x .635	2.210	.745 x 1.005	.030	A A
Core smaller dimension .401 to .420					
7443-0	.416 x .826	.276	1.082 x 1.486	.025	M A
3256-0	.406 x 1.046	.590	.716 x 1.356	.045	A F
2541-0	.405 x .572	.620	1.280 x 1.560	.020	J VV
3415-0	.415 x 1.520	.650	.854 x 2.264	.050	A A
✈ 2886-0	.406 x .781	.656	.844 x 1.312	.032	A A
4476-0	.406 x .531	.656	.843 x 1.062	.025	A A
8442-0	.410 x .815	.690	.875 x 1.312	.030	A A
8443-0	.410 x .570	.690	.875 x 1.060	.030	A A
3233-0	.406 x .562	.875	.875 x 1.000	.030	A A
2559-0	.420 x .660	.990	.844 x 1.000	.040	A M
8139-0	.420 x .420	1.050	.630 x .655	.030	A A
5508-0	.416 x 1.414	1.097	.772 x 1.940	.030	D A
8836-0	.406 x 1.093	1.100	1.062 x 1.750	.050	M M
4406-1	.410 x .765	1.110	.730 x 1.250	.025	O A O
4406-0	.410 x .765	1.110	.730 x 1.250	.025	O O
2524-1	.412 x .597	1.136	1.319 x 1.450	.055	V V
8674-0	.405 x .655	1.185	1.375 x 1.625	.045	A A
1805-0	.406 x 1.281	1.218	.875 x 1.718	.025	M M
2537-0	.406 x .906	1.250	1.375 x 1.875	.062	A F
4508-0	.405 x .640	1.280	2.030 x 2.250	.060	A P
4234-0	.406 x .580	1.405	1.250 x 1.450	.045	V V
5873-0	.406 x .656	1.432	.932 x 1.182	.030	A A
5871-0	.406 x .656	1.432	.589 x .839	.030	A A
7393-0	.405 x .760	1.437	1.000 x 1.500	.035	A P
5775-0	.410 x .656	1.460	1.340 x 1.582	.042	D D
Core smaller dimension .421 to .440					
2587-0	.440 x .645	.620	1.031 x 1.438	.062	A M
2523-0	.426 x .625	.812	1.125 x 1.375	.040	V V
2405-0	.433 x .525	.812	.819 x .964	.032	M M
2569-0	.432 x .815	.815	1.155 x 1.620	.030	A M
2472-0	.428 x .930	1.125	.970 x 1.500	.032	G G
2538-0	.438 x .638	1.328	1.218 x 1.375	.047	A UU
6342-1	.425 x .615	1.340	.954 x 1.174	.045	M 40
6067-0	.422 x .891	3.021	1.375 x 1.844	.047	G A
Core smaller dimension .441 to .480					
2177-0	.480 x .780	.330	1.150 x 1.380	.025	J J
5113-0	.475 x 1.359	.345	1.093 x 1.980	.031	V V
1563-0	.450 x 1.312	.390	1.030 x 1.892	.042	A V
2116-0	.480 x .780	.400	1.150 x 1.380	.025	J J
4843-0	.470 x .550	.750	1.250 x 1.250	.040	A J
4923-0	.448 x .522	.782	1.068 x 1.187	.035	A J
5071-0	.453 x .515	.796	.943 x 1.105	.031	A A
2417-0	.453 x .781	.969	1.312 x 1.625	.045	TT TT
2553-0	.447 x .537	.977	1.375 x 1.406	.055	P P
4614-0	.446 x .517	1.076	1.020 x 1.141	.040	A A
4613-0	.446 x .664	1.081	1.020 x 1.288	.040	A A
4874-0	.457 x .770	1.110	1.165 x 1.478	.040	I I
4987-0	.453 x .453	1.187	.875 x .875	.028	A TT
1512-0	.458 x .630	1.188	1.125 x 1.391	.040	P P
2166-0	.450 x .570	1.250	.940 x 1.030	.030	A A
5055-0	.453 x .885	1.260	1.300 x 1.730	.032	A A
1526-0	.469 x .641	1.312	1.219 x 1.641	.040	X X
5886-0	.453 x .515	1.475	1.500 x 1.340	.040	A A

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles
	Core smaller dimension .481 to .500				
2347-0	.500 x .800	.200	1.158 x 1.380	.025	TT TT
1281-0	.500 x .500	.265	1.093 x 1.093	.030	A A
2358-0	.485 x .785	.450	1.160 x 1.385	.025	TT A TT
1574-0	.500 x .625	.719	1.188 x 1.344	.031	A X
2501-0	.500 x .625	.734	1.094 x 1.344	.030	A CC
1262-1	.500 x .515	.790	1.077 x 1.100	.035	D G
4429-0	.500 x .500	.796	1.094 x 1.094	.030	A N
4307-0	.500 x 1.000	.800	1.100 x 1.650	.030	A A
1212-3	.518 x .518	.803	1.093 x 1.093	.031	M M
2590-0	.495 x 1.297	1.094	1.580 x 2.391	.040	A G
805-0	.500 x 2.547	1.094	1.580 x 3.641	.040	A A
4537-0	.500 x .500	1.100	1.090 x 1.090	.030	A A
2174-0	.499 x .642	1.150	.816 x .957	.031	M A
✈ 5722-0	.500 x .615	1.150	1.150 x 1.250	.055	N N
5429-0	.485 x .620	1.170	1.200 x 1.350	.030	A A
2596-0	.493 x .547	1.305	1.099 x 1.240	.031	A A
1535-0	.493 x .547	1.310	1.105 x 1.240	.031	A A
1850-0	.500 x .693	1.450	1.250 x 1.381	.055	R R
4607-0	.500 x .500	1.625	1.250 x 1.250	.047	J J
3238-0	.500 x .750	1.875	1.250 x 1.750	.031	A A
6088-0	.500 x 1.562	2.437	1.250 x 2.312	.062	A A
769-0	.500 x 1.809	2.561	1.502 x 2.876	.060	J J
	Core smaller dimension .501 to .520				
3306-0	.502 x .510	.156	.969 x .969	.025	A A
2408-0	.510 x 1.010	.331	.875 x 1.375	.025	A A
81482-0	.510 x .510	.410	1.100 x 1.100	.035	J J
3542-0	.518 x .518	.411	1.495 x 1.495	.030	EE EE
4533-0	.510 x .710	.420	1.108 x 1.308	.030	A A
1905-0	.520 x .625	.500	1.140 x 1.175	.028	V V
81349-0	.505 x .625	.580	1.120 x 1.250	.040	46 46
4669-0	.508 x .540	.612	1.338 x 1.370	.030	J J
8179-0	.516 x 1.025	.640	1.437 x 2.000	.035	A A
8858-0	.516 x .656	.640	1.437 x 1.632	.032	A A
7297-0	.505 x .505	.722	.984 x .984	.030	N N
✈ 5991-0	.515 x .515	.734	.875 x .875	.045	A A
1270-0	.515 x .625	.734	1.093 x 1.218	.030	A A
81425-0	.520 x .600	.740	1.490 x 1.600	.040	J A J
3195-0	.515 x .580	.740	1.475 x 1.580	.040	A A J
3992-0	.512 x .762	.750	1.568 x 1.822	.030	A A
81424-0	.520 x .600	.765	1.180 x 1.600	.040	A J
4633-0	.515 x 1.250	.766	.938 x 1.670	.030	A A
3194-0	.515 x .580	.792	1.475 x 1.580	.040	A A
4770-0	.520 x .567	.795	1.100 x 1.152	.030	C A
81629-0	.515 x .515	.795	1.100 x 1.100	.030	A A A
✈ 7030-0	.510 x .510	.796	1.110 x 1.110	.030	A A
1254-2	.510 x .650	.796	1.100 x 1.250	.030	A I
1254-1	.510 x .650	.796	1.100 x 1.250	.035	A B
1254-0	.513 x .650	.796	1.110 x 1.230	.030	A A
7033-0	.515 x .515	.796	.890 x .890	.040	A A
7031-0	.510 x .510	.796	1.100 x 1.100	.030	M M
7030-1	.510 x .510	.796	.960 x .960	.030	A A
3292-0	.514 x .514	.796	1.105 x 1.105	.036	N N
83224-0	.515 x .515	.796	1.115 x 1.115	.035	A A
5926-0	.510 x .510	.800	1.100 x 1.115	.080	O A O
2179-0	.510 x .510	.800	1.105 x 1.105	.080	O A M
2533-0	.510 x 1.025	.800	1.436 x 2.000	.032	A I
7069-0	.511 x .866	.803	1.100 x 1.455	.030	A A
1212-4	.518 x .518	.803	1.100 x 1.100	.035	A N
✈ 1212-0	.518 x .518	.803	1.100 x 1.100	.035	A A
1212-2	.518 x .518	.803	1.100 x 1.100	.035	BB BB
✈ 1236-0	.520 x .647	.917	1.090 x 1.227	.030	M M
4301-0	.505 x .750	.920	1.465 x 1.750	.030	14 14
2530-0	.510 x .924	.955	1.630 x 2.270	.060	I A
1544-0	.505 x .515	.985	1.100 x 1.125	.062	A A
4405-0	.510 x .765	1.110	1.125 x 1.485	.040	O O
✈ 4405-1	.510 x .765	1.110	1.125 x 1.445	.040	O A O
8178-0	.516 x 1.025	1.120	1.437 x 2.000	.035	A A
8859-0	.516 x .656	1.120	1.437 x 1.632	.032	A A
3968-0	.515 x .640	1.125	1.250 x 1.312	.035	F A
1275-1	.508 x .508	1.163	1.250 x 1.250	.030	N N
1275-0	.508 x .508	1.163	1.250 x 1.250	.035	A A
2228-0	.510 x .610	1.180	1.450 x 1.550	.025	AA A AA
1269-0	.515 x 1.031	1.203	1.468 x 2.062	.045	N N
✈ 1641-0	.515 x .562	1.220	1.440 x 1.540	.045	M M
4895-0	.515 x .630	1.238	1.360 x 1.462	.030	M A
1904-0	.515 x .585	1.250	1.125 x 1.219	.050	P P
1496-0	.515 x .822	1.250	1.125 x 1.500	.050	P P
1274-0	.516 x 1.031	1.255	1.696 x 2.297	.045	N N
83848-0	.515 x .515	1.345	1.120 x 1.120	.045	A A
5287-0	.510 x .510	1.460	1.310 x 1.310	.060	A A
8628-0	.510 x 1.265	1.468	1.475 x 2.230	.040	A A
4010-0	.520 x 1.020	1.484	.900 x 1.500	.040	TT TT
4599-0	.516 x .516	1.604	1.250 x 1.250	.047	A CC
4644-0	.520 x .520	1.610	1.110 x 1.110	.032	A A
2459-0	.510 x .510	1.615	1.119 x 1.119	.030	A 7
4607-1	.506 x .508	1.625	1.251 x 1.251	.046	J J
3893-0	.508 x .668	1.748	1.028 x 1.258	.030	F A
1621-0	.514 x .670	1.775	1.058 x 1.270	.094	* A *
646-0	.517 x 2.057	2.216	1.088 x 2.720	.040	J J
809-0	.520 x 1.031	2.281	1.125 x 1.500	.045	N N
	Core smaller dimension .521 to .540				
8433-0	.530 x .696	.380	1.460 x 1.625	.035	A A
2598-0	.531 x .718	.468	1.688 x 2.000	.039	A A

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles	
4732-0	.525 x .715	.482	1.098 x 1.426	.030	A	A
81128-0	.525 x .840	.505	1.250 x 1.500	.030	A	A
2078-0	.525 x 1.280	.549	.894 x 1.645	.025	A	A
4080-0	.525 x 1.521	.671	1.093 x 2.125	.040	A	A
2580-0	.531 x .781	.750	1.062 x 1.312	.030	A	A
1230-0	.525 x 1.020	.781	1.105 x 1.625	.030	A	A
5867-0	.530 x .560	.800	1.240 x 1.170	.040	A	A
979-0	.536 x 1.353	.830	1.843 x 2.312	.045	P	P
890-0	.530 x 3.060	.870	1.060 x 3.590	.050	A	27
4837-0	.525 x .625	1.000	1.200 x 1.300	.030	A	M
1585-0	.531 x .531	1.094	1.500 x 1.500	.030	A	A
1810-0	.525 x .643	1.175	1.188 x 1.490	.032	P	P
1042-0	.530 x 1.562	1.220	1.468 x 2.594	.045	J	J
5390-0	.525 x .568	1.285	1.275 x 1.280	.085	F	F
1953-0	.523 x .581	1.350	1.176 x 1.196	.032	P	P
4258-0	.540 x .540	1.359	1.500 x 1.500	.032	A	A
2436-0	.537 x .597	1.360	1.437 x 1.450	.055	A	A
8434-0	.530 x .696	1.375	1.460 x 1.625	.035	A	A
5366-0	.531 x .564	1.380	1.080 x 1.256	.031	DD	DD
1565-0	.531 x .580	1.406	1.359 x 1.453	.046	V	V
1902-0	.522 x .558	1.412	1.296 x 1.312	.080	V	V
4157-0	.531 x .687	1.437	1.281 x 1.593	.062	P	P
2480-0	.531 x 1.031	1.468	1.219 x 1.719	.030	A	A
2028-0	.540 x .550	1.500	1.500 x 1.510	.040	2	2
8255-0	.536 x .792	1.530	1.470 x 1.730	.060	A	A
2016-0	.534 x .890	1.570	1.125 x 1.500	.050	I	I
1839-0	.530 x .910	1.580	1.390 x 1.850	.035	A	A
1803-0	.531 x 1.531	1.750	1.125 x 1.975	.031	J	A
791-0	.535 x .535	1.875	1.562 x 1.562	.031	A	A
6200-0	.536 x .545	2.110	1.200 x 1.205	.047	A	P
6286-0	.530 x .900	2.656	1.330 x 1.700	.040	J	J
Core smaller dimension .541 to .580						
4359-0	.577 x .650	.335	1.384 x 1.457	.030	A	M
8373-0	.570 x .900	.585	1.088 x 1.443	.031	A	J
1420-0	.562 x .812	.656	1.625 x 1.875	.062	A	A
2000-0	.578 x .781	.734	1.375 x 1.750	.046	A	A
5209-0	.545 x .855	.750	1.140 x 1.460	.035	F	A
1250-1	.565 x 1.520	.796	1.093 x 2.125	.040	A	A
1551-0	.558 x .558	.875	1.562 x 1.562	.031	A	A
5096-0	.562 x 1.406	.953	1.375 x 2.250	.036	A	A
3308-0	.550 x .550	.965	1.570 x 1.570	.040	A	A
6397-0	.550 x .685	.980	1.160 x 1.295	.030	39	A
1434-1	.567 x .729	.991	1.469 x 1.750	.050	PP	PP
2965-0	.565 x .642	1.000	1.475 x 1.500	.040	BB	BB
2595-0	.567 x .891	1.000	1.500 x 1.719	.040	B	B
8420-0	.570 x 1.200	1.000	1.070 x 1.620	.040	A	A
1488-0	.570 x 1.148	1.012	1.375 x 1.937	.040	Q	Q

Part number	Core size	Length	Flange size	Wall	Flange styles	
1458-0	.567 x .766	1.080	1.500 x 1.594	.040	W	W
2415-0	.568 x .574	1.105	1.234 x 1.245	.031	A	A
1448-0	.570 x 1.010	1.125	1.375 x 1.765	.040	A	A
8216-0	.580 x .635	1.175	1.455 x 1.515	.047	A	A
4636-0	.541 x .546	1.240	1.075 x 1.080	.050	A	A
4530-0	.564 x .791	1.240	1.080 x 1.325	.050	A	A
4562-0	.546 x .916	1.240	1.080 x 1.450	.050	A	A
4635-0	.546 x .666	1.240	1.080 x 1.200	.050	A	A
4639-0	.546 x 1.041	1.240	1.080 x 1.575	.050	A	A
1832-0	.560 x .800	1.277	1.406 x 1.625	.032	P	P
1884-0	.580 x .590	1.281	1.375 x 1.406	.031	P	P
1914-0	.560 x 1.350	1.281	1.577 x 2.384	.060	X	X
1964-0	.560 x 1.535	1.320	1.337 x 2.535	.035	V	V
1943-0	.565 x .615	1.320	1.418 x 1.460	.050	V	V
1944-0	.565 x .941	1.320	1.418 x 1.786	.050	V	V
1840-0	.560 x .655	1.321	1.412 x 1.438	.032	P	P
2803-0	.573 x 1.546	1.375	1.611 x 2.421	.040	CC	CC
1999-0	.558 x 1.296	1.375	1.500 x 2.051	.040	P	P
3524-0	.553 x .576	1.375	1.300 x 1.503	.040	P	P
2824-0	.578 x .796	1.380	1.485 x 1.734	.030	CC	CC
8263-0	.572 x .931	1.388	1.602 x 1.756	.046	44	A
2813-0	.552 x 1.115	1.393	1.472 x 2.020	.050	CC	CC
1569-0	.555 x .578	1.397	1.281 x 1.304	.042	V	V
1992-0	.573 x 1.046	1.400	1.500 x 1.796	.040	P	P
4867-0	.556 x 1.032	1.403	1.293 x 1.820	.032	M	M
2476-0	.580 x 1.031	1.405	1.465 x 1.775	.032	V	V
1988-0	.580 x .656	1.406	1.453 x 1.484	.046	V	V
2531-0	.578 x .703	1.406	1.375 x 1.500	.060	V	V
3404-0	.580 x 1.281	1.406	1.453 x 2.109	.046	V	V
1528-0	.580 x 1.160	1.406	1.437 x 2.031	.030	X	X
3405-0	.580 x 1.406	1.406	1.437 x 2.312	.046	V	V
3381-0	.569 x 1.062	1.406	1.406 x 1.875	.034	V	V
4567-0	.580 x .612	1.406	1.578 x 1.578	.035	V	V
4568-0	.580 x .712	1.406	1.406 x 1.703	.035	V	V
4569-0	.580 x 1.262	1.406	1.453 x 2.453	.035	V	V
4570-0	.580 x 1.512	1.406	1.453 x 2.382	.035	V	V
2520-0	.580 x .785	1.407	1.460 x 1.590	.031	V	V
1956-0	.552 x 1.515	1.408	1.472 x 2.420	.050	V	V
1527-1	.580 x .930	1.410	1.445 x 1.785	.035	A	U
1912-0	.563 x 1.010	1.422	1.296 x 1.790	.080	V	V
1920-0	.555 x 1.260	1.422	1.453 x 2.086	.080	V	V
1527-0	.580 x .937	1.437	1.437 x 1.781	.030	X	X
4412-0	.575 x .932	1.486	1.507 x 1.994	.030	J	J
3265-0	.580 x .635	1.500	1.260 x 1.305	.032	DD	DD
8413-0	.550 x 1.050	1.540	1.080 x 1.610	.030	A	A
2067-0	.543 x .786	1.542	1.137 x 1.395	.030	O	O
3984-0	.545 x .545	1.680	1.000 x 1.000	.020	A	A

*** Irregular Flange**

Quick-Ship (see page 2)

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles	
Core smaller dimension .541 to .580 continued						
2484-0	.545 x .705	1.750	1.940 x 2.175	.040	A	S
6265-0	.567 x .695	1.780	.938 x 1.062	.031	A	A
715-0	.575 x .725	2.094	2.081 x 2.268	.058	P	A
6159-0	.570 x 1.062	2.172	.875 x 1.392	.050	I	I
6776-0	.572 x 1.100	2.650	.835 x 1.385	.035	EE	EE
83258-0	.562 x 1.525	2.810	2.320 x 3.275	.030	A	A
6097-0	.560 x .726	3.183	2.126 x 2.373	.060	P	A
730-0	.545 x .725	3.187	2.625 x 2.875	.062	A	A
8043-0	.550 x .550	3.500	1.250 x 1.250	.062	A	A
Core smaller dimension .581 to .620						
2429-0	.605 x .630	.140	.875 x .900	.015	J	J
8486-0	.602 x 1.072	.504	1.128 x 1.627	.030	38	A
4844-0	.586 x 1.025	.550	.906 x 1.345	.025	A	A
1511-0	.600 x .790	.750	1.700 x 1.690	.035	32	A
1941-0	.600 x 1.540	.750	1.720 x 2.626	.035	A	34
1890-1	.600 x 2.040	.750	1.720 x 2.940	.035	A	A
4670-0	.583 x .583	.948	1.912 x 1.912	.030	J	J
4136-0	.600 x .600	.950	1.300 x 1.300	.062	38	N
1896-0	.600 x .625	.968	1.500 x 1.500	.030	P	P
1898-0	.600 x .875	.968	1.500 x 1.500	.030	P	P
8485-0	.603 x 1.071	.987	1.129 x 1.627	.030	38	A
1575-0	.587 x .587	1.028	1.713 x 1.713	.050	A	A
4191-0	.614 x .786	1.046	1.593 x 1.750	.040	A	A
6758-0	.605 x 1.287	1.093	1.370 x 2.000	.050	M	O
1820-0	.600 x .625	1.175	1.250 x 1.490	.040	P	P
2465-0	.615 x .825	1.298	1.154 x 1.439	.040	11	11
4413-0	.593 x .905	1.343	1.593 x 1.968	.078	A	A
4414-0	.593 x .630	1.343	1.593 x 1.968	.078	A	A
4415-0	.593 x 1.030	1.343	1.593 x 1.968	.078	A	A
5811-0	.605 x 1.285	1.350	1.360 x 2.040	.045	A	A
1901-0	.598 x .648	1.350	1.176 x 1.320	.080	P	P
4519-0	.600 x .875	1.350	1.350 x 1.625	.031	A	A
6063-0	.582 x .582	2.000	1.200 x 1.200	.040	M	M
Core smaller dimension .621 to .640						
3298-0	.640 x .640	.270	1.218 x 1.218	.031	A	A
1272-0	.640 x .640	.343	1.000 x 1.000	.040	A	A
1862-0	.635 x .640	.500	1.140 x 1.300	.025	V	V
2464-0	.625 x 1.125	.682	1.498 x 2.123	.031	A	CC
1573-0	.625 x .812	.687	1.498 x 1.811	.031	A	X
2258-0	.640 x .760	.690	1.490 x 1.606	.035	M	M
811-0	.639 x 2.755	.720	1.219 x 3.330	.035	A	J
812-0	.639 x 2.187	.720	1.219 x 2.767	.035	A	J
4058-0	.640 x 1.520	.750	1.218 x 2.098	.035	A	M
4778-0	.640 x .640	.750	1.250 x 1.250	.040	A	J
1279-0	.640 x .640	.812	1.218 x 1.218	.035	A	A
4906-0	.640 x .755	.837	1.218 x 1.350	.030	A	I
4322-1	.640 x .885	.906	1.224 x 1.500	.035	A	A
81412-0	.640 x .640	.920	1.225 x 1.225	.035	C	C
83225-0	.640 x .640	.920	1.225 x 1.225	.035	A	A
3451-0	.640 x .890	.920	1.218 x 1.500	.030	A	A
1285-0	.640 x 1.020	.920	1.210 x 1.600	.030	A	A
81225-0	.640 x .640	.920	1.225 x 1.225	.035	A	A
7034-0	.640 x .640	.921	1.015 x 1.015	.030	A	A
1228-3	.640 x .760	.921	1.218 x 1.343	.033	H	A
7036-0	.640 x .640	.921	1.218 x 1.218	.030	M	M
1214-2	.632 x .632	.921	1.218 x 1.218	.035	J	A
2557-0	.640 x .640	.922	1.850 x 1.850	.050	N	N
341-0	.640 x .640	.931	1.750 x 1.750	.031	DD	DD
1599-0	.640 x .765	1.062	1.264 x 1.389	.040	D	D
1854-0	.634 x 1.150	1.175	1.540 x 2.000	.040	P	P
1806-0	.634 x 1.337	1.175	1.570 x 2.250	.045	P	P
1892-0	.634 x .875	1.175	1.620 x 1.710	.030	V	T
1826-0	.630 x 1.083	1.187	1.578 x 2.000	.040	T	T
2529-0	.630 x 1.143	1.250	1.500 x 2.011	.040	P	P
3853-0	.640 x .890	1.281	1.468 x 1.718	.040	A	M
1576-0	.640 x .843	1.312	1.593 x 1.640	.040	P	P
1577-0	.640 x 1.093	1.312	1.640 x 1.843	.040	P	P
1562-0	.640 x 1.343	1.312	1.640 x 2.093	.040	P	P
1539-0	.640 x 1.145	1.343	1.531 x 1.984	.030	X	X
5385-0	.640 x .640	1.700	1.385 x 1.385	.030	A	A
Core smaller dimension .641 to .660						
7410-0	.660 x 1.050	.437	1.281 x 1.625	.025	A	A
1876-0	.660 x 1.540	.745	1.720 x 2.890	.035	A	*
1524-0	.660 x 1.540	.750	1.800 x 2.440	.030	A	A
746-0	.656 x 2.750	.781	2.000 x 3.875	.031	A	A
1265-0	.650 x .650	.875	1.225 x 1.225	.035	A	A
1228-0	.646 x .758	.917	1.218 x 1.346	.035	A	A
1214-5	.650 x .650	.920	1.230 x 1.230	.035	A	A A
1214-0	.650 x .650	.920	1.225 x 1.225	.035	A	A
1214-4	.650 x .650	.920	1.224 x 1.224	.035	N	N
5805-0	.650 x .650	.920	1.225 x 1.225	.035	A	H
1228-5	.647 x .760	.921	1.218 x 1.343	.035	A	H
1214-1	.650 x .650	.921	1.220 x 1.220	.035	C	M
1214-7	.649 x .649	.921	1.222 x 1.222	.035	A	A A
1329-0	.650 x .910	1.085	1.220 x 1.510	.050	A	A
1918-0	.643 x .943	1.175	1.540 x 1.875	.040	X	X
1822-0	.643 x .700	1.175	1.500 x 1.510	.040	P	P
1814-0	.643 x .875	1.175	1.510 x 1.625	.040	P	P
1816-0	.643 x 1.025	1.175	1.540 x 1.875	.040	P	P
1903-0	.643 x 1.525	1.175	1.600 x 2.500	.052	P	P
884-0	.643 x 2.025	1.175	1.600 x 3.000	.060	P	P
1959-0	.643 x .775	1.175	1.510 x 1.593	.040	P	P
1892-1	.643 x .875	1.187	1.625 x 1.718	.040	V	V

*** Irregular Flange**

Quick-Ship (see page 2)

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles
2494-0	.656 x .781	1.218	1.468 x 1.593	.040	A A
6211-0	.656 x .656	1.671	2.000 dia.	.032	YY YY
5611-0	.658 x .715	1.690	1.675 x 1.745	.062	F F
5503-0	.650 x .650	1.840	1.250 x 1.250	.040	A A
5504-0	.650 x 1.270	1.840	1.250 x 1.860	.040	A A
3240-0	.660 x 1.040	1.850	1.375 x 1.720	.030	A A
6222-0	.660 x 1.035	2.975	1.500 x 1.935	.050	J J
Core smaller dimension .661 to .700					
2322-0	.695 x .757	.667	1.647 x 1.656	.040	A M
5513-0	.675 x .974	.707	1.202 x 1.497	.030	J A
2317-0	.685 x .850	.720	1.440 x 1.620	.025	A A A
8747-0	.675 x 1.300	.812	1.675 x 2.300	.031	A J
8701-0	.675 x 1.300	.937	1.675 x 2.300	.031	A J
4634-0	.690 x .712	1.300	1.570 x 1.562	.060	A A
1927-0	.695 x 1.210	1.307	1.195 x 1.710	.060	A A
4159-0	.687 x 1.031	1.437	1.593 x 1.781	.062	P P
4160-0	.687 x 1.395	1.437	1.593 x 2.109	.062	P P
8353-0	.690 x 1.040	1.445	1.460 x 1.900	.080	M M
1846-0	.687 x .693	1.445	1.387 x 1.437	.055	R R
1954-0	.693 x .812	1.445	1.380 x 1.562	.055	R R
1878-0	.695 x .970	1.445	1.195 x 1.470	.060	33 A
1852-0	.695 x 1.062	1.445	1.382 x 1.812	.060	R R
1937-0	.695 x 1.312	1.445	1.382 x 2.062	.060	R R
1938-0	.695 x 1.562	1.445	1.382 x 2.312	.060	R R
1939-0	.695 x 2.062	1.445	1.382 x 2.812	.060	R R
5915-0	.688 x .860	1.570	1.437 x 1.672	.035	A A
2363-0	.662 x .662	1.620	1.067 x 1.067	.030	M M
81311-0	.687 x 1.320	1.845	1.880 x 2.500	.062	A A
6214-0	.690 x 1.060	2.074	1.360 x 1.690	.037	A J
Core smaller dimension .701 to .740					
1464-1	.730 x 1.145	.420	1.685 x 1.935	.030	G P
5320-0	.738 x 1.150	.473	1.700 x 1.947	.025	39 39
3193-0	.710 x 1.053	.625	1.347 x 1.692	.031	A A
5520-0	.706 x 1.266	.734	1.085 x 1.640	.032	A A
1037-0	.730 x 1.160	.980	1.765 x 2.190	.050	A M
681-0	.705 x .705	1.094	3.136 x 3.136	.040	J J
2485-0	.734 x .859	1.187	1.406 x 1.562	.050	A A
5094-0	.723 x .870	1.220	1.540 x 1.705	.035	A A A
4559-0	.727 x .871	1.222	1.527 x 1.702	.060	A A
5912-0	.723 x 1.138	1.240	1.430 x 1.770	.060	A A
4252-0	.736 x 1.300	1.274	1.561 x 2.275	.062	A A
5868-0	.718 x .875	1.291	2.000 x 1.807	.040	A A
653-0	.712 x 1.750	1.300	1.562 x 2.632	.062	A A
4531-0	.712 x 1.065	1.300	1.562 x 1.945	.060	A A
4638-0	.712 x 1.190	1.300	1.562 x 2.070	.060	A A
675-0	.712 x 2.330	1.300	1.562 x 3.210	.060	A A
797-0	.703 x 1.760	1.346	1.535 x 2.636	.031	V V
5546-0	.710 x .957	1.435	1.375 x 1.760	.045	A A
4158-0	.703 x .703	1.437	1.453 x 1.593	.062	P P
8633-0	.719 x .828	1.440	1.281 x 1.396	.030	O O
✈ 1350-0	.730 x 1.016	1.484	1.725 x 1.968	.040	A A
8634-0	.720 x .831	1.596	1.281 x 1.390	.035	O O
8691-0	.725 x .905	1.832	1.300 x 1.480	.031	A G
Core smaller dimension .741 to .760					
999-0	.758 x 1.010	.250	1.980 x 2.250	.025	A A
4289-0	.750 x .885	.375	1.375 x 1.500	.040	J A J
1264-0	.750 x .750	.550	1.500 x 1.500	.040	O A
5521-0	.760 x .760	.990	1.740 x 1.990	.040	A A
✈ 7039-0	.758 x .758	1.107	1.485 x 1.485	.042	A A
8987-0	.758 x .758	1.110	1.485 x 1.485	.040	M M
✈ 2589-0	.760 x 1.510	1.110	1.485 x 2.235	.040	12 12
7194-0	.758 x .758	1.110	1.490 x 1.490	.042	A A
7039-1	.758 x .758	1.115	1.485 x 1.485	.042	O A O
5736-0	.760 x .760	1.115	1.490 x 1.490	.040	13 13
7038-0	.758 x .758	1.120	1.485 x 1.485	.042	I A
998-0	.758 x 1.010	1.250	1.980 x 2.250	.025	A A
4288-0	.750 x .885	1.437	1.375 x 1.500	.040	N N
5088-0	.750 x 1.022	1.492	1.500 x 1.953	.038	A A
974-0	.750 x 1.020	1.500	1.850 x 2.200	.055	A A
2599-0	.750 x 1.455	1.531	1.687 x 2.343	.040	A A
6051-0	.750 x .885	1.875	1.375 x 1.463	.040	N N
6027-1	.750 x .885	1.976	1.350 x 1.491	.030	A A
6027-2	.750 x .885	2.290	1.350 x 1.491	.030	A A
Core smaller dimension .761 to .800					
7641-0	.790 x .790	.205	2.050 x 2.370	.050	CC CC
8709-0	.765 x .765	.380	1.968 x 2.000	.040	A A
4985-1	.765 x .765	.981	1.480 x 1.480	.040	A A
4985-0	.765 x .765	.981	1.975 x 1.975	.040	A J
8710-0	.765 x .765	1.050	1.968 x 2.000	.040	A A
✈ 1537-0	.765 x .876	1.062	1.390 x 1.500	.040	M A
2214-0	.765 x .770	1.085	1.425 x 1.425	.040	CC A
4745-0	.785 x .876	1.093	1.480 x 1.500	.040	A M
1216-2	.765 x .765	1.108	1.480 x 1.480	.040	H A
1216-0	.765 x .765	1.108	1.480 x 1.480	.040	A A
1216-4	.766 x .766	1.108	1.480 x 1.480	.040	N N
1216-1	.766 x .766	1.108	1.484 x 1.484	.040	C A
1645-0	.765 x .765	1.110	1.470 x 1.470	.040	P A P
7040-0	.765 x .765	1.110	1.245 x 1.245	.030	A A
8531-0	.770 x 4.075	1.110	1.480 x 4.800	.035	A A
8772-0	.765 x 2.275	1.110	1.460 x 3.000	.040	12 J
1258-6	.765 x 1.015	1.110	1.485 x 1.725	.040	A J
✈ 1258-4	.765 x 1.015	1.110	1.472 x 1.718	.040	A A A
1258-5	.765 x 1.015	1.110	1.485 x 1.725	.040	A J
5918-0	.770 x 1.020	1.110	1.478 x 1.728	.040	L C

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core smaller dimension groups and then Length within each group.

Part number	Core size	Length	Flange size	Wall	Flange styles	
Core smaller dimension .761 to .800 continued						
83226-0	.765 x .765	1.110	1.480 x 1.480	.040	A	A
✈ 81226-0	.765 x .765	1.110	1.480 x 1.480	.042	A	A
1645-1	.765 x .765	1.110	1.470 x 1.470	.040	A A	A
✈ 1258-0	.765 x 1.015	1.110	1.486 x 1.725	.040	A	A
977-0	.781 x 1.438	1.125	1.827 x 2.500	.045	P	P
947-0	.781 x 1.781	1.230	1.807 x 2.807	.040	A	A
8707-0	.772 x 1.533	1.381	2.040 x 2.805	.050	40	40
990-0	.780 x 1.550	1.385	2.000 x 2.760	.060	A	A
1083-0	.780 x 1.850	1.430	1.965 x 3.110	.045	J	J
8112-0	.780 x 1.060	1.700	1.500 x 1.800	.035	A	A
✈ 6290-0	.765 x .765	2.220	1.470 x 1.470	.040	A	A
6961-0	.764 x .764	2.227	2.212 x 2.212	.035	A	A
6192-0	.765 x 1.015	2.233	1.303 x 1.605	.040	A	A
1014-0	.800 x 1.535	2.450	2.000 x 2.737	.100	A	A
6153-0	.772 x 1.275	2.920	1.110 x 1.630	.050	L	L
Core smaller dimension .801 to .880						
8102-0	.812 x 1.135	.475	1.937 x 2.200	.050	A	A
2456-0	.812 x 1.000	.537	1.530 x 1.718	.050	A	F
2543-0	.812 x 1.500	.537	1.530 x 2.218	.050	A	F
8103-0	.812 x 1.135	.725	1.937 x 2.200	.050	A	A
1570-0	.875 x 1.010	.850	1.875 x 1.955	.040	A	A
728-0	.860 x 2.220	.890	2.160 x 3.320	.050	QQ	QQ
601-0	.837 x 1.506	.963	2.224 x 2.435	.061	25	26
1348-0	.835 x 1.060	1.080	1.400 x 1.700	.040	A	P
1580-0	.875 x 1.000	1.084	1.125 x 1.250	.032	A	A
994-0	.805 x .805	1.085	2.270 x 2.270	.080	A	A
753-0	.846 x 1.317	1.120	2.316 x 2.686	.038	A	A
736-0	.829 x 1.517	1.251	1.830 x 2.600	.045	M	A
735-0	.829 x 1.018	1.258	1.835 x 2.065	.045	M	A
694-0	.875 x 2.125	1.276	1.734 x 3.000	.035	0	0
4637-0	.832 x .850	1.300	1.562 x 1.730	.060	A	A
2433-0	.832 x 1.520	1.406	1.781 x 2.468	.030	0	0
Core smaller dimension .881 to .900						
1390-0	.885 x .885	.566	1.740 x 1.740	.033	2	28
81227-0	.885 x .885	1.263	1.730 x 1.730	.040	A	A
4857-0	.886 x 1.260	1.265	1.730 x 2.095	.047	A	A
✈ 5122-0	.895 x 1.140	1.275	1.725 x 1.970	.040	A A	A
5272-0	.890 x 1.015	1.276	1.729 x 1.854	.050	0 0	7
✈ 2194-0	.895 x 1.550	1.276	1.730 x 2.365	.042	A	A
✈ 1218-0	.890 x .890	1.276	1.729 x 1.729	.040	A	A
✈ 1266-0	.895 x 1.448	1.276	1.725 x 2.258	.037	*	*
8775-0	.895 x 1.448	1.276	1.725 x 2.258	.042	45 A	A
5866-0	.890 x 1.015	1.276	1.729 x 1.954	.040	A	A
1218-2	.890 x .890	1.276	1.729 x 1.729	.040	7	7
4871-0	.895 x .895	1.282	1.725 x 1.725	.040	C	C
✈ 2021-0	.890 x 1.000	1.296	1.734 x 1.875	.040	M A	M
741-0	.895 x 1.845	1.375	2.562 x 3.500	.040	A	A
1197-0	.895 x 1.875	1.682	1.301 x 1.565	.048	0	0
640-0	.891 x 1.280	2.376	1.940 x 2.316	.040	A	A
7882-0	.885 x 1.010	2.390	1.937 x 2.062	.050	M	M
Core smaller dimension .901 to .960						
2310-0	.906 x 1.500	.750	1.687 x 2.281	.032	TT	TT
4720-0	.940 x 1.015	.770	2.046 x 2.190	.030	A	0
5823-1	.905 x 1.455	.885	1.796 x 2.345	.036	32	32
3230-0	.906 x 1.187	.937	1.687 x 1.968	.045	J	J
981-0	.905 x 1.410	1.129	2.090 x 2.595	.055	EE	00
1196-0	.910 x 1.208	1.186	1.562 x 1.782	.047	0	0
3830-0	.957 x 1.032	1.454	1.764 x 1.652	.058	A	A
6408-0	.945 x 1.182	1.536	1.576 x 1.812	.040	0	0
8256-0	.918 x .966	1.767	1.216 x 1.266	.020	J	A
671-0	.937 x 1.562	2.437	1.687 x 2.312	.062	A	A
Core smaller dimension .961 to 1.020						
2407-0	1.000 x 1.312	.312	2.000 x 2.312	.031	A	A
4279-1	1.010 x 1.885	.595	1.625 x 2.490	.035	QQ	QQ
3880-0	1.010 x 1.192	.620	1.812 x 2.000	.038	A	A
1026-0	1.020 x 1.530	.640	1.995 x 2.490	.035	0	28
2230-0	1.016 x 1.250	.920	1.960 x 2.200	.080	A	A
808-0	1.010 x 2.450	1.150	1.760 x 3.200	.030	A	A
936-0	1.020 x 1.770	1.472	1.980 x 2.730	.040	N	L
4872-0	1.020 x 1.020	1.472	1.980 x 1.980	.040	C	C
885-0	1.016 x 1.454	1.484	1.968 x 2.770	.062	A	J
✈ 1252-1	1.016 x 1.016	1.484	1.937 x 1.937	.040	A	A
4011-0	1.020 x 1.020	1.484	1.500 x 1.550	.040	TT	TT
✈ 650-0	1.020 x 1.525	1.485	1.980 x 2.480	.050	N	N
✈ 991-0	1.020 x 1.800	1.485	1.980 x 3.000	.040	I	I
6455-0	.990 x 1.180	1.500	1.610 x 1.716	.050	7	7
739-0	.968 x 1.505	1.531	2.035 x 2.685	.063	A	A
6454-0	.980 x 1.180	1.635	1.610 x 1.716	.050	0	0
6207-0	.986 x 1.400	1.740	1.900 x 2.485	.045	J	J
6358-0	1.000 x 1.000	1.950	2.000 x 2.000	.045	A	A
723-0	1.020 x 2.025	1.968	1.960 x 3.265	.053	15	15
796-0	1.000 x 1.562	2.000	2.750 x 3.250	.040	A	A
6453-0	.980 x 1.180	2.030	1.610 x 1.716	.050	0	0
8843-0	.984 x 2.125	2.187	1.890 x 3.094	.062	J	J
6208-0	.986 x 1.400	2.710	1.900 x 2.485	.045	J	J
801-0	1.012 x 1.012	2.906	1.984 x 1.984	.050	A	A
8025-0	.987 x 1.403	3.320	1.908 x 2.485	.045	40	40
8024-0	.987 x 1.403	3.860	1.908 x 2.487	.045	40	40
Core smaller dimension 1.021 to 1.040						
5037-0	1.025 x 1.390	.735	1.600 x 1.960	.035	A	A
7444-0	1.031 x 1.031	.906	1.968 x 1.968	.030	A	A
946-0	1.031 x 1.156	1.115	2.745 x 2.871	.080	A	U
2500-0	1.031 x 1.031	1.312	1.921 x 1.922	.040	A	F

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core smaller dimension groups and then Length within each group.

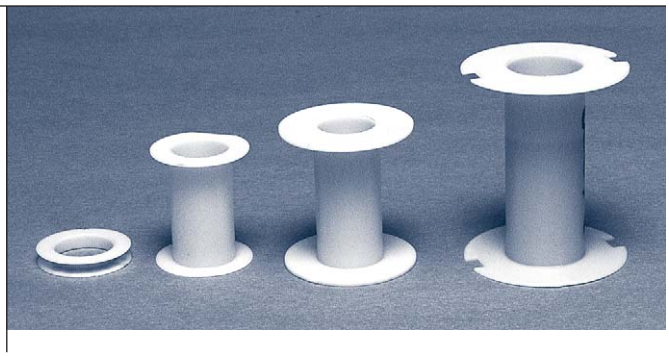
Part number	Core size	Length	Flange size	Wall	Flange styles
2139-0	1.035 x 1.268	1.407	1.509 x 1.870	.040	A A
2140-0	1.025 x 1.260	1.410	1.492 x 1.850	.040	A J
973-0	1.030 x 1.780	1.446	1.970 x 3.000	.055	1 1
✈ 1003-0	1.030 x 1.460	1.470	1.950 x 2.380	.050	H H
✈ 1252-0	1.025 x 1.025	1.470	1.975 x 1.975	.040	A A
566-0	1.024 x 1.829	1.480	1.983 x 2.996	.040	A A
✈ 1002-0	1.030 x 2.480	1.480	1.968 x 3.670	.050	J J
786-0	1.025 x 1.843	1.480	1.980 x 2.875	.063	L L
✈ 1001-0	1.025 x 2.025	1.484	1.980 x 2.980	.045	A A A
✈ 604-0	1.025 x 1.275	1.843	2.218 x 2.468	.040	A A
8786-0	1.031 x 1.082	2.157	1.976 x 2.021	.050	0 0
967-0	1.035 x 1.235	2.975	1.935 x 2.190	.050	J J
Core smaller dimension 1.041 to 1.260					
1198-0	1.076 x 1.291	.516	2.034 x 2.252	.050	M M
5667-0	1.076 x 1.219	1.032	1.958 x 2.155	.040	M M
5215-0	1.076 x 1.219	1.032	1.982 x 2.155	.040	A A
2164-0	1.089 x 2.031	1.324	1.596 x 2.535	.025	A A
682-0	1.045 x 1.045	1.340	2.300 x 2.300	.060	J J
81450-0	1.255 x 2.210	1.400	3.290 x 3.990	.035	A F
4137-0	1.062 x 1.062	1.531	1.937 x 2.125	.041	A A
8692-0	1.060 x 1.180	1.560	1.720 x 1.840	.035	A M
1555-0	1.156 x 2.062	1.625	2.000 x 3.000	.125	A A
612-1	1.150 x 1.150	1.650	2.230 x 2.230	.040	TT A TT
612-0	1.150 x 1.150	1.650	2.230 x 2.230	.040	TT TT
586-0	1.150 x 1.767	1.666	2.170 x 2.628	.050	24 24
585-0	1.156 x 1.397	1.672	2.170 x 2.255	.047	A A
✈ 726-0	1.144 x 1.775	1.672	2.210 x 3.105	.050	TT TT
6073-0	1.076 x 1.440	1.684	1.950 x 2.348	.050	A A
6078-0	1.078 x 1.449	1.686	1.958 x 2.354	.050	A A
✈ 613-1	1.260 x 1.260	1.843	2.475 x 2.475	.050	A A
613-0	1.260 x 1.260	1.843	2.475 x 2.475	.040	TT TT
1199-0	1.070 x 1.280	1.899	2.026 x 2.250	.049	M M
920-0	1.062 x 1.437	2.000	2.250 x 2.670	.063	N N
1139-0	1.043 x 1.507	2.219	2.463 x 2.963	.050	A A
774-0	1.126 x 2.307	2.627	2.385 x 3.685	.060	14 14
6245-0	1.080 x 1.362	2.645	1.970 x 2.372	.065	40 M
6244-0	1.080 x 1.362	2.650	1.970 x 2.346	.050	0 M
6249-0	1.070 x 1.352	2.684	1.951 x 2.362	.065	40 M
6149-0	1.070 x 1.430	2.737	1.960 x 2.352	.050	M 0
6150-0	1.070 x 1.430	2.737	1.960 x 2.352	.045	M J
6148-0	1.070 x 1.430	2.737	1.960 x 2.352	.050	M M
6151-0	1.070 x 1.430	2.737	1.960 x 2.352	.050	M J
909-0	1.253 x 1.253	2.750	2.750 x 3.125	.050	A P
8538-0	1.075 x 2.050	2.900	2.900 x 3.876	.100	A A
6198-0	1.070 x 1.360	3.070	1.979 x 2.329	.040	M J
8022-0	1.256 x 1.256	5.502	2.755 x 3.125	.050	43 A
Core smaller dimension 1.261 to 1.280					
984-0	1.275 x 2.187	.500	2.950 x 3.087	.040	J J
985-0	1.275 x 2.187	1.400	2.950 x 3.087	.040	J J
✈ 709-0	1.265 x 1.515	1.812	2.484 x 2.734	.040	C A
✈ 698-0	1.268 x 1.393	1.836	2.472 x 2.597	.060	C C
8754-0	1.265 x 2.020	1.843	2.450 x 3.500	.060	M A A
✈ 771-0	1.265 x 1.515	1.843	2.468 x 2.718	.045	0 0
✈ 886-0	1.265 x 2.015	1.843	2.468 x 3.500	.062	9 A
✈ 1004-0	1.280 x 1.780	1.845	2.440 x 2.940	.050	B B
1053-0	1.280 x 2.030	1.850	2.460 x 3.330	.063	J J
1054-0	1.280 x 1.530	1.850	2.460 x 2.830	.063	J J
1050-0	1.270 x 1.760	1.860	2.470 x 2.940	.050	29 30
Core smaller dimension 1.281 to 1.500					
8540-0	1.420 x 2.876	.847	3.450 x 3.996	.070	40 40
1045-0	1.285 x 1.380	.900	3.035 x 3.500	.040	0 A
1094-0	1.290 x 1.425	.950	3.000 x 3.240	.050	A J
8520-0	1.320 x 3.370	1.105	2.660 x 4.510	.060	QQ QQ
798-0	1.310 x 1.370	1.880	2.500 x 2.560	.040	A A
1034-0	1.405 x 1.780	2.000	2.715 x 3.090	.055	I A
✈ 772-0	1.390 x 1.522	2.055	2.735 x 2.858	.040	7 0
✈ 775-0	1.420 x 2.000	2.060	2.700 x 3.350	.045	J J
1095-0	1.290 x 1.425	2.250	3.000 x 3.240	.050	A J
1046-0	1.285 x 1.380	2.280	3.035 x 3.500	.040	B A
8541-0	1.400 x 2.878	2.675	3.442 x 3.707	.070	40 40
Core smaller dimension 1.501 to 1.999					
932-0	1.625 x 1.625	1.375	3.000 x 3.000	.093	A A
644-0	1.540 x 2.062	1.450	2.226 x 2.811	.060	V V
658-0	1.550 x 2.093	1.710	2.770 x 3.320	.050	A A
8527-0	1.532 x 2.402	2.135	2.968 x 4.050	.063	A A
✈ 704-0	1.515 x 1.515	2.218	2.980 x 2.980	.060	A A
704-1	1.515 x 1.515	2.218	2.980 x 2.980	.040	M 0
✈ 8518-1	1.520 x 2.405	2.220	2.970 x 4.100	.060	15 15
✈ 887-0	1.525 x 2.000	2.231	2.968 x 3.625	.062	TT A
✈ 887-1	1.525 x 2.000	2.231	2.968 x 3.625	.062	0 M
✈ 8511-0	1.765 x 2.515	2.562	3.484 x 4.234	.062	F A
✈ 8517-0	1.770 x 1.980	2.600	3.470 x 3.980	.060	15 15

*** Irregular Flange**

Quick-Ship (see page 2) ✈

ROUND CORE BOBBINS

These bobbins share the common characteristic of having a round core. There are a wide variety of flange styles represented, keyed to the flange style descriptions on pages 38 - 39. Most of the flange styles are round and are listed with one dimension under Flange Diameter. Square and rectangular flanges show two dimensions under Flange Diameter. Those bobbins that do not fit into the standard flange styles are indicated as irregular. Please request samples or a drawing to determine adaptability to your application.



This table is sequenced by Core smaller diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles	
Core smaller diameter .021 to .120						
7767-0	.059	.035	.095	.008	NN	EE
7907-0	.081	.050	.134	.010	NN	EE
8227-0	.102	.155	.240	.020	47	EE
3676-0	.052	.155	.200	.020	EE	EE
2846-0	.112	.210	.280 x .289	.022	A	DD
3868-0	.120	.210	.470	.020	EE	EE
2126-0	.100	.220	.312	.025	EE	EE
5845-0	.082	.230	.281	.018	EE	66
5218-0	.120	.313	.500	.023	EE	EE
2777-0	.096	.315	.355	.021	EE	FF
3787-0	.086	.350	.375	.040	EE	EE
5193-0	.106	.367	.314	.030	MM	EE
4922-0	.117	.400	.346	.020	EE	EE
2301-0	.120	.435	.730	.030	EE	EE
4774-0	.098	.436	.240	.020	EE	EE
4897-0	.110	.445	.265 x .265	.025	DD	DD
1644-0	.113	.459	.320	.018	EE	OO
6658-0	.118	.460	.420	.030	EE	EE
4423-0	.105	.600	.206	.018	KK	KK
5696-0	.096	.625	.375	.020	EE	FF
1786-0	.062	.662	.245	.030	EE	EE
8441-0	.120	.750	.300	.020	EE	EE
1766-0	.113	.841	.352	.022	EE	OO
2852-0	.100	.875	.375 x .375	.025	XX	XX
81127-0	.104	.935	.310	.030	EE	JJ
4741-0	.095	1.100	.312	.020	EE	EE
1703-0	.093	1.281	.390	.025	EE	EE
2847-0	.113	1.306	.332	.022	EE	NN
4023-0	.103	1.460	.500	.025	EE	EE
Core smaller diameter .121 to .140						
4328-0	.125	.198	.437	.020	EE	EE
4796-0	.132	.237	.417	.023	EE	EE
7859-0	.129	.250	.586	.015	EE	KK
5033-0	.128	.290	.781	.022	EE	FF
2727-0	.137	.320	.500	.023	EE	JJ
4021-0	.130	.323	.312	.024	EE	EE
6708-0	.125	.330	.530	.025	EE	EE
1427-0	.140	.350	.400 x .400	.031	XX	XX
7492-0	.132	.363	.353	.018	EE	EE
5648-0	.127	.390	.530	.030	EE	EE
2798-0	.140	.428	1.023	.032	EE	EE
7258-0	.130	.437	.450	.030	EE	EE
3649-0	.126	.438	.430	.032	EE	EE
5161-0	.126	.600	.625	.025	EE	EE
4452-0	.130	.625	.312	.022	EE	EE
3943-0	.135	.695	.385	.020	EE	EE
2662-0	.127	.700	.300	.025	EE	EE
3661-0	.125	.715	.265	.020	JJ	JJ
3093-0	.135	.734	.375 x .375	.035	DD	DD
2604-0	.140	.750	.500	.025	EE	EE
2154-0	.132	.765	.650	.030	EE	EE
3933-0	.140	.772	.310 x .390	.031	S	S
2624-0	.140	.800	.718	.030	EE	EE
1762-1	.135	.810	.500	.024	23	23
✈1762-0	.132	.810	.500	.030	EE	EE
1969-0	.135	.875	.375 x .375	.030	A	KK
1969-1	.135	.875	.375	.030	KK	KK
4283-0	.136	.875	.375	.030	LL	LL
1827-0	.136	.880	.330 x .373	.030	51	51
1969-3	.135	.882	.270 x .312	.026	51	51
3899-0	.135	.885	.440	.030	EE	EE
5340-0	.127	.977	.317 x .317	.030	A	EE
4536-0	.136	1.002	.380	.025	EE	EE
4935-0	.125	1.078	.250	.031	EE	EE
4595-0	.130	1.090	.535	.030	KK	KK
4750-0	.122	1.180	.290	.020	JJ	JJ
3375-0	.125	1.453	.562	.030	EE	EE
5377-0	.126	1.671	.624	.025	EE	EE
1752-0	.125	1.688	.625	.025	EE	EE
Core smaller diameter .141 to .180						
1776-0	.156	.187	.625	.025	EE	EE
6668-0	.178	.195	.276	.020	MM	MM
1723-0	.160	.195	.515	.023	EE	GG
3683-0	.155	.210	.545	.018	EE	EE
3733-0	.165	.215	.380	.025	EE	KK
4835-0	.156	.240	.440	.025	EE	EE
3630-0	.175	.245	.470	.023	EE	KK
1622-0	.152	.246	.359	.030	EE	EE
2036-0	.163	.262	.472	.020	LL	LL
1713-0	.146	.265	.375	.030	EE	EE
3638-0	.150	.314	.437	.031	EE	EE
1787-0	.180	.345	.545	.025	EE	JJ
3558-0	.142	.352	.402	.015	EE	EE
5025-0	.156	.385	.370	.022	EE	OO
8412-0	.150	.400	.380	.025	EE	EE
7926-0	.151	.401	.382	.025	47	EE
81466-0	.160	.405	.470	.025	EE	EE
3778-0	.150	.437	.343	.025	NN	FF
1670-0	.150	.437	.875	.032	EE	EE
1650-0	.150	.437	.565	.025	EE	EE
5337-0	.161	.450	.500	.020	EE	MM
5983-0	.162	.455	.315 x .315	.025	A	F
3618-0	.171	.461	.375	.030	EE	EE
2807-0	.142	.500	.390 x .390	.030	DD	DD
3707-0	.171	.500	.750	.062	EE	JJ
8488-0	.156	.540	.430	.025	EE	EE
4535-0	.165	.596	.500	.028	EE	EE
5731-0	.143	.598	.687	.022	EE	EE
7890-0	.170	.600	.275 x .275	.012	XX	XX
5125-0	.169	.615	.514	.020	MM	EE
5785-0	.158	.625	.375	.025	EE	EE

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
5751-0	.160	.650	.500	.025	EE EE
5480-0	.146	.660	.472	.020	MM EE
3615-0	.156	.687	.410	.030	EE EE
8334-0	.161	.693	.370 x .370	.025	DD EE
81178-0	.158	.700	.470	.015	EE EE
6662-0	.156	.703	.438	.018	EE EE
8299-0	.167	.715	.335	.020	EE FF
1763-0	.157	.728	.320	.030	EE EE
2697-0	.160	.770	.484	.020	EE EE
7073-0	.141	.800	.375	.025	EE EE
3690-0	.141	.800	.375 x .437	.025	DD DD
3747-0	.150	.800	.450	.025	PP PP
5313-0	.164	.806	.680	.040	FF EE
2783-0	.175	.845	.812 x .863	.030	EE DD
1205-0	.156	.859	.440	.030	EE EE EE
2775-0	.165	.865	.620	.046	EE FF
2023-0	.180	.978	.980	.020	MM MM
8244-0	.141	.993	.383	.020	73 73
8668-0	.148	1.090	.340	.025	EE EE
3813-0	.163	1.150	.400	.020	EE EE
1995-0	.158	1.298	.450	.030	EE EE
1724-0	.160	1.312	.593	.040	EE EE
3776-0	.177	1.345	.531	.040	EE EE
7340-0	.177	1.351	.531	.022	EE EE
Core smaller diameter .181 to .200					
7497-0	.195	.125	.418	.018	KK KK
2689-0	.194	.125	.418	.018	EE JJ
3931-0	.193	.150	.418	.016	KK KK KK
5089-0	.191	.163	.346	.045	KK KK
2626-0	.196	.187	.312	.031	EE EE
5444-0	.194	.320	.661	.020	KK EE
4683-0	.190	.338	.650	.027	EE FF
5721-0	.185	.341	.650	.025	EE EE
4998-0	.187	.343	.656	.030	EE EE
5899-0	.185	.385	.380	.025	EE JJ
4859-0	.192	.390	.780	.030	EE EE
1730-0	.193	.435	.370	.025	JJ JJ
1858-0	.195	.437	.530 x .530	.020	EE DD
7214-0	.192	.441	.497	.020	FF EE
✈4852-0	.196	.460	.620	.020	EE EE
1665-0	.200	.500	.500	.040	EE JJ
5920-0	.200	.500	.750	.046	EE JJ
7074-0	.187	.500	.687	.020	EE EE
3122-0	.190	.510	.630 x .630	.025	EE DD
4442-0	.192	.563	.562	.030	EE EE
2788-0	.187	.572	.531	.062	EE FF
1880-0	.192	.573	.750 x .750	.057	EE A

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
2612-0	.192	.578	.750	.030	EE OO
5905-0	.196	.600	.380 x .380	.025	A A
2616-0	.191	.600	.406	.032	EE MM
3727-0	.187	.625	.500	.031	EE EE
3601-0	.187	.625	.500	.030	EE EE
1872-0	.194	.640	.740 x .740	.034	EE A
1791-0	.190	.643	.680	.031	JJ EE
1791-1	.192	.646	.660	.023	JJ EE
5157-0	.200	.651	.427	.020	JJ EE
4815-0	.192	.655	.700	.030	63 DD
8284-0	.196	.658	.625	.040	65 EE
5898-0	.195	.678	.665	.025	JJ EE
1775-0	.198	.688	.615	.040	EE EE
3730-0	.187	.693	.500	.031	EE EE
1307-0	.197	.710	.550	.030	EE EE
3934-0	.196	.750	.750	.020	EE GG
4361-0	.200	.758	.625	.020	EE JJ
1834-0	.190	.812	.747 x .747	.026	C EE
1373-0	.195	.832	.455 x .455	.025	EE DD
7075-0	.191	.843	.750	.032	EE EE
4539-0	.197	.847	.500 x .500	.020	DD DD
3898-0	.198	.954	.862 x .862	.020	DD DD
5689-0	.194	.962	.750	.030	EE FF
1251-0	.191	1.000	.500	.020	EE EE
4441-0	.192	1.063	.500	.030	EE EE
8131-0	.195	1.080	1.500	.090	EE MM
7438-0	.188	1.125	.438	.025	70 EE
1900-0	.194	1.147	.753 x .753	.030	A EE
4931-0	.196	1.150	.500	.020	EE GG
5756-0	.196	1.150	.500	.022	EE GG
1764-0	.192	1.165	.750	.045	EE OO
5490-0	.195	1.875	.500	.032	JJ JJ
Core smaller diameter .201 to .220					
8215-0	.216	.197	.502	.020	47 47
5705-0	.210	.270	.500	.055	EE EE
4719-0	.203	.275	.500	.020	EE EE
4814-0	.201	.320	.650	.030	EE GG
2634-0	.220	.375	.770	.024	EE EE
4065-0	.220	.460	.625	.025	EE EE
3835-0	.206	.487	.438	.047	EE EE
4869-0	.201	.490	.395	.022	EE EE
2072-0	.203	.500	.625	.045	JJ EE
2758-0	.220	.534	.550	.025	EE EE
1951-0	.220	.562	.750 x .750	.040	EE A
1698-0	.218	.590	.625	.025	EE EE
7076-0	.215	.623	.700	.025	EE EE
5524-0	.204	.625	.455	.025	EE JJ

Part number	Core dia.	Lgth	Flange dia.	Wall	Flange styles
2261-0	.217	.640	.450	.020	EE EE
2641-0	.219	.643	.623	.025	EE JJ
8477-0	.213	.697	.697	.040	EE EE
3199-0	.220	.708	.660	.030	GG GG
1662-0	.218	.718	.874	.020	EE GG
5588-0	.201	.721	.973	.035	EE EE
3668-0	.218	.781	.625	.040	EE EE
3937-0	.218	.812	.687	.025	EE EE
2743-0	.215	.841	.506 x .506	.025	A EE
2743-1	.215	.847	.575	.025	EE EE
1745-0	.219	.950	.570	.025	EE EE
3935-0	.215	.985	.405	.025	EE EE
2632-0	.220	1.000	.430	.020	EE EE
2731-0	.215	1.031	.625	.025	EE EE
8689-0	.205	1.062	.750	.025	EE EE
5714-0	.220	1.072	.900	.024	EE EE
1625-0	.218	1.080	2.110	.090	MM MM
3800-0	.203	1.125	1.125	.045	JJ MM
81268-0	.220	1.195	.720 x .720	.045	77 76
8317-0	.220	1.330	.700	.040	EE EE
3088-0	.218	1.437	.468 x .468	.030	DD DD
5911-0	.215	1.675	.505	.030	EE EE
1761-0	.210	1.875	.438	.030	EE EE
835-1	.220	2.000	.512 x .512	.030	DD DD
81354-0	.214	2.000	.562	.035	EE JJ
835-0	.220	2.000	.512	.030	EE EE
81131-0	.214	2.037	.562	.030	EE EE
6070-0	.215	2.245	.437	.032	EE EE
Core smaller diameter .221 to .240					
1221-0	.239	.105	.454	.020	GG GG
4310-0	.240	.105	.446	.015	KK KK
2239-0	.237	.219	.456	.020	KK KK
7515-0	.225	.490	.750	.020	EE EE
2664-0	.221	.490	.750	.030	EE EE
2729-0	.221	.500	.750	.028	EE EE
3970-0	.230	.510	.625	.025	EE EE
4331-0	.224	.585	.703 x .750	.020	57 EE
3834-0	.224	.615	.458	.047	EE EE
1654-0	.233	.625	.500	.035	EE EE
4591-0	.222	.767	.532	.020	EE EE
3872-0	.222	.781	.562	.040	EE EE
8714-0	.222	.895	.438	.020	KK JJ EE
7077-0	.223	.927	.641	.025	EE EE
3560-0	.225	.927	.627 x .627	.025	DD EE
3775-0	.222	.940	.600	.028	EE EE
1696-0	.221	.940	.875	.031	GG JJ
7078-0	.224	.955	.720	.028	EE EE

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
Core smaller diameter .221 to .240 (continued)					
2252-0	.225	.962	.815	.035	52 52
3671-0	.225	.965	.595	.030	EE EE
2768-0	.230	.982	.844 x .844	.025	EE DD
2768-1	.223	.983	.843 x .843	.025	DD EE
3412-0	.223	.990	.650	.034	EE EE
2619-0	.222	1.062	.656	.031	EE OO
2767-0	.230	1.067	.844 x .844	.022	EE DD
2767-1	.221	1.070	.843 x .843	.025	DD EE
1756-0	.221	1.070	.687	.025	EE EE
1727-0	.230	1.100	.680	.031	EE EE
1772-0	.234	1.156	.875	.031	EE EE
1714-0	.226	1.187	.703	.031	EE EE
7099-0	.224	1.195	.718	.025	EE OO
3344-0	.221	1.414	.750	.040	EE EE
2608-0	.225	1.437	.468	.030	EE JJ
7373-0	.224	1.485	.562	.027	EE EE
6094-0	.240	1.930	1.000	.025	EE LL
883-0	.230	2.062	.500 x .500	.031	A KK
Core smaller diameter .241 to .260					
8736-0	.255	.135	.830	.022	EE EE
4971-0	.260	.190	.400	.040	EE EE
4971-0	.260	.190	.400	.030	EE EE
2197-0	.245	.209	1.000	.042	JJ EE
2246-0	.244	.252	.492	.022	GG GG
5653-0	.250	.285	.562	.020	EE EE
5433-0	.253	.300	.784 x .784	.020	DD DD
3674-0	.260	.310	.940	.030	EE JJ
2676-0	.258	.330	.750	.025	EE EE
378-0	.260	.362	.465	.030	KK KK KK
453-0	.260	.362	.475	.022	GG GG GG
2695-0	.260	.365	.475	.022	KK KK
377-0	.260	.365	.475	.022	KK KK KK
3748-0	.250	.430	.750	.025	EE EE
1636-0	.252	.430	.562	.030	EE EE
1392-0	.252	.440	.769	.030	EE EE
4698-0	.250	.450	.795	.020	GG GG
2692-0	.250	.450	.750	.025	EE EE
1660-0	.251	.495	.875	.030	EE EE
2611-0	.250	.500	.625	.035	EE EE
2862-0	.255	.505	.625 x .625	.030	A A
5712-0	.256	.510	.600 x .680	.020	A J
5507-0	.253	.532	1.008	.035	EE EE
3825-0	.250	.537	.700	.025	EE EE
5128-0	.254	.551	.850	.030	OO EE
3605-0	.252	.562	.781	.031	EE EE
2146-0	.256	.565	.600	.032	EE EE
1877-0	.255	.590	.550	.040	KK KK
1789-0	.255	.590	.720	.040	EE EE
1705-0	.260	.600	.875	.030	EE EE
1491-0	.255	.615	.840	.025	EE EE
1686-0	.253	.625	.687	.031	EE EE
2683-0	.255	.625	.750	.035	EE EE
1769-1	.255	.660	.691	.023	EE EE
2362-0	.260	.660	.575	.030	JJ JJ
3814-0	.258	.660	.812	.030	EE GG
1769-0	.255	.660	.876	.022	EE EE
3789-0	.253	.683	.872	.030	EE EE
3646-0	.249	.687	.694 x .694	.062	DD DD
5203-0	.254	.688	.625 x .625	.022	A D
2799-0	.256	.703	.718	.020	EE EE
3796-0	.254	.703	.875	.032	EE EE
7337-0	.252	.715	.640	.022	EE FF
3343-0	.255	.715	.600	.020	EE EE
2786-0	.251	.720	.640	.040	EE 56
4156-0	.255	.720	.675	.030	EE EE
2827-0	.253	.750	.720 x .720	.029	EE 57
3413-0	.255	.758	.695	.032	EE EE
2736-0	.260	.760	.800	.030	EE EE
7334-0	.260	.810	.950	.025	EE EE
5654-0	.250	.860	.562	.020	EE EE
1648-0	.255	.884	.548	.015	EE EE
4909-0	.260	.892	.656	.023	EE EE
2850-0	.257	.918	.562 x .576	.038	DD EE
3766-0	.256	.925	.495	.020	EE EE
7079-0	.242	.940	.840	.020	EE EE
2830-0	.255	.950	.845 x .975	.025	EE DD
2110-0	.260	.975	.460	.025	KK KK
1908-0	.252	.980	.812	.025	EE OO
3729-0	.252	.987	.500	.031	EE EE
4438-0	.255	.995	.589	.030	EE KK
4486-0	.258	1.025	.760	.027	EE EE
8105-0	.259	1.065	.740 x .764	.025	A DD
2694-0	.250	1.070	.680	.025	EE EE
5097-0	.257	1.078	.594 x .594	.028	DD EE
1960-0	.260	1.115	.750 x .766	.030	DD DD
7470-0	.252	1.119	.625	.020	EE 71
1742-0	.255	1.132	.715	.025	EE GG
1950-0	.257	1.140	.593 x .593	.031	A A
3971-0	.252	1.155	.594 x .594	.030	A SS
1715-0	.258	1.187	.703	.030	EE EE
5312-0	.246	1.192	.740 x .871	.020	A EE
7244-0	.258	1.244	.745	.045	EE EE
3768-0	.255	1.250	.687	.031	EE EE
4540-0	.256	1.253	.936	.030	55 EE
5549-0	.260	1.296	.779	.030	EE EE
2011-0	.258	1.320	.570 x .570	.050	I EE I
5659-0	.257	1.388	.750	.033	EE EE
5428-0	.256	1.420	.545	.030	EE EE
1942-0	.255	1.450	.800 x .800	.040	DD DD
3600-0	.255	1.468	.534	.046	EE EE
1774-0	.250	1.555	.937	.040	EE JJ
5009-0	.255	1.565	.675	.028	EE EE
1797-0	.259	1.718	.500	.030	EE EE
6959-0	.258	1.993	.759	.028	EE EE
Core smaller diameter .261 to .300					
1780-0	.275	.125	.568	.016	EE JJ
2124-0	.300	.200	.875	.025	MM EE
5147-0	.284	.250	.794	.028	EE EE
7716-0	.285	.300	.390	.020	EE MM
7083-0	.283	.312	.625	.023	EE EE
4462-0	.282	.342	.930	.036	JJ MM
4854-0	.295	.355	.510	.020	EE EE
4546-0	.267	.360	.654	.030	EE EE
452-0	.264	.365	.475	.022	KK KK KK
5830-0	.285	.390	1.030	.030	EE DD
5199-0	.293	.395	.611	.035	EE EE
8428-0	.265	.415	.750	.020	EE EE
3208-0	.286	.458	.643	.030	NN NN
5826-0	.280	.460	.900	.020	EE EE
2637-0	.275	.500	.610	.025	EE 53
2688-0	.266	.500	1.125	.031	JJ EE
3634-0	.298	.500	.500	.030	EE EE
6610-0	.285	.530	.545	.025	EE FF
2667-0	.275	.562	.474	.031	EE JJ
7317-0	.287	.578	.750	.025	EE EE
3817-0	.265	.593	.843	.035	EE EE
2683-1	.261	.635	.875	.030	EE JJ
1658-0	.281	.693	.820	.031	EE EE
4853-0	.263	.725	.990	.035	EE EE
2628-0	.293	.734	.607	.022	KK KK
✈1382-0	.295	.755	.565	.027	EE EE
3945-0	.286	.780	1.000	.028	EE EE
5264-0	.290	.810	.875	.032	EE EE
3802-0	.290	.810	.437	.020	EE MM
7336-0	.266	.812	.750	.020	EE EE
4974-0	.266	.812	.750	.032	EE EE
1334-0	.287	.836	.740	.020	EE MM
8280-0	.287	.851	.411	.023	JJ EE
2721-0	.296	.855	.583	.030	EE EE
2699-0	.296	.855	.653	.030	EE EE

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
1784-0	.293	.890	.756	.025	EE FF
3437-0	.262	.917	.650	.028	EE EE
3798-0	.272	.961	.843	.032	EE EE
1604-0	.285	.980	1.000	.032	EE EE
1740-0	.281	1.000	1.000	.030	EE EE
2686-0	.284	1.010	.713	.031	JJ MM
2222-0	.275	1.016	.750	.035	EE EE
5843-0	.262	1.047	.720	.030	EE EE
1749-0	.300	1.062	.750	.031	MM MM
1746-0	.291	1.295	.625	.032	EE EE
5022-0	.300	1.350	.564	.025	OO EE
5082-0	.265	1.375	.750 x .750	.020	DD DD
4842-0	.262	1.440	.860	.040	EE EE
4823-0	.267	1.480	.620	.030	EE MM
3862-0	.288	1.490	.992	.035	EE EE
3862-1	.291	1.499	.847	.030	FF MM
568-0	.282	1.995	.871	.045	EE EE EE
860-0	.265	2.020	.875	.060	EE EE
Core smaller diameter .301 to .320					
5146-0	.304	.102	.584	.021	EE KK
5792-0	.307	.148	.579	.018	KK KK
7691-1	.304	.191	.580	.020	KK EE KK
3990-2	.304	.276	.582	.025	EE EE EE
3990-1	.304	.276	.582	.025	MM EE FF
3749-0	.302	.300	.930	.030	EE JJ
4063-0	.315	.310	.930	.030	MM MM
4260-0	.309	.312	.984	.030	EE EE
4125-0	.305	.315	.655	.025	EE KK
3612-0	.320	.328	1.375	.035	EE EE
8217-0	.312	.375	.560	.020	LL LL
4700-0	.312	.395	.740	.032	EE MM
6483-0	.320	.400	.740	.022	EE EE
3724-1	.305	.425	.880	.032	EE EE
2296-0	.305	.425	.880	.030	EE EE
3724-0	.302	.428	.930	.030	EE EE
8204-0	.304	.435	.702	.027	EE EE
2791-0	.313	.438	.750	.030	EE EE
7384-0	.320	.500	1.062	.031	EE FF
4887-0	.320	.535	.935	.025	EE EE
1626-0	.319	.564	.875	.032	EE EE
2796-0	.318	.586	.654	.027	GG EE
2802-0	.310	.590	.750 x .750	.030	EE A
✈7226-0	.315	.595	.875	.025	EE FF
2836-0	.320	.595	.875 x .964	.035	58 EE
4292-0	.319	.600	.700	.020	EE EE
2614-0	.309	.612	1.057	.026	EE EE
3621-0	.318	.625	.875	.031	EE EE

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
2752-0	.308	.630	1.000	.050	EE EE
2763-0	.316	.633	.940	.025	EE EE
466-0	.317	.652	.845 x .952	.035	EE DD
4752-0	.318	.665	.890	.028	EE EE
5835-0	.317	.695	.680 x .680	.032	EE A
3060-0	.320	.700	.875 x .960	.040	58 EE
2837-0	.320	.700	.875	.035	PP EE
2762-0	.316	.700	.940	.025	EE EE
4379-0	.310	.734	.515	.025	LL LL
2770-0	.320	.790	1.010	.030	EE EE
3777-0	.313	.850	.740 x .740	.040	EE XX
7279-0	.315	.880	1.125	.037	EE KK
5665-0	.315	.980	1.120	.030	EE EE
2636-0	.303	1.047	1.125	.030	EE EE
8610-0	.301	1.054	.722	.025	EE MM 79
4850-0	.320	1.100	.920	.020	EE EE
8426-0	.320	1.125	.875	.032	EE EE
3712-0	.315	1.125	.969	.038	EE EE
7085-0	.320	1.187	.703	.033	EE EE
2141-0	.320	1.340	.730 x .740	.030	A A
8767-0	.317	1.352	.871	.025	EE MMMM
5743-0	.308	1.375	.940	.022	EE EE
3286-1	.310	1.375	.685	.031	EE 59
4169-0	.314	1.387	1.000 x 1.000	.050	EE DD
3754-0	.320	1.400	.898	.045	NN NN
2631-0	.315	1.446	.553	.035	JJ JJ
3613-0	.312	1.500	1.438	.050	EE EE
1753-0	.320	1.562	.556	.040	EE EE
2663-0	.315	1.687	.969 x .969	.052	EE A
2787-0	.312	1.844	.688	.035	KK KK
1722-0	.320	1.862	.935	.035	HH HH
Core smaller diameter .321 to .360					
4521-0	.341	.167	.921	.030	MM EE
83563-0	.360	.172	.805	.020	EE JJ
1709-0	.350	.298	.750	.025	EE EE
1294-0	.356	.313	1.052	.032	EE EE
4255-0	.330	.335	.940	.020	EE EE
4481-0	.332	.340	.940	.020	EE EE
3758-0	.360	.360	.990	.030	EE EE
8240-0	.325	.377	.715	.020	EE MM
3809-0	.352	.411	.540	.022	EE MM
1788-0	.325	.420	.670	.025	EE EE
2365-0	.344	.427	.667	.020	EE MM
7084-0	.326	.440	1.135	.030	EE EE
8328-0	.340	.590	.665	.035	EE MM
3651-0	.335	.595	1.000	.032	EE EE
1682-0	.355	.625	.745	.031	EE NN

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
4977-0	.328	.670	1.000 x 1.000	.031	EE DD
5207-0	.345	.672	.750	.020	EE EE
5424-0	.324	.700	.939 x .939	.033	A EE
2171-0	.325	.720	.970	.030	EE EE
2048-0	.346	.780	.735	.022	EE MM
2666-0	.344	.780	1.295	.020	EE EE
5538-0	.355	.807	.724	.050	FF EE
4077-0	.335	.807	.875	.032	EE EE
7324-0	.355	.833	.891	.030	EE MM
8378-0	.360	.835	.740	.020	EE MM
1717-0	.323	.895	.906	.038	EE EE
8643-0	.345	.924	.980 x 1.056	.025	A EE
5528-0	.355	.968	.665	.027	FF EE
1978-0	.328	.970	1.125 x 1.125	.050	EE DD
3740-0	.328	.970	.700	.031	EE EE
3035-0	.330	.970	.725 x .725	.065	EE DD
1910-1	.328	.970	1.000 x 1.031	.031	EE DD
1910-0	.328	.973	1.000 x 1.031	.030	DD EE
8176-0	.350	.990	1.210	.030	EE MM
7292-0	.332	.991	.725 x .725	.030	A A
1958-2	.323	.999	.736 x .736	.032	A A
3379-0	.328	1.000	.700	.030	EE EE
1958-0	.330	1.000	.734 x .734	.031	A A
3664-0	.325	1.025	.720 x .720	.030	A EE
3435-0	.352	1.036	.540	.020	EE MM
3688-0	.325	1.050	.720 x .720	.030	A EE
3772-0	.321	1.055	.680 x .680	.022	XX XX
7166-0	.327	1.080	.465	.033	EE LL
4655-0	.326	1.083	.515	.020	62 EE
3705-0	.343	1.101	.813	.062	PP PP
3380-0	.351	1.146	.990 x 1.010	.050	DD DD
2648-0	.350	1.240	1.050	.040	HH HH
7415-0	.352	1.245	1.060	.027	HH HH
1684-0	.355	1.300	.745	.031	EE NN
3782-0	.321	1.310	1.180	.030	EE EE
5657-0	.353	1.320	.645	.020	EE MM
2656-0	.328	1.438	1.125	.040	EE EE
4689-0	.335	1.480	1.370 x 1.710	.030	EE DD
5539-0	.355	1.500	.807	.028	FF EE
5510-0	.321	1.500	1.001	.035	OO OO
2825-0	.353	1.719	.946 x .946	.062	EE A
✈7365-0	.340	1.843	.935	.022	HH HH
3785-0	.325	1.843	.682	.030	EE EE
6366-0	.328	2.410	.750	.030	EE EE
6322-0	.335	2.745	.750	.045	EE EE
6272-0	.336	2.750	.788 x .788	.035	A A

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
Core smaller diameter .361 to .380					
✈4662-0	.380	.152	.685	.020	KK KK
2647-0	.362	.183	.906	.015	EE EE
8269-0	.380	.185	.695	.020	KK KK
2646-0	.362	.304	.906	.015	EE EE
1707-0	.380	.311	.796	.020	EE EE
3056-3	.380	.320	.890	.025	MM MM
3647-0	.375	.375	1.250	.030	EE EE
2757-0	.375	.395	.926	.022	EE MM
178-0	.375	.405	.980	.020	EE EE EE
3860-0	.380	.437	1.000	.031	EE EE
1616-0	.380	.495	.968	.035	EE EE
4606-0	.377	.562	1.000	.020	EE EE
3219-0	.380	.577	.825	.025	EE EE
8376-0	.375	.610	.665	.037	EE MM
2654-0	.376	.622	1.251	.045	EE EE
7452-0	.377	.624	.750	.026	EE EE
8218-0	.375	.625	.560	.040	LL LL
3641-0	.380	.625	1.000	.030	EE EE
2781-0	.375	.625	1.250	.028	EE EE
81179-0	.375	.671	1.000	.030	EE EE
4896-0	.380	.680	.938	.031	EE EE
2651-0	.380	.688	1.000	.033	EE EE
1628-0	.380	.718	.938	.031	EE EE
4210-0	.380	.740	.890	.030	EE MM
1923-0	.375	.750	.720 x .725	.030	EE DD
2806-1	.377	.750	1.030	.031	EE 47
8666-0	.380	.760	.650	.020	EE 48
3791-0	.380	.765	.975	.040	EE EE
3007-0	.380	.765	1.094 x 1.094	.035	EE DD
3700-1	.380	.810	.800	.035	EE EE
5752-0	.380	.812	1.125	.031	EE EE
8702-0	.375	.812	.875	.025	EE EE
3808-0	.373	.812	.857	.025	EE EE
3700-0	.380	.812	1.000	.031	EE EE
5587-0	.378	.815	.949	.030	EE EE
2278-0	.375	.815	.875	.030	EE EE
2681-0	.376	.816	.875	.025	EE EE
80846-0	.380	.820	1.000	.035	EE EE
1431-0	.362	.840	.745	.025	JJ JJ
2811-0	.375	.859	1.000 x 1.000	.046	EE CC
4053-0	.380	.866	.937	.035	EE EE
7234-0	.380	.875	1.125	.030	EE EE
3718-0	.379	.875	1.032 x 1.062	.023	EE XX
1760-0	.380	.880	1.028	.030	EE EE
5362-0	.375	.915	.900	.030	EE EE
8683-0	.375	.930	1.065	.035	EE EE
4246-0	.380	.935	.760	.025	EE EE
3604-0	.377	.938	.718	.020	EE MM
3225-0	.363	.990	.970	.025	23 23
1324-0	.380	.995	1.000 x 1.312	.030	EE 50
7086-0	.375	1.000	.875	.047	EE 59
8410-0	.380	1.020	.750	.040	EE EE
4596-0	.362	1.050	.732	.020	EE MM
4012-0	.365	1.093	.750 x .750	.046	A A
✈4097-0	.375	1.095	.745	.030	EE EE
2670-0	.375	1.125	1.000	.031	EE EE
418-0	.368	1.142	.971 x .971	.037	DD DD
2658-0	.380	1.188	1.000	.031	EE EE
5744-0	.370	1.245	1.000 x 1.000	.035	A A
3449-0	.375	1.250	1.450	.050	EE MM
4226-0	.380	1.250	1.046	.031	EE EE
7417-0	.380	1.265	.937	.032	EE EE
5563-0	.377	1.310	.880 x .880	.050	DD DD
8349-0	.380	1.312	1.625	.035	EE EE
7801-0	.362	1.445	.785	.038	EE EE
8220-0	.380	1.455	.875	.040	EE EE
5247-0	.380	1.482	.945	.030	EE EE
2615-0	.366	1.500	.895	.030	EE EE
2633-0	.370	1.524	.882	.032	EE EE
5842-0	.375	1.525	.750 x 1.020	.032	A A
1694-0	.380	1.531	.980	.046	EE EE
3645-0	.378	1.590	.862	.040	EE EE
857-0	.380	1.953	1.000	.031	EE EE
6058-0	.375	2.060	1.250	.030	EE JJ
6248-0	.362	2.295	1.250 x 1.250	.047	DD DD
Core smaller diameter .381 to .400					
2053-0	.396	.190	.789	.028	KK EE
7293-0	.382	.195	.629	.020	EE EE
2671-0	.382	.250	.740	.030	EE EE
3731-0	.400	.281	.718	.025	EE EE
2233-0	.384	.287	.690	.022	KK KK KK
5516-0	.395	.310	.870	.025	JJ JJ
4590-0	.396	.350	.875	.025	EE EE
3742-0	.390	.350	.720	.025	JJ JJ
2630-0	.381	.375	1.062	.031	EE MM
81305-0	.383	.400	.980	.020	KK KK
4421-0	.381	.406	1.000	.028	EE EE
3860-2	.386	.439	1.010	.030	EE EE
4534-0	.394	.505	.967	.030	KK EE
7319-0	.398	.540	.625	.020	EE EE
3658-0	.385	.560	.770	.025	KK KK
2838-0	.384	.595	.937	.040	PP EE
3108-0	.381	.600	.995 x 1.085	.026	EE DD
5001-0	.390	.630	1.000	.030	EE EE
2690-0	.393	.640	.937	.025	GG GG
2815-0	.382	.650	.706 x .983	.046	EE UU
3996-0	.385	.690	.937	.040	EE EE
3703-0	.384	.700	.875 x .875	.030	EE XX
2839-0	.384	.700	.937	.040	PP EE
3801-0	.395	.710	.720	.020	JJ JJ
1628-1	.382	.715	.937	.035	EE EE
2375-0	.395	.735	1.000	.040	EE EE
4220-0	.390	.745	1.120	.033	EE EE
8804-0	.382	.748	1.250	.030	EE EE
8831-0	.390	.750	1.312	.060	EE EE
1923-1	.381	.752	.720	.030	EE EE
3140-0	.390	.790	.920 x .920	.032	A A
4257-1	.385	.790	1.400	.035	EE KK
4257-0	.385	.790	1.401 x 1.401	.032	EE DD
3640-0	.382	.796	.995	.031	EE EE
1680-0	.390	.885	1.063	.031	EE EE
4402-0	.390	.890	.875	.030	EE EE
3771-0	.392	.897	1.285	.035	49 EE
2371-0	.385	.920	.790	.030	EE MM
5680-0	.394	.925	.853 x 1.000	.039	A A
3746-0	.400	.935	.690	.030	JJ EE
3905-1	.383	.965	1.220	.070	EE EE
3143-0	.390	.984	.980 x .980	.030	A A
3728-0	.385	.985	1.065	.035	EE MM
3686-0	.390	.995	1.009	.030	EE EE
2785-0	.387	1.002	.875	.025	55 EE
1388-0	.385	1.025	1.075	.030	EE EE
2273-0	.385	1.025	.750	.040	EE EE
2613-0	.381	1.026	.995	.030	EE EE
3885-0	.385	1.038	1.031	.031	EE EE
7939-0	.389	1.040	.920	.029	EE EE
5026-0	.399	1.050	.906	.031	EE EE
6761-0	.396	1.062	.938	.031	EE JJ
5195-0	.390	1.087	.946 x .946	.035	A A
1860-0	.395	1.087	1.125 x 1.125	.031	XX XX
1711-0	.385	1.093	.969	.031	EE EE
1646-0	.385	1.093	1.125	.030	EE EE
5522-0	.395	1.095	1.107 x 1.125	.030	EE DD
3530-0	.387	1.097	1.124 x 1.124	.032	DD EE
1860-1	.400	1.100	1.130 x 1.130	.045	A A
3769-0	.390	1.109	.675	.031	EE EE
2181-0	.385	1.110	1.410	.060	EE EE
3884-0	.385	1.115	1.031	.031	EE EE
2143-0	.390	1.122	.787	.040	EE EE
3810-0	.390	1.131	1.000	.031	EE EE

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
4277-0	.390	1.172	.710	.023	EE EE
4919-0	.383	1.176	.860	.032	EE EE
7385-0	.383	1.190	1.000 x 1.000	.040	A A
8120-0	.392	1.215	.925	.030	EE JJ
4957-0	.400	1.235	1.230	.035	EE KK
4464-0	.390	1.281	1.328	.040	EE EE
2805-0	.383	1.292	1.188 x 1.188	.050	EE DD
2794-0	.384	1.303	.886 x .886	.050	DD DD
3795-0	.385	1.343	1.375	.063	EE EE
6624-0	.400	1.345	.750 x .750	.025	A A
2607-0	.382	1.356	.750	.040	EE EE
4934-0	.384	1.417	1.000 x 1.015	.050	DD DD
4860-0	.385	1.490	.800 x .800	.025	LL A
1897-0	.385	1.505	.800 x .800	.030	A EE
7841-0	.385	1.525	.875	.039	JJ EE
5945-0	.390	1.545	1.045	.030	EE MM
2259-0	.390	1.565	1.000 x 1.000	.050	DD DD
3678-0	.385	1.593	1.375	.063	EE EE
1712-0	.385	1.594	1.000	.031	EE EE
1627-0	.385	1.625	1.000	.031	EE FF
1657-0	.390	1.675	1.225	.050	EE EE
2096-0	.395	1.685	1.225	.100	EE EE
2792-0	.392	1.725	.937 x .958	.035	EE DD
Core smaller diameter .401 to .440					
6825-0	.410	.190	1.170	.030	EE EE
1697-0	.425	.205	.655	.022	JJ JJ
3940-0	.420	.240	1.045	.020	EE EE
3711-0	.430	.250	.875	.030	EE EE
2645-0	.433	.304	.906	.015	EE EE
8694-0	.410	.320	.695	.018	KK KK
7087-0	.401	.325	.703	.025	FF FF
1793-0	.421	.328	.860	.020	EE EE
8627-0	.415	.345	.670	.025	EE EE
4855-0	.436	.345	.665	.020	EE EE
2372-0	.435	.360	.675	.025	EE MM
1731-0	.415	.385	.755	.018	EE EE
3816-0	.422	.418	1.375	.032	EE EE
1642-0	.422	.418	1.562	.031	EE EE
4269-0	.422	.418	1.562	.045	EE EE
7920-0	.431	.471	.678	.015	EE EE
3446-0	.425	.518	.637	.015	MM EE
2661-0	.410	.595	1.200	.031	EE EE
3654-0	.406	.703	1.093	.031	EE EE
5957-0	.421	.740	.995	.030	EE JJ
8621-0	.440	.760	1.200	.025	EE EE
3624-0	.406	.781	1.000	.031	EE EE
6930-0	.425	.800	.890	.025	EE GG
80888-0	.437	.815	1.250	.035	PP PP
6768-0	.438	.820	1.245	.045	PP PP
5047-0	.440	.875	.940	.030	EE EE
4549-0	.431	.878	.655	.020	EE EE EE
4759-0	.425	.968	.650	.025	EE JJ
5067-0	.440	.990	1.020	.032	EE EE
2277-0	.430	1.025	1.015	.035	EE EE
3399-0	.413	1.078	.859	.032	EE EE
2771-0	.409	1.113	1.074	.022	47 47
83154-0	.438	1.140	1.375	.050	EE EE
2231-0	.405	1.250	1.125	.040	MM EE
4118-0	.410	1.250	1.015	.030	MM EE
5384-0	.410	1.250	.680	.020	EE EE
3912-0	.425	1.285	.631	.015	EE JJ
7503-0	.427	1.440	1.305	.030	EE EE
2650-0	.440	1.500	1.125	.050	EE EE
1734-0	.439	1.500	1.375	.062	EE EE
6291-0	.437	1.845	.927	.035	MM EE EE
6689-0	.437	2.141	1.220	.062	* *
6271-0	.440	2.354	1.100 x 1.214	.090	EE DD
Core smaller diameter .441 to .460					
2112-0	.457	.205	.825	.025	KK KK
✈5963-0	.457	.213	.832	.025	KK KK
5674-0	.458	.216	.828	.022	KK KK
8611-0	.455	.225	.825	.022	JJ JJ
2766-0	.457	.355	.785	.025	EE EE
1798-0	.454	.356	.790	.025	EE EE
81293-0	.453	.380	.780	.025	EE MM
2769-0	.460	.389	.752	.025	EE EE
4047-1	.446	.435	1.245	.030	EE 61
4046-0	.446	.435	1.245	.031	EE EE
4047-0	.446	.435	1.245	.031	EE EE
1678-0	.445	.440	1.245	.031	EE EE
2738-0	.450	.480	.840	.020	EE EE
4945-0	.447	.513	1.725	.030	EE MM
2623-0	.455	.530	.890	.030	EE JJ
4079-0	.447	.562	.995	.025	MM MM
2691-0	.442	.568	.954	.030	EE EE
2732-0	.445	.575	1.437	.030	EE EE
8635-0	.442	.705	.950	.022	EE EE
5205-0	.445	.810	.875	.022	EE EE
2733-0	.445	.818	.984	.030	EE EE
2735-0	.446	.820	1.375 x 1.375	.041	EE DD
1741-0	.455	.832	1.375	.045	EE EE
2745-0	.453	.858	.859	.031	EE 54
1804-0	.453	.890	1.281	.040	OO OO
2625-0	.450	.920	1.429	.030	EE EE
2643-0	.442	.922	1.375	.062	EE NN
2750-0	.443	.950	1.300	.032	EE EE
3383-0	.450	.980	.740	.025	EE JJ
2295-0	.445	1.025	.980	.030	EE FF
1312-0	.442	1.030	1.315	.060	EE EE
1864-0	.455	1.035	1.125 x 1.313	.030	A DD
2609-1	.458	1.044	.875	.031	EE EE
3627-0	.456	1.044	1.060	.022	EE EE
2609-0	.460	1.045	.875	.031	EE EE
4851-0	.455	1.058	.968	.040	EE EE
4950-0	.448	1.065	.978	.030	EE EE
5566-0	.445	1.080	.870	.028	EE EE
2778-0	.443	1.101	1.046	.035	EE EE
1754-0	.450	1.160	1.000	.030	EE EE
3620-0	.444	1.160	1.423	.060	EE EE
8778-0	.448	1.163	.800	.030	EE EE
4951-0	.458	1.238	1.045	.032	EE EE
3579-1	.444	1.239	.814	.025	EE EE
3579-0	.444	1.240	.869	.025	EE EE
1768-0	.444	1.251	.863	.033	EE EE
4117-0	.453	1.262	1.250 x 1.750	.050	EE P
5297-0	.444	1.263	.868	.030	EE EE
4303-0	.450	1.432	1.127	.050	T A
2655-0	.452	1.495	.875	.031	EE EE
2866-0	.441	1.500	1.500 x 1.500	.031	A A
4426-0	.444	1.507	1.730	.045	EE FF
4426-1	.445	1.520	1.730	.045	EE LL
3637-0	.454	1.531	1.125 x 1.125	.031	A A
6060-0	.450	1.718	.937 x .937	.025	A A
2151-0	.443	1.765	1.100 x 1.100	.035	A A
8677-0	.442	1.797	.953	.020	EE EE
5825-0	.450	1.860	.980 x .980	.025	EE Q
6247-0	.450	1.875	.850	.030	EE EE
856-0	.442	1.953	1.000	.031	EE EE
6108-0	.460	1.998	1.250	.040	EE 59
6293-0	.448	2.211	1.004	.030	LL KK EE
Core smaller diameter .461 to .500					
5956-0	.465	.170	.832	.030	KK KK
4119-0	.469	.200	.827	.016	GG GG
2312-0	.495	.205	.930	.025	EE EE
5017-0	.490	.225	.830	.020	KK KK
1735-1	.500	.281	1.515	.030	EE MM
5944-0	.490	.345	.975	.030	EE JJ
2649-0	.500	.375	1.369	.030	EE EE
1751-0	.465	.380	1.020	.020	EE JJ
1685-0	.484	.405	.815	.020	EE EE
4615-0	.476	.406	.911	.030	KK KK

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
Core smaller diameter .461 to .500 (continued)					
5634-0	.464	.422	.809	.020	EE EE EE
1779-0	.490	.480	.755	.030	EE JJ
170-0	.490	.480	.755	.020	EE EE EE
81132-0	.490	.485	.760	.015	JJ EE
2941-0	.498	.500	.755	.020	GG GG GG
5658-0	.500	.500	1.375	.031	EE EE
8487-0	.470	.515	.770	.025	EE EE
2610-0	.477	.578	.860	.030	EE EE
3372-0	.480	.605	1.000	.062	EE JJ
3913-0	.479	.616	.744	.015	EE JJ
2113-0	.465	.710	1.400	.062	EE EE
4056-0	.500	.860	1.375	.040	EE EE
7284-1	.474	.871	1.136	.030	MM EE
7284-0	.474	.873	1.135	.030	EE EE
2682-0	.500	1.000	1.625	.030	EE EE
2682-1	.500	1.001	1.632	.030	EE EE
5681-0	.476	1.052	.853 x 1.010	.040	A A
81438-0	.469	1.060	1.060	.015	EE EE
2696-0	.500	1.062	.875	.030	EE EE
5932-1	.468	1.125	1.915 x 1.915	.045	EE E
5932-0	.468	1.125	1.955 x 1.955	.045	EE A
1656-0	.490	1.240	1.062	.030	EE EE
81451-0	.470	1.250	1.060	.015	EE MM
2669-0	.490	1.380	1.120	.040	GG EE
4364-0	.500	1.395	.882	.050	EE JJ
2360-0	.500	1.437	1.750	.030	EE NN
3803-0	.479	1.486	.744	.015	EE MM
7835-0	.480	1.495	.710	.025	GG KK GG
3689-1	.500	1.500	1.480	.030	EE EE
3689-2	.500	1.500	1.455	.030	EE EE
3689-0	.500	1.500	1.625	.035	EE EE
2175-0	.482	1.660	.875	.035	EE EE
2797-0	.500	1.687	1.625 x 1.625	.078	EE DD
4287-0	.479	1.723	.855	.015	EE MM
8151-0	.478	1.776	.888	.025	GG EE
1783-0	.468	1.859	1.015	.035	EE EE
8333-0	.480	1.860	.875	.030	GG GG
609-0	.500	1.990	2.000 x 2.000	.070	V V
878-0	.500	2.000	.870	.025	EE EE
850-0	.470	2.000	.840	.035	EE EE
6303-0	.470	2.335	1.500	.090	EE EE
Core smaller diameter .501 to .520					
6564-0	.520	.145	.833	.023	JJ JJ
5978-0	.520	.266	.833	.022	JJ JJ
2620-0	.510	.325	1.120	.030	EE EE
1664-0	.510	.363	1.363	.031	EE EE
3752-0	.505	.375	1.500	.032	EE EE
3759-0	.515	.386	1.281	.028	EE MM
4918-0	.512	.435	1.245	.020	EE EE
4789-0	.505	.468	1.250	.031	EE MM
2606-0	.510	.531	1.562	.030	EE EE
3743-0	.520	.580	1.100	.025	JJ JJ
3633-0	.503	.589	.750	.025	EE EE
2014-0	.507	.600	1.000	.031	EE EE
4037-0	.520	.614	1.110	.030	KK KK
7093-0	.518	.647	1.019	.022	EE EE
✈4627-0	.503	.650	.865	.022	EE EE
3660-0	.508	.672	1.250	.030	EE EE
4422-0	.515	.760	.812	.035	EE EE
3478-0	.515	.770	.825	.030	EE EE
5664-0	.515	.810	1.330	.025	EE EE
5806-0	.515	.810	1.315	.030	EE EE
8294-0	.510	.845	.810	.020	EE MM
5525-0	.515	.891	.813	.032	EE EE
1946-0	.515	.902	1.312 x 1.312	.035	A A
1947-0	.520	.906	1.312 x 1.312	.031	A A
5365-1	.515	.910	1.266 x 1.266	.030	65 EE
1720-0	.520	.937	1.000	.030	EE EE
5353-0	.510	.937	1.125	.032	FF FF
1394-0	.507	.942	1.050	.031	EE EE
7498-0	.515	.950	1.310 x 1.310	.036	A A
1919-0	.515	.955	1.220 x 1.220	.030	EE DD
2617-0	.510	.965	1.580	.030	EE JJ
7218-0	.508	.982	1.612	.040	OO EE
2240-0	.520	.990	1.175	.050	EE MM
8401-0	.520	.995	1.125	.030	EE EE
4028-0	.508	1.000	.820	.030	EE EE
4183-0	.513	1.000	1.250	.050	EE EE
3370-0	.515	1.005	1.240	.040	EE EE
7307-0	.512	1.014	1.012	.034	EE EE
6505-0	.510	1.016	1.094	.038	EE EE EE
3828-0	.515	1.016	1.250	.040	EE EE
3762-0	.520	1.035	1.150	.050	FF FF
3677-0	.511	1.047	.936	.035	EE EE
4276-0	.505	1.057	.975	.030	EE MM
3770-0	.510	1.062	1.250	.040	49 EE
2755-0	.510	1.062	1.125	.030	EE EE
8869-0	.505	1.065	.875	.025	FF EE
5816-0	.516	1.067	1.230	.035	EE FF
3774-0	.510	1.077	1.328	.060	EE EE
4678-0	.518	1.080	1.244	.035	EE EE
5263-0	.520	1.090	1.250	.040	EE EE
3753-1	.510	1.125	1.488	.030	EE EE
3753-2	.502	1.125	1.488	.030	JJ JJ
3753-0	.502	1.125	1.488	.032	EE EE
1935-0	.504	1.130	1.260 x 1.500	.025	A EE
5000-0	.520	1.170	1.187	.026	EE EE
5346-0	.518	1.182	1.185	.031	EE EE
3479-0	.507	1.190	1.150	.025	EE MM
3744-0	.520	1.200	1.100	.025	JJ JJ
3806-0	.520	1.245	1.500	.060	EE EE
3562-0	.517	1.248	1.500 x 1.500	.035	DD EE
4286-0	.520	1.250	1.215	.040	EE EE
3215-0	.510	1.253	1.437 x 1.675	.045	A A
348-0	.510	1.285	1.218 x 1.296	.032	DD EE
2678-0	.505	1.315	1.255	.031	EE EE
1710-0	.515	1.375	1.625	.062	EE EE
3635-0	.520	1.375	1.620	.062	EE EE
2926-0	.508	1.410	1.410 x 1.410	.040	A A
3794-0	.510	1.435	1.085	.030	EE EE
1729-0	.510	1.440	1.187	.025	EE EE
6230-0	.516	1.465	1.360	.035	GG EE
4929-0	.508	1.465	1.350	.032	MM MM
2867-0	.520	1.468	1.250 x 1.250	.050	A A
8254-0	.503	1.472	1.104	.039	EE EE
7092-0	.502	1.500	1.750	.050	EE FF
2855-0	.502	1.500	1.190 x 1.325	.050	A A
5933-0	.510	1.580	1.140	.032	MM MM
2640-1	.516	1.605	1.170	.035	EE EE
3767-0	.502	1.711	1.468	.035	FF EE
2746-0	.505	1.837	.937	.035	EE EE
6242-0	.508	1.910	1.000 x 1.000	.030	A G
6185-0	.512	2.000	1.845	.045	EE EE
843-0	.515	2.125	1.875	.040	EE EE
843-1	.515	2.125	1.575	.040	EE EE
7406-0	.505	2.781	1.188	.060	EE OO
Core smaller diameter .521 to .560					
1796-0	.530	.140	1.045	.018	EE EE
2073-0	.521	.170	.905	.030	JJ EE
4680-0	.534	.250	.980	.035	KK KK
4623-0	.547	.252	.980	.022	EE EE
4623-1	.547	.252	.980	.032	JJ JJ
3738-0	.523	.340	.867	.020	EE MM
3666-1	.540	.500	1.490	.035	EE EE
3666-0	.537	.500	1.490	.035	EE EE
3882-0	.530	.502	.971	.030	EE EE EE
4622-0	.547	.505	.980	.033	EE EE EE
4064-0	.530	.550	.930	.030	JJ JJ
4984-0	.525	.584	1.055	.030	64 EE
3427-0	.550	.704	.855	.025	EE MM

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
8782-0	.535	.795	1.105	.045	EE MM
2742-0	.525	.800	1.150	.050	EE EE
3657-0	.530	.870	1.700	.040	EE EE
2693-0	.533	.870	1.625	.045	JJ EE
1415-0	.555	.870	.993	.020	EE GG
2748-0	.527	.890	1.310	.046	EE EE
3797-0	.560	.890	1.400	.030	EE EE
8690-0	.539	.900	.856	.024	KK * 19
4317-0	.558	.972	1.568	.040	59 EE
2284-0	.535	1.040	.975	.060	EE EE
6390-0	.530	1.053	1.375	.040	EE EE
2754-0	.528	1.053	1.298	.040	EE EE
1771-0	.525	1.070	1.380	.040	EE EE
2368-1	.552	1.099	1.182	.030	EE EE
2368-0	.550	1.105	1.800	.030	EE EE
4810-0	.532	1.137	1.400 x 1.500	.040	EE DD
1725-0	.552	1.156	1.750	.031	EE 48
5321-0	.525	1.158	1.343	.035	EE EE
2622-0	.557	1.160	1.675	.060	EE GG
2737-0	.522	1.187	1.280	.040	EE EE
8270-0	.560	1.205	.955	.022	EE MM
4822-0	.535	1.225	1.260	.038	EE EE
1770-0	.525	1.248	1.375	.040	EE EE
2753-0	.528	1.248	1.294	.040	EE EE
2376-0	.535	1.255	1.625	.035	EE EE
5131-0	.534	1.275	1.404 x 1.500	.035	DD EE
5048-0	.530	1.275	1.450	.043	EE EE
2118-0	.542	1.280	1.770	.035	EE EE
3790-0	.531	1.281	1.500	.078	FF FF
3760-0	.525	1.360	1.398 x 1.398	.035	EE SS
1639-0	.560	1.360	1.437	.040	EE EE
1836-0	.522	1.365	1.375 x 1.375	.040	SS SS
2674-0	.535	1.367	1.080	.040	EE EE
8133-0	.521	1.371	1.179	.040	EE EE
3635-1	.526	1.375	1.500	.062	EE EE
3593-0	.560	1.379	.937 x .937	.040	A A
5210-0	.538	1.475	.867	.020	EE KK
5104-0	.535	1.493	1.508	.035	EE EE
2679-0	.545	1.533	1.341	.030	FF EE
3886-0	.526	1.540	1.360	.020	EE EE
4831-0	.530	1.565	1.365	.035	EE EE
8259-0	.544	1.580	1.300	.029	EE KK
3391-0	.550	1.704	.855	.015	EE MM
3914-0	.550	1.840	1.530	.050	EE MM
4196-1	.540	1.990	1.270	.030	EE EE
6360-0	.545	2.240	1.335	.045	LL LL EE
6167-0	.545	2.611	1.262	.035	EE MM
Core smaller diameter .561 to .580					
5331-0	.577	.182	1.177	.025	EE GG
2740-0	.561	.281	.937	.025	EE EE
1738-0	.565	.285	.963	.025	EE EE
3342-0	.575	.303	1.028	.029	EE 60
5310-0	.573	.388	.984	.025	MM EE
3750-0	.562	.495	1.375	.033	EE EE
8177-0	.580	.560	.780	.030	EE MM
8708-0	.578	.613	1.437	.045	EE EE
5167-0	.580	.625	1.208	.031	EE EE
4944-0	.575	.701	.947	.030	EE JJ
8277-0	.580	.780	.810	.030	EE MM
7742-0	.568	.795	1.080 x 1.080	.031	A A
5582-0	.579	.937	1.350	.020	EE EE
3644-0	.565	.950	1.450	.020	EE JJ
4211-0	.566	1.062	1.303	.031	EE MM
3288-2	.562	1.150	1.660	.060	GG GG
5540-0	.575	1.155	.985	.032	EE MM
✈2793-0	.575	1.156	1.525	.050	EE EE
2657-0	.580	1.162	1.437	.035	EE EE
2603-0	.575	1.170	1.140	.025	EE MM
1706-0	.562	1.187	1.500	.062	EE EE
2756-0	.575	1.245	1.290	.030	EE MM
7095-0	.570	1.293	1.293	.031	EE 47
4147-0	.570	1.293	1.293	.031	EE 47
6503-0	.562	1.420	1.300	.050	EE EE
1932-0	.575	1.440	1.375 x 1.375	.030	SS SS
3725-0	.570	1.450	.990	.025	EE MM
3967-0	.575	1.470	.855	.015	EE KK
1802-0	.578	1.500	1.374 x 1.374	.031	SS SS
8211-0	.579	1.636	1.174	.050	EE EE
2003-0	.575	1.655	1.050	.030	EE JJ
3394-0	.575	1.835	1.562 x 1.562	.030	EE XX
6066-0	.570	2.000	1.250	.026	EE 68
6201-0	.562	2.125	1.750	.050	EE EE
6202-0	.562	2.437	1.750	.050	EE EE
7094-0	.571	2.531	2.062	.040	EE EE
Core smaller diameter .581 to .640					
8278-0	.638	.128	1.175	.035	KK KK
1666-0	.632	.281	1.562	.030	EE EE
3888-0	.615	.330	1.145	.020	EE MM
5416-0	.605	.360	1.450	.032	EE EE
5416-1	.606	.363	1.283	.030	EE EE
4603-0	.632	.370	.825	.020	61 61
3773-0	.632	.380	1.162	.015	EE EE
2764-0	.616	.385	.902	.025	EE EE
8641-0	.615	.385	.900	.025	EE EE
4804-0	.610	.395	1.025	.024	EE EE
1794-0	.588	.405	1.937	.050	EE EE
2059-0	.635	.435	1.335	.030	JJ EE
1608-0	.630	.440	1.460	.029	EE EE
1640-0	.640	.475	1.425	.030	EE EE
1602-0	.632	.495	1.375	.030	EE EE
1785-0	.622	.504	1.040	.030	LL EE
176-0	.622	.504	1.040	.030	EE EE EE
8797-0	.609	.557	.950	.030	EE MM
4626-0	.640	.583	1.182	.032	EE EE EE
2385-0	.602	.588	1.203	.015	EE EE
81139-0	.640	.625	1.125	.035	EE 47
2642-0	.635	.625	1.135	.040	EE EE
7860-0	.632	.643	.968	.025	EE EE
4580-0	.593	.656	1.345	.030	EE EE
5829-0	.630	.660	1.665	.025	EE EE EE
2010-0	.635	.678	1.195	.030	EE EE
8338-0	.640	.680	1.048	.040	EE MM
8241-0	.635	.704	.937	.030	MM MM MM
1617-0	.630	.746	2.031	.050	EE EE
8619-0	.635	.880	1.220	.035	EE JJ
8712-0	.601	.923	1.226	.040	OO EE
1618-0	.610	.965	1.050	.031	JJ JJ
4888-0	.610	.974	1.765	.040	EE EE
5197-0	.609	.995	1.535	.040	EE EE
3736-0	.638	1.002	1.375	.030	EE EE
5982-0	.585	1.005	1.044	.032	EE EE
1620-0	.620	1.022	1.125	.031	EE JJ
4104-0	.618	1.025	1.235	.025	KK EE EE
3063-0	.635	1.030	1.465	.035	EE EE
4699-0	.620	1.033	1.220	.025	59 JJ
8612-0	.640	1.055	1.175	.025	EE EE
81171-0	.625	1.175	1.040	.030	EE 72
✈4351-0	.625	1.185	1.540	.035	EE FF
2672-0	.595	1.193	1.406	.047	GG EE
4826-0	.638	1.220	1.490	.031	EE EE
8499-0	.581	1.228	1.609	.025	JJ MM
5733-0	.590	1.231	1.437	.040	EE FF
8404-0	.640	1.245	1.137	.020	MM GG
5229-0	.610	1.245	1.625	.035	JJ EE
648-0	.610	1.245	2.562	.035	EE JJ
3622-0	.630	1.250	1.938	.060	JJ EE
3438-0	.625	1.250	1.575	.062	EE FF
3622-0	.625	1.250	1.937	.062	EE JJ
✈852-0	.625	1.250	2.312	.062	EE JJ
3927-0	.635	1.270	1.120	.025	EE EE
4730-0	.582	1.320	1.725	.045	EE MM

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
Core smaller diameter .581 to .640 (continued)					
8751-0	.609	1.359	1.100	.030	79 79
4185-0	.609	1.468	1.500	.031	EE EE
7103-0	.582	1.498	1.338 x 1.338	.032	A A
2761-0	.609	1.500	1.500	.060	EE EE
4207-0	.640	1.500	1.375	.030	EE EE
6659-0	.595	1.505	.900	.025	MM MM
3655-0	.613	1.575	1.100	.030	EE EE
83164-0	.610	1.630	1.420	.065	MM MM
8894-0	.632	1.728	1.325	.030	EE MM MM
3873-0	.630	1.730	1.625	.040	EE EE
6127-0	.597	1.802	1.287	.032	EE EE
3364-0	.635	1.817	1.370	.050	EE KK
6216-0	.625	1.932	1.187	.050	EE EE
6111-0	.637	1.953	.941	.030	EE MM
847-0	.633	1.980	1.062	.040	EE EE
6234-0	.626	2.160	1.800	.060	EE EE
6368-0	.640	2.360	1.575	.045	LL LL EE
Core smaller diameter .641 to .700					
3611-0	.660	.125	1.500	.025	EE JJ
2782-0	.655	.238	1.205	.025	EE EE
8114-0	.645	.250	1.240	.025	EE EE
2644-0	.670	.250	1.125	.022	EE EE
1465-0	.648	.280	1.174	.030	KK KK
7289-0	.641	.360	2.000	.035	EE EE
3751-0	.666	.365	1.368	.030	EE EE
5950-0	.665	.375	1.031	.030	EE EE
8740-0	.660	.430	1.740	.040	EE JJ
8290-0	.692	.465	1.568	.025	MM MM
3631-0	.641	.490	1.177	.020	EE MM
8379-0	.644	.495	1.183	.020	KK JJ
5052-0	.660	.540	.990	.025	EE MM
2035-0	.649	.563	1.166	.025	KK KK
8755-0	.646	.566	1.162	.035	KK KK
3779-0	.660	.590	1.800	.030	EE GG
1383-0	.665	.600	1.340	.045	EE MM
3732-0	.642	.609	1.625	.065	EE EE
3345-0	.650	.615	1.375 x 1.375	.062	M A
8161-0	.650	.660	1.150	.050	EE EE
1807-0	.660	.670	1.200	.025	EE EE
5553-0	.650	.709	1.047	.027	EE MM
5404-0	.660	.735	1.570	.036	KK KK
4671-0	.661	.752	1.608	.030	JJ JJ
3715-0	.642	.800	1.625	.085	EE EE
3780-0	.660	.810	1.800	.030	EE MM
2345-0	.670	.920	1.065	.030	EE MM
8466-0	.642	.969	1.306	.025	NN EE
5796-0	.655	.970	1.625	.030	EE EE
5432-0	.693	.985	1.600	.040	EE EE
1624-0	.671	1.022	1.125	.031	EE JJ
1624-1	.675	1.032	1.125	.032	EE EE
2346-0	.670	1.040	1.190	.030	EE MM
3900-0	.680	1.045	1.190	.025	59 59
5099-0	.680	1.045	1.200	.040	GG GG
3807-0	.680	1.062	1.312	.030	EE EE
8188-0	.668	1.198	1.654	.030	EE EE
5413-0	.648	1.210	1.200 x 1.200	.035	A A
8281-0	.660	1.218	1.250	.030	EE EE
7783-0	.660	1.220	1.653	.050	EE MM
4792-0	.671	1.250	1.785	.035	EE EE
2254-0	.675	1.250	1.730 x 1.730	.032	SS SS
80711-0	.687	1.250	1.185	.037	EE EE
1765-0	.680	1.263	1.160	.029	EE EE
1613-0	.641	1.315	1.625	.045	EE EE
3606-0	.656	1.343	1.469	.050	EE MM
1688-0	.645	1.350	1.500	.048	EE EE
3629-0	.690	1.355	1.485	.062	EE EE
2022-0	.641	1.375	1.360	.040	JJ JJ
2050-0	.666	1.402	1.315	.030	EE PP
6862-0	.670	1.405	1.590	.037	EE EE
8436-0	.649	1.432	1.322 x 1.424	.050	A EE
6686-0	.656	1.440	1.322 x 1.430	.057	EE DD
5126-0	.641	1.470	1.560	.030	EE EE
7296-0	.690	1.484	1.750 x 1.750	.030	69 69
4951-0	.695	1.495	1.630	.035	EE EE
5646-0	.645	1.500	1.205	.034	EE 55
5947-0	.670	1.520	1.500	.055	67 EE
5133-0	.645	1.555	1.310	.022	MM EE
3509-0	.645	1.591	1.578	.050	EE EE
4013-0	.665	1.610	1.400	.025	EE KK
3625-0	.650	1.635	1.900	.050	EE EE
7702-0	.660	1.640	1.460	.045	EE EE
3685-0	.642	1.682	1.765	.090	EE EE
3799-0	.656	1.687	1.593	.045	EE EE
1261-0	.665	1.720	1.355	.031	EE JJ
5683-0	.675	1.738	1.676 x 2.000	.045	A A
8304-0	.645	1.740	1.340	.070	EE EE
1449-0	.670	1.756	1.300	.030	EE MM
1708-0	.656	1.781	1.375	.032	EE EE
6064-0	.700	1.795	1.600	.030	EE MM
6646-0	.645	1.810	1.530	.038	EE EE
2772-0	.670	1.867	1.725	.030	47 47
6161-1	.695	1.935	1.840	.040	EE EE
6161-2	.695	1.935	1.432	.040	EE EE
607-0	.693	1.937	1.516	.045	EE EE
6090-0	.695	1.950	1.405	.040	MM EE
6062-0	.700	2.173	1.066	.030	EE MM
6183-0	.680	2.375	1.250	.030	EE EE
6260-1	.673	2.418	1.850	.030	EE JJ
6260-0	.673	2.418	1.192	.030	EE JJ
844-0	.700	2.469	1.343	.050	EE EE
Core smaller diameter .701 to .740					
8115-0	.719	.300	1.240	.035	EE EE
8252-0	.720	.303	1.193	.023	EE 74
8242-0	.724	.383	.908	.024	EE MM EE
5637-0	.735	.422	1.269	.033	MM MM
1857-0	.720	.455	1.055	.025	EE JJ
4267-1	.720	.460	1.050	.020	EE MM
1340-0	.715	.460	1.045	.028	EE EE
3609-0	.710	.505	1.620	.035	EE FF
8271-0	.704	.660	1.390	.040	EE EE
3393-0	.735	.690	1.340	.015	EE GG
2722-0	.720	.713	2.103	.022	EE EE
4702-0	.707	.768	1.374	.030	EE MM
4589-0	.709	.780	1.394	.040	KK KK
5002-0	.709	.780	1.394	.042	KK KK KK
8213-0	.703	.800	1.170	.025	EE EE
1303-0	.715	.890	1.390	.035	EE GG
3392-0	.735	.890	1.340	.020	EE MM
3436-0	.715	1.305	1.688	.035	EE 49
5398-0	.715	1.310	1.690	.040	EE EE
2659-0	.734	1.368	1.750	.031	EE EE
5748-0	.710	1.375	1.656	.035	EE JJ
3726-0	.703	1.380	1.990	.060	EE GG
8200-0	.715	1.390	1.525	.030	EE EE
5812-0	.705	1.410	1.760	.062	KK EE
2638-0	.703	1.421	1.938	.062	EE MM
2080-0	.709	1.432	1.560	.030	EE EE
3701-0	.708	1.495	1.960	.030	EE EE
3701-1	.710	1.505	1.625	.050	EE EE
1387-0	.703	1.530	1.875	.062	EE EE
5817-0	.718	1.555	1.475	.050	EE EE
4200-0	.719	1.555	1.530	.050	EE EE
833-0	.740	1.670	2.320	.060	EE EE
833-1	.734	1.687	2.312	.090	EE FF
833-0	.734	1.687	2.312	.090	EE EE
2795-0	.731	1.712	1.302	.030	49 EE
6929-0	.720	1.810	1.145	.035	EE EE KK
1736-0	.725	1.843	1.348	.030	EE HH
6155-0	.702	1.908	1.345	.045	EE MM
868-0	.703	2.200	1.990	.062	EE MM

*** Irregular Flange**

Quick-Ship (see page 2)

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
841-0	.703	2.250	1.938	.062	EE MM
6225-0	.730	2.335	1.845	.042	EE MM
Core smaller diameter .741 to .800					
6996-0	.757	.262	1.251	.020	MM EE
2677-0	.750	.312	1.500	.046	EE EE
2027-0	.790	.370	1.325	.030	EE KK
4608-0	.768	.374	1.580	.030	FF FF
5389-0	.750	.375	1.230	.025	EE EE
5814-0	.796	.375	1.331	.030	EE MM
4194-0	.800	.375	1.440	.035	EE EE
4128-0	.784	.408	1.320	.029	EE EE
6741-0	.780	.490	1.000	.030	EE EE
6729-0	.785	.510	1.300	.030	MM KK
3739-0	.786	.520	1.339	.020	EE MM
8624-0	.790	.615	1.675	.030	EE EE
8149-0	.775	.638	1.100	.030	EE MM
2635-0	.770	.700	1.340 x 1.340	.032	A A
4663-0	.795	.740	1.476	.040	KK KK
2255-0	.755	.795	1.050	.032	EE JJ
8876-0	.757	.825	1.200	.025	JJ JJ
2272-0	.795	.880	1.490	.030	EE JJ
4482-0	.790	.928	1.897	.040	EE EE
5778-0	.762	.960	1.265 x 1.265	.030	DD EE
1419-0	.765	.960	1.385	.030	EE 48
1668-0	.759	.969	1.760	.032	EE EE
1668-2	.759	.974	1.773	.036	EE EE
3384-0	.760	.975	1.812	.045	EE EE
2085-0	.757	.985	1.430	.035	EE EE
5466-0	.757	.986	1.500	.035	EE EE
2256-0	.755	.995	1.050	.032	EE JJ
5348-0	.752	1.000	1.740	.044	JJ EE
2250-0	.763	1.002	1.256	.045	00 00
7098-0	.793	1.050	1.385	.031	EE 56
1611-0	.800	1.055	1.280	.031	JJ JJ
4030-0	.775	1.123	1.182	.031	EE EE
1759-0	.770	1.125	2.200	.047	EE EE
8648-0	.754	1.153	1.405	.035	EE MM
4522-0	.790	1.235	1.950	.035	EE EE
1106-0	.755	1.240	2.250	.040	EE EE
5430-0	.771	1.325	1.745	.032	EE EE
✈4829-0	.765	1.370	1.485	.030	EE EE
2684-0	.798	1.375	1.750	.045	JJ JJ
8121-0	.760	1.395	1.395	.035	EE JJ
3761-0	.768	1.400	1.760	.040	EE EE
4946-0	.785	1.415	1.600	.031	EE EE
2734-0	.800	1.469	1.246	.030	EE GG
2680-0	.760	1.490	1.860	.051	EE MM
8286-0	.769	1.496	1.377	.030	MM EE
7648-0	.765	1.500	1.865	.050	EE MM
2675-0	.796	1.531	1.562	.033	MM GG
7288-0	.771	1.575	1.375	.032	EE EE
4785-0	.771	1.575	1.375	.032	EE EE
1690-0	.760	1.575	1.495	.062	EE EE
7321-0	.771	1.575	1.745	.032	EE EE
8837-0	.764	1.580	1.315	.040	EE JJ
6596-0	.758	1.590	1.290	.035	EE FF
941-0	.750	1.682	2.490	.060	JJ EE
1211-0	.765	1.695	1.400	.038	EE JJ
6165-0	.765	1.700	1.500	.040	EE 48
6219-0	.765	1.705	1.405	.040	EE FF
4755-0	.753	1.725	1.465	.050	GG JJ EE
6182-1	.765	1.740	1.510	.038	EE EE
6182-0	.764	1.745	1.514	.030	48 EE
6285-0	.768	1.750	1.514	.030	FF EE
1634-0	.750	1.750	1.810	.040	GG GG EE
4355-0	.750	1.750	1.500	.060	EE FF
6043-0	.758	1.760	1.809	.045	EE EE
5334-0	.760	1.790	1.780	.060	MM FF
2739-0	.788	1.812	2.000	.060	EE EE
1737-0	.796	1.844	1.515	.030	EE 47
6227-0	.770	1.875	1.750	.035	EE EE
849-0	.780	1.900	1.455	.043	EE EE
6223-0	.795	2.060	1.760	.035	EE EE EE
6347-0	.765	2.070	1.210	.140	MM MM
6332-0	.755	2.105	1.250	.060	EE EE MM
6300-0	.754	2.108	1.492	.055	MM JJ EE
6156-0	.762	2.300	1.485	.040	JJ JJ EE
635-0	.758	2.430	2.125	.050	EE EE
722-0	.760	2.440	2.115	.045	EE EE
839-0	.798	2.590	2.000	.027	EE 48
6263-0	.750	2.750	1.875	.062	EE EE
6115-0	.770	2.830	1.420	.038	EE EE
6102-0	.748	2.885	1.550	.050	EE MM
799-0	.760	2.945	2.220	.035	EE EE
6099-0	.752	3.113	1.465	.050	GG JJ EE
6364-1	.750	3.115	1.710	.090	EE EE
8036-0	.760	3.930	2.785	.050	EE EE
Core smaller diameter .801 to .860					
1744-0	.860	.230	1.625	.030	EE EE
4242-0	.857	.230	1.625	.020	EE EE
6545-0	.802	.252	1.650	.030	EE EE
4096-1	.805	.310	1.172	.028	KK EE
4096-0	.805	.310	1.172	.025	EE MM
5138-0	.856	.350	1.594	.032	EE EE
3781-0	.850	.350	1.562	.025	EE EE
3648-0	.823	.500	1.375	.031	EE EE
5102-0	.850	.520	1.339	.020	EE MM
6652-0	.820	.605	1.730	.035	EE MM
4781-0	.801	.735	1.470	.030	KK KK
4478-0	.855	.890	1.980	.035	OO OO
8203-0	.810	.900	1.180	.032	EE EE
3583-0	.847	.950	1.700	.050	EE EE
8763-0	.815	1.090	1.554	.030	EE 19
4236-0	.829	1.116	1.272	.030	EE MM
3557-0	.830	1.148	1.666	.028	EE EE
81511-0	.847	1.190	1.430	.018	EE EE
8341-0	.817	1.296	1.839	.050	EE EE
2760-0	.819	1.500	2.000	.040	EE EE
2015-0	.828	1.700	1.750	.030	EE EE
2049-0	.803	1.780	1.700	.030	EE EE
8640-0	.825	1.790	1.675	.030	EE JJ
6092-0	.812	1.812	1.625	.045	EE EE
879-0	.842	1.870	2.255	.042	EE EE
861-0	.860	1.939	1.450	.030	EE 49
✈6238-0	.813	1.953	1.781	.062	JJ JJ
7262-0	.822	1.967	1.778	.025	EE EE
599-0	.805	1.980	2.135	.060	EE EE
6077-0	.848	2.125	1.575	.044	EE EE
6158-0	.815	2.125	1.750	.050	EE MM
877-0	.815	2.230	1.865	.045	EE EE
6046-0	.817	2.437	2.035	.045	EE EE
6081-0	.824	2.611	1.264	.030	EE MM
8017-0	.832	3.415	1.497	.050	EE EE
✈8028-0	.820	4.195	1.575	.050	EE EE
Core smaller diameter .861 to .920					
4319-0	.863	.230	1.632	.020	EE EE
1499-0	.880	.250	1.120	.030	EE EE
5258-0	.905	.285	1.900	.030	EE EE
4356-0	.887	.290	1.600	.030	EE EE
4480-0	.890	.375	1.380	.025	EE EE
1781-0	.890	.390	1.766	.049	EE EE
3369-0	.872	.420	1.380	.020	EE EE
2001-0	.906	.430	1.781	.025	EE EE
1041-0	.885	.450	2.300	.030	EE EE
1733-0	.870	.480	1.562	.031	EE EE
4970-0	.920	.500	1.500	.030	EE EE
4346-0	.909	.508	1.646	.030	EE EE
5415-0	.910	.515	1.605	.030	EE MM
8798-0	.911	.515	1.605	.030	JJ JJ
4184-0	.865	.520	1.300	.030	EE GG
4993-0	.895	.528	1.130	.020	EE MM

*** Irregular Flange**

Quick-Ship (see page 2) ✈

This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
Core smaller diameter .861 to .920 (continued)					
5543-0	.920	.540	1.500	.030	EE EE
2665-0	.897	.550	1.540	.031	EE EE
3756-0	.865	.875	1.190	.031	EE JJ
2749-0	.893	.970	1.607	.030	EE MM
3757-0	.890	1.030	1.320	.035	EE MM
2673-0	.875	1.031	2.000	.045	EE EE
5555-0	.915	1.055	1.610	.030	EE MM
4775-0	.875	1.062	1.875	.040	OO OO
4419-0	.885	1.125	1.945 x 1.945	.031	DD EE
727-0	.864	1.127	2.124 x 2.124	.045	A A
4073-0	.900	1.160	2.075	.050	EE EE
4485-0	.890	1.250	1.945 x 2.068	.030	DD DD
1652-0	.893	1.490	1.607	.030	EE JJ
7876-0	.910	1.540	1.735	.040	EE KK
1795-0	.915	1.600	1.860	.031	EE MM
6402-0	.885	1.675	1.480	.045	EE MM
6330-1	.883	1.678	1.483	.040	MM EE
81458-0	.910	1.725	2.010	.060	EE EE
4051-0	.905	1.780	1.400	.030	KK EE
8783-0	.877	1.790	1.700	.030	EE EE
6630-0	.905	1.835	1.675	.050	EE EE
6351-0	.880	1.840	1.355	.045	MM MM
6237-1	.906	1.843	1.670	.045	EE EE
6526-0	.880	1.850	1.595	.045	MM EE EE
6204-0	.890	1.950	1.860	.040	EE EE
1072-0	.906	2.494	2.028	.050	EE EE
81152-0	.900	2.780	1.500	.085	EE EE
Core smaller diameter .921 to 1.080					
8847-0	.977	.196	1.335	.025	EE EE
4398-0	1.007	.217	1.636	.020	EE EE
855-0	1.028	.225	2.208	.031	EE EE
2334-0	1.080	.307	1.500	.030	EE JJ
6642-0	.945	.375	1.745	.035	EE MM
4229-0	1.020	.400	1.390	.030	EE EE
3628-0	.935	.404	1.426	.030	EE EE
2144-0	1.040	.406	1.780	.031	EE EE
2304-0	.945	.430	1.687	.035	EE MM
8352-0	1.046	.460	1.758	.025	EE EE
8301-0	1.065	.500	1.685	.025	EE KK
3632-0	.978	.515	1.652	.020	EE MM
4551-0	1.031	.531	1.283	.025	EE MM
4758-0	1.012	.537	1.602	.032	EE EE
2076-0	.956	.547	1.200	.030	EE MM
4181-0	1.047	.559	1.307	.025	EE EE
2653-1	1.041	.588	2.127	.035	EE EE
3720-0	.980	.596	1.605	.031	EE EE
971-0	.990	.612	2.320	.045	EE EE
5984-0	1.005	.630	1.590	.025	MM MM
2653-0	1.035	.630	2.128	.035	EE EE
4369-0	1.010	.630	1.582	.025	47 EE
1361-0	.978	.668	1.652	.020	MM MM
3765-0	1.061	.714	1.500	.025	EE EE
3643-0	.943	.821	1.450	.040	EE EE
1790-0	.994	.865	1.497	.025	EE EE
1364-0	1.050	.865	1.795	.030	EE MM
8856-0	1.000	.875	1.937	.030	EE EE
1015-0	.932	.925	2.550 x 2.550	.065	DD DD
✈4712-0	1.005	.950	1.800	.040	EE MM
1370-0	1.012	1.125	1.900	.060	EE EE
2020-0	1.017	1.130	1.910	.050	EE EE
8682-0	.975	1.150	1.400	.032	EE JJ
1845-0	1.055	1.315	2.105	.040	EE EE
5638-0	1.010	1.390	1.545	.030	EE EE
3359-0	.955	1.475	1.890	.050	EE OO
866-0	.992	1.485	2.225	.091	EE EE
2012-0	1.015	1.594	1.937	.100	EE EE
81459-0	1.015	1.725	2.063	.060	EE EE
925-0	1.010	1.770	2.210	.050	EE EE
6327-0	.975	1.800	1.745	.035	EE MM
8425-0	1.017	1.875	3.383	.060	EE EE
948-0	.953	1.910	2.063	.060	EE EE
1171-0	1.024	1.911	2.213	.050	MM EE
978-0	.953	1.925	2.063	.055	EE EE
6029-0	.921	1.937	1.750	.031	EE EE
869-0	1.075	1.953	1.755	.045	EE JJ
645-0	.928	2.062	2.312	.031	EE EE
6123-0	.985	2.070	1.800	.050	EE JJ
6176-0	.923	2.167	1.930	.045	EE EE
918-0	.936	2.300	2.760	.045	EE EE
1092-0	1.020	2.330	2.671	.050	EE EE
6317-0	1.068	2.333	1.604	.040	MM EE
6398-0	1.020	2.355	2.105	.055	EE 55
6241-0	1.025	2.355	2.105	.055	55 EE
6444-0	1.016	2.440	1.900	.040	EE EE
6629-0	1.025	2.465	2.000	.060	EE EE
738-0	.968	2.480	2.105 x 2.105	.062	DD DD
867-0	.939	2.490	1.422	.025	EE MM
6682-0	1.005	2.950	2.205	.050	EE MM
6266-0	.921	3.031	2.148 x 2.148	.045	SS SS
Core smaller diameter 1.081 to 1.200					
6543-0	1.177	.250	2.875	.032	EE EE
4576-0	1.140	.273	2.063	.030	EE EE
5280-0	1.145	.310	1.940	.025	EE EE
4545-0	1.146	.312	1.812	.030	EE EE
3997-0	1.135	.315	1.945	.031	EE EE
4737-0	1.142	.317	2.040	.030	EE EE
8136-0	1.114	.330	1.852	.035	EE EE
4913-0	1.125	.336	1.955	.038	EE EE
4913-1	1.125	.336	1.955	.035	EE EE
2162-0	1.142	.348	1.834	.032	NN EE
1231-1	1.125	.373	1.949	.034	EE EE
4739-0	1.125	.375	1.624	.030	EE MM
1231-0	1.130	.375	1.955	.035	EE EE
6544-0	1.125	.375	2.000	.027	EE EE
1308-0	1.110	.375	1.870	.030	EE MM
6716-0	1.125	.375	2.000	.030	GG EE
2687-0	1.105	.391	1.483	.028	EE EE
7664-0	1.120	.396	2.070	.040	EE EE
258-0	1.110	.409	1.750	.030	EE EE
4460-0	1.105	.470	2.000	.033	EE EE
5243-0	1.110	.500	1.937	.035	EE EE
2018-0	1.148	.506	2.125	.025	EE EE
8862-0	1.135	.529	1.812	.025	EE GG
1343-0	1.130	.550	1.730	.030	EE JJ
4757-0	1.098	.555	1.545	.032	EE EE
5152-0	1.104	.559	1.561	.032	EE EE
4528-0	1.135	.595	1.923	.025	EE EE
3783-0	1.120	.620	2.340	.050	EE JJ
5879-0	1.165	.735	2.060	.040	EE EE
5111-0	1.132	.845	1.875	.030	EE MM
3870-0	1.148	.899	1.745	.020	EE EE
718-0	1.183	1.080	2.234	.040	KK KK
961-0	1.170	1.140	2.350	.050	EE EE
4983-0	1.166	1.190	1.887	.025	MM MM
3716-0	1.184	1.271	1.472	.025	EE MM
5471-0	1.130	1.625	2.000	.025	EE FF
4038-0	1.130	1.625	1.993	.035	EE FF
✈3639-0	1.094	1.719	2.000	.062	EE EE
6308-0	1.135	1.750	1.955	.045	EE JJ
1122-0	1.145	2.255	2.497	.045	EE JJ EE
6017-0	1.088	2.320	1.880	.050	EE MM
873-0	1.187	2.375	2.510	.047	EE EE
1194-0	1.148	2.437	2.173	.030	KK EE
6007-0	1.088	3.255	1.880	.100	EE JJ
8041-1	1.140	3.490	2.440	.040	MM MM
Core smaller diameter 1.201 to 1.440					
3669-0	1.220	.175	1.462	.025	LL LL
4740-0	1.296	.344	1.910	.030	EE MM
5283-0	1.296	.365	1.720	.040	KK KK
1758-0	1.276	.370	2.151	.026	EE EE

*** Irregular Flange**

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This table is sequenced by Core diameter groups and then Length within each group.

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
3805-0	1.403	.416	1.844	.030	EE EE
842-0	1.435	.440	2.210	.028	EE EE
4483-0	1.410	.445	2.190	.020	EE EE
706-0	1.310	.450	2.300	.040	EE MM
2698-0	1.380	.499	1.877	.039	EE EE
1038-0	1.325	.500	2.195	.032	EE EE
4387-0	1.335	.500	1.882	.030	EE EE
725-0	1.335	.505	2.590	.050	EE GG
997-0	1.370	.512	2.167	.031	EE EE
4036-0	1.435	.530	2.110	.030	EE EE
1064-0	1.318	.550	2.100	.030	EE EE
4894-0	1.432	.560	2.250	.030	EE JJ
3675-0	1.281	.562	1.937	.031	EE EE
1777-0	1.225	.562	1.600	.062	EE EE
837-0	1.437	.562	2.000	.031	EE MM
7300-0	1.245	.565	2.015	.035	EE EE
2349-0	1.238	.566	1.780	.038	EE EE
3454-0	1.234	.566	1.875	.038	EE EE
4388-0	1.327	.576	1.950	.028	EE EE
1332-0	1.270	.585	1.865	.025	EE EE
3818-0	1.250	.625	1.875	.030	EE EE
6623-0	1.258	.790	2.115	.038	PP PP
3693-0	1.211	.837	1.930	.020	EE MM
6730-0	1.210	.837	1.895	.040	MM KK
3755-0	1.234	.875	1.495	.032	EE EE
5208-0	1.345	.910	2.155	.025	EE EE
7821-0	1.210	.955	1.760	.030	EE KK MM
679-0	1.375	1.000	2.060	.043	EE 47
697-0	1.417	1.050	2.380	.040	EE MM
656-0	1.320	1.105	2.470	.040	OO OO
5068-0	1.350	1.150	1.950	.040	EE EE
944-0	1.245	1.290	2.100	.050	EE EE
865-0	1.250	1.438	2.125	.125	EE FF
853-0	1.425	1.540	2.125	.030	EE MM
1187-0	1.266	1.870	2.995	.060	EE EE
7689-0	1.245	2.200	2.420	.045	EE MM
6983-0	1.234	2.209	2.180	.050	MM EE
633-0	1.390	2.355	2.330	.060	KK EE
733-0	1.312	2.678	2.875	.060	EE EE
1070-0	1.300	2.868	2.750	.070	EE EE
745-0	1.284	2.997	2.995 x 2.995	.056	A A
Core smaller diameter 1.441 to 1.720					
8089-0	1.507	.330	2.704	.045	EE EE
691-0	1.625	.375	2.380	.030	EE MM
4967-0	1.625	.400	2.225	.025	EE EE
4152-0	1.510	.410	1.895	.025	EE EE
761-0	1.640	.415	2.400	.030	EE EE

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
1005-0	1.477	.440	2.347	.035	EE EE
1134-0	1.560	.455	2.250	.025	EE EE
3717-0	1.690	.470	2.260	.030	EE EE
848-0	1.515	.520	2.250	.035	EE EE
854-0	1.468	.530	2.206	.031	EE EE
1081-0	1.530	.540	2.560	.030	EE EE
996-0	1.530	.543	2.560	.031	EE EE
921-0	1.545	.600	2.590	.045	EE EE
2652-0	1.515	.630	2.123	.035	EE EE
712-0	1.465	.640	2.560	.032	EE EE
1035-0	1.460	.672	2.550	.050	EE EE
1747-1	1.638	.680	2.294	.030	EE EE
870-0	1.480	.735	2.350	.035	EE EE
975-0	1.625	.740	2.380	.030	EE MM
872-0	1.565	.775	2.240	.030	EE EE
617-0	1.580	.790	2.500	.030	EE MM
1158-0	1.470	.960	2.400	.030	EE EE
680-0	1.470	1.035	2.375	.040	EE JJ
6412-0	1.656	1.120	3.200	.040	EE EE
1096-0	1.610	1.149	2.180	.060	49 EE
605-0	1.708	1.253	2.930	.040	JJ EE
871-0	1.708	1.255	2.930	.055	EE JJ
874-0	1.515	1.468	2.180	.035	EE MM
1157-0	1.520	1.490	2.703	.045	GG GG
875-0	1.515	1.495	2.535	.035	EE MM
618-0	1.708	1.545	2.930	.040	MM MM
8705-0	1.683	1.598	2.096	.030	EE MM
8032-0	1.656	3.610	2.953	.062	EE JJ
6742-0	1.562	4.000	3.187	.062	EE JJ
Core smaller diameter 1.721 to 3.999					
3616-0	1.750	.148	2.250	.030	EE EE
1130-0	1.770	.179	2.544	.030	EE EE
1008-0	2.000	.250	2.500	.040	KK KK
666-0	1.787	.365	2.500	.027	JJ JJ
3786-0	1.760	.365	2.375	.030	EE EE
840-0	1.925	.405	2.746	.030	EE EE
634-0	1.955	.410	2.690	.030	MM MM
778-0	1.875	.435	1.123	.030	JJ JJ
8546-0	2.912	.479	3.862	.035	EE EE
8528-0	2.770	.480	3.920	.030	MM MM
982-0	2.025	.480	2.875	.030	EE MM
1068-0	2.080	.495	2.590	.047	EE EE
8500-0	2.460	.547	3.742	.040	78 EE
600-0	1.975	.560	2.495	.050	EE EE
846-1	2.085	.565	2.725	.031	EE EE
846-2	2.085	.565	2.725	.031	EE MM
846-0	2.085	.565	2.840	.031	EE EE

Part number	Core dia.	Length	Flange dia.	Wall	Flange styles
639-0	1.750	.570	2.600	.060	JJ JJ
1131-0	2.090	.585	3.000	.025	EE EE
8533-0	2.510	.600	3.530	.030	JJ JJ
8534-0	2.760	.600	3.925	.030	MM EE
1071-0	1.735	.655	2.400	.045	EE EE
8519-0	2.781	.750	3.716	.027	EE EE
8857-0	1.752	.827	2.690	.030	EE EE
✈8504-0	2.730	.837	3.735	.035	EE EE
81290-0	3.437	.840	4.415	.065	EE EE
81300-0	2.760	.840	3.715	.050	EE EE
8509-0	2.185	.853	3.304	.030	EE EE
747-0	1.770	1.009	2.795	.040	EE EE
8506-1	2.525	1.058	3.448	.030	EE EE
1103-0	1.940	1.490	2.765	.050	EE EE
7758-0	1.895	1.500	2.700	.055	EE EE
7808-0	2.730	1.725	3.438	.050	EE EE
8532-0	2.010	2.454	3.598	.063	EE MM
8547-0	2.229	2.938	3.790	.055	GG GG
8031-0	2.280	3.156	3.800	.062	EE JJ

*** Irregular Flange**

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