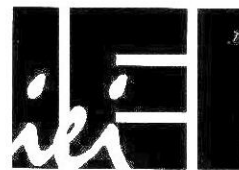
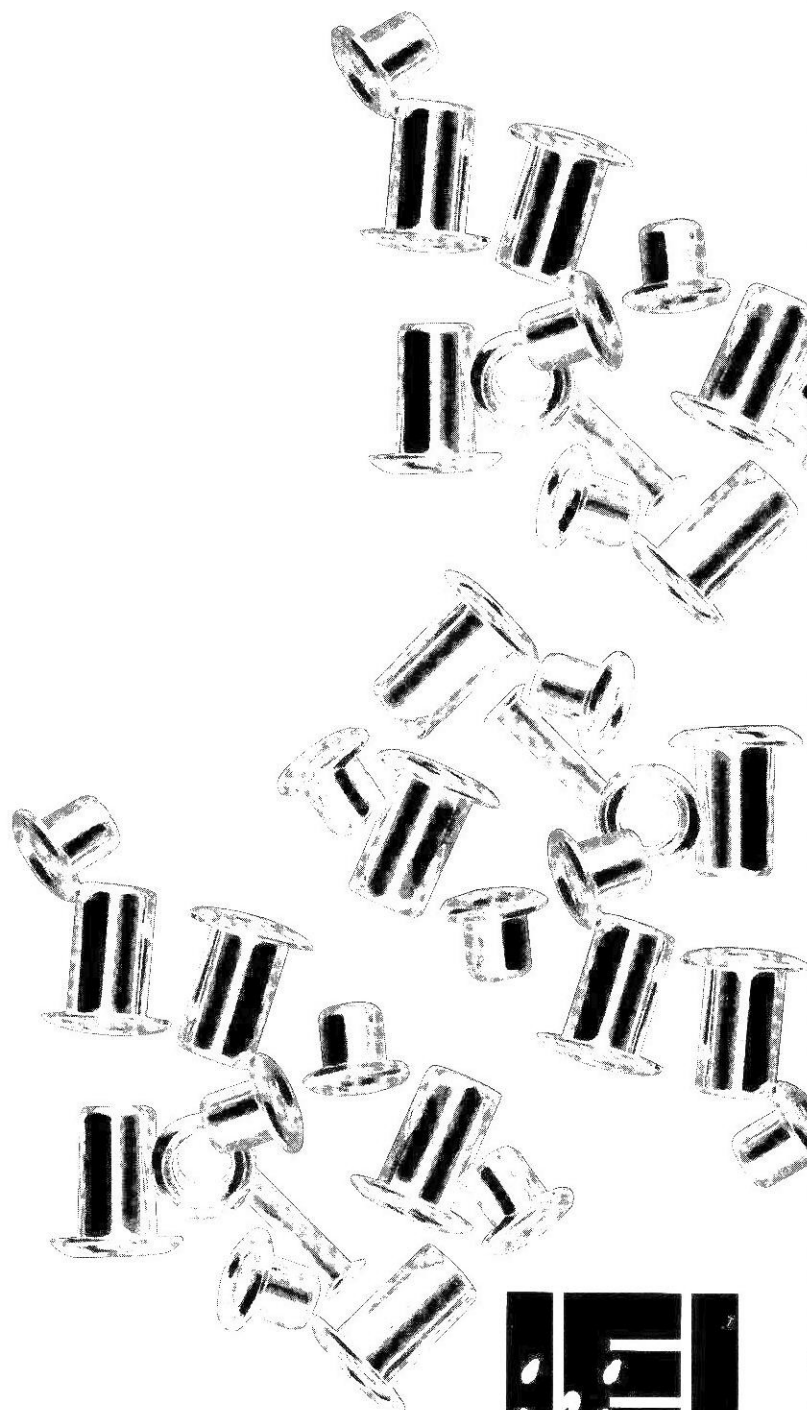


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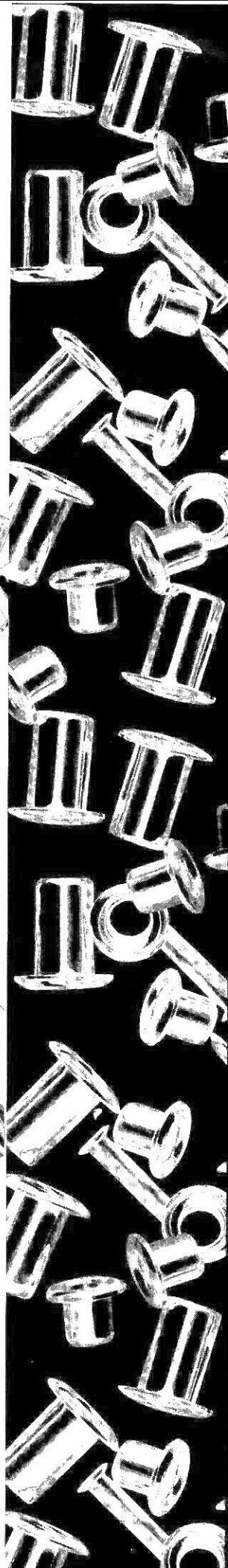


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EYELETS ARE SUPERIOR TO THROUGH-PLATED HOLES.

Anyone making, modifying, or repairing PC boards knows the miseries of through-hole plating. Our versatile handyman ends these headaches. Only electronic eyelets offer all these advantages over through-plated holes.

Far easier board repair is possible with eyelets. Plated holes can be salvaged and continuity restored using eyelets. Eyelets also allow for quick and easy component replacement.

Boards are much easier to modify with eyelets. Circuits can be bypassed and new components or functions can be added to existing boards using eyelets.

Eyelets are versatile. They can be used as Mounting devices, to stack or separate circuits, as guides or grommets for leads, and as connectors.

Eyelets are readily available. A wide variety of sizes, styles, and platings are available to ship same-day from International Eyelets' huge

Eyelets

from the electronic eyelet specialists

Anyone making,

Modifying, or repairing

PC Boards will appreciate

The flexibility and versatility of electronic eyelets.

They're simple to use, low in price, strong in application, and offer several advantages over through-hole plating.

Since 1973, International Eyelets has specialized in only one product line-electronic eyelets and the tools necessary to place them most effectively and efficiently. Our commitment to the development of the electronic eyelets and to the needs of our customers maintains International Eyelets as the premier source for eyelets and Eyelet-setting tools.

When ordering, please specify the type of plating

Desired. Tin, solder, nickel, or gold plating

to MIL specifications is available. Eyelet material is indicated by the final letter of the part number- **"B"** = **brass**, **"C"**= **COPPER**.

A SHORT COURSE ON ELECTRONIC EYELETS

Helpful information and application data from the electronic eyelet specialist since 1973

What are electronic eyelets?

Electronic eyelets are flanged tubular metal conductors inserted into a printed circuit board. They make electrical continuity between the circuitry on both sides of the board, and are an attachment point for soldering component leads.

What is the proper length for an eyelet?

Usually a minimum of .030 should be allowed to roll the setting on small eyelets. Conditions will vary and tests with samples are advised.

What is the diameter of the rolled clinch setting?

The diameter of the rolled clinch setting is usually .030 to .040 more than the barrel's outside diameter (O.D.)

Why are eyelets made from both brass and copper?

Small sizes are made from copper because fabrication and setting is easier. Large sizes are made from brass for increased strength.

What kind of brass is used to make International Eyelets' electronic eyelets?

An alloy of 70% copper and 30% zinc specified as QQB-613B Comp.2

What type of copper is used for International Eyelet's electronic eyelets?

OFHC (Oxygen-Free High Conductivity) QQC-576B

Why are eyelets gold plated?

When electroplated to a thickness of 30 to 50 microns, 24K gold protects the metal from oxidizing and prolongs the shelf life of the solderable surfaces.

Why are some eyelets plated with tin?

Tin plating improves solderability, avoids the cost of gold plating, and avoids the weakening of soldered joints caused by gold diffusion.

Why are flat flange eyelets used?

Because of the smaller flange diameter, flat flange eyelets may be spaced closer together. Solder also flows easier under a flat flange than under a roll flange.

What is the purpose of the rolled flange eyelet?

The roll flange makes a 360 degree contact with the copper land on the printed circuit board, and the contact pressure is maintained by the spring pressure of the arched flange.

What is the purpose of the funnel flange eyelets?

Specifically developed for electronic use, funnel flange eyelets allow solder to flow around the barrel. Lead wires are easier to insert and the solder fillet is quickly inspected.

How can eyelets be used to rework or salvage plated holes in printed circuit boards?

Rework or salvage plated holes by just inserting any style eyelet of the proper size into the plated hole and setting it in the normal manner. If a larger size eyelet is used, drill out the plated hole to a larger size.

Why is visual inspection easier with eyelets?

Since eyeleted holes have solid metal walls, it is not necessary to look for discontinuity or voids as in plated holes.

How are eyelets added to printed circuit boards for retrofitting components or circuit modification?

COMPONENTS MAY BE ADDED TO EXISTING CIRCUIT BOARDS BY DRILLING HOLES ADJACENT TO CONDUCTORS AND INSERTING EYELETS IN CONTACT WITH THE COPPER. Eyelets can also be added for durable test-prod points. Jumper wires can be anchored to eyelets. Reliable feed-through connections between conductors on two sided boards are assured when eyelets are used.

How are eyelet setting tools used?

Setting tools consist of two parts. The anvil holds the eyelet on a retracting spindle and supports the flange and the form tool or die applies the force and curvature necessary to roll the exposed barrel until it is seated firmly against the board.

How are setting tools mounted for setting eyelets?

Setting tools should be mounted in a press which will maintain the tools in alignment and apply a steady pressure on the eyelet. Specialized presses are available or an arbor or drill press may be used.

Can eyelets be resoldered?

Unlike plated-through holes, eyelets are not damaged by soldering heat and can be resoldered several times. An eyelet's wall thickness is 30 times that of plated-through hole and the mechanical clinching of an eyelet is not affected when removing de-soldered components.

What causes a rolled setting to split?

Roll settings can split for the following reasons: the metal is too hard, the setting tools are misaligned or the setting tools are the wrong size or improperly designed. Split eyelets were previously a cause for rejection but are now accepted. Splitting is sometimes induced by tools which over stress the roll or by the use of pre-scored eyelets that facilitate solder flow.

What types of eyelet setting tools are available?

Roll setting tools are used for most electronic eyelets. It will accommodate for board thickness variations and produce a firm clinch. Funnel setting tools are not commonly used because the taper stretches and splits the metal and a tight clinch is not attainable. Copper eyelets tend to be more successful with funnel setting tools.

What causes an eyelet's barrel to deform or collapse?

- The eyelet is too long.
- The holes in the printed circuit board are too large.
- The eyelet metal is too soft.
- The setting tools are misaligned or improperly designed.

What are other uses for eyelets in electronic packaging?

- Spacers for components and mother boards.
- Standoffs for large components.
- Sleeve guides for leads.
- Grommets for leads.
- Strain relief points for leads.
- Guides for screws and pins.
- Telescoping pairs making sliding fits.
- Bearings for shafts.
- Captive washers for nuts.

IEI is the chosen eyelet supplier for AT&T, Boeing, Hewlett Packard, Westinghouse and Xerox.

Call the Sales Department and receive the same excellent service.

Setting Tools

Ensure positive connections simply and easily

Eyelet setting tools form a positive finished connection on circuit boards, without splitting the head or crushing the barrel. They may be used in any arbor or drill press that will accept the .375" shank diameter. Different board thicknesses are accommodated by adjusting the length of travel of the press. All tools are made of hardened steel, to ensure long life and durability while preventing galling or scoring.

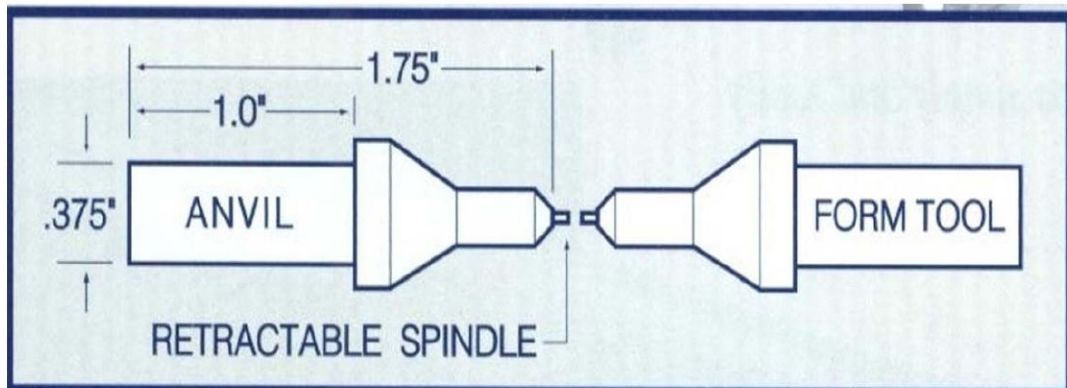
ANVILS support the eyelet flange during swaging. Match the flange type and the barrel O.D. of the eyelet you are setting. For example: a rolled flange eyelet with a barrel O.D. of .059" would use an AR-60 anvil and a flat flange eyelet would use an AF-60.

FORM TOOLS secure the unfinished end of the eyelet in the board by rolling (FR) or spreading the end into a funnel shape (FY). Match the type of setting you want to form and the barrel O.D. of the eyelet you are setting. For example: an eyelet with a barrel O.D. of .059" would require a FR-60 for a roll setting or a FY-60 for a funnel setting.

International Eyelets, Inc.

Setting Tools

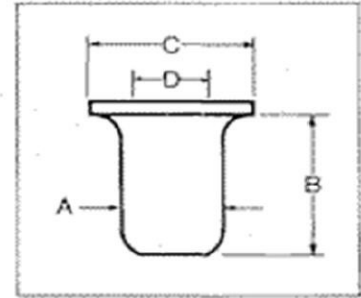
EYELETS O.D.	ANVILS			FORM TOOLS	
	FLAT FLANGE	FUNNEL FLANGE	ROLLED FLANGE	ROLLED SETTING	FUNNEL SETTING
.030"	AF-30	AY-30		FR-30	FY-30
.040"	AF-40			FR-40	FY-40
.047"	AF-50	AY-50	AR-50	FR-50	FY-50
.059"	AF-60	AY-60	AR-60	FR-60	FY-60
.068"	AF-70	AY-70	AR-70	FR-70	FY-70
.078"	AF-80	AY-80	AR-80	FR-80	FY-80
.089"	AF-90	AY-90	AR-90	FR-90	FY-90
.121"	AF-120		AR-120	FR-120	FY-120
.152"	AF-150		AR-150	FR-150	
.183"	AF-180		AR-180	FR-180	
.215"	AF-210		AR-210	FR-210	
.246"	AF-250		AR-250	FR-250	



International Eyelets, Inc.

Flat Flange Eyelets

FLAT FLANGE		A	B	C	D
Nominal Board Thickness	IEI PART NUMBER	Barrel O.D. .002+/-	Length Under Flange .002+/-	Flange Dia. .002+/-	Barrel I.D. .002+/-
.015"	F-3032-C	.030	.028	.046	.020
	F-4747-C	.047	.048	.080	.035
	F-4747-B	.047	.048	.080	.035
	F-3054-C	.030	.054	.046	.020
0.31"	F-4032-C	.040	.062	.060	.030
	F-4762-C	.047	.062	.080	.033
	F-4762-B	.047	.062	.080	.033
	F-6062-B	.059	.062	.090	.045
	F-1163-C	.118	.063	.187	.101
	F-3070-C	.030	.073	.046	.020
.062"	F-3093-C	.030	.094	.046	.020
	F-4093-C	.039	.093	.060	.030
	F-6093-C	.058	.093	.090	.046
	F-6892-B	.068	.092	.087	.056
	F-4895-C	.048	.095	.080	.038
	F-4895-B	.048	.095	.080	.038
	F-4710-C	.048	.102	.072	0.36
	F-6010-C	.059	.105	.090	.045
	F-6011-B	.059	.110	.090	.048
.093"	F-1111-B	.111	.117	.180	.095
	F-3012-C	.030	.120	.046	.020
	F-4012-C	.040	.125	.060	.031
	F-4712-C	.047	.125	.080	.035
	F-4712-B	.047	.125	.080	.035
	F-6012-C	.059	.125	.090	.041
	F-6012-B	.059	.125	.090	.041
.125"	F-4715-B	.048	.157	.072	.035

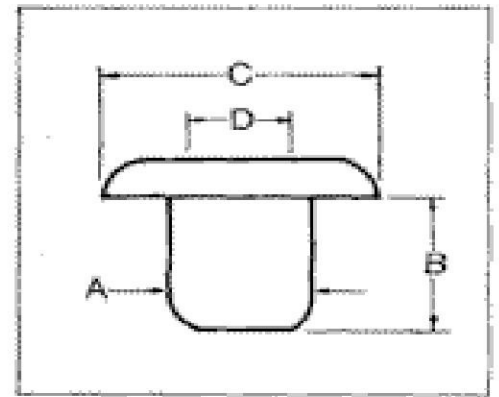


FLAT FLANGE

International Eyelets, Inc.

Rolled Flange Eyelets 1 of 2

ROLLED FLANGE 1		A	B	C	D
Nominal Board Thickness	IEI PART NUMBER	Barrel O.D. .002+/-	Length Under Flange .002+/-	Flange Dia. .002+/-	Barrel I.D. .002+/-
.031"	R-6062-B	.059	.062	.105	.045
	R-7888-B	.078	.088	.110	.062
.062"	R-6093-B	.059	.093	.105	.045
	R-9093-B	.089	.093	.150	.071
	R-1293-B	.121	.093	.200	.102
	R-1593-B	.152	.093	.245	.132
	R-1893-B	.183	.093	.290	.162
	R-2193-B	.215	.093	.340	.193
	R-2593-B	.246	.093	.385	.224
	R-1211-B	.121	.110	.200	.103
	.093"	R-4712-B	.047	.125	.080
R-6012-B		.059	.125	.105	.045
R-9012-B		.089	.125	.150	.071
R-1212-B		.121	.125	.200	.102
R-1512-B		.152	.125	.245	.132
R-1812-B		.183	.125	.290	.162
R-2112-B		.215	.125	.360	.193
R-2512-B		.246	.125	.385	.224
.125"	R-6015-B	.059	.156	.105	.045
	R-9015-B	.089	.156	.150	.071
	R-1215-B	.121	.156	.200	.102
	R-1515-B	.152	.156	.246	.132
	R-1815-B	.183	.156	.290	.162
	R-2115-B	.215	.156	.340	.193
	R-2515-B	.246	.156	.385	.224

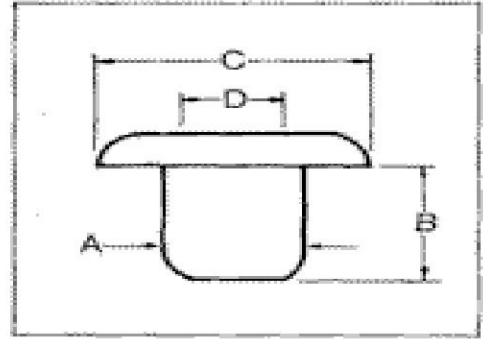


ROLLED FLANGE

International Eyelets, Inc.

Rolled Flange Eyelets 2 of 2

ROLLED FLANGE 2		A	B	C	D
Nominal Board Thickness	IEI PART NUMBER	Barrel O.D. .002+/-	Length Under Flange .002+/-	Flange Dia. .002+/-	Barrel I.D. .002+/-
0.156"	R-6018-B	.059	.187	.105	.045
	R-9018-B	.089	.187	.150	.071
	R-1218-B	.121	.187	.200	.102
	R-1518-B	.152	.187	.245	.132
	R-1818-B	.183	.187	.290	.162
	R-2118-B	.215	.187	.340	.193
	R-2518-B	.246	.187	.385	.224
.187"	R-9021-B	.089	.219	.150	.071
	R-1221-B	.121	.219	.200	.102
	R-1521-B	.152	.219	.245	.132
	R-1821-B	.183	.219	.290	.162
.218"	R-9025-B	.089	.250	.150	.071
	R-1825-B	.215	.250	.340	.193
	R-2125-B	.215	.250	.340	.193
	R-2525-B	.246	.250	.385	.224
	R-6026-B	.059	.260	.105	.045
.250"	R-9028-B	.089	.281	.150	.071
	R-1228-B	.121	.281	.200	.102
	R-1528-B	.152	.281	.245	.132
	R-1231-B	.121	.312	.200	.102
	R-9034-B	.089	.344	.150	.071
	R-1234-B	.121	.344	.200	.102
	R-2137-B	.215	.375	.340	.193
	R-2537-B	.246	.375	.385	.224
	R-1240-B	.121	.405	.250	.099
	R-9045-B	.086	.450	.180	.063

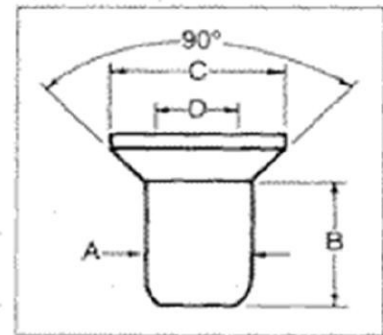


ROLLED FLANGE

International Eyelets, Inc.

Funnel Flange Eyelets

Funnel Flange		A	B	C	D
Nominal Board Thickness	IEI PART NUMBER	Barrel O.D. .002+/-	Length Under Flange .002+/-	Flange Dia. .002+/-	Barrel I.D. .002+/-
.031"	Y-4762-B	.047	.062	.080	.035
	Y-4762-C	.047	.062	.080	.035
	Y-6062-C	.059	.062	.096	.045
.062"	Y-4785-B	.047	.085	.080	.035
	Y-4785-C	.047	.085	.080	.035
	Y-6085-B	.060	.085	.096	.045
	Y-6085-C	.060	.085	.096	.045
	Y-6088-B	.059	.088	.095	.046
	Y-4793-B	.047	.093	.080	.035
	Y-4793-C	.047	.093	.080	.035
	Y-6093-B	.059	.093	.095	.046
	Y-6093-C	.059	.093	.095	.046
	Y-7895-C	.078	.095	.110	.064
	Y-9093-B	.089	.093	.125	.069
	Y-4710-C	.041	.102	.071	.027
	Y-6710-C	.067	.106	.110	.053
	.093"	Y-4712-B	.047	.125	.080
Y-4712-C		.047	.125	.080	.035
Y-6012-B		.059	.125	.096	.045
Y-9012-B		.090	.125	.125	.071
.125"	Y-6015-C	.059	.156	.095	.043
	Y-9015-B	.089	.156	.125	.073
	Y-9015-C	.089	.156	.125	.073



FUNNEL FLANGE