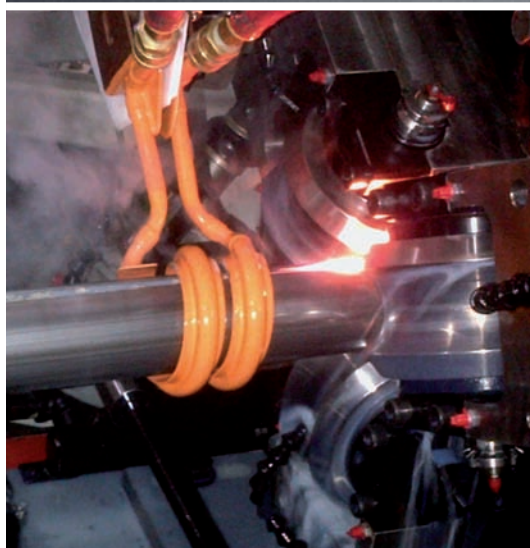




EHE
An EFD Induction company



Electronic Heating Equipment

Product catalog 2016

Want to lower costs while improving quality?

Great. Let's talk.

If you're in the induction welding business, there's one proven way to reduce costs while at the same time meeting ever-tougher quality specs: take advantage of our products, services and expertise.

Electronic Heating Equipment (EHE) has for years been one of the world's largest suppliers of impeder and impeder clusters for induction welders. We also supply premium-quality ferrite that has been specially manufactured to our standards, as well as the famous range of Canticut scarfing systems. And of course, as a member of the EFD Induction Group, we also supply an exhaustive range of off-the-shelf and custom-built coils.

But you'll find much more than standardized products at EHE. Much of what we do involves designing, building, installing and maintaining various solutions (welding contact assemblies, impeder coolant and support systems, coil holders, ferrite testers, etc.). That's why we have our own manufacturing facility in Washington State, and some of the most experienced fabricators in the business.

Stay up to speed

Although we try our utmost to keep prices unchanged throughout the year, we reserve the right to alter prices without notice. So it's a good idea to check with us first before making significant orders.

Please remember that we're constantly adding to our range of products and services. If you don't find what you're looking for in this document, just contact us. In the unlikely event we don't stock what you need, we'll try and devise a customized solution for you.

That's it for now. You probably have lots to do. I know I do! I hope this document helps you, and of course, if you have any questions at all, drop me and my colleagues a line at: sales@impeder.com

All the best

Morten Lavergren
Managing Director, EHE

The logo consists of the letters 'EHE' in white, bold, sans-serif font, centered within a solid red square.

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Through-flow impellers

Through-flow impellers are the most commonly used impeller type. They are also the least expensive. All EHE impellers use high-performance fluted ferrite to ensure low eddy current losses and to maximize cooling efficiency.

Impellers are normally supplied with SAE flare fittings. ISO metric, NPT and BSP pipe fittings and quick connect couplings are available at a small extra cost. Flare nuts are not normally supplied with impellers, since they can be re-used many times. They are available in packs of 10, 25 and 100 from us, or from most hardware and industrial supply outlets.

Standard impellers have outer casings that fully enclose and protect the ferrite. Exposed ferrite impellers are used where weld spume or coatings such as aluminum or zinc tend to build up on conventional impellers and shorten their life. Exposed ferrite impellers often permit a larger impeller to be used, since there is no casing at the narrowest part of the tube. These impellers also work well in air- or gas-cooled installations. Laminar flow of coolant over the exposed ferrite makes these impellers self-cleaning, and therefore highly resistant to damage from weld spume.

Casing types

- *Epoxy/glass*

Epoxy/glass casing type is a high strength, glass fibre-reinforced epoxy resin composite with excellent wear properties, and extended life at high temperatures. It is widely used and is the least expensive type of casing for most impeller sizes. EHE's G-11 epoxy glass will withstand temperatures 100 °F (40 °C) higher than the more common G-10 material.

- *Silglass™*

Silglass is a NEMA grade G-7 ultra-high temperature silicone resin-bonded glass fibre material used primarily for return flow impellers. It has poor wear characteristics and impellers must be protected from contact with the moving strip. Silglass is inorganic so it does not char when exposed to excessive temperatures. This reduces the amount of radiant heat the impeller can absorb from the weld area.

- *Ferroglass™*

Ferroglass is a high temperature, ferrite-impregnated glass fibre tube made specifically for use in impellers. The extra ferrite in the casing can increase weld speeds by up to 40%. This improved efficiency is most noticeable at small diameters. Ferroglass also has the best wear resistance of all materials normally used in impellers.

Cooling requirements

Coolant should be clean, preferably filtered. A pressure of 3 bar (45 PSI) will ensure adequate cooling under most operating conditions. Coolant flow requirements vary widely due to inlet temperature, weld power, frequency and weld area geometry. In high power density situations and at high ambient temperatures, a small chiller for impeller and work coil coolant can greatly improve efficiency.

Cooling by air or other gas is not recommended, but can be useful in special situations where the presence of water inside the tube cannot be tolerated. Gases such as nitrogen have a density that is at least 1,000 times less than that of water, so coolant volume must be increased accordingly. An impeller cooled using half a gallon (1.9 litres) of water per minute would require a minimum of 15 cubic feet (0.42 m³) per minute of nitrogen. The cost of this is prohibitive in most cases.

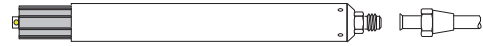
Heavy duty impellers

The limiting factor in impeller efficiency is the total amount of magnetic flux that the impeller can support. This varies with temperature, ferrite type and amount. Placing a larger mass of ferrite within an impeller will increase welding efficiency. This becomes important with high powered welders, especially those operating at lower frequencies. EHE's heavy duty impellers use up to 60% more ferrite than comparable standard impellers and can greatly reduce the amount of power required for a satisfactory weld. Most heavy duty impellers also have thicker outer casing and improved cooling to extend operating life.





THROUGH-FLOW IMPEDER



EXPOSED FERRITE IMPEDER

Standard type

Impeder O.D. (mm)	Impeder O.D. (inch)	Coupling type	Coupling thread	Approx weight*		Thru flow impeders			Exposed ferrite impeders		
						Epoxy/glass	Silglass™	Ferroglass™	Epoxy/glass	Silglass™	Ferroglass™
6.7 mm	0.264"	3/16" Solder	#10-32	0.8 oz	23 g	n.a.	n.a.	*	*	n.a.	*
8.0 mm	0.315"	1/4" Solder	1/4" - 28	1.3 oz	37 g	*	n.a.	*	*	n.a.	*
9.0 mm	0.354"	1/4" Solder	1/4" - 28	1.7 oz	48 g	*	*	*	*	*	*
10.0 mm	0.394"	1/4" Solder	1/4" - 28	2.0 oz	57 g	*	*	*	*	*	*
11.0 mm	0.433"	1/4" Solder	1/4" - 28	2.3 oz	65 g	*	*	*	*	*	*
12.0 mm	0.472"	1/4" SAE FLARE	7/16" - 20	2.8 oz	79 g	*	*	*	*	*	*
13.0 mm	0.512"	1/4" SAE FLARE	7/16" - 20	3.8 oz	108 g	*	*	*	*	*	*
14.0 mm	0.551"	1/4" SAE FLARE	7/16" - 20	4.3 oz	122 g	*	*	*	*	*	*
15.0 mm	0.591"	1/4" SAE FLARE	7/16" - 20	5.0 oz	142 g	*	*	*	*	*	*
16.0 mm	0.630"	1/4" SAE FLARE	7/16" - 20	5.5 oz	156 g	*	*	*	*	*	*
17.0 mm	0.669"	1/4" SAE FLARE	7/16" - 20	6.0 oz	170 g	*	*	*	*	*	*
18.0 mm	0.709"	1/4" SAE FLARE	7/16" - 20	7.0 oz	198 g	*	*	*	*	*	*
19.0 mm	0.748"	1/4" SAE FLARE	7/16" - 20	8.0 oz	227 g	*	*	*	*	*	*
20.0 mm	0.787"	1/4" SAE FLARE	7/16" - 20	8.6 oz	244 g	*	*	*	*	*	*
21.0 mm	0.827"	1/4" SAE FLARE	7/16" - 20	9.0 oz	255 g	*	*	*	*	*	*
22.0 mm	0.866"	1/4" SAE FLARE	7/16" - 20	11.0 oz	312 g	*	*	*	*	*	*
23.0 mm	0.906"	1/4" SAE FLARE	7/16" - 20	12.0 oz	340 g	*	*	*	*	*	*
24.0 mm	0.945"	1/4" SAE FLARE	7/16" - 20	13.0 oz	369 g	*	*	*	*	*	*
25.0 mm	0.984"	1/4" SAE FLARE	7/16" - 20	14.0 oz	397 g	*	*	*	*	*	*
28.0 mm	1.102"	3/8" SAE FLARE	5/8" - 18	1.13 lb	511 g	*	*	*	*	*	*
31.0 mm	1.220"	3/8" SAE FLARE	5/8" - 18	1.44 lb	653 g	*	*	*	*	*	*
34.0 mm	1.339"	1/2" SAE FLARE	3/4" - 16	1.63 lb	739 g	*	*	n.a.	*	*	n.a.
37.0 mm	1.457"	1/2" SAE FLARE	3/4" - 16	2.06 lb	938 g	*	*	n.a.	*	*	n.a.
40.0 mm	1.575"	1/2" SAE FLARE	3/4" - 16	3.00 lb	1.36 kg	*	*	n.a.	*	*	n.a.
43.0 mm	1.693"	1/2" SAE FLARE	3/4" - 16	3.44 lb	1.56 kg	*	*	n.a.	*	*	n.a.
46.0 mm	1.811"	1/2" SAE FLARE	3/4" - 16	3.88 lb	1.76 kg	*	*	n.a.	*	*	n.a.
50.0 mm	1.969"	5/8" SAE FLARE	7/8" - 14	4.38 lb	1.99 kg	*	*	n.a.	*	*	n.a.
57.2 mm	2.250"	5/8" SAE FLARE	7/8" - 14	4.56 lb	2.07 kg	*	*	n.a.	*	*	n.a.
63.5 mm	2.500"	5/8" SAE FLARE	7/8" - 14	5.13 lb	2.33 kg	*	*	n.a.	*	*	n.a.
69.9 mm	2.750"	5/8" SAE FLARE	7/8" - 14	7.16 lb	3.25 kg	*	*	n.a.	*	*	n.a.
76.2 mm	3.000"	1" NPT (M)	1" NPT	7.43 lb	3.38 kg	*	*	n.a.	*	*	n.a.
88.9 mm	3.500"	1" NPT (M)	1" NPT	9.18 lb	4.17 kg	*	*	n.a.	*	*	n.a.
101.6 mm	4.000"	1" NPT (M)	1" NPT	8.30 lb	3.77 kg	*	*	n.a.	*	*	n.a.
114.3 mm	4.500"	1-1/2" NPT (M)	1-1/2" NPT	9.00 lb	4.09 kg	*	*	n.a.	*	*	n.a.
127.0 mm	5.000"	1-1/2" NPT (M)	1-1/2" NPT	10.50 lb	4.77 kg	*	*	n.a.	*	*	n.a.
139.7 mm	5.500"	1-1/2" NPT (M)	1-1/2" NPT	12.00 lb	5.45 kg	*	*	n.a.	*	*	n.a.
152.4 mm	6.000"	1-1/2" NPT (M)	1-1/2" NPT	13.50 lb	6.14 kg	*	*	n.a.	*	*	n.a.

Heavy duty type (recommended for high power and/or low frequency use)

Impeder O.D. (mm)	Impeder O.D. (inch)	Coupling type	Coupling thread	Approx weight*		Thru flow impeders			Exposed ferrite impeders		
						Epoxy/glass	Silglass™	Ferroglass™	Epoxy/glass	Silglass™	Ferroglass™
101.6 mm	4.000"	1" NPT (M)	1" NPT	10.38 lb	4.72 kg	*	*	n.a.	*	*	n.a.
114.3 mm	4.500"	1-1/2" NPT (M)	1-1/2" NPT	11.25 lb	5.11 kg	*	*	n.a.	*	*	n.a.
127.0 mm	5.000"	1-1/2" NPT (M)	1-1/2" NPT	13.13 lb	5.97 kg	*	*	n.a.	*	*	n.a.
139.7 mm	5.500"	1-1/2" NPT (M)	1-1/2" NPT	15.00 lb	6.82 kg	*	*	n.a.	*	*	n.a.
152.4 mm	6.000"	1-1/2" NPT (M)	1-1/2" NPT	16.88 lb	7.67 kg	*	*	n.a.	*	*	n.a.

Sizes in bold print are actual diameters in either inches or millimetres. Sizes shown in italics are calculated equivalents based upon 25.4 mm = 1 inch.

Heavy duty impeders contain 30 to 50% more ferrite for improved welding efficiency with high power, lower frequency welders.

Prices & weights listed above are for 230 mm (9") long impeders. For other lengths, please use the table below.

Impeder length	230 mm/9"	330 mm/13"	430 mm/17"	530 mm/21"	630 mm/25"	830 mm/33"	1030 mm/41"
Price multiplier	x 1.00	x 1.45	x 1.90	x 2.45	x 2.85	x 3.80	x 4.75

* Please contact us for the latest information on prices and availability.



Return-flow impellers

EHE's return-flow impellers enable most types of tubing to be produced with a completely dry I.D. when using a high-frequency induction welder. There are many applications where a dry, clean I.D. is required: to prevent corrosion, to allow painting or powder coating of the tube I.D., to reduce the environmental problems that can occur when mill coolant is left in the tube.

The M-3 and M-4 return-flow impellers offer better performance, working life and serviceability compared to earlier types. These impellers use standard pipe threads (NPT or BSP) and all seals use silicone rubber O-rings, rather than adhesives that may dry out or crack. No fasteners penetrate the outer casings, so the potential for leaks is minimized. The elimination of fasteners also makes these impellers easy to repair, as the end caps can be easily removed to replace the ferrite or outer cover.

Return flow impellers are normally supplied with Silglass™ high temperature composite outer casing. For certain applications, either ceramic or fused silica (quartz) maybe a better choice since these materials have better resistance to heat, molten metal and abrasion, however both are more brittle than composites and will break if subjected to sever mechanical shock.

Since some return-flow impellers may offer more resistance to coolant flow than through-flow types, a higher coolant pressure is recommended. A pressure of 4 bar (60 PSI) ensures adequate cooling under most operating conditions. Coolant flow requirements vary widely due to inlet temperature, weld power, frequency and weld area geometry. A 250 micron or smaller coolant filter is recommended when using return-flow impellers.

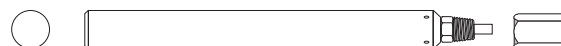
Since coolant flow can be reduced at lower inlet temperatures, it is beneficial to keep the inlet temperature as low as possible. This may require the use of a heat exchanger or refrigerative cooler when using return-flow impellers. Coolant temperature entering the impeder should not exceed 75 °F (25 °C). Higher temperatures will result in lower welding efficiency and impeder life.

EHE offers a range of impeder support systems, couplings etc. for all impellers. These are covered at page 8, Impeder support systems.





M-3 IMPEDER (FEMALE PIPE THREAD)



M-4 IMPEDER (MALE PIPE THREAD)

Standard type

Impeder O.D. (mm)	Impeder O.D. (inch)	Approx. weight*		Price	M-3 type impeders Coupling	Inlet	Price	M-4 type impeders Coupling	Inlet
8.0 mm	0.315"	1.3 oz	37 g	n.a.	n.a.	n.a.	*	1/4"-28	1/8"
9.0 mm	0.354"	1.7 oz	48 g	n.a.	n.a.	n.a.	*	1/4"-28	1/8"
10.0 mm	0.394"	2.0 oz	57 g	*	1/16" NPT (F)	5/32"	*	1/8" NPT (M)	3/16"
11.0 mm	0.433"	2.3 oz	65 g	*	1/16" NPT (F)	5/32"	*	1/8" NPT (M)	3/16"
12.0 mm	0.472"	2.8 oz	79 g	*	1/16" NPT (F)	5/32"	*	1/8" NPT (M)	3/16"
13.0 mm	0.512"	3.8 oz	108 g	*	1/8" NPT (F)	3/16"	*	1/8" NPT (M)	3/16"
14.0 mm	0.551"	4.3 oz	122 g	*	1/8" NPT (F)	3/16"	*	1/8" NPT (M)	3/16"
15.0 mm	0.591"	5.0 oz	142 g	*	1/8" NPT (F)	3/16"	*	1/8" NPT (M)	3/16"
16.0 mm	0.630"	5.5 oz	156 g	*	1/4" NPT (F)	1/4"	*	1/4" NPT (M)	1/4"
17.0 mm	0.669"	6.0 oz	170 g	*	1/4" NPT (F)	1/4"	*	1/4" NPT (M)	1/4"
18.0 mm	0.709"	7.0 oz	198 g	*	1/4" NPT (F)	1/4"	*	1/4" NPT (M)	1/4"
19.0 mm	0.748"	8.0 oz	227 g	*	1/4" NPT (F)	1/4"	*	1/4" NPT (M)	1/4"
20.0 mm	0.787"	8.6 oz	244 g	*	1/4" NPT (F)	1/4"	*	1/4" NPT (M)	1/4"
21.0 mm	0.827"	9.0 oz	255 g	*	1/4" NPT (F)	1/4"	*	1/4" NPT (M)	1/4"
22.0 mm	0.866"	11.0 oz	312 g	*	1/4" NPT (F)	1/4"	*	1/4" NPT (M)	1/4"
23.0 mm	0.906"	12.0 oz	340 g	*	3/8" NPT (F)	5/16"	*	3/8" NPT (M)	5/16"
24.0 mm	0.945"	13.0 oz	369 g	*	3/8" NPT (F)	5/16"	*	3/8" NPT (M)	5/16"
25.0 mm	0.984"	14.0 oz	397 g	*	3/8" NPT (F)	5/16"	*	3/8" NPT (M)	5/16"
28.0 mm	1.102"	1.13 lb	511 g	*	3/8" NPT (F)	5/16"	*	3/8" NPT (M)	5/16"
31.0 mm	1.220"	1.44 lb	653 g	*	3/8" NPT (F)	5/16"	*	3/8" NPT (M)	5/16"
34.0 mm	1.339"	1.63 lb	739 g	*	1/2" NPT (F)	3/8"	*	1/2" NPT (M)	3/8"
37.0 mm	1.457"	2.06 lb	938 g	*	1/2" NPT (F)	3/8"	*	1/2" NPT (M)	3/8"
40.0 mm	1.575"	3.00 lb	1.36 kg	*	1/2" NPT (F)	3/8"	*	1/2" NPT (M)	3/8"
43.0 mm	1.693"	3.44 lb	1.56 kg	*	1/2" NPT (F)	3/8"	*	1/2" NPT (M)	3/8"
46.0 mm	1.811"	3.88 lb	1.76 kg	*	1/2" NPT (F)	3/8"	*	1/2" NPT (M)	3/8"
50.0 mm	1.969"	4.38 lb	1.99 kg	*	1" NPT (F)	5/8"	*	1" NPT (M)	5/8"
57.2 mm	2.250"	4.56 lb	2.07 kg	*	1" NPT (F)	5/8"	*	1" NPT (M)	5/8"
63.5 mm	2.500"	5.13 lb	2.33 kg	*	1" NPT (F)	5/8"	*	1" NPT (M)	5/8"
69.9 mm	2.750"	7.16 lb	3.25 kg	*	1" NPT (F)	5/8"	*	1" NPT (M)	5/8"
76.2 mm	3.000"	7.43 lb	3.38 kg	*	1" NPT (F)	5/8"	*	1" NPT (M)	5/8"
88.9 mm	3.500"	9.18 lb	4.17 kg	*	1" NPT (F)	5/8"	*	1" NPT (M)	5/8"
101.6 mm	4.000"	8.30 lb	3.77 kg	*	1" NPT (F)	5/8"	*	1" NPT (M)	5/8"
114.3 mm	4.500"	9.00 lb	4.09 kg	*	1-1/2" NPT (F)	3/4"	*	1-1/2" NPT (M)	3/4"
127.0 mm	5.000"	10.50 lb	4.77 kg	*	1-1/2" NPT (F)	3/4"	*	1-1/2" NPT (M)	3/4"
139.7 mm	5.500"	12.00 lb	5.45 kg	*	1-1/2" NPT (F)	3/4"	*	1-1/2" NPT (M)	3/4"
152.4 mm	6.000"	13.50 lb	6.14 kg	*	1-1/2" NPT (F)	3/4"	*	1-1/2" NPT (M)	3/4"

Heavy duty type (recommended for high power and/or low frequency use)

Impeder O.D. (mm)	Impeder O.D. (inch)	Approx. weight*		Price	M-3 TYPE IMPEDERS Coupling	Inlet	Price	M-4 TYPE IMPEDERS Coupling	Inlet
101.6 mm	4.000"	10.38 lb	4.72 kg	*	1" NPT (F)	5/8"	*	1" NPT (M)	5/8"
114.3 mm	4.500"	11.25 lb	5.11 kg	*	1-1/2" NPT (F)	3/4"	*	1-1/2" NPT (M)	3/4"
127.0 mm	5.000"	13.13 lb	5.97 kg	*	1-1/2" NPT (F)	3/4"	*	1-1/2" NPT (M)	3/4"
139.7 mm	5.500"	15.00 lb	6.82 kg	*	1-1/2" NPT (F)	3/4"	*	1-1/2" NPT (M)	3/4"
152.4 mm	6.000"	16.88 lb	7.67 kg	*	1-1/2" NPT (F)	3/4"	*	1-1/2" NPT (M)	3/4"

Sizes in bold print are actual diameters in either inches or millimetres. Sizes shown in italics are calculated equivalents based upon 25.4 mm = 1 inch.

Heavy duty impeders contain 30 to 50% more ferrite for improved welding efficiency with high power, lower frequency welders.

Prices & weights listed above are for 230 mm (9") long impeders. For other lengths, please use the table below.

Impeder length	230 mm/9"	330 mm/13"	430 mm/17"	530 mm/21"	630 mm/25"	830 mm/33"	1030 mm/41"
Price multiplier	x 1.00	x 1.45	x 1.90	x 2.45	x 2.85	x 3.80	x 4.75



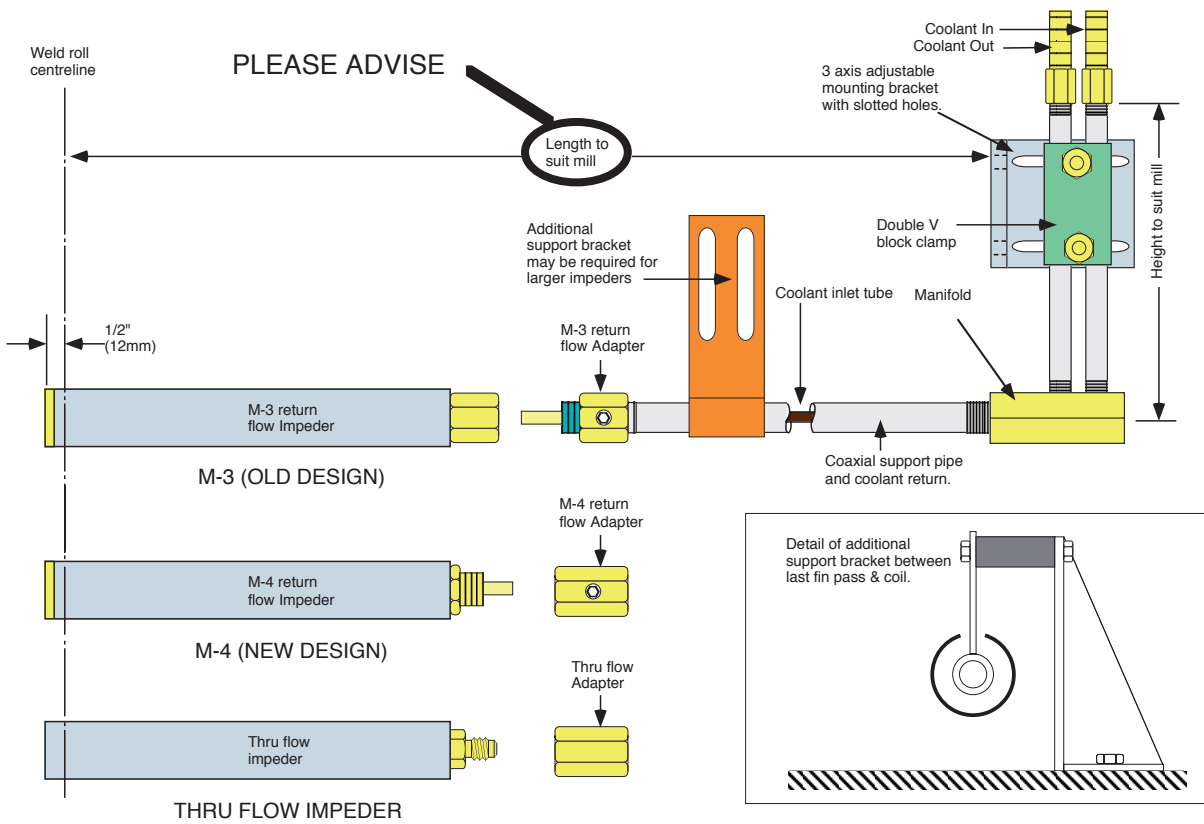
Impeder support systems

For maximum performance and life, all impeders should be supported to ensure they are properly positioned and do not drag on the inside of the tube. EHE makes impeder holders to suit all types of tube mills. Interchangeable adapters allow through-flow and return-flow types to be used with the same basic support system.

The three-way adjustable mounting bracket and clamping system provides a simple and reliable means of adjusting impeder position. Holders are available for impeders from 6 mm (1/4 inch) to 150 mm (6 inch) in seven overlapping ranges.

An optional second support prevents long assemblies from drooping under their own weight and accurately maintains the impeder's vertical position inside the tube.

In addition to EHE's precision line of impeder support systems, we can also supply a variety of return-flow couplings for temporary or short term use.



Impeder support systems

Support tube nom. pipe size	1/16"	1/8"	1/4"	3/8"	1/2"	3/4"	1"
O.D. of outer tube	0.313"	0.405"	0.540"	0.675"	0.840"	1.049"	1.315"
Mounting bracket & clamp	*	*	*	*	*	*	*
Manifold	*	*	*	*	*	*	*
Inlet/outlet tubes ea. (2 reqd.)	*	*	*	*	*	*	*
Hanger blade support (optional)	*	*	*	*	*	*	*
Adaptor	*	*	*	*	*	*	*
Thru flow support tube	*	*	*	*	*	*	*
Return flow support tube (coaxial)	*	*	*	*	*	*	*
Complete system	*	*	*	*	*	*	*

Complete system includes bracket & clamp, manifold, inlet/outlet tubes, one adaptor and 5 ft return flow support tube

Impeder couplings

In addition to EHE's precision line of impeder support systems, we can also supply a variety of return flow couplings for temporary or short term use.



M-3 RETURN FLOW IMPEDER COUPLER



M-4 & M-5 RETURN FLOW IMPEDER COUPLER

M-3 impeder couplers

Coupler	Impeder range	Coupler prices
1/16" NPT (M)	10-12 mm	*
1/8" NPT (M)	13-15 mm	*
1/4" NPT (M)	16-22 mm	*
3/8" NPT (M)	23-31 mm	*
1/2" NPT (M)	34-46 mm	*
1" NPT (M)	50-76 mm	*

M-4, M-5 impeder couplers

Coupler	Impeder range	Coupler prices	With hanger blade
1/4" - 28 (F)	8-10 mm	*	*
1/8" NPT (F)	11-15 mm	*	*
1/4" NPT (F)	16-22 mm	*	*
3/8" NPT (F)	23-31 mm	*	*
1/2" NPT (F)	34-46 mm	*	*
1" NPT (F)	50-76 mm	*	*

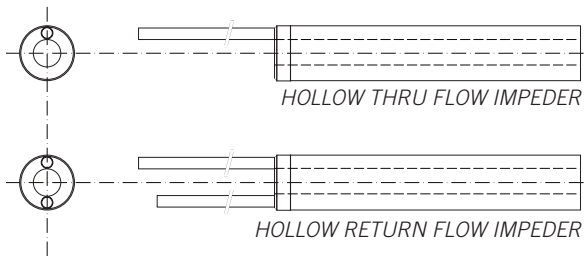


Hollow impeders

Hollow impeders are available in through- and return-flow configurations, and in many combinations of inside and outside diameters. These impeders are used for I.D. flash control with hydraulic or mechanically actuated heads, where integral mandrel impeders are generally unsuitable. Other applications include:

- Internal painting and coating of welded tube
- In-line bright annealing
- Special instrumentation tubing where wiring or optical fibre is laid inside the tube during production

We recommend against using a larger impeder I.D. than necessary, since this reduces the amount of ferrite in the impeder and may lower efficiency. It also increases the cost.



Impeder length	230 mm/9"	330 mm/13"	430 mm/17"	530 mm/21"	630 mm/25"	830 mm/33"	1030 mm/41"
Price multiplier	x 1.00	x 1.45	x 1.90	x 2.45	x 2.85	x 3.80	x 4.75



Hollow through-flow impeders

Impeder O.D. (mm)	Impeder O.D. (inch)	Center hole I.D.									
		4.8 mm 0.188"	6.4 mm 0.250"	8.0 mm 0.313"	9.5 mm 0.375"	12.7 mm 0.500"	15.9 mm 0.625"	19.1 mm 0.750"	25.4 mm 1.000"	31.8 mm 1.250"	38.1 mm 1.500"
13.0 mm	0.512"	*●									
14.0 mm	0.551"	*									
15.0 mm	0.591"	*									
16.0 mm	0.630"	*	*								
17.0 mm	0.669"	*	*								
18.0 mm	0.709"	*	*								
19.0 mm	0.748"	*	*	*							
20.0 mm	0.787"	*	*	*							
21.0 mm	0.827"	*	*	*							
22.0 mm	0.866"	*	*	*	*						
23.0 mm	0.906"	*	*	*	*						
24.0 mm	0.945"	*	*	*	*	*					
25.0 mm	0.984"	*	*	*	*	*					
28.0 mm	1.102"	*	*	*	*	*	*				
31.0 mm	1.220"	*	*	*	*	*	*				
34.0 mm	1.339"	*	*	*	*	*	*	*			
37.0 mm	1.457"	*	*	*	*	*	*	*	*		
40.0 mm	1.575"	*	*	*	*	*	*	*	*		
43.0 mm	1.693"	*	*	*	*	*	*	*	*		
46.0 mm	1.811"	*	*	*	*	*	*	*	*	*	
50.0 mm	1.969"	*	*	*	*	*	*	*	*	*	
57.2 mm	2.250"	*	*	*	*	*	*	*	*	*	*
63.5 mm	2.500"	*	*	*	*	*	*	*	*	*	*
69.9 mm	2.750"	*	*	*	*	*	*	*	*	*	*
76.2 mm	3.000"	*	*	*	*	*	*	*	*	*	*

Hollow return-flow impeders

Impeder O.D. (mm)	Impeder O.D. (inch)	Center hole I.D.									
		4.8 mm 0.188"	6.4 mm 0.250"	8.0 mm 0.313"	9.5 mm 0.375"	12.7 mm 0.500"	15.9 mm 0.625"	19.1 mm 0.750"	25.4 mm 1.000"	31.8 mm 1.250"	38.1 mm 1.500"
13.0 mm	0.512"	*●									
14.0 mm	0.551"	*									
15.0 mm	0.591"	*									
16.0 mm	0.630"	*	*								
17.0 mm	0.669"	*	*								
18.0 mm	0.709"	*	*								
19.0 mm	0.748"	*	*	*							
20.0 mm	0.787"	*	*	*							
21.0 mm	0.827"	*	*	*							
22.0 mm	0.866"	*	*	*	*						
23.0 mm	0.906"	*	*	*	*						
24.0 mm	0.945"	*	*	*	*	*					
25.0 mm	0.984"	*	*	*	*	*					
28.0 mm	1.102"	*	*	*	*	*	*				
31.0 mm	1.220"	*	*	*	*	*	*				
34.0 mm	1.339"	*	*	*	*	*	*	*			
37.0 mm	1.457"	*	*	*	*	*	*	*	*		
40.0 mm	1.575"	*	*	*	*	*	*	*	*		
43.0 mm	1.693"	*	*	*	*	*	*	*	*		
46.0 mm	1.811"	*	*	*	*	*	*	*	*	*	
50.0 mm	1.969"	*	*	*	*	*	*	*	*	*	
57.2 mm	2.250"	*	*	*	*	*	*	*	*	*	*
63.5 mm	2.500"	*	*	*	*	*	*	*	*	*	*
69.9 mm	2.750"	*	*	*	*	*	*	*	*	*	*
76.2 mm	3.000"	*	*	*	*	*	*	*	*	*	*

● Denotes maximum I.D. of 0.156" (4 mm) for 13 mm impeder

* Please contact us for the latest information on prices and availability.



Impeder clusters

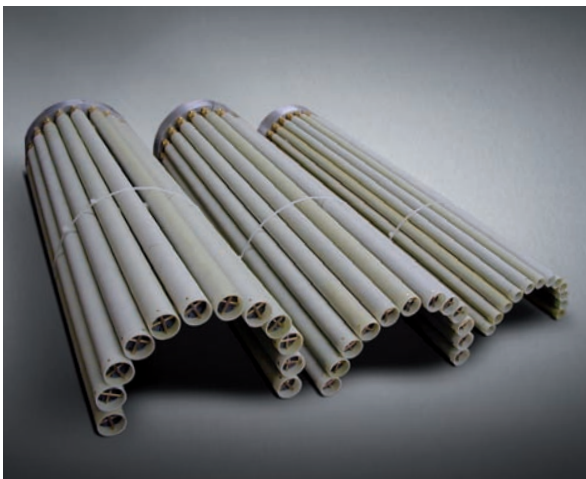
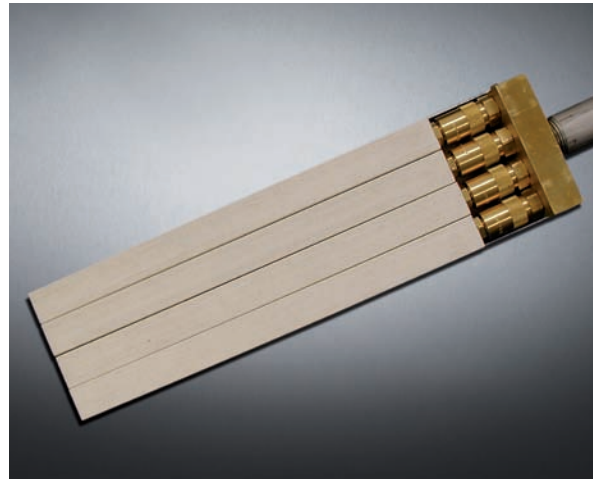
Impeder clusters are a cost-effective alternative to individual impeders for larger tubes. Clusters are available in many configurations for O.D. 5" – 24" (127 – 610 mm). EHE's 'Quick Change System' uses Parker quick-connect couplings to allow rapid replacement of the impeders, often without having to cut the tube. These fittings also eliminate damaged threads and impeder alignment problems.

Impeders do not usually need to form a circle inside large tubes. Larger clusters therefore typically consist of two arcs of impeders positioned close to the top inside surface of the tube. In certain cases a rectangular impeder at the top center position is used for maximum welding efficiency.

Cluster assemblies consist of an aluminum manifold with a clamping system. Also included is a spacer plate to maintain correct alignment of the impeders. Coolant connections are flexible hoses or copper tubing. Returnflow cluster assemblies are available as an option.

For pipes larger than O.D. 8" (219 mm), clusters of rectangular impeders are an efficient solution.

Rectangular impeders are also the preferred method in cases where the product is welded as a square, rectangle or step beam section. Our 1" x 2" (25.4 x 51.0 mm) rectangular impeders are available in lengths up to 60" (1525 mm).



Hybrid impeder cluster assemblies

Pipe O.D. (inch)	Replacement Quick change Manifold	230 mm 9"	330 mm 13"	430 mm 17"	Complete system 530 mm 21"	630 mm 25"	830 mm 33"	1030 mm 41"	1230 mm 49"
6.625"	*	*	*	*	*	*	*	*	*
7.625"	*	*	*	*	*	*	*	*	*
8.625"	*	*	*	*	*	*	*	*	*
9.625"	*	*	*	*	*	*	*	*	*
10.750"	*	*	*	*	*	*	*	*	*
12.750"	*	*	*	*	*	*	*	*	*
14.000"	*	*	*	*	*	*	*	*	*
16.000"	*	*	*	*	*	*	*	*	*
18.000"	*	*	*	*	*	*	*	*	*
20.000"	*	*	*	*	*	*	*	*	*
22.000"	*	*	*	*	*	*	*	*	*
24.000"	*	*	*	*	*	*	*	*	*

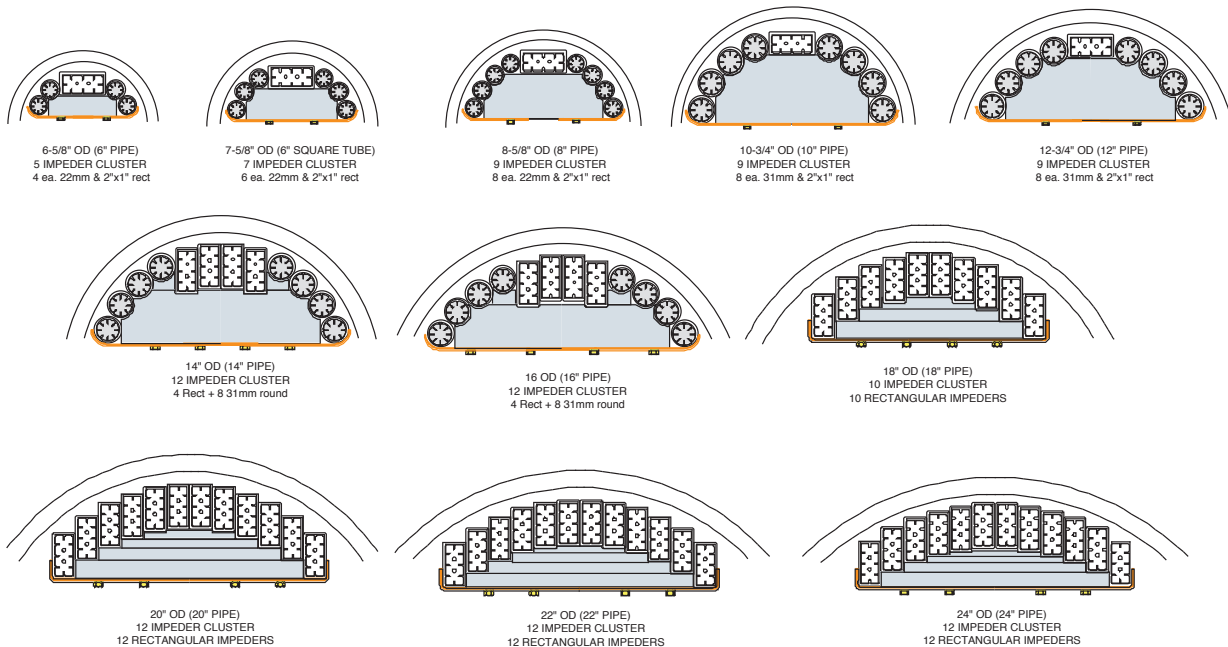
The complete system length listed above are for the impeder length only, the total cluster length will be longer.

Heavy duty hanger blade assembly

	Support tube nom. pipe size			
	1/2"	1"	1-1/2"	2"
Hanger blade assembly	*	*	*	*

Replacement quick change impeders

Impeder O.D. (mm)	230 mm 9"	330 mm 13"	430 mm 17"	Impeder length 530 mm 21"	630 mm 25"	830 mm 33"	1030 mm 41"	1230 mm 49"
22.0 mm	*	*	*	*	*	*	*	*
31.0 mm	*	*	*	*	*	*	*	*
Rectangular 1" x 2" (25.4 x 51.0 mm)	*	*	*	*	*	*	*	*



Common rectangular thru flow impeder clusters for profiles

Config-uration	Common complete system						
	230 mm 9"	330 mm 13"	430 mm 17"	530 mm 21"	630 mm 25"	830 mm 33"	1030 mm 41"
H1	*	*	*	*	*	*	*
V1	*	*	*	*	*	*	*
H2V	*	*	*	*	*	*	*
V2H	*	*	*	*	*	*	*
H3V	*	*	*	*	*	*	*
V3H	*	*	*	*	*	*	*
H4V	*	*	*	*	*	*	*
V4H	*	*	*	*	*	*	*
V5H	*	*	*	*	*	*	*
V6H	*	*	*	*	*	*	*

Heavy duty hanger blade assembly

	Support tube nom. pipe size	
	1/2"	1"
Hanger blade assembly conf. H1 - V2V	*	n.a.
Hanger blade assembly conf. V2H - V6H	n.a.	*

Replacement manifold

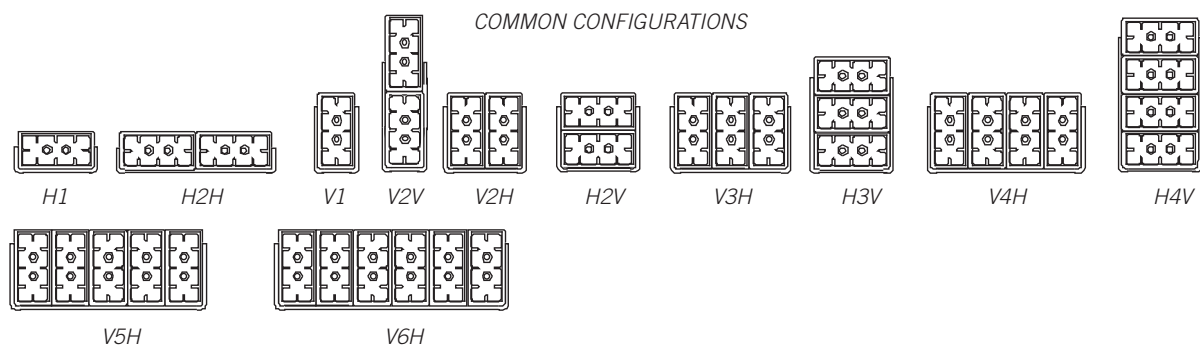
	Number of impeders					
	1	2	3	4	5	6
Thru flow manifold	*	*	*	*	*	*

Replacement support tray

	Number of impeders					
	1	2	3	4	5	6
Support tray for 9" long impeder	*	*	*	*	*	*
Support tray for 13" long impeders	*	*	*	*	*	*
Support tray for 17" long impeders	*	*	*	*	*	*
Support tray for 21" long impeders	*	*	*	*	*	*
Support tray for 25" long impeders	*	*	*	*	*	*
Support tray for 33" long impeders	*	*	*	*	*	*
Support tray for 41" long impeders	*	*	*	*	*	*

Replacement quick change impeders

Impeder O.D. (mm)	Impeder length						
	230 mm 9"	330 mm 13"	430 mm 17"	530 mm 21"	630 mm 25"	830 mm 33"	1030 mm 41"
Rectangular 1" x 2" (25.4 x 51.0 mm)	*	*	*	*	*	*	*



Integral mandrel impeders

EHE's integral mandrel impeders are the most economical and efficient method of I.D. scarfing or rolling with induction welding of tubing up to 3 inch (76 mm) in diameter.

These impeders use an internal stainless steel tie rod or mandrel which is threaded and pinned to heavy-duty hexagonal bushings at both ends. The mandrel is surrounded by either a single cylindrical ferrite tube, or a cluster of smaller-diameter ferrite rods. The entire assembly is enclosed in a heat-resistant, non-metallic outer cover that protects the ferrite and directs the coolant. The hexagonal bushings have internal threads and setscrews that let the impeder be locked to the tow rod. Jam nuts or locknuts can also be used. Most integral

mandrel impeders can be provided with pipe threads at both ends. This facilitates the use of standard threaded pipe as a tow rod.

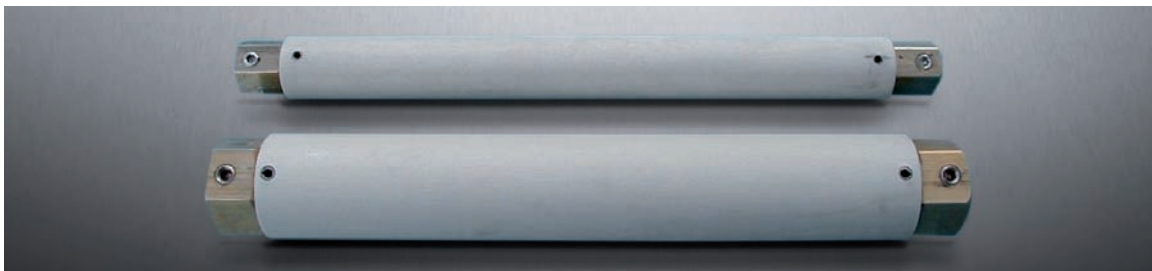
Most I.D. scarfing systems do not allow enough space for ferrite. This reduces welding efficiency, and can cause excessive heating of the tow rod. EHE's integral mandrel impeders maximize efficiency, and provide the mechanical stability needed for quality I.D. flash control.

Tow rods used with our integral impeders can be made from carbon steel. This is less expensive—and often stronger—than the austenitic stainless steel typically used by most tow rods.

Integral mandrel impeders

Impeder O.D. (mm)	Impeder O.D. (inch)	Shipping weight		Thread Dia./Pitch	Tie rod Diameter	Thru flow	Return flow
		Ounces	Grams				
13.0 mm	0.512"	4.25 oz	121 g	3/8" - 24	3/16"	*	n.a.
14.0 mm	0.551"	5.00 oz	142 g	3/8" - 24	3/16"	*	n.a.
15.0 mm	0.591"	6.25 oz	178 g	3/8" - 24	1/4"	*	n.a.
16.0 mm	0.630"	6.75 oz	192 g	3/8" - 24	1/4"	*	*
17.0 mm	0.669"	7.00 oz	199 g	3/8" - 24	1/4"	*	*
18.0 mm	0.709"	7.25 oz	206 g	3/8" - 24	1/4"	*	*
19.0 mm	0.748"	9.50 oz	270 g	1/2" - 20	1/4"	*	*
20.0 mm	0.787"	11.00 oz	313 g	1/2" - 20	1/4"	*	*
21.0 mm	0.827"	11.80 oz	335 g	1/2" - 20	1/4"	*	*
22.0 mm	0.866"	13.00 oz	370 g	5/8" - 18	5/16"	*	*
23.0 mm	0.906"	14.20 oz	404 g	5/8" - 18	5/16"	*	*
24.0 mm	0.945"	15.30 oz	435 g	5/8" - 18	5/16"	*	*
25.0 mm	0.984"	16.00 oz	455 g	5/8" - 18	3/8"	*	*
28.0 mm	1.102"	19.20 oz	546 g	5/8" - 18	3/8"	*	*
31.0 mm	1.220"	24.00 oz	682 g	5/8" - 18	3/8"	*	*
34.0 mm	1.339"	27.52 oz	782 g	3/4" - 16	1/2"	*	*
37.0 mm	1.457"	36.00 oz	1023 g	3/4" - 16	1/2"	*	*
40.0 mm	1.575"	43.20 oz	1228 g	3/4" - 16	1/2"	*	*
43.0 mm	1.693"	48.00 oz	1365 g	3/4" - 16	5/8"	*	*
46.0 mm	1.811"	56.80 oz	1615 g	3/4" - 16	5/8"	*	*
50.0 mm	1.969"	64.00 oz	1820 g	3/4" - 16	5/8"	*	*
57.2 mm	2.250"	80.00 oz	2274 g	1" - 12	3/4"	*	*
63.5 mm	2.500"	96.00 oz	2729 g	1" - 12	3/4"	*	*
69.9 mm	2.750"	128.00 oz	3639 g	1" - 12	3/4"	*	*
76.2 mm	3.000"	160.00 oz	4549 g	1" - 12	3/4"	*	*

The prices listed above are for 267 mm (10-1/2 inch) long impeders. For 368 mm (14-1/2 inch) impeders, multiply price by 1.45. For 470 mm (18-1/2 inch) impeders, multiply price by 1.90. Longer impeders are not recommended.



* Please contact us for the latest information on prices and availability.

Induction welding coils

Good coil design is essential to achieve the high efficiency offered by solid-state welders. Unlike earlier vacuum tube welders, transistor inverters operate at high currents and low voltages. Coil currents can exceed 3,000 A, ten times higher than a typical vacuum tube welder. The power loss in a circuit due to resistance is given by $I^2 \times R$, so it is essential to minimize coil resistance. With 3,000 A in a coil with a resistance of $1/100 \Omega$, the power lost in the coil is 90 kW. This can easily eliminate any efficiency gains due to the higher efficiency of solid state welders.

The resistance of copper rises with temperature. All coils must therefore be designed for optimum performance. When needed, EHE coils are fabricated from 99.9 percent pure, oxygenfree, high conductivity copper, with silver brazed joints and advanced cooling systems. Some larger coils use spray cooling, which reduces the risk of 'hot spots'.

Most solid-state welders use single- or two-turn coils. The latter are available with either left-hand, right-hand

or universal helix directions. The choice of direction depends on the weld roll configuration and mill direction, and should be selected to provide the shortest vee length. In general left hand helix coils are used when mill direction is left to right and right hand helix coils are used for right to left mills.

Single-turn coils are often supplied in two sections. This means the coil can be replaced without cutting the mill. EHE two-turn universal coils can also be supplied in a split type for fast changeovers with virtually zero scrap. Although coil design for vacuum tube welders is less critical, a well-designed coil can still significantly boost efficiency.

The price list on the facing page covers our most common coil types. We also offer a wide range of specialized coils and coil holders for all types of high-frequency welders.



A-2



A-3



A-4



B-1



B-2



B-3



C-1



C-2



D-1



D-2



E-1



E-2

EHE

Induction welding coils

I.D. (mm)	I.D. (inch)	TUBULAR COILS/TUBULAR LEADS			BANDED COILS/TUBULAR LEADS			UNIVERSAL COILS		PLATE MOUNT BANDED COIL		SPLIT BANDED COILS	
		2 TURNS	3 TURNS	4 TURNS	1 TURN	2 TURN	3 TURN	1 TURN	2 TURN			1 TURN	2 TURN
Photo reference		A-2	A-3	A-4	B-1	B-2	B-3	C-1	C-2	D-1	D-2	E-1	E-2
12.0 mm	0.472"	*	*	*									
14.0 mm	0.551"	*	*	*									
16.0 mm	0.630"	*	*	*									
18.0 mm	0.709"	*	*	*									
20.0 mm	0.787"	*	*	*									
22.0 mm	0.866"	*	*	*									
25.0 mm	0.984"	*	*	*	*	*			*		*		
28.0 mm	1.102"	*	*	*	*	*			*		*		
31.0 mm	1.220"	*	*	*	*	*			*		*		
34.0 mm	1.339"	*	*		*	*			*		*		
37.0 mm	1.457"	*	*		*	*	*		*		*		
40.0 mm	1.575"	*	*		*	*	*		*		*		
43.0 mm	1.693"	*	*		*	*	*		*		*		
46.0 mm	1.811"	*	*		*	*	*		*		*		
50.0 mm	1.969"	*	*		*	*	*		*	*	*		
55.0 mm	2.165"	*	*		*	*	*		*	*	*		
60.0 mm	2.362"	*	*		*	*	*		*	*	*		
65.0 mm	2.559"	*	*		*	*	*		*	*	*	*	*
70.0 mm	2.756"	*	*		*	*	*		*	*	*	*	*
75.0 mm	2.953"	*	*		*	*	*	*	*	*	*	*	*
80.0 mm	3.150"	*	*		*	*	*	*	*	*	*	*	*
85.0 mm	3.346"	*	*		*	*	*	*	*	*	*	*	*
90.0 mm	3.543"	*	*		*	*	*	*	*	*	*	*	*
95.0 mm	3.740"	*	*		*	*	*	*	*	*	*	*	*
100.0 mm	3.937"	*	*		*	*	*	*	*	*	*	*	*
110.0 mm	4.331"	*	*		*	*		*	*	*	*	*	*
120.0 mm	4.724"	*	*		*	*		*	*	*	*	*	*
130.0 mm	5.118"				*	*		*	*	*	*	*	*
140.0 mm	5.512"				*	*		*	*	*	*	*	*
150.0 mm	5.906"				*	*		*	*	*	*	*	*
160.0 mm	6.299"							*		*		*	*
170.0 mm	6.693"							*		*		*	*
180.0 mm	7.087"							*		*		*	*
190.0 mm	7.480"							*		*		*	*
200.0 mm	7.874"							*		*		*	*

Tubular & banded coils are normally supplied with 3/8" or 1/2" OD x 12" long straight leads made from hard drawn OFHC copper tubing.
For other lead lengths, diameters & options, please add the following to the coil prices shown above.

OPTIONS (Additional price per coil)

3/8" red brass leads with hose barbs (Emmedi style)	\$27.00	(up to 300mm/12" long)
5/8" OD x 12" long hard drawn copper leads (Eloterm)	\$16.00	(up to 300mm/12" long)
10mm OD copper leads	\$22.00	(up to 300mm/12" long)
24" long leads	\$23.00	
18" long leads	\$10.00	
Offset leads	\$22.00	
Quick connect nipples	\$10.00	
Hose barbs	\$10.00	



PTFE (teflon®) sleeving for induction welding coils

Part #	O.D.	I.D.	Length	\$/ft
CST-00	0.323"	0.260"	RANDOM	*
CST-01	0.390"	0.260"	RANDOM	*
CST-02	0.460"	0.330"	RANDOM	*
CST-03	0.520"	0.390"	RANDOM	*
CST-04	0.650"	0.520"	RANDOM	*
CST-05	0.770"	0.640"	RANDOM	*

Available in coils up to 120 ft. in length.

* Please contact us for the latest information on prices and availability.

Ferrite for high-frequency tube welding

What is ferrite?

A natural mineral form of ferrite called magnetite has existed since the Earth's early beginnings, and was the "lodestone" used by ancient navigators in primitive compasses. Commercially used ferrites are all manufactured products, and were developed independently by scientists in Japan and Holland during the 1940's. There are two main types of ferrite, which are referred to as "hard" and "soft" ferrites. These terms do not refer to physical hardness, but rather to their abilities to retain magnetism. Soft ferrites retain very little permanent magnetism, and are the type used in impederes.

All ferrites are ceramic crystal structures formed from ions of iron, manganese, nickel, chromium, zinc and oxygen. They are not alloys or mixtures of metals. Physically they are hard, dense and brittle, and can only be machined using diamond or cubic boron nitride saws and grinders.

Ferrites have similar but superior magnetic properties to the iron or steel laminations used in low frequency transformers, with the additional advantage that they have much higher electrical resistivity than metals, so eddy current heating is reduced. They can also be easily formed in a variety of intricate shapes.

Ferrites are relatively expensive because of the complex and critical manufacturing processes involved, although the raw materials are plentiful and cheap. A simplified overview of the manufacturing process is as follows:

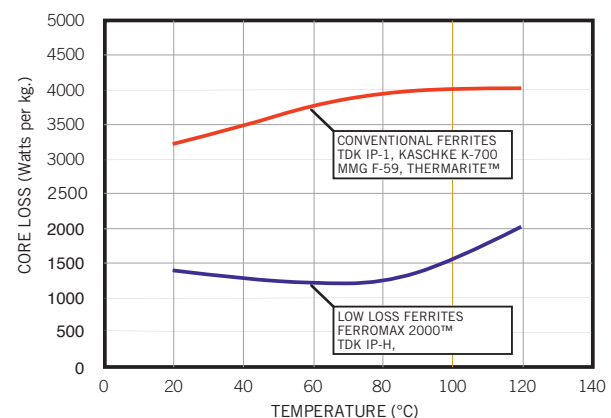
- High purity oxide powders of iron, zinc, manganese, cobalt and nickel are mixed and blended.
- The mixture is then calcined - heated in a kiln at 900 °C to 1100 °C (480 °F – 600 °F) - to start the process of forming the ferrite crystal lattice.
- The calcined material is ground to a fine powder in a ball mill, then dried, mixed with a binder and formed into shapes either by extrusion or pressing.
- The shaped pieces are dried, then sintered in a controlled atmosphere furnace at 1200 °C to 1400 °C (650 °F – 760 °F) to form the spinel crystal structure. During this phase, the material shrinks by as much as 40%.

Final grinding and polishing may be applied if necessary to meet critical dimensional requirements, however this is an expensive process that is not normally applied to ferrite used in impederes. Impeder ferrite has fairly wide tolerances on length, diameter and straightness and these must be accommodated in the design of the impeder.

Ferrite specifications

A theoretically perfect ferrite for impederes would be able to support an infinite amount of magnetic flux, and would have zero losses, requiring no cooling. Such a material has yet to be developed, however there are vast differences in the magnetic and electrical properties of commercially manufactured ferrites, which permit them to be tailored to the application in which they are used. Most of the ferrite produced in the form of rods or tubes is designed for antenna rods in radio receivers, where it operates at high frequencies, but at miniscule power levels. Impeder ferrite operates at very high power levels, but relatively low frequencies of 200 – 500 kHz. Choosing the wrong grade of ferrite for use in impederes can have a disastrous effect on the efficiency of the welding process, and the life of the impeder.

All ferrimagnetic materials are limited in the amount of magnetic flux that they can support. This is known as the saturation flux density, and it is normally expressed



	STANDARD FERRITE	LOW LOSS FERRITE
INITIAL PERMEABILITY	700	2000
SATURATION FLUX DENSITY	400mT	500mT
TOTAL CORE LOSSES	>4kW/kg.	<2kW/kg.
COOLING REQUIRED	3 liters/min.	2 liter/min.

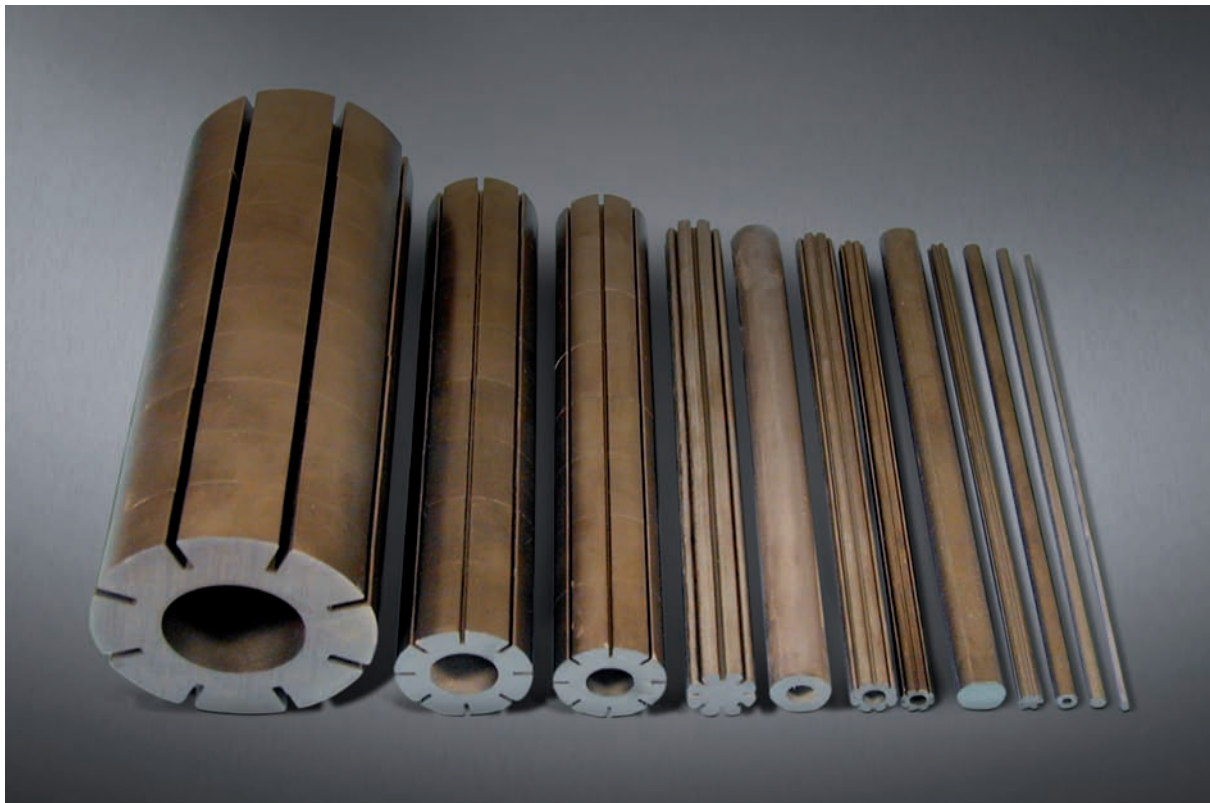
in Gauss or Teslas (10,000 Gauss = 1 Tesla). At high power densities, modern HF welders can establish very high flux densities within an impeder, so it is important to choose a grade of ferrite that will support this flux without saturation.

Ferrite used in impeders also requires cooling because electrical and magnetic losses in the material cause waste heat to be generated. The lower the losses in the ferrite, the less cooling required. Ferrite that operates at a lower temperature and which undergoes less thermal cycling will last longer and require less frequent replacement. Ferrite losses are expressed in Kilowatts/kg, or watts per cubic centimeter at a specified frequency and flux density. For impeder use, these losses should be as low as possible.

The chart on the facing page shows comparative losses of various.

ferrite grades commonly used in impeders Saturation flux density and magnetic permeability both decrease at higher temperatures, so keeping the ferrite cool greatly improves its performance.

The ferrite that we stock is made to our specifications by leading manufacturers around the world, and it has been specifically formulated for high saturation flux density, high permeability and the lowest possible losses. There are other grades of ferrite available, often at lower cost, that will not perform as well, however using these in impeders will result in a loss of welding efficiency that costs many times more than the apparent savings in the cost of the ferrite!



High-performance impeder ferrites

Ferrite is the most critical component in an impeder. Some manufacturers use a cheap grade designed for use in portable radios, not for the high power densities and temperatures in tube welding. EHE ferrite is specially made to our stringent specifications, and offers the following advantages over inferior types:

- Lower losses
- Higher saturation flux density
- Higher Curie temperature

EHE ferrite needs less than half the cooling time of other types. This means the impeder operates at a lower temperature, greatly increasing its working life. This in turn means fewer impeder changes and less mill downtime.

TDK IP-H

TDK's IP-H ferrite is widely considered the gold-standard for ferrite, and is manufactured to the tightest tolerances in the industry. It is the natural choice whenever consistency, straightness and maximum magnetic and electrical performance is required.

Ferromax 2010™

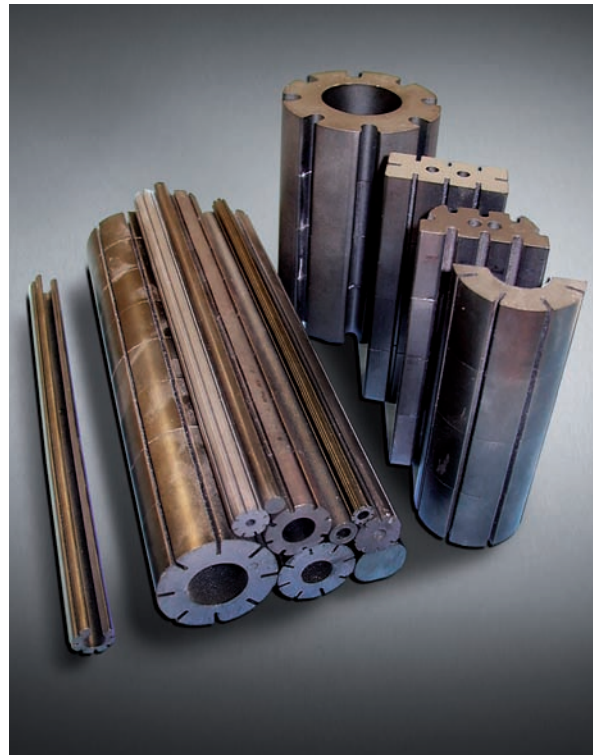
EHE's own brand of high-performance ferrite, Ferromax 2010 is manufactured to our specifications by leading producers. By using multiple sources, we are able to offer premium quality ferrite, short delivery times and extremely competitive pricing.

Cutting service

EHE offers a ferrite cutting and grinding and machining service. The prices per cut piece are as follows:

- 3 mm – 6 mm *
- 7 mm – 10 mm *
- 11 mm – 13 mm *
- 14 mm – 16 mm *
- 17 mm – 20 mm *
- 21 mm – 30 mm *

Ferrite components can be joined using EHE's Ferrobond™ epoxy adhesive. This ferrite powder-filled epoxy maximizes the magnetic permeability of the assembled components.



EHE

Fluted ferrite

O.D.	I.D.	Part #	TDK IP-H		Part #	Ferromax 2010™		Weight	
			1 - 9 9	100+		1 - 9 9	1 0 0 +	Gram	Ounce
5.0 mm	n.a.	ZRS-05x200	*	*	FRS-05x200	*	*	17 g / 0.6 oz	
6.0 mm	n.a.	ZRS-06x200	*	*	FRS-06x200	*	*	25 g / 0.9 oz	
7.0 mm	n.a.	ZRS-07x200	*	*	FRS-07x200	*	*	34 g / 1.2 oz	
8.0 mm	n.a.	ZRS-08x200	*	*	FRS-08x200	*	*	44 g / 1.6 oz	
9.0 mm	n.a.	ZRS-09x200	*	*	FRS-09x200	*	*	56 g / 2.0 oz	
10.0 mm	n.a.	ZRS-10x200	*	*	FRS-10x200	*	*	69 g / 2.4 oz	
11.0 mm	n.a.	ZRS-11x200	*	*	FRS-11x200	*	*	84 g / 3.0 oz	
12.0 mm	n.a.	ZRS-12x200	*	*	FRS-12x200	*	*	100 g / 3.5 oz	
13.0 mm	n.a.	ZRS-13x200	*	*	FRS-13x200	*	*	117 g / 4.1 oz	
14.0 mm	n.a.	ZRS-14x200	*	*	FRS-14x200	*	*	136 g / 4.8 oz	
15.0 mm	n.a.	ZRS-15x200	*	*	FRS-15x200	*	*	156 g / 5.5 oz	
16.0 mm	n.a.	ZRS-16x200	*	*	FRS-16x200	*	*	177 g / 6.3 oz	
17.0 mm	n.a.	ZRS-17x200	*	*	FRS-17x200	*	*	200 g / 7.1 oz	
18.0 mm	n.a.	ZRS-18x200	*	*	FRS-18x200	*	*	225 g / 7.9 oz	
19.0 mm	n.a.	ZRS-19x200	*	*	FRS-19x200	*	*	250 g / 8.8 oz	
20.0 mm	n.a.	ZRS-20x200	*	*	FRS-20x200	*	*	277 g / 9.8 oz	
21.0 mm	n.a.	ZRS-21x200	*	*	FRS-21x200	*	*	306 g / 10.8 oz	
22.0 mm	n.a.	ZRS-22x200	*	*	FRS-22x200	*	*	335 g / 11.8 oz	
23.0 mm	n.a.	ZRS-23x200	n.a.	n.a.	FRS-23x200	*	*	367 g / 12.9 oz	
24.0 mm	n.a.	ZRS-24x200	n.a.	n.a.	FRS-24x200	*	*	399 g / 14.1 oz	
25.0 mm	n.a.	ZRS-25x200	*	*	FRS-25x200	n.a.	n.a.	433 g / 15.3 oz	
27.0 mm	n.a.	ZRS-27x200	*	*	FRS-28x200	*	*	505 g / 17.8 oz	
30.0 mm	n.a.	ZRS-30x200	*	*	FRS-30x200	*	*	624 g / 22.0 oz	

Flat-sided round ferrite

O.D.	I.D.	Part #	TDK IP-H		Part #	Ferromax 2010™		Weight	
			1 - 9 9	100+		1 - 9 9	1 0 0 +	Gram	Ounce
3.0 mm	n.a.	ZR-03x200	*	*	FRF-03x200	n.a.	n.a.	6 g / 0.2 oz	
4.0 mm	n.a.	ZR-04x200	*	*	FRF-04x200	n.a.	n.a.	11 g / 0.4 oz	
5.0 mm	n.a.	ZR-05x200	*	*	FRF-05x200	*	*	17 g / 0.6 oz	
6.0 mm	n.a.	ZR-06x200	*	*	FRF-06x200	*	*	25 g / 0.9 oz	
7.0 mm	n.a.	ZR-07x200	*	*	FRF-07x200	*	*	34 g / 1.2 oz	
8.0 mm	n.a.	ZR-08x200	*	*	FRF-08x200	*	*	44 g / 1.6 oz	
9.0 mm	n.a.	ZR-09x200	*	*	FRF-09x200	*	*	56 g / 2.0 oz	
10.0 mm	n.a.	ZR-10x200	*	*	FRF-10x200	*	*	69 g / 2.4 oz	
11.0 mm	n.a.	ZR-11x200	*	*	FRF-11x200	*	*	84 g / 3.0 oz	
12.0 mm	n.a.	ZR-12x200	*	*	FRF-12x200	*	*	100 g / 3.5 oz	
13.0 mm	n.a.	ZR-13x200	*	*	FRF-13x200	*	*	117 g / 4.1 oz	
14.0 mm	n.a.	ZR-14x200	*	*	FRF-14x200	*	*	136 g / 4.8 oz	
15.0 mm	n.a.	ZR-15x200	*	*	FRF-15x200	*	*	156 g / 5.5 oz	
16.0 mm	n.a.	ZR-16x200	n.a.	n.a.	FRF-16x200	*	*	177 g / 6.3 oz	
17.0 mm	n.a.	ZR-17x200	*	*	FRF-17x200	*	*	200 g / 7.1 oz	
18.0 mm	n.a.	ZR-18x200	*	*	FRF-18x200	*	*	225 g / 7.9 oz	
19.0 mm	n.a.	ZR-19x200	n.a.	n.a.	FRF-19x200	*	*	250 g / 8.8 oz	
20.0 mm	n.a.	ZR-20x200	n.a.	n.a.	FRF-20x200	*	*	277 g / 9.8 oz	



Hollow-fluted ferrite

O.D.	I.D.	Part #	TDK IP-H		Part #	Ferromax 2010™		Weight	
			1 - 9 9	100+		1 - 9 9	1 0 0 +	Gram	Ounce
8.0 mm	4.0 mm	ZRSH-08x200x04	*	*	FRSH-08x200x04	*	*	33 g	1.2 oz
9.0 mm	4.0 mm	ZRSH-09x200x04	*	*	FRSH-09x200x04	*	*	45 g	1.6 oz
10.0 mm	5.0 mm	ZRSH-10x200x05	*	*	FRSH-10x200x05	*	*	52 g	1.8 oz
11.0 mm	3.0 mm	ZRSH-11x200x03	*	*	FRSH-11x200x03	*	*	78 g	2.7 oz
11.0 mm	5.0 mm	ZRSH-11x200x05	*	*	FRSH-11x200x05	*	*	67 g	2.3 oz
12.0 mm	3.0 mm	ZRSH-12x200x03	*	*	FRSH-12x200x03	*	*	94 g	3.3 oz
12.0 mm	6.0 mm	ZRSH-12x200x06	*	*	FRSH-12x200x06	*	*	75 g	2.6 oz
13.0 mm	5.0 mm	ZRSH-13x200x05	*	*	FRSH-13x200x05	*	*	100 g	3.5 oz
13.0 mm	7.0 mm	ZRSH-13x200x07	*	*	FRSH-13x200x07	*	*	83 g	2.9 oz
14.0 mm	5.0 mm	ZRSH-14x200x05	*	*	FRSH-14x200x05	*	*	119 g	4.2 oz
14.0 mm	7.0 mm	ZRSH-14x200x07	*	*	FRSH-14x200x07	*	*	102 g	3.6 oz
15.0 mm	5.0 mm	ZRSH-15x200x05	*	*	FRSH-15x200x05	*	*	139 g	4.9 oz
15.0 mm	7.0 mm	ZRSH-15x200x07	*	*	FRSH-15x200x07	*	*	122 g	4.3 oz
16.0 mm	5.0 mm	ZRSH-16x200x05	*	*	FRSH-16x200x05	*	*	160 g	5.6 oz
16.0 mm	7.0 mm	ZRSH-16x200x07	*	*	FRSH-16x200x07	*	*	143 g	5.1 oz
17.0 mm	5.0 mm	ZRSH-17x200x05	*	*	FRSH-17x200x05	*	*	183 g	6.5 oz
17.0 mm	7.0 mm	ZRSH-17x200x07	*	*	FRSH-17x200x07	*	*	166 g	5.9 oz
18.0 mm	6.0 mm	ZRSH-18x200x06	*	*	FRSH-18x200x06	*	*	200 g	7.0 oz
18.0 mm	9.0 mm	ZRSH-18x200x09	*	*	FRSH-18x200x09	*	*	168 g	5.9 oz
19.0 mm	6.0 mm	ZRSH-19x200x06	*	*	FRSH-19x200x06	*	*	225 g	7.9 oz
19.0 mm	9.0 mm	ZRSH-19x200x09	*	*	FRSH-19x200x09	*	*	194 g	6.8 oz
20.0 mm	6.0 mm	ZRSH-20x200x06	*	*	FRSH-20x200x06	*	*	252 g	8.9 oz
20.0 mm	10.0 mm	ZRSH-20x200x10	*	*	FRSH-20x200x10	*	*	208 g	7.3 oz
21.0 mm	6.0 mm	ZRSH-21x200x06	*	*	FRSH-21x200x06	*	*	281 g	9.9 oz
21.0 mm	10.0 mm	ZRSH-21x200x10	*	*	FRSH-21x200x10	*	*	236 g	8.3 oz
22.0 mm	6.0 mm	ZRSH-22x200x06	*	*	FRSH-22x200x06	*	*	310 g	11.0 oz
22.0 mm	10.0 mm	ZRSH-22x200x10	*	*	FRSH-22x200x10	*	*	266 g	9.4 oz
23.0 mm	11.0 mm	ZRSH-23x200x11	*	*	FRSH-23x200x11	*	*	283 g	10.0 oz
24.0 mm	11.0 mm	ZRSH-24x200x11	n.a.	n.a.	FRSH-24x200x11	*	*	315 g	11.1 oz
25.0 mm	10.0 mm	ZRSH-25x200x10	*	*	FRSH-25x200x10	*	*	364 g	12.8 oz
26.0 mm	11.0 mm	ZRSH-26x200x11	n.a.	n.a.	FRSH-26x200x11	*	*	385 g	13.6 oz
27.0 mm	11.0 mm	ZRSH-27x200x11	n.a.	n.a.	FRSH-27x200x11	*	*	421 g	14.9 oz
28.0 mm	13.0 mm	ZRSH-28x200x13	*	*	FRSH-28x200x13	*	*	426 g	15.0 oz
30.0 mm	14.0 mm	ZRSH-30x200x14	*	*	FRSH-30x200x14	*	*	488 g	17.2 oz
33.0 mm	14.0 mm	ZRSH-33x200x14	*	*	FRSH-33x200x14	*	*	619 g	21.8 oz
36.0 mm	14.0 mm	ZRSH-36x200x14	*	*	FRSH-36x200x14	*	*	762 g	26.9 oz
39.0 mm	20.0 mm	ZRSH-39x200x20	*	*	FRSH-39x200x20	*	*	777 g	27.4 oz
42.0 mm	20.0 mm	ZRSH-42x200x20	*	*	FRSH-42x200x20	n.a.	n.a.	945 g	33.3 oz
45.0 mm	20.0 mm	ZRSH-45x200x20	*	*	FRSH-45x200x20	n.a.	n.a.	1 g	39.6 oz
49.0 mm	20.0 mm	ZRSH-49x200x20	*	*	FRSH-49x200x20	n.a.	n.a.	1 g	48.8 oz
55.0 mm	20.0 mm	ZRSH-55x200x20	*	*	FRSH-55x200x20	n.a.	n.a.	2 g	64.0 oz
62.0 mm	31.0 mm	ZRSH-62x200x31	n.a.	n.a.	FRSH-62x200x31	*	*	2 g	64.1 oz
69.0 mm	35.0 mm	ZRSH-69x200x35	n.a.	n.a.	FRSH-69x200x35	*	*	2 g	86.3 oz
45.0 mm	20.0 mm	RECT-45x100x20	*	*	n.a.	n.a.	n.a.	350 g	12.3 oz

Hollow ferrite

O.D.	I.D.	Part #	TDK IP-H		Part #	Ferromax 2010™		Weight	
			1 - 9 9	100+		1 - 9 9	1 0 0 +	Gram	Ounce
6.0 mm	3.0 mm	ZRH-06x200x03	*	*	FRH-06x200x03	n.a.	n.a.	19 g	0.7 oz
7.0 mm	3.0 mm	ZRH-07x200x03	*	*	FRH-07x200x03	n.a.	n.a.	28 g	1.0 oz
8.0 mm	4.0 mm	ZRH-08x200x04	*	*	FRH-08x200x04	*	*	33 g	1.2 oz
9.0 mm	4.0 mm	ZRH-09x200x04	*	*	FRH-09x200x04	*	*	45 g	1.6 oz
10.0 mm	5.0 mm	ZRH-10x200x05	*	*	FRH-10x200x05	*	*	52 g	1.8 oz
11.0 mm	5.0 mm	ZRH-11x200x05	*	*	FRH-11x200x05	*	*	67 g	2.3 oz
12.0 mm	7.0 mm	ZRH-12x200x07	*	*	FRH-12x200x07	*	*	66 g	2.3 oz
13.0 mm	7.0 mm	ZRH-13x200x07	*	*	FRH-13x200x07	*	*	83 g	2.9 oz
14.0 mm	7.0 mm	ZRH-14x200x07	*	*	FRH-14x200x07	*	*	102 g	3.6 oz
15.0 mm	7.0 mm	ZRH-15x200x07	*	*	FRH-15x200x07	*	*	122 g	4.3 oz
16.0 mm	8.0 mm	ZRH-16x200x08	*	*	FRH-16x200x08	*	*	133 g	4.7 oz
17.0 mm	8.0 mm	ZRH-17x200x08	n.a.	n.a.	FRH-17x200x08	*	*	156 g	5.5 oz
18.0 mm	9.0 mm	ZRH-18x200x09	*	*	FRH-18x200x09	*	*	168 g	5.9 oz
19.0 mm	9.0 mm	ZRH-19x200x09	n.a.	n.a.	FRH-19x200x09	*	*	194 g	6.8 oz
20.0 mm	10.0 mm	ZRH-20x200x10	*	*	FRH-20x200x10	*	*	208 g	7.3 oz
22.0 mm	11.0 mm	ZRH-22x200x11	*	*	FRH-22x200x11	*	*	252 g	8.9 oz
24.0 mm	12.0 mm	ZRH-24x200x12	*	*	FRH-24x200x12	*	*	299 g	10.6 oz
30.0 mm	15.0 mm	ZRH-30x200x15	*	*	FRH-30x200x15	*	*	468 g	16.5 oz

EHE

Impeder and ferrite tester

Every year, thousands of hours of production are lost as a result of damaged impederes, at great cost to the industry. EHE's impeder tester gives you a simple, fast and inexpensive way to test impederes before installing them in a mill.

Simply place the impeder or ferrite within the tester, and the display immediately shows the relative permeability. If the ferrite in the impeder has been damaged in any way, the meter will indicate as much as 50% below a normal reading. Different types and grades of ferrite can also be tested to determine their suitability for use in impederes.

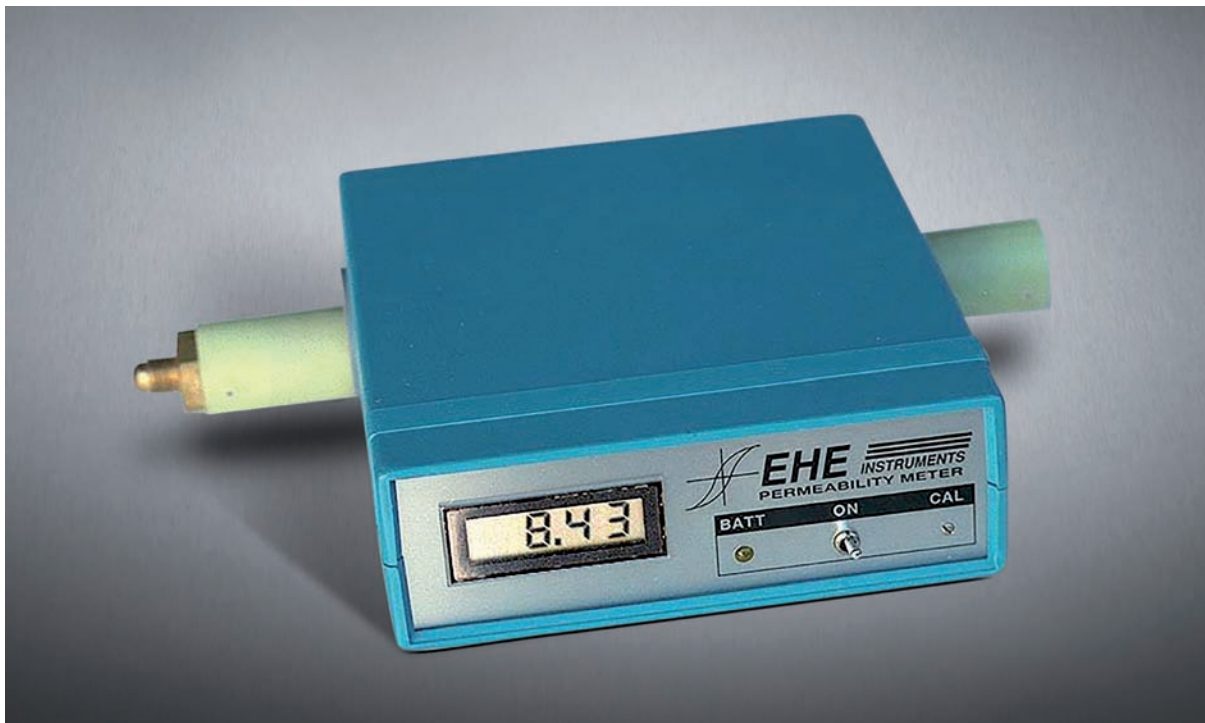
External test Fixtures

1.500" (38 mm)	I.D.	*
2.000" (50 mm)	I.D.	*
3.000" (75 mm)	I.D.	*
4.000" (100 mm)	I.D.	*
5.000" (127 mm)	I.D.	*
6.000" (150 mm)	I.D.	*

The tester is rugged and compact, measuring only 6" x 7" x 2" (150 x 180 x 50 mm), and will test impederes or ferrite rods up to 1.312" (33mm) in diameter. Optional external test fixtures are available for impederes up to 6 inch (150 mm) in diameter. The tester is powered by rechargeable lithium-ion battery which will last for several months of normal usage between charges.

New version with Li-Ion battery & charger

Price: *



* Please contact us for the latest information on prices and availability.

Impeder casing

Ferroglass™ is EHE's proprietary brand of ferrite power filled epoxy/glass impeder casing. The additional ferrite present in the casing can boost weld speeds by as much as 40% in the case of small diameter impiders.

Silglass™ is our proprietary brand of silicone resin bonded glass. Features exceptional high temperature strength.

G-11 Epoxy/glass is a higher temperature rated versions of the popular G-10 material. Good mechanical strength and lower cost are the main advantages.

Impeder casing

O.D.	I.D.	Length •	G-11 Epoxy/Glass	G-7 Silglass™ ••	Ferroglass™
6.7 mm.	5.5 mm.	900 mm.	n.a.	n.a.	*
8.0 mm.	6.5 mm.	900 mm.	*	n.a.	*
9.0 mm.	7.0 mm.	900 mm.	*	n.a.	*
9.0 mm.	7.6 mm.	900 mm.	*	n.a.	*
10.0 mm.	8.0 mm.	2000 mm.	*	*	*
11.0 mm.	9.0 mm.	2000 mm.	*	*	*
12.0 mm.	10.0 mm.	2000 mm.	*	*	*
13.0 mm.	11.0 mm.	2000 mm.	*	*	*
14.0 mm.	12.0 mm.	2000 mm.	*	*	*
15.0 mm.	13.0 mm.	2000 mm.	*	*	*
16.0 mm.	14.0 mm.	2000 mm.	*	*	*
17.0 mm.	15.0 mm.	2000 mm.	*	*	n.a.
17.0 mm.	14.0 mm.	2000 mm.	*	*	*
18.0 mm.	15.0 mm.	2000 mm.	*	*	*
19.0 mm.	16.0 mm.	2000 mm.	*	*	*
20.0 mm.	17.0 mm.	2000 mm.	*	*	*
21.0 mm.	18.0 mm.	2000 mm.	*	*	*
22.0 mm.	19.0 mm.	2000 mm.	*	*	*
23.0 mm.	20.0 mm.	2000 mm.	*	*	*
24.0 mm.	21.0 mm.	2000 mm.	*	*	*
25.0 mm.	22.0 mm.	2000 mm.	*	*	*
28.0 mm.	25.0 mm.	2000 mm.	*	*	*
31.0 mm.	28.0 mm.	2000 mm.	*	*	*
34.0 mm.	31.0 mm.	2000 mm.	*	*	n.a.
37.0 mm.	34.0 mm.	2000 mm.	*	*	n.a.
40.0 mm.	37.0 mm.	2000 mm.	*	*	n.a.
43.0 mm.	40.0 mm.	2000 mm.	*	*	n.a.
46.0 mm.	43.0 mm.	2000 mm.	*	*	n.a.
50.0 mm.	46.0 mm.	2000 mm.	*	*	n.a.
57.1 mm.	50.8 mm.	2000 mm.	*	*	n.a.
63.5 mm.	57.0 mm.	2000 mm.	*	*	n.a.
70.0 mm.	63.5 mm.	2000 mm.	*	*	n.a.
76.0 mm.	70.0 mm.	2000 mm.	*	*	n.a.
89.0 mm.	82.5 mm.	1220 mm.	*	*	n.a.
101.6 mm.	88.0 mm.	2000 mm.	*	n.a.	n.a.
101.6 mm.	92.0 mm.	1220 mm.	n.a.	*	n.a.
114.0 mm.	100.0 mm.	1220 mm.	*	n.a.	n.a.
114.0 mm.	108.0 mm.	1220 mm.	n.a.	*	n.a.
127.0 mm.	114.0 mm.	1220 mm.	*	n.a.	n.a.
127.0 mm.	121.0 mm.	1220 mm.	n.a.	*	n.a.
139.7 mm.	127.0 mm.	1220 mm.	*	n.a.	n.a.
140.0 mm.	134.0 mm.	1220 mm.	n.a.	*	n.a.
25.4 x 51.0 mm RECTANGULAR		2000 mm.	*	*	n.a.

• Shipment of lengths above 4 feet (1220 mm) require special packaging charges

•• Silglass available and priced in 1220 mm lengths

EHE

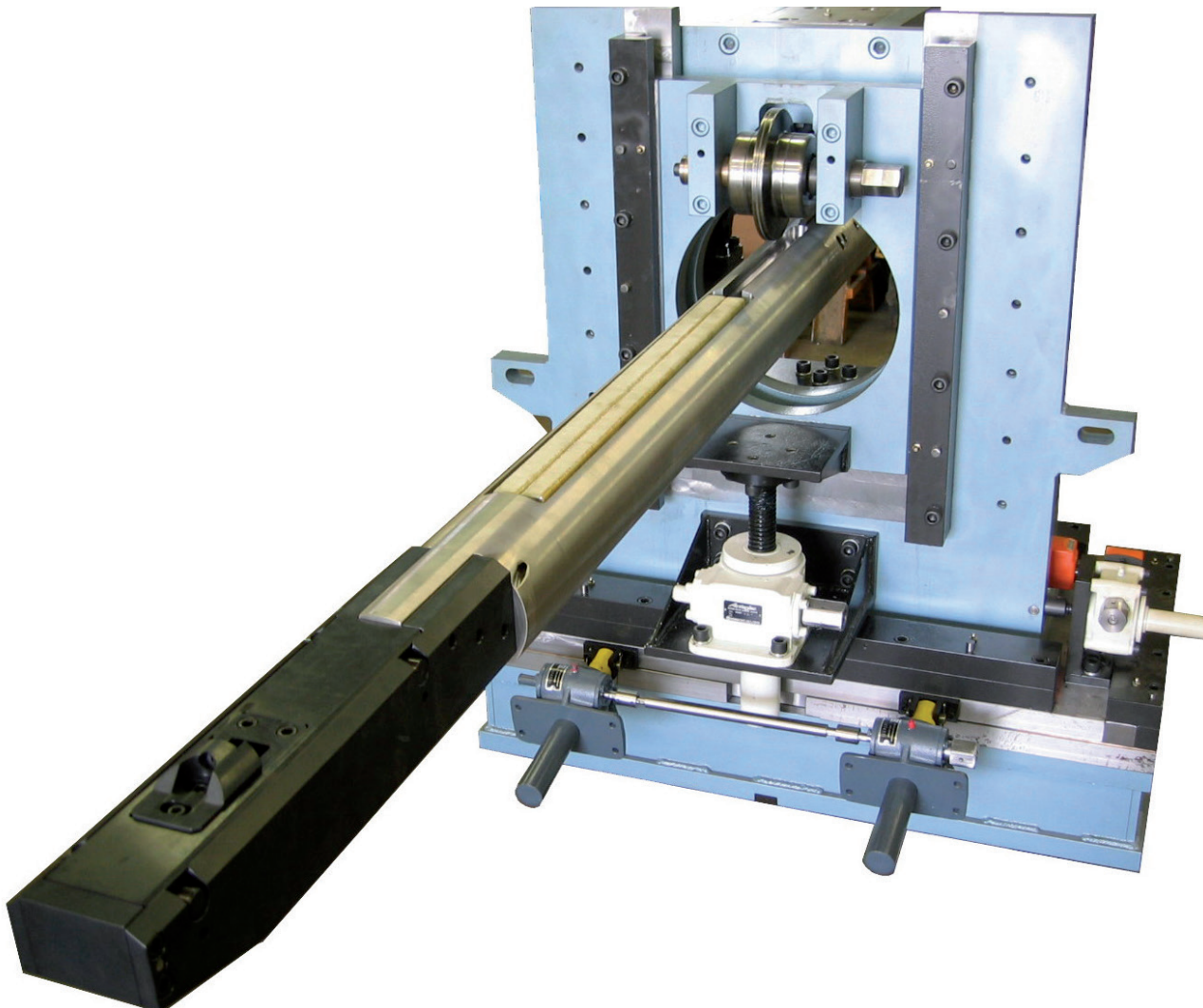
Canticut scarfing system

Canticut is Electronic Heating Equipment's (EHE) innovative ID scarfing system; the unique heavy duty design enables quick set up, precision control, and reliability. All position and cut depth controls are easily accessible to the operator between the last fin pass and weld box, external of the pipe I.D.

Supporting the scarfing tool on a cantilever removes the need for internal rolls. This key feature ensures that the mandrel covers a wide range of tube sizes and eliminates the problem of rolling weld spume or other debris into the tube wall. A Canticut unit can ID scarf pipe sizes ranging from 4.5" - 26" (114 – 660 mm) O.D. using only two mandrels. Canticut ID scarfing systems are used by many of the world's leading tube and pipe producers. Due to its ability to meet the critical demands for energy efficient production, Canticut ID scarfing systems are considered the "gold standard" for tube, pipe and casing manufacturing.

Recent improvements include a hydraulically actuated bead chopper to cut the stringer into manageable lengths for easy removal from the pipe. The use of newer high strength alloys results in mandrels with increased rigidity and strength, while reducing weight and allowing more space to be used for EHE impellers and impeller clusters. The heavily fabricated mounting stand is now available with position sensors including outputs to PLC/HDMI for precise repeatability, and to efficiently optimize set up time.

Interchangeable tool holders and bead chopping heads greatly reduce mill down-time and permit the use of a wide variety of cutting tool styles to suit different grades of material as well as user preferences.



EHE

Cooling systems

In a perfect world, impeders and induction welding coils would not require cooling. Unfortunately nothing is quite that perfect! Copper is an excellent electrical conductor but at the frequencies and power levels used for induction heating, it still has sufficient resistance to require cooling by water or mill coolant. Impeders also require cooling because they operate in close proximity to molten metal and the ferrite that they contain absorbs energy in changing its magnetic polarization, this is dissipated as heat.

Impeder and work coil cooling is particularly critical in producing small diameter tubing. It takes approximately the same amount of power to weld 1/2 inch (13 mm) OD and 4 inch (100 mm) OD tubing of similar gauge, although obviously the impeders and coils for 1/2 inch (13 mm) tubing are much smaller and coolant flow is much less. Most tube mill central coolant systems do not provide sufficient pressure to properly cool these small components, causing them to lose efficiency due to their higher operating temperatures. Return flow impeders and any impeders used with ID scarfing systems benefit

particularly from use of a suitable coolant filtration and booster pump system.

EHE manufactures a range of impeder and coil coolant systems which provide a steady flow of filtered coolant at optimum temperature for efficient operation. This increases welding efficiency and greatly reduces the downtime and cost of frequent impeder and coil replacements. These coolant systems use single or dual washable stainless steel mesh filters and regenerative turbine pumps to boost coolant pressure as high as 20 bar (300 PSI) to ensure proper cooling of even the smallest impeders and coils.

OPTIONS

All coolant systems can be supplied with flow switches, pressure switches and filter condition indicators for local or remote operation and integration into most existing mill control systems. Dual filter units have isolation valves which allow one filter to remain in line and operating while the other is removed for cleaning.

	CS-1	CS-2
Motor power	1/3 HP (250 W)	5 HP (3 kW)
Power requirement	115/240, 50/60 Hz	220/460, 50/60 Hz
Phases	1 (3 optional)	3
Filter size/qty	1 (2) x 10" 250µ	4 x 10" 250µ
Inlet pipe size	3/4" NPT/BSP	1" NPT/BSP
Outlet pipe size	1/2" NPT/BSP	1" NPT/BSP
Dimensions (LxWxH) (Inch)	25" x 13" x 18"	30" x 30" x 16"
Dimensions (LxWxH) (mm)	635 x 330 x 458 mm	965 x 965 x 406 mm
Shipping weight	45 lbs (22 kg)	95 lbs (43 kg)



Coil & impeder sizes

Coil diameter

TUBE O.D.	COIL I.D.	TUBE O.D.	COIL I.D.
0.438"	0.812"	5.500"	6.375"
0.500"	0.875"	6.000"	7.000"
0.563"	0.937"	6.500"	7.625"
0.625"	1.031"	7.000"	8.000"
0.688"	1.125"	7.500"	8.750"
0.750"	1.187"	8.000"	9.250"
0.813"	1.250"	8.500"	9.750"
0.875"	1.312"	9.000"	10.250"
0.938"	1.375"	9.500"	11.875"
1.000"	1.500"	10.000"	11.375"
1.125"	1.625"	10.500"	11.875"
1.250"	1.750"	11.000"	12.500"
1.375"	1.875"	11.500"	13.000"
1.500"	2.000"	12.000"	13.500"
1.625"	2.187"	12.500"	14.000"
1.750"	2.250"	13.000"	14.500"
1.875"	2.375"	13.500"	15.125"
2.000"	2.500"	14.000"	15.750"
2.250"	2.750"	14.500"	16.250"
2.500"	3.250"	15.000"	16.750"
2.750"	3.375"	15.500"	17.375"
3.000"	3.750"	16.000"	17.875"
3.250"	4.000"	16.500"	18.500"
3.500"	4.250"	17.000"	19.000"
3.750"	4.500"	17.500"	19.500"
4.000"	4.750"	18.000"	20.000"
4.250"	5.000"	18.500"	20.500"
4.500"	5.375"	19.000"	21.125"
4.750"	5.625"	19.500"	21.625"
5.000"	5.750"	20.000"	22.250"

Impeder diameter

TUBE I.D.	IMPEDER	TUBE I.D.	IMPEDER
0.250"	0.200"	5.000"	4.000"
0.313"	0.250"	5.500"	4.500"
0.375"	0.300"	6.000"	5.000"
0.438"	0.350"	6.500"	5.500"
0.500"	0.400"	7.000"	6.000"
0.563"	0.450"	7.500"	CLUSTER
0.594"	0.475"	8.000"	CLUSTER
0.625"	0.500"	8.500"	CLUSTER
0.688"	0.550"	9.000"	CLUSTER
0.750"	0.600"	9.500"	CLUSTER
0.813"	0.650"	10.000"	CLUSTER
0.844"	0.675"	10.500"	CLUSTER
0.875"	0.700"	11.000"	CLUSTER
0.938"	0.750"	11.500"	CLUSTER
1.000"	0.800"	12.000"	CLUSTER
1.125"	0.900"	12.500"	CLUSTER
1.250"	1.000"	13.000"	CLUSTER
1.375"	1.100"	13.500"	CLUSTER
1.500"	1.200"	14.000"	CLUSTER
1.625"	1.300"	14.500"	CLUSTER
1.875"	1.500"	15.000"	CLUSTER
2.000"	1.600"	15.500"	CLUSTER
2.125"	1.700"	16.000"	CLUSTER
2.250"	1.800"	16.500"	CLUSTER
2.500"	2.000"	17.000"	CLUSTER
2.750"	2.250"	17.500"	CLUSTER
3.000"	2.500"	18.000"	CLUSTER
3.500"	2.750"	18.500"	CLUSTER
4.000"	3.000"	19.000"	CLUSTER
4.500"	3.500"	19.500"	CLUSTER

Coil diameter

TUBE O.D.	COIL I.D.	TUBE O.D.	COIL I.D.
11 mm	20 mm	138 mm	163 mm
13 mm	22 mm	150 mm	177 mm
14 mm	24 mm	163 mm	194 mm
16 mm	26 mm	175 mm	206 mm
17 mm	28 mm	188 mm	222 mm
19 mm	30 mm	200 mm	234 mm
20 mm	31 mm	213 mm	248 mm
22 mm	33 mm	225 mm	262 mm
23 mm	34 mm	238 mm	276 mm
25 mm	36 mm	250 mm	290 mm
28 mm	40 mm	263 mm	304 mm
31 mm	43 mm	275 mm	318 mm
34 mm	46 mm	288 mm	332 mm
38 mm	50 mm	300 mm	346 mm
41 mm	55 mm	313 mm	360 mm
44 mm	57 mm	325 mm	370 mm
47 mm	60 mm	338 mm	385 mm
50 mm	64 mm	350 mm	400 mm
56 mm	70 mm	363 mm	415 mm
63 mm	80 mm	375 mm	427 mm
69 mm	85 mm	388 mm	442 mm
75 mm	95 mm	400 mm	455 mm
81 mm	101 mm	413 mm	470 mm
88 mm	108 mm	425 mm	483 mm
94 mm	114 mm	438 mm	498 mm
100 mm	120 mm	450 mm	512 mm
106 mm	127 mm	463 mm	526 mm
113 mm	135 mm	475 mm	540 mm
119 mm	142 mm	488 mm	554 mm
125 mm	148 mm	500 mm	568 mm

Impeder diameter

TUBE I.D.	IMPEDER	TUBE I.D.	IMPEDER
6 mm	5.0 mm	125 mm	101.6 mm
8 mm	6.5 mm	138 mm	114.3 mm
9 mm	8.0 mm	150 mm	127.0 mm
11 mm	9.0 mm	163 mm	139.7 mm
13 mm	10.0 mm	175 mm	152.4 mm
14 mm	11.0 mm	188 mm	CLUSTER
15 mm	12.0 mm	200 mm	CLUSTER
16 mm	13.0 mm	213 mm	CLUSTER
17 mm	14.0 mm	225 mm	CLUSTER
19 mm	15.0 mm	238 mm	CLUSTER
20 mm	16.0 mm	250 mm	CLUSTER
21 mm	17.0 mm	263 mm	CLUSTER
22 mm	18.0 mm	275 mm	CLUSTER
23 mm	19.0 mm	288 mm	CLUSTER
25 mm	20.0 mm	300 mm	CLUSTER
28 mm	23.0 mm	313 mm	CLUSTER
31 mm	25.0 mm	325 mm	CLUSTER
34 mm	28.0 mm	338 mm	CLUSTER
38 mm	31.0 mm	350 mm	CLUSTER
41 mm	34.0 mm	363 mm	CLUSTER
47 mm	37.0 mm	375 mm	CLUSTER
50 mm	40.0 mm	388 mm	CLUSTER
53 mm	43.0 mm	400 mm	CLUSTER
56 mm	46.0 mm	413 mm	CLUSTER
63 mm	50.0 mm	425 mm	CLUSTER
69 mm	57.2 mm	438 mm	CLUSTER
75 mm	63.5 mm	450 mm	CLUSTER
88 mm	69.9 mm	463 mm	CLUSTER
100 mm	76.2 mm	475 mm	CLUSTER
112 mm	88.9 mm	488 mm	CLUSTER



Coil & impeder sizes are meant as guidelines. To determine the final size, the setup from the specific mill has to be considered.

* Please contact us for the latest information on prices and availability.

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