

Ferrites and Assemblies for High Frequency Induction Welding



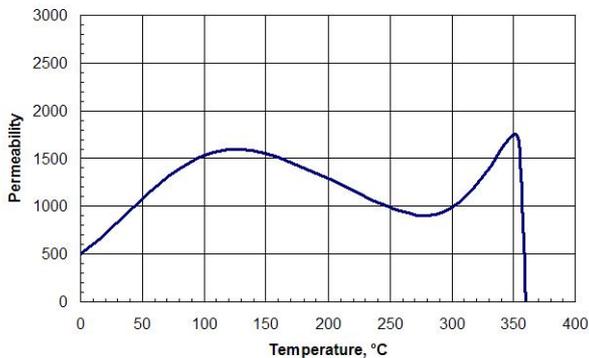
A Subsidiary of TT electronics plc



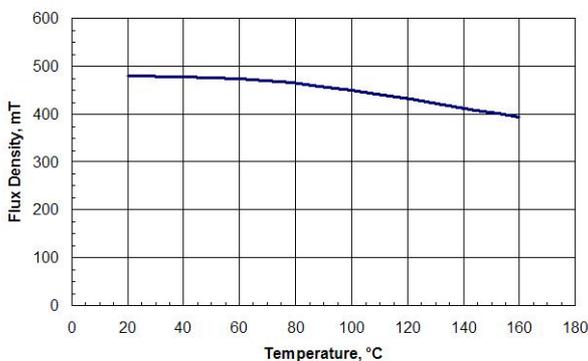
Ferrite Cores for Induction Welding

F59 Typical Performance Curves

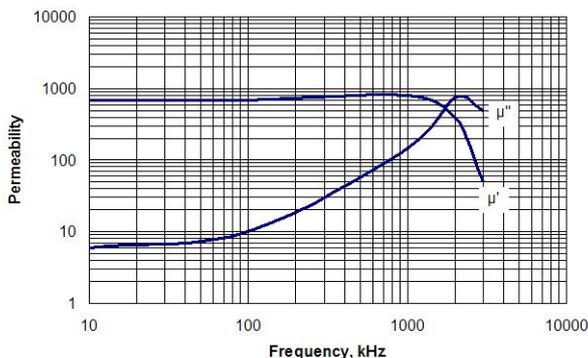
Initial Permeability vs. Temperature



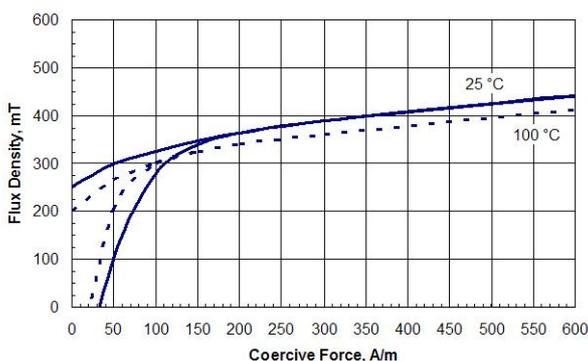
Saturation Flux Density vs. Temperature



Complex Permeability vs. Frequency



Dynamic Magnetisation (BH) Loop



Ferrite Impeder Materials

Ferrite impeder rods and tubes are used in the concentration of magnetic flux in the RF induction welding of steel tubes. In this application, ferrite core temperatures up to 150°C can be experienced and the properties must be optimized for this environment. The parameters influencing the efficiency and the speed of the process are:

- A high material permeability to ensure optimum flux concentration
- A high saturation induction at the working temperature which determines the maximum field in which the ferrite can usefully perform.
- A high curie temperature at which the material ceases to concentrate flux due to loss of ferrimagnetic properties.

MMG has developed a material specifically designed to meet the demanding properties required for induction welding. The F59 grade is a manganese-zinc ferrite material that offers considerable improvements over standard materials.

F59 Material Specification

Parameter	Symbol	Standard Test Conditions	Unit	F59
Initial Permeability (nominal)	μ_i	0.1 mT 10 kHz 25°C	-	700 ±25%
Saturation Flux Density (typical)	B_{sat}	796 A/m (10 Oe) 25°C	mT	420
Curie Temperature (minimum)	T_c	0.1 mT 10 kHz	°C	310

Ferrite Rod and Tube Configurations

MMG manufactures a large range of F59 grade rods and tubes in a variety of configurations.

- **Plain rods** - The simplest type of ferrite rod and often used in multiples bunched together in larger impeder assemblies to allow coolant flow along the full length of the rods.
- **Plain tubes** - Plain tubes provide a hollow central channel for the coolant and can therefore be used for larger assemblies where high temperatures may be experienced. Tubes can also be utilized in return flow assemblies.
- **Fluted rods** - Fluted rods have a number of slots or flutes cut around the circumference. These flutes increase the surface area of the rods providing more efficient cooling. They are most commonly used individually in smaller assemblies but can also be utilized bunched in larger integral units.
- **Fluted tubes** - These are principally used in return flow applications where it is important to ensure the inside of the tube remains dry. The flutes supply efficient cooling channels with the hollow central channel providing a return path for the coolant. They can also be utilized in integral mandrel impiders.

Ferrite Cores for Induction Welding

Ferrite Rods and Tubes - Dimensional Data

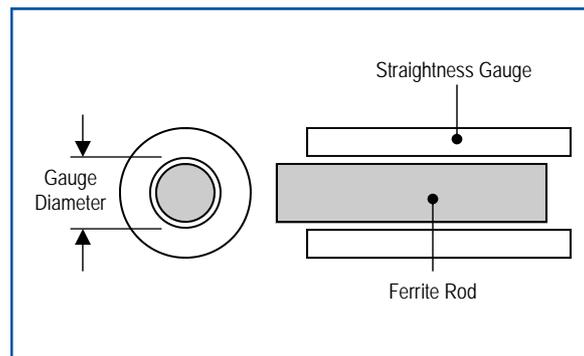
All MMG ferrite rods and tubes are manufactured in accordance with ISO 9002 quality systems. Dimensional tolerances are given below:

Dimensional Tolerances

Length: $\pm 2\%$

Straightness: Components pass through a full length gauge with an inside diameter equal to the ferrite core outside diameter +1.0 mm

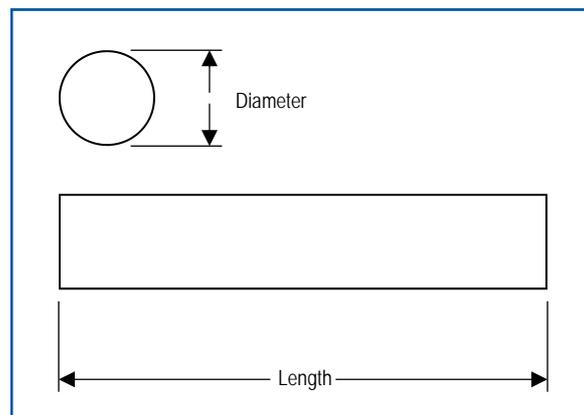
The following pages give details of MMG's range of standard rods and tubes. Customers are encouraged to enquire about non-standard items as a large variety of sizes or alternative material grades are available upon request.



Straightness Gauge

Plain Rods

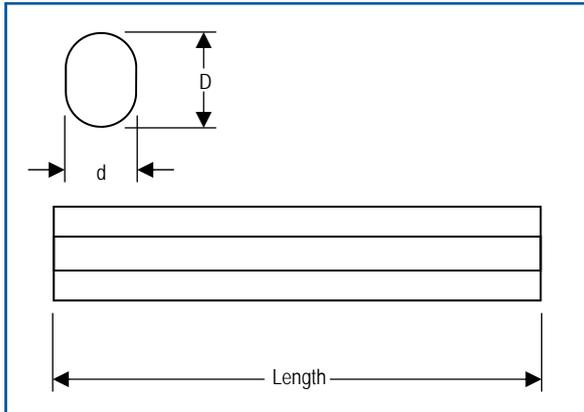
Diameter		Length		Part Number
[mm]	[in]	[mm]	[in]	
5.00 ± 0.30	0.197 ± 0.012	160.00	6.300	37-0516-59
5.00 ± 0.30	0.197 ± 0.012	200.00	7.870	37-0520-59
6.00 ± 0.30	0.236 ± 0.012	160.00	6.300	37-0616-59
6.00 ± 0.30	0.236 ± 0.012	200.00	7.870	37-0620-59
7.00 ± 0.30	0.276 ± 0.012	160.00	6.300	37-0716-59
7.00 ± 0.30	0.276 ± 0.012	200.00	7.870	37-0720-59
8.00 ± 0.30	0.315 ± 0.012	160.00	6.300	37-0816-59
8.00 ± 0.30	0.315 ± 0.012	200.00	7.870	37-0820-59
9.00 ± 0.30	0.354 ± 0.012	160.00	6.300	37-0916-59
9.00 ± 0.30	0.354 ± 0.012	200.00	7.870	37-0920-59
10.00 ± 0.35	0.394 ± 0.014	160.00	6.300	37-1016-59
10.00 ± 0.35	0.394 ± 0.014	200.00	7.870	37-1020-59
11.00 ± 0.35	0.433 ± 0.014	160.00	6.300	37-1116-59
11.00 ± 0.35	0.433 ± 0.014	200.00	7.870	37-1120-59
12.00 ± 0.35	0.472 ± 0.014	160.00	6.300	37-1216-59
12.00 ± 0.35	0.472 ± 0.014	200.00	7.870	37-1220-59
13.00 ± 0.40	0.512 ± 0.016	160.00	6.300	37-1316-59
13.00 ± 0.40	0.512 ± 0.016	200.00	7.870	37-1320-59
14.00 ± 0.40	0.551 ± 0.016	160.00	6.300	37-1416-59
14.00 ± 0.40	0.551 ± 0.016	200.00	7.870	37-1420-59
15.00 ± 0.45	0.591 ± 0.018	160.00	6.300	37-1516-59
15.00 ± 0.45	0.591 ± 0.018	200.00	7.870	37-1520-59
16.00 ± 0.50	0.630 ± 0.020	160.00	6.300	37-1616-59
16.00 ± 0.50	0.630 ± 0.020	200.00	7.870	37-1620-59
17.00 ± 0.50	0.669 ± 0.020	160.00	6.300	37-1716-59
17.00 ± 0.50	0.669 ± 0.020	200.00	7.870	37-1720-59
18.00 ± 0.55	0.709 ± 0.020	160.00	6.300	37-1816-59
18.00 ± 0.55	0.709 ± 0.020	200.00	7.870	37-1820-59



Plain Rod

Alternative diameters and lengths are available upon request.

Ferrite Cores for Induction Welding



Flat Sided Rod

Flat Sided Rods

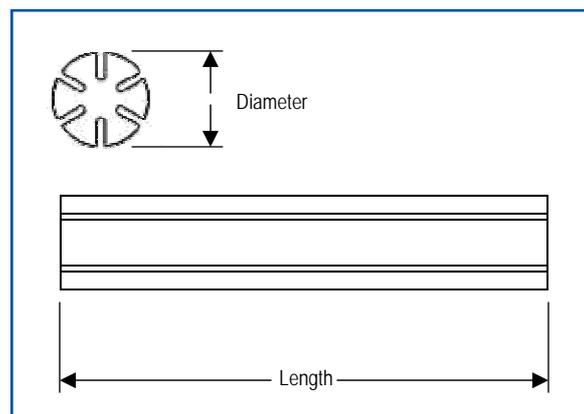
D		d		Length		Part Number
[mm]	[in]	[mm]	[in]	[mm]	[in]	
5.00 ± 0.30	0.197 ± 0.012	4.50	0.177	160.00	6.300	39-0516-59
5.00 ± 0.30	0.197 ± 0.012	4.50	0.177	200.00	7.870	39-0520-59
6.00 ± 0.30	0.236 ± 0.012	0.540	0.213	160.00	6.300	39-0616-59
6.00 ± 0.30	0.236 ± 0.012	0.540	0.213	200.00	7.870	39-0620-59
7.00 ± 0.30	0.276 ± 0.012	6.30	0.248	160.00	6.300	39-0716-59
7.00 ± 0.30	0.276 ± 0.012	6.30	0.248	200.00	7.870	39-0720-59
8.00 ± 0.30	0.315 ± 0.012	7.20	0.283	160.00	6.300	39-0816-59
8.00 ± 0.30	0.315 ± 0.012	7.20	0.283	200.00	7.870	39-0820-59
9.00 ± 0.30	0.354 ± 0.012	8.10	0.319	160.00	6.300	39-0916-59
9.00 ± 0.30	0.354 ± 0.012	8.10	0.319	200.00	7.870	39-0920-59
10.00 ± 0.35	0.394 ± 0.014	9.00	0.354	160.00	6.300	39-1016-59
10.00 ± 0.35	0.394 ± 0.014	9.00	0.354	200.00	7.870	39-1020-59
11.00 ± 0.35	0.433 ± 0.014	9.90	0.390	160.00	6.300	39-1116-59
11.00 ± 0.35	0.433 ± 0.014	9.90	0.390	200.00	7.870	39-1120-59
12.00 ± 0.35	0.472 ± 0.014	10.80	0.425	160.00	6.300	39-1216-59
12.00 ± 0.35	0.472 ± 0.014	10.80	0.425	200.00	7.870	39-1220-59
13.00 ± 0.40	0.512 ± 0.016	11.70	0.461	160.00	6.300	39-1316-59
13.00 ± 0.40	0.512 ± 0.016	11.70	0.461	200.00	7.870	39-1320-59
14.00 ± 0.40	0.551 ± 0.016	12.60	0.496	160.00	6.300	39-1416-59
14.00 ± 0.40	0.551 ± 0.016	12.60	0.496	200.00	7.870	39-1420-59
15.00 ± 0.45	0.591 ± 0.018	13.50	0.531	160.00	6.300	39-1516-59
15.00 ± 0.45	0.591 ± 0.018	13.50	0.531	200.00	7.870	39-1520-59
16.00 ± 0.50	0.630 ± 0.020	14.40	0.567	160.00	6.300	39-1616-59
16.00 ± 0.50	0.630 ± 0.020	14.40	0.567	200.00	7.870	39-1620-59
17.00 ± 0.50	0.669 ± 0.020	15.30	0.602	160.00	6.300	39-1716-59
17.00 ± 0.50	0.669 ± 0.020	15.30	0.602	200.00	7.870	39-1720-59
18.00 ± 0.55	0.709 ± 0.020	16.20	0.638	160.00	6.300	39-1816-59
18.00 ± 0.55	0.709 ± 0.020	16.20	0.638	200.00	7.870	39-1820-59

Alternative diameters and lengths are available upon request.

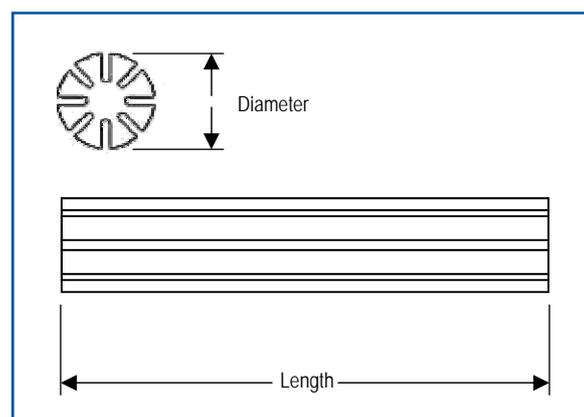
Ferrite Cores for Induction Welding

Fluted Rods

Diameter		Length		Type	Part Number
[mm]	[in]	[mm]	[in]		
5.00 ± 0.30	0.197 ± 0.012	160.00	6.300	1	38-0516-59
5.00 ± 0.30	0.197 ± 0.012	200.00	7.870	1	38-0520-59
6.00 ± 0.30	0.236 ± 0.012	160.00	6.300	1	38-0616-59
6.00 ± 0.30	0.236 ± 0.012	200.00	7.870	1	38-0620-59
7.00 ± 0.30	0.276 ± 0.012	160.00	6.300	1	38-0716-59
7.00 ± 0.30	0.276 ± 0.012	200.00	7.870	1	38-0720-59
8.00 ± 0.30	0.315 ± 0.012	160.00	6.300	1	38-0816-59
8.00 ± 0.30	0.315 ± 0.012	200.00	7.870	1	38-0820-59
9.00 ± 0.30	0.354 ± 0.012	160.00	6.300	1	38-0916-59
9.00 ± 0.30	0.354 ± 0.012	200.00	7.870	1	38-0920-59
10.00 ± 0.35	0.394 ± 0.014	160.00	6.300	1	38-1016-59
10.00 ± 0.35	0.394 ± 0.014	200.00	7.870	1	38-1020-59
11.00 ± 0.35	0.433 ± 0.014	160.00	6.300	2	38-1116-59
11.00 ± 0.35	0.433 ± 0.014	200.00	7.870	2	38-1120-59
12.00 ± 0.35	0.472 ± 0.014	160.00	6.300	2	38-1216-59
12.00 ± 0.35	0.472 ± 0.014	200.00	7.870	2	38-1220-59
13.00 ± 0.40	0.512 ± 0.016	160.00	6.300	2	38-1316-59
13.00 ± 0.40	0.512 ± 0.016	200.00	7.870	2	38-1320-59
14.00 ± 0.40	0.551 ± 0.016	160.00	6.300	2	38-1416-59
14.00 ± 0.40	0.551 ± 0.016	200.00	7.870	2	38-1420-59
15.00 ± 0.45	0.591 ± 0.018	160.00	6.300	2	38-1516-59
15.00 ± 0.45	0.591 ± 0.018	200.00	7.870	2	38-1520-59
16.00 ± 0.50	0.630 ± 0.020	160.00	6.300	2	38-1616-59
16.00 ± 0.50	0.630 ± 0.020	200.00	7.870	2	38-1620-59
17.00 ± 0.50	0.669 ± 0.020	160.00	6.300	2	38-1716-59
17.00 ± 0.50	0.669 ± 0.020	200.00	7.870	2	38-1720-59
18.00 ± 0.55	0.709 ± 0.020	160.00	6.300	2	38-1816-59
18.00 ± 0.55	0.709 ± 0.020	200.00	7.870	2	38-1820-59
19.00 ± 0.55	0.748 ± 0.020	160.00	6.300	2	38-1916-59
19.00 ± 0.55	0.748 ± 0.020	200.00	7.870	2	38-1920-59
20.00 ± 0.60	0.787 ± 0.024	160.00	6.300	2	38-2016-59
20.00 ± 0.60	0.787 ± 0.024	200.00	7.870	2	38-2020-59
21.00 ± 0.60	0.827 ± 0.024	160.00	6.300	2	38-2116-59
21.00 ± 0.60	0.827 ± 0.024	200.00	7.870	2	38-2120-59



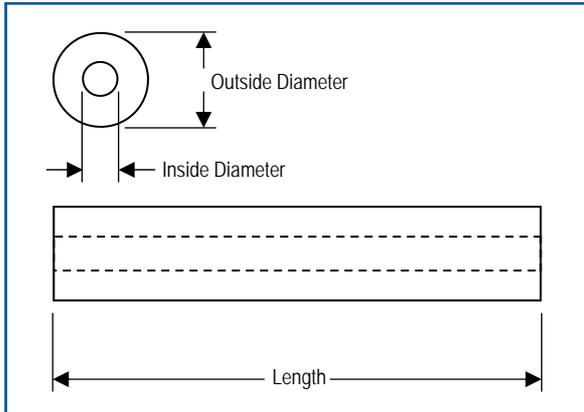
Fluted Rod - Type 1 (6 Slot)



Fluted Rod - Type 2 (8 Slot)

Alternative diameters and lengths are available upon request.

Ferrite Cores for Induction Welding

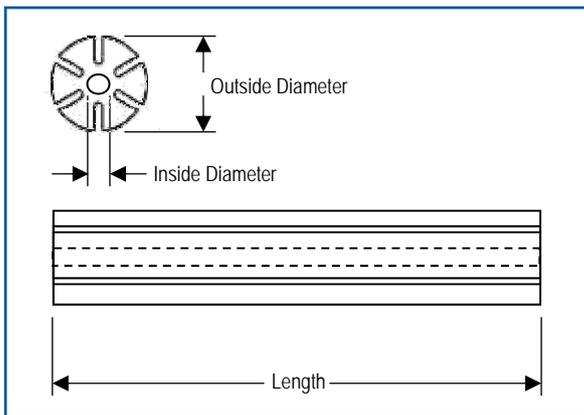


Plain Tube

Plain Tubes

Outside Diameter		Inside Diameter		Length		Part Number
[mm]	[in]	[mm]	[in]	[mm]	[in]	
5.00 ± 0.30	0.197 ± 0.012	2.50 ± 0.30	0.098 ± 0.012	160.00	6.300	35-05B16-59
5.00 ± 0.30	0.197 ± 0.012	2.50 ± 0.30	0.098 ± 0.012	200.00	7.870	35-05B20-59
6.00 ± 0.30	0.236 ± 0.012	3.00 ± 0.30	0.118 ± 0.012	160.00	6.300	35-06C16-59
6.00 ± 0.30	0.236 ± 0.012	3.00 ± 0.30	0.118 ± 0.012	200.00	7.870	35-06C20-59
8.00 ± 0.30	0.315 ± 0.012	4.00 ± 0.30	0.157 ± 0.012	160.00	6.300	35-08E16-59
8.00 ± 0.30	0.315 ± 0.012	4.00 ± 0.30	0.157 ± 0.012	200.00	7.870	35-08E20-59
10.00 ± 0.35	0.394 ± 0.014	5.00 ± 0.30	0.197 ± 0.012	160.00	6.300	35-10G16-59
10.00 ± 0.35	0.394 ± 0.014	5.00 ± 0.30	0.197 ± 0.012	200.00	7.870	35-10G20-59
12.00 ± 0.35	0.472 ± 0.014	6.00 ± 0.30	0.236 ± 0.012	160.00	6.300	35-12H16-59
12.00 ± 0.35	0.472 ± 0.014	6.00 ± 0.30	0.236 ± 0.012	200.00	7.870	35-12H20-59
14.00 ± 0.40	0.551 ± 0.016	7.00 ± 0.30	0.276 ± 0.012	160.00	6.300	35-14J16-59
14.00 ± 0.40	0.551 ± 0.016	7.00 ± 0.30	0.276 ± 0.012	200.00	7.870	35-14J20-59
16.00 ± 0.50	0.630 ± 0.020	8.00 ± 0.30	0.315 ± 0.012	160.00	6.300	35-16K16-59
16.00 ± 0.50	0.630 ± 0.020	8.00 ± 0.30	0.315 ± 0.012	200.00	7.870	35-16K20-59
18.00 ± 0.55	0.709 ± 0.020	9.00 ± 0.30	0.354 ± 0.012	160.00	6.300	35-18L16-59
18.00 ± 0.55	0.709 ± 0.020	9.00 ± 0.30	0.354 ± 0.012	200.00	7.870	35-18L20-59

Alternative diameters and lengths are available upon request.



Fluted Tube - (6 or 8 Slot)

Plain Tubes

Outside Diameter		Inside Diameter		Length		Part Number
[mm]	[in]	[mm]	[in]	[mm]	[in]	
10.00 ± 0.35	0.394 ± 0.014	3.00 ± 0.30	0.118 ± 0.012	200.00	7.870	40-10C20-59
12.00 ± 0.35	0.472 ± 0.014	3.00 ± 0.30	0.118 ± 0.012	200.00	7.870	40-12C20-59
12.00 ± 0.35	0.472 ± 0.014	6.00 ± 0.30	0.236 ± 0.012	200.00	7.870	40-12H20-59
14.00 ± 0.40	0.551 ± 0.016	5.00 ± 0.30	0.197 ± 0.012	200.00	7.870	40-14G20-59
14.00 ± 0.40	0.551 ± 0.016	7.00 ± 0.30	0.276 ± 0.012	200.00	7.870	40-14J20-59
16.00 ± 0.50	0.630 ± 0.020	5.00 ± 0.30	0.197 ± 0.012	200.00	7.870	40-16G20-59
16.00 ± 0.50	0.630 ± 0.020	7.00 ± 0.30	0.276 ± 0.012	200.00	7.870	40-16J20-59
18.00 ± 0.55	0.709 ± 0.020	6.00 ± 0.30	0.236 ± 0.012	200.00	7.870	40-18H20-59
18.00 ± 0.55	0.709 ± 0.020	9.00 ± 0.30	0.354 ± 0.012	200.00	7.870	40-18L20-59

Alternative diameters and lengths are available upon request.

Assemblies for Induction Welding

HF Welding

MMG has developed a range of impeder assemblies and associated products, both standard and custom-made, for use in high frequency welding tube mills. These are available in flow through and return flow types, and include scarfing and bead-rolling application impeders. The following pages give details of these and engineering data on the design and specification of impeders.

In the design, there are several parameters which must be optimized against each other to arrive at the best practical impeder. The key factors in a basic impeder design comprise of the following:

Diameter - Maximum diameter of the impeder should be as large as possible but must be small enough to avoid damage from out-of-roundness of the welding tube, dirt, weld metal bead, bumps in strip or joint in strip. Wall thickness and material of the impeder housing should be sufficient to give useful life before burn through or mechanical failure, yet thin enough to allow maximum ferrite content within the diameter limitations. Maximum abrasion resistance for long wear life, especially in the larger, heavier impeders is given by brass rub rings which are incorporated in our impeders to give longer life and protect the fiberglass housing tubes.

Length - Length of ferrite in impeders should be the shortest possible consistent with good welding. The minimum length should be sufficient to exceed the distance from weld point to the front of the work coil.

Cooling - Ferrites will have a decreasing ability to concentrate flux as the operating temperature rises. At temperatures exceeding the curie temperature, all practically useful magnetic properties would be lost. These changes are completely reversible and it follows that maximum cooling will give the best performance.

Ferrite Geometry - This should be such as to give maximum ferrite packing consistent with good coolant flow through the impeder. MMG's fluted rods with wide-open flutes in tightly fitting tubers give this best compromise in the smaller sizes and form the basis for our standard small impeders. Larger sizes are generally less critical and utilize bunched ferrite rods which results in improved water flow.

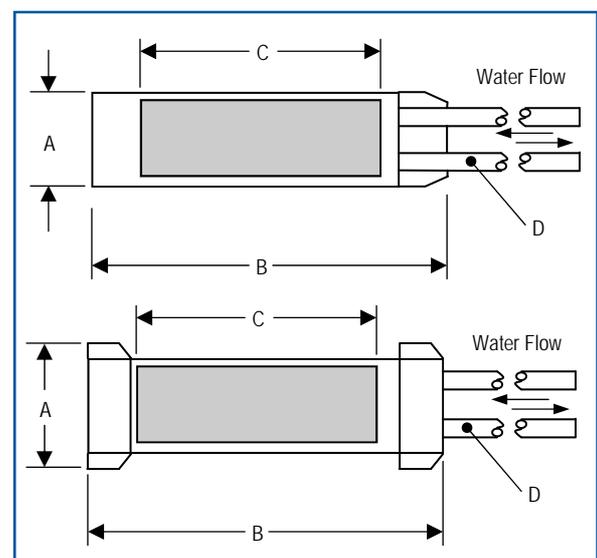
Customer Impeders

MMG is equipped to fabricate custom-made impeders of all types in a wide range of non-standard dimensions and configurations. Frequently, mills require impeders of greater length than standard or in dimensions other than shown. Customers are encouraged to enquire about non-standard sizes as a large variety of sizes can be manufactured.

Standard Return Flow Impeders

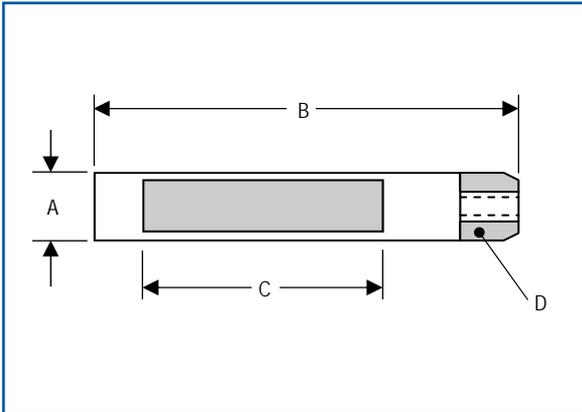
Standard HF welding return flow impeders have a coolant inlet and outlet at the same end to prevent coolant flooding down the welding tube.

Outside Diameter (A)		Overall Length (B)		Ferrite Length (C)		Connection (D) Copper Pipe	Part Number
[mm]	[in]	[mm]	[in]	[mm]	[in]		
15.88	0.500	254.0	10.00	200.0	7.875	1/8" x 254.0 mm	50K0625003
19.05	0.625	254.0	10.00	200.0	7.875	3/16" x 254.0 mm	50K0750003
25.40	1.000	254.0	10.50	200.0	7.875	3/16" x 254.0 mm	50K1000003
38.10	1.500	254.0	12.00	228.0	8.976	3/16" x 254.0 mm	50K1500003
50.80	2.000	254.0	12.00	228.0	8.976	3/16" x 254.0 mm	50K2000003

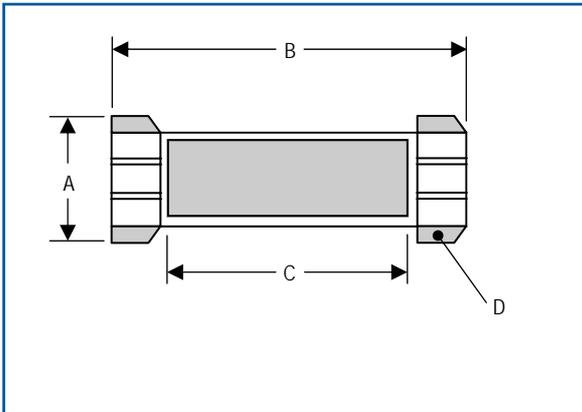


Standard Return Flow Impeder

Assemblies for Induction Welding



Flow Through Impeder (Style 1-PL)



Flow Through Impeder (Style 2-BR)

Standard Flow Through Impeders

Standard HF welding flow through impeders are available with brass components designed to protect the impeder housing and prolong its life.

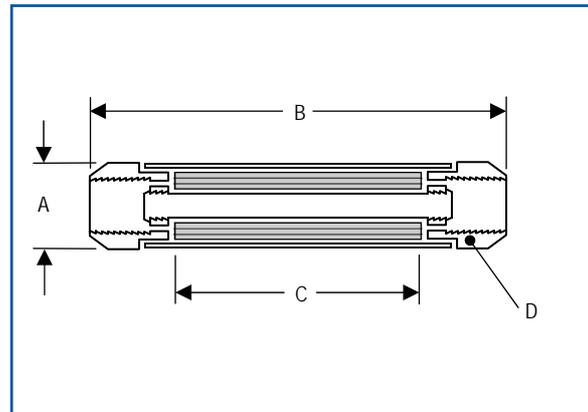
Outside Diameter (A)		Overall Length (B)		Ferrite Length (C)		Connection (D)	Style	Part Number
[mm]	[in]	[mm]	[in]	[mm]	[in]			
8.13	0.320	254.0	10.0	200.0	7.87	1/4" x 20	1PL	50K0320001
9.40	0.370	254.0	10.0	200.0	7.87	1/4" x 20	1PL	50K0375001
10.03	0.395	254.0	10.0	200.0	7.87	1/4" x 20	1PL	50K0395001
11.10	0.437	254.0	10.0	200.0	7.87	1/4" x 20	1PL	50K0437001
12.19	0.480	254.0	10.0	200.0	7.87	1/8" x 27 NPT	1PL	50K0480001
12.70	0.500	254.0	10.0	200.0	7.87	1/8" x 27 NPT	1PL	50K0500001
13.46	0.530	254.0	10.0	200.0	7.87	1/8" x 27 NPT	1PL	50K0530001
15.11	0.595	254.0	10.0	200.0	7.87	1/8" x 27 NPT	1PL	50K0595001
15.88	0.625	254.0	10.0	200.0	7.87	1/8" x 27 NPT	1PL	50K0625001
19.05	0.750	254.0	10.0	200.0	7.87	1/4" x 27 NPT	1PL	50K0750001
20.70	0.815	254.0	10.0	200.0	7.87	1/4" x 27 NPT	1PL	50K0815001
21.59	0.850	254.0	10.0	200.0	7.87	1/4" x 27 NPT	1PL	50K0850001
22.23	0.875	266.7	10.5	200.0	7.87	1/4" x 18 NPT	2BR	50K0875001
25.40	1.000	266.7	10.5	200.0	7.87	1/4" x 18 NPT	2BR	50K1000001
28.57	1.125	266.7	10.5	200.0	7.87	1/4" x 18 NPT	2BR	50K1125001
31.75	1.250	266.7	10.5	200.0	7.87	1/4" x 18 NPT	2BR	50K1250001
34.93	1.375	304.8	12.0	228.6	9.00	1/2" x 14 NPT	2BR	50K1375001
38.10	1.500	304.8	12.0	228.6	9.00	1/2" x 14 NPT	2BR	50K1500001
44.45	1.750	304.8	12.0	228.6	9.00	1/2" x 14 NPT	2BR	50K1750001
50.80	2.000	304.8	12.0	228.6	9.00	3/4" x 14 NPT	2BR	50K2000001
53.98	2.125	304.8	12.0	228.6	9.00	3/4" x 14 NPT	2BR	50K2125001
57.15	2.250	304.8	12.0	228.6	9.00	3/4" x 14 NPT	2BR	50K2250001
60.33	2.375	304.8	12.0	228.6	9.00	3/4" x 14 NPT	2BR	50K2375001
63.50	2.500	304.8	12.0	228.6	9.00	3/4" x 14 NPT	2BR	50K2500001
69.85	2.750	304.8	12.0	228.6	9.00	3/4" x 14 NPT	2BR	50K2750001
76.20	3.000	304.8	12.0	228.6	9.00	3/4" x 14 NPT	2BR	50K3000001
82.55	3.250	457.2	18.0	381.0	15.00	3/4" x 14 NPT	2BR	50K3250001
92.08	3.625	457.2	18.0	381.0	15.00	3/4" x 14 NPT	2BR	50K3625001
100.60	4.000	457.2	18.0	381.0	15.00	3/4" x 14 NPT	2BR	50K4000001
107.95	4.250	457.2	18.0	381.0	15.00	3/4" x 14 NPT	2BR	50K4250001
133.35	5.250	457.2	18.0	381.0	15.00	3/4" x 14 NPT	2BR	50K5250001

Assemblies for Induction Welding

Standard Integral Impeders

Integral impeders are designed for easy attachment to the hollow 'tie-bar' for scarfing and bead rolling applications.

Outside Diameter (A)		Overall Length (B)		Ferrite Length (C)		Connection (D)	Part Number
[mm]	[in]	[mm]	[in]	[mm]	[in]		
15.11	0.595	266.7	10.5	200.0	7.87	3/8" x 24	50K0595502
19.05	0.750	266.7	10.5	200.0	7.87	1/2" x 20	50K0750502
22.23	0.875	266.7	10.5	200.0	7.87	1/2" x 20	50K0875502
25.40	1.000	266.7	10.5	200.0	7.87	1/2" x 20	50K1000502
31.75	1.250	266.7	10.5	200.0	7.87	7/8" x 14	50K1250502
34.93	1.375	266.7	10.5	200.0	7.87	7/8" x 14	50K1375502
38.10	1.500	266.7	10.5	200.0	7.87	7/8" x 14	50K1500502



Standard Integral Impeder

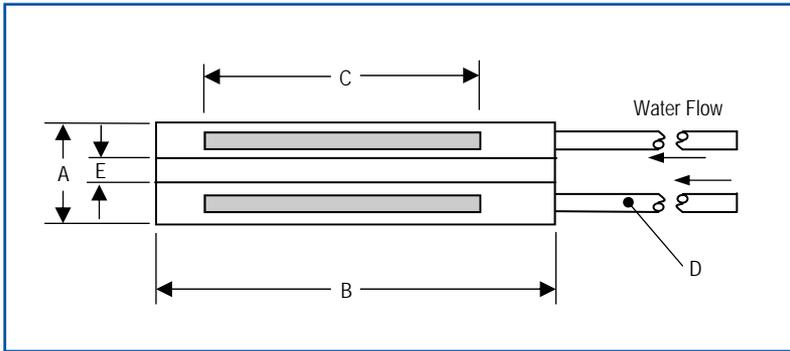
Assemblies for Induction Welding

Flow Through / Return Flow Scarfing Impeders

The standard scarfing impeders provide for a series of efficient outside diameter / inside diameter combinations and are available in flow through and return flow configurations. These impeders consist of a concentric pair of tubes between which ferrites are packed. The tool design has to be such that this impeder can be slipped onto the rod holding the tube - i.e. clear access must be possible from one end or the other. Twin copper pipes form the coolant inlet, but other arrangements are possible. A wide variety of outside diameter / inside diameter . Length combinations can be manufactured.

Standard Flow Through Scarfing Impeders

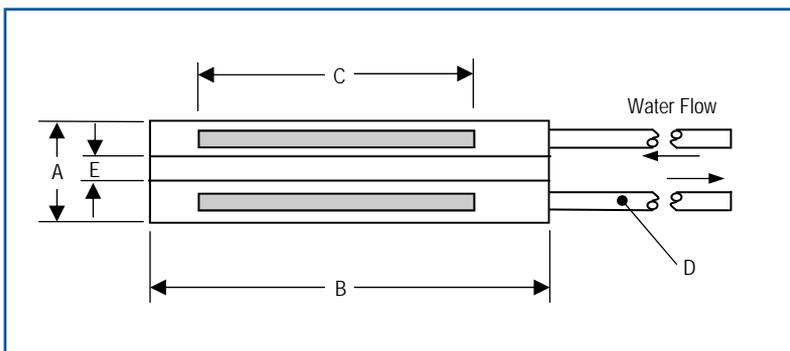
Outside Diameter (A)		Inside Diameter (E)		Overall Length (B)		Ferrite Length (C)		Connection (D) Copper Pipe	Part Number
[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]		
31.75	1.250	12.70	0.500	266.7	10.5	200.0	7.87	1/4" x 266.7	50K1250002
38.10	1.500	15.88	0.625	266.7	10.5	200.0	7.87	5/16" x 266.7	50K1500002
44.45	1.750	19.05	0.750	266.7	10.5	200.0	7.87	3/8" x 279.4	50K1750002
57.15	2.250	25.40	1.000	266.7	10.5	200.0	7.87	3/8" x 279.4	50K2250002



Flow Through Scarfing Impeder

Standard Return Flow Scarfing Impeders

Outside Diameter (A)		Inside Diameter (E)		Overall Length (B)		Ferrite Length (C)		Connection (D) Copper Pipe	Part Number
[mm]	[in]	[mm]	[in]	[mm]	[in]	[mm]	[in]		
31.75	1.250	12.70	0.500	266.7	10.5	200.0	7.87	1/4" x 266.7	50K1250004
38.10	1.500	15.88	0.625	266.7	10.5	200.0	7.87	5/16" x 266.7	50K1500004
44.45	1.750	19.05	0.750	266.7	10.5	200.0	7.87	3/8" x 279.4	50K1750004
57.15	2.250	25.40	1.000	266.7	10.5	200.0	7.87	3/8" x 279.4	50K2250004



Return Flow Scarfing Impeder

Company Profile

MMG Canada Limited, specializes in the design, development and manufacture of magnetic materials, including soft ferrites, permanent magnets and iron powder used in the construction of components for consumer, industrial, telecommunications, medical, computer, automotive and defense applications. With manufacturing bases in both North America and Asia and applications engineering staffed facilities and logistics centers located throughout Asia, Europe and North America, MMG is perfectly positioned to support customers around the world with all of their magnetic materials needs.

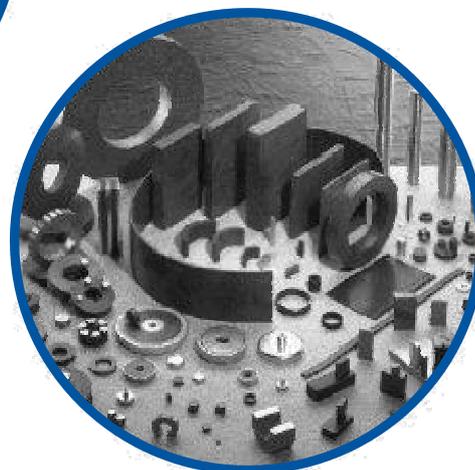
Attention to detail and a knowledgeable staff meet specific needs if not with our vast array of standard parts, then with a custom component designed to your specifications.



Product Profile

MMG is the most diversified manufacturer of magnetic materials and components in the world. Our capabilities include the manufacturing of the following materials and components:

- Manganese-zinc and nickel-zinc soft ferrites
- Low frequency grade iron powder
- MPP, high flux and sendust grade iron powder
- Alnico, ferrite, neodymium-iron-boron and samarium-cobalt magnets
- EMI suppression components
- High frequency induction welding impeder assemblies



Authorized Distributor / Sales Representative

