

TENNANT METALLURGICAL GROUP LTD



MAXIMAG[®]

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MAXIMAG®

High Permeability - Low Carbon - Refined Iron

APPLICATIONS

Maximag® is a high purity soft iron suitable for the manufacture of frames, yokes, armatures, cores etc in telephone relays, solenoids, magnetic clutches, magnetic brakes and all stationary parts of magnetic circuits carrying a direct flux.

Many other applications in the electrical and electronic equipment industry.

Also used for Sacrificial Anodes, for example in the protection of condensers and pumps for the electricity generation and shipping industries and in water de-salination plants.



CHEMICAL PROPERTIES

The specification quoted below can be maintained consistently from cast to cast. Specific analysis for 13 elements is provided for every cast. Material made to this composition, with the following heat treatment, provides typical electromagnetic properties as per the table below. Mechanical properties can be independently tested on request at additional cost.

Carbon	max 0.03%
Silicon	max 0.05%
Manganese	max 0.20%
Sulphur	max 0.02%
Phosphorus	max 0.01%

HEAT TREATMENT

The heat treatment required to produce these typical electromagnetic properties, consists of full annealing from 920°C (ie 920° C soak, furnace cool at 50° C/hour max to 600° C, furnace cool to room temperature). In order to avoid scaling, this treatment should be carried out in a neutral or slightly reducing atmosphere. Maximum hardness after annealing 120 B.H.N. Annealing is normally done after any significant machining work, but can be arranged on request.

ELECTROMAGNETIC PROPERTIES

Normally conforming to MoD specifications DTD 5092 and DTD 5102, which although obsolete, are commonly used as a basis for the typical electromagnetic properties which are expected to be achieved following the annealing process.

In order to develop the optimum electromagnetic properties, the material must be subjected to the above annealing treatment, preferably after rough machining. Toroidal ring testing is expected to yield results exceeding the minima quoted below:

C.G.S Units		M.K.S Units	
H (oersteds)	B (gauss) not less than	H (amp/m)	B (webers/m ²) not less than
5	13,900	500	1.44
10	15,100	1,000	1.53
20	15,700	2,000	1.59
50	16,700	5,000	1.70
100	17,700	10,000	1.81
200	19,000	15,000	1.89



AVAILABILITY

We typically aim to stock:

- A range of bright-turned round bar section sizes between 5/8" (16mm) and 2" (51mm).
- A range of black-rolled (as-forged) bar sizes from 2" (51mm) to 8" (203mm) diameter.
- A selection of commonly-used flat/rectangular bar dimensions.
- A selection of commonly-used plate dimensions, e.g. '1/2" (12mm) & 1" (25mm) thicknesses.
- Anodes or rings can be cut to custom thicknesses from round or rectangular bar. These can be drilled with holes for fixings if required or further machining to specific requirements.
- Many other profiles can be forged and pieces cut and/or machined to customer-specified dimensions on request, using our wide range of experienced sub-contractors.

TYPICAL CHEMICAL ANALYSIS AND MAGNETIC PROPERTIES

Cast Analysis Typical	
Element	%
C	0.006
Si	0.020
Mn	0.160
P	0.004
S	0.005
Cr	0.080
Mo	0.020
Ni	0.040
V	0.002
Al	0.015
Cu	0.040
Sn	0.005
H (ppm)	1.700
Mn: S Ratio	32:1

Magnetic data obtained after heat treatment	
H (amp/m)	B (webers/m ²)
100	0.408
200	1.171
400	1.429
500	1.481
1000	1.583
2000	1.656
5000	1.761
10000	1.873
15000	1.955



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