CONSUMET® ELECTRICAL IRON

Type analysis

Single figures are nominal except where noted

Iron	Balance	**Manganese (Maximum)**	0.15 %	**Silicon (Maximum)**	0.15 %
Vanadium	0.04 to 0.10 %	**Carbon (Maximum)**	0.02 %		

Forms manufactured

Bar-Rounds	**Billet**	**Strip**

Description

Consumet Electrical Iron is a double melted, low carbon iron that has been used for thin wall parts that must be vacuum tight. Melting and manufacture of the product is closely controlled to assure freedom of porosity and internal defects.

Distribution of nonmetallics throughout the alloy is maintained at minimum length and frequency so that thin wall sections approximately 0.020 in. (0.508 mm) or thicker will not contain leaks due to internal discontinuities.

Key Properties:

- Moderate electrical resistivity
- High annealed hardness
- Reduced deformation
- Corrosion resistance

Markets:

- Aerospace

Applications:

- Soft magnetic components that must operate in corrosive environments

> CONSUMET ELECTRICAL IRON

Physical properties

PROPERTY	At or From	English Units	Metric Units
SPECIFIC GRAVITY	—	7.86	7.86
DENSITY	—	0.2840 lb/in^3	7861 kg/m^3
MEAN COEFFICIENT OF THERMAL EXPANSION	77 to 212°F (25 to 100°C)	6.78 x 10^{-6} length/length/°F	12.2 x 10^{-6} length/length/°C
	77 to 392°F (25 to 200°C)	7.00 x 10^{-6} length/length/°F	12.6 x 10^{-6} length/length/°C
	77 to 572°F (25 to 300°C)	7.56 x 10^{-6} length/length/°F	13.61 x 10^{-6} length/length/°C
	77 to 752°F (25 to 400°C)	8.06 x 10^{-6} length/length/°F	14.51 x 10^{-6} length/length/°C
	77 to 932°F (25 to 500°C)	8.33 x 10^{-6} length/length/°F	14.99 x 10^{-6} length/length/°C
	77 to 1112°F (25 to 600°C)	8.61 x 10^{-6} length/length/°F	15.5 x 10^{-6} length/length/°C
	77 to 1292°F(25 to 700°C)	8.78 x 10^{-6} length/length/°F	15.8 x 10^{-6} length/length/°C
ELECTRICAL RESISTIVITY	70°F (21°C)	78.00 ohm-cir-mil/ft	13 microohm·cm
CURIE TEMPERATURE	—	1400°F	760°C

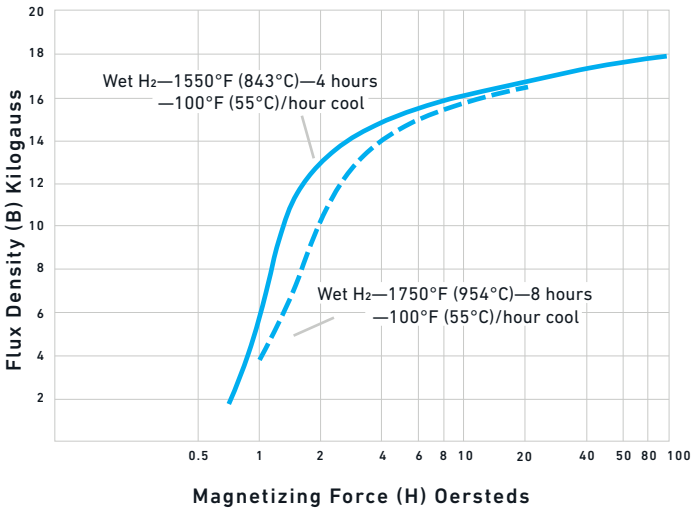
Magnetic properties

When subjected to ASTM aging tests of 600 hours at 212°F (100°C), samples of Consumet Electrical Iron annealed at 1550°F (843°C) in forming gas have shown an increase in coercive force of less than 6%.

SATURATION FLUX DENSITY (Bs)	21500 G	21.5 kG
RESIDUAL INDUCTION	8000 G	8 kG

> CONSUMET ELECTRICAL IRON

MAGNETIZING FORCE VS. FLUX DENSITY



Typical mechanical properties

1 IN (25.4 MM) DIAMETER BAR	0.2% YIELD STRENGTH		ULTIMATE TENSILE STRENGTH		ELONGATION 2 IN (50.8 MM)	HARDNESS
	ksi	MPa	ksi	MPa	%	ROCKWELL B
Consumet Electrical Iron	27	190	50	345	45	65

Heat treatment

Thermal treatment

Consumet Electrical Iron, like Carpenter Electrical Iron, is capable of exhibiting a wide variety of magnetic characteristics that are a function of the heat treating cycle applied and type of atmosphere employed.

To achieve the most magnetically soft condition, a wet hydrogen atmosphere with a dew point between 20°F and 60°F (-7°C and 16°C), at 1550°F (843°C) for 2 to 8 hours, should be employed.

When heat treating at temperatures above 1550°F (843°C), a dry hydrogen atmosphere or vacuum should be employed.

> CONSUMET ELECTRICAL IRON

Workability

TYPICAL MACHINING PARAMETERS —FEEDS AND SPEEDS — USED TO MACHINE CONSUMET ELECTRICAL IRON

MACHINABILITY					
OPERATION	**SPEED**		**FEED**		**TOOL MATERIAL**
	SFM	**M/S**	**IPR**	**MMPR**	
Turning	85	0.43	0.001/0.002	0.025/0.051	M-42
Drilling	60	0.31	0.001/0.005	0.025/0.127	M-42
Milling	65	0.33	0.002/0.005	0.051/0.127	M-2
Tapping	15/20	0.08/0.10	—	—	M-1 or M-2

Data listed should be used as a guide for initial machine setup only.

Additional machinability notes

Figures used for all metal removal operations covered are average. On certain work, the nature of the part may require adjustment of speeds and feeds.

Each job has to be developed for best production results with optimum tool life. Speeds or feeds should be increased or decreased in small steps.

Other information

Applicable specifications	ASTM A848 Alloy 1

For additional information, please contact your nearest sales office:
electrification@cartech.com | 610 208 2000

The information and data presented herein are typical or average values and are not a guarantee of maximum or minimum values. Applications specifically suggested for material described herein are made solely for the purpose of illustration to enable the reader to make their own evaluation and are not intended as warranties, either express or implied, of fitness for these or other purposes. There is no representation that the recipient of this literature will receive updated editions as they become available.