



## XC06

## XC06 : High Purity Ultra Low Carbon Magnet Steel

Magnet applications such as resonance imaging (MRI) or particle accelerators require massive parts with high specific magnetic properties and excellent homogeneity throughout the magnet components.

**Industeel XC06** is a commercially pure iron manufactured via a specific production route that ensures a high chemical and metallurgical purity with homogeneous properties throughout the product. Superior magnetic properties are thus obtained with a high reproducibility level :

- high saturation polarisation
- high permeability
- low coercive field strength

Available as bulk solid plate up to 825 mm thickness, **XC06** already proved its quality as soft magnetic material for high-tech industry components such as :

- particle accelerators (cyclotrons)
- magnet components (cores, yokes)
- synchrotrons
- spectrometers

### PROPERTIES

#### STANDARD

>	AISI	AISI 1006
>	EN 10027	C06
>	Others	Armco iron*

\*XC06 is a proprietary grade developed by Industeel. The above names are the nearest approximations according to different steel grade designations. \*Armco iron is a trademark from AK Steel.

**CHEMICAL ANALYSIS - WEIGHT %, MAXIMUM UNLESS A RANGE IS INDICATED**

	Fe	C	Mn	Si	Ni	Cr	Mo	Cu	S	P
Specification max.	balanced	0.06	0.40	0.20	-	0.10	-	0.10	0.015	0.015
Typical	>99.2	0.01	0.33	0.18	0.06	0.06	0.02	0.05	0.002	0.006

Excessive carbon content and residual elements found in conventional grades may impair the final performance of the grade : a decrease of saturation polarization and enhanced sensitivity to magnetic ageing (an increase of coercivity with time). Thanks to a specific production route combining electric arc furnace melting with VRD vacuum degassing, Industeel XC06 grade exhibits a constant quality with an extreme low level of residuals which does not exceed a few hundred of ppm.

**MAGNETIC PROPERTIES**

**XC06** is a soft ferromagnetic material providing high saturation polarisation whatever the thickness. Induction and coercive field strength are controlled on each plate.

The magnetic polarisation tabulated and graphically represented below is measured according to IEC/EN 60404-4 and IEC/EN 60404-2 on strips of 4 x 30 x 300 mm. The values are measured, not guaranteed. Guarantees will be adjusted according to the project needs. Induction values are tabulated accordingly.

Measured values of magnetic polarisation J(T)								
J1	J5	J10	J20	J50	J100	J200	J500	J1000
0.32	1.29	1.49	1.60	1.73	1.84	1.98	2.11	2.13

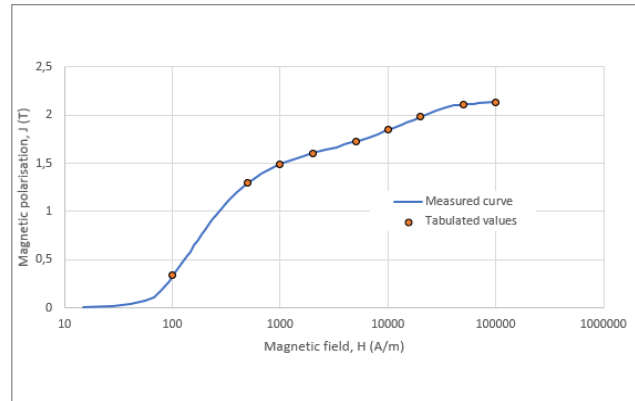
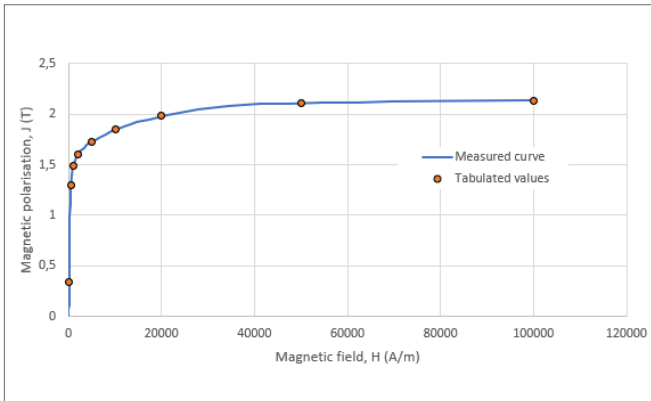
Measured values of magnetic induction B(T)								
B1	B5	B10	B20	B50	B100	B200	B500	B1000
0.32	1.29	1.49	1.61	1.73	1.85	2.00	2.17	2.25

Note : J1 to J1000 indicate the magnetic polarisation in Tesla (T) for magnetic fields from 0.1 kA/m to 100 kA/m

Note : B1 to B1000 indicate the magnetic induction in Tesla (T) for magnetic fields from 0.1 kA/m to 100 kA/m

1kA/m = 1000 A/m = 12.57 Oe

## PROPERTIES



Other typical electro-magnetic properties are :

- Saturation polarisation  $J_{sat}$  : 2.15T
- Coercitive force  $H_c$  :  $\leq 100$  A/m after excitation at 25 KA/m
- Relative permeability at 1000 A/m : 1188
- Resistivity at room temperature :  $16 \mu\Omega/cm$
- Thermal conductivity at room temperature : 50 W/mK

## DELIVERY CONDITIONS

**XC06** is available up to 825 mm thickness and can be supplied in the following conditions :

- Hot rolled plates (delivered as "rolled")
- Forged blocks (delivered as "forged")
- Cut-to-size flame cut pieces (according to specific drawings).

Depending on the size, two parts can be cut from the same mother plate to achieve the best symmetry in the magnetic properties. More information about machining possibilities available on demand.

## YOUR CONTACTS

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Note - This technical data and information represents our best knowledge at the time of printing. However, it may be subject to some slight variations due to our ongoing research program on offshore steel grades. We therefore suggest that information be verified at time of enquiry or order. Furthermore, in service, real conditions are specific for each application. The data presented here is only for the purpose of description, and may only be considered as guarantees when our company has given written formal approval. All information in this brochure is for the purpose of information only. Industeel reserves the right to change its product range at any time without prior notice. All Industeel facilities are ISO 9001, ISO 14001 and OHSAS 18001 certified. © Industeel 2017