

IPCO 1850SM

Martensitic high strength chromium alloyed stainless steel belt

Belt grade characteristics

IPCO 1850SM is a high strength steel with excellent mechanical properties. This in combination with good corrosion resistance makes it the ideal choice for a wide range of application.

The IPCO 1850SM belt grade is a martensitic chromium stainless steel and is characterised by:

- Excellent static strength
- Excellent fatigue strength
- Good corrosion resistance
- Good wear resistance
- Very good repairability

Chemical composition (typical), %

C	Si	Mn	Cr	Mo
0.36	0.40	0.55	13.5	1.0

Standards

EN	No standard
AISI	No standard

Mechanical properties

Static length

Standard strength at 20 °C (68 °F), typical values

Position	Proportional limit		Yield strength		Tensile strength		Elongation A (%)	Weld factor R_m/R_m	Hardness HV5
	MPa	ksi	MPa	ksi	MPa	ksi			
Parent material	1 250	161	1 450	210	1 800	261	0.65	530	
Transverse weld (not heat treated)					1 170	170		*	
Transverse weld (heat treated)								*	

*See figure on page 2.

Continuous operating temperature of or above 350 °C is not recommended for 1850SM, due to embrittlement. If the operating temperature is above 350 °C IPCO office should be contacted for technical assistance.

Impact properties

This belt grade is not recommended for use at low temperatures, e.i. operations below 0 °C.

Forms of supply

The belts are, as standard, delivered in a hardened and tempered condition with a mill finish and have well-rounded edges. If required practically any surface finish can be supplied. Perforated belts are also available.

The belts are levelled and straightened to obtain optimal flatness and straightness. The belts can be supplied in open lengths, with the ends prepared for welding on site, or in endless condition with a welded joint. Max width 310 mm and max thickness 1.2 mm.

For tracking, the belts can be provided with V-ropes, either rubber or in the form of a specially designed steel spiral. If required, the product side of the belt can be fitted with retaining strips to keep the conveyed material on the belt or with transverse flights to prevent material from sliding backwards when the belt is steeply inclined.

Different tolerance grades are available to ensure that the best belt can be selected from an economic point of view.

Recommendation and advice are available from your local IPCO Office.

Dynamic strength

The fatigue limit is defined as the reverse bending stress at which 50% of the test specimen withstand a minimum of 2×10^6 load cycles. These values refer to 20 °C (68 °F), a normal dry atmosphere and standard prepared specimen. The fatigue limit for the parent material is approximately ± 860 MPa (± 125 ksi).

Physical properties

Density, ρ , at 20 °C (68 °F)

7 700 kg/m³, 0.278 lb/in³

Modulus of elasticity, E, at 20 °C (68 °F)

210 000 MPa (30 450 ksi)

Thermal conductivity, λ

Temp	°C	20	100	200	300	400
	°F	68	212	392	572	752
	W/mK	24				
	Btu/ft h °F	14				

Specific heat capacity, C_p

Temp	°C	20	100	200	300	400
	°F	68	212	392	572	752
	kJ/kgK	460	460			
	Btu/lb °F	0.11	0.11			

Thermal expansion, α

Temp	°C	20–100	20–200	20–300
	°F	68–212	68–392	68–572
	10 ⁻⁶ /°C	10.6	11.1	11.4
	10 ⁻⁶ /°F	5.9	6.2	6.3

Magnetic properties

Remanence, B_r	0.7 Wb/m ²
Coercive force, H_c	< 2 500 A/m
Max relative permeability, μ_r	97

The thermal conductivity of chromium steel is comparable to austenitic stainless steels, but the thermal expansion is much lower. This makes this steel less sensitive to thermal strain and buckling caused by uneven temperature.

Corrosion resistance

General corrosion

IPCO 1850SM shows a good corrosion resistance in rural and mild industrial atmosphere and less good resistance when exposed to coastal atmosphere.

It has good resistance to:

- Ammonium hydroxide up to boiling point and sodium hydroxide at low concentrations and temperatures.

IPCO 1850SM is not suitable to use in any concentration of hydrochloric acid, phosphoric acid, nitric acid and sulphuric acid. IPCO 1850SM is not suitable in any concentration.

Pitting and crevice corrosion

The steel may be sensitive to pitting, even in solutions of a relative low chloride content.

Stress corrosion cracking

Stress corrosion cracking, although occurring relatively infrequently, can be cause of failure in stainless steels. It occurs at temperature above about 70 °C (160 °F), if the steel is subjected to tensile stresses and comes into contact with certain solutions, particularly those containing chlorides.

Hydrogen embrittlement

Hydrogen embrittlement is a potential danger to all high strength martensitic steels whenever the reduction of hydrogen ions to atomic hydrogen occurs. If this is the case, contact your local IPCO office.

Welding

IPCO 1850SM. A suitable fusion welding method is gas-shielded arc welding, with the TIG method as first choice.

No welding wire is required.

Further information concerning method and equipment etc. required can be obtained from your local IPCO office.

Hardness HV

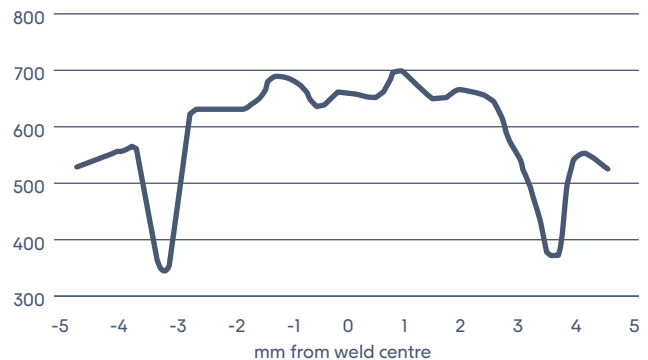


Figure 1. Example of hardness profile across a transverse weld, without heat-treatment in a IPCO 1850SM belt.