IPCO 1300C

Hardened and tempered carbon steel belt

12-2020

Belt grade characteristics

The IPCO 1300C belt grade is made of hardened and tempered carbon steel and is characterised by:

- Very good static strength
- Very good fatigue strength
- Very good thermal properties
- Excellent wear resistance
- Good repairability

IPCO 1300C is a carbon steel with a hard, smooth surface and a dark oxide layer, which makes it suitable for any application with a low risk for corrosion. Very good thermal properties make it ideal for baking and for heating and drying of liquids, pastes and fine-grained products.

Chemical composition (typical), %

C	Si	Mn	Cr
0.65	0.25	0.65	0.20

Standards

EN	1.1231
AISI	1070

Forms of supply

The belts are, as standard, delivered in a hardened and tempered condition 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 or riveting on site, or in endless condition with a welded joint.

For tracking, the belts can be provided with rubber V-ropes. 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.

Mechanical properties

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

Position	Proportional limit		Yield strength		Tensile strength		Elongation	Weld factor	Hardness
	MPa	ksi	MPa	ksi	MPa	ksi	A5 (%)	R_m/R_m	HV5
Parent material			1 200	174	1 280	186	11		400
Transverse weld (heat treated)			880	128	990	144	3	0.77	*

*See figure on page 2.

At elevated temperatures, nominal values

Temperature		Yield strength $R_{p0,2}$		Tensile strength R_m		Elongation A (%)
°C	°F	MPa	ksi	MPa	ksi	
100	212	980	142	1 220	177	10
200	392	950	138	1 210	175	12
300	572	890	129	1 170	170	28
400	752	720	104	850	123	28

IPCO 1300C should not be exposed for prolonged periods (a few hours) to temperatures exceeding 450° C (840° F). A reduction in strength due to carbide precipitation takes place at elevated temperatures and this process is also time related (a short time and high temperature give the same effect as long time and lower temperature). Hence the following recommendation: If an operation temperature of or above 350° C (660° F) is considered, your local IPCO office should be contacted for technical assistance.

Impact properties

This belt grade is not recommended for use at low temperature, i.e. such as in freezing operations.

Dynamic strength

The fatigue limit is defi ned 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 ± 460 MPa (67 ksi).

Physical properties

Density, ρ, at 20 °C (68 °F)
7 850 kg/m^3, 0.284 lb/in^3

Modulus of elasticity, E, at 20 °C (68 °F)
201 000 MPa (29 100 ksi)

Thermal conductivity, λ

Temp	°C	20	100	200	300	400
	°F	68	212	392	572	752
	W/mK	38	39	39	40	39
	Btu/ft h °F	22	22	22	23	23

Specific heat capacity, C_p

Temp	°C	20	100	200	300	400
	°F	68	212	392	572	752
	kJ/kgK	0.46	0.50	0.53	0.56	0.61
	Btu/lb °F	0.11	0.12	0.13	0.13	0.14

Thermal expansion, α

Temp	°C	20 – 100	20 – 200	20 – 300	20 – 400
	°F	68 – 212	68 – 392	68 – 572	68 – 752
	10^{-6}/ °C	11.1	12	12.8	13.5
	10^{-6}/ °F	6.2	6.6	7.1	7.5

Resistivity, ρ at 20 °C (68 °F)
0.2 μΩm

Magnetic properties

Remanence, B_r	1.5 Wb/m^2
Coercive force, H_c	1 500 A/m
Max relative permeability, μ_r	400

IPCO 1300C has high thermal conductivity and low thermal expansion, which makes it less sensitive to buckling and thermal strain caused by uneven temperatures.

Corrosion resistance

General corrosion
IPCO 1300C is, despite its oxide layer, susceptible to general corrosion in water solution, especially at low pH values. Increased temperature, flow rate, acidity and the presence of salts increase the corrosion rate. In neutral solutions, ions such as CrO_4^{-2} and NO_3- have an inhibiting effect.

Pitting and crevice corrosion
Pitting and crevice corrosion attacks can occur in chloride containing solutions at intermediate pH values, where the general corrosion rate is low.

Stress corrosion cracking
IPCO 1300C is not susceptible to stress corrosion cracking or intercrystalline corrosion attacks.

Hydrogen embrittlement
IPCO 1300C is susceptible to hydrogen embrittlement. If the materials exposed to possible sources of hydrogen embrittlement a special heat-treatment of the material is recommended. Contact your IPCO office for information.

Welding

Joints with very good strength and toughness can be formed in IPCO 1300C. A suitable fusion welding method is gas-shielded arc welding, with the TIG method as first choice. A well-balanced heat-treatment must be performed in connection with the welding, to ensure the weld has good static and dynamic mechanical properties.

Welding wire should be of type IPCO 1300C (AWS SFA A5.18 ER 70S-6 or AWS A5.18-95 ER 70S-3).

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

Hardness HV

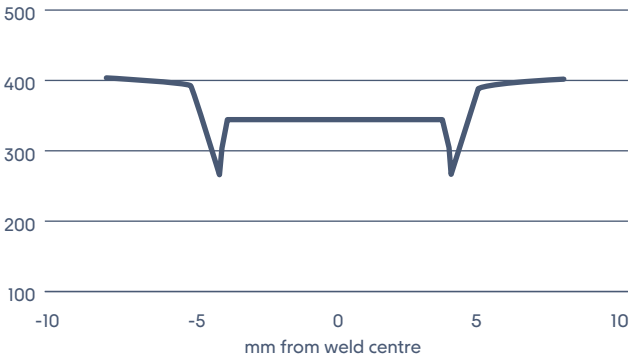

Figure 1. Example of hardness profile across an annealed transverse weld in a IPCO 1300C belt.