

Hardened and Tempered Carbon steel belt

Sandvik I 100C

DATA SHEET PS-SB-466-ENG. 11.2013.

Sandvik I 100C

The Sandvik 1100C belt grade is made of hardened carbon steel and is characterised by:

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

Sandvik 1100C is a carbon steel with a hard, smooth surface and a black 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 (Nominal), %

C	Si	Mn	Cr
0.65	0.25	0.65	0.20

Standards

EN 1.1235
AISI 1065

Forms of Supply

The belts are 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 Sandvik Office.

Mechanical Properties

Static strength
At 20 °C (68 °F), nominal values

Position	Yield strength		Tensile strength		Elongation A (%)	Weld factor $R_{m\ weld}/R_m$	Hardness Vickers, HV5
	$R_{p0.2}$ MPa	ksi	R_m MPa	ksi			
Parent material	1100	159	1200	174	7		380
Transverse weld (heat treated)	800	116	900	130	3	0.75	*

*See figure 1 on page 2.

At high temperatures, nominal values

Temperature	Yield strength $R_{p0.2}$		Tensile strength R_m		Elongation A (%)	
	°C	°F	MPa	ksi		
100	212	950	136	1150	168	7
200	392	950	139	1140	165	10
300	572	770	141	1100	159	20
400	752			780	113	17

Sandvik 1100C 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 Sandvik office should be contacted for technical assistance.

Impact strength

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

Fatigue 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 ± 460 MPa (67 ksi).

Physical Properties

Density, at 20 °C (68 °F)

7.9 kg/dm³, 0.29 lb/in³

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

196 000 MPa (28 380 ksi)

Thermal conductivity, λ

Temperature °C	λ W/mK °C	Temperature °F	λ Btu/ft h °F
20	38	68	22
100	38	200	22
200	38	400	22
300	39	600	23
400	38	800	22

Specific heat capacity, C_p

Temperature °C	C_p kJ/kgK	Temperature °F	C_p Btu/lb °F
0	0.46	68	0.11
100	0.50	200	0.12
200	0.52	400	0.12
300	0.55	600	0.13
400	0.60	800	0.14

Thermal expansion, α

Temperature °C	α × 10 ⁻⁶ /°C	Temperature °F	α × 10 ⁻⁶ /°F
20-100	10.4	68-200	5.8
20-200	11.3	68-400	6.3
20-300	11.9	68-600	6.6
20-400	12.8	68-800	7.1

Resistivity, ρ at 20 °C (68 °F)

0.2 $\mu\Omega$ m

Magnetic properties

Remanence, Br 1.5 Wb/m²
 Coercive force, H_c 1500 A/m
 Max relative permeability, μ_r 400

Sandvik 1100C 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

Sandvik 1100C 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 CrO₄⁻² and NO₃ 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

Sandvik 1100C is not susceptible to stress corrosion cracking or intercrystalline corrosion attacks.

Hydrogen embrittlement

Sandvik 1100C 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 Sandvik office for information.

Welding

Joints with very good strength and toughness can be formed in Sandvik 1100C. 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 Sandvik 1300C (AWS SFE A5.18 ER 70S-6).

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

Hardness HV

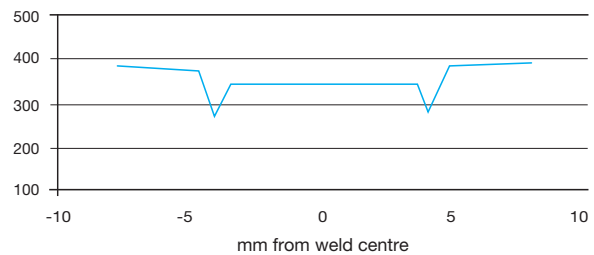


Figure 1. Example of hardness profile across an annealed transverse weld in a Sandvik 1100C belt.

