SANDVIK

SANDVIK 1RK95 STRIP STEEL

DATASHEET

Sandvik 1RK95 is a precipitation hardening stainless steel. In the annealed condition the formability is good and by an aging heat treatment the material obtains extensive precipitation hardening. The corrosion resistance of Sandvik 1RK95 is between that of the stainless 13% chromium steels and the austenitic stainless steels of the ASTM 304 type.

STANDARDS

– UNS: S45500

CHEMICAL COMPOSITION (NOMINAL) %

Chemical composition (nominal) %

C	Si	Mn	P	S	Cr	Ni	Ti	Cu	Nb
0.01	≤0.5	≤0.5	≤0.030	≤0.015	11.5	8.5	1.2	2.2	0.2

FORMS OF SUPPLY

Cold rolled strip can be supplied in coils, bundles, on spools or in cut lengths. Contact us for more information.

The following range of thicknesses and widths can be supplied as standard. Contact us if other dimensions are required.

Thickness	Width	Thickness	Width
mm	mm	in.	in.
1–3.5*	10–330	0.039–0.138	0.39–13.0

* Depending on requested tensile strength.

Tolerances

Contact us for information on tolerances.

MECHANICAL PROPERTIES

Static strength

Nominal values at 20°C (68°F).

Condition[1)]	Aging		Tensile strength, R_m		Proof strength, $R_{p0,2}$[a)]		Elongation, A50
	°C	°F	MPa	ksi	MPa	ksi	%
A	-	-	1050	152	800	116	10
AT	480	896	1850	268	1800	261	4
AT	510	950	1750	254	1700	247	4

Condition1)	Aging		Tensile strength, Rm		Proof strength, Rp0,2a)		Elongation, A50
	°C	°F	MPa	ksi	MPa	ksi	%
AT	538	1000	1500	218	1400	203	8

1) A = Annealed, AT = Annealed and aged for 4h

a) $R_{p0.2}$ corresponds to 0.2% offset yield strength 1 MPa = 1 N/mm2

Impact toughness

Charpy impact test according to ASTM E23 type A with the exception of the thickness. Nominal values at 20°C (68°F).

Condition1)	Nominal tensile strength, Rm	Thickness, t	Energy absorption at impact, J*)	
	MPa	mm	^	//
A	1050	2.5	14	18
AT	1750	2.5	6	6

1) A = Annealed, AT = Annealed and aged, 510°C (950°F)/4 h

*) ^ Sample direction is transverse to the rolling direction

// Sample direction is parallel to the rolling direction

PHYSICAL PROPERTIES

The physical properties of a steel are related to a number of factors, including alloying elements, heat treatment and manufacturing route, but the following data can generally be used for rough calculations. These values refer material at a temperature of 20°C (68°F) unless otherwise stated.

Density: 7.75 g/cm3 (0.28 lb/in3)

Modulus of elasticity

Annealed: approx. 180 000 MPa (26 100 ksi) Tempered: approx. 200 000 MPa (29 000 ksi)

Shear modulus

Annealed: approx. 75 000 MPa (10 900 ksi) Tempered: approx. 70 000 MPa (10 200 ksi)

CORROSION RESISTANCE

The resistance to general corrosion for Sandvik 1RK95 is between that of the martensitic 13% chromium steels and the austenitic stainless steels of the ASTM 304 type. Sandvik 1RK95 has showed good resistance to corrosion attack in the annealed and precipitation hardened condition during salt spray testing according to standard ISO 9227:2006 at 35°C (95°F) in 5% NaCl.

HEAT TREATMENT

The strength of Sandvik 1RK95 in the annealed condition can be increased by an aging process. An increase in tensile strength, due to precipitation hardening, of up to approximately 800 MPa (116 ksi) can be expected as shown in the "Mechanical properties" section. The different aging parameters result in different combinations of strength and ductility. This gives an opportunity to customize the mechanical properties depending on the application.

The recommended aging treatment is at 510°C (950°F) for 4h.

Aging is normally carried out by the customer after forming. To avoid discoloration, parts should be carefully

cleaned before heat treatment. Aging in open air furnaces gives a harmless brownish oxide on the surface.

In order to minimize the influence on properties of welding, Sandvik 1RK95 can be annealed at 830°C (1530°F)/1h and quenched in water to room temperature before the aging process.

WELDING

Due to the low carbon content Sandvik 1RK95 is readily weldable using common welding methods. If welding is performed following tempering, a softer heat affected zone (HAZ) is to be expected adjacent to the weld metal. It is possible to temper the welded material, but in order to get the best material properties it is recommended to perform a solution annealing prior to tempering.

BENDING

The values given below have been obtained by bending according to the standard SS-EN ISO 7438:2005 (in a 90° V-block with a 25 mm die opening, a sample of 35 mm width, turned so that the burrs of the blanked edges face into the bend). They can be used as a guidance for the smallest recommended bending radius for material in the annealed condition.

Nominal tensile strength	Thickness	Min. bending radius as function of thickness*	
R_m	t		
MPa	mm	⊥	//
1050	2.3	2 t	4 t

*) ⊥ Bend transverse to the rolling direction
// Bend parallel to the rolling direction

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