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Sandvik 5R60

(Wire)

Sandvik 5R60 is an austenitic stainless steel alloy with very good corrosion resistance and is recommended for service in dynamic electrostatic precipitator (ESP) environments.

Wire in Sandvik 5R60 is manufactured with a bright, lustrous finish, which provides both increased fatigue strength and corrosion resistance over matt finish materials.

Service temperature for Sandvik 5R60 is -200 to 300 °C (-330 to 570 °F). The grade has a PRE* value of minimum 25.

* PRE, Pitting Resistance Equivalent = % Cr + 3.3 x % Mo + 16 x % N

STANDARDS

- ASTM 316
- UNS S31600
- EN number 1.4436
- EN name X 3 CrNiMo 17-13-3
- W.Nr. 1.4436

CHEMICAL COMPOSITION (NOMINAL) %

C	Si	Mn	P	S	Cr	Ni	Mo
max	max	max	max	max			
0.04	0.6	1.2	0.030	0.015	17	11	2.6

FORMS OF SUPPLY

Sandvik 5R60 ESP for dynamic Electrostatic Precipitators is supplied bright drawn and degreased, in continuous lengths, without welds, on metallic spools.

Dimensions
Standard dimension for the product is 2.70 mm.
Other dimensions can be manufactured on request.

Tolerances
Standard diameter tolerance: +/- 0.020 mm
Roundness tolerance: max 0.020 mm

Surface purity
Wire is supplied with a cleaned surface with a maximum chloride ions content of 0.2 mg/dm ^{2}.

MECHANICAL PROPERTIES

Sandvik 5R60 ESP is tested and certified in accordance with a minimum nominal tensile strength. Proof strength is in the range of 85% of the tensile strength.

AT 20°C (68°F)

Proof strength	Tensile strength
$R_{p0.2}$	R_m
MPa	MPa
min	min
830	975

PHYSICAL PROPERTIES

Density: 8.0 g/cm^3, 0.29 lb/in^3
Specific heat capacity, at 20°C (68°F): 485 J/kg^{o}C, 0.12 Btu/lb h^{o}F
Thermal expansion: 30 - 100°C, 16.5 *10^{-6}/^{o}C, 86 - 210°F, 9.5 *10^{-6}/^{o}F
Thermal conductivity, at 20°C (68°F): 15 W/m^{o}C, 9 Btu/ft· h ^{o}F
Permeability,at 20°C (68°F): 1.004
Resistivity,at 20°C (68°F): 0.80 mWm, 31 mWin.
Modulus of elasticity, at 20°C (68°F)**:** 180 000 MPa, 26 100 ksi

CORROSION RESISTANCE

General corrosion

Sandvik 5R60 ESP has good resistance in:

- Organic acids at high concentrations and moderate temperatures
- Inorganic acids, e.g. phosphoric and sulphuric acids, at moderate concentrations and temperatures. The steels can also be used in sulphuric acid of concentrations above 90% at low temperature.
- Salt solutions, e.g. sulphates, sulphides and sulphites
- Caustic environments.

The risk of general corrosion in sulphuric acid during shut down periods has to be taken into account. In naturally aerated sulphuric acid the corrosion rate is below 0.1 mm/year provided the temperature is not higher than 50°C in 10% solution.

Pitting and crevice corrosion

Resistance to these types of corrosion improves with increasing molybdenum content. Sandvik 5R60 ESP, containing about 2.6% Mo, has substantially higher resistance to attack than steels of type AISI 304 and also better resistance than ordinary AISI 316 steels with 2.1 % Mo.

Stress corrosion cracking

Austenitic steels are susceptible to stress corrosion cracking. This may occur at temperatures above about 60 °C (140 °F) if the steel is subjected to tensile stresses and at the same time comes into contact with certain solutions, particularly those containing chlorides. Such service conditions should therefore be avoided. Conditions when plants are shut down must also be considered, as the condensates which are then formed can develop conditions that leads to both stress corrosion cracking and pitting.

In applications demanding high resistance to stress corrosion cracking, Sandvik Springflex ESP is recommended.

Gas corrosion

Sandvik 5R60 ESP can be used in

- Air up to 850 °C (1560 °F)
- Steam up to 750 °C (1380 °F)

Creep behaviour should also be taken into account when using the steel in the creep range.

In flue gases containing sulphur, the corrosion resistance is reduced. In such environments the steel can be used at temperatures up to 600-750 °C (1110-1380 °F) depending on service conditions. Factors to consider are whether the atmosphere is oxidizing or reducing, i.e. the oxygen content, and whether impurities such as sodium and vanadium are present.

DISCLAIMER:
Recommendations are for guidance only, and the suitability of a material for a specific application can be confirmed only when we know the actual service conditions. Continuous development may necessitate changes in technical data without notice. This datasheet is only valid for Sandvik materials.