

## Seamless Tubes of Heat-resistant Steels for Boiler and Heat Exchanger

### Standard & Material

DIN 17175 19Mn5 1.0482 (Steel Number)

It applies to seamless tubes including tubes for headers of heat-resistant steels St35.8 (1.0305), St45.8 (1.0405), 17Mn4 (1.0481), 19Mn5 (1.0482), 15Mo3 (1.5415), 13CrMo44 (1.7335), 10CrMo910 (1.7380), 14MoV63 (1.7715), 12CrMo195 (1.7362), X12CrMo91 (1.7386), X20CrMoV121 (1.4922), which are used in the construction of boilers, pipelines, pressure vessels and equipment for service up to 600°C and at simultaneous high pressures, where the total stress and relevant scaling conditions can raise or lower the temperature limit.

### Chemistry Composition

C, % 0.17-0.22

Si, % 0.30-0.60

Mn, % 1.00-1.30

P, % 0.040 max

S, % 0.040 max

Cr, % 0.30 max

### Mechanical Properties

Tensile Strength, MPa 510-610

Yield Strength, MPa 310 min

Elongation, % 19 min

Wall Thickness: average wall thickness

Developed Length: max 30 meters each length, +10mm/-0mm

Manufacture: the tubes made by cold drawn or hot rolled process.

Heat Treatment: the tubes are heat treated over the entire length, all types of heat treatments are normalizing, subcritical annealing, hardening and tempering with continuous cooling from the hardening temperature and subsequent tempering, hardening and tempering with isothermal transformation.

Inspection & Test: chemistry composition analysis, tensile test, flattening test, flaring test, NDT, surface inspection and dimension check.

Further Process: U bending tubes, fin tubes

