21F – S165M

Chemical analysis

	C	Si	Mn	S	P	Cr	Ni	Mo	N
Min.						15.0	4.5	0.8	0.02
Max.	0.05	0.7	1.5	0.015	0.035	17.0	6.0	1.5	

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Microstructure

Low carbon martensitic/ferritic stainless steel.

Comparable standard

Standard	Designation/Type
DIN	X4CrNiMo16-5-1
EN	1.4418
AFNOR	Z6CND16.05.01
SS	2387

Main features and applications

General areas of application are:

- Marine industry
- Hydraulic industry (valves, fittings, pumps, turbine hoops, etc.)
- Oil and gas industry (structures, landing grids, etc.)
- Mining industry.
- Chemical industry.

These areas take advantage of:

- High mechanical stress and toughness.
- Good corrosion and abrasion resistance properties.
- Excellent properties in elevated and cryogenic temperatures.
- Good fabrication properties: cutting and forming (both cold and hot processes).
- Good weldability properties.

Process

Produced from scrap and alloys. Melting process: Electric Arc Furnace + AOD.
Forged on a free-form 1600 t hydraulic press.

Minimum mechanical properties

Typical test requirements for

QT-XXX	Yield strength $Rp_{0.2}$ [MPa]	Tensile strength Rm [MPa]	Fracture Elongation A [%]	Impact Charpy-V @20 ºC [J]
QT-900	700	900-1100	14	60
QT-760	550	760-960	14	70

For other dimensions, please contact us. We will be pleased to give you additional information.

Heat treatment

Austenitization at 1000 °C and cooled in air or water, followed by tempering at 560 - 580 °C and air-cooling. The tempering temperature may be adjusted within this temperature range to obtain the desired mechanical properties.

Weldability

S165M belongs to group 7.2, Martensitic stainless steels, according to ISO/TR 15608:2005. The weldability of S165M is good.

Physical properties at room temperature (typical values)

Density, 20 °C [kg/m^3]	Relative magnetic permeability	Coefficient of thermal expansion		Specific heat, 20°C [J/(kg °C)]	Thermal conductivity [W/m °C]	Electrical resistivity [Ωmm^2/m]	Young's modulus, 20 °C [GPa]
		Range [°C]	Coefficient [K^{-1}]				
7700	-	20 - 100	$10.8 \cdot 10^{-6}$	430	15	0.7	200
		20 - 200	$10.8 \cdot 10^{-6}$				
		20 - 300	$11.2 \cdot 10^{-6}$				
		20 - 400	$11.6 \cdot 10^{-6}$				