41A - Alloy 825

Chemical analysis

	C	Si	Mn	S	Fe	Cr	Ni	Mo	Ti	Cu	Al
Min.					22.0	19.5	38.0	2.5	0.6	1.5	
Max.	0.05	0.5	1.0	0.03		23.5	46.0	3.5	1.2	3.0	0.2

Microstructure

Alloy 825 is an austenitic nickel-iron-chromium alloy with additions of molybdenum, copper and titanium.

Comparable standard

Standard	Designation/Type
ISO	NiFe30Cr21Mo3
EN	2.4858
UNS	N08825
AFNOR	NC21FeDU

Applications

General areas of application are:

- Pipes, tubes and fittings in oil and gas industry.
- Food process equipment
- Nuclear applications.
- Steel pickling equipment

These areas take advantage of:

- High resistance to chloride-induced stress corrosion.
- Good resistance to chloride-induced pitting and crevice corrosion.
- Excellent corrosion resistance, in both oxidizing and reducing environments.
- Good toughness at elevated temperatures, up to approximately 550 °C.
- Good mechanical properties from cryogenic to moderately high temperatures.

Process

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

Minimum mechanical properties:

Yield strength $Rp_{0.2}$ [MPa]	Tensile strength Rm [MPa]	Fracture Elongation A [%]	Impact Charpy-V @-196 °C [J]	Hardness HRB
241	586	30	100	92

Heat treatment

Solution annealing, between 950 and 1000 °C, followed by water quenching.

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Weldability

Alloy 825 belongs to group 8.2, Austenitic stainless steels with Cr> 19 %, according to ISO/TR 15608:2013.
Alloy 825 has excellent weldability..

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	1.005	30 - 100	$14.2 \cdot 10^{-6}$	440	11.1	1.13	196
		30 - 200	$14.6 \cdot 10^{-6}$				
		30 - 300	$14.9 \cdot 10^{-6}$				
		30 - 400	$15.1 \cdot 10^{-6}$				
		30 - 500	$15.3 \cdot 10^{-6}$				