MULTI Alloys

ADDING VALUE THROUGH EXPERIENCE

ALLOY 2205

ALLOY INFORMATION SHEET | UNS S31803 / S32205 W Nr 1.4462

HEAT AND/OR CREEP RESISTANT | CORROSION RESISTANT | OTHER

Alloy 2205, a duplex stainless steel, is well established as a material of construction. It displays many of the good properties of the austenitic and ferritic groups combined with high strength.

The chromium, molybdenum and nitrogen contents of the alloy ensure superior pitting and crevice corrosion resistance and for many environments, a general corrosion resistance that surpasses 316L. In addition, the balanced duplex structure of the alloy, comprising austenite and ferrite, imparts good resistance to chloride stress corrosion cracking – a short coming of grades such as 304L and 316L. Because of its corrosion resistance properties Alloy 2205 is well suited for applications involving brackish water and for many processes in the chemical and petrochemical industries.

The high proof strength of Alloy 2205 – approximately twice that of 316L – enables economical design. Further features of the grade are low thermal expansion (like that of ferritic steels) and good weldability. The UNS S32205 specification for the alloy ensures a tighter control of important alloying elements a consequence of which is a more consistent product with optimized properties. SANMAC™ 2205 is a free machining variant of Alloy 2205

*NOTE: Further mechanical property data available on request. *SANMAC™ is a registered trademark of Sandvik Intellectual Property AM*

COMPOSITION (%) * = Maximum								
	Ni	Cr	Mo	Mn	Si	N	C	Fe
Alloy 2205 (UNS S31803)	4.5-6.5	21.0-23.0	2.5-3.5	2.0*	1.0*	0.08-0.20	0.03*	Bal
Alloy 2205 (UNS S32205)	4.5-6.5	22.0-23.0	3.0-3.5	2.0*	1.0*	0.14-0.20	0.03*	Bal

APPLICABLE SPECIFICATIONS (ASTM / ASME)	
PLATE, SHEET & STRIP	A240 / SA240
PIPE	A789 / SA789 A790 / SA790
BAR	A276 / SA276
CASTINGS	A890 Grade 4A
FORGINGS	A182 / SA182
FITTINGS	A815 / SA815
WELDING CONSUMABLES	ER2209 / E2209

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MECHANICAL PROPERTIES #	
TENSILE STRENGTH (MPa) (min)	620
0.2% PROOF STRENGTH (MPa) (min)	450
ELONGATION (% in 50mm) (min)	25%
HARDNESS (Brinell) (max)	293

TYPICAL PHYSICAL PROPERTIES #	
DENSITY (kg / cu m.)	7800
YOUNGS MODULUS (GPa)	200
THERMAL CONDUCTIVITY (W/m.°C)	14
THERMAL EXPANSION (per °C)	0.000013

 # - At room temperature

FABRICATION

The higher strength of this alloy will necessitate greater forces having to be used to form it. This will apply to the bending of plate as well as the expansion of tubes. Hot working can be carried out in the range 1150 to 930 °C whist full annealing requires heating into the range 1020 to 1070 °C followed by rapid cooling.

Alloy 2205 possesses good weldability but precautions should be observed to maintain a balanced microstructure. There should be NO preheating prior to welding and the interpass temperature should be below 150 °C. A filler metal with a matching composition may be used and this will give the weld properties comparable to the parent metal.

In respect of machinability, Alloy 2205 requires higher cutting forces and gives rise to more rapid tool wear than is the case for 316L.

Detailed technical data available upon request

Note: Data shown are typical and full research should be done to determine the usefulness in any application or design.

No warranty is expressed or implied and we assume no responsiblity for the accuracy, completeness or usefulness of the content.

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