MACSTEEL®

Data Sheet

STAINLESS STEEL | 3CR12 TECHNICAL DATA

Description

South African developed 3CR12 is recognised as the original chromium utility ferritic stainless steel.

3CR12 was developed as an alternative material where the mechanical properties, corrosion resistance and fabrication requirements of other materials such as mild steel, galvanised, aluminium, or pre-painted steels are unsuitable.

3CR12 is a corrosion resisting steel and, as such, will exhibit staining when exposed to aggressive atmospheric conditions. In applications where aesthetic appearance is important, it is recommended that the 3CR12 be painted or that a stainless steel such as 304 be used.

Equivalents

3CR12/ 3CR12L- S41003, EN 1.4003

Typical application

Applications for 3CR12 exist in the following industries:

- Mining and minerals processing - chutes, liners and conveyors particularly in wet sliding abrasion conditions
- Material handling- bulk handling, coal, sugar, agriculture and abattoirs
- Structural applications in corrosive industries- ladders, walkways, cable racks, roofing, cladding and palisade fencing
- Rail transport- coal wagons, freight, passenger rail and rail infrastructure
- Road transport- passenger vehicles, coaches & buses, trucks & freight and utility vehicles)
- Petrochemicals and chemical, power generation, telecommunication cabinets and electrical enclosures and water and sewage treatment

Chemical composition (EN 10088-2 & ASTM A240)

Grade	%C	%Mn	%Si	%P	%S	%Cr	%Ni
3CR12L	0.03 max	1.5 max	1.0 max	0.04 max	0.015 max	10.5 - 12.5	0.3 - 1.0

Mechanical properties (EN 10088-2 & ASTM A240)

Grade	0.2% Proof Stess (MPa)	Tensile (MPa)	Elongation (%)	Hardness (HB)
3CR12L	280 min	460 min	18 min	223 max

Short time elevated temperature tensile strength (MPa)

Grade	100°C	300°C	500°C	700°C	900°C
3CR12L	545	415	300	-	-

Maximum recommended service temperature

Continuous service: 600°C
Intermitted service: 750°C

General corrosion

The utility ferritics are significantly more corrosion resistant than mild or low alloy corrosion-resistant steels. They have a lower corrosion resistance than the higher chromium standard ferritics. The utility ferritics should only be used in mildly corrosive conditions where aesthetics are not a primary requirement. A light surface patina or discolouration will form in most corrosive environments and this patina will, to some extent, retard further corrosion.

Thermal processing

Annealing

Heat to a range between 700°C and 750°C and cool rapidly in the air. Controlled atmospheres are recommended to avoid excessive oxidation of the surface.

Stress relieving

The utility ferritics can be stress relieved at 600°C to 650°C. Stress relieving after welding is not normally required. Should this be necessary a temperature range between 200°C and 300°C is recommended.

Hot-working

Initial forging and pressing: 1 100°C to 1 200°C
Finishing temperature: Not below 800°C.

Note: All hot working operations should be followed by annealing and then pickling & passivating to restore the mechanical properties and corrosion resistance.

Cold working

The utility ferritics have fair formability, but severe draws may require intermediate annealing. Roll forming, press braking, bending and pressing processes can be performed, but loadings will be about 30% higher than for mild steel. The minimum inner bend radius is twice the plate thickness. The utility ferritics exhibit greater spring back than mild steel and this should be compensated for by slight over bending.

Welding

The utility ferritics have good weldability and are suited to most standard welding methods. They can be welded to other ferrous metals, for example mild and stainless steels, quite satisfactorily. The recommended grade of electrode is 309L. When welding a utility ferritic to itself, E308L or E316L can also be used.

3CR12®