GLEN FLANGE limited

FOCUS ON MARINE INDUSTRY

DUPLEX & SUPER DUPLEX

Special Piping Materials is renowned for the high volume of Duplex and Super Duplex products that it stocks. It supplies these materials to countless companies around the world who use its product's in numerous applications in many different situations.

Special Piping Materials can supply many different products in both Super Duplex and Duplex such as welded pipes, butt weld fitting, flanges, forged fittings, seamless pipes and many more. They are available to buy from any of the company's offices across the world.

DUPLEX

Duplex stainless steels have a mixed microstructure of austenite and ferrite, the aim being to produce a 50/50 mix, although in commercial alloys, the mix may be 40/60 respectively.

Duplex steels have improved strength over austenitic stainless steels and also improved resistance to localised corrosion, particularly pitting, crevice corrosion and stress corrosion cracking. They are characterised by high chromium (19–28%) and molybdenum (up to 5%) and lower nickel contents than austenitic stainless steels. The most used duplex stainless steel are the 2205 (22% Chromium, 5% Nickel) and the 2507 (25% Chromium, 7% Nickel); the 2507 is known as "super duplex" due to its higher resistance to corrosion.

The mechanical properties of Duplex steels are approximately double those of singular austenitic steels, and resistance to stress corrosion cracking is far superior to type 316 stainless steel in chloride solutions. Duplex material has ductile or brittle transition at approximately -50 degrees.

SUPER DUPLEX

Super Duplex pipe is known to have better stress corrosion, cracking resistance and mechanical properties than any other type of steel. Super Duplex is an austenitic ferritic iron chromium – nickel alloy with molybdenum addition. It has good resistance to pitting and a very good tensile strength and high resistance to stress corrosion cracking at moderate temperatures, compared to that of conventional austenitic stainless steels.

The high corrosion resistance of Super Duplex pipeline supplies makes them ideal for onshore and offshore environments in oil and gas applications. Please see our industry pages for more information regarding the implications of Super Duplex piping.

All Duplex and Super Duplex materials stocked by Special Piping Materials are tested in accordance with international standard such as Norsok M630、Shell MESC.

Duplex/Super Duplex

ASME/ASTM:	German Grade No:	ASTM/UNS:	Density(g/m³)
A182-F51/60	1.4462	S31803/S32205	7.805
A182-F53	1.4410	S32750	
A182-F55	1.4501	S32760	
A182-F44/6Mo	1.4547	S31254	
AL-6XN		N08367	

Duplex Pipe Fittings Production Range

Specification	ASTM A 815, ASME SA 815, ASTM A 182, ASME SA 182
Type	Seamless/ welded/ Fabricated
Range	1/2 NB'' TO 24 NB'' IN Sch 10S, 40S, 80S, 160s, XXS
Dimension	ANSI/ASME B16.9, B16.28, MSS-SP-43

Buttweld Duplex Pipe Fittings

Seamless / Welded 100% Radiography Tested

Products		Size
Duplex Elbows - Long Radius	Duplex Stub Ends	Sizes 1/2'' - 48''
Duplex Elbows - Short Radius	Duplex Crosses	
Duplex Reducing Elbows	Duplex Reducing Crosses	
Duplex 45° Elbows	Duplex 180° LR Return Bends	
Duplex Tees	Duplex 180° SR Return Bends	
Duplex Fabricated Tees	Duplex Pipe Bends / Piggable Bends	
Duplex Reducers	Duplex Couplings	
Duplex Concentric Reducers	Duplex Pipe Nipples	
Duplex Eccentric Reducers	Duplex Forged / Plate Cut Rings	
Duplex 3D Elbow	Duplex End Caps	
Duplex 5D Elbow	Duplex Forged / Plate Circles	

Stainless steel duplex flanges

Forged and plate flanges

Specification	ASTM A182 / ASME SA182 F51 / F52 / F53 / F54 / F55 / F57 / F59 / F60 / F61.
UNS Grade	UNS S31803, S32205, S2205, S32550, S32750, S32760
Standard	ANSI Flanges, ASME Flanges, BS Flanges, DIN Flanges, EN Flanges, etc.
Size	1/2'' to 24''
Dimensions	ANSI/ASME B16.5, B16.47 Series A & B, B16.47, BS4504, BS 10, EN-1092, DIN, etc.
Class/pressure	150#, 300#, 600#, 900#, 1500#, 2500#, PN6, PN10, PN16, PN25, PN40, PN64 etc.

Products		Size
Duplex Slip-On Flanges	Duplex Threaded Flanges	1/8'' - 36'' Raised Face or Flat Face
Duplex Weld Neck Flanges	Duplex Socket Weld Flanges	
Duplex Blind Flanges	Duplex Reducing Flanges	
Duplex Lap Joint Flanges	Duplex Plate Flanges	

PRODUCT: INNER PIECE

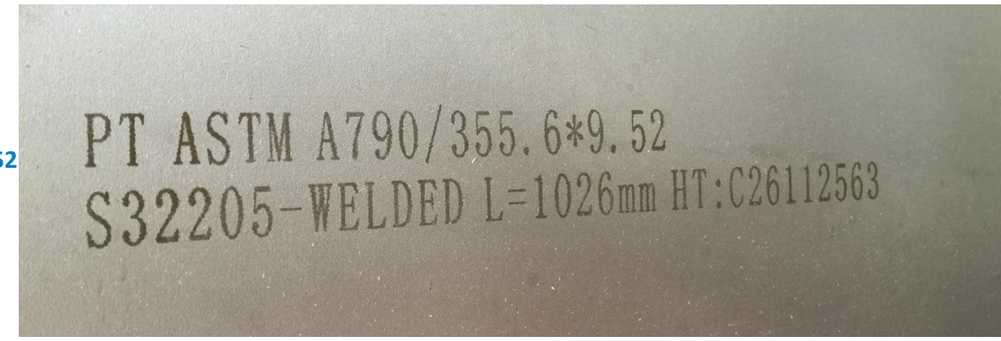
SPECIFICATION: DN300/PN16

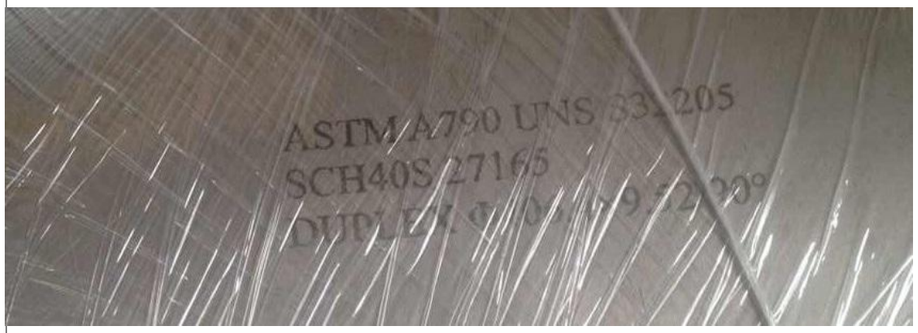
MATERIAL: S32205

PRODUCT: WELDED PIPE

SPECIFICATION: 355.6*9.52

MATERIAL: S32205





PRODUCT: ELBOW

SPECIFICATION:

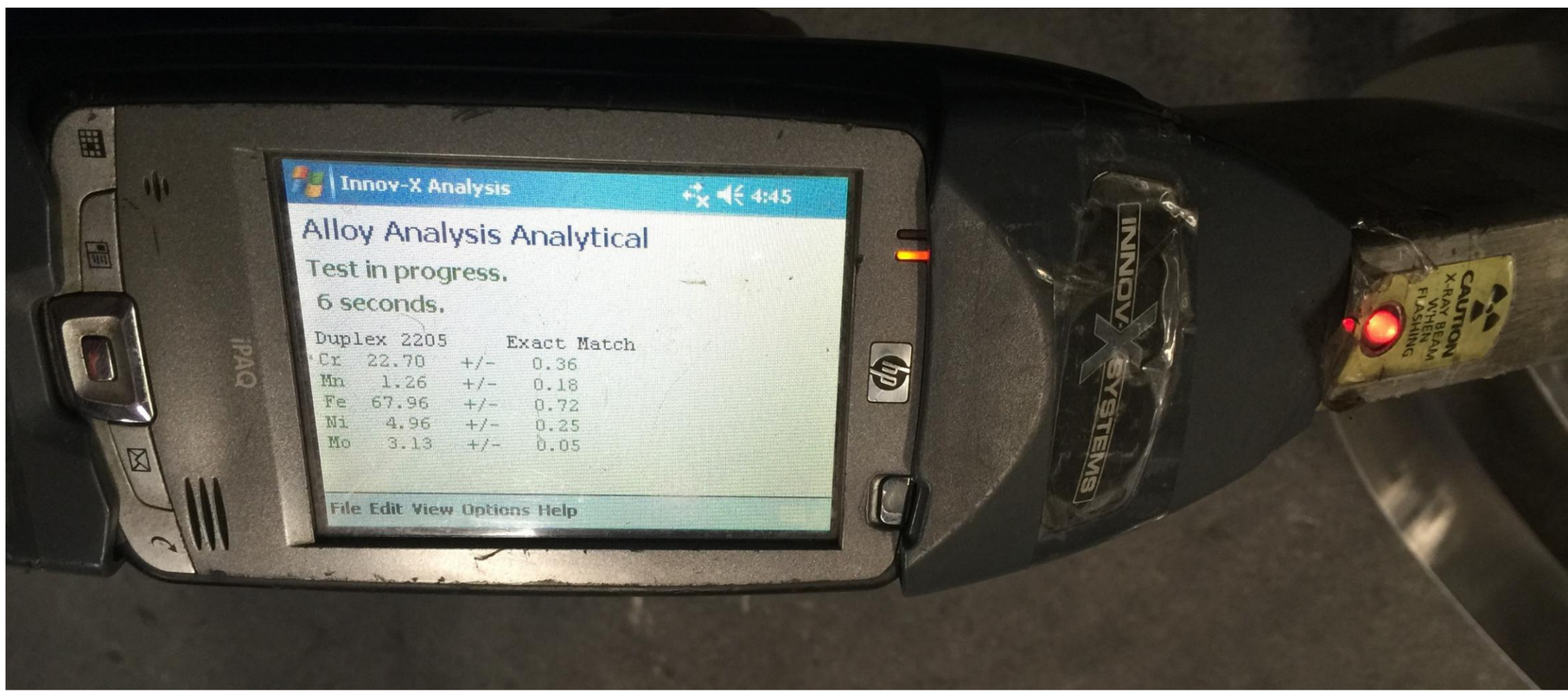
406.4*9.52*90°

MATERIAL: S32205

PRODUCT: SEAMLESS PIPE

SPECIFICATION: Φ33mm*1mm

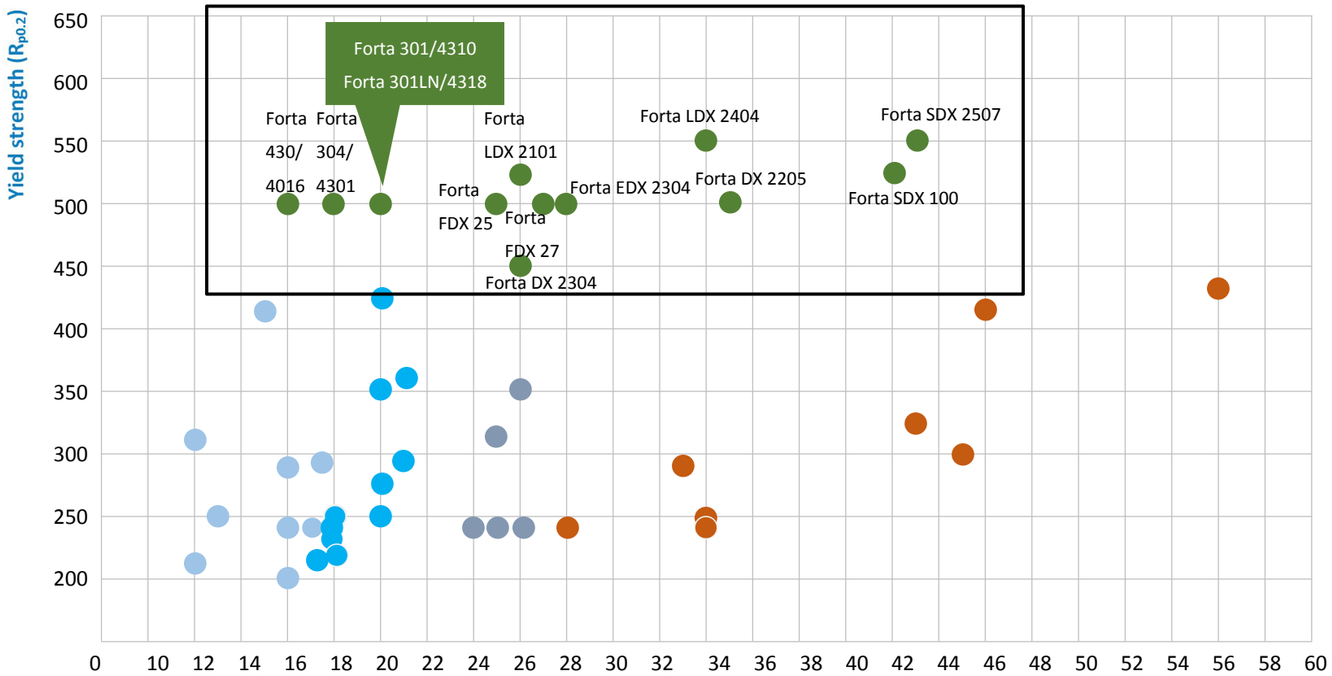
MATERIAL: S31803



Lloyd's Register · China Classification Society · ABS FOUNDED 1862 · CRS Hrvatski Registar Brodova · DNV · TÜVRheinland · RINA 1861 · GL · Bureau Veritas 1828

Product Performance Comparison

Strength vs. Corrosion resistance



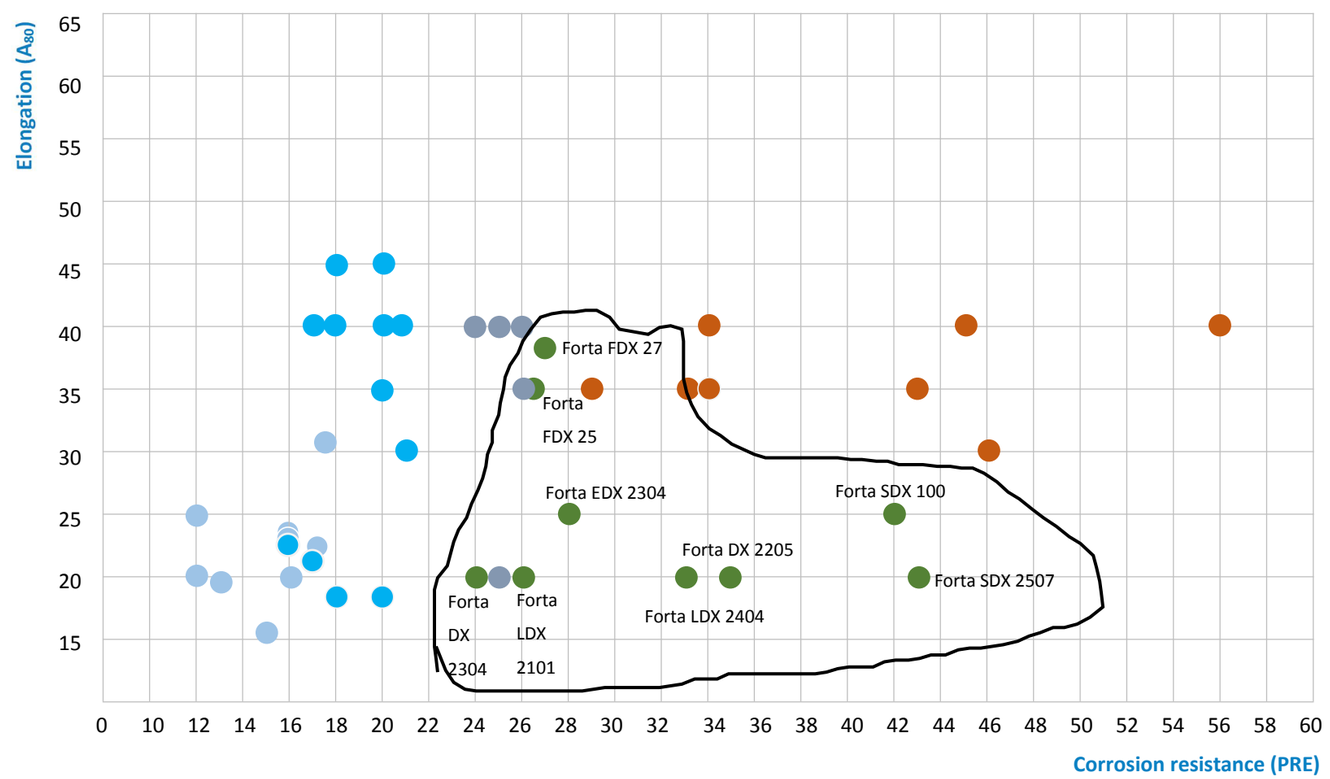
- Moda-Mildly corrosive environments(PRE up to 17)
- Core-Corrosive environments(PRE 17 to 22)
- Supra-Highly corrosive environments(PRE 22 to 27)
- **Forta-Duplex and other high strength(PRE 18 to 43)**
- Ultra-Extremely corrosive environments(PRE ＞ 17)

PRE calculation = %Cr + 3.3×%Mo + 16×%N

Note: PRE values shown are Outokumpu typical values. Yield strength ($R_{p0.2}$) according to EN 10088-2 minimum values for cold rolled strip.

For more values by product, please see www.glenflange.com

Elogation vs. Corrosion resistance



- Moda-Mildly corrosive environments(PRE up to 17)
- Core-Corrosive environments(PRE 17 to 22)
- Supra-Highly corrosive environments(PRE 22 to 27)
- **Forta-Duplex and other high strength(PRE 18 to 43)**
- Ultra-Extremely corrosive environments(PRE ＞ 17)

PRE calculation = %Cr + 3.3×%Mo + 16×%N

Note: PRE values shown are Outokumpu typical values. Elongation(A_{80}) according to EN 10088-2 minimum values for cold rolled strip.

For more values by product, please see www.glenflange.com

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