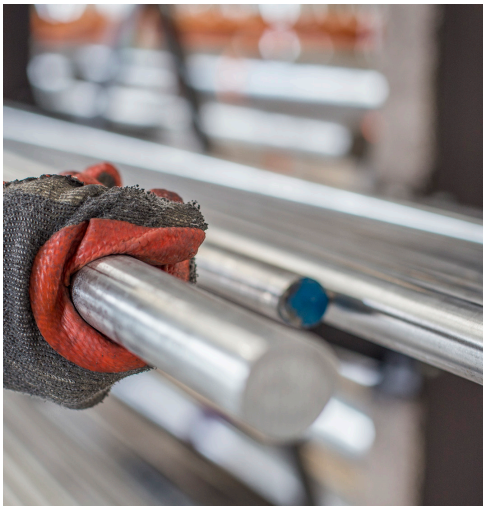
SOLUTIONS: The DUPLEX Option

Duplex stainless steels have become increasingly popular as they have the properties to meet a wide range of demands.



2020 marked the 90TH Anniversary of the duplex branch of the stainless steel family tree and their introduction post-dated that of stainless steels by only some 17 years. The usefulness of the austenitic – ferritic grades and their commercial success was significantly increased during the 1970's with the improved control of the microstructure and hence the properties of these grades not least of which is their weldability. The use of increased amounts of nitrogen played a big part in this.

This led to the development of super duplex grades (those having a PRE of at least 40) and the hyper duplex grades (PRE > 50). The lean duplexes and most recently formable duplexes which have the correct combination of ductility, strength and corrosion resistance to create lightweight complex formed components in these alloys have been the most recent developments.

Our range of DUPLEX ALLOYS

GRADE	MAJOR APPLICATIONS	AVAILABILITY	COMPOSITION
***LDX2101** UNS S32101 W Nr. 1.4162	A low-alloyed general purpose duplex grade displaying high strength and corrosion resistance on a par with most standard grades of stainless steel.	**Selected items from local stock.** Balance imported; ex-stock or mill availability	72Fe-21.5Cr-5Mn-1.5Ni-0.3Mo-N
ALLOY 2205 UNS S31803 UNS S32205 W Nr. 1.4462	A duplex stainless steel with excellent resistance to stress corrosion cracking. It displays a high yield strength as well as a useful resistance to pitting.	**Comprehensive range of plate, bar, pipe, welding consumables, fasteners and fittings from local stock.** Also imports from stock or mill production	69Fe-22Cr-5.7Ni-3Mo-N
ALLOY 255 UNS S32550 W Nr. 1.4507	Copper containing austenitic-ferritic stainless steel. ALLOY 255 has the added benefit over ALLOY 2205 of being resistant to sulphuric and phosphoric acids over a range of conditions.	Imported; ex-stock or mill availability	64Fe-25Cr-5.7Ni-3.3Mo-2Cu-N
ALLOY 2507 UNS S 32750 W Nr 1.4410	As duplex stainless steel this alloy displays similar properties to ALLOY 2205. Strength is however greater as is resistance to pitting and crevice corrosion and resistance to stress corrosion and cracking.	**Comprehensive range of plate, bar, pipe, welding consumables from local stock.** Also imports from stock or mill production	66Fe-24Cr-6Ni-3Mo-N
ALLOY S32760 UNS S32760 W Nr 1.4501	A highly alloyed duplex stainless steel for use in seawater, brine and similar chloride containing environments. Corrosion and strength properties superior to those of ALLOY 2205.	Imported; ex-stock or mill availability	64Fe-25Cr-7Ni-3.5Mo-0.75Cu-0.75W-N

*Registered name of Outokumpu Stainless A.B

The corrosion resistance attributes of the duplex grades are primarily their pitting and crevice corrosion resistance and stress corrosion cracking resistance. The general corrosion resistance of a specific grade will reflect its actual alloy content eg the presence of small amounts of copper have been found to be advantageous in resisting corrosion in sulphuric acid.

Applications for the duplex stainless steels are very wide ranging. They are used in industries in which stainless steels and nickel alloys are long established as the metals of choice to resist corrosion - most notably in chemical and mineral processing industries and for food and beverage production. The standard and super duplex grades are used extensively in marine applications such as the offshore oil and gas industry and for marine craft.

Because of their high strength and fabricability duplex stainless steels are being for rotating equipment and to replace coated structural steel for storage tanks and metal bridges. Heat exchangers are a major application area for tubes in duplex and super-duplex grades and the more recent development of the formable duplex grades opens the way to their use in plate heat exchanges as well. Although duplex stainless steels represent only a small part of the total stainless steel market -some 2 to 3%, they are considered vital in stainless steels contribution to sustainability.