

Cast Materials



Rely on Our Material Competence for Your Demanding Industrial Processes

Our customer-focused R&D and continuous research on new material options enable us to develop equipment with a strong resistance to corrosion and wear.



Proven expertise

- Continous research and development
- Specialist in corrosive and erosive applications
- Leading material technology
- One of the largest manufacturers of stainless castings for pumps, mixers and agitators in the world



- 60 years of experience in the manufacture of duplex steel grades
- 20,000 castings annually, of which roughly 80% corrosion-resistant duplex and super duplex cast steel grades

Own Foundry

- Workshop area 21,853 m²
- Capacity 4,000 tons
- Duplex, super duplex, austenitic and martensitic stainless steels, using the AOD method. Also special cast iron castings.
- For the most corrosive applications AVESTA 654 SMO* and Hastelloy. Sulzer process pumps are also available in titanium.
- ISO certified

Cast Materials

	Internal code	USA ASTM (1	Comparable grades	Nominal chemical						
			Item	Number code	с	Cr	Ni	Мо		
Corrosion-resistant cast steels										
Martensitic cast steels	E2	A743 Grade CA-6NM	G-X 4 CrNi 13 4	1.4317	max. 0.06	11.5-14.0	3.5-4.5	0.40-1.0		
	4E	A747 Grade CB7Cu-2	G-X 5 CrNiCu 16 4	1.4525	max. 0.07	14.0-15.5	4.5-5.5			
Austenitic cast steels	4C	A743 Grade CF-8	G-X 6 CrNi 19 10	1.4308	max. 0.08	18.0-21.0	8.0-11.0			
	4G	A743 Grade CG-3M	C-X 5 CrNiMo 19 11 3	(1.4412)	max. 0.03	18.0-21.0	9.0-13.0	3.0-4.0		
	43	A743 Grade CN-7M	C-X 4 NiCrCuMo 30 20 4	1.4527	max. 0.07	19.0-22.0	27.5-30.5	2.0-3.0		
	4U	(UNS S32654)	AVESTA 654SMO ⁽³		max. 0.025	23.0-25.0	21.0-23.0	7.1-7.5		
Duplex steels (austenitic- ferritic)	41	A890 Grade 3A	(G-X 2 CrNiMoN 25 6 3)	(1.4468)	max. 0.06	24.0-27.0	4.0-6.0	1.75-2.5		
	4L	A890 Grade 1B	(G-X 2 CrNiMoN 25 6 3 3)	(1.4517)	max. 0.04	24.5-26.5	4.7-6.0	1.7-2.3		
	4T	A890 Grade 5A	G-X 2 CrNiMo 26 7 4	1.4469	max. 0.03	24.0-26.0	6.0-8.0	4.0-5.0		
Nickel alloys	4J	A494 Grade CW-6M			max. 0.07	17.0-20.0	balance	17.0-20.0		
Carbon and low a	alloy cast s	steels				1	<u> </u>	1		
Carbon steels	46	A216 Grade WCB	GP 240 GH	EN 10213-2	max. 0.30					
Cast irons		I	J				<u> </u>			
Grey cast irons	52	A48 Class No 30 B	EN-GJL-200	EN-JL-1030						
	53	A48 Class No 35 B	EN-GJL-250	EN-JL-1040						
Ductile cast irons	5H	A395 Grade 60-40-18	EN-GJS-400-18	EN-JS-1020						
Wear-resistant cast irons	5B	A532 Class III Type A	EN-GJN-HV600 (XCr23)	EN-JN-3049	2.0-3.3	23.0-30.0	max. 2.5	max. 3.0		
Cast titanium										
Titanium	75	B367 C-3		3.7055						

⁽¹ Standard corresponding to the internal code is ASTM.

⁽² The hardness is an informative value.

⁽³ AVESTA 654SMO is a trademark owned by Outokumpu Stainless, which has granted Sulzer a license to produce this material.

 $^{(4}$ PRE ≥ 40

composition			Guaranteed mechanical properties				General properties and examples of applications		
Cu	N	Others	Tensile strength N/mm ²	Yield strength N/mm ²	Elonga- tion %	Hard- ness (2			
			755	550	15	250	Air-hardening steel with good strength properties. Used e.g. in power industry applications.		
2.5-3.2		Nb 0.15-0.35	1170	1000	5	400	A precipitation hardening grade with good strength properties and corrosion and wear resistance. Used for pump components.		
			485	205	35	150	Standard stainless steel grade with good toughness and resistance to nitric acid solutions.		
			515	240	25	160	Improved resistance to hot sulphuric and organic acids due to a high molybdenum content. Molybdenum increases the pitting resistance of steel.		
3.0-4.0			425	170	35	140	A grade for castings where resistance to sulphuric acid is essential.		
0.3-0.7	0.40-0.55		600	350	35	220	Excellent corrosion resistance. Nitrogen also gives very good resistance to pitting and crevice corrosion. Resistant to hot acids with high chloride content. Used in pulp bleaching plants, sea water applications, and in the handling of liquids containing halides.		
	0.15-0.25		655	450	25	230	Steel with better tensile and yield strength compared to austenitic steels. Used for various process industry and seawater applications.		
2.7-3.3	0.10-0.25		690	485	16	250	Similar grade to the previous one. The copper content improves corrosion resistance in e.g. weak sulphuric acid solutions. Molybdenum improves general corrosion resistance.		
	0.10-0.30		690	515	18	250	Used for equipment in the chemical and pulp industries. Good resistance to sea water. ⁽⁴		
		Fe max. 3.0%	495	275	25	180	High Mo and Cr contents make the alloy suitable for reducing and oxidizing and otherwise severely corroding conditions. Good resistance to sulphuric acid, and also to hydrochloric acid up to concentrations of approx. 10%.		
		<u> </u>							
		Mn. 1.0 %	485-655	250	22	160	Ductile and strong weldable steel, used e.g. in pump support structures. Also used in hot water pumps.		
			207			190	Used e.g. in pump bearing units.		
			241			210	Used in pump casings, casing covers and parts of bearings.		
			414	275	18	150	Used in casings and covers in various industries.		
max. 1.2						600	High-chromium white cast iron for wear resistant pumps. The high chromium content guarantees reasonable cor- rosion resistance. Well suited for wearing applications in alkaline conditions.		
			450	380	12	≤235	Excellent corrosion resistance in many severe conditions, particularly ones containing chlorine, and in oxidizing conditions. Used in e.g. chlorine dioxide and hypochlorite containing solutions in the pulp and paper and chemical process industry.		

Pitting and Crevice Corrosion

Pitting and crevice corrosion are localized forms of corrosion that can occur in stainless steels.

Wherever there are chloride solutions, such as sea water, bleach or oxidizing salts e.g. ferric chloride and cupric chloride, this form of corrosion can occur.

Pitting occurs randomly on wetted surfaces in the form of small deep cavities. Crevice corrosion occurs in narrow crevices into which the solution can penetrate but is not flushed away during normal operation as in other, more open areas.

Attempts have been made to establish a measure of the pitting and crevice corrosion resistance by calculating the sum of the most important alloying elements in a weighed form. This sum is called PRE (Pitting Resistance Equivalent) and one common expression is PRE = Cr % + 3.3 x Mo % + 16 x N %. The figures in the table have been calculated using this formula.

PRE figures of various stainless steels

(informative values)

Alloy	PRE
CF-8	19
ЗА	34
-	-
1B	35
5A	41
654 SMO	56

The higher the PRE figure, the greater the pitting and crevice corrosion resistance of the alloy.



Steel melted in the arc furnace is processed in the AOD converter (Argon-Oxygen-Decarburization).



The largest cast items which can be heat treated at the Karhula Foundry can have dimensions of $4,500 \times 4,500 \times 3,000$ mm.

www.sulzer.com

E00510 en (7) 4.2015 (500), Copyright © SULZER Ltd. 2015 This brochure is a general product presentation. It does not provide a warranty or guarantee of any kind. Please, contact us for a description of the warranties and guarantees offered with our products. Directions for use and safety will be given separately. All information herein is subject to change without notice.

Se share