HAYNES® 556® alloy for Hot-Dip Galvanizing Tech Brief

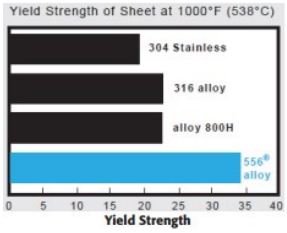
For Hot-Dip Galvanizing Process Hardware


HAYNES® 556® alloy Spinner Basket
(weight of original baskets cut in half)

Molten zinc is one of industry's most aggressive high-temperature environments. In hot-dip galvanizing processes, chains, hooks, baskets, racks, trays, T/C protection tubes, and all sorts of other immersed components can simply dissolve away before your eyes! But you can minimize dissolution and bath contamination problems with HAYNES® 556® alloy. The 556® alloy combines resistance to molten zinc with excellent high-temperature strength, so you can design your components to weigh less and last longer

Product Description

HAYNES® 556® alloy is an iron-nickel-chromium-cobalt alloy that combines effective resistance to sulfidizing, carburizing, and chlorine-bearing environments at high temperatures with good oxidation resistance, fabricability, and excellent high-temperature strength. It has also been found to resist corrosion by molten chloride salts and molten zinc.



HAYNES® 556® alloy is highly useful for service at elevated temperatures in moderately to severely corrosive environments. Applications include tubing and structural members in waste heat recuperators, super heaters, and internals in municipal and chemical waste incinerators; power plant burner buckets, air nozzles and fluidized bed combustor heat exchangers and internals; high speed furnace fans, galvanizing bath hardware and brazing fixtures; and high-temperature rotary calciners and kilns. There are also additional uses in the chemical/petrochemical process and pulp and paper industries.

Corrosion of Alloys Exposed in 850°C (454°C) Zinc for 50 Hours		
Alloy	**Base**	**Metal Loss***
556®		**1.6**
25	Cobalt	2.3
188	Cobalt	2.5
446	Iron	9.3
800H	Iron	11.0
304	Iron	14.1
625	Nickel	>24.0
X	Nickel	>24.0

Nominal Composition

Iron:	Balance
Nickel:	20
Cobalt:	18
Chromium:	22
Molybdenum:	3
Tungsten:	2.5
Tantalum:	0.6
Nitrogen:	0.2
Silicon:	0.4
Manganese:	1
Aluminum:	0.2
Carbon:	0.1
Lanthanum:	0.02
Zirconium:	0.02

Typical Tensile Properties, Plate

Test Temperature		0.2% Yield Strength		Ultimate Tensile Strength		Elongation
°F	**°C**	**ksi**	**MPa**	**ksi**	**MPa**	**%**

RT	RT	55	375	116	805	51
1000	540	31	210	90	625	60
1200	650	31	210	83	575	57
1400	760	29	200	69	470	53
1600	870	28	190	49	340	69
1800	980	19	130	31	210	84
2000	1095	9	60	16	110	95

Typical Rupture Properties, Plate

Test Temperature		Typical Rupture Properties: Stress Required to Produce Rupture in Hours Shown					
		100 h		1,000 h		10,000 h	
°F	°C	ksi	MPa	ksi	MPa	ksi	MPa
1400	760	25.0	172	17.5	121	11.9	82
1500	815	17.0	117	11.8	81	7.8	53
1600	870	11.5	79	7.5	52	4.9	34
1700	915	7.6	52	4.8	33	3.0	21
1800	980	4.8	33	3.0	21	1.9	13

Typical Room Temperature Physical Properties

Physical Property	British Units	Metric Units
Density	0.297 lb/in^3	8.23 g/cm^3
Electrical Resistivity	37.5 µohm-in	95.2 µohm-cm
Modulus of Elasticity	29.7 x 10^6 psi	206 GPA
Thermal Conductivity	77 Btu-in/ft^2-h-°F	11.1 W/m-°C
Specific Heat	0.111 Btu/lb-°F	464 J/Kg-°C

Environmental Resistance

Oxidation in Air - Excellent at 2000°F (1095°C)

Sulfidation - Second only to Co-base alloys

Molten Chloride Salts - Equal to alloy X

Chlorination - Very good to 1650°F (900°C)

Carburization - Equal to alloy 800H

Molten Zinc - Best Available