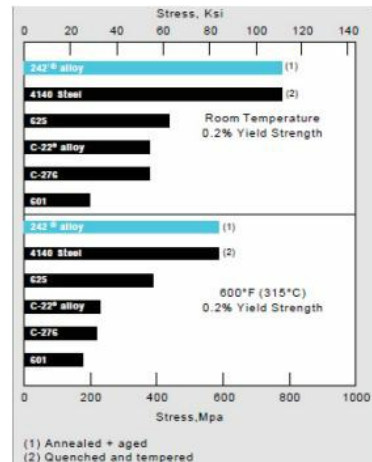


HAYNES® 242® alloy for Plastics Production & Processing Tech Brief

For Plastics Production & Processing Equipment

High strength and resistance to corrosion are critical considerations in the selection of materials for plastics production and processing equipment, and both are hallmark features of HAYNES® 242® alloy from Haynes International, Inc. With twice the strength of traditional HASTELLOY® alloys up to 1200°F (650°C), and excellent resistance to fluoride and chloride process environments, 242® alloy offers performance unmatched by any other material. Field-tested applications to date include extrusion screws and cylinders, film dies, screen housing, injection molding dies, and sensor components, all used in the production and processing of polymers such as PVDF and PTFE.



242® alloy is an age-hardenable material which is usually supplied in the annealed condition. For component applications where even higher strength and additional resistance to wear are desired, 242® alloy can be supplied in a cold-worked condition. When aged, this will afford room temperature hardness levels of Rockwell C50 or more, and yield strength approaching 200 Ksi (1380 MPa). Component machining has been successfully performed in the annealed, annealed + aged, and as-cold-worked conditions.

Aqueous Corrosion Resistance				
Alloy	48% HF 175°F (79°C)		10% HCl 219°F (104°C)	
	mpy	mmpy	mpy	mmpy
242®	32	0.8	22	0.6
C-22®	27	0.7	400	10.2
C-276	37	0.9	288	7.3
600	68	1.7	>4000	>100
625	>1500	>38	642	16.3

MPY = mils per year MMPY = mm per year

Nominal Composition	
Nickel:	Balance
Molybdenum:	25
Chromium:	8
Iron:	2 max.
Cobalt:	2.5 max.
Manganese:	0.8 max.
Silicon:	0.8 max.
Aluminum:	0.5 max.
Carbon:	0.03 max.
Boron:	0.006 max.
Copper:	0.5 max.

Typical Tensile Properties, Plate

Test Temperature		0.2% Yield Strength		Ultimate Tensile Strength		Elongation
°F	°C	ksi	MPa	ksi	MPa	%
RT	RT	113	780	184	1270	38
800	425	80	555	156	1075	44
1000	540	70	480	145	1000	47
1200	650	76	525	137	945	38
1400	760	42	290	106	730	66
1600	870	40	275	69	475	56
1800	980	28	190	41	285	65

Typical Rupture Strength, Plate

Test Temperature		Typical Rupture Properties:					
		10 h		100 h		1,000 h	
°F	°C	ksi	MPa	ksi	MPa	ksi	MPa
1000	540	160	1105	140	965	120	825
1100	595	130	895	110	760	93	640
1200	650	105	725	90	620	75	515
1300	705	86	595	69	475	35	240
1400	760	59	425	29	200	17	115

Typical Mean Coefficient of Expansion

°F	°C	µin/in	µm/m
RT	RT	-	-
800	400	6.7	11.9
1000	550	6.8	12.3
1100	600	6.8	12.3
1200	650	6.9	12.4
1300	700	7.2	130

Typical Room Temperature Physical Properties

Physical Property	British Units	Metric Units
Density	0.327 lb/in ³	9.06 g/cm ³
Electrical Resistivity	48.0 µohm-in	122.0 µohm-cm
Modulus of Elasticity	33.2 x 10 ⁶ psi	229 GPA
Thermal Conductivity	75.7 Btu-in/ft ² -h-°F	11.3 W/m-°C
Specific Heat	0.092 Btu/lb-°F	386 J/Kg-°C

Environmental Resistance

Oxidation Resistance - Excellent to 1400°F (760°C)

Gaseous Fluorine & HF - Excellent to 1650°F (900°C)

Molten Chloride/Fluoride Salts - Excellent to 1650°F (900°C)

Chloride Stress Cracking Resistance - Excellent

Chlorination - Excellent in Reducing Environments

Hydrogen Embrittlement Resistance - Fair to Good