

Cast Heat Resistant Stainless Steels: Applications

Some representative applications of various cast heat-resistant alloys

ACI Designation	Formula	Specification (ASTM)	Applications
HA	9Cr-1Mo	A217 (C12)	Widely used in the oil refining industry. Also used in fan blades, furnace rollers, Lehr rolls, refinery fittings & trunnions. Resistant to high-temperature air, flue gases, petroleum steam
HC, HC-30	28Cr	A297, A608	Applications where strength is not a consideration or for moderate load bearing service around 650°C (1200°F). Also used where appreciable nickel cannot be tolerated for example in very high sulphur atmospheres or where nickel tends to crack hydrocarbons through catalytic action. Castings used in boiler baffles, electrodes, furnace grate bars, gas outlet dampers, kiln parts, lute rings, rabble blades and holders, recuperators, salt pots, soot blower tubes
HD	28Cr-5Ni	A297, A608	Brazing furnace parts, cracking equipment, furnace blowers, gas burner parts, holding pots, kiln parts, pouring spouts, rabble shoes and arms, and recuperator sections. Resists corrosion in air, combustion gases, flue gases, high-sulphur, molten copper and copper alloys, molten neutral salts. Poor resistance to molten magnesium
HE	28Cr-10Ni	A297, A608	Used extensively in ore-roasting equipment. Uses include billet skids, burner nozzles, dampers, furnace chains and conveyors, furnace door frames, oil burner parts, rabble arms and blades, recuperators, rotating shafts, soot blower elements, steam generator parts, tube supports. Excellent corrosion resistance at high temperatures. Good resistance to very high-sulphur content gases at high temperatures
HF	20Cr-10Ni	A297, A608	Suitable for applications requiring high strength and corrosion resistance at 650°C to 850°C (1200°F to 1600°F). Used extensively in oil refinery and heat treating furnaces. Uses include arc furnace electrode arms, annealing boxes and trays, baskets, brazing channels, burner tips, burnishing rolls, conveyor belts and chains, fan housings, furnace rails, gas burner rings, hardening retorts, hearth plates, Lehr rolls, pier caps, soaking pit dampers, tempering baskets, and wear plates. Often selected for superior corrosion resistance to air, combustion gases, flue gases oxidizing and reducing, and steam. When used for resistance to oxidation at elevated temperatures, it is not necessary to keep the carbon content at the lowest level specified for corrosion-resistant castings.
HH	26Cr-12Ni	A297, A447, A608	Annealing trays, billet skids, burner nozzles, carburizing boxes, convection tube supports, dampers, exhaust manifolds, flue gases stacks, grate supports, hardening trays, kiln nose ring segments, muffles, normalizing discs, pier caps, quenching trays, rabble arms and blades, radiant tubes and supports, refractory supports, retorts, roller hearths and rails, stoker parts, tube hangers. Because embrittlement can result in service environment absorption of carbon, alloy HH is seldom used in carburizing applications, particularly those involving thermal shock
HI	28Cr-15Ni	A297	Used extensively for retorts operating with an internal vacuum at continuous temperature of 1177°C (2150°F). Castings used as billet skids, brazing fixtures, conveyor rollers, furnace rails, hearth plates, lead

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			pots, pier caps, and tube spacers
HK	26Cr-20Ni	A297, A608, A351, A 567	Because of its high temperature strength, HK is widely used for stressed parts in structural applications up to 1150°C (2100°F). Castings used for billet skids, brazing fixtures, calcining tubes, cement kiln nose segments, conveyor rolls, furnace door arches and lintels, heat treating trays and fixtures, pier caps, rabble arms and blades, radiant tubes, reformer tubes, retorts, rotating shafts, skid rails, sprockets, stack dampers
HL, HL-30	30Cr-20Ni	A297, A608	Especially useful for severe service where excessive scaling must be avoided. Castings used for carrier fingers, enameling furnace fixtures, furnace skids for slab and bars, radiant tubes, stack dampers. HL-30 and HL-40 are used for pressure pipe applications at high temperatures
HN	25Ni-20Cr	A297	Brazing fixtures, chain, furnace beams and parts, pier caps, furnace tube supports, sill plate brackets, torch nozzles, trays, tubes
HP	35Ni-26Cr	A297	Castings used as ethylene pyrolysis heaters, heat treat fixtures, radiant tubes, refinery tubes
HP-50WZ	26Cr-35Ni		In high temperatures up to 1205°C (2200°F)
HT	35Ni-17Cr	A297	Widely used for generally heat resistant applications in highly stressed parts. Air ducts, brazing trays, carburizing containers, chain, cyanide pots, dampers, dippers, door frames, enameling bars and supports, fan blades, feed screws, gear spacers, glass molds, glass rolls, hearth plates, heat treating fixtures and trays, idler drums, kiln nose rings, lead pots, malleablizing baskets, muffles, oil burner nozzles, point bars, radiant tubes, resistor guides, retorts, roller rails, rolling mill guides, salt pots, tube supports. HT-30 and HT-50 are used for pressure pipe applications at high temperatures
HU	39Ni-19Cr	A297	Especially suited for severe service conditions involving high stress rapid thermal cycling. Articulated trays, burner tubes, carburizing retorts, conveyor screws and chains, cyanide pots, dipping baskets, furnace rolls, lead pots, mufflers, pouring spouts, radiant tubes, resistor guides
HW	60Ni-12Cr	A297	When resistance to carburization and tolerance of temperature fluctuations are needed. Cyanide pots, electric heating elements, enameling tools, gas retorts, hardening fixtures, hearth plates, lead pots, and muffles
HX	66Ni-17Cr	A297	Autoclaves, brazing furnace rails and doors, calciner tubes, carburizing boxes, cyanide pots, enameling tools, heating elements, hearth plates, heat treating trays and fixtures, lead pots, muffles, retorts, roller hearths, salt bath electrodes, salt pots, shaker hearths. Severe service applications at temperatures up to 1150°C (2100°F), situations where corrosion must be minimized

USA

Acme Alloys | 1800 Golden Oak Street | Thousand Oaks | California 91320

Phone 949-439-0839 Fax 949-203-2179 Email amit@acmealloys.com