

ALLOY DATA SHEET F15-3 A

ABRASION RESISTANT ALLOY

HIGH ALLOY MARTENSITIC WHITE IRON

REVISION: 05/00

DESCRIPTION

15-3 A alloy is a high alloy martensitic white iron with an excellent combination of abrasion resistance and toughness. Section thicknesses of up to 3 inches can be fully air hardened. The alloy can be annealed, machined and hardened for use in machined abrasion resistant parts. Abrasion resistance is excellent under conditions of high stress abrasion (grinding), low stress abrasion (scratching), gouging abrasion and slurry erosion. Although it is significantly tougher than low alloy pearlitic white irons, 15-3 A is not suitable for applications with severe impact. 15-3 A alloy's superior wear resistance is due primarily to a high volume fraction of very hard, well-dispersed primary and secondary carbides in a matrix of martensite.

COMPOSITION

	<u>C</u>	<u>Mn</u>	<u>Si</u>	<u>Cr</u>	<u>Mo</u>
Min %	3.0	-	-	14.0	2.5
Max %	3.6	1.5	1.0	18.0	3.5

APPLICATIONS

Briquetting press segments, ball and rod mill liners, sand and dredge pump parts, clay working machine parts, pulverizer impactor and blow bars, tires and grinding rings for roller mill pulverizers, wear plates, chutes and liners, shot blast impeller blades.

PRODUCT FORMS

Horizontal and vertical centrifugal castings; static castings.

PHYSICAL PROPERTIES

		Typical Hardness	
		HRC	Brinell
Density (lbs/in ³)	0.27		
Melting Point(°F)	2210°F		
Thermal Conductivity (Btu/h/ft ² /ft/°F)	13.0 @ 70°F (estimated)	As Cast 51-56	500-580
		Annealed 40-44	375-410
		Hardened 58-65	625-750
Thermal Expansion (10 ⁻⁶ in/in °F)	7.0 @ 70-200°F		
	8.2 @ 200-800°F		

HEAT TREATMENT (Typical)

Softening Anneal: 1600-1750 °F , Furnace cool.
 Hardening: 1750-1950 °F , Air cool.
 Stress Relief: 400-800 °F , Air cool.

MECHANICAL PROPERTIES (Typical Values at room temperature, Hardened condition)

	K.S.I.
Ultimate Tensile strength	70
Ultimate Compression strength	460
Compression 0.2% Yield strength	177

TOUGHNESS

Toughness of 15-3 A is significantly better than low alloy pearlitic white iron, however it is not suitable for applications with severe high speed impact, such as hammers. For applications where moderate impact is a concern, alloy 15-3 B with lower carbon content provides improved toughness with only a minimal loss of hardness.

HARDENABILITY

Section thicknesses of up to 3 inches may be hardened for 15-3 A alloy. For Section thicknesses of up to 2 inches, alloy 15-3 C may be substituted without appreciable loss of hardness or toughness. Where deep hardenability of up to 4 inches is required, alloy 15-3 B may be substituted, with only a modest reduction in hardness and an increase in toughness.

MACHINABILITY

15-3 A is machinable in the annealed condition, using carbide tools. Alloy 15-3 B is more readily machined due to the lower carbon content and correspondingly lower volume fraction of primary carbides.

SERVICE TEMPERATURE

The alloy is suitable for service at temperatures up to approximately 600 °F

WELDABILITY

Welding of 15-3 alloy is not recommended.

RELATED SPECIFICATIONS

ASTM: A 532 grade II-B

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