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# HIGH TEMPERATURE ALLOYS DATA SHEET

SERVICE STEEL AEROSPACE (SSA) IS ONE OF THE LARGEST AEROSPACE ALLOY DISTRIBUTORS IN THE WORLD. SSA STOCKS HIGH TEMPERATURE ALLOYS 718, A-625 AND 286 IN BILLET AND LONG PRODUCTS FOR THE AEROSPACE AND OTHER CRITICAL APPLICATION INDUSTRIES. WE RELY ON OUR VAST INVENTORY AND MILL RELATIONSHIPS TO OFFER QUICK DELIVERIES AND EXCEPTIONAL SERVICE FOR OUR MILL PRODUCTS. SSA PLACES THE HIGHEST VALUE ON QUALITY, CUSTOMER SERVICE AND RELATIONSHIPS.

HIGH TEMPERATURE ALLOY	SPECIFICATIONS
ALLOY 718	AMS 5662, AMS 5663, NACE MRO175, API 6A 718, F-17, LCS, B50TF15-S34, S-1000, S-400
ALLOY 625	AMS 5599, AMS 5666, AMS 5837, ASTM B446, ASTM B475, F-17, LCS, S-1000, S-400
ALLOY A-286	AMS 5731, AMS 5732, AMS 5734, AMS 5735, AMS 5736, AMS 5737, ASTM A 638, S-1000, S-400

## GENERAL CHARACTERISTICS

HIGH TEMPERATURE ALLOYS ARE NICKEL BASED ALLOYS THAT EXHIBIT EXCELLENT CORROSION RESISTANCE AS WELL AS HIGH YIELD, TENSILE AND CREEP RUPTURE PROPERTIES AT ELEVATED TEMPERATURES. THESE ALLOYS ARE DOUBLE OR TRIPLE VACUUM MELTED BY VACUUM INDUCTION MELTING (VIM) FOLLOWED BY VACUUM ARC REMELT (VAR) AND ELECTRO SLAG REMELT (ESR). HIGH TEMPERATURE ALLOYS ARE TYPICALLY PROVIDED IN THE ANNEALED CONDITION. THESE ALLOYS PROVIDE A HIGH VALUE FOR CRITICAL COMPONENTS WHERE TEMPERATURES EXCEED THAT WHICH MORE STANDARD ALLOYS CAN WITHSTAND.

## MACHINING

IN GENERAL, THE HIGH TEMPERATURE FAMILY OF ALLOYS ARE MORE DIFFICULT TO MACHINE THAN STAINLESS STEELS. CARBIDE INSERT TOOLS ARE RECOMMENDED. A-286 HAS A HIGHER IRON CONTENT THAN OTHERS, IT IS EASIER TO MACHINE THAN ALLOYS WITH A HIGHER NICKEL CONTENT SUCH AS 718 AND 625. WHEN CUTTING THESE ALLOYS, RIGID TOOLS AND WORK PIECE, AMPLE COOLANT AND POSITIVE FEEDS ARE GENERAL RECOMMENDATIONS.

## AVAILABILITY

HIGH TEMPERATURE ALLOYS ARE AVAILABLE AS BILLET, FLAT BAR, ROUND BAR, PLATE, SHEET AND STRIP.



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## CHEMISTRY

NOMINAL ANALYSIS	718	625	A-286
CARBON	.08%	.1%	.08%
PHOSPHORUS	.015%	.015%	
SILICON	.35%	.5%	1%
MOLYBDENUM	2.8 - 3.3%	8 - 10%	1 - 1.5%
COBALT	1%	1%	
ALUMINUM	.35 - .8%	.4%	.35%
BORON	.001 - .006%		.003 - .01%
MANGANESE	.35%	.5%	2%
SULFUR	.015%	.015%	
CHROMIUM	17 - 21%	20 - 23%	13.5 - 16%
COPPER	.15%		
TITANIUM	.65 - 1.15%	.4%	1.9 - 2.3%
COLUMBIUM+TANTALUM	4.75 - 5.5%	3.15 - 4.15%	
NICKEL	50 - 55%	BALANCE	24 - 27%
IRON	BALANCE	5%	BALANCE
VANADIUM			.1 - .5%

## PHYSICAL PROPERTIES

MEASUREMENT METRIC	718	625	A-286
DENSITY	.297 LB/IN <sup>3</sup>	.305 lb/in <sup>3</sup>	.286 lb/in <sup>3</sup>
TENSILE (KSI)	*210	*160	*145
YIELD (KSI)	*175	*110	*95
ELONG %	*22	*45	*24
ROFA %	*29	*60	*45
OP TEMP NOT TO EXCEED	1300° F	2000° F	1300° F

\*MECHANICAL PROPERTY VALUES ARE BASED ON STANDARD HEAT TREATMENT PRACTICES SPECIFIC TO EACH ALLOY