

ATI STABALLOY AG17™ and STABALLOY AG17™ HS Alloys



Technical Data Sheet

GENERAL

Staballoy AG17™ is an austenitic type stainless steel specifically developed for use in difficult drilling conditions. Control of critical elements results in excellent resistance to chloride induced stress corrosion cracking in the most aggressive drilling environments. The chemistry of Staballoy AG17 is designed to offer excellent resistance to galling under high torque conditions. Mechanical and magnetic properties are in accordance with API 7 industry standards.

Staballoy AG17™ HS is a high strength stainless steel suitable for critical non-magnetic drill stem components including MWD tools, LWD tools and compressive service drillpipe. The material exhibits all the characteristics of the standard Staballoy AG17 grade but with significantly improved yield strength levels and fatigue properties. Staballoy AG17 HS is available with a minimum guaranteed 0.2% yield strength level of 140 ksi for all section sizes to up 10" diameter. (In smaller diameters it is possible to supply Staballoy AG17 HS with a yield strength level in excess of 160 ksi).

Chemical Composition

	C	Si	Mn	Cr	N ₂	Mo
Nominal	0.03	0.30	20.0	17.0	0.50	0.05

MECHANICAL PROPERTIES

The required high strength is achieved by a combination of composition control and strain hardening during processing. The guaranteed properties apply to the full length of every component. The following are guaranteed minima.

Mechanical Properties of Staballoy AG17 Alloy

Drill Collar Outside Diameter	0.2% Yield (ksi)	UTS (ksi)	Elongation (%)	Impact Energy (CVJ)	Hardness (HB)
<6.875 inches	110	120	18	60	277
7 to 11 inches	100	110	20	60	277
> 11 inches	90	100	10	60	255

Test material taken from 1 inch below outer surface or mid-wall (whichever is the smaller value). Tensile test to BS EN 10002 Part 1 or ASTM A370. Impact Tests to BS EN 10045 Part 1 or ASTM E23.

PHYSICAL PROPERTIES

The very high structural stability of the alloy ensures that magnetic permeability remains below 1.005.

Staballoy AG17 has excellent resistance to chloride induced SCC in the most aggressive drilling environments (e.g., high temperatures, high chloride drilling muds). SCC laboratory data (see page 2 of 2) illustrate the material's excellent corrosion resistance in a variety of test environments.

Staballoy AG17 HS Alloy

0.2% Yield Strength	140 ksi
Ultimate Tensile Strength	150 ksi
Elongation %	18%
Reduction of Area	40%
Charpy "V" Notch (RT)	50 ft lbs (68J)
Hardness	321 HB



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GALLING

Staballoy AG17 has excellent galling resistance with critical galling pressure approximately 7 times that of the conventional austenitic stainless steels. Using a laboratory 'button on block' test technique, in accordance with ASTM G98 procedures, and in make and break tests on machined connections, a critical galling pressure of 35 ksi has been determined. This compares with a value of 5 ksi for a standard nickel bearing austenitic stainless steel.

STRESS CORROSION CRACKING

a) Intergranular

Resistance to Intergranular Stress Corrosion Cracking is achieved by careful control of chemical composition. Freedom from susceptibility is demonstrated by testing to ASTM A262, Practice E.

b) Transgranular

Staballoy AG17 has excellent resistance to chloride induced SCC in the most aggressive drilling environments (e.g., high temperatures, high chloride drilling muds). The laboratory data below illustrate the material's excellent corrosion resistance in a variety of test environments.

Corrosive Environment	Stress MPa (ksi)	Test Duration (Hours)
60% CaCl ₂ , @ 130° C	301 (43.8)	>5000 (not cracked)
Magnesium Chloride mud (20%) @ 115° C	300 (43.5)	>2000 (not cracked)
Saturated NaCl @ 106° C	400 (58.0)	>2000 (not cracked)

(Constant strain tensile samples)

The possibility of cracking increases as stress approaches yield point and for the most arduous conditions, bore surface treatment by the 'XL' procedure is recommended to further resist initiation of stress corrosion cracking.