

C	Cr	Mn	Ni	P	S	SI	Ti
MAX		MAX		MAX	MAX	MAX	
.08	17.0-20.0	2.0	9.0-13.0	0.04	0.30	0.75	Trace*

**CHEMICAL COMPOSITION %**

## DESCRIPTION

These titanium bearing stainless steels are stabilized against carbide precipitation and designed for operation within the damaging temperature range where carbide precipitation develops. In this type of steel, the carbon combines preferentially with titanium to form a harmless titanium carbide, leaving the chromium in solution to maintain full corrosion resistance. Type 321 is basic type 304 modified by adding titanium in an amount at least 5 times the carbon plus nitrogen contents.

## DESIGN FEATURES

- Immune to intergranular corrosion when heated within the carbide precipitation range.
- Titanium addition eliminates the formation of chromium carbides at the grain boundaries by tying up the carbon and nitrogen as titanium carbides or nitrides.
- Better high temperature properties than 304 or 304L. Generally used for parts which are intermittently heated up to 1500F. For continuous service the alloy is good to 1650F.
- May be susceptible to chloride stress cracking.
- Excellent weldability in field.
- Type 321H has high carbon (.04-.10) for better high temperature creep properties.

## AVAILABILITY

## SPECS

AVAILABILITY		SPECS
SEAMLESS PIPE	1/2" - 16"	A312
WELD PIPE	6" - 12"	A312
BAR	1" - 12"	A276, A479
BUTT-WELD FLANGES	1/2" - 8"	A182, F321
FLANGES	1/2" - 8"	A182, F321
PLATE AND SHEET	3/16" - 3 1/4"	A240
FORGINGS		A182

## TYPICAL APPLICATIONS

High temperature chemical process heat exchanger tubes  
 Refineries  
 High temperature steam service

## TENSILE REQ

Tensile Strength	(KSI) 75
Yield Strength	(KSI) 30

KSI can be converted to MPA (Megapascals) by multiplying by 6.895.