

# HASTELLOY® C-22HS® alloy

## CHEMISTRY: Weight %

Ni <sup>a</sup>	Cr	Mo	Fe	W	Si	C
61	21	17	2*	1*	0.08*	0.01*

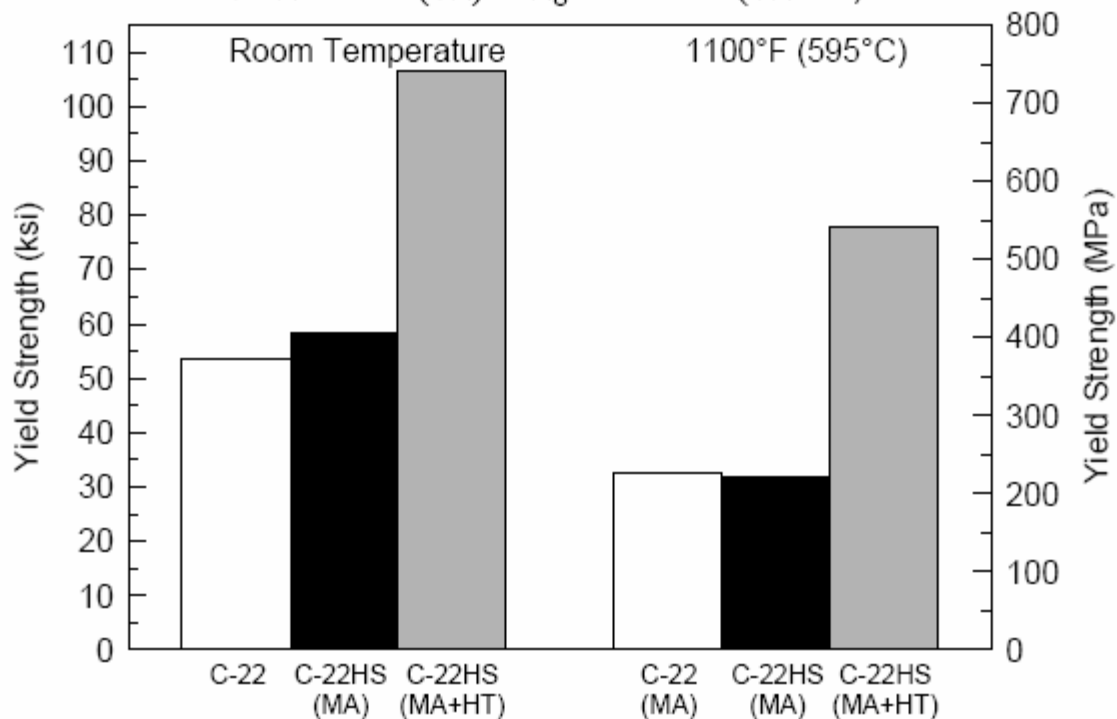
<sup>a</sup>As balance      \* Maximum

## ALLOY DESCRIPTION:

Advances in materials research have led to the recent development of HASTELLOY C-22HS alloy, a nickel-chromium-molybdenum alloy. This alloy was designed to exhibit corrosion resistance comparable to other C-type alloys, but which can be heat treated to obtain approximately double the yield strength. In addition to its high uniform corrosion resistance in oxidizing as well as reducing environments, the as-heat treated C-22HS alloy possesses high resistance to chloride-induced pitting and crevice corrosion attack.

### Comparative Yield Strengths

Mill Annealed (MA) vs. Age-Hardened (MA+HT)



## HEAT TREATMENT, SHEET, STRIP, AND PLATE:

2000°F/Bright Anneal + 1300°F/16h/Furnace cool to 1125°F/32h/AC (Sheet and Strip)  
1975°F/Anneal/Water Quench + 1300°F/16h/Furnace cool to 1125°F/32h/AC (Plate)

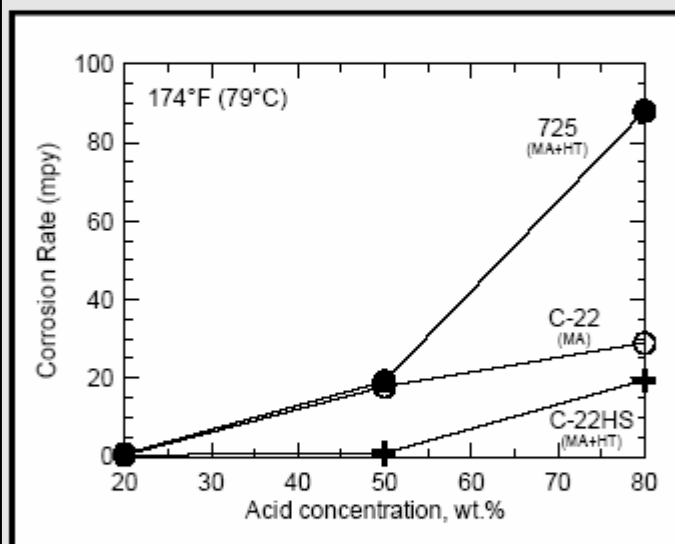
# HASTELLOY® C-22HS® alloy

## COMPARATIVE CORROSION RESISTANCE:

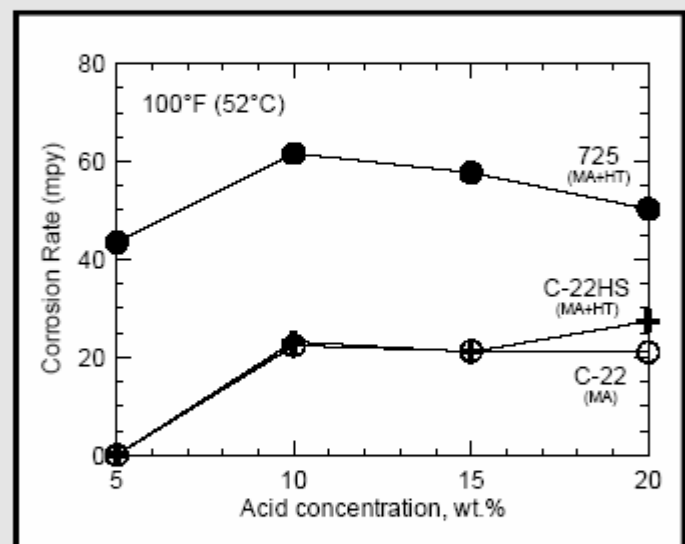
Media	Average Corrosion Rate Per Year, mils*				
	C-22HS® (MA+HT)	C-22 (MA)	725™ (MA+HT)	62 (MA)	C-276 (MA)
2.5% Hydrochloric Acid, 194°F (90°C)	1	<1	298	72	12
10% Nitric Acid, Boiling	<1	<1	<1	<1	7
ASTM G-28A, Boiling	71	40	93	23	250
ASTM G-28B, Boiling	27	8	2401	2721	55

\*To convert mils per year (mpy) to mm per year, divide by 40.

## SULFURIC ACID:



## HYDROCHLORIC ACID:



## HYDROFLUORIC ACID:

Concentration	Corrosion Rate Per Year, mils*		
	C-22HS (MA+HT)	C-22 (MA)	725 (MA+HT)
10%	4	5	20
20%	10	11	73
30%	10	12	81

\*120 hours at 100°F (38°C)

## Resistance to Chloride-Induced Pitting and Crevice Corrosion

Critical Pitting (CPT) & Crevice (CCT) Temperatures in Acidified 6% Ferric Chloride + 1% HCl\*

Alloy	CPT, °C	CCT, °C
C-22HS (MA+HT)	> 100	75
C-22	> 120	80
725 (MA+HT)	85	25
C-276	> 120	55

\*(ASTM G 48, C and D Procedures)

The data and information in this publication are based upon work conducted principally by Haynes International, Inc. and occasionally supplemented by information from open literature, and are believed to be reliable. However, Haynes International, Inc. does not make any warranty or assume any legal liability or responsibility for its accuracy, complete-ness, or usefulness. Haynes also makes no warranty of results to be obtained for any particular use of the information herein contained. Material safety data sheets are available from Haynes International, Inc.

®HASTELLOY and C-22HS® are registered trademarks of Haynes International, Inc