



High Performance Metal Solutions

耐腐蚀应用的超76钽金属

H.C.Starck 

High Performance Metal Solutions

满足苛刻耐腐蚀要求的高性能材料

H.C. Starck Solutions 是耐腐蚀难容金属钽、铌、钼、钨材料的全球供应商。我们为耐腐蚀工业领域提供了性能改良工程金属材料的解决方案，主要应用于管道系统的内衬、热交换管和反应釜的覆层。

具有耐腐蚀性能的钽合金材料经常被用于各种有侵蚀性和危险性化学药品的加工工业，在强烈的腐蚀环境中，这些由钽合金材料制备的关键部件能够提供最适宜的成本效益，延长使用寿命。

超76钽合金

世泰科新型钽合金—超76合金在较高温度和浓度的盐酸和硫酸溶液中具有较强耐腐蚀作用。氢脆化以两位数量级速度减少，与NRC® 76材料相比，在盐酸中低100倍，在硫酸中低10倍，从而使超76合金氢脆化现象最小化。

与其他材料相比，超76钽合金可以延长设备寿命，延缓老化时间，扩大设备的使用环境。

超76钽合金打破了对“Platinum Spot welding”的依赖性，可防止氢脆现象，保持了NRC® 76的所有优越性能。在温度升高的热HCl 和H₂SO₄溶液中，亦可简化生产流程，避免不必要的事后修复，产品损失，确保设备的长寿命。

所有耐腐蚀设备中都需用到高强度合金钢，合金钢强度虽比纯钽金属强度高，但也需要钽金属在HCl和H₂SO₄溶液中较高耐腐蚀的物理性能。

以下情况中，超76钽合金可用作耐腐蚀材料：

- > 插入式加热器，在腐蚀性气体的环境中，可用作蒸气加热的单管和复式管
- > 热交换器，凝结器，和线圈
- > 热电偶保护套管，松散覆层管线或者来自于固体的机械加工
- > 泵，机身，盒子，轴，叶轮等，盛放腐蚀性化学溶剂
- > 桨式搅拌机和搅拌器，固体或在表面的松散覆层
- > 分裂蒸馏塔、锅炉和冷凝器
- > 钽复合浸渍管，加热器和化工厂设备
- > 维修成套工具，可用于槽罐，桶和其他有玻璃条纹的容器
- > 坩埚，用于标准件，特殊形状和尺寸的设备中
- > 炉子和炉子配件，在控制气氛条件下，可用于温度达到1371°C(2500°F)的高温

化学成分¹⁾

(质量分数 % [cg/g]; ppm [µg/g])

元素	ppm (max)	元素	ppm (max)
C	50	Ti	40
O	100	Ni	50
N	50	Mo	200
H	10	Si	25
Nb	0.1 % (1000)	W	2.0 – 3.5 Wt%
Fe	50	PGM*	1000 – 2000
Ta	Balance		

* 铂系金属

1) 来自具体样品实测

机械性能

(设计最小值)

温度 °C	屈服强度 MPa	抗张强度 (MPa)	延伸率 %
21	244.8	344.7	20
100	210.2	331.0	15
200	188.9	289.6	10
250	175.7	275.8	10

温度 °F	屈服强度 KSI	抗张强度 (KSI)	延伸率 %
70	35.5	50	20
210	30.5	48	15
390	27.4	42	10
480	25.5	40	10

与传统钽合金的机械性能比，**超76钽合金**很容易采用同样工艺或制备技术进行加工。

物理性能

密度	16.6	g/ml	0.602	Lb/in ³
熔点	2996	°C		
热膨胀系数 (20 – 500 °C)	6.6×10^{-6}	1/K	3.6×10^{-6}	°F ⁻¹
比热 100 °C	0.14	J/g K	0.0336	BTU/Lb °F
热导率 (20 – 100 °C)	0.575	W/cm K	32	BTU/Hr-Ft °F
电阻 (20 °C)	0.13	((Ohm × mm ²)/m)	14.7	Microhm-cm
抗拉强度 20 °C	310 – 380	MPa	45 – 55	KPSI
屈服强度 20 °C	240 – 310	MPa	35 – 45	KPSI
弹性模量	1.86×10^5	MPa	27×10^6	PSI
退火态硬度 (典型) 维氏	115 – 160			
退火态硬度 (典型) 洛氏	50 – 80			

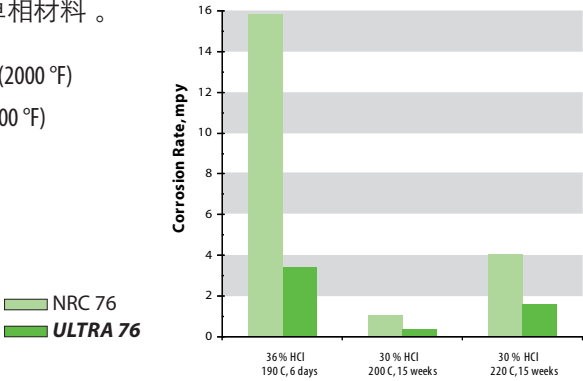
冶金学特征

固相中含钨和铂族金属的单相材料。

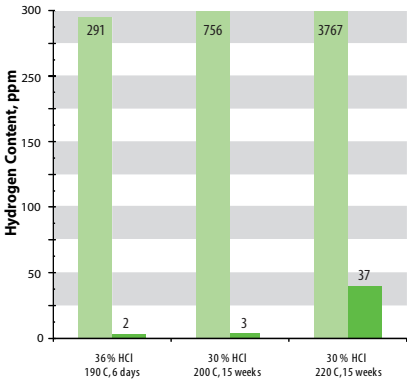
消除应力退火温度在 1093 °C (2000 °F)

再结晶退火温度在 1316 °C (2400 °F)

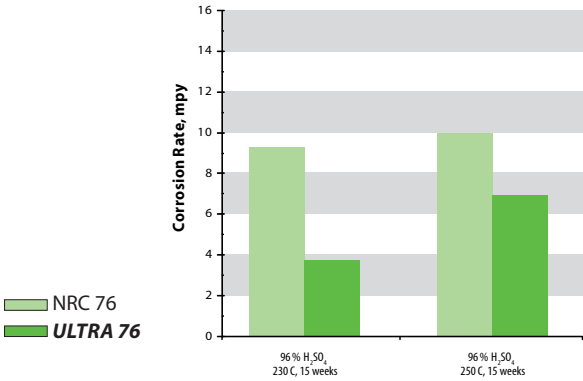
HYDROCHLORIC ACID - CORROSION RATES



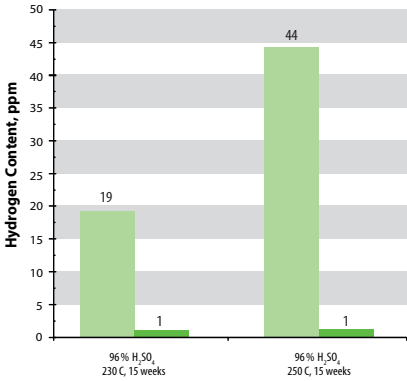
HYDROCHLORIC ACID - HYDROGEN EMBRITTLEMENT



SULFURIC ACID - CORROSION RATES



SULFURIC ACID - HYDROGEN EMBRITTLEMENT



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