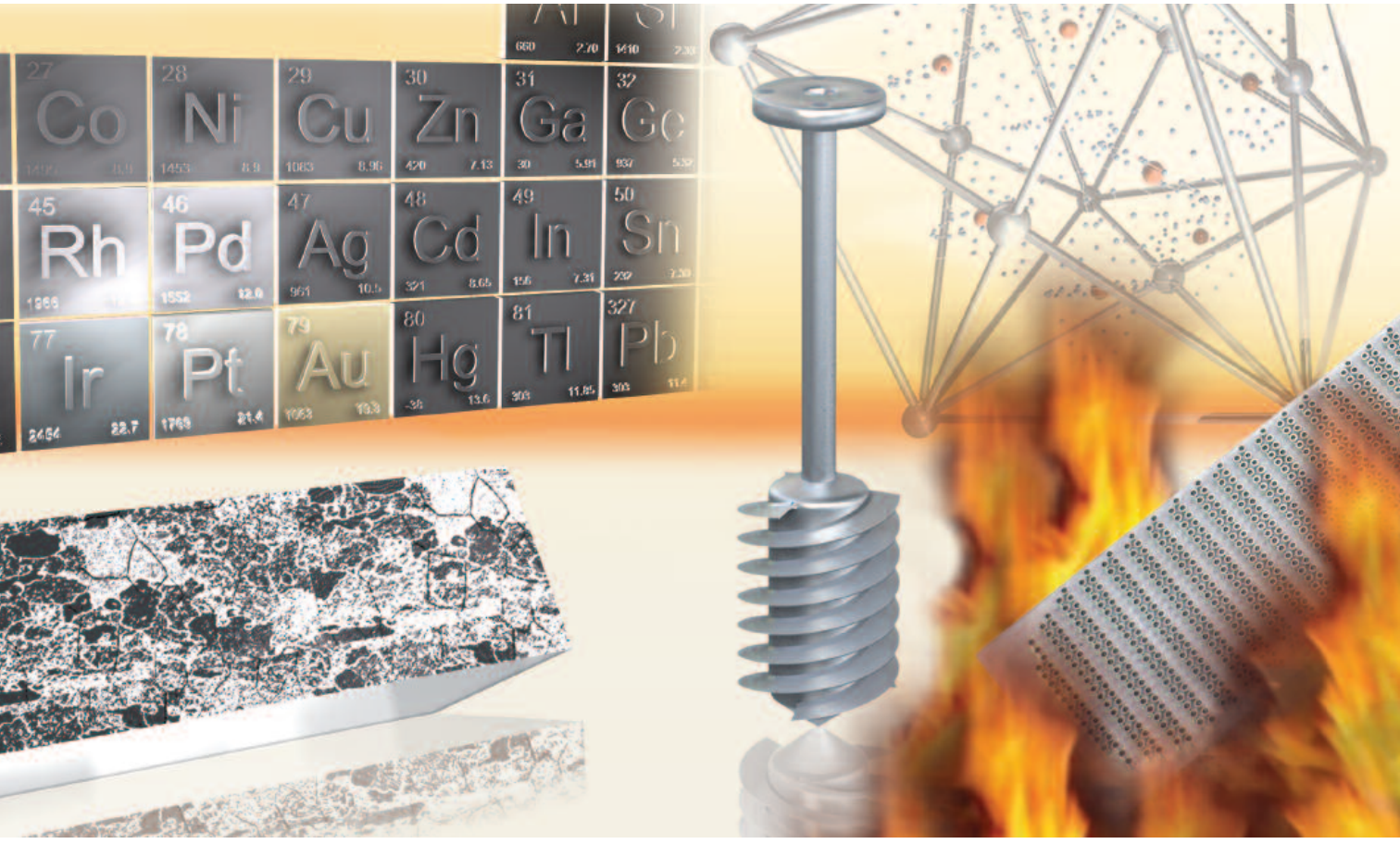
Heraeus



Pt-10%Rh DPH*hs*

Pt-10%Rh DPH*hs* is an advanced modification of the oxide dispersion hardened alloy Pt-10%Rh DPH. Because of its good mechanical properties, Pt-10%Rh DPHhs was originally intended for stirrer shafts, glass fiber bushings and other applications that require a structural material with a very high level of stiffness under service conditions. In the meantime Pt-10%Rh DPH*hs* can replace the original alloys Pt-10%Rh and Pt-20%Rh in these applications, which is a significant advantage for the user.

The good formability and welding properties make the material the perfect candidate for stirrer shafts as well as base plates in glass fiber bushings with both welded and pressed tips.

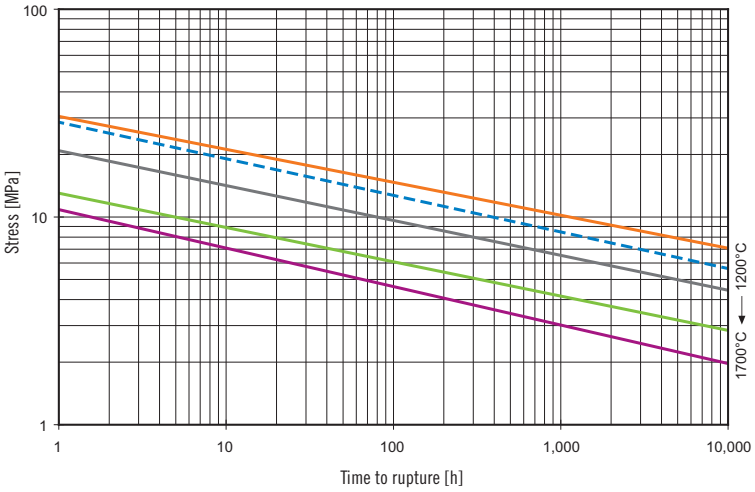
The high creep strength of Pt-10%Rh DPH*hs* is achieved on the one hand by solid solution hardening and on the other by the considerably increased quantity of the dispersed oxide phase relative to the established DPH materials. The good creep resistance of Pt-10%Rh DPH*hs* over the complete temperature range results from this.

In view of the high strength and stiffness, there are some restrictions on the dimensions of semifinished products and parts that can be manufactured from Pt-10%Rh DPH*hs*. We will be pleased to discuss the use of this new material in your components.

Stress-Rupture Strength of Pt-10%Rh DPH*hs*

Stress-rupture test: a specimen of the material is subjected at a defined temperature to a defined stress and the time to rupture of the specimen is determined. The time to rupture is determined on several specimens for different stresses and plotted in the stress-rupture diagram. In this way an appropriate time to rupture curve can be determined for each temperature.

- Pt-10%Rh DPH (1200°C)
- Pt-10%Rh DPH*hs*



High Temperature Mechanical Properties of Pt-10%Rh DPH*hs*

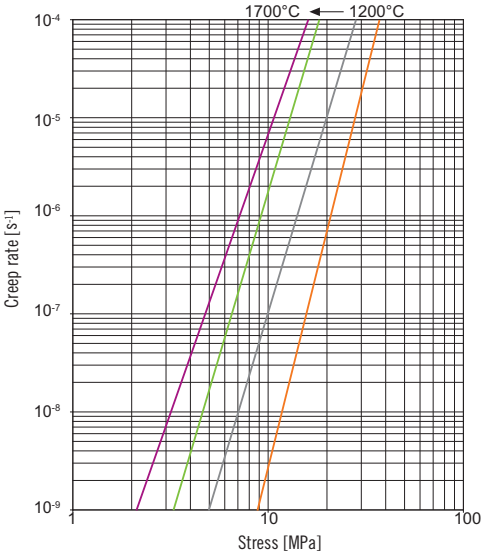
Standard values are needed to permit the comparison of different materials. The table summarizes the results of tensile and stress-rupture tests. The stress-rupture strength is shown for a life of 10,000 h (i.e. almost 14 months). The table also gives the stress at which a creep rate of approx. 3 % per annum is achieved. The table shows a comparison of the stress-rupture strength of Pt-10%Rh DPH and the conventional alloy Pt-20%Rh.

		1200°C	1400°C	1600°C	1700°C
R_m	[MPa]	78.4	48.7	31.3	25.4
$R_{p0.2}$	[MPa]	59.3	40.6	29.9	24.1
A	[%]	47	57	59	54
$R_{m/10,000h}$	[MPa] (Pt-10%Rh DPH*hs*)	7.1	4.4	2.8	2.0
$R_{m/10,000h}$	[MPa] (Pt-10%Rh DPH)	5.6	3.3	1.8	1.4
$R_{m/10,000h}$	[MPa] (Pt-20%Rh)	2.8	2.0	0.8	0.5
$\sigma_{1.0E-09}$	[MPa] (Pt-10%Rh DPH*hs*)	8.9	5.0	3.4	2.1

Rm	Tensile strength
Rp0.2	Yield strength
A	Tensile elongation
$R_{m/10,000h}$	10,000 h stress-rupture strength
$\sigma_{1.0E-09}$	Stress for creep rate 10^{-9} s^{-1} for Pt-10%Rh DPH*hs*

Creep strength of Pt-10%Rh DPH*hs*

During the stress-rupture test, the creep rate of each specimen is determined and plotted for each temperature as a function of the applied stress.



Heraeus Materials Technology GmbH & Co. KG
Engineered Materials Division
Business Unit Precious Metals Technology
Heraeusstr. 12–14
63450 Hanau, Germany
Phone +49 6181.35-3740
Fax +49 6181.35-8620
precious-metals-technology@heraeus.com
www.wc-heraeus.com/precious-metals-technology
www.pt-labware.com

E 1M 10.2011/VN Reu Layout: 5TC, Friedberg