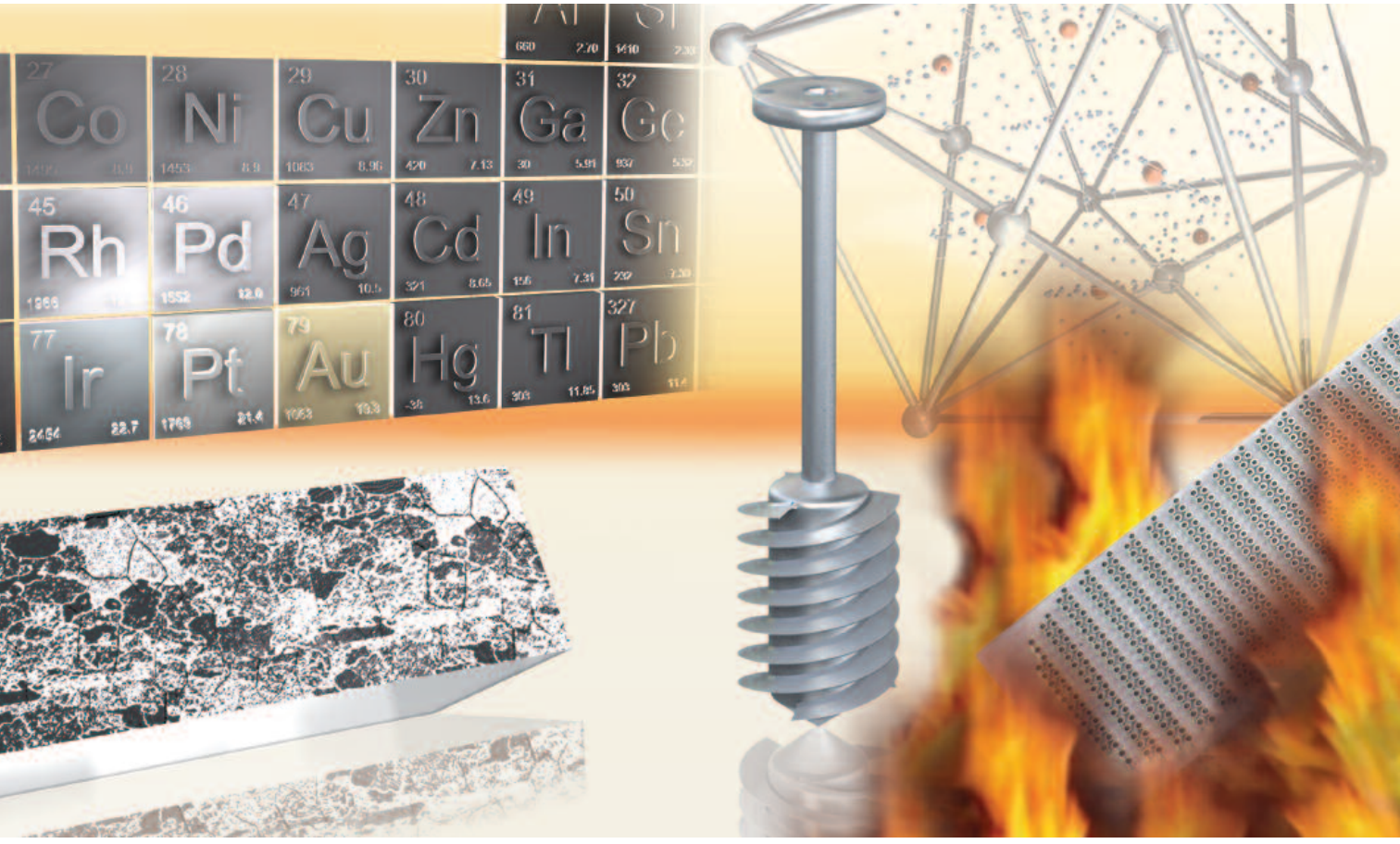
Heraeus



Pt-5%Rh DPH*hs*

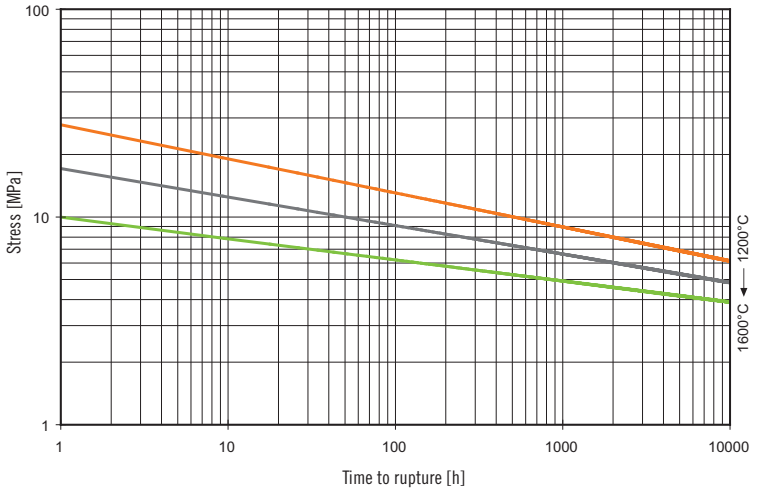
Pt-5%Rh DPH*hs* is an advanced modification of the oxide dispersion hardened alloy Pt-5%Rh DPH. It has been developed primarily as a material for glass fiber bushings and other applications that require a structural material with a very high level of stiffness at service temperature. A particularly interesting application is in the tip-plates of bushings. The good forming and welding characteristics make the material an ideal candidate for plates with both welded and pressed tips where it can be used to advantage as a substitute for the conventional alloys Pt-10%Rh and Pt-20%Rh.

The high creep strength is achieved largely as a result of a substantial increase in the quantity of dispersed oxide phase relative to the standard DPH materials. Pt-5%Rh DPH*hs* contains approximately 3 percent by volume of the oxide. This reduces the density of the alloy relative to Pt-5%Rh or Pt-5%Rh DPH and thus also reduces the weight of alloy required to make any given component. Precious metal weight reductions typically achieved are in the range of 2 – 3%.

In view of the high strength and stiffness, there are some restrictions on the dimensions of semi-finished products and parts that can be manufactured from Pt-5%Rh DPH*hs*. We will be pleased to discuss the use of this new material in your components.

Stress-Rupture Strength of Pt-5%Rh DPH*hs*

Stress-rupture test: A specimen of the material is subjected to a defined stress and the time to rupture of the specimen is determined. The time to rupture is measured for each temperature on a large number of specimens at different stresses and plotted in the stress-rupture diagram.



High Temperature Mechanical Properties of Pt-5%Rh DPH*hs*

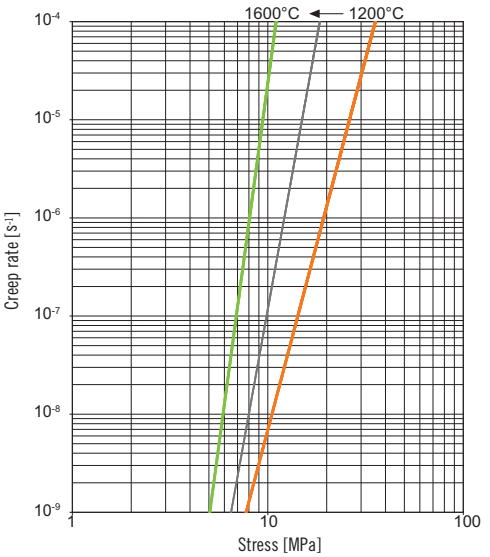
Standard values are needed to permit the comparison of different materials. The table summarizes the results of tensile and stress-rupture tests. The stress-rupture strength is shown for a life of 10,000 h, i.e. almost 14 months. The creep strength corresponds to a creep rate of about 3% per year. The table includes a comparison with the approximate stress-rupture strength of the conventional alloy Pt-20%Rh.

		1200°C	1400°C	1600°C
R_m	[MPa]	81.0	45.4	27.7
$R_{p0.2}$	[MPa]	71.0	38.8	22.2
A	[%]	33	42	46
$R_{m/10,000h}$	[MPa] (Pt-5%Rh DPH*hs*)	6.1	4.8	3.9
$R_{m/10,000h}$	[MPa] (Pt-20%Rh)	2.8	2.0	0.8
$\sigma_{1.0E-09}$	[MPa] (Pt-5%Rh DPH*hs*)	7.7	6.5	5.0

Rm	Tensile strength
Rpo.2	Yield strength
A	Tensile elongation
$R_{m/10,000h}$	10,000 h stress-rupture strength for Pt-5%Rh DPH*hs*
$R_{m/10,000h\ (Pt\text{-}20\%Rh)}$	Approximate comparative values for Pt-20%Rh
$\sigma_{1.0E-09}$	Stress for creep rate $10^{-9}\ s^{-1}$ for Pt-5%Rh DPH*hs*

Creep Strength of Pt-5%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.



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