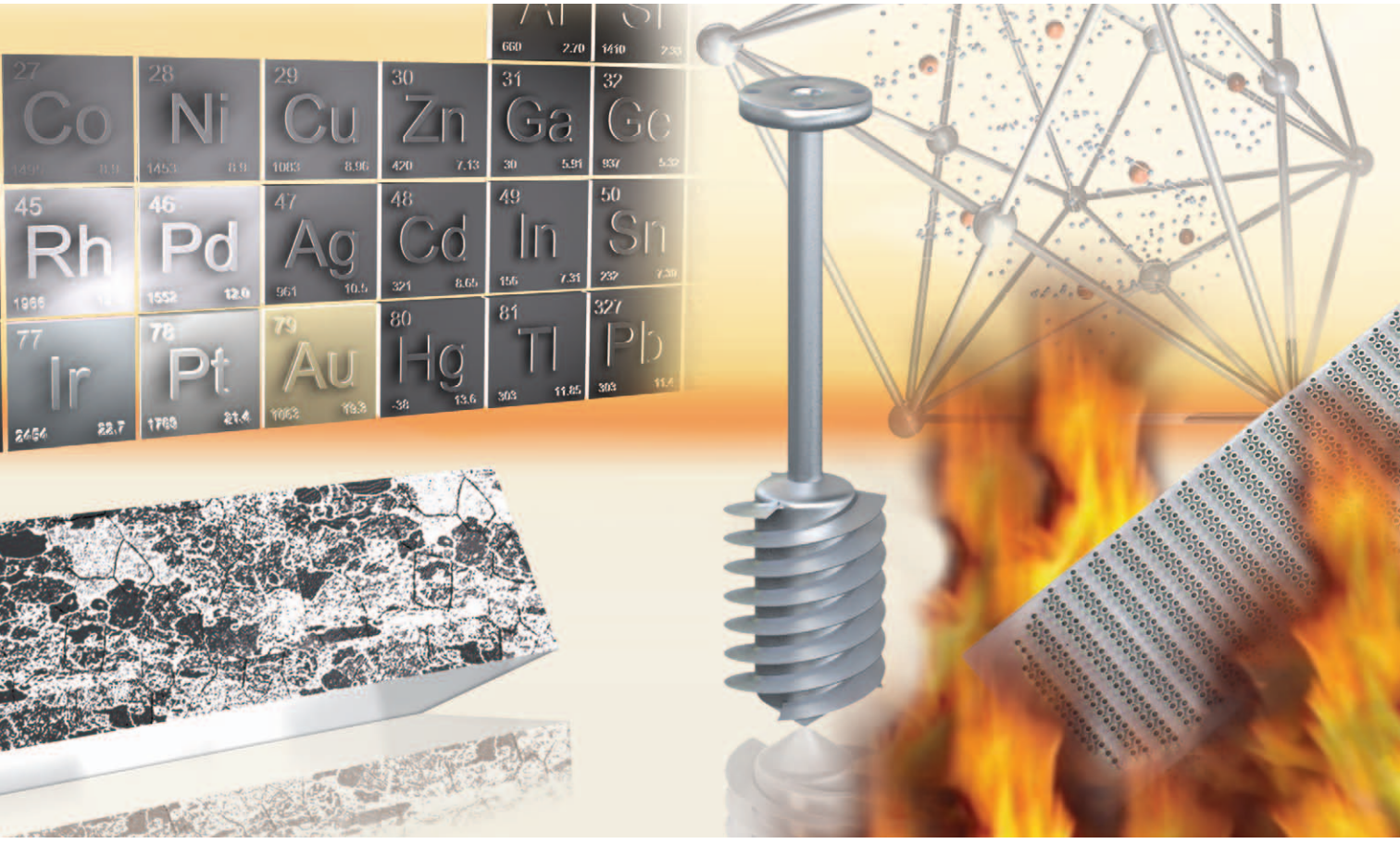
Heraeus



Pt-10%Rh DPH-A(dvanced)

Pt-10%Rh DPH-A is an oxide dispersion hardened alloy from the Heraeus DPH class of materials with very high creep strength at temperatures up to 1700°C.

While Pt-10%Rh DPH-A has the same chemical composition as Pt-10%Rh DPH, its material properties have been optimized to meet the requirements for the shafts of stirrers, gobbers and plungers by specific adjustments of the manufacturing parameters. Pt-10%Rh DPH-A, moreover, can be put to optimum use in applications which require a structural material with the highest degree of stiffness under service conditions.

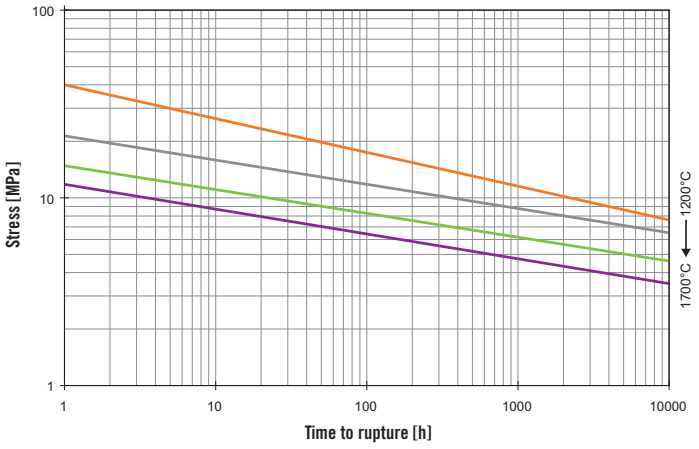
Due to the advantageous material properties in the high temperature range, the use of Pt-10%Rh DPH-A results in longer service life and a more efficient use of material. Thus considerable economic advantages are achieved in use. The very high creep strength of Pt-10%Rh DPH-A which is found over the entire temperature range is achieved on the one hand by solid solution hardening and, in comparison to Pt-10%Rh DPH, by the stronger influence of dispersion hardening.

The excellent combination of hardness and ductility makes the material robust to temperature changes and it stands out for its form stability even in the weld seams. In addition, the good forming and welding characteristics enable the manufacture of components with complex geometries.

Special requirements on semi-finished products and components of Pt-10%Rh DPH-A as well as customer specific component dimensions can be designed individually. Our Heraeus specialists will be pleased to advise you about this.

Stress-Rupture Strength of Pt-10%Rh DPH-A

Stress-rupture test: A sample of the material is subjected at a determined 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.



High Temperature Mechanical Properties of Pt-10%Rh DPH-A

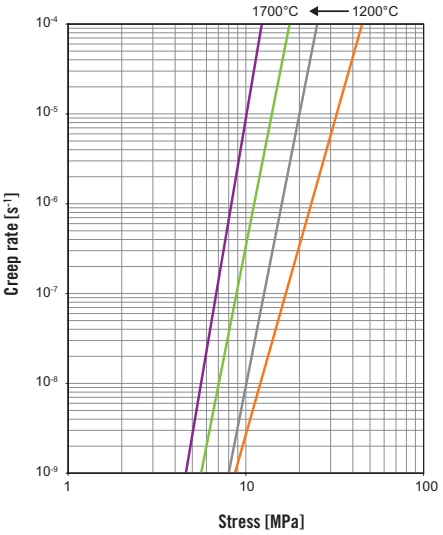
Standard values are needed to permit the comparison of different materials. The table summarizes the results of tensile and stress-rupture tests. The stress-rupture strength is shown for a life of 10,000 h (i.e. almost 14 months). The table also gives the stress at which a creep rate σ of approx. 3%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

		1200°C	1400°C	1600°C	1700°C
R_m	[MPa]	85	52	31	24
$R_{p0.2}$	[MPa]	57	40	27	22
A	[%]	28	32	56	47
$R_{m/10,000h}$	[MPa] (Pt-10%Rh DPH-A)	7.6	6.8	4.6	3.7
$R_{m/10,000h}$	[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-A)	9.3	8.8	6.0	5.2

R_m	Tensile strength
$R_{p0.2}$	Yield limit
A	Tensile elongation
$R_{m/10,000h}$	10,000 h stress-rupture strength
$\sigma_{1.0E-09}$	Stress for creep rate $10^{-9}s^{-1}$

Creep Resistance of Pt-10%Rh DPH-A

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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