

Pt-10%Rh DPH

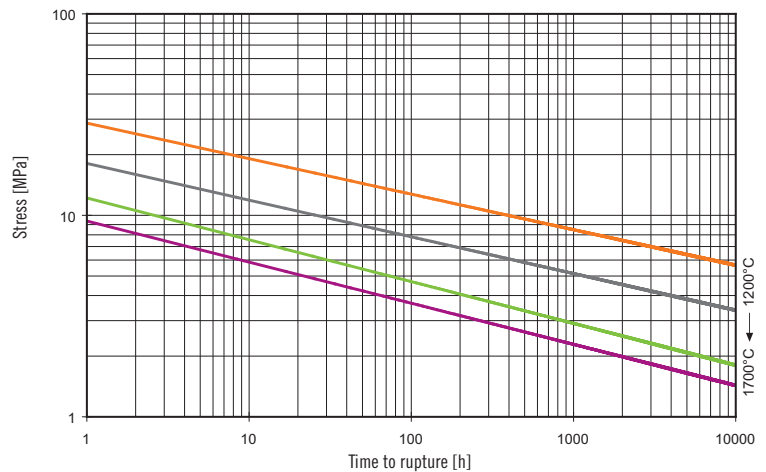
Pt-10%Rh DPH is an oxide dispersion hardened grade of the traditional alloy Pt-10%Rh. The DPH alloy combines the advantages of excellent resistance to oxidation and corrosion with high strength at temperatures up to 1700°C. Despite the high strength, Pt-10%Rh DPH has excellent forming properties and a high degree of ductility under service conditions. In common with the other DPH materials from Heraeus, Pt-10%Rh DPH can be readily welded by all standard techniques, including tungsten inert gas (TIG), laser and electron beam welding. The strength of the alloy is largely maintained after welding.

Especially as a result of the high rhodium price in recent years, Pt-10%Rh DPH has replaced the non-dispersion hardened alloy Pt-20%Rh in many applications.

Pt-10%Rh DPH is very widely used for structural applications in the glass industry. Typical uses are in the manufacture of feeder systems, stirrers, thermocouple thimbles, bubbler tubes, linings for refractory components and in glass fiber bushings.

Stress-Rupture Strength of Pt-10%Rh DPH

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-10%Rh DPH

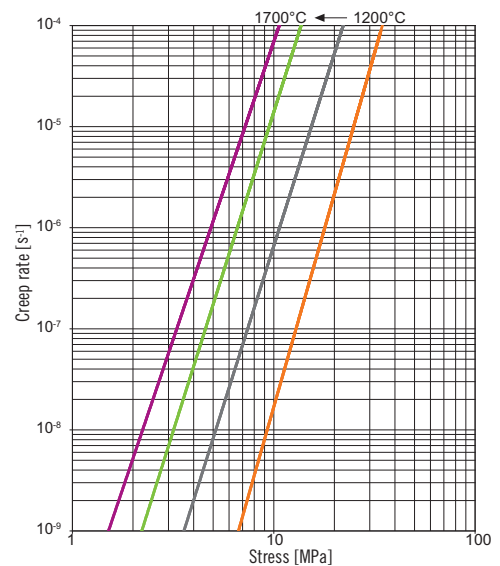
Standard values are needed to permit the comparison of different materials. The table summarizes the results of tensile and stress-rupture tests. The stress-rupture strength is shown for a life of 10,000 h, i.e. almost 14 months. The creep strength corresponds to a creep rate of about 3% per year.

		1200°C	1400°C	1600°C	1700°C
R_m	[MPa]	62.8	36.6	22.2	–
R_{p0.2}	[MPa]	51.3	34.8	22.0	–
A	[%]	34	69	66	–
R_{m/10,000h}	[MPa]	5.6	3.3	1.8	1.4
σ_{1.0E-09}	[MPa]	6.6	3.5	2.2	1.5

R _m	Tensile strength
R _{p0.2}	Yield strength
A	Tensile elongation
R _{m/10,000h}	10,000 h stress-rupture strength
σ _{1.0E-09}	Stress for creep rate 10 ⁻⁹ s ⁻¹

Creep Strength of Pt-10%Rh DPH

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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