Pt-10%Rh DPH-A has very good welding properties and can be welded using all established processes including tungsten inert gas (TIG), laser and electron beam. When a weld seam is created, the material liquefies for a short time before solidifying again. The number of strengthening dispersoid particles in the weld zone thus decreases and the material properties change. In particular, the strengthening effect of dispersion hardening is reduced and the strength can drop to the level of the base alloy.

As a result of the special melting metallurgical process for manufacturing Pt-10%Rh DPH-A a high proportion of hardening dispersoids and an excellent grain structure are present in the solidified microstructure of the weld seams. Pt-10%Rh DPH-A distinguishes itself from powder metallurgical materials by its excellent combination of strength and ductility which is also maintained after welding.

Over and above automated circumferential and longitudinal welding processes it is possible to manufacture manual weld joints in complex components and in areas which are not easily accessible. Depending on the specific application and the weld design, welding is carried out with or without additional filler metal.

When welding with additional metal, various materials can be used in order to achieve maximum strength of the joints. In subsequent processing the seams can be machined to the original sheet thickness so that a homogeneous temperature distribution is ensured in resistance or inductively heated systems.

Our Heraeus specialists will be pleased to advise you on the correct choice of welding process.
Stress-Rupture Strength of TIG-welded 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 alloy and condition.

Pt-10%Rh DPH-A distinguished itself through a fine grain microstructure in the initial sheet and particularly in the weld joint. The reason is the optimum combination of the quantity and size distribution of the oxide particles. After the sheet has locally melted during welding, the innumerable oxide particles in the weld pool act as seed crystals which generate the fine grain structure. Through this combination of fine grains and small oxide particles, grain growth in the weld seam is suppressed. Thus the good strength and high ductility in the weld seams are maintained at a high level during the service life of the components.

Microstructure of the Weld Seams

The photographs, diagrams, drawings and texts contained in this material data sheet are protected by copyright in favor of Heraeus. Any and all resulting rights, in particular the right of translation, reproduction, taking of figures, illustrations or photographs, photo-mechanical reproduction etc. and storage in EDP plants, shall remain reserved even if only excerpts are taken. They may only be exercised after prior written consent of Heraeus. The data contained in this material data sheet have been obtained at Heraeus under laboratory conditions to the best of Heraeus’ knowledge and under observance of the latest state of the art. However, Heraeus does not assume any responsibility for the correctness and completeness of these data or any responsibility that the respective user will obtain the same data under its concrete conditions. Each user shall examine on its own responsibility whether the products of Heraeus are suited also under its own conditions of use and for its own intended purpose of use.