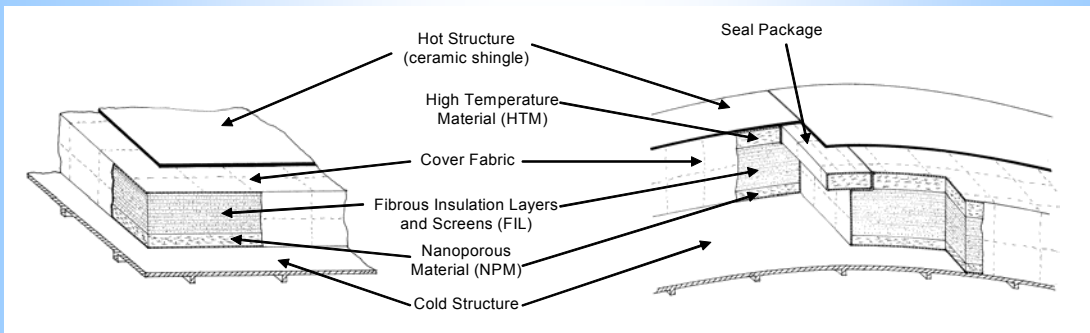


High Performance Insulations for Re-entry Vehicles (HPI)



Between outer shingle and the inner cold structure of a re-entry vehicle insulation material has to be placed in order to protect the inner structure from overheating. An advanced insulation was developed by HPS (with subcontracts to MAN and DLR) in the frame of an ESA TRP-activity between the years 2003 and 2005. Due to new materials and specific configurations of the different insulation layers this High Performance Insulation package (HPI) provides now a lighter (for around 20%) and more cost-effective solution (up to 60% cheaper) in comparison to current state of the art insulation concepts. By configuration adaptation they can be optimized to various locations, with maximal temperatures of e.g. 1000°C or up to 1600°C. Due to several, extended material tests (vibration, thermal, handling, humidity, etc.) as well as a demonstrator test in relevant environment up to 1600°C the new HPI has gained a technology readiness level (TRL) of 5.



Medium Temperature Insulation Package (HPI-1000)

Max. Shingle Temp.: 1000°C for 1200 sec
 Max. Cold Struct. Temp.: 170°C
 Location: Windward surfaces
 Thickness: 40 mm
 Weight: < 4 kg/m²
 Lifetime: 50 re-entries, 15 years

High Temperature Insulation Package (HPI-1600)

Max. Shingle Temp.: 1600°C for 1200 sec
 Max. Cold Struct. Temp.: 170°C
 Location: Nose Cap/Leading Edges
 Thickness: 80 mm
 Weight: < 8 kg/m²
 Lifetime: 50 re-entries, 15 years



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