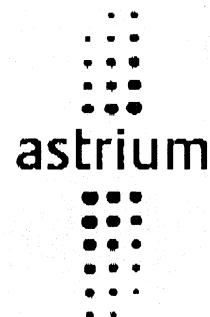


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Betreff/Subj.: Closure of AI 004, HP-ASED-MN-0182, Mech. IF Meeting with SPIRE,  
 27.09.02, Astrium-FN

Dear Eric and John,

Please find attached the Astrium thermal analysis of the L1 interface, as shown in the SPIRE Structure Interface Drawings, Issue 17, MSSL/SPIRE/SP005, 25 October 2002.

This closes AI004 of HP-ASED-MN-0182.

Kind regards

**Astrium GmbH**

*for* i. A. F. Rühle  
 i. V. W. Rühle

*E.Hölzle*  
 i. A. E. Hölzle

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 Datum/Date: 31.10.02  
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**AI 004 Meeting Reference HP-ASED-MN-0182, 27.09.02:  
 ASE/JH to evaluate the I/F to optimise the thermal IF**

The thermal L1-Interface of SPIRE, shown in the drawing SPIRE Interface (Thermal Strap Connection), drawing NO. A1 5264 300sht5, has been thermally analysed with the following result:

These interfaces enable two copper straps of 20 x 2 mm dimension, each to be clamped against the SPIRE FPU with the help of a clamp-bracket as shown below. Material of the screws (1 M8 and two M4) and for the clamp bracket shall be the same as for ISO in order to achieve adequate clamp forces after cooling down to Level1-temperatures.

Based on the clamp-force calculations of D. Tenhaeff (Fax HP-ASED-FX-0644/02) the following clamp forces, contact areas and contact conductances are achieved in comparison with ISO.

Since the clamp forces are higher than for ISO and the contact areas are greater than for ISO the expected contact conductance is expected higher than for ISO.

SPIRE L1		ISO	
screws DIN912, copper alloy 2.0835.73	Tension (N)	screws DIN912, copper alloy 2.0835.73	Tension (N)
M8 screw	12713	M5 screw	5260
M4 screw	3326	M5 screw	5360
M4 screw	3326		
Total force	<b>19365</b>		<b>10520</b>
Contact area	20 x 19.5 -Pi/4 x 8^2		20 x 114
(mm <sup>2</sup> )	<b>340</b>		<b>280</b>
Heat conductance (W/K)	<b>0.49 expected</b>		<b>0.4 measured</b>

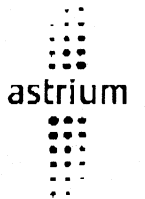
Hence it follows that the SPIRE L1 interface design as shown in the drawing drawing NO. A1 5264 300sht5 could be accepted by ASE/JH.

Please note that this analysis is based on the current ASE/JH reference design. The detailed I/F design is part of the tasks delegated to the Optical Bench Assembly subcontractor and may therefore be different from the current design assumptions.

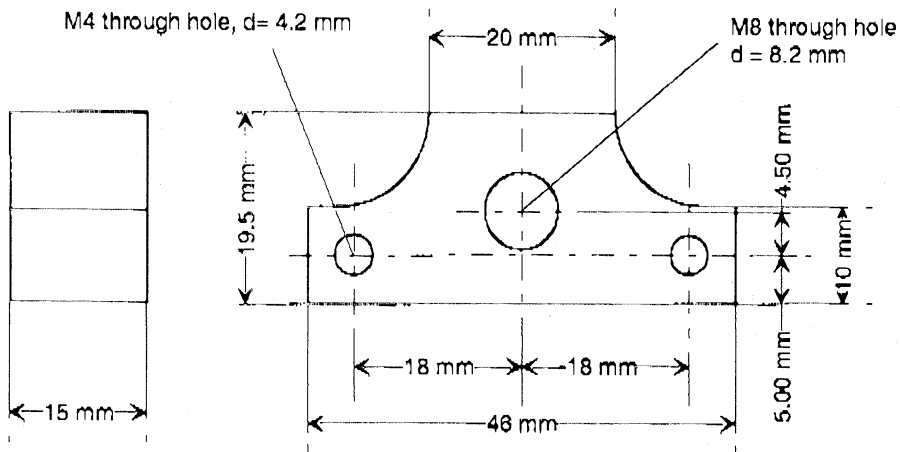
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## SPIRE L1 Interface "Clamp Bracket" Material: 2.1030.26 (CuSn8)



Flatness and roughness TBD by OBA subcontractor

