The baseline design for the mechanical standoffs of each Level 0 straps is currently as follows:

- 1 bipod and 1 tripod both made from Torlon mechanically support the L0 straps off the SPIRE FPU which seats at ~4K.

Following the L0 straps meeting held at RAL on the 23-Apr-2004, ASG had for action to check the assumptions currently used in the thermal model (for the Torlon thermal conductivity) against a set of thermal data provided by PH (Cardiff).

Following this check, a numerical error has been discovered in the array used for the estimation of the Torlon thermal conductivity. As a result, the standoffs conductance is currently under-estimated by a factor of 10 and their parasitic loads into the L0 straps have therefore increased from 0.085 mW/strap to 0.85 mW/strap.

A quick calculation allows to estimated the impact this change would have on the L0 straps heat loads:

	Current Estimation (*)	Corrected (**)	Requirement (***)
L0 Enclosure Strap	0.60 mW	1.35 mW	1 mW
L0 Pump Strap	2.18 mW	2.81 mW	2 mW
L0 Evaporator Strap	0.27 mW	1.0 mW	n/a

(*) – Torlon Thermal conductivity used at 2K ~ 0.0027 W/mK
(**) – Torlon Thermal conductivity should be at 2K ~ 0.0277 W/mK
(***) – Reference: IIDB v 3.2

Such an increase in standoffs parasitic load means that the total load on each L0 strap is now outside the maximum allocated range as defined in the IIDB v 3.2.

Suggestions for L0 strap Standoffs parasitic load reduction:

- Change for a more isolating material

Vespel was initially used for the making of the L0 strap standoffs and offers some advantages thermally in that it is four times more isolating than Torlon (according to some data provided by Tom Bradshaw and Berend Winter).

	Thermal Conductivity at 2K	Improvement Factor	Estimated Load	References
Torlon	0.0277 W/mK	1	Enc : 1.35 mW Pump: 2.81 mW	Ventura, Cryogenics 39, (1999) 481-484
Vespel SP1	0.0042 W/mK	6.6	Enc : 0.65 mW Pump: 2.09 mW	SP1 data from Tom Bradshaw and Berend Winter
Vespel SP22	0.0061 W/mK	4.5	Enc : 0.71 mW Pump: 2.15 mW	SP22 data Berend Winter (0-15K) 23-8-01 email to Sam Heys
Vespel	?	?		

SP3				

Although Vespel SP1 seems to provide the larger improvement factor over the SP22, further analysis is needed for the Vespel SP3, which might be more adapted mechanically speaking.

- Reduction in Standoffs cross section and/or increase in leg length

MSSL should provide feedback on possible options.

The assumptions presented in this analysis have been based on the following thermal model and results data:

- spire_standalone.d (standalone model)
- spir25ntdm.d (SPIRE DTMM) which includes the following files:
  - nodes14_up.INP
  - GL_links54_up.INP,
  - material_props4.INP
  - heat_capacities.INP
  - conductivity_arrays15.INP
  - constants21.INP
  - spire_dissipation_modes6.INP

- Analysis results file “0.95 spectro 4K 4K cool 1-71K 2 1705 at L0IF 8K SDALONE.out”