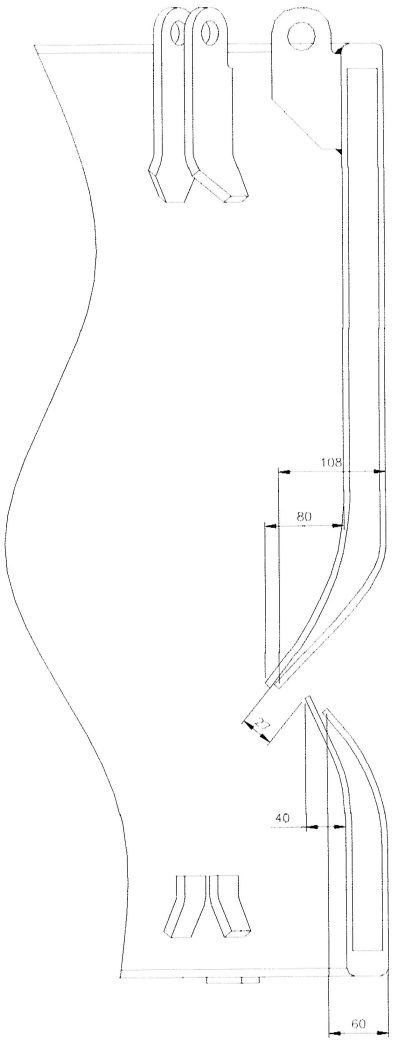

Figure 27: Section through jacket damage

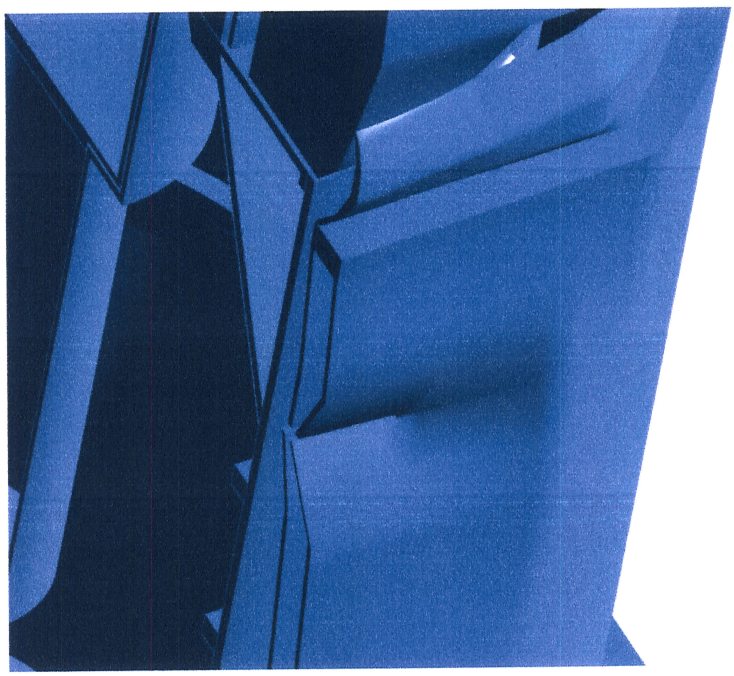

Figure 28: Thermal model (half section) showing punch hole

4.7.4 Package Results

Location	Peak A/C Temperatures (with damage) [°C]			
	Normal Form			Special Form
	Upright	Inverted	Side	Inverted
Cavity wall (mid-height)	273	293	288	316
Maximum lead temperature	271	284	279	302
Closure flange (20mm below upper surface, 50mm from outer edge)	253	253	253	-
Drain point (centre of cylinder, 80mm from outer surface)	228	261	256	-

The maximum peak closure flange temperature was 259°C (Section 4.6, upright and undamaged case). The maximum reverse temperature gradient was 3°C (Appendix 3, R7110/1.1).

4.8 CONTENTS RESULTS

The maximum cavity wall temperature in each orientation was used to model the contents in each orientation:

Orientation and Condition	Temperature [°C]	
	Normal Form	Special Form
Upright, undamaged	433	-
Inverted, undamaged	437	-
Inverted, damaged	437	471
Side, undamaged	435	-

4.9 SURFACE TEMPERATURE IN THE SHADE

The maximum temperature of any normally accessible surface in the shade in a 38°C ambient and with the maximum internal heat load is 79°C (see above). Taking the temperature difference (41°C) as proportional to the heat load, i.e. activity, the temperature reduces to 49.5°C when the contents activity is reduced to 2.08 PBq.

4.10 ADJACENT CARGO

The design of the package is such that adjacent cargo cannot affect its temperature. The pallet prevents other cargo from coming close to the jacket and restricting the free movement of air around the package.

5. CONCLUSIONS

5.1 NORMAL AND ACCIDENT CONDITIONS SUMMARY

Location	Normal Form - Peak Temperatures [°C]		
	Equilibrium in the shade (@ 38°C)	Equilibrium in the sun (@ 38°C)	Thermal Test (maximum with or without drop test damage)
Closure flange (50mm from outer edge)	135	142	259
Drain point (centre of cylinder, 80mm from outer surface)	139	144	262
Maximum reverse gradient in closure flange	-	-	3
	Special Form - Peak Temperatures [°C]		
Capsule wall	409	411	471
Cavity wall (mid-height)	201	205	316
Maximum lead temperature	186	191	302
Closure flange (50mm from outer edge)	141	150	270
Flask wall (mid-height, midway between fins)	149	153	287
Lifting fin (40mm from top edge, 55mm from outer edge)	79	93	-
Flask foot (top surface, 30mm from outer edge)	50	67	-
Top shield (top surface centre)	57	100	-

5.2 NOTES

1. The thermal performance of the R7021 is not sensitive to IAEA normal or accident conditions mechanical testing.
2. The R7021 should be transported under "Exclusive Use" conditions when carrying more than 2.08 PBq of Co^{60}.
3. No accessible surface exceeds 85°C under normal conditions of transport in the shade.
4. The thermal performance of the R7021 is not significantly affected by adjacent cargo.
5. The current issue of the manufacturing drawings is detailed in QS7021 issue 5. RTM 151 details all the changes made to the design from QS7021 issue 4. None have any thermal significance therefore the results and conclusions from this document remain valid.

6. REFERENCES

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