**Materials RAI (Round 2)**

1 **RAI-M1**: The kind of spruce wood to be used is not specified, but the properties of the spruce wood to be used are specified in detail as far as they are essential for the mechanical behavior of the shock absorbers.
Material data sheet WB-03-03 Rev. 4 and WPB-03-03 Rev. 2 (see enclosures) regulate the properties and the testing of the wood during manufacture.
This includes sorting class (quality), density, moisture content and deformation energy.

2 **RAI-M2**: As already explained in an earlier answer report B-TA-3991-Rev.2 was prepared in an early design stage only to evaluate the angle for the 9 m slap down drop test with a cask model. At this time pine wood was intended to be used as shock absorber material instead of later spruce wood. As explained in an earlier answer this has no effect on the results of the calculations. It was also explained that for the slap-down drop only the properties of the wood in the side regions of the shock absorbers (balsa wood longitudinal) are of interest.
The values used in B-TA-3991 for this (9 – 15 MPa) were from BAM tests performed in the 1978 (we sent the curve already) and are in our opinion in good agreement with the new results of tests performed at BAM which are summarized in Table 4-30 of the SAR.

3 **RAI-M3**: Concerning the time yield limit values for lead given in Figure 59 of [Guruswamy 2000] we contacted Professor Guruswamy directly by e-mail and received the confirmation (see copy enclosed) that the stress axis has a typographical error and a factor of 100 is missing (it should be x98100). Therefore for the stress of chemical lead with 0.059% Cu at 10000 h a value of 40 x 98100 ≈ 4 MPa and for 100000 h a value of ≈ 3.4 MPa can be derived.
The values given in Table 4-9 of the SAR (2.0 MPa and 1.7 MPa) are therefore conservative values by a factor of 2.

The stresses in the packaging body under routine conditions of transport are calculated in Chapter 4.3.3 of the SAR and summarized in Table 4-26 for the outer shell. No stresses for the lead shielding were calculated because the lead is no structural material but encased by the outer and inner shell with no opportunity to move.
From the results of a vertical 9 m drop test with the 1:3 cask model at operation temperature (100 °C) where for an acceleration of approx. 100g no lead slump was observed after the test it can be concluded that for routine conditions of transport (2g) no lead deformation will occur.

Enclosures:

- WB-03-03 Rev. 4 (German, English)
- WPB-03-03 Rev. 2 (German, English)
- E-mail Prof. Guruswamy