



MECAL TECHNICAL NOTE

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ISO 7840:2000 FIRE RESISTANT FLEXIBLE HOSE (AND SIMILAR PRODUCTS)

Reference: All Vessels – Section 14

The following notes are for the guidance of examiners when accepting ISO7840:2000 fire resistant flexible hose in coded vessels.

a) ISO 7840 flexible hose is a cost effective solution for many applications in coded vessels where fire resistance is required. Typical applications include fuel supply and return hoses to engines, fuel tank filling and vent lines, sea water inlet and overboard discharge hoses in fire risk areas. Sizes vary from 3mm to 63mm bore. ISO 7840 type A1 hose is suitable for petrol and diesel fuel, whereas type A2 hose is more permeable and is suitable for diesel but not petrol. Most manufacturers only offer type A1 hose.

b) Generally the use of ISO7840 hose is preferred to the practice of applying heat resistant wrapping around vulnerable plastic hoses; there is doubt that such wrapping would be very effective in a real fire, and also the wrapping tends to soak up oil etc in many applications and itself becomes a fire risk.

c) The ISO 7840:2000 fire test is for 2.5 minutes in a heptane fire; liquid heptane is placed in a tray 250mm under a horizontal test length of hose. A typical heptane open flame burns at about 1000 deg C. This suggests that in a real fire, ISO7840 hose should last at least 2 minutes before failing.

d) ISO 7840:2000 hose is really intended for pressure applications but clearly there may be occasions when a hose will have to operate under a partial vacuum. The standard specifies that hose should withstand a vacuum collapse test (ie not reduce its internal bore to less than 80%) as follows: D <10mm 80kPa (3psi absolute in old money), 10<D<25mm 35kPa (10 psi absolute). Diameters above 25mm are not vacuum tested. This latter suggests that ISO7840 hoses larger than 25mm may not be suitable for suctions to engine cooling and fire pumps because the hose could be sucked flat with a temporary blockage in the strainer. However in practice usually these larger hoses are mandrel wound wire re-enforced and are fairly rigid and quite resistant to collapse. A hand "squeeze test" will give a useful indication of resistance to collapse of these larger size hoses. Hoses under 25mm are usually textile reinforced, and it is their small diameter that makes them resistant to collapse under vacuum.

e) If vacuum is likely to be a problem in applications requiring hose sizes over 25mm, then it may be better to go for ISO13363 type 2B "hardwall" exhaust hose; this has a helical wire embedded within and resists exhaust gas at 580 degrees C for 2 minutes. Although ISO13363 does not address

vacuum collapse, the helical wire insert should prevent collapse under moderate vacuum. Older Lloyds specification exhaust hose is similarly re-enforced.

f) SAE J 1527 type B1 hose (as used in some vessels built in the USA) has similar fire resistance and fuel permeability qualities to ISO7840 type A1 hose and may be accepted in coded boats.

g) One important detail omitted from ISO7840:2004 is any mention of electrical conductivity of the hose. This means that it is very important in, say, RIBs with in-hull petrol tanks, that the filler assembly should be bonded electrically to the tanks and sea by a separate grounding wire or metal strap, independent of the tank filler hose, so that risk of sparks during fuelling is minimised.