

MEMORANDUM

19 January 2000

To: G.Alexeev / JINR, G.K.Mallot / EP
From: H.Taureg / EP / DSO
subject: derogation to use ABS in the NA58 COMPASS muon detector
cc: G.Goggi / EP, M. Tavlet / TIS

The NA58 COMPASS muon detector plans to use ABS plastic as envelope to contain the gas in the muon detector. The plastic material is halogen-free but fails the smoke density requirement of IS41.

I authorize, nevertheless, the use of the material in the construction of the muon detector under the condition that the following measures are taken:

- the power distribution to the electronics close to the detector is segmented and appropriately fused,
- if a flammable gas mixture is used in the detector the oxygen content in the gas is monitored online at the outlet and interlocked with the gas supply. The gas mixture is monitored online at the input and interlocked with the supply if a flammable component gas is used,
- appropriate smoke and gas detection is installed close to the detector.

Hans Taureg

Ref:

Date: 15 December 1999

MEMORANDUM

From/De : G. Alexeev/JINR and G.K. Mallot/EP
To/à : G. Goggi/EP
Subject/Sujet : Derogation for the usage of ABS in COMPASS
Copies : H. Taureg/EP



In the COMPASS proposal the Muon Wall 1 (MW1) detector was identical to a D0 detector used in Fermilab, for which a production line was set up in the Joint Institute for Nuclear Research (Dubna) for 6500 tubes. The detector consists of aluminium profiles with 8 cells of 10 mm width and a sense wire in the centre. This unit is covered by a plastic envelope like for Iarocci tubes (Fig. 1). In total COMPASS will use about 4 km of these tubes (1040 pieces).

The JINR team lead by G. Alexeev made big efforts to minimise the hazards related to usage of plastics in the MW1 detector of COMPASS. The main quantity of plastic material in muon detectors of MW1 is concentrated in the more than 3 km high density cables for digital readout and the plastic envelopes of the wire detectors - about 4 km long.

The PVC cables used for the Fermilab detector were replaced by polyolefine cables from the CERN store (Mag.number 04.21.21.380.9), costing 26.5 CHF/meter. This represents extra costs of 75000 CHF for JINR.

In an effort to abandon the PVC plastic envelopes the extrusion and welding of several plastic materials was studied. Acrylonitrile Butadiene Styrene (ABS) plastics was found to be the only workable alternative to PVC. It has been established that the production line can be modified to work with ABS. In particular the welding of the ABS endcaps and the extrusion of the ABS envelopes was optimised. These tests represent a major financial investment from Dubna in order to replace the PVC from the original detector design. The total material will be about 1200 kg of ABS. ABS is also well known in detector construction and guarantees gas tight welding of the envelopes to the end caps. ABS is a neutral material used for Iarocci tubes before. It provides the best perspective for the long life time and high rate environment of COMPASS.

Thus we see ABS as the only viable alternative to PVC within the MW1 project. We intend to use a material without halogenated organic compounds as flame retardants. However, due to the smoke development this material is banned in IS41. As compensatory measures, the detector stations will entirely be enclosed by aluminium sheets. Particular care will be taken in the distribution of electrical power in order to guarantee that in case of a short circuit the available power is limited and immediately switched off by appropriate fuses. The detector station will be installed on either side of an iron absorber (Fig. 2).

In order to proceed with the detector construction we ask for a derogation from IS41 and the permission to install the detector with ABS envelopes and endplugs in the large surface-hall 888.

For final judgement we may provide the TIS with sample of our ABS non-halogen plastic to make necessary tests with it.

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USINAGE MOYEN/MEDIUM MACHINING	± 0.1	± 0.2	± 0.3	± 0.5	± 0.8	± 1.2	± 2
MECANO. SOUDURE/WELDED STRUCTURE	± 0.5	± 1	± 2	± 3	± 5	± 7	± 10

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DRAWING, RUGOSITY, TOLERANCES
ACCORDING TO ISO STANDARDS



PROJECTION



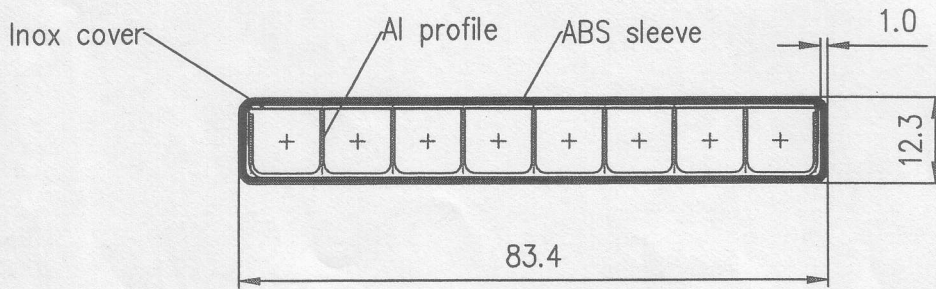
ORGANISATION EUROPEENNE POUR
LA RECHERCHE NUCLEAIRE
EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH
GENEVE

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INDICE	DATE	NOM	MODIFICATION
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Fig 1

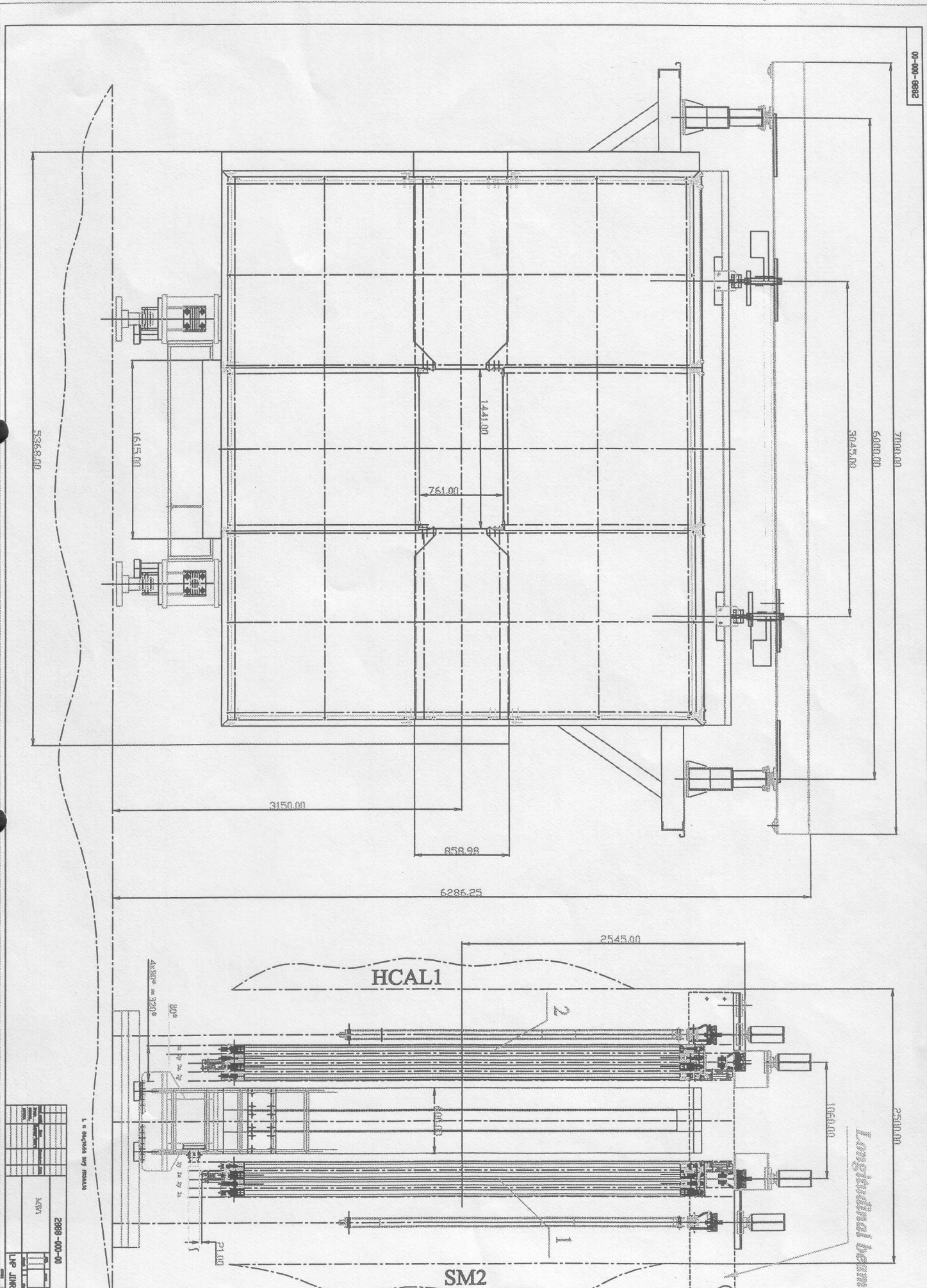
MDT



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Fig 2

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21.07.99 A. Serrano

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1. In brackets any revision