

Memorandum

To: S. Myers (SL), Chairman of LCC
From: P. Strubin, N. Hilleret and N. Kos (LHC-VAC)
Subject: Beam Screens for Inner Triplet
Copies: O. Brüning, Secretary of LCC, Ph. Lebrun (LHC)

The following presents the status of the beam screens for the inner triplet and the proposal of the LHC Vacuum Group on how to proceed with procurement, as asked for in the LCC meeting on 9th of October 2002..

Status

The present line followed by LHC-VAC is to build a “race-track shaped” beam screen for the magnets of the inner triplet, based on the proven design of the arc. The only difference is to use a steel thickness of 0.6 mm for the beam screen wall instead of 1 mm. This is acceptable, because the mechanical constraints in a quenching quadrupole are smaller than those in a quenching dipole.

These screens are optimised to maximize their aperture in one plane, hence they will have to be inserted with the flat parts either horizontal or vertical, depending on the crossing angle of the experiment.

Manufacturing possibilities

CERN could only find two manufacturers willing to build prototype beam screen tubes to our specifications. One of them did not want to make an offer for the arc type beam screens, after having produced a pre-series of LSS type beam screen tubes. The latter did not satisfy our requirements in the field of tolerances. We therefore only have one manufacturer left, busy with the production of the arc type beam screens.

Informal contacts have made it clear to us that this manufacturer would only be willing to enter into negotiation for an extension of the contract for the LSS beam screen tubes if we keep our specification as close as possible to the arc type one. And even so, we do not yet have any commitment, nor pricing, from them.

Schedule

The lead time for the special P506 steel strip used for the beam screen tubes is about one year. If we succeed in negotiating with the present manufacturer an extension of their contract before mid-December, the earliest date at which a first finished beam screens for the LSS would be available for installation into a magnet is February 2005. This is compatible with the installation of the first inner triplet during the first quarter of 2005.

If we have to start the procedures of a new contract, delays of at least 6 months would have to be expected. Furthermore, additional costs for delaying the beam screen finishing contract could not be avoided.

Proposal

LHC-VAC proceeds with the negotiation of “race-track shaped” beam screen tubes with the present manufacturer, optimising the available aperture in one plane and completes the study of the implementation of the connexion of the helium capillaries at the interconnect in case the flat parts are vertical (this problem is not yet fully solved).

In parallel, our group continues to study possibilities of manufacturing a differently shaped tube with the required tolerances and to look for solutions which could make it possible to retrofit an optimised beam screen after a few years of operation.