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MPS/SR/Min. 72-23

22.9.1972

NOTES ON VISIT TO SCHOELLER BLECKMANN, TERNITZ, AUSTRIA

TO DISCUSS F.A.K. PROJECT VACUUM TANK

Persons seen : Tutschek - Commercial

Mayerhofer - Technical

1. Overall Impression

The Ternitz works of Schoeller Bleckmann specializes in alloy steel fabrications. Much of the production is devoted to stainless steel vacuum vessels, some of very large dimensions (Ø 3-4 metres), but for which leak detection rates of 10^{-6} Torr litre/second are the accepted norm. (Detection to 10^{-10} Torr litre/second is specified for the F.A.K. tank). The factory is not modern, nor is it equipped with ultra modern machine tools. Nevertheless, the overall impression was most satisfactory - it is certainly a well organized and efficient production unit, specializing in the same type of fabrication as required for the F.A.K. tank and with vacuum test equipment capable of detecting the leaks at 10^{-10} Torr litre/second.

Past production has included the vacuum tanks for DESY kickers.

2. Delivery

Much of the discussion was devoted to the delivery schedule which could be guaranteed. The fact that CERN would be able to supply all the constructional material at short notice (on or before 1.10.1972 was the date given) causes concern to Schoeller Bleckmann that the promised delivery of 5 months in their quotation can no longer be held. In making the 5 months delivery promise, they had assumed that CERN would require at least 2 months to collect and forward material. The CERN position was stated as follows : Material delivery to Ternitz could be guaranteed for 1.10.1972 and in return delivery of the finished, tested tank to CERN for 1.3.1973 was required. Schoeller Bleckmann could count on CERN transport for the collection of the finished tank in order to minimize delay (subject to renegociation of the contract price in CERN's favour) CERN staff would be available at seven days' notice for witnessing vacuum or goemetrical checks of the tank.

In view of the need to study in detail the manufacturing schedules at Ternitz, Mayerhofer requested additional time before confirming the best possible Schoeller Bleckmann delivery date. It was agreed that he would phone Fiander on 22.9.1972 with this information and also the attitude of Schoeller Bleckmann to a penalty clause of 5% at the rate of 1/2% per week - in principle such a clause was not unacceptable to Schoeller Bleckmann. The revised contract price taking into account minor additions, would also be communicated on 22.9.1972.

3. Production Method

In general the production methods which would be followed would be largely those forseen by CERN. There were no major areas of technical disagreement but certain detailed changes as outlined in 4 would be necessary or desirable, taking into account the machining and fabrication possibilities at Ternitz. Much of the machining would be made on a Collet boring machine which had a table stroke limited to 1m30 - certain

problems would arise for the holes in the tank base for the magnet locating feet.

4. Technical Aspects

As said in 3., the general production method proposed by CERN was accepted, excepted some precised points :

4.1 The required precision cannot be obtained in parallism and dimensions for the 9 pots welded in the tank walls if they are completely machined before. The method proposed by Schoeller Bleckmann forsees welding of rough outer flange on tube, welding of resulting subassembly in tank, machining of outer flange face and inner tube face, and separate complete machining of pot-bottom. They estimate that the final welding of the pot-bottom in position will provide the required accuracy. Dimensioning should be modified according to this new method.

4.2 Polishing is estimated unnecessary for N6 surface finish on shapes obtained by turning, but kept for straight milled surfaces.

4.3 Flatness has to be specified on tank rectangular top-flange.

4.4 Tolerances originally given as a whole at ± 0,05 for the position of the holes machined in the tank base have to be detailed respectively for straightness, parallelism and distances because of the stroke limitation of the Collet boring machine. Straightness and parallelism can be achieved in the 0,05 required tolerance, meanwhile the distances will not be guaranteed better than ± 0,1, which is nevertheless acceptable. The only consequence being magnet aperture reduction of the same order of magnitude.
It was noticed that the dimension referring the weld work to the hole lattice was missing.

4.5 Careful survey of the raw material dimensions has been asked according to the above mentioned modification.

4.6 Every raw material part should be marked by us to avoid later possible confusion.

4.7 Stress relieving heat treatment has been estimated sufficient at 550°C for 3 hours; 100°C more would bring intergranular corrosion, even with low carbon stainless steel, and surface oxidation not removable with the recommended cleaning process; pickling would be necessary with serious possibilities of gas desorption when putting under vacuum.

4.8 The heat treatment should be put before welding of position 15, 16, 17, 18, 22 and 25 (all flanges).

4.9 Putting the finished tank at 150°C for degassing purposes would be of no consequence from a mechanical point of view.

5. Conclusion

Subject to confirmation of delivery for 1.3.1973 it is felt that the order for the F.A.K. tank should be placed with Schoeller Bleckmann. Any extended delivery which is offered should be reviewed carefully in the light of the offer of Leybold (24'000 FS more expensive, but 4 months delivery) and the F.A.K. programme.

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