

Preliminary Specifications
for
The enlarged and bifurcation vacuum chambers 25,26,27
(Serpukhov fast ejection system channel A)

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Following the decisions ¹⁾ taken at the Joint Meeting on ejection and proton beam transport problems, held in March 1968, the enlarged doughnut vacuum chambers and the bifurcation vacuum chamber will be designed and constructed by the IHEP.

The present note contains the main specifications from the ejection point of view. From the vacuum point of view the Serpukhov standard engineering procedures should be followed as much as possible.

Since the freezing of the exact dimensions of the vacuum tanks of the ejection magnets in straight sections 16, 24, 26 and 28 will possibly only be before summer 1969, the design of the modified vacuum chambers must provide a maximum of freedom around these places. In particular the vacuum chambers should not reduce the length available for the magnet tanks and the section valves. For these reasons it is proposed to end all vacuum chambers right at the magnet iron in the straight section of ejection magnets, i.e. (14), 16, 24, 26, 28 (...). The flange would be fixed to the magnet iron a few cm outside the aperture.

For reasons of operation it is convenient to have electrostatic position pickups electrodes right next to the ejection magnets. In order to leave the entire length between the coils of adjacent magnet unit free for the tanks and section valves, it appears necessary to design a new, smaller housing for the electrostatic pickup, since the standard ones would take up too much space. These could be all the same type except an enlarged one at the end of the bifurcation chamber. This housing may possibly at some place contain other detector equipment like fluorescent screens and beam profile monitors, instead of or in addition to electrostatic pickups. This will presumably be the case at the end of the bifurcation chamber.

To take up possible misalignments between the vacuum chambers and the magnet tanks, it is essential to include a flexible bellows of around 12 cm length between the pickup housings and the section valves. Another variant would be to place the pickup housings rigidly against the ejection tanks and the bellows between the former and the vacuum chamber. Fig. 1 shows the principle for SS's (14), 16, 24, 26 and fig. 2 gives a possible layout in SS 28.

The width of the enlarged vacuum chambers is determined by the range of possible trajectories ²⁾ keeping account of the probable beam diameter of 1 cm and a clearance of 2,5 cm between the beam envelope and the wall of the chamber. The main dimensions required are shown in fig. 3.

It is suggested that, on the basis of these specifications and taking account of the discussions, the IHEP makes first draft engineering designs of these chambers and the modified pickup housings, for discussion at the next joint meeting.

Note 1

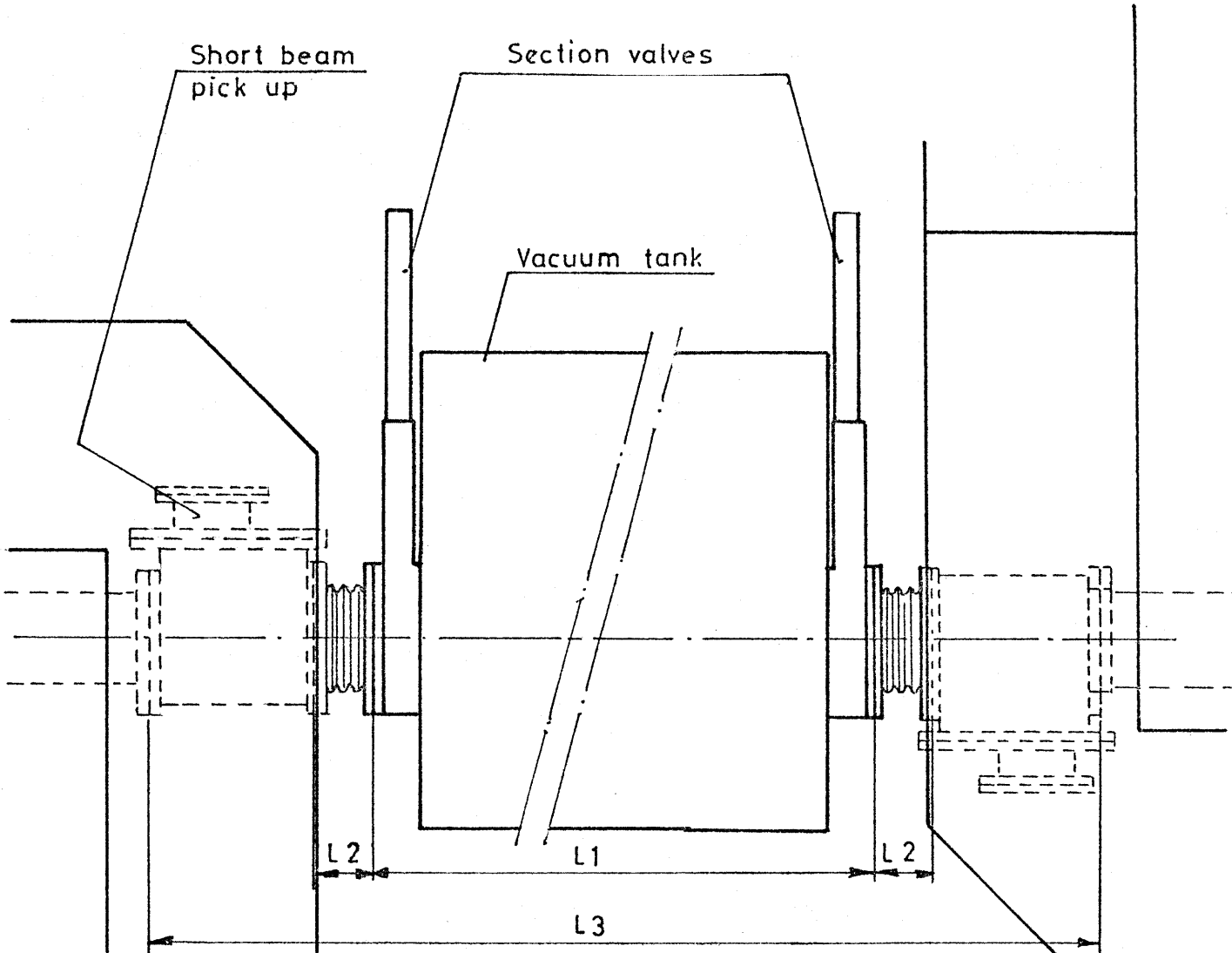
For the proton beam transport it is of great urgency to have preliminary indications about the septum magnet tank and section valves in SS28, since this may influence the trajectory and hence the available space for Q1 and HD1

Note 2

In order to make the chambers stiff, they will be a few mm thick. This and their increased length will result in eddy current intensities that can seriously distort the field pattern at injection. This point should be considered.

References:

- 1) Protocol of the meeting between the CERN and IEPT experts with a participation of IHEP specialists concerning "fast ejection system for the Serpukhov accelerator" March 18-23. Serp. 68.
- 2) "On the so-called final trajectory and target position" by Fabiani PS/FES/TN-23. 16.6.1968

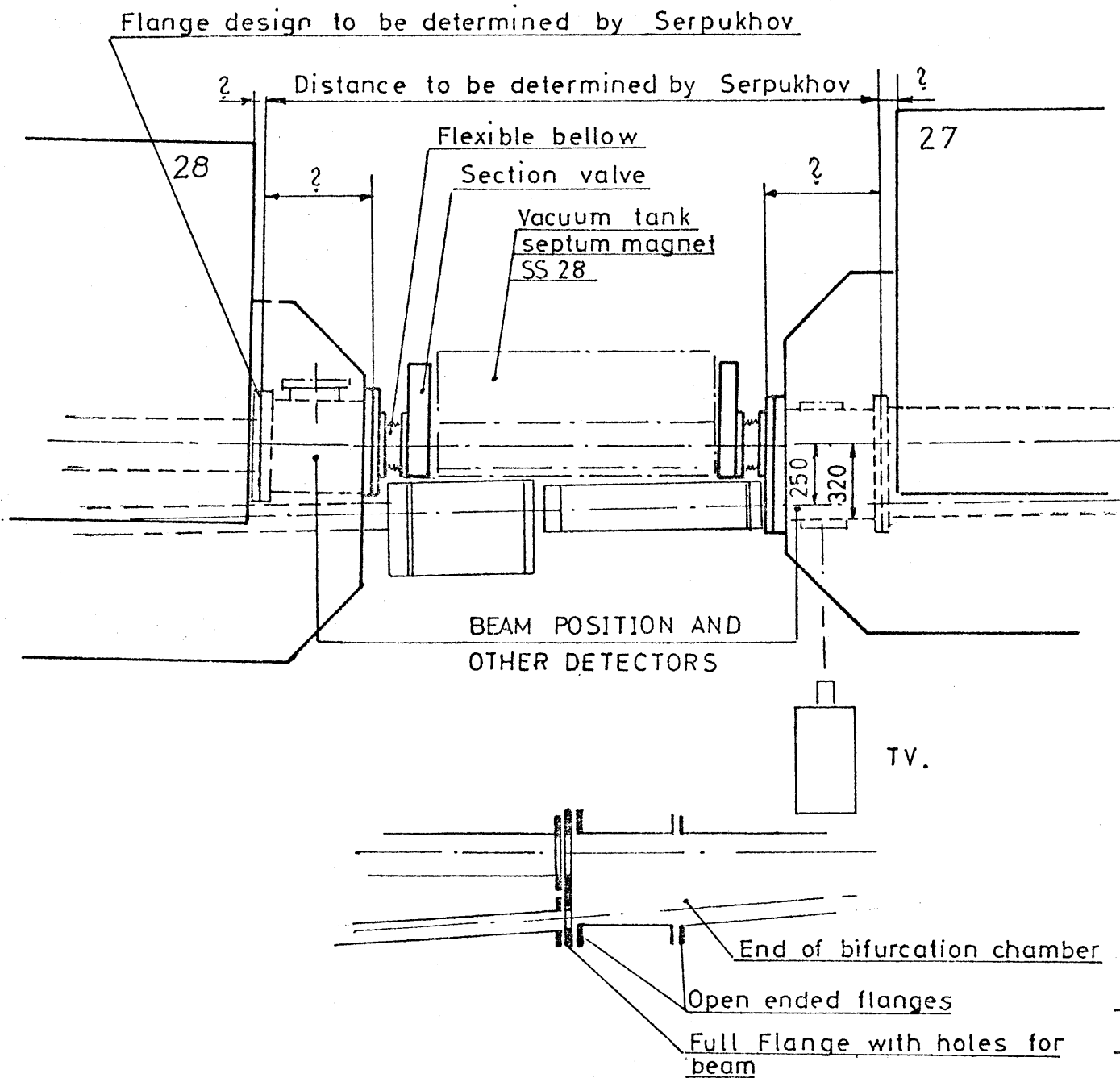


Kicker magnet SS 16 L.1 = 3733 ± 5
 Septum magnet SS 24 L.1 = 3733 ± 5
 ———— SS 26 L.1 = 3733 ± 5
 Flexible bellows L.2 = 120 ± 6 for all sections

Free length L3 in the straight sections 16, 24 and 26, to be determined by Serpukhov

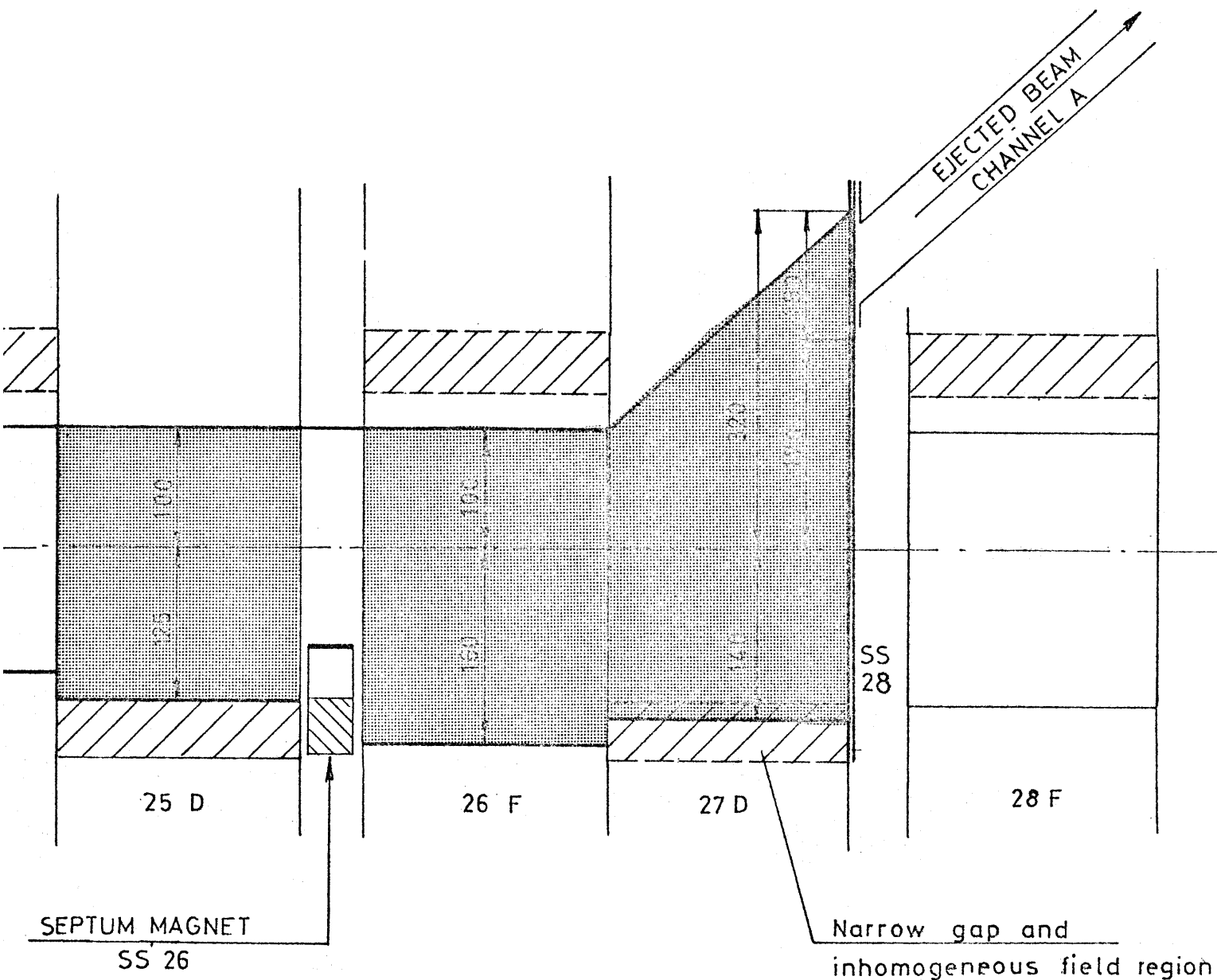
Nombre de pièces			Désignation		Pos.	Matière	Observations						
III	II	I	Mod.	Date	Nom	Tolérances générales			Fig. 1				
			A			de	à	±					
			B			de	à	±					
			C			de	à	±					
			Ensemble				S. Ensemble			Dessiné	15.6.68	SC	
			SERPUKHOV							Echelle	Contrôlé		
			Tentative dimensions for the long straight sections 16, 24 and 26.								/	Vu	
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Nombre de pièces		Désignation	Pos.	Matière	Observations				
III	II	I	Mod.	Date	Nom	Tolérances générales	Fig. 2		
			A	.		de à ±			
			B			de à ±			
C			de à ±						
Dossier N°	Dossier N°	Dossier N°	Ensemble		S. Ensemble	Dessiné	15.6.68	SK	
			SERPUKHOV				Echelle		
			BIFURCATION CHAMBER AND STRAIGHT SECTION 28				/		
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Nombre de pièces			Désignation			Pos.	Matière	Observations						
III	II	I	Mod.	Date	Nom	Tolérances générales			Fig. 3					
			A			de	à	±						
			B			de	à	±						
			C			de	à	±						
			Ensemble			S. Ensemble			Dessiné	14.6.68	<i>JK</i>			
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			Proposed dimensions for the enlarged vacuum chamber and the bifurcation chamber.			1/r			Vu					
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