

TRANSFER LINE AC-AA

DRAWING NO. C-2080-72-2

B. Szeless

A short transfer line is installed between the AC and the AA ring to transport particles from AC to AA.

1. SPECIFICATIONS

The type as well as the position of elements, the vacuum envelopes required, etc.. are given in paper "ACOL Note 47" by S. Maury, dated 3.12.1986.

The elements are briefly recalled here from AC to AA:

MTV 7001	TV screen forms, part of septum in AC.
VPI 7006	60 l/min ion pump, sits on septum vacuum chamber
BHZ 7010	pulsed bending magnet, 2,878° nominal deflection, water cooled
DVT 7013	vertical correction magnt, water cooled
MSG 7016	SEM-grid
QFO 7020	NP-type quad, Ø 60, water cooled
QFE 7030	NP-type quad, Ø 60, water cooled
QFO 7040	SPS-type quad, Ø 80, water cooled
DVT 7042	vertical correction magnet, air cooled
TFA 7044	current transformer
MTV 7045	TV screen
VVS 7047	sector valve
VGI 7048	ion gauge
VPI 7048/49	ion pump 60 l/min
BHZ 7050	bending magnet, like 7010

Alignment precision: ± 0.2 mm in horizontal and vertical directions, a few mm in longitudinal direction except for the bending magnets which have to be correct within a few tenths.

This part of the machine is not foreseen to be baked out, vacuum wise it forms part of the AC machine.

2. CONSTRUCTION

The two bendings at each end of the line have independent stands. The elements between these bendings are mounted on a common girder. This girder, sitting on three independent jacks, has to be preassembled and the elements aligned in the workshop before lowered as a unit into position by the overhead crane. The girder will deflect under its own and the elements weight by about 0.25 mm compensated by the adjustment tables on which each element sits and which is clamped to the girder. The alignment of the elements can be made with the help of a 4 m long ruler which can be fixed along the girder.

Most of the elements have captive vacuum chambers. Two 60 lit/sec ion pumps are situated close to the AA machine just downstream of the sector valve which separates the AC from the AA machine.

The most upstream bit of the vacuum pipe with another 60 lit/sec ion pump is welded onto the septum magnet tank thus forming part of it though it has an own support.

The cooling water distribution and the power and control cables have to be hard wired along the girder during assembly. Once installed the only access to the girder are the right-hand upstream and the left-hand downstream end. The space available being very limited, it is proposed to leave 1 to 2 m of power cable length to fix the distribution box on the floor. The water and control cable connections can be made on either end of the girder.

Other distribution of elements on the girder have been studied. The proposed solution is an optimum.

3. ASSEMBLY, ALIGNMENT AND INSTALLATION

Assembly in workshops

Girder to be assembled with all its elements in the workshop according to drawing, the alignment tables to be set to nominal positions, the vacuum coupling must be undone. The alignment can be made with the help of a 4 m long ruler for the height and the radial position or with the help of the geometers. The two outward elements shall be used as reference. All elements to be levelled first than the height and radial positions are set making the adjustment on the tables. The longitudinal position is preset with a meter. Once the alignment finished the vacuum tubes must be connected and leak-tested.

The water and electric connections must be hard wired to the two ends of the girder. All the equipment must be tested out before going into the machine. This prealigned girder must be lowered into position onto the preset jacks. The girder must now be aligned as a unit using as

references the same two elements as were used in the workshop for the prealignment. The single jacks allows for X, Y, Z controlled movement the two others for height and one of them for radial movement.

Assembly in situ

The two bending magnets have their own stands and adjustmentables and are aligned independently.

The two ion pumps and the vacuum valve are separately supported, the valve will allow to break the vacuum in the line without opening the AA vacuum system. The vacuum pipe on the septum has to be welded and tested in situ. Once all elements installed and cables, water and compressed air connected, the shielding roof can be put on.

The transport of the girder must be made very carefully, otherwise the stability of the prealigned elements cannot be guaranteed. The girder must be lifted on the foreseen points and set onto the jacks only.

Any major intervention in the elements of the girder will necessitate opening the shielding and lifting the whole girder out.

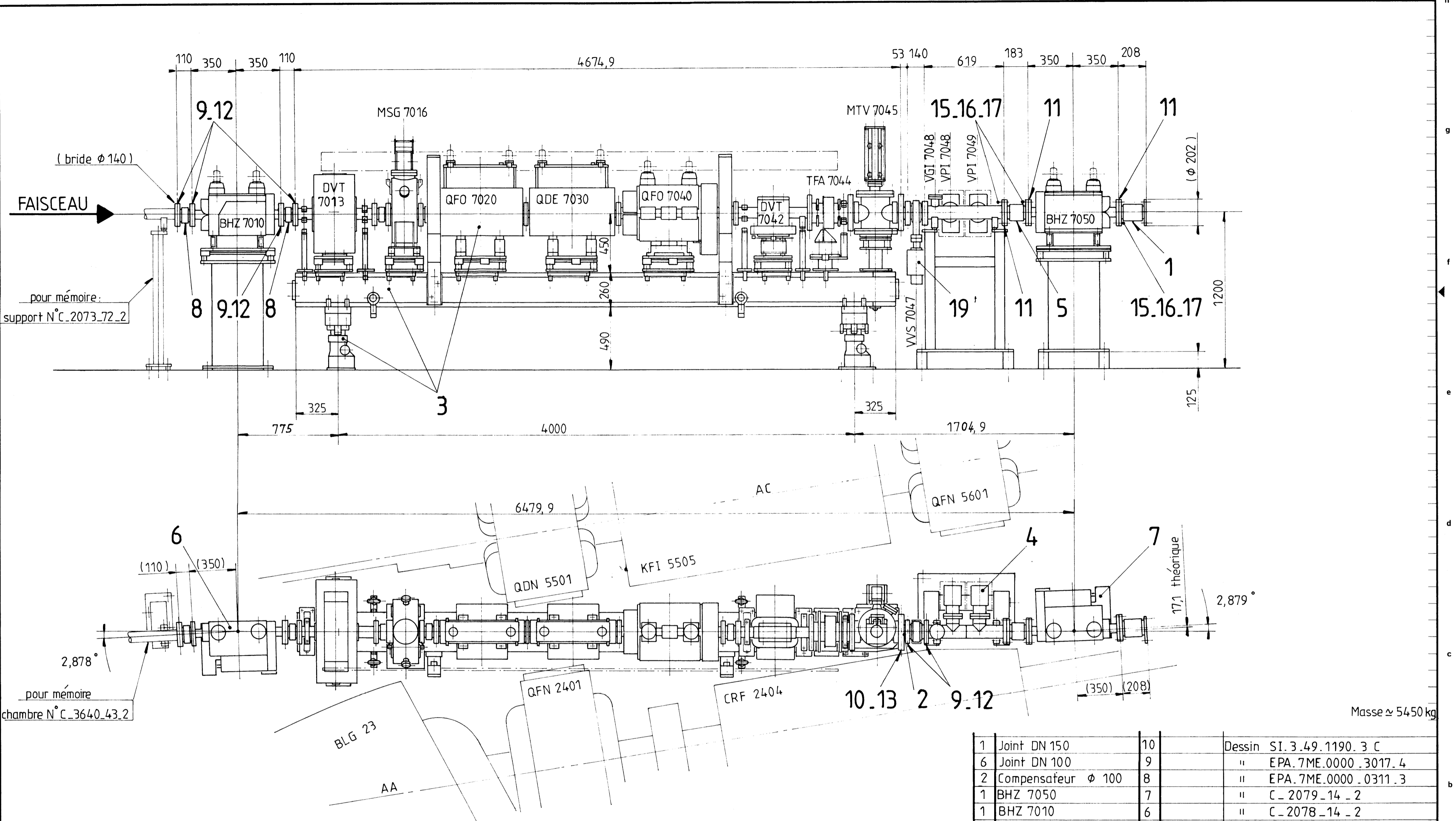
4. COSTS AND SCHEDULES

Vacuum chambers	6.000.- Frs
Support structure girder alignment tables	15.000.- Frs
Production time needed	3 months
Pre-assembly of the girder alignment, tests, hardwiring	8 man-weeks
Installation in machine, alignment, connecting up	1 week

DIMENSION	≤ 6	> 6	> 30	> 120	> 315	> 1000	> 2000
USURE / BRUSH MACHINING	± 0.2	± 0.5	± 0.8	± 1.2	± 2	± 3	± 4
MECAN. Soudure / WELDED STRUCTURE	± 0.5	± 1	± 2	± 3	± 5	± 7	± 10

DESSIN, RUGOSITE, TOLERANCES
SELON NORMES ISO
DRAWINGS, RUGOSITY, TOLERANCES
ACCORDING TO ISO STANDARDS

Projection européenne
First angle projection
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INDICE	DATE	NOM	ZONE	MODIFICATION
11				
10				
9				
8				
7				
6				
5				
4				
3				
2				
1				

Qte	DESCRIPTION	POS	MATIERE	OBSERVATIONS
1	Vanne VVS NW 100	19	N° 47 943 VAT CH. MAAG	
60	Ecrou H 0,8d M8	17	inox A4.90 DIN 934_CERN.SCEM 47.43.78.108.4	
120	Rondelle plate M8	16	Ac.inox 316L DIN 125 " " 47.78.15.116.5	
60	Vis H M8 x 55	15	inox A4.90 DIN 931_CERN.SCEM 47.62.83.122.3	
1	Collier DN150	13	Dessin SI.3.49.1800.1	
6	Collier DN100	12	" GOC.8013	
3	Joint DN 150 pos.6	11	Dessin ISR.278.319.4	

QUANT	DESCRIPTION	POS	MATIERE	OBSERVATIONS
10	Joint DN 150	10		Dessin SI.3.49.1190.3 C
9	Joint DN 100	9		" EPA.7ME.0000_3017.4
8	Compensateur φ 100	8		" EPA.7ME.0000_0311.3
7	BHZ 7050	7		" C_2079_14_2
6	BHZ 7010	6		" C_2078_14_2
5	Membrane souple	5		" C_2075_43_3
4	Groupe de pompage	4		" C_2074_42_1
3	Poutre	3		" C_2072_72_1
2	Transition	2		" C_2027_43_4
1	Membrane souple exc.	1		Dessin C_2022_43_3

ENSEMBLE / ASSEMBLY		S. ENS./S. ASSY.	
INJ. ACOL - AA			
ECHELLE SCALE		1:20	
DESSIN	NOM	DATE	
TP	Aciderna	87.02.05	
CONTROLÉ	TUPLAN	87.02.10	
REPLACE			
PS		C_2080_72_2	