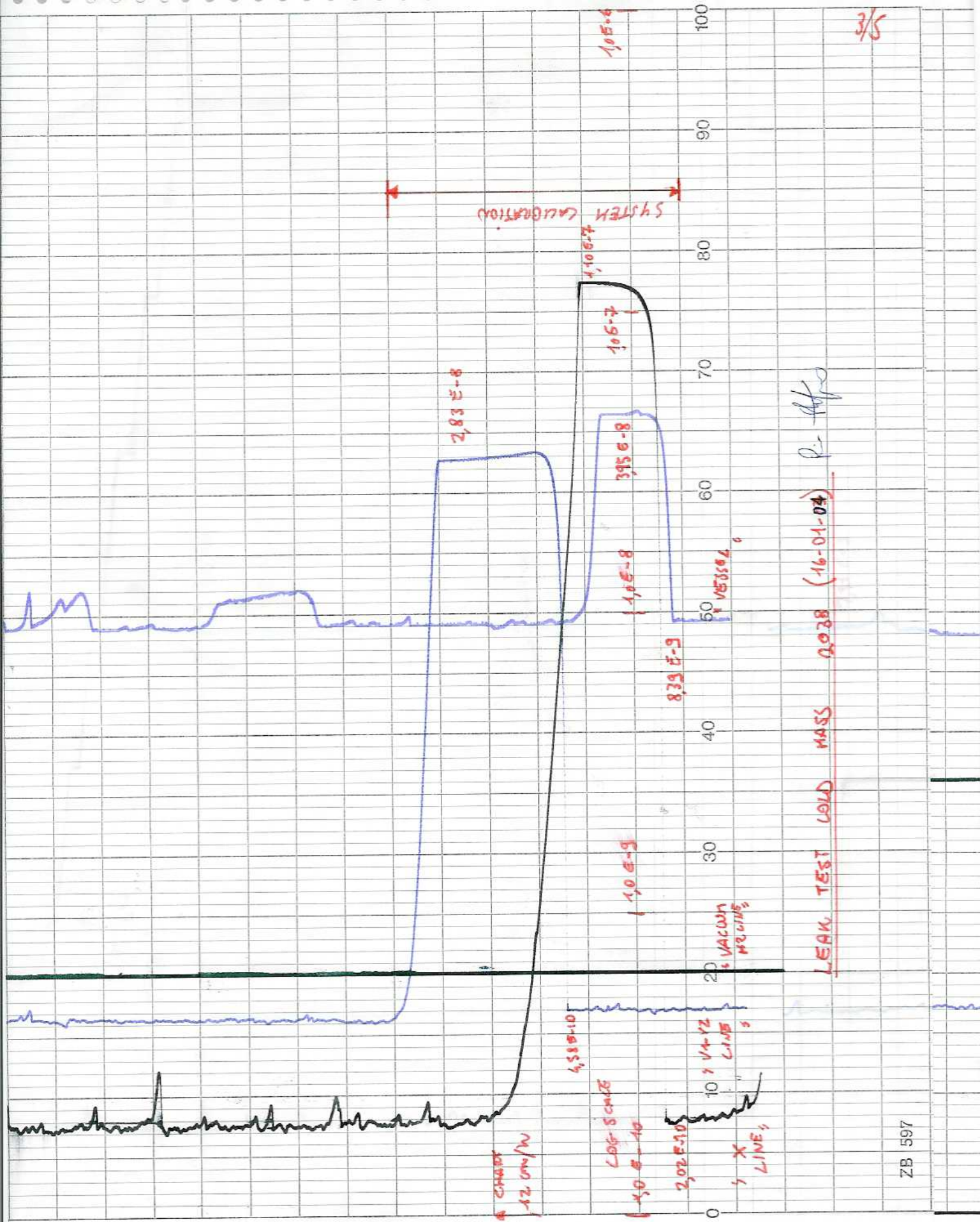




# LHC - Cold masses: HELIUM MASS SPECTROMETER LEAK TEST REPORT

ITP Nr.  
23  
24

<b>Cold Mass Nr.</b> 2038		<b>Step Nr.</b> 1		<b>Heat Exch -&gt; Vacuum</b> 4	
<b>Volume / Volume to be tested</b> CM -> Vacuum		<b>CM -&gt; Heat Exch.</b> 3		<b>Heat Exch -&gt; Vacuum</b>	
<b>Fuga calibrata / Calibrated leak parameter</b>					
Calibrated leak N°:	4011007195	4011007225	FC03000505	4011007195	
Data calibr. / calibration date	06/10/02	06/10/02	20/05/03	06/10/02	
Temp. calibrations fuga / Calibration Temp.	23,0 °C	23,0 °C	20,0 °C	23,0 °C	
Valore nom. fuga calibrata / Calibrated leak nom. value	3,00E-08 mbar l s-1	3,30E-08 mbar l s-1	1,40E-07 mbar l s-1	3,00E-08 mbar l s-1	
<b>Calibrazione del sistema / System calibration</b>					
Conc. He nelle linee di test (100%) / Volumetric fraction of tracer gas in the injection envelope					
T ambiente / Test temp.	17,5 °C	17,5 °C	17,5 °C	17,5 °C	
Fuga calibrata con correz. T ed età / Size of calib. leak after corr. for ageing and T)					
Segnate residuo prima delle misure di SFR / Residual signal prior SFR meas.					
Segnale del LD / Signal given by the calibrated leak					
Min. dev. segnale (=2x amp. segn. residuo) / Smallest read. signal dev. (= 2 x ampl. of RFR noise)	2,42E-08 mbar l s-1	2,68E-08 mbar l s-1	1,28E-07 mbar l s-1	2,42E-08 mbar l s-1	
Tempo di attesa stabiliz. segnale / Time to achieve stabilised leak signal	8,39E-09 mbar l s-1	4,58E-10 mbar l s-1	2,02E-10 mbar l s-1	8,39E-09 mbar l s-1	
<b>SENSIBILITA' DEL TEST / Sensitivity of the leak test</b>					
$= \frac{q_{FR}}{S_m \cdot S_{PR} - R_{PR} \cdot C}$					
Condizioni del test / Leak test conditions	1,56E-11 mbar l s-1	1,91E-12 mbar l s-1	2,33E-12 mbar l s-1	1,56E-11 mbar l s-1	
<b>Pressione del sistema / System pressure</b>					
Segnale residuo del cercatughe ad inizio test / Residual signal prior to SF measurement	5,00E-05 mbar	mbar	mbar	4,80E-05 mbar	
Segnale del LD a fine test / Signal given by the leak after 30 min. (>30)	8,09E-09 mbar l s-1	4,34E-10 mbar l s-1	1,95E-10 mbar l s-1	8,11E-09 mbar l s-1	
<b>CALCOLO DELLA FUGA / Leak evaluation</b>					
$= \frac{q_{PR} \cdot (S_p - R_p)}{S_{PR} - R_{PR} \cdot C}$					
VALORE DI RIFERIMENTO / REF. VALUE (MAX)	1,0E-09 mbar l s-1 at 26 bar	1,0E-10 mbar l s-1 at 26 bar	1,0E-06 mbar l s-1 at 26 bar	1,0E-09 mbar l s-1 at 5 bar	
CONFORMANCE	YES	YES	YES	YES	
<b>Doc. di riferimento / Ref. documents</b>					
CERN contract number: F302/LHCLHC					
CERN technical spec.: LHC MMS-98-198 rev. 2					
Leak test procedure (Ref. N°, Revision): 780FRM09442 rev.0					
<b>Strumentazione / Test equipment</b>					
Helium Mass Spectrometer type: PFEIFFER HLT 260					
Pressure gauge type: full range compact PFEIFFER PKR 251					
Pumping group: turbo pump LEYBOLD PT 360 l/s					
<b>Prepared by: Name / Date</b> PIU S. - Caserza B. 16/01/2004					
<b>Approved by: Name / Date</b> Terzi -16/01/2004					
<b>Checked at CERN by / Signature / Date</b> P. Cagliardi -16/01/2004					
<b>on vessel</b> PFEIFFER HLT 260 full range compact PFEIFFER PKR 251 turbo pump LEYBOLD PT 360 l/s rotary vane pump PFEIFFER DUO 65 m3/h		<b>on heat exchanger line</b> PFEIFFER HLT 260		<b>on vessel</b> PFEIFFER HLT 260 full range compact PFEIFFER PKR 251 turbo pump LEYBOLD PT 360 l/s rotary vane pump PFEIFFER DUO 65 m3/h	
<b>Note / Remarks</b> Test performed after welding of flange (Ø100) the capillary tube cold head, installed on the cold mass					



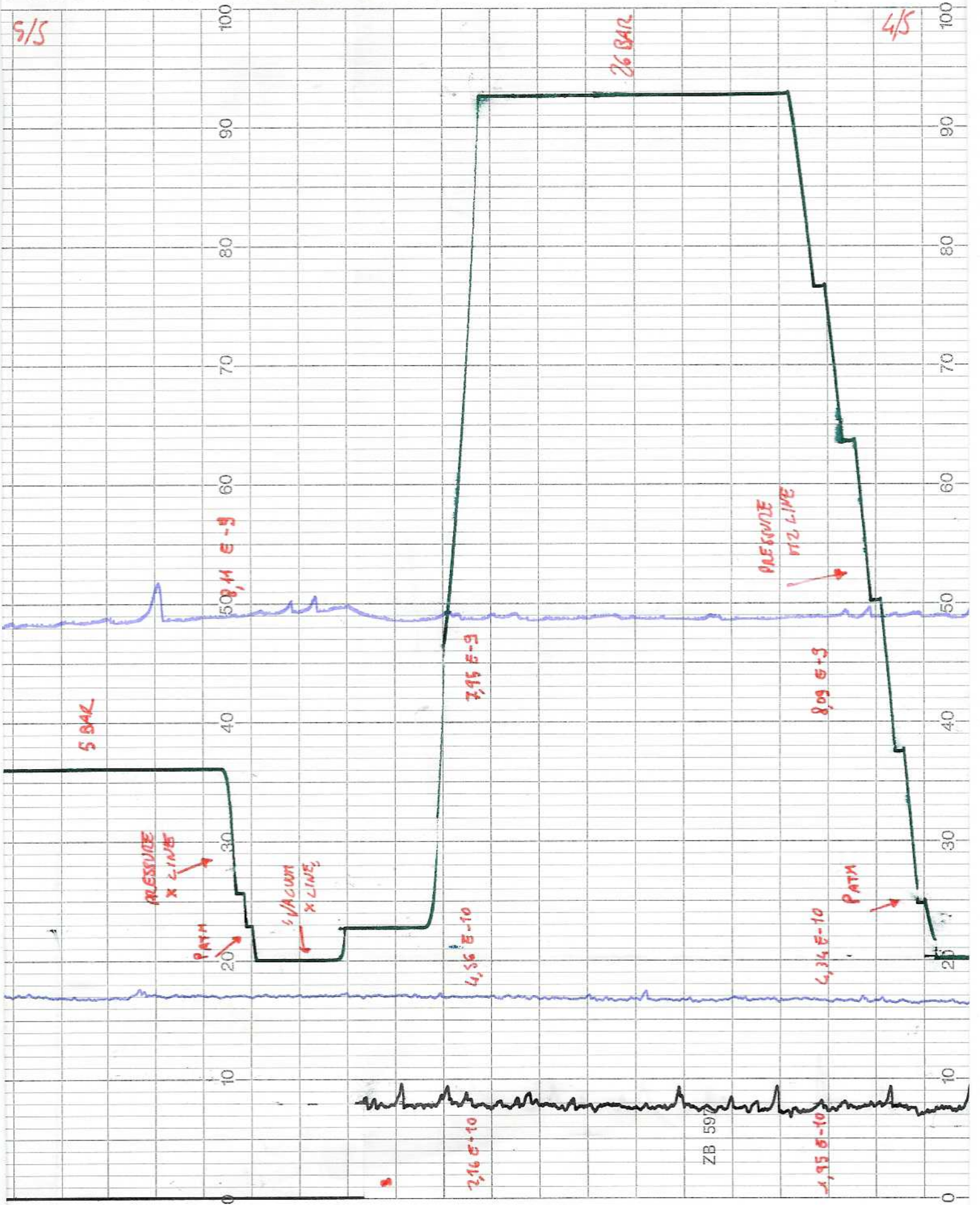
LEAK TEST COLD MASS 0.038 (16-01-04) P. P. P.

3/5

ZB 597

5/5

4/5



5 BAR

26 BAR

4/5

PRESSURE X LINE

VACUUM X LINE

PATH

PRESSURE X LINE

PATH

508.4 E-3

7.95 E-3

8.09 E-3

4.56 E-10

6.34 E-10

2.16 E-10

1.95 E-10

ZB 59

