

**Cold Mass Nr.** 2019

**Step Nr. / Volume to be tested**  
CM -> Vacuum 1

**CM -> Heat Exch.** 3

**Heat Exch -> Vacuum** 4

**Fuga calibrata / Calibrated leak parameter**

Calibrated leak N°	4011007195	4011007195	4011007195
Data calibr. / calibration date	08/10/02	08/10/02	08/10/02
Temp. calibr. / Calibration Temp.	23,0 °C	23,0 °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	3,00E-08 mbar l s-1

**Calibrazione del sistema / System calibration**

Conc. He nelle linee di test (100%) / Volumetric fraction of tracer gas in the injection envelope

C	1	1	1
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T	18,5 °C	18,5 °C	18,5 °C
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Fuga calibrata con correz. T ed età / Size of calib. leak after corr. for ageing and T)

qFR	2,69E-08 mbar l s-1	2,78E-08 mbar l s-1	2,53E-08 mbar l s-1
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Segnale residuo prima delle misure di SFR / Residual signal prior SFR meas.

RFR	3,89E-09 mbar l s-1	4,22E-10 mbar l s-1	2,94E-10 mbar l s-1
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Segnale del LD / Signal given by the calibrated leak

SFR	2,80E-08 mbar l s-1	2,79E-08 mbar l s-1	2,80E-08 mbar l s-1
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Min. dev. segnalato (=2x amp. segn. residuo) / Smallest read. signal dev. (= 2 x ampl. of RFR noise)

Sm	2,00E-11 mbar l s-1	2,00E-12 mbar l s-1	2,00E-11 mbar l s-1
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Tempo di attesa stabilizz. segnalato / Time to achieve stabilised leak signal

3t	1400 sec	900 sec	1400 sec
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$$= \frac{q_{FR}}{S_{FR}} - R_{FR} \cdot C$$

qem	2,09E-11 mbar l s-1	2,02E-12 mbar l s-1	2,09E-11 mbar l s-1
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**CONDIZIONI DEL TEST / Sensitivity of the leak test**

P	1,10E-04 mbar	mbar	1,10E-04 mbar
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Rf	3,81E-09 mbar l s-1	2,51E-10 mbar l s-1	3,88E-09 mbar l s-1
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Sf	3,88E-08 mbar l s-1	3,75E-10 mbar l s-1	3,81E-09 mbar l s-1
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qg	<1,0E-09 mbar l s-1	<1,0E-10 mbar l s-1	1,57E-10 mbar l s-1
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**CALCOLO DELLA FUGA / Leak evaluation**

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-09 mbar l s-1 at 5 bar
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CONFORMANCE YES YES YES YES

**Doc. di riferimento / Ref. documents**

CERN contract number: F302/LHC/LHC  
CERN technical spec.: LHC MMS-98-198 rev.2  
Leak test procedure (Ref. N°, Revision): 780RMR09442 rev.0

**Strumentazione / Test equipment**

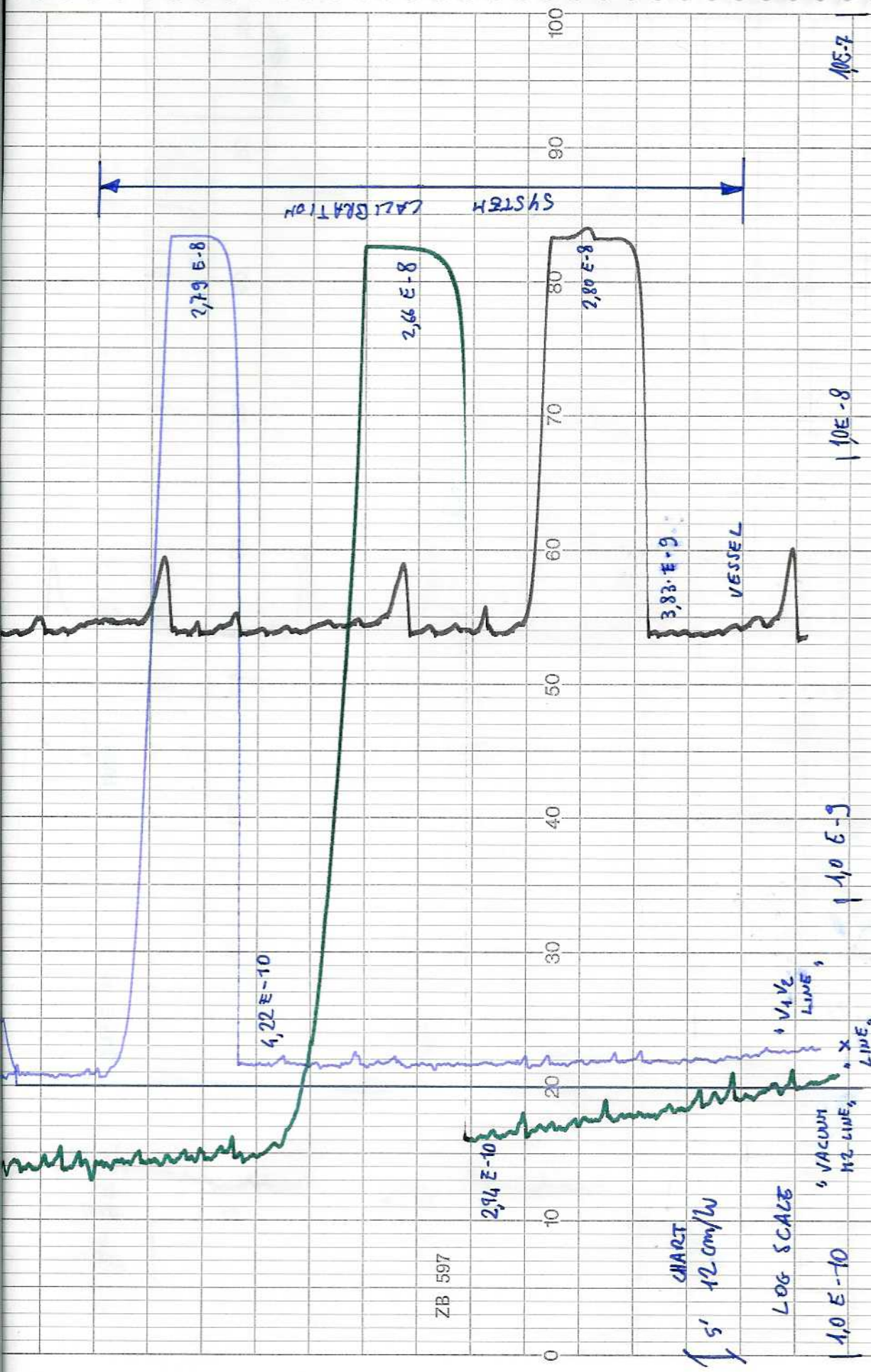
Helium Mass Spectrometer type:  
Pressure gauge type:  
Pumping group:

on vessel	PFEIFFER HLT 260 full range compact PFEIFFER PKR 251 turbo pump LEYBOLD PT 360 l/s rotary vane pump PFEIFFER DUO 65 m3/h	on heat exchanger line	PFEIFFER HLT 260 rotary vane pump PFEIFFER DUO 20 m3/h	on vessel	PFEIFFER HLT 260 full range compact PFEIFFER PKR 251 turbo pump LEYBOLD PT 360 l/s rotary vane pump PFEIFFER DUO 65 m3/h
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**Note / Remarks**  
Test performed after welding of flange (Ø100) the capillary tube cold head, installed on the cold mass

Prepared by: Name / Date Caserza 22/10/2003  
Approved by: Name / Date Tezli - 22/10/2003  
Checked by: Name / Date P. Gagliardi - 22/10/2003  
Checked at CERN by / Signature / Date





Bill

LEAK TEST COLD MASS 11/20/19 (22-40-03)

