



LHC - Cold masses: HELIUM MASS SPECTROMETER LEAK TEST REPORT

ITP Nr.
23
24

Cold Mass Nr. 2054

Step Nr. 1

Volume / Volume to be tested CM -> Vacuum

Volume / Volume to be tested CM -> Heat Exch.

Heat Exch -> Vacuum 4

Fuga calibrata / Calibrated leak parameter

Calibrated leak N°	4011007195	4011007225	4011007195
Data calibr. / calibration date	08/10/02	08/10/02	08/10/02
Temp. calibrazione fuga / 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

T ambiente / Test temp.

Fuga calibrata con correz. T ed età / Size of calib. leak after corr. for ageing and T)

Segnale 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)

Tempo di attesa stabiliz. segnate / Time to achieve stabilised leak signal

$$= S_{in} \frac{q_{FR}}{S_{FR} - R_{FR}} \frac{1}{C}$$

C	1	1	1
T	17,0 °C	17,0 °C	17,0 °C
qFR	2,37E-08 mbar l s-1	2,61E-08 mbar l s-1	2,37E-08 mbar l s-1
RFR	2,94E-09 mbar l s-1	3,04E-10 mbar l s-1	2,05E-10 mbar l s-1
SFR	3,08E-08 mbar l s-1	2,37E-08 mbar l s-1	2,34E-08 mbar l s-1
Sm	2,00E-11 mbar l s-1	2,00E-12 mbar l s-1	2,00E-11 mbar l s-1
3t	700 sec	700 sec	900 sec
qGm	1,71E-11 mbar l s-1	2,23E-12 mbar l s-1	2,04E-12 mbar l s-1

SENSIBILITA' DEL TEST / Sensitivity of the leak test

Condizioni del test / Leak test conditions

Pressione del sistema / System pressure

Segnale residuo del cercatughe ad inizio test / Residual signal prior to SF measurement

Segnale del LD a fine test / Signal given by the leak after 30 min. (>3t)

$$= \frac{q_{FR}}{S_{FR} - R_{FR}} \frac{(S_{FR} - R_{FR})}{C}$$

CALCOLO DELLA FUGA / Leak evaluation

P	3,80E-05 mbar	3,80E-05 mbar	3,80E-05 mbar
Rf	2,85E-09 mbar l s-1	2,92E-10 mbar l s-1	1,99E-10 mbar l s-1
Sf	3,12E-09 mbar l s-1	2,88E-10 mbar l s-1	2,01E-10 mbar l s-1
qG	2,31E-10 mbar l s-1	<1,0E-10 mbar l s-1	2,04E-12 mbar l s-1

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
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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): 780RM09442 rev. 0

Strumentazione / Test equipment

Helium Mass Spectrometer type: PFEIFFER HLT 260

Pressure gauge type: full range compact PFEIFFER PKR 251 turbo pump LEYBOLD PT 360 l/s

Pumping group: rotary vane pump PFEIFFER DUO 65 m3/h

on vessel PFEIFFER HLT 260

on heat exchanger line PFEIFFER HLT 260

on c.b.t. lines PFEIFFER HLT 260

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

rotary vane pump PFEIFFER DUO 20 m3/h

rotary vane pump PFEIFFER DUO 20 m3/h

rotary vane pump PFEIFFER DUO 65 m3/h

Note / Remarks

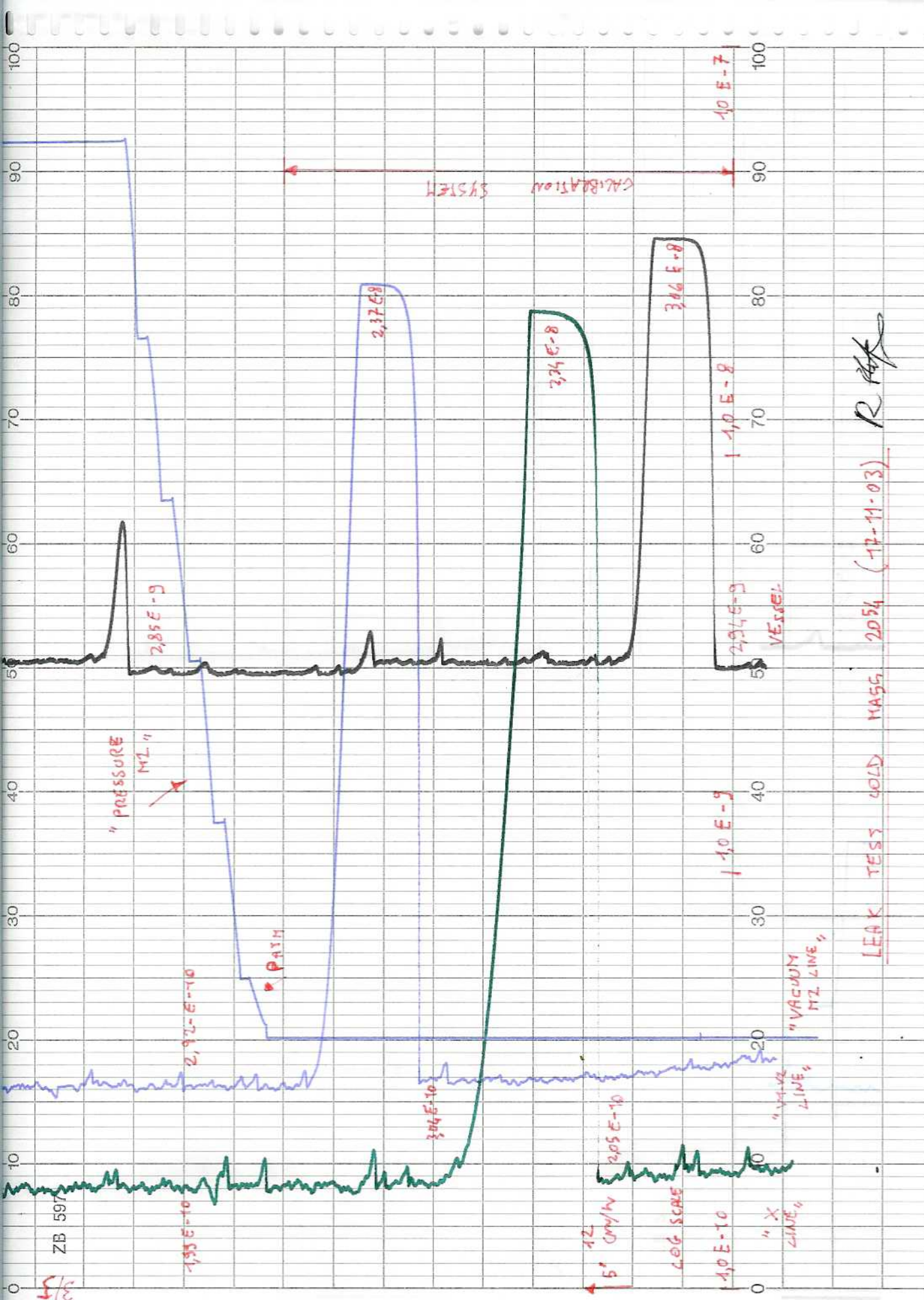
Test performed after welding of flange (Ø100) the capillary tube cold head, installed on the cold mass

Prepared by: Name / Date PIU S. - Caserza B. 17/11/2003 *C. Stepi*

Approved by: Name / Date Terzi - 17/11/2003

Checked by: Name / Date P. Gagliardi - 17/11/2003

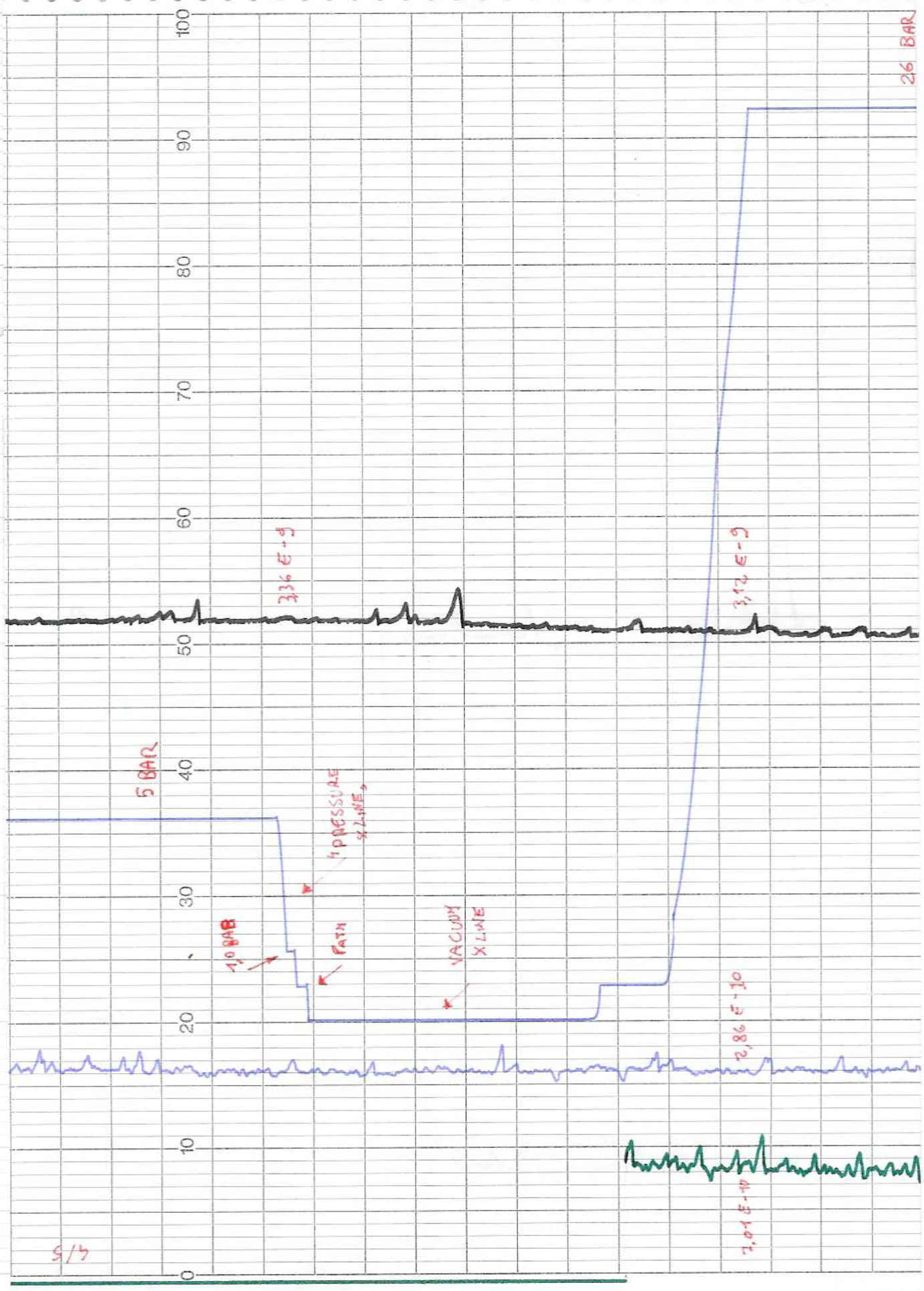
Checked at CERN by / Signature / Date



LEAK TEST GOLD MASS 2054 (17-11-03) R ~~RFK~~

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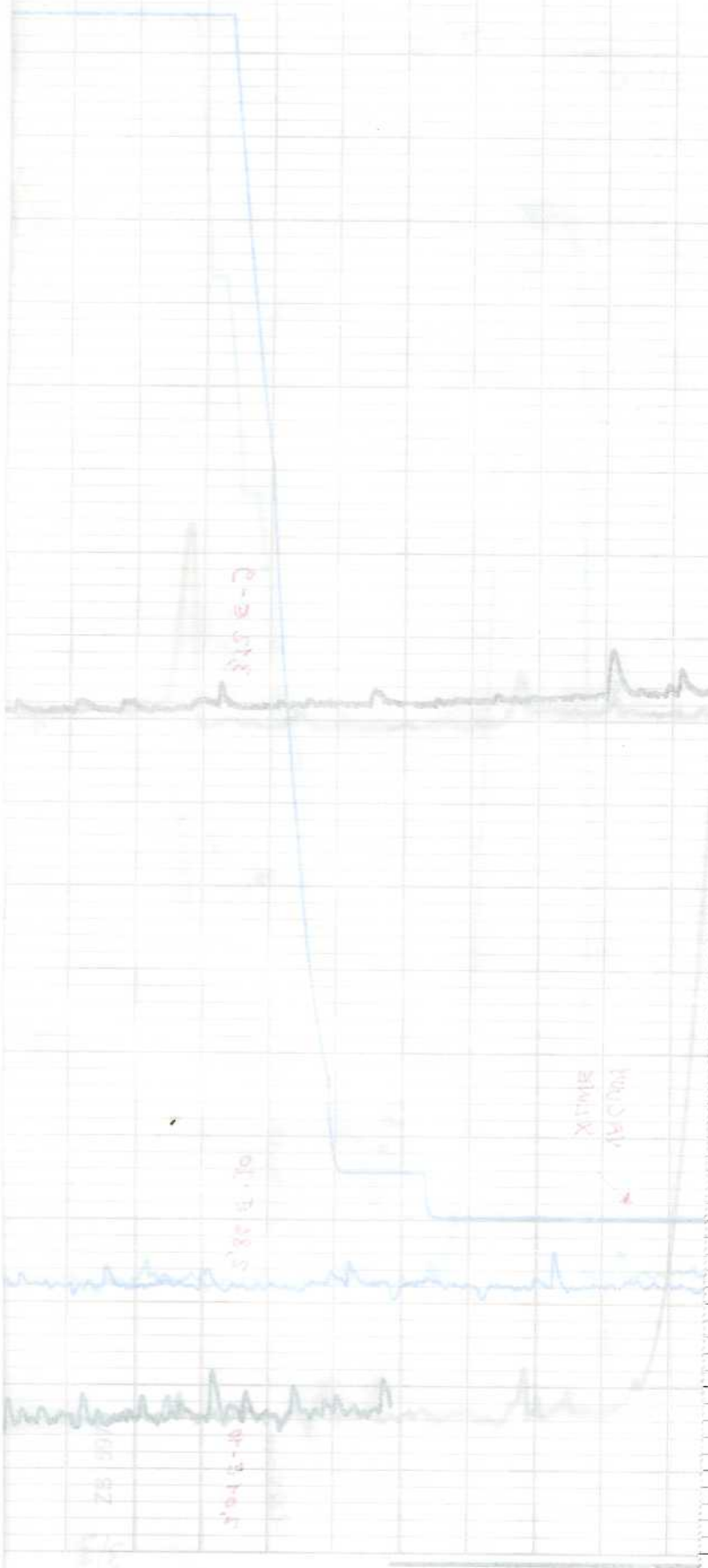
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26 BAR

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3.94 e-10

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