	MAINTENANCE TRACKING TOOL **PETTRACE800**	Date:2023-06-06

Country: France	**Site:** BET	
Intervention:	Single intervention	☑
Subsystems:	Pre-Maintenance	☑
	Vacuum	☑
	Chamber	☑
	Cabinets	☑
	Ion source	☑
	Paper burn test	☑
	LTF	☑
	Autoshield	☑
	Beam conditioning	☑
	PM debriefing	☑

PRE-MAINTENANCE

Registration Date: 2023-06-0600
Gas flow(sccm): 4.0

TPG Settings Verifications

	Low limit (x10-)	High limit (x10-)
Piranni 1 (TPG300 A1):	0.00E+0	0.00E+0
Piranni 2 (TPG300 A2):	0.00E+0	0.00E+0
Penning:	0.00E+0	0.00E+0

Notes

Gauge number	Pressure (x10-) without gas	Pressure (x10-) with gas
A1 (mbar):	0.0036	0,035
A2 Under Range:		
A2:	UR	UR
B1 (mbar):	0,000000053	0,000012

System software

Subsytem	Version
Master:	3,6
ACS:	4.3.2
Service System:	3.6.0
Manager:	TSA

Informix (only applicable to SUN-Master Station):	NA

Comments

Paper Burn Before PM

VACUUM

TPG settings verifications

Date: 2023-06-06
Production gas flow:

Piranni 1 (TPG300 A1)

Pressure with gas	Low limit (x10-)	High limit
2.90E-6	3.00E+0	1.00E+0

Piranni 2 (TPG300 A2)

Under range	Pressure with gas	Low limit	High limit
☑	0.00E+0	8.00E+0	9.00E+0

Penning

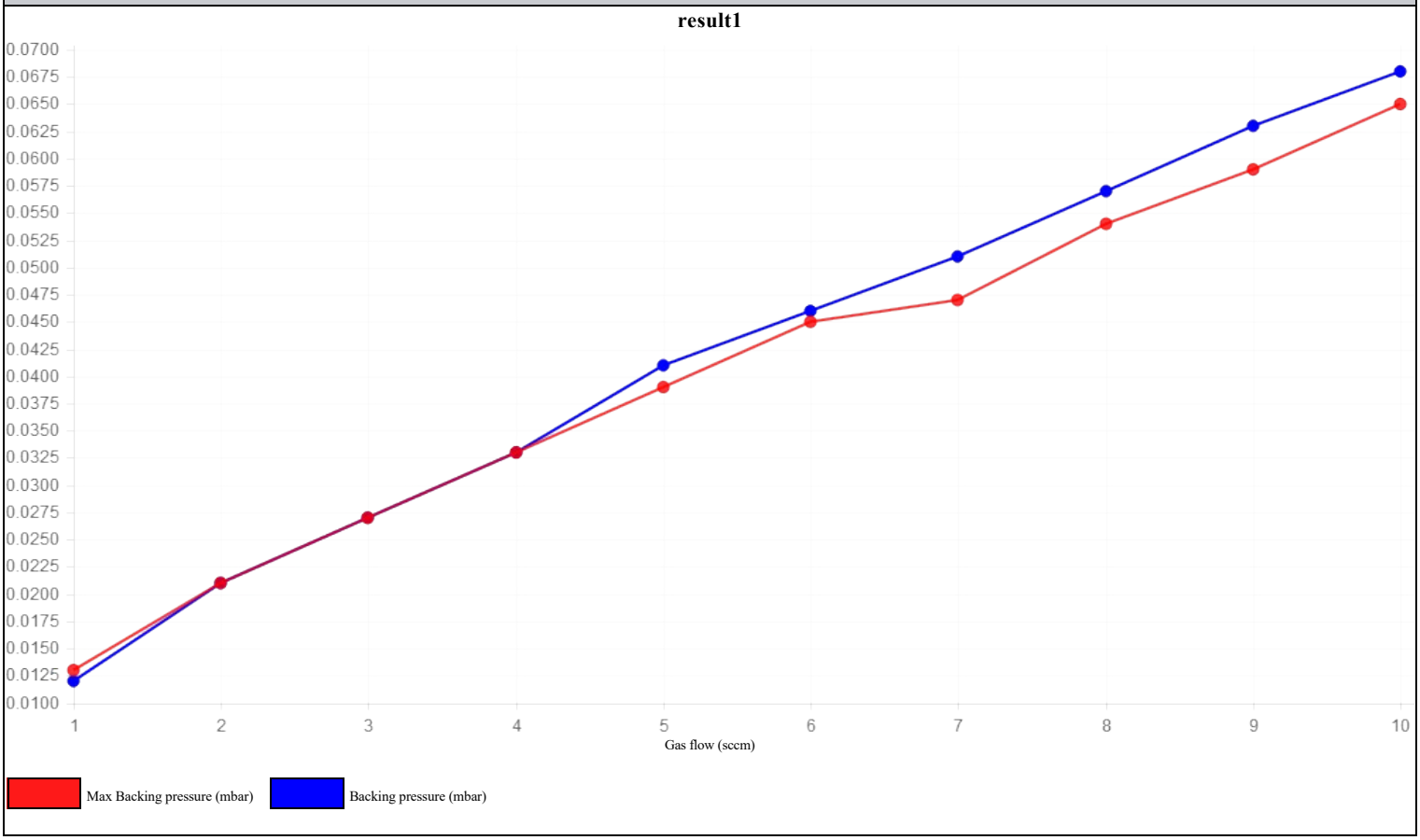
Pressure with gas	Low limit	High limit
1.20E-2	1.00E+0	2.00E+0

Notes

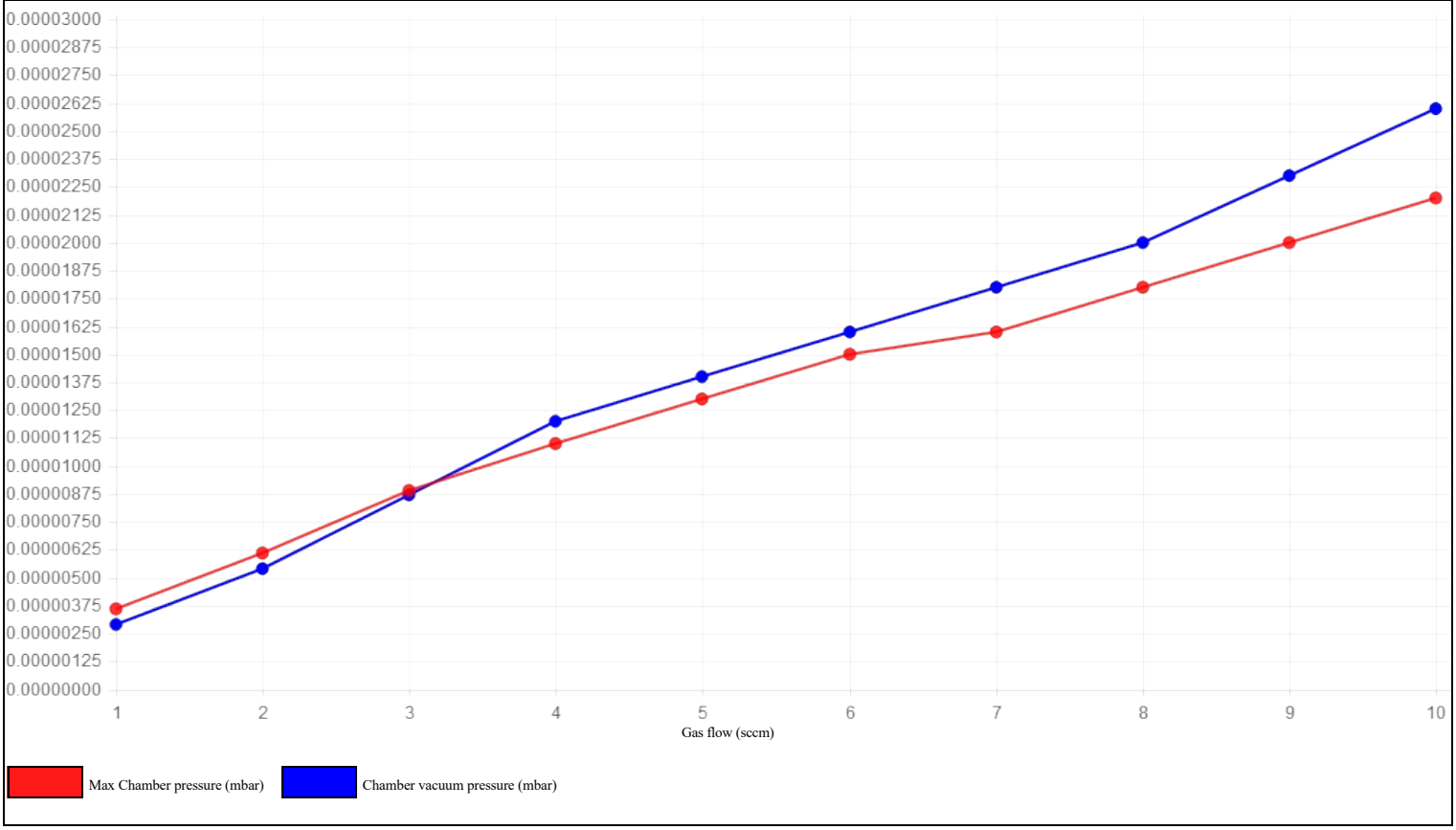
Vacuum MFC curve test

SCCM	Chamber pressure	Backing pressure
1	2.90E-6	1.20E-2
2	5.40E-6	2.10E-2
3	8.70E-6	2.70E-2
4	1.20E-5	3.30E-2
5	1.40E-5	4.10E-2
6	1.60E-5	4.60E-2
7	1.80E-5	5.10E-2
8	2.00E-5	5.70E-2
9	2.30E-5	6.30E-2
10	2.60E-5	6.80E-2

Backing Pressure

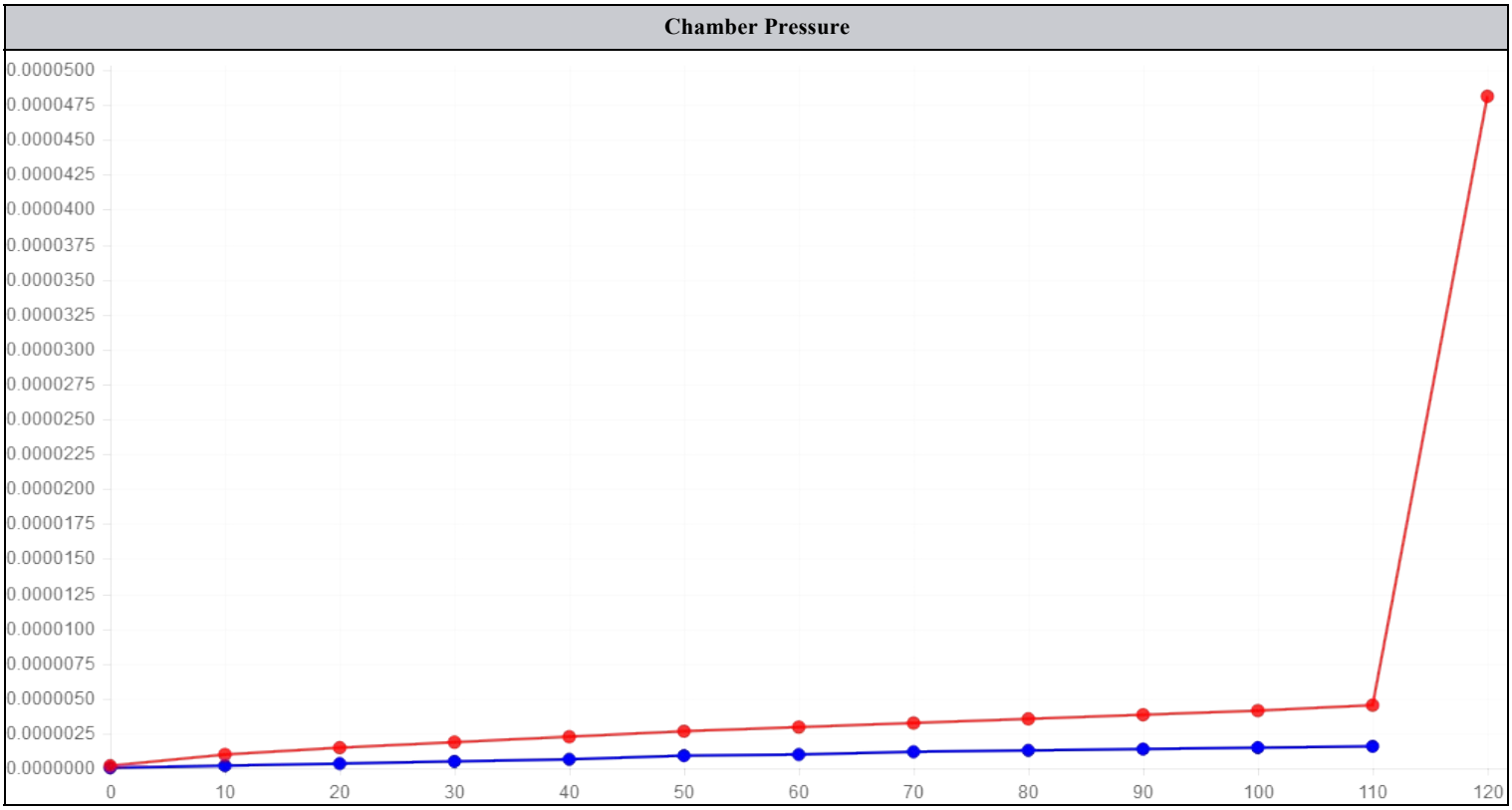


Chamber Pressure



Vacuum leak test

Seconds since push standby	Chamber pressure	Max. Chamber pressure
0	3.00E-8	1.80E-07
10	1.90E-7	1.00E-06
20	3.40E-7	1.50E-06
30	5.00E-7	1.90E-06
40	6.50E-7	2.30E-06
50	9.20E-7	2.70E-06
60	1.00E-6	3.00E-06
70	1.20E-6	3.30E-06
80	1.30E-6	3.60E-06
90	1.40E-6	3.90E-06
100	1.50E-6	4.20E-06
110	1.60E-6	4.60E-06



Diffusion pump & HVV timing

TimeInto	HeatingTime	PumpingTimeBeforeOpenHVV	TimeToOpenHVV
Heating oil	45.0		

TimeInto	HeatingTime	PumpingTimeBeforeOpenHVV	TimeToOpenHVV
Pump		13.0	

TimeInto	HeatingTime	PumpingTimeBeforeOpenHVV	TimeToOpenHVV
Open HVV			11.0

RP & DP pump oil condition

Date last rotary oil change:

Roughing pump oil mist filter cleaned	Roughing pump oil is in good color and condition
	☑

Last DP maintenance: 2023-06-06

DP oil is in good color and condition	
	☑

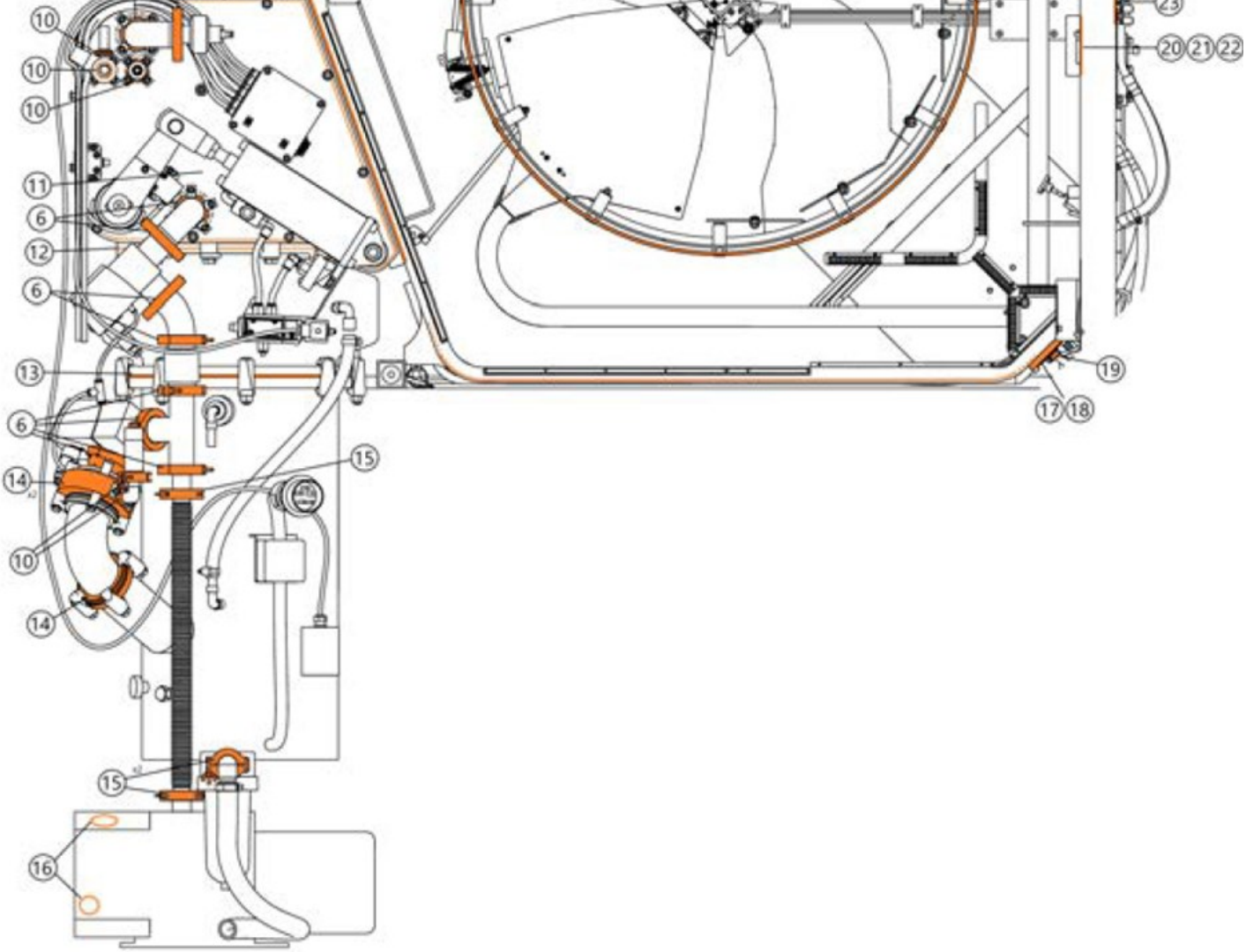
RP Photos
There is not photographic evidence

Photos
There is not photographic evidence

Notes

PETtrace800 O-Rings analysis

Pins



10
10
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22
19
17
18

Pins Data

Pin 1			
Name the O-Ring	Name and Info of the O-Ring		Name the O-Ring
	Name of O- Ring	Parameter	
			1
Explain The Intervention			
1000			
Photos			

Pin 2			
Name the O-Ring	Name and Info of the O-Ring		Name the O-Ring
	Name of O- Ring	Parameter	
			1
Explain The Intervention			
Photos			
Image_pin_2.jpg			

CHAMBER

Chamber Opening

Remove targets	☑
Close target cooling water lines	☑
Visual inspection of door bolts and motor	☑
Bolt replacement if needed	☑
Initial opening of magnet door	☑
close again	☑

Measure yoke play, adjust if needed:

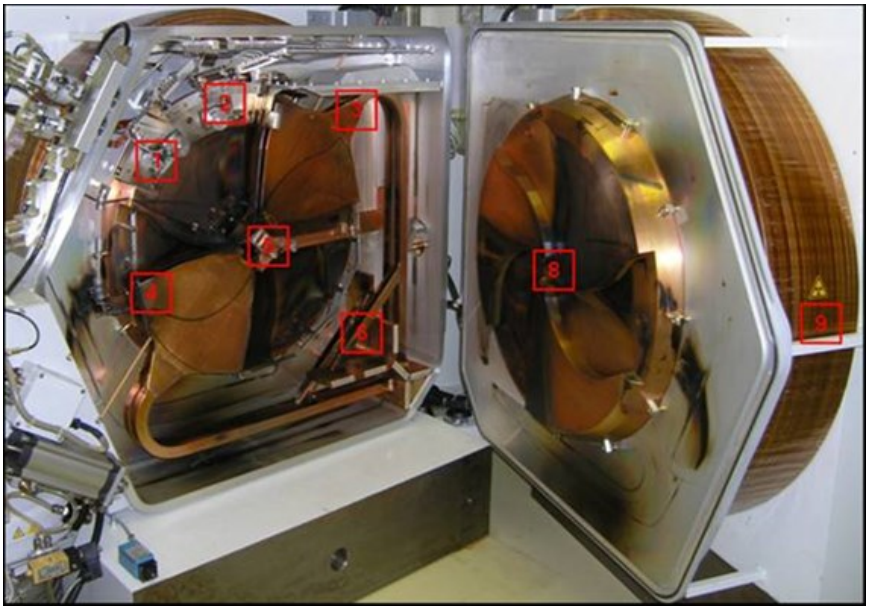
Dose rate mapping (positions 1-9, [µSv/h])	
	
Position 1: At 36 cm from Extraction trolley	
Position 2: At 36 cm from Carousel	
Position 3: At 36 cm from Dee 2-stem junction	
Position 4: At 36 cm from Deel upper corner	
Position 5: At 36 cm from Central region	
Position 6: At 36 cm from Stems coupler	
Position 7: At contact with central region	
Position 8: At 36 cm from magnet pole	
Position 9: At contact of magnet coil	

Photo documentation & visual inspection
There is not photographic evidence

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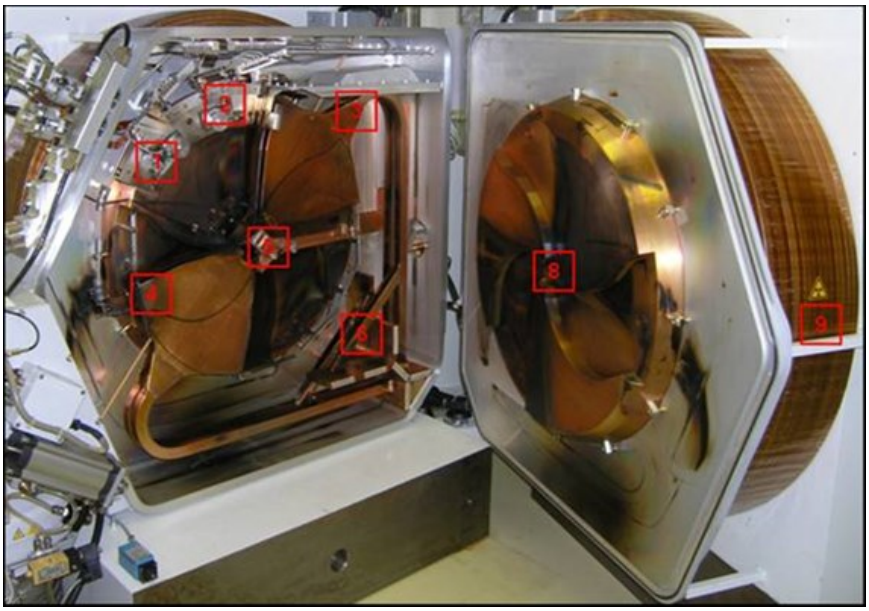	
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Photo documentation & visual inspection
There is not photographic evidence

Beam exit valve tests

Flaps

Flap 1

Calibrate flaps, record minimum and maximum motor current:

Minimum current [mA]	
MaximumCurrentMA	

Record flap to dee distances for 0%, 50%, 100%

0% value [mm]	
50% value [mm]	
100% value [mm]	

Flap 2

Calibrate flaps, record minimum and maximum motor current:

Minimum current [mA]	
MaximumCurrentMA	

Record flap to dee distances for 0%, 50%, 100%

0% value [mm]	
50% value [mm]	
100% value [mm]	

Central Region

Visual inspection of flip-in probe	☑

Measure flip-in probe position (a,b,c,d,e)

A [mm]	B [mm]	C [mm]	D [mm]	E [mm]
0.45000000000000001	0.45000000000000001	0.40000000000000002	0.75	

Dismount ion source and mount dummy ion source	☑

Measure central region distances (A, B, C, D) [mm]

A [mm]	B [mm]	C [mm]	D [mm]
46.0	74.0	47.0	46.399999999999999

Visual inspection and photo of H-puller	☑
If needed: H-puller replacement	☑

If needed: Adjustment of central region and record A, B, C, D again

If needed: Adjustment of central region and record A, B, C, D again			
A [mm]	B [mm]	C [mm]	D [mm]

If needed: Ion source maintenance or replacement	☑
Install back ion source	☑

Restore and record flip-in probe position

Restore and record flip-in probe position		☑	
A [mm]	B [mm]	C [mm]	D [mm]
10.0	12.0	13.0	20.0

Pictures	
Image	Comments

Dees

Visual inspection of dees, internal and external baffles	☑

	Measure dee thickness	Measure dee height
A	33.0	46.0
B	33.0	74.0
C	33.0	47.0
D	33.0	46.399999999999999
E	33.0	74.299999999999997
F	33.0	47.100000000000001
G	33.0	74.900000000000006
H	33.0	75.0

Pictures	
Image	Comments

Verify tightness of dee- and stem screws	

Extraction

Replace extraction foils of carousels	☑
Visual inspection of extraction cables	☑
Test each microswitch of extraction system	☑

Calibrate balance, record minimum and maximum motor current [mA]

	Calibrate balance, record minimum and maximum motor current	**Calibrate extraction 1, record minimum and maximum motor current [mA]**	**Calibrate extraction 2, record minimum and maximum motor current [mA]**
Minimum current [mA]	142.0	120.0	110.0
Maximum current [mA]	101.0		142.0

Diagnostic system checks

Target ID	
Visual inspection of collimators and collimator cables	☑
Check collimator screws tightness	☑
Measure flip-in probe resistance	**0.0**
Target Resistance	
Lower Collimator Resistance	
Upper Collimator Resistance	
Horizontal Collimator Opening	
VerticalCollimatorOpening	

	Resistance Measurement	**Insulation Measurement**
Extraction 1	0.0	20.0
Extraction 2	0.0	0.0

Comments	

Chamber Clean-up

Carousel repositioning

Install back carousels	☑
Foil change test on each carousel	☑
Reset foil counter	☑

Full picture of vacuum chamber
Image_1.jpg

Chamber clean-up

Clean dees and magnet poles	☑
Regrease door o-ring	☑
Check for left items	☑
Inspect RF finger contacts	☑
Close magnet door	☑

Cabinets

Swedwater

Inspect cooling water system for leaks	Bunker water manifold,Magnet coil water connections,Water connections to vacuum chamber,PSMC / RFPG water manifold,Target water manifold,Swedewater cabinet,Check the condition of target cooling water lines, replace if needed
If needed inspection of cooling water filters	Inspect and clean Z1 filter,Inspect Z2 filter, replace if needed,Inspect and clean Z3 filter

Record of water cooling system performance

Record expansion vessel pressure BP1 [bar]	
Record water level [mm]. Adjust if needed	
Record main pump pressure BP2 [bar]	
Record system temperature BT1 [°C]	
Record temperature alarm setting [°C]	
Record cooling water out temperature T2 [°C]	
Record cooling water in temperature BT3 [°C]	
Record deionizer flow BF10 [l/min]	
Record conductivity BQ1[(µS/cm]	
Replace deionizer vessel if needed	

Ion Source

Record H2 gas pressure

Set point [bar]	Reading at MFC [bar]
1.0	2.0

Turn on Magnet, set probe in, turn on RF, turn on gas.

Magnet current [A]	DEE1 voltage [kV]	DEE2 voltage [kV]	Gas flow [sccm]	If ion source was maintained, perform ion source conditioning (ramp up from 30 mA to 100 mA in 30 minutes and from 100mA to 200mA in 10 minutes)
2.0	3.0	4.0	5.0	☑

Record Ion Source Performance

IS current [mA]	IS voltage [V]	Flip in probe current [µA]
	1271.0	43.0
	5288.0	132.0
	153.0	1465.0
	458.0	462.0
	2.0	753.0
	689.0	895.0
	365.0	856.0
	365.0	856.0
	657.0	452.0
	854.0	801.0

Paper Burn Test

Install paper burn target	☑
Perform paper burn test in SB and DB	☑

Install paper burn target

If needed, adjust collimators and repeat	

LTF

Identifier	
LTF	Replace target water-18 peek line and connectors
Inspect the movement of all LTF compressed air actuators	V2

Starting pressure [psi]	Pressure drop [psi / h]
2.0	3.0

If needed: Perform target fill tests and adjustment for each target	
If needed, adjust and repeat test, record adjustment value	4.0

Pictures	
Image	Comments

Autoshield

Check compressor oil level and operational hours	3.0
Autoshield	Refill oil if under low level mark or every 3000 operational hours,Manually drain the the air tank and the air manifold to evacuate condensated water,Verify the air tank relief valve operation, repair/replace as required,Verify air hose connections and air hose status, repair/replace as required
Verify tank water level and float switches functionality, top up water level/repair and/or replace switches as required	☑
Verify functionallity of micro switches for: Door closed	☑
Read and record door lift timing for left door	11.0
Read and record door lift timing for right door	11.0
Verify functionallity of skirt microswitches and that the skirts seats properly on the micro switches	☑
Verify tightening of the upper and the lower socket heads screws	☑
Check the hinges of left and right door	

Autoshield Upper

Read and record upper manometer lifting pressures

K1	K2	K3	K4	K5	K6
23.0	45.0	66.0	78.0	99.0	91.0

Pictures	
Image	**Comments**