	MAINTENANCE TRACKING TOOL **PETTRACE800**	Date:2024-06-12

Country: Iberia	**Site:** BAR
Intervention:	Programmed maintenance: UBM/CBM ☑
Subsystems:	

PRE-MAINTENANCE

Registration Date: 2024-06-12
Gas flow(sccm): 200.0

TPG Settings Verifications

	Low limit (x10-)	High limit (x10-)
Piranni 1 (TPG300 A1):	0.7	
Piranni 2 (TPG300 A2):	0.2	7.00E-2
Penning:	1.80E-5	2.20E-5

Notes

notas

Gauge number	Pressure (x10-) without gas	Pressure (x10-) with gas
A1 (mbar):	100	110
A2 Under Range:	☑	☑
A2:	-	-
B1 (mbar):	105	115

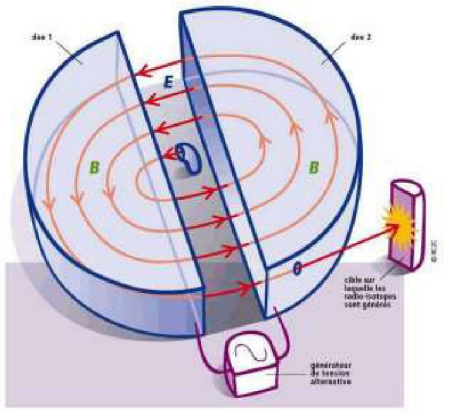
System software

Subsytem	Version
Master:	3.5.2
ACS:	1.2
Service System:	2
Manager:	59
Informix (only applicable to SUN-Master Station):	159

Comments

comentarios pre-maintenance

Paper Burn Before PM

photo pm1


VACUUM

TPG settings verifications

Date: 2024-06-12
Production gas flow: 5.0

Piranni 1 (TPG300 A1)

Pressure with gas	Low limit (x10-)	High limit
4.00E-2	0.7	0.1

Piranni 2 (TPG300 A2)

Under range	Pressure with gas	Low limit	High limit
☑	-	0.1	7.00E-2

Penning

Pressure with gas	Low limit	High limit
1.20E-5	1.80E-5	2.20E-5

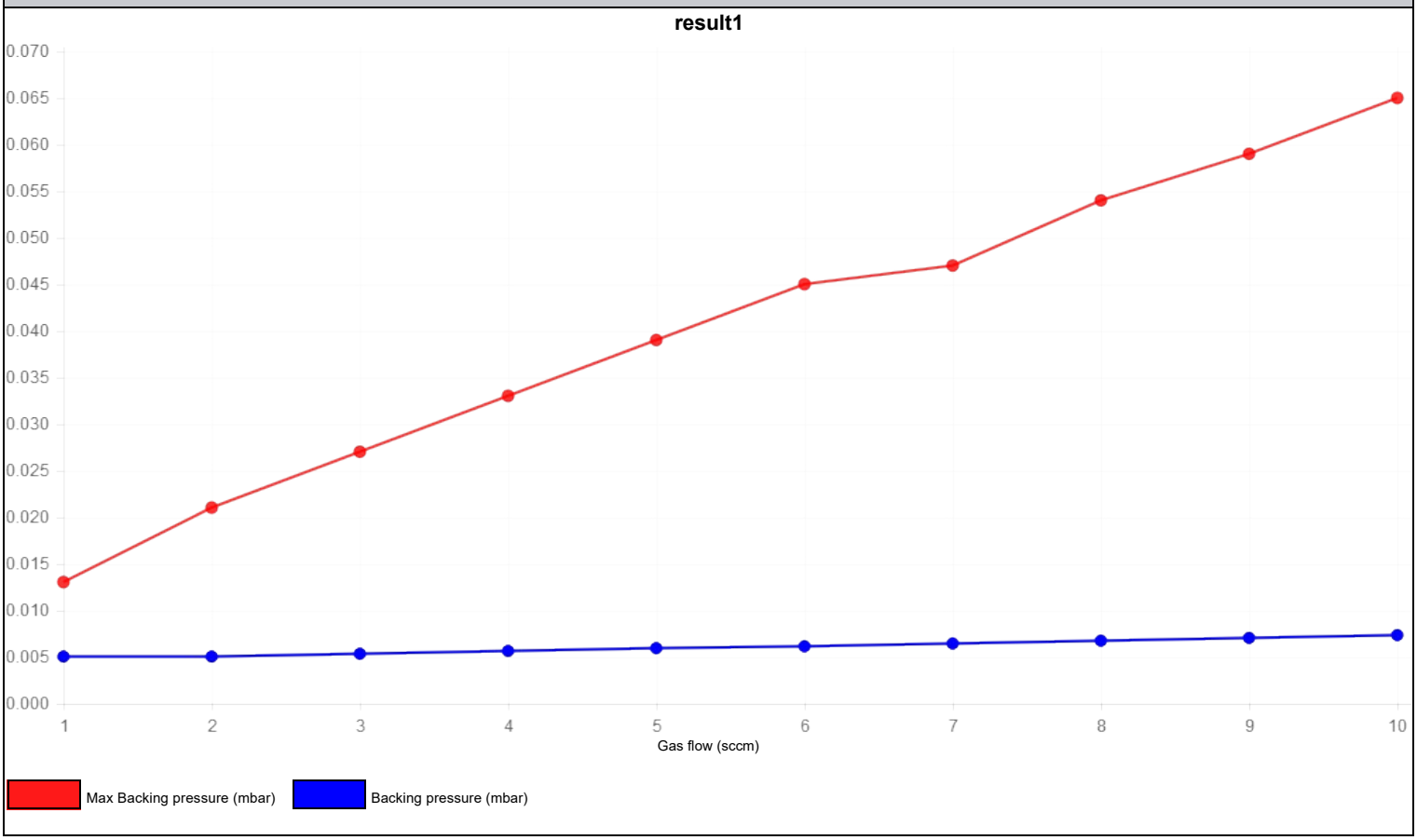
Notes

notas vacum TPG

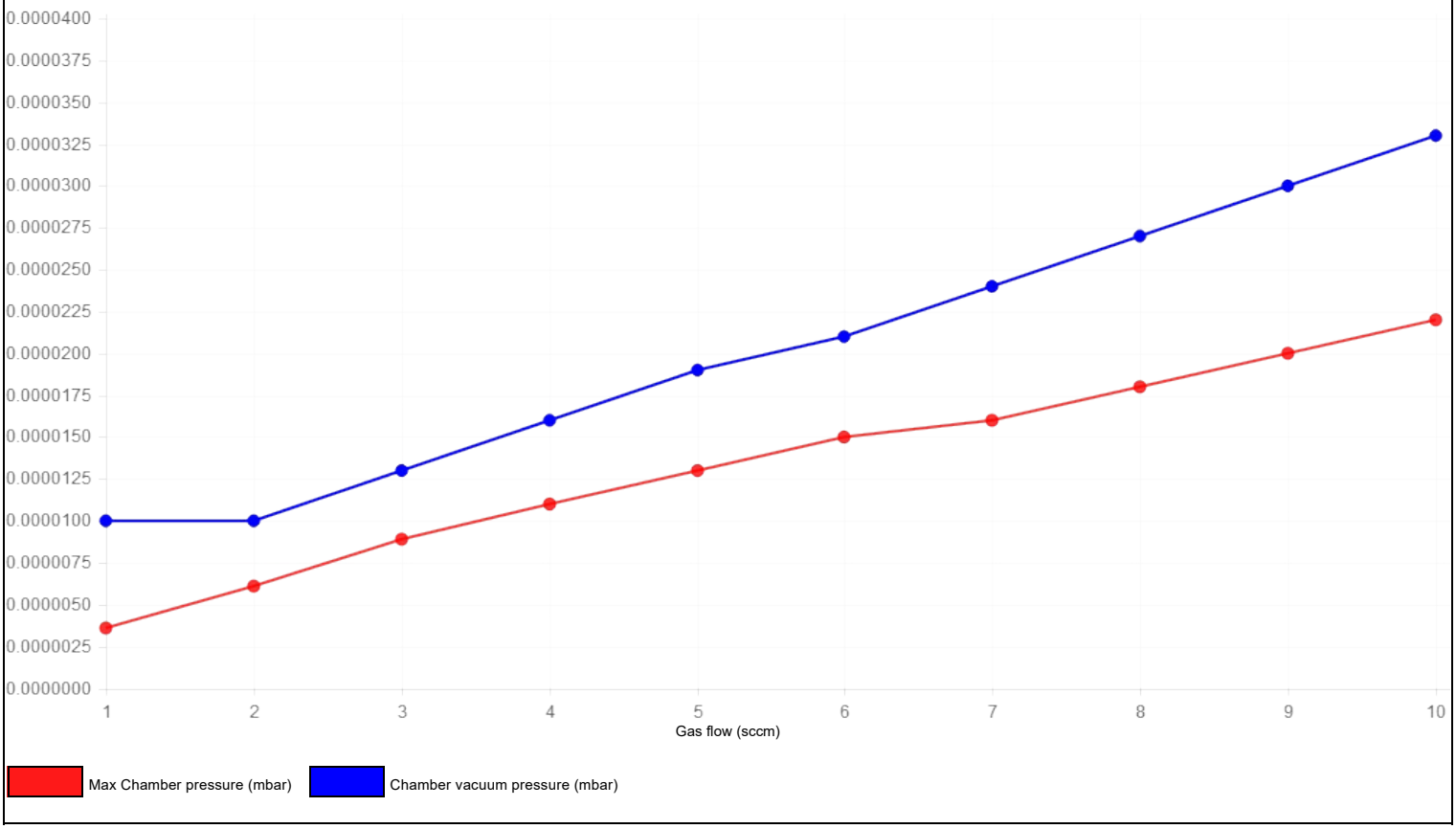
Vacuum MFC curve test

SCCM	Chamber pressure	Backing pressure
1	1.00E-5	5.00E-3
2	1.00E-5	5.00E-3
3	1.30E-5	5.30E-3
4	1.60E-5	5.60E-3
5	1.90E-5	5.90E-3
6	2.10E-5	6.10E-3
7	2.40E-5	6.40E-3
8	2.70E-5	6.70E-3
9	3.00E-5	7.00E-3
10	3.30E-5	7.30E-3

Backing Pressure

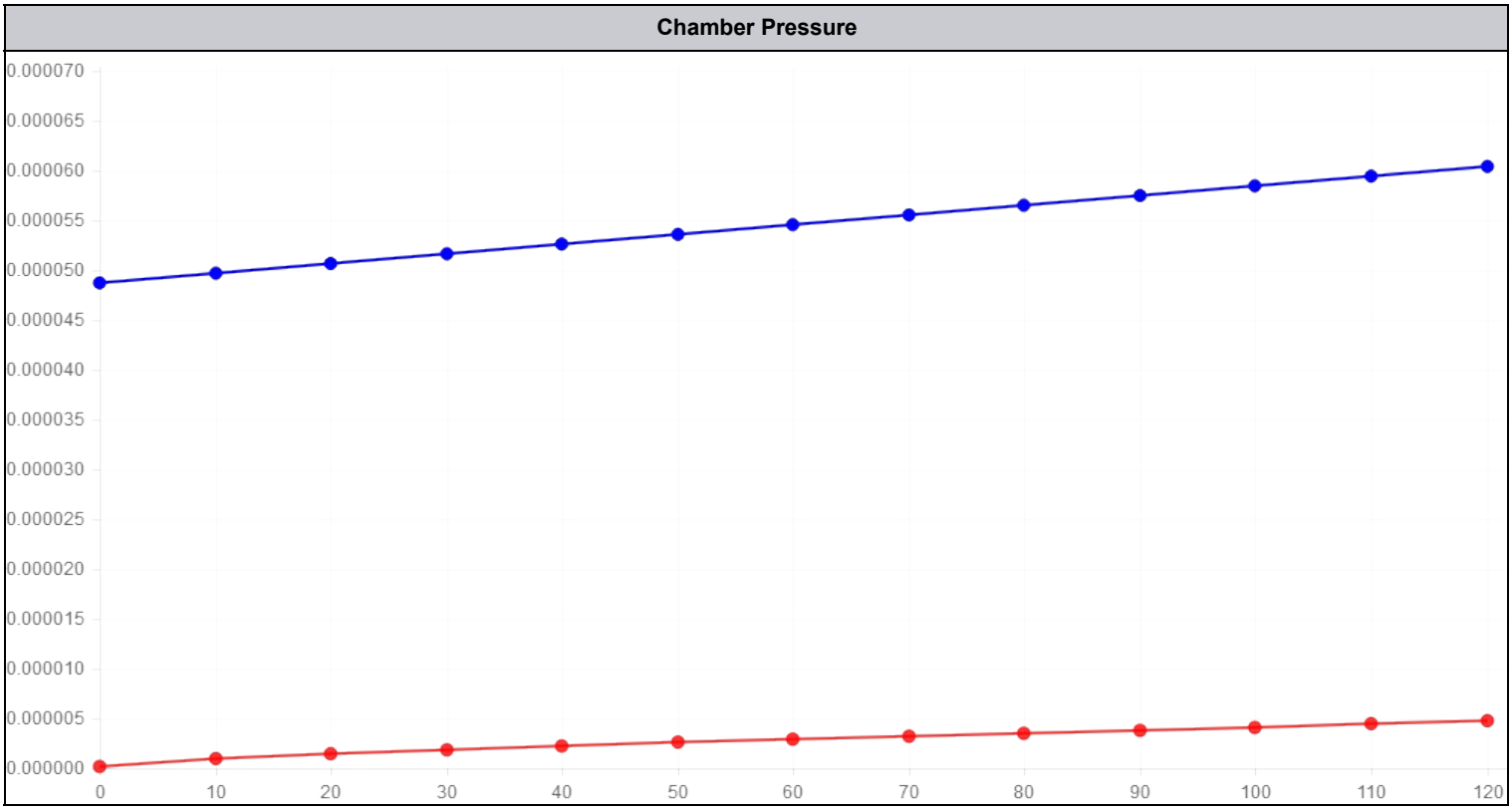


Chamber Pressure



Vacuum leak test

Seconds since push standby	Chamber pressure	Max. Chamber pressure
0	5.00E-5	1.80E-07
10	5.10E-5	1.00E-06
20	5.20E-5	1.50E-06
30	5.30E-5	1.90E-06
40	5.40E-5	2.30E-06
50	5.50E-5	2.70E-06
60	5.60E-5	3.00E-06
70	5.70E-5	3.30E-06
80	5.80E-5	3.60E-06
90	5.90E-5	3.90E-06
100	6.00E-5	4.20E-06
110	6.10E-5	4.60E-06
120	6.20E-5	4.90E-06



Diffusion pump & HVV timing

TimeInto	HeatingTime	PumpingTimeBeforeOpenHVV (Min)	TimeToOpenHVV
Heating oil	1.0		

TimeInto	HeatingTime	PumpingTimeBeforeOpenHVV (Min)	TimeToOpenHVV
Pump		2.0	

TimeInto	HeatingTime	PumpingTimeBeforeOpenHVV (Min)	TimeToOpenHVV
Open HVV			3.0

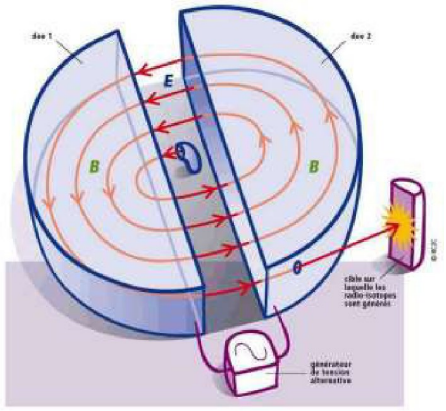
RP & DP pump oil condition

Date last rotary oil change: 2024-06-12

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

Last DP maintenance: 2024-06-03

DP oil is in good color and condition	☑

RP Photo


DP Photos
Photo DP

Notes

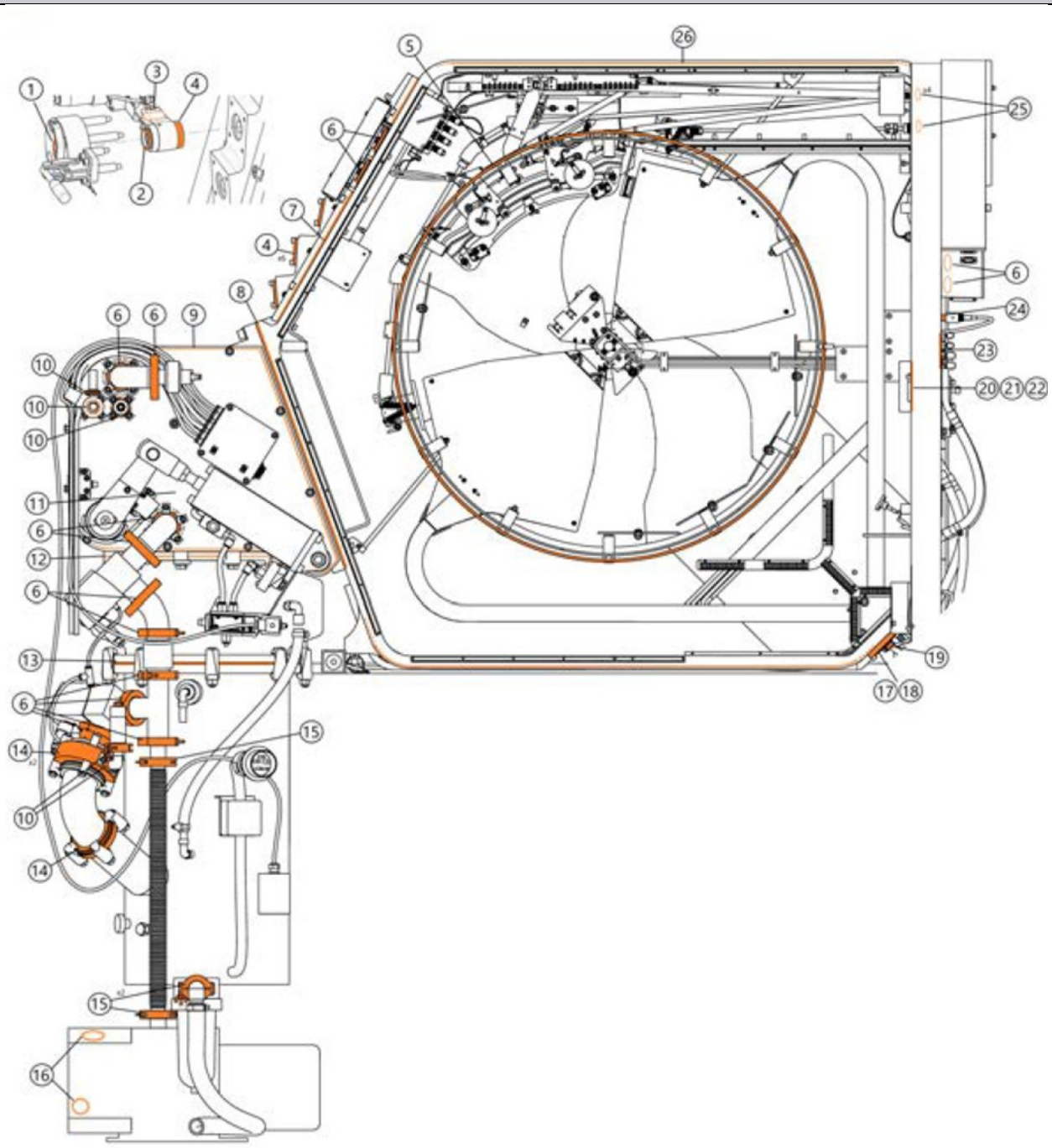
Vacuum RP and DP

OtherTest

Name the test	test demo
Test explanation	Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has survived not only five centuries, but also the l

Photos or Videos
demo

PETtrace800 O-Rings analysis

Pins


CHAMBER

Chamber Opening

Close target cooling water lines	☑
Visual inspection of door bolts and motor	☑
Bolt replacement if needed	☑

Measure yoke play, adjust if needed: 9

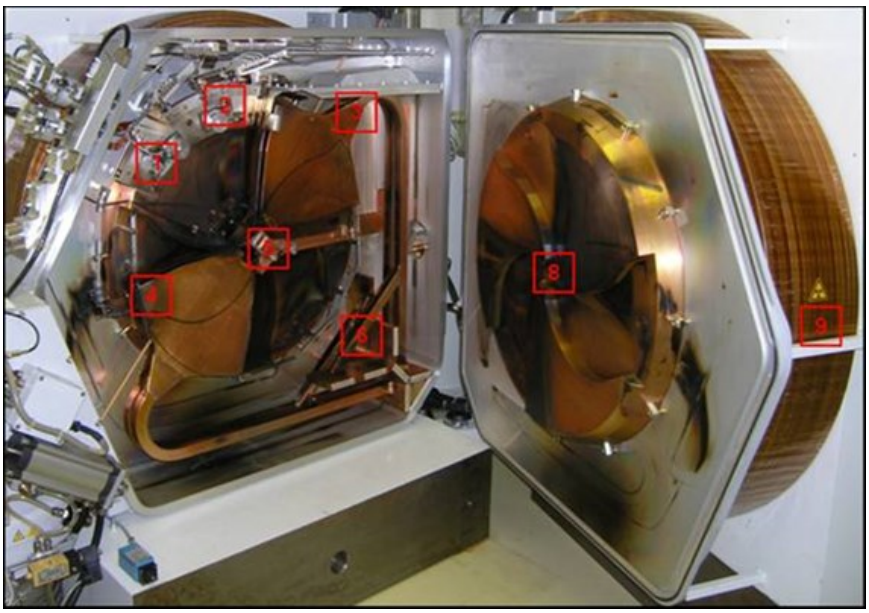
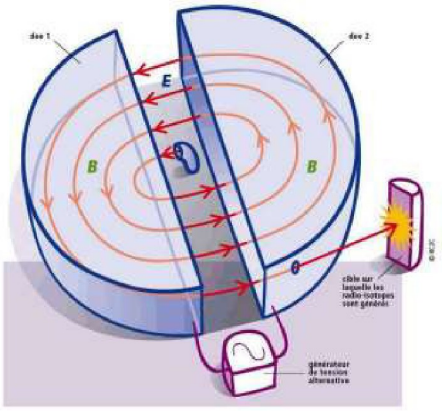
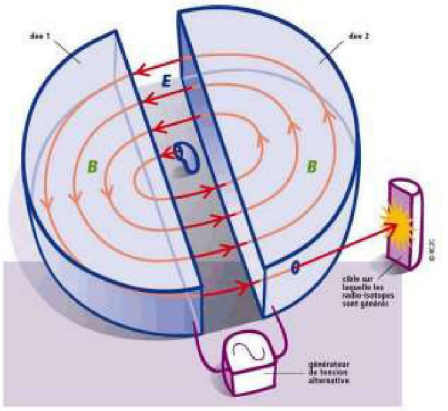
Dose rate mapping (positions 1-9, [µSv/h])	
	
Position 1: At 36 cm from Extraction trolley	-
Position 2: At 36 cm from Carousel	-
Position 3: At 36 cm from Dee 2-stem junction	-
Position 4: At 36 cm from Deel upper corner	-
Position 5: At 36 cm from Central region	-
Position 6: At 36 cm from Stems coupler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

Central region



Flap 2



Beam exit valve tests

Visual inspection of tubing	☑
BEV replacement if needed	☑
Target port O-ring replacement	☑

Flaps

Flap 1

Calibrate flaps, record minimum and maximum motor current:

Minimum current [mA]	546
MaximumCurrentMA	94

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

0% value [mm]	122
50% value [mm]	0
100% value [mm]	234

Notes

asdaa

Flap 2

Calibrate flaps, record minimum and maximum motor current:

Minimum current [mA]	412
MaximumCurrentMA	22

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

0% value [mm]	0
50% value [mm]	12
100% value [mm]	1

Notes

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]
1	2	3	4	5

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]
0	0	5	4

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]
85	984	0	12

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]
32	32	0	32

Pictures	
Image	**Comments**
CentralRegion_1012.jpg	a

Dees

Visual inspection of dees, internal and external baffles	☑

	Measure dee thickness	Measure dee height
A	**1**	**9**
B	**2**	**10**
C	**3**	**11**
D	**0**	**12**
E	**5**	**13**
F	**6**	**14**
G	**7**	**15**
H	**0**	**16**

Pictures	
Image	**Comments**
Dees_1005.jpg	efdfs

Verify tightness of dee- and stem screws	☑

Visual inspection of dees, internal and external baffles	☑

	Measure dee thickness	Measure dee height
A	**132**	**6312**
B	**0**	**8**
C	**132**	**65**
D	**45**	**452**
E	**65**	**21**
F	**15**	**84**
G	**8**	**1**
H	**0**	**0**

Pictures	
Image	**Comments**
Dees_1006.jpg	465

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]	13	20	12
Maximum current [mA]	20	25	15

Diagnostic system checks

Target ID	
Visual inspection of collimators and collimator cables	☑
Check collimator screws tightness	☑
Measure flip-in probe resistance	**11**
Target Resistance	**12**
Lower Collimator Resistance	**13**
Upper Collimator Resistance	**-**
Horizontal Collimator Opening	**15**
VerticalCollimatorOpening	**16**

	Resistance Measurement	Insulation Measurement
Extraction 1	0	18
Extraction 2	19	20

Comments	sda

Chamber Clean-up

Carousel repositioning

Foil change test on each carousel	☑
Reset foil counter	☑

Full picture of vacuum chamber
Image_1006.jpg

Chamber clean-up

Clean dees and magnet poles	☑
Foil change test on each carousel	☑

Full picture of vacuum chamber
Image_1007.jpg

Chamber clean-up

Inspect RF finger contacts	☑

Cabinets

Swedwater

Inspect cooling water system for leaks	Magnet coil water connections,Water connections to vacuum chamber,Target water manifold
If needed inspection of cooling water filters	Inspect and clean Z1 filter,Inspect Z2 filter, replace if needed

Record of water cooling system performance

Record expansion vessel pressure BP1 [bar]	1
Record water level [mm]. Adjust if needed	2
Record main pump pressure BP2 [bar]	3
Record system temperature BT1 [°C]	0
Record temperature alarm setting [°C]	5
Record cooling water out temperature T2 [°C]	6
Record cooling water in temperature BT3 [°C]	7
Record deionizer flow BF10 [l/min]	8
Record conductivity BQ1[(µS/cm]	9
Replace deionizer vessel if needed	☑

Pictures	
Image	**Comments**
Image_1003.jpg	gh

Inspect cooling water system for leaks	Bunker water manifold,Magnet coil water connections,PSMC / RFPG water manifold,Check the condition of target cooling water lines, replace if needed
If needed inspection of cooling water filters	Inspect and clean Z1 filter

Record of water cooling system performance

Record expansion vessel pressure BP1 [bar]	6
Record water level [mm]. Adjust if needed	4
Record main pump pressure BP2 [bar]	8
Record system temperature BT1 [°C]	2
Record temperature alarm setting [°C]	0
Record cooling water out temperature T2 [°C]	0
Record cooling water in temperature BT3 [°C]	78
Record deionizer flow BF10 [l/min]	1
Record conductivity BQ1[(µS/cm]	1
Replace deionizer vessel if needed	☑

Pictures	
Image	**Comments**
Image_1004.jpg	awESDF

Cabinets RFPG

RFPG general tasks

Switch off power to RFPG, log out & tag out	Replace the RFPG air inlet filters, clean the front grid cover, inspect the grid of the back of the cabinet, clean if required
☑	☑

TAU inspection

TAU inspection	Verify that no burn marks, loose cables, or water leaks are present
Repair and/or replace as required	es

Take photos (upper and lower compartment)

Image_1003.jpg

GSPU inspection

Verify that no burn marks or loose cables are present	☑
Clean	☑

Repair and/or replace as required
repair

Take photos

Image_1003.jpg

DPA inspection

Verify that no burn marks, loose cables, or water leaks are present	☑
Clean	☑

Repair and/or replace as required
replace

Take photos

Image_1003.jpg

TPSU back side inspection

Record the resistance of the earth stick	0.0
TPSU back side inspection	

Repair and/or replace as required

Take photos

Image_1003.jpg

Remove earth stick	

TPSU front side inspection

TPSU front side inspection	Clean,Check and tighten all terminal screws

Repair and/or replace as required
sa

Take photos

Image_1003.jpg

RFPG live tests

Record RFPG water cooling pressure	Switch on RFPG main power	Record DPSU voltage [V]	Record DPSU ripple [mV rms]
12	☑	210	2

Record voltages on phase load detector board (SCU)

3V [V]	TP1 +15V [V]	TP2 -15V [V]	TP3 +5V [V]	TP4 +24V [V]
1	2	3	4	0

Record ripple on phase load detector board (SCU)

3V [V rms]	TP1 +15V [V rms]	TP2 -15V [V rms]	TP3 +5V [V rms]	TP4 +24V [V rms]
6	7	8	9	0

Turn on Magnet to set value	☑

Record RF parameters in off mode

RFrom SCU Webpage:

DEE voltage ref [V]	5
DEE voltage read 1 [V]	4
DEE voltage read 2 [V]	8
RF fwd voltage [Vrms]	0
RF reflected voltage [Vrms]	3
DPA RF FWD voltage [Vrms]	12
FWD power [kW]	8
Reflected power [kW]	3
Anode voltage [kV]	0
Anode current [A]	4
Grid voltage [V]	9
Grid current [A]	1
Screen voltage [V]	5
Screen current [mA]	98
Heater voltage [V rms]	1

From PSS:

DEE voltage set [kV]	0.00E+0
DEE voltage read [kV]	9
Delta DEE voltage set [kv]	6
Delta DEE voltage read [kV]	1
FWD power [kV]	7
Reflected power [kV]	0
Flap I start [%]	1.85E+2
Flap I position [%]	2
Flap II start [%]	0
Flap II position [%]	1

Record RF parameters in standby mode

From SCU Webpage:

DEE voltage ref [V]	74
DEE voltage read 1 [V]	8
DEE voltage read 2 [V]	5
DRF fwd voltage [Vrms]	4
RF reflected voltage [Vrms]	1
DPA RF FWD voltage [Vrms]	2
FWD power [kW]	6
Reflected power [kW]	8
Anode voltage [kV]	5
Anode current [A]	7
Grid voltage [V]	4
Grid current [A]	5
Screen voltage [V]	0
Screen current [mA]	9
Heater voltage [V rms]	78

From PSS:

DEE voltage set [kV]	5
DEE voltage read [kV]	4
Delta DEE voltage set [kv]	0
Delta DEE voltage read [kV]	9
FWD power [kV]	5
Reflected power [kV]	8
Flap I start [%]	6.0
Flap I position [%]	41.0
Flap II start [%]	7.0
Flap II position [%]	4.0
Soft-start RFPG. Start from 25kV / 0kV, ramp up with 1kV / 10s to config value	☑

Record RF parameters in on mode

From SCU Webpage:

DEE voltage ref [V]	4
DEE voltage read 1 [V]	0
DEE voltage read 2 [V]	9
RF fwd voltage [Vrms]	7
RF reflected voltage [Vrms]	8
DPA RF FWD voltage [Vrms]	4
FWD power [kW]	5
Reflected power [kW]	0
Anode voltage [kV]	6
Anode current [A]	4
Grid voltage [V]	8
Grid current [A]	5
Screen voltage [V]	9
Screen current [mA]	5
Heater voltage [V rms]	4

From PSS:

DEE voltage set [kV]	1
DEE voltage read [kV]	0
Delta DEE voltage set [kv]	8
Delta DEE voltage read [kV]	5
FWD power [kV]	4
Reflected power [kV]	8
Flap I start [%]	5.0
Flap I position [%]	6.0
Flap II start [%]	3.0
Flap II position [%]	5.0
Let the system run for approximately 1-2 hours, monitor parameters, record fastlog, five second log and statistic log, download the SCU logs.	7
Upload files	File_1003.pdf

Record RF parameters in on mode again

From SCU Webpage:

DEE voltage ref [V]	8
DEE voltage read 1 [V]	5
DEE voltage read 2 [V]	4
RF fwd voltage [Vrms]	0
RF reflected voltage [Vrms]	96
DPA RF FWD voltage [Vrms]	8
FWD power [kW]	45
Reflected power [kW]	0
Anode voltage [kV]	98
Anode current [A]	45
Grid voltage [V]	8
Grid current [A]	4
Screen voltage [V]	8
Screen current [mA]	5
Heater voltage [V rms]	32

From PSS:

DEE voltage set [kV]	1
DEE voltage read [kV]	3
Delta DEE voltage set [kv]	2
Delta DEE voltage read [kV]	4
FWD power [kV]	87
Reflected power [kV]	5
Flap I start [%]	9.0
Flap I position [%]	6.0
Flap II start [%]	5.0
Flap II position [%]	2.0
Turn RFPG off	☑

Cabinets PSMC

PSMC
Inspect for water leaks, burn marks and broken parts,Check and tighten all terminal screws

Verify the resistance values with the installation tester

Resistance between negative and positive [Ω]	Resistance between negative and ground [MΩ]	Resistance between positive and ground [MΩ]
65	41	2

Real time mesurements
Install multimeter probes on positive and negative, guide them through the air outlet grid, connect oscilloscope,Install back all covers

Record on sequence ramping speed	Record on sequence ramping up time to maximum	Record on sequence ramping up time to configuration value
5	4	2

Verify PSMC performance for H-config value

Set current	9
Output current [A]	4
Voltage read PSS [V]	2
Coil voltage [V]	5
Firing sequence [number of peaks in 20ms]	9
Ripple [mV rms]	6

Verify PSMC performance for 499A

Set current	5
Output current [A]	7
Voltage read PSS [V]	4
Coil voltage [V]	12
Firing sequence [number of peaks in 20ms]	0
Ripple [mV rms]	1

Verify PSMC performance for 250A

Set current	2
Output current [A]	85
Voltage read PSS [V]	0
Coil voltage [V]	4
Firing sequence [number of peaks in 20ms]	9
Ripple [mV rms]	6

Verify PSMC performance for 50A

Set current	4
Output current [A]	5
Voltage read PSS [V]	1
Coil voltage [V]	78
Firing sequence [number of peaks in 20ms]	5
Ripple [mV rms]	6

Turn off PSMC and measure off sequence ramping down time	☑

Cabinets ACU

Record ACU voltages GND_IO / 24	Record ACU voltages GND_IO / +15V	Record ACU voltages GND_IO / -15V	Record ACU voltages GND / +5V	Record ACU voltages Chassis / GND_IO
1	5	4	2	5

Cabinets PDU

Visual inspection	☑

Pictures	
Image	**Comments**
Image_1002.jpg	cf

Check and tighten all terminal screws	☑

Ion Source

Record H2 gas pressure

Set point [SCCM]	Reading at MFC [bar]
1	2

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)
3	0	4	5	☑

Record Ion Source Performance

IS current [mA]	IS voltage [V]	Flip in probe current [µA]
45	2	498

Paper Burn Test

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

Install paper burn target
Image_1009.jpg

If needed, adjust collimators and repeat	565

LTF

Identifier	LTF4
LTF	Replace target water-18 peek line and connectors
Inspect the movement of all LTF compressed air actuators	V4,Syringe

Starting pressure [psi]	Pressure drop [psi / h]
5	9

If needed: Perform target fill tests and adjustment for each target	4
If needed, adjust and repeat test, record adjustment value	6

Pictures	
Image	Comments
Image_1007.jpg	asd

Autoshield

Check compressor oil level and operational hours	12.0
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 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	2.0
Read and record door lift timing for right door	65.0
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
1.0	5.0	0.0	9.0	3.0	1.0

Autoshield Lower

Read and record lower manometer lifting pressures

K1	K2	K3	K4	K5	K6
7.0	5.0	6.0	0.0	92.0	4.0

Pictures	
Image	**Comments**
Image_1002.jpg	sgs

Beam Conditioning

Photo name	Add Comment
Image_1005.jpg	No comments

PMDebriefing

Record additional tasks performed not recorded elsewhere	Record open tasks and issues	Record spare parts / consumables to be ordered	Record worker dosimetry
Lorem Ipsum is simply dummy text of the printing and typesetting industry. Lorem Ipsum has been the industry's standard dummy text ever since the 1500s, when an unknown printer took a galley of type and scrambled it to make a type specimen book.	It is a long established fact that a reader will be distracted by the readable content of a page when looking at its layout. The point of using Lorem Ipsum is that it has a more-or-less normal distribution of letters	when an unknown printer took a galley of type and scrambled it to make a type specimen book. It has survived not only five centuries, but also the leap into electronic typesetting, remaining essentially unchanged.	

Name	Total Dose [uSv]
name name name	465