

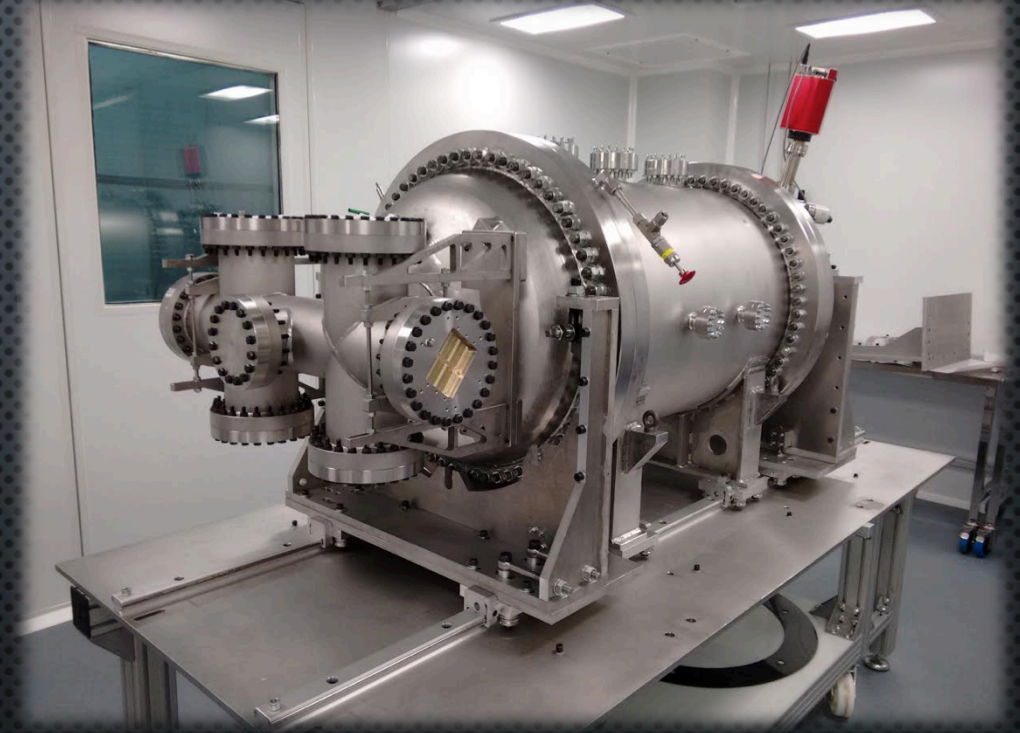
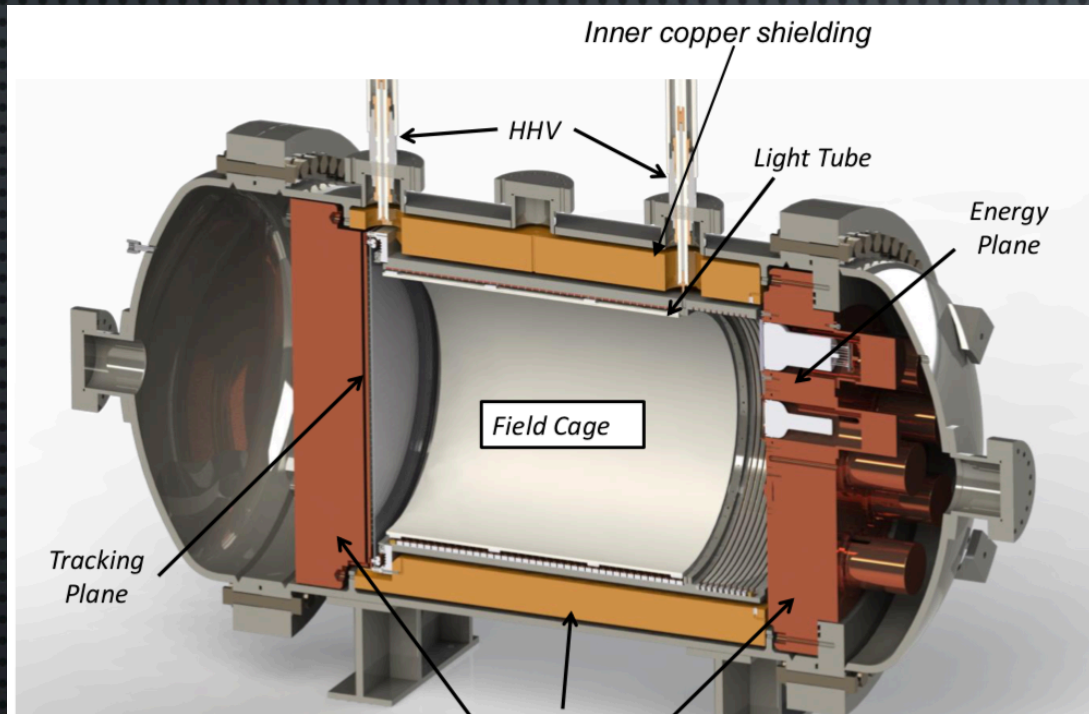
DETECTORES DEMO++, NEW Y NEXT100

ALBERTO MARTÍNEZ, JORDI TORRENT Y SARA CÁRCEL

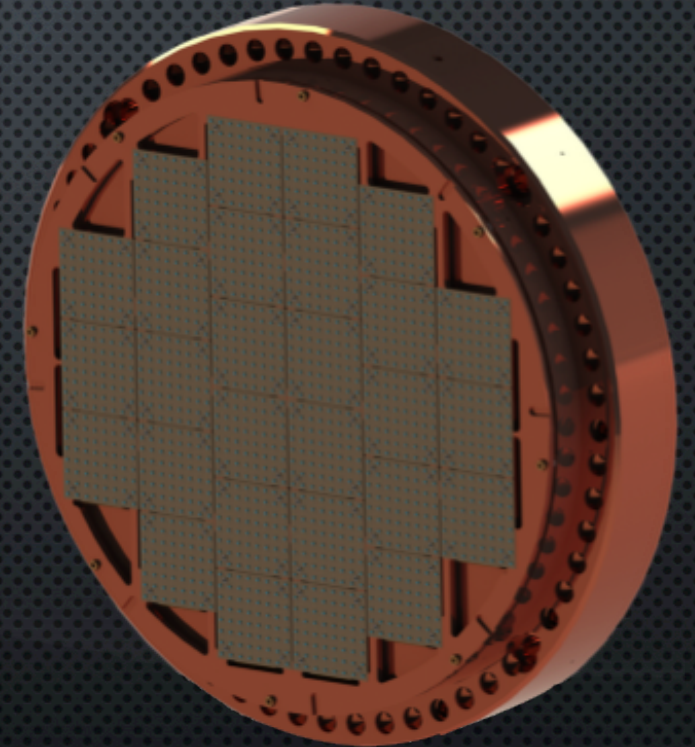
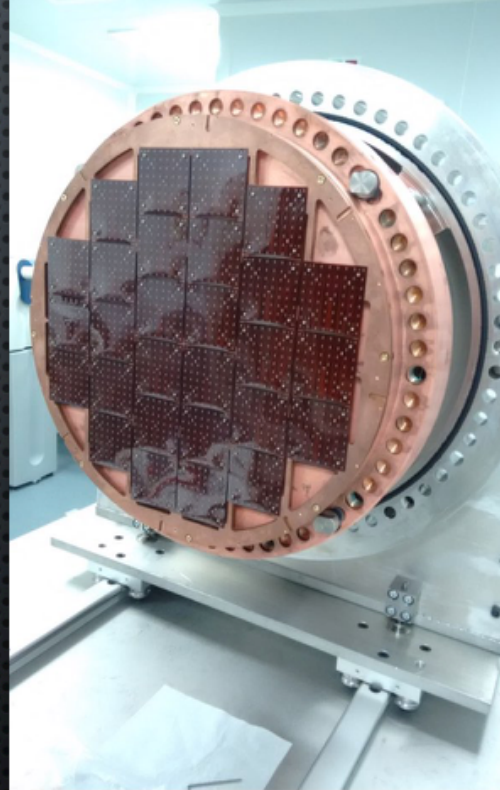
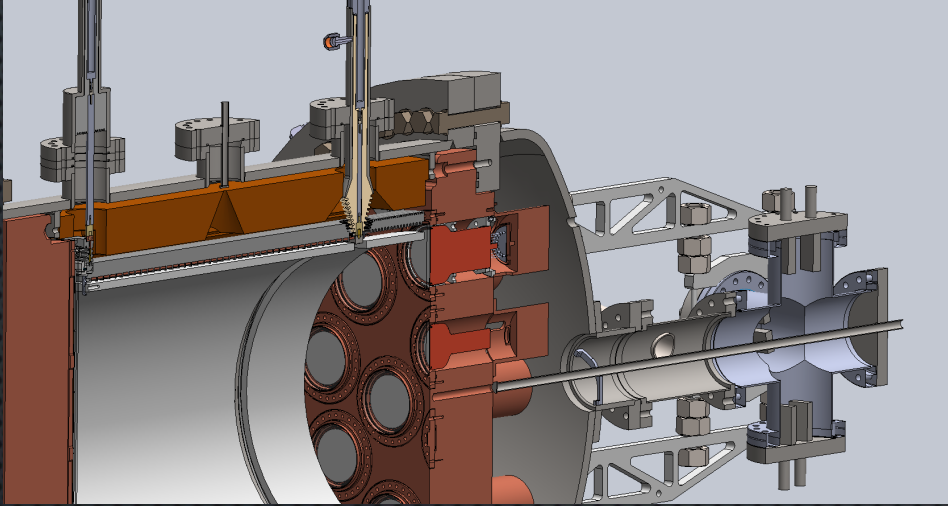
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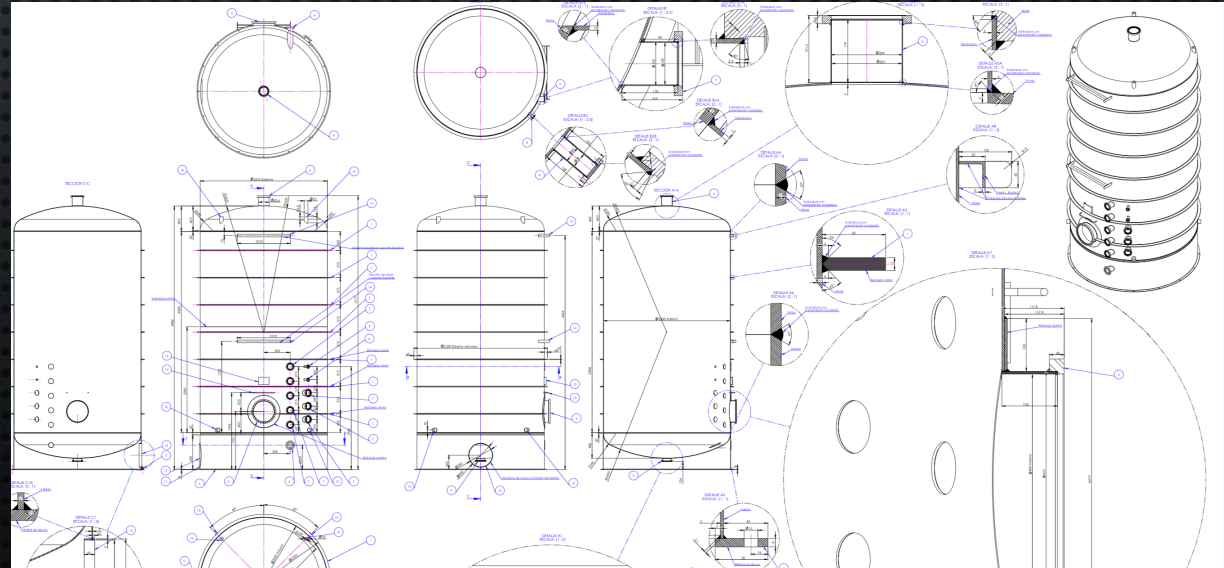
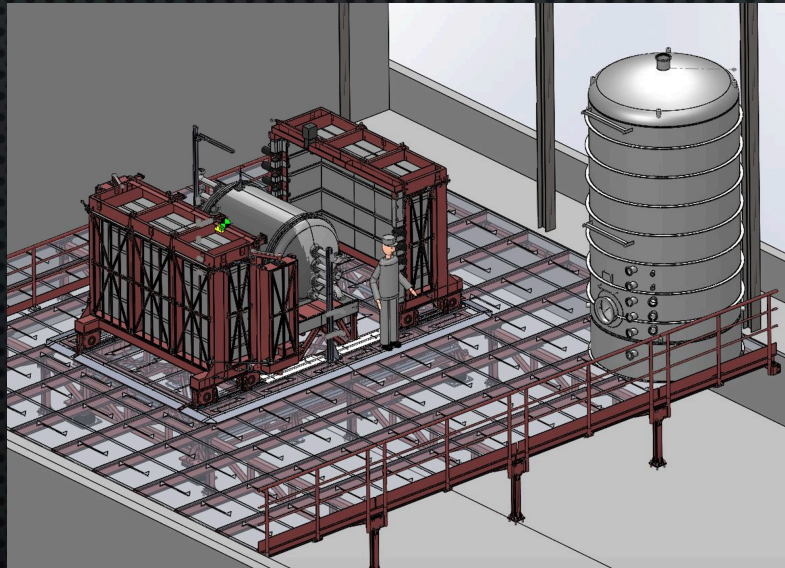
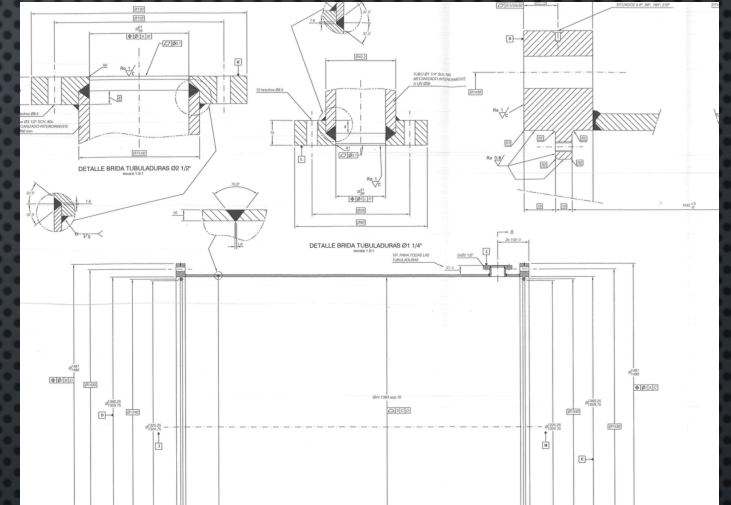
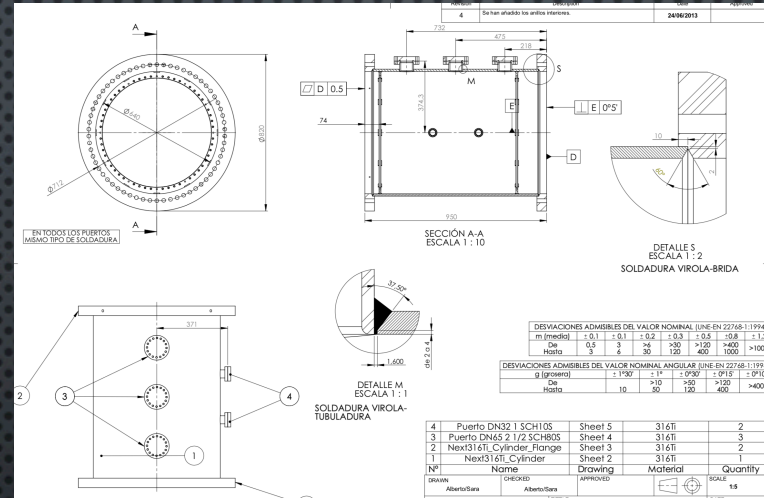
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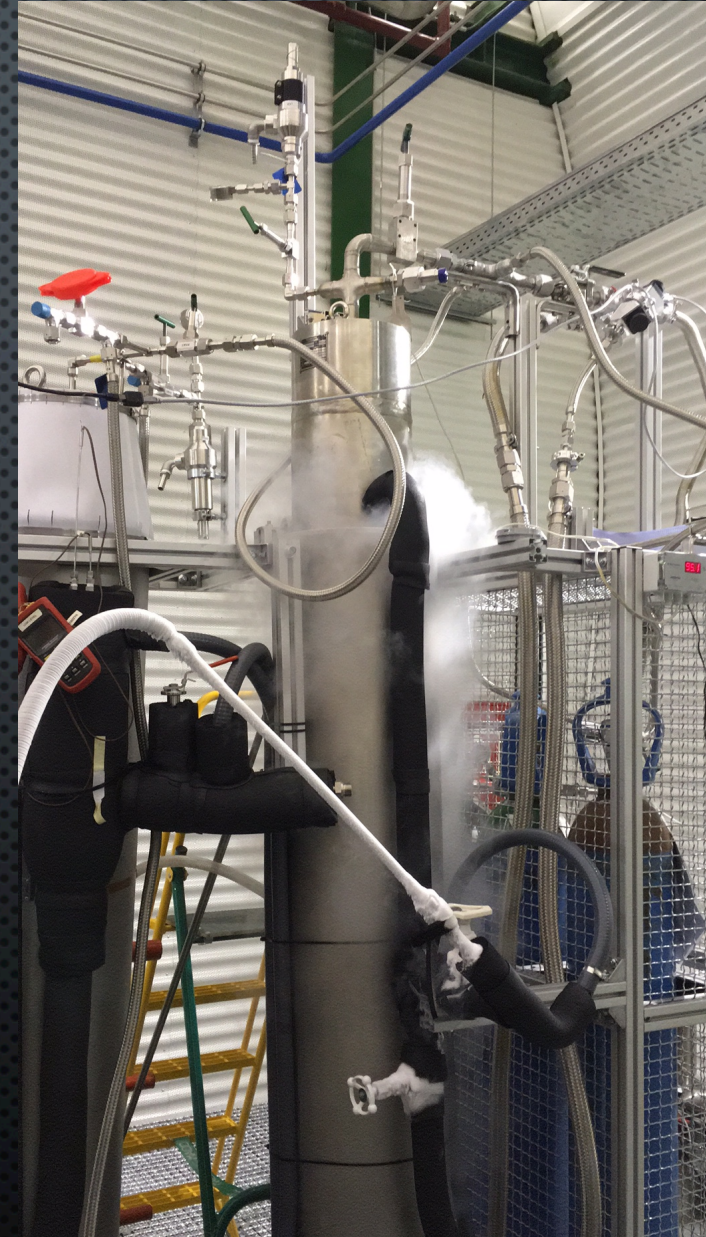
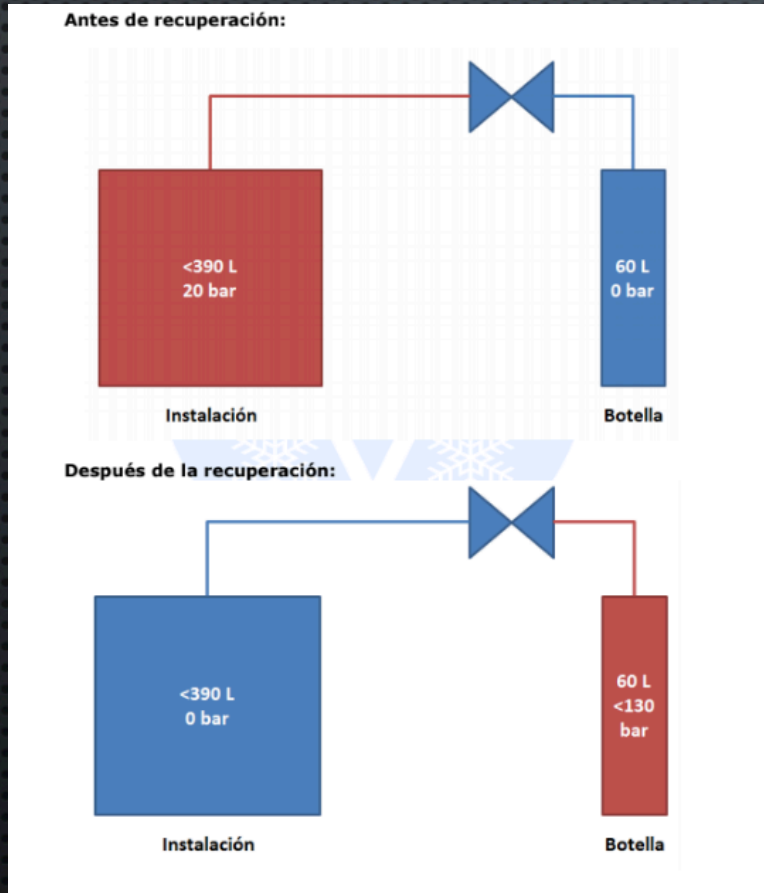
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2-RECUPERACIÓN POR CRIOGENIA



3-MARCADO CE DE EQUIPOS A PRESIÓN

	NEW	NEXT100- TANQUE DE RECUPERACIÓN ACTUAL	TANQUE DE RECUPERACIÓN	BOTELLA DE RECUPERACIÓN
PRESIÓN	20 bar	15 bars	2 bar	130 bar
VACÍO	10 ⁻⁶ mbar	10 ⁻⁶ mbar	10 ⁻⁶ mbar	10 ⁻⁶ mbar
VOLUMEN	150 litros	3.000 litros	20.000 litros	60 litros

AC7M
(Tubería y Calderería, S.L.)
Trabajos en Acero Inoxidable y Acero Carbono

Los Mochos (Pol. Ind. Albolleque), 5
19160 ALBOLLEQUE, CHILOECHES, GUADALAJARA
Teléfono: 94.936.68.04

DENOMINACIÓN: CAMARA NEW

MODELO: ÚNICO **NORMA DE DISEÑO:** ASME VIII.DIV.1

CLIENTE: INSTITUTO DE FISICA CORPUSCULAR

VOLUMEN (V): 150 Litros **PESO TOTAL:** Kg

PRESIÓN MÁXIMA ADMISIBLE: 20 Bar

TEMPERATURA ADMISIBLE: Max. °C Min. °C

PRESIÓN DE PRUEBA NEUMÁTICA: 22 Bar **FECHA:** 21/05/2015

TIPO DE FLUIDO: XENON 135 **GRUPO:** 2

CE 1348

P X V (bar x L) 3000

CATEGORÍA III

MÓDULO G

CONTRASTE PT

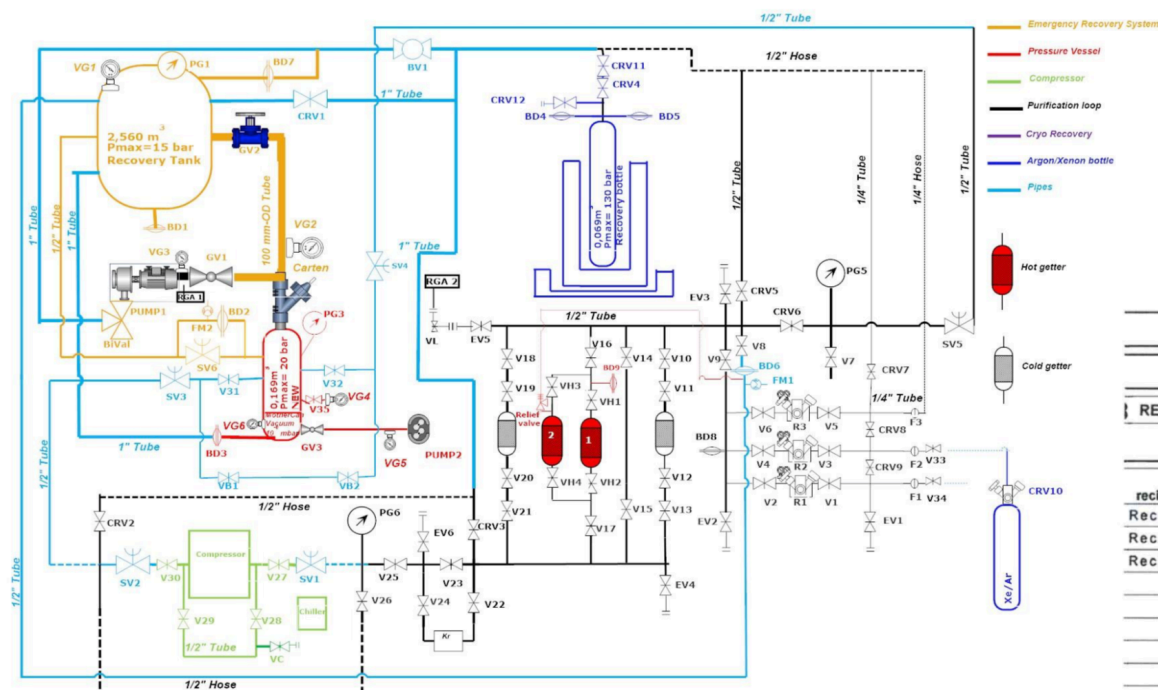
Nº FABRICACIÓN 140092

AÑO FABRICACIÓN 2014

PRUEBAS PERIÓDICAS

- Según ASME VIII-División 1
- Según la UNE EN 13445-3

4-INSTALACIÓN Y PUESTA EN MARCHA DEL SISTEMA DE GAS



Title: Gas System NEW



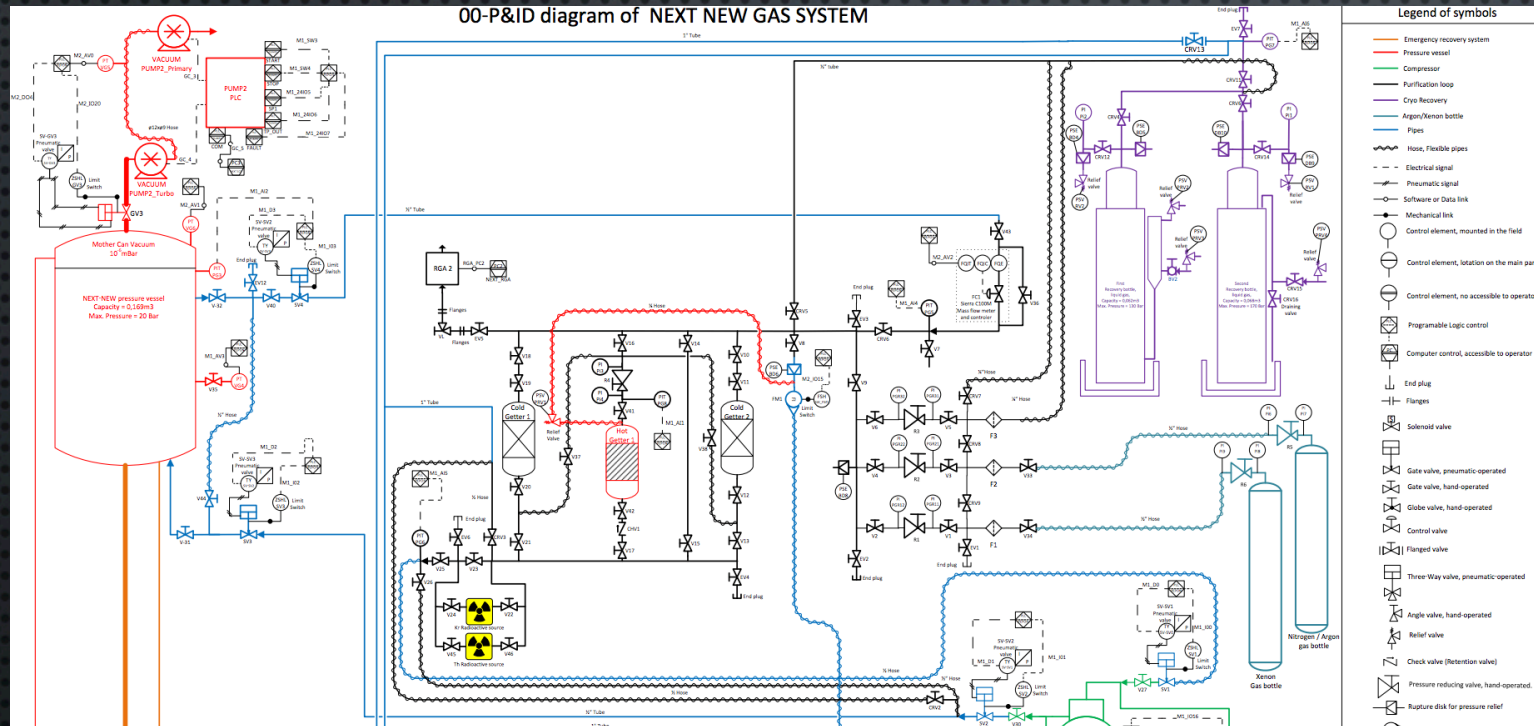
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5-ESQUEMA P&ID DEL SISTEMA DE GAS Y PROCEDIMIENTO DE TRABAJO



C. Normal cryogenic gas recovery (only for Xe)

-Before starting the stage “C-Normal cryogenic gas recovery” check that the valves are like show in the CHECK LIST
“B- Normal gas re-circulation”

- If the hot getter is working, “purifying”, follow the next steps to turn off
 - Open the manual valves V28 and V29
 - Press the button “purify/bypass” and wait until in the screen shows “bypass mode”. If there is an error, turn off manually the hot getter and call the technician.
 - Close the manual valves V28 and V29
- Select state A**, and wait until the green light with the OK label is switch on. (If the OK label is not on, call a technician).
- The Control System must:
 - Turn off the compressor
 - Turn off PUMPI
 - Close GV1

- The Operators and Control System have to check the following conditions are met:
 - OPEN: SV1, SV2, SV3, SV4 and SV5(green light)**

5. Close manual valves

V27	V30

- Manually close manual valves (ONLY if we want to use any cold gas purifiers)

V11(V19)	V12(V20)

- Fill the recovery bottle's cryogenic bucket with liquid nitrogen and insure that the recovery gas bottle has cooled sufficiently.** Follow the instructions defined in the specific NEXT Process Procedure NEXT_NEW_012

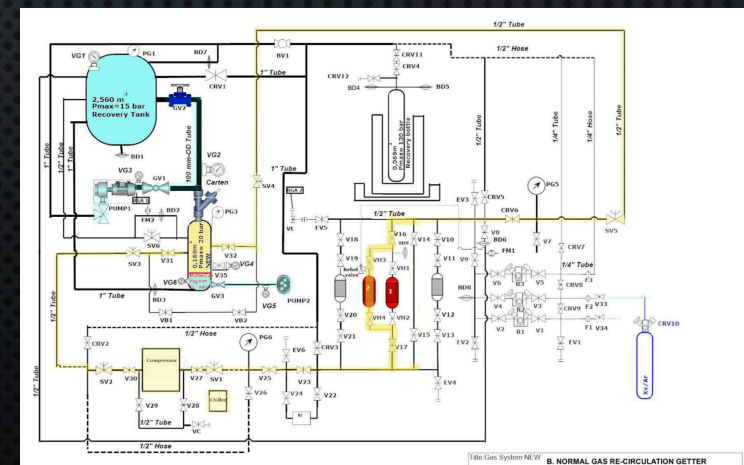
8. Open manual valves in the order give

CRV2	CRV3	CRV5	CRV11	CRV4	V26

- Wait until the pressure in the main vessel has fallen to around 100 mbar absolute

10. Close the valves

CRV4	CRV11

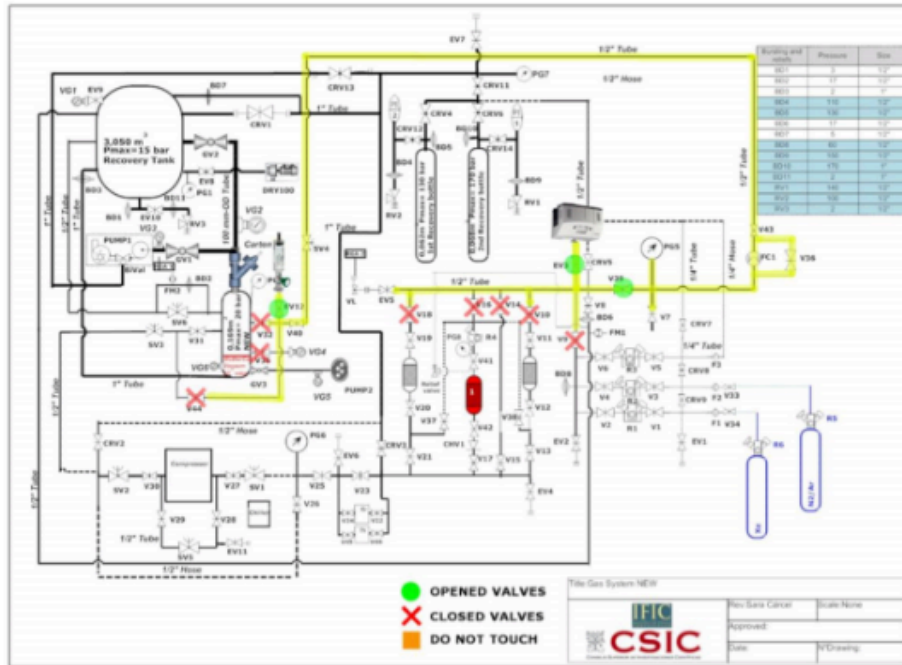


6-ANÁLISIS DE CRITICALIDAD DE FALLO

7	Component	Carten Valve											
	Failure Mode	Potential Effects of Failure	S	Potential Causes of Failure	O	Criticality	Existing Preventive Actions	Recommended Preventive Actions	Responsibility & Target Completion Date	Action Results			
										Actions Taken	S	O	RISK
11	Carten valve does not open in an emergency evacuation	Less effective emergency evacuation of depleted Xe gas	III	Carten valve failure , No pneumatic pressure available	D	Tolerable	(1) In case the carten valve does not open, there's an alternative though less effective evacuation path: 8D2-SV6. (2) A pressurized air tank for NEXT and a pneumatic system with regulators have been installed. If the pressure of the air tank is low, the control system sends emails to the Shifter to solve that manually.				III	D	Tolerable
8	Component	Pneumatic valves											
	Failure Mode	Potential Effects of Failure	S	Potential Causes of Failure	O	Risk score	Existing Preventive Actions	Recommended Preventive Actions	Responsibility & Target Completion Date	Action Results			
										Actions Taken	S	O	RISK
12	Not enough pneumatic pressure at the valves	Re-circulation stops because all the valves will close.	III	Pneumatic pipe disconnection, NEXT's pneumatic system failure	C	Tolerable	(1) A pressurized air tank for NEXT and a pneumatic system with regulators have been installed. If the pressure of the air tank is low, the control system sends emails to the Shifter to solve that manually. Valves are closed if not enough pressure is present. In case of failure will place the system into a safe state. Additionally, the compressor will be shut down from the Control System.				III	C	Tolerable
13	No 24 VDC voltage available to actuate the valves	Re-circulation stops because all the valves will close and compressor and chiller will stop operation	III	Power supply in cRIO fails, Cable disconnection	C	Tolerable	(1) An UPS is available for the cRIO chassis (Control System). In case of failure will place the system into a safe state (detected with limit switches). Additionally, the compressor will be shut down from the Control System.				III	C	Tolerable
9	Component	Main power											
	Failure Mode	Potential Effects of Failure	S	Potential Causes of Failure	O	Risk score	Existing Preventive Actions	Recommended Preventive Actions	Responsibility & Target Completion Date	Action Results			
										Actions Taken	S	O	RISK
14	Power failure	Loss of: monitoring, acquisition and control of the experiment.	III	LSC without power	A	Intolerable	Upon mains AC power failure, the Gas System automatically brought by default to the Safe	3	Control System(CompactRio chassis)	Potencial effect of failure	Unknown state of te gas system	Failure m	
								3	Power supply fails		False resp		
								4	Hardward cabling failis and cRIO program and logic fails	Rare events (like open/close valves where we could lose the gas, lost of communication,...)	Ruptu		
										False rep			
								5	Pressure Vessel	Potencial effect of failure	Failure m		
								7	Vessel rupture	Explosion	Leakin		
								6	Compressor	Potencial effect of failure	Failure m		
								8	Power fail	Gas re-circulation is stopped	No Flic		
								9	Hydraulic Oil leak	Compressor stops and re-circulations stops	No Out		
								10	Chiller failure	Compressor is stopped	No Flic		
								7	Carten Valve	Potencial effect of failure	Failure m		
								11	Carten valve does not open in an emergency evacuation	No effective emergency evacuation of depleted Xe gas	Stuck Cl		
								8	Pneumatic valves	Potencial effect of failure	Failure m		
								12	Not enough pneumatic pressure at the valves	Re-circulation stops because all the valves will close.	Stuck Cl		
								13	No 24 VDC voltage available to actuate the valves	Re-circulation stops because all the valves will close and compressor and chiller will stop operation	Stuck Cl		
								9	Main Power	Potencial effect of failure	Failure m		
14	Power failure	Loss of: monitoring, acquisition and control of the experiment.	Data lo										
10	System	Potencial effect of failure	Failure m										
15	Fire	Gas heats up and causes overpressure	Fire										
11	Hot getter	Potencial effect of failure	Failure m										
16	Exothermic reaction	Gas inside the getter heats up and causes overpressure, venting hot gasses (>400°C) through the relief valve	False resp										

	Severity	Probability of occurrence <i>Cr</i>	Risk Classification
Fire	<i>I</i>	$2,51*10^{-4}$	High risk- Undesirable
Electrical shock	<i>II</i>	$5,26*10^{-4}$	Medium risk- Tolerable

7-DETECCIÓN DE FUGAS A PRESIÓN Y VACÍO



Test a vacío

- El background de Helio en el test a vacío es de 5E-11 mbar l/s durante todo el test.
- Se detectan niveles de fuga en los VCR menores de 5E-10 mbar l/s. Valor admitido como válido para este tipo de uniones.
- El resto del sistema presenta valores por debajo del background.

Test a presión (100 bar)

- El background de Helio con autocero es de $1\text{E}-8$ mbar l/s, se utiliza el método de Sniffer.
- El sistema no presentaba fuga alguna por encima del nivel de background.



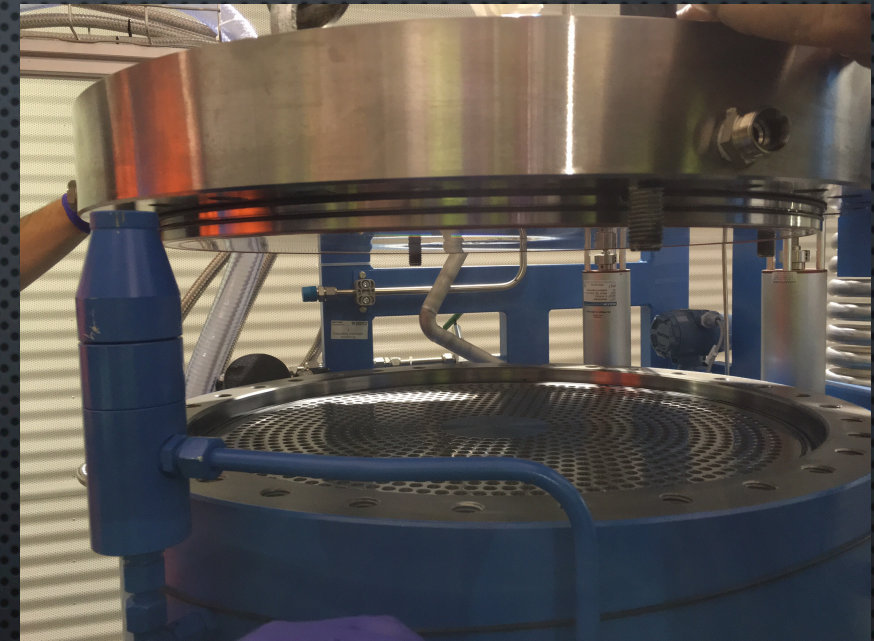
8-MANTENIMIENTO DE EQUIPOS



Maintenance equipment NEW

2017

Compressor		Model	SERA	
		Maintenance Kit location	Oil in the wastes room-Kit in the platform	
Location	Frequency/maintenance	Action	Estimate operation date	Operation date
In the platform	At least once a year	Change the oil Diaphragm set replacement	1/6/17	9/2/17
Notes				
Person in charge and signature	Sera Company by Oliver Blank			
PUMP3		Model	nxd20i	
		Maintenance Kit location	In the gas system cupboard	
Location	Frequency/maintenance	Action	Stimate operation date	Operation date
In the platform	12 months	Inspect and clean the inlet strainer, the external fan cover if required	25/7/17	
Notes				
Person in charge and signature				
Chiller		Model		
		Maintenance Kit location		
Location	Frequency/maintenance	Action	Stimate operation date	Operation date
In the platform	Every year	Change the glicol	9/11/17	
Notes				
Person in charge and signature				



GRACIAS POR SU ATENCIÓN