

# MARCO @ KEK



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PXD Workshop Hamburg  
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## Outline:

- > Safety Clearance
- > Transport
- > Installation
- > Commissioning
- > Performance
- > CO2Lean @ Desy



# Safety Clearance – Pressure relief valve, Limits

- Replace the safety valve: 120bar → 80bar
- Change software interlocks to avoid any pressure above 80bar



		new:	
CSM_CO2_HP_AA	CSM_PT_MAX > 90.0 <b>Action</b> : Warning Indication	72.0	Any pressure too high W
CSM_CO2_HP_AA	CSM_PT_MAX > 95.0 <b>Action</b> : CSM_CO2 FS	76.0	Any pressure too high FS
CSM_EH119_HT_AA	CSM_TT119 > 105.0 <b>Action</b> : Warning Indication	105.0	Accumulator heater temperature too high W
CSM_EH119_HT_AA	CSM_TT119 > 110.0 <b>Action</b> : CSM_EH119 TS	110.0	Accumulator heater temperature too high TS
CSM_EH119_HP_AA	CSM_PT119 > 68.0 <b>Action</b> : Warning Indication	68.0	Accumulator heater pressure too high W
CSM_EH119_HP_AA	CSM_PT119 > 70.0 <b>Action</b> : CSM_EH119 FS	70.0	Accumulator heater pressure too high FS
CSM_PM101_HP_AA	CSM_PT103 > 85.0 <b>Action</b> : Warning Indication	72.0	Pressure after pumps too high W
CSM_PM101_HP_AA	CSM_PT103 > 90.0 <b>Action</b> : CSM_PM101 FS	76.0	Pressure after pumps too high FS

## Safety Clearance – Pressure Test

- > Each component should keep shape at 240bar (proved with samples).
  - > Assembled system should be tested with 100bar(gas) or 120bar(liquid).
  - > Leak test with 60 bar gas.
- (Toru Tsuboyama, Prof. Kimura)

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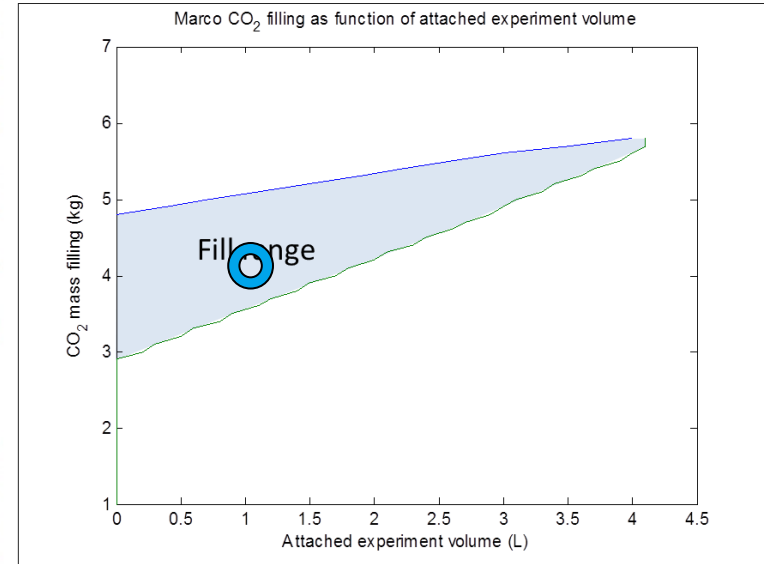
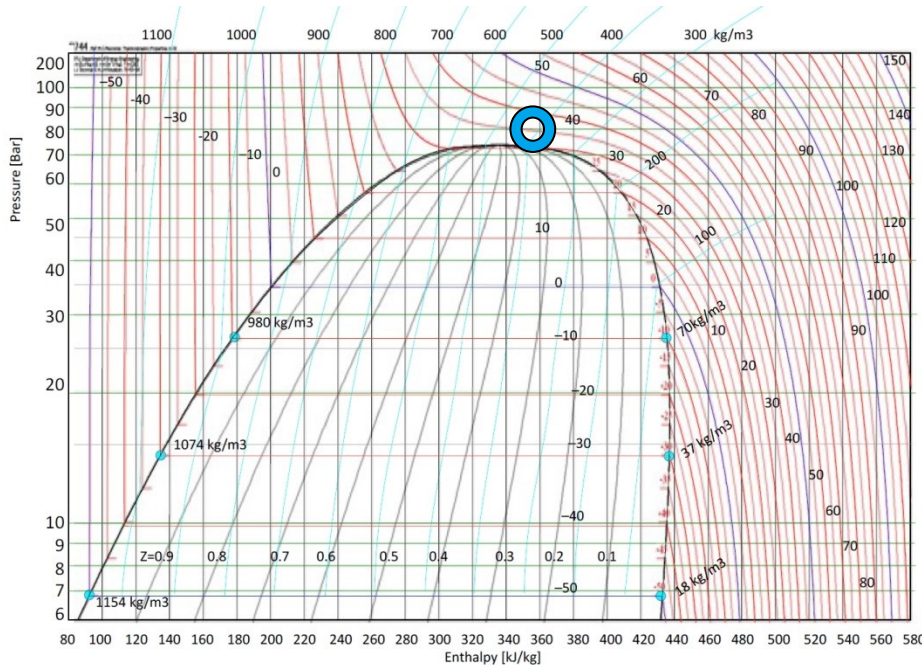
- Done for MARCO
- and HNP pump refit.
- To be repeated for Distributor.



# Safety Clearance – Overpressure

- Maximum amount of CO<sub>2</sub> to be filled in the accumulator to avoid overpressure at 35°C:

$$\rho_{\max}(80\text{bar}, 35^\circ\text{C}) = 420 \text{ kg/m}^3, V_{\text{MARCO}} = 10\text{L}, m_{\text{CO}_2} = 4,2\text{kg}$$



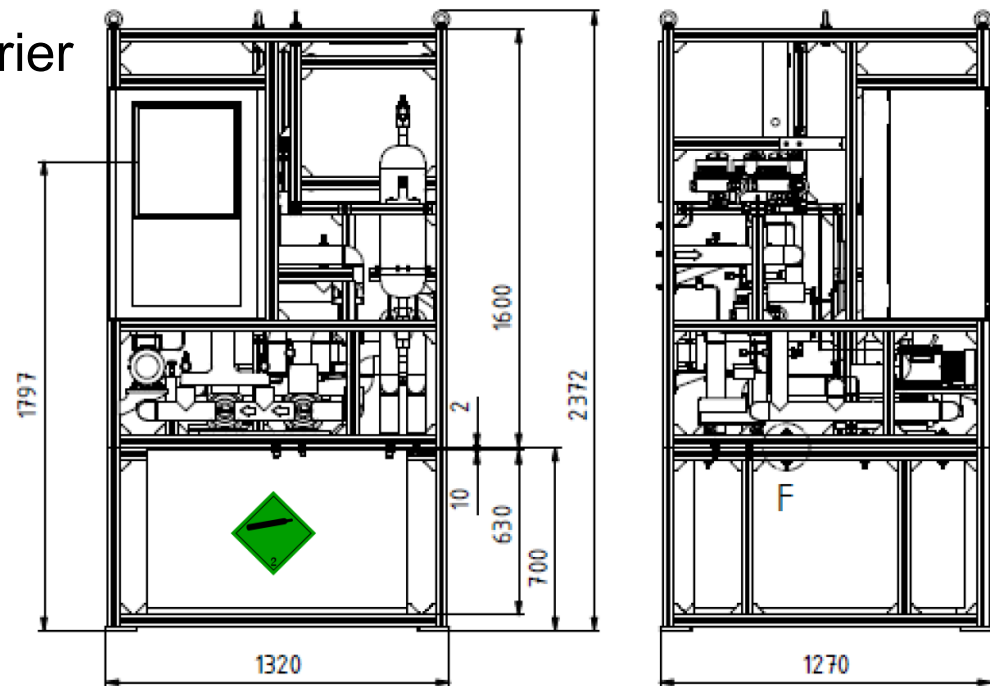
- Low value but still within fill range.

# Transport

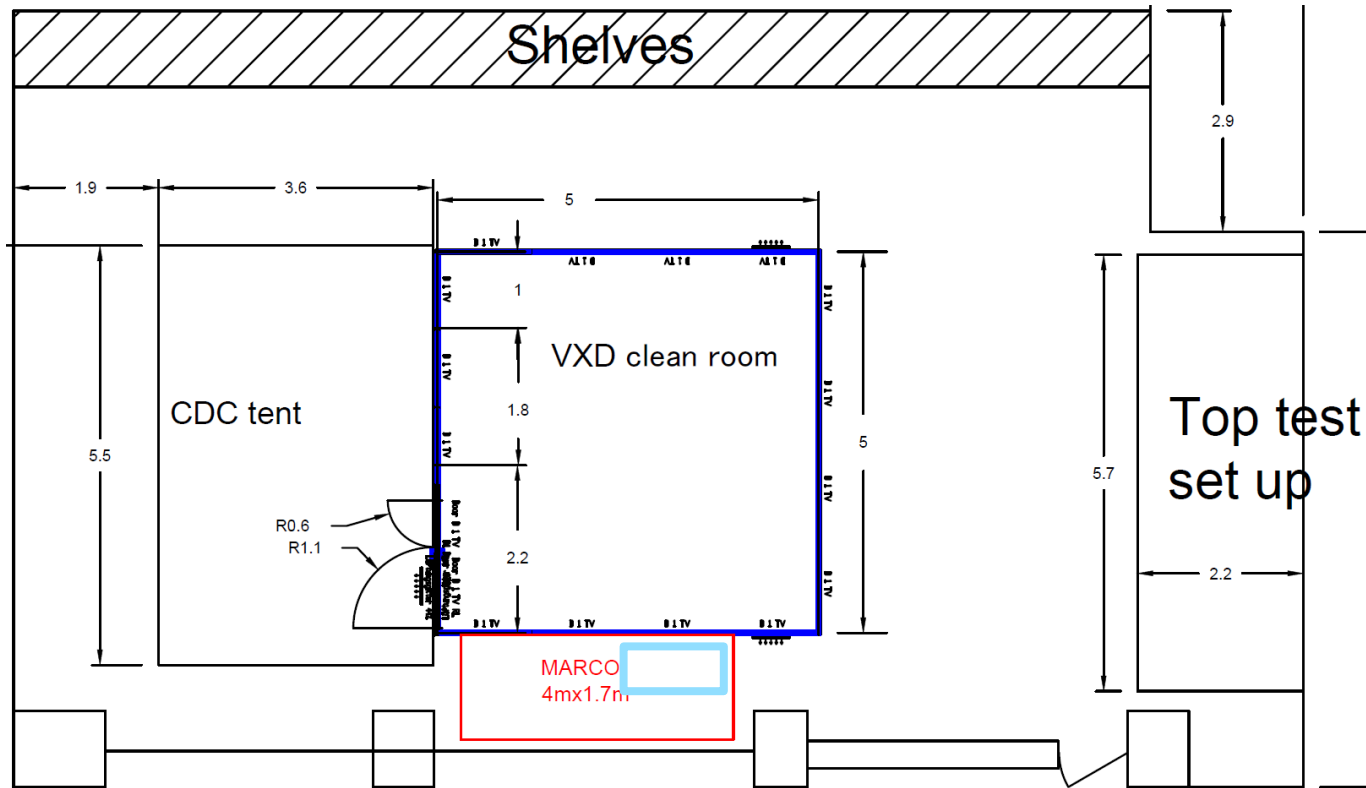
MARCO and Distributor with 12 flex lines, PC, cables ...

- KW4: Disassemble
- KW5: Move to shipping department, declare and package
- KW6: Shipping by air freight carrier
- KW7-8: Install and commission

➤  $H_{\max} = 2630\text{mm}$



# Installation + Commissioning

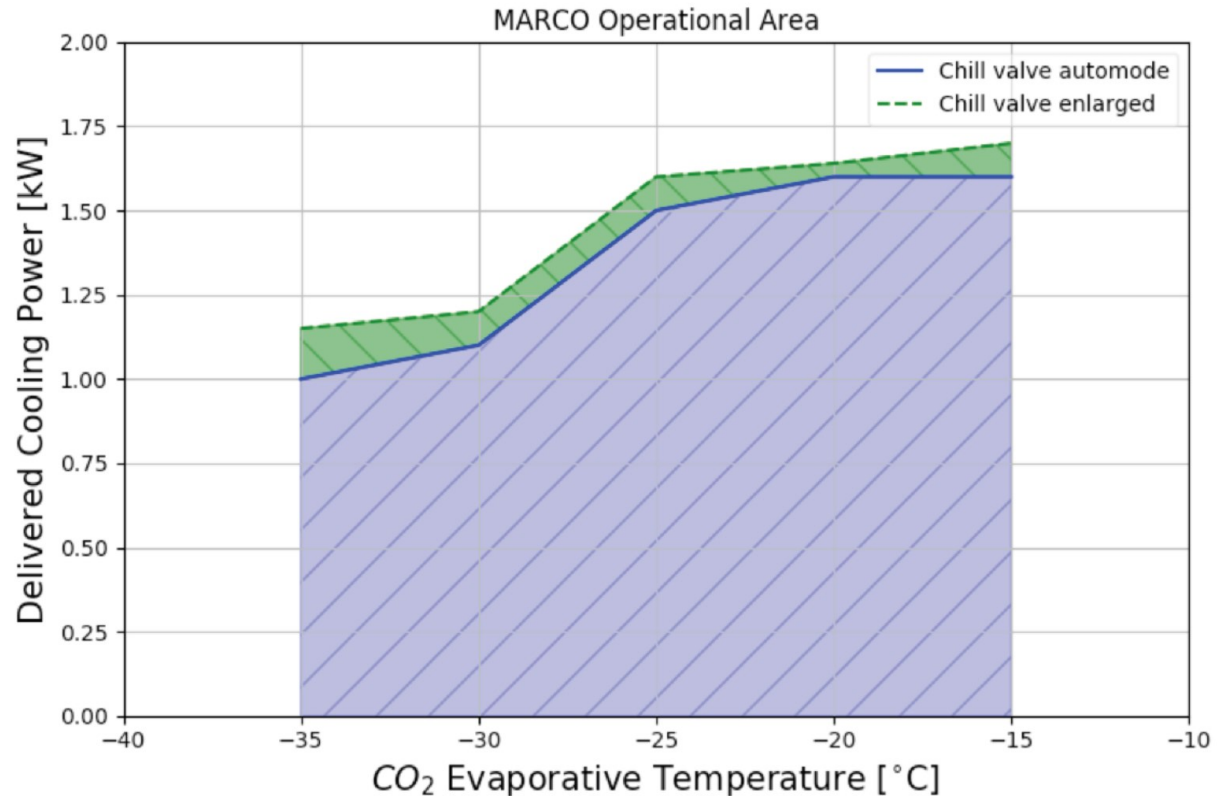


- > Due to the clean room cooling solution  
**MARCO** maybe placed 10m away together with an air2water cooler.
- > **Distributor** with 12 flex lines will stand next to CR (+ KEK Vacuum pump)
- > Transformer 400V/32A is available.



# Performance

- >  $\dot{m}_f = 2 \dots 12 \text{ g/s}$
- >  $p_d = 2 \dots 10 \text{ bar}$



- > Depending on Temperature set point and environmental heat intake MARCO could just cope with full VXD heat load.



# CO2Lean for PXD Half Shell Commissioning @ Desy

- from ETH Zürich
- TSP regulated by pressure valves
- well within  $\pm 0.3^\circ\text{C}$ .
- Cooling capacity 1,4kW @  $-20^\circ\text{C}$ .
- Slow ramping down and up ( $1^\circ\text{C}/\text{min}$ )
- is requested and getting implemented.
- KW7: Transport
- KW8: Installation



# Floor Plan Clean Room Hera West

