

# JUNCTION BOX STATUS

CPPM, November 16th 2000

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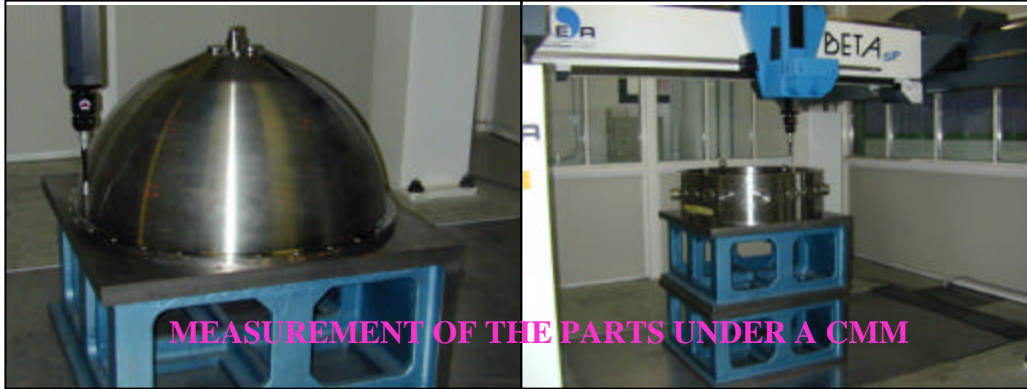
# Vessel manufacturing: final acceptance



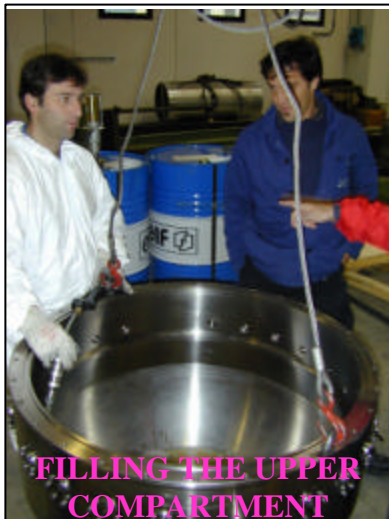
## INSPECTION RESULTS:

- local defaults on the diaphragm surface in contact with the O-ring: CORRECTIVE ACTION PRESCRIBED
- diaphragm thickness (17 mm instead of 15 mm): LONGER SCREWS REQUIRED
- O-ring groove depth (4.16 mm instead of 4.20 mm): O-RING SUPPLIER ACCEPTED IT
- ground anode penetrator hole larger than specified: ACCEPTED, AS DOESN'T INFLUENCE THE TIGHTNESS (ONLY FACE SEAL)
- penetrator holes roughness (1.1  $\mu\text{m}$  instead of 0.8 1.25  $\mu\text{m}$ ): ACCEPTED - RADIAL O-RING SHOULD GIVE ONLY A MINOR CONTRIBUTION TO THE GLOBAL TIGHTNESS

## Vessel hyperbaric tests: set up



MEASUREMENT OF THE PARTS UNDER A CMM



FILLING THE UPPER COMPARTMENT



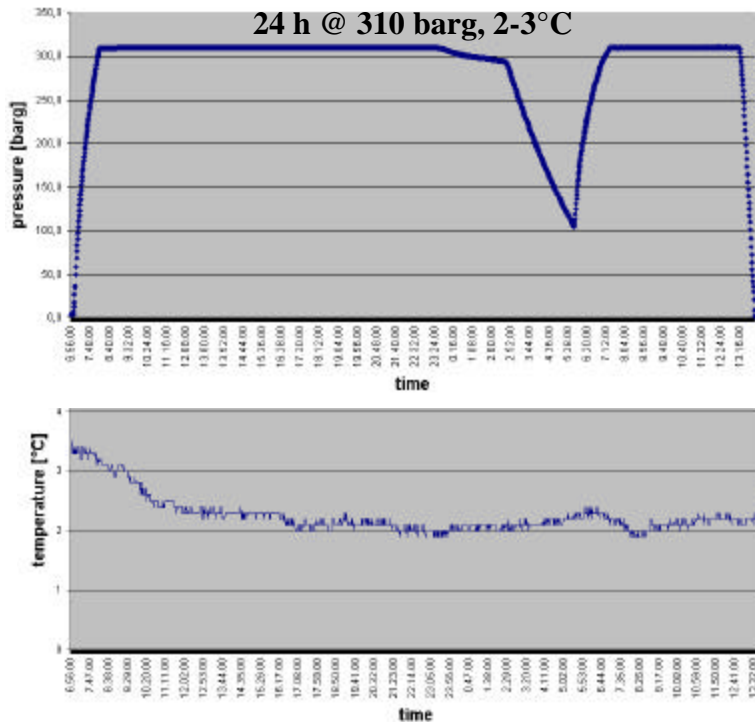
FLUXING THE LOWER COMPARTMENT



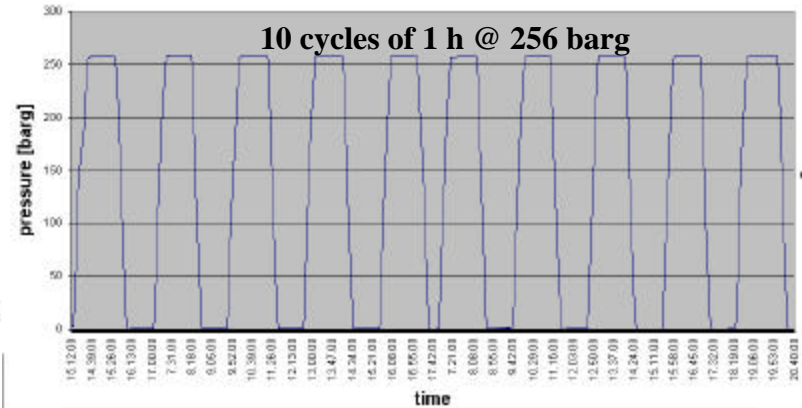
PUTTING THE VESSEL INTO THE HYPERBARIC CHAMBER

# Vessel hyperbaric tests: under load

Hyperbaric static test



Hyperbaric dynamic test



## REMARKS:

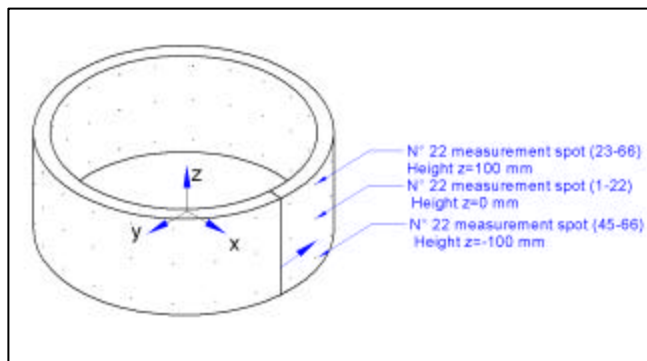
- static test: a temporary failure caused a pressure drop. Then we decided to extend the test in order to achieve the 24 hours @ 310 barg
- static test: we accepted the temperature to fluctuate between 2 and 3 °C

# Vessel hyperbaric tests: results summary

- **GEOMETRY COMPARISON:  
NO PERMANENT  
DEFORMATION DETECTED  
AFTER BOTH STATIC AND  
DYNAMIC TEST**
- **VOLUME REDUCTION OF A  
COMPARTMENT MEASURED:  
-2 dm<sup>3</sup> @ 256 barg**
- **NO MAJOR LEAKAGE  
DETECTED (INSIDE VOLUME  
SUBSTANTIALLY DRY)**
- **“SHADOW” UNDER THE  
DIAPHRAGM (IN THE O-RING  
JUNCTION AREA): MINOR  
LEAKAGE FROM THE UPPER  
COMPARTMENT?**
- **“SHADOWS” AROUND 2  
PENETRATOR HOLES:  
GREASE TRACES DIFFUSED  
IN THE DETECTING PAINT OR  
WATER FROM OUTSIDE?**

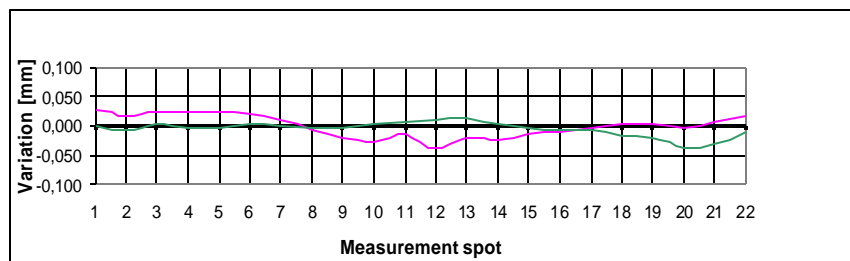
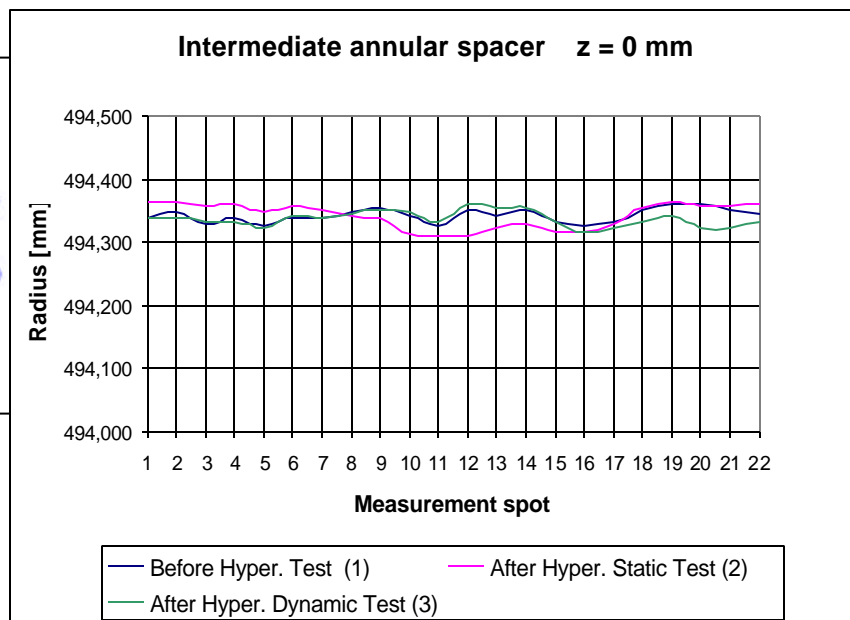


# Vessel hyperbaric tests: annulus measurements



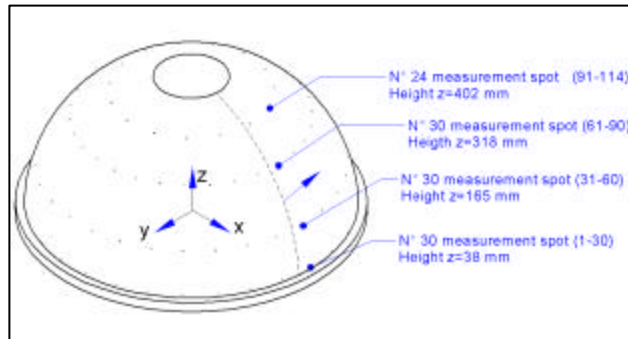
## REMARKS:

**DEVIATIONS NOT SIGNIFICANT**



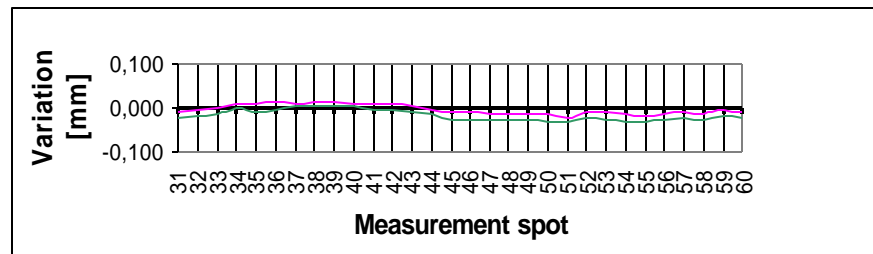
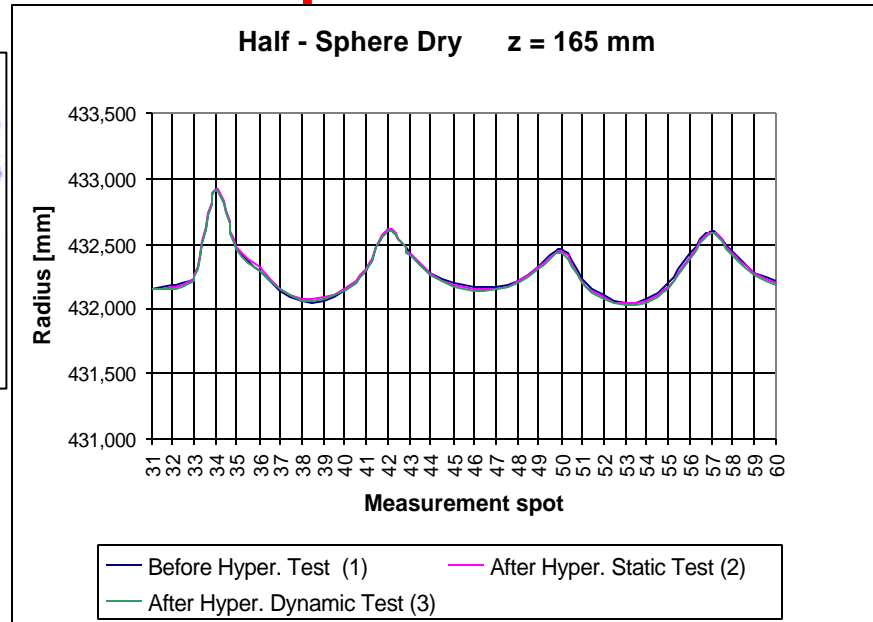


# Vessel hyperbaric tests: cap measurements

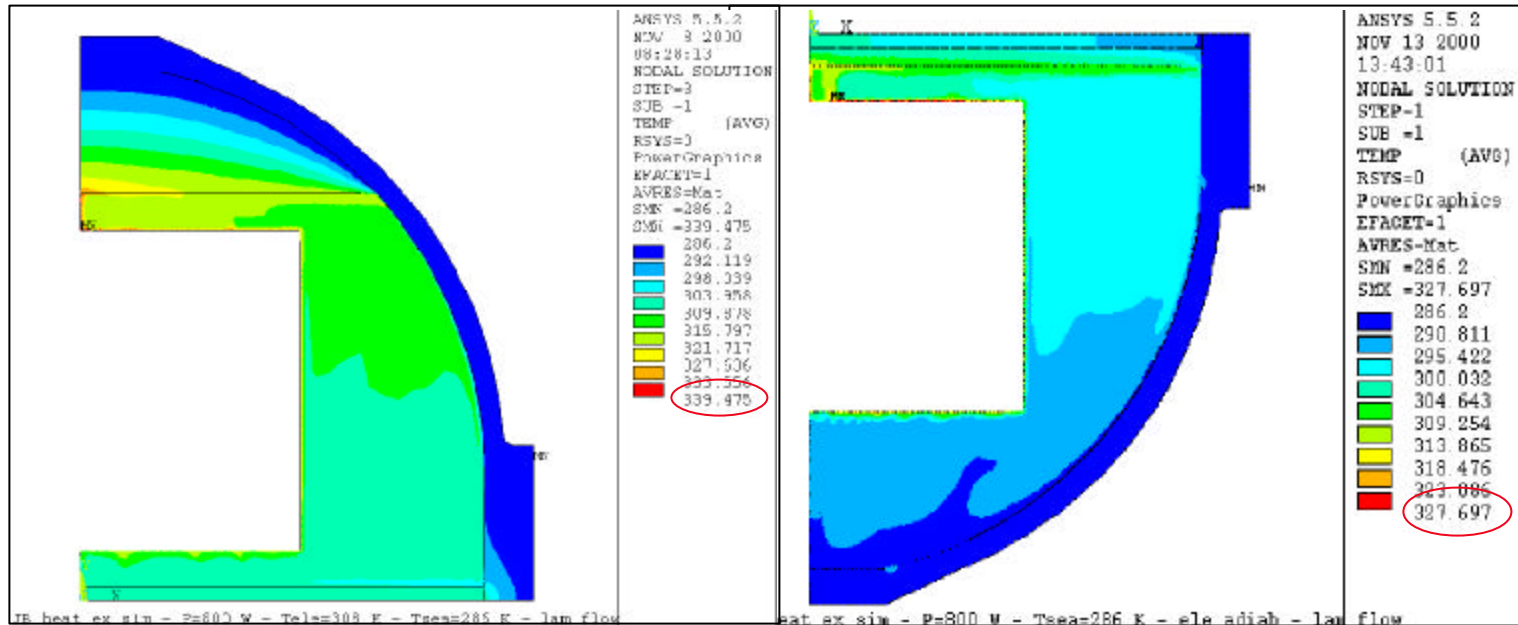


## REMARKS:

**DEVIATIONS NOT SIGNIFICANT**



# Vessel CFD simulations



## COMMENTS

- TRAFO IN THE UPPER COMPARTMENT: WORST CONDITION (MINIMUM ALLOWABLE LEVEL OF OIL)
- TRAFO IN THE LOWER COMPARTMENT: OIL LEVEL CAN'T DECLINE (NO LEAKS POSSIBLE)
- DIFFERENCE OF HIGHEST TEMPERATURES IN THE 2 CONFIGURATIONS: **12°C**



# Vessel future tests

**AFTER LAST EXPERIENCE, WE PLAN TO DO ENDURANCE TEST:**

- THE JB, IN ITS ACTUAL CONFIGURATION, IS EQUIPPED WITH **RESISTORS ON BOTH SIDES** TO SIMULATE THE HEAT DISSIPATION OF BOTH TRANSFORMER AND ELECTRONICS
- **TEMPERATURE AND AIR MOISTURE PROBES** ARE INSTALLED INSIDE, TO MONITOR BOTH TEMPERATURE AND MOISTURE LEVEL (BY MEANS OF ATMOSPHERIC MOISTURE MEASUREMENTS)
- **DETECTING PAINT** IS LAID OFF CLOSE TO THE JOINTS, TO HIGHLIGHT LEAKAGE
- THE JB IS PUT IN A TANK, THAT IS KEPT FILLED WITH **WATER @ 13°C**
- THERMAL LOAD AND PRESSURE OVER THE OIL **CAN BE CYCLED**, TO MAKE THE CONDITIONS MORE SEVERE
- THE TEST IS PLANNED TO GO ON FOR **A COUPLE OF WEEKS.**

