

Storage and transport box

Update

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End Cap meeting - mechanics

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Storage/testing box

Based on commercial boxes for electronic component transport in clean room made of antistatic and conductive plastic material (polipropilene PP)



External size: 80 x 60 x 12 cm

Internal size: 76 x 56 x 10.5 cm

The project is still evolving and we need due several prototypes to develop the simplest and best design.

Sizes



Maximum size: External size: 80 x 60 x 12 cm, Internal size: 76 x 56 x 10.5 cm
to compare with handling frame for outer HR 70 x 42 cm

Second Maximum size: External size: 60 x 40 x 12 cm, Internal size: 57 x 37 x 11.5 cm
to compare with handling frame for inner HR 45.5 x 29 cm

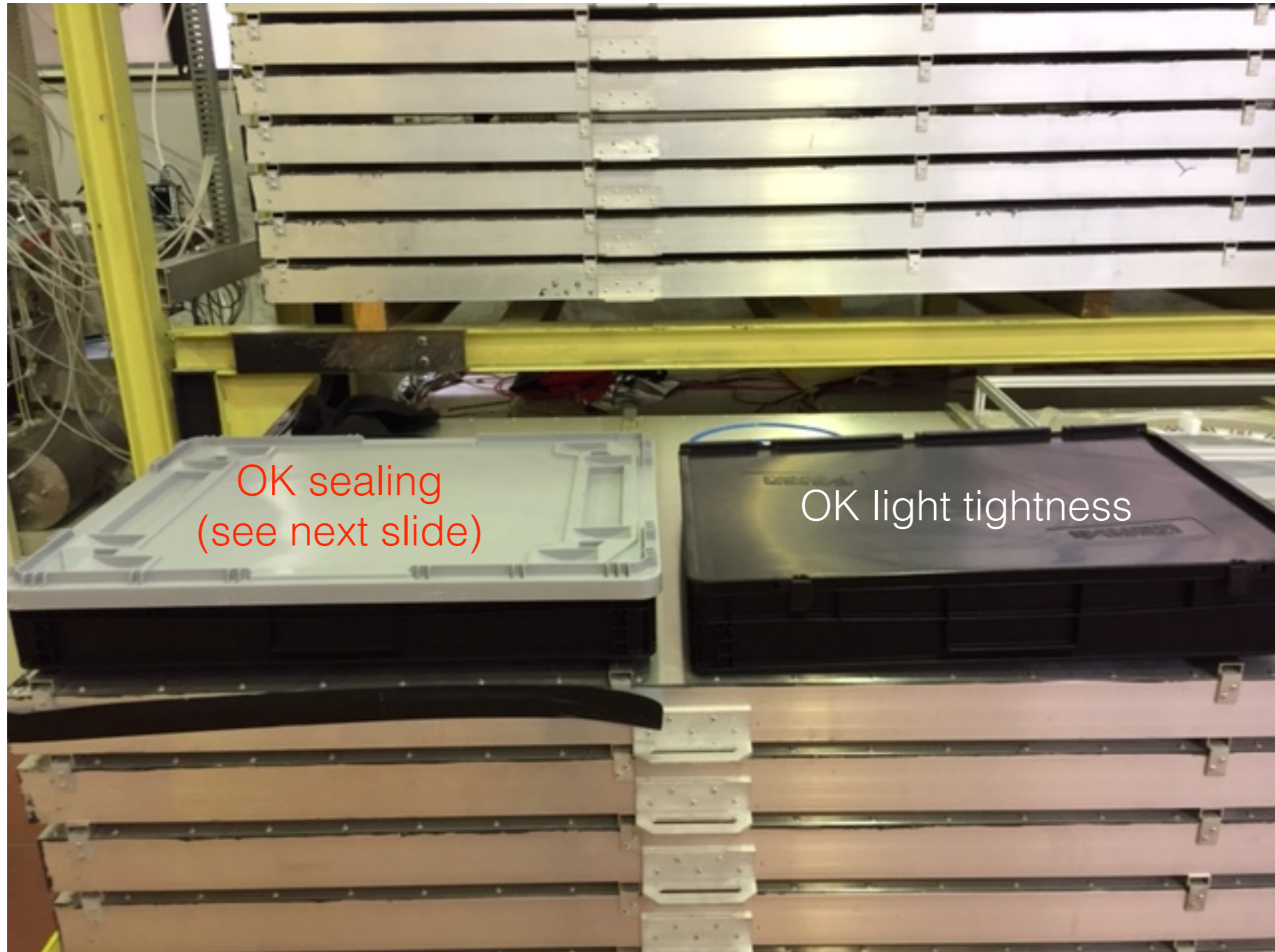
NB: No way to find larger ESD boxes. This is a requirement on the handling frame size.



Height for maximum size from
12 (10.5) cm up to 42 (40.5) cm
in steps of 10 cm. Otherwise
also 7.5 cm.

Useful if you want to put a
thermocamera on top

ESD box with covers



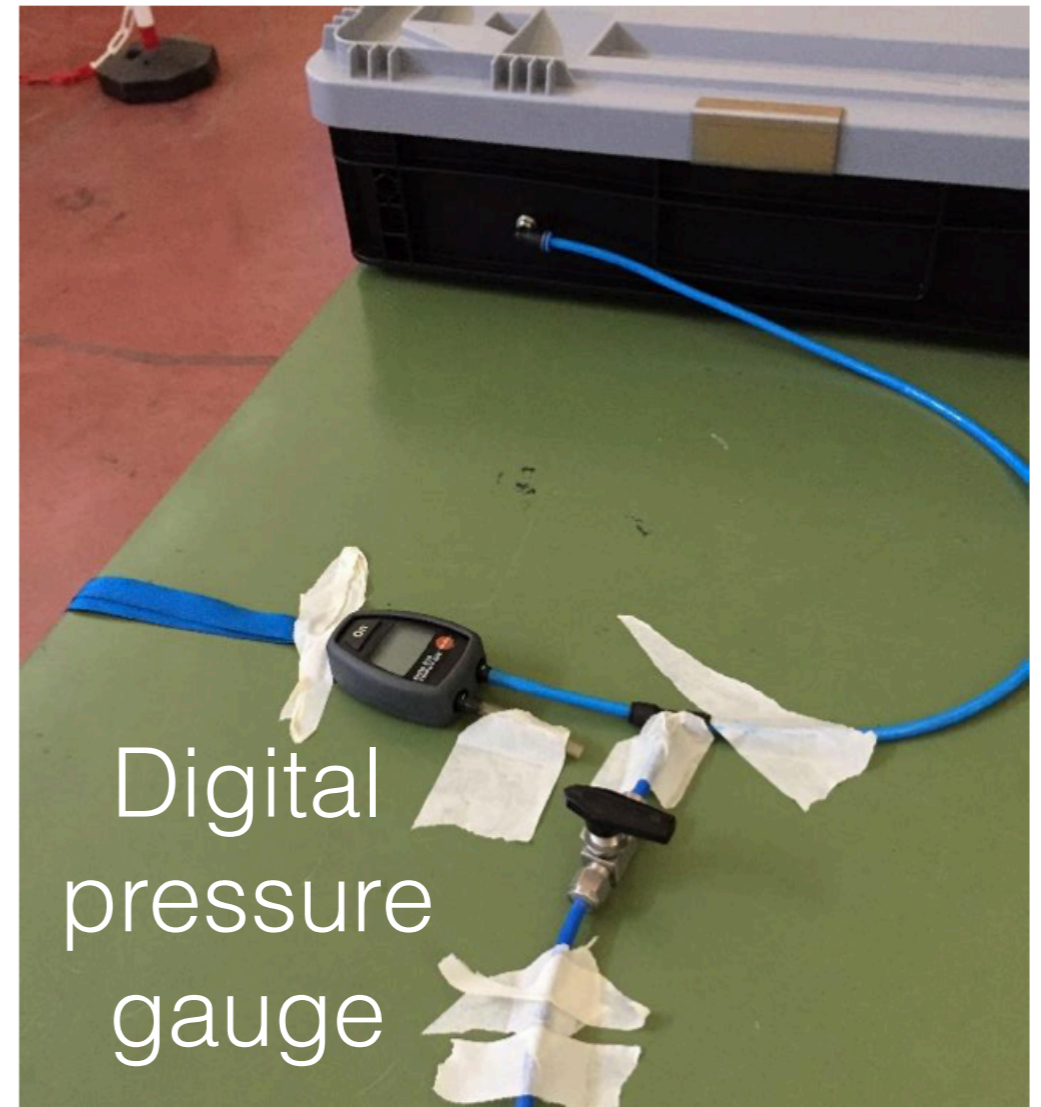
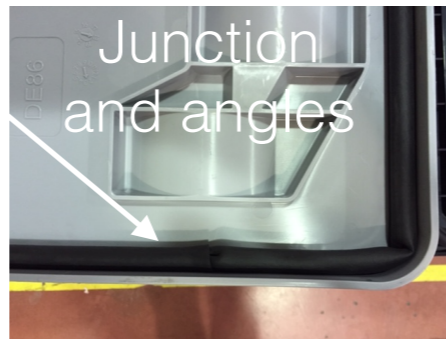
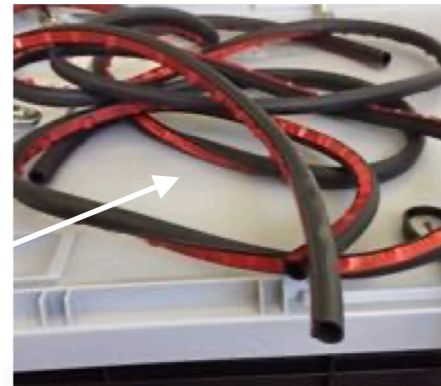
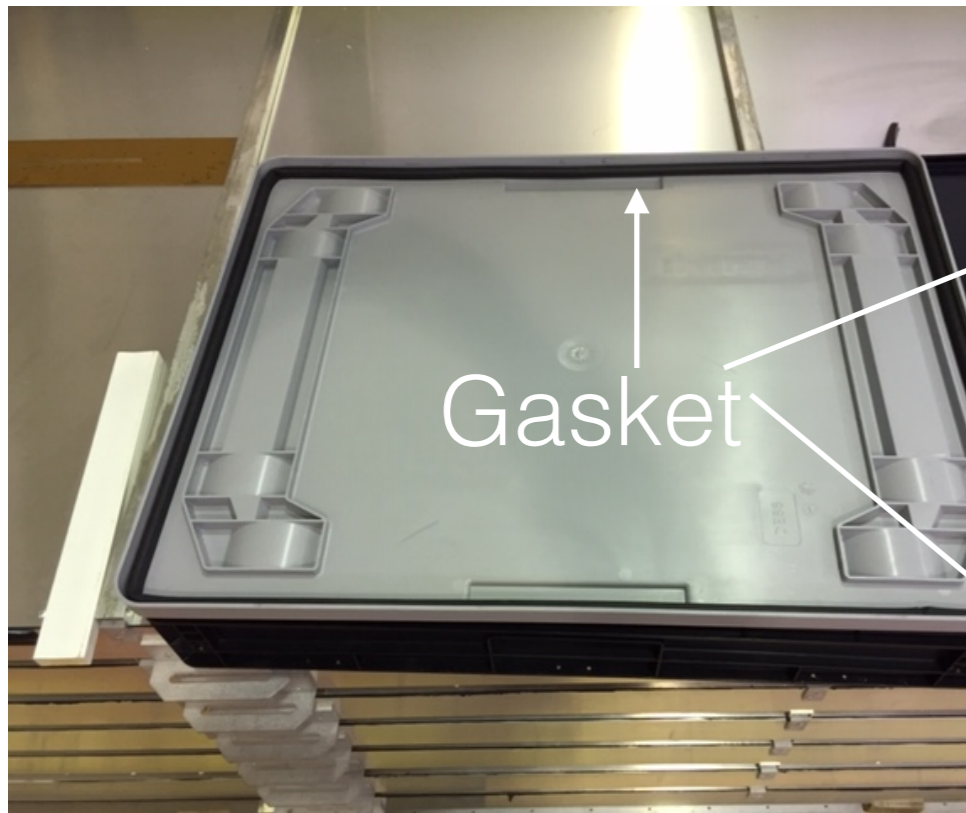
OK sealing
(see next slide)

OK light tightness

Cover separated from the box

Cover attached to the box

Leakage test

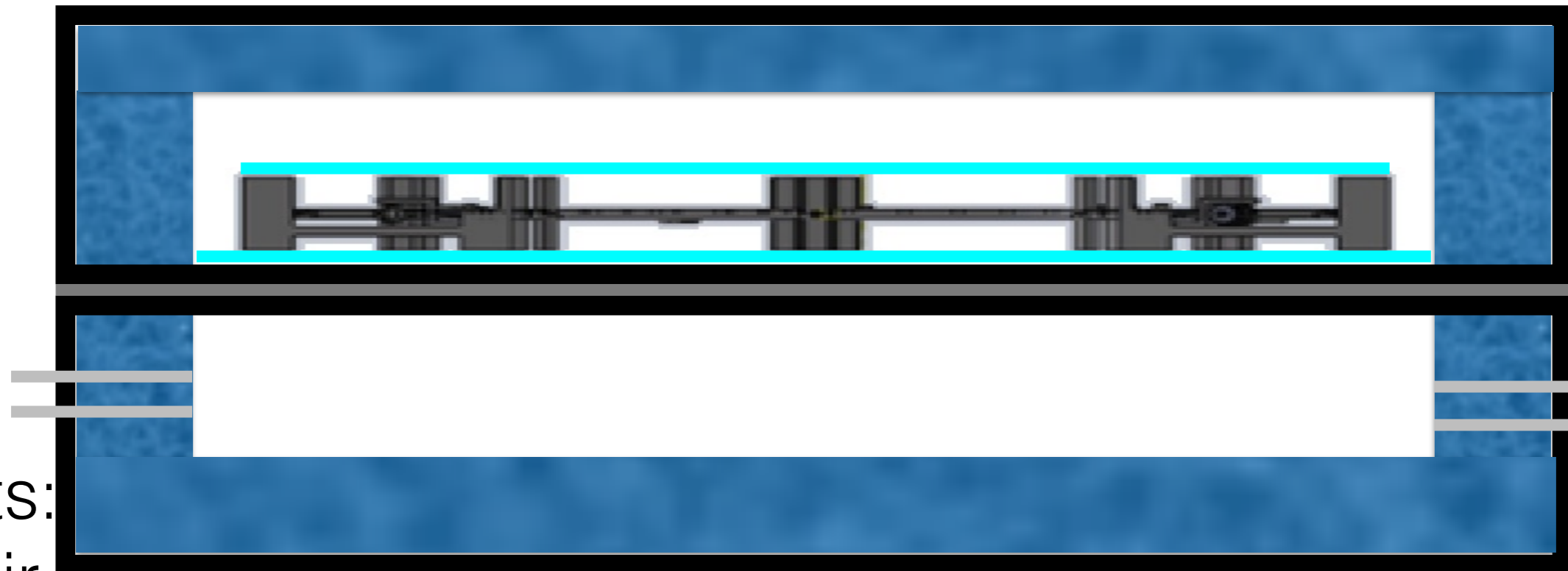


- ESD box material very nice to drill and connect gas tight circular connectors.
- Sealing test OK with ESD cover and 8 external vices.
- ESD covers are mechanically not enough rigid.

→
Go to the real proposal with two ESD box

Vertical section

Top cover ESD box
Top foam
Bosh frame
Top cover ESD acrylic
Gasket



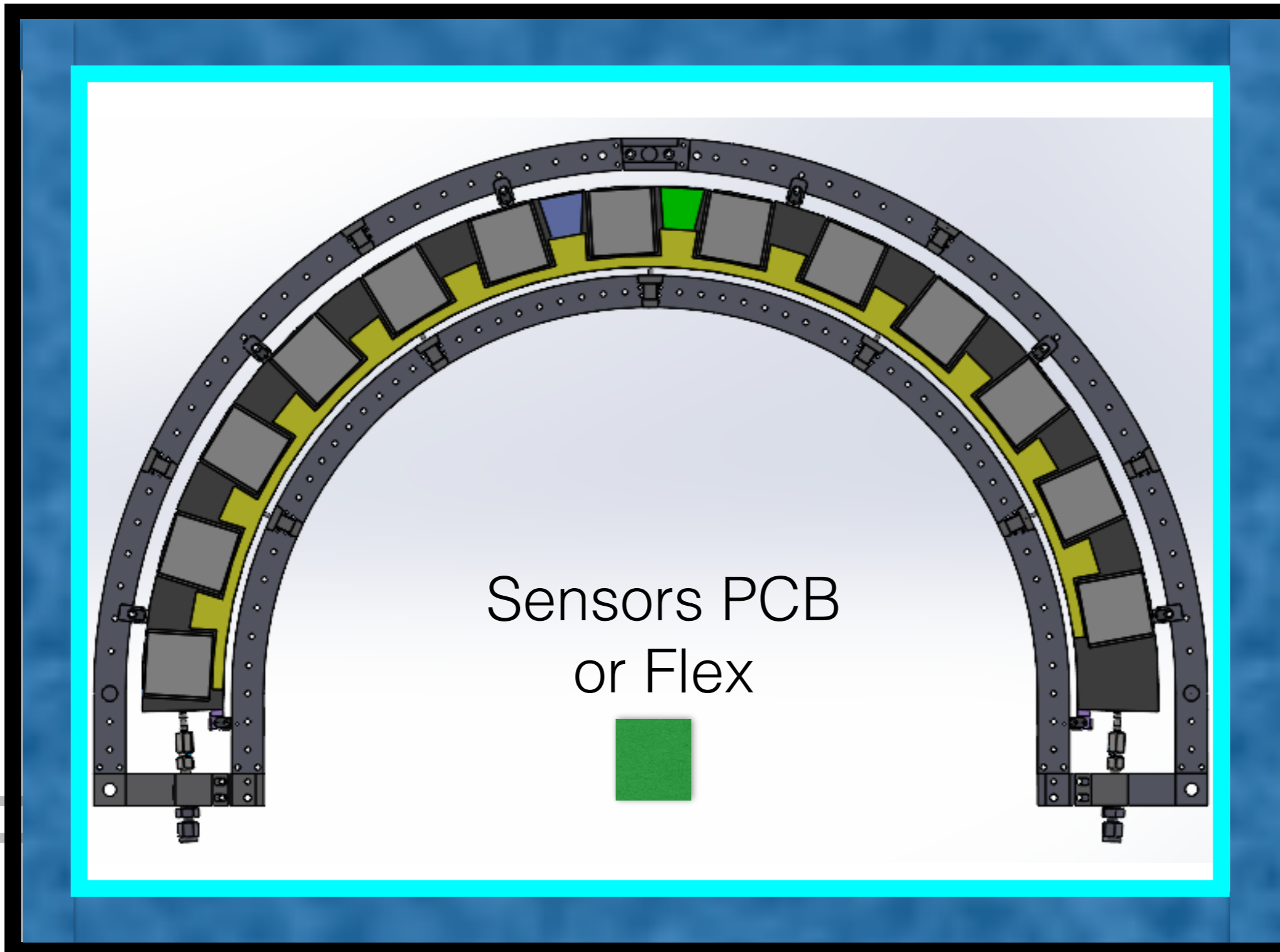
Outlets:
-dry air
-CO2

Inlets:
-dry air
-CO2

Gasket
Bosh frame
Bottom cover ESD acrylic
Bottom foam
Bottom cover ESD box

Horizontal section

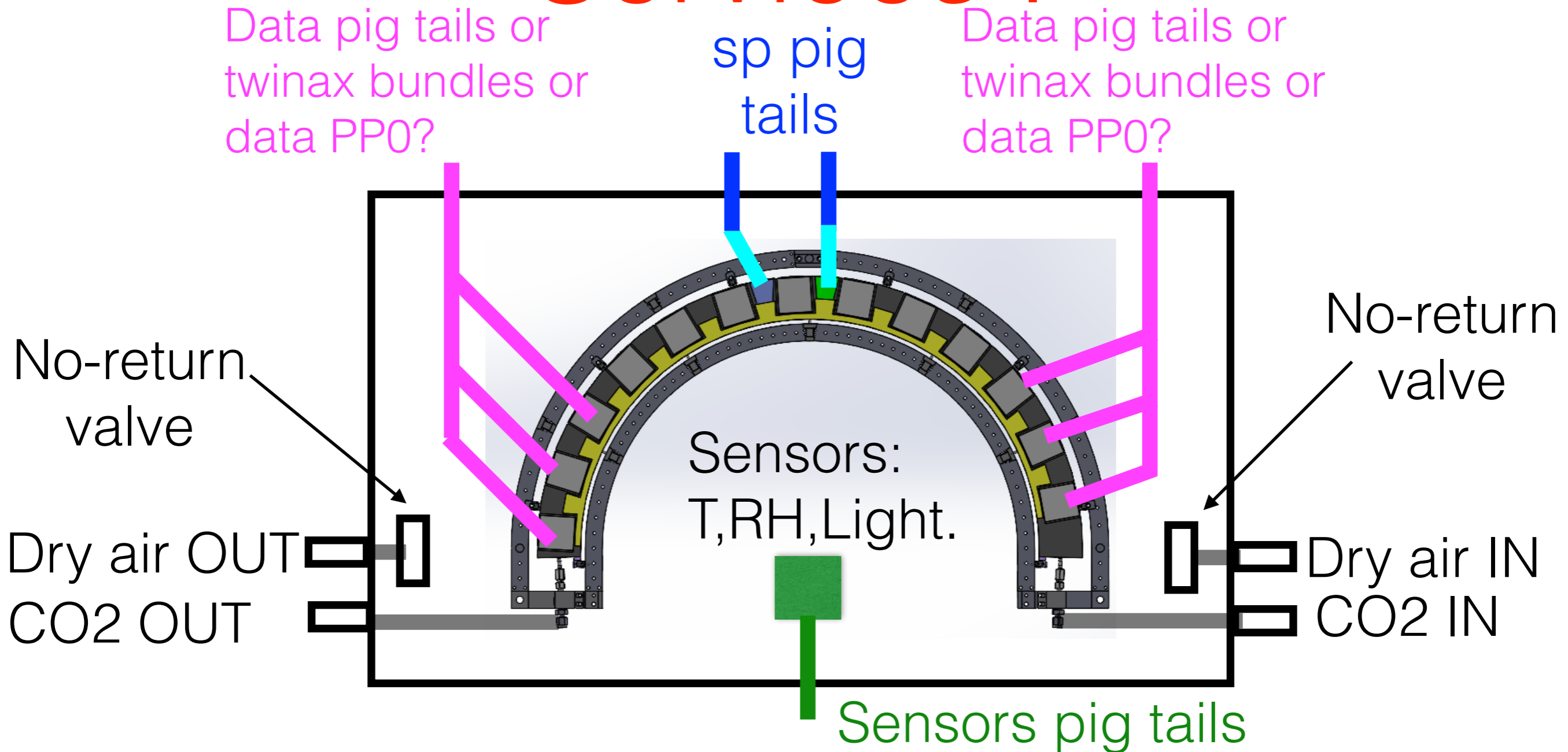
Inner size box 76 cm - handling frame outer hr 70 cm



3 cm thick foam for outer half-ring

Inner size:
-box 56 cm -
outer
handling
frame 42 cm

Services I



- All the services are one per box
- All the pig tails are to be defined
- All the external connectors are to be defined

Service II

Service are meant one for box to avoid too many opening and handling after loading.

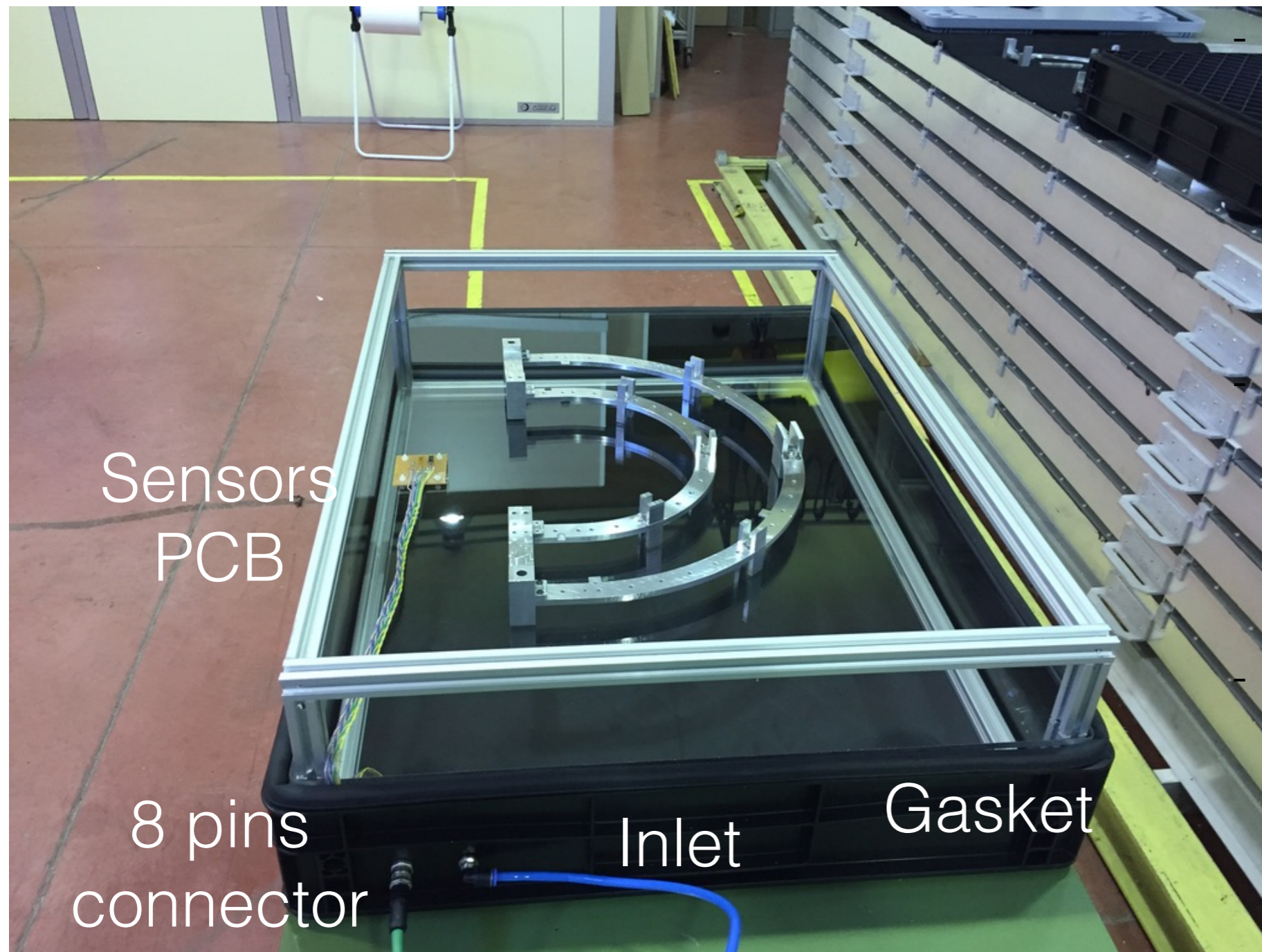
We have to contact people to understand:

- which piping and connectors for CO2 cooling could be used
- what is the situation about SP PP0 connectors and cables. What can be used and what must be developed for half-ring QC.
- which is the best way to readout data for half-ring QC:
 - Ad hoc made data pig tails. A modified version of the data pig tails.
 - Ad hoc made data PP0 different from final. A modified version of the data pig tails.
 - Final PP0
 - Ad hoc made twinax bundles. It looks a very expensive.

Water condensation in the box

- Likely the ESD box is water repellent enough to avoid condensation when dry air is fluxed and cooling with CO2 is ON.
- The foam could be a good one like armaflex
- Armaflex cost is about 200 euro/m²
- We need about $0.76 \times 0.56 \times 2 + (0.76 + 0.56) \times 2 \times 0.21 = 0.85 + 0.55 = 1.4$ m² about 350 euro/box
or for the smaller size box: $0.57 \times 0.37 \times 2 + (0.57 + 0.37) \times 2 \times 0.14 = 0.42 + 0.26 = 0.68$ m² about 137 euro/box
or cheaper foam.

First prototype

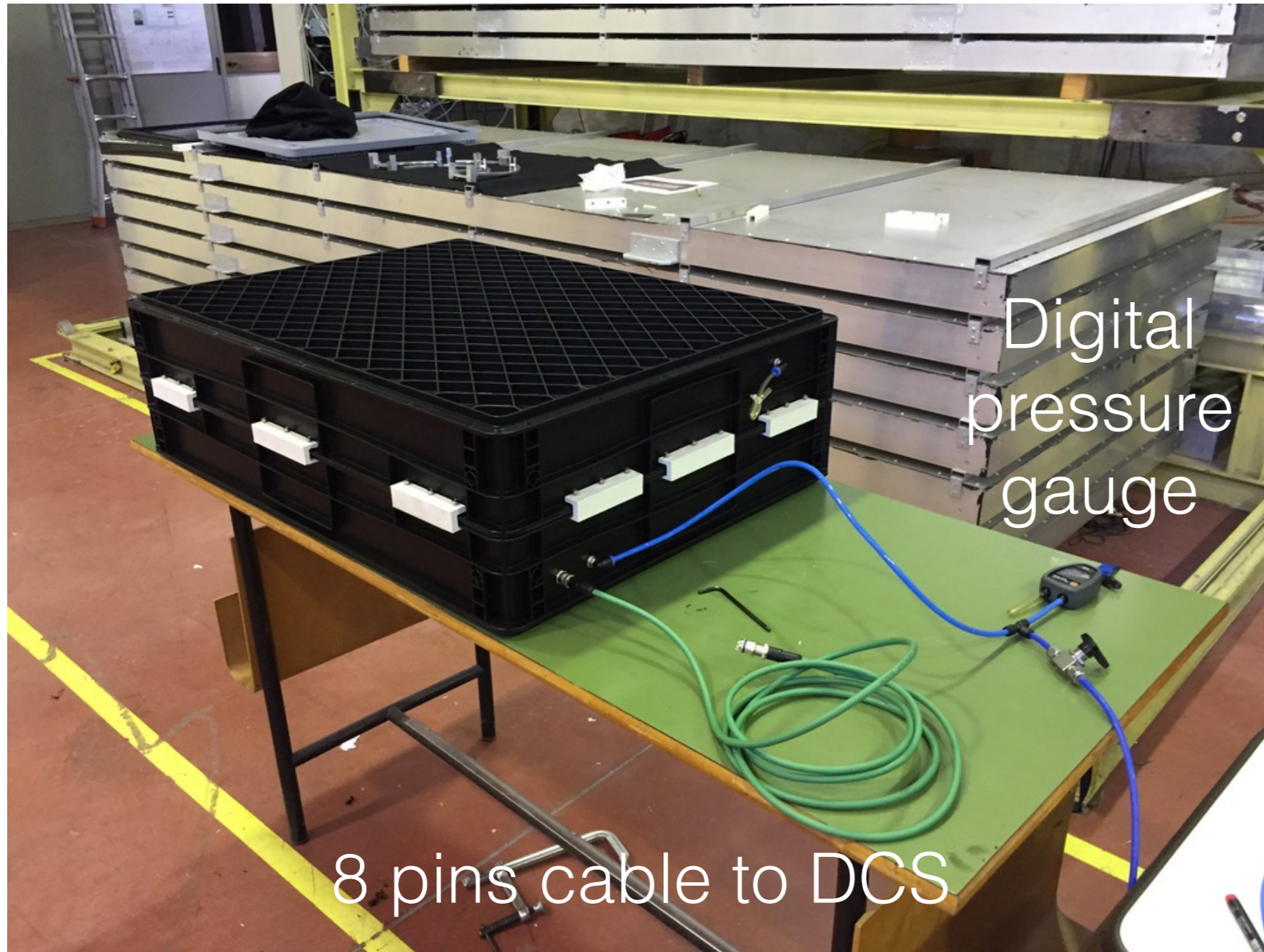


- ESD box material very nice to drill and make gas tight circular connectors

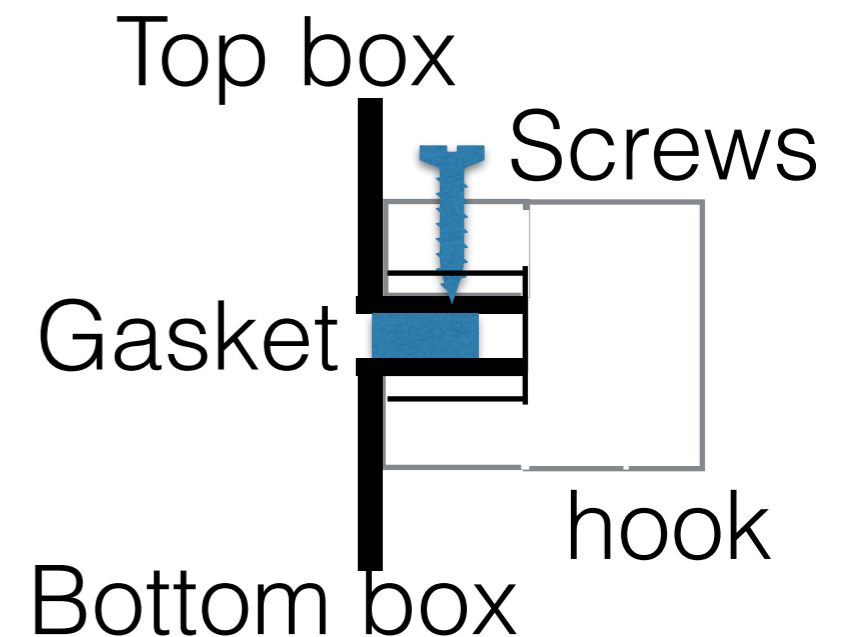
- Chosen gasket is OK for top cover but not optimal for top cover made with ESD box.

- Metallic frame and acrylic plate size must be reduced of 6 cm x 6 cm to fit 3 cm thick foam.

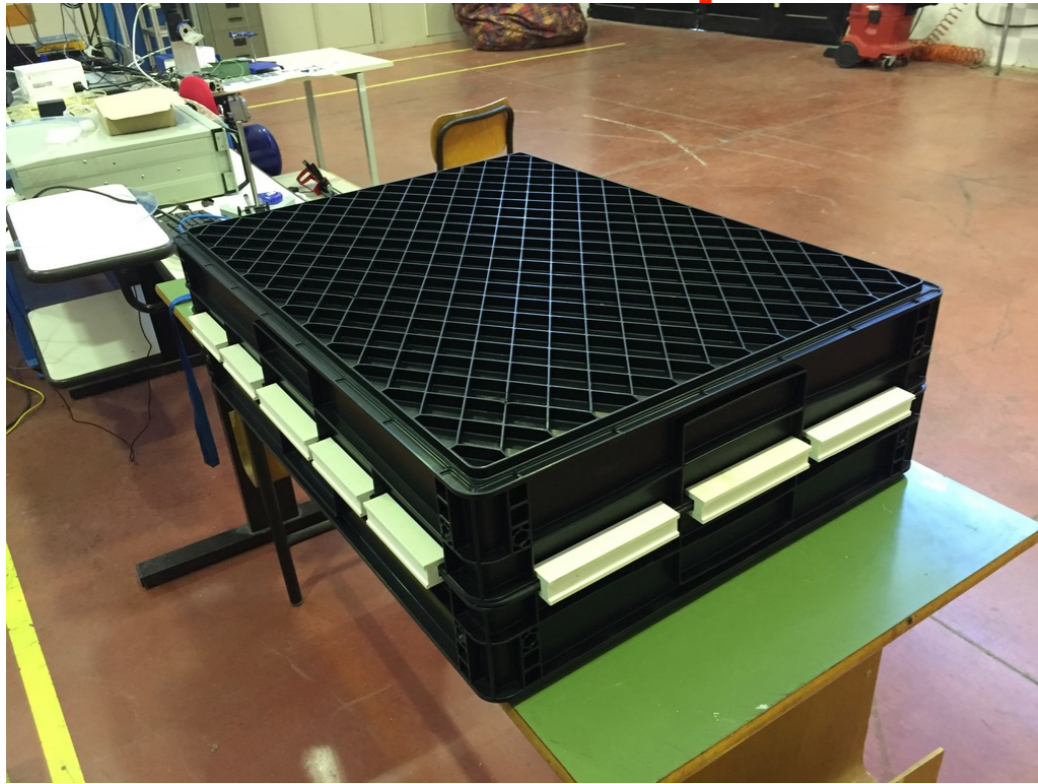
C-shaped closure hooks with screws



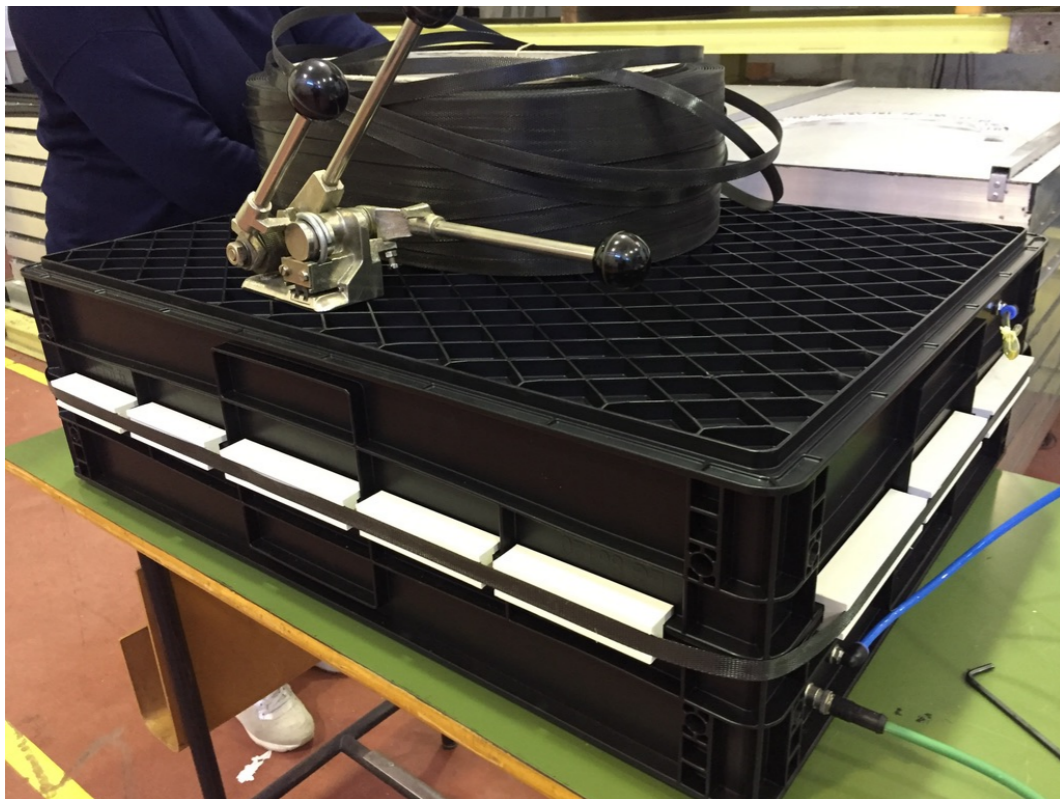
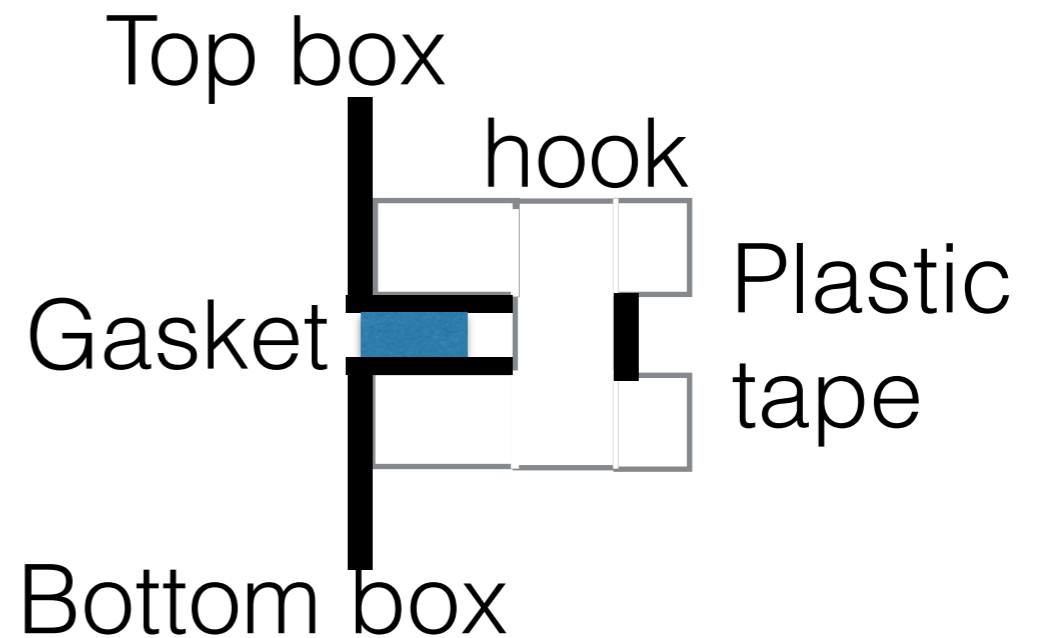
C shaped hooks made from plastic blocks to tight together the top and bottom boxes with screws



H shaped closure hooks



Asymmetric H shaped hooks made from plastic blocks to tight together the top and bottom boxes by pushing down the top and lateraly the plastic blocks.



Space for electrical service must be left.

Black plastic tape and strapping seal for final packaging



Transport box

Expensive commercial, hermetic, and pressurised box for scientific instrumentation, weapons, musical instruments.




In Lecce we have a box of 81 x 57 x 48 cm³
-Not large enough for
-storage box 80x60x12cm
-up to 3 storage box
60x40x7.5 cm


- Filled with foam
- Temperature logger
- xyz accelerations/
shocks logger

342euro+Taxes

MAX820

 880 x 660 x H483 mm
34.64 x 25.98 x H19.01 inch.

 820 x 600 x H450 mm
32.28 x 23.62 x H17.71 inch.

 70 + 380 mm
2.75 + 14.96 inch.

 15,4 kg / 35.27 lb

No foam. :524euro+Taxes
With foam:728euro+Taxes

- WATERTIGHT SEAL AROUND LID / GUARNIZIONE ERMETICA
- AUTOMATIC PRESSURE RELEASE VALVE / VALVOLA AUTOMATICA DI PRESSURIZZAZIONE
- EASY TO OPEN DOUBLE THROW LATCHES / CHIUSURE DI SICUREZZA A DOPPIO STEP
- LOAD TESTED SOFT GRIP HANDLE / MANICO MORBIDO AD ALTA ERGONOMICITÀ
- STACKABLE INTERLOCKING SYSTEM / SISTEMA DI IMPILABILITÀ
- THICK BODY MATERIAL / PARETI SPESSIE ANTIURTO
- EXTRA FIXING POINTS / PUNTI DI FISSAGGIO PER VARIE APPLICAZIONI
- FULLY LENGTH HINGES / CERNIERA LUNGO TUTTO IL PROFILO DELLA VALIGIA
- NYLON PINS, CORROSION FREE / PERNI IN NYLON ANTI CORROSIONE
- SCREEN PRINTING AND RESIN LABEL SPACE / SERIGRAFIA ED ETICHETTA RESINATA
- MATERIAL: POLYPROPYLENE COPOLYMER / MATERIALE: POLIPROPILENE COPOLIMERO
- LATCHES: NYLON / SERRATURE IN NYLON
- O-RING: POLYMER / GUARNIZIONE POLIMERO
- WHEELS WITH STAINLESS STEEL PIN / RUOTE CON ASSALE IN ACCIAIO INOX

SIDE HANDLES
+ LARGE FOLD DOWN HANDLE
MANIGLIA LATERALE
SU ENTRAMBI I LATI
+ MANIGLIONE PER TRASPORTO



820 x 600 x 450 cm³

Up to one 80x60x12 storage box
Up to two 60x40x7.5 storage box

CUBI

4°F)

IP67 RATING

MIL SPECS DEF STAN 81-41
STANAG 4280

Main elements functionality

Transport box must guarantee a hermetic and pressurised transportation outside the laboratory. No custom made.

Storage/test box must guarantee a dry atmosphere when flushed with dry air or N₂. Could be custom made:

- Top and bottom cover ESD box:
 - -Dark
 - -Hermetic
 - -Mechanical strength
 - -Packaging

- -No moisture absorption
- Top and bottom foam:
 - -protection against mechanical shock
- Bosh frame
 - -half-ring handling outside the storage box
 - -protection against bad handling
- Top and bottom cover ESD acrylic
 - half-ring protection outside the box