This section has been introduced on June 17,1997

RICH 1 VESSEL

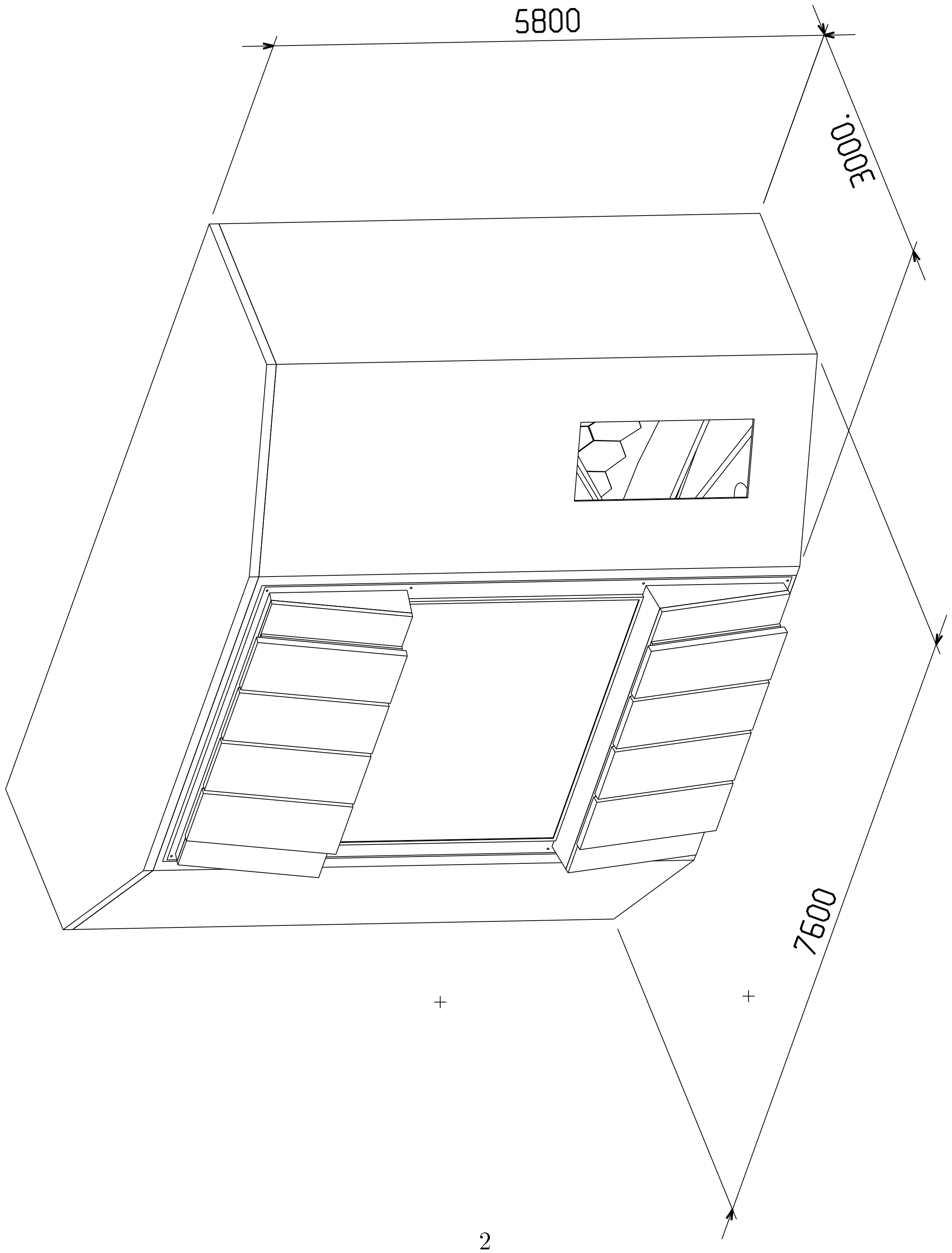
Some figures presenting the present status of the studies:

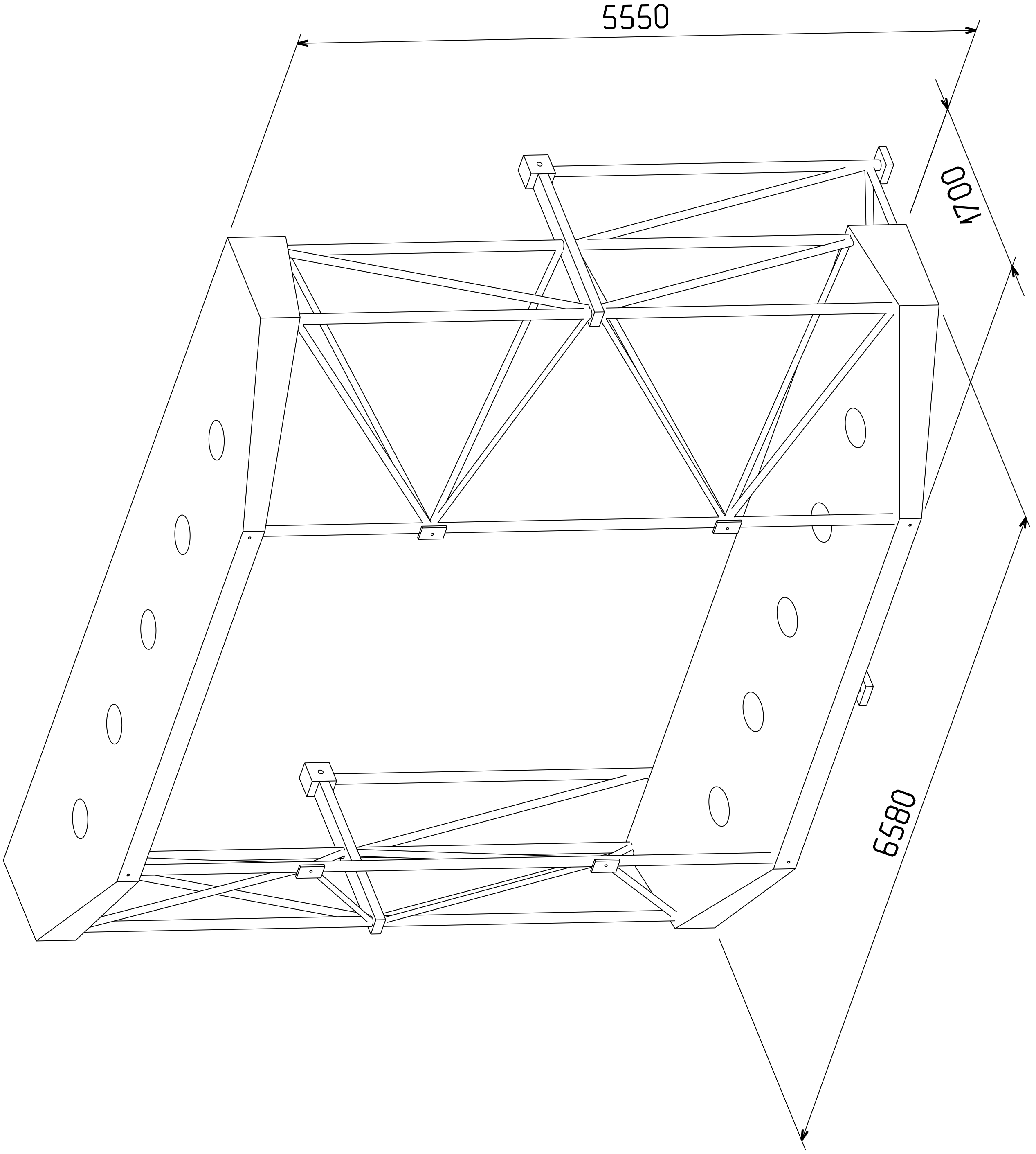
1. **Detector overview**

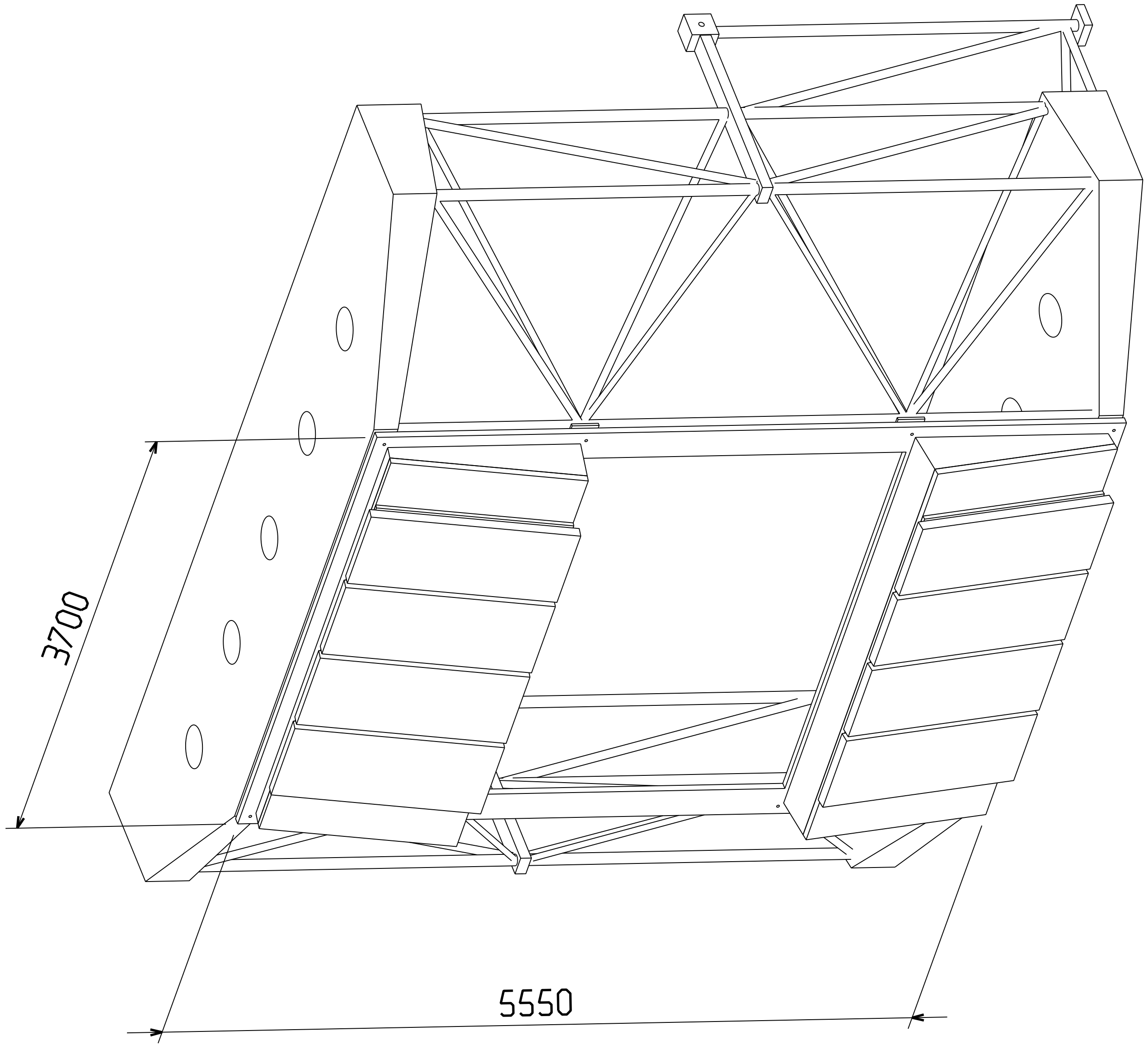
2. **The structure connecting photon detectors and mirror wall**

3. **The structure connecting photon detectors and mirror wall and the front face**

4. **The structure connecting photon detectors and mirror wall and the mirror wall itself**


5800
3000.
7600


5550
1700
6580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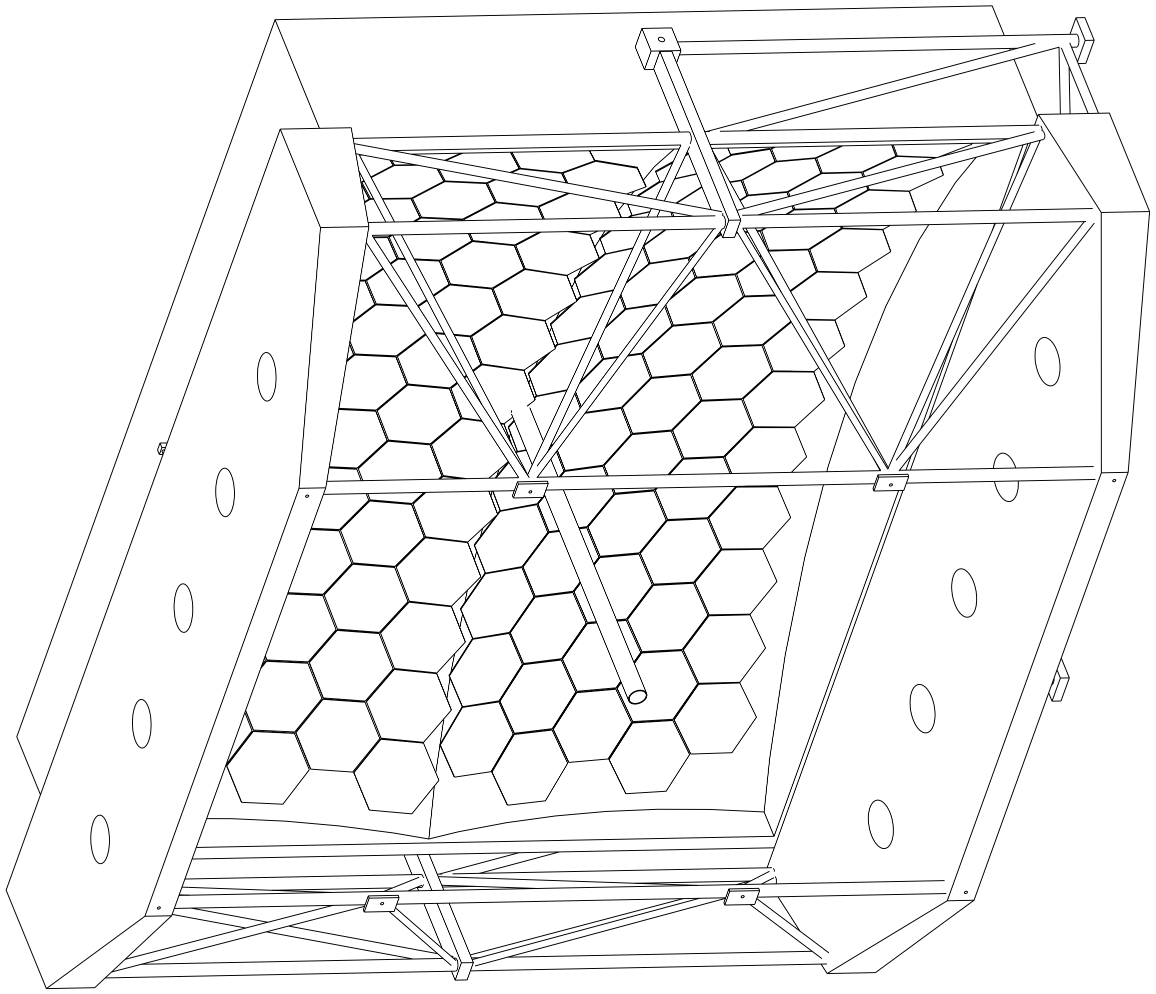

This section has been introduced on January 31,1997

COMPASS RICH's - Gas vessels

1. Some important requirements for our vessels

(not an exhaustive list of requirements !)

(i) THIN entrance and exit WINDOWS

(ii) MINIMIZE Δn (n - refractive index)

(i) **what limits the window thickness ?**

gas pressure varies with height due to gas weight :

$$\Delta\text{P} = /P_{top} \text{ - } P_{centre}/ = /P_{bottom} \text{ - } P_{centre}/$$

assume :

$$P_{centre} = P_{outside}$$

example , RICH 1 :

window	height (m)	length (m)	ΔP (mbar)
entrance	2.4	2.5	1.5
exit	4.	5.6	2.5

The window thickness has to be calculated taking into acount this pressure; indicatively : **steinless steel foil, $\leq$ 0.5 mm**.

(ii) contributions to Δn

example , RICH 1 :

- chromatic dispersion $\Delta n / (n - 1) = \pm 1.2$ %
- gas weight $\Delta n / (n - 1) = \pm 0.25$ %
- ΔT within the vessel :

0.1 degrees $\Delta n / (n - 1) = \pm 0.02$ %
1. degrees $\Delta n / (n - 1) = \pm 0.2$ %
5. degrees $\Delta n / (n - 1) = \pm 1.$ %

CONCLUSION : keep $\Delta T \leq 1.$ degrees

the vessel has to be thermalized; the easiest way is to keep it at

$$T \geq T_{max-hall}$$

i. e. @ 35 - 40 degrees.

A consequence of the previous considerations:

it is not possible to keep the refractive index constant in time;

this would require:

T constant

P constant

$$/P_{inside} - P_{outside}/ \sim 15 \text{ mbar (or more !)}$$

very thick windows are necessary !

2. Mechanical arrangement

(This section is based on several fruitful conversations with M. Bosteels from CERN, EST division; his kind help is here acknowledged.)

VESSEL ELEMENTS

structure - main supporting structure (internal) formed by stainless steel pillars and beams, mechanically not precise, but stable and rigid

frames - interface between the structure and some closing elements that require mechanical precision; each of them is double, one element fixed to the structure with possibility of adjustment before welding the vessel skin (see below), the second one is screwed on the first one; list of frames:
(1) forward frame (for the entrance window),
(2) backward frame (for the exit window),
(3) chamber frame (to support detectors, 2 frames),
(4) door frame (to access the vessel)

mirror support - mechanical structure to support the mirrors

hang support - to move the vessel with crane (external)

feet - to support the vessel, external and adjustable

skin - steinless steel foils closing the vessel volume; they are welded onto the structure or the frames or among them.

An **infrastructure** to assemble the vessels (one for each vessel) is needed; it can be a **simple clean room** with thermalization to be built in the experimental hall at location of the detector; it can be formed with plastic foils and it has 3 main aims:
- to have a reasonably clean room for vessel assembling
- to make thermalization possible: it is needed to align structure and frames at working temperature
- to remove the backward frame and window for mirror alignment without polluting the vessel.