

ANNEXE 1

**English version of the document:
Base module container_CCTP_CNRS DR016_A05**

PARIS-NORMANDIE DELEGATION

SPECIAL TECHNICAL SPECIFICATIONS

(In french : CCTP = Cahier des Clauses Techniques Particulières)

PUBLIC SUPPLY CONTRACTS

SUBJECT:

Purchase of cylindrical titanium containers and their 2 associated specific flanges for new detection lines for the KM3NeT-ORCA project as part of NEPTUNE funding by the Normandy region.

Lot n°05

BUYER :

CNRS-Délégation Paris-Normandie
3 rue Michel Ange
75794 PARIS Cedex 16

CONTRACTUAL FORM:

Single-award framework agreement based on unit prices following a formal open tender procedure in accordance with Articles L. 2124-2, R. 2124-2 and R. 2161-2 to R. 2161-5 of the Public Procurement Code.

This is a supply contract subject to the provisions of the General Administrative Clauses for Public Supply Contracts (CCAG/FCS) issued by the decree of 31 March 2021.

This document comprises 18 pages, including the cover page.

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LIST OF ABBREVIATIONS

CCAG	Cahier des Clauses Administratives Générale = General Administrative Terms and Conditions
CCTP	Cahier des Clauses Techniques Particulières = Special Technical Specifications
CCAP	Cahier des Clauses Administratives Particulières = Special Administrative Terms and Conditions
EPST	Etablissement public à caractère scientifique et technologique = Public scientific and technological institution
FCS	Fournitures courantes ou services = Routine supplies or services
HT	Hors taxes = Excluding taxes
RC	Règlement de la consultation = Consultation rules
RGPD	Règlement général sur la protection des données personnelles = General Data Protection Regulation
PEPR	Programmes et équipements prioritaires de recherche = Priority research programmes and equipment
SCTD	Service centralisé de traitement de la dépense = Centralised expenditure processing service
CNRS	Centre national de la recherche scientifique = National Centre for Scientific Research
LPCC	Laboratoire de Physique Corpusculaire de Caen = Caen Particle Physics Laboratory
LNS	Laboratori Nazionali del Sud (Catane -Italie)
KM3NeT	Kilomètre cube Neutrino Telescope
ORCA	Oscillation Research with Cosmics in the Abyss
ARCA	Astroparticle Research with Cosmics in the Abyss
NEPTUNE	Neutrino Physics with Telescope Underwater
DU	Detection Unit
BM	Base Module

APPENDICES TO « French CCTP »

Annexe 1	English translation of these Special Conditions of Contract
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In these Special Conditions of Contract:

- The terms "equipment", "supplies" and "materials" refer interchangeably to the materials to be supplied for each lot;
- The term "Contractor", "holder", "supplier" "successful tenderer" refers to the company that is awarded one or more lots of the contract.;
- The term "Contract" refers to the agreement concluded between the CNRS and the Holder of each lot.

1 Preamble

The provision of the services defined in this document constitutes a contract with a public institution with an obligation of means and results.

The Contractor undertakes that it is able to perform this contract in strict compliance with the obligations set out in the contract documents, in particular with regard to confidentiality, qualification and insurance clauses.

The Contractor shall be deemed, under its responsibility and regardless of any justifications provided, to have received the legal authorisations to perform and to possess the professional qualifications corresponding to the nature and importance of the service covered by this contract. The Contractor shall be solely liable for any consequences that may arise from the fact that these qualifications do not comply with regulations or are incorrect and, in particular, for the consequences of any termination that the CNRS may rightly decide to implement as a result.

In addition to the documents constituting the consultation file, the Contract Holder is required to comply with the specifications and requirements of the decrees, orders, regulations, standards and texts in force on the date of submission of its tender.

2 Presentation

The national centre for scientific research (hereinafter « CNRS » - Centre National de la Recherche Scientifique) is a public research organisation (a public scientific and technological institution, EPST, under the supervision of the Ministry of Higher Education, Research and Innovation). It produces knowledge and puts this knowledge at the service of society.

Its governance is ensured by a chief executive officer, assisted by deputy chief executives.

With over 33,000 employees, a budget of €3.5 billion and a presence throughout France, the CNRS is active in all fields of knowledge, drawing on more than 1,100 laboratories.

Present in all fields of knowledge

As France's leading multidisciplinary research organisation, the CNRS conducts research in all scientific, technological and societal fields. It covers the entire spectrum of scientific disciplines.

The CNRS is active in all major disciplines, grouped into 10 institutes, and focuses on developing collaborations between specialists from different disciplines, particularly with universities, opening up new fields of research that meet the needs of the economy and society.

Present throughout the country

17 regional delegations ensure direct, local management of laboratories and maintain links with local partners and local authorities.

2.1 General context of the project

The NEPTUNE project, funded by the Normandy Region, aims to continue the construction of underwater infrastructure to establish a KM3NeT ORCA underwater observatory for neutrino research, which will ultimately consist of around 115 detection lines and instrumentation for marine and environmental science. It is located approximately 40 km south of Toulon at a depth of 2,500 m.

2.2 Background to the purchase

Each KM3NeT-ORCA detection line consists of 18 optical modules whose data is synthesized in an electronic module called a "base module" located at the anchor. This module also supplies power to the line and transfers data to the shore.

The purpose of this consultation is to supply the cylindrical containers positioned on the anchor at the bottom of each line, which serve as watertight enclosures for the "base modules."

These technical specifications describe all of the contractor's technical obligations. These constitute an obligation of results for the contractor.

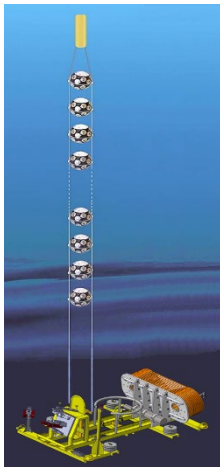


Figure 1: Diagram of a detection line

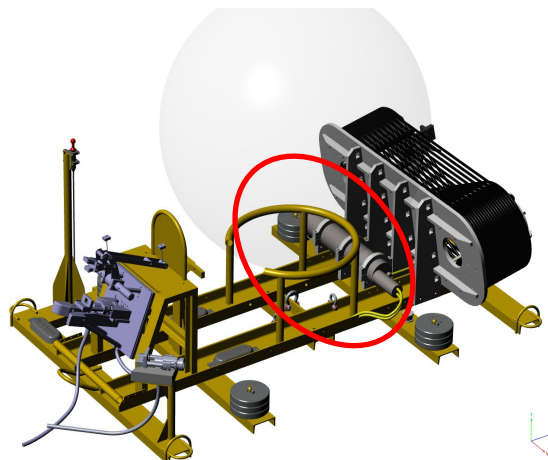


Figure 2: View of the end of the line with the base module cylinder

2.3 Subject matter of the contract

Purchase of 11 cylindrical titanium containers and their 2 specific flanges for new detection lines for the KM3NeT-ORCA project as part of NEPTUNE funding by the Normandy region.

Quantity : 11 sets (10 standard Set and 1 'Beacon' Set // see §3.1)

(Estimated quantity in relation to the budget allocation).

2.4 Allotment

This contract is a supply contract.

The contract is divided into 08 separate lots. Each lot is the subject of a separate contract.

Lots	Dénomination des lots
01	Cable vertical Opto-Electrique (VEOC)
02	Structure de support des bouées
03	Carte électronique BPS (Base Power System)
04	Pénétrateur VEOC dans le Base Module
05	Conteneur cylindrique du Base Module
06	Carte électronique CLB (Central Logic Board)
07	TSFP optical Transceiver
08	Hydrophone

3 Description of expected equipment and general and technical specifications

3.1 Description of expected equipment

The contract is a single contract for the supply of 11 cylindrical containers, each consisting of the following components:

- 1 titanium cylinder,
- 1 titanium closure flange,
- 1 titanium interface flange standard or 'beacon' ***,
- Associated titanium fasteners,
- Associated O-rings.

The cylinders and flanges will be delivered machined according to the plans provided.

The titanium screws and O-rings will be delivered **with 20% spare parts**.

***There are two versions of interface flanges with slight variations depending on the container application. (see: §3.1.2 & § 3.1.3).

The quantities according to the interface flange versions are as follows:

- Model 1 – Standard : Quantity: **10**
- Model 2 – 'Beacon' : Quantity: **1**

3.1.1 Environment and conditions of use

The terms of use are as follows:

- Continuous operating pressure: 250 bars,
- Storage temperature: -10°C / +60°C,
- Seawater temperature: 13°C,
- Mechanical stresses: Vibrations during transport
- The immersion service life must be **at least 15 years**.

3.1.2 General specifications

The watertight container consists of a cylinder, a closing flange, and an interface flange for mounting connectors or penetrators.

a) Cylinder:

Material: **TA6V Titanium** (Grade 5 titanium)

Dimensions : see *figure 6*

Free internal diameter : 170 mm +/- 0.1 mm

Free Interior length : 1000 mm +/-1 mm

Total external length with flange : ≤ 1060 mm

The cylinders will be drilled with blind tapped holes.

This machining is also covered by the contract

The final plans will be delivered to the contract holder at the time of machining.

The current plan, Figure 6 (Pressure Tubes 170x1000) in §3.1.3, can be used for technical studies and costing.

b) Interface flanges:

Material: **TA6V Titanium** (Grade 5 titanium)

The interface flanges will be drilled with bored or tapped holes, both through-holes and blind holes.

This machining is also covered by the contract.

The estimated diameters of these three holes are 63 mm, 36 mm, and 10 mm.

The thickness of the flanges must therefore allow for this machining without compromising the cylinder's pressure resistance.

There are two versions of interface flanges with slight variations (see: §3.1.3)

- Model 1 – Standard : drawing 'Connector Flange' - Figure 3 (Qty: 10)
- Model 2 – 'Beacon': drawing 'Connector Flange Beacon' - Figure 4 (Qty: 1)

The final plans will be delivered to the contract holder at the time of machining.

The current plan, Figure 3 and 4 in §3.1.3, can be used for technical studies and costing.

c) Closing flanges:

Material: **TA6V Titanium** (Grade 5 titanium)

The closing flanges will be drilled with bored or tapped holes, both through-holes and blind holes.

This machining is also covered by the contract.

The thickness of the flanges must therefore allow for this machining without compromising the pressure resistance of the cylinder.

The final plans will be delivered to the contract holder at the time of machining.

The current plan, Figure 5 (End-Flange) in §3.1.3, can be used for technical studies and costing.

d) Watertightness :

The seal between each flange and the cylinder will be achieved by at least two O-rings supplied by the holder.

- Type of seal : O-rings
- Dimensions : Ø 164 mm ; épaisseur 4 mm
- Material : NBR - 70 shore
- Quantity : 2 per flange (so 4 par set)

e) Fasteners :

Material: **TA6V Titanium** (Grade 5 titanium)

- 3 screws par flange : Ø M6 ; length : 20 mm
- 3 washers for M6 screws per flange ; Ø outer = 12 mm

3.1.3 Dimensional specifications (Drawings)

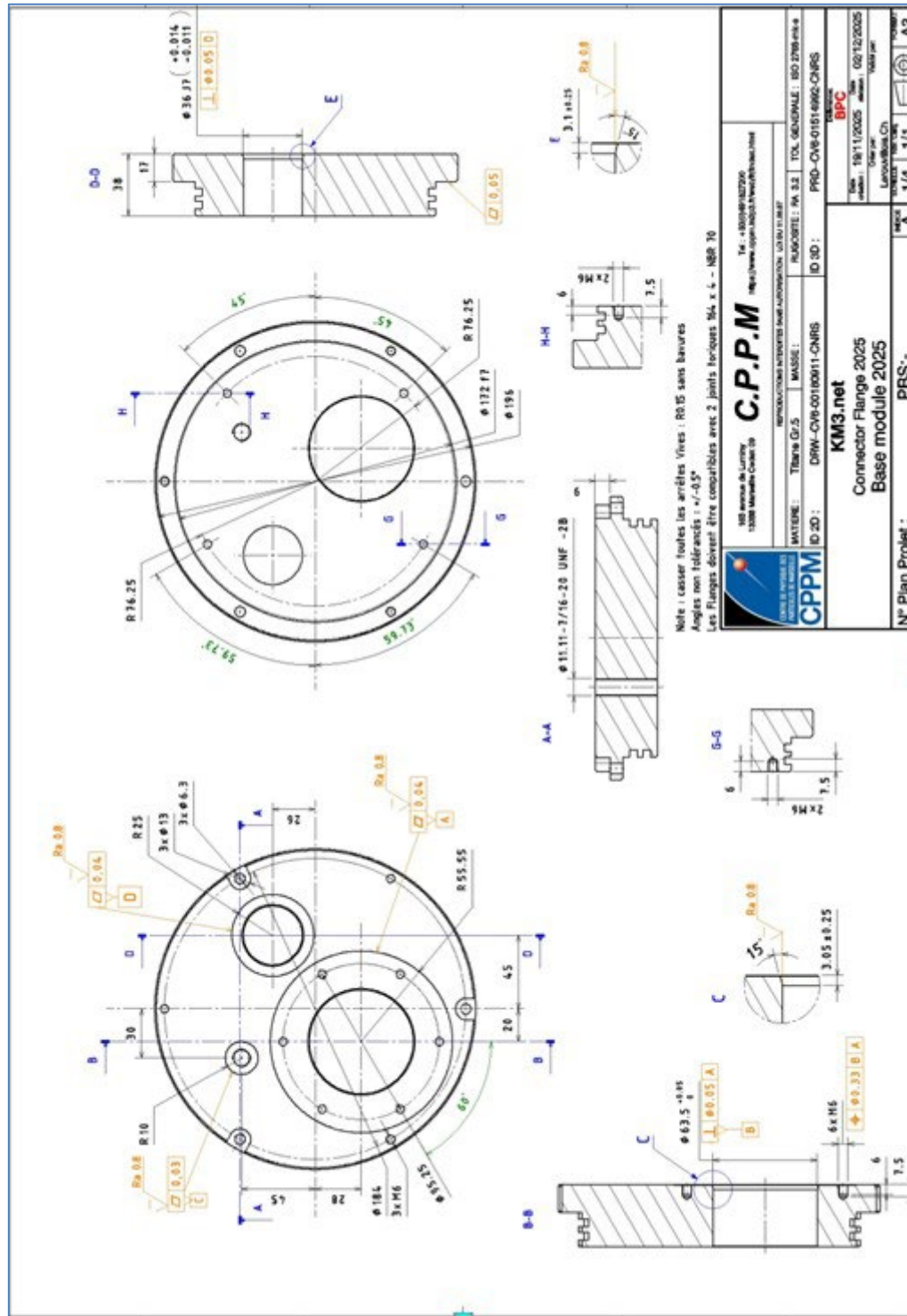
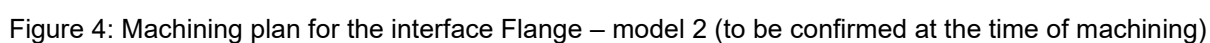
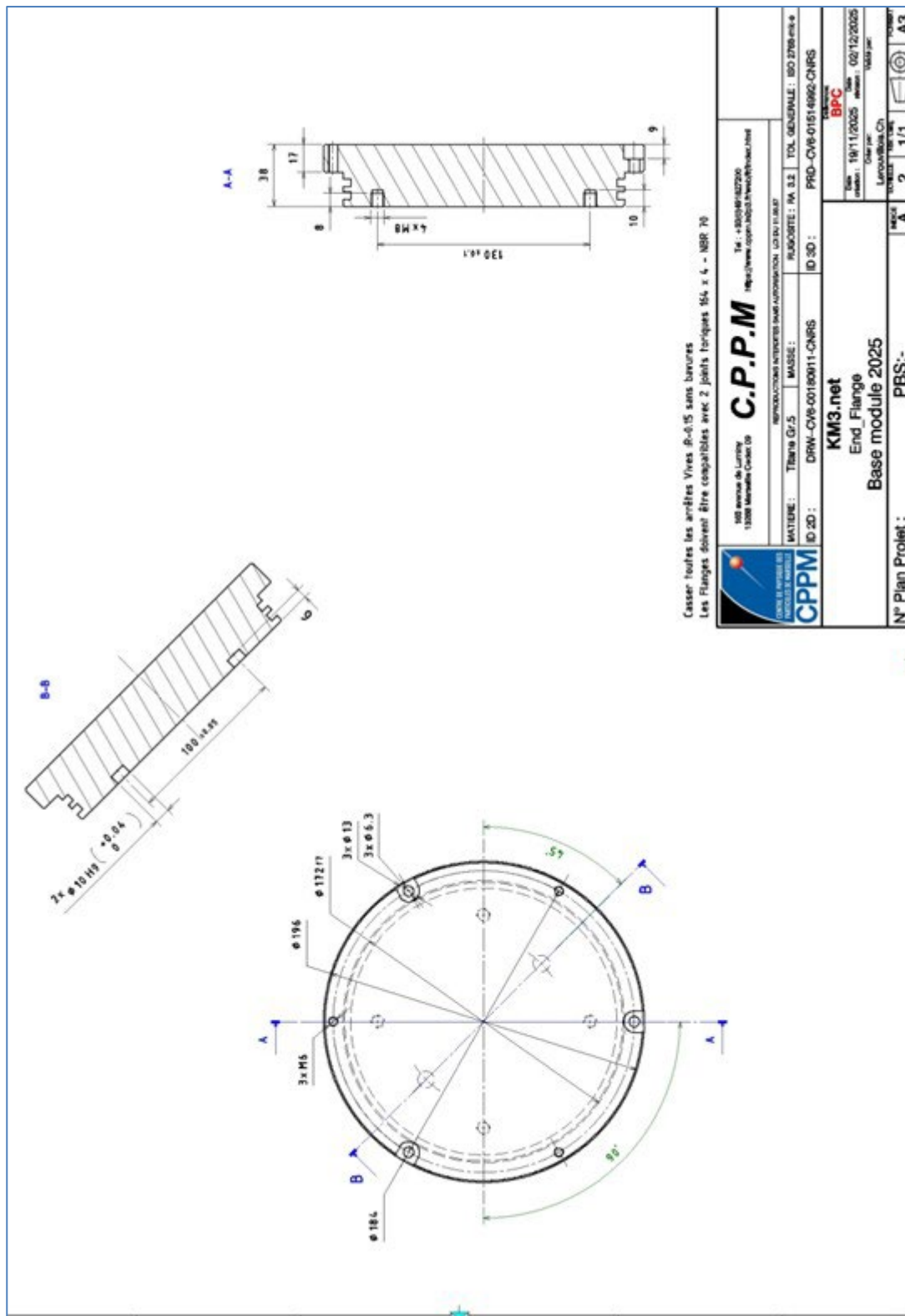


Figure 3: Machining plan for the interface flange – model 1 (to be confirmed at the time of machining)





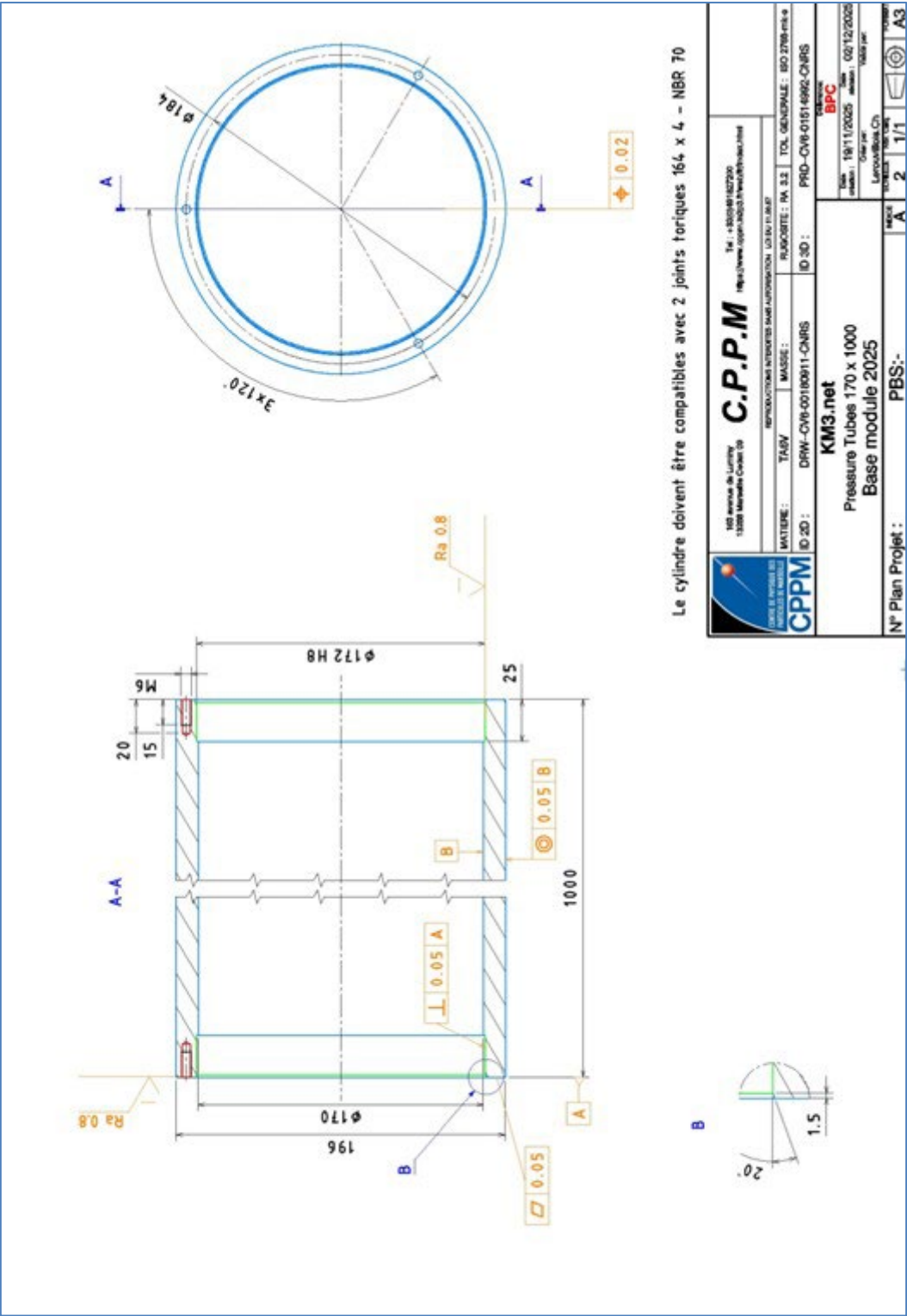
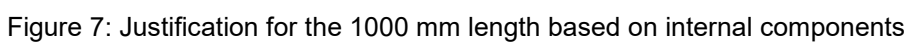


Figure 6: Cylinder machining plan (to be confirmed at the time of machining)



3.2 Supplementary benefits

3.2.1 Qualification Tests

The supplier must provide evidence of the container's suitability for the life cycle described in section § 3.1.1 "Environment and conditions of use."

This justification may include a calculation note, hyperbaric chamber tests, or feedback on comparable products.

3.2.2 Acceptance tests

Each container delivered must have undergone a pressure acceptance test with the following characteristics:

- Test pressure: 310 bar
- Pressure rise/fall ramp: 12 bar/minute
- Duration: 1 hour
- Environment: water

3.2.3 Mechanical acceptability criteria for products

No machining chips at all

Test using a screw to check all through-holes

As indicated on the plans, **it is imperative to break all sharp edges.:**

- R-0.15 without mechanical burrs.

All Products with:

- sharp edges and/or not deburred
- sharp edges and/or not deburred compromising the integrity of the seals
- non-conformities in hole threading

will not be accepted and will be returned to the supplier.

3.2.4 Product identification

Each cylinder and flange will be individually marked, by Laser engraving, with a unique serial number.

The required marking (UPI) will be provided at a later date by KM3NeT.

3.2.5 Packaging for transport and storage

The equipment must be delivered in a box that protects it during transport.
The packaging must protect the equipment from mechanical shocks during transport.
Each box must be accompanied by a sheet detailing the technical characteristics of the equipment inside the box.
Impact indicators must be present on the transport boxes.
The holder assumes all responsibility for transport, including insurance.
Transport costs will be paid by the holder, including any import costs.

4 Delivery times / Terms and conditions of delivery and performance of services

Delivery is at the expense of the holder.

The equipment will be packaged to ensure safe transport.

Delivery will be made in a single phase.

The delivery time must be stated in the tender by the contractor, provided that it does not exceed the maximum time limit.

4.1 Maximum delivery time for all products

Maximum time limit : 05 months

4.2 Delivery terms and premises layout

Deliveries are made on working days from Monday to Friday between 9am and 12pm and between 2pm and 5pm.

Packaging and delivery shall be borne by the contractor.

The contractor is responsible for packaging, packing, loading and stowage operations.

The risks associated with transport to the place of delivery are borne by the contractor.

The exact date of delivery of the services will be agreed upon between the laboratory and the contractor

The services delivered by the contractor or their representative must be accompanied by a delivery note drawn up in duplicate, specifying:

- ✧ The date of dispatch,
- ✧ Tender references,
- ✧ Identification of the contractor,
- ✧ Identification of delivered supplies.

Damage caused by deliveries and installations:

The holder remains liable for any damage of any kind caused by their agents or the carrier to equipment: buildings, land, plantations, installations, etc.....

The CNRS reserves the right to carry out itself or have carried out, on behalf of the holder, the repair of any damage caused.

4.3 CNRS Technical Correspondents

Jérôme PERRONNEL
Laboratoire de Physique Corpusculaire de Caen - LPCC
6 Boulevard Maréchal Juin
14050 Caen cedex
France

4.4 KM3NeT Technical Correspondents

Alain COSQUER
Centre de Physique des Particules de Marseille - CPPM
163, avenue de Luminy - Case 902
13288 Marseille cedex 09
France

4.5 Delivery locations / Access

Delivery must be made to the following addresses:

Centre de Physique des Particules de Marseille - CPPM
Attn : Nick LUMB
163, avenue de Luminy - Case 902
13288 Marseille cedex 09
France

- Access: Articulated trucks are not permitted on the CPPM campus.
Only straight trucks may access the campus (length < 13 meters).

5 Documentation to be provided by the Holder

Documents must be in French and/or English.

5.1 Documentation upon delivery

The documentation provided upon delivery will include the following for each item:

- A certificate of conformity
- Titanium material certificate
- A dimensional inspection report
- A pressure test certificate (described in part in § 3.3.2)

5.2 Documentation for the call for tenders

The offer must contain:

- Cylinder prices
- Price for flanges
- Price for screws and O-rings if not included in the plug/cylinder prices.
- Delivery price
- Delivery times
- A technical description with specifications (particularly for titanium), supply plans, and proof of qualification

6 Verification operations

Upon delivery, the CNRS performs the following checks and tests:

- Visual inspection
- Documentation check
- Dimension check.

6.1 Terms and conditions for final acceptance of services

Final acceptance shall be declared within a maximum of four weeks after delivery, following the checks described in § 6 and the provision of the documentation listed in § 5.1.