CAREMAG PROJECT

TECHNICAL SPECIFICATION FOR

VACCUM BELT FILTERS PACKAGE (MR-03)

MTK045-EQD-0003-RQT

VACUUM BELT FILTERS PACKAGE

PROJET CAREMAG

REVISION	MODIFICATION	WRITTEN BY	CHECKED BY	APPROVED BY	DATE
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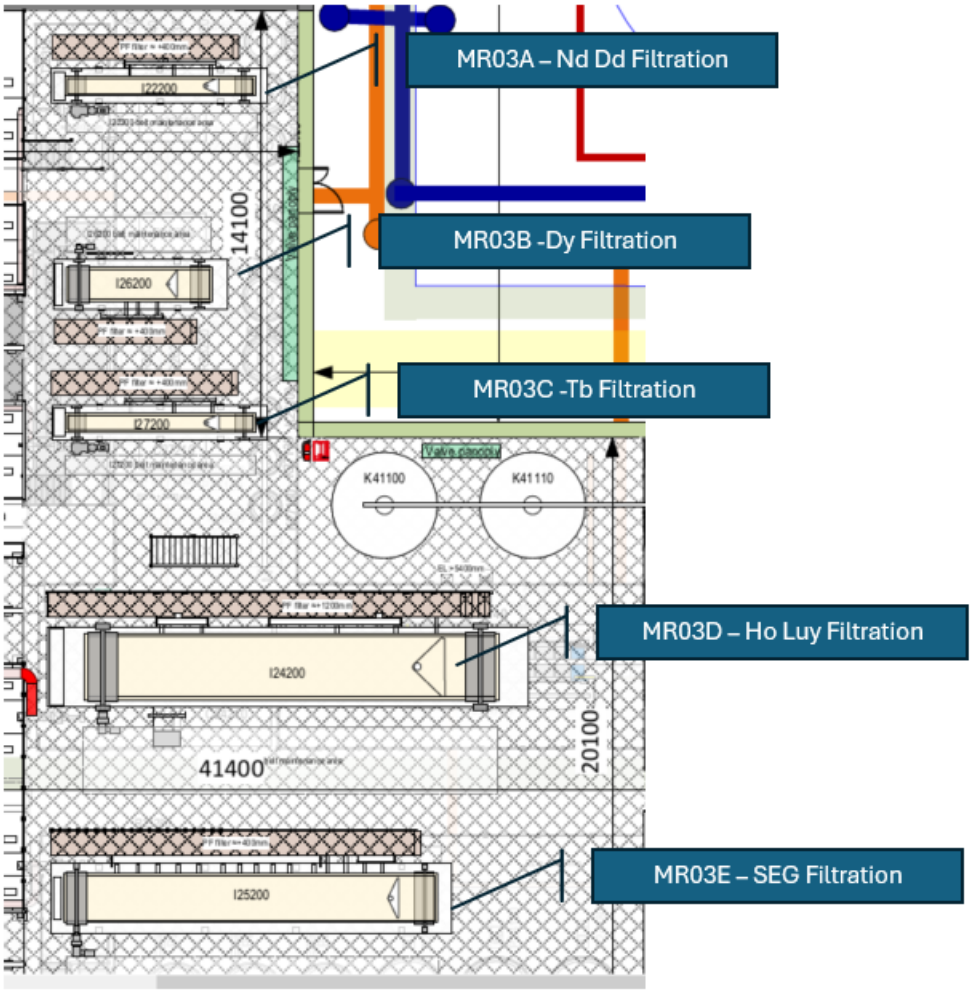
RESUME



1. GENERAL

Caremag Project consists in building a grassroot environmentally friendly production unit for pure rare-earth oxides in France from two main sources:

- Permanent magnets to be recycled
- Rare earth concentrates from mines to fill the plant in the first few years and support the economic ramp-up of recycling.

1.1. SCOPE

This specification defines the scope of supply and covers the minimum technical requirements for the design, fabrication, supply and delivery of the 5 vacuum belt filters packages and associated auxiliaries to be installed in : **CAREMAG PROJECT**

located in : **Lacq Industrial Area, France (64).**

This specification shall be used with :

- Technical Requisition MTK045-EQD-0003-RQT Appendix n° 01.
- APPENDICES attached and relevant listed documents.

This specification applies to the EQUIPMENT/PACKAGE, as well as to each individual component.

1.2. DEFINITIONS

For the purposes of this specification, the following definitions shall apply:

CLIENT: ***CAREMAG S.A.S.***

Owner/ Client is the Party, that awarded the Project to the ENGINEERING, and CLIENT will be the final recipient of the equipment.

ENGINEERING: ***ARTELIA INDUSTRIE***

The Engineering is the Party that carries out all or part of the design, the engineering, the procurement and the construction management of the Project.

SUPPLIER: The party who manufactures and/or supplies equipment, technical documents/drawings, and services to perform the duties specified by ENGINEERING.

SUB-SUPPLIER: The party who carries out all or part of the design, procurement, manufacturing and testing of the System under the responsibility of the SUPPLIER.

EQUIPMENT/PACKAGE: Shall mean VACUUM BELT FILTERS PACKAGES (MR-03) and its associated auxiliaries.

ASSEMBLER : The party in charge of field works under SUPPLIER technical supervision. The assembler will be taken in charge by the Client.

1.3. ABBREVIATIONS

Followings abbreviations could be used in this specification:

- ATEX : Atmosphere Explosible
- EC : European Community
- ICPE : Classified Installation for Environment Protection
- PED : Pressure Equipment Directive 97/23/IEC
- BREF : Best available techniques Reference document, so-called BAT (Best Available Techniques) or MTD : “Meilleures Technique Disponibles” in french
- DCS : Distributed Control System
- ESD : Emergency Shutdown System
- FAT : Factory Acceptance Test
- SAT : Site Acceptance Test
- P&ID : Process & Instrumentation Diagram
- BL : Battery Limit
- IS : Intrinsic Safety
- Non-IS : Non Intrinsic Safety
- NDE : Non Destructive Examination
- UCP : Unit Control Panel (Package)

1.4. SUPPLIER RESPONSIBILITIES

1.4.1. Health, Safety, and Environment (H.S.E)

SUPPLIER shall ensure that the design, fabrication and testing of his equipment does not endanger the health and security of his own employees, employees of his SUB-SUPPLIERS, employees of site erection of CLIENT, and future operators of the Plant.

The respect of the environment shall be considered as a design criterion.

SUPPLIER shall provide any necessary recommendations for a safe installation, operation and maintenance of his equipment.

SUPPLIER shall ensure compliance to regulations regarding Pollutant emissions.

SUPPLIER shall commit himself to minimize the environmental impact of the equipment (leakage, noise, etc.), conduct and optimize safety risk analysis and eliminate short and long terms health threat.

1.4.2. Methods of design

It is SUPPLIER responsibility to check that all the aspects of design and the satisfactory operation of the EQUIPMENT/PACKAGE are in accordance with the documents listed in this Technical Requisition for all the equipment’s included in its scope of supply.

The SUPPLIER must, also, provide EQUIPMENT/PACKAGE of satisfactory design, according to the requirements of manufacturing code based on his experience and his quality assurance.

The SUPPLIER shall cooperate with ENGINEERING to ensure that the scope of work and interfaces between parties are clearly stated & understood by both parties.

The SUPPLIER shall provide to ENGINEERING sufficient information to enable the later to purchase equipment that shall be installed on the EQUIPMENT/PACKAGE.

The SUPPLIER shall be responsible for defining the process requirements of any ancillaries/services that will be provided by ENGINEERING to operate the EQUIPMENT/PACKAGE.

1.4.3. Conformity to the specifications and regulation

Compliance with this specification and the referenced Codes, Standards and Specifications does not relieve the SUPPLIER's responsibility to supply an EQUIPMENT/PACKAGE of proper design, workmanship and material to achieve the specified service.

The SUPPLIER’s responsibility is not limited to the supply of listed components. If in order to meet the performances, the mechanical guarantee, the reliability, the operability and the maintainability if additional equipment’s are necessary, it is SUPPLIER's responsibility to supply them without any extra cost.

It is incumbent on SUPPLIER to comply with all legislation applicable to the Project.

SUPPLIER shall provide EC certificate of incorporation for the EQUIPMENT/PACKAGE.

The SUPPLIER shall make sure that the EQUIPMENT/PACKAGE conforms to any law or regulation applicable to the place of installation whether it is national, regional or local.

The SUPPLIER shall determine the measures that must be taken to comply with any governmental code, regulation, ordinance, or rule that are applicable to the EQUIPMENT/PACKAGE.

1.4.4. Coordination

The SUPPLIER shall be responsible for the overall co-ordination of the complete unit including all auxiliary equipment within the EQUIPMENT/PACKAGE regardless of the source of supply.

Where the SUPPLIER supplies equipment that he has not manufactured, he shall be responsible for ensuring that the designs are compatible with each other and with his own EQUIPMENT/PACKAGE in all respects.

The SUPPLIER shall co-ordinate, expedite and resolve any question with his SUB-SUPPLIERS and **ASSEMBLER.**

The SUPPLIER shall be responsible for ensuring that all relevant information and documentation is passed to his SUB-SUPPLIERS and **ASSEMBLER** and that his requirements have been considered by SUB-SUPPLIERs and **ASSEMBLER** which supply contributes to his EQUIPMENT/PACKAGE performances and reliability.

Regarding the sub-supplied equipment, the SUPPLIER's responsibility covers at least the following:

- Transmission to SUB-SUPPLIERS and **ASSEMBLER** all contractual documents,
- Basic design definition of sub-supplied equipment or works and technical co-ordination with SUB-SUPPLIERS and **ASSEMBLER,**
- Compliance of sub-supplied equipment or works to applicable specifications and standards,
- Co-ordination and control of SUB-SUPPLIER's drawings and documents before submission to the ENGINEERING,
- Co-ordination with SUB-SUPPLIERS and **ASSEMBLER** for inspection including notification to the ENGINEERING,
- Co-ordination of expediting of all sub-supplied equipment,
- Co-ordination with **ASSEMBLER** for the erection and assembly works at CLIENT site.

1.4.5. Design Responsibilities

The SUPPLIER shall guarantee and be responsible for the complete design, engineering, material procurement, manufacturing, performance, assembly, inspection, testing, onsite delivery as specified in the sales record and the operation of the equipment and sub-items.

The SUPPLIER will be responsible for compliance with the regulations, applicable design codes, standards and specifications, and requirements referenced in this document.

If the SUPPLIER cannot respond to a request, it will have to subcontract to a qualified SUB-SUPPLIER with the agreement of CAREMAG.

The SUPPLIER shall take all appropriate measures to ensure that the SUB-SUPPLIER takes the requirements of this requisition into account.

The SUPPLIER shall ensure that all information, references to documents and documentation requirements are properly transmitted to the SUB-SUPPLIER and **ASSEMBLER**.

The SUPPLIER shall be responsible for issuing a notification of inspection at least 2 weeks before the applicable test date for each station so that the CLIENT and the ENGINEERING can attend.

2. REGULATION, CODES, NORMS AND STANDARDS APPLICABLE

Contractual documents are listed in the Technical Requisition Appendix n°01.

Unless otherwise stated, all referenced documents, and their addendums, are applicable in their latest revision at PO placement date.

The SUPPLIER is supposed to have in hands the totality of the above listed documents.

In case documents are missing the SUPPLIER must require them from ENGINEERING.

The SUPPLIER will have to check the possible lacks, contradictions or ambiguities between the technical documents of the invitation to tender which constitute the bases of the order. Any confusing point shall be brought to the attention of the ENGINEERING or its representative. No supplement will be accepted later due to this reason.

The SUPPLIER is responsible for interpretations or the bad translations which could be made by him or by his SUB-SUPPLIERS for the documents which constitute the order.

If conflicts appear between applicable documents, the most stringent requirement shall apply.

In no case is this Technical Requisition to be used to supersede, delete and/or lower applicable code requirements, laws and/or local regulations.

The order placed to the SUPPLIER will be carried out according to the following contractual documents.

2.1. APPLICABLE LAWS AND REGULATION

2.1.1. European directives

The supply shall meet the requirements of the following European Directives:

- 97/23/EC : Directive of the European Parliament and of the Council of 29 May 1997 on the approximation of the laws of the Member States concerning Pressure Equipment Directive (PED).
- 2006/42/EC : Directive of the European Parliament and of the Council of 17 May 2006 on machinery.
  - Supplier must indicate if some special items are to be foreseen in view of the enforcement of the update revision of the Directive coming into force in 2027
- 94/9/EC : Directive of the European Parliament and of the Council of 23 March 1994 on the approximation of the laws of the Member States concerning equipment and protective (ATEX Equipment).
- 99/92/EC : Directive of the European Parliament and of the Council of 16 December 1999 on minimum requirements for improving the safety and health protection of workers potentially at risk from explosive atmospheres (ATEX workplace).
- 2003/10/EC (Feb 2003) : Directive of the European Parliament and of the Council on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise).
- 2014/35/UE : Directive of the European Parliament and of the Council on the harmonization of Member States' laws concerning the provision of market in electrical equipment for use within certain voltage limits
- EMC 89/336 & 2004/108/CE : Directive of the European Parliament and of the Council on electromagnetic emissions limits and equipment compatibility.
- 2006/42/CE : Machinery directive
- 2006/95/CE : Directive of the European Parliament and of the Council of 12 December 2006 on electrical equipment designed for use within certain voltage limits.

- 2010/75/UE : Directive of the European Parliament and of the Council of 24 November 2010 on industrial emissions (protection and reduction of pollution).

2.1.2. French regulation

- Ministerial Decree of 21 December 1999 on classification and evaluation of the ESP.
- Limitations imposed by Article 15 of the Ministerial Decree of 24 March 1978 and modified Ministerial Decree of 15 January 1962 relating to the chemical composition and mechanical properties of steel.
- Decree No. 2004-924 of September 1st, 2004, on the use of work equipment provided for temporary work at height and to amend the Labour Code (Second Part: Decrees and the State Council) and Decree ° 65-48 of January 8, 1965.
- Decree of 21 December 2004 on scaffolding checks and amending the Annex to the Decree of 22 December 2000 regarding the conditions and procedure for the certification bodies for conformity verification of work equipment.
- Articles R.233 of the French Labour Code.
- French Labour Code.
- French Health Code.

2.2. CODES, NORMS AND STANDARDS

Listed codes and standards represent the minimum requirements.

Supplier must indicate which construction code is applicable to his field of supply.

Any other norms & codes could be proposed by the SUPPLIER before order, to meet all applicable local & European directives.

2.2.1. Construction codes

Metallic Pressure Vessels :

- CODAP 2010 Div. 2 : French Code for Construction of Unfired Pressure Vessel
- EN13445 : Unfired Pressure Vessel
- ASME VIII Div.1 : Boiler and Pressure Vessel Code
- AD-Merkblatt : Rules for construction of pressure vessels

Plastic vessels :

- NF EN 13121-1 to 4 : Construction code for PRV plastic vessels
- EN 12573-1 to 4 : Construction code for plastic vessels
- UIC DT15 for SVR plastic vessels

Metallic Piping :

- CODETI : French construction code for piping
- EN 1092 : Flanges and gaskets
- ANSI / ASME B31.3 : Construction code for piping

Plastic Piping :

- CODETI : French construction code for piping
- NF EN ISO 14692 : French construction code for piping

- ASME NM-2 : Construction code for piping

Heat exchangers : Not Applicable

Pumps :

- ISO 15783 : Seal-less rotodynamic pumps – Class II - Specification
- ISO 5199 : Technical specifications for centrifugal pumps - Class II
- ISO 2858 : End-suction centrifugal pumps
- ISO 9906 : Rotodynamic pumps – hydraulic performance acceptance tests

2.2.2. Norms and Standards

European Best practices

- BREF Common Wastewater and Waste gas Treatment (February 2003): Reference document for wastewater treatment and gas treatment.
- BREF Energy Efficiency (February 2009): Reference document about Energy Efficiency

Materials

- EN ISO 5817 : Welding - Fusion-welded joints in steel, nickel, titanium and their alloys (beam welding excluded) - Quality levels for imperfections
- NF EN ISO 9606-1 : Qualification testing of welders - Fusion welding - Part 1: steels
- NF EN ISO 15607 octobre 2019 : Specification & qualification of welding procedure for metallic materials
- NF EN ISO 9712 Non-destructive testing-Qualification and certification of NDT personnel
- NF EN ISO 3452-1 : Non-destructive testing. Penetrant testing. Part 1 : general principles
- NF EN 19O 17637 : Non-destructive examination of fusion welds. Visual examination
- EN ISO 9712 : Non-destructive testing — Qualification and certification of personnel
- EN 1043-1 : Destructive tests on welds in metallic materials - Hardness testing - Part 1: Hardness test on welded joints
- NF EN 10021 : General technical deliver/ conditions for steel products
- NF EN ISO 17635 : Non-Destructive examination of welds - General rules for metallic materials
- EN ISO 15614-1 : Specification and qualification of welding procedures for metallic materials. Welding procedure test. Arc and gas welding of steels and arc welding of nickel and nickel alloys

Structure

- EN 1090 : Execution of steel structures
- EN 1993 : Design of Steel Structure
- EN 1998-1 Eurocode 8 : Design of structures for earthquake resistance
- EN 1991-1 Eurocode 1 : Actions on structures, wind and snow loads

Quality and inspection

- NF X 02-006 : International Systems Of Units - Description And Rules For Use - Choice Of Multiples And Sub-multiples
- EN ISO 9001 : Quality management system certification
- EN 10204 : Metallic products - Types of inspection documents
- EN 10474 : Steel and steel products - Inspection documents

Electricity

- NF-C-15-100+additives : Low voltage installations
- NF-C-63-850 : Electronic device for controlling machines and processes
- NF-C-32-070 : Classification tests on cables and cords with respect to their behaviour to fire
- EN 50014 : Electrical apparatus for potentially explosive atmospheres. General requirements
- NF-EN-60529 : Degrees of protection provided by enclosures (IP code)
- NF C52-100/CEI 76/EN60742 : Transformers
- EN 60 146/CE146 : Tests
- EN 50 081/50 082/50 091.2 : Electromagnetic compatibility (CEM)
- IEC 61000-1-2: Electromagnetic prescriptions (CEM)

Instrumentation and control

- IEC EN61508 : Functional safety of electrical/electronic/ programmable electronic safety-related systems
- IEC EN61511 : Safety Instrumentation System Industrial process
- ISA/IEC/CENELEC : Suds for instrumentation & electrical parts
- IEC 61131 : Automat program languages
- ANSI / FCI 70.2 : Control Valve Seat Leakage

Painting

- ISO 12944 Paints and varnishes : Corrosion protection of steel structures by protective paint system

Insulation :

- NF DTU 45.2 P1-2

Health, Safety and environmental

- EN 1127-1 : Explosive atmospheres - Explosion prevention and protection
- EN 12874 : Flame arresters - Performance requirements, test methods and limits for use
- NFPA 86 : Standard for Ovens and Heaters
- GESIP 2004/01 : Guide of French Oil and Chemical Industry Safety Group
- EN 60079-29 : Gas detection
- IFC EHS : Guidelines Large Volume Inorganic Compounds

- ATG C.320 : Guide of ATG paragraph 5 about Gas Technology
- ATG B.67-1 : Guide of ATG about design of gas installation
- EN 61672 : Electroacoustics – sound level meters
- APSAD fire safety installations (detection, fire extinguishers, sprinkler systems, etc.)

2.3. ALTERNATIVE DESIGN AND DEVIATION REQUEST

2.3.1. Alternative Design

The SUPPLIER shall offer the EQUIPMENT/PACKAGE as specified in this Technical Specification and relevant Technical Requisition as a base proposal.

EQUIPMENT/PACKAGE of a different design may be offered as an alternate by SUPPLIER, if so reason of the proposed alternative design shall be detailed by SUPPLIER.

If SUPPLIER can justify important costs or delay savings by modifying the design or deviating from some standards, specifications, codes or recommendation, without compromising the safety of personnel, regulatory compliance, reliability in service, it shall be documented in detail and quoted as an option or alternative.

Nevertheless, EQUIPMENT/PACKAGE base price shall conform to the specifications.

2.3.2. Deviations

Deviations to any applicable documents attached to the Technical Requisition or associated specifications are subject to ENGINEERING's approval.

SUPPLIER shall supply an exhaustive list of deviations requested to the documents listed in the contract.

In case no deviation list demand is supplied, EQUIPMENT/PACKAGE is considered to be in full compliance with the requirement.

SUPPLIER shall wait for ENGINEERING written approval of any deviation from requirements before proceeding with design/manufacture.

3. EXTENT OF SCOPE

SUPPLIER scope of supply shall include as a minimum all components and services listed below.

The SUPPLIER extend of supply shall include, but not necessarily limited to the following : design, supply of materials, fabrication and manufacture of EQUIPMENT/PACKAGE, provision of drawings, necessary documentation, certificates and data, assembly, painting, testing and shipment of the 5 vacuum belt filter packages (MR-03).

The extent of supply shall also include all necessary sub-equipments and materials not listed which are necessary to achieve an operable and safe EQUIPMENT/PACKAGE.

3.1. SCOPE OF SUPPLY

The SUPPLIER scope of supply shall conform to :

- Process datasheet given in APPENDIX n°02
- The technical requisition MTK045-EQD-0003 -RQT Appendix n°01

and include as a minimum the following items for each packages :

Vacuum belt filter packages	Vacuum Belt filter size
MR03A : I22200 – Nd Dd	2m²
MR03B : I26200 – Dy	2,5m²
MR03C : I27200 - Tb	2m²
MR03D : I24200 – Ho-LuY	21m²
MR03E : I25200 - SEG	15m²

- the vacuum belt filters packages with drip pan, splash and mechanical protection system equipped with their filter cloths (clipped filter cloth and welded cloths prices option will be differentiated)
- dewatering system improvement in option
- the external cooling system for belt driving motor
- the mother liquor vacuum receivers with level detection instrumentation (3)
- the mother liquor pumps
- the vacuum pump with accessories (total water recirculation, cooling with cooling water is preferred)
- All required electric motors, couplings and guards,
- Auxiliary required equipment (such as temperature regulation system for cooling water)
- Safety devices and personal protection for the equipments
- Local instrumentation supply, installation and wiring to junction boxes
- All automation necessary for the correct operation, safety control,
- All the interconnecting piping between the equipments of the complet vacuum belt filter package (**installation BY ASSEMBLER),**
- Structural steel for equipment and piping supports if necessary to the installation
- Heat insulation and personal protection if necessary (Definition by SUPPLIER, **supply and installation BY ASSEMBLER**
- Access platforms, ladders, stairs : Definition by SUPPLIER, **supply and installation BY ASSEMBLER,**
- Anchor bolts : Definition & supply by SUPPLIER,
  Remark : anchor bolts shall be designed per seismic conditions

- Sub-soleplates, shims, etc... for installation on concrete (if applicable) Definition by SUPPLIER, **supply and installation BY ASSEMBLER,**
- Equipment's earthing and skid earthing continuity, Definition by SUPPLIER, **supply and installation BY ASSEMBLER,**
- Equipment and instrument tagging,
- Refinishing paint, Definition by SUPPLIER, **supply and installation BY ASSEMBLER,**
- Preparation for long term preservation, shipment, storage,
- Packing of the complete EQUIPMENT/PACKAGE,
- All special tools required for installation, testing, operation and maintenance,
- Commissioning and start-up spare parts,
- First charge of consumables : lubricant….

3.2. SCOPE OF SERVICES

SUPPLIER shall include coordination meetings in ENGINEERING's office.

SUPPLIER shall provide the following services with relevant documentation:

- Engineering design,
- Coordination meetings with ENGINEERING including as minimum:
  - Technical clarification meeting
  - Participation to P&ID's review and Hazop review
  - Participation to 3D model review
  - Participation to control system FAT in the ICSS SUPPLIER's offices.
  - Participation of 3rd party, ENGINEERING or CLIENT at mechanical FAT in SUPPLIER offices/factory
- Inspection and testing of the supplies
- All services and specifics inspection to reach EC marking compliance, including Notified Body
- EQUIPMENT/PACKAGE shipment according to the Incoterm retained in contract.
- Supervision of Opening the Packing and Inspection (OPI)
- Supervision by SUPPLIER specialits of on-site assembly work performed by **ASSEMBLER**
- Support for training assignment for end-user's employees: training on customer's site,
- Supervision of instrumentation test on site and cold commissioning
- Supervision for commissioning/start-up
- Supervision of Site Acceptance Test / Performances Tests

These assignments must be carried out by the SUPPLIER's employees.

The employees performing the work – in addition to knowledge of the EQUIPMENT/PACKAGE – must have the skills required for the work assigned to them.

The SUPPLIER will submit an estimated duration and daily rate for each case.

3.3. REQUIRED DOCUMENTATION

SUPPLIER shall supply the documentation listed pages 5 to 7 of the Technical Requisition Appendix n°01.

3.4. DELIVERY OF EQUIPMENT/PACKAGE :

The proposed splits of elements will be submitted for review and validation to ENGINEERING & CLIENT prior to engage studies and manufacturing of the equipment.

3.5. BATTERY LIMITS

The limit of supply and terminal points of SUPPLIER will be according to the limits presented in the PFD in appendix N° 3.

3.5.1. Structural / Civil

SUPPLIER will be in charge of :

- **Definition of loads transmitted by EQUIPEMENT/PACKAGE excluding seismic calculation that will be performed by OTHERS.**
- As per Eurocode 8 (NF EN1998 and 2010-1255 & 2010-1254 decrets seismic classification to be used for CAREMAG project are :
    - Zone 3 (moderate)
    - Soil category C
    - Building category : II (to be confirmed)
    - Seismic acceleration a_{gr} : 1.1 m/s2
    - Soil parameter S : 1.5
    - Spectrum parameters :
        - T_b = 0.06s
        - T_c = 0.6 s
        - T_d = 2.0s

SUPPLIER calculation note with details of each loads to be applied and all cases to be considered will be transmitted to **ASSEMBLER which will have in charge of :**

- Necessary templates for anchor bolts position of each separate element of the EQUIPMENT/PACKAGE
- Anchor bolts Installation for each separate element
- Templates for positioning of anchor bolts

3.5.2. Piping

Piping battery limits are detailed on Battery limit definition attached and shall respect the following constraints:

- Connections at battery limits shall be with flanged
- Flanges shall conform to the applicable piping class
- Each battery limit connection shall be a fixed point to avoid any forces or moment transmission to the piping attached to it
- Vent connection: with a single point of connection per type of fluid
    - With blind flange if the vent is not connected to a recovery network.
- Drain(s): drain nozzles equipped with block valve, and blind flange.

- Utilities distribution :
  - A single point of connection for the EQUIPMENT/PACKAGE per utility
  - Utility distribution within the EQUIPMENT/PACKAGE will be in charge of SUPPLIER
  - Utility manifold(s) shall include any required pressure regulator, lubricator and filter.

UTILITY	Design conditions	Operating conditions	Material /piping class	Quality
Air instrum & service (1 network)	11barg / 60°C /-20°C	7 barg / 40°C / 0°C	CS	According to ISO 8573-1 : Solid particle content : Class 2 Water content : Class 3 (<-20°C at working pressure) Oil content : Class 3 (<1 mg/m3)
N2	11barg / 60°C /-20°C	7 barg / 40°C / 0°C	CS	Oxygen content < 0.5% vol
Cooling Water	6 barg /60°C / 0°C	3.5barg 28°C in / 38°C out	CS (TBD)	
Chilled Water	6 barg / 60°C / -20°C	3.5 barg 0°C inlet / 10°C outlet	CS (TBD)	Water mixed with Propylene glycol 40%vol for -20°C anti freeze
Industrial Water	6 barg / 60°C / 0°C	3 barg / 28°C	CS (TBD)	
Soft Water	6 barg / 50°C	3 barg 28°C	CS (TBD)	Must comply the following quality for steam boiler : Hardeness : Max 0.5°F O2 : max 0.1 ppm Free CO2 : 0.2ppm Iron : maximum 0.1 ppm Organic content : max 1ppm pH : 7.5 – 9.5 Copper : max 0.1 ppm
Hot Water	6barg 100°C	3barg / 85-75°C	CS (TBD)	
Steam	4barg / -1barg 157°C /-20°C	3barg / 137°C	CS	

Notes :

- TBD = To be defined
- Each BL shall be flanged, location accessible from grade, and let possibility to install isolation device (valve) by OTHER.

3.5.3. Instrumentation and electrical equipment

Package type P1/P2/P3 description according to § 4.12 must be followed

SUPPLIER will be in charge of:

- Definition and supply of instruments, electric motors and other consumer
- Definition of cabling of each element

Based on SUPPLIER definition, drawings and applicable procedures ASSEMBLER will be in charge of all supply (other that those detailed here above as SUPPLIER scope of Supply) within the following battery limits :

- Instrumentation : Instrument junction boxes and local cabinet, including cable glands
- Electricity : Wired terminal strips (power supply junction boxes)
- Earthing: Earthing dispatchers

3.6. EXCLUDED FROM SUPPLIER'S SCOPE OF SUPPLY

The following is excluded from the SUPPLIER's scope of supply:

- Civil work,
- Electricity cabling from MCC to motors terminal boxes,
- DCS control system,
- Cables between the local cabinet and the PLC cabinet inside ITR
- Cables between power junction boxes and the MCC or switchboard inside ETR

Note: It shall be the SUPPLIER's responsibility to seek clarification in the event of any doubt concerning the extent and limit of his supply.

4. COMMON TECHNICAL REQUIREMENTS

4.1. GENERAL

The design of EQUIPMENT/PACKAGE shall comply with all applicable specifications listed in the Technical Requisition.

SUPPLIER shall clarify with ENGINEERING before order if additional documents not listed in the Technical Requisition are applicable to his scope of work.

The objective is to minimize field works, the EQUIPMENT/PACKAGE shall preferably and if possibly be delivered fully assembled on site.

However, if the EQUIPMENT/PACKAGE is delivered in separate elements or skids :

- Each assembly shall be complete, tested and pre-commissioned in accordance with the requirements of this specification
- A blank assembly of the complete EQUIPMENT/PACKAGE shall be performed in SUPPLIER shop to insure the correct assembly of the elements.

The EQUIPMENT/PACKAGE design shall be aimed at maximum standardization of components and subassemblies to ensure the lowest possible inventory of replacement parts.

All equipment shall be designed to permit rapid and economical maintenance.

4.2. LIFETIME

The EQUIPMENT/PACKAGE shall be designed and built for a minimum of 20 years service based on 7884 hours per year.

During the ramp-up stage in the first years, EQUIPMENT/PACKAGE will be operated in continuous campaign. SUPPLIER shall detail and supply any specific devices that would be required to ensure EQUIPMENT/PACKAGE performance in ramp-up stage. SUPPLIER shall also clearly detail any risks linked to this ramp-up operation and foresee it the operating manual.

The EQUIPMENT/PACKAGE shall be designed and constructed so that the plant can operate continuously over 7884 hours per year between major maintenance that led to shut down the EQUIPMENT/PACKAGE.

The EQUIPMENT/PACKAGE shutdowns and their duration shall be kept to an absolute minimum. SUPPLIER shall give full details of any operations that may require the EQUIPMENT/PACKAGE to be shut down. SUPPLIER shall state the need, the frequency and the duration of all scheduled shutdowns.

4.3. BASIC DESIGN DATA

The SUPPLIER shall specify consumption of all required utilities and all emission figures (fugitive, waste, etc.) in his proposal.

The system of measurement defined in relevant Project Procedure shall be used exclusively in all technical documents, drawings, calculation sheets…

The EQUIPMENT/PACKAGE shall be designed and constructed to meet safely all specified process operating conditions and transient operations including start-up, normal and emergency shut-down conditions.

Any equipment that must be operated at its design limit in order to meet the specification is not acceptable.

4.4. PROCESS DESIGN DATA

All the process design data including performances applicable to the EQUIPMENT/PACKAGE are defined in the Process data sheet attached as APPENDIX N°02.

4.5. MATERIAL AND CORROSION ALLOWANCE

Material of construction shall be as specified (the supplier will have to preconize the adequate material – it will have to be as minimum 304L SS but the supplier will be responsible for corrosion allowance).

Where no specific material has been specified, the SUPPLIER shall recommend materials compatible with the handled fluid at design conditions.

Materials of components shall be identified by reference to appropriate standard including the grade. The selected material standard shall be compatible with the equipment design code.

The use of cast iron parts is not allowed on valves and safety valves.

Unless otherwise specified in relevant piping and pressure vessel specifications, corrosion allowance shall be as per applicable design code.

4.6. ARRANGEMENT

The equipment shall be laid out to ensure easy and safe operability and maintenance access.

All valves, instruments and components shall be accessible from grade for easy operation and maintenance.

All locally mounted instruments must be accessible for the operator from the floor or platforms defined and supplied by SUPPLIER.

Piping arrangements shall consider the possibility of access, opening or removal of any equipment that may require maintenance.

Systems shall have the capability of being completely vented and drained for maintenance purposes.

The SUPPLIER shall specify all necessary maintenance access/area, and lifting information (height/load), drop areas for the EQUIPMENT/PACKAGE and the associated auxiliaries.

4.7. LOCATION

EQUIPMENT/PACKAGE shall be designed for indoor installation.

SUPPLIER shall confirm to ENGINEERING that no hazardous source internal to its EQUIPMENT/PACKAGE will modify the hazardous classification.

Electrical requirements concerning protection and enclosure adapted to the specified hazardous areas are defined in relevant ENGINEERING instrumentation and electrical specifications.

For EQUIPMENT/PACKAGE installed on ground, design shall be made according to NF EN 1998-1 - Eurocode 8.

4.8. ROTATING MACHINERY

The rotating machinery shall be designed, fabricated and tested in accordance with relevant Europeans directives (Cf § 2.1.1) and applicable Norms & Standards (Cf § 2.2).

4.8.1. Sealing

Seal selection shall be SUPPLIER's responsibility taking into consideration the operating conditions, the product properties, the product hazard classification and the local emission regulations.

Only referenced designs in similar applications and operating conditions can be proposed.

The selected mechanical seal shall be submitted by the SUPPLIER to the ENGINEERING for approval.

4.8.2. Balance and vibration *(when applicable)*

All rotating assemblies shall be statically and/or dynamically balanced.

Balancing procedure including balance and vibration standard used and limit considered shall be supplied.

4.8.3. Transmissions

Wherever possible, equipment shall be driven directly.

4.8.4. Shaft coupling (when *applicable)*

SUPPLIER shall submit for ENGINEERING's approval the selected code(s) used for coupling design.

A removable spacer shall be provided in all couplings where it would otherwise be necessary to remove or disconnect main piping or machines in order to service the seals or the bearings.

All flexible couplings incorporating a spacer piece shall be of a design in which the spacer piece is positively constrained from flying out in the event of failure of the flexible elements.

For all types of coupling it shall be possible to remove the half couplings or coupling hubs in-situ without moving driving or driven equipment including gearbox.

The method of mounting coupling hubs on to shafts shall be such that they can be removed in-situ without the application of heat.

4.8.5. Guards

All moving parts shall be guarded as per existing regulation.

Guards shall be provided to ensure that operating personnel cannot be in contact with any moving surface or nip point.

The guard shall be non-sparking type

Guards shall be sufficiently robust to resist distortion in normal industrial use. In addition to the other safety requirements coupling guards shall be designed to withstand a minimum static vertical load of 1000N.

Any opening or guard which can be removed manually (without any tool) shall be equipped with a safety switch to trip the machine.

4.9. PRESSURE VESSELS

The process pressure vessels shall be designed, fabricated and tested in accordance with the manufacturer standard with the minimum requirements of this specification.

The manufacturer standard shall be based on PED and an approved construction code either CODAP, EN13455, ASME VIII division 1, or other international codes (AD Merkblatt, etc…), subjected to ENGINEERING approval.

4.10. PIPING, VALVES, CONNECTIONS AND PIPING COMPONENTS

Piping shall comply with chose construction code and piping classes provided attached.

The process piping inside battery limits shall be designed, fabricated and tested in accordance with ENGINEERING piping classes.

The auxiliary piping inside battery limits can be designed, fabricated and tested in accordance with SUPPLIER's standard piping classes.

Piping installed on skid shall be delivered fully installed, controlled, hydrotested and painted.

4.11. ELECTRICAL

Electrical components shall conform to the relevant Europeans directives (Cf § 2.1.1) and applicable Norms & Standards (Cf § 2.2).

All electrical components shall be suitable for the specified hazardous area classification.

4.11.1. GENERAL REQUIREMENTS

Unless otherwise agreed, SUPPLIER shall provide all electrical equipment required for autonomous operation of the Equipment. SUPPLIER shall advise in the tender if the electrical equipment requires any special tools.

Exceptions being :

- Distribution Boards dedicated to lighting and Convenience outlet circuits and miscellaneous minor loads.
- Local Control Station unless they are connected to the UCP.
- Unless specifically required, for equipment which requires MCC are part of the Equipment scope of supply.

4.11.2. AVAILABLE POWER SUPPLY CHARACTERISTICS

Available voltages on site and power supply characteristics are the below:

VOLTAGE	400V	230V	230V UPS
Neutral system	IT	TT	IT
Nber of phases	3 phases	1 phase + N	1 phase + N
Frequency	50 Hz	50 Hz	50 Hz

If other voltages are necessary for the EQUIPMENT/PACKAGE, they shall be derived by SUPPLIER from the voltage above.

4.11.3. SYSTEM HARMONIC CONTENTS

When SUPPLIER provides equipment generating harmonic currents to the network, such as variable frequency drives or rectifier, it shall ensure that those currents do not induce voltage harmonic distortion higher than 5% for the total harmonic distortion content and 3% for a single harmonic distortion.

4.11.4. ELECTROMAGNETIC COMPATIBILITY

Electrical equipment shall conform to CEI 61000 and European directive.

4.11.5. GENERAL REQUIREMENTS

Unless otherwise agreed, SUPPLIER shall provide all electrical equipment required for autonomous operation of the Equipment. SUPPLIER shall advise in the tender if the electrical equipment requires any special tools.

Exceptions being :

- Distribution Boards dedicated to lighting and Convenience outlet circuits and miscellaneous minors loads.
- Local Control Station unless they are connected to the UCP
- Unless specifically required, for equipment which requires MCC are part of the Equipment scope of supply.

4.11.6. CABLES

Power cables shall be supplied as per standards UTE / AFNOR, type U1000 R2V (or shieled if VFD Drives), 0.6kV/1kV, flame retardant, halogen free, outer sheath black color.

Earthing/bonding : Type HO7VR Y/G.
Cables shall be labelled at both ends.

4.11.7. ROUTING

Cable routing system shall be arranged in accordance with the following :

- Cables shall be routed in separate trays/ladders according to the type of use: power, lighting, control, etc…
- Power cables shall pass across signal cables at right angles and on different levels.
- Separate routing shall be selected for redundant data links.

Cable trays shall be of galvanized steel for internal use, of aluminum AG3 or SS316L for external use.

4.11.8. JUNCTION BOXES

General :

Junction boxes shall be of GRP type.

All cables shall enter the bottom part of JB's only, no side or top entry is allowed.

All cable glands shall be supplied according to the cable's characteristics given from the ENGINEERING to the SUPPLIERs.

Electrical connection for junction boxes cable glands shall be ISO thread.

Cable gland plate arrangement shall allow the removal of one cable gland without removing any other gland fitted on the same gland plate.

"Flanged gland plates" are not acceptable.

Specific to JB installed in hazardous area: Glands shall have EExe /EExd double certification and installation in Zone 1 and T3 temperature classified.

Cable glands shall be made of 316 L stainless steel or Nickel-Plated Brass.

Gland grounding of the cable armor shall be in accordance with the applicable code for the connected equipment.

4.11.9. INGRESS & SHOCKS PROTECTIONs

The minimum degree of Ingress Protection shall be :

- ~~IP55 : for equipment located outdoor.~~ Not applicable
- ~~IP54 : for equipment located outdoor, protected from weather.~~ Not applicable
- IP31 : for equipment located indoor in technical space (dry area).
- ~~IP20 : for equipment located indoor in offices (dry area).~~ Not applicable

The minimum protection degree against shocks shall be:

- IK08 For equipment located indoor.
- ~~IK10 For small power equipment located outdoor (sockets, lighting fixtures, junction boxes, control stations ...).~~ Not applicable

4.11.10. MOTORS

Electrical motors shall be conformed to the relevant specifications listed in the Technical Requisition.

All needed electrical motors shall be supplied by the SUPPLIER.

General Rules :

- For every motor the starting current and torque and their duration shall be compatible with the mechanical load, the overall characteristics of the supply system and the protective equipment. Each motor must be rated in accordance with its duty.
- Electric motors with a rated output lower than 370W shall be supplied at 230V.
- Electric LV motors with a rated output in excess of 90kW shall be associated to Variable Frequency Drive (VFD).

- Efficiency of electric motors :
    - As per OEEE November 1st 2017, implemented in September 1st 2021 **efficiency of electric motors shall be IE3 minimum up to 1000KW**
    - **As alternates SUPPLIER will indicate the impact of electricity consumption and impact on price for :**
        - **The supply of motors with IE4 efficiency**
        - **The supply of permanent Magnet motors**

Electric motors shalt be able to re-accelerate, when running, after any power supply failure lasting not longer than 0.5 seconds. If the failure is longer then the motor shall stop and re-start.

All high voltage electric motors and all low voltage motors with a rating larger than 22kW or installed in potentially damp locations shall be provided with anti-condensation heaters which are energized when the motor is stationary. They shall also be provided with a drainage system.

Pre-lubricated sealed bearings are to be used where practicable. Where this is not possible lubrication facilities are to be provided.

Motors and control equipment should have an IP rating appropriate to their application and location. Motor shall be isolation class F and temperature class B as defined in IEC standard.

An emergency local (adjacent to motor) stop (stay put type) push button shall be provided for all motors except for fans motors.

4.11.11. EARTHING

SUPPLIER shall ensure earthing continuity of packaged EQUIPMENT/PACKAGE.

Earthing lug shall be according to ENGINEERING standard.

Skids shall include a minimum of two earthing lug connections located on opposite ends of the frame.

4.12. INSTRUMENTATION AND CONTROL

Instrumentation shall conform to the relevant specification listed in the Technical Requisition and specially :

Instrument general specification

Instrument identification & numbering procedure

General rules :

All necessary instrumentation for proper functioning of the EQUIPMENT/PACKAGE under all conditions shall be defined and supplied by the SUPPLIER.

The EQUIPMENT/PACKAGE and associated elements shall be a **Package type P2** according to definition given in the Instrument general specification shall be wired and connected to junction boxes at the skid edge.

SUPPLIER shall produce all necessary engineering documents for implementation of safety and control functions. These engineering documents including control and safety philosophy, I/O lists shall be based on applicable authority regulations. The aim is to provide a safe, simple and reliable system allowing easy and safe start-up and operation of the EQUIPMENT/PACKAGE.

Supply of instruments shall cover, tubing, wiring up to terminal junction boxes, cable trays, tagging, winterization, isolating valves, etc....

Unless otherwise specified the local instruments shall be wired to EQUIPMENT/PACKAGE mounted junction boxes.

All field instrumentation shall be securely mounted so that they are not affected by vibration, are properly visible during normal operation and are easily accessible for maintenance.

Instrument mounting/hook-up shall allow instrument venting and drainage for calibration and isolation.

Safety valves design code used shall be indicated.

The package type characteristics are listed here after.

4.12.1. 5. PACKAGE TYPE

Extent of instrument supply and connection to ICSS are divided into 3 package types :

4.12.2. P1 TYPE PACKAGE : NOT APPLICABLE

4.12.3. P2 TYPE PACKAGE

The package is supplied with its instrumentation, junction boxes, cables, and cable trays. The instruments are wired and connected to the junction boxes by the Package SUPPLIER ; the junction boxes are located at the edge of the package skids. The multi-cables from the package junction boxes to the ICSS marshalling cabinets shall be specified, provided, and installed by the ENGINEERING.

This type of package has its own instruments, but the control and safety logic are simple and do not exist as standard supply by the Package SUPPLIER or for packages considered as integral part of the facility process functions.

Electrical Power supplies required are supplied by the ENGINEERING (refer to Electrical section)..

ENGINEERING will supply to the Package SUPPLIER some typical documents such as an electrical consumers list, instrument and I/O list in order to homogenize all project data's and documents.

The P2 packages are fully controlled by the ICSS.

The Package SUPPLIER shall provide the ENGINEERING with a detailed functional analysis. The Package SUPPLIER shall assist the ICSS IFAT to validate the control and safety functionalities.

4.12.4. P3 TYPE PACKAGE NOT APPLICABLE

4.13. NAME PLATE AND TAGGING

All equipment and components including electrical and instruments accessories shall be identified with a stainless steel nameplate, on which will be engraved :

- TAG
- Information required by the design code

- Minimum and maximum allowable design limits and rating data (including pressures, temperatures, speeds and power), maximum allowable working pressures and temperatures.
- Manufacturer standard information : supplier name, equipment's serial number, the machine's size and model

All the nameplates, the safety labels and the instruction labels shall be in French.

Rotation arrows shall be cast in or permanently attached to each rotary equipment.

All motors, junction boxes, cables, heaters and other electrical components shall be properly labelled with TAG numbers.

All field instrumentation, wiring and junction boxes shall be properly labelled with TAG numbers.

4.14.STRUCTURE

SUPPLIER in in charge of conception and mechanical calculation (including under seismic conditions) of the structure that will support and give access to the elements of the 5 vacuum belt filter packages.

SUPPLIER will ensure that the proposed conception is adequate for field installation, operation of the units and maintenance, reviews will be performed with ENGINEERING & CLIENT.

Repartition of Scope Of Work on structural steel & access :

- The structure supporting the belt, drum, rollers and all their other accessories of the belt filter will be fully defined and supplied by SUPPLIER
- The other structures including platforms access, ladders and stairs will be defined by SUPPLIER, but **supply and installation will be by ASSEMBLER,**

Steel structure shall be executed in accordance with execution class EXC2 minimum as per EN 1090.

All equipment supplied shall be mounted on a skid structure whenever possible.

Steel structure shall be equipped with lifting lugs and shall be of sufficient strength and rigidity for transportation and installation to avoid any distortion or damage to the equipment installed on them during lifting.

Baseplates shall be designed for grouting. The baseplate bottom shall be coated with a suitable coating system compatible with the grouting material.

All the outer main skid beams, grating, handrails and any other surface representing a potential object capable of causing personnel injuries, shall be cut or rounded off, all the sharp surfaces shall be eliminated. Outer corners of the main structure shall be rounded with a radio of 1-1/2 inches.

4.15.BOLTING

Bolting shall be metric.

4.16.PAINTING

CAREMAG chart color shall be followed as per attached specification

The SUPPLIER shall submit for acceptance his proposed painting system for its complete scope including equipment sub-supplied.

This document shall describe surface preparation, primer and topcoat description and color as per USER RAL definition. SUPPLIER's painting system shall conform to "corrosivity zone C2" as per ISO 12944-2 and shall be submitted to the ENGINEERING for acceptance.

The extension of painting shall be maximized up to the finish coat for all the prefabricated equipment (for example skid mounted packages, pressure vessels, machinery, prefabricated piping, supports etc…), that will require only a final assembly and/or connection at battery limits in the field.

Loose off skid interconnecting piping between the different skids can be delivered unpainted in case complementary fabrication is needed at site. In this case, painting will be applied by others based on SUPPLIER's specification. Prefabricated interconnecting piping shall be delivered painted as per specification.

4.17. INSULATION AND HEAT TRACING

SUPPLIER shall identify on its P&ID's the parts insulated, or heat traced.

Surfaces accessible having a temperature exceeding 60°C shall be protected against direct contact using personal protection or insulation.

Heat insulation and personal protection repartition between SUPPLIER **and ASSEMBLER** :

- Insulation on equipements will be fully defined and supplied by SUPPLIER
- Piping heat insulation and/or personal protection will be defined by SUPPLIER, but **supply and installed by ASSEMBLER,**
- Whenever required, SUPPLIER will preinstall insulation support on the equipment

4.18. LUBRICANTS

SUPPLIER shall specify needed lubricants, refill frequency and compatible brand name.

4.19. NOISE

The noise level of all the equipment supplied including auxiliaries shall conform to the following

Lp@1m ≤ 80dB(A)

If a part of the supply doesn't meet the job noise limit, all the necessary noise reduction devices to meet the noise limit shall be included in the SUPPLIER's scope.

Where noise hoods are required, they shall have adequate ventilation, lighting and protection. Filling materials shall be fireproof. The noise hood design shall allow easy access to the equipment for monitoring, inspection and maintenance purposes. The noise hood shall allow dismantling of the equipment.

SUPPLIER shall specify the expected noise level for each equipment in its scope of supply and for the overall EQUIPMENT/PACKAGE.

4.20. LIFTING DEVICES

Any lifting devices : lifting beams, sling, shackles… provided by SUPPLIER either permanent for site erection shall be supplied with testing and 3rd party certificate.

Certificate shall cover test performed, witness of the lifting equipment including all accessories used.

4.21.SHOP ASSEMBLY AND DELIVERY CONDITIONS

The EQUIPMENT/PACKAGE shall be shop-fabricated to the maximum possible extent and shall be transported to site as one complete unit, or as a number of large sub-assemblies ready for, and requiring as little as possible, site assembly.

The extent of shop fabrication shall be clearly specified by the SUPPLIER and shall be agreed upon between the SUPPLIER and the ENGINEERING.

5. INSPECTION AND TESTING

5.1. CERTIFICATION AND MARKING

The overall EQUIPMENT/PACKAGE shall be provided with a "CE Integration certificate" (European conformity declaration of incorporation) of a Quasi Machine" by SUPPLIER

5.2. GENERAL

SUPPLIER shall carefully and continuously control and test the quality of the materials and the manufacturing operations to ensure compliance with Quality Plan, Inspection and Test Plan and Purchase order requirement.

SUPPLIER Inspection and Test Plan (ITP) shall be submitted to ENGINEERING and CLIENT for review and approval.

In accordance with approved ITP, a pre-inspection meeting shall be organized after Purchase Order to establish mutually acceptable manufacturing, testing and inspection procedures.

All equipment's including SUBSUPPLIERS manufactured equipment, shall be subject to inspection and tests at the SUPPLIER's workshop according to applicable construction codes, local authority and Inspection Test Plan of SUBSUPPLIERS.

During the Pre-Inspection meeting the SUPPLIER shall present the following documents:

- Quality Assurance Plan
- Production Plan
- Inspection and Test Plan with SUB-SUPPLIER activities included, including establishment of proposed points to be witnessed, observed, etc…
- All relevant specifications and standards and the deviations from these
- Information, drawings and clearances about all associated equipment's
- Itemized listing of all equipment's and origins

These documents will be used to identify the extent and degree of all aspects of inspection and testing to be agreed upon as well as to ascertain compliance with the technical specification and relevant standards.

SUPPLIER shall make sure that all his SUB-SUPPLIERS are informed and concur with any agreement reached during the pre-inspection meeting.

5.3. INSPECTION

SUPPLIER shall notify ENGINEERING of the proposed dates for witness points fifteen (15) working days in advance.

The SUPPLIER is responsible for notifying all SUB-SUPPLIER of the inspection and testing requirements.

At any time during the fabrication CLIENT, ENGINEERING or his designated representative shall have access to SUPPLIER workshop with a 5 days' notice.

The inspector(s) can request additional inspections or examination to ensure that EQUIPMENT/PACKAGE complies with the specifications.

When manufacturing damages affecting the mechanical integrity and/or performance of major components are identified, SUPPLIER shall submit to ENGINEERING the corrective actions proposed for review & approval.

All welding and repair procedures and relevant qualifications including those of the welders shall conform to construction code and have ENGINEERING validation.

Corrective actions shall be included in QA documentation.

All welding procedures and qualifications shall conform to construction code chosen and shall be included in manufacturers QC documentation.

All personnel performing Non-Destructive Testing must be qualified as per construction code impositions.

Qualification Record shall be available at SUPPLIER shop.

Welding Procedure Specification shall conform to construction code chosen.

Welder Qualification Record shall be available at SUPPLIER shop.

Fabricated components shall not be painted until the specified inspection of the parts is completed.

All dimensional checks of equipment with relevant drawings and specifications as reviewed by ENGINEERING shall be done by the SUPPLIER.

All design parameters shall be as per specification sheets of SUPPLIER duly reviewed and stamped by ENGINEERING.

Final inspection will be performed based on version of drawings & documentation formally approved by ENGINEERING.

5.4. TESTING

SUPPLIER shall perform all tests and inspection necessary to ensure that the material and workmanship conform to ENGINEERING's requirement and design.

SUPPLIER shall supply the list of tests that will be performed in workshop and the list of tests to be performed at site.

SUPPLIER shall take all precautions necessary to ensure that all testing is carried out in a manner consistent with safe practices. This shall include, but not limited to, use of temporary equipment for testing which is adequately rated for test conditions, good housekeeping, and adequate protection for other personnel in the test area.

Unless otherwise specified into Specifications, components like instrumentation, piping items, etc. shall be inspected and tested according to the relevant code and standard.

If necessary for testing, temporarily wiring shall be done by SUPPLIER.

For the performance of the individual item/equipment, testing shall cover the extent possible for working conditions created in the SUPPLIER shop.

Testing at SUPPLIER shop shall be as per relevant standard applicable for the item.

Prior to inspection and testing, SUPPLIER shall supply a copy of the relevant standard to ENGINEERING's inspector. Performance test in SUPPLIER's shop shall be carried out in presence of ENGINEERING's representative before acceptance.

Acceptance of shop tests shall not constitute a waiver of requirements to meet the field performance under specified operating conditions, nor does inspection in any way relieve the SUPPLIER of his responsibility.

All testing procedures shall clearly specify method of testing and acceptance criteria.

During assembly of the EQUIPMENT/PACKAGE and before testing, each component and all piping and appurtenances shall be cleaned by appropriate method to remove foreign materials, corrosion products, and mill scale.

All rotating components shall be checked for abnormal friction, vibration or any other characteristics.

Machinery mechanical running test procedures shall be submitted to the ENGINEERING for review one month before testing.

All certified test certificates shall be submitted to show that the equipment meets the performance requirement at the rated duties. Test certificates from manufacturers shall be submitted for all standard items.

All required tools, test equipment and devices for shop tests shall be made available by the SUPPLIER.

If site tests are needed or specified by the ENGINEERING, SUPPLIER’s scope shall include all required special tools, test equipment and devices for site tests.

As a minimum, gas systems shall be subject to valve operation verification when shop assembly has been completed.

Unless otherwise specified, SUPPLIER standard cleaning procedure shall be applied to make sure that pre-commissioning and commissioning activities on site are minimized.

6. SPARE PARTS AND SPECIAL TOOLS

6.1. SPARE PARTS

Construction, commissioning and start-up spare parts are parts needed to enable the construction work to be completed and all components part of the supply to be tested and commissioned.

SUPPLIER shall include in his scope all needed construction, commissioning and start-up spare parts.

Two (2) years spare parts are maintenance and operational spare parts required for a period of two (2) years. SUPPLIER shall supply a priced list of 2 years spare parts in option based on equipment required availability.

Capital spare parts are vital maintenance and operational spare parts that are not already included in the two years spare parts list and that are critical in terms of delivery time.

SUPPLIER shall supply 3 lists for :

- Commissioning and start-up spare parts
- 2 years operating & maintenance spare parts
- Capital spare parts

6.2. SPECIAL TOOLS

Special tools and test equipment are items specifically designed for the equipment that would not be available in the plant's standard tools inventory.

SUPPLIER shall include in his scope all special tools required for testing, operation and maintenance. Test ring and companion flange, if necessary for cooler testing, shall be in SUPPLIER scope.

The special tools shall be shipped with the equipment packaged in separate rugged boxes and marked “special tools for (tag / item number)”. Each tool shall be tagged to indicate its intended use.

7. PREPARATION FOR SHIPMENT AND ON-SITE STORAGE

7.1. SHIPMENT PREPARATION

SUPPLIER shall submit his standard preservation and packaging procedure for ENGINEERING review at least six weeks before shipment.

Any “package” with an estimated weight above 1 ton shall be weighted with calibrated equipment before shipment. Measured value and method of weighting shall be detailed in shipment documentation.

All the documents, including the SUPPLIER Data Book shall be in final code 3 at least one month before the final inspection.

No material or equipment shall be sent to the site until a release note for shipment has been issued by the ENGINEERING.

7.2. ON-SITE STORAGE

SUPPLIER shall provide to ENGINEERING all the instructions required to insure correct protection of the equipment during on-site storage.

These instructions shall include as a minimum:

- The required site storage conditions (outdoor, under a shelter, indoor, in heated area, in air-conditioned area, humidity level etc…)
- The measures to be taken at site arrival like nitrogen blanketing, oil filling, electrical motors space heater to be energized etc…
- The preservation requirements once the equipment has been installed but is not in operation.

8. DOCUMENTATION - SUPPLIER'S DATA

8.1. GENERAL

Documentation and correspondence shall be either in French or in English.

A GED (Mezzoteam software) will be implemented by the ENGINEERING for the documentation follow up of CAREMAG project, SUPPLIER transmission of documents will so be done via the software chosen.

Operating and maintenance manuals as well as all documents that will potentially be used on site shall be supplied in French.

The SUPPLIER documentation shall be in accordance with the Technical Requisition Part III and relevant project procedures.

For data sheets, SUPPLIER shall complete ENGINEERING's forms when available otherwise SUPPLIER's standard data sheets will be provided.

SUPPLIER shall supply a P&ID's for each unit identifying limits of supply, instrumentation and identification of insulation and heat-traced parts.

These P&ID's will be used for equipment and instrumentation tagging and interfaces connections identification.

8.2. DOCUMENTATION AT BID STAGE

Along with the bid, SUPPLIER shall supply the documents listed here-below :

- SUPPLIER's datasheet
- Description of SUPPLIER's scope of supply
- Preliminary general arrangement drawings (including outline drawings for the auxiliary systems) with
  - Overall dimensions of EQUIPMENT/PACKAGE and if applicable auxiliaries' equipment's including motors.
  - Estimated size, rating, and location of all piping and auxiliary connections.
  - All necessary maintenance access/area, and lifting information (height/load/position and number of hoists and cranes)
- Preliminary static and dynamic load data to be considered for foundation
- Preliminary P&ID / PFD indicating supplied instrumentation, insulation and heat traced parts.
- Preliminary part list.
- Electrical consumer list and motors datasheets.
- Instruments and I/O List with instruments datasheets.
- Hardware and Software Specification for controls and safety systems
- Utility list & estimated consumption
- Preliminary Inspection and Test Plan
- List of tests performed in shop and to be performed at site
- Proposed manufacturers and SUBSUPPLIERS for major components.
- Reference list for similar applications
- Deviation lists to the standards and the applicable documents attached to the Technical Requisition (all exceptions shall be listed).

- Painting specification for the complete supply including all the auxiliaries and sub supplied equipment.
- Spare parts lists.
- Special tools list (if applicable).
- Site installation program including at least:
  - Site operation activities list
  - List of all components and sub-assemblies that require field assembly and erection.
  - Personnel requirements with qualifications and needed supervision
  - Construction checklist
  - Material/ tools/ cranes etc… requirements
  - Site erection schedule including man-hours
  - Commissioning program

9. WARRANTY

EQUIPMENT/PACKAGE provided by the SUPPLIER shall be warranted according to Purchase Order requirements.

The SUPPLIER shall guarantee the mechanical behavior and the performance of the EQUIPMENT/PACKAGE as per the information given in Process Data Sheet, Technical Specification and applicable construction codes.

9.1. MECHANICAL WARRANTIES

Mechanical warranties shall be :

- Warranty against defects in materials, workmanship and fabrication defects.
- Equipment's supplied shall be suitable for continuous operation, with incorporation of special design features to operate in campaign for the Nd/Dd kiln and in Start / Stop mode during 3 (three) years of operation for the Dy and Tb kilns.
- Material selection and mechanical suitability, especially regarding operating temperatures.
- Conformity to applicable regulations, specifications, construction codes and standards.
- Mechanical compliance of the equipment with process and design requirements.

9.2. PERFORMANCES WARRANTIES

SUPPLIER shall guarantee EQUIPMENT/PACKAGE operation for each of the operating cases given in the process datasheet attached as APPENDIX N°2, which includes but not limit to;

- Feed flowrate Max and Min Throughputs
- Cake height variation with belt drive speed
- Washing ratio performance
- Sissity performance at the outlet of vacuum belt filters

9.3. ELECTRICITY & UTILITIES CONSUMPTION WARRANTIES

SUPPLIER shall give estimated and guaranteed electricity & utilities consumption at nominal rate.

10. APPENDICES

APPENDIX n°01 – TECHNICAL REQUISITION

APPENDIX n°02 – PROCESS DATA SHEET

APPENDIX n°03A-F – VACUUM BELT FILTER PACKAGES PDF TYPICAL

1.1. APPENDIX N°01 TECHNICAL REQUISITION

1.2. APPENDIX N°02
PROCESS DATA SHEET

1.3. APPENDIX N°03
VACUUM BELT FILTERS PFD

MR03A – A-03-PFD-2220 REV 2 – ND DD FILTRATION

MR03B – A-03-PFD-2620 REV 2 – DY FILTRATION

MR03C – A-03-PFD-2720 REV 2 – TD FILTRATION

MR03D – A-03-PFD-2420 REV 2 – HO LUY FILTRATION

MR03E – A-03-PFD-2520 REV 2 – SEG FILTRATION