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TECHNICAL SPECIFICATION



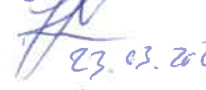







Predosing dedusting

LIBERTY GALATI

*Contracted work:
Engineering, supply, manufacturing, erection, commissioning*

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FOREWORD

LIBERTY Galati plant is called hereinafter, the COMPANY.

Within this project the COMPANY aims to replace and revamp existing dedusting installation in predosing station for sinter plant in order to ensure:

- working conditions for employees, in accordance with the existing legislation
- dust concentration at the chimney in accordance with the environment regulations

The compliance with this Technical Specification from the part of the PROVIDER represents a commitment for results.

The PROVIDER, within his commitment for results, will ensure that the equipment object of his work, and all the materials to be delivered by him, comply perfectly with enforced laws, decrees and standards, especially regarding health and safety and environment protection, as well as with internal regulations of the COMPANY.

Within the contracted work, the PROVIDER will strictly comply with IT DP 045 “General rules to be applied by LIBERTY GALATI contractors” as well as with all the policies and objectives of the latter.

1. OBJECT OF CONTRACTED WORK

Within the project this technical specification refers all the supply, equipment and works needed to provide the **COMPANY** the possibility to ensure:

- working conditions for employees, in accordance with the existing legislation
- dust concentration at the chimney in accordance with the environment regulations

in Predosing station – Sinter Plant.

The object of contracted work is conception of equipment, BE, DE, manufacturing and supply all components, automation, erection, supervision during erection and performing commissioning.

The work executed by the PROVIDER will include in particular:

- *Conception of Equipment, including HIRA (Hazard Identification and Risk Assessment), HAZOP (Hazard and Operability study) and FMEA (Failure Mode and Effect Analysis)*
- *Basic engineering (all drawings/documents containing all required data for detailed engineering development) - Annex -04-Required engineering documents*
- *Detail Engineering (the design activities providing all the necessary information for the equipment and material procurement and manufacturing), (including the means to LOCK OUT/TAG OUT energies - Annex -04-Required engineering documents*
- *As build drawings*
- *Software process application, including source code*
- *On-site verification of drawings belonging to existing installations*
- *Supply and provision, including the LOTO elements (devices which prevent the transmission or release of energy by Locking it Out through a mechanical element or mechanism)*
- *Automation (software+ hardware); standard software & software platform for application development, including all licenses.*
- *Manufacturing in the workshop, including energy LOTO elements*
- *Management & coordination of all tests in PROVIDER'S workshop, all tests to be done with the COMPANY'S representatives including simulation for energy LOTO on the new equipment/ installation.*
- *Shop test assembly, workshop tests, Factory Acceptance Test (FAT), including the verification of energy LOTO elements*
- *The technical acceptances, intermediary & end phase acceptances*
- *Site Acceptance Tests (S.A.T.)*

- *Sequence of warehouse entry for proper take out in scope of assembly/erection on site*
- *Packing, loading, transport, dispatching, unloading, delivery on site and O.P.I.*
- *Execution, erection, assembly including all on site adjustments,*
- *Performing of cold tests and hot tests, as well as performance tests*
- *Regulatory tests*
- *Management and coordination of tests on site, by considering all operational constraints, including simulation for energy LOTO on the new equipment/ installation.*
- *Industrial Commissioning until reaching contractual performances*
- *Training of COMPANY's personnel*
- *Any other legal tests and or documents as per Romanian laws*
- *Technical assistance until reaching the contractual performances*
- *Complete documentation, in Romanian and English, necessary for start-up, operation, energy Lock Out/Tag Out/Try Out and maintenance of the Equipment*
- *CE certificate, incorporation manual, declaration of incorporation for CE and all other legal documents corresponding to the scope of supply*
- *Spare parts for commissioning and spares parts for 2 years of operation*
- *Risk assessment file for design, manufacturing, execution, and commissioning*
- *Pre-commissioning and commissioning manual*

All supplies of parts, materials and matters, all transports, all loading and unloading operations, all equipping (nacelles, scaffoldings, movable cranes etc.), all servicing equipment (crane operator to be provided by the PROVIDER), all protection equipment, all works, drawings and compliances related to the object of this technical specification and to the achievement of results expected by the COMPANY are exclusively in the scope of the PROVIDER.

The PROVIDER will use for scaffoldings from companies agreed already to perform such activities inside COMPANY'S premises.

The PROVIDER will receive all contact details of the above companies in order to receive support for scaffolding evaluation after he confirms the participation to tendering.

The PROVIDER has the obligation to include within its offer the following:

Height and m2 of the required scaffolding including the level of the working platforms and the need of personnel from scaffolding company to supervise and/or make modification.

The PROVIDER is the sole responsible for the solutions implemented in order to guarantee the proper operation of his installation and to obtain the results, performances and functionalities expected by the COMPANY.

The PROVIDER will execute in his workshop the maximum of required pre-fabrications

The PROVIDER, in the scope of his work will have to strictly comply with the following principles:

- *Define, conceive, supply and commission the assembly of equipment described in this specification, in order to guarantee a perfect restart of the installation.*
- *Conceive the installation and its organization, in order to guarantee the health and safety and environment protection and to minimize the execution difficulties of his work.*
- *Obtain the results expected and defined by the COMPANY*
- *Improve the reliability, availability, maintainability of equipment which were modified, adapted, replaced and / or related with the execution of contracted work*
- *Integrate the contracted work in the planning of the COMPANY*
- *Inform the COMPANY, on regular basis, about achieved results.*

2. CHARACTERISTICS OF THE INSTALLATION INTERFACING WITH THE CONTRACTED WORK AND LOCATIONS FOR THE EXECUTION OF CONTRACTED WORK

2.1 SITE CONSTRAINTS

The installation is located on the site of the COMPANY, in GALATI ROMANIA, Primary Area, Sinter Plant.

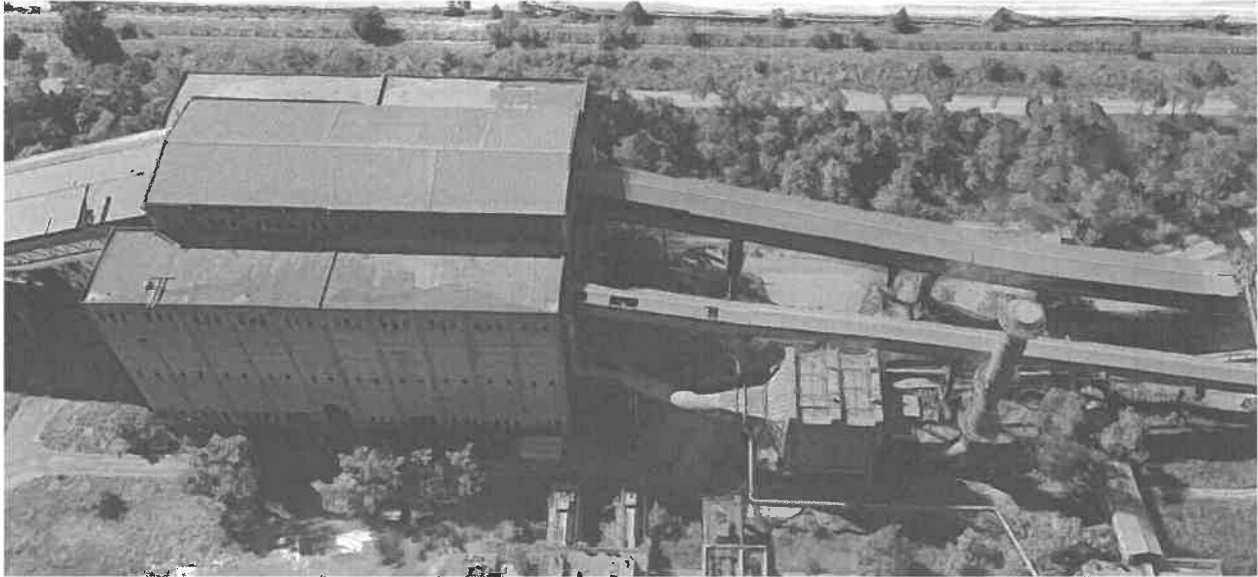


Figure 1 Google map view from north to predosing station and actual dedusting installation

Google maps coordinates: 45.41592003485729, 27.9824634895907

The installation will replace the existing dedusting system. Actual planned stoppages are 12 h / 2 months.

The PROVIDER, while executing the work, will consider the constraints applying to the site of the COMPANY', defined in IT DP 045 "General rules to be applied by LIBERTY GALATI contractors"

2.1.1 Constraints specific to the working environment of the equipment

The PROVIDER, during the execution of work, will also take into consideration the following specific constraints:

- Wind *
- Outdoor temperature *
- Relative humidity *
- Wind and Snow conditions*:
 - Reference wind speed: 32m/s,
 - Reference wind pressure: 0,5 kPa,
 - Snow load: 250 kg/m² at ground level

(*) : values to be confirmed by the PROVIDER based on the meteorological station near the Braila airport, for the execution period of concerned works, see at:

<http://www.weatherbase.com/weather/weather.php3?s=1351&refer=&cityname=Galati-Romania>

- Last earthquake observed in the area:: - 30.08.1986 = 7, 1° Richter, 30.05.1990 = 6, 9° Richter, 31.05.1990 = 6, 4 ° Richter, 27.10.2004 = 6 ° Richter
- Galati is in Earthquake Risk Zone Level VII on Mercalli scale.

- Installation located outdoors
- Installation located indoors
- Dust
- Noise
- Temperature of electrical locations / sites
- Behaviour during standard power line disturbances (amplitude – 30% U duration 300 ms)
- Location and means available for stocking
- Physical aggression (shocks, vibrations)
- Movement of handling and transport equipment
- Under voltage installations
- Works performed on the installation during operation or while out of order
- Equipment in movement (automated control)
- The existing means and elements for Lock Out/Tag Out of energies
- Lightning
- Location and means available for stocking only at the central warehouse, limited space, and time for stocking near the execution area (without possibly to ensure the security of goods).

2.2 INSTALLATION INTERFACING WITH THE CONTRACTED WORK

Pre dosing station is a stock house for raw materials that is prepared for sintering process. The station has silos, conveyor belts as main equipment.

The existing dedusting installation is designed in 1975 for dust concentration at the stack of 100 mg/m³. The actual ESP is not working in the proper limits. The actual dust collector network is old, affected by corrosion and was designed for higher dust granulometry versus today's usage.

Existing electrical feeding systems: see Annex 7

Pre dosing feeding flows with raw materials and return fine

Pre dosing belt conveyors, chutes and silos

Pre dosing delivery flows for homogenize material: see Annex 6

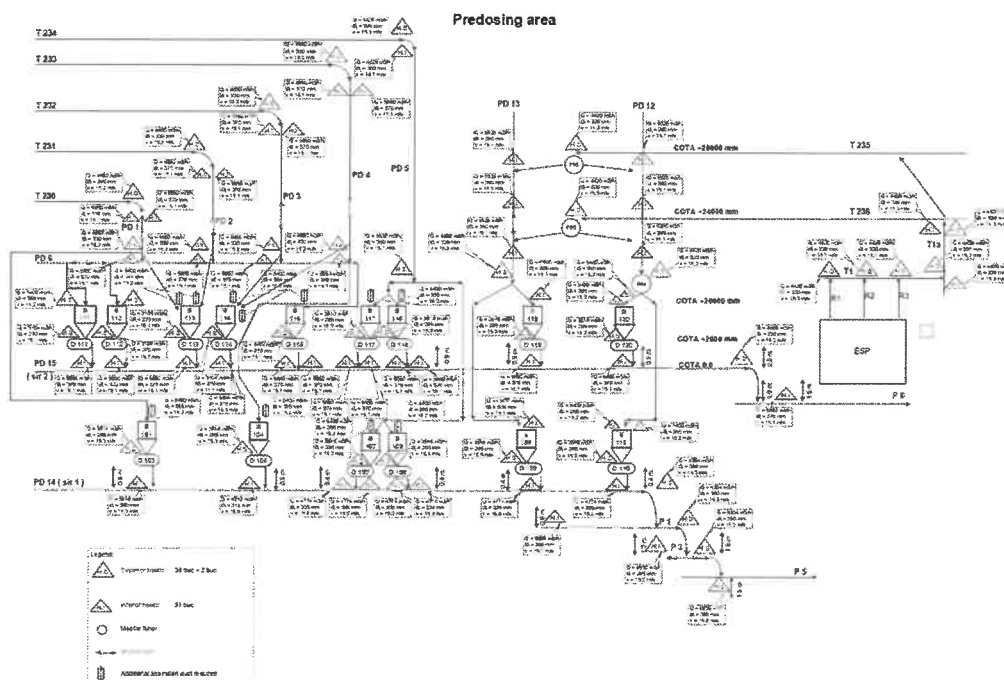


Figure 2 Schematic presentation for ~ 102 dedusting points in pre dosing station, only for information

2.3 TOPOGRAPHY – SITUATION OF LOCATIONS – VERIFICATION OF GENERAL LAYOUTS OF THE COMPANY

The PROVIDER, prior to the execution of contracted work, will conduct one or several visits of concerned locations in order to specifically verify the accuracy of layouts of existing installation.

All visits of locations will take place in the presence of a member of the COMPANY.

The Equipment supplied by the PROVIDER must be, in any case, compatible with existing structures rather than with the layouts of the COMPANY, if due to any reasons the latter will prove to be inaccurate.

3. DESCRIPTION OF CONTRACTED WORK

3.1 DESCRIPTION OF GENERAL FUNCTIONS IN THE SCOPE OF CONTRACTED WORK

Redesign, manufacture, supply, site works - installation, supervision, commissioning in order to replace the actual dedusting installation and provide following functions:

-dedusting predosing station to ensure the working conditions for employees, in accordance with the existing legislation, dust emissions at 1 meter distance from each working equipment (dust emission sources) < 10 mg/m³

-capturing the emissions, filtering to ensure dust emissions at the stack < 10 mg/Nm³

3.2 SPLITTING OF CONTRACTED WORK INTO FUNCTIONAL POSTS

In order to have clarity in the functional description of the contracted work, the COMPANY has hereinafter divided the contracted work into functional posts.

In the same idea, in order to clarify the global comprehension of the contracted work, the PROVIDER will comply with this splitting into posts, unless this splitting does not allow him to comply with his commitment for results.

The contracted work may split into posts:

- *Post 1: Engineering - mandatory*
- *Post 2: Supply, manufacturing, inspection, FAT, delivery on site – mandatory*
- *Post 3: Erection, assembly works – optional*
- *Post 4: Commissioning, cold tests, hot tests, supervision - mandatory*

An activity noted by the COMPANY in this Technical Specification with **OPTIONAL** means that the activity, the equipment, the item, etc. respectively may or may not be contracted by the COMPANY, but the SUPPLIER has the obligation to include it in their Offer, following that the final decision to be taken by COMPANY afterwards.

3.3 FUNCTIONAL DESCRIPTION OF POSTS

3.3.1 Post 1 Engineering – mandatory

The **PROVIDER** is requested to follow the below requests (see Annex -04-Required engineering documents):

- Drawings and written documents (descriptions),
- Basic information (BI) - The **PROVIDER** will provide all the basic information related to the main equipment. This information will be analyzed by the **COMPANY** to be improved or to be acknowledged. The **PROVIDER** will continue in the next design phase after receiving the acknowledgement of the **COMPANY** related to the basic information received.
- Basic engineering (BE) - The documentation related to the basic engineering will contain information related to all technical specialties (i.e. A.E.I, mechanical, safety). The **PROVIDER** will provide within the same package of basic engineering also the first evaluation for risk and quality plan for the related phase.
- All the execution details (DDE) needed for the manufacturing of the new equipment. Details for execution (DDE) of the equipment will be provided in Romanian language (must include manufacturing details, treatment features of all the parts, etc.). Within this phase the **PROVIDER** will provide the maintenance, operation manual, the erection manual along with the safety risk analysis updated and the quality plan for manufacturing in the workshop and erection works on **COMPANY'S** site.

The **PROVIDER** will list within its offer the details of the main consumptions of the equipment (water, energy, chemical substances) and will ensure the lowest consumption possible according to the latest technology.

The **PROVIDER** must verify that the existing types on drives and motors are not interfering with the final performances. In case there are any interferences and/or modification the **PROVIDER** will take this within its scope all required modification and/or replacement.

All process parameters must be measured using transducers and monitored by SCADA (PLC + HMI).

The **PROVIDER** must supply all sensors needed and the process to be automated control and manual control from the HMI and from local panel/station/cubical

The final solution needs to be integrated with existing process network and Level 2 gateway Hardware standardization to be defined according to Automation Department standards.

On-line monitoring system for vibrations, temperature.

The **PROVIDER** must supply at the minimum the basic engineering for the equipment that he cannot include within its offer.

It is recommended to perform a 3D scanning for the area before proceeding to engineering. Based on 2022 study results, we propose the following scope split:

- Stack 40 m
 - Check foundation and access stairs and catwalks
 - Cleaning and painting minimum without beaconing
 - Remake grounding and lightning protection
- Fan (~360.000 Nm³/h)
 - Dismantle the old equipment
 - New foundation, impeller, motor, instruments (vibration, temperatures)
 - Connection to stack and filter revamping and fitting
- Filter
 - Repairs on actual casing
 - New fabric filter using actual casing
 - Possibility to isolate each bag compartments in case of bag breakdown without affecting the performance for 24 hours
 - Bag breakdown detection system
- Dust evacuation
 - Replace rotating valves
 - Repairs on dust silos under the filter casing
 - Closing casing the conveyor belts (5 conveyors, total length <100 m)
 - Repairs on conveyor belts (rolls, supports, drums, gearboxes, motors)
 - Implement technical solution to spray water on evacuated dust, next after rotating valves
- Electrical station
 - Total replacement for outdated electrical equipment
 - Small civil works & new ventilation system
 - Existing electrical station can fit the compressors room
- Air compressed unit
 - New system required ATLAS COPCO to standardize spare parts with other systems (compressor GA30, refrigeration dryers FD95, oil separator OSC355, absorption dryer CD90, air tank with automatic purge)
- Outer dedusting network
 - Redesign and replace entire ducts network

- Expertise on the 3 pillars and civil repairs as required
- Inner dedusting network (102 dedusting points*)
 - Redesign and replace ducts network (ducts and supports)
 - Install new suction points

Note * not all 102 suction points are used in the same time, 6 usual scenario available as attachment, see Annex 17

3.3.2 Post 2 Supply, manufacturing, inspection, FAT, delivery on site – mandatory

3.3.2.1 Core equipment

The PROVIDER will ensure all components, manufacture the equipment, provide, and purchase all necessary parts as per the acknowledged engineering to achieve the results and performances requested by the COMPANY

The PROVIDER will do his best to send the equipment on site pre-assembled, making the final assembly as easy as possible.

The PROVIDER will ensure the full logistics to provide the COMPANY the possibility to perform workshop inspections, verification and factory acceptance test prior to the packing and transportation.

The PROVIDER will provide also details related to packing and transportation prior to this event. The PROVIDER will send to the COMPANY with at least 1 month in advance of planning of the manufacturing that will contain all the milestones related to inspection, verification and all the conducted tests. The PROVIDER will synthesize all the information using the Annex 14 Template for pre-commissioning and commissioning.xlsx

3.3.2.2 Metallic elements

The PROVIDER will ensure at least the basic engineering for the metallic elements belonging to the project that will not be delivered by him.

3.3.2.3 Delivery on site

- *The supply can be received and unloaded from Monday until Friday between 9:00 – 12:00 hours.*
- *The PROVIDER must announce by e-mail within 5 days in advance any delivery to the COMPANY.*

3.3.3 Post 3 Erection, assembly works – optional

The PROVIDER will ensure full erection and assembly activities on site for all the specialties involved within the project aiming to achieve the results and performances requested by the COMPANY in this technical specification and all the annexes.

The entire erection, installation and assembly activities will be performed by the PROVIDER without affecting the processes needed for production.

3.3.4 Post 4 Commissioning, cold tests, hot tests, supervision - mandatory

The PROVIDER will perform full commissioning activities on site for all the specialties involved within the project aiming and for all equipment to demonstrate the results and performances requested by the COMPANY in this technical specification and all the annexes.

The entire commissioning will be performed by the PROVIDER without affecting the processes needed for production.

3.4 STUDIES

All definition and conception documentation listed hereinafter in a functional and non-limited manner, as well as the basic and detail engineering are in the scope of the PROVIDER, including HIRA, the means to Lock Out energies and the definition of LOTO elements.

3.4.1 Mechanical / Hydraulic / Pneumatic Studies

The PROVIDER is responsible to establish all documents required for the management of the project, respectively (also commented within the Annex 04 - Required engineering documents):

- *Definition layouts*
- *General assembly layouts*
- *Assembly layout for mechanical / hydraulic / pneumatic LOTO points and elements*
- *Assembly layout for civil works*
- *Calculation sheets*
- *Reliability study*
- *Study of interferences with the existing installation*
- *On site verification and validation of existing installation*
- *Access and protections*
- *Sub-assembly drawings*
- *Detail drawings*
- *Drawings in AUTOCAD.*

3.4.2 Civil Works Study

The PROVIDER is in charge of establishing the documentation required for the management of the project, respectively:

- *Definition layouts*
- *General assembly layouts*
- *Dimensioning drawings*
- *Calculation sheets*
- *Study of interferences with existing installation*
- *On-site verification and validation of existing installations*
- *Access and protections*
- *Subassemblies drawings*
- *Detail drawings*
- *Drawings in AUTOCAD.*

3.4.3 Functional studies

3.4.3.1 General and / or Detailed Functional Analysis

The COMPANY expresses its requirements in functional terms.

The PROVIDER:

- *Provides the operational instructions*
- *Elaborates the functional analysis jointly with the COMPANY*
- *Elaborates the form for the functional requirement.*
- *Verifies the correlation of this functional requirement with the requirements of the COMPANY*
- *Specifies the interfaces.*

3.4.4 Electrical and automation studies

3.4.4.1 General and detailed organic analysis

The PROVIDER has to:

- *Draw up the developed, single wire, implementation, cabling diagrams, list of parts, etc...*
- *Draw up the assembly layout for electrical LOTO points and elements*
- *Draw up the execution drawings*
- *Determine the organization and the constituents of the system*
- *Determine the commissioning of each constituent*
- *Structure the treatment for each constituent.*

In order to structure the conception and the execution of sub-assemblies for automations, the PROVIDER has to use a library of standard programming modules, unless there is a properly justified exception. He has to supply the documentation and the applied standard programming modules.

The conception of automation sub-assemblies has to ensure the safety and the rapidity in installing, diagnosing and troubleshooting them.

3.4.4.2 Studies for Factory Acceptance Test (FAT)

The PROVIDER has to:

- *Define the configuration of the platform*
- *Supply a list of necessary materials for the platform and simulation*
- *Prepare the job list for technical acceptances and simulation*
- *Ensure the validation of the platform by an authorized organization*

The PROVIDER is in charge with ensuring the energy LOTOTO procedure and instruction during the performance of Factory Acceptance Tests.

3.4.5 Reliability study

The PROVIDER has to:

- Submit to **COMPANY** the list of references for past improvements done
- Submit a FMEA with the aim to show all improvements taken in consideration from design phase
- Analyze all causes for unreliability by root cause analysis (respecting **COMPANY'S** template and methodology)
- Assess the probability of occurrence,
- Identify the corrective actions to comply with requested availability constraints.

3.4.6 Study for safety during design/ conception

The PROVIDER has to:

- Identify the risks linked to his supply during design, implementation, operation and maintenances phases
- HIRA (according with DIN EN ISO 14121 mechanical safety assessment and DIN ISO EN 13849-1 functional safety assessment)
- HAZOP
- Identify and implement actions to eliminate/reduce/replace identified risks
- List these risks and measures in a synthesis document (as table)

- List in a synthesis document called "LOTOTO" the following: energy Lock Out points, energy Lock Out elements, Lock Out possibilities, energy Lock Out/Tag Out/Try Out instructions.

3.4.7 Studies for the execution and implementation of contracted work within existing installation

The PROVIDER has to:

- *Verify the existing installations (existing piping, anchorage, cabling...)*
- *Study the interfaces with existing installations*
- *Make the studies for the integration of the entire system (including automation)*
- *Make the execution drawings and written description of works*
- *Prepare the technology of works on phases of execution as per standardised template of Projects Department (annex to this Technical Specification).*

3.4.8 Special studies for erection and dismantling during the execution of contracted work

The PROVIDER has to optimize, within the contracted work, the operations to be performed on site in order to minimize the main shutdown time for integration, as well as the number and duration of necessary initial stoppages. In this respect he will define:

- *Operational grid,*
- *Equipment for erection and adjustments,*
- *Maintenance equipment,*
- *Equipment for the exploitation of the machine or installation.*

3.5 WCM

The PROVIDER will comply with IT DP 045 "General rules to be applied by LIBERTY GALATI contractors" and the IT DP 046 «WCM Job List for Suppliers».

3.5.1 Synthesis of WCM measures and actions

The PROVIDER will provide a document under the form of a table, listing the actions and measures applied in order to comply with the WCM concept within the execution of contracted work.

3.5.2 Particular specifications regarding WCM

The following points will be considered by the **PROVIDER**:

- Access: 100% of equipment accessible at man-height
- Lighting
- Cleanliness
- Tidiness
- Maintainability
- Numbering system: the system will take into consideration the actual identification tag for each equipment and component. For a proper identification, the same tag will be used in all documentation mechanical drawings, electrical circuit diagram, PID diagram, bill list, layout, cable tray, PLC application program, HMI application.
- All the equipment must be supplied with visual management and clear warnings (POKA Yoke system to be implemented)

3.6 FIRST PRIORITY PARTS – SPARE PARTS – UPGRADEABILITY

The PROVIDER will comply with IT DP 045 “General rules to be applied by LIBERTY GALATI contractors”

3.6.1 Availability of spare parts

The PROVIDER ensures the spares for commissioning and for 2 years of operation. Within its offer the PROVIDER will make his proposal on a possible list for two years of operation's purpose. This list will be finally agreed during detailed engineering phases. The PROVIDER will ensure that for each component the COMPANY has at least 2 (two) possible suppliers. The PROVIDER will ensure all manufacturing details for the parts and/or components that will have unique supplier. Furthermore, the COMPANY will be allowed to use the manufacturing drawings for ensuring the spare parts

3.6.2 Particular specifications regarding Spare Parts – First priority parts - Upgradeability

Not the case

4. RESULTS AND PERFORMANCES TO BE ACHIEVED AND MEASUREMENT OF RESULTS AND PERFORMANCES

4.1 RESULTS AND PERFORMANCES TO BE ACHIEVED

The PROVIDER studies, defines and executes the contracted work as well as the equipment object of the contracted work in order to achieve the results and performances defined below, as well as in IT DP 045 “General rules to be applied by LIBERTY GALATI contractors”

4.1.1 Automation system

- CPU loading $\leq 50\%$
- Free memory $\geq 25\%$
- I/O spare, cabled, not used: 20%
- Time to act /switch/ execute the action as per command (HMI , automatic) $< 0,5$ sec
- Information update time on HMI as per the real information (after manual command, change the value of the parameter) < 1 sec
- HMI sampling time for variables $\leq 0,1$ sec, depending on the parameter
- Data transfer in the network: without collisions, $t < 0,2s$;
- Cycle time for automation response less than ...s - to be defined by the provider

4.1.2 Exploitation

The work executed by the PROVIDER, as well as the Equipment object of contracted work, has to achieve the following results and performances in terms of exploitation:

Results and Performances expected in terms of exploitation

- *Perform dedusting in predosing station 365 day / year, 24 hours / day*
- *Constraints due to environment, temperatures -20°C ... $+45^{\circ}\text{C}$*
- *Stoppages for maintenance: 12 hours / 2 months*
- *dust emissions at 1 meter distance from each working equipment (dust emission source) < 10 mg/m³*
- *dust emissions at the stack < 10 mg/Nm³*

- *remote automatic control configuration on suction points operational scenario (not all 102 suction points are used in the same time, 6 usual scenario available as attachment see Annex 17)*

4.1.3 Product quality

The work executed by the PROVIDER, as well as the Equipment object of contracted work, has to achieve the following results and performances in terms of product quality:

Not the case

4.1.4 Yield

The work executed by the PROVIDER, as well as the Equipment object of contracted work, has to achieve the following results and performances in terms of yield:

Not the case

4.1.5 Impaired or reversed operation, specific conditions

The work executed by the PROVIDER, as well as the Equipment object of contracted work, has to achieve the following results and performances in terms of impaired or reversed operation:

It cannot be accepted abnormal operation for dedusting installation. The installation is intended to work 365 days/year, 24 hours / day in normal performance parameters.

4.1.6 Standardization

All the spares should be standardized, with the possibilities to place further orders, if possible, to the several suppliers;

- Air compressed equipment ATLAS COPCO
- Distribution on 6 kV and 0.4 kV - Schneider
- Drives, (all types) Siemens or Schneider
- Motors (all types) Siemens or ABB (all motors > 150 kW to be equipped with temperature and vibration sensors)
- Measurement field equipment Siemens, ABB, IFM, WIKA, Hydac, SICK, Land, Williamson
- Sealings – European suppliers

4.1.7 Consumptions

The work executed by the PROVIDER, as well as the Equipment object of contracted work, has to achieve the following results and performances in terms of consumption:

The **PROVIDER** will list within its offer the details of the main consumptions of the equipment (water, energy etc.) and will ensure the lowest consumption possible according to the latest technology.

This will be an assessment criterion of the offer.

4.1.8 Reliability – Maintenance - Availability

The work executed by the PROVIDER, as well as the Equipment object of contracted work, has to comply strictly with the recommendations regarding Maintenance and Reliability of installations, detailed in the document « List of WCM tasks submitted to the attention of suppliers» attached to this technical specification.

The work executed by the PROVIDER, as well as the Equipment object of contracted work, has to achieve also, the following results and performances in terms of Reliability – Maintenance - Availability:

4.1.6.1 Tolerances for non-availability of the Equipment object of work executed by the PROVIDER

The non-availability of the Equipment object of the work executed by the PROVIDER must not exceed the limits indicated in the following Matrix of criticality.

The cases considered as acceptable are marked by “A”
The cases considered as unacceptable are marked by “I”

Breakdown = non-availability or faulty operation of the function

BREAKDOWN	VERY FREQUENT 1 breakdown per month Fmax = 12 / year	FREQUENT 1 breakdown per semester Fmax = 2 / year	LESS FREQUENT 1 breakdown per year Fmax = 1 / year	IMPROBABLE 1 breakdown every 5 years Fmax = 0.2 / year
CATASTROPHIC Stoppage > 8 h	I	I	I	I
CRITICAL 2h < Stoppage <= 8 h average = 5 h	I	I	I	A
MAJOR 1h < Stoppage <= 2 h average = 1.5 h	I	I	A	A
MINOR Stoppage < 1 h Average = 0.5 h	I	A	A	A

4.1.8.2 Operational Rate – Availability Rate

The definition by calculation of the Operational Rate and Availability Rate of the Equipment object of the work executed by the PROVIDER can be done in the following manner:

- ▶ The above matrix allows to determine the tolerated breakdown time:
 - Critical breakdown : 1 x 1h = 4 h /year
 - Major breakdown : 2 x 2h = 4 h /year
 - Minor breakdown : 4 x 1 h = 4 h /year

Therefore, the **Tolerated breakdown time** is: $T_{tolerated\ breakdown} = 12\ h /year$

- ▶ The installation operates 365 days per year or 8760 H /year.
The stoppages planned for maintenance are evaluated at: $T_{planned\ stops} = 72\ h /year$.

- ▶ The **Operational rate** is calculated by integrating the stoppages planned for maintenance, or as:

$$\text{Operational rate} = (8760 - T_{\text{planned stoppages}} - T_{\text{tolerated breakdown}}) / (8760)$$

- ▶ The **Availability Rate** is calculated excluding stoppages planned for maintenance, or as:

$$\text{Availability rate} = (8760 - T_{\text{planned stoppages}} - T_{\text{tolerated breakdown}}) / (8760 - T_{\text{planned stoppages}})$$

The Equipment object of the work executed by the PROVIDER has to achieve the following results and performances:

- **Operational rate = 99,041 %**
- **Availability rate = 99,861 %**

The assembly of the installation has to be conceived in order to achieve the above defined operational rate and availability rate, especially with **the possibility to diagnose and replace immediately a faulty mechanism and the availability of necessary spare parts.**

4.1.8.3 Other results and performances to be obtained in terms of Maintenance and Reliability

The **PROVIDER** will design the assembly into consideration the WCM principles resulting in a friendly maintenance.

4.1.9 Other performances to be achieved

The PROVIDER has to achieve also the following results and performances:

To be detailed and quantified unless classified in the previous paragraphs.

- *Illumination level*
- *Noise level < 85db(A)*
- *For on-site works:*
 - *Quality of works*
 - ▶ N° of anomalies report – Zero anomaly reported
 - ▶ N° of non-conformity reports max 1 NCO reported /activity
 - ▶ Time to solve anomaly / non-conformities: corrective actions in case of NCO report deployed not later than 1 shift
 - ▶ Qualification of workers – as per legal and professional standard requirements for authorised professions with proof of credentials.
 - ▶ Respect of planning
 - ▶ N° of safety remarks: Zero Cardinal Rules Infringements; Zero First Aids, Zero Medical Treatments, Zero Restricted Works, Zero Lost Time Injuries, Zero Fatalities.
 - ▶ Tidiness and Cleanliness on site – max 1 NCO reported /day and corrective actions in case of NCO report deployed not later than 1 shift.

4.2 POSSIBLE EVOLUTION OF THE INSTALLATION IN THE FUTURE

The Equipment of the PROVIDER has to be able to evolve in the following manner:

Evolution on short - middle - long term:

- *The filter and fan capacity should have 10% reserve for future extension on suction points network*

4.3 LIFETIME

The **PROVIDER** must design the supplied solution and equipment so that the lifetime is of 25 years. The **PROVIDER** must deliver the reference list with the observed lifetime all supply

4.4 METHODS TO VERIFY THE RESULTS AND PERFORMANCES TO BE ACHIEVED

- Workshop pre-inspections on the supply manufacturing/assembly intermediary phases
- Final supply inspection in the workshop before delivery
- Intermediary inspections on the manufacturing development intermediary phases
- FAT and cold commissioning in workshop
- Hot tests- with evaluation for minimum 3 different materials handled
- Performance tests – with evaluation on maximum scenario suction points simultaneously
- Commissioning
- Measurements will be done by Liberty Galati – Safety Department using Casella Apex type instrumentation at distance of 1 meter for different equipment inside Predosing Station
- Measurements will be done by Liberty Galati – Environment Department for stack emissions
- Third party measurements if measurements not concluded, in scope of the PROVIDER

4.4.1 Measurement of non-availability and availability rates

The Non-availability as well as the Availability rate of the Equipment object of contracted work will be verified and measured between the Industrial Commissioning phase and the Reception, and between the Reception and the end of the guarantee period.

5. SAFETY – ENVIRONMENT

THE COMPANY UNDERSTANDS THAT THE SAFETY OF EQUIPMENTS AND WORKS EXECUTED ON-SITE IS OPTIMUM AND WORKS ARE EXECUTED IN PERFECT SAFETY CONDITIONS.

The PROVIDER will comply strictly with Annex 10 - “General rules to be applied by LIBERTY GALATI contractors” and Annex 03 General safety instructions for External Companies that work on the beneficiary’s sites.

The PROVIDER will inform the COMPANY about all the specificities of the equipment in terms of environment and safety.

Taking into account the environment in which the Equipment will be installed, since the conception phase of the respective equipment, the PROVIDER will comply with prescriptions regarding machine (equipment) safety and that of the worksite.

The PROVIDER must attach to the Technical Offer, the filled-in template Annex 16 - H&S Management Questionnaire V1, (annex to this Technical Specification).

5.1 PARTICULAR SAFETY SPECIFICATIONS TO BE CONSIDERED

All actions to eliminate / reduce / replace identified risks resulting from HIRA, described in chapter 3.4.6 – **Study for safety during design/conception**, of this document are considered as part of the PROVIDER supply – design, manufacturing, delivery, erection, notably all the energy Lock out elements.

The PROVIDER shall consider and integrate in his scope of work (if the need arises), that any access, work or maintenance platform shall comply with COMPANY standard requirements (equipped with toe boards and standard height of handrails and guardrails to be min 1100 mm).

The PROVIDER shall conceive and execute the contracted work in complete compliance with equipment electrical security and grounding conditions.

The PROVIDER must optimize, within the contracted work, the operations to be performed on site in order to:

- simplify the site organization and improve the efficiency of risks prevention
- minimize the shutdown time for integration, as well as the number and the duration of necessary initial stoppages

5.2 PARTICULAR SPECIFICATIONS REGARDING THE SAFETY OF THE WORKSITE

The PROVIDER shall consider and integrate in his scope of works the necessary health and safety specialized supervision of his work team during the entire performance of contracted works.

The PROVIDER shall consider and integrate in his mandatory PPE – the chinstrap (min. 3 points) – attached to the safety helmet for all his personnel (including subcontractors and service providers) to be used on site at all times and the respiratory protection PPE (dust masks min FFP1) since the execution on site of contracted works shall be done with minimum of stoppage time of conveyor belts.

The PROVIDER shall consider and integrate in his working equipment and devices, the necessary electro insulated field accessories (a.i. “S” type hooks) to ensure all electrical supply cables and

energetic fluid hoses to be used during the execution of contracted works are suspended, to minimize the trip and fall hazards.

The PROVIDER shall consider and integrate in his scope of works all the necessary field lifting devices to accommodate his technology of work to install conceived equipment considering that on the location of the COMPANY, the existing lifting devices are decommissioned.

The operational process specific to the location where most part of the contracted work shall be executed raises the fire risk level in case of performance of hot works, therefore the PROVIDER shall consider and integrate in his scope of supply all the necessary technical measures available to prevent fire starting by ensuring limitation of hot work areas through protection panels, protection of areas with fire blankets and existence of first intervention fire extinguishers.

5.3 PARTICULAR SPECIFICATIONS REGARDING THE ENVIRONMENT

The PROVIDER shall prepare and execute all activities related to this technical specification considering the legal requirements for environmental protection as well as SR EN ISO 14001: 2015 Environmental Management Standard.

The PROVIDER shall consider and include in his technical offer any relevant information regarding possible delivery and use of any necessary chemical substance (hazardous or not).

Any chemical substance, considered hazardous or not, shall be declared by the PROVIDER prior to being delivered on the premises of the COMPANY by filling in the template for introduction / use of chemical / hazardous substances (see attached) in two copies, which will be stamped by the security guard when accessing the COMPANY premises as well as by the Environmental Representative of the Company when delivered, following that the second copy to be submitted by the PROVIDER to the security guard at the end of activity, for archiving purposes.

The COMPANY, based on the data included in this template shall indicate to the PROVIDER the location and proper storage conditions for the respective chemicals.

For the scope of his activity, the PROVIDER shall identify all environmental risks and decided mitigations actions and will submit this analysis to the knowledge and approval of the COMPANY by filling in the template for identification and analysis of environmental risks (see attached), prior to any commencement of site activities

6. TECHNICAL RULES FOR CONCEPTION, CONSTRUCTION, CALCULATIONS

The PROVIDER will comply strictly with IT DP 045 "General rules to be applied by LIBERTY GALATI contractors"

According to the evolution of standards and norms, if there are any contradictions between the recommendations and prescriptions of the COMPANY and enforced regulations: the PROVIDER has the obligation to inform the COMPANY. The final solution will be chosen by mutual agreement of the two parties.

6.1 SPECIFIC RULES

Additional to enforced Norms and Regulations, as well as to construction standards, instructions and rules of the COMPANY, the PROVIDER will comply with the below mentioned specific rules:

ISO 12944

ISO 2409

C150-99 welding quality directive

ISO 13920

ISO 9001

ISO 14001

ISO 45000

IEC 81346

SR EN 22768-1,2 mK

6.1.1 Welding Procedure

All welds on the mechanical equipment must be stress relieved (e.g.: drums, gear reducer casings, special couplings, clamps, hooks, balancing rods, steel structure frames etc.)

The **PROVIDER** must comply with

C150-99 welding quality directive

sr en ISO 13920

In order to fulfil the conditions of traceability and quality the **PROVIDER** must provide all quality welding control documents and related documents for used materials and compile one file quality for each element (support, welded joint pipes, etc) respecting the minimum as follows:

1. Welding procedure (WPS) - specifications covering all type of welding joints (provided in drawings and / or specifications);
 2. Document of approval of welding procedures (WPQR) - records covering all type of welding joints (provided in drawings and / or specifications);
 3. List of welders who worked on product (authorization of welders for type and thickness of the base material - including welding position);
 5. Location map of welder punches (according to specification / drawings);
 6. Control file (visual, LP, US, etc.- where appropriate - according to specification / drawings);
 7. Quality certificate for semi-finished products (sheets, profiles, pipes, etc.);
 8. Quality certificate for filler materials (electrodes, wires, flux, etc.);
 9. Document for dimensional measurements (where applicable);
- ASTME 709, Standard Ghid pentru examinarea cu Particule Magnetice, editie aplicabila / Guide norm for examination with magnetic particles, valid edition*;
h) ASTM E 165, Norm of testing methods by penetrant liquids, valid edition*;
i) EPRI NP-5380, Visual control of welds acceptance criteria, valid edition*;

6.1.2 Tests

HG 51/1996 – decision regarding the regulation of reception for machine montage, equipments, technological installations and their commissioning.

OG No. 95 from 30 August 1999

Law NO. 440 from 27 June 2002

6.1.3 X- Ray inspections

6.1.4 Thermal treatments

6.1.5 Specific rules and request for mechanical, hydraulic, heat, thermo and ventilation

Directive 2006/42/EC of the European Parliament and of the Council of 17 May 2006 on machinery, and amending Directive 95/16/EC (recast) (Text with EEA relevance)
HG nr. 1029/2008,

DIRECTIVE 2004/108/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 15 December 2004 on the approximation of the laws of the Member States relating to electromagnetic compatibility

6.1.6 Specific Rules for Electrical – Instrumentation

73/23/EEC	Low Voltage Directive
EN 60 204	Safety of machine, electrical equipment of machines
EN 50 178	Electrical equipment in electrical installation
EN 61 800-3	Variable-speed electric drive EMC product standard
EN 55 011	EMC Emission
EN 61 000-4-3	EMC Interference - Immunity
IEC 60 801-3	EMC Interference

IEC 62337 Commissioning of Electrical, Instrumentation and Control Systems in the Process Industry

IEC 62381 Activities during Factory Acceptance Test (FAT), Site Acceptance Test (SAT) and Site Integration (SIT) for Automation

IEC 62382 Electrical and Instrumentation Loop Check

DIRECTIVE 2006/95/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 December 2006 on the harmonisation of the laws of Member States relating to electrical equipment designed for use within certain voltage limits

HG nr. 457/18.04.2003

HG nr. 982 from 22 august 2007

The list is not exhaustive. All EU electrical standards must be accomplished.

Romanian Norms

- NP 17-02 – norm for electric installations engineering and execution
- PE 107/98 – Norm for electric cable networks engineering and execution
- PE 102/86 – Norm for the engineering and execution of connecting and distribution installations with power up to 1000 V a.c.

6.1.7 Specific Rules for Automation

See Annex -GENERAL IT REQUIREMENTS for new Automation Systems

6.1.8 Specific Rules for Level 3

See Annex -GENERAL IT REQUIREMENTS for new Automation Systems

6.1.9 Other Specific Rules

All European standards must be respected

6.1.10 Specific Rules concerning the Safety for Fire Prevention and Suppression

These prescriptions, rules and regulations are non-limiting ones, the beneficiary can take other actions to prevent or remove any event (accident).

- Law 307/2006-fire-fighting;
- Safety and hygiene regulation 9/N/1993;
- GD 355/2007 – monitoring the workers health
- Order 508/933 – MMSS and MSF – Population safety and health;
- P 118-99-fire safety;
- Law 307/2006 – fire-fighting
- Law 319/2006 – H&S Law
- H&S Law no. 319/2006.
- GD 300/2006 – Minimum H&S requirements on temporary or mobile sites
- GD 971/2006 – Minimum H&S requirements at the workplace
- GD 1028/2006 – Minimum H&S requirements for the equipment with screens
- GD 1048/2006 – Minimum H&S requirements for the workers use of the PPE
- GD 1091/2006 – Minimum H&S requirements at the workplace
- GD 1146/2006 – Minimum H&S requirements for the workers use of the working equipments
- Department norms MIM – vol. I and V (not cancelled)

6.1.11 Specific Rules for Civil Works

Law 10/1995 – building quality, published in the OG MO 12/24.01.1995

7. RANGE AND INTERFACES OF CONTRACTED WORK

7.1 INTERFACES

The contracted work of the PROVIDER will be executed within the following physical limits:

Liberty Galati - Primary Area – Sinter Plant - ***Pre dosing station***

Existing dedusting installation (ducts, filter, fan, stack, dust evacuation)

Existing electrical stations

Existing cranes

Access roads inside Sinter Plant

Utilities network (water, natural gas, oxygen, compressed air)

7.2 ELEMENTS DELIVERED BY ANOTHER PROVIDER OF THE COMPANY

The PROVIDER has a mission to coordinate and erect the elements delivered by another provider of the COMPANY, which are interfacing with the execution of his work.

He will address to the COMPANY and to the other provider a note in which:

- He will define his expectations regarding these elements, referring to their main and necessary characteristics;
- He will make all useful recommendations for these elements to allow him to comply with his commitment for results and to ensure the complete success of project.

The delivery of these elements, for which the construction and installation will be done according to pre-specified information, will result in the elaboration of a reception protocol signed by the PROVIDER and by the other provider of the COMPANY who has executed the respective elements.

During this contradictory reception, the PROVIDER will verify the works executed by the other provider of the COMPANY.

Unless any written reservations issued by the PROVIDER during the contradictory reception, the respective elements will be considered as accepted without reservations by the PROVIDER and therefore perfectly adequate with his commitment for results.

Any ulterior modifications will then be exclusively in the charge of the PROVIDER.

The PROVIDER will inform the COMPANY about all difficulties encountered during this reception phase.

7.3 WORKSITE

The PROVIDER will comply with Annex 10 - "General rules to be applied by LIBERTY GALATI and IT DP 044 General safety instructions for External Companies that work on the beneficiary's sites.

7.3.1 Particular specifications

Particular specifications regarding:

- *Social buildings*
- *Worksite network*
- *Utilities*
- *Pre-manufacturing areas*
- *Stocking areas*
- *Etc...*

Will be established during preparatory site visits

8. TESTS - COMMISSIONING – RECEPTION

8.1 SHOP TEST ASSEMBLY – TECHNICAL ACCEPTANCES, SIMULATION, WORKSHOP TESTS

The PROVIDER engages to favour the shop test assembly and/or technical acceptance. He will specify to the COMPANY which are the assemblies or sub-assemblies which can be erected in the workshop and / or technical acceptance and all the documents which can be defined.

The automation technical acceptance concerns the ensemble of functions, having as objective their validation.

The PROVIDER favours all tests and technical acceptance of automation, being in charge with energy LOTOTO process during tests.

The **PROVIDER** will provide to the **COMPANY** the proposed location (workshop) for tests, a detailed planning and full documentation (including manufacturing drawings) to allow the **COMPANY** to provide feedbacks and participate at all tests assembly, checks, inspections and technical acceptances.

The proposed location (workshop) for the tests must have the capability to perform all tests and measurements. The **PROVIDER** must be able to prove measurement eligibility by presenting all certifications and measuring methods of the measurement tools needed.

The **PROVIDER** will inform the **COMPANY** with at least two weeks in advance the details related to the verifications, inspections, tests and their planning, which will be conducted in the workshop or plant

The **PROVIDER** must update the documents within 10 working days after any improvements/observations are agreed with the **COMPANY**.

Only after engineering is acknowledged by the **COMPANY**, the **PROVIDER** may start manufacturing (partial engineering acknowledgement is accepted). The **PROVIDER** is not allowed to perform any modification without the written approval of the **COMPANY**.

8.1.1 Description of automation tests specific to the contracted work

The FAT and SAT test for automation must include the minimum tests of the following (open list):

- visualization, operation and functioning of motors and valves in local mode, manual mode;
- visualization, operation and functioning in automatic mode;
- measurements visualization and operation;
- motors, valves and measurements alarms;
- interlocks.
- sequences and calculations.
- stability of PID controls.
- input parameters.
- access levels.
- Acoustic alarms.
- Energy Lock Out test

Other test:

- Data exchange with and other systems;
- Connection between PLC's on the same level;
- Connection between PLC's and HMI station client/server
- Connection between HMI server and clients
- Connection between new Level 1 and new Level 2

Test protocol of tests will be written by the **PROVIDER** and approved by the **COMPANY** using Annex -14-Template for pre-commissioning and commissioning

8.1.2 Special verifications

Not applicable

8.2 RECEPTIONS AND VERIFICATIONS IN THE PLANT

The **PROVIDER** will inform the **COMPANY** about the verifications and their planning, which will be conducted in the plant.

During the visit(s) for verification(s) in the plant, the **PROVIDER** will present to the controllers of the **COMPANY**, his **Quality Insurance Manual** as well as the **Quality Insurance Plan**, specific to the respective contracted work which he applied during the entire period for studies and manufacturing of concerned Equipment.

8.3 ON SITE TESTS

The **PROVIDER** prepares the testing procedures for the Equipment object of contracted work.

He ensures the availability of the organising and participating personnel, in terms of quality, number and necessary time, based on the time schedule defined by the general planning for tests:

- Partial tests
- Assembly tests
- Test of energy LOTO elements
- Cold tests

- Hot tests in the exploitation environment
- Adjustment tests
- 72 h test
- ISCIR legal tests for authorization
- Industrial Commissioning
- Performance tests
- Reliability tests

The **PROVIDER** will follow minimum the template provide by the **COMPANY** - Annex – Template for pre-commissioning and commissioning

8.3.1 Description of tests specific to the contracted work

- *No-load tests*
- *Energy Lock Out test*
- *Partial tests: The partial tests will be performed with the intervention services of the COMPANY and other providers*
- *Regulatory tests*

8.4 CONFORMITY OF THE EQUIPMENT, OBJECT OF CONTRACTED WORK

The **PROVIDER** will comply strictly with IT DP 045 “General rules to be applied by LIBERTY GALATI contractors”.

8.5 COMMISSIONING

8.5.1 Partial Commissioning

Not applicable

8.5.2 Industrial Commissioning

The **PROVIDER** will comply strictly with IT DP 045 “General rules to be applied by LIBERTY GALATI contractors”.

8.5.3 Stand-by and intervention

The **PROVIDER** will have to ensure full support for pre-commissioning and commissioning activities following form of:

- Permanent presence during all pre-commissioning activities
- Permanent presence on **COMPANY’S** site in terms of 8 working hours per shift, week-end and holidays included, during all commissioning tests
- Permanent phone services for technical support and interventions (arrival on site 2 hours) after IC until PAC

This permanent presence will be maintained until achieving the operation of the installation delivered by the **PROVIDER**, as per the specification.

This (these) permanent presence(s) will be maintained until achieving the operation of the installation delivered by the **PROVIDER**, as per the specification.

8.6 TRAINING

The training will be performed with training documents established by the PROVIDER, in Romanian and English language.

The PROVIDER will submit to COMPANY during early engineering phases the full training manual with clear syllabus/curricula (table of contents).

The training sessions will be organized thus to comply with the proper development of different phases of the project, by ensuring the necessary know-how to different intervention parties, at the adequate moment.

The PROVIDER will provide for this training the necessary personnel having a perfect and very accurate knowledge about the Equipment.

8.6.1 Personnel to be trained by the PROVIDER

- *The project group of the COMPANY having general knowledge about the tools and techniques applied for the execution of the equipment (specific tools for study, automated systems, specific software, development method....)*
- *The operational personnel using the system for the operation, adjustment and first diagnosis of the installation. It is reminded that the exploitation personnel work in 5 shifts.*
- *The personnel for interventions during troubleshooting and for the maintenance of equipment and materials*
- *The specialists of the COMPANY with profound knowledge regarding implemented equipment and software.*

Main subject of training	Training objective	No of people	Speciality
Automation L0	Understand maintenance and detailed working principle Safety best practices Safety and technical risk Awareness Application source code understanding	2	Instrumentation specialists
Automation L1		6	Automation engineers
Automation L2&IT	Knowledge regarding application software development (develop, optimize, troubleshoot, integrate, extend) Knowledge regarding implemented equipment (hardware, system software, network: install, maintain, troubleshoot, integrate) Safety best practices and risk awareness	4	Software developers Computer system/ network engineers
Mechanical , hydraulic and HTV	Understand detailed working principle and maintenance of the system. Safety best practices. Safety and technical risk awareness	10	Maintenance personnel
Electric		10	Electrical maintenance personnel
Process		16	Process operators

8.6.2 Location for the Training

- In the workshops of the PROVIDER
- On-site, in the plant of the COMPANY

8.6.3 Training on the installation

- On similar installations
- On the installation erected in the plant, on the site of the COMPANY

8.6.4 Time schedule of the training

The ensemble of this training will be organized thus to comply with the proper development of different phases of the project, by providing the necessary know-how to different intervention parties at the adequate moment.

The PROVIDER will specify in his offer the time schedule for the training period.

The PROVIDER will finalize the time schedule for the training period after performing the functional analysis.

8.7 RECEPTION

The PROVIDER will comply strictly with IT DP 045 "General rules to be applied by LIBERTY GALATI contractors".

The Reception will take place 3 months after the Industrial Commissioning, under the reservations that:

- The work executed by the PROVIDER, as well as the Equipment object of contracted work, achieve the results and performances defined in article 5 "Results and Performances to be achieved and measurement of results and performances»
- The PROVIDER has complied with all his contractual obligations.

9. GUARANTEE PERIOD

24 months from PAC

10. DOCUMENTS TO BE SUPPLIED

All the documents to be supplied will be in Romanian and English language.

The documents issued in a foreign language have to be supplied in the "original language" version and the translation in Romanian language.

They will be updated and sent during the execution of the work, as per established planning.

The final versions of all documents, updated and accurate, will be submitted to the COMPANY prior to the Industrial Commissioning.

10.1 LIST OF DOCUMENTS TO BE SUPPLIED (NON-EXHAUSTIVE LIST)

- *Quality Plan of the project as per ISO 9001 / 9002 / 14001*
- *Drawings and documentations for mechanical and civil works*
 - *Drawings for assemblies, sub-assemblies, details with the detailed list of drawings*
 - *Assembly layouts showing the cinematic diagram of the equipments and the possible interferences between moving sub-assemblies*
 - *General layouts for implementation*
 - *Assembly layouts for civil works and reduction of loads*
 - *Dimensioning layout for civil works*

- *PID : Pipe Instrumentation Design Diagrams*
- *List of motors and components*
- *List of instrumentation*
- *Functional description of the entire system*
- *Piping isometric drawings*
- *Sub-contracting of his scope of supply*
- *Particular technical specifications*
- *Calculation notes.*
- *Electrical layouts and drawings as per technical instructions*
 - *Developed diagrams: electrical circuit diagram, electrical cabinet bill list, electrical cabinet layout, layout of equipment installation and cable route, wiring diagrams, cable list, etc*
 - *Network diagram, signal list, hardware configuration,*
 - *PID diagram with electrical tag*
 - *Description of software application for PLC, HMI, Level 2 software, database architecture, tables and fields*
 - *General and detailed functional analysis*
 - *General and detailed organic analysis*
 - *The list of tasks for acceptance and tests*
 - *The commented listings*
 - *The source code for all software and all necessary tools to develop application, programs (L1 and L2),*
- Reliability study
- Governance model
- FMEA analysis
- Technical description during erection phases for all performed operations (daily)
- Complex lifting plans
- Study for safety during conception
- Detailed equipment and component list
- Detailed handling procedure
- All standards used and catalogues
- Detailed sequence equipment and components mounting for warehousing and transport optimization
- List of TPM/CM measures and actions for all project phases
- Detailed planning for design phase (MS Project 2007)
- Detailed planning for manufacturing with clear milestones for the pre-inspections and final inspections (MS Project 2007)
- Detailed planning for erection phase (MS Project 2007)
- Detailed planning for commissioning phase (MS Project 2007)
- Detailed list of operations for erection/mounting and list of verification/checking's
- Entire site assembly and mounting documentation
- Description of operational modes for erection, mounting, site assembly and tests (technological file)
- Technical control file and protocol description for all tests as per **COMPANY'S** template
- Listing and adjustment sheets
- Instructions for operation, exploitation and maintenance including Lockout/tag out process
- Preventive maintenance plan
- Complete constructor file
- Risk assessment for all project phases (HIRA, HAZOP)

10.2 DIFFUSION METHODS OF DRAWINGS

The PROVIDER will comply strictly with IT DP 045 "General rules to be applied by LIBERTY GALATI contractors".

10.3 PARTICULAR SPECIFICATIONS REGRADING THE DIFFUSION METHODS

The **PROVIDER** will comply strictly with IT DP 045 "General rules to be applied by LG **PROVIDERS**".

The **PROVIDER** is requested to propose to **COMPANY** the easy of structuring the documentation before starting any process. The final documentation structure as well as the naming of each file has to be agreed by the **COMPANY**.

All drawings will be submitted in *.dwg format as well as *.pdf format.

All the drawings and documentation to be received will be defined into an excel list (centralizer of all documents/drawings). This list will act as a monitoring file (live document) for all send, updated review documents and drawings

Any document or drawing is sent with the updated excel list (summary of all documents/drawings).

The **COMPANY** does not accept partial transmittals or any other type of list fragmented list.

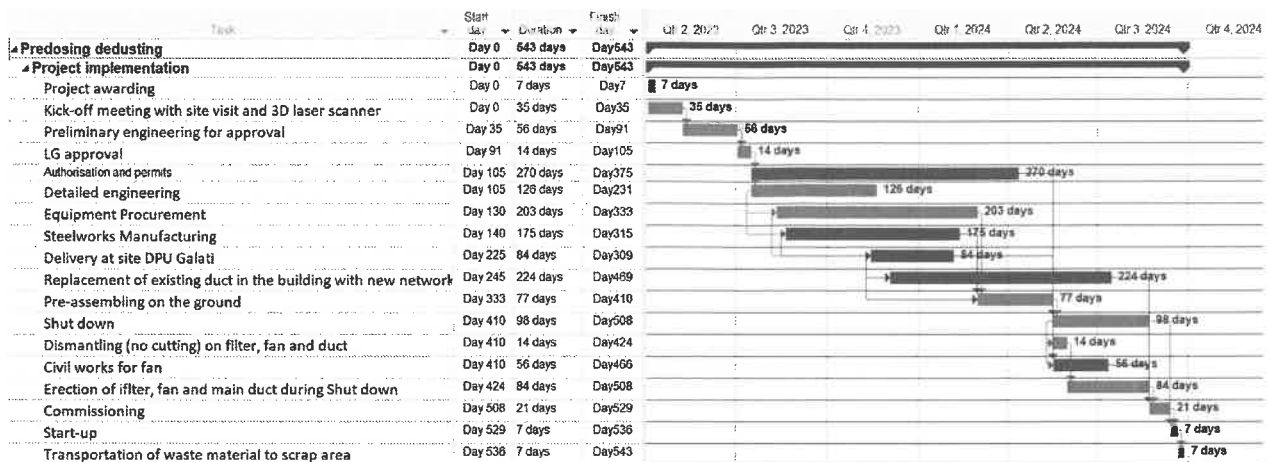
The documentation, included As Built will be provide on paper (4 files) and electronic support for review (modifications in red color)

As Built documentation will also contain the drawings and documentation unchanged (as original)

The electronic format will contain the files in editable form (doc, xls, CAD, Eplan) and pdf / tif

11. DELAYS – PLANNINGS

The key dates for the development of the business are:



The PROVIDER draws up and provides his Planning by specifying the main phases, including the preparation studies and works.

The PROVIDER also establishes the following different planning and ensures the compliance with:

- **General Time Schedule of the project**, allowing the time positioning of the following:
 - ▶ Studies.
 - ▶ The dates for the submission of documents
 - ▶ The reviews of conception
 - ▶ The procurement
 - ▶ The erection and shop test assembly
 - ▶ The civil works
 - ▶ The transportation
 - ▶ The training periods
 - ▶ The on-site erection.
 - ▶ The tests and the industrial commissioning.
- **Detailed Time Schedule for the on-site erection** by specifying the main phases, including the preparation works. In particular, the PROVIDER specifies all the phases requiring the stoppage of the installation, therefore of the production.

11.1 REQUEST OF SCHEDULE DELIVERY

The PROVIDER defined and delivers his planning by specifying the all the phases, including the preparation studies and works.

The planning document will be defined in Microsoft project 2007 and will be submitted in the original format that is the *.mpp extension.

The planning will be made respecting the succession of the tasks rather the task type (electric, mechanical, etc.).

The PROVIDER will avoid using the tasks constrains (i.e. must start on, must finish on, etc) and will use links for all tasks

The PROVIDER also establishes the following different planning and ensures the compliance with:

- Detailed time schedule of the project, allowing to monitor the details of:
 - ▶ Studies and design
 - ▶ The dates for the submission of documents
 - ▶ The reviews of conception and design
 - ▶ The procurement and manufacturing
 - ▶ The workshop tests, pre-inspections, final inspection before delivery, FAT

- ▶ The transportation
- ▶ Assistance

The **PROVIDER** will send a weekly update of the planning in Microsoft project 2007 (*.mpp format) for all the above phases except for the erection, shop test assembly, tests and commissioning.

12. PROJECT MANAGEMENT

The **PROVIDER** must comply and respect with the governance model of the **COMPANY** and assure full availability and collaboration on the following:

1. Kick off meeting
2. Project monitoring meetings
3. Clarifications and technical discussions

Any change considered in the initial organization of the **PROVIDER** must be announced with at least 3 days in advance by submitting a new organization sheet.

All roles and responsibilities inside the **PROVIDER's** organization must be clearly detailed and explained to **COMPANY** representatives

12.1 PROCEDURE FOR QUALITY CONTROL

The **PROVIDER** will comply strictly with Annex 10 "General rules to be applied by LIBERTY GALATI contractors"

The **PROVIDER** will transmit to the **COMPANY** with at least two weeks in advance, his **Quality Insurance Manual** as well as the **Quality Insurance Plan**, specific to the respective contracted work which he will apply during the entire period.

12.2 PARTICULAR SPECIFICATIONS REGARDING THE QUALITY CONTROL

As per the quality plan released by **PROVIDER** and approved by the **COMPANY**

13. PRESENTATION OF THE OFFER

13.1 . PRESENTATION OF THE TECHNICAL OFFER

In his offer, the **PROVIDER** has to strictly comply with the splitting into posts as described in chapter 3.3.

13.2 . PRICE BREAKDOWN

In his offer, the **PROVIDER** will split the prices as follows:

Annex 11 Scope of works template

14. ANNEXES

Annex -1-Technology of works template

Annex -2-GENERAL IT REQUIREMENTS for new Automation Systems

Annex -3-General safety instructions for External Companies that work on the beneficiary sites

Annex -4-Required engineering documents

Annex -5-Automation architecture

Annex -6 - Predosing station – equipments

Annex -7-PLC, electric cabinets, and electric feeding in SMC stations

Annex -8-Automation procedures

Annex -9-WCM Specification for suppliers

Annex -10-General rules to be applied by Liberty contractors- eng - rom

Annex -11-GCIP-00-Liberty

Annex -12-AutoCAD template for drawings

Annex -13-Scope of works template

Annex -14-Template for pre-commissioning and commissioning

Annex -15-Instruction for bidders on quotation

Annex -16-Questionnaire for Contractor H&S V1_EN

Annex -17 – Scenarios for suction points simultaneously