



**LIBERTY**

**LIBERTY Galati**

**Project Department**

**No 7400 / 144/06.02.2023**

## TECHNICAL SPECIFICATION

### ENVIRONMENT

## LIBERTY GALATI

**Contracted work: Replacement of actual transformers  
(cooling with PCB oil) with new type (free  
PCB) – step 4**

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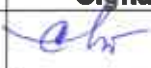

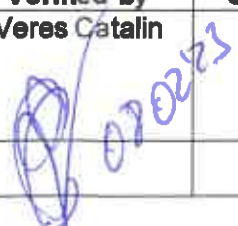
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**FOREWORD**

LIBERTY Galati plant is called hereinafter, the COMPANY.

In this Technical Specification, the Installations represents Hot Strip Mill as well as the complete connected installations (Electrical, 6KV stations, electrical motors), and the Equipment represents the complete or a part of the Installation.

The COMPANY, within its project aims to maintain operational HSM according with European and Romanian law related to environment, which request to be not more used transformers cooling with oil PCB/PCT.

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 safety and environment, 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 contractors" as well as with all the objectives of the latter.

### 1. OBJECT OF CONTRACTED WORK

Within the project for environment, this Technical Specification refers to electrical transformers which are using PCB (softol) for cooling.

The object of contracted work is to comply European and Romanian for environment (HG nr. 173/2000 ; HG 173/2000 ; SR EN ISO 14001:2015) and to replace the transformers which are using softol / PCB(PolyChlorinated Biphenyls) until 2024.

The project is started in 2019. Until now are already replaced 47 pcs.  
For 2023 are foreseen to be replaced 12 transformers and in 2024 the last 12 pcs.

The technical offer will be valid until 2024, for all types of transformers, except the Time Schedule which will be updated for each step.  
The list of transformers PCB with main electrical features is presented in Annex 1 "List of existing equipment rev 9".

The work executed by the PROVIDER will include in particular:

- Conception of Equipment
- Basic and Detail Engineering
- Documentation for erection
- On-site verification of drawings belonging to existing installations
- Assembly layouts and detail drawings
- Supply and provision
- Manufacturing in the workshop
- Shop test assembly and workshop tests
- Factory Acceptance Test (FAT)
- The technical acceptances
- Packing, loading, transport, dispatching, unloading, delivery on site
- Supervision of erection including all on site adjustments,
- Conducting of cold tests and hot tests, as well as performance tests
- Regulatory tests
- Management and coordination of tests on site, by taking into account all operational constraints
- Assistance during the Industrial Commissioning until reaching contractual performances
- Training of Company's personnel
- Complete documentation, in Romanian and English, necessary for start up, operation and maintenance of the Equipment

**All supplies of parts, materials and matters, all transports, all loading and unloading operations, all equipping (nacelles, ...), all servicing equipment, 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 is the sole responsible for the solutions implemented in order to guarantee the proper operation of his installation and to obtain the results 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.

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- **Conceive the installation and its organization, in order to guarantee the safety and to minimize the execution difficulties of his work, by complying with the environmental standards.**
- **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

The PROVIDER, while executing the work, will take into account the constraints applying to the site of the COMPANY', defined in IT DP 045 "General rules to be applied by LIBERTY 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:

- Outdoor temperature \*
- Relative humidity \*
- 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 located in Earthquake Risk Zone Level VII on Mercalli scale.
- Installation located in the bay
- Nature of terrain
- Heat (conduction, radiation, convection)
- Dust
- Sand
- Noise
- Temperature of electrical locations / sites
- Temperature (environmental): +40...45°C during the summer, -10°C in winter time;
- Behavior during standard power line disturbances (amplitude – 30% U duration 300 ms)
- Location and means available for stocking
- Acid environment
- Physical aggression (shocks, vibrations)
- Exposure to projection of hot metal
- Movement of handling and transport equipment
- Under voltage installations
- Ionizing radiation
- Magnetism
- Works performed on the installation during operation or while out of order
- Equipment in movement (automated control)

### **2.2 INSTALLATION INTERFACING WITH THE CONTRACTED WORK**

- **Role of the Installation**

#### **➤ FINISHING MILL**

Rotary drum crop shear with cutting optimization

Seven stands of 6300 kW,

Maximum delivery strip speed at F7: 12m/s

Work rolls diameter 770mm, (gray cast iron / cast iron high alloyed with chrome.)

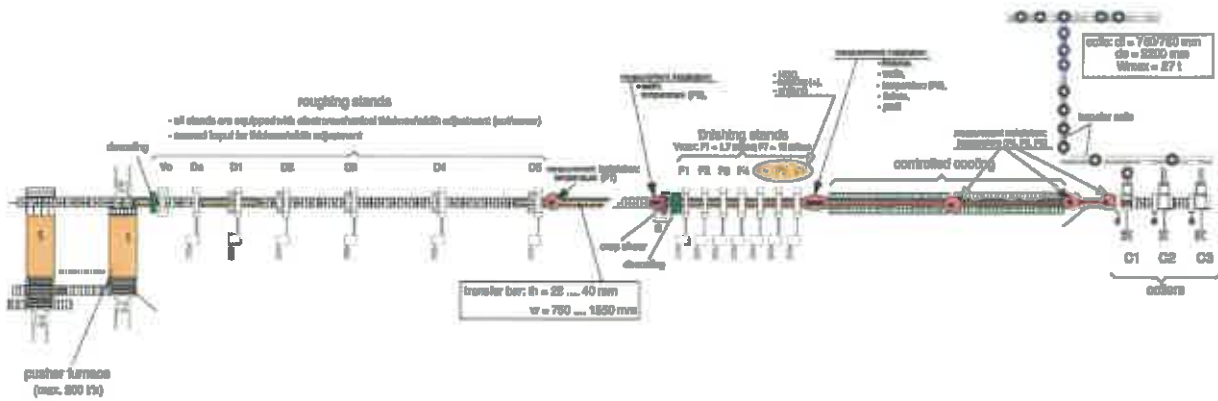
Back-up rolls in 85CV15 forged with a diameter of 1500mm

Max roll force 3000 T

Hydraulic AGC, WRB and WRS on F5-F6-F7

No inter-stands cooling

HRM - MAIN FLUXES



Roll cooling pressure 400-500 kPa

➤ RUN OUT COOLING TABLE

Length: 162 m (156m between first and last pyrometer)

Rolls diameter: 300mm, gap 400mm

Cooling length: Main spray zone: 62m (2x34 ramps), Trim spray zone: 51m (2x10 ramps)

Maximum Top Flow 120 m<sup>3</sup>/min, Maximum Bottom Flow 80 m<sup>3</sup>/min

Bottom side pressure: 200 kPa

➤ COILERS

Three coilers: two electro-pneumatic made by NKMZ and third one hydraulic made by Ciecim

▪ Location, Implementation

See Annex 2 and 3 Layout

▪ Operational data of Interfacing Installations (Description – Production)

- Capacity of 3.5 Mt/year

- 6000 ton/days net productive

- Slabs:

- Thickness = 220 / 250 mm (take 220 as reference)
- Width = 700 / 1550 mm
- Length = 5 / 10.5 m

- Coils:

- Thickness = 1.45 / 12mm
- Width = 700 / 1550 mm
- Max weight = 27 tons
- Max diameter = 2200 mm
- Internal Diameter: 760/780 mm

▪ Characteristics of processed products - strips,

Product parameters	Description
Alloy	Micro alloyed steel, Carbon steel, Alloyed steel
Thickness range	1.45 to 12.50 mm



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Width range	750 la 1550 mm
Maximum coiling speed	18 m/s
Rolling Speed F7	3 -18 m/s
Min-max coil weight	7-27T
Productivity	450T/h
Strip temperature	1050 °C
Coiling temperature	480 la 750 °C

### Electrical

The existing transformers are operational from 1971 and are cooled with PCB oil agent. They ensure power supply for DC drives, 0,4kV electrical stations and DC rectifiers.

Locations of transformers with PCB:

- Pusher furnaces area - 12 pcs;
- Roughing area - 23 pcs
- Finishing area – 23 pcs
- Collers area – 8 pcs

The power supply of transformers is ensured by existing medium voltage stations (6KV), which will not be modified.

### 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**

The functions in scope of contracted work:

- To maintain operational HSM according with European and Romanian law related to the environment (HG nr. 173/2000 ; HG 173/2000 ; SR EN ISO 14001:2015) which request to not be more used to polychlorinated biphenyls (PCB / PCT) as cooling fluids for electrical transformers.
- not affect the designed production level 8000 to/day;
- not affect the actual rolling cycle (one strip at every 120 sec input in stand F1)
- the new equipment will be designed for overload detailed in "Annex 1 List of existing transformers EN rev 3" sheets 1 (columns 43 to 48) and overload graphs (sheets 2 to 8);
- endurance test overload for 60 sec – current value as per "Annex 1 List of existing transformers EN rev 3" sheets 1, result of "x" between columns 34 and 35;
- to ensure the necessities for consumers (power, overload, working cycle)
- The new transformers must be compatible with:
  - o the existing power supply (P, U, I, shortcircuit current) ;
  - o existing consumers (P, U, I, shortcircuit current, nominal working parameters, permissible overload);
- Control and monitoring:
  - o display local and send the signals for remote monitoring (analog signal 4-20mA, free NO contact) of the following parameters:
  - o transformer overtemperature
  - o maximal electrical current protection in 6kV
  - o short circuit
  - o overload
  - o fault power and control voltage.
  - o Protection to internal fault and overheating
  - o Electrical energy consumption
- Calculation of existing upstream feeders:
  - o Shortcircuit maximal protection (Protectie maximala scurt circuit)
  - o Timing Overload (Suprasarcina cu temporizare)
  - o Power-up Delay Protection (Intarziere protectie la cuplare);
  - o Minimum voltage breakdown (Avarie minima tensiune)
- Installation in the same locations -> to be considered the actual weight, size, heat dissipation;
- Environmental temperature
  - o Average + 40° to +45°C in the bay, during the summer
  - o Minimum – 10° C during the winter
- Cooling with air (forced cooling)
- To be protected in case, minimum IP 31.
- Grounding connector in bottom part, market and visible
- Label with electrical parameters
- Level of noise according with SR EN 60076-10:2003
- To be designed for earthquake according with SR EN 60083-3-3/1994

In scope of contracted works are included the following activities, even the erection will be not contracted:

- supervision of erection
- test and adjustments, which will include:
  - o protection recalibration of existing 6kV switchgears
  - o protection adjustment and signaling for new equipment
- commissioning

### NOTE

1. For replacement of transformers to be considered the features of existing consumers, (some of existing transformers are designed for 10 kV but in real are power supply 6 kV)
2. Engineering for mounting is in the scope of contracted works, including cabling and cable route.  
Will be included in variable part of the contract for erection the following:
  - new electrical cables between transformers and protection or partial replacement of existing cables ;
  - terminal heads of cable
  - electrical cable to connect the transformers and protectionsFor above items, the quantities will be will defined during engineering phase and site survey. In commercial offer will be included quotation price per unit and will be contracted during erection phase.
3. The following activities are not in scope of contracted works and will be ensured by other contractor: dismantling, erection, transport , neutralization.

#### Requirements for transformers design:

- the cables connection to Medium voltage part and Low voltage part must be similar as existing (in longitudinal direction), to avoid cable relocation and platform drilling.  
The PROVIDER must provide all documentation for equipment mounting and electrical cables relocation / mounting and connection.

The offer will contain all types of transformers as are detailed in Annex 1 List of existing equipment rev 9.

### 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: LOT 1
- POST 2: LOT 2

In scope of contracted works are engineering for mounting (including cabling), technical assistance, and supervision of erection, commissioning of the new equipment

### 3.3 FUNCTIONAL DESCRIPTION OF POSTS

#### 3.3.1 Post 1 Lot 1

The transformers list which will be manufactured and supplied is presented below:

No	Area	Mechanism	Equivalent LEGRAND	Actual Type	P [KVA]
1	SM1B	3A	CRT-630-6000/400	ТНП-800/10	564
2	SM1B	3B	CRT-630-6000/400	ТНП-800/10	564
3	SM1B	3D	CRT-400-6000/400	ТНП-400/10	355
4	SM1B	3E	CRT-400-6000/400	ТНП-400/10	355
5	SM1B	4A	CRT-630-6000/400	ТНП-800/10	564
6	SM1B	4B	CRT-630-6000/400	ТНП-800/10	564
7	SM1B	4D	CRT-400-6000/400	ТНП-400/10	355
8	SM1B	4E	CRT-400-6000/400	ТНП-400/10	355
9	SM1B	B19.I	CRT-400-6000/200	ТНЗ-630/10/65	630 (378)
10	SM1B	B19.II	CRT-400-6000/200	ТНЗ-630/10/65	630 (378)
11	SM1B	B19.III	CRT-400-6000/200	ТНЗ-630/10/65	630 (378)
12	SM1C	КВПП 1	CRT-1250-6000/2x355	ТНПТ 2000/10	1054

The features of all existing transformers are detailed in Annex 1 List of existing equipment rev 9.

#### 3.3.2 Post 2 (OPTION)

The procurement of the equipment for next steps will be contracted year by year. The technical offer is valid until 2024, only the time schedule for equipment delivery will be updated for next steps.

### 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.

#### 3.4.1 Electrical studies

##### 3.4.1.1 *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 execution drawings
- Determine the organization and the constituents of the system
- Determine the commissioning of each constituent
- Structure the treatment for each constituent.

##### 3.4.1.2 *Reliability study*

The PROVIDER has to:

- Analyze the causes for unreliability,
- Assess the probability of occurrence,
- Identify the corrective actions in order to comply with requested availability constraints.

##### 3.4.1.3 *Study for safety during conception*

The PROVIDER has to:

- Identify the risks link to his supply during operation and maintenances phases
- Propose and integrate the corrective measures including lockout/tagout points
- List these risks and measures in a synthesis document (as table)

##### 3.4.1.4 *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 system
- Make the execution drawings.

##### 3.4.1.5 *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 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 contractors" and the «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.

### **3.6 FIRST PRIORITY PARTS – SPARE PARTS – UPGRADEABILITY**

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

#### **3.6.1 Availability of spare parts**

The PROVIDER will assure the spare parts for 2 years. The list for spare parts will be discussed and agreed with the COMPANY.

## **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 contractors"

#### **4.1.1 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:

- Constraints due to environment (no PCB or other materials forbidden)
- Stoppages for maintenance: 1 time per year, duration 10 days.
- It will be not affected the rolling cycle : one strip in Stand F1 at every 120 sec.
- The new transformers will ensure the overload detailed in Annex 1 sheet Data Base columns 43 to 48;
- the new transformers will be designed to ensure power supply of consumers (rev3)

#### **4.1.2 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 Energy Performance of the equipment requested is as follows:

- The power consumption of new transformers will be at least equal with the actual value or less.

#### **4.1.3 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,

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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
<b>CATASTROPHIC</b> Stoppage > 16 h	I	I	I	I
<b>CRITICAL</b> 2h < Stoppage <= 16 h average = 10 h	I	I	I	A
<b>MAJOR</b> 0,5h < Stoppage <= 4 h average = 2.5 h	I	I	A	A
<b>MINOR</b> Stoppage < 1 h Average = 0.5 h	I	A	A	A

### 4.1.3.2 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:
  - Catastrophic breakdown : 0 h /year
  - Critical breakdown : 0.2 x 10 = 2 h /year
  - Major breakdown : 1 x 2,5 = 2,5 h /year
  - Minor breakdown : 2 x 0.5 = 1 h /year

Therefore the Tolerated breakdown time is:  $T_{\text{tolerated breakdown}} = 5.5 \text{ h /year}$

- ▶ The installation operates 365 days per year in 3x8 H or 8760 H /year.  
The stoppages planned for maintenance are evaluated at:  $T_{\text{planned stops}} = 240 \text{ h /year}$ .
- ▶ 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 (entire package) object of the work executed by the PROVIDER has to achieve the following results and performances:

- **Operational rate = 97,197 %**
- **Availability rate = 99,935 %**

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.

### **4.1.3.3 Other results and performances to be obtained in terms of Maintenance and Reliability**

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

- The fault or alarms to be send to automation system for monitoring and diagnose in order to solve the issues in short time;
- Troubleshooting file to be provided

### **4.1.4 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.**

- Response time (lines, automation, transmissions, etc ...).
- Precision, fidelity, repeatability (measurements accuracy 0,1% full scale).
- autonomy.
- immunity (power line disturbances, industrial parasites, lighting resistance, electro – magnetic phenomena.).
- dimensioning, consumption (nominal value, admissible overcharge in value and in duration).
- Illumination level
- Noise level < 85db(A)
- Thermal dissipation.
- video.
- Environment protection
- Reliability (see §7.5 Reliability, maintainability, availability, safety)
- For on site works:
  - ▶ Quality of works (describe criteria's)
  - ▶ N° of anomalies report
  - ▶ N° of non-conformity reports
  - ▶ Time to solve anomaly / non-conformities
  - ▶ Qualification of workers
  - ▶ Respect of planning
  - ▶ N° of safety remarks
  - ▶ Tidiness and Cleanliness on site

## **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: n/a

## **4.3 LIFETIME**

**30 years**



**4.4 METHODS TO VERIFY THE RESULTS AND PERFORMANCES TO BE ACHIEVED**

The Provider will supply the methods to verify the guaranteed performances.

**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 IT DP 045 “General rules to be applied by LIBERTY contractors” and IT DP 044 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 the following prescriptions, regarding the safety of the equipment and that of the worksite:

### **5.1 PARTICULAR SAFETY SPECIFICATIONS TO BE CONSIDERED**

All the corrective measures resulting from the safety analysis described chapter 3.4.6 of this document are considered as part of the PROVIDER supply, notably all the lockable components for the Lockout/Tagout process.

### **5.2 PARTICULAR SPECIFICATIONS REGARDING THE SAFETY OF THE WORKSITE**

SPECIAL ATTENTION has to be provided for the safety of the worksite, especially regarding:

- Superposed works (during maintenance stoppage)
- Interfaces between worksites – Providers
- Works with plant operational

### **5.3 PARTICULAR SPECIFICATIONS REGARDING THE ENVIRONMENT**

The equipment delivered must be aligned with EU and European law related to environment SR EN ISO 14001:2015.

## **6. TECHNICAL RULES FOR CONCEPTION, CONSTRUCTION, CALCULATIONS**

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

Additionally 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:

#### **6.1.1 Tests**

According to SR EN 60076-1+A11:2001 and CEI 726 – 82

#### **6.1.2 Specific Rules for Electrical**

SR EN 60076-1+A11:2001	Transformatoare de putere. Partea 1: Generalități;
SR EN 60076-11:2005 SR HD 478.2.1 S1:2002	Transformatoare de putere. Partea 11: Transformatoare uscate Clasificarea condițiilor de mediu. Partea 2: Condiții de mediu prezente în natură. Temperatură și umiditate
SR EN 60068 -3-3/94	Încercări de mediu. Metode de încercări seismice ale echipamentelor.
SR CEI 60605-4+A1:2000	Încercarea de fiabilitate a echipamentelor. Partea 4: Metode de calcul al estimatorilor punctuali și al limitelor de încredere care rezultă din încercările de determinare a fiabilității echipamentelor
SR EN 60137:2004	Treceri izolate pentru tensiuni alternative mai mari de 1000 V
SR EN 13523-0:2002	Vopsire continuă în bandă a metalelor. Metode de încercare. Partea 0: Introducere generală și lista metodelor de încercare
SR EN 60529-95	Grade de protecție asigurate prin carcase (Cod IP)
NPI-1/87	Protecție electrochimică.
CEI 726 - 82	Dry – type transformers

## **7. RANGE AND INTERFACES OF CONTRACTED WORK**

### **7.1 INTERFACES**

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

- HSM

### **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, in particular referring to their main and necessary characteristics;
- He will make all useful recommendations in order 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 IT DP 045 "General rules to be applied by LIBERTY and IT DP 044 General safety instructions for External Companies that work on the beneficiary's sites.

#### **7.3.1 Particular specifications**

The COMPANY can ensure the utilities

- Water
- Energy

It is in the PROVIDER scope to ensure:

- Site organisation (connection of container to power supply, water supply, waste evacuation, grounding)
- Connection to Internet
- Telephone
- others

### **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.

##### **8.1.1 Special verifications**

The COMPANY requires special verifications such as:

- Protection and signaling of the new equipment
- Overload test 60 seconds at the value of the current = columns 38 x 39 from Annex 1 – sheet Data base.

#### **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
- Hot tests in the exploitation environment
- Adjustment tests
- Industrial Commissioning
- Performance tests

##### **8.3.1 Description of tests specific to the contracted work**

The documentation supplied by the PROVIDER must describe in details the test, preconditions, constraint for exploitation, test procedure, report of test, check list for.

- *No-load tests*
- *Regulatory tests*

It will be tested the protection of existing 6kV switchgears.

#### **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 contractors".

### **8.5 COMMISSIONING**

#### **8.5.1 Industrial Commissioning**

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

#### **8.5.2 Stand-by and Intervention**

During the industrial commissioning and ramp up phases, the PROVIDER will have to ensure a stand-by team under the form of:

- permanent presence on-site daily shift and on COMPANY request in week-end and holidays, night or afternoon shift, for 1 week after start-up;
- Permanent phone services for technical support and interventions, if necessary, with arrival on site in 1 hour, for a period of 1 month after start-up

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 all the documents necessary for the exploitation and maintenance of supplied installation:

- Constructor file
- Exploitation and maintenance instructions
- CE Conformity file

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 ;*
- *The personnel for interventions during troubleshooting and for the maintenance of equipment and materials – 10 people working in 4 shifts.*

#### **8.6.2 Location for the Training**

- On-site, in the plant of the COMPANY

#### **8.6.3 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.

### **8.7 RECEPTION**

The PROVIDER will comply strictly with IT DP 045 "General rules to be applied by LIBERTY 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 or according with GCCP agreed with Purchasing Department

### **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 electric and for erection of the equipment
- Drawings for assemblies, sub-assemblies, details with the detailed list of drawings
- General layouts for implementation
- Sub-contracting of his scope of supply
- Particular technical specifications
- Calculation notes.
- Developed diagrams
- The list of tasks for acceptance and tests
- Reliability study
- Study for safety during conception
- Study for environment protection according to SR EN ISO 14001:2015
- Synthesis of TPM/WCM measures and actions
- Study and execution planning (MS Project 2000)
- Detailed planning for erection and tests (MS Project 2000)
- List of operations for erection and verification
- Description of operational modes for erection and tests

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- Technical control file and protocol for tests
- Listing and adjustment sheets
  
- Instructions for operation, exploitation and maintenance including Lockout/tagout process
- Preventive maintenance plan
  
- Complete constructor file
- The documentation listed during the submission of the incorporation certificate (or the conformity certificate, in case of an order for turn-key work) or of the CE certificate

### **10.2 DIFFUSION METHODS OF DRAWINGS**

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

### **10.3 PARTICULAR SPECIFICATIONS REGRADING THE DIFFUSION METHODS**

The documentation will be delivered:

- On paper – 3 files
- On DVD (electronic format printable pdf/tiff and editable ACAD/EPLAN/DOC/XLS) – 3 pcs



## 11. DELAYS – PLANNINGS

The key dates for the development of the business are:

	LIBERTY scope	Supplier scope	Deadline
▪ Ordering on:	v	v	Day D
▪ Submission of Project Quality Plan and Safety Action Plan on :		v	D + 4 weeks
▪ Submission of documentation for erection and 6KV cell adapting		v	D + 8 weeks
▪ FAT Shop test assembly / Acceptance		v	D + 25 weeks
▪ Equipment delivered on site		v	D + 26 weeks
▪ Start of plant shutdown for erection on-site, on:	v	v (supervision)	Day S (see NOTE)
▪ End of erection on-site, on:	v	v (supervision)	S + 8 days
▪ End of commissioning		v	S + 10 days
▪ End of IC	v	v	S+ 30 days
▪ Reception / Provisional Acceptance Certificate (PAC), on:			3 months from IC
▪ FAC Final Acceptance Certificate			1 years from PAC
▪ End of guarantee period, on:			24 months from reception (PA)

**NOTE** : the start of shutdown for erection will be defined later. The PROVIDER will be informed 1 month in advance and will adapt the schedule without additional costs.

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 transportation
  - ▶ The training periods
  - ▶ The tests and the industrial commissioning.

## **12. PROCEDURE FOR QUALITY CONTROL**

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

## **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 per LOTS and activities

<b>Equipment</b>	<b>Engineering</b>	<b>Equipment</b>	<b>Supervision of erection</b>	<b>Commissioning</b>
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## **14. ANEXES**

-  H & S Management\_EN
-  IT DP 044 General Safety instructions for external companies working on the beneficiary's sites\_rev1\_RO\_EN
-  IT DP 045 General rules to be applied by AMG contractors- engl - rom
-  IT DP 046 WCM Specification for suppliers Rev.0
-  POMM DM-006 rev1-Managementul deseurilor in carul AMG
-  POMM-DM-016 (rev2)-Gestionare activ. de stocare temporara a deseurilor nepericuloase

➤ **Technical documentation:**

- **Annex 1 List of existing transformers rev 4 rev 9**
  - Sheet1 Data base
  - Sheet 2 Overload Permanent
  - Sheet 3 Overload Intermitent 1
  - Sheet 4 Overload Intermitent 2
  - Sheet 5 Intermitent permanent
  - Sheet 6 Constant