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## **TENDER BOOK for**

**Acquisition of the license, basic and detail engineering and technical assistance for project implementation**

**THE ESTABLISHMENT OF A NEW SUSTAINABLE EPOXY RESIN PRODUCTION UNIT BASED ON EPICHLORHYDRIN SYNTHESIS IN CHIMCOMPLEX SA BORZESTI**



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## **1. Tender book objectives**

- 1.1. This tender book contains the minimum necessary requirements that a speciality company must meet for to provide the license, know-how, basic engineering, detail engineering, technical specifications of the equipment for purchase and technical assistance, thus ensuring the performance guarantee of the project.
- 1.2. The tender book must contain technical specifications. This are defining, as the case may be and without being limited to the following, characteristics related to the qualitative, technical and performance level, operational safety, dimensions, as well as quality assurance systems, terminology, symbols, tests and test methods, the conditions for certification of compliance with relevant standards.
- 1.3. The technical and functional characteristics presented below for the products that are the subject of the acquisition are mandatory and minimal, they can be offered at a higher level (with the punctual highlighting of all these deviations). If all the minimum requirements cannot be met, the offer will be declared non-compliant. Alternative offers are not permitted.

## **2. Activity purposes**

This contract subject to the contracting procedure will include: the license part, know-how, basic and detailed engineering and technical assistance for the project implementation.

The tenderer is responsible for design documents for all specialties and for all objects included in the contract (including technical specifications and DDE projects for the acquisition of the equipments for the plant).

The tenderer will submit together with the offer all the technical details that he considers to be good for the realization of the design, the technical assistance assurance for the project implementation.

The following activities will be the responsibility of the Tenderer:

### **2.1. Provision of license, know-how, basic and detail engineering**

Tenderer will have in the view inclusion in the TECHNICAL and COMMERCIAL offer the following activities:

- Provision of license, know-how for each component of the project (described in point 3.3)
- Gantt chart of the requested activity;
- Technical project, basic engineering;
- Elaboration of technical specifications and DDE projects for the purchase of the equipments from the plant;
- Elaboration of detail engineering for all specialties: the loads/tasks necessary to perform the DDE for civil construction works and metal structures; technology, equipment installation and pipes, electrical, automation, classification of ATEX zone and documentation;



- Operation manuals;
- Analytical manual to support the interphase and final control of the product (analysis methods, necessary equipment and equipment specification);
- Documentation conforming to the execution (as-built) after the successful completion of the performance test;
- Performance guarantees of the project for the unit.

The tenderer will execute the technical design, basic and detail engineering in accordance with the provisions of the contract, with good engineering practices and with the technical standards in force in Romania and in EU.

The tenderer will be responsible for any discrepancies, errors or omissions in the specifications, drawings and other technical documents it has prepared.

The scope of these works is not limited to the activities specified above, but will also include any other activities necessary to carry out the works described in these requirements and to put the facility into operation.

## **2.2. Technical assistance for the project implementation**

The tenderer must :

- Evaluation of the technical specification for the equipment which will be purchased;
- Participates at the preparation of the Work Quality Control Plan;
- Participates at the control phases provided in the Work Quality Control Plan;
- To be present at construction site whenever this is requested by the person which performing the construction-erection works;
- Elaborate the designer's presentation report regarding the way on how the work was executed, for each specialty, for the reception at the end of the work;
- Participates in any other activity that is provided for in the legislation in force regarding technical assistance from the designer and was not specified in the documentation;
- Participate at the tests for commissioning, normal and stable operation of the facility, performance test;
- Develop and participate at the Training Program for the operating personnel of the production unit;
- Develops solutions for fixing defects during the warranty period.

## **2.3. Providing project performance guarantees**

The tenderer must demonstrate guaranteed parameters (specific consumption and finished product quality) of the new unit in a performance test planned for a period of 72 hours after commissioning and stable operation of the unit.



### **3. TECHNICAL DESCRIPTION OF THE INVESTMENT OBJECTIVE**

#### **3.1. Project context and objectives**

CHIMCOMPLEX SA BORZEȘTI signed, as a BENEFICIARY, financing contract no. 22 of 18.12.2023 within the "State Aid Scheme regarding the granting of grants for investments intended for the manufacturing industry" for the realization of the project " THE ESTABLISHMENT OF A NEW SUSTAINABLE EPOXY RESINS PRODUCTION UNIT BASED ON EPICHLOROHYDRIN SYNTHESIS, IN CHIMCOMPLEX SA BORZESTI"

The general objective of the project consists in the realization of a manufacturing unit of epoxy resins based on epichlorohydrin.

The technology to produce epichlorohydrin from biogenic glycerin is efficient and sustainable. The epichlorohydrin produced must be of the best quality and the resulting brine must be of high purity.

Taking as raw material for the manufacture of epichlorohydrin, biogenic glycerin (a by-product from biodiesel plants) and not propylene, it is obtained:

- reducing the carbon footprint of approximately 2.56 tons of CO<sub>2</sub>/ton of epichlorohydrin.
- reducing the amount of waste water generated from 40 to 5 t/t of epichlorohydrin.

The technologies that will be implemented in the project for the production of epoxy resins ensure a closed loop by:

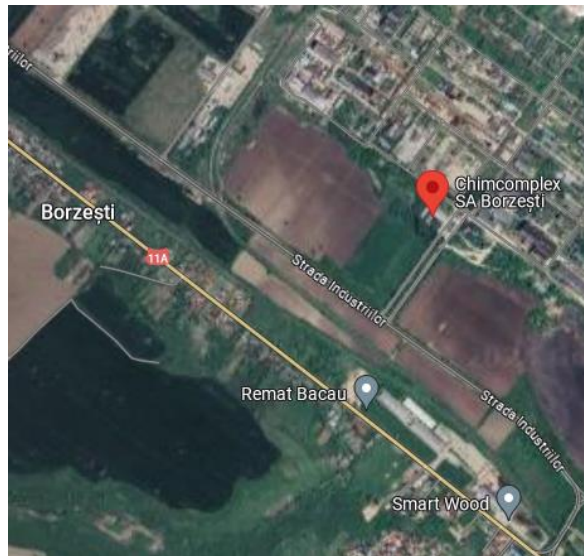
- purification of the resulting brine and its recirculation in the membrane electrolysis plant;
- treatment of liquid waste and gaseous emissions through incineration and energy recovery.

Thus, the present project must adopt a sustainable technology (which consumes raw materials from renewable sources, realizes low consumption of resources/utilities, with low pollutant emissions) thus presenting a series of advantages:

- Closed loop technology with optimal integration of the Membrane Electrolysis Plant;
- Energy efficiency due to internal steam production and resource recovery;
- Internal treatment and purification unit of the resulting brine will lead to obtaining raw material that can be integrated into the general flow of Chimcomplex
- High quality products;
- Reliable production facility with low pollutant emissions;
- Compliance with the current requirements of the European Union in terms of environmental protection (use of organic raw materials and circular economy)

#### **3.2. The investment location**

The location of the investment is located outside the protection perimeter of historical and architectural-urbanistic values. Space intended for future investment is owned by Chimcomplex SA



**Site Information:**

- Site altitude: 208.5 m (above sea level);
- Climatic data:
  - barometric pressure: approx. 1013 mbar (760 mmHg);
  - environmental temperature (min/max): -29.6 °C (winter)/+39.8 °C (summer);
  - average annual temperature: + 8 °C to + 9 °C;
  - relative humidity: min 60% / max 90%;
  - multiannual average precipitation: 50.9 l/m2;
  - snow load: 2.5 KN/m2;
  - wind: pressure = 0.5 KPa (at 10 m height above the ground), speed = 35 m/s (at 10 heights above the ground), predominant direction NNW;
- Seismic data:
  - peak horizontal ground acceleration (a): 0.28g;
  - corner period (Tc): 0.7 sec;
  - average recurrence interval: 100 years;
  - MSK/Mercalli scale: grade VIII;

**a) Relations with neighboring areas, existing access roads and/or possible access roads**

CHIMCOMPLEX S.A Borzești is located about 8 km southeast of the Onești town, in the southern sector of the Tazlău-Caşin depression. The company is located on the Borzești Industrial Platform, in its eastern part, with the following objectives nearby:

North-West: Termoelectrica - Borzești Electrocentrale Branch CET 1

South-East: agricultural land, Ștefan cel Mare village

East: Trotuș river, about 800 - 1000 m



North – East: agricultural land Gura – Văii village

**b) pollution sources existing in the area;**

Manufacturing facilities are in operation on the site producing chlorosodium, inorganic chlorides and alkylamines, regulated by integrated environmental authorization. The installation is IPPC and complies with the legal provisions applicable at the European level. Technologies used are BAT.

**c) the existence of some:**

**- building networks in the location that would require relocation/protection, to the extent that they can be identified;**

There are no networks that would require relocation/protection.

**- possible interference with historical/architectural monuments or archaeological sites on the site or in the immediately adjacent area; the existence of specific conditions in the case of the existence of protected or protection areas;**

It's not necessary

The project will be carried out on the industrial platform, on a land belonging to Chimcomplex SA Borzesti, being outside the areas with historical monuments/architecture and at a distance from protected natural areas.

**- lands belonging to institutions that are part of the defense system, public order and national security;**

It's not necessary.

**d. geophysical characteristics of the land intended for the location of the unit**

It will be done before the start of construction work.

**3.3. The configuration of the epoxy resin production unit based on epichlorohydrin synthesis**

The entire unit for obtaining epoxy resins starting from raw glycerin consists in the following subunits/main technological phases:

- 1) crude glycerin distillation/ crude glycerin purification –GLY unit;
- 2) epichlorohydrin synthesis - ECH unit;
- 3) synthesis of epoxy resins - ERP unit comprising lines for the production of base liquid epoxy resins, solid resins, solvent resins, modified resins and diluent reagents;
- 4) treatment brine - BBP unit
- 5) waste incineration – WIP unit
- 6) synthesis of HCl gas (this unit is not the subject of these tender book)

The waste water resulting from the production units will be treated, so that it can be discharged to the existing local treatment station on the platform.

**Design data of the epichlorohydrin-based epoxy resin production unit**

Design data	Technical parameters
Glycerine distillation/purification unit capacity	2 7,500 t/year glycerin
Epichlorohydrin synthesis unit capacity	26,000 t/year epichlorohydrin
Basic epoxy resin synthesis unit capacity, inclusive: - line capacity for solid epoxy resins synthesis - line capacity for modified epoxy resins synthesis - line capacity for epoxy resins in solvent synthesis - line capacity for reactive diluent	24,000 t /year base epoxy resin  10,000 t/year solid epoxy resins 10,000 t/year modified epoxy resins 6,000 t/year epoxy resins in solvent 4,000 t/year reactive diluent
Brine treatment unit capacity	According to the brine outputs from the manufacturing units: epichlorohydrin, glycerin and epoxy resins, reactive diluent.
Waste incineration unit capacity	According to the waste outputs from the manufacturing units: epichlorohydrin, glycerin and epoxy resins, reactive diluent and brine treatment.
Operating time	8300 h/year
The flexibility of the installations	50-100% of the nominal capacity

### 3.3.1. Crude glycerin distillation/purification unit

The designed unit must produce 27,500 t/year (operating time 8300 h/year) purified glycerin according to the technical specification:

Purified glycerin	UM	Value
Glycerin content	mass %	≥99.7
Appearance		clear
Acidity or alkalinity	ml NaOH 0.1N	≤0.2
Refraction index	(nD20)	1,470-1,475
Esters	ml of 0.1N HCl	≤ 8
Impurities	mass %	≤ 0.1
Halogenated compounds	ppm	≤ 35
Chloride	ppm	≤ 10
APHA-color	ASTM D1209	≤ 10 or ≤ 30 (technical use)
Density at 20 °C	g/cm <sup>3</sup>	1,260-1,264

3.3.1.1 Raw material used in the unit will be in accordance with the technical specification:

Parameter	U.M	VALUE
Glycerine content	mass %	>70
Appearance		brownish yellow



MONG content	mass %	<5
Fatty acids and esters	mass %	<1
Water content	mass %	According to the mass balance
Methanol content	mass %	<1
Salt/sulphate/ash content	mass %	<7
pH	pH units	5 - 8.5

or

Parameter	U.M	VALUE
Glycerin content	mass %	≥80
Appearance		brownish yellow
MONG content	mass %	≤2.5
Water content	mass %	≤10
Methanol content	mass %	≤ 0.5
Salt/sulphate/ash content	mass %	<7
pH	pH units	5 - 7

### 3.3.1.2 Utilities available and which will be used in the unit:

**cooling water :**

temperature (supply/return): supply: 17 °C (winter) and 28 °C (summer);

return: 20 °C (winter) and 33 °C (summer);

pressure: supply: 2.5 - 4.5 bar g;

return: free fall

Parameter	UM	VALUE
Chlorides content	mg/l	180-300
Chlorine content	mg/l	0.1-0.5
Suspensions content	mg/l	max. 25
Total hardness ( as CaCO <sub>3</sub> )	mg/l	190
pH	pH unit	7-8.9

**Saturated steam:**

- pressure: 9-12 bar(g);

- temperature: 180 °C - 190 °C;

**Instrumental air:**

- pressure: 4 - 5.5 bar(g);

- temperature: Ambiente

- without oil: Yes;

- dust free: yes;

- dew point : -30 °C

**Electricity:**

- supply with 6.3 KVAC (if necessary);
- 380VAC power supply +/- 15% /50Hz /3 phases;
- 220VAC supply +/- 15% /50Hz /1 phase;

**Natural gas:**

- pressure: 1 -2 bar(g);
- composition CH<sub>4</sub> =92 to 99.4%, C<sub>2</sub>= 0.02 to 3%, C<sub>3</sub>=0.02 to 2%, C<sub>4</sub>= max. 1%, N<sub>2</sub>=0.2-3%;
- lower calorific value: 10500 -12000 Kcal/Kg;

Chimcomplex SA Borzesti will provide other necessary materials (demineralized water, HCl solution 33%, NaOH 32%, NaOH 50%) at the battery limit.

• HCl min.33% solution

Parameter	U.M	Value
Appearance	-	Clear liquid
Color		colorless or slightly yellowish liquid
HCl content	%	Min.33%
Iron content	%	Max. 0.002

NaOH 50% solution

Parameter	U.M	Value
Appearance	-	Clear, colorless
NaOH content	%	min. 48%
NaCl content	mg/kg	max. 170
Chlorate content (NaClO <sub>3</sub> )	mg/kg	exceeding 50
Iron content	mg/kg	max. 5
Nickel content	mg/kg	max 1

**Demineralized water**

Parameter	U.M	Value
Appearance	-	Clear colorless liquid
Conductivity	μS/cm	Max. 5
SiO <sub>2</sub> content	ppm	max. 0.05
pH	united pH	7 ± 1.5
Iron content	ppm	max.0.2
Total hardness (as CaO)	mg/l	max.0.1
Pressure	bar	6
Temperature	°C	>18 °C

If other utilities are needed, they will be defined by the tenderer, being included in the purpose of the technology supplier.

### 3.3.1.3. Environmental aspects

The waste water discharged from the glycerin purification unit will be treated in compliance with *the Implementing Decision (EU) No. 902/2016 establishing conclusions on the best available techniques*

(BAT) for common waste water treatment/management systems and waste gases in the chemical sector, pursuant to Directive 2010/75/EU of the European Parliament and of the Council.

Air emissions generated from the unit will comply with the provisions of *Commission Implementing Decision (EU) no. 2427/2022, establishing conclusions on the best available techniques (BAT), based on Directive 2010/75/EU of the European Parliament and of the Industrial Emissions Council, for common waste gas management and treatment systems in the chemical sector.*

For waste of any type resulting from the technological process (in liquid or solid form), the tenderer will have to provide, as far as possible, integrated solutions for their recycling, reuse, treatment and management within the battery limit, and if this is not possible to indicate potential solutions for the management of these wastes outside the battery limit before their disposal in authorized landfills.

In the case of waste water, the tenderer will have to provide as far as possible integrated solutions for their treatment and management inside of the battery limit, and if this is not possible, indicate potential solutions for the management of this waste water outside the battery limit before discharge in the existing local treatment plant on the site.

### 3.3.1. Epichlorohydrin synthesis unit

The designed unit must produce 26,000 t/year (operating time 8300 h/year) of epichlorohydrin according to the technical specification:

Parameter	U.M	VALUE
Purity	mass %	≥ 99.9
Appearance		Clear colorless liquid
Water content	mass %	max.0.02
Organochlorine impurities content	mass %	Max. 0.2
Chroma	Hazen	<15
Specific weight at 20 °C	-	1,179-1,185

### 3.3.2.1 Raw materials:

A) **Glycerin** according to the technical specification

Parameter	UM	Value
Glycerin content	mass %	≥99.5
Appearance		clear
Acidity or alkalinity	ml NaOH 0.1N	≤0.2
Refraction index	(nD20)	1,470-1,475
Esters	ml of 0.1N HCl	≤ 8
Impurities	mass %	≤ 0.1
Halogenated compounds	ppm	≤ 35

Chloride	ppm	≤ 10
APHA-color	ASTM D1209	≤ 10 or ≤ 30 (technical use)
Density at 20 °C	g/cm <sup>3</sup>	1,260-1,264

## B) HCl gas

The beneficiary will provide at the limit of the battery at a pressure of 2.3-2.5 bar and a temperature of 80-120 °C HCl gas having the following composition:

Parameter	U.M	Value
HCl	volume %	>94.6
H <sub>2</sub>	volume %	<4
H <sub>2</sub> O	volume %	2.47
Cl <sub>2</sub>	ppm	<5
CO <sub>2</sub>	volume %	0.39
N <sub>2</sub>	volume %	0.042

The other raw materials necessary to carry out the technological process will be defined by the tenderer. The beneficiary will analyze the flow of necessary materials and will consider the most advantageous offer from the point of view of ensuring the quality of the finished product and the impact on the environment.

### 3.3.2.2. Utilities available

The available utilities that can be used in the unit are presented **at the point 3.3.1.2**

If other utilities are needed, they will be defined by the tenderer, being included in the purpose of the technology supplier.

### 3.3.2.3. Environmental aspects

The wastewater discharged from the epichlorohydrin synthesis unit will be treated in compliance with *the Implementing Decision (EU) no. 902/2016 establishing conclusions regarding the best available techniques (BAT) for common waste water treatment/management systems and waste gases in the chemical sector, pursuant to Directive 2010/75/EU of the European Parliament and of the Council.*

Air emissions generated from the unit will comply with the provisions of *Commission Implementing Decision (EU) no. 2427/2022, establishing conclusions on the best available techniques (BAT), based on Directive 2010/75/EU of the European Parliament and of the Industrial Emissions Council, for common waste gas management and treatment systems in the chemical sector.*

For waste of any type resulting from the technological process (in liquid or solid form), the tenderer will have to provide as much as possible integrated solutions for their recycling, reuse, treatment and management within the battery limit, and if this is not possible, to indicate potential solutions for the management of these wastes outside the battery limit before their disposal in authorized landfills.

In the case of waste water, the tenderer will have to provide as much as possible integrated solutions for their treatment and management inside of the battery limit, and if this is not possible to indicate potential solutions for the management of this waste water outside the battery limit before discharge in the local treatment plant existing on the site.

### 3.3.2. Epoxy resins synthesis unit

The unit designed with the related lines must produce:

Basic epoxy resins (with low, intermediate and high viscosity)	24,000 t/year
Solid epoxy resins	10,000 t/year
Modified epoxy resins	10,000 t/year
Epoxy resins in solvent	6,000 t/year
Reactive diluent	4,000 t/year
Operating time	8300 h/year

The unit designed with the related lines must produce finished products in accordance with the technical specifications, but not limited to them, namely:

#### Epoxy resins based on Bisphenol A

	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	8-10
Epoxy equivalent	g/Equiv	175-185
Hydrolyzable chlorine	ppm	≤150
Non-volatile compounds	%	>99.9
Color	APHA	≤15
	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	9-13
Epoxy equivalent	g/Equiv	182-192
Color	Gardner	≤1
	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	11-14
Epoxy equivalent	g/Equiv	185-190
Hydrolyzable chlorine	ppm	≤150
Non-volatile compounds	%	>99.9
Color	APHA	≤15
	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	11-14
Epoxy equivalent	g/Equiv	184-189
Hydrolyzable chlorine	ppm	≤150
Non-volatile compounds	%	>99.9
Color	APHA	≤15
Inorganic chlorine content	% w/w	≤0.02
Iron content	ppm	≤1
Sodium content	ppm	≤3

#### Resins based on bisphenol F

	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	2.5-4.5
Epoxy equivalent	g/Equiv	165-173
Color	Gardner	≤1

### Novolac epoxy resin

	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	9-13
Epoxy equivalent	g/Equiv	170-182

### Solid epoxy resins

	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	5-10
Epoxy equivalent	g/Equiv	450-500
Density at 100°C	g/cm <sup>3</sup>	1.19
Non-volatile compounds	%	>99.5
Color	Gardner	≤0.2
Melting point	°C	50-70
Softening temperature	°Pa.s	72-85
	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	14-18
Epoxy equivalent	g/Equiv	800-900
Density at 100°C	g/cm <sup>3</sup>	1.19
Non-volatile compounds	%	>99.5
Color	Gardner	≤0.2
Melting point	°C	75-95
Softening temperature	°Pa.s	5

### Epoxy resins in solvent

	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	mPa.s	7500-11000
Epoxy equivalent	g/Equiv	450-500
Density at 20°C	g/cm <sup>3</sup>	1.09
Non-volatile compounds	wt %	74-76
Color	Gardner	<0.2
	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	7.5-11.5
Epoxy equivalent	g/Equiv	450-500
Color	Gardner	<2
Description	-	Bisphenol A resin , 75%wt in xylene

### Modified epoxy resins

	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	0.5-0.9
Epoxy equivalent	g/Equiv	165-180
Description	-	Bisphenol A based resin, bifunctional reactive diluent
	<b>U.M</b>	<b>Value</b>
Viscosity at 25°C	Pa.s	1.0-1.3
Epoxy equivalent	g/Equiv	170-185

Description	-	Bisphenol A based resin , bifunctional reactive diluent
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### Diluent reagents

	U.M	Value
Viscosity at 25°C	mPa.s	15-25
Epoxy equivalent	g/Equivalent	140-160
Density at 20°C	g/cm <sup>3</sup>	1.06
Alcohol	-	1,6 hexanediol
	UM	Value
Viscosity at 25°C	mPa.s	5-10
Epoxy equivalent	g/Equivalent	270-300
Density at 20°C	g/cm <sup>3</sup>	0.89
Alcohol	-	C12-C14
	UM	Value
Viscosity at 25°C	mPa.s	12-22
Epoxy equivalent	g/Equivalent	125-145
Density at 20°C	g/cm <sup>3</sup>	1.11
Alcohol	-	1,4 butanediol

### 3.3.2.1. Raw materials

#### A) Epichlorohydrin according to the technical specification

Parameter	U.M	VALUE
Purity	mass %	≥ 99.9
Appearance		Clear colorless liquid
Water content	mass %	max.0.02
Organochlorine impurities	mass %	Max. 0.2
Chroma	Hazen	<15
Specific weight at 20 °C	-	1,179-1,185

#### B) Bisphenol A/F

Parameter	U.M	VALUE
Purity	mass %	>99.7 (p-p' isomer)
Phenol content	ppm	<80
Iron content	ppm	0
Color	APHA	<10
Water content	% masses	<0.4
Methanol content	ppm	<200

The other raw materials necessary to carry out the technological process will be defined by the tenderer. The Beneficiary will analyze the flow of required materials and consider the most advantageous offer from the point of view of ensuring the quality of the finished product and the impact on the environment.



### 3.3.3.2. Utilities available

The available utilities that can be used in the unit are presented **at the point 3.3.1.2**

If other utilities are needed, they will be defined by the tenderer, being included in the purpose of the technology supplier

### 3.3.3.3. Environmental aspects

The waste water discharged from the unit for production of epoxy resins will be treated in compliance with *the Implementing Decision (EU) no. 902/2016 establishing conclusions regarding the best available techniques (BAT) for common water treatment/management systems waste and waste gases in the chemical sector, pursuant to Directive 2010/75/EU of the European Parliament and of the Council.*

Air emissions generated from the unit will comply with the provisions of *Commission Implementing Decision (EU) no. 2427/2022, establishing conclusions on the best available techniques (BAT), based on Directive 2010/75/EU of the European Parliament and of the Industrial Emissions Council, for common waste gas management and treatment systems in the chemical sector.*

For waste of any type resulting from the technological process (in liquid or solid form), the tenderer will have to provide as much as possible integrated solutions for their recycling, reuse, treatment and management within the battery limit, and if this is not possible to indicate potential solutions for the management of these wastes outside the battery limit before their disposal in authorized landfills.

In the case of waste water, the tenderer will have to provide as much as possible integrated solutions for their treatment and management inside of the battery limit, and if this is not possible to indicate potential solutions for the management of this waste water outside the battery limit before discharge in the local treatment plant existing on the platform.

### 3.3.3. Brine treatment unit

The designed unit must ensure the treatment of all impure brine flows resulting from the entire production units such as: crude glycerin purification, epichlorohydrin synthesis, epoxy resins and reactive diluent.

Treatment and purification brine unit capacity: **minimum 24 m<sup>3</sup>/h**

Operating time: 8300 h/year

The technical specification of the impure brine flow is:

Parameter	U.M	Value
NaCl content	mass %	15-18
TOC	ppm	3000-40000
COD	ppm	10000-18000
organic components		Glycerin, MCH, DCH, epichlorohydrin, toluene, trichloropropane



After the treatment and purification, a purified brine will result according to the specification:

Component	U.M	Value
pH	pH units	8.5-10.5
Organic compounds	ppm	<10
Na <sub>2</sub> CO <sub>3</sub>	g/l	0.06
NaOH	g/l	<0.004
Sulphate (as Na <sub>2</sub> SO <sub>4</sub> )	g/l	10
Ca	g/l	0.3
Mg	g/l	0.04
Al	ppb	<10
As	ppm	<0.5
Ba	ppm	<0.1
Sb	ppm	<0.2
Cd	ppm	<0.2
Co	ppm	<0.1
Cr	ppm	<0.05
Cu	ppm	<0.02
Fe	PDB	290
Hg	ppm	<0.01
Mn	ppm	0.09
Mo	ppm	0.25
Ni	ppb	<10
Pb	ppb	<50
Sb	ppb	< 8.4
SiO <sub>2</sub>	ppm	2
Sr	ppb	<100
Chlorate (as NaClO <sub>3</sub> )	g/l	4
sulphides	ppm	0.34
Chlorine		-
NH <sub>4</sub> <sup>+</sup>	ppm	2.4
Turbidity	NTU	≤ 64

Thus, the brine purified in this unit will be able to be integrated into the existing flow of the Membrane Electrolysis Plant.

The final purified brine storage vessels must ensure a storage capacity of at least 20 hours.

Air emissions generated from the unit will comply with the provisions of *Commission Implementing Decision (EU) no. 2427/2022, establishing conclusions on the best available techniques (BAT), based on Directive 2010/75/EU of the European Parliament and of the Industrial Emissions Council, for common waste gas management and treatment systems in the chemical sector.*

#### 3.3.4. Waste incineration unit

The designed unit must ensure the treatment of all gaseous and impure liquid flows resulting from the other units such as: crude glycerin purification, epichlorohydrin synthesis, epoxy resins, reactive diluent and treatment and purification of the brine. Organic compounds will be converted mainly to CO<sub>2</sub>, H<sub>2</sub>O and HCl.

Waste incineration unit capacity: **minimum 1400 kg/h liquid and gaseous waste.**

Operating time: 8300 h/year

Liquid residues can represent between 30-45% of the total amount of incinerated residues having the following component:

Component	U.M	Value
MONG	mass %	29
Glycerin		35
MCH		2
DCH		1
Methanol		7
Polymers		6
Epoxy resins		2
Nacl		12
Water		6

Gaseous residues can have the following composition:

Component	U.M	Value
alcohols	mass %	$\geq 3$
epichlorohydrin		$\geq 1$
Chlorinated solvents		$>0.2$
Co.		$\leq 3$
HCl		$< 1$
Inert (H <sub>2</sub> O, O <sub>2</sub> , CO <sub>2</sub> , N <sub>2</sub> )		REST

Air emissions from the waste incineration unit must comply with Commission Implementing Decision (EU) 2019/2010 establishing conclusions on best available techniques (BAT) under Directive 2010/75/EU of the European Parliament and the Council, for waste incineration, namely:

Parameter	U.M	Value
TCOV ( Total Volatile Organic Carbon Content)	mg/Nm <sup>3</sup>	<3-10
HCl	mg/Nm <sup>3</sup>	<2-6
H	mg/Nm <sup>3</sup>	<1
SO <sub>2</sub>	mg/Nm <sup>3</sup>	5-30
Powders	mg/Nm <sup>3</sup>	<2-5
NO <sub>x</sub>	mg/Nm <sup>3</sup>	50-120
CO	mg/Nm <sup>3</sup>	10-50
NH <sub>3</sub>	mg/Nm <sup>3</sup>	2-10
PCDD/F (polychlorinated p-dibenzodioxins and polychlorinated dibenzofurans)	ng/m <sup>3</sup>	< 0.01-0.04

PBDD/F ( p-dibenzodioxins and polybrominated dibenzofurans) + dioxin-type PCBs	ng/m <sup>3</sup>	< 0.01-0.06
Cd+Ti	mg/Nm <sup>3</sup>	0.005-0.02
Sb+As+Pb+Cr+Co+Cu+Mn+Ni+V	mg/Nm <sup>3</sup>	0.01-0.03

Incineration unit must be complete, and if this is not possible, tenderer will have to provide as far as possible integrated solutions for the management of incineration waste within the battery limit, and if this is not possible, indicate potential solutions for their management outside the battery limit before their disposal in authorized depots.

In the case of waste water, tenderer will have to provide as far as possible integrated solutions for their treatment and management inside the battery limit, and if this is not possible indicate potential solutions for the management of this waste water outside the battery limit before discharge in the existing waste water treatment plant.

### 3.4. Automatic control system of the technological process

The production process will use the distributed control system (DCS).

The control process of the production unit will also include:

- The instrumented safety system that will ensure that the plant is stopped safely in the event of shut-down or interlocks (exceeding critical parameters). This system will have real-time communications with the DCS system.
- Detection, alarm and protection system in operation with flammable/toxic gases

This system is independent of the DCS and other systems. The system will be capable of receiving flammable/toxic gas detection and alarm signals (from facility area, intermediate/final storage area, building area, etc.) and initiates related interlocks. This will transmit real-time communications to the DCS, and the alarm status can be displayed, recorded/printed in the DCS.

The control system must be sufficiently redundant and provide an interface with the production management program and the beneficiary's central control system - SCADA

The tenderer will provide all the necessary data for process control in the distributed control system, interlocking logic, control loops, process control philosophy, cause-effect diagram, interlocking diagram.

## 4. Delivery

### 4.1. The offers delivery

The offer can be sent in english or romanian language, electronically and printed on paper, in a sealed envelope **at the register of Chimcomplex S.A Borzesti, Str. Industriilor no. 3, Onesti Bacau attention: Anamaria Mardaru – Chief Engineering Office/Project Manager**

On the envelope will be mentioned:



1. Tenderer name and address
2. Project name: THE ESTABLISHMENT OF A NEW SUSTAINABLE EPOXY RESIN PRODUCTION UNIT BASED ON THE SYNTHESIS OF EPICHLORHYDRINE, IN CHIMCOMPLEX SA BORZESTI.
3. DO NOT OPEN UNTIL 10.05.2024 at 15:00.

**The deadline for submitting the offer is 10.05.2024 at 14.00.**

**All the offers will be open on the 10.05.2024 at 15:00.**

The paper offer will be accompanied by a memory stick that will include the entire offer in pdf format.

The envelope will contain 3 distinct envelopes:

- The envelope with the qualification documents of the company according to chapter 5.1
- The envelope with the technical offer and the proposed schedule;
- The envelope with the commercial offer that will include the total and detailed price per component according to chapter 2.

The tenderer **can visit the site** within a maximum of 10 calendar days from the date of publication of the announcement on the Chimcomplex S.A website.

The tenderer can send requests for clarifications only later than 10 calendar days before the deadline for submitting the offer. The beneficiary will respond to requests for clarifications received from tenderer in maximum 5 calendar days from received the requests for clarifications.

Offer will be signed by the REPRESENTATIVE legal of the tenderer.

Offer must arrive before or on the date of deadline.

The offer for which it finds non-compliance with the provisions describe above will be rejected.

#### **4.2 . Delivery of technical documentation**

The tenderer declared the winner will deliver the following documents:

- License, know-how (including manufacturing recipes) for each component of the plant;
- The schedule of the activity contracted;
- Basic engineering, technical design, for each component of the plant;
- Detail engineering for each component of the plant;
- The technical assistance will be presented at the necessary stages within the project:
  - technical analysis of the equipment which will be purchased;
  - operators training;
  - participation at the tests necessary to prepare the plant for commissioning, plant commissioning until normal and stable operating parameters are reached, the performance test;
  - designers' reports for each specialty regarding the implementation method of the



construction and erection projects and for the completion reception of the construction - erection works.

All deliverables must comply with the provisions regarding technical request mentioned in chapter 3 and applicable standards: SR EN ISO, the laws and technical regulations in the force in the European Union (EU), EU ATEX Directives.

➤ The documents conforming to the execution (as-built) after the successful completion of the performance test.

**The tenderer will make the design documentation (BD, PT, technical specifications of the equipment, DDE) available to the beneficiary within a maximum of 6 months from the date of signing and entry into force of the contract.**

As-built documentation will be submitted within three months of receiving the successful performance test.

The tenderer will notify beneficiary with 5 days in the advance regarding the delivery steps and the documents which will be delivery.

All documents and manuals will be sent in editable electronic format, pdf and autocad and in 3 printed copies.

The Beneficiary will notify the Tenderer in 5 days in advance of the data when attendance is requested for the performance of contractual technical assistance.

## **5. Offer presentation**

### **5.1 Demonstration of the tenderer technical capability**

The tenderer will present a list of reference work with similar projects made in the last 10 years, from which to see at least one similar project (production of epichlorohydrin and epoxy resins). In the list of reference, it will specify: the title the project, the beneficiary, the value the work, the beginning year and the end of the project, the current stage of the project (under construction, in operation), the contact person from the beneficiary and the role played by the tenderer in the project.

The tenderer guarantees the design quality in accordance with the national and international norms of good engineering practice and technical standards in force in Romania and the European Union, from a technical point of view and environmental regulations and BAT (Best Available Technology).

The tenderer will have in the view that after award, in the contract that will be concluded between the parties, he will have the obligation to provide a bank letter of Good Execution Guarantee of 10% of the value of the contract without VAT or an insurance instrument for the guarantee of good execution of the contract. Period of guarantee it will extend with period of the correction of failing found during the period of guarantee of minimum 24 months.

Minimum eliminatory requirements (mandatory to be demonstrated by each tenderer):

The tenderer must have an average turnover over the last 3 years (2020-2022) of at least 15



million EURO.

The financial exercises for the years 2020-2022 must to be positive.

The maximum estimated value of the offer according to the requirements of chapter 2 will not exceed 16.5 million EURO (excluding VAT)

## **5.2. Technical offer**

The tenderer must send the technical offer in romanian or english language, in two original copies and a memory stick that will include the offer in pdf format.

The validity period of the offer must be at least 60 days.

Technical offer must to includes: the technical solution proposed taking into account the project described in chapter 3, the requirements of chapter 2, chapter 4.2, as well as the detailed plot plan.

## **5.3. Financial offer**

Financial offer will includes:

- the total price expressed in EURO or LEI, the distinct value by types of activities described in chapter 2;
- the detailed technical assistance price according to:

The period of provision of technical assistance services according to the requirements of chapter 2.2 will be considered the period necessary for the implementation of DDE projects within the framework of construction and erection works, followed by the periods of pre-commissioning, commissioning, performance tests and the elaboration of documentation As- built.

The technical assistance will be quoted as number of specialists, number of days per specialist and the total price will be quoted with the detailing specified and for the stages mentioned above.

Technical assistance will be billed separately after milestones, based on daily activity report and at the end of the performance period.

- payment methods proposed;

100% advance payment is not accepted. Any advance payment is made on the basis of the Bank Guarantee Letter for the refund of the advance.

The period for delivery the basic and detail engineering will not exceed 6 months from the date of signing and entry into force of the contract - the date on which the letter of bank guarantee for the return of the advance is received.

The guarantee of good execution of the project in the amount of 10% of the proposed value of the contract will not include the value of the technical assistance.

## **6. Documents analysis of the tender request**

The tenderer has the obligation to analyze all received documents and elaborated documents (clarifications).

The tenderer must to have in the possession or to get the access to the international and local



standards, norms, regulations.

The tenderer will immediately inform the beneficiary of any existing contradiction, ambiguity and/or omission in the tender book.

The tenderer will assume the risk in the event non-compliance with the requirements of this specification.

Beneficiary it has the right to request in writing, clarifications of the offer, after receiving offers, in during the process of offers assessment.

The beneficiary will not be held liable for the costs or expenses incurred by the tenderer regarding the execution of the bid, the analysis of the contract in any of the cases in which the tenderer is the winner or the loser.

The beneficiary will not be made responsible and in the consequence tenderer not will claim compensations if the beneficiary awards the contract according to the award criteria of chapter 10, cancels this procedure before the deadline or decides not to award the execution of the project any of the tenderers.

## **7. The questions of tenderer**

All questions/clarifications from tenderer, inclusive the contradictions found in the tender book will be transmit on beneficiary email (contact addresses: [razvan.dogarelu@chimcomplex.com](mailto:razvan.dogarelu@chimcomplex.com); [anamaria.mardaru@chimcomplex.com](mailto:anamaria.mardaru@chimcomplex.com)).

The text of the questions and answers will be distributed as an auxiliary document of the offer.

The tenderer can send requests for clarifications only later than 10 days before the deadline for submitting the offer.

The beneficiary will respond to requests for clarifications received from tenderer in maximum 5 calendaristic days after receiving the request for clarifications.

## **8. Site visit**

In the period of development of the offers, it is recommending that the tenderer to make a visit in the site to know the magnitude and nature of the project, its location and access, the conditions under which it will be executed the works and other aspects that can influence the offer.

Beneficiary not will do not pursue any complaint due to insufficient knowledge of what is described above.

The tenderer can visit the site within a maximum of 10 calendar days from the date of receipt of the bid request.

## **9. Confidentiality of the documents**

The tenderer will consider as confidential, permanently, the documents received, as well as their content. These documents can be used by the tenderer only for the purpose of drawing up the offer for the works and will not be transmitted to third parties unless this becomes necessary in order to draw



up the offer. The third-party consultants for this purpose will be informed by the tenderer regarding the confidentiality of the documents related to the bid request and will be obliged to respect the confidentiality of the content of these documents.

The tenderer will not make any public statement regarding the documents related to the bid request without the written approval of the Beneficiary.

### 10. Contract award criteria

Will be applied the criterion of the most efficient offer from a technical-economic point of view/ the best quality-price ratio

Evaluation factors		Percentage, %
1	Technical offer	50
2	Financial offer	50
TOTAL		100

Details regarding the application of the formula calculation for the total score:

$$P=(50\% \times F)+(50\% \times T) \text{ points}$$

where:

Total P-score

F- score obtained as a result of the evaluation of the financial offer

T-score obtained as a result of the evaluation of the technical offer

<b>F</b>	<b>Evaluation of FINANCIAL OFFER are made taking in consideration:</b>	<b>Max. 100 points</b>
F1	<p>The price that is compared for scoring is the total price, in EURO or LEI without VAT</p> <p>The maximum score of 80 points is awarded to the offer with the lowest price <math>F_{min}</math> (minimum price score)</p> <p>For the offer with price (n), other than the minimum, the assigned score will be determined as follows:</p> $F_n = \left[ \frac{\text{minimum offer price}}{\text{offer price}(n)} \right] \times 100$	80
F2	<p>The maximum score of 10 points is given for the shortest delivery time</p> <p>For the offer with a duration (n), other than the minimum, the assigned score will be determined as follows:</p> $F_n = \left[ \frac{\text{minimum duration}}{\text{offer duration}(n)} \right] \times 100$	10
F3	<p>Payment methods</p> <p>Advance payment of max. 30%. it will be done only on the basis of the receipt of the bank guarantee letter for the advance refund which will have a validity period of 30 days beyond the DDE delivery deadline.</p> <p>The tenderer who requests the smallest advance and subsequent</p>	



	<p>payments will receive 10 points, as follows:</p> <ul style="list-style-type: none"> <li>- up to 90% of the value of the services required in point 2.1. upon delivery and design approval (basic engineering, technical project and detail engineering)</li> <li>- 5% after the successful completion of the performance test</li> <li>- the remaining 5% upon signing the final acceptance, i.e. at the end of the project guarantee period (24 months from commissioning)</li> </ul> <p>The technical assistance will be paid only after fulfilling the specifications related to chapter 2.2 and the mentions in chapter 5</p> <p>For the offer with advance(n), other than the minimum, the assigned score will be determined as follows:</p> $F_n = \left[ \frac{\text{minimum offer advance}}{\text{offer advance}(n)} \right] * 100$	10
$F = F_1 + F_2 + F_3$		
<b>T</b>	<b>SCORE TECHNICAL OFFER are made taking in consideration:</b>	<b>Max. 100 points</b>
T1	The proposed technical solution considering the project described in chapter 3 and the requirements of chapter 2	30
T2	Integration of all units in the closed loop and ensuring process performance	10
T3	Internal treatment of liquid, solid and gaseous emissions so as to ensure compliance with the emission limits imposed by the EU and Romanian environmental legislation in force	25
T4	Provision of recipes for the manufacture of epoxy resins and reactive diluent	5
T5	Technical assistance for the project implementation	20
T6	Similar projects (production of epichlorohydrin and/or epoxy resins) - 10 points will be awarded to the tenderer which presenting the largest number of similar projects	10
$T = T_1 + T_2 + T_3 + T_4 + T_5 + T_6$		

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