	Technical Specification for Dry Ice Plant & Dry Ice Cleaning Machine Engineering, Supply, Construction and Commissioning			
	Dry Ice Plant: 258000003794	Dry Ice Plant Bulding: 258000003795	REV. NO	01
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	Prepared By: Bioethanol Production Engineer		Approved By: Deputy Biotech. Director	

1. SCOPE

This technical document is for engineering, supply, construction and commissioning of Dry Ice Plant and Dry Ice Cleaning Machine. The plant shall be installed near the Liquid Carbon Dioxide Plant in Cumra Sugar Integrated Facilities at the state of Konya. Liquid carbon dioxide to be used in Dry Ice Plant shall be supplied from Liquid Carbon Dioxide Plant. The plant shall produce different type and dimensions of dry ice.

2. SCOPE OF SUPPLY & WORKS

Scope of supply and works classified for cost in the table as shown below;

Scope	Design & Engineering	Material Supply	Installation & Site Works	Supervision for Installation & Commissioning
Plant Building	Company	KS	KS	KS
Dry Ice Machine	Company	Company	Company	Company
Molds for Dry Ice Machine	Company	Company	Company	Company
Dry Ice Cleaning Machine	Company	Company	Company	Company
Dry Ice Wrapping Machine	Company	Company	Company	Company
One Reel of Packing Film for Wrapping	Company	Company	Company	Company
Dry Ice Packing Material	Company	Company	Company	Company
Pipes, Fittings, Insulation and Piping	Company	Company	Company	Company
All Valves	Company	Company	Company	Company
Automation of Dry Ice Machine	Company	Company	Company	Company
Electrical Works and MCC Panel	Company	Company	Company	Company
Power Supply to MCC Panel	KS	KS	KS	KS
Pressured Air Supply	KS	KS	KS	KS
Lift, Crane, Welding Materials	Company	Company	Company	Company
Transport of All Machines, Equipments and Materials to Site Area	Company	Company	Company	Company
Certification of Machines and Equipments for CE Marking	Company	Company	Company	Company

3. TECHNICAL SPECIFICATIONS

3.1. Plant Capacity


Plant capacity shall be 400 kilograms per hour for all sizes of dry ice product.

3.2. Dry Ice Plant Area

The area to be used for dry ice plant is for width 8,5 meters and length 23 meters. This area shall be provided by Konya Seker. This area is just near the existing liquid carbon dioxide storage tanks.

3.3. Dry Ice Production Machine

Machine to be used to produce dry ice shall be supplied at desired capacity mentioned in section 2.1. Quantity of dry ice production machine shall be number of 2 (two). One machine can produce all type and sizes of dry ice products mentioned in section 2.3.

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and it shall possess all necessary molds for related dry ice products. Technical specifications, drawings, usage and maintenance manuals of dry ice production machines shall be supplied. All manuals shall be in the English and Turkish language. **Note that gas return system shall not be requested.**

3.4. Dry Ice Cleaning Machine

Dry ice cleaning machine to be supplied by company shall have a consumption capacity minimum 25 kg/h and maximum 80 kg/h. The machine will be operated with air at 6 - 7 bar. Blasting gun with different types, hoses, electrical cables, control panel and all necessary parts shall supplied with machine. The machine will transportable with its wheels. Requested quantity of machine is 1(one).

3.5. Type and Dimensions of Dry Ice Products

Dry ice products shall have size and dimensions as shown below;

- a) **Dry Ice Block:** 205±5 mm x 125 x 20 or 205±5 mm x 150 mm x 20 mm
- b) **Dry Ice Block:** 205±5 mm x 125 x 22 or 205±5 mm x 150 mm x 22 mm
- c) **Dry Ice Block:** 205±5 mm x 125 x 25 or 205±5 mm x 150 mm x 25 mm
- d) **Dry Ice Block:** 205±5 mm x 125 x 30 or 205±5 mm x 150 mm x 30 mm
- e) **Dry Ice Block:** 205±5 mm x 125 x 35 or 205±5 mm x 150 mm x 35 mm
- f) **Dry Ice Block:** 205±5 mm x 125 x 40 or 205±5 mm x 150 mm x 40 mm
- g) **Dry Ice Block:** 205±5 mm x 125 x 45 or 205±5 mm x 150 mm x 45 mm
- h) **Dry Ice Block:** 205±5 mm x 125 x 50 or 205±5 mm x 150 mm x 50 mm
- i) **Dry Ice Block:** 205±5 mm x 125 x 60 or 205±5 mm x 150 mm x 70 mm
- j) **Dry Ice Block:** 205±5 mm x 125 x 70 or 205±5 mm x 150 mm x 70 mm
- k) **Pellets:** Ø3 mm
- l) **Nuggats:** Ø9 mm
- m) **Nuggats:** Ø16 mm


3.6. Dry Ice Automatic Wrapping Machine

Required wrapping machine specifications as given below;

- Dry ice to be used for wrapping: up to 210 mm x 125 mm x 20 - 22 mm
- Wrapping capacity: 3 – 15 packs / min.
- Wrapping material: polypropylene md447/40
- Film reel: max width 520 mm, reel outside diameter 350 mm, reel inside diameter 70 - 76 mm
- Air supply: 20 liters/min at 6 bar
- Powe supply: 400 V / 50 Hz / 3 Ph

This machine shall also has conveying system, steel structure and anticorrosive painted parts. It can be operated as fully automatic by means of a control panel. Requested wrapping machine quantity is 1 (one).

Note that 1 (one) reel of packing film shall be supplied as free by the company for commissioning works of wrapping machine. Thus no cost shall be requested.

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3.7. Dry Ice Molds

Molds to be used for producing dry ice shall be resistant to high pressure, impacts and dry ice temperature. If mold damaged it can be easily replaced with new one. Technical specifications and drawings of all molds shall be supplied. All molds shall be supplied in one group or set but not separately.

3.8. Dry Ice Packing Material

Dry ice packing material shall be ISOBOX having 1200 mm length and 800 mm width and suitable for loading on Euro Pallets. The empty volume of ISOBOX shall be approximately 340 liters. Its technical specifications shall be suitable for transportation of dry ice products. Polyurethane foam will be used as insulation material. Box structure will be made by steel, covered Polyester – Fiberglass (CTP Material) and silicone gasket will be used for leakproofing. The box can be closed by latches and it shall possess 2 handgrip on both side for transportation. The box cover can be opened and closed by means of hydraulic cylinders on the box. And there will be drain point can be closed and opened on the box. The boxes shall be long lasting when one box is placed on the other box. All technical drawings of ISOBOX shall be supplied. Requested amount of ISOBOX is 10 (ten).

3.9. Automation of Dry Ice Production Machine

Dry ice production machine shall have an automation panel. Type and dimension of dry ice to be produced can be selected and changed by using this automation panel. It means that molds belongs to dry ice product can be changed automatically. Additionally, automation panel shall have start/stop selection, emergency stop selection, on/off selection and other necessary selections. The panel shall be touch screen.

3.10. Quality


Dry ice production machine shall comply with CE marking.

4. CONSTRUCTION OF DRY ICE PLANT

All civil engineering works to build the plant shall be done by company. Thus all drawings for foundations, architectural design, steel structure, support and layouts shall be supplied by company and it will be approved by Konya Seker. Necessary informations for design works will be given by Konya Seker. But all necessary materials such as steel structure and concrete to build the plant shall be supplied by Konya Seker.

5. INSTALLATION AND COMMISSIONING

All machines, equipments, valves, automation and electrical cables, pipes with insulation shall be installed and commissioned by company and shall be ready to use to run the plant. As mentioned in section 1, liquid carbon dioxide shall be taken from Liquid Carbon Dioxide Plant storage tanks by pipe interconnecting between both plants. This pipe interconnection shall also be

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done by company. After the completion of installation and commissioning works, Konya Seker persons shall be educated by company regarding plant running and maintenance. All costs for installation and commissioning works shall be fulfilled by company. On the other hand all costs of company supervisors such as travel, communication, food, accommodation etc. again shall be fulfilled by company. Performance criteria shall be determined and undersigned during contracting stage.

6. WARRANTY

All machines and equipments to be supplied by company shall have 2 years warranty after handing over the plant. If some parts of any machine or equipment changed under warranty conditions new parts shall be supplied by company as free of charge and all shipment costs for this purposes shall also be paid by company. All materials to be supplied by company shall be insured during the shipment, installation and commissioning time.

7. HANDING OVER TIME

The dry ice plant shall be commissioned by the company and handed over to Konya Seker within 12 weeks after signing the contract.