

Attachment no. 1 to TENDER INQUIRY No. 1/1.1.1/FENG-WI/2024 of 08.10.2024

DESCRIPTION OF THE SUBJECT MATTER OF THE ORDER

The subject of the order is **the supply and commissioning of a brand new (unused) (1 piece) SPRAY DRYER WITH INSTRUMENTATION** with parameters no worse than those described below and in accordance with the requirements specified below.

LP.	TECHNICAL PARAMETERS AND EQUIPMENT
1.	Application: continuous operation, variable efficiency, drying of food products in emulsions, suspensions, homogeneous solutions
2.	Three-stage spray dryer construction with fine powder return system allowing to produce agglomerated products;.
2.1	Design assumptions: the proposed spray drying system is based on a design with most spray drying components supplied pre-assembled. The centrifugal fans, scrubber and some miscellaneous connecting hoses would be supplied in bulk for on-site assembly.
2.2	Finish: all surfaces in contact with the product will be finished to a 2B standard, with joints/welds ground flushed, surfaces with roughness Ra<0.8
3.	Manufacturing: for food products:
3.1	Parts in contact with the product: made of 316L stainless steel with 304 stainless steel external stiffeners
3.2	Parts not in contact with the product: made of 304 stainless steel or black steel (the use of black steel is only permissible for locations and components where 304 stainless steel cannot be used or is unreasonable),
4.	Product: agglomerated powders, with different levels of agglomeration (colors, flavors, intermediates for dietary supplements);
5.	Design/performance and spatial assumptions for determining installation parameters:
5.1	Location: inside the building
5.2	Installation location above sea level: <100 m
5.3	The maximum height of the installation including the height to operate the equipment: 16,6 m
5.4	Maximum width of the installation including the width to handle the equipment: 14 m
5.5	Maximum length of the installation including the length to operate the equipment: 12 m
5.6	Minimum indoors ambient temperature: 15°C
5.7	Maximum indoors ambient temperature: 45°C
5.8	Minimum outdoors temperature: -20°C
5.9	Maximum outdoors temperature: 40°C
5.10	Barometric pressure at the location: 1001 mbar
5.11	Average moisture content at 20 °C: information to be ascertained on the basis of the location of the investment, bearing in mind atmospheric conditions at different times of the year
5.12	Maximum drying temperature: 220°C
6.	General guidelines and performance requirements:
6.1	Inlet temperature in the drying process: 170°C
6.2	Outlet temperature in the drying process: 85°C
6.3	Dry mass weight in the liquid feed: 30%
6.4	Liquid feeding capacity: no worse than 290 kg/h (for assumed parameters)
6.5	Hourly powder yield/production capacity: no worse than 89 kg/h (for assumed parameters)
6.6	Water evaporation capacity: not worse than 200 kg/h (for assumed parameters)
6.7	Annotation: the above conditions are a design scenario. The performance test will be based on this data set, although the hourly product yield is based on the assumption of 50% dry matter in the feed fluid and an inlet/outlet temperature profile: 180/90 °C. The plant manufacturer will undertake to adapt the capacity and volume of the entire equipment to the best possible process conditions specified by the developer. At the same time, it is noted that the Investor would prefer to carry out performance tests, both at the design parameters

	and at the maximum parameters specified in the given subsection. This is to verify the compliance of the installation's performance with the assumptions, as well as to check the efficiency and throughput of the equipment in the case of the most optimal drying parameters.
7.	Properties of the liquid feed and the powder produced on the device:
7.1	Powder carrier used: medium-sugar maltodextrin (DE15), low-sugar maltodextrin (DE06), gum arabic, modified starches
7.2	Viscosity of liquid feed for drying: ≤ 600 cP
7.3	Permissible moisture content of the powder after external fluid bed: $< 5\%$;
7.4	Permissible temperature of the resulting powder: $\leq 45^{\circ}\text{C}$
8.	Consumption of utilities: the supplier of the equipment is asked to provide an approximate consumption of utilities in the following range - natural gas consumption; water consumption, compressed air consumption, chilled water consumption, energy consumption with a breakdown of the main components of the installation (dryer, electric heaters, fans)
9.	List of components included in the order:
9.1	Wet part of the system (liquid feeding):
9.1.1	Pumping and filtration system (task: filtering the flowing liquid feed and providing the required inlet pressure to the high-pressure pump). Lube pumps are preferred.
9.1.2	High-pressure pump, duplex monobloc type (task: to create the high inflow pressure necessary for atomization on spray nozzles)
9.2	Air intake system:
9.2.1	Ambient air filters (task: to filter incoming ambient air to the drying system, minimum standard F5 + H11, preferred F9 + H13)
9.2.2	Dehumidification system (task: cooling and dehumidifying the inlet air stream to the required inlet moisture content using an ice water/air heat exchanger and/or adsorption desiccant wheel and reactivation energy)
9.3	Cooling air generation and distribution system:
9.3.1	Cooling air fan/distributor (task: to bring the desired cooling air flow to the upper part of the spray chamber to cool the spray element and the part of the chamber ceiling surrounding the drying air inlet):
9.3.1.1	Air chamber made of 304 grade stainless steel
9.3.1.2	Substructure made of 304 grade stainless steel
9.3.2	Cooling air ducts (task: air supply from the main inlet and hot air ducts, connection to the distributor and cooling and hot air fan):
9.3.2.1	Design: structural components of 304 grade stainless steel with external stainless steel stiffeners
9.4	Spray dryer - air supply elements:
9.4.1	System of air supply to the dryer (task: to provide the required amount of air for the drying process):
9.4.1.1	Design: 304 grade stainless steel air duct structure; 304 grade stainless steel base/support elements, ducts insulated
9.4.2	Air heater (task: heating the drying medium - air, to the required inlet temperature required by the drying process):
9.4.2.1	Type: indirect
9.4.2.2	Heating medium: natural gas
9.4.2.3	Design: structural elements of 304 grade stainless steel with external stainless steel stiffeners
9.4.3	Hot air distributor (task: to ensure efficient heat exchange between hot inlet air and atomized liquid)
9.4.3.1	Construction: 304 grade stainless steel components with stainless steel external stiffeners
9.4.4	Spray chamber (task: to provide the required residence time for the material to dry before leaving the drying chamber):
9.4.4.1	Prefabrication: the preferred form of delivery is the chamber as a finished single component, but not required. If the chamber is delivered in parts, the full cost and responsibility for assembly will be borne by the Supplier.
9.4.4.2	Access/service door with built-in sight glass.

9.4.4.3	2 x sight glass with lighting
9.4.4.4	Insulation in the form of mineral wool sealed under the sheathing of 304 stainless steel
9.4.4.5	Not less than 16 pneumatic hammers for the whole installation
9.4.5	Atomization system (task: to produce co-current atomization of the liquid product against the hot air stream):
9.4.5.1	Design: parts in contact with the product made of 316L grade stainless steel
9.4.5.2	1 or more spray nozzle with central fine dust return nozzle for product agglomeration
9.4.6	Piping assembly for the air supply to the spray dryer (task: connecting the elements of the internal fluidized bed):
9.4.6.1	Design: 304 grade stainless steel construction
9.5	Internal fluid bed:
9.5.1	Supply fan (task: supplying the required amount of drying air to the internal fluid bed):
9.5.1.1	Design: 304 grade stainless steel air duct structure; 304 grade stainless steel base/support elements
9.5.2	Electric or steam heater (task: to raise the temperature of the fluidizing air to the level required by the internal fluidized bed):
9.5.2.1	Design: housing made of 304 grade stainless steel
9.5.3	Fluidized bed (purpose: built-in static fluidized bed located at the bottom of the spray chamber for final drying and conditioning of the larger agglomerated product produced in the spray dryer):
9.5.3.1	Construction: 316L grade stainless steel components with 304 grade stainless steel external stiffeners
9.5.4	Rotary valve of the internal fluid bed (task: discharging the dried product from the inner fluidized bed to the outer fluidized bed, while maintaining air tightness):
9.5.4.1	Design: body and internal moving parts in 316L grade stainless steel
9.5.5	Set of ductwork for the internal fluid bed (task: connecting all components of the internal fluid bed):
9.5.5.1	Design: 304 grade stainless steel construction
9.6	External fluid bed:
9.6.1	2x Supply fan (task: supply the required amount of drying and cooling air to the external fluid bed):
9.6.1.1	Design: 304 grade stainless steel air duct structure; 304 grade stainless steel base/support elements
9.6.2	Electric or steam heater (task: to raise the temperature of the fluidizing air to the level required by the external fluid bed):
9.6.2.1	Design: 304 grade stainless steel housing
9.6.3	External Vibrating Fluid Bed Dryer/Cooler (task: final agglomeration, providing cooling of spray-dried and agglomerated product):
9.6.3.1	Design: 316L grade stainless steel structural components with 304 grade stainless steel external stiffeners
9.6.4	Rotary valve of the external vibrating fluidized bed (task: discharge the dried product from the external fluid bed, while maintaining air tightness):
9.6.4.1	Design: body and internal moving parts made of 316L grade stainless steel
9.6.5	Safety magnet (task: removing all ferrous metals from the dried product):
9.6.5.1	Design: 304 grade stainless steel construction, where product contact - 316L.
9.6.6	Set of ductwork for external fluid bed (task: connecting all components of external fluidized bed):
9.6.6.1	Design: 304 grade stainless steel construction
9.6.7	Heat exchanger (task: cooling the air going to the last section of the external fluidized bed, to cool the powder received from the plant):
9.6.7.1	Operating medium: ice water at a temperature of approximately 2°C
9.7	Spray dryer - exhaust air system:
9.7.1	Complete high-efficiency cyclone with discharge rotary valve (task: receiving the dried product/separating the product from the exhaust air removed from the dryer, while maintaining air seal):

9.7.1.1	Design: 316L grade stainless steel structural components with 304 grade stainless steel external stiffeners
9.7.2	Scrubber (task: separation of fine material that was not captured in the cyclone out of exhaust air):
9.7.2.1	Design: scrubber made of 304 grade stainless steel, with 304 grade stainless steel structural components, with 304 grade stainless steel external stiffeners
9.7.2.2	Finish: scrubber internal surfaces finished to 2B standard, with welds/welds ground and smoothed (Ra 0.8), welds etched and passivated
9.7.2.3	Pollution capture parameter: <10 mg/Nm ³ in the exhaust air stream
9.7.3	Spray dryer exhaust fan (task: to extract air from the spray dryer system with the appropriate efficiency and exhaust it to the outside through the exhaust/exhaust air system):
9.7.3.1	Design: 304 grade stainless steel air duct structure; 304 grade stainless steel base/support elements
9.7.4	Safety systems: isolation and explosion suppression based on explosion suppression bottles (HRD system) (task: suppressing the explosion and providing isolation and safety for specific system components):
9.7.4.1	A system including protection for the following components: spray chamber, cyclone, external fluidized bed, ducts through and behind the cyclone
9.7.4.2	A wall-mounted/designated control unit
9.7.5	Set of ductwork for the spray dryer air outlet system (task: connecting all components of the air outlet system)
9.8	Fines return system:
9.8.1	Fines return system fan (task: pneumatically transfer fine particles to the upper part of the spray dryer for product agglomeration or external fluidized bed discharge):
9.8.1.1	Design: 316L grade stainless steel air duct structure; 304 grade stainless steel base/support elements
9.8.2	Diverter valve (task: to provide flexibility in redirecting fine particles carried in the fines return system):
9.8.2.1	Design: 304 grade stainless steel construction
9.8.2.2	Manual or automatic
9.8.3	Ducting unit for the fines return system (task: connecting all components of the fines return system):
9.8.3.1	Design: 316L grade stainless steel construction
9.9	CIP and fire extinguishing system:
9.9.1	1 x set of movable and stationary CIP nozzles in a total quantity of not less than 30 pieces (task: ensure efficient cleaning of all components in direct contact with the product)
9.9.2	Fire suppression water system (task: injecting water into strategic areas of the dryer system in the event of a temperature rise caused by ignition):
9.9.2.1	1 x spray nozzle set including the following components: spray chamber, cyclone
9.9.2.2	The wiring system connecting the switchgear with the corresponding spray nozzles will be on the investor's side. Extinguishing system switchgear with solenoid valve on the investor's side
9.10	Control system:
9.10.1	A locally mounted HMI panel, fully wired and tested, must be located in a secure area. This panel will contain the necessary interlocks and control functions required to safely start, operate and shut down the drying system.
9.10.2	A combined control panel and MCC (Motor Control Center) containing PLCs, IO circuits, safety relays, Ethernet Switch, drives, power distribution and soft-start motor starters and other electronic equipment.
9.10.3	It is expected that all PLCs, IOs, HMIs, power supplies, Ethernet interfaces, soft-start motor starters etc. supplied are of a high quality standard. The same standard also applies to inverters and other electronic components
9.10.4	The scope of work on the supplier's side: providing the logic system, providing the automation diagrams, providing the wiring diagrams, providing the PLC software, providing the HMI software, commissioning/startup and testing.



9.10.5	It is expected that all instrumentation components (process measurement equipment) are of a high quality standard.
9.10.6	Control system to connect the device and selected accessories to the SCADA system
9.11	Dry anti-caking agent dosing system:
9.11.1	Weighing or volumetric type dispenser
9.11.2	Preferred installation location: dosing into the internal fluid bed, or on the top of the drying tower
9.11.3	Properties of the powders to be dosed:
9.11.3.1	Name of metered substances: magnesium carbonate (E504) and precipitated amorphous silica
9.11.3.2	Bulk density: 0.1 to 0.65 kg/l
9.11.3.3	Moisture content: <3.5%
9.11.3.4	Product temperature: up to 40°C
9.11.3.5	Average particle size: <100 µm
9.11.4	Feed rate: 0.4 to 3.0 kg/h
10.	Design assumptions for selected areas of the system:
10.1	Suppression system designed for product parameters indicated by the Investor: Kst value <150 or 200 bar-m/s; Maximum explosion overpressure (Pmax): 8.1 bar(g); Lower explosion limit (LEL): to be determined; Minimum ignition energy (MIE): to be determined. Equipment components must be designed to withstand the specified overpressure without destroying the components, and all such equipment will be externally braced if necessary.
10.2	Acoustic attenuation system: full noise emission data must be provided. The investor does not plan to purchase acoustic damping systems
10.3	Steel supporting structure and platforms: guidelines provided by the Manufacturer; assembly and materials provided by the Investor.
10.4	Insulation and cladding: Drying chamber transported as insulated; insulation on selected air ducts to be installed on site. If the drying chamber is delivered as components, its insulation and cladding will be carried out on site, for which the equipment Supplier bears full responsibility and cost.
10.5	General Finish Guidelines: All product contact surfaces will have welds ground flush All external welds mechanically brushed with splatter removed, and external carbon steel will be prime painted or a non-inferior finish. Non-product contact surfaces will have welds mechanically brushed with splatter removed, 50% profile remaining. External carbon steel will be prime painted or a non-inferior finish.
11.	Documentation: The manufacturer of the equipment is required to provide full documentation to enable the correct installation, safe operation, shutdown and maintenance of the equipment. In addition, the Manufacturer is obliged to provide all documents required by law and by intra-community law and good business practice, as well as other standard documents to be included when supplying production equipment, i.e. material certificates for components coming into contact with the product. All documentation will be in English and/or Polish with the requirement that the final operating and maintenance instructions are in the local language in accordance with EU law, where applicable.
11.1	The manufacturer must declare that drawings/documentation that will require further modifications in order to meet the investor's guidelines or modifications resulting from changed data from suppliers will be delivered as "as-built" drawings together with the operation and maintenance instructions
12.	Additional services expected from the Manufacturer/Seller:
12.1	Basic assumptions:
12.1.1	"Days" means working days, i.e. 10 hours of uninterrupted work
12.1.2	The Investor is responsible for ensuring uninterrupted access to the test material, all media and providing an operator for physical assistance
12.1.3	In the event of a problem with the equipment during start-ups and startups, the cause of which will be issues beyond the Investor's control, the Manufacturer is obliged to provide a free service to solve the problem

12.1.4	In case of delays caused by the Investor, the Investor will bear the additional travel time and costs required
12.1.5	In order to ensure the availability of personnel, it is expected that the Manufacturer/Seller will be notified of the actions taken at least three (3) weeks in advance of the arrival date
12.2	Control Engineering: The Manufacturer/Seller will provide all necessary information, i.e. diagrams and flowcharts for the correct control and regulation of the installation, in accordance with the specification. This should include: P&ID diagrams, instrumentation specifications, functional descriptions (cause-effect diagrams, automation logic, control philosophy, interlock and alarm logic). The Manufacturer/Seller is also expected to provide engineering support to provide, verify and ensure the functionality of the control system
12.3	Participation in the HAZOP analysis (Hazard Analysis and Operational Capabilities): The Manufacturer/Seller is expected to participate in the HAZOP analysis, for a minimum of 2 days.
12.4	Assembly supervision: The Manufacturer/Seller is expected to participate and provide engineering supervision in the works related to the assembly of the installation. This means that supervision for a minimum of 20 days is to be provided by one or more employees of the Manufacturer/Seller, in order to control the assembly of critical parts of the installation, i.e. the spray chamber, all fans, scrubber. The employees performing the supervision will be expected to be regularly present at the workplace for a period agreed by both parties, but not less than 20 days. At the remaining stages of the assembly works, extending beyond the aforementioned 20 days, the Manufacturer/Seller is expected to designate a person to provide cursory supervision of the remaining elements of the dryer system.
12.5	Acceptance and start-up:
12.5.1	Mechanical acceptance: The Manufacturer/Seller is expected to appoint a competent person to participate in the mechanical acceptance and start-up of the system components prior to official start-up, for a minimum of 5 days.
12.5.2	Process acceptance: The Manufacturer/Seller is expected to appoint a competent person to participate in the process acceptance of the installation (checking its functionality and efficiency), for a minimum of 15 days.
12.5.3	Training: The Manufacturer/Seller is expected to appoint a competent person to perform a full training of local operators, for a minimum of 2 days.
12.6	In the case of delivery of the spray tower in the form of elements - transport, unloading, foundation and welding works within the spray tower are fully the responsibility of the supplier (Manufacturer/Seller). The works must be done in a timely manner, without unnecessary delays. The Investor will provide an undisturbed access to worksite and all necessary means (which will lay in the Investor's scope of responsibility)
12.7	The Manufacturer/Seller undertakes to provide complete detailed designs of the entire system, including automation design, process guidelines, data and other unspecified elements customarily included in the scope of the documentation, within a period of no longer than 24 weeks from the order/signing of the contract.
12.8	The Manufacturer/Seller undertakes to provide guidelines for all industries including the construction industry and the media within a maximum period of 10 weeks from the order/signing of the contract. The period also includes time for verification and acceptance by the developer.
13.	Terms of payment: the stages of payment and settlement, upon completion of individual stages of work, will be determined and accepted jointly, by the Investor and the Manufacturer. The formal issues and the form of payment will be determined and accepted jointly, by the Investor and the Manufacturer, noting that the advance payment may not amount to more than 30% of the contract value. The following payment stages are preferred: 1. 30% down payment, 2. 30% after full completion of the design/engineering phase, 3. 30% after FAT testing and declaration of readiness to ship the order, 4. 10% after commissioning, acceptance and performance testing
14.	Terms of delivery: following the order/signing of the contract, the manufacturer is expected to deliver the overall equipment/mechanical part to the site indicated by the Investor within a maximum period of 46 weeks and the electronic equipment within a maximum period of 52 weeks.



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15.	Exclusions:
15.1	The Investor undertakes to obtain all licenses, permits and certificates necessary for both parties to fulfill the scope of the agreement
15.2	The installation of the device, mechanical and electrical assembly are not the subject of the order. Transport of all equipment to the location indicated by the Investor is the responsibility of the Supplier.
15.3	The supplied installation should be complete and processually fully functional
16.	GENERAL CONDITIONS:
16.1	The cost of packaging and delivery of the device to the Investor's plant included in the price (Transport and transport insurance on the Manufacturer's side);
16.2	The device must have a CE declaration of conformity and must comply with Directive 2006/42/EC;
16.3	Warranty conditions: the Manufacturer undertakes to remove all defects in the delivered equipment resulting from material defects or faulty workmanship. The device should be covered by a warranty for a period of at least 18 months (without a limit of hours) from the date of commissioning the installation or at least 24 months (without a limit of hours) from the date of shipment or the date of notification of readiness for shipment.
16.4	Process warranty conditions: process functionality warranty issues will be determined and accepted jointly by the Investor and the Manufacturer/Seller

At the supplier selection stage, the ordering party allows for the possibility of carrying out reference visits in order to verify technology similar to the offered one operating in industrial conditions.

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