

### TECHNICAL SPECIFICATION LABORATORY TWIN SCREW MIXER UNIT LAPPEENRANTA TECHNOLOGY CENTER

**OUTOTEC (Finland) Oy**

**Note!**

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### **LABORATORY TWIN SCREW MIXER SPECIFICATION** LAPPEENRANTA TECHNOLOGY CENTER

#### 1. SCOPE

##### 1.1 General

This specification covers the specifications for the laboratory twin screw mixer unit to be used in material activation grinder in Lappeenranta technology center in Lappeenranta Finland.

The equipment shall be supplied as a complete functional and operational unit incorporating all necessary auxiliary equipment except as specifically excluded in this specification.

Note 1: If the supply deviates from this specification, complete technical and economic arguments for the alternative solution are to be stated.

Note 2: All document references included in this specification refer to the latest revision of the document in question.

##### 1.2 Work excluded

All work and equipment required for a complete operating unit shall be included except as specifically excluded below:

- Field erection and installation
- Electrical wiring and cabling which are not integral to the units
- Supply of utilities

##### 1.3 Battery limits

- Stand-alone unit on fixing points
- Receiving chute of material in and chute out
- Connection terminals of electric devices, motors and instruments

## 2. DESIGN SPECIFICATIONS

### 2.1 Operating principle:

- two counter rotating screw blade mixers to create high shear
- high wear grinding elements or replaceable carbon steel
- multiple configuration possibility for different materials/duties
- two electric motors, or synchronizing gear, possibility to run with variable speed drives
- chutes for material feed and output
- on frame

### 2.2 General performance:

- Twin screw mixer unit
- Equipment is used in laboratory and research works for mixing and mechanical activation of different slurries, fluids, cake and powdered materials
- It is also used in chemicals mixing in industries as an industrial mixer
- Equipment can also be used for treatment of suspensions and emulsions.
- Prerequisites for the treated material: cake pieces/lumps below up to 60 mm, size of particles below 2.5 mm inside cakes/lumps

### 2.3 Technical specifications

#### **A continuous twin screw mixer for mixing of two fluids in laboratory conditions**

Sample material information, for example, powdered cake pieces and slurry together:

- Fluid A: Solids mass fraction ~75%, feed possibility ~2-10 m<sup>3</sup>/h
- Fluid B: Solids mass fraction ~62%, feed possibility ~5-25 m<sup>3</sup>/h
- Fluid A and B will be mixed into a homogenous fluid

Specifications/requirements:

- Total capacity approx. 10 - 40 m<sup>3</sup>/h
- Two paddle screws with adjustable paddles and easily removable shaft center section
  - The paddle angle needs to be adjustable between -45...+45 degrees
  - The shaft center section should be easily removed without dismantling of the device frame, bearings etc. → The type of the mixer shaft can be easily changed
- Single drive unit for frequency converter use – synchronized screw rotation (mechanically or electronically)
- Mixer screws should rotate in opposite directions
- An adjustable positioning plate for the inlet of fluid A, for optimum feed position (speed dependent)
- A feed box for fluid B with adjustable (the shape of the overflow) fluid overflow, multi feed points preferred
- Adjustable outlet points, two outlets minimum preferred
- Split plummer block bearing housings or equivalent
- Sealed construction, no liquid leakages allowed
  - Packing boxes or equivalent solution for shaft sealing
  - All the joints in the frame need to be sealed

### 3. EQUIPMENT DESCRIPTION

#### 3.1 Construction description:

Standard delivery includes: a twin screw unit, a slurry feeder on top with a homogenizing hopper for the initial material.

Guards and shielding according to ISO 14122, EN 953 and ISO 13857:2008

#### 3.2 Surface treatment and painting:

Carbon steel parts are epoxy painted. Stainless steel and plastic parts are not painted.

SFS-EN ISO 12944-5/A3.08 (EP 160/2-FeSa 2½)

- surface treatment epoxy painting, 2 coats of primer
  - primer paint 1 x 80 microns
  - 1 coat of epoxy paint 80 microns
  - total paint thickness 160 microns

Color: TBA (supplier selects similar paint)

#### 3.3 Fabrication:

Refer to Outotec (Finland) ISO9001 for required quality assurance procedures and check-routines that are required to be executed during the component fabrication.

#### 3.4 Shop assembly:

Components and installation shall be shop assembled to the maximum extent regarding the fabrication, transportation and installation. Seller is responsible to consult with the Client about the extent of the shop assembly.

#### 3.5 Trial assembly:

All motors, drives, linings, lubrications etc. shall be trial assembled and shop tested for operation.

Refer to Outotec (Finland) ISO9001 Quality Plan for required quality assurance procedures and check-routines that are required to be executed during the shop assembly.

### 4. OPERATION and USE

Twin screw mixer unit should be a multifunctional mixer, intended for mixing of dry, relatively less abrasive powdered or granulated materials such as fly ash, tailings minerals ( with particles below 0.1 – 0.5 mm ). In the equipment should be possible to effectively mix different dry biological, organic, inorganic and metallic materials. It is also possible to treat liquids: solutions, emulsions and suspensions.

JanKau/MP Research

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In addition to the equipment offer for our laboratory, please, offer your expertise in the installation and fine-tuning of the lab equipment and operation training.

Safety, operation and maintenance manual, 2 pcs in English, are included in delivery.