TECHNICAL SPECIFICATION
LABORATORY HIGH SHEAR ATTRITION GRINDER
DEWATERING TECHNOLOGY CENTER

OUTOTEC (Finland) Oy

Note!
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LABORATORY HIGH SHEAR ATTRITION GRINDER SPECIFICATION
DEWATERING TECHNOLOGY CENTER

1. SCOPE

1.1 General

This specification covers the specifications for the laboratory high shear attrition grinder to be used in material activation grinder in dewatering 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 grinding media to create high shear
- high wear grinding elements
- multiple configuration possibility for different materials/duties
- two electric motors, possibility to run with variable speed drives
- chutes for material feed and output
- on frame

2.2 General performance:

- Laboratory Attrition Grinder
- Equipment is used in laboratory and research works for grinding and mechanical activation of different dry granulated 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.
- Prerequisits for the treated material: hardness below Mohs up to 6, size of particles below 2.5 mm, content of moisture below 3 %.
- Average fineness of the ground product is between 0.01-0.2 mm

2.3 Technical specifications

Range of capacity, kg/h	12-20
Installed power, kW	7-10 kW total
Max. speed of impacts, m/s, range variable	175 / 240
Rotor's rotation frequency (adjustable), rpm	3000-12000 / 3000-18000
Max. dimensions, mm:	
- length	500-800
- width	600-1200
- height	1000-2000
Max. weight, kg	50-125
Sound level at distance 1 m, dB	below 100

3. EQUIPMENT DESCRIPTION

3.1 Construction description:

Standard delivery includes: a grinding unit, a vibrofeeder with a hopper for the initial material (supplied with an agitator), a bag air filter, a receiving container and a control board.

Stainless steel is used for the construction of those parts of the device which come into contact with the grinding material.

Optionally, an attrition grinder unit may also be fitted/supplied later with additional features/devices, or alternate permitting:

1. Grinding in inert gas medium

2. Grinding of the pre-cooled materials (including at criogenic temperatures)

3. Grinding of the material with particles of up to 10 mm by using built in sieve.

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

3.2 Surface treatment and painting:

Mild 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) ISO9001Quality Plan for required quality assurance procedures and check-routines that are required to be executed during the shop assembly.

4. OPERATION and USE

Laboratory Attrition Grinder should be a multifunctional mill, intended for fine grinding of dry, relatively less abrasive powdered or granulated materials such as fly ash, tailings minerals (with particles below 0.1 – 0.5 mm). Preferable for materials and systems with mechano-activation is also available. In the equipment should be possible to effectively grind different dry biological, organic, inorganic and metallic materials. It is also possible to treat liquids: solutions, emulsions and suspensions.

Grinding in the Laboratory Attrition Grinder is performed by several, usually 3-7 impacts at high speed of up to 100-200 m/s. The speed is increased as the particles move from the center of the rotors to the periphery.

The central part of the disintegrator consists of two rotors which revolve in opposite directions, with several concentrically placed rows of impact elements with different design.

The fineness of the ground product depends on the properties of the iniatial material, the size of the particles, the model of the disintegrator, and the grinding regimes. The fineness of the material ground in the disintegrator could reach from several microns to hundreds of microns.

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.