

DESINTEGRAATOR TOOTMISE OÜ

ZEOLITE VEN-ZEOTEX grinding & activating unit

The passport - maintenance instruction

1B61.00.00.PS

Tallinn, 2019.

CONTENT	Page.
1. General information of the product	3
2. Basic information and characteristics of the line	3
3. Basic units characteristics.	3
3.1. Disintegrator DESI-14	3
3.2. Screw feeder WAM TU / 168 / 0300	3
3.3. Cyclone 5B15	5
3.4. Cyclone 5B14 with hopper 5B14.01	4
3.5. Rotary valve RV05/30	5
3.6. Screw conveyor WAM TU 168 / 0250 (horizontal)	4
3.7. Screw conveyor WAM TG 168 / 0400	4
3.8. Automatic air filter WAMFLO FNW4J46	5
3.9. Exhausting fan MT132SA021453	5
3.10. Diverter Flap Valve DVA, type 150C4	6
3.11. Control board	6
4. Complete set of delivery	6
5. Design and principle of the work	6
5.1. Design of the grinding system	6
5.2. Principle of the work	7
5.3. Electrical part	7
6. Instruction a security measures	8
7. Preparation for work	9
8. Operation	11
9. Maintenance service	11
10. Possible malfunctions and methods of their elimination	13
11. Packing	14
12. Rules of storage	14
13. Transportation	15
14. Guarantee certificate	15
15. Certificate on acceptance, conservation and packing	15

ANNEXES

Annex 1. Draw of the grinding & activating unit.	16
Annex.2. Disintegrator DESI-14.	17
Annex 3. Air filter WAMFLO with fan	18
Annex 4. Rotary valve RV05/30	19
Annex 5. Screw conveyor & feeder	20
Annex 6. Diverter Flap Valve, type 150	20
Annex 7. Electrical circuit of the grinding unit.	20
Annex 8. Connection table	21
Annex 9. Wire marking	22
Annex 10. Scheme on the door of control board.	21

Separately enclosed.

Passport - maintenance instruction on the disintegrator DESI-14 / 2B143 /.
Control board of the automatic air filter.
Passport and test protocol on control board.

1. General information of the product.

- 1.1. Name: Grinding & activating unit.
- 1.2. Trade mark: 1B61
- 1.3. Factory number: 05
- 1.4. Year of manufacture: 2019
- 1.5. Manufacturer / Seller: Desintegraator Tootmise OÜ

2. Basic information and characteristics of the unit.

- 2.1. Unit is intended for Zeolite VEN-ZEOTEX grinding & activating.
- 2.2. Productivity, kg / h - 1000
- 2.3. Maximum size of particles in initial material, mkm - 100
- 2.4. Maximum moisture of initial material, % - 2
- 2.5. Maximum temperature of initial material, °C - 50
- 2.6. Power supply from electrical network: ~3N, 50 Hz, 380 V
- 2.7. Maximum total installed power, kW - 80
- 2.8. Hopper for initial material with volume, m³ - 1,5
- 2.9. Area dimensions of the unit arrangement, mm:
 - length - 6000
 - width - 5200
 - height - 4000
- 2.10. Weight Brutto, kg - 2700
- 2.11. Degree of electrical protection – IP54, IP55
- 2.12. Maximum sound pressure (at the distance 1 m from the unit), dB - 90
- 2.13. Maximum air flow, m³ / h - 1000
- 2.14. Maximum content of dust in air on the distance 1 m from line, mg/ m³ - 5,0
- 2.15. Construction materials:
 - carbon steels EN-235, st.45, st.30;
 - working surfaces of impact elements of disintegrator's rotors are covered by electrode HARD 60 in lays 2...3 mm.

3. Basic unit's parts.

3.1. Disintegrator DESI-14 / see its passport - maintenance instruction /.

- 3.1.1. Disintegrator DESI-14 is intended for Zeolite VEN-ZEOTEX grinding & activating.
- 3.1.2. Minimum productivity, kg / h - 1000
- 3.1.3. Maximum size of initial particles, mkm - 100
- 3.1.4. Maximum moisture of initial material, % - 2
- 3.1.5. Drives of the disintegrator - 2 electric motors BEVI 3D3 200L1–2, B35, I.cl. F:
 - capacity, kW - 30
 - frequency of rotor's rotation, rpm – 2965
- 3.1.6. Disintegrator is supplied by 6-rows set of rotors 2BP141, working surfaces of impact elements are protected by wear resistant alloy HARD 60.
- 3.1.7. Housing and cover of the disintegrator are supplied by water cooling jackets.
- 3.1.8. Dimensions of disintegrator, mm:
 - length - 1570
 - width - 1160
 - height - 1300
- 3.1.9. Weight Netto / with 1 set of rotors /, kg - 850
- 3.1.10. Maximum air flow, m³ / h - 1000

3.2. Screw feeder WAM TU 168 / 0300, Italy .

3.2.1. Screw feeder is intended for uniform feeding initial material in disintegrator DESI-14.

3.2.2. Minimum productivity, kg / h - 1000

3.2.3. Screw drive: geared motor WAM MT1120M041453, reductor S4320112ES, B50:

■ capacity, kW - 4,0

■ rotor's speed of rotation, rpm - 1456

■ gear transmission ratio - 1 : 20

3.2.4. Screw parameters, mm:

■ diameter - 150

■ pitch - 100 / 160

3.2.5. Diameter of the case, mm - 168

3.2.6. Distance between inlet and outlet, mm - 3000

3.2.7. Inclination, degree - 30

3.2.8. Current's Frequency Inverter: Altivar Machine ATV320, Schneider-Electric,
3 x 400 V

■ capacity, kW - 4,0

■ range of frequency changing, Hz - 8...60

3.3. Cyclone 5B15.

3.3.1. Cyclone is intended for preliminary extraction of ground product from air flow.

3.3.2. Dimensions, mm:

■ diameter - 600

■ height - 1300

3.3.3. Weight, kg - 215

3.4. Cyclone 5B14.

3.4.1. Cyclone with hopper is intended for second stage extraction of ground product from air flow.

3.4.2. Dimensions, mm:

■ diameter - 500

■ height without hopper - 1060

■ height with hopper - 1500

3.4.4. Weight, kg - 200

3.5. Rotary valve RV 05 /30, TOREX, Italy.

3.5.1. Rotary valves are intended for discharging material from cyclone 5B15, from hopper of second cyclone 5B14 and air filter WAMFLO and also prevent dusting.

3.5.2. Max productivity, m³ / h - 1,5

3.5.3. Diameter of the rotor, mm - 220

3.5.4. Drive: geared electric motor WAM Group MV0800B04145, reductor Motovario SW063:

■ capacity, kW - 0,75

■ frequency of rotor's rotation, rpm - 1445

■ gear transmission ratio - 1 : 50

3.6. Screw conveyor WAM TG 168 / 025021332, Italy / horizontal /.

3.6.1. Screw conveyor is intended for collecting ground product from rotary valves.

3.6.2. Minimum productivity, kg / h - 1000

3.6.3. Screw drive: geared motor WAM MT100LH041453, reductor S4320100ES12401N, B50:

- capacity, kW - 3,0
- rotor's speed of rotation, rpm - 1400
- gear transmission ratio - 1 : 20

3.6.4. Screw parameters, mm:

- diameter - 150
- pitch - 160

3.6.5. Diameter of the case, mm - 168

3.6.6. Distance between inlet and outlet, mm - 2500

3.7. Screw conveyor WAM TG 168 / 040021334, Italy.

3.7.1. Screw conveyor is intended for direction ground product into [Diverter Flap Valve](#).

3.7.2. Minimum productivity, kg / h - 1000

3.7.3. Screw drive: geared motor WAM MT1120M041453, reductor S4320112ES, B50:

- capacity, kW - 4,0
- rotor's speed of rotation, rpm - 1400
- gear transmission ratio - 1 : 20

3.7.4. Screw parameters, mm:

- diameter - 150
- pitch - 160

3.7.5. Diameter of the case, mm - 168

3.7.6. Distance between inlet and outlet, mm - 4000

3.7.7. Inclination, degree - 45

3.7.8. Current's Frequency Invertor: DELTA VFD037,
3 x 400 V

- capacity, kW - 3,7
- range of frequency changing, Hz - 20...60

3.8. Automatic Air Filter WAMFLO FNW4J46, Polypleat, Dust Collector.

3.8.1. Air filter is intended for final cleaning air from ground material. Cleaning of filter's elements – periodically / check by time relay / by impulses of compressed air.

3.8.2. Summary surface of filter's elements, m² - 48

3.8.3. Number of filtering elements - 14

3.8.4. Maximum cleanable air flow, m³ / h - 2000

3.8.5. Compressed air for filter cleaning:

- pressure, bar - 5...6
- consumption of compressed air, Nm³/h - 10...15
- volume of receiver for compressed air, dm³ - 5,1

3.8.6. [Filtering elements: Polypleat, filtering media: pleated non-woven polyester](#)
KFEW3014PFVE

3.8.7. Coil voltage, V 24...220

3.8.8. Constructional material - [stainless steel AISI-304, AISI 316](#)

3.8.9. Dimensions, mm:

- diameter - Ø 1000
- height - 2300

3.8.10. Weight, kg - 462

3.9. Exhausting fan, WAMGroup, Italy:

3.9.1. Maximum quantity by air, Nm³/h - 2000

3.9.2. Vacuum, Pa - 1600

3.9.3. Drive - electric motor MT132SA021453, WAMGroup:

- capacity, kW - 5,5
- speed of rotor's rotation, rpm - 2820
- 3.9.4. Weight, kg - 230

Diverter Flap Valve DVA, type 150C4.

Diverter Flap Valve is intended for discharging ground product into big-bags.

3.11. Control board , type JK-R2.

3.11.1. Dimensions, mm:

- length - 1200
- width - 400
- height - 1400

3.12. Weight, kg - 150

4. Completeness of delivery.

Table 1

№	Designation	Name	Q-tity	Notes
1.	2B143.00.00	Disintegrator DESI-14 on the frame	1	In set
2.	2BP141.00	Set of rotors	2 sets	by 2 rotors
3.	TU 168 / 0300	Screw feeder	1	WAM
4.	TG 168 / 0250	Screw conveyor	1	WAM
5.	TG 168 / 0400	Screw conveyor	1	WAM
6.	5B15	Cyclone	1	
7.	5B14	Cyclone with hopper 5B14.01	1 set	
8.	RV05/30	Rotary valve	3	TOREX
9.	DVA	Diverter Flap Valve, type 150C4	1	WAMGroup
10.	WAMFLO	Automatic air filter	1	WAM
11.		Exhausting fan	1	WAMGroup
12.	JK-R2.00	Control board	1	VG-Production OÜ
13.		Hoppers, frames, supporting metal constructions, connecting channels	1 set	8 pcs.
14.		Spare set of filtering elements KFEW3014PFVE for air filter	1 set	14 pcs.
15.		Set of connecting elements (bolts, nuts).	1 set	100 pcs.
16.	JK-R2.00.00.PS	Passport, instruction manual	1	

5. Design and principle of the work.

5.1. Design of the grinding unit.

Principal technological scheme and placement of grinding unit is shown in annex 1 / draw 1 /.

Unit consists from hopper (1), screw feeder (2), disintegrator DESI-14 (3), 2 cyclones (4, 6), 3 rotary valves RV 05/30 (5, 6, 11), hopper (7) of the cyclone (6), automatic air filter (9), discharging screw conveyors (12, 13). Also unit include: exhausting fan (10) / on the top of air filter /, Diverter Flap Valve (14), lattice (17) / within hopper (1), supporting metal constructions, connecting channels, hoses and control board. For unit's work are necessary: air compressor, big-bags, balance / them not belongs to the set of delivery /.

Screw feeder and conveyors consist from screw, placed within case, loading and unloading channels, supplied by flanges and geared motor. Productivity of screw feeder (2) and conveyor (13) are adjustable by current's frequency invertors / placed in unit's common control board /.

Disintegrator DESI-14 (3) consists from working chamber / formed by cover and housing / with loading and outlet channels, set of rotors, 2 electric motors and frame / more information is in separate passport, maintenance - instruction on disintegrator DESI-14 /.

Discharging rotary valves RV05/30 (5, 8, 11) are placed under cyclone 5B15 (4), hopper (7) of the second cyclone 5B14 (6) and hopper of air filter (9). Cyclones and air filter are placed on the common frame.

Automatic air filter, consists from case, cover, hopper / under filter /, 14 filtering elements / cartridges from polyplete Polyester /, receiver / volume $5,4 \text{ dm}^3$ / for compressed air, own electronic board with time relay. Purification of filter elements takes place due periodically submission inside each filtering element / grouped by 4...5 elements / short reverse impulses of compressed air / on timer is installed time between impulses of compressed air ca' 30 s, time of impulses is 0,4 s /. Filter is supplied by exhausting fan (10) / placed on the top of air filter / and must be supplied by air compressor with productivity up to $15 \text{ m}^3 / \text{h}$, air pressure up to 6 bar /. Hopper (7) of the cyclone (6) is supplied by hatch / for its inspection and cleaning /. Screw feeder (2) and conveyor (13) are supplied by supports (23, 24).

Unit include also common control board; connecting channels / hoses from polyurethane /: hose $\varnothing 160 \text{ mm}$ (9), hose $\varnothing 100$ (22), hose $\varnothing 200 \text{ mm}$ (25) / and hose $\varnothing 12 \text{ mm}$ for compressed air. Unit must be supplied by electrical cables / them as air compressor, hose $\varnothing 12$ for compressed air and electrical connecting cables don't belong to set of delivery /.

5.2. Principle of work.

Initial material from hopper (1), direct by screw feeder (2) / with regulated productivity / into working chamber of the disintegrator DESI-14 (3), where takes place grinding of material. Ground & activated product throws in air flow through discharging channel (20) of disintegrator into first cyclone 5B15 (4), where extracts from air flow ca' 85...93 % of material, which removed by rotary valve (5) and submits into screw conveyor (12). Air flow with remained in it material submits through channel (21) into second cyclone 5B14 (6), where also 5...10 % of remained material separates from air and fall down in its hopper (7) and by rotary valve (8) submits into conveyor (12). Air with remained part of material / ca' 1...3 % from all ground material / submits from cyclone (6) into air filter (9), where in filtering elements air finally separates from material. Rotary valves (5, 8, 11) serve to prevent submission of air with material into screw conveyor (12). Ground product dispatches by screw conveyor (12) into other screw conveyor (13), from which product dispatch through Diverter Flap Valve (14) and its hoses (25) into one of empty big-bags (15).

Fan on the top of air filter additionally to disintegrator DESI-14 / air flow checked by rotary slider on its feeding channel / ensure necessary quantity of air flow for transportation material into cyclone (4). Compressor provides air filter (9) by necessary quantity of compressed air / $P = 5...6 \text{ bar}$ / for cleaning filtering elements.

5.3. Electrical part / see electrical circuit in annex 7, 8, 9. /.

For electrical protection of the power circuit are used the automatic switches QF1... QF11, with an adjustable thermal inserts for protection against overloading currents. At correct connection and readiness of unit for work flash indicator on relay KA1. Unit's switch on / off performs by the electromagnetic switches S1...S6 in turn accordingly scheme,

shown in Annex 10 and taped on door of the control board. The rotors of disintegrator DESI-14 have relatively large inertial starting moment, and is possible at first start up one motor and after 5...7 c to start up second motor.

Maximum allowable currents, consumed by motors / check by ammeter /:

- M1 and M2 / disintegrator DESI-14 / is 51 A;
- M3 / screw feeder / is 8,0 A;
- M4, M5 and M6 / rotary valves RV05 / is 1,75 A;
- M7 / fan / is 10,2 A;
- M8 / screw conveyer / is 6,0 A.
- M9 / screw conveyer / is 8,0 A.

For safe maintenance and trouble-free service to exclude start-up of disintegrator's DESI-14 electric motors at open working chambers is intended electrical blocking by limit micro switch SQ1 / connected with contacts X1 and X2 in control board /. Main switch Q1 is intended for switch off unit at service or equipment's reparation work.

For changing productivity of the screw feeder - by changing current's frequency - press green button "Esc" 2 times until on display will appear double value / in percentages / of the frequency / light up top indicator on the display of inverter. F.e. if drive of feeder worked at frequency 20 Hz – it means, that it is 40 % of nominal value / 50 Hz /. Turn green handle to put necessary productivity.

Discharging conveyor TG 168 / 0400 is connected through current's inverter A2 VFD037, 3,7 kW. To check current, consumed by inverter A2, press few times button "MODE" until display of inverter start flash indicator "A" /. For changing current's frequency come back to regulation frequency / press few times button "MODE" until on display of inverter start flash indicator "F" / and put necessary frequency at turning handle on the control panel of inverter. At accident stoppage of disintegrator reset inverter A2 by pressing button "RESET".

More information about maintenance and service of inverter: www.schneider-electric.com and www.delta.com.tw.

The control board must be connected by a copper flexible cables:

- with supply electrical net – by cable 5 x 50 mm²;
- with electric motors of disintegrator DESI-14 – by cables 4 x 16 mm²;
- with screw feeder, 2 conveyors and rotary valves RV05/30 – by cables 4 x 1,5 mm²;
- with fan – by cables 4 x 2,5 mm²;
- with limit micro switch SQ1, siren and control cabinet of air filter – by cable 2 x 1,5 mm².

On the door of control board beside switches / common for groups of apparatuses / and button SA "Emergency STOP" are placed indicators HL10...HL19 / show apparatuses which are in work /.

At stoppage of the unit: stop apparatuses in turn reverse to starting turn / scheme in Annex 8 on door of control board / or by press knob of emergency switch SA1. Is possible to switch off only feeder by switch S6.

To end the work switch off apparatuses of the unit, give filter, compressor and fan works few minutes for better clean filter's elements.

6. Instruction a security measures.

6.1. The technical personnel, serving grinding unit should be instructed under the safety precautions at work with high-speed rotor machines and with low-voltage / up to 1000 V / electric equipment and also should be acquainted with the present instruction.

6.2. Electric safety of the apparatuses is provided by protective earthing of cases of the electric consumers. **Work on the grinding unit without earthing is not allowed.**

6.3. Electrical resistance between stator's windings of electric motors and their cases should not be less than 10 mΩ / it is recommended after long-term storage equipment in a damp room or at a low temperature to dry windings of electric motors by warm air, with $T < 70\text{ }^{\circ}\text{C}$ /.

6.4. It is forbidden to maintain grinding unit in room with explosive or flammable liquids and gases, chemically active environment, spoiling metals and electric isolation.

6.5. It is forbidden to start-up disintegrator DESI-14 with the switched - off or faulty limit switch; it is categorically forbidden to short-circuit its contacts.

6.6. Before cleaning of equipment or before reparation or service works - switch-off the power supply / switch off in control board main switch Q1 / and hang out on the control board the table with an inscription: **"Do not switch-on. Repair work"**.

6.7. Before start-up grinding unit should be completely prepared for work, according to the requirements, listed in the item 7.

6.8. At finishing work stop screw feeder and after that switch off other apparatuses in reverse wise to switch them on.

6.9. It is categorically forbidden to open disintegrator's DESI-14 working chamber after it switch-off, before complete stop of both rotors.

6.10. It is forbidden to brake the rotors of disintegrator DESI-14 after switched-off of the electric motors by any subjects through protective cases of electric motor's fans.

6.11. To exclude the submission in the unit any metal subjects or non-organic materials with the size of particles more than 5 mm.

6.12. It is forbidden to work on the grinding unit at occurrence in operating time below listed malfunctions:

- increased noise, occurrence knocks or vibration;
- occurrence a smell of burned isolation or smoke from the electric equipment;
- dustment of material from apparatuses and connecting channels.

NB! At their occurrence immediately to switch off unit.

6.13. It is forbidden to leave the unit without supervision in operating time.

6.14. During work, the personnel should use means for individual protection from noise and dust.

6.15. Constantly clean external surfaces of unit's apparatuses and room's inner surfaces.

7. Preparation for work.

7.1. Grinding unit would be placed in room with next conditions:

- air temperature: from minus 10 °C up to plus 30 °C;
- relative air humidity: not more than 80 % at temperature 20 °C;
- air environment: non-explosive, non-flammable, does not contain combustible gases and active vapours in concentration spoiled electrical isolation and coverings;
- room must be supplied by fire-extinguishing equipment, ventilation system;
- grinding unit will be placed on horizontal concrete or stone surface;
- for service air filter, fan and other highly placed equipment is recommended to purchase transferable platform with height ca' 2,5...2,8 m.

7.2. Release apparatuses and parts of grinding unit from packing and remove anticorrosive greasing by white-spirit. Check up completeness and absence of external damages.

7.3. Assemble grinding unit:

- place disintegrator in right position, fix by bolts disintegrator's frame to floor;
- connect inlet flange of the feeder (2) with flange under hopper (1), put feeder in right position relatively disintegrator and by hose (19) connect feeder's discharging channel with feeding channel of disintegrator;
- put support under feeder / near its discharging tube /;

- connect flange of intermediate channel (20) with flange on discharging channel of disintegrator;
 - put in right position / relatively disintegrator / frame with cyclones and connect flange on intermediate channel (20) with flange on inlet of first cyclone;
 - put air filter on its hopper (18) on the frame;
 - connect cyclone (6) and filter by hose (22);
 - put second conveyor (13) in right position and connect flange on inlet channel of conveyor (13) with discharging / outlet / flange of conveyor (12); put support in the middle of conveyor (13);
 - fix Diverter Flap Valve on discharging end of conveyor (13), fix under DVA 2 flanges with hoses (25);
 - for hermetization connections between channels and apparatuses use tightenings or silicon hermetic /.
 - fasten all equipment to floor;
 - put lattice (17) in the hopper (1);
 - fasten frame of common control board of the unit to the floor;
 - connect apparatuses with control board by cables, accordingly to the electrical circuit / Annex 7 /, Annex 8. / Connection table / and Annex 9 / Wire Marking /; motor M9 may be connected with contacts 9XT1...9XT3 on contactor KM9 or with contacts U, V, W on inverter A1 / if need to change productivity of conveyor (13) /;
 - place compressor on the floor near air filter and connect compressor with receiver on air filter by flexible hose with outer diameter 12 mm;
 - fix big-bags on hoses of the DVA;
 - place balances under big-bags.
- 7.4. Check resistance of isolation between phases and cases of each electric motor / R should be not less than 10 mΩ at 20 °C /. Check up serviceability of the limit switch SQ1 on disintegrator DESI-14.
- 7.5. Remove supports of disintegrator's DESI-14 motor, placed on its cover. Open working chamber of disintegrator, place and fix rotors on hubs, check by hand rotor's free rotation. Shut working chamber. Rotate rotors through fan's protective casings f.e. by screw driver for check, that rotors does not cling.
- 7.6. At short-term separately start up disintegrator DESI-14 / at first start one drive and after 5...7 s. start other drive /. Check that disintegrator's DESI-14 rotors rotate in right directions / specified by arrows on them protective cases and housings /. If the direction of any motor's rotation do not corresponds with specified by arrow, change connections of two phases on motors or in control board.
- 7.7. Start other apparatuses of the unit to be convinced, that:
- rotor of the fan rotates in right direction / specified by arrow on its protective case /;
 - start screw feeder and both conveyors to be convinced, that them screws turn in right directions, specified by arrows on the end without drive of conveyor or feeder;
 - directions of rotary valve's rotors rotation is not specified.
- 7.8. Put on inverter A1 of the feeder frequency 10 Hz / 20 % /. Switch on / off of screw feeder's and conveyors electric motors performed by pressing buttons of switch S6 "FEEDER", and S2 "CONVEYOR". The maximum allowable current for feeder's and conveyor TU 168/0400 motors is 8,0 A /. For changing current's frequency of feeder see item 5.3.
- 7.9. Put the apparatuses into idle work on ca' 15 minute to be convinced in absence of vibration and extraneous noise. Order of unit's starting is displayed on door of the control board / annex 3 /:
- switch on compressor,
 - switch on air filter and fan / switch S1 /;

- switch on discharging conveyors / switch S2 /;
 - switch on rotary valves / switch S3 /;
 - switch on by switches S4 and S5 motors of disintegrator DESI-14;
 - then drives of disintegrator DESI-14 will come in operation mode – ca' after 15...20 seconds / and ammeter on control board show current not more than 25 A / to switch on screw feeder / by pressing S6 /;
 - check / by special ammeter / electric current, consumed by each motor;
 - check in temperature of motors and reducers.
- 7.10. Fill in hopper few hundreds kg of material. Check productivity of feeder / for it disconnect outlet flange of feeder from inlet channel on disintegrator /.
- 7.11. For unit installation is recommended put initial productivity of feeder ca' 1000 kg / h.
- 7.12. Grind batch of material. Check fineness of final product. If fineness of product and consumed currents on disintegrator's motors permit – may increase frequency on inverter A1 / it increase productivity of the unit /.
- 7.13. At grinding batch / 500...1000 kg / of initial material testify that unit work normally, without dusting, productivity of feeder is near optimum.
- 7.14. If at unit's testing will take part some malfunctions - allowed to start work on the grinding unit only after them elimination.
- 7.15. For protection from material sticking in hopper (1) near its discharging flange – outside hopper - place agitator f.e. pneumatic shocker GUNJET 080 or vibrator M3/45 from Italvibras, periodically started by time relay / them not include in the set of delivery /.

8. Operation.

- 8.1. Load batch of initial materials into hopper (1).
- 8.2. Start up grinding unit and grind batch of material.
- 8.3. Check quality of ground product and productivity of the unit. If necessary to change productivity of the unit at changing by inverter A1 current's frequency on feeder's motor. For better grinding possible to decrease productivity of the feeder and decrease air flow / by slider on feeding channel of disintegrator /. Optimal productivity of the unit determines by quality of ground material.
- 8.4. If temperature of case and housing of disintegrator increased up to 80 C – use water cooling jackets.
- 8.5. Before finish grinding of materials - switch off all apparatuses in order reverse to start them up.
- 8.6. For emergency stop of the unit, press switch SA1 on the door of the control board. Before start up unit anew release button SA1 / press and turn it /.
- 8.7. At emergency stop of the unit - find reason of malfunction / appropriate automatic switch in control board is switched off /.
- 8.8. **Attention.** After an emergency stop of grinding unit for restart it is necessary previously to be convinced, that the working chamber of disintegrator DESI-14 and other apparatuses and connecting channels are not fill by a material. If necessary – to clean them.

9. Maintenance service.

- 9.1. At operation with the grinding unit is necessary constantly to watch serviceability of the electric motors and other equipment, and also connecting cables of electric system, according to the common service regulations of the electrical equipment.

9.2. Carry out necessary operations of maintenance service of apparatuses according them passports and descriptions:

- on screw feeder and conveyors: www.wamgroup.com - Product Range – screw feeders - TU – Complete Manual;
- on rotary valves: www.wamgroup.com - Product Range – valves – RV - Complete Manual;
- on air filter and its fan: WAMGroup, passport-maintain instruction;
- on inverter: www.schneider-electric.com and www.delta.com.tw;
- on electric motors: www.bevi.com - Products – Electric Motors – Sg/Sh (or 2A / 4A) – Technical Information.

9.3. For cleaning apparatuses after work use vacuum cleaner.

9.4. The maintenance service of the grinding unit includes a daily and periodic maintenance.

9.5. Daily after work it is recommended:

- open working chamber of disintegrator DESI-18, clean from material rotors, working chambers, also clean external surfaces of the apparatuses;
- check up rotors fastening of disintegrator DESI-18, carry out visual survey of the rotors abrasive wearing and possible defects;

9.6. The periodic service includes the following kinds of work:

- check up a condition and abrasive wearing of working surfaces of disintegrator's DESI-14 rotors, check axial gap between rotors; wearing of feeders and conveyer screws, cases, rotors of rotary valves, connecting channels;
- check up all screw connection; fastenings of electric motors;
- check up condition and level of lubricant in bearings of disintegrator DESI-14, feeders, conveyer and rotary valves reducers;
- check up tightenings;
- check up condition of air filter's filtering elements;
- check up conditions of the fan and air filter.

Attention! All maintenance service must be carried out on the grinding unit, disconnected from electrical supply net / main switch Q1 must be switched off /.

9.7. Minimum 2 times in a year or after 800 h of work - to carry out the preventive inspection of the electric motors, according to the common service regulations of electric motors and check up the condition of them bearings, so as bearings in feeder's reducers.

9.8. In case at increased vibration of disintegrator DESI-14 – check its rotor's condition, if them is not significant worn - balance rotors, if it don't eliminate vibration - check up a condition of bearings in electric motors. If necessary to change bearings.

9.9. At strong wear of disintegrator's DESI-14 rotors / impact elements and discs /, or at significant grinding quality worsening it is necessary to repair rotors or replace them on new set.

9.10. At strong wear of screws of feeder and conveyors - to repair them by welding wear resistant alloy / f. a. HARD 60 / on worn places.

10. Possible malfunctions and methods of their elimination.

10.1. List of malfunctions.

Table 3.

№	Kind of malfunction	The reason of malfunction	The method of elimination
1.	Does not start the drives of one of apparatuses. Does not start the drives of disintegrator DESI-14	Is switched-off any automatic switch in a control board. Absent date of frequency on inverter A1. Is open disintegrator's working chamber.	Find out the reason and remove it. Press red button "RESET" on inverter. Close the working chamber.
2.	Raised a vibration	Does not balanced or worn rotors of disintegrator DESI-14. Worn screw of feeder or conveyor. Bearings of electric motors are worn out.	To balance rotors. To replace rotors on new set. Repair screw. To change bearings.
3.	Sharp increasing of electric motor's loading.	The working chamber of disintegrator DESI-14 or connecting channels is full with ground material. Too high productivity.	To clean up a working chambers of apparatuses and channels. To reduce productivity of the feeder.
4.	Increased noise of disintegrator DESI-14	Absents of lubricant in its bearings	Add lubricant in bearings. Change lubricant.
5.	Sticking of a material in unit.	High humidity of material.	To dry material.
6	Unsatisfactory fineness of grinded material.	Rotors of disintegrator DESI-14 are worn. Large productivity of the unit.	Change or repair rotors. Decrease productivity of the feeder.

10.2. List of wearing units and details.

Table 4.

№	Name	The designation	Amount	Notes
1.	Rotors of disintegrator DESI-14	2BP141.00.00	2	By 2 rotors
2.	Bearings of electric motor, N = 30 kW	6312 C3	2	
3.	Protective housing in the casing of disintegrator	2B111.00.05	1	
4.	Protective housing in discharging channel	2B112.05.00	1	

10.3. Table of lubrication

Table 4.

№	Name	Quant.	Period of greasing	Lubricant
1	Bearings 6312 C3 of electric motors	4	Refilling by grease after 750 h of work Change of grease after 5000 h of work	LGHP 2/0.4, SKF bearing grease, LS3, or SHELL Alvania R3
2	Bearing 7208 of disintegrator's cover hinge	2	Not less than 1 time in year	- " -
3	Bolt of fixing unit		Each 3 months	- " -

11. Packing.

11.1. Apparatuses and other equipment of grinding unit are placed and fixed on the wooden bars and pallets.

11.2. Before packing:

- remove rotors from disintegrator DESI-14,
- place supports under disintegrator's electric motors;
- repair damage of painting;
- grease bearings in correspond with them passports - maintenance instructions.

12. Rules of the storage.

12.1. At storage equipment of the grinding unit over two months all non-painted surfaces of apparatuses and channels should be covered by anticorrosive greasing.

12.2. Equipment of the grinding unit to store under a canopy, protected from atmospheric precipitation.

12.3. It is forbidden to store grinding unit in rooms with high humidity, and also at temperature lower than - 10 °C.

13. Transportation.

13.1. For transportation apparatuses of grinding unit should be packed according items, listed in the section 11. "Packing".

13.2. For transportation place disintegrator DESI-14 in vehicle so, that its axe is perpendicular to moving direction.

13.3. Avoid impacts and sharp pushes.

13.4. Is not allowed to transport equipment of grinding unit on open vehicles without protection against atmospheric precipitation.

14. Guarantee certificate.

14.1. The manufacturer guarantees serviceability of the grinding unit on the base of disintegrator DESI-14 at proper service regulations, according present Passport – instruction Manual, during 12 months from the date of its sending to the Buyer.

14.2. The guarantee is not valid on the abrasive wearing of units, channels and details.

15. Certificate on acceptance, conservation and packing.

Calcite grinding unit 1B61, factory number 05.

Technical control and tests	Conservation and packing
Grinding unit corresponds to terms of the Contract № 17 / 18 from 19.12.2018 and engineering specifications. Unit was tested: 1. Idling during 1 hour. Current on each phase of disintegrator's drives 17...18 A and 21...22 A. 2. At grinding 200 kg of carbonate CaCO_3 with particles < 100 mkm, humidity 2 %, at productivity $Q = 1000 \text{ kg/h}$. Ground powder contents 92 % fraction below 30 mkm. Current on each phase of disintegrator's drives is 48...49 and 50....51 A. Temperature of material increased on 16 C, air flow – $1200 \text{ m}^3 / \text{h}$, maximum sound pressure 85 dB. On the basis of tests grinding unit is recognized as suitable for zeolite grinding.	Conservation and packing of the apparatuses and other parts is performed in correspondence with present passport - instruction of operation. Date of conservation and packing: “ “ _____ 2019 Heard of working shop: Urmas Vain Chief technologist: Boris Kipnis Date of manufacture: “ ” ____ 2019

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Annex 2. Cyclone 5B24

18

Annex 3. Cyclone 5B20 with hopper

18

Annex 4. Screw feeders and conveyer

Feeder

Feeder

Conveyer