

DDM SERIES

Desiccant Dryer Mobile
Drying of free-flowing granular plastic materials



Desiccant Dryer Mobile - DDM

Introduction

Labotek's series of mobile desiccant dryers, DDM, is designed for the continuous drying of freeflowing plastic raw materials in granulate form. The DDM has been energy optimized and is available as a complete desiccant drying and integrated dry air conveying system to processing machine, based on proven, reliable and energy saving design. The standard temperature range is 60 to 140°C with a preset deviation of +/- 2°C. A HT (High Temperature) model is also available with a temperature range of 60 to 180°C. Owing to the extremely accurate temperature control and a dew point of <-35°C, a final moisture content of less than 0.02% can be achieved (HT model 0.002%).

Touch Screen Control

DDM is operated via the microprocessor-based, 6" colour touch screen control. The touch screen is menu driven, using basic symbols and enabling easy operator interface. Furthermore the control features shortcuts to the most basic functions, i.e. drying temperature settings, drying time, start/stop timer for drying and conveying settings.



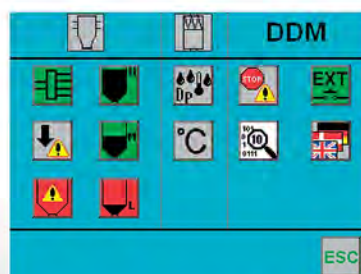
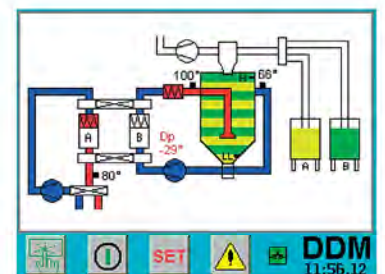
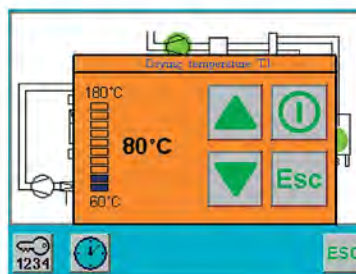
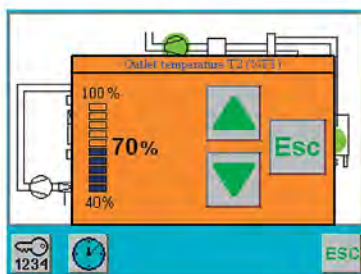
DDM series offers...

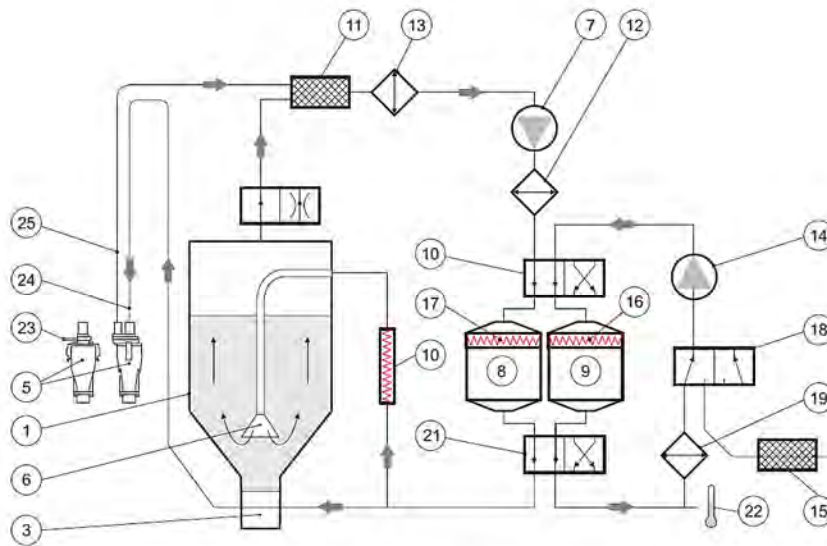
- Small footprint of only 0.82 m²
- Drying hopper capacities of 60, 120 and 180 litres
- Electrical 3 phase power supply, no compressed air needed
- Unique dry air conveying system to process machine
- Built-in 3 phase conveying system to dryer (SVR)
- Dew point connection gate
- A separate over temperature thermostat
- Comprehensive 3 year warranty, excluding wear parts

LESS - Labotek Energy Saving System

Labotek Energy Saving System has been designed to achieve energy savings of the drying air that is fed to the drying hopper, as well as providing protection against over drying.

The current drying temperature can be lowered by an optionally selected number of degrees from the set drying temperature. Lowering of the temperature and reset to normal drying temperature are automatically controlled by the return air temperature. The LESS system in DDM, operates using relative lowering of drying temperature after reaching the set value. Temperature reduction will begin when the material has been dried.





Drying

The desiccant air blower (7) circulates the drying air in a closed system. The air is dried in one of the two desiccant beds (8) or (9), and the dewpoint temperature is lowered to approx. -35°C.

The dry air heating element (10) is used to heat the drying air to the required temperature before, via the air separator (6), it is distributed in the drying hopper DH (1).

After the drying air has heated the raw material and transformed the moisture to water vapour, it is led back through the dust filter (11) to the blower (7). The humid air is cooled in the structural frame (12) of the machine just before it is led to one of the desiccant beds (8) and (9) which will adsorb the humidity. In HT units the air is cooled through the cooler (13).

Regeneration

The DDM dryer has two desiccant beds (8) and (9) with molecular sieves for dehumidification of the drying air. One of the beds is always operative in the drying cycle whereas the other is either regenerating in the regeneration cycle or, when fully regenerated, in standby mode.

Regeneration occurs when hot air passes through the desiccant bed (8) or (9).

The regeneration blower (14) takes in ambient air through the intake filter (15) and sends it to the regeneration heating element (16) or (17) where the air temperature is increased to approx. 140°C. The moisture adsorbed in the desiccant bed is evaporated and forced into the ambient air in the form of water vapour. In the last phase of the regeneration cycle, the regeneration heating element (16) or (17) is disconnected and as the position of the regeneration valve (18) changes, the air is re-circulated in a closed system. This is done to cool the molecular sieve through a cooling frame (19), and to lower the dew point temperature to approx. -35°C. In HT units the cooling frame (19) is cooled by water.

Two automatic, double-acting valve units (20) and (21) are placed at the inlet and the outlet of the

desiccant beds ensuring that one of the desiccant beds is always operative in the drying cycle and the other in the regeneration cycle. Time between regenerations is variable and calculated according to moisture pick-up, monitored in microprocessor control and regeneration sensor (22).

Conveying

Raw material is fed automatically into the machine hopper proportional to the consumption of the processing machine.

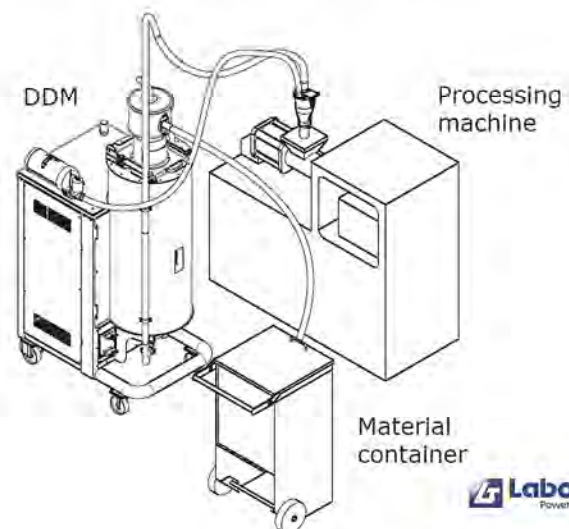
The principle is that part of the blower (7) drying air is bypassed and sent to the injector (3) whereby the dried raw material is sucked from the drying hopper utilising the injector effect.

The injector is adjustable. It can be adjusted to match size and shape of the granular material.

Consequently, most types of regrind can be conveyed.

The raw material is blown from the injector (3) to the air separator (5) which is either located directly on the machine hopper or fitted on the barrel inlet using a special intermediate flange.

Conveying is initiated by the slide valve (23) inside the air separator. Conveying air is now fed from the material hose (24) into the return air hose (25). Conveying stops automatically when the machine hopper has been fully loaded, thus blocking the air passage between (24) and (25).



Technical Data

| DDM Type | DDM 60 | DDM 120 | DDM 180 | | |
|---|--|---------------|---------------|-----------|-----------|
| Supply Voltage | 3 x 50/60Hz 380-480V | | | | |
| Installed Power, kW | 8,6/9,0 | 9,0/9,3 | 9,0/9,5 | | |
| Blower, drying | | | | | |
| Blower motor, drying - 3 Phase 50/60 Hz, kW | 1,1/1,4 | 1,5/1,9 | 1,5/1,9 | | |
| Air volume m ³ /h - 50/60Hz | 36/43 | 100/120 | 100/120 | | |
| Water column [mm] | 1400/1680 | 2400/2880 | 2400/2880 | | |
| Blower, regeneration | | | | | |
| Blower motor, regeneration - 3 Phase 50/60 Hz, kW | 0,37/0,44 | 0,37/0,44 | 0,37/0,44 | | |
| Dew point, temp. °C | Better than -35°C | | | | |
| Heating element, Drying - kW | 2,5/2,5 | 3,5/3,5 | 3,5/3,5 | | |
| Heating element, Drying HT version - kW | 2,5/2,5 | 5,0/5,0 | 5,0/5,0 | | |
| Heating element, Regeneration - kW | 2x3,5/3,5 | 2x3,5/3,5 | 2x3,5/3,5 | | |
| Cooling water requirement - HT version | Max. pressure: 8 bar-flow 250 l/h-cooling water temp. In/out 15/40°C | | | | |
| Noise level (dBA) | 63 | 65 | 63 | | |
| Drying Hopper, sizes (litre) | 60 | 120 | 180 | | |
| Desiccant beds | 2 | 2 | 2 | | |
| Conveying hose, inner Ø [mm] / length [m] | 38 / 2,5 | 38 / 2,5 | 38 / 3,5 | | |
| Return air hose, inner Ø [mm] / length [m] | 32 / 3 | 32 / 3 | 32 / 4 | | |
| Telescopic suction probe, Ø [mm] | 32 / 38 | 32 / 38 | 32 / 38 | | |
| Air separator | 1 | 1 | 1 | | |
| Connecting cable [m] | 3 | 3 | 3 | | |
| Net weight [kg] / Shipping weight [kg] | 186 / 228 | 215 / 257 | 230 / 272 | | |
| Shipping volume [m ³] | 1,63 | 1,63 | 2,04 | | |
| Shipping dimensions [mm] | 1200x800x1700 | 1200x800x1700 | 1200x800x2120 | | |
| DDM 180 Energy Consumption for Drying & Conveying: | | | | | |
| Material type | ABS | PC | PA6.6 | PBT | PMMA |
| Output in kg/h | 54 | 42 | 27 | 46 | 39 |
| Drying temperature | 80°C | 120°C | 80°C | 120°C | 90°C |
| Drying time | 2 hour | 3 hour | 4 hour | 3 hour | 3 hour |
| Total energy per hour | 2,63 kWh | 2,98 kWh | 2,36 kWh | 3,35 kWh | 2,57 kWh |
| Energy per kg | 0,048 kWh | 0,070 kWh | 0,087 kWh | 0,072 kWh | 0,065 kWh |

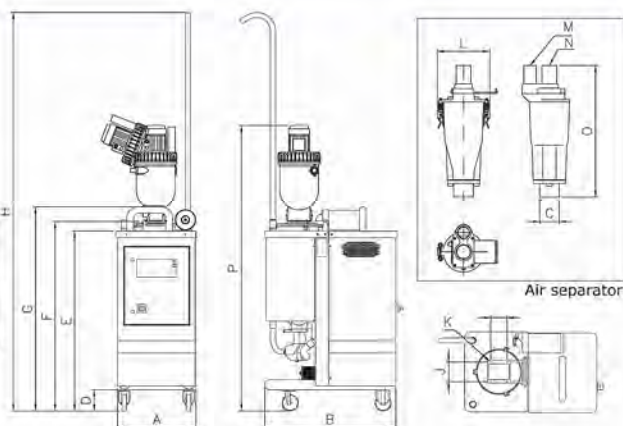
Dimensions

| | A | B | C | D | E | F | G | H |
|---------|-----|------|-----|-----|------|------|------|------|
| DDM 60 | 612 | 1005 | ø51 | 150 | 1370 | 1442 | 1576 | 3020 |
| DDM 120 | 612 | 1005 | ø51 | 150 | 1370 | 1442 | 1576 | 3020 |
| DDM 180 | 612 | 1005 | ø51 | 150 | 1650 | 1722 | 1856 | 3300 |

| | I | J | K | L | M | N | O | P* | P** |
|---------|-----|-----|----|-----|-----|-----|-----|------|------|
| DDM 60 | 125 | 150 | M8 | 136 | ø32 | ø38 | 342 | 2025 | 2177 |
| DDM 120 | 125 | 150 | M8 | 136 | ø32 | ø38 | 342 | 2025 | 2177 |
| DDM 180 | 125 | 150 | M8 | 136 | ø32 | ø38 | 342 | 2305 | 2457 |

* with PGT4
** with PGT61

All measurements are in mm.



Technical Data

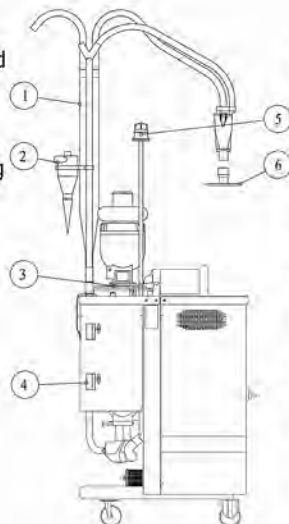
| Capacity table for desiccant dryers | | | | | | |
|-------------------------------------|-----------------------------------|--------------------------|-----------------------------|--|---------|---------|
| Raw material | | Recommended dry time [h] | Recommended drying temp. °C | Drying capacity kg/h at bulk density 0.6 | | |
| | | | | DDM 60 | DDM 120 | DDM 180 |
| ABS | Acrylonitrilebutadiene-styrene | 2-3 | 80 | 18-12 | 36-24 | 54-36 |
| PA | Polyamide 6/6.6/10 | 3 | 75-80 | 12 | 24 | 36 |
| PA | Polyamide 11/12 | 4 | 75-80 | 9 | 18 | 27 |
| PBTP | Polybutylene terephthalate | 3 | 120 | 12 | 24 | 36 |
| PC | Polycarbonate | 2-3 | 120 | 18-12 | 36-24 | 54-36 |
| PE | Polyethylene | 1-2 | 80-90 | 36-18 | 72-36 | 108-54 |
| PE | Polyethylene, black | 3-4 | 90 | 12-9 | 24-18 | 36-27 |
| PEC | Polyester carbonate | 4-5 | 130 | 9-7 | 18-14 | 27-22 |
| PEEK | Polyaryletherketone | 2-3 | 150 | 18-12 | 36-24 | 54-36 |
| PEI | Polyetherimide | 3-4 | 150 | 12-9 | 24-18 | 36-27 |
| PET | Polyethylene terephthalate | 4-6 | 170-180 | 9-6 | 18-12 | 27-18 |
| PETG | Polyethylene terephthalate glycol | 4 | 66 | 9 | 18 | 34-36 |
| PETP | Thermoplastic polyester | 2-3 | 120 | 18-12 | 36-24 | 27 |
| PI | Polyimide | 2-3 | 120 | 18-12 | 36-24 | 54-36 |
| PMMA | Methylmethacrylate polymer | 2-3 | 80 | 18-12 | 36-24 | 54-36 |
| POM | Polyacetal | 2-3 | 100 | 18-12 | 36-24 | 54-36 |
| PP | Polypropylene | 1-2 | 80-90 | 36-18 | 72-36 | 108-54 |
| PPO | Polyphenylene oxide | 2 | 110 | 18 | 36 | 54 |
| PPS | Polyphenylene sulphide | 3-4 | 150 | 12-9 | 24-18 | 36-27 |
| PPSU | Polyether sulfone | 3-4 | 120 | 12-9 | 24-18 | 36-27 |
| PS | Polystyrene | 1-2 | 80 | 36-18 | 72-36 | 108-54 |
| PSU | Polysulfone | 2-3 | 130 | 18-12 | 36-24 | 54-36 |
| PUR | Polyurethane | 2-3 | 90-100 | 18-12 | 36-24 | 54-36 |
| PVC | Polyvinyl chloride | 1 | 70 | 36 | 72 | 108 |
| SAN | Styrene acrylonitrile | 2-3 | 80 | 18-12 | 36-24 | 54-36 |
| SB | Styrene butadiene (high impact) | 1-2 | 80 | 36-18 | 72-36 | 108-54 |
| TPE | Polyester elastomer | 2-3 | 110 | 18-12 | 36-24 | 54-36 |
| TPR | Thermoplastic rubber | 3 | 75 | 12 | 24 | 36 |

The above capacity table states recommended values only, based on the drying of the specific materials down to a residual moisture content of 0.02% which, however, will vary depending on the type of material. The capacities are based on a general bulk density of 0.6 with the exception of PE and PETG to which a bulk density of 0.55 and 0.85 respectively forms basis.

Options

The DDM is prepared for a number of options to ensure optimal treatment of the material being processed.

The DDM can be customized to your specified production.



| Pos. | | LT no. |
|------|---|--------|
| 1 | Double conveying 1 > 2 DDM | 202885 |
| 2 | Cyclone , dust separation , with plastic container | 201818 |
| 2 | Cyclone , dust separation , with plastic bag | 204249 |
| 3 | Filter insert in hopper DDM | 202101 |
| 4 | Level control , PGT4 on DDM , All levels | 206099 |
| 4 | Level Control , f/PGT6.1 on DDM , All levels | 206047 |
| 5 | Warning lamp , long , DDM , flash lamp , yellow/blinking , 24VAC | 206258 |
| 5 | Warning lamp , short , DDM , flash lamp , yellow/blinking , 24VAC | 206259 |
| 5 | Warning lamp , long , DDM , flash lamp , yellow/blinking/sound | 206315 |
| 5 | Warning lamp , short , DDM , flash lamp , yellow/blinking/sound | 206329 |
| 6 | Flange for air separator Ø50.8 , DDM | 202500 |
| - | Ratio-Selector , RS2000 for DDM , excl. control , incl. Ø32 suction probe | 101079 |
| - | Ratio-Selector , RS2000 for DDM , excl. control , incl. Ø38 suction probe | 101080 |
| - | By-Pass assembly for DDM | 203852 |



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