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ProTec Polymer Processing GmbH

Drying of Plastics for Injection Moulders





SOMOS®-Dryers: Always Your First Choice for Applications in Injection Molding!

For many years, ProTec Polymer Processing GmbH (former MANN+HUMMEL ProTec GmbH) has been known as a reliable and experienced partner to the plastics industry. The company's world renowned brands SOMOS® and OHL stand for efficient material handling and ready to use recycling plants.

Innovative solutions and top quality at the best available price-performance ratio have convinced our customers.

When it comes to energy efficiency, SOMOS® sets standards in the industry. Experts therefore refer to SOMOS® as „the“ brand for energy-efficient drying and optimum adjustment to special requirements. In times where energy costs are experiencing a steady increase, it is an additional benefit for the customer that, with regard to energy consumption, the dryers are optimally designed to suit particular applications. Our philosophy of saving energy is complemented by a range of useful options.

The mobile dry-air dryers of the T/TF eco model series - which are specially designed for application in an injection molding environment - are known for their particular flexibility in the 1.5 to 180 kg/h throughput range and for changing types of material. They work at drying temperatures ranging from 75 to 140 °C (HT model even from 60 up to 200 °C) and impress with extremely low

maintenance requirements and a long service life.

All devices of this model range are equipped with only one desiccant chamber and use the tried and tested molecular sieve as a desiccant. The dryers reach a dew point of up to - 35 °C subject to environmental conditions like temperature, humidity and so on. Together with the oscillating blower, the SUPER-SOMOS® energy saving function integrated as standard ensures optimum drying at a significantly reduced regeneration rate of the desiccant.

The microprocessor control automatically monitors the direction of rotation of the blower, the condition of the filter, the position of the flap and the heater. In addition, the TF eco model comes with the option of an integrated conveying system for automatic, demand-driven loading of the processing machine.

Put your drying requirements into our hands and let us convince you from the quality of our products. We will accompany you during the entire solution-finding process for your special application requirement!

Why not give us a call? Our team will be happy to assist you.

SOMOS® = Energy Efficiency + Environmental Protection

Throughput-dependent regeneration frequency - Super SOMOS®

Super SOMOS® automatically adapts the regeneration frequency to the moisture quantities resulting from the drying process. For this purpose, a thermal balance is created by measuring the temperatures. It is used to calculate the water volume adsorbed by the desiccant bed. The calculated actual value is compared to the maximum adsorption amount of the desiccant bed and put in relation. Using a stored algorithm, in turn, the optimum adsorption time for the desiccant is calculated. The pot can therefore remain in the drying process for longer and always absorb the optimum quantity of water. This lowers energy requirements for the regeneration process significantly as the regeneration time is optimally adjusted to the actual water load.

Gentle material processing - the raw material is reliably prevented from becoming moist again after drying

The option of integrating dry-air conveying in the processing machine perfectly equips SOMOS® dryers of the TF model series for processing materials that are extremely sensitive to moisture.

In addition, permanent blanketing of the machine hopper with dry air prevents the material from becoming moist again in the receiving hopper on the machine; a process that could not be prevented otherwise.

The following devices of the T/TF eco dryer series are designed for application in injection molding:

- T/TF 10 eco with 30 l VA hopper*
- T/TF 20 eco with 50 l VA hopper*
- T/TF 40 eco with 100 l VA hopper*
- T/TF 70 eco with 200 l VA hopper*
- T/TF 100 eco with 300 l VA hopper*

* All variants also available as a high-temperature model with water cooling for drying temperatures of up to 200 °C.

Select the device to suit you in relation to material, throughput and the drying air temperature to match the material. The diagram and matrix on pages 4 and 5 present a wide range of materials and help you to choose the right dryer from the series to suit your particular application.

The latest dryer generation is characterized, among other things, by better heat insulation (energy efficiency) and quick cleaning thanks to its ergonomically shaped VA hoppers.

Optimized dwell time – the special SOMOS® hopper geometry

The special hopper design is matched to the material properties. Built-in components that have been enhanced in their structural design ensure even material flow for both granulate and ground materials.

Based on this property, air flow and material flow are distributed homogeneously across the entire section of the hopper. The result is a balanced temperature profile and an even range of dwell time.

This and other design features mean that the hoppers have a lower overall height than standard hoppers.

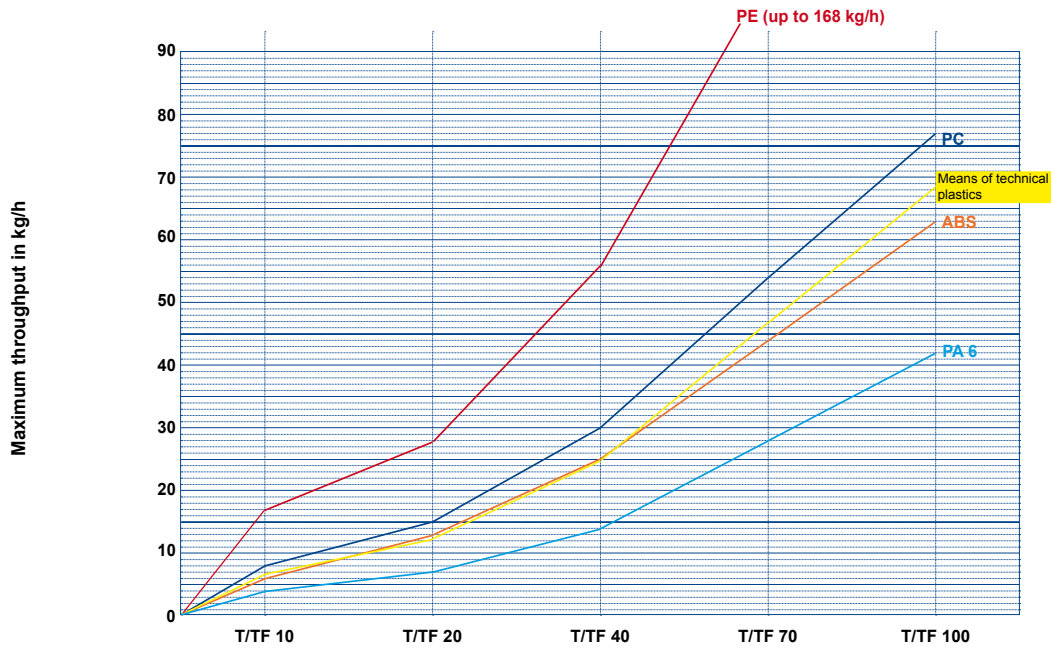
Solutions for applications from the area of injection molding:

- Available without (T) or with (TF) integrated conveyor unit for loading the machine
- Energy saving functions such as Automatic Super SOMOS® and ALAV Saving Thermostat
- Diagnostic functions such as Automatic Detection and Correction of the Rotation Direction



TF 70 eco - Drying device of the latest generation

Selection Matrix for the SOMOS® Dryer



The diagram shows mean throughputs in relation to drying temperature and material specific heat capacity. The intersection points of the X- and Y-axis show each the highest possible throughput for each of the dryers for the selected material. Drying tasks that exceed these values can be handled by dryers of the D series. You are welcome to contact us!

Simple Selection of Your new SOMOS® Dryer

Selecting the suitable dryer model

The diagram helps you to find the perfect dryer model of the T/TF eco series to suit your application requirements simply and quickly. The selection is mainly determined by throughput requirements in kg/h.

Important! Please note that for the temperature range from 75 to 140 °C the ordinary version would be the preferred choice, whereas temperatures from 60 up to 200 °C require HT version!

The following options are available:

- T model (without conveying) or the TF model (with conveying) with dry-air conveying incl. dry-air blanketing of the machine hopper
- Cleaning door (only for types 40, 70 and 100, types 10 and 20 are cleaned from above as they are quite small)
- Lid for taking in a conveyor unit
- Conveying unit
- HT model
- Suction box or suction elbow (only for T models)

Please contact our staff if you wish to discuss further options or adjustment possibilities!

Generation of the order code of a T/TF dryer:

T/TF ___ eco / ___ HT

Product

- T Dryer
- TF Dryer with conveyor

Dry air volume in m³/h

- T/TF 10 = 10 m³/h, 30 l VA-hopper
- T/TF 20 = 20 m³/h, 50 l VA-hopper
- T/TF 40 = 40 m³/h, 100 l VA-hopper
- T/TF 70 = 70 m³/h, 200 l VA-hopper
- T/TF 100 = 100 m³/h, 300 l VA-hopper

Properties of the lid

- 0 = without conveying unit intake
- 1 = with conveying unit intake (without conveyor)

Hopper model

- 0 = without cleaning door
- 1 = with cleaning door (only for types 40, 70, 100)

High temperature model

with water return air cooler = HT

TF 40 eco/11 therefore means:

Dryer with conveyor and 100 l VA-hopper + lid with conveyor unit intake + cleaning door

SOMOS® Will Also Dry Your Product

Material	Drying-temperature in °C	Dwell-time in h	Drying capacity				
			in kg/h (max.)				
			T/TF 10 eco 30 l	T/TF 20 eco 50 l	T/TF 40 eco 100 l	T/TF 70 eco 200 l	T/TF 100 eco 300 l
ABS	80	3	7	13	26	50	63
ASA	80	3	6	13	25	44	63
CAB	75	3	5	11	21	37	53
LCP ¹⁾	150	4	5	11	21	37	53
PA 6 ³⁾	75	6	6	11	22	39	56
PA 6.6 ³⁾	80	5	6	12	24	41	59
PAEK ¹⁾	150	4	5	10	19	33	48
PC	120	3	8	15	31	54	77
PC/ABS, PC/ASA	110	3	7	14	29	50	71
PC/PBT, PBT/ASA	105	4	7	14	29	50	71
PC/PET	105	4	6	13	25	44	63
PE ²⁾	90	1	5	11	21	37	53
PEEK ¹⁾	150	4	5	11	21	37	53
PEI ¹⁾	150	4	5	11	21	37	53
PEK ¹⁾	160	4	6	11	22	39	56
PES ¹⁾	150	4	6	11	22	39	56
PET ¹⁾	160	6	5	10	20	35	50
PETG	60	6	5	10	20	35	50
PMMA	80	3	6	13	25	44	63
POM	100	3	7	13	27	47	67
PP ²⁾	90	1	5	10	20	35	50
PPE	120	4	6	13	25	44	63
PPE/SB	120	2	7	13	27	47	67
PPO	120	2	8	15	31	54	77
PPS	150	4	5	11	21	37	53
PS ²⁾	80	1	6	13	25	44	63
PSU ¹⁾	150	2.5	6	11	22	39	56
PUR	80	3	6	13	25	44	63
PVC ²⁾	70	1	7	13	27	47	67
SAN	80	3	6	13	21	37	53
TPE	100	3	7	13	27	47	67
TPU	110	2	7	14	39	50	71

¹⁾ Specifications apply to HT-version. / ²⁾ Drying only without full material heating / ³⁾ Input moisture < 1 %

The specified values are based on common input and residual moisture values. In individual cases, actual results may deviate. Data from other raw materials are available and can be obtained. You are welcome to contact us!

Maximum Throughput Rate of an Injection Moulding Machine

Auger diameter in mm	Maximum cubic capacity in cm ³	Maximum throughput rate* in kg/h
18	28	5.3
22	42	7.9
25	61	11.5
30	88	16.6
35	135	25.5
40	201	38.0
45	296	55.9

Auger diameter in mm	Maximum cubic capacity in cm ³	Maximum throughput rate* in kg/h
50	393	74.3
55	432	81.6
60	678	128.1
65	862	162.9
70	1,077	203.6
75	1,325	250.4
80	1,608	303.9

* Capacity based on the example of a standard Polystyrol/PS (density 1.05 g/cm³)

More Things You Should Know Before Selection

It is most important to select the dryer in relation to the particular process. Selection always starts with the material to be processed and depends on the actual throughput and temperature range.

Insufficient drying has a negative effect on the surface quality (bubbles or streaking), for example, or the mechanical properties (firmness, elongation at break).

Overdrying results in strong discoloring or changes in the mechanical properties through oxidation, depending on the feed material. In addition, elements can outgas from the granulate and thus change the required functions and the serviceability of the end product. Special solutions are available for materials inclined to outgassing.

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Throughput-dependent air-volume adjustment - ALAV Saving Thermostat

The ALAV function serves to reduce the power supplied to the system to a required minimum level. Surplus power, which leads to high exhaust air temperatures, is thus avoided on a long-term basis.

When a previously determined target value of the return air temperature is reached (approx. 40 °C), the air volume fed to the hopper is optimally adjusted to the necessary energy requirements by briefly interrupting the drying-air flow.

The original moisture of the raw material is determined depending on the delivery conventions of the material suppliers. Typical values - according to material - range between 0.1 and 0.3 % original moisture. Assuming maximum original moisture of 0.5 % for the SOMOS® dryer will always put you on the safe side.

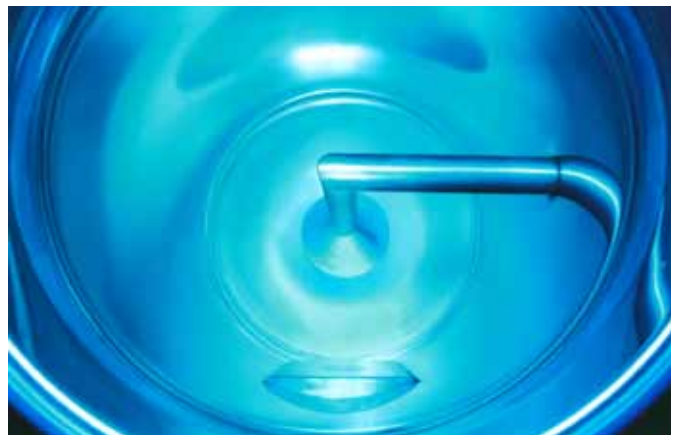
The required residual moisture after drying heavily depends on material and application and can vary between 0.005 % and 0.1 %.

The required dryer capacity depends on the throughput as well as the original and residual moisture of the material to be dried.

The throughput capacity can be determined via shot weight and cycle time, for example:

$$\text{Throughput in kg/h} = (\text{shot weight in g/cycle time in s}) \times 3,6$$

If particles vary significantly, the maximum machine throughput can also be determined via the diameter of the plasticizing auger (also see table on p. 5).



A glance inside the drying hopper: The internal space designed without dead corners is clearly visible. It facilitates quick and easy cleaning.

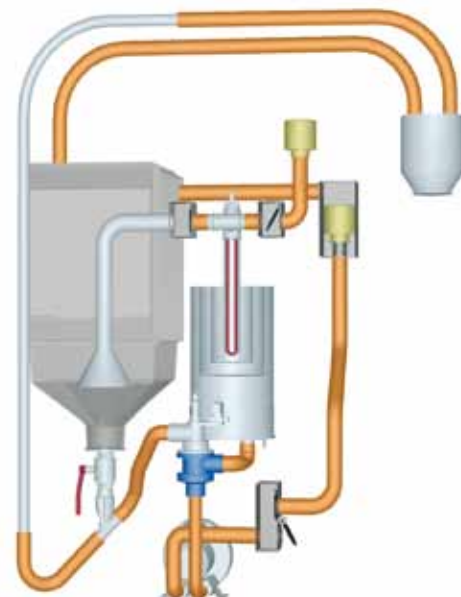


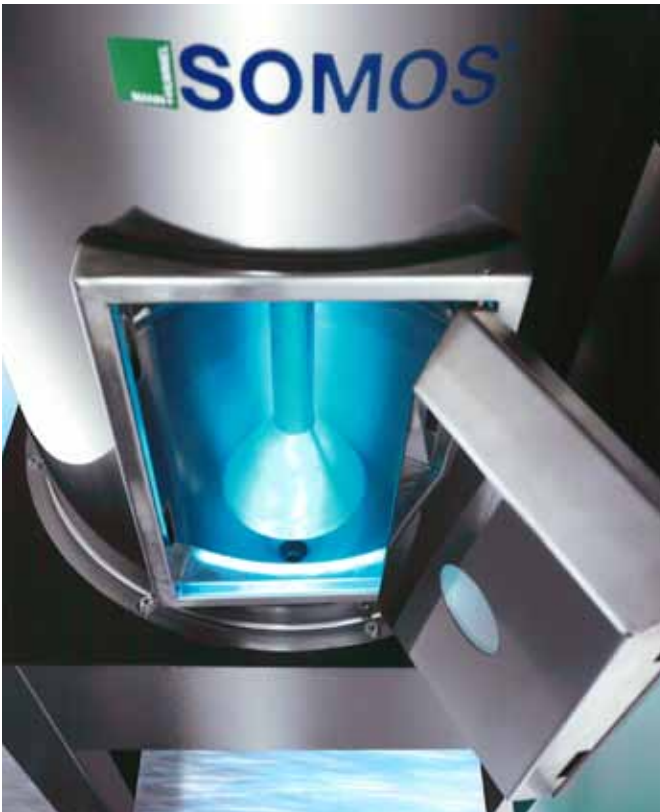
Diagram of drying process for the T/TF eco dryer



Dryer TF 10 eco without cleaning door, with intake lid for a conveying unit, without conveyor



Option of conveying the material to the processing machine (TF model)



Option: Cleaning door



Option: Lid with intake for conveying unit and conveyor unit

ProTec Polymer Processing - Always at Your Side

Globally networked sales and service structure

Not only do we strive to offer our customers demanding products in the highest quality, but we also strive to ensure that these products are efficiently utilized and that the optimal production conditions are created.

We advise and assess in advance, however we do not transfer responsibility once we've been commissioned. Instead we forward this to our extensively trained service team that makes an on-site visit to ensure that all equipment and systems are optimally serviced and set up.

We do not only provide this service in Germany, but worldwide as well. A network consisting of our own employees – and complemented by the well-trained staff members from our trusted representative offices – is quickly mobilized to be on-site not only when things “get dicey” but also for regular service visits from time to time.



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