



## RECYCLING LINE recoSTAR PET

for production and post-consumer scrap, preforms, bottle and sheet flakes, **integrated pre-drying**, dust-free processing, optional inline solid stating, **energy efficient**, high ROI, **full automatisaton**



Starlinger

## RECYCLING LINE recoSTAR PET



**State-of-the-art recycling** technology for the in-house recycling of PET flakes from bottles, preforms, strapping bands and sheets as well as for the **recycling of post-consumer bottle flakes** after the washing process. The **end product is melt-filtrated, uniform granulate** that can be used for a wide range of applications.



**The PET flakes** are fed into the pre-drying unit on top of the extruder. The material is dried, heated and crystallised, either by application of hot (dessicant) air, or vacuum. This treatment already contributes to outstanding decontamination results.



**The high-vacuum degassing extruder** reduces viscosity loss during extrusion and purifies the melt from volatile contamination. The water-free vacuum pump reduces production and maintenance costs.



**Continuous filters** for dirt particle removal are available with or without backflushing. The direct material flow reduces stress on material. Finest filtration available on request. **The inline viscosimeter** optionally measures the IV for immediate quality control.



**The underwater pelletiser** is energy-saving, features a simple start-up procedure and can replace the strand pelletiser or automatic strand pelletiser. Pellet size and bulk density are adjustable for all pelletising systems.



**The optional inline crystallisation** after underwater pelletising ensures optimised foot-print, energy saving and high crystallinity. **Inline colour measurement** guarantees first-class colour values.



Machines pictured may include equipment sold as options.

**Solid state polycondensation** – optionally for the **IV increase of PET and outstanding decontamination**. The regranulate after the Starlinger iV+ process is suitable for **food contact applications** such as bottle-to-bottle or bottle-to-sheet. The process has achieved several national and brand-owner approvals.



**SSP technology** enables constant and adjustable IV increase with the FIFO principle. Outstanding decontamination values qualify for food contact applications. AA level and other VOCs are reduced to the levels of virgin resin.



**Alternative energies** such as natural gas or steam can be used as a cost-friendly alternative for heating. The energy recovery kit uses the residual heat of the PET regranulate for drying and heating the input material, achieving considerable energy savings.



**Resin-like characteristics** of the rPET in terms of form, flow behaviour, crystallinity, humidity, VOC, AA and EG levels, IV, dust content, etc. Consequently, the material is suitable for all PET applications.

### Advantages

- FIFO ensures uniform treatment
- Outstanding decontamination
- Adjustable IV increase
- Energy saving through inline processing
- Improved production efficiency
- User-friendly touchscreen and high automation
- Modular design provides flexibility, single mode extruder operation for recoSTAR PET 330



Starlinger recycling technology allows **utmost flexibility** for the customer and adjustment to the ever changing requirements in the market or applications through **modular design**.

**recoSTAR PET FG**

Food contact

FDA/EFSA

Decontamination/  
VOC

Brand owner  
approved

Low AA level

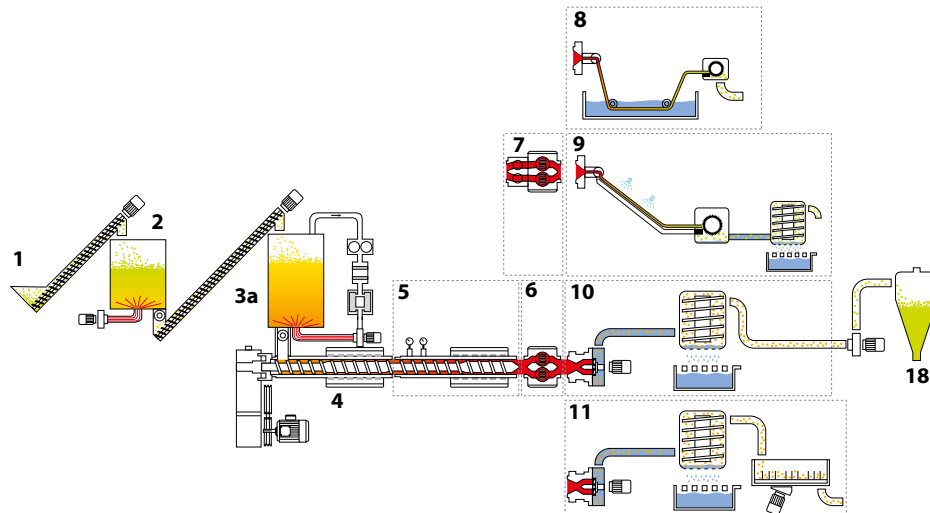
IV increase



optionally

with reduced output

PET flakes are heated and dried in a two-stage process, first with hot air, then with dry air. The special design of the dryer outlets results in center flow prevention, consistent residence time and FIFO processing. This ensures decontamination for food contact applications and ideal preparation for the extrusion process with maintained IV level. A choice of filtration and pelletising systems is available. Once installed, the unit can be equipped with an SSP reactor (iV+) to increase viscosity and decontamination levels.



**recoSTAR PET FG+**

Food contact

FDA/EFSA

Decontamination/  
VOC

Brand owner  
approved

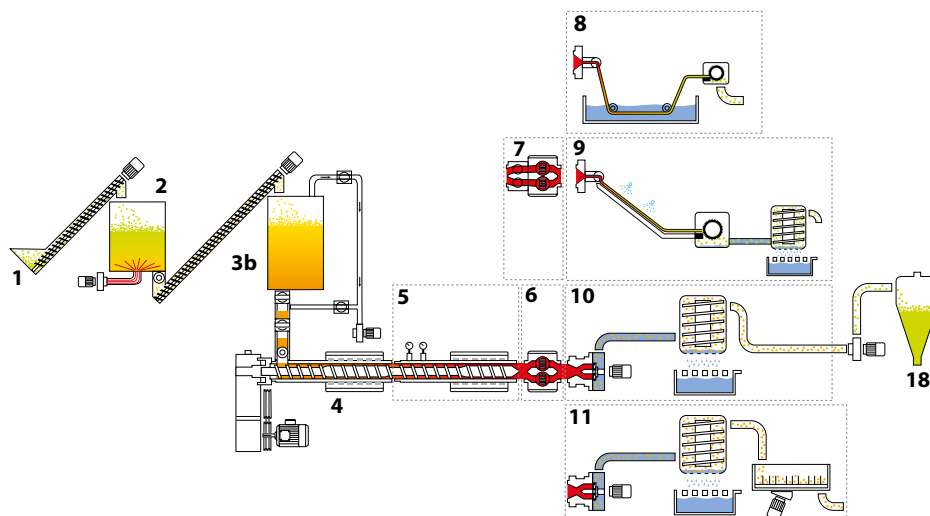
Low AA level

IV increase



with full output

PET flakes are heated and dried in a two stage process, first with hot air, then by means of vacuum. The special design of the dryer outlets results in center flow prevention, consistent residence time and FIFO processing. This ensures decontamination for food contact applications and ideal preparation for the extrusion process with IV increase. A choice of filtration and pelletising systems is available. Once installed, the unit can be equipped with an SSP reactor (iV+) to increase viscosity and decontamination levels.



1. Conveyor screw  
2. Hot air drying unit

3a/b. Pre-drying unit/pre-drying unit under vacuum

4. Extruder  
5. High-vacuum degassing extruder  
6. Melt filter without backflushing

7. Melt filter with backflushing  
8. Strand pelletiser  
9. Automatic strand pelletiser

The final product fulfils a variety of characteristics comparable to virgin resin.  
**PET recycling** – equipment designed to fit your requirements.

**recoSTAR PET iV+**

Food contact

FDA/EFSA

Decontamination/  
VOC

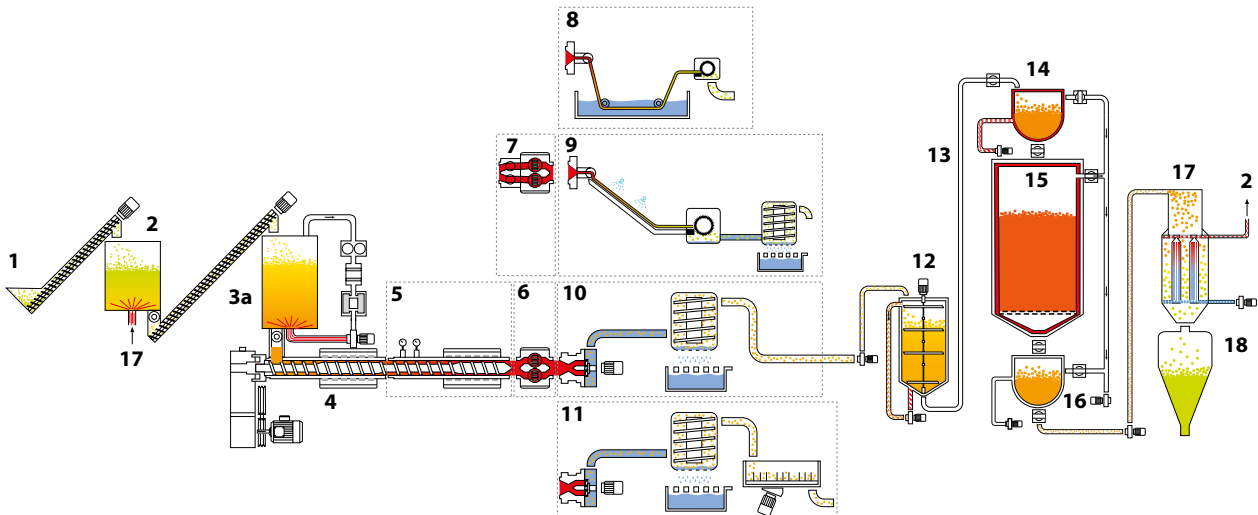
Brand owner  
approved

Low AA level

IV increase



PET flakes are heated and dried in a two stage process, first with hot air, then with dry air. The special design of the dryer outlets results in center flow prevention, consistent residence time and FIFO processing, ensuring ideal preparation for the extrusion process. A choice of filtration and pelletising systems is available. The downstream inline vacuum SSP reactor uses the energy of the previous step. Special FIFO design ensures consistent reaction parameters, adjustable IV increase as well as highly effective decontamination (ultra low VOC, AA < 1 ppm) for food contact applications.



**recoSTAR  
PET iV+ Superior**

Food contact

FDA/EFSA

Decontamination/  
VOC

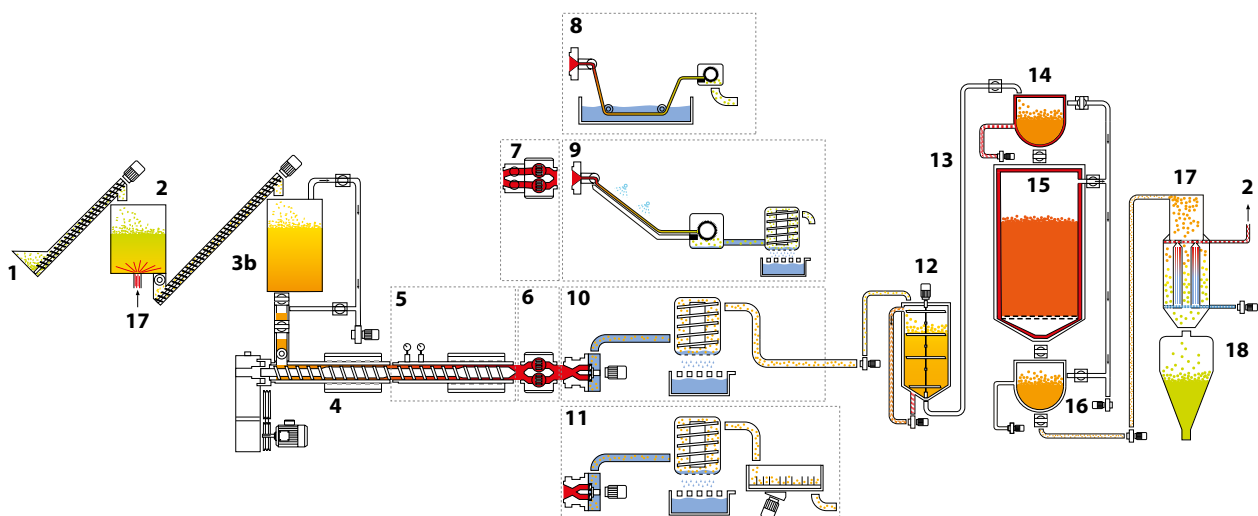
Brand owner  
approved

Low AA level

IV increase



The combined decontamination steps – first the flakes in the vacuum dryer upstream of the extruder (FG+), then the pellets in the SSP reactor downstream of the extruder (iV+) – result in the highest possible pellet quality. This superior decontamination reduces AA and VOC to a minimum. Optionally, the two steps can be separated to double the capacity: Food-contact flakes and/or food-contact pellets can be produced.



- 10. Underwater pelletiser
- 11. Underwater pelletiser with inline crystallisation
- 12. Crystalliser/post-crystallisation unit

- 13. Vacuum transport
- 14. Preheating unit
- 15. SSP reactor

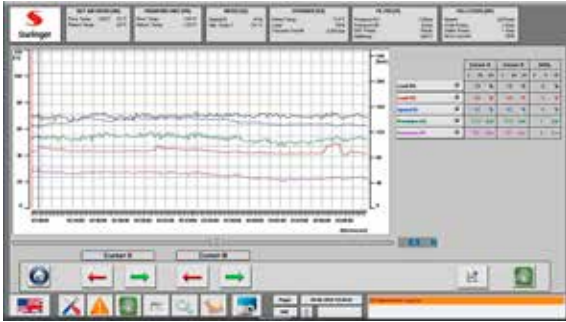
- 16. Cooling unit/vacuum sluice
- 17. Energy recovery kit
- 18. Storage silo

## Special features and services



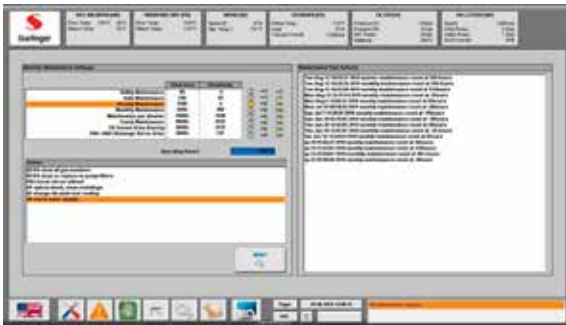
### Recipe control

All settings required for a certain type of production are stored in the control system of the line together with the chosen recipe name and the date.



### Trend reporting

One feature of the colour touch panel is the integrated storage of main production parameters (extruder load, melt pressures, etc.), which can be displayed within seconds.



### Maintenance list

As a support for maintenance personnel and the operator, each line is programmed with a customized maintenance system.

recoSTAR technology is designed for **high automation** and **userfriendliness**.

The touch screen enables a simple start-stop procedure, password controlled user levels, and screenshots (USB port). This ensures **highest efficiency** and consequently **fast ROI**.

Features are either standard or can be added according to customer's requirements.



### Optional online support

Based on a DSL connection, the online support establishes a connection from Starlinger to the customer line – wherever in the world it is installed.



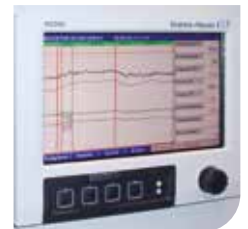
### Optional inline viscosimeter

The continuously measured IV of the PET melt during extrusion helps to control quality and indicates any required change of the residence time in SSP.



### Optional inline colour measurement

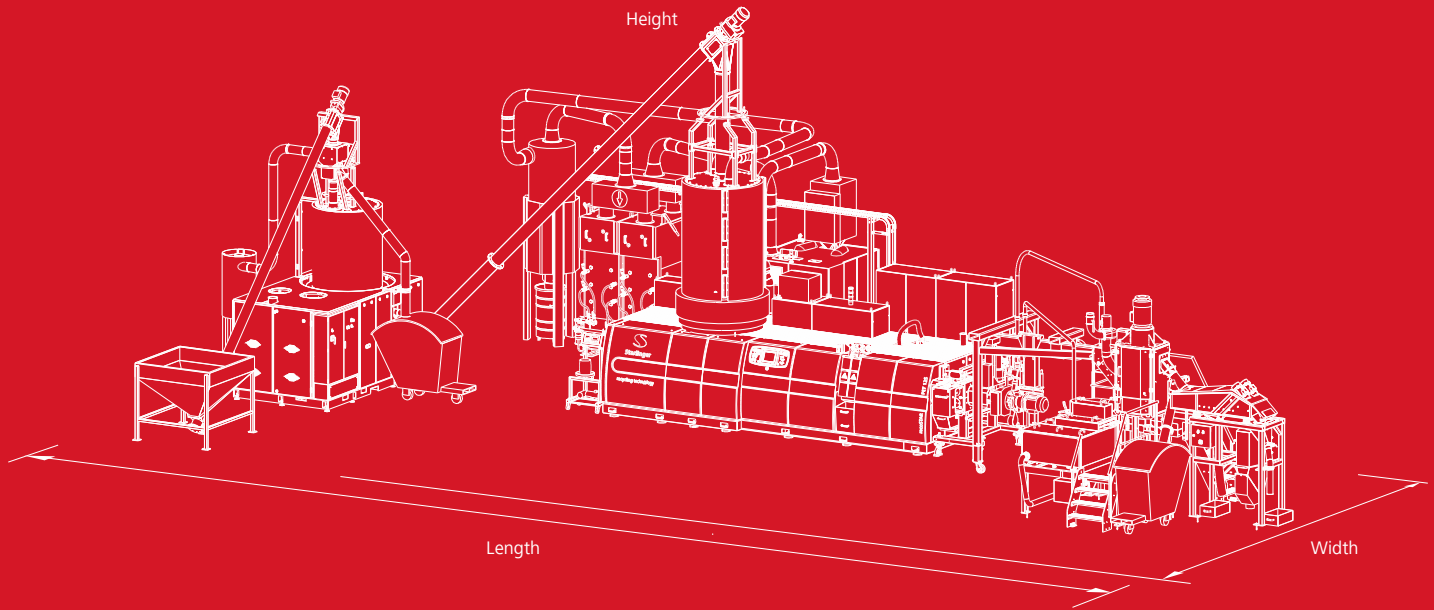
Colour deviations from a set standard are detected and serve as an inline quality control of the input material: Off-spec material is rejected. Deviations can also be offset by adding additive (either liquid or masterbatch).



### Optional online writer and archiving

The online writer collects all relevant production data for secure traceability. Up to 50 parameters can be stored in short sequences in an internal memory and thus are saved in the event of a power cut.

recoSTAR PET/PET HC (High Capacity)  
recoSTAR PET FG/FG+



Dimensions in mm		recoSTAR PET / PET HC / PET FG / PET FG+						
Type		65	85	105	125	165	215	330
Height		5200	6200	7000	7250	7250	11700	11700
Height in inches		200	240	280	290	290	460	460
Width		8760	10100	11100	11100	13400	16000	11700
Width in inches		340	400	440	440	530	630	460
Length		14750	16350	17000	21600	22800	32000	27100
Length in inches		580	640	670	850	900	130	1070

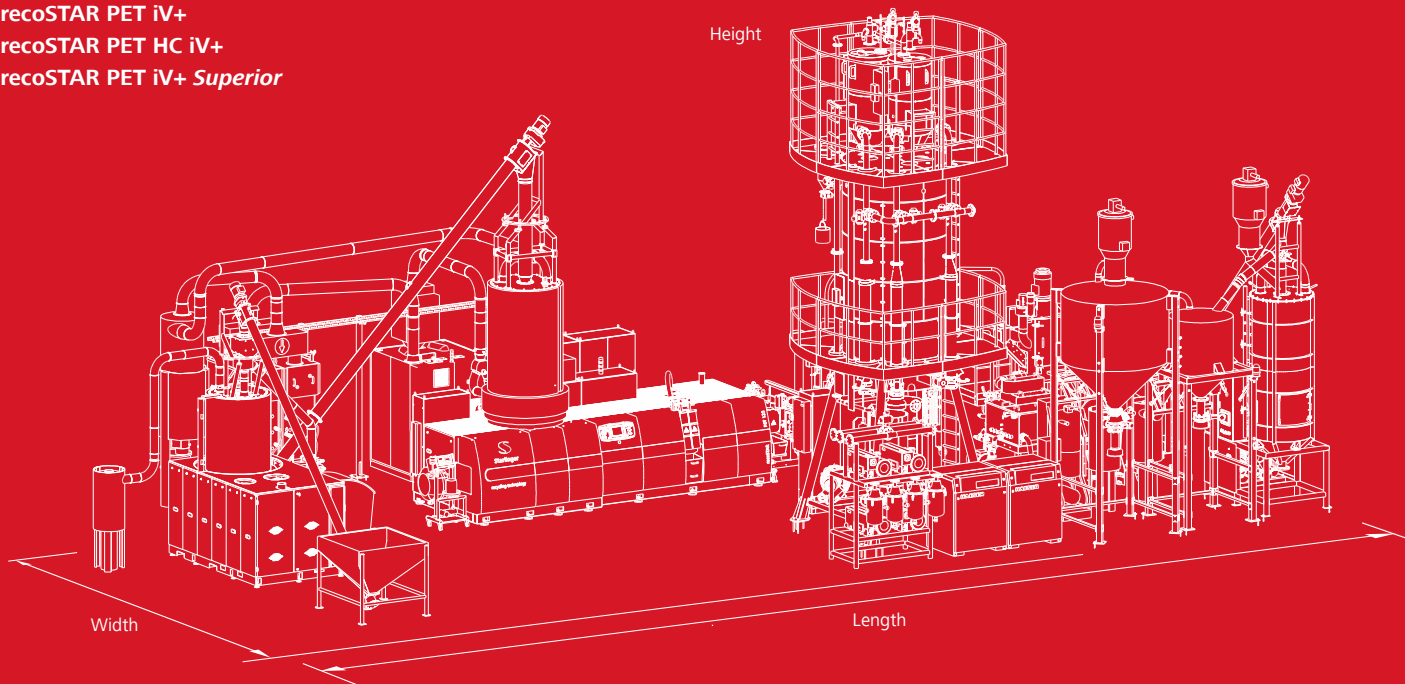
**Technical data**

Type	65	85	105	125	165	215	330
<b>recoSTAR PET</b>							
Output [kg/h]	150 – 200	250 – 350	450 – 600	650 – 800	1250 – 1450	2300 – 2500	2500 – 2900
Output [lbs/h]*	330 – 440	550 – 770	990 – 1320	1430 – 1760	2750 – 3200	5070 – 5500	5500 – 6400
AC drive [kW]	45	75	110	160	250	470	500 (2x250)
<b>recoSTAR PET HC</b>							
Output [kg/h]	150 – 250	350 – 500	550 – 700	700 – 1050	1600 – 1800	2500 – 2700	3200 – 3600
Output [lbs/h]*	330 – 550	770 – 1100	1200 – 1540	1540 – 2310	3530 – 3970	5500 – 5950	7050 – 7940
AC drive [kW]	45	90	132	160	315	530	630 (2x315)
<b>recoSTAR PET FG / FG+</b>							
Output [kg/h]	150 – 220	250 – 400	450 – 650	650 – 900	1200 – 1650	2000 – 2400	2500 – 3300
Output [lbs/h]*	330 – 480	550 – 880	990 – 1430	1430 – 1980	2640 – 3640	4400 – 5300	5500 – 7280
AC drive [kW]	45	90	132	160	315	530	630 (2x315)
<b>Extruder</b>							
Screw diameter (L/D) [mm]	65 (40)	85 (40)	105 (40)	125 (40)	165 (40)	215 (40)	2x165 (40)
Screw diameter (L/D) [inch]	2.5 (40)	3.3 (40)	4.1 (40)	4.9 (40)	6.5 (40)	8.5 (40)	2x6.5 (40)
Energy consumption [kWh/kg]	0.25 – 0.35	0.25 – 0.35	0.25 – 0.35	0.25 – 0.35	0.25 – 0.35	0.25 – 0.35	0.25 – 0.35
High-vacuum [mbar]	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10
<b>Downstream equipment</b>							
Strand pelletiser	●	●					
Underwater pelletiser	alternative	alternative	●	●	●	●	●
Automatic strand pelletiser	alternative	alternative	alternative	alternative	alternative	alternative	alternative

● standard

All data depending on design!

recoSTAR PET iV+  
recoSTAR PET HC iV+  
recoSTAR PET iV+ Superior



We reserve the right to technical modifications. DPR-24841-08T

Dimensions in mm		recoSTAR PET iV+ / PET HC iV+ / PET iV+ Superior						
Type		65	85	105	125	165	215	330
Height in mm		6500	6800	11200	12300	14200	14200	15700
Height in inches		260	270	440	480	560	560	620
Width in mm		12000	11000	15000	17000	19000	20000	18000
Width in inches		470	430	590	670	750	790	710
Length (with degassing) in mm		13000	18000	22000	24000	28000	42000	40000
Length (with degassing) in inches		510	710	870	940	1100	1650	1570

Technical data		recoSTAR PET iV+ / PET HC iV+ / PET iV+ Superior						
Type		65	85	105	125	165	215	330
<b>recoSTAR PET iV+</b>								
Output [kg/h]		150 – 200	250 – 350	450 – 600	650 – 800	1250 – 1450	2300 – 2500	2500 – 2900
Output [lbs/h]*		330 – 440	550 – 770	990 – 1320	1430 – 1760	2750 – 3200	5070 – 5500	5500 – 6400
AC drive [kW]		45	75	110	160	250	470	500 (2x250)
<b>recoSTAR PET HC iV+</b>								
Output [kg/h]		150 – 250	350 – 500	550 – 700	700 – 1050	1600 – 1800	2500 – 2700	3200 – 3600
Output [lbs/h]*		330 – 550	770 – 1100	1200 – 1540	1540 – 2310	3530 – 3970	5500 – 5950	7050 – 7940
AC drive [kW]		55	90	132	200	315	530	630 (2x315)
<b>recoSTAR PET iV+ Superior</b>								
Output [kg/h]		150 – 220	250 – 400	450 – 650	650 – 900	1200 – 1650	2000 – 2400	2500 – 3300
Output [lbs/h]*		330 – 480	550 – 880	990 – 1430	1430 – 1980	2640 – 3640	4400 – 5300	5500 – 7280
AC drive [kW]		55	90	132	200	315	530	630 (2x 315)
<b>Extruder</b>								
Screw diameter (L/D) [mm]		65 (40)	85 (40)	105 (40)	125 (40)	165 (40)	215 (40)	2x165 (40)
Screw diameter (L/D) [inch]		2.5 (40)	3.3 (40)	4.1 (40)	4.9 (40)	6.5 (40)	8.5 (40)	2x6.5 (40)
High-vacuum [mbar]		≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10	≤ 10
<b>Downstream equipment</b>								
Strand pelletiser		●	●					
Underwater pelletiser		alternative	alternative	●	●	●	●	●
Automatic strand pelletiser		alternative	alternative	alternative	alternative	alternative	alternative	alternative
<b>Solid state polycondensation</b>								
IV increase [dl/g/h]								0.01 – 0.04
Plant energy consumption [kWh/kg]		0.40 – 0.53	0.40 – 0.53	0.40 – 0.53	0.40 – 0.53	0.40 – 0.53	0.40 – 0.53	0.40 – 0.53
Energy Recovery Kit (ERK): Reduction of energy consumption [kWh/kg]								up to 0.03

● standard

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All data depending on design!

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