

PET Recycling Systems



foil & sheet extrusion

PET FDA - Superclean Extrusion

Food Contact Approved

EFSA & FDA
certification



Test Report

The results of the test report are property of the client. However use of the results by a third party, publication, or duplication, also in an excerpted version is subject to a written agreement with the Fraunhofer-Institut für Verfahrenstechnik und Verpackung

Determination of the cleaning efficiency of the Diamat flat sheet process regarding PET post-consumer contaminants

Client: Diamat Maschinenbau GmbH
Amperestraße 13
91550 Dinkelsbühl

Order No.: PA/4164/08

Date of order: 10.11.2008

Samples: 23.02.2009

DAP-PL-3909.00
Fraunhofer-Institut für Verfahrenstechnik und Verpackung, Göggenhauser Straße 35, 85354 Freising



May 28, 2021

Dr. Frank Welle
Head of Department Product Safety and Analytics
Fraunhofer-Institute for Process Engineering
and Packaging (IVV) Göggenhauser
Straße 35
85354 Freising
Germany

Re: Prenotification Consultation (PNC) 002619

Dear Dr. Welle:

This letter is in response to your submission (PNC 002619), received March 12, 2021, requesting on behalf of Diamat Maschinenbau GmbH (Diamat) (Dinkelsbühl, Germany), a letter of no objection from the Agency, confirming the capability of the proposed secondary recycling process, known as a "super clean" process, "in producing post-consumer recycled polyethylene terephthalate (PCR-PET) material that is suitable for food-contact applications. The PCR-PET material is intended for use at levels of up to 100% recycled content in manufacture of PET containers for all food types under conditions as severe as hot-fill, i.e., Conditions of Use (COU) C through G, as described in Table 2, which can be accessed from the Internet in the Packaging and Food Contact Substances section under the Food topic at www.fda.gov.

We reviewed the proposed recycling process as well as the results obtained from surrogate testing and migration modeling, which were submitted to demonstrate the capability of the proposed recycling process in removing potential contaminants from PCR-PET. Based on our review of these data, we determined that the proposed recycling process described in the subject submission is effective in removing potential contaminants from PCR-PET material to a level that does not migrate to food at a dietary concentration exceeding 0.5 ppb, FDA's threshold of regulatory concern. Therefore, we conclude that the finished PCR-PET material may be used at levels of up to 100% recycled content in manufacture of PET containers for all food types under COU C through G, provided the feedstock comes from food-grade PET containers and the PCR-PET complies with 21 CFR § 177.1630 and other applicable authorizations. If the proposed recycling process is modified, new data may need to be evaluated.

The finished recycled material should comply with all applicable authorizations, including 21 CFR § 174.5 - General provisions applicable to indirect food additives. For example, in accordance with section 402(a)(3) of the Federal Food, Drug and Cosmetic Act, use of the recycled material should not impart odor or taste to food rendering it unfit for human consumption.

If you have any questions concerns, please do not hesitate to contact us.

Sincerely,

Laura A. Dye
Consumer Safety Officer
Division of Food Contact Substances
Office of Food Additive Safety
Center for Food Safety
and Applied Nutrition

U.S. Food and Drug Administration
Center for Food Safety & Applied Nutrition
5001 Campus Drive
College Park, MD 20740
www.fda.gov

A system of several degassing sections ensures an efficient material cleaning leading to the necessary certification for food contact. The structure allows a large surface and circulation of the melt to ensure diffundation and dissolution of the volatile components as well as complete suction.

Extruder B

Retrofittable
to existing
diamat-
extrusion lines

PET - Extruder - Overview

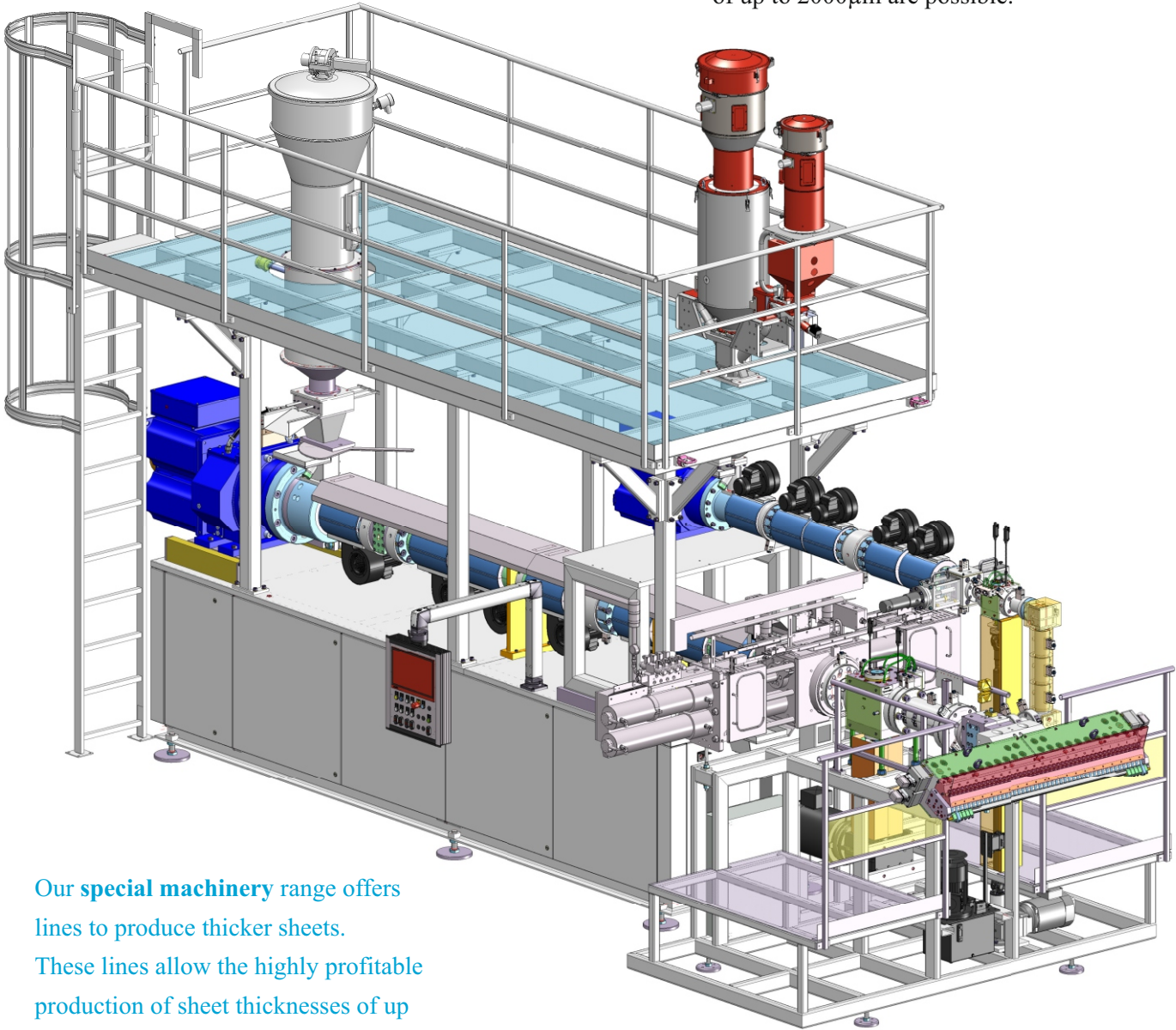
your standard - our flexibility



Your benefits at a glance

- + applicable materials: A-PET, C-PET, PET-G, PP, PS, PLA
- + available machine sizes: 700 to 2200 kg/h
- + PLC control system with visualisation and touchscreen
- + fully automatic screen-changer with back-flushing
- + automatic gauging die with inner deckling
- + 45° calander with motorised roller-gap-adjustment (µm)
- + automatic roller cleaning system
- + PE lamination systems for the MAP/FFS market
- + inline thickness measuring gauging
- + liquid coating systems
- + center cutters with circular knives up to 6-lane production
- + edge trim grinders
- + remote maintenance / service via modem
- + worldwide on-site service

Type	Output [kg/h]
DE 85 - 700	700
DE 100 - 950	950
DE 125 - 1200	1200
DE 125_2 - 2000	2000
DE 150 - 1600	1600
DE 150 - 2000	2000



Our PET lines produce sheet thicknesses of approx. 120 - 1500µm as standard. Processing materials like PP or PS, ticknesses of up to 2000µm are possible.

Our **special machinery** range offers lines to produce thicker sheets. These lines allow the highly profitable production of sheet thicknesses of up to 2500µm. In case you are interested in larger plants, we will submit an individual offer.

diamat 2to PET-line

Example of a line



material handling & crystallization

machine & process control

PLC modular diamat visualisation



extrusion



gravimetric dosing unit

- clear and intuitive operation
- individual presentation of all components for a better overview
- recipe handling for precise reproduction of the different products
- all installed sensors are visible in the visualization

- modular control system PLC
- Windows based operation system for data backup TCP/IP connectivity for remote access
- integrated heating control software
- visualization based on latest HTML5 technology
- diagnosis of all EtherCAT bus terminals (sensors, frequency convertor, ...)



smoothing unit



winding unit

standard equipment

Highest quality at the best price

Take-off, slitting & trimming

- longitudinal cutter with circular driven blades
- AC driven
- 2 auxiliary winding stations for the edge trims
- width adjustment while production
- center cut for multi-lane production
- AC frequency controlled take-off system
- haul-off rollers with wear-resistant industrial rubber coating

pneumatic sheet accumulator

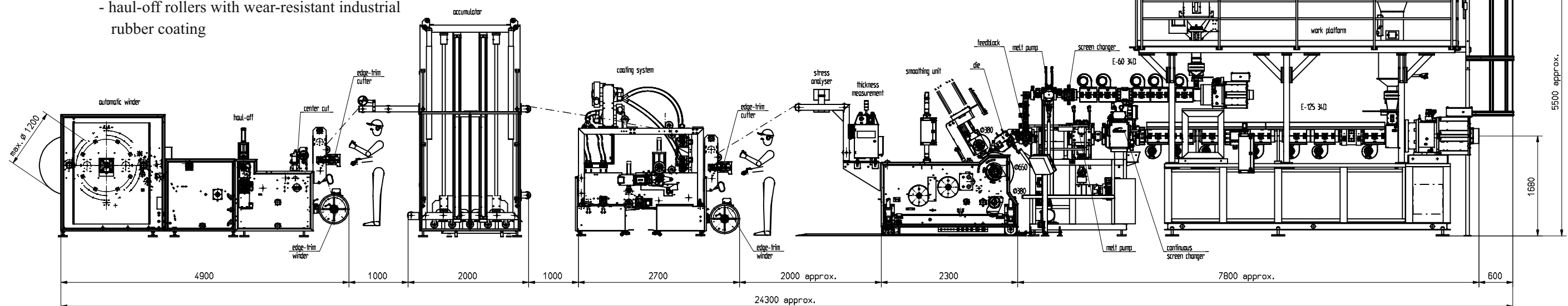
- to support and protect the reel changing process
- pneumatically controlled sheet tension (adjustable)
- safe sheet feed from ground level

3-roller polishing stack

- inclined or horizontal arrangement
- pneumatic closing unit
- sheet thickness 300 ... 1800 μm
- AC single drive of the rollers
- manual roller gap setting with digital reading
- roller single temperature control 20-90°C
- 2 driven additional cooling rolls
- length adjustment motor-driven on linear rail
- height adjustment in inching operation, motor-driven
- thickness gauge for film thickness control
- polarized light for quality control

Blending and dosing system

- gravimetric dosing system
- 4 components
- vacuum conveying
- metal elimination magnet



Automatic winding unit

- 2 AC-driven winding stations
- winding shaft 76 mm (3 inch)
- winder tension individually controllable
- regulated automatic winding shaft filling
- max. reel diameter 1200 mm
- automatic roll change
- automatic cross-cutting and lay on

liquid coating system

- flexible coating - flexo print
- unilateral or bilateral
- with hot air jet drying

Standards

- 3 phases with neutral- and grounding conductor
- 3×400V, 50 Hz (3×380V, 60Hz)
- colour to request free to RAL
- operator friendly platforms
- melt leading channels in high alloy stainless chrome steel
- modular concept

Single screw extruder

- AC direct screw drive
- up to 100% regrind possible
- 34D...40D screw length
- screw and barrel with long-term wear protection hardening
- heating and cooling zones with air isolation
- extruder control- and visualisation system
- continuously operating screen changer
- frequency controlled melt pump
- dummy channel for possible retrofit of a static mixer
- manually or automatically operated extrusion die