Training - Polymers Extrusion and Pelletizing

EXTRU-EN-P | **Face-to-face only** | **3 days**

This course provides a better knowledge of the equipment and physical phenomena used in the extrusion and granulation of polymers, and a better understanding of the operating rules

Level

Skilled

Public

- Operating staff in charge of the operation of extruders; pelletizers and ancillary equipment
- Technical staff involved in the operation or maintenance of this kind of facilities

Objectives

Attendees will be able to implement the following skills:

- Describe the phenomena involved in an extruder
- Explain settings
- Assign the role of safety and automation

Pedagogical & technical resources

- The content may be customized for a particular type of machine or for products if information is provided in advance
- Otherwise, standard products are covered: PolyEthylene, PolyPropylene. It can be implemented on specialties polymers and compounds
- Case studies based on industrial cases

Assessment of achievements

- Trainees are assessed throughout the training through practical application phases and interactions with the trainer
- A final on-the-spot evaluation may also be carried out at the end of the course and/or at the end of each module using tests designed to verify the learners' understanding and assimilation of the knowledge linked to the training objectives

Prerequisites

No prerequisites are necessary to follow this course

Responsable

IFP Training instructors, with expertise in the field and trained in modern teaching methods adapted to the specific needs of learners from the professional world

Program

EXTRUSION OF THERMOPLASTIC - PROCESS DESCRIPTION — 0.25 day

Aim of the extrusion, general layout description and the various steps of the polymer treatment.
Operating principle of raw material feeding system.

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Operating principle and different cross section areas: feeding system, filling, melting, degassing, compression, transport, pelletization.
Different types of screws, advantages and drawbacks.
Different types of extruders: single screw, counter-rotating or co-rotative twin screw, BUSS type mixers, advantages and drawbacks.
Operating principle of pellets conveying.

TECHNOLOGY & OPERATION OF EXTRUDERS 1.5 days

Drive: motors and starters, variable speed drives, gearboxes, loads, overload safety devices, structure of the thrust bearings, auxiliaries..
Extruder: feeding systems, blockage prevention; different section of screw and barrel, adjusting the temperature; starting diverter valve and start-up operation; fouling filters monitoring and filter changing device, the die plate: technology, different heating systems, pressure monitoring, calculating the percentage of blocked holes, risk of damage. The pelletizer, different cutting systems, calculation and adjustment of knifes speed, water flow, water temperature, monitoring of pellets size/shape.
Principle of heat exchange in the die plate and temperature control.

AUTOMATION & SAFETY 0.25 day

Review of the machine safety principles (flow charts, logic diagrams).

PRODUCT QUALITY 0.25 day

Different grades manufactured; specifications in relation to the applications.
Laboratory tests: equipment procedures, visualization of various types of defects.

INFLUENCE OF OPERATING PARAMETERS 0.75 day

Fluidity, viscosity: dynamic viscosity, definition, effect of shear rate, kinematic viscosity, melt index (MI), testing conditions, temperature effect.
Consequences: control of the temperature as a function of the polymer grade and feedrate.
Required power: the influence of the feedrate, the MI and temperature: guidelines.
Equipment reliability.
Application: troubleshooting, solutions, items to be checked.

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