

Laboratory machines for the processing of polymers

Filter Test FT-MP-IS (pat. pending)

with integrated screen changer and melt pump

The simple and reliable system for a fast material test



Application

The screen pressure test serves to recognize quality differences in a polymer because of agglomerates, insufficiently dispersed fillers respectively contamination. The screen pressure test can be used, for example:

- in the field of product development to optimize the color approach
- in the field of quality control respectively in and outgoing control of master batch compounds or even polymers

Function

The material to be tested is molten and homogenized in an extruder and is delivered via a melt pump with a defined and constant volume flow to the filter. Particles of a certain size clog the filter and so reduce the free penetration surface of the screen. Consequently, with a constant volume flow in front of the screen, the pressure does increase and is recorded by a sensor and can be used to define the quality of the material tested.

Special features

- Very fast change of the screen by a cassette system
- Purging the extruder by diverting the melt with a by-pass during the change of the screen
- Changing the screen without stopping the extruder
- integrated screen pre-heating
- user-friendly analysing software with data printout

From the abstract polymer to the real properties

The COLLIN-Filter Test Unit FT-MP-IS

with integrated screen changer and melt pump

- A screen cassette system allows the change of the screen within a few seconds.
- By using a by-pass valve, the melt flow can be by-passed in front of the screen. This enables an interruption of the melt flow without having to stop the extruder or the melt pump.

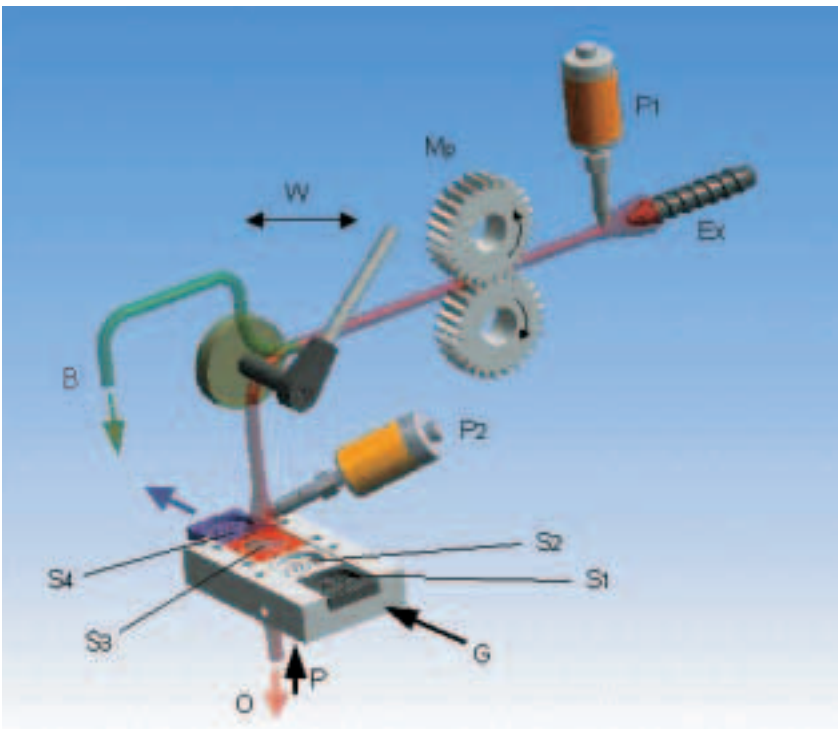
A change of the screen can easily be done while purging both, the extruder and melt pump. But the most decisive advantage is that after having changed the screen the extruder and the melt pump need not be started again.

- First, the new screen is positioned in a pre-heating position and then in the actual testing position for the next trial. Therefore, the time needed for the test screen to adapt thermally to the testing equipment is no longer necessary.
- user-friendly software to calculate the screen pressure test value.

System's advantages

- Extremely reduced downtime
- Reduction of the staff requirement
- considerably better measuring equipment duty
- all design parameters and the evaluation correspond to the expected EN-standard

Elements of the screen changer



- Ex extruder
- P1 melt pressure 1
- Mp melt pump
- W melt distributing guide
- P2 melt pressure 2 in front of the screen
- S1 screen 1 (insert)
- S2 screen 2 (pre-heat)
- S3 screen 3 (test)
- S4 screen 4 (remove)
- G movement of the screens
- P sealing pressure of the screen S3
- O outlet of the screen
- B outlet of side stream

The especially designed testing equipment allows the change of the screen within 10 seconds:

1. Insertion of the screen cassette (S1) into the guiding rail
2. By turning the melt distributing guide (W) reversal of the melt flow into the by-pass (B)
3. Release of the screen cassette positioning (P)
4. Pushing in the inserted screen into the preheating position (S2) and moving the second screen from the preheating position into the testing position (S3). Simultaneously, the used screen is removed into the removal position (S4)
5. Tiding of the screen cassette (S3)
6. By reswiveling the melt distributing guide, the melt flow is recirculated through the screen
7. Removing the screen cassette (S4)

Filter Test with the testing extruder FT-E25P-MP-IS

For testing larger batches of polymers which need a larger throughput, the measuring equipment is installed in an extruder with a diameter of 25 or 30 mm. This combination allows throughputs from 3 to 10 kg/h. Herewith, all requirements for testing polymers or compounds are fulfilled.

Here, the screen testing unit is installed on a movable base. So, the use of the extruder for any other situation is possible.

Measuring

A PC which is connected with the filter test unit accumulates the data necessary for the test:

- melt pressure in front of the filter
- melt temperature
- melt pump number of revolutions

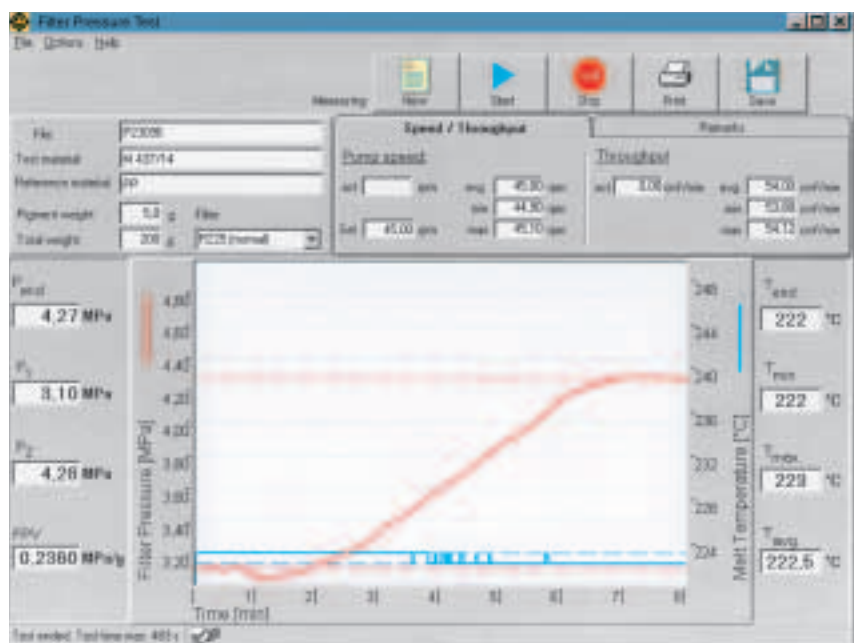
The time development of the melt pressure and temperature are shown in a diagram.

By pressing a start/stop button the user decides when the test is started (filling in the sample) and finished. The calculation of the filter pressure value (FPV) starts at the end of the test by determining the initial pressure P1 respectively the highest pressure P2 which occurred during the test by using the following formula:

$$FPV = (P2 - P1) / GP$$

GP is the pigment weight contained in the sample.

The registered data can be stored in the PC and a test protocol can be printed out.



Filter Test FT-MP-IS with Extruder 20 mm diameter

For standard measuring in the field of master batch, small batches of for example 200 g are used. Therefore, the compact unit with a extruder E 20 T is suitable.

The extruder's base group includes the electrical control for extruders and melt pump.

The screen measuring equipment is a movable part of the extruder to simply undock and to clean the screw. The unit is installed in a movable base cabinet.

Measuring

There are two options:

- a.) Using a separate PC for data accumulation and evaluation as well as presenting measuring curves.
- b.) Using a touch screen with integrated PC. This unit is situated on the back of the base cabinet.

Filter Test without melt pump

For a simplified testing method of experimentation a variant without a melt pump is available. The functions of the integrated screen changer are still the same.



Technical modifications reserved

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