COMPACT *Scientific* FILTER TESTER

TYPE LCFT34GP

FULLY COMPUTERIZED AND EQUIPPED WITH 20 MM EXTRUDER INCORPORATING A HIGH TORQUE SERVO MOTOR DRIVE FOR GEAR PUMP

IN FULL COMPLIANCE WITH DIN NORM EN 13900-5 AND ISO 23900-5 FILTER TEST STANDARDS

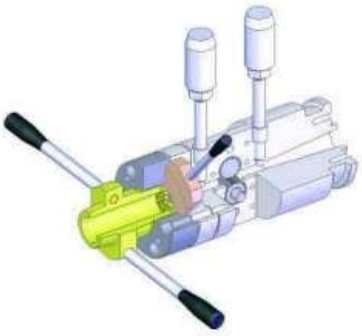
FILTER TESTER FEATURES

Filter test body with a streamlined, integrated Gear Pump heated with electric band heaters. The gear pump delivers three cc/RPM and is driven by a servo motor which provides constant torque and gives very accurate feed rate. The gear pump drive shaft bearing is water-cooled to ensure a leak-free operation, and the shaft is also equipped with an easily exchangeable shear pin to prevent overload of the gears.

A pressure and melt temperature sensor is inserted in the channel to the gear pump inlet. The pressure sensor is connected to a pressure control instrument that in turn, will regulate the extruder screw speed to ensure that it delivers a steady flow of polymer at a constant pressure.

The melt temperature sensor will register the temperature of the melt accurately before entering the gear pump. It is also connected to the gear pump drive to ensure that the pump is not started unless proper melt temperature has been reached.

A second combined melt temperature and pressure sensor is inserted just before the filter disk location. This will sense very accurately the pressure building up in front of the filter disk as well as the temperature of the melted polymer.



The filter test head is mounted in line with the gear pump and extruder as shown to the right. This very streamlined melt flow from extruder straight to the filter disk eliminates completely any dead corners and melt channels which makes cleaning very easy. Thus it is possible to use a minimal amount of virgin resin of only a few hundred grams for cleaning both extruder and filter test head. This, in turns, saves a lot of time and resin.

The head is equipped with our new clamping system which incorporates a Quick-Lock system as shown in the picture to the left. Here the filter retainer with the filter disk is clamped simply by turning the two handles.

The nozzle is equipped with threads and will screw into the filter retainer when turned. This new system makes changing of filter very fast and easy, and it also ensures that the filter is fully sealed at all times. The breaker plate for the 34 mm filter disks is mounted on a retainer plate with a convenient handle so that it can be quickly inserted and removed from the side of the filter test head. Our filter test head is of a streamlined design with no dead corners, which ensures a very easy cleaning from one batch to another.

The heating of the head is made with band heaters, and the temperature is regulated very accurately by the onboard computer with PID functions and auto-tuning. The filter test with gear pump has a working range of 0 to 300 bars pressure.

A practical feature is the draw out stainless steel tray below the filter tester head which conveniently collect the resin coming out from the nozzle. The tray can be removed from its frame for emptying out.

FULLY COMPUTERIZED CONTROLS OF FILTER TESTER & EXTRUDER

OFFERING EXCELLENT RECORDING AND REPORTING OF ALL TEST RESULTS

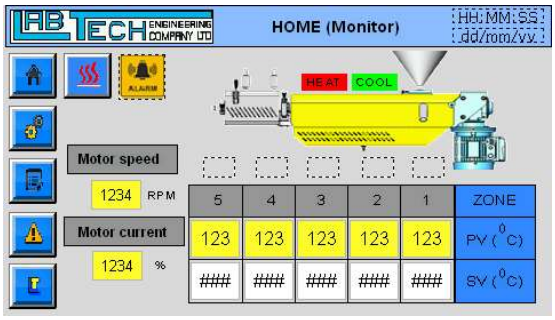
With this new version, the recording and controls are made with an on-board Industrial Panel PC with a large 12.1-inch LCD screen. The control panel is also equipped with an in house made electronic microchip circuit which registers and controls signals from pressure transducers and thermocouples.

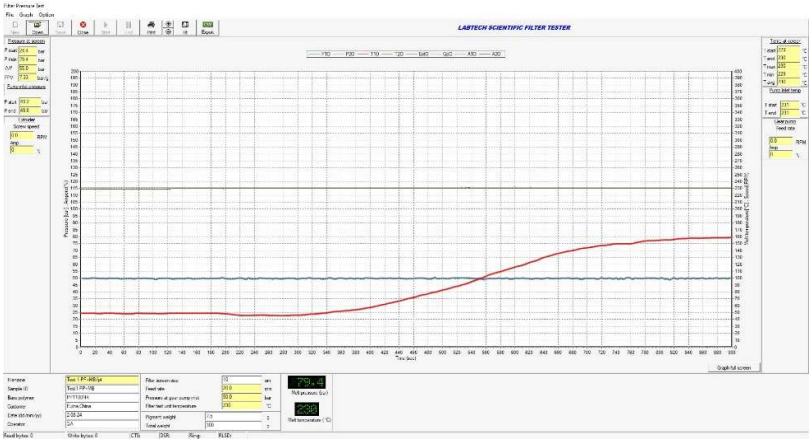
The test parameters can be keyed in on a very practical conventional Key Board with large ball type Scroll Mouse mounted on the control panel. This feature is a lot easier to use than for instance with a touch screen since the running parameters and batch data can be keyed in on the keyboard in the same way as you work with a normal PC. However, the touch screen also has a keyboard screen if you prefer to use this system.

The on-board Industrial Type Panel PC has high memory capacity, using a solid 2 GB flash card instead of the hard disk to ensure the system is insensitive to vibrations and chocks. The PC can store thousands of test result, which can be recalled on screen for immediate comparison and/or downloaded to another PC through a USB port on the side of the control panel

The lower part of the control panel has start/stop buttons for gear pump and extruder as well as main on/off and emergency switches. It also contains a speed control button for the screw RPM and a selector switch for switching the filter tester from manual to auto mode. The second selector switch is for on/off of the onboard panel PC

The control panel has a second smaller touch screen controlling the extruder parameters like heating and cooling of all barrel zones including auto-tuning. The screen shows actual motor load in percent of a full load as well as screw RPM. Additional this extruder control screen features an alarm system which will warn if any functions of the extruder are not working properly.





The panel above controls the gear pump parameters in respect of pump RPM as well as inlet pressure and you can set here the required values with the up/down scroll buttons. It also controls the temperature of the filter test head. Further you can also set the maximum allowed pressure on the filter which will stop the extruder if the set value is exceeded.

The PC main screen shown above has a multitude of text boxes for entering on the keyboard all the essential batch parameters such as:

1. Sample ID (test batch code number),
2. Base Polymer and Comments on the Test
3. Date
4. Operator ID
5. Filter Mesh Size
6. Pigment Weight
7. Total Weight of Batch

The computer will automatically calculate the FPV (Filter Pressure Value) and show all running parameters in designated windows.

The large central graphic area on the screen will display continuously processing curves for pressure before the gear pump, filter pressure as well as melt temperatures before and after gear pump. The computer screen will show the pressure build-up on the filter in real-time

After the test is completed, the data can be stored onboard as well as transferred to another PC and printed with any printer through ports on the rear of the control panel.

The software is based on Windows 10, and all test results can be downloaded to another PC simply by copying and pasting. Data can also be transferred to a memory stick through a USB port on the back of the control panel.

In conclusion, the computerized filter tester offers the following advantages:

- The filter tester head and extruder is very easy to clean, often using as little as a few hundred grams, which also save time.
- The onboard panel PC can store at least 5,000 of tests which can be called up at any time for immediate comparison with ongoing tests.
- The computer will automatically calculate the Filter Pressure Value (FPV), which is the pressure build-up in bar/gram of pigment. This value is the most important for comparing from one batch to another.
- The result for each test can be saved and printed out on a normal color inkjet printer or similar. The print out shows a very clear graph of the whole process, and it also has all the needed information of the test sample such as:

  - Sample ID (Masterbatch code etc.)
  - Base polymer
  - Comments
  - Date
  - Operator ID
  - Filter Screen type

- Pigment weight
- Total weight

All these data can easily be keyed in with the help of the onboard keyboard.

- The test result with graphs and all data can be downloaded to an external PC, and it can easily be stored and emailed to your customer, etc. You will instantly have here indisputable evidence of the quality of your masterbatch or compound, which is useful in case of complaints and also to show the quality comparison in between a reference or competing product.

LABORATORY 20 MM SINGLE-SCREW EXTRUDER

WITH 30 L/D TYPE LE20-30/P

FOR PROCESSING OF ALL KINDS OF POLYMERS SUCH AS POLYOLEFINES, STYRENICS, PA, PET, PC, ETC.

EXTRUDER FEATURES

- Screw and barrel in high-grade nitride hardened steel, screw diameter 20 mm and L/D ratio of 30.
- Plain screw to ensure that the compound being tested is not influenced by the screw
- Water-cooling of feed section as well as the lower part of hopper funnel.
- Large rectangular feed opening in barrel for efficient feeding of both pellets and powders.
- Screw speed infinitely variable from 0 to 150 RPM.
- Large oversized 1.5 kW AC motor drive, coupled directly to a helical gearbox. The gearbox is flange-mounted directly to a thrust bearing housing containing the screw-connecting shaft, which is resting in a heavy-duty thrust bearing arrangement.
- Programmable frequency inverter for infinite variable screw speed and high torque even at low screw speeds. The inverter is connected via plug-in cables to the pressure instrument on the filter test unit. With this, the extruder can be regulated to deliver a precise flow of resin to the gear pump.
- Three heating zones on the barrel, all with air-cooling. Each zone with multiple rows of copper fins for high cooling efficiency, coupled with oversized cooling fans mounted in the extruders sub cabinet. Large wattage on heaters coupled with the efficient cooling system ensures very fast heating and cooling of each zone.
- The built-in Panel PC has designated modules for set and readout temperature controls for all 3-barrel heating zones. The controllers are coupled to solid-state relays for accurate heat control and are equipped with auto-tuning as well as linear compensation for very precise temperature regulation over the entire working range of up to 300°C or 570°F (Higher temperatures on request)
- Full steel cover over the extruder barrel with air venting grid on top.
- Stainless steel hopper mounted on a turret valve with spring lock pin and with the following three positions: fully closed, fully open and discharged through a pipe at the side of the extruder.
- Extruder and filter head mounted on steel sub-cabinet resting on four heavy-duty lockable casters.