

## Brabender® Measuring Mixers

for Material Research  
and Quality Control



... where quality is measured.

# Measuring Mixers



## Features

The technical design of our measuring mixers offers:

- Sophisticated design for efficient mixing
- Easy handling and cleaning through bipartite (with liquid heating/cooling) or tripartite (with electric heating) mixer bowl
- Easy cleaning and manifold applications through quickly detachable and partially interchangeable mixer blades
- Precise and constant heating/cooling of the mixers with electric heating through three separate, independent heating zones
- Operating temperatures of up to 500 °C with electric heating
- Wide range of accessories to make your job more convenient: e.g. loading chutes, blade extractors, sealing covers for tests under inert gas or for gas flow measurements, automatic precision dosing pumps for adding liquids, etc.

## Principle

The internal or batch mixers - as their name suggests - are machines for non-continuous production of homogeneous polymer, elastomer, ceramic or other mixtures. The raw material is loaded through the top opening into the heated mixer bowl where it is homogenized by specially shaped mixing blades.

How can this equipment be used as a measuring mixer?

If connected to a drive unit (torque rheometer), the torque and the stock temperature can be measured and recorded during the mixing process. This torque mirrors the resistance the material opposes to the rotating blades during the mixing process. The torque moves a dynamometer out of its zero position. This path can be measured and visualized as a function of time. The resulting diagram illustrates the relationship between torque (viscosity) and temperature over the measuring time and also shows structural changes of the material.

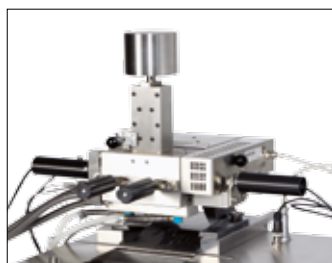
### Carl Wilhelm Brabender said:

"It is only testing, measuring, and recording as a function of time which efficiently helps to rise production quality; only this way, certain processes can be recognized which cannot be grasped with static measurements."

## Application

Brabender measuring mixers are perfectly suited for a large range of applications.

Use them as batch mixers for sample preparation if you only need small amounts of sample material. Several different batches can be produced in short time and with almost no waste of raw material.



Measuring mixer 50 EHT

Simulate on a laboratory scale all processes relevant for the production and processing of polymers and other plastic and plastifiable materials, such as compounding, mixing, masticating, etc. As an example, the fusion time of PVC and other materials can be determined precisely and related to the estimated residence time of the material in an extruder.

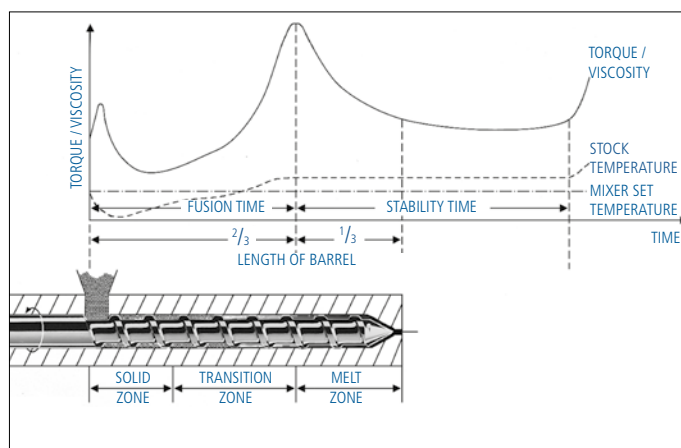
Test the processibility and material characteristics of thermoplastics, thermosets, elastomers, ceramic molding materials, pigments, and many other plastic and plastifiable substances.

Various specific application examples are listed on pages no. 8 - 10.

## Blade geometries

Select the optimum blade geometry for your application from a large program of mixer blades.

Decades of industrial experience have shown that roller, cam, Banbury and sigma blades have proven to be perfectly suited for most applications on thermoplastics and elastomers. Apart from these, Brabender offers various special blade geometries optimized for particular measuring tasks, such as e.g. delta blades for thermoset applications.



Relationship between the torque vs. time curve ("Plastogram") from a mixer test and the estimated residence time of the product in a production extruder



Mixer blades (left to right): roller, cam, Banbury, sigma blades for series 50 mixers, delta blades for series 30 mixers

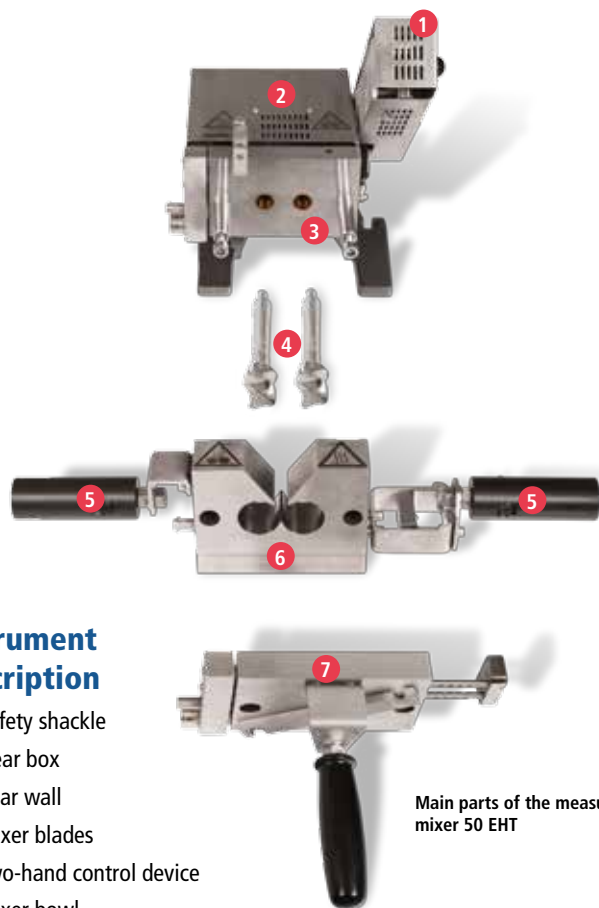
Blade type	Application examples	For mixer series
Roller (W)	thermoplastics	15, 30, 50 and 350
Cam (N)	caoutchouc, elastomers	50 and 350
Banbury (B)	caoutchouc, elastomers	50 and 350
Sigma (S)	PVC dry blends	50, 300 and 350
Delta (MB)	thermosets	30 and 50

## W 50 / W 50 EHT

- ASTM D 2538 Fusion of poly(vinyl chloride) (PVC) compounds

## W 30 / W 30 EHT

- ASTM D 2538 Fusion of poly(vinyl chloride) (PVC) compounds
- ASTM D 3795 Thermal flow, cure, and behavior properties of pourable thermosetting materials



Main parts of the measuring mixer 50 EHT

### Instrument description

- 1 Safety shackle
- 2 Gear box
- 3 Rear wall
- 4 Mixer blades
- 5 Two-hand control device
- 6 Mixer bowl
- 7 Front plate

## Measuring mixers 30/50 and 30/50 EHT

At most of the research and development sites, the versatility of an equipment is a basic requirement due to steadily changing samples and materials.

The most general purpose mixers are the series 30/50 mixers, comprising the liquid heated mixers 30 and 50 and the electrically heated types 30 EHT and 50 EHT.

Mixers with the extension EHT (electric, high temperature) distinguish by their electric temperature conditioning in three control zones with compressed air cooling. This feature allows to extend the operating range to a maximum temperature of 500 °C.

These measuring mixers are perfectly suited for materials like PAEK and PEEK with melting temperatures of more than 300 °C.

The liquid heated measuring mixers stand out for particularly precise heating/cooling and uniform temperature distribution. This makes these mixers the perfect tool for applications at lower temperatures (< 300 °C).

Another notable feature is the rotor speed ratio of 2 : 3 (driven to non driven, US type 5) which results in a high torque resolution and allows a better differentiation, especially when testing low viscosity polymers. Of course, all of the series 30/50 measuring mixers can be supplied with a 3 : 2 (US type 6) speed ratio either.

## With roller blades: W 30/50 and W 30/50 EHT

The W 30/50 and W 30/50 EHT with their roller blades are the allrounders among the measuring mixers. They are used for all thermoplastics. The special shape of the rotors,

developed by Brabender more than 50 years ago, as well as the tight clearance between the rotors and the mixing chamber provide for intensive, high shear mixing.

Measuring mixers W 30 / W 30 EHT	
Application	thermoplastics
Volume of mixer bowl approx.	30 cm <sup>3</sup>
Sample weight*	25 - 40 g
Heating/cooling	W 30: liquid W 30 EHT: electric with air cooling
Torque max.	200 Nm
Speed ratio driven : idle blade	2 : 3
Operating temperature max.	300 / 500 °C
Dimensions W x H x D	550 x 200 x 430 mm
Net weight approx.	13 / 17 kg

\*depending on the specific weight and bulk density of the sample material

Measuring mixers W 50 / W 50 EHT	
Application	thermoplastics
Volume of mixer bowl approx.	55 cm <sup>3</sup>
Sample weight*	40 - 70 g
Heating/cooling	W 50: liquid W 50 EHT: electric with air cooling
Torque max.	200 Nm
Speed ratio driven : idle blade	2 : 3
Operating temperature max.	300 / 500 °C
Dimensions W x H x D	550 x 200 x 450 mm
Net weight approx.	18 / 17 kg

\*depending on the specific weight and bulk density of the sample material

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# Measuring Mixers

## N 50

- ASTM D 3185 Evaluation of SBR including mixtures with oil
- ASTM D 3186 Evaluation of SBR mixed with carbon black or carbon black and oil
- ASTM D 3187 Evaluation of NBR
- ASTM D 3188 Evaluation of IIR
- ASTM D 3189 Evaluation of solution BR
- ASTM D 3190 Evaluation of CR
- ASTM D 3191 Standard test methods for carbon black in SBR - recipe and evaluation procedures
- ASTM D 3192 Standard test methods for carbon black evaluation in NR
- ASTM D 3403 Evaluation of IR
- ASTM D 3484 Evaluation of oil-extended solution BR
- ASTM D 3848 Evaluation of NBR mixed with carbon black
- ASTM D 3568 Evaluation of EPDM including mixtures with oil

**With cam blades: N 50 and N 50 EHT**  
**With Banbury blades: B 50 and B 50 EHT**

The Brabender N 50 / N 50 EHT with cam blades and the B 50 / B 50 EHT with Banbury blades are the standard measuring mixers for testing natural and synthetic elastomers. The most typical applications are testing the flow and cure behavior, mastication, compounding with additives such as carbon black, silica, etc. They are also frequently used for measuring the breakdown index and the black incorporation

time (BIT). Furthermore, the flow behavior of electrode masses and ceramic molding materials can be determined as a function of temperature and shear, and absorption tests can be run on materials like iron oxide powder, carbon black, pigments, and similar materials with particle sizes in the  $\mu\text{m}$  range.



Plastograph EC Plus  
with measuring mixer 50 EHT

## Instrument description

- 1 Plastograph EC Plus drive unit
- 2 Loading chute with weight
- 3 Mixer
- 4 Quick opening system
- 5 Batch collector drawer

### Measuring mixers B 50 / B 50 EHT

Application	elastomers
Volume of mixer bowl approx.	70 cm <sup>3</sup>
Sample weight*	40 - 70 g
Heating/cooling	B 50: liquid B 50 EHT: electric with air cooling
Torque max.	200 Nm
Speed ratio driven : idle blade	2 : 3
Operating temperature max.	300 / 500 °C
Dimensions W x H x D	550 x 200 x 450 mm
Net weight approx.	18 / 17 kg

\*depending on the specific weight and bulk density of the sample material

### Measuring mixers N 50 / N 50 EHT

Application	elastomers
Volume of mixer bowl approx.	80 cm <sup>3</sup>
Sample weight*	40 - 80 g
Heating/cooling	N 50: liquid N 50 EHT: electric with air cooling
Torque max.	200 Nm
Speed ratio driven : idle blade	2 : 3
Operating temperature max.	300 / 500 °C
Dimensions W x H x D	550 x 200 x 450 mm
Net weight approx.	18 / 17 kg

\*depending on the specific weight and bulk density of the sample material

## Internal Mixers 350 / 350 E



Plasti-Corder Lab-Station with internal mixer 350 E

Internal mixer heads of the 350 series are available with liquid heating/cooling and with electric heating and air cooling. Due to the large mixer volumes of 370 to 440 cm<sup>3</sup>, these mixers are frequently used for producing sample compounds for subsequent tests. The material can easily be taken out and rolled out to sheets or pressed to plates.

Control and document the entire compounding process from your computer or implement and benefit from an optional process control of each individual mixing step.

Of course, these compounding mixers can also be applied for material testing (e.g. of rubber compounds).

The series 350 mixers can be equipped with roller, cam, Banbury and sigma blades.

## Internal Mixer 350 S



Internal mixer 350 S

Due to its special design, the internal mixer 350 S is mainly used in the rubber and caoutchouc industry for mixing and compounding tasks or for material testing. The upper and lower half of the mixing chamber can be opened like a jaw in order to facilitate removal of the sample material. Special seals prevent the leakage of fine-particle fillers like carbon black or silica.

for proportioning of the recipe components.

The internal mixer 350 S, which is supplied on a special docking station, can be equipped with roller, cam, Banbury and sigma blades.

Extensive software packages are available for material tests like e.g. the determination of the black incorporation time (BIT).

The large net mixer volume of 370 to 440 cm<sup>3</sup> has proven favorable

### Internal mixers 350 / 350 E

### Internal mixer 350 S

	Internal mixers 350 / 350 E	Internal mixer 350 S
Application	various	elastomers
Volume of mixer bowl approx.	370 - 440 cm <sup>3</sup> (depending on the blades)	370 - 440 cm <sup>3</sup> (depending on the blades)
Sample weight*	250 - 500 g	250 - 500 g
Heating/cooling	350: liquid 350 E: electric with air cooling	liquid
Torque max.	400 Nm	400 Nm
Speed ratio driven : idle blade	standard: 3 : 2 with Banbury blades: 1 : 1.11	standard: 3 : 2 with Banbury blades: 1 : 1.11
Operating temperature max.	300 / 350 °C	300 °C
Dimensions W x H x D	350: 550 x 260 x 400 mm 350 E: 650 x 270 x 400 mm	1000 x 2040 x 640 mm with docking station
Net weight approx.	44 / 46 kg	170 kg with docking station

\*depending on the specific weight and bulk density of the sample material

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# Measuring Mixers

## P 600

- DIN EN ISO 4612 Preparation of a paste from PVC paste resins
- DIN 54802 Determination of plasticizer sorption and rate of plasticizer sorption in the heat of vinyl chloride (VC) polymers
- ASTM D 2396 Standard test methods for powder-mix time of poly(vinyl chloride) (PVC) resins using a torque rheometer



Planetary mixer P 600

## MB 30/50

- DIN 53764 Test method for flow and cure properties of pourable thermosettings (presently withdrawn)



Mixer MB 30

## Planetary mixer P 600

The Brabender planetary mixer P 600 is used for testing the properties of powders like e.g. the liquid sorption and the drying time of PVC powders in compliance with international standards or the pourability of PVC dry blends, further for preparing PVC pastes for tests and testing them in compliance with DIN EN ISO 4612.

A special rotor runs in a planetary motion in the mixer bowl. A revolving scraper prevents the sample material from sticking to the mixer wall.

## Measuring mixers MB 30/50

These mixers have delta-shaped blades and are used for thermo-setting materials.

They were developed and designed by Brabender together with a group of renowned producers and comply with the German standard DIN 53764 (presently withdrawn).

The mixers are made of a special, hardened steel to prevent abrasion. Liquid heating/cooling of the MB 30/50 mixers provides for excellent temperature constancy.

### Measuring mixers MB 30/50

Application	thermosets
Volume of mixer bowl approx.	25 cm <sup>3</sup>
Sample weight*	20 - 40 g
Heating/cooling	liquid
Torque max.	200 Nm
Speed ratio driven : idle blade	3 : 2
Operating temperature max.	300 °C
Dimensions W x H x D	MB 30: 550 x 200 x 430 mm MB 50: 550 x 200 x 450 mm
Net weight approx.	13 / 18 kg

\*depending on the specific weight and bulk density of the sample material

### Planetary mixer P 600

Application	powder
Volume of mixer bowl approx.	2500 cm <sup>3</sup>
Sample weight*	variable acc. to DIN/ISO
Heating/cooling	liquid
Torque max.	20 Nm
Operating temperature max.	150 °C
Dimensions W x H x D	300 x 420 x 550 mm
Net weight approx.	11 kg

\*depending on the specific weight and bulk density of the sample material

## WinMix software

### Software support

With the WinMix software you can easily configure and give the initial settings to your instrument.

Run mixer tests at constant temperature and speed or create temperature and/or, as an option, speed profiles which will then be processed fully automatically in order to visualize the influence of temperature and shear rate on the viscosity of the product. This is a decisive factor e.g. for designing extruder die heads etc. for complex profiles.

Real-time diagrams give a quick survey of the measured data already during the measurement. All values measured are stored throughout the mixing process so that you can evaluate them later as well. For the evaluation, you can select between several fully automatic methods:

- Fusion behavior of PVC
- Heat and shear stability of polymers
- Flow and cure behavior of elastomers
- Flow and cure behavior of cross-linking polymers (std. evaluation)

- Flow and cure behavior of cross-linking polymers in compliance with DIN 53764 (presently withdrawn)
- Automatic evaluation of the black incorporation time (BIT) with selectable zero point
- Plasticizer sorption of PVC dry blends according to DIN 54802 and ASTM D 2396
- Liquid absorption of powders
- Calculation of isothermal torque curves
- Degree of property breakdown

Or determine your own evaluation points in order to perfectly adapt the evaluation method to your specific application.

With the sophisticated correlation software, you can compare the recorded data of several tests and clearly spot the influence of e.g. parameter variations or additives. Mean values and standard deviations are calculated automatically and visualized in the diagram.

Define any correlation curves as reference curves with free definition of tolerance ranges and easily check whether your sample material meets certain demands.

## The Brabender MetaBridge



Brabender MetaBridge software running on tablet

### Discover the Brabender MetaBridge

The new software is characterized by its easy and intuitive handling. After log-in, the user finds all information about the device and a choice of options for his purpose on the start screen.

### The advantages

- User-friendly operation by touch – perfect for tablets and smartphones
- Responsive web design: screen resolution adjusted automatically
- Ready to use, no installation necessary
- Security of tests and data through easy, password protected user log-in
- Live test tracking by authorized users from multiple end devices all over the world at a time

### Intelligent features

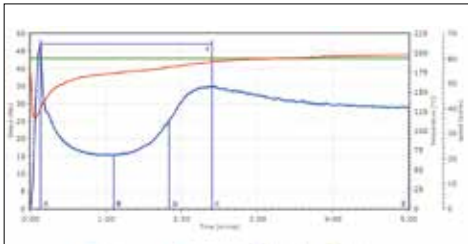
Benefit from new and optimized functions:

- Administration mode for user access rights
- Webbased solution – possibility of sharing information and data with other users worldwide
- Live tracking of tests with end time indication for logged-in users
- Optimized basic functions like data recording and evaluation, printing and export of test results – clearer, easier, faster
- Central test administration and data storage provides for quick and easy access of authorized users
- Easy definition, clear display and quick integration of reference curves
- Optimized functions for editing and adapting diagrams to your individual needs

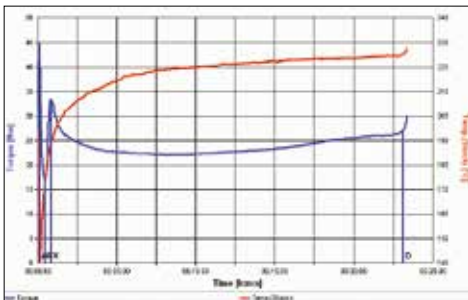
... where quality is measured.

# Measuring Mixers

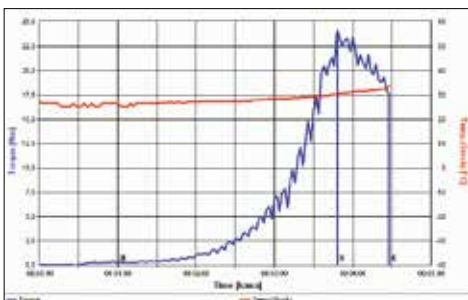
## Application and evaluation examples for measuring mixers - MetaBridge and WinMix software



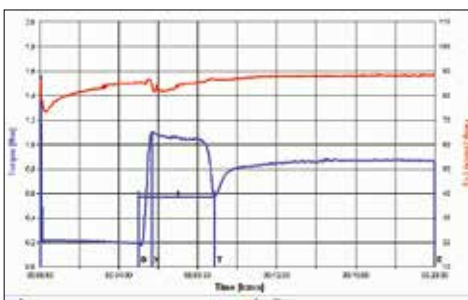
Fusion behavior



Heat and shear stability



Liquid absorption



Plasticizer sorption in compliance with DIN 54802

### Thermoplastics: PVC, PE, PP ...

Use this evaluation method for testing the fusion behavior of thermoplastic polymers. Measure material-specific Plastograms which also permit to draw conclusions as to the history of the material.

The software analyzes the curve and determines, among others,

the extreme values in the torque curve (as a measure for viscosity), fusion time, gelation speed, and the mechanical energy input.

These material characteristics are valuable data for incoming and final inspection or for the configuration of production processes.

### Thermoplastics: PVC, PE, PP ...

During processing of thermoplastic polymers, stability against thermo-mechanical oxidative stress plays an important role.

It determines, among others, the maximum residence time within the production machine. Therefore, conditioning of polymers with stabilizers is of decisive importance for the production process.

Use this evaluation method in a test series for determining (among others) the beginning of decomposition, fusion time, decomposition time, and for optimizing your material reliably and reproducibly.

### PVC, silica ...

For this test method, the powdery material is premixed one minute in a planetary mixer, sigma, or cam mixer. After this premixing time, the software starts a dosing pump which feeds the liquid at a constant and selectable dosing rate into the mixer. The diagram shows the torque increase up to the absorption maximum and, if further liquid

is added, the torque decrease by saturation.

Like with all other evaluation methods, the mechanical energy input is calculated as well.

### PVC dry blends, Plastigels ...

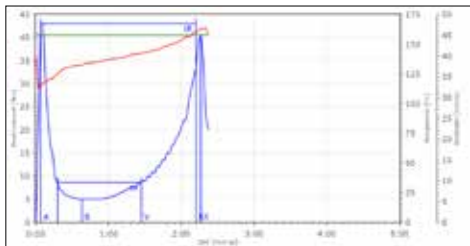
The plasticizer sorption of e.g. PVC dry blends can be characterized on the basis of the torque maximum, dry point, and the plasticizer input up to the dry point. These values are calculated automatically during the analysis of the diagram and can be used for material control and development of plastisols and plastigels.

Apart from that, the final torque is a measure for the material viscosity – an important characteristic for optimizing the actuating variables of a production line.

The evaluation complies with ASTM D 2396, DIN EN ISO 4612 and with the German DIN 54802 standard.



## Thermosets: EP, MUF, PF ...



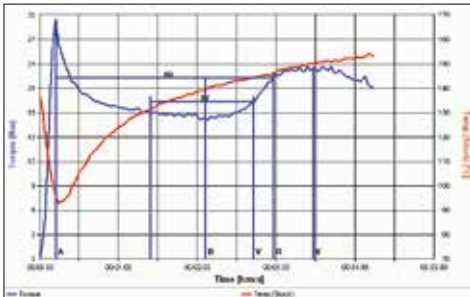
Flow and cure behavior of polymers

The most important values of this evaluation are the torque minimum, which describes the melt viscosity, the melting time, curing time, and reaction time.

With this test, you can monitor the development and production of thermosetting materials, measure

and record the properties and influence of different additives and fillers onto existing recipes, check uniformity of production, classify thermosetting molding materials with regard to their flow and cure behavior for different production methods.

## Elastomers: NBR, SBR, IR ...



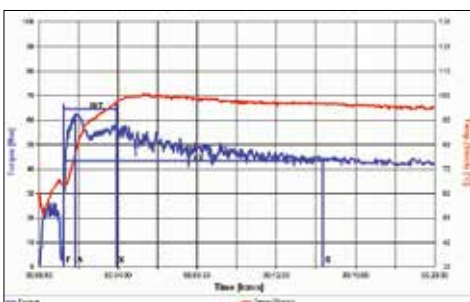
Flow and cure behavior of elastomers

The diagram shows the loading peak, the flow behavior of the blend in the torque minimum, and the increase of the curve up to the torque maximum which is due to vulcanization.

Apart from that, the mechanical energy input is calculated.

Similar to the thermoset evaluation, this method can be used for investigating the properties and the influence of various types of additives and fillers in order to maintain a constantly high quality level of the final products and group the raw materials according to their suitability for certain production processes.

## Carbon black: HAF, GPF, XCF ...



Black Incorporation Time (BIT)

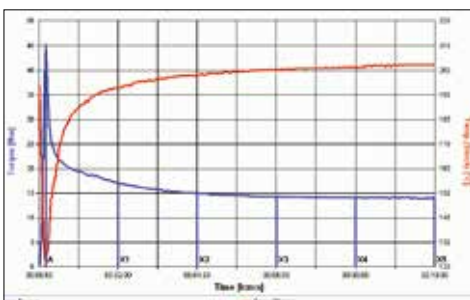
The mechanical properties of elastomer compounds are decisively determined by the activity of incorporated fillers, e.g. carbon black.

For determining the time up to full incorporation and activation of the carbon black particles within the caoutchouc matrix, the black incorporation time (BIT) is determined.

On the basis of the black incorporation time, the operating parameters of a compounder can be optimized and a constant high product quality be ensured.

The program automatically determines the BIT during evaluation of the measured data. Apart from that, other parameters like the mechanical energy input are calculated.

## For all materials ...



Universal evaluation

Call this evaluation program and define up to 20 evaluation points of the Plastogram that make sense to you for calculation - torque minima and maxima, torque changes due to additive addition, or any other significant points in the diagram.

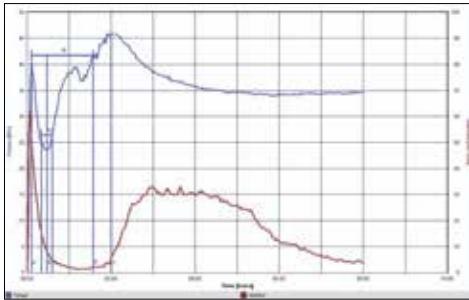
The evaluation of these points will give you the torque, temperature

and time as well as the mechanical energy input from the beginning of the test and from the previous evaluation point up to this point.

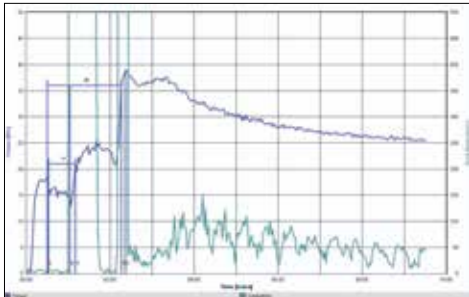
The universal evaluation is the basic tool for evaluating a Plastogram and belongs to the standard equipment of each Lab-Station and Plastograph EC.

... where quality is measured.

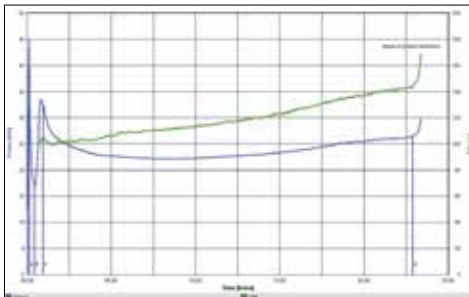
# Measuring Mixers



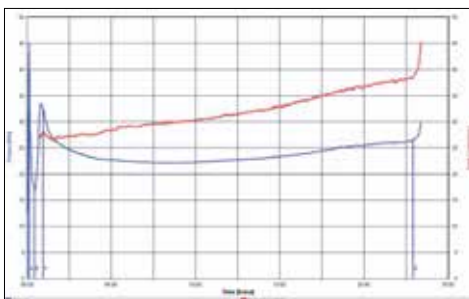
Conductivity measurement



Measurement of gas flow



Determination of isothermal torque curves



Determination of the degree of property breakdown

## Polymers with: Carbon black, C-fibers ...

Brabender measuring mixers can be equipped with optional sensors. One example is the application of a conductivity sensor for monitoring the compounding process and determining the conductivity as a material characteristic with

electrically conductive polymers. Running these measurements with different concentrations of the conductive additive allows to plot conductivity as a function of the additive concentration (percolation point).

## Polymers: Reactive processes, foaming agents ...

Another example for optional sensors is the application of a gas flow detector at a gas-tight measuring mixer. This detector permits to investigate e.g. the effect of physical and chemical foaming agents in various concentrations and at different mechanical and thermal stresses.

In case of reactive processes with gas development running during the mixing process, you can record a gas flow curve which allows to make reliable statements about material conversion and reaction kinetics.

## Polymers, ceramics ...

All Plastograms can be additionally evaluated e.g. for the calculation of isothermal torque curves.

By means of physical temperature shift functions, the nonisothermal torque curve measured is converted into an isothermal curve at a

selectable reference temperature. Represent and evaluate all structural changes without considering the influence of dissipation heat and increase the precision of your results especially in case of reactive processes.

## Polymers, ceramics ...

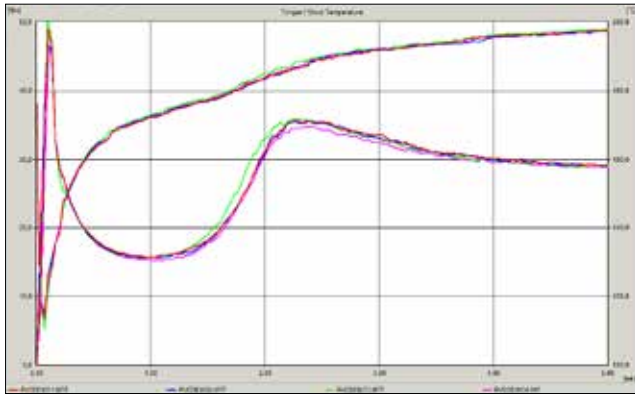
One example for the application of isothermal torque curves is the determination of the degree of property breakdown (DPB).

The DPB curve mirrors the structural build-up and degradation processes during the mixing process which result from thermo-mechanical stress and/or the effect of reactive components.

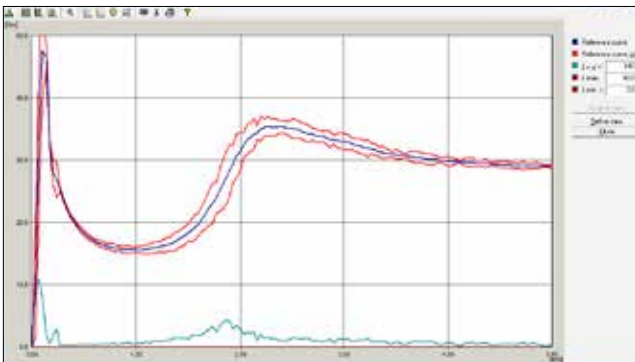
This evaluation is a valuable tool in particular for material development which completes the usual Plastogram evaluation.

Use this program e.g. for precisely determining the beginning of vulcanization with rubber compounds or the beginning of a decomposition process.

## Data correlation software



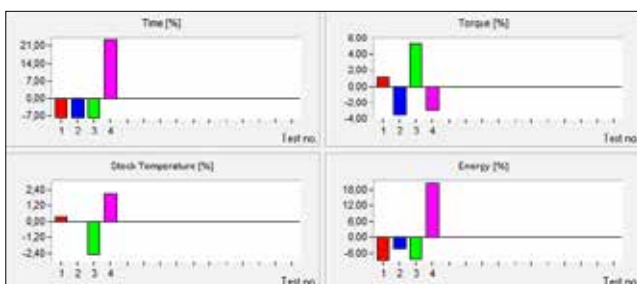
Correlation diagram



Mean value curve with envelope curve

Evaluation points		Time [min]	Torque [Nm]	St. temp. [°C]	Speed [1/min]	Energy [kJNm]
A	Mean value	0,10	48,4	126,3	60	1,3
	Standard dev.	0,02	1,7	2,0	0	0,2
B	Mean value	0,98	15,6	172,4	60	8,0
	Standard dev.	0,03	0,2	0,7	0	0,2
G	Mean value	1,82	25,3	181,9	60	13,8
	Standard dev.	0,03	0,2	0,4	0	0,3
X	Mean value	2,32	35,3	187,6	60	19,9
	Standard dev.	0,03	0,4	0,9	0	0,2
E	Mean value	5,00	29,0	197,6	60	51,5
	Standard dev.	0,00	0,1	0,1	0	0,6
t	Mean value	2,20	13,1	61,3	0	18,6
	Standard dev.	0,02	1,4	2,2	0	0,2

Summary table



Statistical evaluation of a test series

Frequently, expressive results can only be obtained by comparing the individual tests of a test series with each other. For this purpose, the correlation program was created.

Benefit from the power of graphics and get a quick survey over a test series by correlating all tests in a single diagram. With a simple keystroke, you get statistical calculations like

- mean values
- standard deviation
- minimum and maximum values

of all measuring values which can be plotted in clear color diagrams.

Provided the test parameters of all individual tests were kept constant, such a correlation makes deviations from certain preset values evident at a glance.

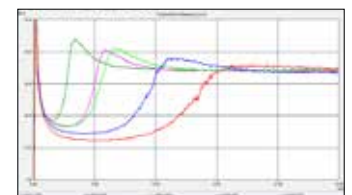
Get even more information from these statistical calculations by comparison with a reference curve. In a first step, this reference curve is created from the mean value curve and the envelope curve of the correlated tests. In a second step, you can edit this reference curve according to your specific needs. By comparing a measured Plastogram with this reference curve, you can easily recognize whether your sample material meets certain criteria or not.

With such reference curves, you have the ideal tool on hand for incoming and final inspections as well as for quality control parallel to production.

Furthermore, the correlation enables a statistical comparison of the individual evaluation points. For each evaluation point, you get a separate table of the measuring values recorded in the test series. These tables also include the mean values and standard deviations for each measuring value. As this statistic evaluation may comprise up to 20 different tables, a summary table provides a quick survey of the results. Here, all measuring values are represented together with the mean values and standard deviations in a single table.

Of course, you can get a graphical representation of this statistical evaluation of your test data. A simple keystroke represents the percentages of deviation from the mean value as bars and enables quick assessment of a test series.

In contrast to a correlation, i.e. to a comparison of tests with all test parameters being kept constant, a comparison of tests where a single parameter is modified step by step (variation) reveals the influence of this parameter onto the curve and, thus, onto the material properties.



Variation diagram



Statistical evaluation of a variation (speed)

A snap shot function is standard for all graphics in the correlation software. With this function, you can easily import your diagrams into other Office applications.

... where quality is measured.

# Measuring Mixers

## Additional equipment

Brabender offers a wide range of additional equipment and options for the different measuring mixers in order to provide for

- even better reproducibility of your measurements
- extension of the application range of your equipment
- more convenient handling

### Loading chutes

- Manual loading chutes for quick loading of free-flowing substances like PVC dry blends
- Pneumatic loading chutes for quick and reproducible loading of free-flowing substances, stripes, etc.

### Pressure rams

- for loading materials that are sensitive to heat and/or pressure
- for loading bulky materials (e.g. elastomer stripes)
- with bore for titrating liquids into the closed mixing chamber

### Further accessories

- Sealing cover for running tests under inert gas or for extracting gas and vapor accumulating in the mixer bowl during the test
- Gas flow detector
- Electric conductivity sensor
- Metering pumps/burets for titrating liquids into the mixer
- Heat resistant glass front plate for observing the mixing process in a 30/50 EHT measuring mixer (max. temperature 300 °C, glass front plate is not heated)
- Hastelloy (Ni-based alloy) mixer bowls and blades for highly corrosive materials (e.g. fluoropolymers)
- Mixer bowls and blades with Brabender silver TiN coating for highly abrasive materials

### Pneumatic loading chutes

	For series 30 mixers	For series 50 mixers	For series 350 mixers
<b>Piston cross section</b>	12 x 23 mm	12 x 45 mm	20 x 79 mm
<b>Piston stroke</b>	200 mm	200 mm	200 mm
<b>Piston force at 5 bars (approx.)</b>	330 N	330 N	1600 N
<b>Max. operating pressure</b>	8 bar	8 bar	8 bar

## The Brabender support

Our state of the art application laboratory is always made available to our customers.

You can choose to send material to us for testing or schedule a specific Lab Trial with our expert team. In our application laboratory, you will have access to our full product line to help come to a solution for your application.



Brabender application laboratory



Heat resistant glass front plate



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