

Thermal Value Excellence



**Excellence**

**Melting Point Systems**

MP50

MP70

MP90



## **Automatic Melting Point Determination**

Simple, Efficient and Video-Recorded

**METTLER TOLEDO**

# Melting Point Determination

## Trustworthy, Automatic, Exact

**With the innovative METTLER TOLEDO melting point system, you are definitely on the safe side. You can determine the melting point or melting range very accurately. But the instruments can do a lot more: Investigate color changes, clear points and decomposition temperatures with video observation.**

### Conformity with current standards

Operation according to European and United States (USP) Pharmacopeias and the Japanese Industry Standard (JIS K0064) makes it easier to compare measurement values.

The instrument provides two different evaluation algorithms – the evaluation of a threshold value or the endpoint. In addition to the pharmacopeia mode, evaluations can also be performed thermodynamically. You can use capillaries with a diameter of up to 1.8 mm to ensure compliance with all standard methods.

### Unmatched measurement principle

Automatic measurement of transmission and visual camera observation in reflection guarantee that the melting points and melting ranges you determine are reliable.

Measurements can include conformity checks and printout of results in one simple step.

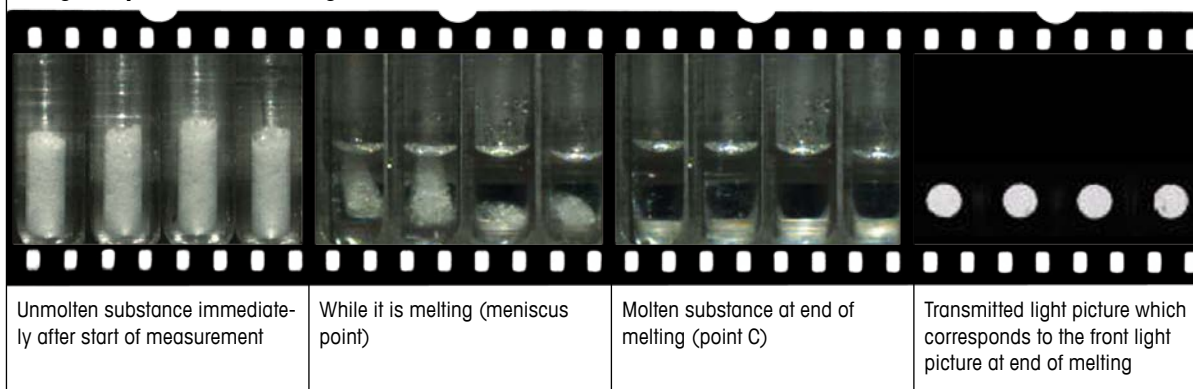
Alternatively, you can manually set evaluation points depending on the sample events that take place.

### Reliable results

The measurement principle and the possibility of eliminating obvious outliers from mean value determination guarantee excellent reproducibility without the need to repeat the measurement.

Statistical evaluation methods like averaging over several samples and standard deviation mean you can have full confidence in your data.

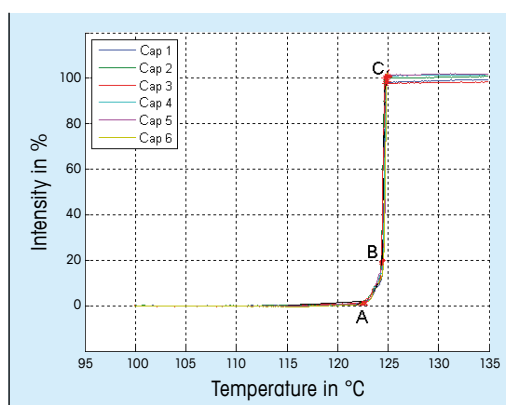
### Image sequence of a melting





#### Performance at a glance:

- **One Click™ and superior ergonomics** – quick to learn, easy to operate
- **Convenient playback of high resolution color videos** – offers maximum security
- **Simultaneous measurement of up to 6 samples** – increases productivity
- **Compliant to standards** – ensures trustworthy results



Intensity curve from transmitted light video versus temperature. The three marked points are start of melting A, threshold value B (here 20%) and end of melting C.

#### The melting point and its detection

The melting point is a characteristic property of a substance. It is the temperature at which the crystalline phase of a substance changes to the liquid state. A pure substance normally has a sharp melting point, whereas an impure substance melts over a temperature range that is lower than the melting point of the pure substance (melting point depression). Some organic compounds will however melt irreproducibly due to decomposition.

Melting point determination is used in research and development as well as in quality control to identify and check the purity of a wide range of substances.

If a sample is heated at a constant rate in a capillary, the transmission of light through the sample and hence the light intensity measured by a sensor (the camera) changes with increasing temperature. The sample is considered to have melted when a predefined level of light transmission is reached.

# Determine the Melting Point with just One Click™

- **One Click™ Melting Point**
- **Fatigue-free Analyses**
- **Easy to use**

## One Click™ results

Melting point determination has never been so easy!

The color touch screen allows one finger intuitive operation, provides clear information for the user, and can be easily seen from a distance. Just One Click™ is all that is needed to start the measurement – the instrument does the rest for you.

While the measurement is being performed, you can attend to other important tasks.

## Superior ergonomics

High priority was given to thoughtful instrument design to ensure optimum ergonomics. Features like a small instrument footprint, color touch screen and rotatable protection lid are distinct advantages resulting from this unique concept. This enables you to perform measurements very easily without experiencing fatigue. In addition, you can conveniently set any one of several different languages and work in your own native tongue.

## Intuitive operation

The operating concept is fast and easy to understand and offers simple operating routines.

It provides the same ease of use as other innovative METTLER TOLEDO laboratory instruments.

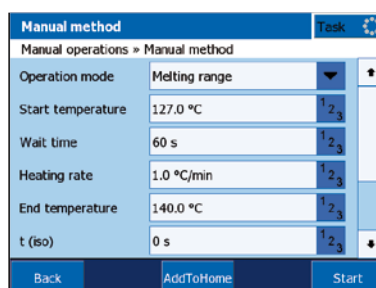
The following sequence of images illustrates a typical analysis



For sample preparation the dry powdery substance is ground in a mortar and filled into the capillaries, which are then inserted into the furnace.



The MP50 start screen. The pharmacopeia operating mode has been set. Once programmed the shortcut key "Urea" could be used to start the measurement immediately.

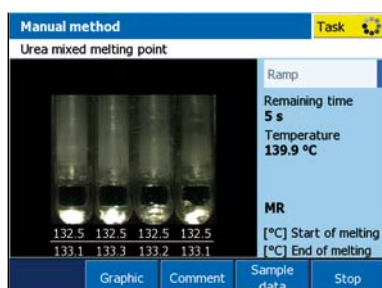


In "Manual method", set the start and end temperatures and heating rate according to the method in the Pharmacopeia. Insert the capillaries and start the measurement.





Scan the QR code with a smart phone and enjoy one-click-melting.



When melting is completed, the instrument signals the end of the measurement with an acoustic tone and displays the measured temperatures.

### Simple determination of identity and purity

A standard procedure used in the pharmaceutical industry to identify starting materials is the determination of melting temperatures. With the MP50 melting point system, you can test organic solids with a defined melting point up to a maximum temperature of 300 °C. The instrument provides a rapid and exact method for automatic, unattended melting point determination. Fill capillaries with the reference substance, the substance under investigation and a mixture of the two substances. A melting point depression observed even if the purity level is only slightly different guarantees that substances are correctly identified.

# High Quality Sample Observation Maximizes Sample Information

- High resolution color videos
- Replay on the instrument
- Comprehensive documentation

## Watch every single crystal melt

High resolution color videos allow you to study melting effects even with substances that are colored or decompose. You can also detect thermochromic effects.

With more than 6x zoom, one can obtain detailed information on the behavior of very small samples. This is of great value, especially in the research and development of fine and specialty chemicals and for the characterization of new pharmaceutically active substances.

This melting point system satisfies the requirements of standard methods that need visual observation.

## Easy to check results

Never miss a melting point again. Unattended measurements do not result in loss of visual data. The high resolution color videos can be repeatedly replayed on the instrument. This allows you to check unexpected results by visually reviewing measurements.

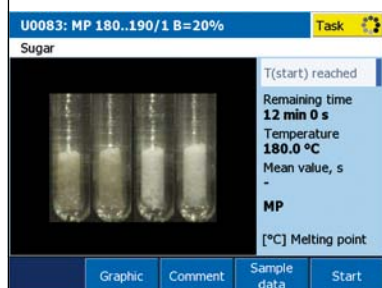
The instrument shows the video, intensity curve and results on a full VGA color screen in high resolution.

## Maximum information

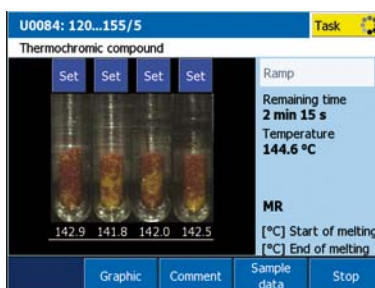
Get the maximum information possible from your measurements. The MP70 fulfills this need and offers easy data archiving. Video files can be easily transferred to the computer as standard AVIs via an SD memory card.

Thus, there is no limit to the number of videos you can archive. Replay is possible with commonly available video software.

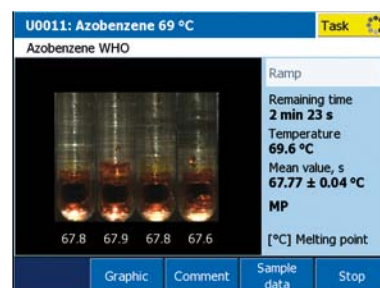
## Examples of challenging samples



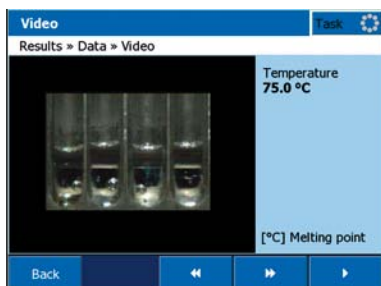
Decomposing substance, right ones undecomposed



Thermochromic transition



Colored substance



Air bubbles

### Secure characterization of precious substances

In chemical synthesis laboratories, newly synthesized substances have to be quickly and accurately characterized. This is routinely done by determining the melting point. Nothing must be left to chance because the substances are usually only present in very small amounts and are therefore very precious.

The magnified visual observation opens up new dimensions in sample analysis.

The measurement is not lost if automatic evaluation did not determine a melting point due to the behavior of the substance or poor sample preparation. A correct value can still be obtained by replaying the video and eliminating any outliers from the statistical results.



# Increased Efficiency Through Simultaneous Determination

- Efficient measurement and documentation
- Intelligent method management
- Optimized handling

## Measure rapidly and economically

You can achieve high throughput by simultaneously determining up to 6 samples in one run. One Click™ enables you to start quickly after sample preparation. Short heating and cooling times allow you to perform more analyses in the same amount of time. The storage of results as a PDF file or by exporting as an ASCII text file ensures data security.

## Flexible and adaptable methods

Perform different measurement tasks rapidly and efficiently by working with up to 60 stored methods. These include simple calibration routines that ensure your instrument is performing properly. Easily check your product for conformity using the substance database that is incorporated within the instrument. This convenient feature allows you to add your own substances and acceptable temperature limits.

## Simplified Sample Handling

Rapid sample preparation and quick sample insertion can help you to save time and money. An innovative sample preparation tool specially developed for the Excellence melting point systems holds up to six samples. This simplifies the correct filling, storage and simultaneous insertion of multiple capillaries.

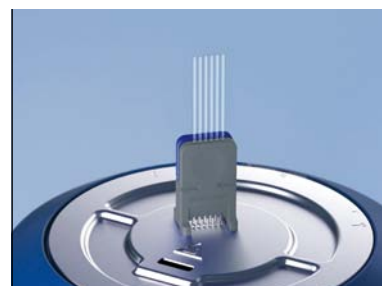
### Contributions to efficiency increase



Data output

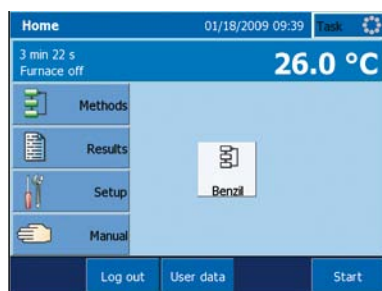


Method database



Rapid sample preparation





One Click™

### High throughput analysis

A quality control laboratory might have to determine the melting points of up to 25'000 samples in a year.

In this case, the MP90 melting point instrument offers unique possibilities for saving time and money in the routine analysis of substances.

Faster sample handling using the sample preparation tool, one click operation, and twice the usual number of samples measured simultaneously – these unique advantages offer a real and effective reduction in analysis time when compared with other instruments.

The numerous possibilities for reporting results, whether on a strip- or Ethernet printer, by creating PDF files or exporting text files, together with the user identification system guarantee a high level of data security and a working environment conforming to GLP.

# Always the Right System for Your Requirements

The **METTLER TOLEDO** product portfolio for melting point determination consists of three different systems. The table below illustrates the incremental difference between the models.

## MP50 – Simply to the point

Everything you need for automatic melting point determination.

- 4 samples can be measured in parallel
- Gray scale display of up to 30 minutes of video
- Replay on the instrument
- 12 One Click™ Short Cuts
- User identification
- Optional IQ/OQ available

## MP70 – best choice

### for maximum flexibility

Additional possibilities through optimum visual observation

- Color video recording of up to 300 minutes in length
- 2 manually set evaluation points
- Export possibilities on an external SD card
- 12 One Click™ per user
- Memory for up to 20 user-defined methods
- 5 substances in reference database
- Automated calibration procedure
- PDF storage on a USB flash drive or direct transfer to a PC
- GMP-compliant access control
- LabX® PC Software connectivity

## MP90 – melting point

### determination at the highest level

Optimized for a wide range of tasks and high throughput


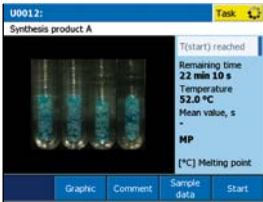

- 6 samples can be measured in parallel
- Wide temperature range from room temperature to 400 °C
- Last 100 results are stored internally
- 60 methods can be stored
- 5 pre-programmed methods
- Reference database incorporated for up to 100 substances
- Direct transfer of PDFs and videos to a PC
- Modern connections: USB and Ethernet
- Delivered with comprehensive accessories
- LabX® PC Software connectivity

## Application table

Application	MP50	MP70	MP90
Melting point	•	•	•
Melting range	•	•	•
Purity determination	•	•	•
Decomposition temperature	◦	•	•
Solvent loss	◦	•	•
Sublimation	◦	•	•
Change in the crystal structure	◦	•	•
Sintering point	◦	•	•
Color change		•	•
Thermochromism		•	•
High throughput analysis			•

• suitable, ◦ partly suitable

## Comparison Table Excellence Melting Point Systems

			
	<b>MP50</b>	<b>MP70</b>	<b>MP90</b>
Measurement principle	Observation in reflection and transmission measurement	Observation in reflection and transmission measurement	Observation in reflection and transmission measurement
Temperature range	RT to 300 °C	RT to 350 °C	RT to 400 °C
Heating rate	0.1 to 20 °C per minute	0.1 to 20 °C per minute	0.1 to 20 °C per minute
Measurement accuracy 30 ... 200 °C	± 0.2 °C	± 0.2 °C	± 0.2 °C
200 ... max. temperature	± 0.5 °C	± 0.5 °C	± 0.5 °C
Heating time to T <sub>max</sub>	< 4 minutes	< 5 minutes	< 6 minutes
Cooling time to T <sub>max</sub>	< 6.5 minutes	< 7 minutes	< 7.5 minutes
Capillaries number	Up to 4	Up to 4	Up to 6
dimensions	< 1.8 mm	< 1.8 mm	< 1.8 mm
Display	5.7" VGA color touch screen	5.7" VGA color touch screen	5.7" VGA color touch screen
Languages	Chinese, English, German, Japanese, Spanish		
Video	Gray scale AVI Magnification 6x	Color AVI Magnification 6x	Color AVI Magnification 6x
Video run time	30 min	300 min	300 min
Replay on the instrument	Yes	Yes	Yes
Video export	No	on SD card	on an SD card or to a PC
One Clicks™ (Short Cuts)	12	12 per user	12 per user
Max. number of methods	—	20	60
Substance database	No	Up to 5 substances	Up to 100 substances
Number of permanently stored results	Last 10	Last 50	Last 100
Power	120 W	120 W	120 W
Dimensions WxLxH in cm	18x35x19	18x35x19	18x35x19
Weight in kg	4	4	4
<b>Standards complied with</b>	European Pharmacopeia (Ph.Eur.) 2.2.60		
	United States Pharmacopeia (USP) <741>		
	Japanese Industry Standard (JIS) K 0064		
	ISO 3146		
	ASTM D1519		

## Accessories

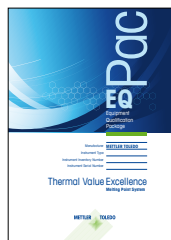
### MP Accessories box



### Application notes



### Service



### USB-P25 compact printer



### LabX® PC Software



# Whatever the Task

## We have the Right Answer

**METTLER TOLEDO manufactures a wide array of solutions for routine applications, quality assurance, and research and development. This is supported by competent assistance, extensive applications know-how and innovative accessories.**



### Thermal analysis

Complete range (DSC, TGA, TMA and DMA) of innovative, modular thermal analysis systems for almost any task in materials characterization.



### Density and refractive index

From simple portable meters to fully automatic multi-parameter systems, METTLER TOLEDO offers flexible solutions for density and refractive index measurements in the laboratory and on site.



### Titration

The Excellence family of titrators provides highly automated state-of-the-art solutions for a wide range of routine to complex titrations and Karl Fischer moisture content determination.



### Halogen moisture instruments

The METTLER TOLEDO halogen moisture instruments are made for fast and reliable moisture analysis in laboratory and production environments.



### Pipettes, Tips and Services

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