

No vibration in the cooled incubator

The perfect ice cream has a creamy consistency without water crystals and melts smoothly and slowly. Thanks to the Meltdown Analyzer TC 1 of the Swiss company Certa Fides GmbH, ice cream manufacturers can now exactly analyse and document the ice cream melting behavior.

In cooperation with the **Memmert** R&D department, the food engineer and **Certa Fides** CEO Adrian Dürig made an invention of the Food Process Engineering laboratory of the ETH Zürich (ETH ZH) in Switzerland, headed by Prof. E-J Windhab, ready for industrial series production.

On the tracks of ice cream melting behavior

Ice cream manufacturers are challenged by a number of issues in their everyday work. On the one hand, the raw



Thanks to the absence of vibration in the climate chamber Peltier technology, ice cream can melt without any mechanical disturbance



material has to be as natural as possible. On the other hand, they cannot afford making compromises in melting behavior. A dripping water ice is just as unmarketable as **ice cream** liquefying almost immediately. So far, suitable measurement systems necessary for avoiding those unacceptable product properties in development and production were often not available. With the meltdown analyzer, **Memmert** and **Certa Fides** have brought an economically viable ready-to-use solution to the market.



The perfect ice cream has a creamy consistency and melts slowly

The stability of ice cream is influenced by a multitude of parameters

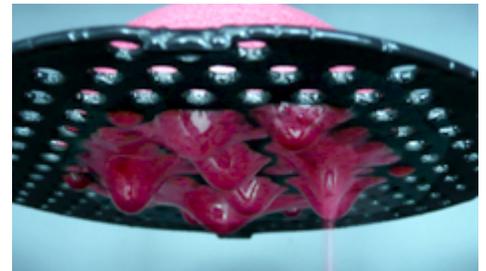
Scientific literature provides an explanation why the preparation of **ice cream** is still considered an art. Depending on the flavour, milk or butterfat, cream, egg, water, sugar, vegetable fats, fruits, flavourings, additives as well as emulsifying and stabilising agents are processed in several steps. In the first step, the ingredients are mixed together to form a mass, which is then homogenised, pasteurised and cooled down to the desired temperature. Ripening takes place by stirring the mass for several hours. Temperature-sensitive ingredients like flavourings are often not added before this production step. Subsequently, the mass is strongly whipped and air is introduced. Finally, the **ice cream** is filled into containers and frozen (typically at $-40\text{ }^{\circ}\text{C}$) in such a way that it keeps its consistency.

With so many ingredients, temperatures and mechanical forces having an effect on the raw mixture, changing a single parameter can already have a decisive influence on the quality of **ice cream**. The stability that keeps ice cream from melting or collapsing too quickly and subsequently leads to a slow meltdown is guaranteed due to fat agglomerates stabilising the surface of the air bubbles. The fat agglomerates and air bubbles are created simultaneously, while whipping the mass. The way ice cream melts at room temperature is called melting behavior. For those interested in digging into the molecular structures of ice cream and whipped cream, Prof. H. Douglas Goff from Guelph University offers an [informative overview of the structure of ice cream](#).

Standardised monitoring in the cooled incubator

The **Certa Fides Meltdown Analyzer TC 1** enables **ice cream** manufacturers and their suppliers to perform standardised **ice cream melting experiments** at defined temperatures. The main requirements the **climate chamber** has to fulfill are sensitive, uniform and fluctuation-free temperature control on the one hand and avoiding mechanical impacts with a compressor while, on the other hand, maintaining the same homogeneous conditions for all samples. Due to the absence of **vibration** and precise controllability of the **Peltier technology** used for heating and cooling, the equipment of choice is the **Memmert cooled incubator IPP 500**. The control electronics was developed by **Memmert**, with **Certa Fides** providing the application-specific components like weighing cells, cameras and illumination units as well as comprehensive measuring and evaluation software.

Measurement preparation, the measurement itself and data evaluation are performed with a software specifically developed for this application. In the inner chamber, four sample holders are attached to the weighing cells, where the standardised ice cream samples can melt slowly. With an interval of several seconds, each ice cream sample is weighed, the ambient air temperature measured and a picture is taken with a camera, while the humidity in the measurement chamber is monitored. These so-called raw data form the basis for calculating the product characteristics of form and foam stability and dripping behavior. The calculated data can be graphically represented, exported and printed as a report. The synchronous combination of weight and image analysis enables the user to draw more conclusions on the internal structure of the ice cream than it would be possible with separate weight and image analyses.



Controlled melting of ice cream in the Memmert cooled incubator

Vacuum drying of milk powder

Vacuum drying is part of the basic training in nutritional science and food technology studies. At the TU Weihenstephan, students get acquainted with the method in experiments using the Memmert vacuum drying oven VO.

[more information](#)

For more information on the Meltdown Analyzer, go to www.certafides.ch.

For inquiries on **Memmert custom** products, contact myatmosafe@memmert.com.

Overview of focal topics

- Material test
- Low vibration
- Meltdown
- Ice cream, whipped cream
- Climate chamber
- Cooled incubator

Cooling laboratory equipment

[Cooled incubator IPP](#)

[Climatic test chamber CTC](#)

[Constant climate chamber HPP](#)

[Climate chamber ICH](#)

Picture credits: Certa Fides, Memmert, [QuintanaRoo](#)
licensed under [Creative Commons](#)

Autor: Memmert GmbH + Co. KG

www.atmosafe.net > [Applications](#) > [Material testing](#) > [Ice cream meltdown](#)

AtmoSAFE is a brand of Memmert GmbH + Co. KG
Copyright © 2009 Memmert GmbH + Co. KG.
All Rights Reserved.



memmert
Experts in Thermostatics