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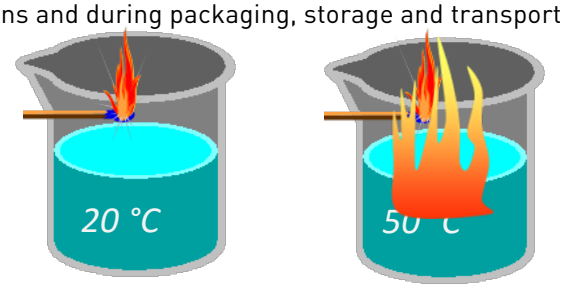
# Flash point

As is commonly known, many organic liquids like ethanol and gasoline are easily ignited with a flame. Time and again, this results in serious accidents due to fires or explosions.
Handling of flammable organic liquids or solutions is also common practice in industry.
The flash point is one important physiochemical parameter from which information can be deduced for safe handling of organic liquids or solutions both during handling in operations and during packaging, storage and transport.

The **flash point** is defined as the lowest temperature of the sample, corrected to a barometric pressure of 101.3 kPa (760 mm Hg), at which application of a test flame causes the vapor of the sample to ignite under specified test conditions.




The flash point therefore does not represent an inherent substance property, such as for instance the boiling point, but rather is dependent on the test method, test conditions and test apparatus. In principle, to determine the flash point the liquid is warmed in a suitable apparatus, then an ignition source is introduced (flame or glow wire) to test whether ignition results. If it does not, the liquid is heated further and the test with the flame is repeated. In general, these days only methods using closed cups are used to determine the flash point, since these provide more conservative data. Closed cups are also specified in the tests for classification according to the Global Harmonized System (GHS).

A distinction is meanwhile made between methods that work in a state of equilibrium and those in which no state of equilibrium is achieved during the measurement, but where instead the sample is continuously heated at a constant heating rate. For this reason, substance properties must be considered in selecting the determination method in order to ensure that the "suitable" flash point is selected for the specific problem or sample and that, based on this flash point, the liquid can be safely handled in operations or can be correctly classified for storage and transport.

Table 1 shows the most frequently used methods and their ranges of application.

*Table 1: Methods for determining flash point*

| Test method | DIN EN ISO 2719 (2002), Pensky-Martens | DIN EN ISO 13736 (2013), Abel | DIN EN ISO 3679 (2015), Rapid Tester | DIN EN ISO 1523 (2002), Abel equilibrium |
|---|---|---|---|---|
| **Type** | Closed cup, heating rate | Closed cup, heating rate | Closed cup, fast equilibrium | Closed cup, equilibrium |
| **Flash point range** | 40 to 300 °C | -30 to 75 °C | -30 to 300 °C | -30 to 110 °C |
| **Suitable for** | Liquids (also high viscosity) | Liquids | Liquids | Liquids |
| **Not suitable for** | Liquids containing low amounts of volatile substances that influence the flash point | | - | - |
| **Headspace/ liquid space** | 1 / 2-3 | 1 / 2-3 | 10 / 1 | 1 / 2-3 |

If you have questions about flash point determination, please contact us. Our experts will be happy to advise you.

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