

Flash Point Tests in the Cosmetics & Fragrance Industries

What is Flash Point?

The flash point test is a procedure in which a test specimen is introduced into a temperature controlled test cup and an ignition source is applied to the vapours produced by the test specimen.

The purpose of the test is to determine whether the vapour/air mixture is flammable or at what temperature the vapour/air mixture is flammable.

Why is Flash Point testing relevant to the cosmetics industry?

Flash point is the key parameter for ensuring compliance regarding safety and transportation for the cosmetics industry. This is applicable for all modes of transport and governed by their relevant legislative bodies, whether by air (IATA), rail (COTIF), road (ADR) or maritime (IMDG).

What are the CLP Regulations?

CLP (Classification, Packaging and Labelling of dangerous substances and preparation regulation) EC No 1272/2008, is the EU regulation by which the United Nations' Globally Harmonised System (GHS) of classifying and labelling chemicals is legally implemented in the EU to ensure that the hazards presented by chemicals are clearly communicated to workers and consumers through the correct classification and labelling of chemicals and products .

The legislation ensures global harmonisation regarding storage and transport of hazardous materials.



CLP implementation

In order to allow manufacturers and suppliers time to implement the new labelling legislations, CLP has been introduced in 2 phases:

Phase 1 - governing substances and replacing the former DSD (Dangerous Substance Directive), applicable by June 2015.

Phase 2 - governing mixtures and replacing the former DPD (Dangerous Preparations Directive), applicable by June 2017. Any added component to a substance or a mixture is subject to re-labelling and testing.



There are 4 main hazard categories:

Symbol				No symbol
Signal word	Danger	Danger	Warning	Warning
Hazard statement	Extremely flammable liquid and vapour	Highly flammable liquid and vapour	Flammable liquid and vapour	
Category	1 - flashpoint of <math><23^{\circ}\text{C}</math>, boiling point $\leq 35^{\circ}\text{C}$	2 - flashpoint of <math><23^{\circ}\text{C}</math>, boiling point of $>35^{\circ}\text{C}$	3 - flashpoint of $\geq 23^{\circ}\text{C}$ and $\leq 60^{\circ}\text{C}$	4 - flashpoint of $>60^{\circ}\text{C}$ and $\leq 93^{\circ}\text{C}$

Which products are controlled?

Cosmetics range from everyday hygiene products such as soap, shampoo, deodorant and toothpaste, to luxury beauty items. Perfumes, essential oils, dyes and scented cosmetics all fall under the category of cosmetic products which must be tested for their flash point in order to comply to CLP and GHS regulations for hazard content, storage and transportation. Fragrance or essential oils used in aromatic candles, also fall under this category.

The CLP flammable symbol

Products are assigned hazard "classes" which must be identified on the product using an internationally recognised system of labels. The label is the primary source of information about the product's identity, safe use, transport, storage and disposal measures to be taken during use and in case of emergencies. Further information must be recorded on a "MSDS, Material Safety Data Sheet" which, by law, must accompany a hazardous product.

CLP regulations include new hazard pictograms which categorise a product by type and packing group to indicate the risk associated with the material inside. This determines whether the material carries a hazard label and requires special packaging.



Product classification errors

Dangerous materials which have frequently been shipped incorrectly include an array of cosmetics such as perfumes, nail polish and lipstick as well as aerosol cans. Cosmetic products often contain numerous ingredients and it is the manufacturers' responsibility to assess their flammability/hazardous nature to ensure storage and shipping regulations are met.

For example, determining the flash point of fine fragrances which contain Ethanol is essential both for the design of the manufacturing process and in order to meet dangerous goods regulations for storage and shipping. The information provided by the material supplier may be incorrect and result in hefty fines for the cosmetic manufacturer. The danger in relying upon information provided by the material supplier is this may be incorrect and result in serious penalties for cosmetic manufacturers. Testing for flash point not only assists a business in complying with hazardous regulations and supports HAZMAT by identifying a material's precise flash point, it may actually classify a substance into a lower flammable category thus saving costs!

For example, pure ethylene glycol has a flash point of 111°C which is reduced to 29°C when acetaldehyde at a level of only 2% is present.



What are the implications of non-compliance?

It is a criminal offence to fail to comply with CLP regulations which can result in fines and / or imprisonment. Cosmetic companies may put themselves at risk of incurring significant losses each year because of hazardous shipping violations and the consequences of not undertaking due diligence. This includes training their employees regarding HAZMAT (hazardous materials).

In the USA, the maximum civil penalty for violating hazardous material transportation laws has increased from \$ 55,000 to \$ 75,000, whilst violations which result in death, serious illness or serious injury to any person, or substantial destruction of property, have exceeded \$250,000. CLP is enforced by the National Health and Safety authorities in each EU country as well as by their relevant local trading officers.

How to avoid financial penalties

To avoid fines, packages containing hazardous materials should be labelled appropriately before shipping. Law mandates that one member of a company must have attended a training / certification course which meets the Department Of Transportation (DOT) and International Air Transportation Administration (IATA) requirements. This person is then accountable for ensuring that all those involved in shipping hazardous materials are aware and trained in the correct procedures for shipping and labelling of hazardous materials.

How Flash Point assists in CLP compliance

The measurement of flash point is specified in standards issued by ISO, CEN, ASTM and others.

These standards specify flash point values used for quality control purposes as well as for ascertaining the flammability risk.



By identifying the flash point or flammability of a liquid or semi solid substance or mixture, suppliers can correctly classify their hazard potential. The lower the flash point temperature, the greater the risk. Furthermore, a change in flash point may indicate the presence of potentially dangerous volatile contaminants or the adulteration of one product by another.

Manufacturers are advised to consult with the relevant local authorities to establish appropriate actions required to fulfil HAZMAT due diligence obligations. All cosmetic products supplied in the EU, whether for consumer or professional use, must comply with European Cosmetics Regulations which include testing flash point as a vital parameter.

Useful links

www.hse.gov.uk/chemical-classification/legal/clp-regulation.htm

www.gov.uk/guidance/product-safety-for-manufacturers

www.ctpa.org.uk

www.stanhope-seta.co.uk/flashpoint-testing.asp