Lubricant Oils as a Certified Reference Material for Cleveland Open Cup Flash Point Testers

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Abstract: The flash point is an important indicator for the flammability of the liquid materials and also in the development of safe practices for handling and storage of these materials. The production of certified reference materials is essential to guarantee the performance of the flash point measurement apparatus so that it can be trusted and acceptable for its intended use. In this work lubricant oils of high molecular weight hydrocarbons (HM1, and HM2) were tested as certified reference materials in accordance with ISO guide 34 and 35 by using the high flash point temperature detector Cleveland-open cup as per ASTM D-92. The selected oils were tested for uncertified properties like pour point, viscosity, cloud point, density, and total acid number. The thermal analysis techniques DSC, and TGA were used to ensure the thermal stability of the lubricant oils and its ability to be used as high temperature flash point reference material. The certified value of the flash point temperature was assigned upon evaluation of the data acquired in an inter-laboratory comparison involving expert laboratories using the same measurement method. The certified values of the candidate reference materials with expanded uncertainty (coverage factor K = 2, approximate 95% confidence level) calculated using the results of the characterization, calibration (organizer lab), homogeneity, and stability assessment were 232 ± 9 C for HM1, and 242 ± 10 C for HM2.

Keywords: Flash point; Homogeneity; Inter-laboratory; CRM; Cleveland open-cup