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Limits for volatile organic compounds content in cleaning agents

清洗剂挥发性有机化合物含量限值

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Limits for volatile organic compounds content in cleaning agents

1 Scope

This Standard specifies the product classification of cleaning agents, limit requirements, inspection methods and packing marks of volatile organic compounds (VOC).

This Standard applies to cleaning agents containing volatile organic compounds and produced and used in industrial production and service activities.

This Standard does not apply to cleaning agents used in aerospace, nuclear industry, military industry and semiconductor (including integrated circuit) manufacturing.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

GB/T 4472 Determination of density and relative density for chemical products

GB/T 6283 Chemical products - Determination of water Karl Fischer method (general method)

GB/T 6680 General rules for sampling liquid chemical products

GB/T 13173-2008 Surface active agents - Detergents - Testing methods

GB/T 23990-2009 Determination of the contents of benzene, toluene, ethylbenzene and xylene in coatings by gas chromatography

GB/T 23992-2009 Determination of chlorohydrocarbon content in coatings - Gas chromatographic method

GB/T 23993 Determination of formaldehyde content of waterborne coatings

CARRY OUT according to the provisions of Clause 15 of GB/T 13173-2008, where the determination procedure of semi-water-based cleaning agents and organic solvent cleaning agents is revised as: Before the determination, it shall evaluate whether there is a safety risk in the determination process according to "Safety Data Sheet" (SDS) of cleaning agent products, and the test sample with a safety risk shall be equipped with an explosion-proof oven for determination; during the measurement, the weighing bottle containing the sample shall be placed in an open environment below the flash point temperature of the sample, and ventilate for 15 min ~ 30 min before putting into the oven; safety protection measures for the testers shall be taken during the determination process. Calculate the VOC content of cleaning agents according to formula (1):

$$\rho_{VOC} = (w_{volatile} - w_{water} - w_i) \times \rho \times 0.01 \quad \text{.....(1)}$$

where:

ρ_{VOC} - the VOC content of the cleaning agent, in grams per liter (g/L);

$w_{volatile}$ - the mass fraction of volatile substances in the sample test solution, %;

w_{water} - the mass fraction of water in the sample test solution, %;

w_i - the mass fraction of deductible substance *i* in the sample test solution, %;

ρ - the density of the sample test solution, in grams per liter (g/L);

0.01 - the conversion factor.

NOTE: *i* refers to substances such as p-chlorobenzotrifluoride, 1,1,1,3,3-pentafluoropropane (HFC-245fa), 1,1,1,3,3-pentafluorobutane (HFC-365mfc), 1,1,1,2,2,3,4,5,5,5-decafluoropentane (HFC-4310me), cis 1,1,1,4,4,4-hexafluoro-2-butene (HFO-1336mzz-z), trans 1,3,3,3-tetrafluoropropene (HFO-1234ze), 1,1,2,2-tetrafluoroethyl-2,2,2-trifluoroethyl ether (HFE-347), methyl nonafluorobutyl ether 1,1,1,2,2,3,3,4,4-nonafluoro-4-methoxybutane (HFE-7100), ethyl nonafluorobutyl ether (HFE-7200). If the cleaning agent product contains these substances, their name, content and test method shall be clearly indicated. The conditions to be met by the test method are: the method's lower limit of determination is ≤ 0.01 %, and the method's repeatability relative standard deviation is < 10 %.

6.3.4 Determination of formaldehyde

CARRY OUT according to the provisions of GB/T 23993.

6.3.5 Determination of the sum of benzene, toluene, ethylbenzene and xylene

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