



HARMONIZED SYSTEM
COMMITTEE

-
29th Session
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NC0554E1

O. Eng.

Brussels, 9 April 2002.

CLASSIFICATION OF A POLYURETHANE RESIN IN DIMETHYLFORMAMIDE

(Item IX.4 on Agenda)

I. BACKGROUND

1. The Secretariat recently received a letter from the Pakistani Customs Administration explaining a dispute that had arisen as to whether dimethylformamide was a volatile organic solvent in the context of the classification of a polyurethane resin in dimethylformamide and requesting the Secretariat to place this question before the HS Committee with a view to obtaining a ruling on the correct classification of the disputed goods.
2. According to the manufacturer's information, the product, with the tradename "WC 823", is a one component wet process polyurethane resin. The product contains [by weight] [by volume] polyol (15%), isocyanate (7%), glycol (8%) and dimethylformamide (70%). It is used in the production of artificial leather with a hard touch and high flexibility.

II. COMMENTS FROM PAKISTAN

3. "Polyurethane, in primary form, includes all polymers, produced by the reaction of polyfunctional isocyanates with polyhydroxy compounds, vide Explanatory Note to heading 39.09. Dimethylformamide, as per Hawley's Chemical Dictionary, 11th Edition, is a dipolar solvent, miscible with water and most organic solvents (except halogenated hydrocarbons). It is used as a solvent for vinyl resin and acetylene etc. According to the Kirk-Othmer Encyclopedia of Chemical Technology, 3rd Edition, Vol.II, page 267, the wire enamels, based on polyamides, polyurethane and others, are also produced with dimethylformamide as a solvent.
4. In terms of Note 4 to Chapter 32 and Note 2 (d) to Chapter 39, the solutions consisting of any of the products specified in headings 39.01 to 39.13 in volatile organic solvents are classifiable in heading 32.08 if the weight of the solvent exceeds 50% of the weight of solution. If the weight of the volatile organic solvents does not exceed 50% of the weight of solution, the goods attract classification under headings 39.01 to 39.13, depending upon the nature of the polymer.

Note : Shaded parts will be removed when documents are placed on the WCO documentation database available to the public.

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5. The definition of volatile organic solvents is not given in the Explanatory Notes to the Harmonized System. However, the [Pakistan] Customs laboratory used to treat all the organic solvents as volatile and based their findings on the definition of "volatility" in the Condensed Chemical Dictionary which describes volatility as tendency of a solid or liquid material to pass into a vapour state.
6. The other view is that the under reference organic solvent is non-volatile on the following grounds :
- (i) It has boiling point 153°C and flash point 136°F.
 - (ii) The Condensed Chemical Dictionary defines that combustible materials are those whose flash point is greater than 100° F. Conversely it means that the products having flash point below 100°F are volatile.
 - (iii) According to the Encyclopaedia of Chemical Process Industries by Jaffery R. Stewart EDN 1956, page 740, the term volatile is used to indicate the relative rapidity of evaporation of any solvent. Any material, which evaporates faster than distilled water, is considered as being volatile.
 - (iv) The term volatility in adhesive and protective coating industries denotes the property of a material which causes it to evaporate or vaporize by heating and exposure to the normal atmosphere. The product dimethyl formamide, having boiling point 153 °C and flash point 136 °F, falls within the definition of non-volatile, as it evaporates at higher temperature than the distilled water.
7. In view of the foregoing, the term "volatile" for the purpose of classification of products under heading 32.08 or headings 39.01 to 39.13 needs to be defined."

III. SECRETARIAT COMMENTS

8. The main issue is to determine whether dimethylformamide could be considered to be a volatile organic solvent within the context of Note 4 to Chapter 32 and Note 2(d) to Chapter 39.
9. Hawley's Condensed Chemical Dictionary (Twelfth Edition), describes "volatility" as follows :
- "The tendency of a solid or liquid material to pass into the vapor state at a given temperature; specifically, the vapor pressure of a component divided by its mole fraction in the liquid or solid."
10. According to the Merck Index (Twelfth Edition), dimethylformamide is used as a solvent for liquids and gases and also in the synthesis of organic compounds. Furthermore, it is used whenever a solvent with a slow rate of evaporation is required.

11. Hawley's Condensed Chemical Dictionary indicates evaporation as being the change of substance from the solid or liquid phase to the gaseous or vapor phase. The rate of evaporation of liquids varies with their chemical nature and with the temperature; in general, organic liquids (benzene, gasoline) evaporate at a lower temperature and higher rates than water.
12. According to Ullmann's Encyclopedia of Industrial Chemistry (Sixth Edition), a polyurethane is usually used as a coating material for the production of compact film leather imitates. Ullmann's further indicates as follows.

"The coating material, usually a polyurethane, is dissolved in a water-miscible solvent (e.g., dimethylformamide) and spread on a textile carrier. The coating hardens as the solvent is gradually displaced by water. The water-insoluble coating coagulates to give porous film. This method is used, for example, to produce a moisture-storing base layer which can be covered with a compact covering layer by the reverse method. Leather imitates of this type are used in the shoe industry."
13. Based on the information provided by the **Pakistan** Customs Administration, the exact application of the product in question is not clear. However, based on the above information (paragraphs 9 to 12), the Secretariat considers that the product is used as a coating material for making artificial leather (leather imitates).
14. In the case of coatings, as the solvent evaporates, film formation occurs and a continuous, compacted film develops (Kirk-Othmer Encyclopedia of Chemical Technology, 4th Edition, Vol.14). The Explanatory Note to heading 32.08, Part C, indicates that the expression "volatile organic solvents" also includes solvents having a relatively high boiling point, e.g., turpentine. Consequently, the Secretariat is of the view that the high boiling point of dimethylformamide is not relevant in this context (Note 4 to Chapter 32 and Note 2(d) to Chapter 39) as far as dimethylformamide serves as a volatile organic solvent.
15. The Secretariat believes that dimethylformamide is used as a volatile organic solvent in this one-component polyurethane system. Furthermore, it may be used in the product due to its slow rate of evaporation.
16. The **Pakistan** Customs Administration has not indicated whether the percentages of individual components shown in the manufacturer's information represent weight or volume. However since dimethylformamide content was indicated to be 70%, the Secretariat assumes that the weight of the solvent exceeds 50% of the weight of the solution. The Secretariat is therefore inclined to classify this product in heading 32.08 (subheading 3208.90) by application of GIR 1 (Note 4 to Chapter 32 and Note 2 (d) to Chapter 39).
17. The **Pakistan** Customs Administration may wish to clarify the points raised above to facilitate the examination of this product by the Committee.
18. The technical information cited above will be made available to delegates at the meeting.

III. CONCLUSION

19. The Committee is requested to take account of the above comments by the Pakistani Administration and the Secretariat in examining the classification of the product in question and to determine what further action should be taken in this regard.

One-component wet process polyurethane resin containing, [by weight] [by volume] polyol (15%), isocyanate (7%), glycol (8%) and dimethylformamide (70%), used in the production of artificial leather with a hard touch and high flexibility.
