

SCIENTIFIC SUB-COMMITTEE

40.207 E

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11th Session

O. Eng.

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SC-3

Brussels, 13 May 1996.

PROPOSAL BY THE EC FOR THE AMENDMENT OF HEADING 25.07

(Item II.5 on Agenda)

Reference documents :

40.038 (RSC/13)

40.180 Annex C/15 (RSC/13 - Report)

I. BACKGROUND

- 1 The Review Sub-Committee at its 13th Session examined a proposal by the EC to create new subheadings for "kaolin" and "other kaolinic clays" under heading 25.07.
- 2 The Delegate of Canada, expressing no objection in principle to the proposal, indicated that there might be difficulties in distinguishing between kaolin and other kaolinic clays. She also suggested that the classification of calcined kaolin and kaolinic clays be clarified, perhaps by the creation of a separate subheading for these products.
- 3 The EC Delegate expressed that, according to the chemists he had consulted within the EC, there was no particular problem in distinguishing between kaolin, which was a single clay substance, and other kaolinic clays which consisted essentially of Kaolinic minerals.
- 4 The Review Sub-Committee agreed to ask the Scientific Sub-Committee (a) to provide objective criteria for distinguishing between kaolin and other kaolinic clays, and (b) to determine the role of calcination and its effects on these products.

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II. SECRETARIAT COMMENTS

Objective criteria for distinguishing between kaolin and other kaolinic clays :

- 5 According to the Explanatory Note to heading 25.07, the main constituents of kaolin and other kaolinic clays are kaolin minerals such as kaolinite, dickite and nacrite, anauxite, and halloysite-endellite. Kaolin, also known as Chine clay, is a high grade, white or nearly white clay.
- 6 The Secretariat has gathered the following additional information concerning kaolin and other kaolinic clays from technical literature ("Ullmann's Encyclopedia of Chemical Industry", volume A7, pp. 113-115); "Britannica Micropedia 6", p. 730 and "Macropaedia 24", pages 207-209; and "Elements of Mineralogy", B. Mason and L.G. Berry", pages 440-443) :
 - 6.1. "Kaolin" in its natural state is a white, soft powder consisting principally of the mineral kaolinite (hydrous aluminium silicate), which, under the electron microscope, is seen to consist of roughly hexagonal, platy crystals ranging in size from about 0.1 micrometre to 10 micrometres or even larger. These crystals may take vermicular and booklike forms, and occasionally macroscopic forms approaching millimetre size are found. Many large kaolin deposits are essentially pure and require little concentration during preparation for market. Most, however, are slightly off-colour and require beneficiation to improve the brightness and whiteness and to control the particle size.
 - 6.2. "Kaolinite" the commonest of four polymorphs, the others being dickite, nacrite, and halloysite. Dickite and nacrite are rare, halloysite moderately common. The polymorphs differ in stacking of the basic structural unit (the kaolin unit), which consists of a tetrahedral layer united with gibbsite-type layer. Regular sequences of one, two, and six kaolin layers are found in kaolinite, dickite and nacrite, respectively. Halloysite is made up of an irregular sequence of kaolin layers. It is characterized by its tubular nature in contrast to the platy nature of kaolinite particles. Anauxite, which was previously regarded as a kaolinite-group mineral possessing a higher than usual silica-alumina ratio, is now considered to be kaolinite and free silica (mainly noncrystalline).
 - 6.3 The specific clay minerals are identified by several techniques, including X-ray diffraction, differential thermal analysis, electron microscopy, and infrared spectrometry.
- 7 Taking the different structural characteristics of kaolinic

minerals and the availability of different identification methods into account, there seems no particular difficulty in distinguishing between kaolin and other kaolinic clays. However, the Secretariat leaves the establishment of an objective criteria for such distinction to the Sub-Committee.

The role of calcination and its effects on kaolin and other kaolinic clays :

- 8 According to "Ullmann's Encyclopedia of Chemical Technology", volume A7, p. 124;
- 9.1. Calcining is one of the several special processes that are used to produce special grades of kaolin.
- 9.2. One grade is thermally heated to a temperature just above the point where the structural hydroxyl groups are driven out as water vapour, which is between 650 and 700 °C. This produces a bulky product that is used as a paper coating additive to enhance resiliency and opacity in low basis weight sheets.
- 9.3. A second grade is thermally heated to 1000 - 1050 °C. By proper selection of the feed kaolin and careful control of the calcination and the final processing, the abrasiveness of the calcined product can be reduced to acceptable levels. The brightness of this fully calcined, fine particle kaolin is 92-95 %, depending on the feed material. It is used as an extender for titanium dioxide in paper coating and filling and in paint and plastic formulations.
- 9 Though the purpose of calcination is technically explained as the production of special grades of kaolin, the Secretariat requests the Sub-Committee to clarify whether calcined products can also be distinguished from uncalcined products by the methods mentioned in paragraph 6.3 above, on the possibility of creation of separate subheadings for these products as suggested by Canada.

III. CONCLUSION

- 10 Taking the Secretariat's comments above into account, the Sub-Committee is requested to :
- (a) provide objective criteria for distinguishing between kaolin and other kaolinic clays; and
- (b) determine the role of calcination and its effects on these products.
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