United States Court of Appeals for the Federal Circuit

2007-1020

DEGUSSA CORPORATION,

Plaintiff-Appellee,

v.

UNITED STATES,

Defendant-Appellant.

Frederic D. Van Arnam, Jr., Barnes, Richardson & Colburn, of New York, New York, argued for plaintiff-appellee. With him on the brief was Eric W. Lander. Of counsel was Rufus E. Jarman, Jr.

Bruce N. Stratvert, Attorney, Commercial Litigation Branch, Civil Division, United States Department of Justice, of New York, New York, argued for defendant-appellant. With him on the brief were Peter D. Keisler, Acting Attorney General, Jeanne E. Davidson, Director, of Washington, DC; and Barbara S. Williams, Attorney in Charge, International Trade Field Office, of New York, New York. Of counsel on the brief was Chi S. Choy, Office of Assistant Chief Counsel, International Trade Litigation, United States Customs and Border Protection, of New York, New York.

Appealed from: United States Court of International Trade

Senior Judge Thomas J. Aquilino, Jr.

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Plaintiff-Appellee,

v.

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DECIDED: November 26, 2007

Before SCHALL, Circuit Judge, CLEVENGER, Senior Circuit Judge, and MOORE, Circuit Judge.

MOORE, Circuit Judge.

The United States Customs Service (Customs) classified Degussa Corporation's (Degussa) surface-modified silicon dioxide products under Heading 3824 of the Harmonized Tariff Schedule of the United States (HTSUS), thereby making them subject to a five percent ad valorem tax. The United States Court of International Trade held that the subject products are properly classified under Heading 2811 of the HTSUS, which provides for "Silicon dioxide: Other" and are not subject to a duty tax. See Degussa Corp. v. United States, 452 F. Supp. 2d 1310 (Ct. Int'l Trade 2007). The government appealed. We conclude that because Degussa's products contain certain

impermissible impurities, they are not properly classified under Heading 2811 of the HTSUS, but rather under Heading 3824, as determined by Customs. Therefore, we reverse the judgment of the Court of International Trade.

BACKGROUND

The products at issue are surface-modified silicon dioxide.[1] Silicon dioxide (SiO_2) has a basic tetrahedral structure, where four oxygen atoms surround a central silicon atom ("silicon dioxide" is also known as "silica"). The SiO_2 stoichiometry of silica requires that each oxygen atom must be shared by silicon atoms in two tetrahedra. Because silicon atoms on the surface of natural, unmodified silicon dioxide are surrounded only by two, not four oxygen atoms, they are highly strained and react with water molecules present in the air to form silanol groups (Si-OH). The resultant surface of natural, unmodified silica contains both siloxane (O-Si-O) groups and silanol groups. The silanol groups on the surface of the silica cause the natural, unmodified silica to be hydrophilic (i.e., water-attractive).

The surface modification of silica in Degussa's products is a result of reacting silicon dioxide with certain silanes or silicone oil. The resultant surface comprises hydrocarbon moieties bonded to the silica surface and silanol groups. Depending on the silane used, the number of residual silanol groups on the treated silica surface is reduced by 30% to 70% as compared to the number of silanol groups on the untreated silica surface. In contrast to unmodified silica, the surface-modified silica is hydrophobic (i.e. water-repellent). This surface modification does not affect the bulk properties of the

[1] There are several products at issue, for example: AEROSIL ® R202, AEROSIL ® R805, AEROSIL ® R812, AEROSIL ® R812S, AEROSIL ® R972, AEROSIL ® R104, and AEROSIL ® R976.

silica but it does change the surface, and concomitantly the moisture absorption (or wettability) of the particle. The Court of International Trade found the hydrophobic nature of the surface-modified particles "allows the particles to be incorporated into certain organic solvents and polymers faster and easier than hydrophilic [particles]." Degussa, 452 F. Supp. 2d at 1315.

Customs classified the product in question under Chapter 38, which specifically excludes "separate chemically defined compounds." HTSUS Chapter 38 Note 1(a). Degussa appealed the Custom's classification, asserting that its surface-modified silica is properly classified under Chapter 28, which includes "separate chemically defined compounds, whether or not containing impurities." HTSUS Chapter 28 Note 1(a). For its part, the government argued that Degussa's products were not properly classified under Chapter 28 because they did not contain permissible "impurities" within the meaning of Chapter 28 Note 1(a). The government noted the provision of the Explanatory Note to Chapter 28 Note 1 stating that when substances from the manufacturing process "are deliberately left in the product with a view to rendering it particularly suitable for specific use rather than for general use, they are not regarded as permissible impurities . . . ." The government argued that the carbon containing moieties in Degussa's products were "deliberately incorporated in, and left in, the products, with the view to rendering them particularly suitable for specific use." That use was to render the product hydrophobic.

The Court of International Trade agreed with the government's description of Degussa's products. Degussa, 452 F. Supp. 2d at 1315. The court ruled, however, that the conditions or exclusions set forth in the Explanatory Note to Heading 2811

pertaining specifically to "(M) Silicon Compounds" were the only conditions or exclusions that apply to Silicon compounds. In other words, the trade court effectively found that when there are specific explanatory notes directed to particular compounds (like "(M) Silicon Compounds" or "(A) Compounds of Fluorine" or "(B) Compounds of Chlorine") these specific provisions become the exclusive provisions that apply to these compounds and that they trump all of the general conditions (such as the impermissible impurities) even if the general conditions are in no way inconsistent with the specific ones. As a result, the trade court found that even though the hydrocarbon moieties were impermissible impurities as defined by the Explanatory Note to Chapter 28 Note 1, this did not remove the product from Chapter 28. Id. Instead, the trade court reasoned that because the hydrocarbon moieties were not within the exclusions set forth in the Explanatory Note to Heading 2811 pertaining specifically to silicon compounds, the product was still properly classified under Chapter 28. Id. At the same time, the court stated: "Here, the plaintiff has borne its burden of proving that the bulk and the essence of each of its powders at issue are silicone dioxide, a separate chemically-defined compound." Id. Thus, the court apparently disregarded the surface chemistry of the surface-modified silicon dioxide. Based upon its analysis, the Court of International Trade held the surface-modified silica is properly classified under the eo nomine Subheading 2811.22.50, entitled "Silicon dioxide: Other." Id. at 1316.

The government appealed. We have jurisdiction pursuant to 28 U.S.C. § 1295(5).

ANALYSIS

The meaning of a tariff term is a question of law, reviewable de novo by this court, while the determination of whether a particular product fits within that meaning is a question of fact, reviewable for clear error. Nat'l Advanced Sys. v. United States, 26 F.3d 1107, 1109 (Fed. Cir. 1994).

I.

HTSUS General Rule of Interpretation 1 provides that, "for legal purposes, classification shall be determined according to the terms of the headings and any relative section or chapter notes . . . ." HTSUS General Rules of Interpretation, R. 1 (1990). The section and chapter notes are integral parts of the HTSUS, and have the same legal force as the text of the headings. HTSUS Chapter 28 Note 1(a) provides: "Except where the context otherwise requires, the headings of this chapter apply only to: (a) Separate chemical elements and separate chemical defined compounds, whether or not containing impurities . . . ."

The Explanatory Notes for HTSUS Chapter 28 provide insight as to the meaning of "separate chemically defined compounds." Explanatory notes are not legally binding but may be consulted for guidance and are generally indicative of the proper interpretation of a tariff provision. Motorola, Inc. v. United States, 436 F.3d 1357, 1361 (Fed. Cir. 2006).

Significantly, not all impurities in a compound qualify as impurities permissible within the meaning of Chapter 28 Note 1(a). The Explanatory Note for Chapter 28 Note 1 states:

> The term "impurities" applies exclusively to substances whose presence in the single chemical compound results solely and directly from the

> manufacturing process (including purification). The substances may result from any of the factors involved in the process and are principally the following:
>
> (a) Unconverted starting materials.
> (b) Impurities present in the starting materials.
> (c) Reagents used in the manufacturing process (including purification).
> (d) By-products.
>
> It should be noted, however, that such substances are not in all cases regarded as "impurities" permitted under Note 1(a). When such substances are deliberately left in the product with a view to rendering it particularly suitable for specific use rather than for general use, they are not regarded as permissible impurities.

Explanatory Notes at 261 (emphasis in original).

Moreover, the Explanatory Note for Chapter 28 Note 1 further states that "Such products with added water-repellents are, on the other hand, excluded [from Chapter 28] since such agents modify the original characteristics of the products." Explanatory Notes at 261 (emphasis in the original). The surface modification has changed the nature of the silica particle from hydrophilic (i.e. water-attractive) to hydrophobic (i.e. water-repellent). While Degussa argued during oral argument that its surface-modified silica is hydrophobic but not water-repellent, all of Degussa's own evidence contradicts this argument. In its literature, Degussa explains that the "R" in AEROSIL® R is taken from the word repellent and that the "R" should not be confused with the ® for "registered trademark." Degussa Corp., Technical Bulletin Fine Particles: Basic Characteristics of AEROSIL ® Fumed Silica Number 11 at 10; Joint Appendix JA 707. See also Degussa Corp., Technical Bulletin Fine Particles: Basic Characteristics of AEROSIL ® Fumed Silica Number 11 at 64; Joint Appendix JA 761 (Degussa defines hydrophobic as "water-repellent."). The Explanatory Notes are clear and based upon sound principles. The hydrocarbon moieties are added to the silicon dioxide for the

purpose of rendering the silica hydrophobic and are therefore impermissible impurities. Hence the product at issue cannot be classified under Chapter 28.

Degussa argued for the first time in oral argument that Rubie's Costume Co. v. United States, 337 F.3d 1350 (Fed. Cir. 2003) bars this court from considering the permissible versus impermissible impurity distinction in the Explanatory Note for Chapter 28 Note 1, as this distinction would improperly narrow the scope of Chapter 28 Note 1(a). Although there is language in Rubie's Costume that "Explanatory Notes are only instructive and are not dispositive or binding," Rubie's Costume, 337 F.3d at 1359 (quoting Marubeni Am. Corp. v. United States, 35 F.3d 530, 535 n.3 (Fed. Cir. 1994)), we did not hold, as Degussa argues, that an explanatory note cannot define a term in a way that might narrow the plausible interpretation of a chapter note or heading.

In Rubie's Costume, Customs had solicited and received written comments regarding the classification of the product, and had provided Rubie with detailed written reasons for its classification choice. Id. at 1352. The explanatory note at issue in that case gave examples of items that were included in Heading 9505. Id. at 1353. The trade court suggested that these examples were exhaustive and improperly imported "their limiting characteristics . . . to narrow the language of the classification heading itself." Id. This court reversed the trade court and held that Customs' classification ruling was persuasive and therefore must be granted deference. Id. at 1360.

In contrast to Rubie's Costume, the language of Chapter 28 Note 1(a) is not being narrowed by a limiting characteristic gleaned from a list of inclusive examples in an explanatory note. Chapter 28 Note 1(a) states that "except where the context otherwise requires," headings of Chapter 28 only apply to "separate chemically defined

compounds, whether or not containing impurities." The Explanatory Note for Chapter 28 Note 1(a) defines the term "impurities" broadly: "substances whose presence in the single chemical compound results solely and directly from the manufacturing process (including purification)." The explanatory note then carves out an exception for impermissible impurities: "substances [that] are deliberately left in the product with a view to rendering it particularly suitable for specific use rather than for general use." Explanatory Notes at 261. The Explanatory Note simply defines permissible and impermissible impurities; at no time are we importing a limiting characteristic from a set of inclusive examples in the explanatory note.

Degussa argues that the hydrocarbon moieties are not impermissible impurities because they are not in the product (but instead on the surface of the product). This argument is not persuasive as there is nothing in the language of the explanatory note to suggest the term "in" should be so artificially limited. The evidence at trial demonstrated that the hydrocarbon groups attached to the surface of silica are not just deliberately left in, but intentionally added, to the particles to change the nature of the product from hydrophilic to hydrophobic. Degussa, 452 F. Supp. 2d at 1314–15. The government argues that this transformation renders the product suitable for specific use (namely, uses requiring a hydrophobic attribute—water-repellent). The trade court concurred, finding the hydrophobic silica particles have a lower moisture absorption that enables them to be more readily incorporated into certain organic solvents and polymers. Id. at 1315. We agree.

The trade court stated that finding the surface-modified silica contained impermissible impurities did "not foreclose classification of plaintiff's products under

HTSUS subheading 2811.22.50." Id. Instead, the court reasoned that because the hydrocarbon moieties were not within the exclusions set forth in the Explanatory Note for Heading 2811: Silicon Compounds,[2] the products were still properly classified under Chapter 28. Id. The government argues that the exclusions set forth in the Explanatory Note for Heading 2811: Silicon Compounds are not exhaustive. We agree. The exclusions set forth in the explanatory notes that pertain to particular compounds supplement the remainder of the chapter notes and explanatory notes. For a silica product to fall within Chapter 28, it must be a separate chemically defined compound containing only permissible impurities and it must also not be (a) natural silica, (b) colloidal suspension of silica, or (c) silica gel with added cobalt salts.

II.

As seen above, the Court of International Trade also appeared to ground its analysis in the proposition that the surface chemistry of the surface-modified silicon dioxide is not relevant. Under the general section for Chapter 28, the Explanatory Note states:

> A separate chemically defined compound is a substance which consists of one molecular species (e.g., covalent or ionic) whose composition is defined by a constant ratio of elements and can be represented by a definitive structural diagram. In a crystal lattice, the molecular species corresponds to the repeating unit cell.
>
> The elements of a separate chemically defined compound combine in a specific characteristic proportion determined by the valency and the bonding requirements of the individual atoms. The proportion of each element is constant and specific to each compound and it is therefore said to be stoichiometric.

[2] The Explanatory Note for Heading 2811: Silicon Compounds excludes: (a) natural silica, (b) colloidal suspension of silica, and (c) silica gel with added cobalt salts. Explanatory Notes at 283.

> Small deviations in the stoichiometric ratios can occur because of gaps or insertions in the crystal lattice. These compounds are described as quasi-stoichiometric and are permitted as separate chemically defined compounds provided that the deviations have not been intentionally created.

Explanatory Notes at 260.

The parties agree that the bulk of the surface-modified silica meets the Explanatory Note's definition of separate chemically defined compounds. The question is whether the entire particle (bulk plus the modified surface) constitutes a separate chemically defined compound. The government argues that the presence of the hydrocarbon moieties on the surface of the silica causes the product to lack stoichiometry, as the quantity of hydrocarbon moieties is not in a constant ratio with the number of silicon or oxygen atoms. Further, the government argues that the entire particle cannot be represented by a definitive structural diagram, as the number of hydrocarbon moieties on the surface vary from particle to particle. Degussa argues that the surface chemistry is irrelevant and should be disregarded in determining whether the surface-modified silica is a separate chemically defined compound.

This court is cognizant of the fact that the tetrahedral structure of silicon dioxide present in the bulk is not identically present at the surface. This court is also mindful that the number of atoms on the surface of a particle is normally very small when compared to the number of atoms in the bulk phase, and that chemists normally disregard the surface of unmodified silica when determining whether a particle is a separate chemically defined compound. See Degussa, 452 F. Supp. 2d at 1315 ("You would have to torture something in chemistry to try and make surfaces stoichiometric or to encompass them totally in the definition of a bulk . . . .").

The parties do not dispute that, in the case of unmodified silicon dioxide, naturally occurring silanol groups at the surface differ from the bulk structure.[3] Clearly such compounds were intended to be covered by Chapter 28, Heading 2811. Nonetheless, when the surface of a product is intentionally modified, the surface chemistry is to be considered when determining whether a product is a separate chemically defined compound that contains impermissible "impurities" for purposes of Chapter 28. The Court of International Trade erred in concluding to the contrary.

III.

In sum, Degussa's surface treated silicon dioxide products contain impermissible impurities (water-repellents) and therefore, cannot be classified under Chapter 28. Customs properly classified the surface-modified silica products under Chapter 38 entitled "Miscellaneous chemical products" and more specifically under Subheading 3824.90.90 covering "chemical products and preparation of the chemical and allied industries."[4] Explanatory Notes for HTSUS Heading 3824 provide examples of products included in Heading 3824 such as chemical products that are analogous to surface-modified silica, for example surface-treated calcium carbonate (whereas non-

[3] The silanol groups present on unmodified silica are the result of its surface reacting with water vapor in the atmosphere. This reaction is naturally occurring and common for metal oxides.

[4] Note 1(a) to Chapter 38 states "this chapter does not cover: separate chemically defined compounds," with exceptions not relevant here. Because the hydrocarbon moieties were intentionally added to the surface of the silica particles, the surface chemistry must be considered when determining whether Degussa's surface-modified silica is a separate chemically defined compound. When considering the entire particle (bulk plus modified surface chemistry), Degussa's surface-modified silica is not stoichiometric and cannot be represented by a definitive structural diagram. Further, the ratio of hydrocarbon moieties is not in constant proportion to the number of silicon or oxygen atoms. Therefore, Degussa's surface-modified silica is not a separate chemically defined compound.

surface treated calcium carbonate is classified in HTSUS subheading 2836.50.00). See Explanatory Notes at 697–703. The Court of International Trade erred in failing to recognize, as a matter of law, that Chapter 28 excludes separate chemical compounds that contain impermissible impurities.

CONCLUSION

Based on the foregoing, we conclude that Degussa's surface-modified silica is properly classified under Heading 3824. Accordingly, the judgment of the Court of International Trade is

REVERSED.