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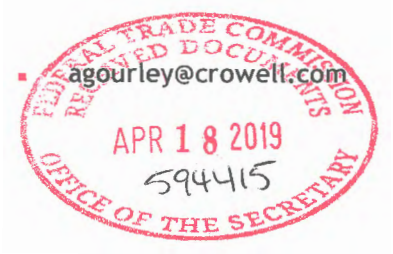

April 10, 2019

116:lab
100152.030

BY FEDEX

Ms. April Tabor
Acting Secretary of the Federal Trade Commission
Federal Trade Commission
600 Pennsylvania Avenue, NW
Washington, DC 20580

Re: Milliken & Co.'s Application for Generic Fiber Name "Polyoxadiazole"

Dear Ms. Tabor:

On behalf of Milliken & Co. and at the request of Josh Chung, we are submitting a corrected version of Milliken's Application for a generic fiber name dated April 3, 2019. The only change that has been made is on page 6 to correct the quotation for 16 C.F.R. § 303.7(f) to correctly reflect that "Saran" requires long chain synthetic polymer composed of at least 80% by weight of vinylidene chlorine units. The subject of Milliken's application, poloxadiazole, is not composed of any vinylidene chlorine units.

If you have any questions concerning this application or seek additional information, please contact either the undersigned or Frances P. Hadfield at 212.803.4040 or fhadfield@crowell.com.

Respectfully submitted,

Alan W. H. Gourley

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April 3, 2019

116:lab
100152.030

BY FEDEX

Ms. April Tabor
Acting Secretary of the Federal Trade Commission
Federal Trade Commission
600 Pennsylvania Avenue, NW
Washington, DC 20580

Re: Milliken & Co. – Request for Generic Fiber Name "Polyoxadiazole"

Dear Ms. Tabor:

On behalf of our client, Milliken & Company ("Milliken"), we hereby submit, pursuant to 16 C.F.R. § 303.8, this application requesting the designation of a generic fiber name and definition for a foreign manufactured fiber that Milliken uses in a fabric it initially developed for an industrial protective garment application. This fabric can pass relevant National Fire Protection Association standards while still maintaining a desired level of wear-ability and comfort for industrial users. The additional fiber, commonly known by its chemical designation, polyoxadiazole, has inherent flame- and arc-resistant properties that make it well suited for protective garments for industrial workers and for other industrial applications. As explained further below, its chemical composition is radically different from any of the long chain synthetic polymers whose generic names are currently included within the list provided at 16 C.F.R. § 303.7 and, accordingly, requires its own designation.

Milliken's fabric, which it has been selling since 2015, is for use for protective industrial workwear to be worn in environments presenting risk of arcing or flame to workers. To achieve the protective properties for these industrial, non-household applications, the fabric contains 6% (± 2%) polyoxadiazole (along with cotton and polyester). Milliken has been using the common chemical name for the fiber because its fabric has been intended solely for this non-household textile application. Milliken now may be expanding the market for the fabric to garments that could include "household textile articles." Accordingly, Milliken submits this application for a generic name for the fiber and also seeks authorization to use the "polyoxadiazole" name on a temporary basis pending consideration of its request.

Request for Temporary Generic Name

In light of the fiber's use in a fabric currently being manufactured in the United States, Milliken seeks designation of a temporary name. Although it recognizes that under Section 303.8(b), the FTC would normally designate an alpha or numeric designator pending consideration of a generic name request, Milliken respectfully submits that here the commonly understood chemical name, polyoxadiazole, would be the most accurate and least confusing name to the industrial markets for which these protective garments are currently being manufactured. It is not a proprietary tradename and accurately conveys the chemistry and properties of the fiber. As an alternative, we suggest "POD" which is also commonly used to abbreviate "polyoxadiazole" and denote the fiber (*see, e.g.*, Chemical Retrieval on the Web (CROW), Polymer Properties Database: https://polymerdatabase.com/Fibers/POD.html#.html).

Several other references in the scientific and patent literature demonstrate the common and accepted use of "polyoxidiazole" to refer to this fiber generically:

1. Frazer, A. H. and Wallenberger, F. T. Poly(1,3,4-oxadiazole) fibers: New fibers with superior high temperature resistence. J. Polym. Sci. A Gen. Pap., 2: (1964), 1171-79;

2. Korschak, V. V., Kronguaz, Ye. S., Rusanov, A. L., Nemirovskaya, L. B., Synthesis and study of ply-1,3,4-oxadiazoles, Polym. Sci. U.S.S.R., 8(5), (1966), 883-87;

3. Brocks, G. and Tol, A., Electronic structure of poly-oxadiazoles, J. Chem. Phys., 106 (1997) 6418;

4. Chinese Patent CN101508775; and

5. US Patent US8695319.

Furthermore, because Milliken is not the manufacturer of this fiber, a temporary code based upon its name would likely be both confusing and meaningless to the marketplace and accordingly inappropriate even as a temporary designation.

Background

Milliken & Company

Milliken is a privately held textile and chemical manufacturing company headquartered in Spartanburg, SC. The company was founded in 1856 and is a recognized leader in the innovation and manufacturer of chemicals, floor covering, and specialty textiles. Milliken's business spans a wide variety of market segments throughout the world. One of the textile segments in which Milliken is a market leader is the area of flame- and arc-resistant protective textiles. These textiles are used to produce protective garments for fire fighters, electrical workers, workers who produce and process petroleum products, and other industrial applications.

As discussed further below, Milliken has developed and sold an inventive fabric that combines fibers of cotton, polyester and a modest amount (~6%) of a long chain synthetic polymer known by its chemical name, polyoxadiazole. Milliken developed this fabric specifically, and so far exclusively, for garments to be worn in industrial work environments presenting risk of arcing or flame, although it hopes to expand that market in the future.

Defining Characteristics of Polyoxadiazole Fiber

Polyoxadiazole is a synthetic polymer fiber that is radically different from any of the fibers for which either the FTC or ISO has established generic names.[1]

Polyoxadiazole has the following generic chemical structure:

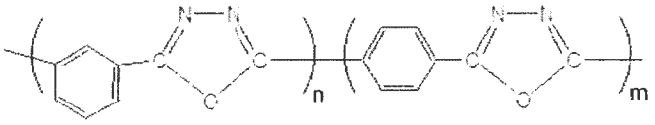

Figure 1: Chemical structure of Polyoxadiazole

The fiber is extruded from a random copolymer of *meta*-phenylene 1,3,4-oxadiazoile and *para*-phenylene 1,3,4-oxadizole. However, the repeats **n** and **m** can be any integer (including 0 for homopolymers). Also included in this class are polymers with substituted phenylene rings (*i.e.*, with Bromine or Chlorine). The defining characteristic is a repeating unit of oxadiazole/phenylene in the polymer backbone.

As shown in Figure 2, polyoxadiazole is synthesized by reacting aromatic dicarboxylic acids (terephthalic and/or isophthalic acid) with hydrazine sulfate in a solution of hot polyphosphoric acid. The reaction mixture is heated under inert atmosphere and the fiber is spun from this solution by precipitation into a basic aqueous media.

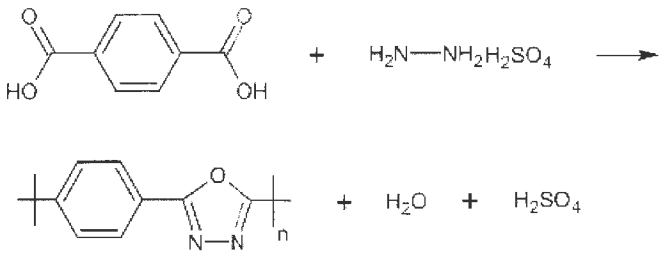

Figure 2: Generic synthetic route to polyoxadiazole

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[1] We note that 16 U.S.C. § 303.7 currently cites to International Organization for Standards (ISO) 2076:2010(E) "Textiles—Man-made fibres—Generic names" which is not the most current version of that ISO standard. Even the more recent 2013 version, however, does not contain a generic fiber name that would accurately capture polyoxadiazole fiber within its definition.

The resulting properties of polyoxadiazole fiber are summarized below in Table 1:

Property	Value	Test Method
Breaking Strength	3.2 cN/tex	GB/T 14337
Elongation at Break	15-30%	GB/T 14337
Decomposition Temperature	500°C	TG-DTG
Limiting Oxygen Index (LOI)	30%	GB/T 5455
Shrinkage at 300°C, 15 min	1%	FZ/T5004

Table 1: Properties of Polyoxadiazole Fiber

These properties are important to users of fabrics containing an appreciable amount of polyoxadiazole fiber. The high limiting oxygen index, low thermal shrinkage and high thermal decomposition temperature allow the use of polyoxadiazole fibers for lightweight fabrics in place of other high thermal decomposition fibers such as aramids and poly(benzimidazole). The polyoxadiazole fiber, however, provides distinct advantages over these alternative fibers in terms of thermal shrinkage, dyeability, softness, and cost in those applications. Comfort and wearability are key discriminators in the market for protective garments in hazardous industrial environments.

Discussion

As discussed further below, this application for a new generic name is appropriate in order to permit proper labeling of garments subject to the TFPIA manufactured from fabric containing more than 5% of polyoxadiazole fiber. Such polyoxadiazole fiber is not accurately described within any of the existing generic names contained in 16 C.F.R. § 303.7. The term "polyoxadiazole" is not a trade name but rather the term commonly used in the literature to identify this long chain polymer fiber. The fiber provides significant benefits that when combined with other natural and synthetic fibers into a fabric produces a comfortable garment that nonetheless achieves significant protective standards as required for certain work by the U.S. Occupational Safety and Health Administration ("OSHA").

Polyoxadiazole Fiber is Not Captured by Any Existing Generic Name

Milliken polymer scientists have carefully reviewed the current generic names and definitions contained in 16 C.F.R. § 303.7. None of these names could be used to describe a polyoxadiazole fiber accurately and without misleading the consuming public. As noted further below, for many of these generic fibers, polyoxadiazole is completely distinguishable because it simply is not composed of one or more of the defining elements for the listed generic fibers.

With respect to those generic definitions that do describe certain long chain polymers, polyoxadiazole differs radically from them in that its repeat unit is neither the same nor similar to those specified. The definitions accompanying all the available generic fiber names listed describe the structure of the polymer backbone, usually by listing the percentage of the defining

repeat unit. The monomer repeat unit of polyoxadiazole, oxadiazole, can have four basic structural isomers as shown below in Figure 3.

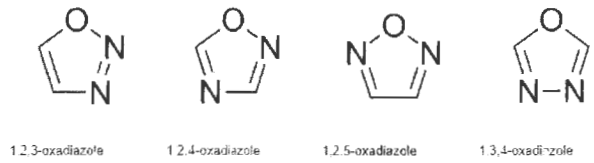

Figure 3: Structure of oxadiazole isonomers

However, the polymer that is formed from the hydrazine condensation with aromatic dicarboxylic acids as described in the synthetic route in Figure 2, will only contain the 1,3,4 isomer. The repeat unit that defines the polymer fiber can by defined by 1,3,4-oxadiazole attached directly to an aromatic ring. This structure is not listed in any percentage among any of the available generic fiber names, and accordingly, identifying this fiber as one of the existing generic names would be inaccurate and misleading.

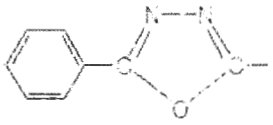

Figure 4: Base repeat unit of polyoxadiazole fibers

The specific grounds for concluding that none of the existing generic names could accurately be used to describe polyoxadiazole fiber are summarized below:

A. Acrylic

Acrylic is defined in 16 CFR § 303.7(a) as "a manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85 percent by weight of acrylonitrile units."

Polyoxadiazole has no acrylonitrile units in its structure, and thus cannot accurately be included within the FTC definition of acrylic.

B. Modacrylic

Modacrylic is defined in 16 CFR § 303.7(b) as "a manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of less than 85 percent but at least 35 percent by weight of acrylonitrile units."

Polyoxadiazole has no acrylonitrile units in its structure, and thus cannot accurately be included within the FTC definition of modacrylic.

C. Polyester

Polyester is defined in 16 CFR § 303.7(c) as "a manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85% by weight of an ester of a substituted aromatic carboxylic acid, including but not restricted to substituted terephthalate units, and para substituted hydroxybenzoate units."

Polyoxadiazole has no ester bonds in its structure. The carbocyclic acid groups in the starting material are converted to oxadiazole units during condensation with hydrazine, resulting in carbon-carbon bond linkages with no esters. Accordingly, polyoxadiazole cannot accurately be included within the FTC definition of polyester.

D. Rayon

Rayon is defined in 16 CFR § 303.7(d) as "a manufactured fiber composed of regenerated cellulose, as well as manufactured fibers composed of regenerated cellulose in which substituents have replaced not more than 15% of the hydrogens of the hydroxyl groups."

Polyoxadiazole is not composed of regenerated cellulose, and thus cannot accurately be included within the FTC definition of rayon.

E. Acetate

Acetate is defined in 16 CFR § 303.7(e) as "a manufactured fiber in which the fiber-forming substance is cellulose acetate."

Polyoxadiazole is not composed of cellulose acetate, and thus cannot accurately be included within the FTC definition of acetate.

F. Saran

Saran is defined in 16 CFR § 303.7(f) as "a manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 80 percent by weight of vinylidene chloride units."

Polyoxadiazole is not composed of any amount of vinylidene chloride units and thus cannot accurately be included within the FTC definition of saran.

G. Azlon

Azlon is defined in 16 CFR § 303.7(g) as "a manufactured fiber in which the fiber-forming substance is composed of any regenerated naturally occurring proteins."

Polyoxadiazole is not composed of any regenerated naturally occurring proteins, and thus cannot accurately be included within the FTC definition of azlon.

H. Nytril

Nytril is defined in 16 CFR § 303.7(h) as "a manufactured fiber containing at least 85 percent of a long chain polymer of vinylidene dinitrile where the vinylidene dinitrile content is no less than every other unit in the polymer chain."

Polyoxadiazole does not contain a polymer of vinylidene dinitrile, and thus cannot accurately be included within the FTC definition of nytril.

I. Nylon

Nylon is defined in 16 CFR § 303.7(i) as "a manufactured fiber in which the fiber-forming substance is a long-chain synthetic polyamide in which less than 85 percent of the amide linkages are attached directly to two aromatic rings."

Polyoxadiazole is not a synthetic polyamide, and therefore does not meet the FTC definition of nylon.

J. Rubber

Rubber is defined in 16 CFR § 303.7(j) as "a manufactured fiber in which the fiber-forming substance is comprised of natural or synthetic rubber," including manufactured fibers in which the fiber-forming substance is:

1. a hydrocarbon such as natural rubber, polyisoprene, polybutadiene, copolymers of dienes and hydrocarbons, or amorphous (noncrystalline) polyolefins; or
2. a copolymer of acrylonitrile and a diene (such as butadiene) composed of not more than 50 percent but at least 10 percent by weight of acrylonitrile units; or
3. a polychloroprene or a copolymer of chloroprene in which at least 35 percent by weight of the fiber-forming substance is composed of chloroprene units.

Polyoxadiazole does not meet any of these defining characteristics. It is not a natural rubber; it is not a copolymer of dienes and hydrocarbons or amorphous polyolefins; it is not a copolymer of acrylonitrile and a diene; and it is not a polychloroprene or a copolymer of chloroprene. Accordingly, polyoxadiazole cannot accurately be included within the FTC definition of rubber.

K. Spandex

Spandex is defined in 16 CFR § 303.7(k) as "a manufactured fiber in which the fiber-forming substance is a long chain synthetic polymer comprised of at least 85 percent of a segmented polyurethane."

Polyoxadiazole is not comprised of a segmented polyurethane, and therefore cannot accurately be included within the FTC definition of spandex.

L. Vinal

Vinal is defined in 16 CFR § 303.7(l) as "a manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50 percent by weight of vinyl alcohol units, and in which the total of the vinyl alcohol units and anyone or more of the various acetal units is at least 85 percent by weight of the fiber".

Polyoxadiazole is not composed of vinyl alcohol units and therefore cannot accurately be included within the FTC definition of vinal.

M. Olefin

Olefin is defined in 16 CFR § 303.7(m) as "a manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85 percent by weight of ethylene, propylene, or other olefin units, except amorphous (non-crystalline) polyolefins qualifying under paragraph (j)(1) of this section."

Polyoxadiazole is not composed of ethylene, propylene, or other olefin units and therefore cannot accurately be included within the FTC definition of olefin.

N. Vinyon

Vinyon is defined in 16 CFR § 303.7(n) as "a manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 85 percent by weight of vinyl chloride units."

Polyoxadiazole is not composed of vinyl chloride units, and therefore cannot accurately be included within the FTC definition of vinyon.

O. Metallic

Metallic is defined in 16 CFR § 303.7(o) as "a manufactured fiber composed of metal, plastic-coated metal, metal-coated plastic, or a core completely covered by metal."

Polyoxadiazole is not composed of any metal or metal coating, and therefore cannot accurately be included within the FTC definition of metallic.

P. Glass

Glass is defined in 16 CFR § 303.7(p) as "a manufactured fiber in which the fiber-forming substance is glass."

Polyoxadiazole is not composed of any glass, and therefore cannot accurately be included within the FTC definition of glass.

Q. Anidex

Anidex is defined in 16 CFR § 303.7(q) as "a manufactured fiber in which the fiber-forming substance is any long chain synthetic polymer composed of at least 50 percent by weight of one or more esters of a monohydric alcohol and acrylic acid."

Polyoxadiazole is not composed of esters of a monohydric alcohol and acrylic acid and therefore cannot accurately be included within the FTC definition of anidex.

R. Novoloid

Novoloid is defined in 16 CFR § 303.7(r) as "a manufactured fiber containing at least 85 percent by weight of a cross-linked novolac."

Polyoxadiazole does not contain any novolacs (also known as phenol-formaldehyde resins) and therefore cannot accurately be included within the FTC definition of novoloid.

S. Aramid

Aramid is defined in 16 CFR § 303.7(s) as "a manufactured fiber in which the fiber-forming substance is a long-chain synthetic polyamide in which at least 85 percent of the amide linkages are attached directly to two aromatic rings."

Polyoxadiazole is not a synthetic polyamide, and therefore cannot accurately be included within the FTC definition of aramid.

T. Sulfar

Sulfar is defined in 16 CFR § 303.7(t) as "a manufactured fiber in which the fiber-forming substance is a long chain synthetic polysulfide in which at least 85% of the sulfide (-S-) linkages are attached directly to two aromatic rings."

Polyoxadiazole is not a synthetic polysulfide and therefore cannot accurately be included within the FTC definition of sulfar.

U. PBI

PBI is defined in 16 CFR § 303.7(u) as "a manufactured fiber in which the fiber-forming substance is a long chain aromatic polymer having reoccurring imidazole groups as an integral part of the polymer chain."

Polyoxadiazole does not have reoccurring imidazole groups and therefore cannot accurately be included within the FTC definition of PBI.

V. Elastoester

Elastoester is defined in 16 CFR § 303.7(v) as "a manufactured fiber in which the fiber-forming substance is a long-chain synthetic polymer composed of at least 50% by weight of aliphatic polyether and at least 35% by weight of polyester, as defined in 16 CFR §303.7(c)."

Polyoxadiazole is not composed of aliphatic polyether or polyester and therefore cannot accurately be included within the FTC definition of elastoester.

W. Melamine

Melamine is defined in 16 CFR § 303.7(w) as "a manufactured fiber in which the fiber-forming substance is a synthetic polymer composed of at least 50% by weight of a cross-linked melamine polymer".

Polyoxadiazole not composed of a melamine polymer and therefore cannot accurately be included within the FTC definition of melamine.

X. Fluoropolymer

Fluoropolymer is defined in 16 CFR § 303.7(x) as "a manufactured fiber containing at least 95% of a long-chain polymer synthesized from aliphatic fluorocarbon monomers."

Polyoxadiazole is not synthesized from aliphatic fluorocarbon monomers, and therefore cannot accurately be included within the FTC definition of fluoropolymer.

Y. PLA

PLA is defined in 16 CFR § 303.7(y) as "a manufactured fiber in which the fiber-forming substance is composed of at least 85% by weight of lactic acid ester units derived from naturally occurring sugars.

Polyoxadiazole is not composed of lactic acid ester units, and therefore cannot accurately be included within the FTC definition of Pl.A.

* * *

Based upon the above detailed review of the existing generic fiber names and definitions already established by the Commission in 16 CFR § 303.7, we believe it is clear that none of these existing terms accurately describe the polyoxadiazole fibers used by Milliken & Company. Accordingly, to accurately label a :household textile article" manufactured with a fabric containing 5% or more of polyoxadiazole fiber, an appropriate generic name is required.

Proposed Generic Name and Definition

The polyoxadiazole that is the subject of this application is a long chain synthetic polymer composed of oxadiazole units that are bonded directly to aromatic rings. Accordingly,

based on the information presented in this application, we ask the Commission to adopt the following new generic name under 16 CFR § 303.7:

> ***Polyoxadiazole***: A manufactured fiber in which the polymer backbone comprises repeating units of oxadiazole linked to an aromatic ring.

Polyoxadiazole Fiber is in Commercial Use and Grant of the Generic Name will Enhance Consumer Understanding and Awareness

Outside the United States, polyoxadiazole fiber is produced commercially for applications such as high temperature filtration media, flame-resistant paper mats and protective clothing. There are two known producers of this fiber, both of whom are outside the United States:

1. OJSC Svetlogorsk Khimvolokno which manufacturers the fiber in the Gomel region of the Republic of Belarus under the trade name "Arselon®" (http://www.sohim.by/en/produktsiya/arselon/nit/), (https://www.swicofil.com/commerce/products/arselon/410/arselon); and

2. Podrun (联系我们) which manufactures the fiber in Zhangjiagang, Jiangsu, China under the trade name "Pod-Z Fiber." (http://www.podrun.com/a/PRODUCTCENTER/POD_Z_Fiber/)

In the United States, polyoxadiazole is also used in various industrial applications similar to those outside the United States identified above. To Milliken's knowledge, however, its fabric is the only current use in the United States for garments intended solely for protective industrial workwear. OSHA requires that employers in industries such as firefighting and electrical utilities provide adequate personal protective equipment ("PPE"), including protective clothing, to these workers. The fabrics from which these garments are manufactured must pass rigorous standards established and maintained by the National Fire Protection Association ("NFPA") or other agencies in order to be considered by OSHA as proper PPE.

Milliken & Company invented a flame-resistant and arc-resistant fabric for use in industrial workwear that provides protection while remaining extremely comfortable. The comfort of protective garments is a very important parameter because it alleviates a common disincentive for wearing PPE while performing dangerous work. Workers will often remove or disregard protective clothing that is uncomfortable or interferes with their freedom of movement, despite the risk such action entails in hazardous environments.

Fabrics can be engineered to be flame-resistant through a variety of techniques. For lightweight fabrics, however, thermally stable fibers are often employed to reinforce the charred area of the fabric. NFPA testing standards require that the charred area of the fabric be sufficiently strong of have a char length of 4 inches or less when tested according to ASTM D6413 (Standard Test Method for Flame Resistant Textiles).

During its product development process, Milliken discovered that although blends of cotton and polyester, when engineered with the proper flame retardants, can achieve good flame-

and arc-resistant properties, the char was too weak to pass the required flammability standards; *i.e.*, a char length of less than 4 inches. To pass the relevant NFPA standards and maintain the desired comfort properties, Milliken introduced approximately 6% of the synthetic fiber, polyoxadiazole, to the yarn blend to reinforce the charred area. This fabric achieves the NFPA standards without compromising comfort to an unacceptable degree.

To Milliken's knowledge, its fabric is the only current use of the polyoxadiazole fiber for PPE garments in the United States. It is possible, however, that in the near future Milliken will develop other protective fabrics utilizing this fiber in amounts beyond the identification threshold that would have broader markets, including garments common to household use.

Conclusion

Polyoxadiazole has a chemical structure that is radically different from the structure of the fibers on the TFPIA list outlined in 16 CFR § 303.7 as well as the list contained in ISO 2076: 2010(E). The structure of the base repeat unit for polyoxadiazole fibers is not mentioned at any percentage among any of the fibers with available generic names. Furthermore, polyoxadiazole fiber is in commercial production by at least two manufacturers, and commercial use in industrial secondary protective garments has demonstrated the properties are of great importance to the general public.

Although the char stabilizing properties demonstrated by polyoxadiazole fibers may be duplicated by the substitution of other high-temperature fibers that have existing generic names, such as aramid or polybenzimidazole, these substitute fibers are higher performing, and higher cost. Shoehorning polyoxadiazole fiber into the definitions of these fibers would not only be inaccurate chemically, but also could be potentially misleading to the end user in terms of performance of the fabric.

Therefore, we respectfully request that the Commission designate the term "polyoxadiazole" as a new generic fiber name for purposes of the Textile Fiber Products Identification Act, 15 U.S.C. § 70 - § 70k.

If you have any questions concerning this application or seek additional information, please contact either the undersigned or Frances P. Hadfield at 212.803.4040 or fhadfield@crowell.com.

Respectfully submitted,

Alan W. H. Gourley
Frances P. Hadfield