

United States District Court,
M.D. Florida, Tampa Division.

LINQ INDUSTRIAL FABRICS, INC,
Plaintiff.

v.

INTERTAPE POLYMER CORP., et al,
Defendants.

No. 8:03-CV-528-T-30MAP

Sept. 27, 2005.

Charles W. Saber, Donald A. Gregory, Salvatore P. Tamburo, Dickstein Shapiro LLP, Washington, DC,
William F. Jung, Jung & Sisco, PA, Tampa, FL, for Plaintiff.

REPORT AND RECOMMENDATIONS OF THE SPECIAL MASTER ON CLAIM CONSTRUCTION

STEPHEN RUBIN, Special Master.

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Pursuant to the Order Appointing Special Master dated September 17, 2004, I submit my Report and Recommendations with respect to disputed claim language in the three patents at issue: U.S. Patent Nos. 5,478,154 ('154 patent), 5,679,449 ('449 patent) and 6,112,772 ('772 patent) (collectively the "**LINQ Patents**"). FN1

FN1. The '154 patent, '449 patent and '772 patent are Exhibits 1-3, respectively, to Plaintiff LINQ Industrial Fabrics, Inc.'s Opening Brief on Claim Construction ("**LINQ Br.**").

My appointment as special master occurred after extensive discovery and briefing by plaintiff LINQ Industrial Fabrics, Inc. ("**LINQ**") and defendants Intertape Polymer Corp. and Intertape Polymer Management Corp. (collectively "**Intertape**") on the issues of claim construction, a *Markman* hearing FN2 conducted by the Court on July 28 and 29, 2004, and submission by the parties of proposed orders. Copies of the briefs, *Markman* hearing transcripts, and proposed orders have been provided to me and are the primary source materials for my Report and Recommendations.

FN2. *Markman v. Westview Industries, Inc.*, 512 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996).

Following the *en banc* decision of the Court of Appeals for the Federal Circuit in *Phillips v. AWH Corp.*,

415 F.3d 1303 (Fed.Cir.2005), the parties submitted supplemental memorandum regarding application of *Phillips* to the present case. I then met with counsel for the parties on August 12, 2005, to gain a first-hand understanding of the technology embodied in the LINQ Patents and to discuss with counsel questions I had following my review of their claim construction submissions. Counsel observed at the meeting that information and documents also relevant to the issues of claim construction were contained in Intertape's motion for summary judgment regarding invalidity and noninfringement and LINQ's opposing memorandum. At the suggestion of counsel, I have reviewed these papers from the restricted perspective of claim interpretation.

The parties have identified the specific claim language in each of the LINQ Patents that is in dispute. The construction proposed by the parties is at wide variance and is based on their very different interpretations and analyses of the intrinsic and extrinsic records attending the LINQ Patents. I will first describe the background and context of the patented invention and summarize the prosecution history of the LINQ Patents. After a review of the applicable standards of claim construction, highlighted in the recent *Phillips* decision, I will apply these standards to construe the disputed words in the claims identified by the parties.

I. BACKGROUND OF THE PATENTED INVENTION

The LINQ Patents relate to modifications and improvements to the antistatic properties of flexible fabric containers, such as flexible intermediate bulk containers known as FIBCs, with the objective of decreasingly the potential for incendiary electrostatic discharges. Industrial flexible fabric containers, woven typically from polypropylene fibers, are in common use for the bulk transport of powders and granulated substances.FN3 As explained in the specification of the LINQ Patents:

FN3. *See Markman* hearing trans. (July 28, 2004) at pp. 55:3-57:12.

It has been found that the shifting of specific materials within containers made of woven fabrics, as well as particle separation between the materials and such containers during loading and unloading of the container cause triboelectrification and create an accumulation of static electricity on the container walls. In addition, the accumulation of static electricity is greater at lower relative humidity and increases as the relative humidity drops. Also, highly charged material entering such containers can create an accumulation of static electricity on the container walls. Electrostatic discharges from a charged container can be incendiary, i.e., cause combustion in dusty atmospheres or in flammable vapor atmospheres. Moreover, discharges can be quite uncomfortable to workers handlings such containers.FN4

FN4. '154 patent, col. 1, ll. 15-29; '449 patent, col. 1, ll. 49-62; '772 patent, col. 1, ll. 52-65. *See generally* National Fire Protection Assn., "Recommended Practice on Static Electricity" (NFPA 77, 1993 ed.), s.s. 1-4 to 2-3 at 77-5 to 77-9 (*Markman* hearing, Intertape Ex. 4).

The problems created by electrostatic buildup in FIBCs have been recognized for many years.FN5 LINQ's expert, Mark Horenstein, Ph.D., testified during the *Markman* hearing that one solution applied to FIBCs is to weave into the relatively nonconductive container fabric antistatic conductive fibers that transmit an electrostatic charge from the container surface to a ground connected to the conducting fibers, thereby dissipating the charge from the container.FN6 This solution is defeated if a proper ground is not achieved, in which event the electrostatic discharge from the container may be intensified.FN7

FN5. L. Britton, "Static Hazards Using Flexible Intermediate Bulk Containers for Powder Handling," 12 PROCESS SAFETY PROGRESS 240 (1993), Defendants' Statement of Material Facts Not In Dispute and Memorandum of Law In Support of Dispositive Motion for Summary Judgment of Invalidity and Non-Infringement ("**Intertape Sum. J. Memo.**"), Exh. 14 ('154 Patent File Wrapper, Paper 10), IT00620. *See also*, U.S. Patent No. 5,071,699, col. 1, l. 50 to col. 2, l. 15, Exhibit 21 to Defendants' Memorandum On Claim Construction ("**Intertape Br.**").

FN6. *Markman* hearing trans. (July 28, 2004) at pp. 73:5-17; 75:10-76:14.

FN7. *Id.*, at pp. 76:23-77:8; '154 patent, col. 1, ll. 29-39.

A second solution in use before the LINQ Patents avoids the necessity of grounding the FIBC by weaving antistatic conductive fibers into the container fabric that are configured to achieve corona discharge.FN8 Unlike a spark charge, that "jumps from one place to another" and can cause combustion in a flammable atmosphere, a corona charge "just slowly bleeds off into the air" and is known to be non-incendiary.FN9

FN8. *Id.*, at pp. 77:11-79:14.

FN9. *Id.*, at p. 81:10-20. *See also* M. Nelson, *et al.*, "Anti Static Mechanisms Associated With FIBC Fabrics Containing Conductive Fibres," 30 J. ELECROSTATICS 135 (1993), Intertape Sum. J. Memo., Exh. 14, IT00586, 587-593. The Nelson article also is Exhibit 18 to Intertape Br.

Common to both grounded bags and the ungrounded bags at the time of the invention is the use of conductive fibers to achieve charge dissipation as rapidly as possible.FN10 However, as explained during the *Markman* hearing by Dr. Horenstein, the use of conductive fibers to achieve corona discharge in ungrounded containers also has disadvantages. The corona mechanism is inherently slower to achieve discharge than the same conductive fibers connected directly to a ground. As a result, an electrostatic charge may remain in the conductive fibers employing corona discharge for a longer period or not be removed completely. While in this state of retained electrostatic charge, the conductive fibers may emit a spark if brought into contact with a grounded object along any point in much the same way as would occur in a FIBC employing ground technology that is improperly grounded.FN11

FN10. *Markman* hearing trans. (July 28, 2004) at p. 83:18-20.

FN11. *Id.* at pp. 84:4 to 86:15; 163:3-9.

The inventors of the LINQ Patents sought to address "the deficiencies of the prior art to a great extent by creating a quasi-conductive woven fabric section including quasi-conductive fibers." FN12 The quasi-conductive fibers, a term coined by the inventors, *inter alia*, "have a resistivity that prevents an incendiary discharge from occurring from the fiber surface." FN13

FN12. '154 patent (LINQ Br., Exh. 1), col. 2, ll. 26-28.

FN13. Id., col. 4, ll. 53-55.

II. PROSECUTION HISTORY OF THE LINQ PATENTS

A. *The* '154 Patent

The first of the three LINQ Patents is entitled "Quasi-Conductive Anti-Incendiary Flexible Intermediate Bulk Container," and issued from an application filed on June 1, 1994. Of the 32 original claims in the application, claims 9-16 were rejected and the remaining claims were withdrawn at the direction of the examiner because they related to distinct inventions and divergent subject matter. The withdrawn claims ultimately formed the basis of the '449 patent and '772 patent.FN14

FN14. The '449 patent issued from a continuation-in-part application of the '154 patent application. A continuation-in-part application discloses subject matter in addition to that disclosed by its parent application. The '772 patent results from a divisional application of the '449 patent application. A divisional application is required when a prior pending application discloses and claims more than one invention. The parties have treated terms common to the three related LINQ Patents as equivalent for purposes of claim construction. *See* LINQ Br. at p. 32; Intertape Br. at 24, n. 8.

In response to the rejection of claims 9-16, the inventors amended the application to add new claims 33-38 with new limitations .FN15 For example, rejected original claim 9 stated:

FN15. At the same time, applicants amended the specification to add the language that is now '154 patent, col. 4, ll. 59-63. The new language provides specific threshold voltages for corona discharge of the DuPont "P-70 fiber."

A flexible fabric container with a reduced potential for incendiary discharge comprising:
woven fabric sections;

quasi-conductive fibers;

wherein said quasi-conductive fibers are woven into said woven fabric sections, said woven fabric sections are attached to one another to create said flexible fabric container.FN16

FN16. '154 patent File Wrapper at IT00539 (Intertape Sum. J. Memo, Exh. 14).

New claim 33, which substituted for claim 9 and became into independent claim 1 of the '154 patent, instead provided:

An ungrounded flexible fabric container with a reduced potential for incendiary discharge comprising:

a woven fabric configured to form the flexible fabric container having side walls, a closed end and an open end;

a coating of a compound having antistatic properties applied to cover the surface of said walls; and

said coated fabric including a plurality of quasi-conductive fibers having corona discharge points, said fibers being composed of materials and sized and shaped to effect corona discharge at said discharge points, and to have sufficient resistance to substantially avoid incendiary discharge at its ends or along its length at a rate that results in incendiary type discharges in the combustible environment.FN17

FN17. *Id.*, at IT00657-IT00658. The examiner required 3 changes to the wording of amended claim 33 before giving final approval. *Id.*, at IT00719.

The applicants argued in support of the amended claims that the use of "quasi-conductive fibers" in an ungrounded FIBC to reduce the potential for incendiary discharge in "combustible environments" achieved results that "were both unexpected and substantially improved over conventional [antistatic fiber] materials" FN18, thereby distinguishing the invention from prior art. The examiner had contended that it would be obvious to replace the conductive fibers achieving corona discharge in ungrounded FIBCs disclosed in U.S. Patent No. 5,071,699 ("Pappas '699 patent") with the antistatic sheathed-core fibers disclosed in U.S. Patent No. 5,202,185 ("Samuelson '185 patent") to achieve the claimed invention.FN19

FN18. *Id.*, at IT00673; IT00706 (Decl. of Robert J. Pappas).

FN19. *Id.*, at IT00655.

Much more will be said about the Pappas '699 patent and the Samuelson '185 patent. For present purposes, it is sufficient to recognize that the Pappas '699 patent, while directed primarily to antistatic coatings of ungrounded FIBC woven fabrics, teaches, *inter alia*, use of "electrically conductive filaments" so that, "[a]s static charges are generated, the electrons flow across the fabric and dissipate or bleed into the atmosphere almost immediately." FN20 The Samuelson '185 patent discloses an embodiment of the quasi-conductive fiber in applicants' invention. In applicants' own words: "Samuelson employs a conductive core having a plurality of lobes, ensheathing the conductive core within an insulating sheath." FN21 As stated in the Samuelson '185 patent, sheath-core filaments used in antistatic textile applications are well-known in the art; "[t]he present invention offers an improved spinning technique as well as providing a novel filament which rapidly dissipates electrical charges." FN22

FN20. Pappas '699 patent (Intertape Br., Exh. 21), col. 2, ll. 45-47; col. 8, ll. 43-45 (claim 7).

FN21. '154 patent File Wrapper at IT00676 (Intertape Sum. J. Memo, Exh. 14).

FN22. Samuelson '185 patent (Intertape Br., Exh. 4), col. 1, ll. 23-23, 29-32; col. 2, ll. 20-21.

Applicants responded that the Pappas '699 patent taught use of highly conductive fibers to dissipate the static charge in ungrounded FIBCs as rapidly as possible, with the attendant problem of potential incendiary discharge if grounded contact is made. They argued this is contrary to their invention of the benefits of more electrically resistive, and thus slower dissipating, "quasi-conductive fibers." FN23 As for the Samuelson '185 patent, applicants asserted "[t]here is no disclosure in Samuelson that the resulting fibers are quasi-conductive fibers which effect corona discharge and have sufficient resistance to avoid incendiary discharges in combustible environments, as recited in new claims 33-38." FN24

FN23. '154 patent File Wrapper at IT00671, IT00674-676 (Intertape Sum. J. Memo, Exh. 14).

FN24. Id., at IT00676.

These distinctions were accepted. The '154 patent issued with 10 claims on December 26, 1995.

B. *The '449 Patent and the '772 Patent*

The '449 patent was filed June 1, 1995, and the '772 patent was filed on October 27, 1997. Both are titled "Low Discharge Anti-Incendiary Flexible Intermediate Bulk Container." As mentioned, the '449 patent is a continuation-in-part of the '154 patent and the '772 patent is a divisional of the '449 patent. Accordingly, the '449 patent and the '772 patent contain the identical disclosure, including everything disclosed in the '154 patent. They also contain additional information not found in the '154 patent. The '449 patent and the '772 patent disclose additional embodiments of the "quasi-conductive fibers" first defined in the '154 patent; an ungrounded flexible fabric container system in which the woven fabric is configured to have side walls, a closed end and an open end; and "fill/empty trial" test data quantifying the amount of energy in an individual electrostatic discharge from the surface of a FIBC as it is approached by a grounded object.FN25 The '449 patent contains 10 claims directed to the apparatus of "ungrounded type flexible fabric container system" and the '772 patent contains 7 claims directed to a method for reducing electrostatic discharge in such a system.

FN25. '449 patent (LINQ Br., Exh. 2) and '772 patent (LINQ Br., Exh. 3), figs. 6, 10-14, col. 4, 65-67; col. 5, ll. 11-26; col. 8, ll. 10-50; col. 9, ll. 58-67 to col. 11, ll. 1-45.

In the prosecution of the application that issued as the '449 patent, the examiner initially rejected claims 1-10 on the basis, among others, that the claims failed particularly to point out and distinctly claim the subject matter that applicants regard as the invention as required by the Patent Act, 35 U.S.C. s. 112, second paragraph. Of particular relevance to the terms in issue here, the examiner questioned: "What is the scope and meaning of the 'quasi-conductive' recited in claims 3-4, 6, 8-9?" FN26 Applicants provided this answer:

FN26. '449 patent File Wrapper at IT01010. The file wrapper of the '449 patent is Exh. 33 to Intertape Sum. J. Memo., and the '449 patent and the '772 patent file wrappers also are included as exhibits to Intertape's Memorandum On Claim Construction.

Page 15 of the as-amended specification states that "Quasi-conductive fibers are disclosed in copending U.S. Patent Application Serial No. 08/252,660, now U.S. Patent No. 5,478,154, which is incorporated" in the above-identified application by reference in its entirety. As defined in the '154 patent, a quasi-conductive fiber effects a corona discharge, either at its end or at other discharge points and has sufficient resistance to substantially prevent incendiary discharge therefrom in combustible environments. A number of embodiments of quasi-conductive fibers are described in the '154 patent.... However, as the applicants have qualitatively defined them, all of the embodiments of the quasi-conductive fibers are sized and shaped to have sufficient resistance to substantially avoid incendiary discharge and effect corona discharge at the filament ends or other discharge points (col. 4, lines 10-13, 46-63).

Applicants submit that the term "quasi-conductive", as defined in U.S. Patent 5,478,154, is sufficiently definite and meets the requirements of s. 112, second paragraph. Applicants respectfully request the Examiner withdraw this rejection of claim 3 and its dependent claims, claims 4-10. FN27

FN27. Id., at IT01019-IT01020.

The examiner withdrew her objection based on the recited specification amendment, which added reference to the '154 patent and applicants' explanation of the term "quasi-conductive." FN28

FN28. Id., at IT01031. The examiner also withdrew his objection to the application on the basis of the prior art of the Pappas '699 patent and the Samuelson '185 patent based on applicants' elaboration of the argument they presented to the same rejection by the examiner of the claims of the '154 patent application. Id., at IT01020-28.

III. PRINCIPLES GOVERNING CLAIM CONSTRUCTION

The Court of Appeals for the Federal Circuit has developed a comprehensive body of precedent governing the legal standards to be applied by district courts in undertaking patent claim construction. In its anticipated decision in *Phillips v. AWH Corp.*, 415 F.3d 1303, 1324 (Fed.Cir.2005) (*en banc*), the Federal Circuit reviewed this precedent and concluded that "there is no magic formula or catechism for conducting claim construction" and that "[t]he sequence of steps use by the [district] judge in consulting various sources is not important; what matters is for the court to attach the appropriate weight to be assigned to those sources in light of the statutes and policies that inform patent law." Notwithstanding this flexibility, certain core principles reiterated in *Phillips* continue to structure the analytical process.

Claim construction is an issue of law reserved for the district court. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970-971 (Fed.Cir.1995) (*en banc*), *affirmed*, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). To ascertain the meaning of claims, the district court resorts to three primary sources constituting the intrinsic record: the claims, the specification, and the prosecution history. *See Markman*, 52 F.3d at 979.

Claim construction begins with the language of the claims. *See Phillips*, 415 F.3d at 1312; *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996) ("we look to the words of the claims themselves ... to define the scope of the patented invention"); *Innova/Pure Water, Inc. v. Safari Water Filtration Systems, Inc.*, 381 F.3d 1111, 1115 ("the claims of a patent define the invention to which the patentee is entitled the

right to exclude"). Moreover, claim terms are presumed to be used consistently throughout the patent, such that the usage of a term in one claim can often illuminate the meaning of the same term in other claims. *See Phillips*, 415 F.3d at 1314-1315; *Vitronics*, 90 F.3d at 1582.

The words of a claim generally are given the ordinary and customary meaning they have to persons of ordinary skill in the art in question at the time of the invention. *See Phillips*, 415 F.3d at 1312-1313; *PC Connector Solutions LLC v. SmartDisk Corp.*, 406 F.3d 1359, 1363 (Fed.Cir.2005) (time of the invention is the effective filing date of the patent application); *Innova/Pure*, 381 F.3d at 1116. "The inquiry into how a person of ordinary skill in the art understands a claim provides an objective baseline from which to begin claim interpretation." *Phillips*, 415 F.3d at 1314. This principle stands as a practical recognition that inventors are usually persons skilled in the field of the invention and that the patent is addressed to and intended to be read by others similarly skilled in the particular art. *Ibid.*

While the language of the claims is the first source for interpretation, "[t]he claims, of course, do not stand alone." *Phillips*, 415 F.3d at 1315. *Phillips* emphasizes that "the person of ordinary skill in the art is deemed to read the claim term not only in the context of the particular claim in which the disputed term appears, but in terms of the entire patent, including the specification." *Phillips*, 415 F.3d at 1314. The importance of the specification derives from the statutory "close kinship" between the written description of the specification and the claims. *Phillips*, 415 F.3d at 1316. The Patent Act mandates the specification "shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains ... to make and use the same...." 35 U.S.C. s. 112, second paragraph. *See also* 37 C.F.R. s. 1.75(d)(1).

The inventor's words that are used to describe the invention-the inventor's lexicography-must be understood and interpreted by the court as would be understood and interpreted by a person in that field of technology. Thus the court starts the decisionmaking process by reviewing the same resources as would that person, viz., the patent specification and the prosecution history.

Phillips, 415 F.3d at 1414, quoting *Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1477 (Fed.Cir.1998).

This nexus between the specification and the claims makes it appropriate for a court "to rely heavily" on the written description for guidance as to the meaning of the claims. *Phillips*, 415 F.3d at 1317. Indeed, the specification "is the best single guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315, quoting *Vitronics*, 90 F.3d at 1582. A patentee is at liberty to be his or her own lexicographer, for example, but any special usage of a term must be clearly disclosed in the specification. *See CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed.Cir.2002); *Intellicall, Inc. v. Phonometrics, Inc.*, 952 F.2d 1384, 1387-1388 (Fed.Cir.1992).

The prosecution history also plays a role in claim construction, particularly as it may reveal how the inventor and the patent examiner understood the claim language. *See Graham v. John Deere Co.*, 383 U.S. 1, 33, 86 S.Ct. 684, 15 L.Ed.2d 545 (1996); *Phillips*, 415 F.3d at 1317. The prosecution history is comprised of the complete record of the proceedings before the United States Patent and Trademark Office ("**PTO**"), including prior art cited during examination. It also includes communications between the examiner and the applicant that may reveal the applicant limited the invention in the course of prosecution, with the effect of making the claim scope narrower than it would otherwise be. *Ibid.*; *Chimie v. PPG Industries Inc.*, 402 F.3d 1371, 1384 (Fed.Cir.2005) (purpose of consulting the prosecution history is to exclude any interpretation

that was disclaimed); Vitronics, 90 F.3d at 1582-1583; Markman, 52 F.3d at 980; Autogiro Co. of America v. United States, 181 Ct.Cl. 55, 384 F.2d 391, 399 (Ct.Cl.1967).

Notwithstanding the general usefulness of the specification and prosecution history to the district court when undertaking claim interpretation, these intrinsic guides are not without their drawbacks. Thus, it is improper to import particular embodiments and examples from the specification into the claims as limitations. *See* SciMed Live Systems, Inc. v. Advanced Cardiovascular Systems, Inc., 242 F.3d 1337, 1340 (Fed.Cir.2001) ("one of the cardinal sins of patent law-reading a limitation from the written description into the claims"); Wenger Manufacturing, Inc. v. Coating Machine Systems, Inc., 239 F.3d 1225, 1237 (Fed.Cir.2001); *compare* Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1186-1887 (Fed.Cir.1998) ("there is sometimes a fine line between reading a claim in light of the specification, and reading a limitation into the claim from the specification"). The prosecution history, for its part, often lacks the clarity of the specification because it is a record of the ongoing negotiation between the PTO and the applicant, rather than the final product of that negotiation. *See* Phillips, 415 F.3d at 1317.

The guideposts set forth in *Phillips* concerning judicial use of intrinsic evidence in claim construction-the claims, specification and prosecution history-are intended by the Federal Circuit as an affirmation of present law. The same cannot be said for the Federal Circuit's discussion of the role of extrinsic evidence-dictionary definitions, treatises or expert testimony-in claim interpretation. The *en banc* Court repudiated the approach espoused in Texas Digital Systems, Inc. v. Telegenix, Inc., 308 F.3d 1193 (Fed.Cir.2002), that a court should determine the ordinary meaning of claim terms through dictionary definitions and the like before turning to intrinsic evidence, and then only for limited purposes. Phillips, 415 F.3d at 1320. The *en banc* Court does not reject the utility of extrinsic evidence in appropriate cases and for particular purposes to assist the court's understanding of scientific principles, the field of the invention, and what a person of ordinary skill in the art would understand claim terms to mean. *See* Phillips, 415 F.3d at 1319; Markman, 52 F.3d at 980. What *Phillips* makes clear is that resort to extrinsic evidence is secondary to intrinsic sources and appropriate only when the available intrinsic evidence is not dispositive.

Assigning such a limited role to the specification, and in particular requiring that any definition of claim language in the specification be express, is inconsistent with our rulings that the specification is "the single best guide to the meaning of a disputed term," and that the specification "acts as a dictionary when it expressly defines terms used in the claims or when it defines terms by implication." Vitronics, 90 F.3d at 1582; Irdeto Access, Inc. v. Echostar Satellite Corp., 383 F.3d 1295, 1300 (Fed.Cir.2004) ("Even when guidance is not provided in explicit definitional format, the specification may define claim terms by implication such that the meaning may be found in or ascertained by a reading of the patent documents.") (citations omitted); Novartis Pharms. Corp. v. Abbott Labs., 375 F.3d 1328, 1334-35 (Fed.Cir.2004) (same); Bell Atl. Network Servs., Inc. v. Covad Communications Group, Inc., 262 F.3d 1258, 1268 (Fed.Cir.2001) ("[A] claim term may be clearly redefined without an explicit statement of redefinition.").

Phillips, 415 F.3d at 1320-1321.

Claim construction involving inventor-created words, other terms whose meaning may not be facially apparent, applicant disclaimers and amendments in the patent prosecution, and a invention that is built upon substantial prior art, calls forth the full panoply of interpretive guideposts offered in *Phillips*. As the Federal Circuit stated in an earlier decision:

Ultimately, the interpretation to be given a term can only be determined and confirmed with a full

understanding of what the inventors actually invented and intended to envelop with the claim. The construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction.

Renishaw PLC v. Marposs Societa' Per Azioni, 158 F.3d 1243, 1250 (Fed.Cir.1998).

With these principles in mind, I turn to construction of the claim terms in dispute.

IV. THE '154 PATENT

The parties are in agreement that the meaning of the terms in boldface in Claims 1-5 and 7-9 of the '154 patent is in dispute:

1. **An ungrounded type flexible fabric container with a reduced potential for incendiary discharge for use in a combustible environment** comprising:

a woven fabric configured to form the flexible fabric container having side walls;

a coating of a compound having antistatic properties applied to cover a surface of said walls; and

said coated fabric including **a plurality of quasi-conductive fibers having corona discharge points, said fibers being composed of a plurality of filaments, said filaments sized and shaped to effect: corona discharge at said discharge points and to have resistance to avoid incendiary discharge at ends of said filaments and along the lengths of said filaments at a rate that results in incendiary type discharges in the combustible environment.**

2. **An ungrounded type flexible fabric container** according to claim 1, wherein **said quasi-conductive fibers** are woven into the fabric container.

3. **An ungrounded type flexible fabric container** according to claim 1, wherein **said quasi-conductive fibers** are positioned about one to about four inches apart from one another.

4. **An ungrounded type flexible fabric container** according to claim 1, wherein **said filaments** include a conductive core and an insulating sheath.

5. **An ungrounded type flexible fabric container** according to claim 1, wherein **said filaments are sized and shaped to have a corona discharge** threshold voltage at said ends of said filaments in the range of about three to four kilovolts and **said filaments** having a looped-end corona discharge threshold voltage of about nine kilovolts.

6. [No terms in dispute.]

7. **An ungrounded type flexible fabric container with a reduced potential for incendiary discharge for use in a combustible environment** comprising:

a woven fabric configured to form the flexible fabric container having side walls; and

said woven fabric **including at least one quasi-conductive fiber positioned up to about four inches apart from one another and having corona discharge points, said fibers being composed of one or more filaments, said filaments sized and shaped to effect corona discharge points and to have resistance to avoid incendiary discharge at ends of said filaments and along the lengths of said filaments at a rate that results in incendiary type discharges in the combustible environment.**

8. **An ungrounded type flexible fabric container** according to claim 7, wherein said **quasi-conductive fibers** include a conductive core and an insulating sheath.

9. **An ungrounded type flexible fabric container** according to claim 7, wherein said **filaments are sized and shaped to have a corona discharge** threshold voltage at said ends of said filaments in the range of about three to about four kilovolts and said **filaments** having a looped-end corona discharge threshold voltage of about nine kilovolts.

10. [No terms in dispute.]

It can be seen that a number of the disputed terms appear in more than one claim. Because identical terms appearing in multiple claims are presumed to have a common meaning, *see* Phillips, 415 F.3d at 1314-1315; Vitronics, 90 F.3d at 1582, these terms will be construed the first time they appear and applied consistently to later claims. All of the disputed words are found in claims 1 and 2.

A. Claim 1

1. An ungrounded type flexible fabric container with a reduced potential for incendiary discharge for use in a combustible environment

Claim 1 is an independent claim, meaning it is self contained. All terms necessary to set forth with particularity the metes and bounds of the claimed invention are included. An independent claim commonly begins with a preamble clause that ends with a transition word followed by one or more phrases containing "limitations." Claim 1 begins with this preamble:

An ungrounded type flexible fabric container with a reduced potential for incendiary discharge for use in a combustible environment comprising

The parties dispute the meaning to be accorded the preamble language in two ways: they disagree as to the meaning of specific preamble words and they disagree as to whether the preamble as a whole serves as a limitation beyond what is disclosed in the remainder of claim 1. These issues will be taken in order.

1.1 An ungrounded type flexible fabric container

The meaning of the words "ungrounded type flexible fabric container" is disclosed in the specification and was well-understood technology at the time of filing the '154 patent application. Fig. 4 of the specification is a side view of a woven fabric container.FN29 One of the prior art references cited in the ' 154 patent is the Pappas ' 699 patent, discussed at pages 6-7 *supra* in relation to the ' 154 patent prosecution history. Its specification teaches:

FN29. '154 patent (LINQ Br., Exh. 1), Fig. 4, col. 5, ll. 7-13.

Flexible bulk containers have been utilized for a number of years to transport and deliver finely divided solids such as cement, fertilizers, salt, sugar, and barite, among others. Such bulk containers can in fact be utilized for transporting almost any type of finely divided solid. The fabric from which they are constructed is a weave of polyolefin, specifically, polypropylene, which may or may not receive a coating of a similar polyolefin on one or both sides of the fabric.... The usual configuration of such flexible bulk containers involves a rectilinear or cylindrical body having a wall, base, cover and a closed spout secured to extend from the base or the cover or both. FN30

FN30. Pappas '699 patent (Intertape Br., Exh. 21), col. 1, ll. 13-27.

The '154 patent specification describes containers employing electrical ground technology to dissipate electrostatic charges that may accumulate on the container fabric.FN31 The Pappas ' 699 patent discloses the utilization of ungrounded flexible containers: "A particular advantage of the fabrics of the present invention is that containers constructed therefrom need not be grounded during filling and emptying operations." FN32 Intertape maintains that the term "ungrounded type flexible fabric containers" applies to any flexible fabric container of any size, shape or use that is not electrically grounded.FN33 The intrinsic evidence contradicts this.

FN31. '154 patent (LINQ Br., Exh. 1), col. 1, ll. 29-42.

FN32. Pappas '699 patent (Intertape Br., Exh. 21), col. 2, ll. 42-44.

FN33. Intertape Br. at 7.

Dependent claims 6 and 10 expressly limit the term "ungrounded flexible fabric container" to FIBCs. Therefore, the language "ungrounded flexible fabric container" in independent claim 1 (and the identical language in claim 7) may include but should not be read to be restricted solely to FIBCs. *See* Liebel-Flarsheim Co. v. Medrad, Inc., 358 F.3d 898, 910 (Fed.Cir.2004); Rambus, Inc. v. Infineon Technologies, AG, 318 F.3d 1081, 1089, 1093 (Fed.Cir.2003). At the time of the invention, FIBCs were defined as

Flexible, rectilinear containers constructed of woven plastic with a suitable liner. The typical FIBC is made of woven polypropylene with a polyolefin liner, and has a capacity of 300-500 kg. Various designs exist for the basic container and grounding arrangements (if any), and larger capacities are also available.... FIBCs are fully collapsible for easy storage and once used can be folded again, hence the name "Flexible Intermediate Bulk Container".FN34

FN34. L. Britton, "Static Hazards Using Flexible Intermediate Bulk Containers for Powder Handling," 12 PROCESS SAFETY PROGRESS 240 (1993). ' 154 patent File Wrapper, Intertape Sum. J. Memo., Exh. 14, IT00620.

The invention is directed to the problem of static electricity created by the movement of finely divided solids in containers woven from electrically resistive polypropylene or similar materials.FN35 At a

minimum, the terminology "ungrounded flexible fabric container" must be defined to incorporate these features. The specification gives examples of other applications such as pneumatic conveyor tubes and containment vessel liners. FN36 *See* Renishaw PLC v. Marposs Societa' Per Azioni, supra, 158 F.3d at 1250.

FN35. '154 patent (LINQ Br., Exh. 1), col. 5, ll. 10-14.

FN36. *See* '154 patent, col. 6, ll. 36-41. For a description of the characteristics of a FIBC, *see* Flexible Intermediate Bulk Container Association, "Flexible Intermediate Bulk Containers (FIBCs)," *Markman* hearing, Intertape Exh. 14. Another description of a flexible fabric container is provided in U.S. Patent No. 5,244,281 ("Williamson '281 patent"), cited as prior art in the '154 patent and discussed in the prosecution history. The Williamson '281 patent is titled "Static Controlled Collapsible Receptacle." The examiner stated the container disclosed in the Williamson '281 patent was "analogous" to the '154 patent container. '154 patent File Wrapper at IT00651 (Intertape Sum. J. Memo, Exh. 14).

I recommend construction of the phrase "an ungrounded type flexible fabric container" to mean a fabric container made from woven polypropylene or similar material used for the shipment and storage of materials capable of generating a hazardous electrostatic charge that does not utilize an electric ground mechanism to dissipate such a charge.

1.2 with a reduced potential for incendiary discharge

The '154 patent specification expressly defines "incendiary" to mean: "cause combustion in dusty atmospheres or in flammable vapor atmospheres." FN37 A "discharge" is said to result from "an accumulation of static electricity on the container walls." FN38 Hence, an "incendiary discharge" is an electrical discharge that causes combustion in certain atmospheres.FN39

FN37. '154 patent (LINQ Br., Exh. 1), col. 1, ll. 26-29.

FN38. *Id.*, at col. 1, ll. 23-24.

FN39. The file wrapper of the '154 patent includes articles from technical journals that describe the forms of electrical discharges in great detail. *See* M. Nelson, *et al.*, "Anti Static Mechanisms Associated With FIBC Fabrics Containing Conductive Fibres," 30 J. ELECTROSTATIC 135 (1993) ('154 patent File Wrapper, Intertape Sum. J. Memo., Exh. 14, IT00586, 587-593); L. Britton, n. 34 *supra*, at IT00620-630.

Intertape argues that the words "with a reduced potential for" preceding "incendiary discharge" lack comparative basis and, consequently, are irremediably vague.FN40 This ignores the instruction of the specification that the "invention is directed at decreasing the potential for incendiary discharges caused by electrostatic discharges that can accumulate on flexible containers." FN41 The invention claims to reduce the potential for incendiary discharges that might otherwise occur on containers lacking a electrostatic charge dissipating mechanism. A journal article by Lawrence Britton in 1993, made a part of the ' 154 patent

prosecution file, reveals that the hazard of electrostatic discharge resulting from a FIBC lacking effective antistatic safeguards was recognized in the industry, and that various measures were being investigated to reduce their incidence.FN42 "Reduced potential" means it is less likely to occur, a concept that would be evident to a person skilled in the pertinent art at the time of the invention. *See Phillips*, 1312-1313 ("the words of a claim 'are generally given their ordinary and customary meaning' "), quoting *Vitronics*, 90 F.3d at 1582.

FN40. Intertape Br. 11.

FN41. '154 patent (LINQ Br., Exh. 1), col. 1, ll. 8-10.

FN42. *See* L. Britton, n. 34 *supra*, IT00620-629.

1.3 for use in a combustible environment

The words "combustible environment" appear in the preamble to independent claims 1 and 7 of the '154 patent. "Combustible environment" is not a term appearing in the specification of the '154 patent. From all that appears of record, the phrase combustible environment did not have a recognized meaning to those skilled in the art at the time of the invention. Dr. Horenstein, LINQ's expert, was not asked during the *Markman* hearing whether the words combustible environment had an understood meaning to those skilled in the art at the time of the invention.FN43 Intertape's expert, Mr. Reppermund, testified that he had never encountered the term in his 35 years of experience working with flammable materials and that it lacked technical meaning. FN44 His "plain English" definition is "any environment that contains substances that will burn." FN45

FN43. *Markman* hearing trans. (July 28, 2004) at p. 69:12-22.

FN44. *Markman* hearing trans. (July 29, 2004) at pp. 12:23 to 13:3.

FN45. *Id.*, at p. 13:5-7.

LINQ contends that the meaning of combustible environment is much narrower than Mr. Reppermund's plain English definition. LINQ maintains that the proper meaning can be ascertained from the specification and prosecution history, in both of which the term combustible environment is defined by the minimum ignition energy ("MIE") required to achieve combustion as a result of an incendiary discharge in a flammable atmosphere, such as a dusty atmosphere or flammable vapor atmosphere described in the specification.FN46

FN46. '154 patent, col. 1, ll. 24-27.

LINQ's argument proceeds as follows.FN47 A person skilled in the art of electrostatic discharge suppression in flexible fabric containers would want to know from the patent disclosure the MIE threshold of safe use afforded by the invention. Figures 5 through 7 and the accompanying description in the '154 patent specification, accordingly to LINQ, provide the answer. Figure 7 is a graph depicting that it is safe to practice the invention in a "combustible environment" having a MIE of 0.25mJ (millijoules).FN48 Figures 5 and 6 are similar graphs depicting a potential for incendiary discharge when a flexible fabric container lacking the invention's static dissipating mechanisms is used in an environment having an MIE of 0.25mJ.FN49 Further, LINQ notes that the applicants amended the preamble during the patent prosecution to add language expressly including "combustible environment" in order to differentiate their invention from the Samuelson '185 patent cited by the PTO.FN50 The declaration of Robert Pappas, a co-inventor, also forms part of the prosecution history. In his declaration, Mr. Pappas states: "It is considered within the industry that 0.25 millijoules (mj) of energy is capable of causing combustion in a combustible environment." FN51

FN47. *See* LINQ Br. at p. 21; LINQ's Proposed Order On Claim Construction, at pp. 20-22.

FN48. '154 patent (LINQ Br., Exh. 1), Fig. 7, col. 6, ll. 19-35.

FN49. *Id.*, Fig. 5, col. 6, ll. 6-10; Fig. 6, col. 6, ll. 10-19.

FN50. '154 patent File Wrapper (Intertape Sum. J. Memo, Exh. 14) at IT00678, IT00682. The applicants' successful rebuttal to the PTO's Samuelson '185 patent reference included this argument: Furthermore, applicants are unable to locate any disclosure in Samuelson that the discharges off its multilobal conductive core filaments are at an energy level so as to substantially prevent the occurrence of incendiary discharges in combustible environments.

To the contrary, the only end-use application expressly noted in Samuelson for the multilobal conductive core filaments is for "career apparel worn in *clean rooms*." (Column 1, lines 17-19). Samuelson is directed to preventing static discharges that can damage electronic components. The energy of static discharges that can impair electronic components is far below the energy of discharge which can be incendiary in combustible environments.

Id., IT00677 (underscore in original).

FN51. *Id.*, at IT00703. This point also is made by the applicants in their Amendment, *id.*, at IT00677-679. LINQ's expert testified in deposition that 0.25mJ is generally accepted as the MIE level encompassing many hydrocarbon vapors. Intertape Br., Exh. 27 (Deposition of Mark Horenstein, Ph.D.) at p. 166:2-4.

Intertape responds that the words "combustible environment" do not derive an ascertainable meaning by reference to MIEs because there are many combustible environments in which flexible fabric containers may be deployed that have MIEs below the 0.25 mJ threshold set by the inventors.FN52 This may be true.

Nonetheless, the fact that any number of other MIEs could have been designated by the inventors to establish the measuring point of "combustible environment" does not preclude the inventors from selecting one for purposes of describing the features of their invention. Use of MIE to measure incendiary discharge potential was practiced at the time of the invention.FN53 The inventors acted within their recognized power to define "combustible environment" as they deemed appropriate-to act as their own lexicographer-provided the special usage is clearly disclosed in the specification. *See CCS Fitness, Inc. v. Brunswick Corp.*, supra, 288 F.3d at 1366. The specification and prosecution history of the ' 154 patent make clear that the threshold combustible environment of concern to the inventors, and referenced by them to measure the potential for incendiary discharge, has an MIE of 0.25mJ. *See Phillips*, 415 F.3d at 1315 ("best source for understanding a technical term is the specification from which it arose, informed, as needed, by the prosecution history"), quoting *Multiform Dessicants, Inc. v. Medzam, Ltd.*, supra, 133 F.3d at 1478.

FN52. *Intertape Br.* at p. 16 and *Exh. 29* at pp. 9-10.

FN53. *See N. Wilson*, "The Electrostatic Spark Discharging Behavior of Some Flexible, Intermediate Bulk Containers" (1989) (*Intertape Br.*, *Exh. 17*) at pp. LQ001392-1396.

In this case, the specification reveals a "special definition given to the claim term by the patentee...." *Phillips*, 415 F.3d at 1316. I recommend construction of the term "combustible environment" to mean an environment having an MIE of 0.25mJ.

1.4 The preamble as a limitation to claim 1.

LINQ argues that the preamble, including the just-construed words "combustible environment," constitutes a structural limitation on the scope of independent claim 1. *Intertape* asserts that the preamble is a vague description of the invention's function or purpose, incapable of serving as a limitation.

"Whether to treat a preamble as a claim limitation is determined on the facts of each case in light of the claim as a whole and the invention described in the patent." *Storage Technology Corp. v. Cisco Systems, Inc.*, 329 F.3d 823, 831 (Fed.Cir.2003). A preamble that merely states an intended use or purpose usually does no more than define a context in which the invention operates and will not serve to limit the scope of the claim. *See Storage Technology Corp. c. Cisco Systems, Inc.*, 329 F.3d 823, 830-832 (Fed.Cir.2003); *Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp.*, 320 F.3d 1339, 1345 (Fed.Cir.2003). "In general, a preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to a claim." *Catalina Marketing International, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed.Cir.2002), quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed.Cir.1999). The preamble in this case does not "recite essential structure or steps" and it is not essential to give meaning to the remainder of the claim. All of the constituents of the preamble can be found in the remainder of claim 1. The preamble merely defines the context of the '154 patent invention. *See Intirtool, Ltd. v. Texar Corp.*, 369 F.3d 1289, 1295 (Fed.Cir.2004). On this basis, the preamble does not serve as a claim limitation.

However, a claim preamble may constitute a limitation for a separate reason, one present here. During the prosecution of the application that led to the '154 patent, the applicants were confronted with the PTO's rejection of claim 1 based in part on prior art disclosed in the Samuelson '185 patent. FN54 Although not

denominated "quasi-conductive," the Samuelson ' 185 patent describes an embodiment of the quasi-conductive fiber disclosed in the ' 154 patent.FN55 The PTO argued that it would be obvious to apply the teaching of the Samuelson ' 185 patent with the Pappas ' 699 patent directed to ungrounded flexible fiber containers incorporating other conductive fibers. In order to overcome this objection, applicants' amended the preamble to recite that the ungrounded flexible fabric containers of their invention are used in combustible environments while the Samuelson ' 185 patent discloses a very different use in clean rooms to prevent damage to electronic components. FN56

FN54. '154 patent File Wrapper at IT00653, IT00655 (Intertape Sum. J. Memo, Exh. 14).

FN55. Samuelson '185 patent (Intertape Br., Exh. 4), col. 1, ll. 23-23, 29-32; col. 2, ll. 20-21.

FN56. '154 patent File Wrapper at IT00677, IT00681, IT00682 (Intertape Sum. J. Memo, Exh. 14).

A "clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art" transforms the preamble into a claim limitation. *Intirtool*, 369 F.2d at 1295, quoting *Pitney Bowes*, 182 F.3d at 808. This is because "such reliance indicates use of the preamble to define, in part, the claimed invention." *Invitrogen Corp. v. Biocrest Manufacturing, L.P.*, 327 F.3d 1364, 1370 (Fed.Cir.2003), quoting *Catalina*, 289 F.3d at 808-809. The patentees of the '154 patent made just such a clear reliance by their amendment of the preamble during the patent prosecution to distinguish a prior art reference. For this reason, the preamble is a limitation on the scope of independent claim 1.

2. a coating of a compound having antistatic properties

Intertape has not asserted explicitly that the meaning of the words "a coating of a compound having antistatic properties" is in dispute. For example, no mention of this phrase is made in Intertape's proposed Order on claim construction submitted after the *Markman* hearing. However, in a claim chart in its "Defendants' Memorandum On Claim Construction," Intertape reads into the words "a coating of a compound having antistatic properties" the limitation that the resultant fabric possesses "a surface resistivity between 109 and 1012 ohm/square." FN57 This resistivity range is selected by Intertape from the specification description that places antistatic coating materials between a range of 105 ohms per square and below for certain conductive materials and 1012 to 1013 ohms per square for non-conductive materials in general. Intertape has not provided a justification for its interpretation. I find neither intrinsic nor extrinsic evidence that LINQ intended to limit the definition of "a coating of a compound having antistatic properties" to require a resultant fabric with a specific ohms-per-square resistivity. Absent clear evidence of such an intention by the inventors, embodiments and examples contained in the specification should not be read into a claim as limitations. *See Tate Access Floors, Inc. v. Maxcess Technologies, Inc.*, 222 F.3d 958, 966 (Fed.Cir.2000).

FN57. Intertape Br. at p. 8.

3. a plurality of quasi-conductive fibers having corona discharge points

"Plurality" means more than one. Plurality does not have a special or technical meaning as used in claim 1.

The parties point to none.FN58 "Corona discharge points," a technical term, has an ordinary and customary meaning to those skilled in the relevant art at the time of the invention. FN59 Its meaning in the context of the LINQ Patents is not disputed. FN60

FN58. There is no inconsistency with the plain meaning of "plurality" as used in claim 1 and the words "at least one quasi-conductive fiber positioned up to about four inches apart from one another" in claim 7. *See* Intertape Br. at 13. The description of claim 7 that the fibers are "apart from one another" on the container fabric allows no other logical interpretation than that the container fabric has more than one fiber.

FN59. M. Nelson, *et al.*, Anti Static Mechanisms Associated With FIBC Fabrics Containing Conductive Fibres," n. 39 *supra*, IT00587: "Corona discharges have been studied extensively over the last century and the theories developed have been used for the design of static precipitators [,] dust collectors and static eliminators, etc."

FN60. LINQ's Proposed Order On Claim Construction, at p. 25 n. 9.

Unlike these surrounding terms, the definition to be accorded the term "quasi-conductive fibers" is the most contentious of the claim construction issues presented by the parties. The term appears in claims 1, 2, 3, 7 and 8 of the '154 patent; claims 3, 4, 6, 7, 8 and 9 of the '449 patent; and 1, 2, 3, 4, 5 and 7 of the '772 patent. LINQ and Intertape agree that "quasi-conductive fibers" is a term created by the patentees and that it identifies fibers having an intermediate level of electrostatic conductivity on a scale between conductive and non-conductive.FN61 This is the single point on which there is agreement regarding the meaning of quasi-conductive fibers.

FN61. *See Markman* hearing (July 28, 2004) at pp. 33:14-17; 160:18-21.

LINQ's position is that the proper definition is essentially in the form it appears in the claim. Thus, a quasi-conductive fiber has corona discharge points and contains a plurality of filaments sized and shaped to effect corona discharge at these points and to have sufficient resistance to avoid incendiary discharge at the ends and along the lengths of the filaments at a rate that results in incendiary type discharges in a combustible atmosphere of 0.25mJ.

Intertape notes that the word "sufficient" was disclaimed by the inventors in response to a PTO objection and that, in any event, no metes and bounds are given to for the level of conductivity needed to achieve corona discharge and the level of resistivity needed to avoid incendiary discharges in a combustible atmosphere. Intertape argues that a quasi-conductive fiber is fiber that has conductivity along a continuum from the most conductive material to the least conductive material known in the art at the time of the invention.

It is important to observe that LINQ was not the first to address the problem of electrostatic buildup in fibers. Terms such as corona discharge, incendiary discharge, conductivity and resistivity were well-understood by persons of ordinary skill in the art of flexible fabric containers at the time the '154 patent application was filed in 1994. The prior art that is made a part of the prosecution history of the '154 patent is

extensive and helpful to an understanding of the patentees' definition of the coined term "quasi-conductive fibers." The following references are illustrative.

The concept of antistatic safeguards in plastic packaging, including ranges of protection based on surface electrical resistivity, was well-known at the time of the invention. For example:

The Department of Defense Handbook 263 defines three levels of protection, which have corresponding ranges of surface resistivity (expressed as ohms/square). In descending order of conductivity (fewer ohms/square), the three categories are: conductive, static dissipative, and antistatic.FN62

FN62. '154 patent File Wrapper (Intertape Sum J. Memo., Exh. 14), "Electronics, packaging spur developments in antistats," PLASTICS WORLD (Mar.1989) at IT00617.

U.S. Patent No. 4,431,316 was issued to Massey on February 14, 1984 ("Massey '316 patent").FN63 The Massey ' 316 patent teaches the utilization of electrostatic dissipative "threads" in the woven polymeric fabric of an ungrounded FIBC. The specification discloses:

FN63. Intertape Br. at Exh. 10.

Usually these additional threads will be additional warp threads spaced apart at say intervals of 1.5 centimeters to 3.5 centimeters, usually about 2.0 centimeters. The additional threads are formed from or include staple metal fibers which are conductive to electricity as distinct from the polymeric material which can be an electrical insulator.

...

... Preferably the threads have a central core of a synthetic textile material; e.g., a polyester or polyamide textile material, and surrounding this core is spun the metal staple fibers. The threads so obtained are included in the woven fabric during manufacture.

It is believed that these metal staple fibers not only may provide a path in the fabric along which charged ions may travel, but the free ends of the staple fibers protruding outwardly of the fabric may provide convenient electric corona discharge points.FN64

FN64. Massey '316 patent, "Defendants' Brief In Response to Plaintiffs Opening Brief On Claim Construction," ("**Intertape Resp. Br.**"), Ex. 10, col. 2, ll. 17-22, 32-42.

The specification states that the "container of the present invention is of particular use in the transportation of powders ... and other granular products which can be used in industry where spark discharges can be dangerous in dusty atmospheres or in proximity to inflammable solvents." FN65

FN65. Id., col. 2, ll. 60-65.

The Pappas '699 patent, which received significant attention during the prosecution of the application that

led to the '154 patent, also discloses an ungrounded flexible bulk container used "in dusty atmospheres or in close proximity to inflammable solvents" that employs "conductive yarns" woven into the container fabric to enhance dissipation of static electricity. "As static charges are generated, the electrons can flow across the fabric and dissipate or bleed into the atmosphere almost immediately ." FN66 The specification description of electrons being dissipated as they bleed into the atmosphere is a commonly-understood description of corona discharge.FN67 The preferred embodiment of antistatic thread disclosed in the Pappas ' 699 patent specification is a relatively nonconductive monofilament core coated with a highly conduct metal such as silver or copper.FN68

FN66. Pappas '699 patent (Intertape Br., Exh. 21), col. 1, ll. 56-57, col. 2, ll. 45-47.

FN67. *See, e.g.,* G. Luttgens, *et al.*, "Understanding and Controlling Static Electricity" pp. 98-99 ('154 patent File Wrapper, Intertape Sum. J. Memo., Exh. 14, IT00637-638); M. Nelson, *et al.*, *Anti Static Mechanisms Associated With FIBC Fabrics Containing Conductive Fibres*," n. 39 *supra*, IT00587-588.

FN68. Pappas '699 patent (Intertape Br., Exh. 21), col. 4, ll. 9-15; col. 7, ll. 36-38.

As previously mentioned, during the prosecution of the '154 patent application, the examiner asserted that portions of the invention were anticipated by the Pappas '699 patent. Of particular relevance here, the examiner remarked:

With respect to the claim language "quasi-conductive", applicant's [*sic*] attention is drawn to Pappas et al. '699 col. 4, lines 9-15. Since the conductive fiber of Pappas et al. '699 is disclosed as being a plastic filament with a conductive coating, the fiber, taken as a whole, is considered to be "quasi-conductive" to the same degree claimed in the present invention. FN69

FN69. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14), IT00650.

The examiner drew the same conclusion from his reading of the Samuelson '185 patent, which teaches use of a particular antistatic fiber conforming to the structure of the preferred embodiment of the '154 patent and which, like the Pappas '699 patent antistatic fiber, also employs corona discharge properties.FN70 The examiner believed it would be obvious to persons skilled in the art to combine the teaching of the Pappas '669 patent with respect to use of bi-component conductive fibers woven into flexible fabric containers to dissipate static discharges in flammable atmospheres with the antistatic fiber consisting of a conductive multilobal filament and insulating sheath taught in the Samuelson ' 185 patent.FN71

FN70. Samuelson '185 patent (Intertape Br., Exh. 4), Figs. 1 and 2, col. 2, ll. 26-43, col. 6, ll. 58-62.

FN71. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14), IT00652.

The rebuttal presented by the inventors stated that neither the Pappas '699 patent nor the Samuelson '185

patent teach use of fibers that are "quasi-conductive fibers which effect corona discharge and have sufficient resistance to avoid incendiary discharge." FN72 Because the fibers in both prior art patents do utilize corona discharge to achieve static dissipation, the inventors' distinction boils down to the characteristic that the quasi-conductive fiber is conductive enough to effect corona discharge and yet maintain "sufficient resistance" to avoid an incendiary discharge in a combustible environment.

FN72. Id., IT00675-676.

The '154 patent discloses a "quasi-conductive fiber effects corona discharge, such as its ends or at other discharge points, but has sufficient resistance to substantially avoid incendiary discharge at its ends and along its length that results in incendiary type discharges." FN73 Intertape argues that this merely states the objective or function of the "quasi-conductive fiber."

FN73. '154 patent (LINQ Br., Exh. 1), col. 4, ll. 10-13, claims 1 and 7.

As instructed by *Phillips*, I turn to the specification of the '154 patent for guidance. The written description is not as helpful as it could be.

First, while "sufficient" is used to qualify the word "resistance" in the specification, it is not contained in the relevant claims. That is because the PTO required it to be disclaimed on the ground that it was indefinite. FN74 Intertape correctly argues that is improper to restore the word "sufficient" to the claims in view of the inventors' express waiver.FN75 See *Phillips*, 415 F.3d at 1317; *Chimie v. PPG Industries Inc.*, supra, 402 F.3d at 1384.

FN74. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14), IT00719-720.

FN75. *Markman* hearing trans. (July 29, 2004) at p. 73:12 to 74:3.

Second, the specification contains imprecise and somewhat inconsistent descriptions of the levels of conductivity of the quasi-conductive fiber components. In one disclosure, the embodiment is said to consist of a *relatively conductive* core, at least partially ensheathed in a *relatively quasi-conductive* or *non-conductive* material." FN76 In dependent claim 8, the quasi-conductive fibers are said to include a *conductive core* and a *relatively insulating* sheath.FN77 The preferred multilobal embodiment of a *quasi-conductive* fiber shown in Figure 3 contains a *relatively conductive* portion and a *quasi-conductive* outer sheath.FN78 The electrical resistivity of the insulating sheath material is even specified, but it seems clear that this level of resistivity is not intended to define the measure of resistivity required to avoid incendiary discharge in the quasi-conductive fiber taken as a whole. The parties have not treated it as such in any of their submissions. Such references in the written description to only one part of a "quasi-conductive fiber" qualifying as quasi-conductive is inconsistent with other descriptions of the entire "quasi-conductive fiber" and contribute to the uncertain meaning of the term.

FN76. '154 patent (LINQ Br., Exh. 1), col. 4, ll. 13-16. The specification states that other embodiments may not include distinct conductive cores with "quasi-conductive" sheaths. Id., col. 4, ll. 40-41.

FN77. *Id.*, claim 8, col. 8, ll. 9-10.

FN78. *Id.*, Fig. 3 and col. 4, ll. 34-36. LINQ appears to fall victim to this ambiguity. It asserts that "conductive materials, quasi-conductive materials and non-conductive materials, and various combinations, could all be used to make the quasi-conductive fibers." LINQ Br. at 26. Perhaps true for combinations of materials, but it is difficult to understand how, for example, non-conductive materials alone could be used to make quasi-conductive fibers.

Third, the specification identifies P-70, a "currently available fiber" created by DuPont, that "may be adopted for use as a quasi-conductive fiber..." FN79 In fact, the threshold voltage to achieve corona discharge for this DuPont fiber was added as an amendment to the specification. FN80 Reference to a specific product as an example of "quasi-conductive fiber" would be highly relevant to understanding the definition of this term. *See Chimie v. PPG Industries Inc.*, supra, 402 F.3d at 1378. However, the parties agree that the P-70 product does not exist.FN81 What does exist, and is part of the prosecution history, is a brochure disclosing DuPont antistatic fibers sold under the mark NEGA-STAT with designations P-140 and P-190.FN82 The diagrammed P-140 NEGA-STAT product has features disclosed in the Samuelson ' 185 patent, including a trilobal conductive core, insulating sheath, and use of corona discharge to dissipate static charges. These elements are also disclosed in the preferred embodiment of the ' 154 patent.FN83 Mr. Pappas, a co-inventor, testified that in his opinion had DuPont been contacted with a description of the misidentified P-70 fiber DuPont would have been able to identify the correct product.FN84 Perhaps the written description of the threshold voltage to achieve corona discharge would assist such an inquiry. Intertape's expert refutes this, observing that DuPont no longer sells NEGA-STAT products.FN85 The testimony on both sides is inconclusive as to whether contact with DuPont by a person skilled in the art at the time of the invention would have revealed the correct product. *See further Phillips*, 415 F.3d at 1318. What is clear is that the patentees gave a detailed description of the product and provided guidance on the kinds of antistatic fibers and antistatic fiber sources to be considered in order to practice the invention.

FN79. *Id.*, col. 4, ll. 43-45.

FN80. *Id.*, col. 4, ll. 59-63. *See* '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14) at IT00718.

FN81. *See Markman* hearing trans. (July 29, 2004) at p. 29:18-25; Depo. of M. Horenstein (Intertape Br., Exh. 27), at p. 136:7-10.

FN82. DuPont, "NEGA-STAT: The New Standard in Static Dissipative Fibers," '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14), at IT00599-615. The specifications of the '449 patent and the '772 patent change the product designation from P-70 to P-190. The product numbers refer to the diameter (denier) of the fiber. Depo. of R.J. Pappas (Vol.II) at p. 20:13-17.

FN83. *See* Depo. of M. Horenstein (Intertape Br., Exh. 27) at p. 148:13-17; Depo. of R.J. Pappas (Vol.1) (Intertape Br., Exh. 1) at p. 213:7-10.

FN84. Depo. of R.J. Pappas (Vol.II) (Intertape Br., Exh. 1) at p. 21:4-8.

FN85. *Markman* hearing trans. (July 29, 2004), at pp. 29:18-25; 38:3 to 40:15.

Fourth, as Intertape observes, the claims, specification and prosecution history of the '154 patent do not reveal any test or other objective criteria that would enable a person of ordinary skill in the art to determine that a particular fiber is "quasi-conductive." FN86

FN86. The subject of statutory enablement and description pursuant to Section 112 of the Patent Act, 35 U.S.C. s. 112, is not addressed in this report. It is the subject of "Defendants' Statement of Material Facts Not In Dispute and Memorandum of Law In Support of Dispositive Motion for Summary Judgment of Invalidity and Non-Infringement."

In view of the ambiguity introduced by the specification, it is helpful to review the teaching of prior art made of record in the prosecution history, and to evaluate available extrinsic evidence within the guideposts provided by *Phillips* to determine what, if anything, the disclosure of the '154 patent, as so amplified, would inform a person of ordinary skill in the art at the time of the invention as to the meaning of "quasi-conductive fiber."

A person of ordinary skill in the relevant art at that time would understand the degree of conductivity required to "size and shape" quasi-conductive fiber filaments to achieve corona discharge at corona discharge points. There is substantial prior art in the record of this case, including prior art made part of the prosecution history, to support this conclusion.FN87 By identifying an antistatic fiber product of DuPont to be "quasi-conductive," the ' 154 patent inventors reveal that they did not restrict their own research to fibers that have a known application to FIBCs. Others skilled in the art at this time can be presumed to act similarly. *See Phillips*, 415 F.3d at 1314 (inventors typically persons skilled in the art). Also, "[o]ne of the best ways to teach a person of ordinary skill in the art how to make and use the invention is to provide an example of how to practice the invention in a particular case." *Phillips*, 415 F.3d at 1323. Although the DuPont P-70 product may be misidentified in the specification, the DuPont NEGA-STAT brochure included in the prosecution history and the specification disclosure threshold voltage for corona discharge would provide important information about the characteristics and possible source of this example of a quasi-conductive fiber.

FN87. *See, e.g.*, n. 39 *supra*; Samuelson '185 patent (Intertape Br. Exh. 4); DuPont, "NEGA-STAT: The New Standard in Static Dissipative Fibers," '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14), IT00609-610. N. Wilson, "The Electrostatic Spark Discharging Behavior of Some Flexible, Intermediate Bulk Containers" (Intertape Br., Exh. 17);

The ability to establish corona discharge in a variety of different fibers using a broad range of fiber

structures would enable an ordinarily skilled person to set the upper limit of conductivity for a "quasi-conductive" fiber. To set the lower limit of "resistivity" it would be necessary for an ordinarily skilled person to engage in controlled tests to determine the point at which incendiary discharges would be avoided in combustible atmospheres having an MIE of 0.25 mJ.

The parties agree that such testing is required to establish a fiber is quasi-conductive.FN88 At the time of the invention, several tests of varying efficacies existed to determine the static dissipative properties of fabrics and fibers. Intertape has attached as an exhibit to its brief a paper authored by N. Wilson and presented on September 28, 1989, entitled "The Electrostatic Spark Discharging Behavior of Some Flexible, Intermediate Bulk Containers." FN89 In addition to describing the state of the art of FIBC static dissipation at that time, the author describes a test using flammable vapors. The test measures the capacitance of conducting threads woven into a FIBC fabric and the incidence, at different thread capacitances, of an incendiary type discharge in atmospheres with a defined MIE.FN90 A somewhat similar "charge" test appears to have been employed by Mr. Pappas, a co-inventor, in describing the differences between existing antistatic fabric and the novel fabric of the invention.FN91 Such a test is also disclosed in the Samuelson '185 patent.FN92 There was also a "static decay" test in existence at the time that measures the electrical resistance of static dissipative materials by means of a national standard.FN93 The DuPont NEGA-STAT brochure supports use of the static decay test, but notes its limitations.FN94

FN88. *See* Depo. of R.J. Pappas (Vol.1) (Intertape Br., Exh. 1) at pp. 175:1-19; 209:11 to 210:7.

FN89. DuPont, "NEGA-STAT: The New Standard in Static Dissipative Fibers," '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14), at IT00599-615.

FN90. *Id.*, at LQ001388-1396.

FN91. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14) at IT00703-712.

FN92. Samuelson '185 patent (Intertape Br., Exh. 4), col. 6, l. 58 to col. 7, l. 2.

FN93. *See* Exxon Chemical, "Static Electricity and FIBC's" (Intertape Br., Exh. 19) at pp. 2-3.

FN94. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14) at IT00606-607.

The record shows that a two-part "full-scale FIBC" test was employed by the inventors to ascertain whether a fiber met the "quasi-conductive" standard. The necessary resistivity of the fiber was determined by the electrostatic charging of the container's contents and then approaching the fabric surface of the container with a gas probe in an effort to induce an incendiary discharge in a combustible environment of 0.25mJ.FN95 Mr. Pappas, the co-inventor, explained: "You would examine a particular fiber for corona discharge properties, and then to determine if you have incendiary discharges from the ends of the fiber, you

would perform a full-scale FIBC test." FN96 However, this test appears to have been little known at the time of the invention and still is not accepted as a standard in the industry.FN97

FN95. Depo. of R.J. Pappas (Vol.1) (Intertape Br., Exh. 1) at pp. 175:1-18; 213:1-10.

FN96. Depo of R.J. Pappas (Vol.III) (Intertape Br., Exh. 1) at p. 174:1-4. The test is described in Depo. of R.J. Pappas (Vol.I) (Intertape Br., Exh. 1) at pp. 157:12 to 158:1.

FN97. Depo of R.J. Pappas (Vol.II) (Intertape Br., Exh. II) at pp. 12:19 to 13:20

On balance, the extrinsic evidence of tests available to persons skilled in the art to ascertain antistatic fiber resistivity does not contribute to the definition of "quasi-conductive fibers." The need for any such test is not mentioned in the claims, specification or prosecution history. To import an undisclosed test requirement into the claim definition in these facts would be improper. *See Liebel-Flarsheim Co. v. Medrad, Inc.*, supra, 358 F.3d at 910. As noted, the tests were not widely accepted or practiced at the time of the invention. Finally, and most importantly, such testing is unnecessary to understand the meaning of "quasi-conductive fiber" as intended by the patentees.

The intrinsic evidence, while not without the limitations mentioned before, does provide sufficient disclosure to support a definition of "quasi-conductive fiber" that includes an upper range of conductivity to effect corona discharge and a lower range of conductivity (higher resistance) to avoid incendiary discharge in combustible environments of 0.25mJ. The structure of the quasi-conductive fiber is disclosed, including a preferred embodiment in Figure 3. The requirement that the fiber have corona discharge points is taught, as is the requirement that the fiber be sufficiently conductive to effect corona discharge at the discharge points. As has been said, the upper measure of conductivity required to effect corona discharge was well-known at the time by persons ordinarily skilled in the art. The specification teaches that too much conductivity might result in incendiary discharges in ungrounded flexible fabric containers. The Pappas '699 patent and the Samuelson '185 patent, which the patentees distinguished during prosecution, use highly conductive fibers to achieve static dissipation. The specification shows that by reducing the conductivity of a component of the quasi-conductive fiber, such as the sheath in the preferred embodiment, the resultant fiber avoids incendiary discharge in a defined combustible environment.

Accordingly, I recommend adoption of this construction: quasi-conductive fibers are composed of filaments that are sized and shaped to effect corona discharges at corona discharge points while having a resistance to avoid discharges at the ends and along the length of the filaments at a rate that would result in an incendiary type of discharge in a combustible environment of 0.25mJ.

Intertape disputes the definition of three terms subsumed within this definition, and that are contained within claims 1 and 7 and several dependent claims of the '154 patent. These terms are "composed of," "sized and shaped," and "filaments."

3.1 composed of

Independent claims 1 and 7 state that the "quasi-conductive fibers" are "composed of" a plurality of

filaments. The parties dispute whether "composed of" used in this context is an "open" or "closed" transitional term. If open, as LINQ contends, then quasi-conductive fibers may include features other than those specifically identified in the claim. If closed, as Intertape contends, then the quasi-conductive fibers must contain only these features.

The Federal Circuit has stated that while " 'closed' transition phrases such as 'consisting of' are understood to exclude any elements, steps, or ingredients not specified in the claim", there is slight leeway in appropriate cases to include features that "do not materially affect the basic and novel properties of the invention." *AFG Industries, Inc. v. Cardinal IG Company, Inc.*, 239 F.3d 1239, 1245, 1247 (Fed.Cir.2001), quoting *PPG Industries v. Guardian Industrial Corp.*, 156 F.3d 1351, 1354 (Fed.Cir.1998). In *AFG Industries*, interlayers not disclosed in the claims were shown by the patent specification and testimony to be an essential part of the manufacturing process of the claimed product but not to be a part of the final product. The Court concluded that the undisclosed interlayers could be included in the claim interpretation because they did not materially change the scope of the claim as written.

In this case, LINQ argues for an open-ended permit to add elements to the meaning of "quasi-conductive fibers" without specifying with precision what the added elements are or how their inclusion would avoid a material change to the scope of the invention.FN98 The examples LINQ gives of permutations of fiber structure either are already encompassed in the definition of quasi-conductive fibers or are not sufficiently disclosed in the intrinsic evidence to enable a determination if their inclusion would materially affect the invention as expressly claimed.

FN98. LINQ Br. at 26-27.

For these reasons, I recommend the words "composed of" be given the closed meaning requested by Intertape.

3.2 sized and shaped to effect corona discharge

The words "sized and shaped" appear in independent claims 1 and 7 and dependent claims 5 and 9. The claims and specification use these words to describe the attributes of the filament that would achieve corona discharge at corona discharge points. The prior art references teach that corona discharge is effected by the configuration of the fiber, in other words how it is sized and shaped.FN99 They also discuss corona discharge onset at different configurations.FN100 Further, the DuPont NEGA-STAT brochure depicts corona discharge occurring in its P-140 fiber product that has a conductive core and insulating sheath.FN101 The specification teaches that the DuPont product has a specific corona discharge threshold voltage.FN102

FN99. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14) M. Nelson, *et al.*, "Anti Static Mechanisms Associated With FIBC Fabrics Containing Conductive Fibres," 30 J. ELECTROSTATICS 135 (1993), at IT00620; G. Luttgens, *et al.*, "Understanding and Controlling Static Electricity," at IT00638.

FN100. *Id.*, M. Nelson, *supra*, at IT00588-596.

FN101. *Id.*, DuPont, "NEGA-STAT: The New Standard In Static Dissipative Fibers," at IT00603.

FN102. '154 patent (LINQ Br., Exh. 1), col. 4, ll. 59-63.

Intertape maintains that the words "sized and shaped" are vague and indefinite. However, in view of the specification and prior art disclosures just described, a person of ordinary skill in the art would find that the words "sized and shaped" to achieve corona discharge have an ordinary and customary meaning applicable to antistatic fibers. Further, such a person would not conclude, as Intertape contends, that only the preferred embodiment of Figure 3 teaches the proper "size and shape." The specification mentions a number of possible embodiments. Unless the specification clearly demonstrates otherwise, it is improper to import the preferred embodiment's structure into the claims. *See* North American Container, Inc. v. Plastipak Packaging, Inc., 415 F.3d 1335, 1348 (Fed.Cir.2005); Wenger Manufacturing, Inc. v. Coating Machine Systems, Inc., supra, 239 F.3d at 1237; Karlin Technology., Inc. v. Surgical Dynamics, Inc., 177 F.3d 968, 973 (Fed.Cir.1999). Further, dependent claim 4 recites key features of the preferred embodiment and independent claim 1 is presumed to have a broader scope. *See* Liebel-Flarsheim Co. v. Medrad, Inc., supra, 358 F.3d at 910.

3.3 plurality of filaments

Independent claims 1 and 7 and dependent claims 4, 5 and 9, recite that the quasi-conductive fibers are composed of a "plurality of filaments." LINQ proposes "thinly spun threads" as the correct construction of filament. FN103 Intertape proposes the narrower definition that a filament is a "continuous strand" as distinct from a staple fiber. FN104 According to Intertape, "[o]nce filaments are chopped into short segments, the material ceases to be referred to as filaments and becomes known as staple material." FN105 It appears that Intertape also questions use of the term "plurality" in connection with "filaments." It asserts that the only embodiment of the quasi-conductive fiber shown and discussed in the specification is the single filament of Figure 3. FN106 This contradicts the claim language that quasi-conductive fibers are composed of a "plurality" of filaments.

FN103. LINQ Br. at p. 25

FN104. Intertape Br. at p. 14.

FN105. Order regarding claim construction proposed by Intertape, at p. 13.

FN106. *Ibid.*

Corona discharge can occur at various "points" on a fiber, including corners and ends, based on the size and shape (diameter) of the fiber. FN107 To achieve corona discharge requires a relatively thin fiber. FN108 A quasi-conductive fiber consisting of "continuous" filaments, as in Intertape's definition, would have "points" only at its two ends because it would not have any intermediate ends within the length of the

quasi-conductive fiber. Conversely, if the filaments are made up of a number of shorter length fibers wound together, such as Intertape's definition of a staple fiber, the quasi-conductive fiber can have additional corona discharge points along its length where such ends of the shorter filaments occur. The specification does not mention corona discharge points other than at the ends of the quasi-conductive fiber.FN109 However, there is reference to the possibility of such additional corona discharge points occurring along the length of the quasi-conductive fiber in the declaration of co-inventor Pappas included in the prosecution history:

FN107. M. Nelson, *et al.*, Anti Static Mechanisms Associated With FIBC Fabrics Containing Conductive Fibres," n. 39 *supra*, IT00587.

FN108. *See Markman* hearing trans. (Vol.I), at p. 79:7-18.

FN109. '154 patent, claim 9, col. 4, ll. 59-65, col. 4, l. 67 to col. 5, l. 6.

Further, the filaments are sized and shaped to effect corona discharge at discharge points. The multifilament fiber is composed of six fibers or filaments that are wound together making up the finished bundle. Because this bundle is not strong enough for weaving into fabric, the bundle is twisted with a multifilament polyester strand. The finished fiber is woven into the fabric at about one-inch spacings, or about two centimeters. During this process, filaments may become damaged or broken, creating break points in the filaments, which points may serve as likely sites for corona discharge.FN110

FN110. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14) at IT00704.

Certainly, Mr. Pappas uses the terms filament and fiber interchangeably. He states "the multifilament fiber is composed of six fibers or filaments." He describes that the filaments may become damaged or broken in the process of manufacture. The continuous, indeterminate length of the filaments, the definition urged by Intertape, is not a feature of the invention.

The Pappas '699 patent, of which Mr. Pappas is also a co-inventor, similarly uses the terms filament and fiber interchangeably. The specification refers to a conductive "fiber," while claims 7, 8 and 12 to which it relates refer to a "filament." FN111 As another example, United States Patent No. 3,969,559 made of record by Intertape is titled "Man-Made Textile Antistatic Strand" and gives as two examples of "filament" a "multifilament or monofilament yarn or staple fiber." FN112 A dictionary definition offered by Intertape at the *Markman* hearing establishes: "A fiber or a filament is the smallest unit in any type of cloth." FN113

FN111. Pappas '699 patent (Intertape Resp. Br., Exh. 21), *e.g.*, col. 3, ll. 40-53; claim 7, col. 8, ll. 43-45; claim 8, col. 8, ll. 46-48; claim 12, col. 8, ll. 58-59.

FN112. U.S. Patent No. 3,969,559 (Intertape Resp. Br., Exh. 14) abstract

FN113. *Markman* hearing (Def.Exh.11B) *Encyclopedia of Textiles* (3d ed., 1980) at p. 544.

There is no intrinsic evidence that the inventors intended to limit "quasi-conductive fiber" to any one form of filament or fiber. To the contrary, the specification describes other possible embodiments, FN114 and the continuation-in-part '449 patent adds others. FN115 The prior art demonstrates that antistatic fibers have been made from both staple fibers and filaments. FN116 There is no reason to believe a person of ordinary skill in the art at the time of the invention would believe the filaments disclosed in the '154 patent could not include staple fibers.

FN114. '154 patent (LINQ Br., Exh. 1), col. 4, ll. 39-45.

FN115. '449 patent (LINQ Br., Exh. 2), Figs. 10-11.

FN116. *See* Massey '316 patent (Intertape Resp. Br., Exh. 10) (metal staple fibers); Samuelson '185 patent (Intertape Br., Exh. 4) (filaments).

I derive from the foregoing that "filament" has a broader meaning to persons skilled in the art than a continuous strand of indeterminate length, the dictionary definition urged by Intertape. "If an apparatus claim recites a general structure without limiting that structure to a specific subset of structures, we will generally construe the term to cover all known types of that structure" that the patent disclosure supports." CCS Fitness, Inc. v. Brunswick Corp., *supra*, 288 F.3d at 1366, quoting *Renishaw PLC v. Marposs Societa' Per Azioni*, *supra*, 158 F.3d at 1250.

I recommend "filament" be construed to mean a thin strand or fiber, which may include staple fibers.

With respect to Intertape's contention that the specification does not disclose a "plurality" for filaments constituting the quasi-conductive fiber, I agree that the preferred embodiment of a quasi-conductive fiber does not disclose a plurality of filaments, nor does the specification clarify this point. In contrast, the '449 patent describes the preferred embodiment as "a single filament of the quasi-conductive fiber...." FN117 As mentioned above, the declaration of Mr. Pappas explains that six filaments are wound into a bundle with a polyester strand to form the quasi-conductive fiber. While not an ideal disclosure, we are instructed to review the intrinsic evidence as a whole, as is presumed would a person with ordinary skill in the art. *See Phillips*, 415 F.3d at 1314. Read in its entirety, the intrinsic evidence supports the interpretation that the quasi-conductive fiber of the invention may be composed of a plurality of filaments.

FN117. '449 patent (LINQ Br., Exh. 2) col. 4, ll. 62-64.

B. Claim 2

LINQ requests that the language of claim 2 providing "wherein said quasi-conductive fibers are woven into the fabric container" be construed by the Court. FN118 LINQ maintains that this language should be read to allow the quasi-conductive fibers to be woven in the fabric in any manner and at any time during the process of manufacturing. Intertape appears only to have raised this contention in a cursory manner and by

taking a very literal approach to the meaning of "woven into the fabric container", namely, after the container is assembled.FN119 Intertape's interpretation is contrary to the claim, FN120 the specification,FN121 and logic, all of which instruct that the antistatic fibers are woven into the fabric at the point and in the manner at which it is efficient to do so.

FN118. LINQ Br. at pp. 29-30; LINQ's Proposed Order On Claim Construction, at pp. 35-37.

FN119. Intertape Br. at 9.

FN120. 154 patent (LINQ Br., Exh. 1), claim 1, col. 6, 52-54 ("said coated fabric including a plurality of quasi-conductive fibers").

FN121. Id., Fig. 2 and col. 3, ll. 1-3, 62-67.

V. THE '449 PATENT

The parties are in agreement that the following boldface terms of claims 1 and 3-9 of the '449 patent are in dispute. Only certain of the terms in dispute have not been addressed in connection with the '154 patent. These new words are underscored. A majority of the words are the same as construed in connection with the '154 patent, of which the '449 patent is a continuation in part. Only the underscored language will be addressed. The remaining boldface words have the same meaning as provided in the preceding discussion of the '154 patent claims.FN122

FN122. With respect to the key term "quasi-conductive fibers," the applicants expressly stated to the PTO during the prosecution of the '449 application that the term has the same meaning as it does in the '154 patent. *See* '449 patent File Wrapper (Intertape Sum. J. Memo., Exh. 33) at IT-01019.

1. **An ungrounded flexible fabric container system *with a reduced energy of electrostatic discharge for use in a combustible environment comprising:*** a woven fabric **configured to form the flexible fabric container** having side walls, *a closed end and an open end;* and Said woven fabric *having an electrical resistivity to allow the flow of electricity through the fabric at a rate to discharge of below about one-hundred nanocoulombs per individual discharge with the fabric charged at greater than about negative ten thousand volts .*

2. (No terms in dispute.)

3. A system as in claim 1 wherein said fabric includes a **plurality of quasi-conductive fibers** positioned preferably about one-half to about four inches apart from one another and having **corona discharge points, said fibers being composed of materials and sized and shaped to effect corona discharge at said discharge points, and to have sufficient resistivity to avoid incendiary discharge at its ends or along its length at a rate that results in incendiary type discharges in the combustible environment.**

4. A system in claim 3 wherein said **quasi-conductive fibers** are composed of *multifilaments*.
5. (No terms in dispute.)
6. A system as in claim 5 wherein said **quasi-conductive fibers are woven into the fabric container**.
7. A system as in claim 6 wherein said **quasi-conductive fibers** are positioned preferably about one to about four inches apart from one another.
8. A system as in claim 7 wherein each said *multifilament of said quasi-conductive fibers* includes a conductive core and an insulating sheath.
9. A system as in claim 8 wherein said **quasi-conductive fibers are sized and shaped to have a corona discharge** threshold voltage at their ends in the range of about three to about four kilovolts and an end of a looped one of said sized and shaped quasi-conductive fibers has a corona discharge threshold voltage of about nine kilovolts.
10. (No terms in dispute.)

As a continuation in part of the '154 patent, the '442 patent includes all of the provisions of the parent patent and additional subject matter not disclosed there. For example, the '449 patent disclosed additional embodiments of the quasi-conductive fiber and "charge transfer" test data quantifying the amount of energy produced by an electrical discharge a grounded object approaches a FIBC containing different elements of the invention.

A. Claim 1

1. An ungrounded flexible fabric container system *with a reduced energy of electrostatic discharge for use in a combustible environment*

This preamble is similar to that of the '154 patent, with the exception of the underscored words. Only the new terms are discussed here. The remaining terms have the construction previously assigned in the '154 patent analysis.

The preamble of independent claims 1 and 7 of the '154 patent provides for "a reduced potential for incendiary discharge". The preamble of independent claim 1 of the '449 patent modifies this language to read "a reduced energy of electrostatic discharge." The change reflects the new disclosure in the '449 patent specification relating to the manner in which electrical energy is discharged from a region of the surface of the container.FN123 This difference is not material to the construction of the preamble, which remains as stated for the preamble language of claims 1 and 7 in the '154 patent.

FN123. '449 patent (LINQ Br., Exh. 2) col. 11, ll. 26-28.

2. a closed end and an open end

Intertape asks that the limitation in the claim that the flexible fabric container has a "closed end and an open end" be read literally to mean the container has one end that is always closed and another end that is always

open or without a closure mechanism.FN124 In truth, the chosen claim is inartful if, as LINQ contends, the intended meaning is that the container ends may be opened or closed depending upon whether the container is being filled, emptied or transported.FN125 Nonetheless, Intertape's construction is contradicted by the preferred embodiment of the container shown in Figure 6. It includes drawstrings (numerals 95) for opening and closing the top and bottom ends.FN126 Further, the specification discloses that "[t]he usual configuration of such flexible bulk containers involves a rectangular or cylindrical body having a wall, base, cover, and a closable spout secured to extend from the base or the top or both." FN127 This also is consistent with the prior art. For example, the Massey ' 316 patent teaches containers formed of flexible fabric with fill and discharge mechanisms at opposite ends. FN128

FN124. Intertape Br. at p. 25; Order on claim construction proposed by Intertape, at p. 19.

FN125. LINQ's Proposed Order On Claim Construction, at p. 40.

FN126. '449 patent (LINQ Br., Exh. 2), Fig. 6 and col. 4, ll. 65-67.

FN127. Id., col. 1, ll.25-28.

FN128. Massey '316 patent (Intertape Resp. Br., Exh. 10), Fig. 1 and col. 3, ll. 9-25.

Intertape's proposed construction would not cover the preferred embodiment of Figure 6. There is no reason to depart from the admonition that such a construction is rarely correct. *See Vitronics Corp. v. Conceptronic, Inc.*, supra, 90 F.3d at 1583. I recommend construction of the words "a closed end and an open end" to mean ends that may be opened or closed to effectuate the transport, fill and discharge of the contents of a flexible fabric container.

3. having an electrical resistivity to allow the flow of electricity through the fabric at a rate to discharge of below about one-hundred nanocoulombs per individual discharge with the fabric charged at greater than about negative ten thousand volts

LINQ requests an interpretation of this claim language to mean "a resistance to electricity that allows the movement of static electric charge on the fabric from a first location on the fabric to a second location on the fabric at a rate to discharge such that each individual discharge is below about one-hundred nanocoulombs whenever the fabric is charged at greater than about negative ten thousand volts." FN129

FN129. LINQ's Proposed Order On Claim Construction, at p. 42.

Intertape contends that the claim language is vague and indefinite and disputes that the language is limited to flexible container fabrics. It asserts that any fabric showing a rate to discharge below one hundred nanocoulombs when charged to greater than negative ten thousand volts under any conditions would fall within the scope of this clause.FN130 Intertape further argues that the language constitutes a means-plus-

function element within the meaning of Section 112 of the Patent Act, 35 U.S.C. s. 112, paragraph 6. In Intertape's words: "The fabric itself is the means that accomplishes the function of allowing the flow of electricity while limiting the flow to discharge of below about one-hundred nanocoulombs (nC) per individual discharge with the fabric charged at greater than about negative ten thousand volts." FN131

FN130. Order on claim construction proposed by Intertape, at p. 20.

FN131. Intertape Br., at p. 29.

Intertape's argument is not supported by the facts or the governing law. The word "means" does not appear in claim 1. Claim language that does not use "means" triggers the "rebuttable presumption" that the means-plus-function analysis of Section 112, paragraph 6, does not apply. *See* *Lighting World, Inc. v. Birchwood Lighting, Inc.*, 382 F.3d 1354, 1358 (Fed.Cir.2004) ("the presumption flowing from the absence of the term 'means' is a strong one that is not readily overcome"); *CCS Fitness, Inc. v. Brunswick Corp.*, supra, 288 F.3d at 1369. Moreover, even if the word "means" appears in the claim, the presumption that Section 112, paragraph 6, applies is overcome if the claim itself recites sufficient structure or material for performing the claimed function. *See Al- Site Corp. v. VSI International, Inc.*, 174 F.3d 1308, 1318 (Fed.Cir.), *rehg. en banc denied*, 1999 U.S.App. LEXIS 11945 (Fed.Cir.1999).

Claim 1 recites "a woven fabric configured to form the flexible fabric container having side walls, a closed end and an open end...." In *Lighting World*, the district court applied a means-plus-function analysis even though the claim did not use the word "means" based on its finding that the claim failed to identify a specific structure and used a generic term that includes a wide variety of structures. The Federal Circuit reversed, holding that "it is sufficient if the claim term is used in common parlance or by persons of skill in the pertinent art to designate the structure, even if the term covers a broad class of structures and even if the term identified the structures by their function." *Lighting World*, 382 F.3d at 1359-1360.

In this case, "woven fabric configured to form a flexible fabric container" is well-understood by persons with ordinary skill in the art. The application that resulted in the '449 patent contains the same disclosures as in the '154 patent prosecution history discussed previously.FN132 In light of the fact that the claim language does not include the word "means" and the recitation of sufficient structure, I recommend Intertape's requested means-plus-function construction be denied and that the construction proposed by LINQ and stated above should be approved.

FN132. '449 patent File Wrapper (Intertape Sum. J. Memo., Exh. 33) at IT00987-992.

B. Claim 3

1. materials

Claim 3 replaces the word "filaments" used to define the composition of "quasi-conductive fiber" in claims 1 and 7 of the '154 patent with the word "materials." LINQ requests that "materials" be given its plain meaning to include any composition.FN133 Intertape observes that the only "materials" disclosed in the '449 patent claims and specification are "filaments" and that the construction of the term "materials" should be limited to its definition of "filaments." FN134

FN133. LINQ's Proposed Order On Claim Construction, at p. 45.

FN134. Order on claim construction proposed by Intertape, at p. 20.

It is correct, as Intertape states, that the three embodiments of quasi-conductive fiber shown in Figures 5, 10 and 11 of the '449 patent refer to its composition as a "filament." FN135 Notwithstanding, the specification emphasizes that other embodiments are possible. As discussed in section IV(A)(3.3) of this report construing the term "filament," it would be improper to limit claim language to a specific embodiment disclosed in the specification when such limitation is neither intended by the inventor nor required by the state of the art. *CCS Fitness, Inc. v. Brunswick Corp.*, supra, 288 F.3d at 1366; *Renishaw PLC v. Marposs Societa' Per Azioni*, supra, 158 F.3d at 1250.

FN135. '449 patent (LINQ Br., Exh. 2), Figs. 5, 10-11 and col. 4, ll. 62-64; col. 5., ll. 10-15; col. 8, ll. 23-30

There is no evidence in the record to indicate that "materials" is used or understood by those with skill in the art in other than its plain meaning. I recommend "materials" not be limited to filaments but cover any composition relevant to antistatic fiber.

2. said fibers sized and shaped to effect corona discharge

In the claim description of quasi-conductive fibers in the '154 patent, the filaments making up the quasi-conductive fibers were sized and shaped to achieve corona discharge. In Claim 3 of the '449 patent it is the quasi-conductive fiber itself is sized and shaped. This description also is contained in the specification.FN136 I recommend the words "sized and shaped" be read to refer to the quasi-conductive fiber and not the "materials" of which they are composed.

FN136. '449 patent (LINQ Br., Exh. 2) at Col. 3, ll. 13-14.

3. sufficient resistance

As noted previously in section IV(A)(3), the word "sufficient" was removed from the claims of the '154 patent at the direction of the PTO during prosecution of the application.FN137 A different examiner allowed the term to remain in claim 3 of the ' 449 patent and claim without objection. Intertape again argues for its deletion from the definition of the level of resistivity required for a quasi-conductive fiber. It maintains that it is improper to permit the "recapture" in claim 3 of the '449 continuation-in-part patent of a term that was expressly disclaimed by the same inventors with respect to the substantially similar claims of the '154 parent patent. FN138 Intertape cites no authority for this proposition. Notwithstanding, addition of the term "sufficient" to the definition of the level of resistance required for a quasi-conductive fibers does not alter the definition in any material way. I recommend the term "sufficient" not be included in the construction of the meaning of "quasi-conductive fibers."

FN137. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14), IT00719-720.

FN138. Order on claim construction proposed by Intertape, at p. 20.

4. multifilaments

The word "multifilaments" appears in the claims of the '449 patent for the first time. The '154 patent referred only to "filaments." However, Mr. Pappas refers to multifilaments in the prosecution history in the context of multiple individual filaments.FN139 It is evident from these references that multifilament has its plain meaning of more than one filament or multiple filaments.

FN139. '154 patent File Wrapper (Intertape Sum. J. Memo., Exh. 14) at IT00704.

VI. THE '772 PATENT

The parties are in agreement that the following boldface terms of claims 1 and 3-9 of the '772 are in dispute. Only certain of the terms in dispute have not been addressed in connection with either the '154 patent or the '449 patent. These new words are underscored. A majority of the words are the same as construed in connection with the '154 patent or '449 patent, the latter of which the '772 patent is a divisional. As was done with the ' 449 patent, only the underscored language will be addressed. The remaining boldface words have the same meaning as provided in the preceding discussion of claims of the '154 patent or '449 patent.

1. *A method for reducing the energy of electrostatic discharge in an ungrounded type flexible fabric container system for use in a combustible environment comprising the steps of:*

providing a woven fabric configured to form the flexible fabric container having side walls, a closed end and an open end; and

including within said woven fabric a plurality of quasi-conductive fibers, wherein the electrical resistivity of said woven fabric allows the flow of electricity through the fabric at a rate to discharge of below about one-hundred nanocoulombs per individual discharge with the fabric charged at greater than about negative ten thousand volts.

2. A method as in claim 1 wherein said step of including **quasi-conductive fibers** adjusts the electrical resistivity of said woven fabric to allow the flow of electricity through the fabric at a rate to discharge of between about four nanocoulombs to about thirty nanocoulombs per individual discharge with the fabric charged at greater than about negative ten thousand volts.

3. A method as in claim 2 wherein said step of including **quasi-conductive fibers** comprises including fibers composed of **multifilaments**.

4. A method as in claim 3 wherein said step of including **quasi-conductive fibers** comprises the step of weaving the fiber into the fabric container.

5. A method as in claim 4 wherein said step of including **quasi-conductive fibers** about one to about four inches apart from one another.

6. A method as in claim 3 wherein said step of including fibers composed of **multifilaments** comprises including fibers having a conductive core and an insulating sheath.

7. A method as in claim 1 wherein said step of including **quasi-conductive fibers comprises including fibers sized and shaped to have a corona discharge** threshold voltage at their ends in the range of about three to about four kilovolts and an end of a looped one of said sized and shaped quasi-conductive fibers has a corona discharge threshold voltage of about nine kilovolts.

As a divisional of the '449 patent, the '772 patent contains the identical specification. The '449 patent claims disclose the apparatus of "ungrounded type flexible fabric container system," while the '772 patent claims disclose a method for reducing electrostatic discharge in such a system.

A. Claim 1

1. A method for reducing the energy of electrostatic discharge in an ungrounded type flexible fabric container system for use in a combustible environment comprising the steps of: providing a woven fabric configured to form the flexible fabric container ...; and

including within said woven fabric a plurality of quasi-conductive fibers

The parties are in substantial agreement that all of the individual terms in dispute in the '772 patent have been addressed in the construction of these same terms in the '154 patent or '449 patent.FN140 The exception is claim 1 of the ' 772 patent. It recites a method of electrostatic reduction in a FIBC comprised of multiple steps. The issue raised for claim construction is whether the recited steps must be undertaken in any prescribed order.

FN140. LINQ's Proposed Order on Claim Construction, at p. 48; Order on claim construction proposed by Intertape, at p. 21.

It appears clear from the specification that no specific order is required. The claim provides for the fabric to be configured into the FIBC and inclusion of quasi-conductive fibers. It is logical that the quasi-conductive fibers could be woven into the fabric before the fabric is made into the FIBC. Nothing in the specification or the record contradicts this common sense approach. The words of a claim should be given their ordinary meaning. *See Phillips*, 415 F.3d at 1312.

VII. CONCLUSION

The *en banc* Court acknowledged in its *Phillips* opinion that there are claim construction disputes that require resort to the full record to ascertain appropriate meaning. This Report and Recommendations has sought to follow the *Phillips* guideposts in reaching the claim construction recommendations that are provided.