

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reexamination of:

William T. Clark et al.

Examiner: Minh T. Nguyen

Control No.: 95/000,476

Art Unit: 3992

Patent No.: 6,998,537

Confirmation No.: 8496

Issue Date: February 14, 2006

For: MULTI-PAIR DATA CABLE WITH
CONFIGURABLE CORE FILLING AND PAIR
SEPARATION

CERTIFICATE OF SERVICE

I hereby certify that on this date I served a true and correct copy upon Patentee's counsel of record by U.S. First Class Mail, postage prepaid of:

1. Third Party Requester's Comments to Patent Owner's Response Under 37 C.F.R. § 1.947 (52 pages);
2. Exhibit 1 to the Comments (5 pages);
3. Exhibit 2 to the Comments (6 pages);
4. Exhibit 3 to the Comments (10 pages);
5. Exhibit 4 to the Comments (9 pages);
6. Exhibit 5 to the Comments (5 pages); and
7. An Information Disclosure Statement

to:

Sarah M. Gates
LANDO & ANASTASI, LLP
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Respectfully submitted, this 22nd day of January, 2010.

/W. Scott Petty/

W. Scott Petty, Reg. No. 35,645

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**THIRD PARTY REQUESTER'S COMMENTS TO
PATENT OWNER'S RESPONSE UNDER 37 C.F.R. § 1.947**

Mail Stop *Inter Partes* Reexam
ATTN: Central Reexamination Unit
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The Third Party Requester respectfully provides these Comments to the Patent Owner's Amendment and Response to Office Action in *Inter Partes* Reexamination, served on December 23, 2009, in connection with the above-identified *inter partes* reexamination proceeding. The Patent Owner's Amendment and Response to Office Action was accompanied by a Petition to suspend rule 37 C.F.R. § 1.943(b), which has yet to be acted on. As such, the 30-day time period for Comments has not been triggered, but is not earlier than January 22, 2010.

The Third Party Requester requests that the Examiner maintain the rejection of and issue an action closing prosecution of the pending original claims 1, 4-11, 15, and 17-22 (claims 2, 3, 12-14, and 16 have been canceled) deem the arguments advanced by the Patent Owner in the Patent Owner's Response to be erroneous, improper and/or unpersuasive, and issue a rejection of each of the added claims 23-34, for the reasons discussed below.

I hereby certify that this petition is being transmitted by EFS-Web addressed to: Mail Stop *Inter Partes* Reexam, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on January 22, 2010.

/W. Scott Petty/

W. Scott Petty – Reg. No. 35,645

REMARKS

On September 28, 2009 the Patent Office transmitted an Office Action rejecting all 22 claims of U.S. Patent No. 6,998,537 (hereinafter, “the ‘537 patent”) as unpatentable on multiple grounds. The Patent Owner responded on December 23, 2009. The response added thirteen claims, including independent claim 26. The following Comments address issues presented in the Office Action and the Patent Owner’s Amendment and Response to Office Action in *Inter Partes* Reexamination, served on December 23, 2009 (hereinafter, the “Patent Owner’s Response”) to that Office Action.

The Patent Owner’s Response is addressed as indicated in the table below:

Issue Challenged in Patent Owner’s Response¹	Applicable Claims	Page Numbers in These Comments Where Issue is Addressed
The separator disclosed in the ‘866 patent is “substantially flat”	1, 4-11, 15, and 17-22	6-9
The ‘866 patent discloses a “dielectric pair separator”	1, 4-11, 15, and 17-22	9-11
The ‘866 patent discloses “wherein the plurality of twisted pairs of insulated conductors and the substantially flat configurable dielectric separator are twisted about a common axis to form the finished communications cable”	1, 4-11, 15, and 17-22	11-12
U.S. Patent 5,969,295 teaches helical twisting of a cable	1, 4-11, 15, and 17-22	12-13
U.S. Patent 5,670,748 teaches materials that would be used for a separator	4 and 6-8	13-15
European Patent 0 569 217 teaches woven fiberglass materials that would be used for a separator	5	15-16
Claims 9 and 10 are not patentable over the combination of the ‘866 patent and ‘711 patent	9 and 10	16
Claims 9 and 10 are not patentable over the combination of the ‘866 patent and ‘710 patent	9 and 10	16-17
Claim 18 is obvious over the ‘866 patent	18	17
Claims 11, 15, and 17 should remain rejected	11, 15, and 17	17

¹ For the purposes of this roadmap, shorthand notation for the references and the issues has been used. These Comments fully describe the issue and clearly identify the relevant prior art in the remarks below.

Issue Challenged in Patent Owner's Response¹	Applicable Claims	Page Numbers in These Comments Where Issue is Addressed
Claims 19-22 are not patentable over the combination of the '866 patent, '683 patent, and the '748 patent, as the disclosed pair separator is "substantially flat"	19-22	18
The combination of the '866 patent and the '683 patent teaches a dielectric separator consisting of non-conductive, dielectric materials	19-22	18-20
Claims 19-22 are not patentable over the combination of the '866 patent, '683 patent, and the '748 patent, as the '748 patent discloses a foamed polymer material used for data communications cables	19-22	20-21
The Patent Owner failed to rebut the rejection of the claim limitations contained in claims 20-22	20-22	21
Claims 1, 9, 17, and 18 are unpatentable over the combination of the '485 patent and the Refi reference	1, 9, 17, and 18	21-23
The '748 patent discloses polymer material used for data communications cables	4 and 6-8	24
The '217 patent teaches woven fiberglass materials that would be used for a separator	5	24
Claims 10 and 11 are unpatentable	10 and 11	24
Claims 19-22 are not patentable over the combination of the '485 patent, Refi reference, and the '748 patent, as the combination of the '485 patent and the Refi reference discloses a plurality of twisted pairs	19-22	25
Claims 19-22 are not patentable over the combination of the '485 patent, Refi reference, and the '748 patent, as the combination of the '485 patent and the Refi reference discloses a flat separator	19-22	25
Claims 19-22 are not patentable over the combination of the '485 patent, Refi reference, and the '748 patent, as the '748 patent discloses materials for use in a telecommunications cable	19-22	25-26
The '470 patent discloses a configurable dielectric separator	1, 4-8, 11, and 19-22	26-27
The '748 patent discloses polymer material used for data communications cables	4, 6-8, and 19-22	27-28
Claim 11 is unpatentable over the '470 patent	11	28
The '629 patent discloses a flat separator	19-22	28-29

Issue Challenged in Patent Owner's Response¹	Applicable Claims	Page Numbers in These Comments Where Issue is Addressed
Claims 1, 11, 15, and 17 are unpatentable over the '629 patent in view of the '485 patent	1, 11, 15, and 17	30
The '748 patent discloses polymer material used for data communications cables	4 and 6-8	31
Claims 9, 10, and 18 are unpatentable over the '629 patent	9, 10, and 18	31
The Patent Owner's "Secondary Considerations" Should Be Given Little Or No Weight	all	32-36
New Claims Are Not Patentable Over Prior Art Printed Publications	23-34	36-49
Patent Owner's Support For New Claims Is Deficient under 35 U.S.C. § 112	1, 4-11, 15, 17-18, and 23-34	50-51

The Third Party Requester respectfully asserts that these Comments are within the 50-page limit, as the Specific Comments are no more than 47 pages (pages 5-51) and the substantive part of Mr. Baxter's Declaration (paragraphs 8-24) is no more than 3 pages for a total of no more than 50 pages.

Specific Comments

Overview

The Third Party Requester respectfully submits that the Patent Owner's Response is erroneous, improper and/or unpersuasive and should be disregarded by the Examiner. For example, the Declarations from Mr. Niemiera and Mr. Gareis, both employees of the Patent Owner, are not credible and do not adequately support the Patent Owner's positions. Mr. Niemiera's Declaration, for example, alleges certain facts used to support secondary considerations for the '537 patent claims. However, neither Mr. Niemiera nor the Patent Owner provide any nexus between his Declaration statements and the patented invention. *See, e.g., In re DBC*, 545 F.3d 1373, 1384 (Fed. Cir. 2008) (requiring such a nexus).

Similarly, Mr. Gareis's Declaration attempts to support the position that shielded and unshielded cables represent unconnected art. However, this position is contrary to the specification of the '537 patent and other cable industry patents, including a patent for which Mr. Gareis is an inventor. These patents treat shielded and unshielded cables comparably and fail to disclose any unpredictability in moving from designs of shielded cables to unshielded cables.

Also, in its Response, the Patent Owner improperly attempts to construe the terms of the pending claims narrowly in view of the Examiner's rejection of the claims. While this approach is not surprising given the compelling nature of the prior art references, it is improper. In a reexamination proceeding, claims are to be given their broadest construction consistent with the specification. *See In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007) ("During reexamination, as with original examination, the PTO must give claims their broadest reasonable construction consistent with the specification.").

Further, the Patent Owner attempts to narrowly apply the prior art teachings, for example, by focusing on the problems and solutions addressed in the prior art reference rather than the teaching of that reference as a whole. Again, this approach is improper. *See In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) ("The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain."); *see also* MANUAL OF PATENT EXAMINING PRACTICE § 2123 (Rev. 7, Jul. 2008) (citing *In re Heck*).

The original claims, as amended, remain unpatentable over the prior art printed publications of record. Also, the newly-added claims are unpatentable, either under 35 U.S.C. § 102(b) or 35 U.S.C. § 103(a) over prior art printed publications of record. The Third Party Requester's Comments below more completely address these and other deficiencies with the Patent Owner's Response.

Original Claims Should Stand Rejected Over The Prior Art Publications

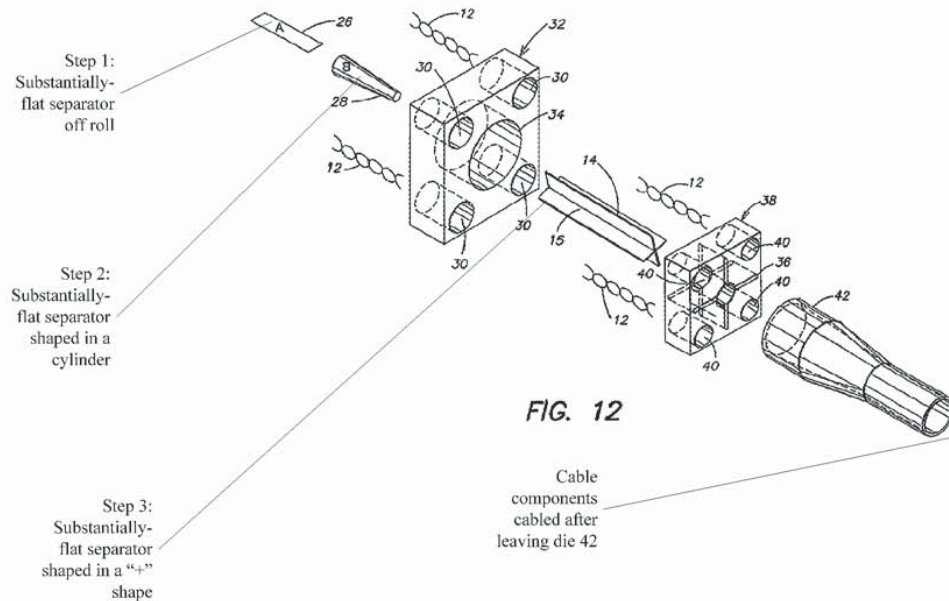
Issue: The separator disclosed in the '866 patent is "substantially flat"

The separator disclosed in DE 297 19 866 (the "'866 patent") is a "substantially flat in a radial cross-section taken through the finished cable" as required in amended claims 1, 4-11, 15, and 17-22 of the '537 patent. The Patent Owner attempts to avoid this fact by improperly construing the word "flat." See Patent Owner's Response at 22-23.

The Patent Owner wants the Examiner to construe the word "flat" to mean "appear as a straight line in a radial cross-section."² This narrow construction is improper for a reexamination and against the plain meaning of the claim term as that term is used in the specification. The law requires the Examiner to give a claim term its **broadest** reasonable construction, consistent with the specification. See *In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007) ("During reexamination, as with original examination, the PTO must give claims their broadest reasonable construction consistent with the specification."); see also *Phillips v. AWH Corp.*, 415 F.3d 1303, 1316 (Fed. Cir. 2005); MANUAL OF PATENT EXAMINING PRACTICE § 2111 (Rev. 7, Jul. 2008). The specification of the '537 patent consistently refers to a configurable separator as "flat," **even when that separator has been shaped**. See, e.g., '537 patent, col. 5, ll. 48-53 ("In the embodiment of the cable of FIG. 6, the pair separator 14 is a flat configurable tape used as a core filler, that is shaped to have the illustrated profile and that is provided in the cable between the four twisted pairs 12. In particular, in this embodiment, the configured pair separator has a shape somewhat like a "+""); '537 patent, col. 5, ll. 59-61 ("[I]t is preferred that the pair separator is supplied as a flat extruded tape").

² This construction is not supported by the specification and would constitute new matter. See discussion below.

As illustrated in the '537 patent's description of the manufacturing process, the separator is substantially flat, then configured during manufacturing. That description is illustrated below:



At “Step 1,” which is “prior to cabling,” the pair separator is substantially flat. At “Step 2,” the separator is still flat, just shaped in a cylinder. At “Step 3,” the separator is still flat, just shaped in a “+”-shape (the 1:30, 4:30, 7:30, and 10:30 positions of the cylinder have been collapsed towards the middle of the cylindrical shape). At a step after the cable components leave the die 42, the “cabling” takes place. At three points before that, the pair separator is “substantially flat.”³

Even under the narrow construction proffered by the Patent Owner including the implied timing (that is, substantially flat after the cable is made), the '866 patent discloses that flat separator. The '537 patent discloses only one embodiment that could conceivably support the Patent Owner's claim amendment. That embodiment is pictured in Figures 4 and 5 of the '537 patent, with Figure 5 depicting the cross-sectional view of the cable (that is, the view that equates

³ Even if the requirement is that the separator be flat and unshaped prior to cabling, the '866 patent discloses such a separator because, like the separator at Step 1, the separator is flat prior to shaping. The time “prior to shaping” must occur “prior to cabling,” as recited in claims 3 and 14.

with the recitation added to amended claim 1). See '537 patent, col. 4, ll. 27-41 ("FIG. 4 depicts an embodiment of a data communications cable 10 according to the present invention. . . . FIG. 5 depicts a cross-sectional view of an embodiment of the cable of FIG. 4. The configurable pair separator 14 runs along a longitudinal length of the cable, and is configured such that the twisted pairs are disposed within channels or grooves 15 of the pair separator along the length of the cable."'). Figure 5 is reproduced below:

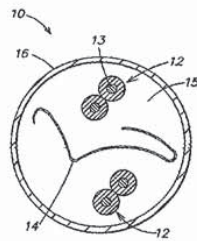
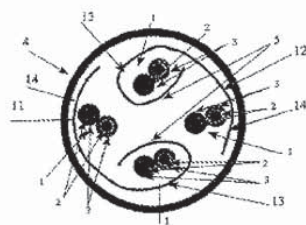


FIG. 5

Embodiment of the '537 patent.

As can be seen from Figure 5 of the '537 patent, the "flat" separator 14 has grooves. "The configurable pair separator 14 runs along a longitudinal length of the cable, and is configured such that the twisted pairs are disposed within channels or grooves 15 of the pair separator along the length of the cable." '537 patent, col. 4, ll. 38-41. Compare the separator 14 of Figure 5 of the '537 patent with a separator 5 disclosed in the '866 patent, as reproduced below.



Figur 1

Embodiment of the '866 patent.

As can be seen, the separators have a comparable shape. The '866 pair separator satisfies even the restrictive construction improperly applied to the claim amendment of claim 1 by the Patent Owner, namely the separator is "substantially flat in a radial cross-section taken through the finished cable." The two separators are compared below (the separator from the '866 patent

is the lower separator from Figure 1 of the '866 patent, rotated approximately 30 degrees to the left):



Substantially flat separator of the '866 Patent (on left) and '537 Patent

Claim 18 of the '537 patent further supports that the meaning the term “flat” as further defined by the added recitation in amended claim 1 cannot be “appear as a straight line in a radial cross-section” as suggested by the Patent Owner. Claim 18 recites “wherein the substantially flat configurable dielectric separator does not extend more than 180 around any one of the plurality of twisted pairs of insulated conductors.” Claim 18 would be superfluous under the Patent Owner’s asserted construction of the term “flat.” See *Xerox Corp. v. 3Com Corp.*, 267 F.3d 1361, 1366 (Fed. Cir. 2001) (stating that reading a limitation into a claim that would render two claims superfluous “will not do”).

The Third Party Requestor respectfully requests that the Examiner maintain rejections of amended claim 1 based on the '866 patent disclosing a substantially flat separator, even as that claim has been amended.

Issue: The '866 patent discloses a “dielectric pair separator”

Amended claim 1 recites a “dielectric pair separator.” The Patent Owner’s Response attempts to improperly narrow the construction of this term to mean “non-conductive.” The Third Party Requester respectfully requests that the Examiner reject this attempt to improperly narrow the scope of the claims as inconsistent with the prosecution record for the '537 patent and the express language of the claim.

First, the Patent Owner’s construction ignores the intrinsic record of the '537 patent and instead turns to a dictionary to define the term “dielectric.” See Patent Owner’s Response at 15. The Federal Circuit has rejected this approach to construing claim terms. See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1321 (Fed. Cir. 2005) (“Yet heavy reliance on the dictionary divorced from the intrinsic evidence risks transforming the meaning of the claim term to the artisan into the meaning of the term in the abstract, out of its particular context, which is the specification.”). Instead, the intrinsic record of the '537 patent supports a construction where “dielectric pair

separator” means “a pair separator with at least a non-conductive layer.” For example, original claim 13 of the ‘537 patent⁴ recites “[t]he communications cable as claimed in claim 1, wherein the substantially flat configurable dielectric separator comprises **a conductive layer**.” This claim, which depends from claim 1, further defines what is meant by “dielectric separator” in claim 1. See *Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (“Differences among claims can also be a useful guide in understanding the meaning of particular claim terms.”); see also 35 U.S.C. § 112 (2009) (“[A] claim in dependent form shall ... specify **a further limitation** of the subject matter claimed.”) (emphasis added). Also, claim 24 of U.S. Patent No. 6,570,095 - a patent in the family of the ‘537 patent -- recites “a dielectric pair separator” with “a dielectric layer **and** a conductive layer.” See U.S. Patent No. 6,570,095, col. 11, ll. 36-37 (emphasis added). The ‘537 patent issued from an application that was a continuation of the application that matured into U.S. Patent No. 6,570,095. As such, the term “dielectric pair separator” should be construed the same for the ‘537 patent as in its family member, U.S. Patent No. 6,570,095. See *NTP, Inc. v. Research in Motion, Ltd.*, 418 F.3d 1282, 1293 (Fed. Cir. 2005) (“Because NTP’s patents all derive from the same parent application and share many common terms, we must interpret the claims consistently across all asserted patents.”). The Third Party Requester respectfully submits that the proper construction of the term “dielectric pair separator” for this reexamination is “a pair separator with at least a non-conductive layer.”

To further support this position, the Patent Owner has written claims that formally recite a pair separator that is non-conductive. See e.g., ‘537 patent, claim 19 (reciting “a ... dielectric separator that consists of non-conductive, dielectric materials”). The Patent Owner’s construction of “dielectric pair separator” improperly attempts to rewrite claim 1 (without an express amendment) to read like claim 19. Similarly, newly-added claim 23, which depends from claim 1, recites “wherein the substantially flat configurable dielectric separator consists of dielectric materials.” See Patent Owner’s Response at 5. Under the doctrine of claim differentiation, the “dielectric separator” of claim 1 must be broader than newly-added dependent claim 23 and include, but not be limited to, dielectric material. See *Phillips v. AWH Corp.*, 415

⁴ The fact that the Patent Owner cancelled claim 13 does not impact how the term “dielectric separator” should be construed, as original claim 13 is part of the specification being reexamined.

F.3d 1303, 1314-15 (Fed. Cir. 2005) (“Differences among claims can also be a useful guide in understanding the meaning of particular claim terms. For example, **the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.**”) (internal citations omitted) (emphasis added).

As the Examiner found, under the proper construction of the term ‘dielectric pair separator,’ the ‘866 patent discloses such a separator, as it expressly discloses a foil separator with a plastic laminate, with the plastic laminate being a non-conductive layer. *See* ‘866 patent, Engl. transl. at 5. The Third Party Requester respectfully requests that the Examiner reject the Patent Owner’s attempt to improperly adopt a narrow construction of the scope of claim 1 and maintain the rejection of amended claim 1 as the ‘866 patent discloses a “dielectric pair separator.”

Issue: The ‘866 patent discloses “wherein the plurality of twisted pairs of insulated conductors and the substantially flat configurable dielectric separator are twisted about a common axis to form the finished communications cable”

Contrary to the Patent Owner’s assertion at page 23 of the Patent Owner’s Response, the ‘866 patent discloses the claim limitation “wherein the plurality of twisted pairs of insulated conductors and the substantially flat configurable dielectric separator are twisted about a common axis to form the finished communications cable.” The ‘866 patent discloses that “[t]he invention-specific arrangement of the shielding further makes it possible to use stranding and/or longitudinal reshaping of the conductor pair to apply onto or insert the shielding into the cable. By this means, cost-effective manufacture is made possible in a continuous manufacturing process.” ‘866 Pat., Eng. transl. at 2. This “longitudinal reshaping” is the twisting about a common axis. *See* Declaration of Baxter at para. 11 (Attached as Exhibit 1). One of ordinary skill in the art would understand this quoted language to mean that the cable is finished by twisting the cable components about a common axis. *See* Declaration of Baxter at para. 11. The Third Party Requester respectfully submits that the Patent Owner fails to consider the relevant disclosure in the ‘866 patent.

The Patent Owner attempts to further support its position by stating that “[c]abling of the cable including the shielding foils disclosed in the ‘866 patent would be complex, would likely result in inoperable cables, and so should be avoided.” Patent Owner’s Response at 23. The Patent Owner cites to the Declaration by Mr. Gareis. The Third Party Requester notes that Mr.

Gareis, an employee of the Patent Owner, offers no objective evidence to support his statements, such as testing results, that a cable with shielding foils could not be twisted.

The Third Party Requester respectfully submits that Mr. Gareis's conclusions are unpersuasive, at least as to the complexity of the process and the inoperability of the cable, and are inconsistent with the teachings of the '537 patent. The '537 patent disclosure itself envisions this very situation - a foil/plastic pair separator in a cable finished by helical or S-Z twisting. The embodiment of Figure 6 of the '537 patent includes a pair separator with a foil layer and a plastic laminate layer. *See* '537 patent, col. 6, ll. 2-6 ("For this embodiment, it is preferable that the configurable core pair separator be an aluminum/mylar tape, with an aluminum layer on a side of the tape facing the plurality of twisted pairs."). The '537 patent goes on to teach that "[i]t is to be appreciated that the cable can be twisted with any known twisting arrangement such as a helix, or an S-Z configuration. It is also to be appreciated that this method can be varied to include any of the components illustrated and discussed above, such as, for example, to include a drain wire, a binder, a shield, or central core filler." '537 patent, col. 8, ll. 46-48. Nowhere does the specification of the '537 patent teach that this process would be complicated with a foil/plastic pair separator or how one would make the invention given any complexity. Further, nothing in the '537 patent suggests that the separator would wrinkle or tear, as opined by Mr. Gareis. Indeed, Mr. Gareis seems to direct his opinion to a separator made of foil only. *See* Gareis Declaration at paras. 14-17 (provided with the Patent Owner's Response_. This paragraph in the Gareis Declaration discusses a "foil shield" and "stretching the foil." His discussion appears to ignore a cable structure that includes a separator having a foil shield and plastic laminate, as disclosed in the '866 patent.

The Third Party Requestor respectfully requests that the Examiner maintain the rejection of amended claim 1 based on the '866 patent disclosing cabling the cable components about a common axis. The Examiner should reject the Patent Owner's unsupported assertions regarding the disclosure of the '866 patent and the ability to twist the disclosed cable components about a common axis.

Issue: U.S. Patent 5,969,295 teaches helical twisting of a cable

As the Examiner found, U.S. Patent 5,969,295 to Boucino (the "'295 patent") discloses helically twisting a cable to finish the cable. *See* Office Action at 18; '295 patent, col. 4, ll. 10-22. The Patent Owner attempts to rebut this finding by first contending that the '295 patent does

not disclose or suggest any reason to helically configure the '866 patent cable. *See* Patent Owner's Response at 24. The Third Party Requester respectfully submits that the '295 patent does provide such a suggestion. The '295 patent states that "[f]urthermore, this helical configuration improves the impedance uniformity of the cable by maintaining uniformity of spacing of the respective twisted pairs 16, 18, 20 and 22 despite bending of the cable 10." '295 patent, col. 4, ll. 18-22. This statement suggests that helically twisting the cable could have a similar benefit for the cable disclosed in the '866 patent.

The Patent Owner also repeats the argument that the cable of the '866 patent cannot be twisted without complications. *See* Patent Owner's Response at 24. As discussed above, this assertion is unsupported and the Third Party Requester respectfully submits that the Examiner should ignore it. The Third Party Requester respectfully requests that the Examiner maintain the rejection of amended claim 1 based on the '866 patent, in combination with the '295 patent, disclosing cabling the cable components about a common axis.

Issue: U.S. Patent 5,670,748 teaches materials that would be used for a separator

The Examiner rejected claims 4 and 6-8 under 35 U.S.C. § 103(a) as obvious over the '866 patent in view of U.S. Patent 5,670,748 (the "'748 patent"). The Patent Owner improperly attempts to limit the teaching of the '748 patent in an attempt to avoid this reference. The Third Party Requester respectfully requests that the Examiner ignore the improper argument and maintain the rejection of claims 4 and 6-8.

The Patent Owner's Response ignores the overall teaching of the '748 patent and attempts to focus the Examiner on a portion the entire disclosure of this publication, namely the claimed invention of the '748 patent, which relates to an invention for insulating conductors. *See* Patent Owner's Response at 26. This narrow approach to applying the disclosure of the '748 patent to Claims 4 and 6-8 is improper. "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." *In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983). The Third Party Requester respectfully contends that the '748 patent's scope of disclosure within the four corners of the printed publication is broader than the invention it claims.

The background of the '748 patent teaches:

In plenum applications for voice and data transmission, electrical conductors and cables should exhibit low smoke evolution, low flame spread, and favorable electrical properties. Materials are generally selected for plenum applications such that they exhibit a balance of favorable and unfavorable properties. In this regard, each commonly employed material has a unique combination of desirable characteristics and practical limitations. Without regard to flame retardancy and smoke suppressant characteristics, olefin polymers, such as polyethylene and polypropylene, are melt extrudable thermoplastic materials having favorable electrical properties as manifested by their very low dielectric constant and low dissipation factor.

'748 patent, col. 2, ll. 1-13.

As seen from this disclosure, the background section discusses **materials** used for plenum cable applications. The background of the '748 patent continues by stating that:

Table 1 below summarizes the electrical performance and flame retardancy characteristics of several polymeric materials. Besides fluorinated ethylene/propylene, other melt extrudable thermoplastic generally do not provide a favorable balance of properties (i.e., high LOI, low dielectric constant, and low dissipation factor). Moreover, when flame retardant and smoke suppressant additives are included within thermoplastic materials, the overall electrical properties generally deteriorate.

'748 patent, col. 2, ll. 50-60.

Table 1 of the '748 patent discloses **material** properties useful for cable applications, independent of whether the material is being used to insulate a conductor. These properties include dielectric constant, dissipation factor, Limiting Oxygen Index (LOI), and smoke generation. All of these properties would be considered by one of ordinary skill in the relevant cable art in choosing materials for a cable. *See* Declaration of Baxter at paras. 14-15, 20. Additionally, the '748 patent expressly states:

In general, the electrical performance of an insulating material is enhanced by foaming or expanding the corresponding solid material. Foaming also decreases the amount of flammable material employed for a given volume of material. Accordingly, a foamed material is preferably employed to achieve a favorable balance of electrical properties and flame retardancy.

'748 patent, col. 3, ll. 20-26.

Although this disclosure is in the context of insulation for conductors, this teaching would be considered by one of skill in the art even when choosing materials for a separator, if not just for the reduced amount of material that occurs due to foaming. *See* Declaration of Baxter at para.

15. The '748 patent makes clear that electrical performance considerations for the disclosed materials are not limited to conductor insulation. *See* '748 patent, col. 3, ll. 58-60 ("The principal electrical criteria can be satisfied based upon the dielectric constant and dissipation factor of an insulation *or jacketing material*.") (emphasis added).⁵ This statement alone counters the Patent Owner's position, which tries to limit the teaching of the '748 patent to materials that come into contact with bare metal. *See* Patent Owner's Response at 26. A cable jacket does not come into contact with the bare metal of a conductor in a cable with insulated conductors.

The Third Party Requester respectfully submits that the Patent Owner's unsupported assertion that a "disclosure of a particular material used for an insulation layer does not provide any teaching or suggestion to use that material to form a pair separator" is not correct and the Examiner should disregard this improper attorney argument and maintain the rejection of claims 4 and 6-8.

Issue: European Patent 0 569 217 teaches woven fiberglass materials that would be used for a separator

Similar to the issue above, the Patent Owner narrowly applies the teaching of European Patent Application No. 0 569 217 (hereinafter, "the 217 patent") in an improper attempt to get around the true teachings of this prior art reference. *See* Patent Owner's Response at 26-27. Again, the Patent Owner argues that a material that can be used to insulate an electrical

⁵ As an indication of the state-of-the-art in the cable industry before the filing of the application that serves as the priority document for the '537 patent (priority date asserted by the Patent Owner of Feb. 25, 1999), U.S. Patent No. 6,211,467 (hereinafter, "the '467 patent," which has a priority date before that of the '095 patent) discloses a central filler that separates the twisted pairs of the cable. The preferred materials for that pair separator are the same as those identified for the conductor insulation disclosed in the '467 patent and the same as the materials identified in the '748 patent. *See* '467 patent, col. 6, l. 62 - col. 7, l. 45. This section also discloses foaming the pair separator. The disclosure in the '467 patent is consistent with Mr. Baxter's opinion on the knowledge of one of ordinary skill in the art. *See* Declaration of Baxter at para 20. *See also* WO 9320563 publication (hereinafter, the '563 reference) at 4-7 (published October 14, 1993) (cited as providing a further indication of the knowledge of one of ordinary skill in the art and disclosing these same materials for use as insulation for a conductor and for a tape separator).

conductor would not be considered for a pair separator. The Third Party Requester respectfully submits that this argument is not technically correct. *See* Declaration of Baxter at para. 16.

The Patent Owner attempts to distance the teaching of the '217 patent by stating that the reference discloses using the woven fiberglass on "magnetic wire, low-voltage wiring, high-voltage cables and devices such as motors and generators." *See* Patent Owner's Response at 27. As explained by Mr. Baxter, this assertion by the Patent Owner is not correct. The teaching of the '217 patent, when properly viewed in the entirety of the document, extends to communications cable applications. *See* Declaration of Baxter at para. 16. Indeed, the '217 patent teaches that the disclosed material can be used for a variety of applications. *See* '217 patent, col. 7, ll. 45-50.

The Third Party Requester respectfully requests that the Examiner maintain the rejection of claim 5 in view of the '217 patent and dismiss the Patent Owner's attempt to improperly narrow the teaching of the '217 patent to the specific problem solved by that patent. *See In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) ("The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.").

Issue: Claims 9 and 10 are not patentable over the combination of the '866 patent and '711 patent

The Examiner found that claims 9 and 10 are unpatentable under 35 U.S.C. § 103(a) as obvious over the '866 patent in view of U.S. Patent 5,789,711 (the "'711 patent"). The Patent Owner failed to provide any response to the Examiner's position on how the '711 patent satisfies the subject matter recited in claims 9 and 10. Instead, the Patent Owner merely repeated arguments related to amended claim 1 from which these dependent claims depend. For the reasons discussed above concerning independent claim 1, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 9 and 10.

Issue: Claims 9 and 10 are not patentable over the combination of the '866 patent and '710 patent

The Examiner found that claims 9 and 10 are unpatentable under 35 U.S.C. § 103(a) as obvious over the '866 patent in view of U.S. Patent 3,888,710 (the "'710 patent"). The Patent Owner failed to provide any response to the Examiner's position on how the '710 patent satisfies the subject matter recited in claims 9 and 10. Instead, the Patent Owner merely repeated

arguments related to amended claim 1 from which these dependent claims depend. For the reasons discussed above concerning independent claim 1, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 9 and 10.

Issue: Claim 18 is obvious over the '866 patent

The Examiner found that claim 18 is unpatentable under 35 U.S.C. § 103(a) as obvious over the '866 patent. Claim 18 recites "wherein the substantially flat configurable dielectric separator does not extend more than 180 around any one of the plurality of twisted pairs of insulated conductors." As the Examiner found, "[a] skilled artisan would recognize that as to a configurable separator, there are a finite number of identified, predictable potential solutions as to the shape of the separator. The separator can be either less than or equal to 180 around a pair, or greater than 180 degrees around a pair." Office Action at 30. *See also, KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.").

The Patent Owner argues that the recitation of claim 18 would not be obvious because "the '866 patent discloses that the shielding foils are arranged to substantially enclose ... at least some of the conductors" Patent Owner's Response at 29. The Patent Owner ignores that the '866 patent teaches that some pairs are surrounded by a pair separator that does not extend more than 180 degrees around the pair. This teaching of the '866 patent shows that this configuration indeed can be used and that it would be obvious to try a configuration with the separator extending around none of the pairs more than 180 degrees.

The Third Party Requester respectfully requests that the Examiner maintain the rejection of claim 18.

Issue: Claims 11, 15, and 17 should remain rejected

The Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 11, 15, and 17. These claims depend from amended independent claim 1. The Patent Owner failed to provide any argument for why the claim limitations recited in these claims are patentable. For the reasons discussed above in connection with claim 1, the Third Party Requester respectfully submits that these claims are unpatentable and requests the Examiner maintain the rejection of these claims.

Issue: Claims 19-22 are not patentable over the combination of the ‘866 patent, ‘683 patent, and the ‘748 patent, as the disclosed pair separator is “substantially flat”

The Examiner rejected claims 19-22 as unpatentable under 35 U.S.C. § 103(a) as obvious over the ‘866 patent in view of U.S. Patent No. 6,622,683 (the “‘683 patent”) and in further view of the ‘748 patent. The Patent Owner argues that the pair separator of the ‘866 patent is not flat because the separator is “not substantially flat in a radial cross-sectional views of the cable.” Patent Owner’s Response at 30. The Third Party Requester respectfully submits that the Patent Owner’s argument is improper for at least two reasons. First, as discussed above in connection with amended claim 1, the Patent Owner’s construction “flat” is improperly narrow in an attempt to circumvent the prior art without expressly amending the claim to narrow the scope of the recited subject matter. Second, even if the Patent Owner’s position with respect to claim 1 is correct (which it is not), the Patent Owner amended claim 1 to expressly recite “substantially flat in a radial cross-section taken through the finished cable.” The Patent Owner has made no such amendment as to Claim 19. Instead, the Patent Owner is employing an improper construction to obviate the need to amend the claim and expressly narrow the recitation of the claimed subject matter. *See In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007) (“During reexamination, as with original examination, the PTO must give claims their broadest reasonable construction consistent with the specification.”).

For the reasons discussed above in connection with claim 1, the Third Party Requester respectfully submits that the ‘866 patent discloses the “flat configurable dielectric separator” recited in independent claim 19. The Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 19-22.

Issue: The combination of the ‘866 patent and the ‘683 patent teaches a dielectric separator consisting of non-conductive, dielectric materials

Contrary to the Patent Owner’s assertions at pages 30-31 of the Patent Owner’s Response, the teachings of the ‘866 patent in combination with the teachings of U.S. Patent No. 3,622,683 (the “‘683 patent”) renders obvious claims 19-22. Specifically, the disclosure of the ‘866 patent in combination with the disclosure of the ‘683 patent teaches one of ordinary skill in the art the claim limitation “configurable dielectric separator that consists of non-conductive, dielectric materials.” As the Examiner has asserted, based on this combination, it would have been obvious to one of ordinary skill in the art to remove the foil from the foil/plastic laminate

separator to arrive at the recited separator, as the remaining plastic component would consist of “non-conductive, dielectric materials.”

The Third Party Requester respectfully submits that the Patent Owner’s assertion that it would not have been obvious to simply remove the additional material of the metal foil from the foil/plastic laminate separator disclosed in the ‘866 patent is unsupportable. First, the Patent Owner argues that a combination of the ‘866 patent separator and the ‘683 patent separator would still have a foil component. *See* Patent Owner’s Response at 31. The Patent Owner’s contention ignores what is taught in this combination, but instead wants to mechanically combine the literal embodiments. As the Examiner asserted, one teaching of the combination is that there is a finite possible number of configurations for the separator. Given that the foil element adds cost to the cable, one skilled in the art would be motivated to try a cable with no foil component - one of the finite number of arrangements for the separator. *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”). Also, in the U.S. market, one of ordinary skill in the art would be motivated to try a configuration without the foil, as in the U.S., cable manufacturers had a preference for unshielded cables. *See* Declaration of Baxter at paras. 12-13. The Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 19-22 as unpatentable under 35 U.S.C. § 103(a) as obvious over the ‘866 patent in view of the ‘683 patent and other prior art as the combination of the ‘866 patent and the ‘683 patent teaches the recited dielectric separator.

The Patent Owner further contends that the proposed modification would render the prior art reference unsatisfactory for its intended purpose. *See* Patent Owner’s Response at 31. The Patent Owner is improperly restricting the teachings of the prior art reference. The Patent Owner improperly focuses on the purpose of the foil and then concludes that, without the foil the purpose is not satisfied. This micro-level approach is not correct. The proper focus is on the purpose of the disclosed device - a telecommunications cable. As the ‘866 patent states, “[t]he problem that is the basis for the present invention, proceeding from the data transmission cable described initially, is to configure it so that the manufacturing costs can be lowered, without the transmission properties, especially in a transmission range from 1 to 100 MHz or 1 to 600 MHz,

being impaired as compared to those cables with individually shielded conductor pairs. ‘866 patent, Eng. transl. at 1. In other words, the objective of the ‘866 patent is to have a cable that will operate in the frequency range of 1 to 100 MHz in a way comparable to a cable with individually-shielded conductors. The test data quoted by Mr. Niemiera demonstrates that a pair separator that is made of only plastic material performs adequately for the disclosed purpose of the ‘866 patent, a telecommunications cable. *See* Declaration of Mr. Niemiera at para. 7 and accompanying appendix. The Third Party Requester respectfully submits that modifying the tape separator of the ‘866 patent by removing the metal foil and leaving only a plastic separator would result in a cable that operates as intended in the telecommunications field.

Finally, Mr. Gareis declares that “shielded and unshielded cables have a different status in the art,” to suggest that one of ordinary skill in the art would not look to the ‘866 patent teachings because of the difficulty in adjusting cable parameters when going from a shielded to unshielded cable. *See* Declaration of Galen Gareis Under 36 C.F.R. § 1.132 at para. 11 (attached to the Patent Owner’s Response). The Patent Owner relies on this statement to support its position that one of ordinary skill in the art would not modify the ‘866 patent pair separator by removing the foil component. Of course, Mr. Gareis’ statement is not correct. *See* Declaration of Baxter at para. 10. Indeed, the ‘537 patent specification itself discloses that the cable could be shielded or unshielded and makes **NO** reference to any difficulties in going from an unshielded to shielded cable. This lack of teaching indicates that the inventors did not see any difficulty or any “different status in the art” between shielded and unshielded cables. *See* ‘537 patent, col. 6, ll. 17-43 (disclosing a shielded embodiment)

The Third Party Requester respectfully submits that the Patent Owner’s positions are baseless. As such, the Third Party Requester respectfully requests that the examiner ignore these attorney arguments and maintain the rejection of claims 19-22.

Issue: Claims 19-22 are not patentable over the combination of the ‘866 patent, ‘683 patent, and the ‘748 patent, as the ‘748 patent discloses a foamed polymer material used for data communications cables

The Patent Owner attempts to distinguish the subject matter of the ‘748 patent by what it claims, not what it teaches as a whole, in an attempt to overcome the clear teaching of the ‘748 patent of foamed polymer materials used in cables. *See* Patent Owner’s Response at 32. As discussed above, the ‘748 patent discloses the benefits of specific materials used in data cables. The ‘748 patent expressly states:

In general, the electrical performance of an insulating material is enhanced by foaming or expanding the corresponding solid material. Foaming also decreases the amount of flammable material employed for a given volume of material. Accordingly, a foamed material is preferably employed to achieve a favorable balance of electrical properties and flame retardancy. ‘748 patent, col. 3, ll. 20-26.

Although this disclosure of the ‘748 patent is in the context of insulation for conductors, this teaching would be considered by one of skill in the art even when choosing a material for a separator, if only for the reduced amount of material that is used due to foaming. *See* Declaration of Baxter at para. 15. The ‘748 patent makes clear that electrical performance considerations are not limited to conductor insulation and extend to other cable applications. *See* ‘748 patent, col. 3, ll. 58-60 (“The principal electrical criteria can be satisfied based upon the dielectric constant and dissipation factor of an insulation *or jacketing material*.”) (emphasis added). The Third Party Requester respectfully requests that the Examiner reject the Patent Owner’s attempt to restrict the teaching of the ‘748 patent to the invention as claimed in the ‘748 patent and to maintain the rejection of claim 31.

Issue: The Patent Owner failed to rebut the rejection of the claim limitations contained in claims 20-22.

The Third Party Requester notes that the Patent Owner’s Response does not address the disclosure of the claim limitations recited in dependent claims 20-22, which depend from independent claim 20, except for the above-described general criticism of the ‘748 patent. For this reason and the reasons above related to the ‘748 patent and claims 19-22, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 20-22.

Issue: Claims 1, 9, 17, and 18 are unpatentable over the combination of the ‘485 patent and the Refi reference

To overcome the combination of U.S. Patent No. 4,385,485 (the “‘485 patent”) and “Fiber Optic Cable: A Lightguide,” by James Refi (the “Refi reference”), the Patent Owner argues that one of ordinary skill in the art would not take the teaching of the ‘485 patent, directed to a fiber optic cable, and the teaching of the Refi reference, directed to fiber optic cables, including hybrid cables that use twisted pairs of insulated conductors, to arrive at the recitations of amended claim 1. *See* Patent Owner’s Response at 34-36.

First, the Patent Owner criticizes the Examiner’s use of statements in the specification of the ‘537 patent for support of the combination. *See* Patent Owner’s Response at 34-35. The

Third Party Requester respectfully submits that the Examiner's position is well supported. The specification of the '537 patent expressly states what one of ordinary skill in the art would "appreciate" at the time of the priority date of the '537 patent. The specification expressly uses the term "it is to be appreciated." *See* '537 patent, col. 4, l. 23. By using this phrase, the inventors themselves acknowledge what one of ordinary skill in the art would understand at the time of the priority date of the '537 patent. By using the phrase "it is to be appreciated," the inventors were not conveying an aspect of their innovation, but instead conveying what one of ordinary skill in the art would understand based on that level of skill - that optical fibers could be used as the transmission media. The Third Party Requester respectfully submits that the Patent Owner's position ignores the admission of the inventors as to the level of understanding of one of ordinary skill in the art.

Second, the Patent Owner attempts to limit the Refi reference to a disclosed embodiment, rather than the general teaching of the reference. The Patent Owner contends that Refi discloses using a single twisted pair of insulated conductors, rather than a plurality of twisted pairs. *See* Patent Owner's Response at 35. The Third Party Requester respectfully submits that this contention ignores the general teaching of the Refi reference - that twisted pairs of insulated conductors can be used in place of optical fibers in a telecommunications cable.

The Third Party Requester respectfully submits that the Refi reference teaches the compatibility of two types of data communications media - optical fibers and twisted pairs of insulated copper conductors - suggesting that either type of transmission media can be used in the same cable structure. The specification of the '537 patent supports that understanding of one of ordinary skill in the art. *See also* Declaration of Baxter at para. 24.

The Patent Owner further argues that the '485 patent fails to disclose a configurable dielectric separator that is "substantially flat in a radial cross-section taken through the finished cable" as recited in amended claim 1. The Third Party Requester respectfully disagrees. The '537 patent discloses only one embodiment that could conceivably support the Patent Owner's claim amendment. That embodiment is pictured in Figures 4 and 5 of the '537 patent, with Figure 5 depicting the cross-sectional view of the cable (that is, the view that equates with the recitation added to amended claim 1). *See* '537 patent, col. 4, ll. 27-41 ("FIG. 4 depicts an embodiment of a data communications cable 10 according to the present invention. . . . FIG. 5 depicts a cross-sectional view of an embodiment of the cable of FIG. 4. The configurable pair

separator 14 runs along a longitudinal length of the cable, and is configured such that the twisted pairs are disposed within channels or grooves 15 of the pair separator along the length of the cable.”).

As can be seen from Figure 5 of the ‘537 patent, the “flat” separator 14 has grooves. “The configurable pair separator 14 runs along a longitudinal length of the cable, and is configured such that the twisted pairs are disposed within channels or grooves 15 of the pair separator along the length of the cable.” ‘537 patent, col. 4, ll. 38-41. As can be seen below, the separators have a comparable shape. The ‘485 pair separator satisfies even the restrictive construction improperly applied to the claim amendment of claim 1 by the Patent Owner, namely the separator is “substantially flat in a radial cross-section taken through the finished cable.” The separator from the ‘485 patent is taken from the shape of the die from Figure 4 of the ‘485 patent:



Substantially flat separator of the ‘485 Patent (on left) and ‘537 Patent

As such, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claim 1 over the ‘485 patent in view of the Refi reference, even as that claim has been amended. Also, as the Patent Owner has failed to provide any basis that the claim limitations recited in dependent claims 9, 17, and 18 are patentable over the combination of the ‘485 patent and the Refi reference, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 9, 17, and 18.

Issue: The ‘748 patent discloses polymer material used for data communications cables

The Patent Owner attempts to distinguish the subject matter of the ‘748 patent by what it claims, not what it teaches as a whole, in an improper attempt to overcome the clear teaching of the ‘748 patent of foamed polymer materials used in cables. See Patent Owner’s Response at 36. As discussed above, the ‘748 patent discloses materials suitable for a plenum communications cable. One of ordinary skill in the art would apply these general teachings to the separator disclosed in the ‘485 patent to arrive at the subject matter of claims 4 and 6-8. “The use of patents as references is not limited to what the patentees describe as their own inventions or to

the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.” *In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983).

For the reasons discussed above in connection with the ‘748 patent, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 4 and 6-8 over the ‘485 patent in view of the Refi reference in further view of the ‘748 patent.

Issue: The ‘217 patent teaches woven fiberglass materials that would be used for a separator

As with the ‘748 Patent, the Patent Owner narrowly applies the teaching of the ‘217 patent in an attempt to get around the full scope of disclosure of this prior art reference. *See* Patent Owner’s Response at 36-37. Again, the Patent Owner argues that a material that can be used to insulate an electrical conductor would not be considered for a pair separator. As discussed above in connection with the unpatentability of claim 1 over the ‘866 patent in view of the ‘217 patent, one of ordinary skill in the art would look to the teaching of the ‘217 patent, specifically the fiberglass tape used for a variety of applications, to modify the tape separator of the ‘485 patent to arrive at the subject matter of claim 5. For the reasons discussed above in connection with the ‘217 patent, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claim 5 over the ‘485 patent in view of the Refi reference in further view of the ‘217 patent.

Issue: Claims 10 and 11 are unpatentable

For the reasons provided above for why the rejection of claim 1 over the ‘485 patent in view of the Refi reference is proper, the Third Party Requester respectfully submits that the rejection of claims 10 and 11 are also proper. The Patent Owner fails to provide any argument as to why either U.S. Patent No. 5,789,711 or U.S. Patent No. 3,888,710 fails to disclose the additional limitation of claim 10 or any arguments as to why U.S. Patent No. 5,486,649 fails to disclose the additional element of claim 11. Instead relies on arguments related to claim 1. *See* Patent Owner’s Response at 37-38. As such, for the reasons provided above in connection with independent claim 1, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 10 and 11.

Issue: Claims 19-22 are not patentable over the combination of the '485 patent, Refi reference, and the '748 patent, as the combination of the '485 patent and the Refi reference discloses a plurality of twisted pairs

In arguing for the patentability of claims 19-22, the Patent Owner repeats its argument that the combination of the '485 patent and the Refi reference fails to disclose a plurality of twisted pairs. See Patent Owner's Response at 39. As discussed above in connection with claim 1, the '485 patent and the Refi reference teaches a plurality of twisted pairs. Accordingly, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 19-22 over the '485 patent in view of the Refi reference and further in view of the '748 patent.

Issue: Claims 19-22 are not patentable over the combination of the '485 patent, Refi reference, and the '748 patent, as the combination of the '485 patent and the Refi reference discloses a flat separator

In arguing for the patentability of claims 19-22, the Patent Owner repeats its argument that the combination of the '485 patent and the Refi reference fails to disclose a substantially flat separator. See Patent Owner's Response at 40. As discussed above in connection with claim 1, the combination of the '485 patent and the Refi reference teaches a substantially flat separator. Accordingly, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 19-22 over the '485 patent in view of the Refi reference and further in view of the '748 patent.

Issue: Claims 19-22 are not patentable over the combination of the '485 patent, Refi reference, and the '748 patent, as the '748 patent discloses materials for use in a telecommunications cable

In arguing for the patentability of claims 19-22, the Patent Owner repeats its argument that the '748 patent fails to disclose a separator that is made of a foamed polymer (claim 19) or any of the materials recited in dependent claims 20-22, but instead teaches materials for insulation. See Patent Owner's Response at 40-41. As discussed above in connection with claim 1, one skilled in the art would combine the materials taught in the '748 patent with the separator of the '485 patent to arrive at the subject matter of claims 19-22. The Patent Owner's attempt to restrict the teaching of the '748 patent to the claimed invention is improper in view of the full scope of disclosure presented by that reference. The Third Party Requester respectfully requests that the Examiner ignore the Patent Owner's improper argument. See *In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) ("The use of patents as references is not limited to what the

patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.”).

Accordingly, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 19-22 over the ‘485 patent in view of the Refi reference and further in view of the ‘748 patent.

Issue: The ‘470 patent discloses a configurable dielectric separator

The Patent Owner argues that Japanese Patent No. Sho43 (1968)-15470 (the “‘470 patent”) fails to disclose the separator recited in claim 1. Specifically, the Patent Owner argues that the disclosed separator is not “configurable.” See Patent Owner’s Response at 42-43. The Third Party Requester respectfully submits that the Patent Owner’s position is erroneous for at least two reasons.

First, although amended claim 1 recites “a finished cable” in the claim preamble, nothing in the claim requires that the separator be configurable once in the finished cable. Instead, the finished cable must include a separator that is configurable. The Patent Owner’s position in its Response is inconsistent with the plain teachings of the ‘537 patent. Once a cable is finished, that is, the cable components are jacketed, no separator would be configurable - the separator would already have been arranged in the cable in the desired configuration and that configuration would not be changed. Further, to the extent that the Patent Owner is correct, then amended claim 1 fails to meet the requirements of 35 U.S.C. § 112, as the specification of the ‘537 patent fails to teach one of ordinary skill in the art how to configure the separator of the cable **after it is finished**.

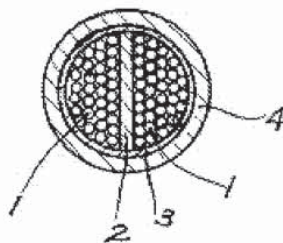
Instead, the proper interpretation of the claim requires the separator to be, at some time, configurable. The separator disclosed in the ‘470 patent is a clear example of such a separator, which is configured into an S-Z helical shape when the plastic material is heated.

Second, the Patent Owner’s argument is contrary to the construction for the term “configurable” asserted by the Patent Owner in litigation. The Patent Owner asserts that the term “configurable” means “flexible” in a signed paper filed with the court. See D.I. 102, Joint Claim Construction Statement filed Nov. 16, 2009, at 7, Belden Technologies, Inc. v. Superior Essex Inc., 1:08-cv-00063 SLR (D. Del) (excerpt provided as Exhibit 2). Since the Patent Office is to give claim terms their broadest reasonable construction and the Patent Owner believes a supportable construction for the term “configurable” is “flexible,” then the Patent Office must

apply a construction at least as broad. *See In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007) (“During reexamination, as with original examination, the PTO must give claims their broadest reasonable construction consistent with the specification.”). Using “flexible” for the term “configurable,” one of ordinary skill in the art would understand that the separator of the ‘470 patent satisfies the claim limitation. If the separator was not flexible, then the cable could not be installed and used. The thin plastic material would flex along with the cable during installation of the cable. *See Declaration of Baxter at para. 22.*

Even under the most narrow reading of amended claim 1, the ‘470 patent discloses the amended recitation “and so as to be substantially flat in a radial cross-section taken through the finished communications cable.” *See Fig. 1 of the ‘470 patent, below (showing that the separator (item 2) appears as a straight line in a radial cross section of the cable).* Accordingly, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claim 1 under 35 U.S.C. § 102(b) as anticipated by the ‘470 patent, even as that claim has been amended.

第 1 図



‘470 Patent, Radial Cross Section View

Issue: The ‘748 patent discloses polymer material used for data communications cables

The Patent Owner attempts to distinguish the subject matter of the ‘748 patent by what it claims, not what it teaches as a whole in an improper attempt to overcome the clear teaching of the ‘748 patent of foamed polymer materials used in cables. *See Patent Owner’s Response at 43.* As discussed above, the ‘748 patent discloses materials suitable for a plenum communications cable. One of ordinary skill in the art would apply these general teachings of the ‘748 patent to the separator disclosed in the ‘470 patent to arrive at the subject matter of claims 4 and 6-8.

“The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.” *In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983).

For the reasons discussed above in connection with the ‘748 patent, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 4 and 6-8 over the ‘470 patent in view of the ‘748 patent. Similarly, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 19-22 over the ‘470 patent in view of the ‘748 patent.

Issue: Claim 11 is unpatentable over the ‘470 patent

For the reasons provided above for why the rejection of claim 1 over the ‘470 patent is proper, the Third Party Requester respectfully submits that the rejection of claim 11 is also proper. The Patent Owner fails to provide any argument as to why the additional element of claim 11 is not rendered obvious by the ‘470 patent, but instead relies on arguments related to claim 1. *See* Patent Owner’s Response at 44. As such, for the reasons provided above in connection with independent claim 1, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claim 11 as obvious over the ‘470 patent.

Issue: The ‘629 patent discloses a flat separator

The Examiner concluded that U.S. Patent No. 4,755,629 (the “‘629 patent”) anticipates under 35 U.S.C. § 102(b) claim 19 of the ‘537 patent. The Patent Owner argues that the ‘629 patent fails to disclose a flat separator. The Third Party Requester respectfully disagrees.

The Patent Owner once again relies on an improper construction of the term “flat” - that the separator is flat when viewed in a radial cross-section of the cable - a limitation that is not present in claim 19. This construction is improper for at least three reasons.

First, claim 19 has no language in the claim itself to support the Patent Owner’s narrow construction. Second, this narrow construction is not consistent with the specification of the ‘537 patent. The specification consistently refers to a configurable separator as “flat,” **even when that separator has been shaped**. *See, e.g.*, ‘537 patent, col. 5, ll. 48-53 (“In the embodiment of the cable of FIG. 6, the pair separator 14 is a flat configurable tape used as a core filler, that is shaped to have the illustrated profile and that is provided in the cable between the four twisted pairs 12. In particular, in this embodiment, the configured pair separator has a shape

somewhat like a “+””); ‘537 patent, col. 5, ll. 59-61 (“[I]t is preferred that the pair separator is supplied as a flat extruded tape”).⁶ Finally, this narrow construction advocated by the Patent Owner is contrary to the Patent Office’s claim construction practice during reexamination. *See In re Icon Health & Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007) (“During reexamination, as with original examination, the PTO must give claims their broadest reasonable construction consistent with the specification.”). As the Examiner concluded, the flat tape disclosed in the ‘629 patent is the recited flat separator of claim 19.

Also, even under the Patent Owner’s construction, the ‘629 patent satisfies the claim. As can be seen from Figure 5 of the ‘537 patent, the “flat” separator 14 has grooves. “The configurable pair separator 14 runs along a longitudinal length of the cable, and is configured such that the twisted pairs are disposed within channels or grooves 15 of the pair separator along the length of the cable.” ‘537 patent, col. 4, ll. 38-41. As can be seen below, the separators have a comparable shape. The ‘629 patent pair separator satisfies even the restrictive construction applied to the claim amendment of claim 1 by the Patent Owner. The separator from the ‘629 patent is taken from the shape of the preform from Figure 7 of the ‘629 patent. The ‘629 patent states that the tape separator can replace this preform. See ‘629 patent, col. 6, ll. 52-56 (“Also, the S-shaped preform 58 in FIG. 7 may be replaced with a tape which is made of a dielectric material and which is wrapped about the conductor pairs to cause each pair to be enclosed substantially in a dielectric portion of the buffer system.”).



Substantially flat separator of the ‘629 Patent (on left) and ‘537 Patent

As such, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claim 19 as anticipated the ‘629 patent.

⁶ The Third Party Requester refers the Examiner to the discussion above in connection with claim 1 and the ‘866 patent for a more complete discussion of this issue.

Issue: Claims 1, 11, 15, and 17 are unpatentable over the ‘629 patent in view of the ‘485 patent

The Examiner concluded that the ‘629 patent did not satisfy the claim limitation “wherein the plurality of twisted pairs of insulated conductors and the substantially flat configurable dielectric separator are twisted about a common axis to form the finished communications cable.” Of course, twisting a cable closed is known, as admitted by the Patent Owner. The ‘537 patent goes on to teach that “[i]t is to be appreciated that the cable can be twisted with any known twisting arrangement such as a helix, or an S-Z configuration. It is also to be appreciated that this method can be varied to include any of the components illustrated and discussed above, such as, for example, to include a drain wire, a binder, a shield, or central core filler.” ‘537 patent, col. 8, ll. 46-48. For example, the ‘485 patent discloses twisting a cable about a common axis to close the cable. The Third Party Requester respectfully submits that one of ordinary skill in the art would apply the teaching of the ‘485 patent with the ‘629 patent to arrive at the subject matter of claim 1.

In contrast, the Patent Owner argues that the cables of the ‘629 patent and the fiber optic cables of the ‘485 patent are too different to disclose the cabling element. *See* Patent Owner’s Response at 48. The Third Party Requester respectfully submits that this argument ignores the teaching of the ‘485 patent, that cables can be twisted to finish the cable. “The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.” *In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983).

The Patent Owner also repeats its position that the ‘629 patent fails to disclose a flat separator. *See* Patent Owner’s Response at 49. For the reasons discussed above, the Third Party Requester respectfully disagrees.

As such, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claim 1 over the ‘629 patent in view of the ‘485 patent. Also, as the Patent Owner has failed to provide any basis that the claim limitations recited in dependent claims 11, 15, and 17 are patentable over the combination of the ‘629 patent and the ‘485 patent, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 11, 15, and 17.

Issue: The '748 patent discloses polymer material used for data communications cables

The Patent Owner attempts to distinguish the subject matter of the '748 patent by what it claims, not what it teaches as a whole in an improper attempt to overcome the clear teaching of the '748 patent of foamed polymer materials used in cables. *See* Patent Owner's Response at 49-50. As discussed above, the '748 patent discloses materials suitable for a plenum communications cable. One of ordinary skill in the art would apply these general teachings of the '748 patent to the separator disclosed in the '629 patent -- a separator in a communications cable -- to arrive at the subject matter of claims 4 and 6-8. "The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain." *In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983). In this case, the '748 patent expressly teaches the use of foamed polymer materials for use in a communications cable and the '629 patent discloses a communications cable.

For the reasons discussed above in connection with the '748 patent, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 4 and 6-8 over the '629 patent in view of the '485 patent and further in view of the '748 patent. Similarly, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 20-22 over the '629 patent in view of the '748 patent.

Issue: Claims 9, 10, and 18 are unpatentable over the '629 patent

For the reasons provided above for why the rejection of claim 1 over the '629 patent is proper, the Third Party Requester respectfully submits that the rejections of claims 9, 10, and 18 are also proper. The Patent Owner fails to provide any argument as to why the subject matter of claims 9, 10, and 18 is not rendered obvious by the '629 patent in combination with other art, but instead relies on arguments related to claim 1. *See* Patent Owner's Response at 50-52. As such, for the reasons provided above in connection with independent claim 1, the Third Party Requester respectfully requests that the Examiner maintain the rejection of claims 9, 10, and 18 as obvious over the '629 patent in view of other prior art.

The Patent Owner's "Secondary Considerations" Should Be Given Little Or No Weight

Issue: Mr. Niemiera's Declaration and the Patent Owner's Response, at pages 12-14, fail to provide adequate support for any secondary considerations.

"To be given substantial weight in the determination of obviousness or nonobviousness, evidence of secondary considerations must be relevant to the subject matter as claimed, and therefore the examiner must determine whether there is a nexus between the merits of the claimed invention and the evidence of secondary considerations." MANUAL OF PATENT EXAMINING PRACTICE § 716.01(b) (Rev. 7, Jul. 2008). "The term 'nexus' designates a factually and legally sufficient connection between the objective evidence of nonobviousness and the claimed invention so that the evidence is of probative value in the determination of nonobviousness." *Id.* Mr. Niemiera's proffered "evidence" does not satisfy the Patent Office's standard as evidence of secondary considerations.

Mr. Niemiera's Declaration, at paragraph 6, states that "at the priority date of the ['537 patent], the high-speed cable industry had been experiencing a long-felt and persistent need to find a viable alternative that could satisfy Category 6 performance requirements, but without the expense and other technical disadvantages associated with the various prior art approaches. These prior approaches to varying degrees all represented failed attempts to strike this desired price/performance balance." Mr. Niemiera fails to provide any objective evidence that a "long-felt need" existed at the time of the priority date of the '537 patent, just an unsupported statement. Mr. Niemiera does not provide any nexus between the claimed invention and this supposed "long-felt need." If any long-felt need did exist, the only possible nexus that Mr. Niemiera provides is with the TIA/EIA Category 6 requirements. None of the claims for the '537 patent specify meeting the Category 6 requirements as a claim limitation. According to Mr. Niemiera, this "long-felt need" would have been initiated by the Category 6 standard. Although the first draft "Category 6" standards were released in September of 1997, the standards were not finalized **until June of 2002**. It is inconsistent to have a "long-felt need" to satisfy requirements that evolved over 5 years and were finalized almost two-and-one-half years **after** the priority date of the '537 patent.

Even the Patent Owner's own public documents counter this "long-felt need." First, Mr. Niemiera states, in paragraph 6, that the long-felt need was to find a viable alternative cable that satisfied Category 6 standards but without the rigid pair separators of the prior art. Mr. Paul

Kish (an employee of the Patent Owner) stated that “Category 6 cables are manufactured with larger copper conductors and may include an internal divider called a cross-web that serves to separate the pairs within the cable and reduce cross-talk noise. *The cross-web divider to separate the pairs is not a specified requirement of the Cat 6 standard, and some manufacturers have developed designs and processes that deliver full Cat 6 compliance without the use of any physical dividers between pairs.*” Paul Kish, *Category 6 Cabling Questions and Answers* at 3, July 2002, available at http://www.belden.com/pdfs/Techpprs/What_is_Category_6_Q&A.pdf (last visited Nov. 10, 2009) (emphasis added) (Attached as Exhibit 3).⁷ As seen from this statement, cables existed that met the Category 6 standards and did not have any pair separator. As such, there could not be a “long-felt need” for a cable with a configurable pair separator.

Also, Mr. Kish’s paper states that: A frequently asked question is why do we need Category 6? Isn’t Category 5e good enough for what is needed today and in the foreseeable future? The answer is ‘probably Yes.’ *Id.* at 5. This statement at least suggests that, as of July 2002, over three years after the priority date of the ‘537 patent, the lesser Category 5e performance was sufficient. Category 5e performance is met with cables without pair separators. *See* Declaration of Baxter at para. 18.

Mr. Niemiera also states that “[w]e were able to overcome industry skepticism with test results showing that tape separator products are able to consistently meet all of the Category 6 performance requirements.” Declaration of Gregory Niemiera at para. 7 (Nov. 23, 2009) (attached to Patent Owner’s Response). Mr. Niemiera fails to provide any objective evidence (industry white papers, statements from other industry personnel, ...) in support of his statement about “industry skepticism.” As Mr. Baxter, who was an active member of the cable industry including the standards bodies, declares, he was not aware of any such skepticism. *See*

⁷ At the time Mr. Kish wrote this paper, he was with NORDX/CDT. NORDX/CDT was acquired by Belden, the Patent Owner. As can be seen from the citation for the paper, the paper is available on Belden’s website. As recently as July 2009, Mr. Kish was Director, Systems and Standards at Belden. *See Standards Update: Greening of the Data Centre*, available at <http://www.belden.com/pdfs/Techpprs/cnsstandardsjulaug2009.pdf> (last visited Nov. 10, 2009) (providing Mr. Kish’s title).

Declaration of Baxter at para. 19. And again, Mr. Niemiera seems to show a nexus between Category 6 requirements and alleged “skepticism.” No claim of the ‘537 patent includes a claim element directed to Category 6 requirements. As such, there is no nexus with the claims of the ‘537 patent.

Finally, Mr. Niemiera declares that the Patent Owner has “enjoyed tremendous commercial success in selling cable products that embody the claimed tape separator” Declaration of Gregory Niemiera at para. 8 (Nov. 23, 2009) (attached to Patent Owner’s Response). Neither Mr. Niemiera nor the Patent Owner’s Response (page 14) provides any nexus between the alleged “commercial success” and the patented invention. *See In re DBC*, 545 F.3d 1373, 1384 (Fed. Cir. 2008) (“We have held on a number of occasions that evidence of commercial success alone is not sufficient to demonstrate nonobviousness of a claimed invention. Rather, the proponent must offer proof ‘that the sales were a direct result of the unique characteristics of the claimed invention--as opposed to other economic and commercial factors unrelated to the quality of the patented subject matter.’”).

Other factors were a force in category cable sales beginning in 2006, including a commercial real estate boom. This boom generated a great demand for all types of cable. This demand, and not the patented features of the ‘537 patent, drove the sales of the products referenced by Mr. Niemiera. *See Construction Market Forecasting Service, Analysis and Forecasts of National and Regional Construction Markets* (2008) (showing increases in non-residential and commercial construction) (provided herein as Exhibit 4). Another factor affecting these sales is the advent of the 10 Gb/s Ethernet (referred to as 10GBASE-T) standard (IEEE 802.3AN). This standard issued in June of 2006. The publicity surrounding this standard and the need for Category 6-compliant cables to satisfy the standard was a factor in the increased sales of category 6 cables. *See Declaration of Baxter at para. 21.*

The Patent Owner states, at page 14 of its Response, of an “observation by the Patent Owner of possible copying by their competition.” The Patent Owner provides **no evidence at all** that supports this “observation” that the patented technology has been **copied**. The only support offered by the Patent Owner is a reference to paragraphs 5-10 of Mr. Niemiera’s Declaration. The only paragraph in the Niemiera Declaration that might suggest copying is paragraph 10, which states:

As a further evidence of commercial success, I note that several of Belden's competitors who are among the top five largest suppliers of copper cables in the U.S. marketplace -- e.g., General Cable; Superior Essex; Commscope -- are also now selling significant tape separator product lines. In fact, Belden is currently prosecuting a pending patent infringement litigation against Superior Essex concerning the above-identified patent and other patents in its family.⁸

Nowhere in this paragraph does Mr. Niemiera indicate that any competitor **copied** the cables of the '537 patent. The Third Party Requester is aware of no evidence provided by the Patent Owner during the current litigation to support any alleged copying. As the Patent Owner has not provided any other support for its statement, this baseless assertion should be given no weight. "The arguments of counsel cannot take the place of evidence in the record." MANUAL OF PATENT EXAMINING PRACTICE § 716.01(c) (Rev. 7, Jul. 2008).

The Patent Owner characterizes the performance results of a cable embodying the invention of the '537 patent as unexpected, referring to test results provided by Mr. Niemiera. See Patent Owner's Response at 14. These results show that the cable satisfies Category 6 requirements. See Declaration of Gregory Niemiera at para. 7 (Nov. 23, 2009) (attached to Patent Owner's Response). However, these results **cannot be unexpected**. As the Patent Owner itself states in a public document, **cables with no separator at all satisfy Category 6 requirements**. See Paul Kish, *Category 6 Cabling Questions and Answers* at 3, July 2002, available at http://www.belden.com/pdfs/Techpprs/What_is_Category_6_Q&A.pdf (last visited Nov. 10, 2009) (Exhibit 3).

Also, Mr. Kish's statement that cables were constructed that met Category 6 standards that had no separator seems to cast doubt on any real industry skepticism - why would the industry be skeptical that a cable with a tape separator met Category 6 requirements when a cable without a separator met the requirements. See Paul Kish, *Category 6 Cabling Questions and*

⁸ Mr. Niemiera includes the Third Party Requester in his list of companies. The Patent Owner has not established any evidence, either during litigation or in its Response, that the Third Party Requester has copied any product of the Patent Owner.

Answers at 3, July 2002, available at http://www.belden.com/pdfs/Techpprs/What_is_Category_6_Q&A.pdf (last visited Nov. 10, 2009) (Exhibit 3).⁹

The Third Party Requester respectfully requests that the Examiner disregard Mr. Niemiera's Declaration and the Patent Owner's remarks concerning secondary considerations. The Patent Owner has failed to provide sufficient support for these considerations by declining to offer any evidence of a nexus between these considerations and the subject matter defined by the claims of the '537 patent.

New Claims Are Not Patentable Over Prior Art Printed Publications

The Patent Owner has amended independent claim 1¹⁰ and added claims 23-34, with claim 26 being an independent claim. Newly-added claims 23-34 merely repackage some of the original claims of the '537 patent. As such, newly-added claims 23-34 are unpatentable over the prior art of record. Specifically:

Anticipation

- Claims 24, 25, 32, and 34 are anticipated under 35 U.S.C. § 102(b) by DE 297 19 866 (the "'866 patent"); and
- Claims 23, 25, and 32 are anticipated under 35 U.S.C. § 102(b) by Japanese Patent No. Sho43 (1968)-15470 (the "'470 patent").

Obviousness

- Claims 23, 26, 30, and 31 are unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of U.S. Patent No. 6,622,683 (the "'683 patent");
- Claims 27-29 are unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent and further in view of U.S. Patent 5,670,748 (the "'748 patent");
- Claim 33 is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of U.S. Patent No. 5,010,210 (the "'210 patent");

⁹ Mr. Niemiera references test results in his Declaration. All these test results do is confirm that, more than three years **after** the priority date of the '537 patent, a 6 LAN cable satisfied Category 6 performance requirements. Again, as Mr. Kish noted in his July 2002 paper, cables **with no separator** satisfied the Category 6 requirements. Mr. Niemiera's test data fails to provide a nexus between an invention recited by one or more claims of the '573 patent and market success for a commercial cable product.

¹⁰ The unpatentability of claim 24 is addressed in the specific comments above.

- Claims 24 and 34 are unpatentable under 35 U.S.C. § 103(a) over the '470 patent in view of the '866 patent;
- Claim 33 is unpatentable under 35 U.S.C. § 103(a) over the '470 patent in view of the '210 patent;
- Claims 23, 24, 26, 30, and 31 are unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 4,755,629 (the "'629 patent") in view of U.S. Patent No. 4,385,485 (the "'485 patent");
- Claims 27-29 are unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '748 patent; and
- Claim 23 is unpatentable under 35 U.S.C. § 103(a) over the '485 patent in view of "Fiber Optic Cable: A Lightguide," by James Refi (the "Refi reference").

The Third Party Requester respectfully requests that, in view of at least the foregoing, that the Examiner finds newly-added claims 23-34 unpatentable over the prior art printed publications of record.

Amended claim 1 is provided below. As discussed above, the claim amendment fails to overcome the prior art printed publications of record.

1. (amended) A finished communications cable comprising:

a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;

a substantially flat configurable dielectric separator disposed between the plurality of twisted pairs of conductors in the finished communications cable and arranged so as to separate the first twisted pair of insulated conductors from the second twisted pair of insulated conductors and so as to be substantially flat in a radial cross-section taken through the finished communications cable; and

a jacket enclosing the plurality of twisted pairs of insulated conductors and the configurable dielectric separator;

wherein the plurality of twisted pairs of insulated conductors and the substantially flat configurable dielectric separator are twisted about a common axis to form the finished communications cable.

Dependent Claim 23. Claim 23 recites "**[t]he finished communications cable as claimed in claim 1 wherein the substantially flat configurable dielectric separator consists of dielectric materials.**" The Examiner concluded that claim 1 was anticipated under 35 U.S.C. § 102(b) by the '866 patent (Ground 5). As discussed above, the Examiner should maintain this rejection for claim 1, as amended. Furthermore, the Third Party Requester respectfully submits that it would

have been obvious to combine the teachings of the '683 patent with the '866 patent to arrive at a modified separator that "consists of dielectric materials" as recited by claim 23. As the Examiner concluded in the Official Action, the '683 patent teaches one of ordinary skill in the art that a finite number of possible configurations for a foil/plastic laminate separator exist and that one of ordinary skill in the art would try a separator without the metal foil, leaving only a plastic separator, for a communications cable. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp."). *See also* Office Action at 31-33. Also, in the U.S. market, one of ordinary skill in the art would be motivated to try a separator configuration without the foil, as in the U.S., cable manufacturers had a preference for unshielded cables. *See* Declaration of Baxter at paras. 12-13.

One of ordinary skill in the art would have known to combine the '866 patent and '683 patent to form the subject matter recited by Claim 23 because both patents teach a solution for improving cross-talk in telecommunications cables. Both patents teach employing flat separators, including separators with foil and plastic laminate. It would have been obvious to one of ordinary skill in the art to combine the teaching from the '683 patent of a separator that totally encases the foil component in plastic, making the separator non-conductive, with the cable of the '866 patent. Further, one of ordinary skill in the art would have a reasonable expectation of success of using the separator configuration of the '683 patent with the cable structure of the '866 patent because of the substantial overlap of cable technology and the predictable result of combining them (indeed, the '683 patent shows a variety of foil/plastic laminate separators). **Accordingly, claim 23 is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent.**

The Examiner concluded that claim 1 was unpatentable under 35 U.S.C. § 103(a) as obvious over the '485 patent in view of the Refi reference (Ground 15). As discussed above, the Examiner should maintain this rejection in light of the claim amendments to claim 1. The Third Party Requester respectfully submits that the '485 patent discloses a separator that "consists of dielectric materials." *See* '485 patent, col. 3, ll. 34-37 (disclosing polyester as a material for the separator). **Accordingly, claim 23 is unpatentable under 35 U.S.C. § 103(a) over the '485 patent in view of the Refi reference.**

The Examiner concluded that claim 1 was anticipated under 35 U.S.C. § 102(b) by the '470 patent (Ground 23). As discussed above, the Examiner should maintain this rejection in light of the claim amendments to of claim 1, as amended. The Third Party Requester respectfully submits that the '470 patent discloses a separator that "consists of dielectric materials." as recited by claim 23. *See* '470 patent, Engl. transl. at 1 ("Core material 2 is most effectively shown in Figure 2; as shown therein, the material is formed into a reciprocatingly twisted state by slowly changing the facing of both surfaces as the material moves in the longitudinal direction. This can be achieved by twisting the facing direction of the plate body to the opposing direction at fixed intervals while maintaining the rigid plastic or other material of the horizontal plate at a prescribed temperature.") (emphasis added). **Accordingly, claim 23 is anticipated under 35 U.S.C. § 102(b) by the '470 patent.**

The Examiner concluded that claim 1 was unpatentable under 35 U.S.C. § 103(a) as obvious over the '629 patent in view of the '485 patent (Ground 29). As discussed above, the Examiner should maintain this rejection for claim 1, as amended. The Third Party Requester respectfully submits that the '629 patent and the '485 patent disclose a separator that "consists of dielectric materials." *See* '629 patent, col. 6, ll. 52-56 (disclosing that the tape separator is made of a dielectric material); '485 patent, col. 3, ll. 34-37 (disclosing polyester as a material for the separator). **Accordingly, claim 23 is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent.**

Dependent claim 24. Claim 24 recites "[t]he finished communications cable as claimed in claim 1, wherein the plurality of twisted pairs of insulated conductors consists of four twisted pairs of insulated conductors." The Examiner concluded that claim 1 was anticipated under 35 U.S.C. § 102(b) by the '866 patent (Ground 5). As discussed above, the Examiner should maintain this rejection of claim 1, as amended. The Third Party Requester respectfully submits that the '866 patent discloses an embodiment with four twisted pairs of insulated conductors. *See* '866 patent, Figures 1-5. **Accordingly, claim 24 is anticipated under 35 U.S.C. § 102(b) by the '866 patent.**

The Examiner concluded that claim 1 was anticipated under 35 U.S.C. § 102(b) by the '470 patent (Ground 23). As discussed above, the Examiner should maintain this rejection for the amended version of claim 1. The Third Party Requester respectfully submits that the '866 patent discloses an embodiment with four twisted pairs of insulated conductors (indeed, all

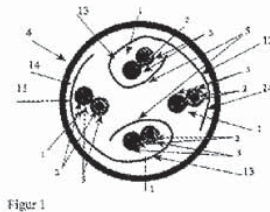
disclosed embodiments have four twisted pairs). *See* '866 patent, Figures 1-5. The number of pairs used in a cable is a matter of design choice, with the number of pairs selected for a specific application. *See* Declaration of Baxter at para. 23. It would have been obvious to one of ordinary skill in the art to combine the cable structure of the '470 patent with a cable consisting of four twisted pairs of insulated conductors as taught by the '866 patent to arrive at the subject matter of claim 24. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 420 (2007) ("Common sense teaches, however, that familiar items may have obvious uses beyond their primary purposes, and in many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle.").

One of ordinary skill would have known to combine the teachings of '470 patent and '866 patent to form the recited subject matter of claim 24 because both patents are directed to telecommunications cables with twisted pairs of insulated conductors. Further, one of ordinary skill in the art would have a reasonable expectation of success of using the cable structure of the '470 patent with the number of twisted pairs disclosed in the '866 patent because of the substantial overlap of technology and the predictable result of combining them (indeed, the '470 patent shows a cable with twisted pairs). **Accordingly, claim 24 is unpatentable under 35 U.S.C. § 103(a) over the '470 patent in view of the '866 patent.**

The Examiner concluded that claim 1 was unpatentable under 35 U.S.C. § 103(a) as obvious over the '629 patent in view of the '485 patent (Ground 29). As discussed above, the Examiner should maintain this rejection for the amended version of claim 1. The Third Party Requester respectfully submits that the '629 patent discloses an embodiment with four twisted pairs of insulated conductors. *See* '629 patent, Figure 5 (disclosing a cable consisting of four twisted pairs). **Accordingly, claim 24 is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent.**

Dependent claim 25. Claim 25 recites "[t]he finished communications cable as claimed in claim 1, wherein the plurality of twisted pairs of insulated conductors further includes a third twisted pair of insulated conductors; and wherein the substantially flat configurable dielectric separator does not separate the first twisted pair of insulated conductors from the third twisted pair of insulated conductors." The Examiner concluded that claim 1 was anticipated under 35 U.S.C. § 102(b) by the '866 patent (Ground 5). As discussed above, the Examiner should maintain this rejection for claim 1, as amended. The Third Party Requester

respectfully submits that the '866 patent discloses an embodiment where "the plurality of twisted pairs of insulated conductors further includes a third twisted pair of insulated conductors; and wherein the substantially flat configurable dielectric separator does not separate the first twisted pair of insulated conductors from the third twisted pair of insulated conductors." *See, e.g.*, '866 patent, Figure 1. As can be seen in Figure 1 of the '866 patent, reproduced below, the embodiment comprises (that is, has at least) three twisted pairs and the pair separator does not separate the twisted pair at the "9 o'clock" location from the twisted pair at the "3 o'clock" position in the figure. **Accordingly, claim 25 is anticipated under 35 U.S.C. § 102(b) by the '866 patent.**



'866 Patent, Figure 1

The Examiner concluded that claim 1 was anticipated under 35 U.S.C. § 102(b) by the '470 patent (Ground 23). As discussed above, the Examiner should maintain this rejection for claim 1, as amended. The Third Party Requester respectfully submits that, given the structure of the separator of the '470 patent, half the pairs lie on one side of the separator and half of the pairs lie on the other. The pairs on one side of the separator are not separated by the separator of the cable disclosed by the '470 patent. **Accordingly, claim 25 is anticipated under 35 U.S.C. § 102(b) by the '470 patent.**

Independent claim 26. Claim 26 recites:

A finished twisted pair data communications cable comprising:

four twisted pairs of insulated conductors consisting of a first twisted pair, a second twisted pair, a third twisted pair, and a fourth twisted pair;

a substantially flat configurable non-conductive pair separator disposed between the four twisted pairs of insulated conductors and arranged to separate the first twisted pair from the second twisted pair, the substantially flat configurable non-conductive pair separator being substantially flat in a radial cross-section taken through the finished twisted pair data communications cable; and

a jacket enclosing the four twisted pairs of insulated conductors and the substantially flat configurable non-conductive pair separator;

wherein the substantially flat configurable non-conductive pair separator is a tape;

wherein the substantially flat configurable non-conductive pair separator consists of dielectric materials; and

wherein the four twisted pairs of insulated conductors and the substantially flat configurable non-conductive pair separator are helically twisted about a common axis to close the cable and form the finished twisted pair data communications cable.

Newly-added claim 26 differs from amended claim 1 in three ways:

1. claim 26 recites that the cable consists of four twisted pairs, while claim 1 recited a plurality of twisted pairs;
2. claim 26 recites that the pair separator consists of dielectric material, while claim 1 does not have that requirement; and
3. claim 26 recites that the pair separator is a tape, where claim 1 does not have that requirement.

The Examiner concluded that claim 1 was anticipated under 35 U.S.C. § 102(b) by the '866 patent (Ground 5). The Third Party Requester refers the Examiner to discussion above in connection with the '866 patent and claim 1 and Ground 5 in the current Office Action. The Third Party Requester respectfully submits that the '866 patent discloses an embodiment with four twisted pairs of insulated conductors. *See* '866 patent, Figures 1-5. Further, the Third Party Requester respectfully submits that the '866 patent discloses a pair separator that is a tape. *See* '866 patent, Figures 1-5; see also '866 patent, Engl. transl. at 5 (disclosing that the separator is only tens of microns thick). The thin configuration of the separator would be considered a tape by one of ordinary skill in the art.

As discussed above, in connection with claim 23, the Third Party Requester respectfully submits that it would have been obvious to combine the teachings of the '683 patent with the '866 patent to arrive at a modified separator that "consists of dielectric materials." As the Examiner concluded in the prior Official Action, the '683 patent teaches one of ordinary skill in the art that a finite number of possible configurations for a foil/plastic laminate separator exist and that one of ordinary skill in the art would try a separator without the metal foil, leaving only a plastic separator. *See KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("When there is a design need or market pressure to solve a problem and there are a finite number of identified,

predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp.”). *See also* Office Action at 31-33. Also, in the U.S. market, one of ordinary skill in the art would be motivated to try a configuration without the foil, as in the U.S., cable manufacturers had a preference for unshielded cables. *See* Declaration of Baxter at paras. 12-13.

Reasons to combine the ‘866 patent and ‘683 patent are discussed above in connection with claim 23. **Accordingly, claim 26 is unpatentable under 35 U.S.C. § 103(a) over the ‘866 patent in view of the ‘683 patent.**

The Examiner concluded that claim 1 was unpatentable under 35 U.S.C. § 103(a) as obvious over the ‘629 patent in view of the ‘485 patent (Ground 29). As discussed above, the Examiner should maintain this rejection for claim 1, as amended. The Third Party Requester refers the Examiner to discussion above in connection with the ‘629 patent and claim 1 and Ground 29 in the current Office Action. The Third Party Requester respectfully submits that the ‘629 patent and the ‘485 patent disclose a separator that “consists of dielectric materials.” *See* ‘629 patent, col. 6, ll. 52-56 (disclosing that the tape separator is made of a dielectric material); ‘485 patent, col. 3, ll. 34-37 (disclosing polyester as a material for the separator). Similarly, the ‘629 patent and the ‘485 patent disclose a separator that is a tape. *See* ‘629 patent, col. 6, ll. 52-56 (disclosing that the tape separator can be used instead of the preform separator); *see generally*, ‘485 patent, col. 3, ll. 34-37 (disclosing separator as “splicing tape 11”). Also, the ‘629 patent discloses an embodiment with four twisted pairs of insulated conductors. *See* ‘629 patent, Figure 5 (disclosing a cable consisting of four twisted pairs). **Accordingly, claim 26 is unpatentable under 35 U.S.C. § 103(a) over the ‘629 patent in view of the ‘485 patent.**

Dependent claim 27. Claim 27 recites “[t]he finished twisted pair data communications cable as claimed in claim 26, wherein the substantially flat configurable non-conductive pair separator comprises a foamed polymer.” As the Examiner has already determined, U.S. Patent 5,670,748 (the “‘748 patent”) discloses materials for use in data cables, including foamed polymers. *See, e.g.*, Office Action at 19-20. For example, the ‘748 patent discloses fluorinated ethylene propylene (FEP) polymer (among other materials) for use in data cables to achieve flame retardancy and minimize smoke. The ‘748 patent is directly related to materials used for flame retardancy and smoke suppression in data communications cables. *See generally*, ‘748 patent.

The '748 patent further discloses "the electrical performance of an insulating material is enhanced by foaming or expanding the corresponding solid material. Foaming also decreases the amount of flammable material employed for a given volume of material. Accordingly, a foamed material is preferably employed to achieve a favorable balance of electrical properties and flame retardancy." See '748 patent, Table 1 and col. 3, ll. 11-25.

Although the '748 patent claims are directed to a composition of materials used to insulate a conductor, the "Background of the Invention" section discusses electrical and fire retardancy properties of materials used in cables generally. One of ordinary skill in the art would have recognized this general teaching of the '748 patent to modify the teaching of the '866 patent to arrive at the recitation of new claim 27. See '748 patent, col. 2, l. 1 - col. 3, l. 25. One of ordinary skill in the art would have known to combine the foamed polymer disclosed in the '748 patent with the pair separator of the '866 patent, to arrive at the recitation of claim 27. See Declaration of Baxter at paras. 14-15, 20. See also, *In re Heck*, 699 F.2d 1331, 1333 (Fed. Cir. 1983) ("The use of patents as references is not limited to what the patentees describe as their own inventions or to the problems with which they are concerned. They are part of the literature of the art, relevant for all they contain.").

As discussed above, claim 26 is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent. **Accordingly, claim 27, which depends from claim 26, is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent and further in view of the '748 patent.**

Similarly, as discussed above, claim 26 is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent. **Accordingly, claim 27, which depends from claim 26, is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent and further in view of the '748 patent.**

One of ordinary skill would have known to combine either the separator of the '866 patent or the separator of the '629 patent and the '748 patent because these patents relate to data communications cables. The '748 patent is specifically related to the types of materials that are optimal to meet fire and electrical standards. The '748 patent demonstrates that one of ordinary skill in the art would have known that certain materials may be used to achieve flame retardance without degrading cable transmission performance. It would have been obvious to one of ordinary skill in the art to combine the materials of the '748 patent with the cable structure of

either the '866 patent, as modified by the '683 patent, or the '629 patent, as modified by the '485 patent, to achieve the subject matter of claim 27. Further, one of ordinary skill in the art would have a reasonable expectation of success of using the materials of the '748 patent with the cable structure of either the '866 patent (as modified by the '683 patent) or the '629 patent (as modified by the '485 patent) because of the substantial overlap of technology and the predictable result of combining them. *See* Declaration of Baxter at paras. 14-15, 20.

Dependent claim 28. Claim 28 recites “[t]he finished twisted pair data communications cable as claimed in claim 27, wherein the substantially flat configurable non-conductive pair separator comprises a flame-retardant, low-dielectric constant, foamed polymer.” As the Examiner has already determined, the '748 patent discloses materials for use in data cables, including foamed polymers. One of the disclosed foamed polymers is FEP, “a low dielectric constant, low dissipation factor foamed polymer.” *See* '748 patent, Table 1. The '537 patent itself defines FEP as “a low dielectric constant, low dissipation factor foamed polymer.” *See* '537 patent, col. 4, ll. 60-66. Reasons for combining the '748 patent with either the '866 patent or the '629 patent to form the subject matter recited by claim 28 are provided above, in connection with claim 27.

As discussed above, claim 27 is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent and in further view of the '748 patent. **In view of the disclosure of use of a foamed polymer for a data cable in the '748 patent, the Third Party Requester respectfully submits that claim 28, which depends from claim 27, is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent and further in view of the '748 patent.**

Similarly, as discussed above, claim 27 is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent and in further view of the '748 patent. **Accordingly, claim 28 is also unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent and further in view of the '748 patent.**

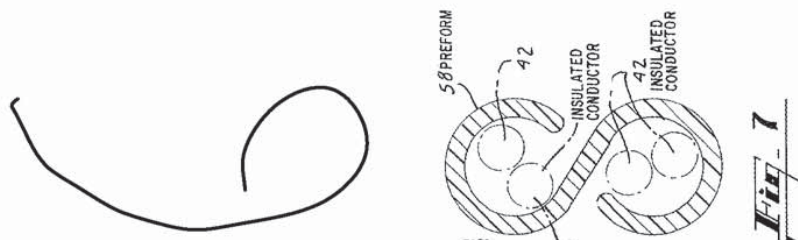
Dependent claim 29. Claim 29 recites “[t]he finished twisted pair data communications cable as claimed in claim 27, wherein the substantially flat configurable non-conductive pair separator comprises a foamed fluorinated ethylene propylene material.” As the Examiner has already determined, the '748 patent discloses materials for use in data cables, including foamed polymers. One of the disclosed foamed polymers is FEP - fluorinated ethylene

propylene. See '748 patent, Table 1. As discussed above, claim 27 is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent and in further view of the '748 patent. Reasons for combining the '748 patent with either the '866 patent or the '629 patent are provided above, in connection with claim 27.

As discussed above, claim 27 is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent and in further view of the '748 patent. **In view of the disclosure of use of a foamed FEP for a data cable in the '748 patent, the Third Party Requester respectfully submits that claim 29, which depends from claim 27, is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent and further in view of the '748 patent.**

Similarly, as discussed above, claim 27 is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent and in further view of the '748 patent. **Accordingly, claim 29 is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent and further in view of the '748 patent.**

Dependent claim 30. Claim 30 recites "**[t]he finished twisted pair data communications cable as claimed in claim 26, wherein the substantially flat configurable non-conductive pair separator has a concave shape.**" The '866 patent discloses a pair separator with a concave shape. See '866 patent, Figures 1-5. Figure 1 from the '866 patent is reproduced above. As can be seen from that figure, the pair separators have a concave shape. Similarly, the separator of the '629 patent has a concave shape, as each half of the "S" shaped separator has a concave shape. These separators are depicted below:



Concave-shaped separators of the '866 Patent (on left) and '629 Patent

As discussed above, claim 26 is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent. **In view of the disclosure of use of a concave-shaped separator for a data cable in the '866 patent, the Third Party Requester respectfully**

submits that claim 30, which depends from claim 26, is unpatentable under 35 U.S.C. § 103(a) over the '866 patent in view of the '683 patent.

Similarly, as discussed above, claim 26 is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent. In view of the disclosure of use of a concave-shaped separator for a data cable in the '629 patent, the Third Party Requester respectfully submits that , claim 30 is unpatentable under 35 U.S.C. § 103(a) over the '629 patent in view of the '485 patent.

Dependent claim 31. Claim 31 recites “[t]he finished twisted pair data communications cable as claimed in claim 26, wherein the substantially flat configurable non-conductive pair separator does not extend more than 180 around any one of the four twisted pairs of insulated conductors.” As the Examiner has already determined, it would be obvious to modify the shape of a separator to not extend more than 180 degrees around any twisted pair in a cable. See Office Action at 30. As the Examiner concluded:

Fig. 2 of GmbH '866 discloses at least some of the pairs with the separator being not more than 180 degrees around the pair. To the extent that GmbH '866 does not disclose the recited limitation that the separator does not extend more than 180 around any one of the plurality of twisted pairs of insulated conductors as called for in the claim, this limitation would have been obvious to a person skilled in the art. A skilled artisan would recognize that as to a configurable separator, there are a finite number of identified, predictable potential solutions as to the shape of the separator. The separator can be either less than or equal to 180° around a pair, or greater than 180 degrees around a pair. Further, One of ordinary skill in the art would have a reasonable expectation of success of using a separator that did not extend more than 180 degrees around a pair. As such, it would have been obvious to one of ordinary skill in the art to try a configuration where the separator did not extend more than 180° around any pair.

The Third Party Requester respectfully submits that it would have been obvious to modify the configuration of the configurable pair separator disclosed in the combination of the '866 patent and '683 patent to achieve a configuration as recited in claim 31. Because the separator of the '866 patent is configurable, a person of ordinary skill would have an opportunity to try one or more of the finite arrangements to achieve a desired separator configuration without difficulty. See *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (“When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue

the known options within his or her technical grasp.”). *See also* Office Action at 31-33. As discussed above, claim 26 is unpatentable under 35 U.S.C. § 103(a) over the ‘866 patent in view of the ‘683 patent. **Accordingly, claim 31 is unpatentable under 35 U.S.C. § 103(a) over the ‘866 patent in view of the ‘683 patent.**

Similarly, as discussed above, claim 26 is unpatentable under 35 U.S.C. § 103(a) over the ‘629 patent in view of the ‘485 patent. **Accordingly, claim 31 is unpatentable under 35 U.S.C. § 103(a) over the ‘629 patent in view of the ‘485 patent.** For the same reasons as specified above for the separator of the ‘866 patent, it would have been obvious to one of ordinary skill in the art to modify the tape separator of the ‘629 patent to try a configuration where the pair separator does not extend more than 180 degrees around any twisted pair in a cable.

Dependent claim 32. Claim 32 recites “**[t]he finished twisted pair data communications cable as claimed in claim 25, wherein the substantially flat configurable non-conductive pair separator does not separate the first twisted pair from the third twisted pair.**” Claim 25 recites: “wherein the substantially flat configurable dielectric separator does not separate the first twisted pair of insulated conductors from the third twisted pair of insulated conductors.” Claim 32 is directed to subject matter that is common with this recitation of claim 25 and, as a result, this claim is unpatentable for the reasons provided above in connection with claim 25 (see analysis above).

Dependent claim 33. Claim 33 recites “**[t]he finished twisted pair data communications cable as claimed in claim 25, wherein the jacket comprises polyvinyl chloride.**” The use of a thermoplastic, including polyvinyl chloride, for a cable jacket was known in the art at the time of the priority date of the ‘537 patent. *See* Declaration of Baxter at para. 20. For example, U.S. Patent No. 5,010,210 (the “‘210 patent”) discloses a telecommunications cable, including an embodiment with four twisted pairs of insulated conductors contained within a jacket. *See* ‘210 patent, Figure 1 and accompanying text. The jacket of the cable comprises polyvinyl chloride. *See* ‘210 patent, col. 3, ll. 33-35. It would have been obvious to combine the teaching of a jacket of a cable comprising polyvinyl chloride, as disclosed in the ‘210 patent, with the cable structure of the ‘866 patent. **Accordingly, claim 33 is unpatentable under 35 U.S.C. § 103(a) over the ‘866 patent in view of the ‘210 patent.** Similarly, as discussed above, claim 25 is anticipated

under 35 U.S.C. § 102(b) by the '470 patent. **Accordingly, claim 33 is unpatentable under 35 U.S.C. § 103(a) over the '470 patent in view of the '210 patent.**

Reasons to combine the '210 patent with either the '866 patent or the '470 patent includes that all of these patents disclose telecommunications cables with twisted pairs of insulated conductors and jackets. As for the '866 patent, the specification expressly recites that the jacket can be a thermoplastic. Polyvinyl chloride is a thermoplastic. *See, e.g.,* G. Hawley, "Condensed Chemical Dictionary," Van Nostrand Reinhold Company, Inc. at 840 (1981) (provided as Exhibit 5) (identifying polyvinyl chloride as a thermoplastic). Further, one of ordinary skill in the art would have a reasonable expectation of success of using the materials of the '210 patent jacket with the cable structure of either the '866 patent or the '470 patent because of the substantial overlap of technology and the predictable result of combining them.

Dependent claim 34. Claim 34 recites "[t]he finished twisted pair data communications cable as claimed in claim 25, wherein the jacket comprises a thermoplastic." The '866 patent discloses that the jacket can be made of a thermoplastic. *See* '866 patent, Engl. trans. at 3 ("As an outer mechanical protection, an invention-specific transmission cable has a cable cover 4, which consists of customary thermoplastic cover materials."). As discussed above, claim 25 is anticipated under 35 U.S.C. § 102(b) by the '866 patent. **Accordingly, claim 34, which depends from claim 25, is also anticipated under 35 U.S.C. § 102(b) by the '866 patent in view of that patent's disclosure of a jacket comprising thermoplastic.**

The use of a thermoplastic for a cable cover was known in the art at the time of the priority date of the '537 patent. It would have been obvious to construct the sheath 4 of the '470 patent cable structure with a thermoplastic as taught in the '866 patent. Reasons to combine the '866 patent and the '470 patent are provided above, in connection with claim 24. As discussed above, claim 25 is anticipated under 35 U.S.C. § 102(b) by the '470 patent. **Accordingly, claim 34, which depends from claim 25, is also unpatentable under 35 U.S.C. § 103(a) over the '470 patent in view of the '866 patent.**

Patent Owner's Support For New Claims Is Deficient under 35 U.S.C. § 112

A newly-added limitation to amended independent claim 1 recites that the separator is “substantially flat in a radial cross-section taken through the finished communications cable.” To the extent that this added limitation is interpreted to mean that the separator “appears as substantially a straight line in a radial cross-section,” this subject matter represents “new matter” and should be rejected, along with claims depending from amended claim 1, under 35 U.S.C. § 112. See MANUAL OF PATENT EXAMINING PRACTICE § 2670 (Rev. 7, Jul. 2008) (“[C]laims representing new matter will be rejected under 35 U.S.C. § 112.”). None of the embodiments of the ‘537 patent disclose such a configuration. The Patent Owner contends that this recitation is supported by Figure 4 of the ‘537 patent. See Patent Owner’s Response, Appendix A. However, the ‘537 patent expressly states that Figure 5 of the ‘537 patent shows the cable of Figure 4 in a radial cross-section. See ‘537 patent, col. 4, ll. 36-37. As seen in Figure 5 of the ‘537 patent, the separator does not appear as a straight line. Figure 5 is reproduced below.

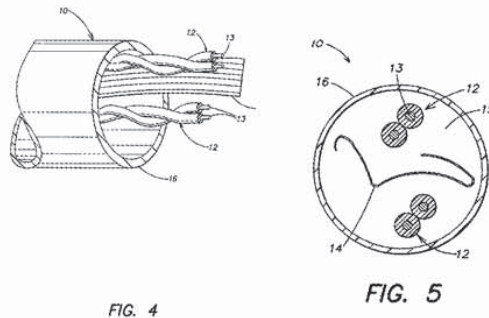


FIG. 4

FIG. 5

‘537 Patent

Newly-added independent claim 26 recites “four twisted pairs of insulated conductors **consisting of** a first twisted pair, a second twisted pair, a third twisted pair, and a fourth twisted pair” and “the substantially flat configurable non-conductive pair separator being substantially flat in a radial cross-section taken through the finished twisted pair data communications cable.” See Patent Owner’s Response at 5-6 (emphasis added). As such, newly-added claim 26 requires a cable with four and only four twisted pairs along with a separator that is “substantially flat configurable non-conductive pair separator being substantially flat in a radial cross-section taken through the finished twisted pair data communications cable.” The Patent Owner points to Figure 4 of the ‘537 patent in support of the “substantially flat” recitation. See Patent Owner’s

Response, Appendix A. However, as seen above, the embodiment of Figure 4 shows **only two twisted pairs of insulated conductors**. Similarly, Figure 5, the cross-sectional view of an embodiment of Figure 4 also shows **only two twisted pairs**. Nowhere does the '537 patent suggest that the embodiments of Figures 4 and 5 can have more than 2 twisted pairs and, more specifically, four and only four twisted pairs. Further, Figures 4 and 5 disclose an embodiment where each twisted pair is separated from each other twisted pair. However, newly-added claim 26, as drafted, would allow two twisted pairs adjacent to one another on one side of the separator and two twisted pairs adjacent to one another on the other side of the separator, as it recites "a substantially flat configurable non-conductive pair separator disposed between the four twisted pairs of insulated conductors and arranged to separate the first twisted pair from the second twisted pair." No embodiment of the '537 patent discloses a configuration of four twisted pairs with two twisted pairs adjacent to one another on one side of the separator and two twisted pairs adjacent to one another on the other side of the separator. As such, newly-added claim 26 constitutes new matter and should be rejected, along with the claims depending from claim 26, under 35 U.S.C. § 112.

The Third Party Requester respectfully submits that amended independent claim 1 (and consequently dependent claims 4-11, 15, 17-18, 23-25, and 32-34) constitute new matter and should be rejected under 35 U.S.C. § 112, to the extent that the phrase "so as to be substantially flat in a radial cross-section taken through the finished communications cable" is construed to mean "appear as a straight line in a radial cross-section."

Further, regardless of the construction of the phrase the "the substantially flat configurable non-conductive pair separator being substantially flat in a radial cross-section taken through the finished twisted pair data communications cable," the Third Party Requester respectfully submits that newly-added independent 26 and newly-added dependent claims 27-31 constitute new matter and should be rejected under 35 U.S.C. § 112 for at least the reason that no embodiment of the '537 patent discloses a configuration of four twisted pairs with two twisted pairs adjacent to one another on one side of the separator and two twisted pairs adjacent to one another on the other side of the separator.

CONCLUSION

The Third Party Requester respectfully requests that the Examiner maintain the rejection of pending original claims 1, 4-11, 15, and 17-22 and further reject claims 23-34 as unpatentable in view of the teachings of the prior art printed publications and requirements of 35 U.S.C. § 112 and deem the arguments advanced by the Patent Owner in the Patent Owner's Response to be erroneous, improper and/or unpersuasive.

Respectfully submitted,

By: /W. Scott Petty/
W. Scott Petty – Reg. No. 35,645

January 22, 2010

KING & SPALDING LLP
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(404) 572-4600
(404) 572-5134 (fax)

Exhibit 1

Declaration of Mr. Les Baxter, P.E.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Reexamination of:

William T. Clark et al.

Examiner: Minh T. Nguyen

Control No.: 95/000,476

Art Unit: 3992

Patent No.: 6,998,537

Confirmation No.: 8496

Issue Date: February 14, 2006

For: MULTI-PAIR DATA CABLE WITH
CONFIGURABLE CORE FILLING AND PAIR
SEPARATION

Mail Stop *Inter Partes* Reexam
Commissioner for Patents
P. O. Box 1450
Alexandria, VA 22313-1450

January 22, 2010

DECLARATION OF MR. LES BAXTER, P.E.

1. My name is Mr. Les Baxter.
2. I am a recognized expert and leading advocate of the use of unshielded twisted pair cabling. I have been involved in the field since the late 1980's and have contributed to all the major TIA cabling standards, including the following (and numerous amendments): TIA-568 (Commercial Building Telecommunication Cabling Standard); TIA-570 (Residential Telecommunications Cabling Standard); TIA-606 (Administration Standard for Commercial Telecommunications Infrastructure). While at Bell Labs, I was responsible for developing structured cabling products, including the industry-leading SYSTIMAX Structured Cabling System which featured the first Category 5 and Category 6 UTP cabling systems.
3. I am active in the TIA TR-42 committee and have recently participated in the standardization of UTP cabling systems to support 10 Gb/s Ethernet, including TSB-155 (Guidelines for the Assessment and Mitigation of Installed Category 6 Cabling to Support 10GBASE-T) and the Augmented Category 6 UTP specification (TIA 568B.2-10, Transmission Performance Specifications For 4-Pair 100 Ohm Augmented Category 6 Cabling).

4. I am the co-author of a book, which is currently in its third edition, that covers the theory, standards, component requirements, and system considerations for modern structured cabling systems. It has been very influential in the industry and has been widely used in both academic and industrial training programs. The three editions of this book have sold more than 27,000 copies. I have authored or co-authored over 30 other publications in the telecommunications field.
5. In 1975, I received my Bachelor of Science in Electrical Engineering from the Rochester Institute of Technology. In 1977, I received a Masters of Electrical Engineering from the University of Delaware.
6. I am a registered professional engineer in the State of New Jersey.
7. I am an IEEE Fellow.
8. I have read and I understand U.S. Patent No. 6,998,537 entitled *Multi-Pair Data Cable with Configurable Core Filling and Pair Separation*, which issued February 14, 2006. I refer to this patent as the '537 Patent in this declaration.
9. I understand the structure and benefits of pair separators used in twisted pair communications cables.
10. Communications cables can be unshielded or they can be shielded, such as by having an overall foil or braided shield. In comparing an unshielded cable and shielded cable, certain cable parameters, such as insulating material, twist lays of the twisted pairs, and insulation thickness may vary. However, one of ordinary skill in the art of the '537 Patent would be able to adjust these parameters when modifying a shielded cable to arrive at an unshielded cable. Calculations would be made to determine many of the parameter values. These parameter values can be readily adjusted.
11. I have reviewed and understand the English translation of the German patent DE 297 19 866. My understanding of the disclosure on page 6 of the English translation of DE 297 19 866 is that the cable is twisted about a common axis to finish the cable. I base this conclusion on my reading of the translation and specifically the phrase "longitudinal reshaping of the conductor pairs." This phrase means a longitudinal twisting of the interior components of the cable - the pair separators and the twisted pairs of insulated conductors.
12. In parts of Europe, including Germany, the cable industry developed a preference for shielded cables. In contrast, other markets such as the United States favors unshielded cables. These preferences represent a design choice for the industry. Both shielded and unshielded cables can be designed to perform comparably, including satisfying Category 6 requirements based on TIA/EIA -568-B.2.
13. Given the preference for unshielded cables in the United States and the fact that unshielded cables can be made to perform comparably to shielded cables, one of ordinary skill in the art of the '537 Patent would have been motivated to try to modify the separator disclosed in DE 29719866 to Backmann by removing the foil from the foil/plastic laminate separator to arrive at an unshielded cable. One specific reason to try is to make a cable more attractive to the U.S. market.

14. I have reviewed and understand U.S. Patent 5,670,748. The Background section of this patent discloses material properties of common materials used in data cables. These properties relate how the material may affect the electrical properties of a cable and the fire safety aspects of the material. These materials and properties would be considered for any component of a data cable.
15. The types of information disclosed in the U.S. Patent 5,670,748 about material properties would be considered when selecting a material for a pair separator. The fact that these materials are used to insulate a conductor used in a data cable would reflect positively on the material as a choice of material for a separator used in a data cable. One of ordinary skill in the art would understand from the description that foaming of these materials provides enhanced electrical properties and that foaming would result in a reduced amount of material used.
16. I have reviewed and understand European Patent Application No. 0 569 217. This publication discloses a fiberglass and polymer tape that can be used as an insulating material. The reference indicates that the material can be used for a "wideranging variety of electrical current-conducting bodies or structures, including low-voltage wiring, high voltage cables and a variety of electrical devices, including motors and generators." (col. 7, lines 45-50). These "wideranging" uses would lead one of ordinary skill in the art to consider this material for data cable applications.
17. Typically, data communications cable components (the twisted pairs, pair separators, and other internal components) are twisted to finish the cable. This twisting improves bending performance and mechanical stability of the cable.
18. Typically, a cable that is designed to meet the Category 5e performance standards does not use a pair separator.
19. As I indicated above, I have extensive experience in the telecommunications cable industry, including experience with standards bodies. I am not aware of any industry skepticism prior to the priority date of the '537 patent, which I understand the patent owner contends to be February 25, 1999, that a non-conductive tape separator could not be used to satisfy Category 6 performance standards.
20. The use of foamed polymers, including flame retardant low dielectric constant foamed polymers, in telecommunications cables was known in February 1999. Specifically, the use of fluoropolymer, fluoroethylenepropylene (FEP), foamed fluoropolymer, and polyvinyl chloride (PVC) in telecommunications cables was known in February 1999. Also, the use of thermoplastics, and particularly polyvinyl chloride, for telecommunications jackets was known in February 1999.
21. In June of 2006, IEEE 802.3AN was issued. This standard specified the operation of 10 Gb/s Ethernet (referred to as 10GBASE-T) on unshielded twisted pair cables. For a time period of 1-1.5 years before the standard issued, the standard received publicity in trade journals, technical conferences, trade shows, etc. In my opinion, this publicity led to increased sales of Category 6 compliant cables (especially for new construction), since Category 5e cables were insufficient to support 10GBASE-T networks and users wanted the highest performance cables that were available.

22. Premises telecommunications cables are typically installed in buildings. These cables must have some degree of flexibility to enable the cables to be installed. The TIA/EIA-568-A standard (1995) specifies bending radius performance for twisted pair cable, for example, requiring specific mechanical performance under a bending radius of 1 inch for unshielded twisted pair cables.
23. The number of twisted pairs of insulated conductors in a telecommunications cables can vary, based on the application of the cable. Telecommunications cables with four twisted pairs are common, but cables with as many as 25 pairs or more are used.
24. I have read and understand "Fiber Optic Cable: A Lightguide," by James Refi as it relates to hybrid cables which employ both fiber optic transmission media and twisted pairs of insulated copper conductors. The disclosure of a hybrid cable in "Fiber Optic Cable: A Lightguide" demonstrates that either transmission medium could be used in similar telecommunication cable constructions.
25. I declare further that all statements made herein of my own knowledge are true and that all statements made herein on information and belief are believed to be true, and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine, imprisonment, or both, under Section 1001, Title 18, United States Code, and that willful false statements may jeopardize the validity of any claim that is the subject of this reexamination.

1/22/2010
Date

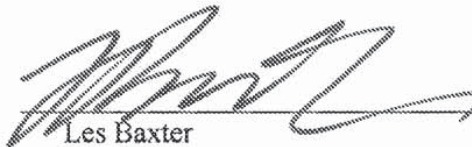

Les Baxter

Exhibit 2

Excerpt from Joint Claim Construction Statement filed Nov. 16, 2009, at 7, Belden Technologies, Inc. v. Superior Essex Inc., 1:08-cv-00063 SLR (D. Del)

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BELDEN TECHNOLOGIES, INC. and,	)	
BELDEN CDT (CANADA) INC.	)	
	)	
Plaintiffs,	)	
	)	Case No. 08-0063-SLR
v.	)	
	)	
SUPERIOR ESSEX INC. and	)	
SUPERIOR ESSEX COMMUNICATIONS LP	)	
	)	
Defendants.	)	

JOINT CLAIM CONSTRUCTION STATEMENT

Pursuant to the Paragraph 7 of the Court's February 13, 2009 Scheduling Order, Plaintiffs Belden Technologies, Inc. and Belden CDT (Canada) Inc. (collectively "Belden") and Defendants Superior Essex Inc. and Superior Essex Communications LP (collectively "Superior Essex") submit this Joint Claim Construction Statement identifying the claim terms and phrases from U.S. Patent No. 5,424,491 ("the '491 Patent"), U.S. Patent No. 6,074,503 ("the '503 Patent"), U.S. Patent No. 6,570,095 ("the '095 Patent"), U.S. Patent No. 6,596,944 ("the '944 Patent"), U.S. Patent No. 6,998,537 ("The '537 Patent"), U.S. Patent No. 7,199,999 ("the '999 Patent"), and U.S. Patent No. 7,339,116 ("the '116 Patent") that the parties believe require construction by the Court, along with their competing proposed claim constructions. In addition, with respect to the '491 and '095 Patents, the parties have also submitted certain agreed to claim constructions.

The '095 Patent

Claim 27 of the '095 Patent:

27. A data communications cable comprising:
 [27a] a first twisted pair of insulated conductors;
 [27b] a second twisted pair of insulated conductors;
 [27c] a **configurable dielectric pair separator** that separates the first and second twisted pairs of conductors, the **configurable dielectric pair separator** being **substantially flat**;
 [27d] a jacket enclosing the first and second twisted pairs of insulated conductors and the **dielectric pair separator**; and
 [27e] wherein the **configurable dielectric pair separator**, the first twisted pair of insulated conductors and the second twisted pair of insulated conductors are twisted about a common central axis to form a twisted pair cable; and wherein the **configurable dielectric pair separator** is arranged within the jacket to form at least two **grooves**.

Claim 31 of the '095 Patent:

31. A data communications cable comprising:
 [31a] a plurality of twisted pairs of insulated conductors;
 [31b] a **configurable dielectric pair separator** disposed between at least two of the plurality of twisted pairs of insulated conductors, the **configurable dielectric pair separator** including a **substantially flat** dielectric tape formed of a foamed polymer;
 [31c] a jacket enclosing the plurality of twisted pairs of insulated conductors and the **configurable dielectric pair separator**; and
 [31d] wherein the plurality of twisted pairs of insulated conductors and the **configurable dielectric pair separator** are twisted about a common axis to form a twisted pair cable.

Disputed Term/Phrase	Belden's Proposed Construction	Superior Essex's Proposed Construction
"configurable"	Flexible.	Able to be formed or arranged while providing structural stability during manufacture.
"dielectric pair separator" (dielectric separator)	Non-conductive separator.	Pair separator containing a non-conductive layer.
"grooves"	Portions within the cable that are substantially physically separated from other portions within the cable by a pair separator.	Narrow channels of the formed pair separator in which an insulated pair of twisted conductors is placed.

Disputed Term/Phrase	Belden's Proposed Construction	Superior Essex's Proposed Construction
"substantially flat"	A thin member that is substantially uniform in thickness and having an overall profile that is substantially straight.	Thin and substantially uniform in thickness.

Undisputed Term/Phrase	Jointly Agreed to Construction
"pair separator"	An element that physically separates one twisted pair of conductors from at least one other twisted pair of conductors.

The '537 Patent

Claim 19 of the '537 Patent:

19. An unshielded communications cable comprising:
- [19a] a plurality of twisted pairs of insulated conductors comprising a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;
- [19b] a **substantially flat configurable dielectric separator** that consists of nonconductive, dielectric materials disposed between the plurality of twisted pairs of conductors that separates the first twisted pair of insulated conductors from the second twisted pair of insulated conductors; and
- [19c] a jacket enclosing the plurality of twisted pairs of insulated conductors and the **configurable dielectric separator**;
- [19d] wherein the **substantially flat configurable dielectric separator** includes a foamed polymer.

Disputed Term/Phrase	Belden's Proposed Construction	Superior Essex's Proposed Construction
"configurable"	Flexible.	Able to be formed or arranged while providing structural stability during manufacture.
"dielectric pair separator" (dielectric separator)	Non-conductive separator.	Pair separator containing a non-conductive layer.
"substantially flat"	A thin member that is substantially uniform in thickness and having an overall profile that is substantially straight.	Thin and substantially uniform in thickness.

The '999 Patent

Claim 1 of the '999 Patent:

1. An unshielded twisted pair communications cable comprising:
 - [1a] a plurality of twisted pairs of insulated conductors including a first twisted pair of insulated conductors and a second twisted pair of insulated conductors;
 - [1b] a **configurable tape** separator disposed between the plurality of twisted pairs of conductors in the unshielded twisted pair communications cable and arranged so as to separate the first twisted pair of insulated conductors from the second twisted pair of insulated conductors; and
 - [1c] a jacket enclosing the plurality of twisted pairs of insulated conductors and the **configurable tape** separator;
 - [1d] wherein the plurality of twisted pairs of insulated conductors and the configurable tape separator are cabled about a common axis to form the unshielded twisted pair communications cable; and
 - [1e] wherein the **configurable tape** separator is substantially non-conductive.

Claim 2 of the '999 Patent:

2. The unshielded twisted pair communications cable as claimed in claim 1, wherein the **configurable** pair separator is arranged so as to define at least two **channels** and wherein the first twisted pair of insulated conductors is disposed at least partially within a first **channel** and the second twisted pair of insulated conductors is disposed at least partially within a second **channel**.

Disputed Term/Phrase	Belden's Proposed Construction	Superior Essex's Proposed Construction
"channel"	A portion within the cable that is substantially physically separated from other portions within the cable by a pair separator.	<i>No construction necessary.</i>
"configurable"	Flexible.	Able to be formed or arranged while providing structural stability during manufacture.
"tape"	A long, flexible strip of substantially flat material.	A long, flexible strip of material.

Respectfully submitted,

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Exhibit 3

Paul Kish, Category 6 Cabling Questions and Answers, July 2002

***Category 6 Cabling
Questions and Answers***

by

Paul Kish

NORDX/CDT
July 2002

Introduction

On June 20th, 2002, TIA finally published the Category 6 cabling standard. Now that this standard is a reality, many people are exhibiting renewed interest and are asking themselves - So what is Category 6 cabling? Does it look and behave differently than Category 5 / 5e? Will it supercede Category 5 / 5e? Does it work? Have all the issues been resolved? What does it mean for network performance? What are the applications that will work on Category 6 that don't work, or don't work as well, on Category 5e cabling? These are very good questions, and this paper will provide simple and impartial answers to these questions. For more information, a list of references is provided that explains bandwidth, cabling parameters and cabling performance in more detail.

What is Cat 6?

"If it looks like Category 6, and it feels like Category 6, and it sounds like Category 6, then it must be Category 6! To feel comfortable with this argument, you need to know "What is Cat 6?" It is a cabling system comprised of components (cables, cords and connecting hardware) that have many features in common with Category 5 and 5e but also some significant differences. Let's look at some of these similarities and differences:

First of all, Category 6 components are specified to be interoperable between different vendor's products and are fully backward compatible with all lower categories. Interoperability means that Category 6 components from different vendors can be mixed and matched to form a minimally compliant Category 6 Channel. Backward compatibility means that a Category 6 component can be substituted in any existing Category 5 or 5e channel to give Category 5 or 5e performance respectively. Although being 'backward compatible' seems like an obvious feature, it is not quite as easy as it sounds from the manufacturers' point-of-view. Similarly, 'interoperability' seems obvious in today's world of 'open architectures', but this concept presented significant challenges for both TIA and the manufacturers alike. Like most good things, these features were not easy to create, but worth the benefits that they bring to the end-user community.

Second, all Category 6 components have the same nominal Impedance of 100 Ohms as Category 5 and 5e components, but have a tighter tolerance on Impedance variations. Impedance variations are specified in terms of a parameter called Return Loss. A higher value of Return Loss (in dB) means better Impedance matching between components and lower signal reflections and re-reflections. As a result, Category 6 provides better Bit Error Rate (BER) performance for Fast Ethernet (100BASE-TX) and Gigabit Ethernet (1000BASE-T) networks. More frequently occurring bit errors means that your expensive networking devices are caught in unproductive cycles of error detection and re-transmission. Fewer bit errors means that your network is accurately and rapidly transferring the information that drives your business and improves productivity.

Third, all the transmission parameters for Category 6 channels, permanent links and components are specified up to 250 MHz compared to 100 MHz for Category 5 and 5e. Annex A provides a detailed comparison of the transmission performance of Category 6 and Category 5e channels as specified in the published TIA standards.

There is a difference between the specified frequency range and the usable Bandwidth. Bandwidth is defined as the frequency range where the PSACR (Power Sum Attenuation-to-Crosstalk Ratio) is positive. Category 6 yields a Bandwidth* of 200 MHz at 20 °C for the most demanding 100 meter channel configurations compared to a bandwidth of 100 MHz for Category 5 / 5e. So if you consider Bandwidth to be the 'speedometer' for cabling systems, you will see that Category 6 effectively doubles the 'top speed' of earlier standards.

* Note: For more information see [Category 6 Requirements at 200 Mhz and 250 Mhz](#)

Do Category 6 components behave differently than Category 5 / 5e?

One of the biggest observable differences is in the cable construction. From the outside, Category 6 cables have a larger overall diameter, to a greater or lesser extent depending on the design. The diameter of Category 6 cables are in the range of 0.21 to 0.25 inch (5.3 - 5.8 mm) compared to Category 5/ 5e, which is in the range of 0.19 to 0.22 inch (4.8 – 5.5 mm). This is because Category 6 cables are manufactured with larger copper conductors and may include an internal divider called a cross-web that serves to separate the pairs within the cable and reduce cross-talk noise. The cross-web divider to separate the pairs is not a specified requirement of the Cat 6 standard, and some manufacturers have developed designs and processes that deliver full Cat 6 compliance without the use of any physical dividers between pairs.

The reason for the larger conductor size (approx. 23 AWG) is to provide a lower Insertion Loss (also called Attenuation) over the specified frequency range. A lower Insertion Loss means a stronger signal at the Receiver compared with Category 5 / 5e. This improves the noise immunity to external and internal noise sources. Additionally, cables with a lower Insertion Loss can support longer distances or a higher temperature range for certain applications while continuing to deliver full Cat 6 performance. Even if you're not a cabling expert, most of us will recognize that lower Insertion Loss is the functional equivalent of a strong signal, and we all know that signal strength is the critical factor in overall network performance.

Another feature of Category 6 cables is a very tight twist length of 0.5 inches or less to reduce crosstalk interference between pairs. Altogether, these differences are analogous to buying a car. There are many different models to choose from that come in different sizes and shapes and with different features and performance. Category 6 cabling, with its larger conductors, internal dividers, and tighter twist lengths would be analogous to a high-end model delivering better performance and more capacity.

What about installation?

Category 6 cables and components are installed very much the same way as their Category 5 / 5e counterparts. However there are some design and installation issues that the contractor and the installer must pay greater attention to, including 1) the cable terminations and 2) the cable pathway fill. The larger physical cable diameter needs to be taken into account when routing cables at cross-connects and in provisioning cable pathways. When terminating Category 6 cables it is very important to ensure that the pair twists are maintained right up to the point of termination. It is particularly important to follow manufacturer's instructions for terminating connectors. A poor termination can significantly reduce performance margins ([Article: "Category 6 Testing in the Field"](#)) or cause test failures in the field.

Will Category 6 supercede Category 5 / 5e?

The answer is yes; the only question is "When"? Today, the choice for Category 6 tends to be an economic one. Like most newly introduced technologies, Category 6 systems currently command a price premium and the installed cost for Category 6 cabling can be about 20 % higher than Category 5e, depending on market conditions. Experience tells us that prices will decrease over time as acceptance and volume increases. Regardless of traditional technology life-cycle pricing, the benefits of Category 6 in terms of bandwidth, performance headroom, reliability and application support, need to be weighed against end user needs, planning horizon and budgetary constraints. From a cost/benefit perspective the doubling effect of Category 6 performance versus Category 5/5e performance for as little as a 20% pricing premium deserves careful consideration. And the equation improves if you factor in the reality that the 'technology window' and operational life span of Category 6 systems will far out reach Category 5/5e systems.

So, even with a new technology, an old adage rings true; it may be 'penny wise, but pound foolish' to implement new Category 5/5e systems today only to be forced to replace them in the near future because continually evolving IT systems need Category 6 performance. To paraphrase from a famous film that suggested "If you build it, they will come", The Cat5/5e to Cat 6 migration would be better described as "If you don't build it, they are coming anyway!" As we see with all technologies, the needs for 'more' and 'faster' are inevitable and irresistible forces that must be considered in your cabling infrastructure decisions.

Have all the bugs been ironed out, and does Category 6 deliver what is promised?

The answer is 'yes'. There are no technical obstacles in the way. What took so long in completing the standard was the development of the test parameters and the test procedures that are used to qualify Category 6 components to ensure interoperability between different vendor's products. These specifications are in place and very much detailed. Category 6 connecting hardware needs to be qualified with a range of "high" and "low" test plugs that simulate worst case variations in the field. This means that a specific connector design may work optimally with certain plugs while only achieving minimum Cat 6 performance with other plugs. So while the important concept of interoperability is delivered in the Cat 6 standard, it is most likely that optimum performance would be achieved using connectors and cords from the same vendor.

A simple way to describe Category 6 connector performance is to think of a parameter called sensitivity and selectivity on radio or TV receivers. Let's take the example a Satellite Dish Receiver. When the technician comes to install the satellite dish he points it in the general direction of the satellite. While watching the signal level on the TV set or listening to an audible beeper, the technician adjusts the dish up and down, left and right to get the strongest signal. It is the same way with a plug / jack connection. There is a minimally acceptable signal level depending on the orientation of the dish and an optimum signal when it is in the best alignment. The Category 6 connector specification defines the deviation allowed and the minimum signal level to achieve interoperability.

So, as you can see, Cat 6 does deliver on its promise. As a member of the TIA subcommittee that developed Cat 6, NORDX/CDT had proposed that the 'next generation' cabling standard should specify additional performance margins to account for 'Alien Cross-talk' and the effects of temperature on cabling performance. Although consensus support for the NORDX/CDT proposal was only partly accommodated, the work done by the Engineering Committee is a significant accomplishment in the industry considering the level of detail, completeness and the quality of the Category 6 standard as delivered. In retrospect, a curious fact comes to mind that is true for all technology standards and perhaps especially true for cabling standards. New standards represent significant new performance targets that we must stretch while under development. On publication of the standard, these distant targets instantly transform from projected upper thresholds to the absolute minimum acceptable performance values allowed under that standard. While the Cat 6 might have gone further, the published standard provides a solid step forward and our vision of higher performance systems will be achieved through a natural evolution in the marketplace.

What about the performance of your network when Category 6 is installed compared with Category 5 /5e?

Whether Cat 6 or Cat5/5e, network performance effectively boils down to Signal-to-Noise Ratio at the Receiver. All the different noise sources need to be taken into account, including NEXT, FEXT, ILD Noise, Alien Crosstalk and Impulse noise. The biggest benefit of Category 6 cabling is the much-improved Signal-to-Noise Ratio (SNR) using the Bandwidth employed by today's applications and also for future applications. The main result is that Category 6 provides about 12 dB (or 16 times) better Signal-to-Noise Ratio compared to Category 5 / 5e over a wide frequency range. For a more detailed technical explanation of this phenomenon, please refer to a white paper on the subject entitled "Cat 6 vs. Cat 5 / 5e – How cabling parameters affect network performance" **Article: Cat 6 versus Cat5/5e**

Why do we need Cat 6?

A frequently asked question is why do we need Category 6? Isn't Category 5e good enough for what is needed today and in the foreseeable future? The answer is "probably Yes". Does that mean we are avoiding the question. No, it simply means that we can only answer with certainty for today, and can only postulate about the future. For today's applications, there has been some work done by others that indicates Category 6 provides higher Data Throughput (fewer bit errors) than Category 5e for 100BASE-TX and 1000BASE-T applications. This work shows that some network switch ports are at the limits of the IEEE 802.3ab standard (i.e. marginally compliant) and are more susceptible to cabling and temperature variations. NORDX are presently in the process of generating some information on the Data Throughput of Category 6 and Category 5e in the presence of outside noise.

What about future applications?

A TIA Standard is already in place for Gigabit over Category 6 (1000BASE-TX) that provides for a more cost-effective solution in the future. Another application that is quite demanding is broadband video that today runs over coaxial cable. Broadband video can be supported over Category 6 cabling at distances up to 100 meters and frequencies up to 550 MHz. Category 6 is particularly suited for this application because of the lower signal losses and better transmission performance at higher frequencies compared with Category 5 / 5e. Another application that is on the horizon is digital video. The direct digital signals from HD-SDI sources are at 1.5 Gb/s, which goes significantly beyond the capability of today's twisted pair Cat 5 / 5e copper networks. An analysis of the information capacity of Category 6 cabling with 200 MHz Bandwidth indicates that it could support data rates of 2 Gb/s using the same encoding scheme of 1000BASE-T at twice the clock rate.

Accepting that new installations should be better than Cat5e. Why not skip Cat 6 and go all the way to optical fiber?

Without even considering the issue of relative performance, the copper/fiber decision has been driven historically by the significant differences between the initial costs of copper versus fiber cabling plants, combined with the even greater differences between the costs of electrical versus optical networking devices. Overall, the comparatively high total cost of ownership for optical networking made it very difficult to justify for use in horizontal distribution except where environmental noise, or security, or ultra high performance requirements made copper solutions impractical or inoperable. Today, the cost differential between copper and fiber cabling is decreasing, however even as the cost of optical fiber becomes more comparable to copper, the

largest deterrent to the use of fiber continues to be the cost of the active optical networking equipment.

To research information for this article, we 'shopped' equipment prices and availability on the Internet. There are a plethora of choices that provide 100 Mb/s Fast Ethernet ports over copper to the desktop and fewer choices over fiber. Looking at relative prices from a leading manufacturer of networking equipment, a 48 port 100BASE-TX switch with two 1000BASE-X uplinks is \$4500US (approx. \$80US / port for 100 Mb/s) compared with \$4900 US for a 12-port 100BASE-FX switch (approx. \$400US / port). In this particular example, the cost per user port for the optical switch was more than 400% higher than its copper-based counterpart. Generally the cost of optical networking equipment is from 2 to 4 times higher than copper. As an alternative option, an end user can purchase a media converter with copper equipment. The added cost of media converters for multimode fiber is about \$112.00 US / port for Fast Ethernet and \$385US / port for Gigabit Ethernet (see reference: Frost & Sullivan), and some may be concerned over the reliability/manageability issues that may arise from introducing additional points-of-failure in the network. All this means that running fiber to the desk is not economically attractive for today's applications compared to copper, and the continually increasing performance envelop of copper cabling systems would seem to be more than adequate for horizontal distribution now and in the foreseeable future.

Another reason that supports high performance copper cabling to the desk is the need for remote powering for VoIP telephones and other devices. This is an important new development. IEEE is in the process of developing a DTE Powering standard that would enable end users to plug in a variety of devices into the data outlet connector in the wall. The networking equipment or the mid-span power source would detect and recognize the type of device, e.g. an IP phone, sensor, camera, etc. and deliver the appropriate power as required by the device. This is an important step towards a ubiquitous network that is designed for device independence. When powering remote devices, Category 6 cabling has advantages over Category 5e because of the lower DC resistance (23 AWG) and 'Pair Balance' recommendations, which is a new parameter for Category 6 components.

Conclusions

This paper has explained the major differences and similarities between Category 6 and Category 5e cabling, and provides the reasons why an end user should consider Category 6 cabling for new installations.

The new CAT 6 standard includes specific requirements for Interoperability between different vendors' products as well as full Backward Compatibility with all existing Category 5 / 5e cabling, as this was a major objective in the development of the standard.

From a performance perspective, if we use Bandwidth and Signal-to-Noise Ratio (SNR) as the key indicators of performance, Category 6 cabling provides twice the Bandwidth (200 MHz) and 16 times (12 dB) better than Signal-to-Noise margins compared with Category 5e cabling. These additional performance margins compensate for deficiencies in the equipment and external noise and temperature variations in the environment. Category 6 is well positioned to support demanding applications such as multi-channel broadband video with an extended frequency range up to 550 MHz and digital video signals as high as 2 Gb/s for HD-SDI and future multi-Gigabit applications. Category 6 cabling is also a better alternative to fiber-to-the-desk because the cost of electronics is significantly lower for copper compared to fiber. Lastly, the new IEEE standards for remote powering of DTE equipment would be better served with Category 6 cabling because of the lower power dissipation for Category 6 cables and the improved balance recommendations for Category 6 components.

All together, these performance improvements offered by Cat 6 systems means higher capacity, throughput and productivity for your networks and your users. The forward-looking Cat 6 specifications should produce an extended operational life span and protection of your Cat 6 infrastructure investment. This combination of performance, longevity, and investment protection, along with the new attributes of interoperability and backward compatibility, makes Category 6 the smart choice for all new cabling system implementations.

The authors:

Paul Kish is Director, IBDN Systems and Standards with NORDX/CDT. He is the current vice-chair of the TIA TR-42 engineering committee responsible for telecommunications cabling standards for commercial and residential installations.

References:

- [Category 6 Requirements at 200 Mhz and 250 MHz](#)
- [Article: "Category 6 Testing in the Field"](#)
- [Article: Cat 6 versus Cat5/5e](#)
- Frost & Sullivan, North American Premises Wiring Market, A040-62
www.frost.com

Special thanks to:

Warren Davies of NORDX/CDT for extensive comments and editorial review of this document. His insight is very much appreciated.

Annex A

Category 6 Channel Transmission Performance

Frequency MHz	Ins. Loss Max (dB)	NEXT Min (dB)	ACR Min (dB)	PSNEXT Min (dB)	PSACR Min (dB)	ELFEXT Min (dB)	PSELFEXT Min (dB)	Return Loss Min (dB)	Prop. Delay Max (ns/100m)	Delay Skew Max (ns/100m)
1	2.1	>65	>62.9	>62	>59.9	63.3	60.3	19	580	50
4	4	63	59	60.5	56.5	51.2	48.2	19	562	50
8	5.7	58.2	52.5	55.6	49.9	45.2	42.2	19	557	50
10	6.3	56.6	50.3	54	47.7	43.3	40.3	19	555	50
16	8	53.2	45.2	50.6	42.6	39.2	36.2	18	553	50
20	9	51.6	42.6	49	40	37.2	34.2	17.5	552	50
25	10.1	50	39.9	47.3	37.2	35.3	32.3	17	551	50
31.25	11.4	48.4	37	45.7	34.3	33.4	30.4	16.5	550	50
62.5	16.5	43.4	26.9	40.6	24.1	27.3	24.3	14	549	50
100	21.3	39.9	18.6	37.1	15.8	23.3	20.3	12	548	50
200	31.5	34.8	3.3	31.9	0.4	17.2	14.2	9	547	50
250	35.9	33.1	-2.8	30.2	-5.7	15.3	12.3	8	546	50

Category 5e Channel Transmission Performance

Frequency MHz	Ins. Loss Max (dB)	NEXT Min (dB)	ACR Min (dB)	PSNEXT Min (dB)	PSACR Min (dB)	ELFEXT Min (dB)	PSELFEXT Min (dB)	Return Loss Min (dB)	Prop. Delay Max (ns/100m)	Delay Skew Max (ns/100m)
1	2.2	>60	>57.8	>57	>54.8	57.4	54.4	17	580	50
4	4.5	53.5	49	50.5	46	45.4	42.4	17	562	50
8	6.3	48.6	42.3	45.6	39.3	39.3	36.3	17	557	50
10	7.1	47	39.9	44	36.9	37.4	34.4	17	555	50
16	9.1	43.6	34.5	40.6	31.5	33.3	30.3	17	553	50
20	10.2	42	31.8	39	28.8	31.4	28.4	17	552	50
25	11.4	40.3	28.9	37.3	25.9	29.4	26.4	16	551	50
31.25	12.9	38.7	25.8	35.7	22.8	27.5	24.5	15.1	550	50
62.5	18.6	33.6	15	30.6	12	21.5	18.5	12.1	549	50
100	24	30.1	6.1	27.1	3.1	17.4	14.4	10	548	50

Difference in Channel Transmission Performance (Cat 6 vs. Cat 5e)

Frequency MHz	Ins. Loss Max (dB)	NEXT Min (dB)	ACR Min (dB)	PSNEXT Min (dB)	PSACR Min (dB)	ELFEXT Min (dB)	PSELFEXT Min (dB)	Return Loss Min (dB)	Prop. Delay Max (ns/100m)	Delay Skew Max (ns/100m)
1	-0.1	>5	>5	>5	>5	5.9	5.9	2	0	0
4	-0.5	9.5	10	10	10.5	5.8	5.8	2	0	0
8	-0.6	9.6	10.2	10	10.6	5.9	5.9	2	0	0
10	-0.8	9.6	10.4	10	10.8	5.9	5.9	2	0	0
16	-1.1	9.6	10.7	10	11.1	5.9	5.9	1	0	0
20	-1.2	9.6	10.8	10	11.2	5.8	5.8	0.5	0	0
25	-1.3	9.7	11	10	11.3	5.9	5.9	1	0	0
31.25	-1.5	9.7	11.2	10	11.5	5.9	5.9	1.4	0	0
62.5	-2.1	9.8	11.9	10	12.1	5.8	5.8	1.9	0	0
100	-2.7	9.8	12.5	10	12.7	5.9	5.9	2	0	0

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Exhibit 4

Construction Market Forecasting Service, Analysis and Forecasts of National and Regional Construction Markets (2008)

MCGRAW-HILL CONSTRUCTION

**CONSTRUCTION MARKET
FORECASTING SERVICE
(CMFS)**

The Next Five Years

***ANALYSIS AND FORECASTS OF NATIONAL AND
REGIONAL CONSTRUCTION MARKETS***

Summer 2008

Construction Market Forecasting Service

Summer 2008 Report

Preliminary Release: April 2008

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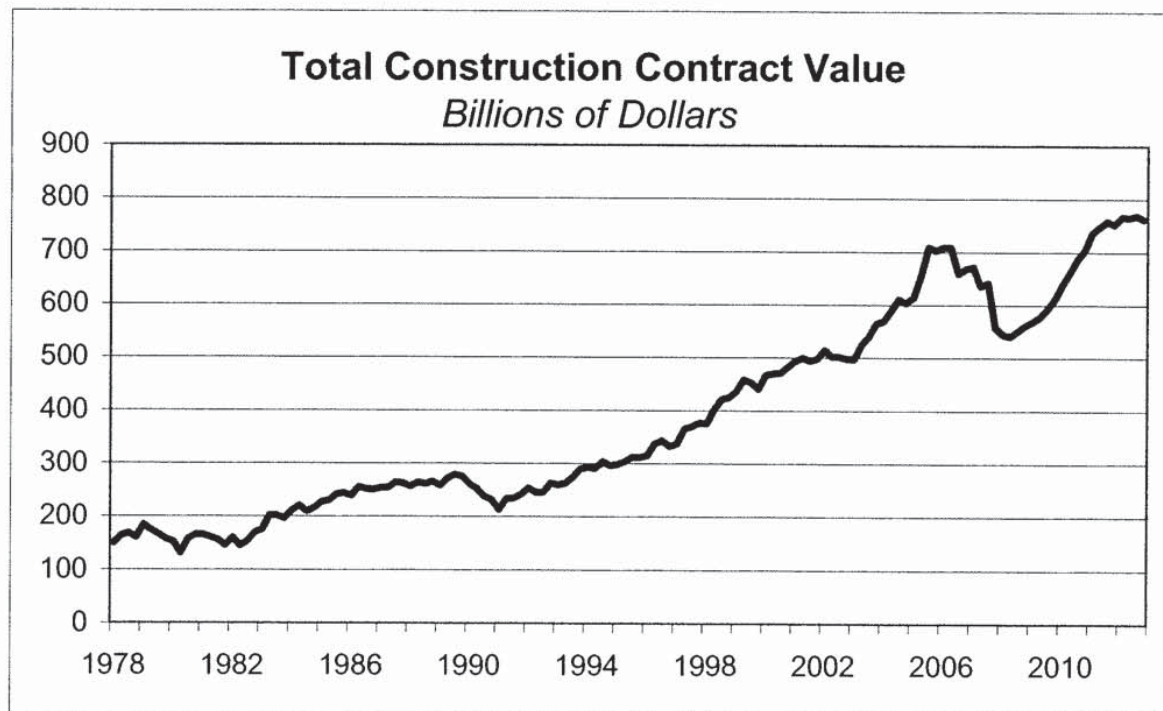
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McGraw Hill
CONSTRUCTION
Dodge
Sweets
Architectural Record
ENR
Regional Publications

Total Construction Contract Value for the United States

Billions of Dollars

	HISTORY					FORECAST				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Construction	531.7	593.2	670.3	686.3	626.5	549.3	587.7	672.5	748.9	765.9
% Chg	+5	+12	+13	+2	-9	-12	+7	+14	+11	+2
Total Building	439.5	497.6	566.6	558.7	493.0	415.1	451.8	531.2	599.1	607.4
% Chg	+9	+13	+14	-1	-12	-16	+9	+18	+13	+1
Nonresidential	156.1	164.5	182.5	216.4	229.8	221.2	216.9	232.8	252.5	263.7
% Chg	+1	+5	+11	+19	+6	-4	-2	+7	+8	+4
Residential	283.4	333.2	384.1	342.3	263.2	193.8	234.9	298.4	346.6	343.7
% Chg	+14	+18	+15	-11	-23	-26	+21	+27	+16	-1
Total Nonbuilding	92.3	95.5	103.7	127.7	133.5	134.2	135.8	141.3	149.8	158.5
% Chg	-8	+4	+9	+23	+5	+1	+1	+4	+6	+6



Total Construction Contract Value for the United States

Billions of 2000 Dollars

	HISTORY					FORECAST				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Construction	468.7	494.2	515.6	484.2	420.9	356.7	371.1	412.5	444.6	441.7
% Chg	+2	+5	+4	-6	-13	-15	+4	+11	+8	-1
Total Building	382.4	407.8	432.4	395.1	332.3	267.0	285.2	325.6	355.0	349.5
% Chg	+5	+7	+6	-9	-16	-20	+7	+14	+9	-2
Nonresidential	136.4	137.1	143.0	152.5	156.7	142.1	136.3	142.0	149.0	151.1
% Chg	-3	+1	+4	+7	+3	-9	-4	+4	+5	+1
Residential	246.0	270.7	289.4	242.6	175.5	124.8	148.9	183.6	206.0	198.5
% Chg	+10	+10	+7	-16	-28	-29	+19	+23	+12	-4
Total Nonbuilding	86.3	86.4	83.2	89.1	88.6	89.7	85.8	86.9	89.5	92.2
% Chg	-11	+0	-4	+7	-1	+1	-4	+1	+3	+3



Total Building Contract Activity for the United States

Millions of Square Feet

	HISTORY					FORECAST				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Building	5093.4	5519.1	5875.6	5282.3	4276.1	3333.4	3606.0	4200.4	4629.0	4531.0
% Chg	+6	+8	+6	-10	-19	-22	+8	+16	+10	-2
Nonresidential	1404.8	1457.5	1528.8	1633.1	1630.1	1455.1	1368.3	1442.6	1533.1	1550.2
% Chg	-2	+4	+5	+7	-0	-11	-6	+5	+6	+1
Comm. & Indust.	870.0	961.1	1007.6	1096.3	1113.3	952.9	877.3	939.5	1008.3	1015.8
% Chg	-1	+10	+5	+9	+2	-14	-8	+7	+7	+1
Stores	282.9	295.2	311.6	307.6	310.1	253.3	240.1	261.9	278.5	275.0
% Chg	+10	+4	+6	-1	+1	-18	-5	+9	+6	-1
Warehouses	188.1	209.3	222.3	216.6	244.5	201.8	182.9	193.8	210.1	212.4
% Chg	-4	+11	+6	-3	+13	-17	-9	+6	+8	+1
Offices	143.6	165.1	167.6	207.5	214.8	192.0	168.0	177.9	193.4	200.2
% Chg	-8	+15	+1	+24	+4	-11	-12	+6	+9	+4
Hotels	44.7	47.4	49.2	81.8	85.8	77.5	63.2	66.9	70.7	73.3
% Chg	+12	+6	+4	+66	+5	-10	-18	+6	+6	+4
Garages/Serv Statn	135.7	158.1	177.6	199.9	175.4	150.3	144.1	153.4	168.2	170.3
% Chg	-16	+16	+12	+13	-12	-14	-4	+6	+10	+1
Manufacturing	75.1	86.0	79.3	82.8	82.7	78.1	78.9	85.6	87.4	84.5
% Chg	+11	+15	-8	+4	-0	-6	+1	+8	+2	-3
Institutional	534.8	496.4	521.2	536.8	516.7	502.3	491.0	503.1	524.7	534.4
% Chg	-4	-7	+5	+3	-4	-3	-2	+2	+4	+2
Education	241.4	209.6	219.3	230.4	220.0	217.0	209.9	215.1	224.9	230.3
% Chg	-5	-13	+5	+5	-5	-1	-3	+2	+5	+2
Dormitories	28.5	21.3	27.0	24.1	25.8	26.6	27.3	27.0	26.4	25.1
% Chg	+22	-25	+27	-11	+7	+3	+2	-1	-2	-5
Health Facilities	92.1	93.8	108.4	109.5	100.3	96.0	93.4	95.4	100.0	101.7
% Chg	-5	+2	+16	+1	-8	-4	-3	+2	+5	+2
Public	35.4	33.6	33.3	33.7	48.4	44.2	39.2	37.8	38.5	40.2
% Chg	-3	-5	-1	+1	+44	-9	-11	-4	+2	+4
Religious	44.6	42.7	36.6	34.4	30.7	28.7	29.5	31.4	33.3	34.9
% Chg	-14	-4	-14	-6	-11	-7	+3	+6	+6	+5
Amusement	67.1	68.5	67.2	72.4	65.9	64.8	66.2	69.9	73.1	71.8
% Chg	-6	+2	-2	+8	-9	-2	+2	+6	+5	-2
Transportation	25.8	26.9	29.4	32.5	25.6	25.0	25.5	26.5	28.5	30.3
% Chg	+1	+4	+9	+11	-21	-2	+2	+4	+8	+6
Residential	3688.5	4061.5	4346.7	3649.2	2646.0	1878.2	2237.7	2757.8	3096.0	2980.9
% Chg	+10	+10	+7	-16	-27	-29	+19	+23	+12	-4
Single Family	3143.2	3453	3620.9	2946.9	2064.1	1428.4	1763.8	2224.9	2476.3	2365.2
% Chg	+9	+10	+5	-19	-30	-31	+23	+26	+11	-4
Multifamily	545.3	608.6	725.9	702.3	581.9	449.8	473.8	532.8	619.7	615.7
% Chg	+16	+12	+19	-3	-17	-23	+5	+12	+16	-1

Total Building Contract Activity for the United States

Billions of Dollars

	HISTORY					FORECAST				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Building	439.5	497.6	566.6	558.7	493.0	415.1	451.8	531.2	599.1	607.4
% Chg	+9	+13	+14	-1	-12	-16	+9	+18	+13	+1
Nonresidential	156.1	164.5	182.5	216.4	229.8	221.2	216.9	232.8	252.5	263.7
% Chg	+1	+5	+11	+19	+6	-4	-2	+7	+8	+4
Comm. & Indust.	65.7	75.3	82.5	105.9	114.7	103.9	98.6	107.6	117.9	122.3
% Chg	+1	+15	+10	+28	+8	-9	-5	+9	+10	+4
Stores	20.2	21.8	23.8	25.4	29.0	25.3	24.8	27.4	29.9	30.5
% Chg	+11	+8	+9	+7	+14	-13	-2	+10	+9	+2
Warehouses	8.4	9.9	10.7	11.1	12.9	11.0	10.3	11.3	12.6	13.2
% Chg	-6	+18	+8	+4	+16	-14	-6	+9	+12	+5
Offices	18.4	21.7	21.0	30.5	31.4	30.6	28.7	31.3	34.9	36.7
% Chg	-7	+18	-3	+46	+3	-3	-6	+9	+11	+5
Hotels	5.2	5.9	7.4	14.4	14.0	14.8	12.3	13.4	14.6	15.5
% Chg	+9	+13	+26	+93	-3	+6	-17	+9	+9	+6
Garages/Serv Statn	6.6	8.0	9.5	11.1	10.5	9.3	9.2	10.2	11.5	12.0
% Chg	-15	+21	+18	+17	-5	-11	-1	+10	+13	+4
Manufacturing	6.9	8.0	10.1	13.4	16.9	12.9	13.2	14.0	14.4	14.4
% Chg	+25	+17	+26	+32	+26	-23	+2	+6	+3	-0
Institutional	90.4	89.1	100.0	110.5	115.0	117.3	118.3	125.2	134.6	141.5
% Chg	+0	-1	+12	+11	+4	+2	+1	+6	+8	+5
Education	44.0	40.8	44.7	49.9	52.4	53.5	53.9	57.3	61.8	65.1
% Chg	+4	-7	+10	+12	+5	+2	+1	+6	+8	+5
Dormitories	3.8	3.2	4.3	3.9	4.7	4.9	5.2	5.3	5.4	5.3
% Chg	+19	-16	+36	-8	+20	+5	+6	+2	+1	-1
Health Facilities	15.8	17.6	22.3	24.2	23.3	23.2	23.2	24.5	26.6	28.1
% Chg	-2	+11	+27	+9	-4	-0	+0	+6	+8	+6
Public	7.1	7.2	7.9	8.3	12.0	12.5	11.7	11.6	12.2	13.1
% Chg	-3	+1	+11	+4	+45	+4	-7	-0	+5	+7
Religious	4.5	4.5	4.1	4.1	3.7	3.6	3.8	4.2	4.6	4.9
% Chg	-13	+0	-9	-0	-8	-3	+6	+10	+9	+7
Amusement	11.0	11.6	11.8	14.3	13.5	14.2	14.9	16.2	17.5	17.9
% Chg	-4	+5	+2	+21	-5	+5	+6	+9	+8	+2
Transportation	4.3	4.4	5.0	5.9	5.3	5.3	5.6	5.9	6.4	7.0
% Chg	-8	+1	+13	+18	-9	+0	+5	+6	+8	+9
Residential	283.4	333.2	384.1	342.3	263.2	193.8	234.9	298.4	346.6	343.7
% Chg	+14	+18	+15	-11	-23	-26	+21	+27	+16	-1
Single Family	242.3	282.7	315.5	272.4	201.2	144.0	180.8	235.7	271.5	266.9
% Chg	+13	+17	+12	-14	-26	-28	+26	+30	+15	-2
Multifamily	41.0	50.5	68.6	69.9	62.1	49.9	54.1	62.7	75.2	76.8
% Chg	+19	+23	+36	+2	-11	-20	+8	+16	+20	+2

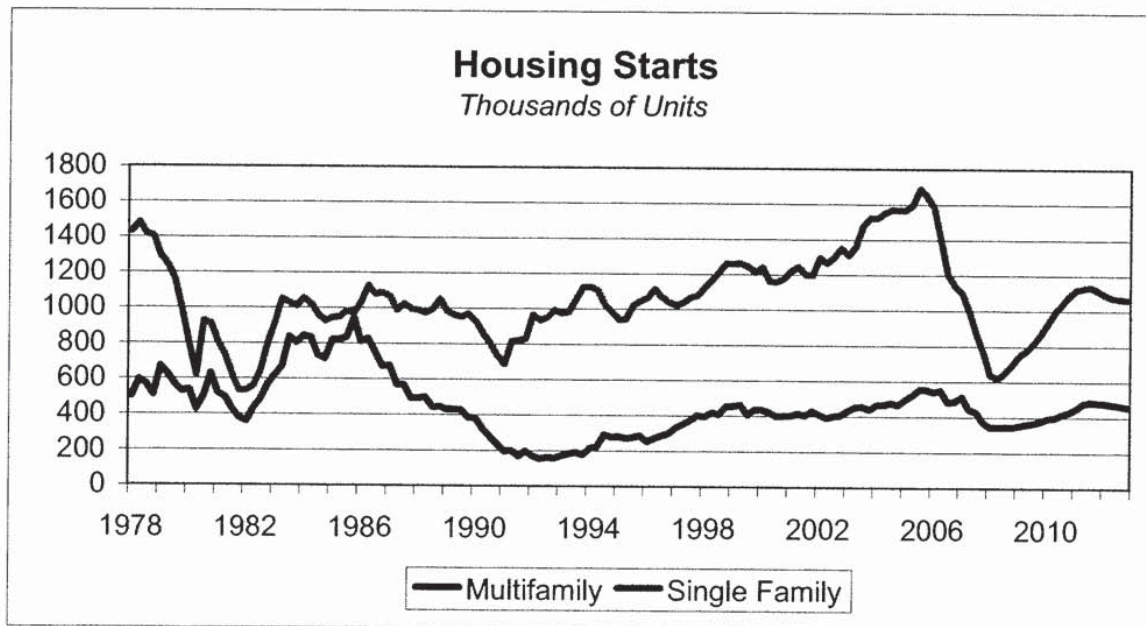
Total Residential Construction for the United States

Thousands of Dwelling Units

	HISTORY					FORECAST				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential	1,863	2,022	2,157	1,847	1,376	995	1,165	1,420	1,600	1,545
% Chg	+9	+9	+7	-14	-25	-28	+17	+22	+13	-3
Single Family	1,417	1,553	1,626	1,331	936	650	800	1,010	1,125	1,075
% Chg	+9	+10	+5	-18	-30	-31	+23	+26	+11	-4
Multifamily	446	469	531	516	440	345	365	410	475	470
% Chg	+11	+5	+13	-3	-15	-22	+6	+12	+16	-1

Billions of Dollars

	HISTORY					FORECAST				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Residential	283.4	333.2	384.1	342.3	263.2	193.8	234.9	298.4	346.6	343.7
% Chg	+14	+18	+15	-11	-23	-26	+21	+27	+16	-1
Single Family	242.3	282.7	315.5	272.4	201.2	144.0	180.8	235.7	271.5	266.9
% Chg	+13	+17	+12	-14	-26	-28	+26	+30	+15	-2
Multifamily	41.0	50.5	68.6	69.9	62.1	49.9	54.1	62.7	75.2	76.8
% Chg	+19	+23	+36	+2	-11	-20	+8	+16	+20	+2



Total Nonbuilding Contract Value for the United States

Billions of Dollars

	HISTORY					FORECAST				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Nonbuilding	92.27	95.55	103.69	127.66	133.45	134.20	135.82	141.31	149.80	158.50
% Chg	-8	+4	+9	+23	+5	+1	+1	+4	+6	+6
Public Works	83.40	88.24	95.90	112.37	120.08	121.50	122.92	127.95	135.60	143.00
% Chg	-5	+6	+9	+17	+7	+1	+1	+4	+6	+5
Streets	30.89	31.47	33.00	37.67	38.89	40.80	42.40	45.50	49.80	53.60
% Chg	-5	+2	+5	+14	+3	+5	+4	+7	+9	+8
Bridges	11.26	9.98	11.39	13.24	14.51	15.50	15.80	16.10	16.80	17.80
% Chg	+3	-11	+14	+16	+10	+7	+2	+2	+4	+6
Dams/Water Dev.	6.02	6.01	7.26	8.49	7.95	8.30	8.72	9.40	10.10	10.40
% Chg	-14	-0	+21	+17	-6	+4	+5	+8	+7	+3
Sewers	10.68	11.46	13.26	14.54	15.83	16.20	16.30	16.65	17.45	18.10
% Chg	+3	+7	+16	+10	+9	+2	+1	+2	+5	+4
Water Supply	8.53	9.66	10.90	10.36	13.00	12.60	12.80	13.30	14.20	14.90
% Chg	-13	+13	+13	-5	+25	-3	+2	+4	+7	+5
Other Nonbuilding	16.01	19.66	20.08	28.07	29.90	28.10	26.90	27.00	27.25	28.20
% Chg	-8	+23	+2	+40	+7	-6	-4	+0	+1	+3
Utilities	8.87	7.31	7.79	15.28	13.37	12.70	12.90	13.36	14.20	15.50
% Chg	-26	-18	+7	+96	-13	-5	+2	+4	+6	+9

Billions of 2000 Dollars

	HISTORY					FORECAST				
	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Total Nonbuilding	86.32	86.41	83.21	89.15	88.62	89.72	85.85	86.92	89.51	92.18
% Chg	-11	+0	-4	+7	-1	+1	-4	+1	+3	+3
Public Works	78.04	79.93	76.98	77.78	79.01	77.41	76.88	77.87	80.15	82.23
% Chg	-9	+2	-4	+1	+2	-2	-1	+1	+3	+3
Streets	29.25	29.21	26.15	24.76	24.18	24.23	24.79	25.85	27.47	28.78
% Chg	-9	-0	-10	-5	-2	+0	+2	+4	+6	+5
Bridges	10.66	9.27	9.02	8.71	9.02	9.44	9.24	9.15	9.27	9.56
% Chg	-1	-13	-3	-4	+4	+5	-2	-1	+1	+3
Dams/Water Dev.	5.67	5.29	5.98	6.58	5.91	6.04	6.27	6.57	6.89	6.93
% Chg	-17	-7	+13	+10	-10	+2	+4	+5	+5	+1
Sewers	9.73	9.95	10.82	10.74	11.15	11.10	11.12	11.09	11.31	11.43
% Chg	+0	+2	+9	-1	+4	-0	+0	-0	+2	+1
Water Supply	7.78	8.39	8.89	7.65	9.16	8.80	8.73	8.86	9.20	9.41
% Chg	-16	+8	+6	-14	+20	-4	-1	+1	+4	+2
Other Nonbuilding	14.96	17.81	16.12	19.35	19.59	17.79	16.74	16.34	16.01	16.12
% Chg	-11	+19	-10	+20	+1	-9	-6	-2	-2	+1
Utilities	8.27	6.49	6.23	11.37	9.61	12.31	8.97	9.05	9.36	9.95
% Chg	-28	-22	-4	+82	-15	+28	-27	+1	+3	+6

Exhibit 5

Excerpt from G. Hawley, "Condensed Chemical Dictionary," Van Nostrand
Reinhold Company, Inc. (1981)

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Condensed Chemical Dictionary

TENTH EDITION

Revised by

GESSNER G. HAWLEY



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POLYVINYL ACETAL

340

Properties: Good resistance to abrasion, weathering, and organic solvents; tend to harden and become brittle at low temperatures. Combustible.

Derivation: Reaction of polyisocyanates with linear polyesters or polyethers containing hydroxyl groups.

Uses: Sealants and caulking agents; adhesives; films and linings; shoe uppers and heels; encapsulation of electronic parts; binders for rocket propellants; abrasive wheels and other mechanical items; auto bumpers, fenders and other components.

Foams:

Properties: Both flexible and rigid foams are available. Density varies from 2 to 50 pounds per cubic foot; thermal conductivity as low as 0.11; excellent insulators.

Hazard: Combustible unless protected by effective thermal barrier. Evolves toxic fumes on ignition. See also under foam, plastic.

Derivation: A polyether such as polypropylene glycol is treated with a diisocyanate in the presence of some water and a catalyst (amines, tin soaps, organic tin compounds). As the polymer forms, the water reacts with the isocyanate groups to cause cross linking, and also produces carbon dioxide which causes foaming. In other cases trifluoromethane or similar volatile material may be used as blowing agent.

Flexible foams are based on polyoxypropylene diols of 2000 molecular weight and triols up to 4000. Rigid foams are based on polyethers made from sorbitol, methyl glucoside, or sucrose.

Uses: (Flexible) Furniture; mattresses; laminates and linings; flooring leveling; seat cushions and other automotive accessories; carpet underlays; upholstery; absorbent of crude oil spills on seawater. (Rigid) Furniture; packaging and packing, building insulation; marine flotation; auto components; cigarette filters; light structures, as boat hulls; soundproofing; salvaging operations; ship-building (for buoyancy); transportation insulation for box cars, refrigerated cars, tank and hopper cars, trucks and trailers (claimed to be twice as effective as glass fiber); insulation for storage tanks, ships' holds, and pipelines; auto bumpers.

polyvinyl acetal. One of the family of vinyl resins resulting from the condensation of polyvinyl alcohol with an aldehyde; acetaldehyde, formaldehyde and butyraldehyde are commonly used. The three main groups are polyvinyl acetal itself, polyvinyl formal, and polyvinyl butyral. These are all thermoplastic, and can be processed by extruding, molding, coating and casting. They are used chiefly in adhesives, paints and lacquers, and films. Polyvinyl butyral is used in sheet form as an interlayer in safety glass and shatter-resistant protection in aircraft.

polyvinyl acetate (PVAc).

$[-CH_2CH(OOCCH_3)-]_n$. A thermoplastic high polymer.

Properties: Colorless, odorless, transparent; sp. gr. 1.19 at 15°C; insoluble in water, gas oils and fats; soluble in low molecular weight alcohols, esters, benzene, and chlorinated hydrocarbons. Resistant to weathering. Combustible; toxic.

Derivation: Polymerization of vinyl acetate peroxide catalysts.

Uses: Latex water paints; adhesives for paper, w glass, metals, and porcelain; intermediate for version to polyvinyl alcohol and acetals; seal shatterproof photographic bulbs; paper coating paperboard; bookbinding; textile finishing; woven fabric binder; component of lacquers, and plastic wood; strengthening agent for cement.

polyvinyl alcohol (PVA; PVOH)

$[-CH_2CHOH-]_n$. A water-soluble synthetic polymer made by alcoholysis of polyvinyl acetate.

Properties: White to cream-colored powder; sp. 1.27-1.31. Refractive index 1.49-1.53. Proper depend on degree of polymerization (q.v.) and percentage of alcoholysis, both of which are controllable in processing. Water solubility increases; molecular weight decreases; strength, elongation, tear resistance, and flexibility improve with increasing molecular weight. Tensile strength up to 22,000 psi; decomposes at 260°C. PVA has high impermeability to gases; is unaffected by oils, greases, and petroleum hydrocarbons. Attacked by acids and alkalis. It forms films by evaporation from water solution. Combustible. Low toxicity. Grades: Super-high viscosity (m.w. 250,000-300,000); high-viscosity (m.w. 170,000-220,000); medium-viscosity (m.w. 120,000-150,000); low viscosity (m.w. 25,000-35,000).

Uses: Textile warp and yarn size; laminating adhesives; molding powders; binder for cosmetic preparations, ceramics, leather, cloth, nonwoven fabrics, and paper; paper coatings; greaseproofing paper; emulsifying agent; thickener and stabilizer for photosensitive films; cements and mortars; intermediate for other polyvinyls, imitation sponge printing inks (glass).

polyvinylbenzyltrimethyl ammonium chloride. A electrically conductive polymer, used to increase the conductivity of papers.

polyvinyl butyral. See polyvinyl acetal.

polyvinyl carbazole. A brown, thermoplastic resin obtained by the reaction of acetylene with carbazole. It softens about 150°C, has excellent dielectric properties, good heat and chemical stability, but poor mechanical strength. It is used principally as substitute for mica in electrical equipment and as a impregnant for paper capacitors.

polyvinyl chloride (PVC) $[-H_2CCHCl-]_n$. A synthetic thermoplastic polymer.

colorless, transparent solid; soluble in water, gasoline, low molecular weight alcohol chlorinated hydrocarbons. Combustible; non-

on of vinyl acetate with

adhesives for paper, wood, tin; intermediate for con-hol and acetals; sealant; e bulbs; paper coating and g; textile finishing; non-ponent of lacquers, inks, ening agent for cements.

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H₂C=CHCl. A syn-

Properties: White powder or colorless granules. Resistant to weathering and moisture; dimensionally stable; good dielectric properties; resistant to most acids, fats, petroleum hydrocarbons and fungus. Readily compounded into flexible and rigid forms by use of plasticizers, stabilizers, fillers, and other modifiers. Easily colored and processed by blow molding, extrusion, calendaring, fluid bed coating, etc. Available as film, sheet, fiber and foam.
Derivation: Polymerization of vinyl chloride (q.v.) by free radicals with peroxide initiator. May be copolymerized with up to 15% of other vinyls.
Hazard: Decomposes at 148°C, evolving toxic fumes of hydrogen chloride. See also vinyl chloride, and note.

Uses: Piping and conduits of all kinds; siding; gutters; window and door frames; officially approved for use in interior piping, plumbing, and other construction uses; raincoats, toys, gaskets, garden hose, electrical insulation, shoes, magnetic tape, film and sheeting; containers for toiletries, cosmetics, household chemicals; fibers for athletic supports; sealant liners for ponds and reservoirs; adhesive and bonding agent; plastisols and organosols; tennis court playing surfaces; flooring; coating for paper and textiles; wire and cable protection; base for synthetic turf; phonograph records.

Note: Use of PVC in rigid and semirigid food containers, such as bottles, boxes, etc., is under restriction by FDA, as well as in coatings for fresh citrus fruits. Its use in thinner items such as films and package coatings is permissible. Possibility of migration of vinyl chloride monomer into food products is the critical factor; this tends to increase with the thickness of the material.

polyvinyl chloride-acetate. A vinyl chloride and vinyl acetate copolymer that is more flexible than polyvinyl chloride. The copolymer usually contains 85 to 97% of the chloride. It is generally similar in properties and uses to polyvinyl chloride.

polyvinyl dichloride (PVDC). A chlorinated polyvinyl chloride. Has high strength and superior chemical resistance over a broad temperature range; self-extinguishing. Used for pipe and fittings for hot corrosive materials up to 100°C. Is immune to solution or direct attack by inorganic reagents, aliphatic hydrocarbons and alcohols.

polyvinyl ether. See polyvinyl ethyl ether; polyvinyl isobutyl ether; polyvinyl methyl ether; polyvinyl methyl ether-maleic anhydride.

polyvinyl ethyl ether (PVE; polyvinyl ether)
[—CH(C₂H₅)CH₂—]_n.

Properties: Viscous gum to rubbery solid, depending on molecular weight. Colorless when pure; sp. gr. 0.97 (20°C); refractive index 1.45 (25°C). Insoluble in water; soluble in nearly all organic solvents. Stable toward dilute and concentrated alkalis and dilute acids. Compatible with a limited number of

commercial resins, including rosin derivatives and some phenolics.

Derivation: Polymerization of vinyl ethyl ether.

Uses: Pressure-sensitive tape; to improve adhesion to porous surfaces, cellophane, cellulose acetate and vinyl sheet.

polyvinyl fluoride (—H₂C=CHF—)_n. Polymer of vinyl fluoride. In film form it is characterized by superior resistance to weather, high strength, high dielectric constant, low permeability to air and water, as well as oil, chemical solvent and stain resistance.

Hazard: Not recommended for food packaging. Evolves toxic fumes on heating.

Uses: Protective material for outdoor use; packaging; electrical equipment.

polyvinyl formal. See polyvinyl acetal.

polyvinylidene chloride (saran). A stereoregular, thermoplastic polymer.

Properties: Tasteless, odorless, nontoxic; abrasion-resistant; low vapor transmission; impermeable to flavor. Highly inert to chemical attack; softened by chlorinated hydrocarbons and soluble in cyclohexanone and dioxane. Combustible but self-extinguishing.

Derivation: Polymerization of vinylidene chloride (q.v.) or copolymerization of vinylidene chloride with lesser amounts of other unsaturated compounds.

Forms: Extruded and molded products; oriented fibers; films.

Uses: Packaging of food products, especially meats and poultry; insecticide-impregnated multiwall paper bags; pipes for chemical processing equipment; seat covers, upholstery, fibers, bristles, latex coatings.

See also saran fiber; "Cryovac."

polyvinylidene fluoride H₂C=CF₂. A thermoplastic fluorocarbon polymer suitable for compression and injection molding and extrusion.

Properties: Crystalline melting point 171°C. Thermally stable from -62 to +148°C. Self-extinguishing and nondripping. Tensile strength 7000 psi at 25°C; yield stress 5500 psi; elongation 300%; compression strength 10,000 psi; thermal conductivity 1.05 Btu/hr/sq ft/°F/in; water absorption 0.04% in 24 hrs; sp. gr. 1.76; refractive index 1.42. Resistant to oxidative degradation, electricity, acids, alkalis, oxidizers, halogens. Somewhat soluble in dimethylacetamide; attacked by hot conc. sulfuric acid or n-butylamine.

Forms: Powder, pellets, solution, and dispersion.

Uses: Insulation for high-temperature wire, tank linings, chemical tanks and tubing, protective paints and coatings with exceptional resistance (30 years) to weathering and U.V.; valve and impeller parts; shrinkage tubing to encapsulate resistors, diodes, and soldered joints; sealant.

See also fluorocarbon polymer.