

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Omega Liner Company, Inc.,
Petitioner

v.

Buergofol GmbH,
Patent Owner

Case: IPR2023-01402

U.S. Patent No. 8,794,269

Issued: August 5, 2014

Filed: November 30, 2012

Inventor: Henrik Hummel

Title: Multi-Layer Film Permeable to UV Radiation

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 8,794,269**

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PETITIONER'S EXHIBIT LIST

Exhibit	Description
EX1001	U.S. Patent No. 8,794,269 (“ the '269 Patent ”)
EX1002	File History of U.S. Patent No. 8,794,269
EX1003	Declaration of Dr. Steven B. MacLean
EX1004	<i>Curriculum Vitae</i> of Dr. Steven B. MacLean
EX1005	European Publication No. EP 0267742 A2 (“ Glover ”)
EX1006	U.S. Patent No. 6,679,966 (“ Brandenburger ”)
EX1007	Russian Publication No. RU 2182999 C1 (“ Khramenkov ”) – Certified English Translation
EX1008	Russian Publication No. RU 2182999 C1 (Khramenkov) – Original
EX1009	European Publication No. EP 0342897 A2 (“ Jones ”)
EX1010	Declaration of Frank-White, Buergofol’s Website on Archive.org, 2004-2007 (“ Buergofol’s Website ”)
EX1011	U.S. Patent No. 4,009,063 (“ Wood ”)
EX1012	U.S. Publication No. 2005/0194718 A1 (“ Blades ”)
EX1013	Buergofol’s Opposition to European Pub. No. EP 2582520 B1 (“ Buergofol’s EPO Opposition ”) – Certified English Translation
EX1014	Buergofol’s Opposition of European Pub. No. EP 2582520 B1 – Original
EX1015	Buergofol’s Exhibit Nos. E1-E24 for Buergofol’s EPO Opposition
EX1016	Chinese Office Action for Chinese Application No. CN 201180029444 A – English Translation from EPO

EX1017	Chinese Office Action for Chinese Application No. CN 201180029444 A – Original
EX1018	International Pub. No. WO 2011/157356 A1 (Hummel) - Published Version of European Pub. No. EP 2582520 B1 (Hummel)
EX1019	Chinese Pub. No. CN103079822A (Hummel)
EX1020	Abdel-Bary, E., <i>Handbook of Plastic Films</i> (2003), pp. 5-40
EX1021	Alam, S., <i>Experimental and Numerical Evaluation of Cured in Place Pipe Lining System for High Temperature Applications in Sewer Pipes</i> (2011), pp. 32-51
EX1022	Bennett, R., <i>Guidelines for Trenchless Technology: Cured-in-Place Pipe (CIPP), Fold-and-Formed Pipe (FFP), Mini-Horizontal Directional Drilling (Mini-HDD), and Microtunneling</i> (1995), pp. 2-1 - 2-7
EX1023	Callister, W., <i>Materials Science and Engineering: An Introduction, Eighth Edition</i> (2010), pp. 537-540, 610-614
EX1024	Costa, F., <i>Thermoplastic Elastomers</i> (2009), pp. 101-146
EX1025	Deopura, B., <i>Polyesters and Polyamides</i> (2008), pp. 41-48
EX1026	Donaldson, B., <i>Water Quality Implications of Culvert Repair Options: Vinyl Ester Based and Ultraviolet Cured-in-Place Pipe Liners</i> (2012), pp. 1-21
EX1027	Mark, H., <i>Encyclopedia of Polymer Science and Technology, Third Edition</i> (2004), pp. 189-222 (Vol. 8)
EX1028	Mark, J., <i>Polymer Data Handbook</i> (1999), pp. 172-229, 518-528, 780-786
EX1029	Namhata, S. P., et al., <i>Rationalisation of Vicat Softening Point Measurements</i> (1990), pp. 75-89
EX1030	Nwabunma, D., et al., <i>Polyolefin Blends</i> (2008), pp. 3-12, 14-16

EX1031	Odian, G., <i>Principles of Polymerization, Fourth Edition</i> (2004), pp. 3-16, 27-29
EX1032	Olabisi, O., <i>Conventional Polyolefins</i> (1997), pp. 1-38
EX1033	Salem, S., et al., <i>Use of Trenchless Technologies for a Comprehensive Asset Management of Culverts and Drainage Structures</i> (2008), pp. 45-51
EX1034	Sterling, R., et al., <i>State of Technology of Rehabilitation of Wastewater Collection Systems</i> (2010), pp. 16-20, A-12 – A-17
EX1035	<i>Pipeline Renewal Technologies, The Elements of CIPP: Cured-in-Place Materials and Processes</i> (2020), pp. 1-11
EX1036	Ozaki, Y., et al., <i>Far-Ultraviolet Spectroscopy in the Solid and Liquid States: A Review</i> (2012), pp. 1-25
EX1037	Ozaki, Y., et al., <i>Far-Ultraviolet Spectroscopy of Solid and Liquid States: Characteristics, Instrumentation, and Applications</i> (2016), pp. 3962-3981
EX1038	Cohen, S., <i>Design of UV-Absorbing Polypropylene Films with Polymeric Benzotriazole Based Nano- and Microparticle Coatings</i> (2016), pp. 868-875
EX1039	U.S. Patent No. 4,680,066 (Wood)
EX1040	Original Complaint, August 15, 2022, <i>Buergofol GmbH v. Omega Liner Company, Inc.</i> , Case No. 22-cv-04112-KES (D. S.D.) (Dkt. 1)
EX1041	Affidavit of Service, September 26, 2022, <i>Buergofol GmbH v. Omega Liner Company, Inc.</i> , Case No. 22-cv-04112-KES (D. S.D.) (Dkt. 7)
EX1042	Amended Scheduling Order, July 12, 2023, <i>Buergofol GmbH v. Omega Liner Company, Inc.</i> , Case No. 22-cv-04112-KES (D. S.D.), (Dkt. 161)

EX1043	First Amended Complaint, July 13, 2023, <i>Buergofol GmbH v. Omega Liner Company, Inc.</i> , Case No. 22-cv-04112-KES (D. S.D.) (Dkt. 169)
EX1044	Buergofol's Responses to Omega's Interrogatories to Buergofol (Set Two) (Nos. 6-13), March 31, 2023
EX1045	Buergofol's Infringement Contentions (Response to Interrogatory No. 14), April 24, 2023
EX1046	Omega's Sotera Stipulation

LIST OF CHALLENGED CLAIMS

Claim 1	
[1pre]	1. An insertion tube suitable for the renovation of subterranean pipes, optionally subterranean sewer pipes, comprising
[1A]	an optionally nonconditioned multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation, comprising a layer sequence made of
[1A-1]	(a) a layer (a) comprised of at least one thermoplastic olefin homo- or copolymer, as one of the external layers,
[1A-2]	(b) an adhesive-promoter layer (b),
[1A-3]	(c) an internally situated layer (c) comprised of at least one homo- and/or copolyamide,
[1A-4]	(d) an adhesive-promoter layer (d), and
[1A-5]	(e) a layer (e) comprised of at least one homo- and/or copolyamide, as one of the external layers,
[1A-6]	in the form of a tubular film,
[1A-7]	wherein the VICAT softening point of the thermoplastic olefin homo- or copolymer of the layer (a) is at least 100° C.;
[1A-8]	as internally situated tube, and
[1B]	an externally situated single- or multilayer tubular film which is impermeable to liquids, and which reflects and/or absorbs UV radiation and/or short-wave, visible light, as externally situated tube, and
[1C]	a support material situated therebetween and saturated with a reactive synthetic resin.
Claim 2	

[2]	2. The insertion tube as claimed in claim 1, wherein the thickness of the layer (a) is at least 40% of the total thickness of the multilayer film that is impermeable to liquids and at least to some extent permeable to UV radiation.
Claim 3	
[3]	3. The insertion tube as claimed in claim 1, wherein the layer (a) of the multilayer film that is impermeable to liquids and at least to some extent permeable to UV radiation is comprised of at least one ethylene homo- or copolymer and/or at least one propylene homo- or copolymer.
Claim 4	
[4]	4. The insertion tube as claimed in claim 1, wherein the layers (c) and (e) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation have an identical layer structure, optionally an identical layer thickness, and/or identical polyamide components, and/or an identical composition, optionally an identical polyamide component.
Claim 5	
[5]	5. The insertion tube as claimed in claim 1, wherein the layers (c) and (e) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation have a different layer structure, <i>optionally</i> a different layer thickness, and/or different polyamide components, and/or a different composition.
Claim 6	
[6]	6. The insertion tube as claimed in claim 1, wherein the adhesive-promoter layers (b) and (d) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation comprise respectively mutually independently at least one modified thermoplastic olefin homo- or copolymer, <i>optionally</i> respectively mutually independently at least one modified thermoplastic ethylene homo- or copolymer and/or at least one modified propylene homo- or copolymer.

Claim 7	
[7]	7. The insertion tube as claimed in claim 1, wherein the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation consists of the layers (a)-(e).
Claim 8	
[8]	8. The insertion tube as claimed in claim 1, wherein the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation is permeable to an extent of at least 80% to UV radiation.
Claim 9	
[9]	9. The insertion tube as claimed in claim 1, wherein the surface layer (a) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation is directly adjacent to the support material.
Claim 10	
[10]	10. A pipe-renovation system suitable for the renovation of subterranean pipes, comprising an insertion tube as claimed in claim 1, provided for introduction into the pipe requiring renovation, and a source that emits UV radiation and/or short-wave, visible light, and that is optionally moveable.

Omega Liner Company, Inc. (“**Petitioner**” or “**Omega**”) hereby petitions for inter partes review (“**IPR**”) under 35 U.S.C. §§ 311–319 and 37 C.F.R. § 42 of Claims 1-10 (“**Challenged Claims**”) of U.S. Patent No. 8,794,269 (“**the ’269 Patent**”). There exists a reasonable likelihood Petitioner will prevail with respect to the challenged claims. Petitioner respectfully submits that IPR of the ’269 Patent should be instituted, and the challenged claims canceled.

I. Mandatory Notices Under 37 C.F.R. §42.8(a)(1).

A. Real Party-in-Interest.

Omega Liner Company, Inc. is the real party-in-interest in this IPR petition.

B. Related Matters.

U.S. Patent No. 8,794,269 (“**’269 Patent**”), together with U.S. Patent No. 9,657,882 (“**’882 Patent**”), is the subject of pending litigation involving the Omega Liner Company, Inc. (“**Petitioner**” or “**Omega**”) and Buergofol GmbH (“**Patent Owner**” or “**Buergofol**”) in *Buergofol GmbH v. Omega Liner Company, Inc.*, Case No. 22-cv-04112-KES (D. S.D.) (“**District Court Litigation**”). The presently challenged ’269 Patent was first asserted in Patent Owner’s Complaint, served on Petitioner on September 21, 2022. EX1040; EX1041.

The District Court recently issued an amended scheduling order on July 12, 2023. EX1042. The District Court has not set a trial date in the scheduling order. *Id.* Also, the deadline for briefing to close on all motions is not until October 22, 2024

(motions must be filed by September 17, 2024, oppositions briefs within 21 days thereafter, and reply briefs 14 days thereafter). *Id.* at ¶9. However, “If, after reviewing the parties’ briefing on dispositive motions, the court believes a claim construction hearing is necessary, the court will reach out to the parties to schedule a hearing.” *Id.* No trial date has been set and Petitioner does not expect a trial date to be set until late 2025 if a claim construction hearing is determined to be necessary by the Court.

Omega is not aware of any other legal proceedings addressing the ’269 Patent.

C. Designation of Counsel.

Lead Counsel	Backup Counsel
Michael S. Neustel Reg. No. 41,221 NEUSTEL LAW OFFICES, LTD 2534 South University Drive, Suite #4 Fargo, North Dakota 58103 Tel: 701-281-8822 michael@neustel.com	Monte M. Bond <i>Pro Hac Vice</i> (application to be filed) NEUSTEL LAW OFFICES, LTD 2534 South University Drive, Suite #4 Fargo, North Dakota 58103 Tel: 701-281-8822 monte@neustel.com

A Power of Attorney is filed concurrently herewith under 37 C.F.R. § 42.10(b).

D. Service Information.

Please address all correspondence and service to the address listed above. Petitioner consents to electronic service directed to michael@neustel.com and monte@neustel.com.

II. Grounds for Standing.

Petitioner hereby certifies that the '269 Patent is available for *inter partes* review and that the Petitioner is not barred or estopped from requesting *inter partes review* challenging Claims 1-10 on the grounds identified herein. Petitioner was served with a complaint of infringement of the '269 Patent on September 21, 2022, less than one year ago. EX1040, EX1041.

III. Fees.

Petitioner requests review of 10 claims, with a \$41,500 payment. The Office is authorized to charge the fees specified by 37 C.F.R. §§ 42.103(a) and 42.15(a) to Deposit Account No. 501248.

IV. Person of Ordinary Skill in the Art.

A person of ordinary skill in the art (“**POSITA**”) in the relevant field at the time of the invention would have at least a bachelor’s degree in Polymer Science and Engineering, Material Science and Engineering, or a related engineering field, combined with at least three years of experience in the formulation, manufacturing, and end-use performance of polymeric film and sheet products. EX1003, ¶23. Alternatively, one skilled in the art could be a person with at least seven years of experience in the formulation, manufacturing, and end-use performance of polymeric film and sheet products, without possessing a bachelor’s degree in a related scientific or engineering discipline. *Id.* Individuals with different

educational backgrounds and additional experience could still be of ordinary skill in the art if that additional experience compensates for a deficit in their education and experience stated above. *Id.* Additional education might substitute for some of the experience, and substantial experience might substitute for some educational background. *Id.*

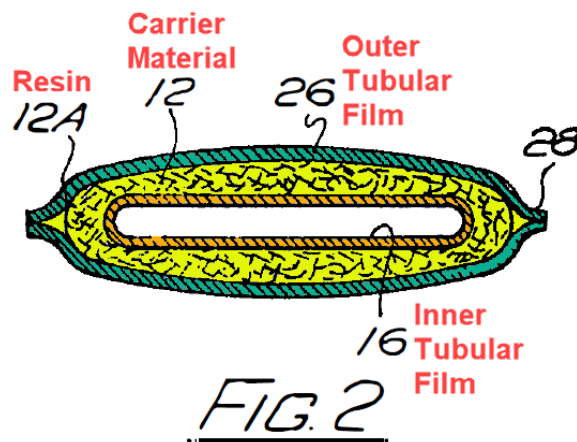
V. Background of Technology.

A. 1971: Invention of CIPP Liners With Inner Tubular Film.

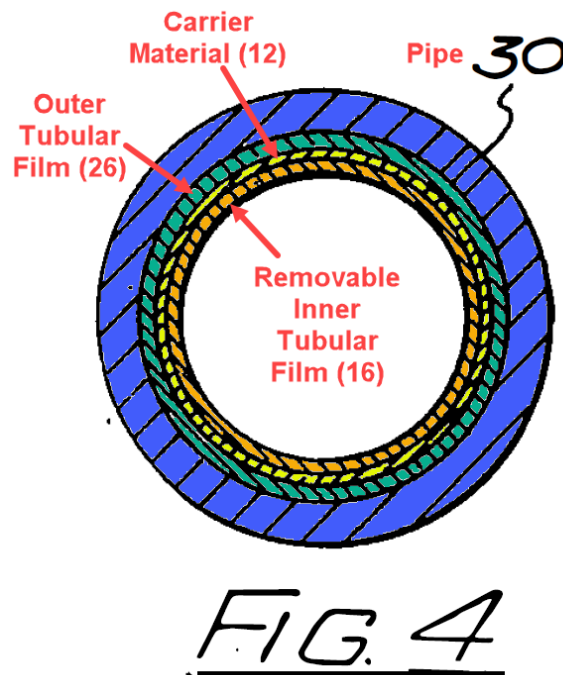
In 1971, Eric Wood implemented the first cured-in-place-pipe (“**CIPP**”) liner in London, England. EX1035, p. 2; EX1033, p. 5. On August 21, 1972, Mr. Wood filed for a United States patent for his CIPP liner and eventually received U.S. Patent No. 4,009,063 (“**Wood Patent**”) for his CIPP liner titled “Method of Lining a Pipe.” EX1011.

The Wood Patent discloses a CIPP liner having an “inner tube” (16), an outer tube (26) and a carrier material (12) impregnated with a curable resin (12A) between the inner tube and outer tube. EX1011, 4:61-68. The Wood Patent further discloses that the “inner tube” is a “tubular laminate” of various materials that has a “relatively high impermeability to fluids so that the laminate can be shaped with fluid pressure and there will be no leakage through the liner.” EX1011, 10:24-40.

Below is Figure 2 from the Wood Patent showing the CIPP liner prior to installation:



Wood's CIPP liner was drawn into the pipe with the resin uncured and then inflated so that the CIPP liner was positioned against the interior surface of the pipe to be renovated and then the resin is cured in place. EX1011, 5:25-33. Below is Figure 4 from the Wood Patent showing the inflated CIPP liner within a pipe (30) to be renovated:



According to the Wood Patent, the inner tube (16) may be constructed from a plastic film material that either “becomes firmly bonded to the resin ... or alternatively after curing of the resin, *it may be capable of removal from the cured resin depending upon the materials used for the tube 16* and the resin which is used.” EX1011, 5:51-56 (emphasis added.)

Eric Wood is also the named inventor of U.S. Patent No. 4,680,066 issued on July 14, 1987 which discloses the use of an ultraviolet light curable resin along with a movable lamp that passes through the inflated liner. EX1019, Abstract. The installation of UV CIPP liners is basically the same as the CIPP liner invented by Eric Wood including the removal of the inner film after the resin is hardened except a UV light source is pulled through the inflated UV CIPP liner to harden the resin instead of using steam.

B. 2004: Buergofol Made 5-Layer Tubular Film.

Buergofol’s ’269 Patent focuses on a five-layer inner tubular film. EX1001, Abstract, Claim 1, 2:34-45; EX1043, ¶50. However, there is nothing new or novel about the five-layer sequence claimed as patentable by Huhtamaki Films Germany GmbH & Co. KG – Buergofol’s predecessor-in-interest to the ’269 Patent.

By at least July 1, 2004, Buergofol was manufacturing tubular film having the five-layer sequence claimed in the ’269 Patent. EX1010. On July 1, 2004, Buergofol’s website at www.buergofol.com stated that Buergofol was making and

selling tubular film having five-layer sequences such as PA/HV/PA/HV/PE and PA/HV/PA/HV/PP.¹ EX1010, p. 9. On March 11, 2005, Buergofol's website at www.buergofol.com stated that Buergofol was making and selling tubular film having five-layer sequences such as PA/TIE/PA/TIE/PE and PA/TIE/PA/TIE/PP. EX1010, p. 7.

C. Buergofol's Opposition to the '269 Patent European Counterpart.

Buergofol acquired the '269 Patent from Loparex (Huhtamaki Films' current name) only *five-days* before filing the patent infringement lawsuit against Omega under terms and conditions still unknown to Omega. EX1043, ¶18. Seven years before acquiring the '269 Patent, on January 30, 2015, ***Buergofol filed an opposition against the European counterpart to the '269 Patent***, European Pub. No. EP 2582520 B1 (**"Buergofol's EPO Opposition"**). EX1013 (Buergofol's EPO Opposition) and EX1015 (Exhibits E1-E24 for EPO Opposition); *See infra* Section VI(D). In Buergofol's EPO Opposition, Buergofol submitted evidence of its own sales and manufacturing information dating back to 2002 for the same five-layer sequence used in inner tubular film for UV CIPP liners sold to Saertex and other companies. *Id.*

¹ "PA" references polyamide, "PE" references polyethylene, "PP" references polypropylene and "HV" references the tie layer or adhesion promoter layer.

On April 19, 2012, prior to filing Buergofol’s EPO Opposition, Buergofol had also filed a cancellation proceeding against German Patent No. DE202010016048U1 with evidence similar to that presented in Buergofol’s EPO Opposition.² Even Buergofol – the current owner of the ’269 Patent – does not believe the five-layer inner tubular film technology is patentable.

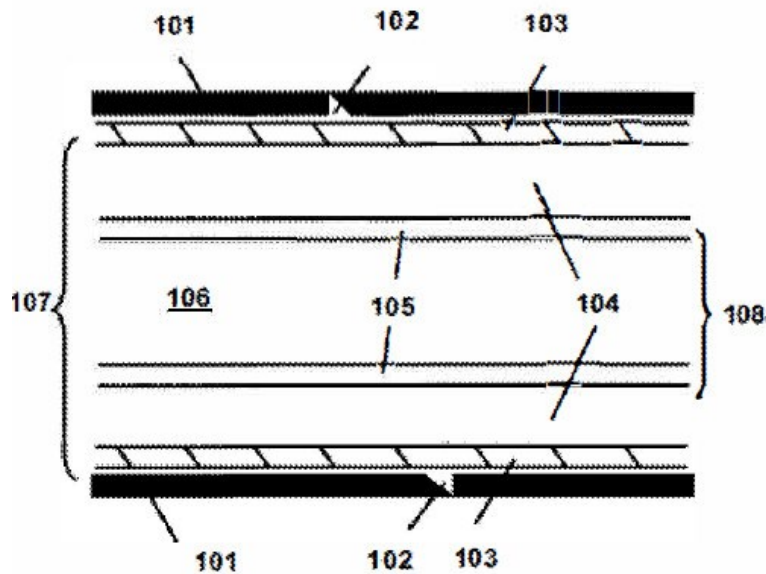
VI. The ’269 Patent.

A. Overview of ’269 Patent.

The ’269 Patent was filed on November 30, 2012 entitled “Multi-Layer Film Permeable to UV Radiation” naming Henrik Hummel as the inventor and Huhtamaki Films Germany GmbH & Co. KG (“**Huhtamaki**”) as the assignee. EX1001, Cover. The claims of the ’269 Patent are directed towards conventional UV CIPP liners used to rehabilitate underground culverts and pipes. EX1001, Claims 1-10.

² Omega was forced to file a Motion to Compel to get Buergofol’s German cancellation documents filed against German Patent No. DE202010016048U1, and after a September 18, 2023 hearing in the District Court Litigation the Court entered an order stating “Buergofol is ordered to produce all documents filed in the German cancellation proceeding.” *Buergofol GmbH v. Omega Liner Company, Inc.*, Case No. 22-cv-04112-KES, Dkt. No. 233 (text order) (D. S.D.). Buergofol has not complied with the Court’s order as of the filing of this Petition.

Figure 1 is the only figure in the '269 Patent which is shown below:



The '269 Patent and independent claim 1 of the '269 Patent focus upon an inner tubular film having the following specific five-layer sequence:

- a **layer (a)** comprised of at least one thermoplastic olefin homo- or copolymer, *as one of the external layers*,
- an adhesive-promoter **layer (b)**,
- an internally situated **layer (c)** comprised of at least one homo- and/or copolyamide,
- an adhesive-promoter **layer (d)**, and
- a **layer (e)** comprised of at least one homo- and/or copolyamide, *as one of the external layers*.

EX1001, Abstract, Claim 1, 2:34-45; EX1043, ¶50.

The Challenged Claims 1-10 merely claim a well-known five-layer tubular plastic film which has been known for many years prior to the critical date of the '269 Patent. *See supra* Section V and *infra* Section X. Only as the result of blatant overreach and lack of disclosure of known prior art to the USPTO did the Challenged Claims emerge from the USPTO.

B. Priority Date.

The earliest possible priority date of Claims 1-10 of the '269 Patent is June 15, 2010, the filing date of a German application to which the '269 Patent ultimately claims priority. Thus, this petition applies pre-AIA 35 U.S.C. §102(b) and pre-AIA 35 U.S.C. §103 in showing unpatentability of the Challenged Claims. As explained below, each of Petitioner's prior art references were published more than one-year before the earliest priority date and qualify as prior art. *See infra VII.*

C. Prosecution History of the '269 Patent and Related Chinese Counterpart Application.

On November 30, 2012, the '269 Patent was filed with the USPTO with claims 1-10. EX1002, pp. 168-204. On January 30, 2014, the Examiner issued a Notice of Allowance without issuing an Office Action. EX1002, pp. 260-267.

On April 11, 2014, the Chinese Patent Office issued an Office Action in co-pending Chinese Application No. CN201180029444A (Hummel) finding that the claims were not patentable in view of Russian Patent No. RU 2182999 C1

(Khramenkov) and European Pub. No. EP0342897A2 (Jones). EX1016.³ Despite the Chinese Office Action, Huhtamaki Films paid the Issue Fee on April 11, 2014. EX1002, p. 315.

On July 14, 2014, three-months after paying the Issue Fee, Huhtamaki Films filed a late and improper IDS that included Russian Patent No. RU 2182999 C1 (Khramenkov) cited in the April 11, 2014 Chinese Office Action. EX1002, pp. 350-371. Huhtamaki Films did not submit a copy of the Chinese Office Action to the USPTO. *Id.*

On August 15, 2014, the '269 Patent issued without any review of Khramenkov by the USPTO and without any efforts by Huhtamaki Films to withdraw the application from issue. Russian Patent No. RU 2182999 C1 (Khramenkov) was not considered by the Examiner as shown by the References

³ The April 11, 2014 translated Chinese Office Action (EX1016) and the original April 11, 2015 Chinese Office Action (EX1017) were both downloaded from the European Patent Office website at <https://register.epo.org/ipfwretrieve?apn=CN.201180029444.A&lng=en>. The Office Action relates to Chinese Application No. CN201180029444A (Hummel) filed on May 31, 2011 and which was published on May 1, 2013 as Chinese Pub. No. CN103079822A (Hummel) attached hereto untranslated as EX1019.

Cited section of the '269 Patent (EX1002) and the cover page of the '269 Patent (EX1001, pp. 1-2).

Khramenkov is the main reference used in Ground 2 of this Petition.

D. Buergofol's Opposition to European Counterpart to the '269 Patent Using Prior Sales and Glover in View of Brandenburger.

The '269 Patent and its foreign counterparts were all filed by Huhtamaki Films – Buergofol's predecessor-in-interest to the '269 Patent. In 2015, Buergofol opposed the granting of the European counterpart to the '269 Patent (European Pub. No. EP 2 582 520 B1⁴) providing evidence of unpatentability of the same claims that issued in the '269 Patent including arguing that the combination of European Publication No. EP 0267742 A2 (Glover) with German Publication No. DE 19924251 A1 (Brandenburger). EX1013, pp. 12-16. German Publication No. DE 19924251 A1 (Brandenburger) is the German counterpart to U.S. Patent No. 6,679,966 (Brandenburger) used in this Petition. EX1006. Omega uses the combination of Glover in view of Brandenburger as Ground 1 in this Petition.

In the European opposition, Buergofol also submitted evidence of Buergofol's own *prior sales* of the same five-layer inner tubular film for UV CIPP liners.

⁴ European Publication No. EP 2 582 520 B1 claims priority to the same German Application No. DE102010023764 as the '269 Patent.

EX1013.⁵ In Buergofol's opposition filed against the European counterpart to the '269 Patent (European Pub. No. EP 2582520 B1), Buergofol provided extensive evidence of *Buergofol's own "prior use"* of the claimed five-layer sequence inner tubular film for UV CIPP liners. EX1013, p. 18-28.

Buergofol provided evidence to the European Patent Office showing an "extrusion order" for inner tubular film sold to Saertex multiCom GmbH for use in a UV CIPP liner having the same five-layer sequence as that is claimed in the '269 Patent. EX1013, pp. 22-23. Buergofol even submitted the extrusion document as "document E14" in its opposition. *See* EX1015, pp. 131-132 (Document E14 – Extrusion Document). Buergofol further included an "order confirmation dated 03/11/2002 with the order number 10200554 is submitted as document E13" which corresponds to the five-layer inner tubular film shipped to Saertex. EX1013, p. 21; EX1015, p. 131 (Document E13 – Order Confirmation).

⁵ EX1013 is the certified English translation of the European opposition shown in EX1014 which is in German language. The original exhibits E1-E24 filed by Buergofol in the European opposition are included herein as EX1015 without translation.

VII. Brief Description of the Applied Prior Art References.

A. Glover (EX1005).

European Publication No. EP 0267742 A2 (“**Glover**”) entitled “Multilayer Carrier Films” is a “multilayer carrier film for supporting a fluid synthetic resin composition impregnated fibrous mat against a surface, for example the inside surface of a pipe, during curing of the resin” – i.e., a CIPP liner. EX1005, Cover and Abstract. Glover was filed on November 5, 1987, and was published on May 18, 1988. EX1005, Cover. Glover therefore qualifies as pre-AIA prior art under 35 U.S.C. § 102(b).

Glover discloses a five-layer inner tubular film for a CIPP liner with a five-layer sequence that is the same five-layer sequence claimed in independent claim 1 of the '269 Patent. *See infra* Sections X(A)(1)(c)-(g). The multilayer sequence taught by Glover comprises:

- External Layer (a): weldable synthetic plastic composition
- Internal Layer (b): bonding layer
- Internal Layer (c): polyamide
- Internal Layer (d): bonding layer
- External Layer (e): polyamide copolymer

EX1003, ¶126.

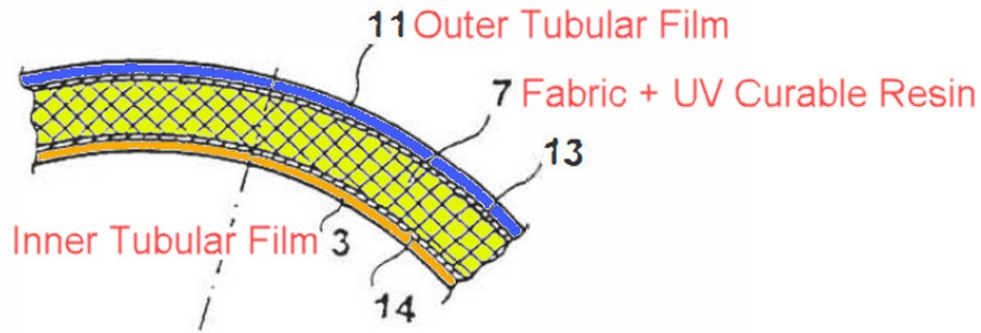
While Glover does not expressly disclose an external tubular film, a POSITA would have been motivated to combine a well-known external tubular film (e.g., external tubular film from Brandenburger) to protect the resin and to block UV radiation if a UV curable resin were used.

B. Brandenburger (EX1006).

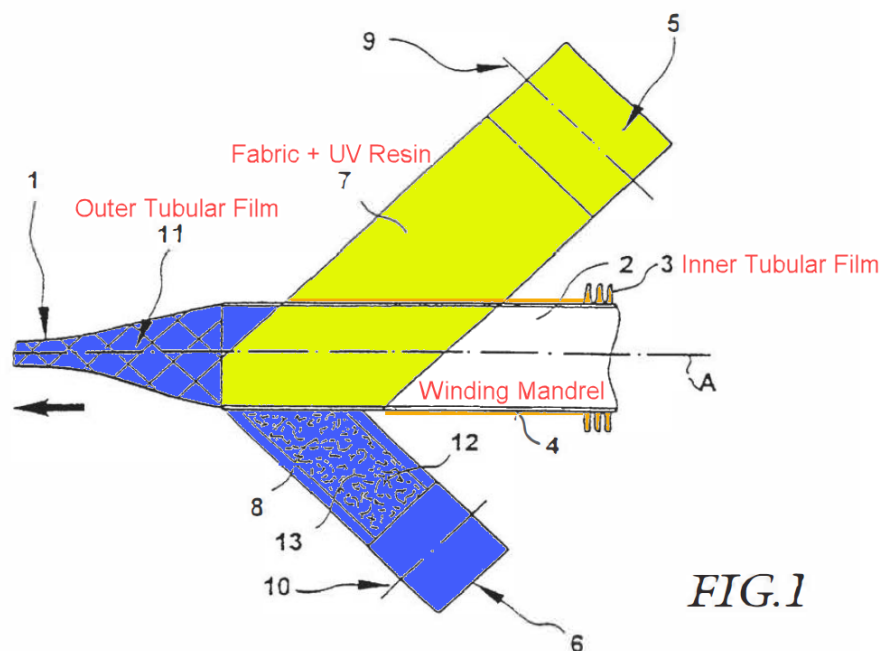
U.S. Patent No. 6,679,966 (“**Brandenburger**”) entitled “Liner with a Tubular Film That Is Coated With a Nonwoven” is a “liner for producing a lining tube for carrying out sewer pipe renovation work” – i.e., a UV CIPP liner. EX1006, Cover and Abstract. Brandenburger was filed on May 5, 2000, and was issued on January 20, 2004. EX1006, Cover. Brandenburger therefore qualifies as pre-AIA prior art under 35 U.S.C. § 102(b).

Brandenburger discloses an inner tubular film, an outer tubular film and a curable resin between the inner tubular film and the outer tubular film. EX1006, Abstract, Figures 1-2. Brandenburger further discloses that a “UV-curing [resin] is preferably employed.” EX1006, 1:40-42. Brandenburger further discloses that the outer tubular film has an “opaqueness” to block UV light from prematurely entering the UV curable resin. EX1006, 2:30-33, 5:22-26.

Below is Figure 2 of Brandenburger showing a partial cross-sectional view of the UV CIPP liner:



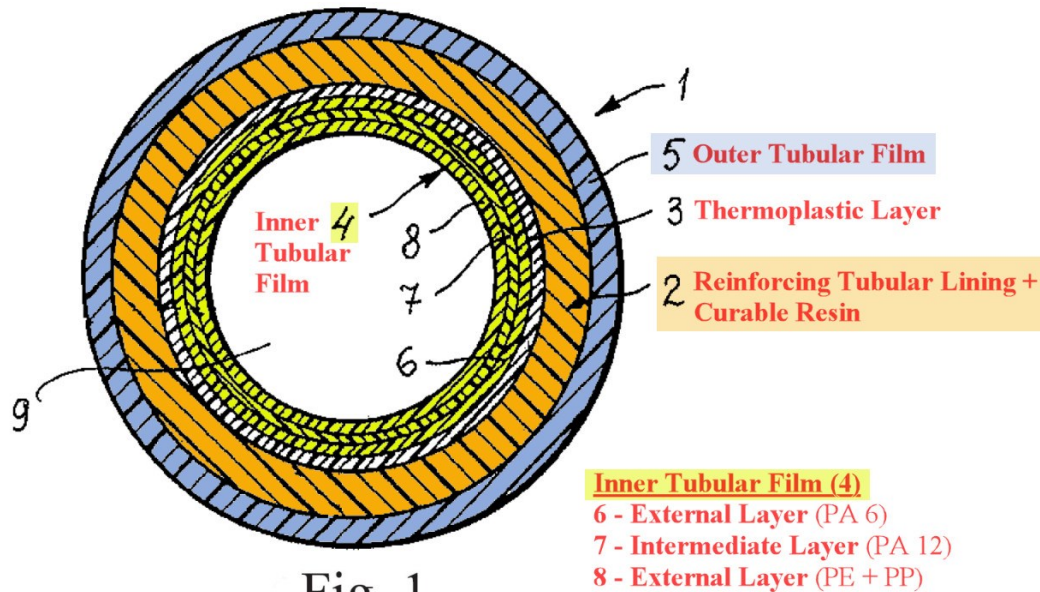
Below is Figure 1 of Brandenburger showing the manufacturing of the tubular liner using a stationary winding mandrel (2):



C. Khramenkov (EX1007).

Russian Patent No. RU 2182999 C1 (“**Khramenkov**”) entitled “Method for Applying Hose Lining Onto Inner Surface of Pipeline and Applied Coating” is for “applying of hose lining onto inner surface of pipelines” – i.e., a CIPP liner. EX1007, Cover and Abstract. Khramenkov was filed on July 3, 2001, and was

published on May 27, 2002. EX1007, Cover. Khramenkov therefore qualifies as pre-AIA prior art under 35 U.S.C. § 102(b).



Khramenkov discloses a three-layer inner tubular film for a CIPP liner with a major layer sequence that is the same five-layer sequence claimed in independent claim 1 of the '269 Patent except for the adhesion promoter layers. Khramenkov discloses melting the layers together to bond together but a POSITA would easily understand that adhesion promoter layers may be used between the major three layers to adhere together instead of melting and would be motivated to do so because it would be cheaper to manufacture with a one-step manufacturing process and there would be other benefits. Khramenkov further discloses an outer tubular film and a curable resin between the inner tubular film and the outer tubular film. While Khramenkov does not expressly disclose using a UV curable resin, a POSITA would

have been motivated to replace the heat curable resin with a UV curable resin (e.g., Jones) to increase the efficiency and remove the secondary step of melting the layers together which would reduce manufacturing time and cost. EX1003, ¶220.

D. Jones (EX1009).

European Publication No. EP 0342897 A2 (“**Jones**”) entitled “Polymeric Films” for use with a UV curable resin to recondition sewer pipes – i.e., a UV CIPP liner. EX1009, Cover and Abstract. Jones was filed on May 15, 1989, and was published on November 23, 1989. EX1009, Cover. Jones therefore qualifies as pre-AIA prior art under 35 U.S.C. § 102(b).

Jones discloses a multilayer inner tubular film with a layer of support material (“mat of acrylic fibers”) where the layer of support material is impregnated with a UV curable resin. EX1009, 3:15-50.

VIII. Claim Construction.

In an IPR, claim terms in a patent are interpreted according to the same claim construction standard that is used to construe the claim in a civil action under 35 U.S.C. § 282(b), including construing the claim in accordance with the ordinary and customary meaning as understood by a POSITA and the prosecution history under *Phillips v. AWH Corporation*, 415 F.3d 1303 (Fed. Cir. 2005) and its progeny. 37 C.F.R. § 42.100(b).

No formal claim constructions are necessary because “claim terms need only be construed to the extent necessary to resolve the controversy.” *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). Petitioner reserves the right to respond to any constructions offered by Patent Owner or adopted by the Board. Petitioner is not conceding that each challenged claim satisfies all statutory requirements, nor is Petitioner waiving any arguments concerning claim scope or grounds that can only be raised in district court.

IX. Identification of Challenge and Relief Requested.

Petitioner requests cancellation of Claims 1-10 of the '269 Patent based on the following grounds:

Ground	Claims	Prior Art	Statutory Basis (Pre-AIA 35 U.S.C.)
1	1-10	Glover + Brandenburger	§ 103
2	1-10	Khramenkov + Jones	§ 103

Petitioner also submits the Declaration of Dr. Steven B. MacLean (EX1003), a qualified expert, in support of the above grounds.

Grounds 1 and 2 are not cumulative of the art of record because they address features not identified or used by the Examiner in the references considered during prosecution. *See infra* Section XII(B). Grounds 1 and 2 are not cumulative because they each use different subject matter to disclose the claimed subject matter in

Challenged Claims 1-10. Each count should be independently considered as each has its own strengths, and each demonstrates the invalidity of the claims.

X. The Challenged Claims Are Unpatentable.

A. Ground 1: Claims 1-10 Are Obvious Over Glover in View of Brandenburger.

Challenged Claims 1-10 are obvious over Glover in view of Brandenburger. Glover has all of the elements of Challenged Claims 1-10 except for the well-known outer film for UV CIPP liners which Brandenburger provides. *See infra* Sections X(A)(1)-(10). For example, Glover teaches the same exact five-layer sequence for the inner tubular film as recited in independent claim 1. *See infra* Sections X(A)(1)(c)-(g). Glover also discloses material that has a VICAT softening point of at least 100 degrees Celsius. *See infra* Section X(A)(1)(i). Glover also discloses the resin impregnated support material. *See infra* Section X(A)(1)(l).

While Glover does not expressly disclose an outer tube, outer tubes for UV CIPP liners were well-known at the time of the invention as shown by the prior art including Brandenburger. EX1006. When using a UV curable resin, a POSITA would have easily recognized that an opaque outer tube would be desirable to protect the UV curable resin from premature hardening during storage and transportation to job sites. *See infra* Section X(A)(1)(k). A POSITA would have therefore been motivated to combine the outer tube of Brandenburger that has an “opaqueness” to the CIPP liner disclosed in Glover.

In view of the above and the following, Challenged Claims 1-10 are obvious over Glover in view of Brandenburger. *See infra* Sections X(A)(1)-(10); EX1003, ¶¶ 114-194.

1. Claim 1.

- a) **[1pre] “An insertion tube suitable for the renovation of subterranean pipes, optionally subterranean sewer pipes, comprising”**

Glover discloses a tubular multilayer carrier film for supporting a resin composition against the interior of “sewer pipes” during curing of the resin. EX1005, 1:1-6.⁶ Brandenburger discloses “a liner for producing a lining tube for carrying out sewer pipe renovation work.” EX1006, Abstract.

To the extent that the preamble of independent claim 1 is a limitation, Glover and Brandenburger both disclose “An insertion tube suitable for the renovation of subterranean pipes, optionally subterranean sewer pipes.” EX1003, ¶¶116-117.

- b) **[1A] “an optionally nonconditioned multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation, comprising a layer sequence made of”**

Glover discloses a “multilayer carrier film.” EX1005, Abstract, 1:1-2, 2:15-23, 3:20-34, 56-57. Glover also discloses a multilayer carrier film is “impermeable”

⁶ Citations to Glover reference the column numbers and line numbers unless a page number is indicated.

to liquids such as the fluid resin composition. EX1005, 2:18-23, 3:3-4, 37-39; EX1003, ¶¶118-119. Glover further discloses a multilayer film that has a layer sequence as claimed in independent claim 1. *See infra* Sections X(A)(1)(c)-(g). There is no required conditioning step in Glover so Glover also discloses “an optionally nonconditioned multilayer film.” EX1003, ¶¶118-119.

Glover also discloses that it is well-known in the art to use UV curable resins and to use a corresponding tubular film that “permit[s] the passage of the light to the resin to effect the curing.” EX1005, 1:40-50. Glover further discloses a multilayer film that “transmits light” when “used in circumstances where a light activatable curing catalyst is incorporated within the resin.” EX1005, 5:15-18; EX1003, ¶120. In addition, three of the four examples in Glover use an ultraviolet light activatable curing catalyst for the resin which require a film that is permeable to UV radiation. EX1005, 4:15-29, p. 5 (Table).

Glover therefore discloses “an optionally nonconditioned multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation, comprising a layer sequence made of” as recited by independent claim 1. EX1003, ¶¶118-121.

c) [1A-1] “(a) a layer (a) comprised of at least one thermoplastic olefin homo- or copolymer, as one of the external layers,”

Glover discloses a multilayer film with one of the external layers comprised of “a layer of a weldable synthetic plastic composition.” EX1005, Abstract, Claim 1, 2:21-23. Glover further discloses that the “weldable synthetic plastic composition” may be polyethylene or polypropylene which a POSITA would recognize as a thermoplastic olefin homo- or copolymer. EX1005, 2:35-44; EX1003, ¶¶122-124. The multilayer sequence taught by Glover comprises:

- **External Layer (a): weldable synthetic plastic composition**
- Internal Layer (b): bonding layer
- Internal Layer (c): polyamide
- Internal Layer (d): bonding layer
- External Layer (e): polyamide copolymer

Glover therefore discloses “(a) a layer (a) comprised of at least one thermoplastic olefin homo- or copolymer, as one of the external layers” as recited by independent claim 1. EX1003, ¶¶122-124.

d) [1A-2] “(b) an adhesive-promoter layer (b),”

Glover discloses “a bonding layer of a bonding agent” to enhance the adhesion of layer (a) with layer (c). EX1005, 3:23-28; EX1003, ¶¶125-127. The multilayer sequence taught by Glover comprises:

- External Layer (a): weldable synthetic plastic composition
- **Internal Layer (b): bonding layer**
- Internal Layer (c): polyamide
- Internal Layer (d): bonding layer
- External Layer (e): polyamide copolymer

EX1003, ¶126.

Glover therefore discloses “(b) an adhesive-promoter layer (b)” as recited by independent claim 1. EX1003, ¶¶125-127.

e) [1A-3] “(c) an internally situated layer (c) comprised of at least one homo- and/or copolyamide,”

Glover discloses an internal central “nylon layer (preferably nylon 6)” between the external layer (a) of the “weldable synthetic plastic composition” and the external layer (e) of the “polyamide copolymer.” EX1005, Abstract, Claim 1, 2:15-20, 45-46, 3:3-8, 23-27, 50-55; EX1003, ¶¶128-130. As discussed previously, the multilayer sequence taught by Glover comprises:

- External Layer (a): weldable synthetic plastic composition
- Internal Layer (b): bonding layer
- **Internal Layer (c): polyamide**
- Internal Layer (d): bonding layer
- External Layer (e): polyamide copolymer

EX1003, ¶129.

Glover therefore discloses “(c) an internally situated layer (c) comprised of at least one homo- and/or copolyamide” as recited by independent claim 1. EX1003, ¶¶128-130.

f) [1A-4] “(d) an adhesive-promoter layer (d), and”

Glover discloses “a bonding layer of a bonding agent” to enhance the adhesion of layer (c) with layer (d). EX1005, 3:23-28; EX1003, ¶¶131-133. As discussed previously, the multilayer sequence taught by Glover comprises:

- External layer (a): weldable synthetic plastic composition
- Internal layer (b): bonding layer
- Internal layer (c): polyamide
- **Internal layer (d): bonding layer**
- External layer (e): polyamide copolymer

EX1003, ¶132.

Glover therefore discloses “(d) an adhesive-promoter layer (d)” as recited by independent claim 1. EX1003, ¶¶131-133.

g) [1A-5] “(e) a layer (e) comprised of at least one homo- and/or copolyamide, as one of the external layers,”

Glover discloses a multilayer film with an external layer comprised of “a polyamide copolymer” such as “49% nylon 6 and 51% nylon 12 by weight.”

EX1005, Abstract, Claim 1, 3:11-19, 33-43, 50-55; EX1003, ¶¶134-136. As discussed previously, the multilayer sequence taught by Glover comprises:

- External Layer (a): weldable synthetic plastic composition
- Internal Layer (b): bonding layer
- Internal Layer (c): polyamide
- Internal Layer (d): bonding layer
- **External Layer (e): polyamide copolymer**

EX1003, ¶135.

Glover therefore discloses “(e) a layer (e) comprised of at least one homo- and/or copolyamide, as one of the external layers” as recited by independent claim 1. EX1003, ¶¶134-136.

h) [1A-6] “in the form of a tubular film,”

Glover discloses a multilayer “carrier film in the form of elongated bags” – i.e., tubular film. EX1005, 2:11-12, 30, 5:5-8; EX1003, ¶¶137-138. Glover therefore discloses the multilayer film “in the form of a tubular film” as recited by independent claim 1. EX1003, ¶¶137-138.

i) [1A-7] “wherein the VICAT softening point of the thermoplastic olefin homo- or copolymer of the layer (a) is at least 100° C.,”

The '269 Patent and corresponding prosecution history is silent as to *why* the VICAT softening point of the thermoplastic olefin homo- or copolymer of layer (a)

would be desired to be “at least 100° C.” EX1001, EX1002. The applicant for the ’269 Patent appears to have simply chosen an arbitrary VICAT softening point of at least 100° C.” In fact, Buergofol – the current owner of the ’269 Patent – argued extensively in Buergofol’s EPO Opposition filed in 2015 against European Publication No. EP 2582520 B1 that the VICAT softening temperature of at least 100° C. is not related to any desired material properties of the inner tubular film. EX1013, pp. 6-11, 14, 18, 24-26.

Regardless, Glover discloses that layer (a) of the “weldable synthetic plastic composition” may be polyethylene or polypropylene. EX1005, 2:35-44; Polypropylene in particular typically has a VICAT softening point significantly over 100° C in the range of 145-150 °C. EX1003, ¶139. Furthermore, the VICAT softening point for homopolymer polyethylene has a softening point in the range of 85 to 130 °C, depending on the density. *Id.* Using a layer (a) thermoplastic olefin homo- or copolymer material that has a VICAT of at least 100° C would be considered routine and well-known to a POSITA. EX1003, ¶¶139-141.

Glover discloses that curable resin may be cured by either heat (e.g., hot air or steam) or ultraviolet light. EX1005, 2:45-50. To the extent Glover is argued to not disclose limitation [1A-7] of claim 1, it would have been obvious to a POSITA to use a thermoplastic olefin homo- or copolymer for layer (a) that had a VICAT softening point of at least 100° C which were well-known in the art and would yield

predictable results of withstanding increased temperatures such as those incurred when using a heat-based curing process. EX1003, ¶140.

Glover therefore discloses “wherein the VICAT softening point of the thermoplastic olefin homo- or copolymer of the layer (a) is at least 100° C.” as recited by independent claim 1. EX1003, ¶¶139-141.

j) [1A-8] “as internally situated tube, and”

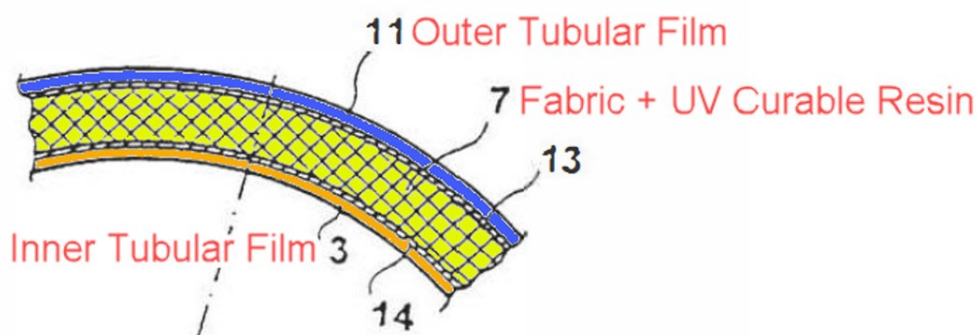
Glover discloses a CIPP liner that uses an eversion installation process where the multilayer film is initially on the outside of the CIPP liner during storage but is turned inside out using an eversion process so that the CIPP liner thereby placing the resin impregnated mat against the pipe wall with the multilayer carrier film “now on the inside” of the liner. EX1005, Abstract, 1:1-4, 12-19, 31-36. Furthermore, Glover discloses the eversion and ultraviolet light curing process in European Publication No. 0168053 which is the European counterpart to U.S. Patent No. 4,680,066 to Eric Wood, the original inventor of the CIPP liner. EX1005, 1:40-41; EX1039 (Wood). Glover therefore discloses where the multilayer film is an internally positioned tube which is required to “support a fluid synthetic resin composition against a solid surface during curing of the resin.” EX1005, 1:1-4. Brandenburger also discloses where the multilayer composite “inner tubular film 3” is positioned on the interior of the UV CIPP liner. EX1006, Figures 1-2, 4:11-13, 5:14-21.

Glover in view of Brandenburger therefore discloses the multilayer film “as internally situated tube” as recited in independent claim 1. EX1003, ¶¶142-143.

- k) [1B] **“an externally situated single- or multilayer tubular film which is impermeable to liquids, and which reflects and/or absorbs UV radiation and/or short-wave, visible light, as externally situated tube, and”**

Glover does not expressly disclose an outer tubular film. The use of outer tubular films for CIPP liners that is impervious to fluids surrounding the resin layer has been well-known to a POSITA since the early 1970’s as shown in U.S. Patent No. 4,009,063 to Wood. EX1011, 2:49-51; *See supra* Section IV(a).

Brandenburger discloses an inner tubular film (3) and an “outer tubular film [11] consisting of at least one plastic foil” that has an “impermeability to resin [7].” EX1006, 2:25-34; EX1003, ¶¶144-146. Below is Figure 2 of Brandenburger showing a partial cross-sectional view of the UV CIPP liner:



Brandenburger further discloses an outer tubular film (11) that has an “opaqueness” or a “function of opaqueness, reflection.” EX1006, 2:30-33, 5:25-28; EX1003, ¶144. Brandenburger further discloses a UV curable resin so the

“opaqueness” and “reflection” properties of the outer tubular film (11) would reflect and absorb UV radiation and short-wave, visible light to prevent premature curing of the UV curable resin. EX1003, ¶¶146, 148.

It would have been obvious to a POSITA to combine the opaque outer tubular film of Brandenburger with the inner tubular film of Glover when using a UV curable resin to protect the UV curable resin from premature hardening for periods of storage prior to installation within a sewer pipe. EX1003, ¶¶148. A POSITA would have found positioning the opaque outer tubular film of Brandenburger on the outside of the support material with a UV curable resin to be a standard design choice for UV CIPP liner which would have yielded predictable results of preventing premature curing of the resin during storage and transportation to a job site. EX1003, ¶¶144-150.

A POSITA would have found it obvious to modify Glover in view of Brandenburger to use the outer film of Brandenburger on the outside of the UV curable resin to allow for extend periods of storage time and to prevent premature hardening of the UV curable resin during storage and transportation. EX1003, ¶149. A POSITA would be motivated to use the outer film of Brandenburger so the UV CIPP liner would no longer be required to be stored in dark conditions to prevent premature curing of the UV curable resin. EX1003, ¶149. Another advantage and motivation to a POSITA with using the outer film of Brandenburger is that the UV

CIPP liner may be stored, transported and installed without having to turn the liner inside out through a complicated eversion process and instead could simply pull the liner through the pipe to be repaired.

Glover in view of Brandenburger therefore discloses “an externally situated single- or multilayer tubular film which is impermeable to liquids, and which reflects and/or absorbs UV radiation and/or short-wave, visible light, as externally situated tube” as recited in independent claim 1. EX1003, ¶¶144-150.

D) [1C] “a support material situated therebetween and saturated with a reactive synthetic resin.”

Glover discloses using a “heat activatable or a light activatable catalyst to bring about curing of the resin at the appropriate time.” EX1005, 2:46-50. Glover further discloses a “resin impregnated mat” (e.g., fibrous mat) that is next to the inner multilayer film. EX1005, 1:43-46, 2:9-18; EX1003, ¶151. When the opaque outer tubular of film of Brandenburger is combined with the inner tubular film of Glover to form a CIPP liner as taught and disclosed by Brandenburger, the resin impregnated mat of Glover is positioned between the inner and outer tubular films.

The combination of Glover and Brandenburger discloses “a support material situated therebetween and saturated with a reactive synthetic resin” as recited by independent claim 1. EX1003, ¶¶151-152.

For the above reasons in this Section X(A)(1), independent claim 1 therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶151-152.

2. Claim 2.

[2] “The insertion tube as claimed in claim 1, wherein the thickness of the layer (a) is at least 40% of the total thickness of the multilayer film that is impermeable to liquids and at least to some extent permeable to UV radiation.”

In one example, Glover discloses that layer (a) 150 microns, layer (c) is 30 microns and layer (d) is 30 microns. EX1005, 4:1-3; Glover further discloses that an adhesion promoter layer (“bonding layer”) may be used to enhance the bonding of layers (a), (c) and (d), where the adhesion promoter may be “polyethylene graft maleic anhydride copolymer.” EX1005, 3: 20-28;

Glover confirms that adhesion promoter layers are relatively very thin by disclosing in Example 4 in the table on page 5 the use of a bonding layer having a thickness of 10 microns. EX1005, p. 5 (Table – See Column Titled “Graft Mod. PE” and Example 4); EX1003. When using bonding layers of 10 microns between the layers (a), (c) and (d) of Glover and using Example 4 in the table of Glover, layer (a) of Glover has a total thickness of 70% ($190 / 150 + 10 + 30 + 10 + 30$) which is greater than 40%. EX1003, ¶¶153-159.

Glover therefore discloses “wherein the thickness of the layer (a) is at least 40% of the total thickness of the multilayer film” as recited by dependent claim 2.

Dependent claim 2 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶153-159.

3. Claim 3.

[3] “The insertion tube as claimed in claim 1, wherein the layer (a) of the multilayer film that is impermeable to liquids and at least to some extent permeable to UV radiation is comprised of at least one ethylene homo- or copolymer and/or at least one propylene homo- or copolymer.”

Glover discloses that layer (a) is comprised of a weldable composition layer such as “polyethylene,” an ethylene homopolymer, or “an ethylene/vinyl acetate copolymer, an ethylene/acrylic acid copolymer, an ethylene/ethyl acrylate copolymer” which are all ethylene copolymers. EX1005, 2:35-40; EX1003, ¶162. Glover further discloses that layer (a) is comprised of a weldable composition layer such as “polypropylene” which is a propylene homopolymer. Glover, EX1005, p. 2 at col. 2, ll. 35-36; EX1003, ¶162. Because dependent claim 3 is stated in the disjunctive “and/or,” Glover discloses “wherein the layer (a) of the multilayer film ... is comprised of at least one ethylene homo- or copolymer and/or at least one propylene homo- or copolymer” as recited in dependent claim 3.

Dependent claim 3 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶160-163.

4. Claim 4.

[4] “The insertion tube as claimed in claim 1, wherein the layers (c) and (e) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation have an identical layer structure, optionally an identical layer thickness, and/or identical polyamide components, and/or an identical composition, optionally an identical polyamide component.”

Dependent claim 4 uses the logical disjunction “and/or” to connect how layers (c) and (e) can have an “identical layer structure.” Glover discloses where layers (c) and (e) each have an identical layer thickness of 30 microns. EX1005, 4:1-3; EX1003, ¶166. Glover discloses where layers (c) and (e) have an “identical layer structure” because they both have an “identical layer thickness” of 30 microns. *Id.*

Glover therefore discloses “wherein the layers (c) and (e) of the multilayer film ... have an identical layer structure, optionally an identical layer thickness, and/or identical polyamide components, and/or an identical composition, optionally an identical polyamide component” as recited by dependent claim 4. EX1003, ¶¶164-168.

Dependent claim 4 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶164-168.

5. Claim 5.

[5] “The insertion tube as claimed in claim 1, wherein the layers (c) and (e) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation have a different layer structure, optionally a different layer thickness, and/or different polyamide components, and/or a different composition.”

Dependent claim 5 uses the logical disjunction “and/or” to connect how layers (c) and (e) can have a “different layer structure” (i.e., “a different layer thickness, and/or **different polyamide components**, and/or a **different composition**”). Glover discloses where layers (c) and (e) each have different polyamide components and different composition where layer (c) comprises nylon 6 and layer (e) comprises a “polyamide copolymer consisting of 49% nylon 6 and 51% nylon 12 by weight.” EX1005, 3:50-55; EX1003, ¶¶169-173. Glover discloses where layers (c) and (e) have a “different polyamide components” and/or “different composition.” *Id.*

Glover therefore discloses “wherein the layers (c) and (e) of the multilayer film ... have a different layer structure, optionally a different layer thickness, and/or different polyamide components, and/or a different composition” as recited by dependent claim 5. EX1003, ¶172.

Dependent claim 5 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶169-173.

6. Claim 6.

[6] “The insertion tube as claimed in claim 1, wherein the adhesive-promoter layers (b) and (d) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation comprise respectively mutually independently at least one modified thermoplastic olefin homo- or copolymer, optionally respectively mutually independently at least one modified thermoplastic ethylene homo- or copolymer and/or at least one modified propylene homo- or copolymer.”

Glover discloses where the adhesive-promoter layers (b) and (d) of the multilayer film are comprised of “a bonding agent such as a polyethylene graft maleic anhydride copolymer.” EX1005, 3:23-28; EX1003, ¶¶174-175. Because dependent claim 6 uses the disjunctive “and/or,” Glover discloses “wherein the adhesive-promoter layers (b) and (d) of the multilayer film ... comprise respectively mutually independently at least one modified thermoplastic olefin homo- or copolymer, optionally respectively mutually independently at least one modified thermoplastic ethylene homo- or copolymer and/or at least one modified propylene homo- or copolymer” as recited by dependent claim 6.

Dependent claim 6 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶174-175.

7. Claim 7.

[7] “The insertion tube as claimed in claim 1, wherein the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation consists of the layers (a)-(e).”

Dependent claim 7 depends from independent claim 1 which requires a “layer sequence” of layers (a), (b), (c), (d) and (e) as discussed previously. *See supra* Sections X(A)(1)(c)-(e). Because a “layer sequence” requires a specific sequence of five-layers, the layer sequence therefore “consists of the layers (a)-(e).” Dependent claim 7 therefore adds no additional limitations.

To the extent that dependent claim 7 is deemed to add a limitation to the scope of independent claim 1, Glover discloses a multilayer film that “consists of the layers (a)-(e)”. *See supra* Sections X(A)(1)(c)-(e); EX1003, ¶¶176-178. Glover therefore discloses “wherein the multilayer film ... consists of the layers (a)-(e)” as recited in dependent claim 7. EX1003, ¶¶176-178.

Dependent claim 7 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶176-178.

8. Claim 8.

[8] “The insertion tube as claimed in claim 1, wherein the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation is permeable to an extent of at least 80% to UV radiation.”

Glover also discloses that it is well-known in the art that when using UV curable resins “it is necessary for the carrier film and the mat to permit the passage of the light to the resin to effect the curing.” EX1005, 1:40-50. Glover further discloses a multilayer film that “transmits light” when “used in circumstances where a light activatable curing catalyst is incorporated within the resin.” EX1005, 5:15-18. In addition, three of the four examples in Glover use an ultraviolet light activatable curing catalyst for the resin which require a film that is permeable to UV radiation. EX1005, 4:15-29, p. 5 (Table).

A POSITA would understand that when using a UV curable resin that it is required that the inner tubular film has a high permeability to UV radiation to ensure that the UV curable resin hardened in a lower period of time and would have been motivated to use a multilayer film that is permeable to UV radiation greater than 80%. EX1003, ¶179. Glover discloses a multilayer film that “transmits light” when using a UV curable resin which requires that the multilayer film of Glover would inherently have a permeability to UV radiation greater than 80%. EX1005, 5:15-18; EX1003, ¶179.

Glover therefore discloses “wherein the multilayer film ... is permeable to an extent of at least 80% to UV radiation” as recited by dependent claim 8. EX1003, ¶¶179-180.

To the extent that Glover is deemed not to expressly disclose the limitations of dependent claim 8, a POSITA would have found it obvious to use a multilayer film with the layer sequence (a)-(e) that is permeable to UV radiation at least 80% and would have been motivated to use a multilayer film with higher than 80% permeability to UV radiation (preferably as close to 100% permeability to UV radiation as possible) to ensure that the UV curable resin hardened completely and in a reduced period of time. EX1003, ¶179. A POSITA would have also understood that the inner tubular films used in UV CIPP liners, such as the UV CIPP liner disclosed in U.S. Patent No. 4,680,066 referenced by Glover, would have required a high level of UV radiation transmittance to cure efficiently. EX1003, ¶179; EX1039 (Wood).

Dependent claim 8 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶179-180.

9. Claim 9.

[9] “The insertion tube as claimed in claim 1, wherein the surface layer (a) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation is directly adjacent to the support material.”

Glover discloses that layer (e) of the nylon copolymer layer is directly adjacent to the support material. EX1005, 3:11-19. It would have been obvious to a POSITA to try flipping the multilayer film taught by Glover to have the external layer (a) of the at least one thermoplastic olefin adjacent to the support material which a POSITA would have had a reasonable expectation of success that would yield predictable results. EX1003, ¶¶181-190.

Dependent claim 9 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶181-190.

10. Claim 10.

[10] “A pipe-renovation system suitable for the renovation of subterranean pipes, comprising an insertion tube as claimed in claim 1, provided for introduction into the pipe requiring renovation, and a source that emits UV radiation and/or short-wave, visible light, and that is optionally moveable.”

Glover discloses a pipe-renovation system suitable for renovation of subterranean pipes and the use of a “light activatable catalyst” that is activated by “exposing it to an appropriate light, for example ultra violet light.” EX1005, 1:40-50; EX1003, ¶193. Glover further discloses that the UV curable resin was

“subjected to the action of ultra violet light until the resin had cured to form a hard mass.” EX1005, 5:26-28. Glover therefore discloses the use of a source that emits UV radiation and/or short-wave, visible light. EX1005, 1:40-50, 5:26-28; EX1003, ¶193. While not required by dependent claim 10, a POSITA would also understand that the UV radiation and/or short-wave, visible light source would preferably be movable to ensure curing of the UV curable resin along the entire length of the sewer pipe which is well-known in the art of CIPP liners by using UV light trains and the like. EX1003, ¶193.

Glover therefore discloses the limitations [10] as recited by dependent claim 10 and dependent claim 10 is therefore obvious over Glover in view of Brandenburger. EX1003, ¶¶191-194.

B. Ground 2: Claims 1-10 Are Obvious Over Khramenkov in View of Jones.

Challenged Claims 1-10 are obvious over Khramenkov in view of Jones. Khramenkov has all of the elements of Challenged Claims 1-10 except for the well-known adhesive promoter layers between the major layers which Jones provides. *See infra* Sections X(B)(1)-(10). For example, Khramenkov teaches the same exact three major layer sequence for the inner tubular film as recited in independent claim 1 except for the well-known adhesion promoters between the major layers (Khramenkov discloses melting the major layers together). *See infra* Sections X(B)(1)(c)-(g). Khramenkov also discloses material for layer (a) that has a VICAT

softening point of at least 100 degrees Celsius. *See infra* Section X(B)(1)(i). Khramenkov also discloses the resin impregnated support material. *See infra* Section X(B)(1)(k).

While Khramenkov does not expressly disclose the use of adhesive promoter layers, using adhesive promoter layers to bond different major layers of film together were well-known at the time of the invention as shown by the prior art including Jones. EX1009. A POSITA would have easily recognized that using adhesive promoter layers between the three major layers of Khramenkov instead of melting would be desirable to ensure proper bonding of the layers and to avoid the extra manufacturing step of heating the layers to melt them together when they could be easily co-extruded together. *See infra* Section X(B)(1)(j). A POSITA would have therefore been motivated to combine the adhesive promoter layers of Jones between each of the three major layers disclosed in Khramenkov.

In view of the above and the following, Challenged Claims 1-10 are obvious over Khramenkov in view of Jones. *See infra* Sections X(B)(1)-(10); EX1003, ¶¶ 195-295.

1. Claim 1.

- a) [1pre] “An insertion tube suitable for the renovation of subterranean pipes, optionally subterranean sewer pipes, comprising”**

Khramenkov discloses “applying tubular lining onto the inner surface of a pipeline and a lining of the inner surface of a pipeline” – i.e., a CIPP liner for pipes including subterranean sewer pipes. EX1007, p. 4 at 1:3-6; Abstract.⁷ A POSITA would understand that the CIPP liner of Khramenkov could be used in various types of pipes including sewer pipes. EX1003, ¶¶197-198.

To the extent that the preamble of independent claim 1 is a limitation, Khramenkov discloses “An insertion tube suitable for the renovation of subterranean pipes, optionally subterranean sewer pipes.” EX1003, ¶¶197-198

- b) [1A] “an optionally nonconditioned multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation, comprising a layer sequence made of”**

Khramenkov discloses an inner tubular film that has multiple layers with three main layers of a first external layer of polyamide 6, an intermediate layer of polyamide 12 and a second external layer of a thermoplastic polymeric material

⁷ Citations to Khramenkov reference the page numbers added to EX1007 with the column number and lines identified in the following format: EX1007, p. [PAGE] at [COL.]:[LINES].

(polyethylene and polypropylene). EX1007, Abstract, *see infra* Sections X(B)(1)(c)-(g). Khramenkov further discloses a multilayer inner tubular film that has a layer sequence as claimed in independent claim 1. *See infra* Sections X(B)(1)(c)-(g). There is no required conditioning step in Khramenkov so Khramenkov also discloses “an optionally nonconditioned multilayer film.” EX1003, ¶199.

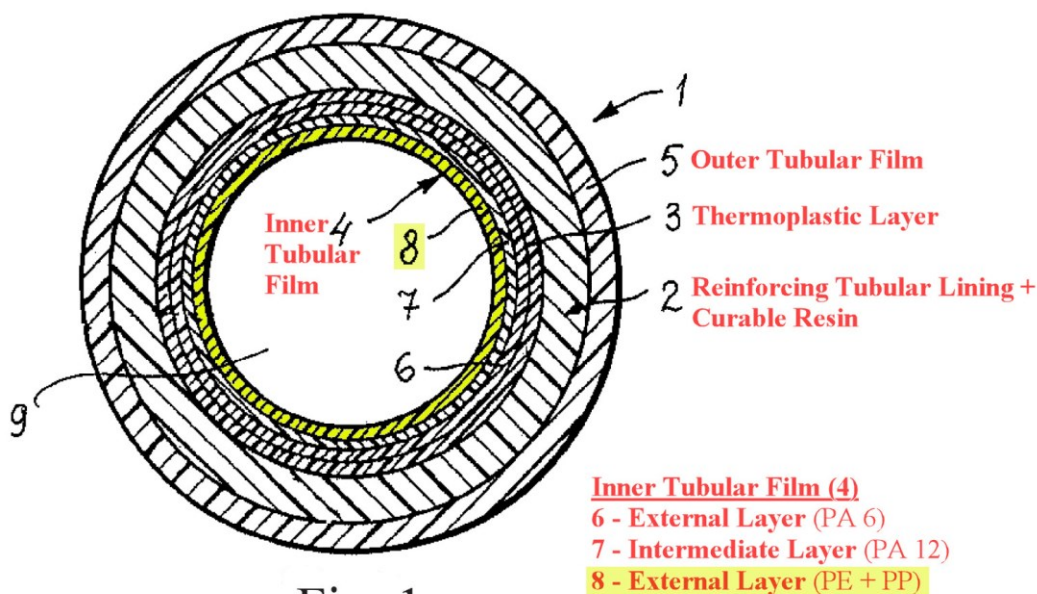
Khramenkov discloses that the outer tubular film in contact with the pipe “prevents external intrusion of groundwater into uncured tubular lining” to protect the uncured bonding agent (i.e., resin) from absorbing water which “prevents bonding agent from curing.” EX1007, p. 6 at 1:32-42. A POSITA would have been motivated to use an inner tubular film that also protects the uncured resin from absorbing water and other liquids similar to the outer tubular film. The inner tubular film of Khramenkov is subjected to “[p]ressurized air or water” during heat treating to cure the bonding agent (i.e., resin), so the inner tubular film is inherently impermeable to liquids to prevent entry of the pressurized air or water into the resin. EX1007, p. 6 at 2:27-44. Furthermore, a POSITA would understand that the multilayer inner tubular film of Khramenkov is impermeable to liquids and would be motivated to ensure that the inner tubular film was impermeable to liquids to prevent the absorption of water into the uncured resin. EX1003, ¶201.

Khramenkov does not expressly disclose that the inner tubular film is permeable to UV radiation. However, a POSITA would understand that the multilayer inner tubular film disclosed in Khramenkov would be inherently permeable to UV radiation because (1) all plastic film allows the passage of at least some UV radiation and (2) Khramenkov does not disclose adding any UV radiation inhibitors to prevent the passage of UV radiation. EX1007; EX1003, ¶204. Furthermore, if a UV curable resin were used such as disclosed in Jones, a POSITA would have been motivated to ensure that the multilayer inner tubular film of Khramenkov did not include UV inhibitors and would further be motivated to have the maximum passage of UV radiation through the multilayer inner tubular film to ensure that the UV curable resin cures in a timely manner. EX1003, ¶212.

Khramenkov therefore discloses “an optionally nonconditioned multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation, comprising a layer sequence made of” as recited by independent claim 1. EX1003, ¶¶199-204. To the extent that Khramenkov is considered not to disclose limitation [1A] of independent claim 1, it would have been obvious to a POSITA to modify or ensure that the multilayer inner tubular film of Khramenkov allowed the maximum passage of UV radiation (preferably close to 100% passage of UV radiation). EX1003, ¶¶205-214.

- c) [1A-1] “(a) a layer (a) comprised of at least one thermoplastic olefin homo- or copolymer, as one of the external layers,”

Khramenkov discloses an external “layer [8] containing as thermoplastic polymeric material mixture of polyethylene with polypropylene.” EX1007, Abstract.



Khramenkov further discloses that “Inner layer 8 of inner tubular film 4 comprises a mixture of polyethylene in the amount of 20-40 wt.% with polypropylene in the amount of 80-60 wt.%.” EX1007, p. 7 at 1:20-29. Khramenkov expressly recognizes the “mixture of polyethylene with polypropylene as a thermoplastic polymer material.” EX1007, p. 6 at 2:19-20. A POSITA would understand that polyethylene and polypropylene are thermoplastic polyolefins. EX1003, ¶¶216.

Khramenkov therefore discloses “(a) a layer (a) comprised of at least one thermoplastic olefin homo- or copolymer, as one of the external layers” as recited by independent claim 1. EX1003, ¶¶215-217.

d) [1A-2] “(b) an adhesive-promoter layer (b),”

Khramenkov discloses that the three major layers of the inner tubular film “may be interconnected over the entire surface of the layers by melting.” EX1007, p. 5 at 2:60-63. To the extent it is argued that the melted interchange layer between layers (a) and (c) of Khramenkov is not an adhesion-promoter layer (b), a POSITA would have found it routine and obvious to use an adhesion-promoter layer between layers 7 and 8 of Khramenkov. EX1003, ¶220.

Jones discloses a “bonding layer can be provided between the nylon polymer layer and the weldable synthetic plastics composition.” EX1009, p. 2 at ll. 42-49. Jones further discloses an example embodiment where a “tie layer” is used between the nylon and ionomer layers. EX1009, p. 3 at ll. 15-20. A POSITA would have found it obvious and would have been motivated to use an adhesion-promoter layer, such as the bonding/tie layer of Jones, between layers 7 and 8 of Khramenkov instead of melting the layers together to (1) ensure that the layers are fully bonded together, (2) avoid damaging the mechanical properties of the layers by using heat to melt the layers together, (3) avoid the extra unnecessary and costly manufacturing step of heating the layers to melt to together because the adhesion-promoter layer can be co-

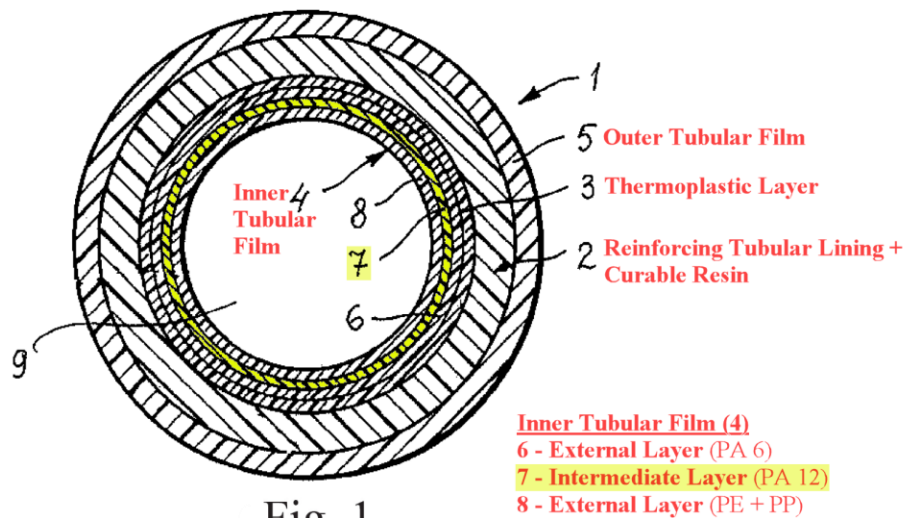
extruded together, and (4) efficiently co-extrude all five layers (a)-(e) together in an efficient single process. EX1003, ¶220.

Using an adhesion promoter layer to bond the layers 7 and 8 together instead of melting the layers together would have been simply combining known prior art elements according to known methods of film manufacture to yield predictable results. EX1003, ¶220. A POSITA would also know that the simple substitution of an adhesion promoter layer instead of melting the layers together would obtain predictable results with a reasonable expectation of success. EX1003, ¶220.

Khramenkov in view of Jones therefore discloses “(b) an adhesive-promoter layer (b)” as recited by independent claim 1. EX1003, ¶¶218-222.

e) [1A-3] “(c) an internally situated layer (c) comprised of at least one homo- and/or copolyamide,”

Khramenkov discloses an “intermediate layer [7] containing polyamide 12.” EX1007, Abstract, Figure 1, p. 5 at 1:35-40, p. 6 at 2:4-20, p. 8 at 1:25-30. Khramenkov discloses that the intermediate layer 7 is between the opposing external layers 6 and 8. *Id*; EX1003, ¶¶223-226.



Khramenkov therefore discloses “(c) an internally situated layer (c) comprised of at least one homo- and/or copolyamide” as recited by independent claim 1. EX1003, ¶¶223-226.

f) [1A-4] “(d) an adhesive-promoter layer (d), and”

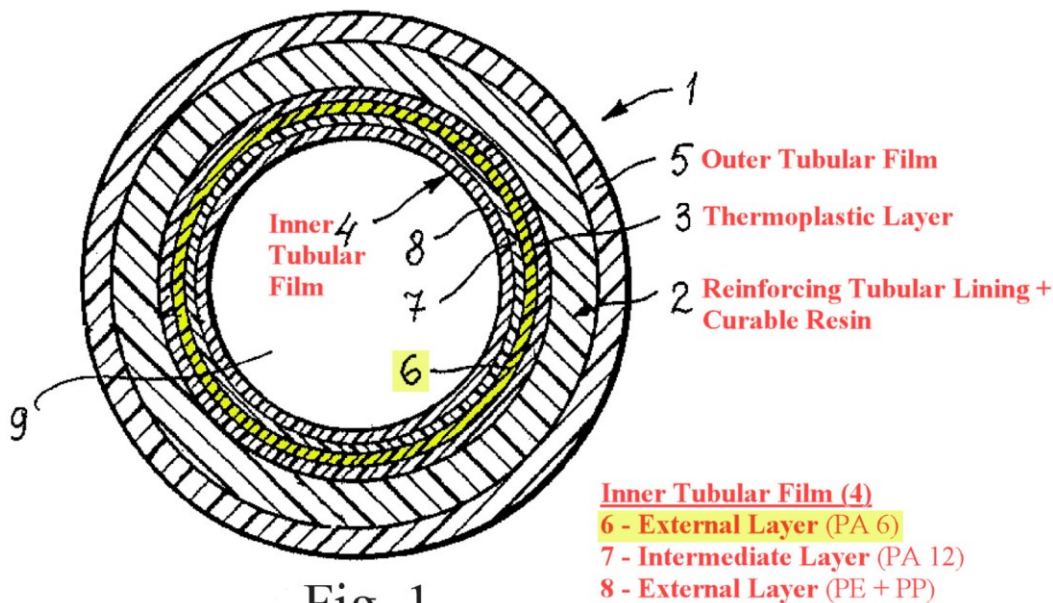
As discussed in prior Section X(B)(1)(d), a POSITA would have been motivated to use an adhesive promoter layer for layer (d) instead of melting layers (c) and (e) together. *See supra* Section X(B)(1)(d); EX1003, ¶¶227-231. Using an adhesive promoter layer instead of melting would save manufacturing time and cost to make the inner tubular film of Khramenkov because the film can be co-extruded in a one step manufacturing process. EX1003, ¶229.

Khramenkov in view of Jones therefore discloses “(b) an adhesive-promoter layer (b)” as recited by independent claim 1. EX1003, ¶¶227-231.

- g) [1A-5] “(e) a layer (e) comprised of at least one homo- and/or copolyamide, as one of the external layers,”

Khramenkov discloses a “first outer layer [6] containing polyamide 6.”

EX1007, Abstract, Figure 1, p. 5 at 1:31-35, p. 6 at 2:8-11, p. 8 at 1:22-26; EX1003, ¶¶232-234.



Khramenkov therefore discloses “(e) a layer (e) comprised of at least one homo- and/or copolyamide, as one of the external layers” as recited by independent claim 1. EX1003, ¶¶232-234.

- h) [1A-6] “in the form of a tubular film,”

Khramenkov discloses that the multilayer film is an “inner tubular film 4.”

EX1007, Figure 1, p. 5 at 1:9-30, 50-57, p. 5 at 2:9-17, 53-63, p. 6 at 1:58-63; EX1003, ¶¶235-236.

Khramenkov therefore discloses the multilayer film “in the form of a tubular film” as recited by independent claim 1. EX1003, ¶¶235-236.

- i) [1A-7] **“wherein the VICAT softening point of the thermoplastic olefin homo- or copolymer of the layer (a) is at least 100° C.;”**

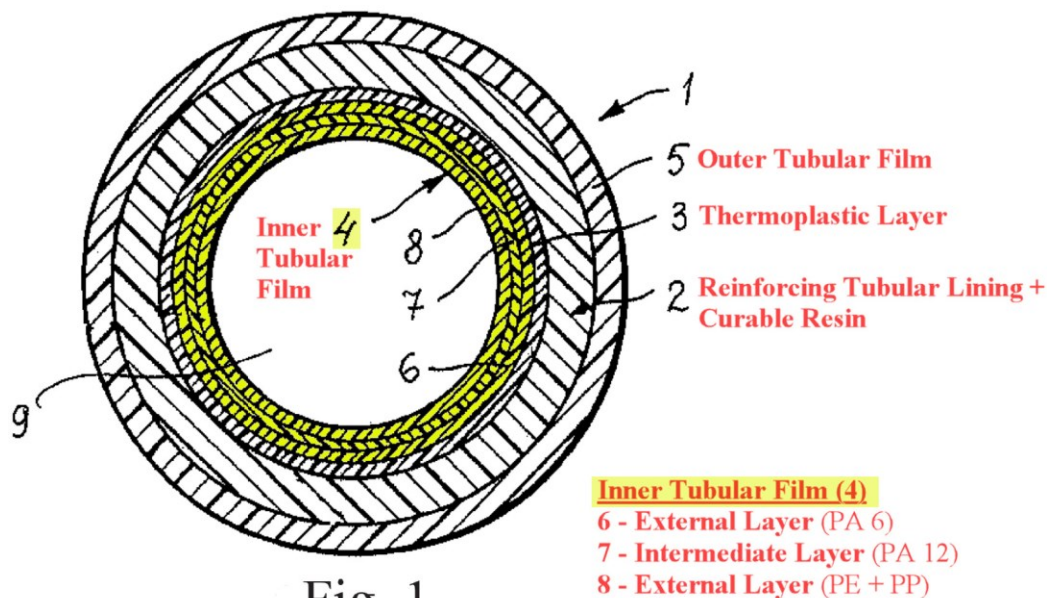
Khramenkov discloses an external “layer [8] containing as thermoplastic polymeric material mixture of polyethylene with polypropylene.” EX1007, Abstract. Khramenkov further discloses that “Inner layer 8 of inner tubular film 4 comprises a mixture of polyethylene in the amount of 20-40 wt.% with polypropylene in the amount of 80-60 wt.%.” EX1007, p. 7 at 1:20-29, *see also* p. 5 at 2:52-60. Polypropylene has a higher VICAT than polyethylene. EX1003, ¶239. A POSITA would understand that a mixture of 60% by weight of polypropylene (the lowest amount) and 40% by weight of polyethylene would have a VICAT of approximately 120° C which is greater than 100° C. EX1003, ¶240. If a higher portion of the mixture was polypropylene, the VICAT temperature would be higher than 120° C. EX1003, ¶239.

A POSITA would also be motivated to use a material, such as a modified polyethylene or polypropylene, for layer (a) that has a VICAT of at least 100° C if a heat curable resin were used instead of a UV curable resin to ensure layer (a) could withstand temperatures exceeding 100° C during curing of the heat curable resin. EX1003, ¶238.

Khramenkov therefore discloses “wherein the VICAT softening point of the thermoplastic olefin homo- or copolymer of the layer (a) is at least 100° C.” as recited by independent claim 1. EX1003, ¶¶237-242.

j) [1A-8] “as internally situated tube, and”

The inner tubular film (4) of Khramenkov is internally situated within the tubular lining (1) as shown in Figure 1 below:

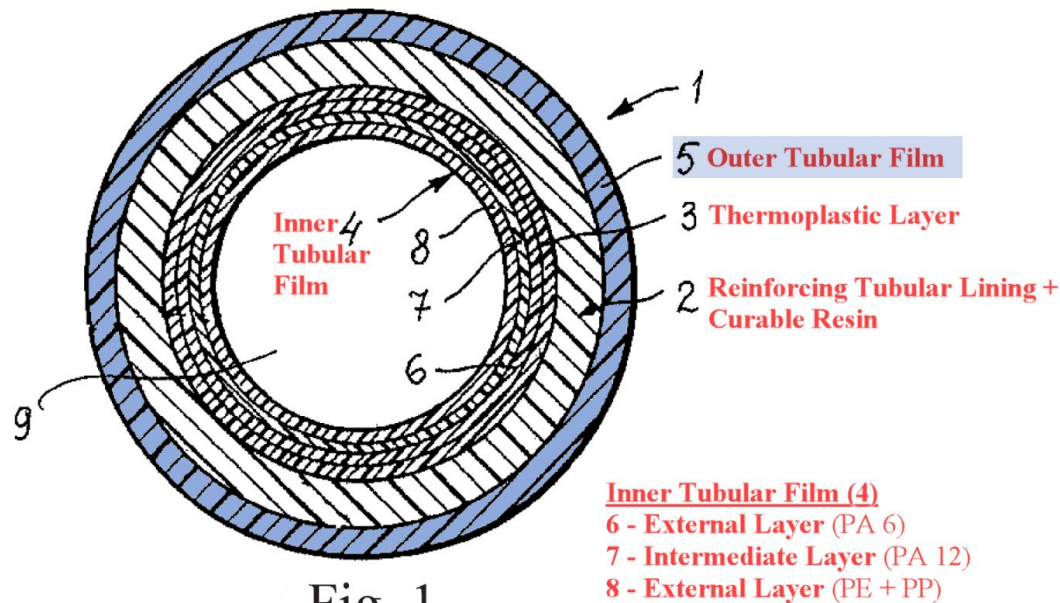


Khramenkov in view of Jones therefore discloses the multilayer film “as internally situated tube” as recited in independent claim 1. EX1003, ¶¶243-244.

k) [1B] “an externally situated single- or multilayer tubular film which is impermeable to liquids, and which reflects and/or absorbs UV radiation and/or short-wave, visible light, as externally situated tube, and”

Khramenkov discloses an outer tubular film 5 surrounding the resin impregnated material and that is in contact with the pipe which “prevents external

intrusion of groundwater into uncured tubular lining” to protect the uncured bonding agent (i.e., resin) from absorbing water which “prevents bonding agent from curing.” EX1007, Figure 1, p. 6 at 1:32-42. The outer tubular film 5 of Khramenkov is therefore impermeable to liquids.



Khramenkov does not expressly disclose that the outer tubular film 5 “reflects and/or absorbs UV radiation and/or short-wave, visible light.” However, a POSITA would know that all plastic film to some extent reflects and/or absorbs a portion of UV radiation and/or short-wave, visible light. EX1003, 250.

Khramenkov therefore discloses “an externally situated single- or multilayer tubular film which is impermeable to liquids, and which reflects and/or absorbs UV radiation and/or short-wave, visible light, as externally situated tube” as recited in independent claim 1.

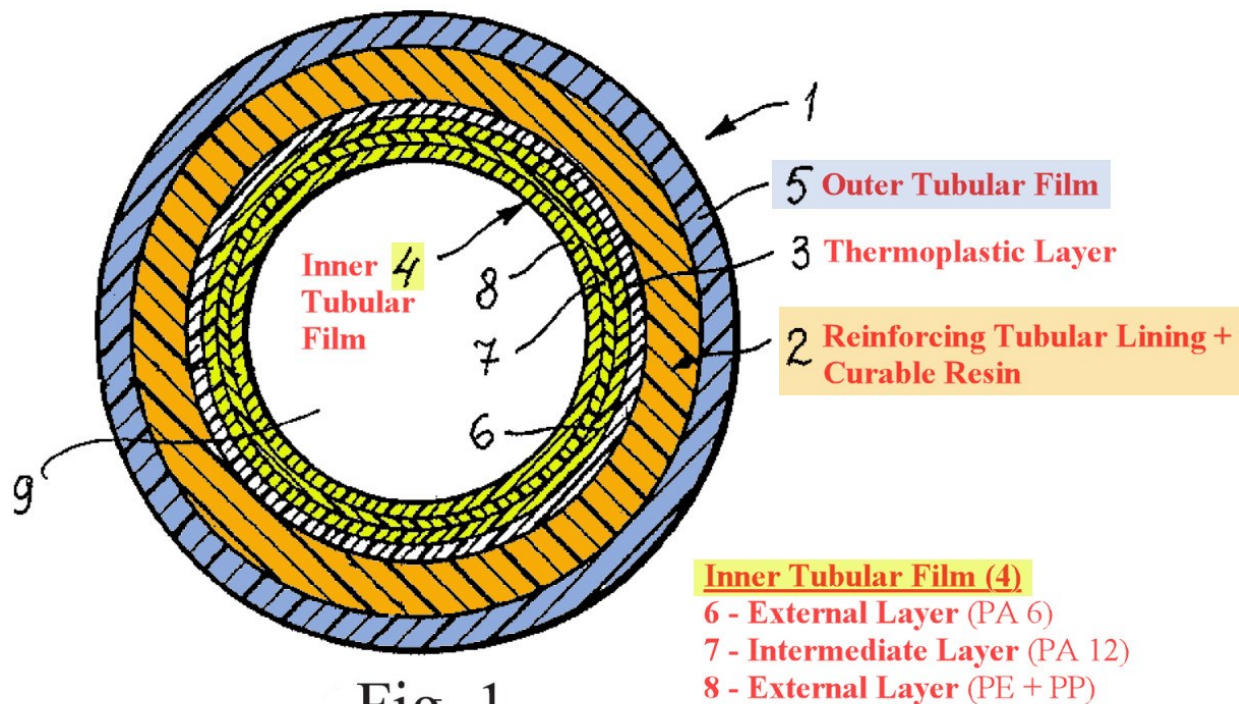
To the extent that Khramenkov does not disclose limitation [1B], a POSITA would have been motivated to use an outer tubular film that reflects and/or absorbs UV radiation and/or short-wave, visible light to prevent premature curing of a UV curable resin – such as the UV curable resin in Jones. EX1003, ¶¶250-251. A POSITA would have known that using UV curable resins are desirable because of their increased strength compared to heat curable resins. A POSITA would have known to use an outer tubular film that reflects and/or absorbs UV radiation and/or short-wave, visible light when using a UV curable resin which would have used known outer film technology in a manner that would be predictable to a POSITA and yield predictable results – i.e., reflect and/or absorb UV radiation and/or short-wave, visible light thereby preventing the premature hardening of the UV curable resin and allow for extended periods of time of storage. EX1003, ¶¶250-253.

Khramenkov in view of Jones therefore discloses “an externally situated single- or multilayer tubular film which is impermeable to liquids, and which reflects and/or absorbs UV radiation and/or short-wave, visible light, as externally situated tube” as recited by independent claim 1. EX1003, ¶¶250-253.

l) [1C] “a support material situated therebetween and saturated with a reactive synthetic resin.”

Khramenkov discloses a “reinforcing tubular lining 2 impregnated with a curing bonding agent is placed between outer 5 and inner 4 three-layer tubular

films.” EX1007, Figure 1, p. 6 at 1:64 - col. 2, l. 1, *see also* Abstract, claims 1 and 9, p. 7 at 1:49-51, 2:14-17.



Khramenkov in view of Jones therefore discloses “a support material situated therebetween and saturated with a reactive synthetic resin” as recited by independent claim 1. EX1003, ¶258.

For the reasons stated above in this Section X(B)(1), independent claim 1 is therefore obvious over Khramenkov in view of Jones. EX1003, ¶¶196-259.

2. Claim 2.

[2] “The insertion tube as claimed in claim 1, wherein the thickness of the layer (a) is at least 40% of the total thickness of the multilayer film that is impermeable to liquids and at least to some extent permeable to UV radiation.”

While Khramenkov does not expressly disclose the individual thicknesses of each of the layers, it would have been obvious for a POSITA to utilize a layer configuration for the multilayer film wherein the thickness of the layer (a) is at least 40% of the total thickness. EX1003, ¶261. A POSITA would have been motivated by the reduced cost of polyolefins compared to polyamides – having a multilayer film comprising at least 40% polyolefin would cost less than a multilayer film with higher amounts of polyamide. EX1003, ¶261. Further, a POSITA would have known that polyolefins are known for their flexibility and high tensile strength, and are generally less stiff than polyamides. EX1003, ¶261. Therefore, a POSITA would have been motivated to construct the inner tubular film of Khramenkov using a polyolefin layer (a) thickness of greater than 40% of the total film thickness to allow the film to be sufficiently elastic to withstand the inflation pressures used during installation as disclosed by Khramenkov. EX1007, p. 5 at 1:49-58; EX1003, ¶261.

Khramenkov in view of POSITA knowledge therefore discloses “wherein the thickness of the layer (a) is at least 40% of the total thickness of the multilayer film

that is impermeable to liquids and at least to some extent permeable to UV radiation” as recited by dependent claim 2. EX1003, ¶¶260-262.

Dependent claim 2 is therefore obvious over Khramenkov in view of Jones. EX1003, ¶¶260-262.

3. Claim 3.

[3] “The insertion tube as claimed in claim 1, wherein the layer (a) of the multilayer film that is impermeable to liquids and at least to some extent permeable to UV radiation is comprised of at least one ethylene homo- or copolymer and/or at least one propylene homo- or copolymer.”

Khramenkov discloses an external “layer [8] containing as thermoplastic polymeric material mixture of polyethylene with polypropylene.” EX1007, Abstract; EX1003, ¶264; *See supra* Section X(B)(1)(c). Polyethylene is an ethylene homopolymer and polypropylene is a propylene homopolymer. EX1003, ¶264. Khramenkov therefore discloses that layer (a) is “comprised of at least one ethylene homo- or copolymer” and also “at least one propylene homo- or copolymer.” EX1003, ¶264.

Because dependent claim 3 is stated in the disjunctive “and/or,” Khramenkov discloses “wherein the layer (a) of the multilayer film that is impermeable to liquids and at least to some extent permeable to UV radiation is comprised of at least one ethylene homo- or copolymer and/or at least one propylene homo- or copolymer” as recited in dependent claim 3.

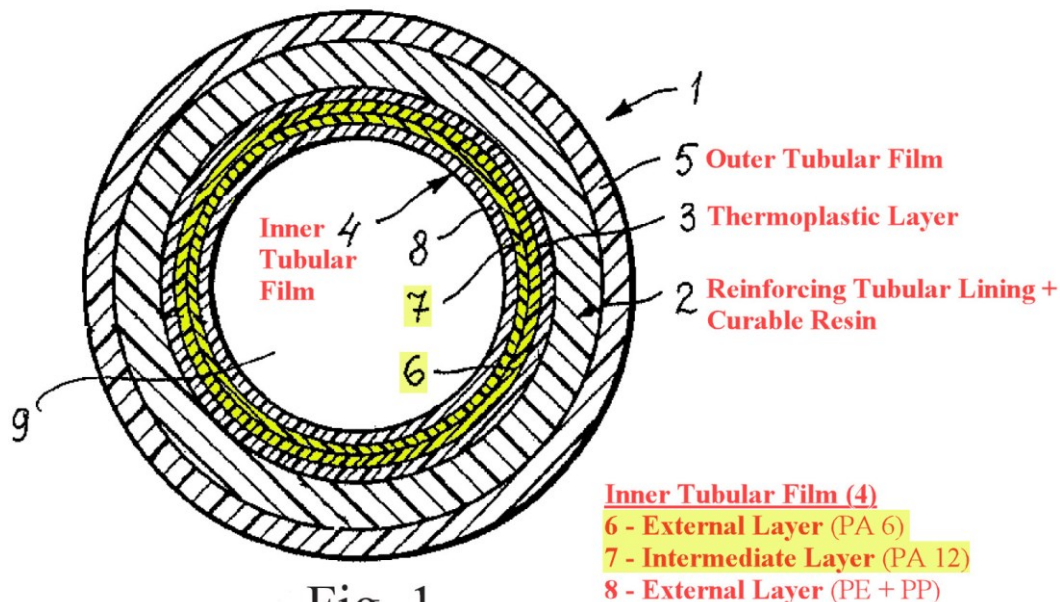
Dependent claim 3 is therefore obvious over Khramenkov in view of Jones.

EX1003, ¶¶263-265.

4. Claim 4.

[4] “The insertion tube as claimed in claim 1, wherein the layers (c) and (e) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation have an identical layer structure, optionally an identical layer thickness, and/or identical polyamide components, and/or an identical composition, optionally an identical polyamide component.”

Dependent claim 4 uses the logical disjunctions “and/or” to connect how layers (c) and (e) can have an “identical layer structure.” As shown in Figure 1 of Khramenkov, layers 7 and 6 (layers c and e) have an identical layer thickness:



EX1007, Figure 1; EX1003, ¶269. Khramenkov therefore discloses where layers (c) and (e) have an “identical layer structure” because they both have an “identical layer thickness” of 30 microns.

Furthermore, it would have been obvious for a POSITA to try to make layers (c) and (e) of Khramenkov in view of Jones so that layers (c) and (e) would have identical polyamide components which would simplify the manufacturing process by using the same components and would yield predictable results. EX1003, ¶270. Also, it would have been obvious for a POSITA to try to make layers (c) and (e) of Khramenkov in view of Jones so that layers (c) and (e) would have identical composition which would also simplify the manufacturing process by using the same components and would yield predictable results.

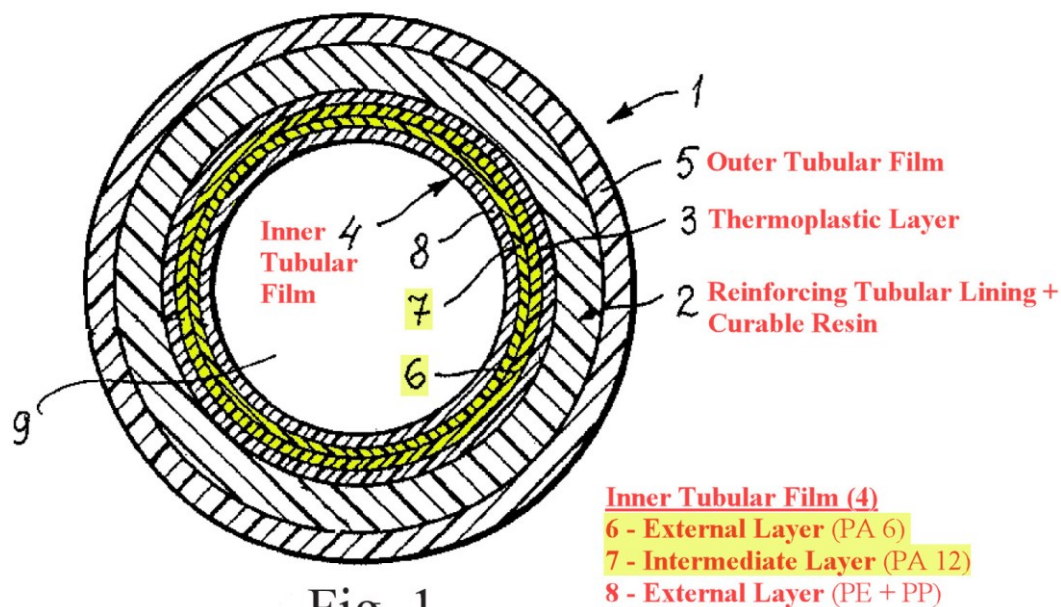
For the above reasons, Khramenkov in view of Jones therefore discloses “wherein the layers (c) and (e) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation have an identical layer structure, optionally an identical layer thickness, and/or identical polyamide components, and/or an identical composition, optionally an identical polyamide component” as recited by dependent claim 4. EX1003, ¶¶266-272.

Dependent claim 4 is therefore obvious over Khramenkov in view of Jones. EX1003, ¶¶266-272.

5. Claim 5.

[5] “The insertion tube as claimed in claim 1, wherein the layers (c) and (e) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation have a different layer structure, optionally a different layer thickness, and/or different polyamide components, and/or a different composition.”

Dependent claim 5 uses the logical disjunctions “and/or” to connect how layers (c) and (e) can have a “different layer structure” (i.e., “a different layer thickness, and/or **different polyamide components**, and/or a **different composition**”). Khramenkov discloses an “intermediate layer [7] containing polyamide 12.” EX1007, Abstract, Figure 1, p. 5 at 1:35-40, p. 6 at 2:4-20, p. 8 at 1:25-30. Khramenkov further discloses a “first outer layer [6] containing polyamide 6.” EX1007, Abstract, Figure 1, p. 5 at 1:31-35, p. 6 at 2:8-11, p. 8 at 1:22-26. Khramenkov therefore discloses where layers 7 and 6 (layers (c) and (e)) each have different polyamide components and different composition. *Id.*; EX1003, ¶275.



Khramenkov therefore discloses “wherein the layers (c) and (e) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation have a different layer structure, optionally a different layer thickness, and/or different polyamide components, and/or a different composition” as recited by dependent claim 5. EX1003, ¶¶273-276.

Dependent claim 5 is therefore obvious over Khramenkov in view of Jones. EX1003, ¶¶273-276.

6. Claim 6.

[6] “The insertion tube as claimed in claim 1, wherein the adhesive-promoter layers (b) and (d) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation comprise respectively mutually independently at least one modified thermoplastic olefin homo- or copolymer, optionally respectively mutually independently at least one modified thermoplastic ethylene homo- or copolymer and/or at least one modified propylene homo- or copolymer.”

As discussed in Sections X(B)(1)(d) and X(B)(1)(f) above, Jones discloses the use of bonding layers (i.e., adhesive-promoter layers) between the major layers (a), (c) and (e) to ensure proper bonding of the major layers together. Jones further discloses that the adhesive-promoter layers (b) and (d) between the major layers (a), (c) and (e) may be comprised of the following materials:

Suitable polymeric materials for use as the bonding layer include **modified polyolefins, e.g. modified polyethylene or modified polypropylene**, polyurethane, polymers containing units derived from ethylene and at least one of vinyl acetate, acrylic acid and lower C1-4 alkyl acrylates, e.g. ethyl acrylate, and modified equivalents of such polymers, the modification in each case preferably being by the inclusion of units derived from maleic anhydride.

EX1009, 2:45-49 (emphasis added).

Jones therefore discloses “wherein the adhesive-promoter layers (b) and (d) of the multilayer film that is impermeable to liquids and that is at least to some extent

permeable to UV radiation comprise respectively mutually independently at least one modified thermoplastic olefin homo- or copolymer, optionally respectively mutually independently at least one modified thermoplastic ethylene homo- or copolymer and/or at least one modified propylene homo- or copolymer” as recited in dependent claim 6. EX1003, ¶279. As discussed in Sections X(B)(1)(d) and X(B)(1)(f) above, a POSITA would have found it obvious to combine the bonding layers of Jones between the major layers (a), (c) and (e) of Khramenkov.

Dependent claim 6 is therefore obvious over Khramenkov in view of Jones. EX1003, ¶¶277-279.

7. Claim 7.

[7] “The insertion tube as claimed in claim 1, wherein the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation consists of the layers (a)-(e).”

Dependent claim 7 depends from independent claim 1 which requires a “layer sequence” of layers (a), (b), (c), (d) and (e) as discussed previously. *See supra* Sections X(A)(1)(c)-(e). Because a “layer sequence” requires a specific sequence of five-layers, the layer sequence therefore “consists of the layers (a)-(e).” Dependent claim 7 therefore adds no additional limitations.

To the extent that dependent claim 7 is deemed to add a limitation to the scope of independent claim 1, the combination of Khramenkov and Jones discloses a multilayer film that “consists of the layers (a)-(e)” as recited by claim 1. *See supra*

Sections X(B)(1)(c)-(e); EX1003, ¶¶280-281. Khramenkov in view of Jones therefore discloses “wherein the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation consists of the layers (a)-(e)” as recited in dependent claim 7. EX1003, ¶¶280-281.

Dependent claim 7 is therefore obvious over Khramenkov in view of Jones. EX1003, ¶¶280-281.

8. Claim 8.

[8] “The insertion tube as claimed in claim 1, wherein the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation is permeable to an extent of at least 80% to UV radiation.”

A POSITA would understand that when using a UV curable resin that it is desirable that the inner tubular film has a high permeability to UV radiation to ensure that the UV curable resin hardened in a lower period of time and would have been motivated to use a multilayer film that is permeable to UV radiation greater than 80%. EX1003, ¶282. Jones discloses the use of ultraviolet light (i.e., UV radiation) to cure the synthetic resin composition. EX1009, 2:7-9, 3:26-32. The multilayer inner tubular film of Jones would inherently have a permeability to UV radiation of at least 80%. EX1005, 5:15-18; EX1003, ¶282.

A POSITA would have found it obvious to use a multilayer film with the layer sequence (a)-(e) that is permeable to UV radiation at least 80% and would have been

motivated to use a multilayer film with higher than 80% permeability to UV radiation (as close to 100% permeability to UV radiation as possible) to ensure that the UV curable resin hardened completely and in a reduced period of time. EX1003, ¶282.

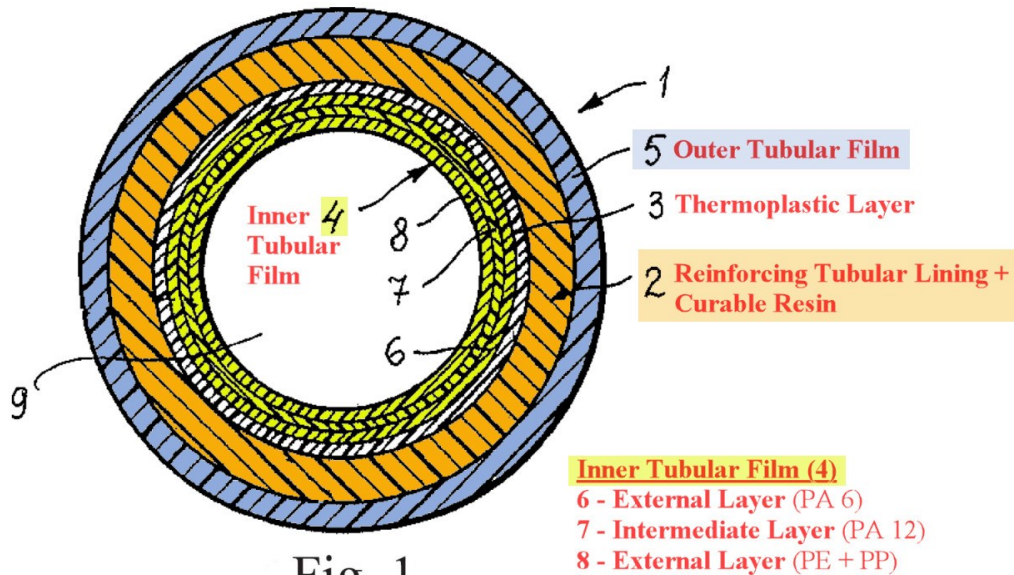
Khramenkov in view of Jones, and further in view of POSITA knowledge, therefore discloses “wherein the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation is permeable to an extent of at least 80% to UV radiation” as recited by dependent claim 8. EX1003, ¶¶282.

Dependent claim 8 is therefore obvious over Khramenkov in view of Jones, and further in view of POSITA knowledge. EX1003, ¶¶282-283.

9. Claim 9.

[9] “The insertion tube as claimed in claim 1, wherein the surface layer (a) of the multilayer film that is impermeable to liquids and that is at least to some extent permeable to UV radiation is directly adjacent to the support material.”

Layer 8 (layer (a)) of Khramenkov is not “directly adjacent to the support material.” Below is Figure 1 of Khramenkov showing the arrangement of the inner tubular film layers 6-8:



A POSITA would have found it obvious to try flipping the multilayer film layer arrangement of Khramenkov in view of Jones so that layer 8 (layer (a)) is directly adjacent to the support material. EX1003, ¶¶282. To the extent that that the layer 3 of Khramenkov is not considered integral with the reinforcing tubular lining 2, a POSITA would be motivated to remove the permanently bonded thermoplastic layer 3 of Khramenkov to provide a UV CIPP liner that is less expensive, and easier to manufacture because there is no bonding to the support layer. EX1003, ¶290.

Dependent claim 9 is therefore obvious over Khramenkov in view of Jones and POSITA knowledge. EX1003, ¶¶284-292.

10. Claim 10.

[10] “A pipe-renovation system suitable for the renovation of subterranean pipes, comprising an insertion tube as claimed in claim 1, provided for introduction into the pipe requiring renovation, and a source that emits UV radiation and/or short-wave, visible light, and that is optionally moveable.”

Jones discloses that a UV curable resin may be used in the CIPP liner that is activated by ultraviolet light (i.e., UV radiation). EX1009, 2:7-9, 3:26-32. A POSITA would understand that a source of ultraviolet light is required to activate the UV curable resin in Jones. EX1003, ¶294. Jones further discloses that the UV curable resin was “subjected to the action of ultra violet light [UV light source] until the resin had cured to form a hard mass.” EX1009, 3:31. Jones therefore discloses a source of ultraviolet light. *Id.*

Finally, a POSITA would understand that the UV light source would also need to be movable to ensure curing of the UV curable resin along the entire length of the sewer pipe which is well-known in the art of CIPP liners by using UV light trains and the like. EX1003, ¶294.

Therefore, Jones discloses “a source that emits UV radiation and/or short wave, visible light, and that is optionally moveable.”

Khramenkov in view of Jones therefore discloses “A pipe-renovation system suitable for the renovation of subterranean pipes, comprising an insertion tube as claimed in claim 1, provided for introduction into the pipe requiring renovation, and

a source that emits UV radiation and/or short-wave, visible light, and that is optionally moveable” as recited by dependent claim 10. EX1003, ¶¶293-295.

Dependent claim 10 is therefore obvious over Khramenkov in view of Jones, and further in view of POSITA knowledge. EX1003, ¶¶293-295.

XI. Secondary Considerations.

For objective indicia evidence to be accorded substantial weight, a nexus must exist “between the evidence and the merits of the claimed invention.” *Novartis AG v. Torrent Pharms. Ltd.*, 853 F.3d 1316, 1330-31 (Fed. Cir. 2017) (citation omitted). “If commercial success is due to an element in the prior art, no nexus exists.” *Tokai Corp. v. Easton Enters., Inc.*, 632 F.3d 1358, 1369 (Fed. Cir. 2011).

In response to Petitioner’s Interrogatory No. 9 in the District Court Litigation, Patent Owner has made broad based allegations of non-obviousness based on alleged copying and alleged commercial success. EX1044, pp. 9-12. However, Patent Owner’s bare allegations of copying and commercial success are not probative of validity because they fail to establish the required nexus and are not commensurate in scope with the claims. See *Novartis*, 853 F.3d at 1331. Furthermore, the Patent Owner has failed to show that the “merits of the invention” have driven any alleged copying or commercial success of their film.

Accordingly, any presently known assertions by Patent Owner regarding commercial success lack the requisite evidence to be given any probative weight in support non-obviousness.

XII. No Basis for Discretionary Denial.

A. 35 U.S.C. §314(a).

Omega respectfully submits that no basis exists under § 314(a) for discretionary denial. All relevant factors favor institution or, at the very least, are neutral. See *Apple Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (designated precedential May 5, 2020).

Furthermore, as to 314(a), a discretionary denial would also be inappropriate. Following the guidance that “the PTAB will not discretionarily deny institution in view of parallel district court litigation” if a *Sotera* stipulation is filed (Memorandum on “Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation” issued on June 21, 2022), Petitioner herewith provides such a *Sotera* stipulation (EX1046).

Although the Board need not address additional *Fintiv* considerations in light of Omega’s *Sotera* stipulation (*see* EX1046), the *Fintiv* factors do not favor denial.

Factor 1 is neutral. The Board should “not attempt to predict how the district court in the related district court litigation will proceed.” *Sand Revolution II LLC v.*

Continental Intermodal Group-Trucking LLC, IPR2019-01393, Paper 24 at 7 (P.T.A.B. Jun. 16, 2020) (informative).

Factor 2 favors institution as there is no scheduled trial date and the Board will likely issue its Final Written Decision before any scheduled trial date. EX1042.

Factor 3 favors institution because Petitioner has diligently filed this Petition while the District Court Litigation is in its early stages, has just completed the pleadings stage and before expert discovery. On July 13, 2023, the Patent Owner filed a First Amended Complaint (EX1043), and Petitioner recently filed its only Answer, Defenses and Counterclaims on July 27, 2023. On September 1, 2023, Patent Owner filed a Motion to Dismiss some of the Petitioner's counterclaims. Patent Owner's infringement contentions are currently not due until October 23, 2023, and Petitioner's invalidity contentions are not due until November 27, 2023. EX1042.

Factor 4 favors institution because Petitioner challenges claims 1-10 whereas Patent Owner has only asserted a subset (claims 1-3, 5-8) in the District Court Litigation. EX1045, pp. 8-11. Petitioner also stipulates that, if the Petition is instituted, Petitioner will not pursue in the District Court Litigation any ground raised or that could have been reasonably raised in an IPR. EX1046. *Sotera Wireless, Inc. v. Masimo Corp.*, IPR2020-01019, Paper 12 at 18 (P.T.A.B. Dec. 1, 2020) (precedential).

Factor 5: The Petitioner and the Patent Owner are currently the same parties in the District Court Litigation.

Factor 6 favors institution because Petitioner has set forth a strong case of unpatentability. *Sand Revolution*, Paper 24 at 13.

Further, the Director’s interim procedure states that institution will not be denied based on the *Fintiv* factors “where a petition presents compelling evidence of unpatentability.” Memorandum, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel District Court Litigation at 2 (USPTO June 21, 2022); *CommScope Techs. LLC. v. Dali Wireless, Inc.*, IPR2022-01242, Paper 23 (February 27, 2023) (precedential). Because this Petition presents a compelling case that all claims are unpatentable, institution should not be denied.

B. 35 U.S.C. § 325(d).

1. Ground 1: Glover and Brandenburger.

In Ground 1, the two references used – Glover and Brandenburger – were listed in the References Cited but were not substantively used in an Office Action or in any communications with the USPTO Examiner. EX1001, pp. 1-2; *see generally* EX1002. While Glover and Brandenburger were included in the References Cited section of the ’269 Patent, the Petitioner is able to demonstrate that the Examiner erred in a manner material to the patentability of the Challenged Claims 1-10. *See supra* Section X(A).

The Examiner did not issue *any* Office Action during the prosecution of the '269 Patent and therefore neither Glover nor Brandenburger were used as a basis for rejection. *See generally* EX1002. The Examiner also did not indicate any comparison to Glover or Brandenburger in the Notice of Allowance that would indicate either reference was substantively considered by the Examiner. EX1002, pp. 260-267. There is nothing in the prosecution history that indicates that either Glover or Brandenburger was evaluated during examination. *See generally* EX1002. Therefore, there would be no overlap between the arguments made during examination and the manner the Petitioner relies on Glover in view of Brandenburger because no such arguments were made during examination of the '269 Patent. *See generally* EX1002.

The Examiner erred in a material manner by not considering Glover or using Glover to reject all of the claims of the '269 Patent because Glover has all of the elements of Challenged Claims 1-10 except for the well-known outer film which Brandenburger provides. *See supra* Sections X(A)(1)-(10). For example, Glover teaches the same exact five-layer sequence for the inner tubular film as recited in independent claim 1. *See supra* Sections X(A)(1)(c)-(g). Glover also discloses material that has a VICAT softening point of at least 100 degrees Celsius. *See supra* Section X(A)(1)(i). Glover also discloses the resin impregnated support material. *See supra* Section X(A)(1)(l). Glover does not expressly disclose an outer tube, but

outer tubes within UV CIPP liners were well-known at the time of the invention as shown by the prior art including Brandenburger which a POSITA would have easily recognized adding to Glover when using a UV curable resin. *See supra* Section X(A)(1)(j). Most of the subject matter claimed in the dependent claims is disclosed by Glover also. *See supra* Sections X(A)(2)-(10). Because of the clear case of obviousness of Claims 1-10 over Glover in view of Brandenburger – almost anticipation by Glover alone except for the missing outer tube – the Examiner erred in a manner material to the patentability of the Challenged Claims 1-10.

For the above reasons, the Examiner erred in a manner material to the patentability of Challenged Claims 1-10 and a discretionary denial of Ground 1 under 35 U.S.C. § 325(d) should not be exercised.

2. Ground 2: Khramenkov and Jones.

In Ground 2, the Jones reference is used as a secondary reference and was listed in the References Cited section of the '269 Patent. EX1001, pp. 1-2; *see also supra* Section X(B). However, Khramenkov is the main reference used in Ground 2 and was improperly disclosed to the USPTO by Huhtamaki Films so Khramenkov was never considered by the Examiner during examination or even cited in the References Cited section of the '269 Patent. EX1001, pp. 1-2; EX1002, pp. 350-371; *see also supra* Section VI(C). For these reasons, discretionary denial of Ground 2 under 35 U.S.C. § 325(d) should not be exercised.

XIII. Conclusion.

Petitioner has demonstrated by a preponderance of the evidence that Claims 1-10 of the '269 Patent are invalid and respectfully requests the Board institute a trial and cancel Claims 1-10 of the '269 Patent.

Dated: September 20, 2023

Respectfully submitted,

/Michael S. Neustel/

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Attorney for Omega Liner Company, Inc.

CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this petition complies with the type-volume limits of 37 C.F.R. § 42.24(a)(1)(i) because it contains 13,868 words, according to the word-processing system used to prepare this petition, excluding parts of this petition that are exempted by 37 C.F.R. § 42.24(a) (including the table of contents, a table of authorities, mandatory notices, a certificate of service or this certificate word count, appendix of exhibits, and claim listing).

Dated: September 20, 2023

Respectfully submitted,

/Michael S. Neustel/

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CERTIFICATE OF SERVICE

Pursuant to 37 C.F.R. §§ 42.6(e) and 42.105, the undersigned hereby certifies that on September 20, 2023, a complete and entire copy of this **PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 8,794,269** and all supporting exhibits (**Exhibits EX1001-EX1046**) were served on the Patent Owner via USPS Priority Mail Express at the correspondence address of record for U.S. Patent No. 8,794,269 as follows:

NORRIS MCLAUGHLIN, PA
7 Times Square, 21st Floor
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and by serving via USPS Priority Mail Express the following litigation counsel for the Patent Owner in the pending litigation *Buergofol GmbH v. Omega Liner Company, Inc.*, Case No. 22-cv-04112-KES (D. S.D.) as follows:

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Dated: September 20, 2023

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