

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Omega Liner Company, Inc.,
Petitioner

v.

Buergofol GmbH,
Patent Owner

Case: IPR2023-01372

U.S. Patent No. 9,657,882

Issued: May 23, 2017

Filed: March 11, 2014

Inventors: Kurt Stark, Gregor Schleicher and Abdel-Kader Boutrid

Title: Tubular Film and the Use Thereof

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 9,657,882**

Table of Contents

I.	Mandatory Notices Under 37 C.F.R. §42.8(a)(1).....	1
A.	Real Party-in-Interest.	1
B.	Related Matters.....	1
C.	Designation of Counsel.	2
D.	Service Information.....	2
II.	Grounds for Standing.....	3
III.	Fees.....	3
IV.	Person of Ordinary Skill in the Art.....	3
V.	Background of Technology.	4
A.	1950’s: “Migrating Compounds” (Waxes) In Plastics.....	4
B.	1971: Invention of CIPP Liners With Removable Inner Film.	5
C.	2005: CIPP Liner Film With Extra “Migrating Compounds.”	8
D.	2008: Stark’s Knowledge of Adding Waxes to CIPP Liner Films.	9
VI.	The ’882 Patent.....	10
A.	Overview of ’882 Patent.	10
B.	Prosecution History of the ’882 Patent.	13
C.	Priority Date.	14
VII.	Brief Description of the Applied Prior Art References.....	15
A.	Common Ownership (Huhtamaki) and Inventorship (Stark).....	15
B.	Hummel (EX1005).	16
C.	Schuhmann (EX1007).	18
D.	Nagai (EX1009).	20
VIII.	Claim Construction.....	22
IX.	Identification of Challenge and Relief Requested.....	24
X.	The Challenged Claims Are Unpatentable.	25
A.	Ground 1: Claims 1, 4-7, 10 and 11 Are Anticipated by Hummel.	25
1.	Claim 1.....	25
2.	Claim 4.....	30

3.	Claim 5.....	31
4.	Claim 6.....	33
5.	Claim 7.....	34
6.	Claim 10.....	35
7.	Claim 11.....	36
B.	Ground 2: Claim 3 is Obvious Over Hummel.	36
C.	Ground 3: Claims 1, 3-7 and 10-13 Are Obvious Over Hummel in View of Schuhmann.	39
1.	Claim 1.....	41
2.	Claim 3.....	45
3.	Claim 4.....	46
4.	Claim 5.....	47
5.	Claim 6.....	47
6.	Claim 7.....	48
7.	Claim 10.....	49
8.	Claim 11.....	50
9.	Claim 12.....	51
10.	Claim 13.....	52
D.	Ground 4: Claims 1, 3-7 and 10-11 Are Obvious Over Hummel in View of Nagai.	53
1.	Claim 1.....	54
2.	Claim 3.....	58
3.	Claim 4.....	59
4.	Claim 5.....	59
5.	Claim 6.....	60
6.	Claim 7.....	60
7.	Claim 10.....	61
8.	Claim 11.....	62
XI.	Secondary Considerations.	63
XII.	No Basis for Discretionary Denial.....	64

A.	35 U.S.C. §314(a).....	64
B.	35 U.S.C. § 325(d).....	66
XIII.	Conclusion.	70

PETITIONER'S EXHIBIT LIST

Exhibit	Description
EX1001	U.S. Patent No. 9,657,882 (“ the ’882 Patent ”)
EX1002	File History of U.S. Patent No. 9,657,882
EX1003	Declaration of Dr. Steven B. MacLean (“ MacLean Decl. ”)
EX1004	<i>Curriculum Vitae</i> of Dr. Steven B. MacLean
EX1005	International Publication No. WO2011/157356 (“ Hummel ”) with certified English translation
EX1006	International Publication No. WO2011/157356 (Hummel) – original publication in German language
EX1007	International Publication No. WO2011/054434 (“ Schuhmann ”) with certified English translation
EX1008	International Publication No. WO2011/054434 (Schuhmann) original publication in German language
EX1009	Japanese Publication No. JP2002001819A (“ Nagai ”) with certified English translation
EX1010	Japanese Publication No. JP2002001819A (Nagai) original publication in Japanese language
EX1011	U.S. Publication No. 2011/0083765 (“ Stark ”)
EX1012	U.S. Patent No. 4,009,063 (“ Wood ”)
EX1013	U.S. Publication No. 2005/0194718 A1 (“ Blades ”)
EX1014	International Publication No. WO2008/095967 (“ Gunter ”) with certified English translation
EX1015	International Publication No. WO2008/095967 (Gunter) original publication in German language
EX1016	Abdel-Bary, E., <i>Handbook of Plastic Films</i> (2003), pp. 5-40

EX1017	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
EX1018	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
EX1019	Callister, W., <i>Materials Science and Engineering: An Introduction, Eighth Edition</i> (2010), pp. 537-540, 610-614
EX1020	Costa, F., <i>Thermoplastic Elastomers</i> (2009), pp. 101-146
EX1021	Deopura, B., <i>Polyesters and Polyamides</i> (2008), pp. 41-48
EX1022	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
EX1023	Khudyakov, I., <i>Release Coatings: Defining Performance</i> (2019), pp. 1-12
EX1024	Mark, H., <i>Encyclopedia of Polymer Science and Technology, Third Edition</i> (2004), pp. 203-218 (Vol. 1), 635-670 (Vol. 1), 115-124 (Vol. 4), 63-88 (Vol. 6)
EX1025	Nwabunma, D., <i>Polyolefin Blends</i> (2008), pp. 3-16, 27-29
EX1026	Odian, G., <i>Principles of Polymerization, Fourth Edition</i> (2004), pp. 1, 103-105, 465
EX1027	Salem, S., <i>Use of Trenchless Technologies for a Comprehensive Asset Management of Culverts and Drainage Structures</i> (2008), pp. 45-51
EX1028	Sterling, R., <i>State of Technology of Rehabilitation of Wastewater Collection Systems</i> (2010), pp. 16-20, A-12 – A-17
EX1029	<i>Pipeline Renewal Technologies™, The Elements of CIPP: Cured-in-Place Materials and Processes</i> (2020), pp. 1-11

EX1030	Mark, J., <i>Polymer Data Handbook</i> (1999), pp. 180-188, 518-527, 780-786
EX1031	Wypych, G., <i>Handbook of Antiblocking, Release, and Slip Additives 3rd Edition</i> (2014), pp. 1-5
EX1032	RESERVED
EX1033	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)
EX1034	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)
EX1035	Buergofol's Opposition to Motion to Dismiss, November 18, 2022, <i>Buergofol GmbH v. Omega Liner Company, Inc.</i> , Case No. 22-cv-04112-KES (D. S.D.), (Dkt. 161)
EX1036	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)
EX1037	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)
EX1038	Buergofol's Responses to Omega's Interrogatories to Buergofol (Set Two) (Nos. 6-13), March 31, 2023
EX1039	Buergofol's Infringement Contentions (Response to Interrogatory No. 14), April 24, 2023
EX1040	Dr. Kurt Stark LinkedIn Profile, https://www.linkedin.com/in/dr-kurt-stark-b681881b8/ , September 8, 2023
EX1041	Sotera Stipulation

LIST OF CHALLENGED CLAIMS

Claim 1	
[1pre]	An insertion tube for use in trenchless sewage pipe renovation, comprising:
[1a]	an opaque external tubular film that is impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths;
[1b]	an inner tubular film;
[1c]	a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film; and
[1d]	wherein the inner tubular film comprises: one or multiple layers an inner facing external side and an outer facing external side facing the carrier material;
[1e]	a coating of at least one of (1) a coating with a polysiloxane; or (2) a coating or covering with at least one migrating compound; and
[1f]	wherein the coating is applied over a section of or an entire circumferential area of the outer facing external side facing the carrier material.
Claim 3	
[3]	The insertion tube according to claim 1, the inner tubular film further comprising a layer that contains a thermoplastic elastomer (TPE) within a range of more than 20% by weight up to 100% by weight.
Claim 4	
[4]	The insertion tube according to claim 1, wherein the inner tubular film has a total thickness between 10 μm and 5000 μm .

Claim 5	
[5a]	The insertion tube according to claim 1, the inner tubular film further comprising at least one internal layer in the form of an adhesion promoter layer, wherein at least one of the external layers comprising the coating, and wherein:
[5b]	one of the external layers has at least one homo- and/or copolyamide and the other external layer has at least one thermoplastic olefin homo- or copolymer with a proportion by weight expressed in percent of more than 25% by weight, or
[5c]	both external layers contain at least one thermoplastic olefin homo- or copolymer, and there is one internal layer containing a homo and/or copolyamide with a proportion by weight expressed in percent of more than 25% by weight.
Claim 6	
[6a]	The insertion tube according to claim 5, the inner tubular film further comprising an additional internal layer comprising one of:
[6b]	an EVOH layer;
[6c]	a barrier material against oxygen, water vapor, or oil; or
[6d]	a thermoplastic homo and/or copolymer of polyethylene homopolymer (PE), LDPE, HDPE, or a polypropylene homopolymer (PP).
Claim 7	
[7]	The insertion tube tubular film according to claim 5, wherein the coating has a thickness no more than 15 μm .
Claim 10	
[10a]	The insertion tube according to claim 1, wherein the coating is a coating or covering with at least one migrating compound, and the migrating compound is one of:

[10b]	(1) a lipophilic compound from the group of a wax, paraffin, fatty acid, or a fat, or
[10c]	(2) a hydrophilic compound from the group of a polyether, polyester, an alcohol with at least one hydroxyl group, ethylene glycol, polyethylene glycol, polypropylene glycol, propanediol, butanediol, pentanediol, hexanediol or glycerin.
Claim 11	
[11]	The insertion tube according to claim 10, wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer or a homo- or copolyamide.
Claim 12	
[12]	The insertion tube according to claim 10, wherein the migrating lipophilic or hydrophilic compound has a proportion of at least 1% by weight of a respective layer in which it is contained.
Claim 13	
[13pre]	The insertion tube according to claim 12, wherein the migrating lipophilic or hydrophilic compound is one of:
[13a]	a short-chain compound or an oligomer with 1 to 50 carbon atoms;
[13b]	an inorganic compound (with 1 to 500 silicon atoms) or a (sheet) silicate; or
[13c]	a shorter-chained polymer with 50 to 20.000 carbon atoms.

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, 3-7, 10-13 (“**Challenged Claims**”) of U.S. Patent No. 9,657,882 (“**the ’882 Patent**”). There exists a reasonable likelihood Petitioner will prevail with respect to the challenged claims. Petitioner respectfully submits that IPR of the ’882 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. 9,657,882 (“**’882 Patent**”), together with U.S. Patent No. 8,794,269 (“**’269 Patent**”), is the subject of pending litigation involving 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 ’882 Patent was first asserted in Patent Owner’s Complaint, served on Petitioner on September 21, 2022. EX1033; EX1034.

The District Court recently issued an amended scheduling order on July 12, 2023. EX1036. 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 ’882 Patent.

C. Designation of Counsel.

Lead Counsel	Backup Counsel
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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 '882 Patent is available for *inter partes* review and that the Petitioner is not barred or estopped from requesting *inter partes* review challenging Claims 1, 3-7, and 10-13 on the grounds identified herein. Petitioner was served with a complaint of infringement of the '882 Patent less than one year ago. EX1033, EX1034.

III. Fees.

Any additional fees for this IPR may be charged 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. 1950's: "Migrating Compounds" (Waxes) In Plastics.

The '882 Patent assigns special status to "migrating compounds" insinuating they are special or unique. *See, generally*, EX1001. However, "migrating compounds," such as waxes, are simply well-known chemical additives that have been added to plastic film many years prior to filing the '882 Patent. EX1003, ¶¶63-68. When incorporated into a polymer, these compounds will naturally "migrate" through the plastic material during and after curing of the plastic material with a small portion of the "migrating compounds" emerging ("migrating") to the surface of the plastic material to form a thin coating on the surface. EX1003, ¶¶64-65.

"Migrating compounds," such as waxes, have been in use since at least the 1950's. EX1003, ¶66. Wax is one commonly found "migrating compound" that has been used for the manufacture of plastic film many years prior to the filing of the '882 Patent. EX1003, ¶¶65-66.

Dr. Kurt Stark, the first inventor on the '882 Patent, was also a named co-inventor on another exemplary patent reference filed by Huhtamaki Forchheim

(“**Huhtamaki**”) that was published on August 14, 2008 as International Publication No. WO 2008/095967 A1 (“**Gunter-Stark**”). EX1014.¹ Gunter-Stark discloses a multilayer plastic film “having at least one *release layer* which possesses release properties with respect to sticky substances.” EX1014, Abstract. Gunter-Stark further discloses that the “prior art” film technology included “extrudable silicones and silicone copolymers [that] are extruded alongside adhesive layers.” EX1014, 3: 8-9.

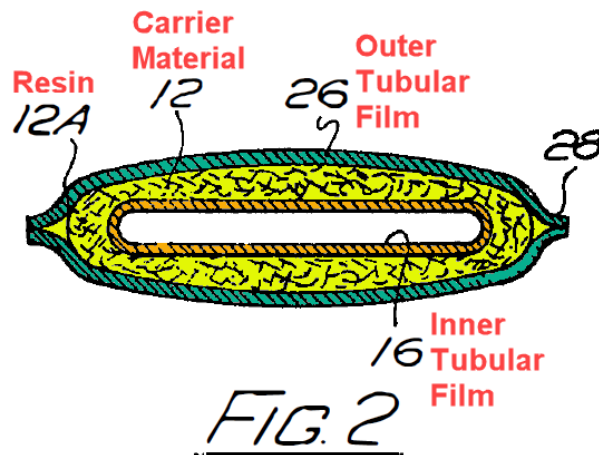
B. 1971: Invention of CIPP Liners With Removable Inner Film.

In 1971, Eric Wood implemented the first cured-in-place-pipe (“**CIPP**”) liner in London, England. EX1029, p. 2; EX1027, 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.” EX1012.

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

¹ EX1014 is the certified English translation of International Publication No. WO 2008/095967 A1 (Gunter-Stark) where the original document is shown in EX1015.

the inner tube and outer tube. EX1012, 4:61-68. 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. EX1012, 5:25-33. Below is Figure 4 from the Wood Patent showing the inflated CIPP liner within a pipe (30) to be renovated:

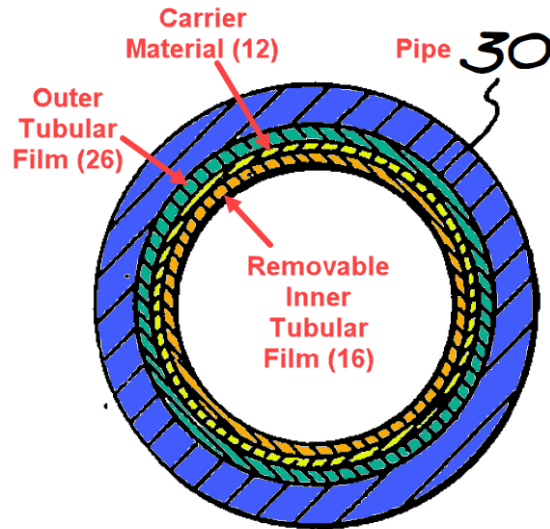


FIG. 4

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.” EX1012, 5:51-56 (emphasis added.)

The '882 Patent acknowledges that it is well-known to use either “UV or steam curing” for the resin in a CIPP liner. EX1001, 1:15-17, 30-31, 66-67. Ultraviolet CIPP (“**UV CIPP**”) liners use a resin that is activated by UV radiation (referred to also as UV light) which results in a hardened liner that is stronger than heat cured CIPP liners. EX1029, p. 4. 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.

C. 2005: CIPP Liner Film With Extra “Migrating Compounds.”

In addition to the applied prior art references (Hummel, Schuhmann and Nagai), U.S. Publication No. 2005/0194718 A1 (“**Blades**”) titled “Pipe Liners and Method of Lining Pipes” – i.e., CIPP liners – discloses the use of a “modified polymer” that includes an “additive” to reduce the coefficient of friction of the film during installation. EX1013, Cover and Abstract.

Blades specifically discloses the use of “**external lubricants**” and “**internal lubricants**” to manufacture the inner tubular film for the CIPP liner. EX1013, ¶¶0071. Blades further discloses that suitable external lubricants include “**waxes**” including ethylene bis-stearamide (**EBS wax**). EX1013, ¶0075. Blades further discloses that external lubricants “*tend to migrate towards the surface of the polymer*” thereby improving the surface appearance and “*reducing the COF of the polymer.*” EX1013, ¶0072. Blades further discloses that “the lubricant is present in the polymer in an amount between 0.01 and 5% by weight.” EX1013, ¶0083.

It was well-known at least since 2005 to use “migrating compounds,” such as waxes, within the inner tubular film to reduce the coefficient of friction thereby reducing the stickiness of the film to other substances.

D. 2008: Stark's Knowledge of Adding Waxes to CIPP Liner Films.

Dr. Kurt Stark, the first inventor on the '882 Patent, was also a named co-inventor on another exemplary patent reference filed by **Huhtamaki**. United States Publication No. 2011/0083765 ("**Stark**") entitled "UV Light and Protective Film" for a UV CIPP liner identifies **Kurt Stark**, **Hendrik Hummel** and Manfred Rübner as co-inventors and was applied for by **Huhtamaki**. EX1011, Cover. Stark was published April 14, 2011 and claims priority to a German patent application filed on December 17, 2008. EX1011, Cover.

Stark discloses that "[each of the layers of the internally lying film tube may ... be provided with additives]" such as "waxes" within the external layer of the inner tubular film. EX1011, ¶0090. The '882 Patent extensively identifies "waxes" as a "migrating compound" and gives examples of using waxes. EX1001, 4:15-19, 5:39-67, 15:15-18, 16:3-57; 18:10-28. The '882 Patent further gives examples of "advantageous waxes" such as "surfactants." EX1001, 5:52-55. In addition, Buergofol has acknowledged that "waxes" are a "migrating compound" during the District Court Litigation. EX1037, ¶¶15, 28, 40.

VI. The '882 Patent.

A. Overview of '882 Patent.

The '882 Patent was filed on March 11, 2014 entitled “Tubular Film and the Use Thereof” naming Kurt Stark, Gregor Schleicher and Abdel-Kader Boutrid as inventors and Buergofol as the assignee. EX1001, Cover.

The claims of the '882 Patent are directed towards conventional UV CIPP liners used to rehabilitate underground culverts and pipes. EX1001, Claims 1-13. According to the '882 Patent, a “good release effect is necessary so the inner tube film can be pulled out without residues from the cured resin.” EX1001, 1:47-50. Also according to the '882 Patent, prior art inner tubular film had an “excessively low release effect against adhesive resins” and that the film would “tear off owing to excessive adhesion to the resin” thereby leaving behind “film fragments.” EX1001, 2:30-43.

The '882 Patent is directed to an inner tubular film with “an outstanding release effect against adhesive substances such as resins” used in CIPP liners. EX1001, 2:53-58. The '882 Patent describes using a “**migrating compound**” (e.g., “**wax**”) on the external surface of the inner tubular film to increase the release effect. EX1001, 4:15-20, 5:23-34. The “migrating compound” may be “*incorporated in* that outermost layer of the one- or multilayered film to whose external side the

migrating compound should migrate,” or *applied directly to the external side* of the inner tubular film. *Id.*

Below is Figure 1 from the '882 Patent:

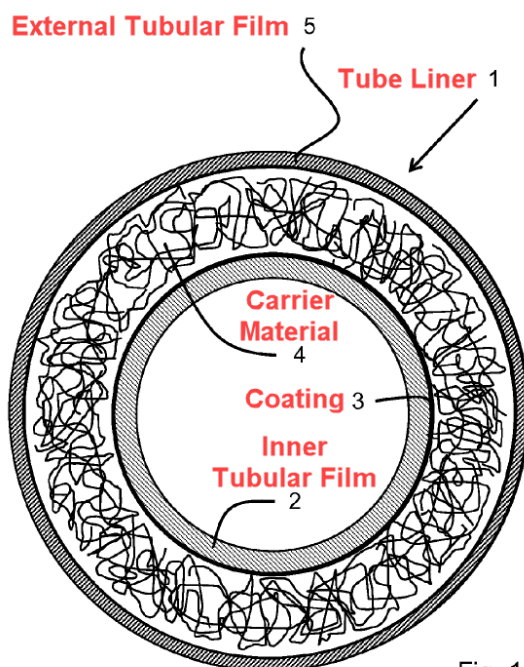


Fig. 1

Below is Figure 2 from the '882 Patent:

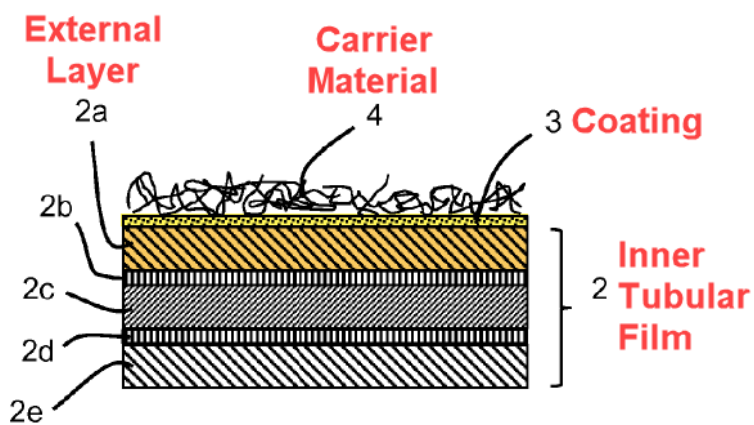


Fig. 2

Claim 1 of the '882 Patent is the only independent claim and generically recites an “insertion tube” or CIPP liner with an inner tubular film having a “coating,” e.g., “migrating compound,” applied over the external side of the inner tubular film. EX1001, 20:18-36. However, the use of removable inner tubular film was well-known since the early 1970’s as disclosed in the Wood Patent. EX1012, 5:51-56.

Also, multilayer inner tubular film for UV CIPP liners with release coatings to prevent attachment to the cured resin were also well known and disclosed within the prior art. *See infra* Section X. The allegedly inventive “coating” of a “migrating compound” applied over the external side of the inner tubular film to act as a release agent was already expressly disclosed in the prior art. *Id.*

The challenged claims 1, 3-7 and 10-13 merely identify well-known plastic materials for use in the inner tubular film of a CIPP liner. *Id.* The challenged claims 1, 3-7 and 10-13 also generically identify well-known “migrating compounds” (e.g., waxes) incorporated in or applied to the outer surface of plastic film *without any connection to the alleged problem solved.* *Id.*

Indeed, as it will be seen, the first named inventor of the '882 Patent (Dr. Kurt Stark) is a named co-inventor on one of the prior art references relied upon by Petitioner (Schuhmann), which was not disclosed to nor considered by the USPTO. EX1007.

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. Prosecution History of the '882 Patent.

On March 11, 2014, the '882 Patent was filed with the USPTO with claims 1-17. EX1002, pp. 2-68. On June 9, 2014, a Preliminary Amendment was filed cancelling claims 2-17. EX1002, pp. 77-79. On July 30, 2014, a Second Preliminary Amendment was filed cancelling claim 1 and adding new claims 18-33. EX1002, pp. 133-139.

On August 24, 2016, an Election/Restriction Requirement was issued by the USPTO indicating that claims 18-31 and 33 were drawn to a “tubular film” for Invention I and claim 32 was drawn to an “insertion tube for use in trenchless sewage pipe” for Invention II. EX1002, pp. 356-361. On October 24, 2016, the Patent Owner elected Invention II cancelling claims 18, 31 and 33, and amending claims 19-30 and 32. EX1002, pp. 364-368.

On January 25, 2017, the Examiner issued a Notice of Allowance without a prior Office Action being issued. EX1002, pp. 455-462. For the Reasons for Allowance, the Notice of Allowance stated:

WO 98/12465 is the closest prior art but does not disclose wherein the inner tubular film comprises one or multiple layers an inner facing external side and an outer facing external side facing the carrier material, a coating of at least one of (1) a coating with a polysiloxane,

or (2) a coating or covering with at least one migrating compound, and wherein the coating is applied over a section of or an entire circumferential area of the external side faces facing the carrier material.

EX1002, p. 460. WO 98/12465 discloses a “coating applied onto the *internal surface* of a pipe.” EX1002, p. 262.

On March 1, 2017, a Rule 312 Amendment was filed amending claims 19, 21 and 32 specifying that the coating was applied over the “outer facing external side facing the carrier material.” EX1002, pp. 474-477. On March 9, 2017, the Examiner accepted the amendment and the ’882 Patent issued on May 23, 2017. EX 1002, pp. 481-482.

The Examiner did not issue an Office Action or identify any additional prior art references, indicating the Examiner only considered the selected few references cited by the applicant. EX1002, pp. 455-469.

C. Priority Date.

The earliest possible priority date of Claims 1, 3-7, and 10-13 of the ’882 Patent is March 11, 2013, the filing date of a German application to which the ’882 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.

VII. Brief Description of the Applied Prior Art References.

A. Common Ownership (Huhtamaki) and Inventorship (Stark).

Prior to commencing his employment at Buergofol in October 2011, the lead inventor of the '882 Patent (Dr. Kurt Stark) was employed by Huhtamaki Forchheim in Germany as Head of Research and Development. EX1040, p. 2. Two of the three patent references used by Petitioner are owned by Huhtamaki Forchheim (Hummel and Schuhmann). EX1005, EX1007. One of the three patent references (Schuhmann) used by Petitioner expressly names Dr. Kurt Stark as a co-inventor. EX1007.

During his employment as Head of Research and Development at Huhtamaki Forchheim, Dr. Stark would have managed Henrik Hummel – the named inventor for the main applied prior art reference (Hummel) in this Petition. EX1005, Cover. Although Dr. Stark is not officially listed as a co-inventor on the Hummel reference, Petitioner is aware of information that Dr. Stark claims to be a co-inventor of Hummel. This along with the fact that both Dr. Stark and Hummel worked at Huhtamaki Forchheim could explain the striking similarity in language between the '882 Patent (Stark) and Hummel. *See generally* EX1001, EX1005.

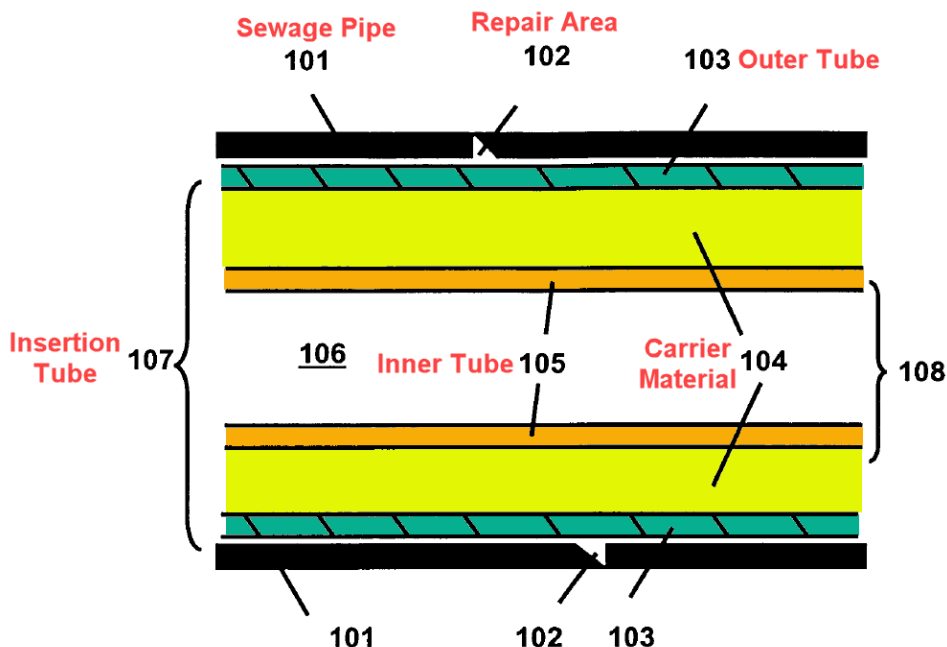
B. Hummel (EX1005).

International Publication No. WO2011/157356 (“**Hummel**”) entitled “Multi-Layer Film Permeable to UV Radiation” identifies Henrik Hummel as the inventor and was applied for by **Huhtamaki**. EX1005, Cover. Hummel was filed on May 31, 2011 and claims priority to German Application No. DE 10 2010 023 764.7 filed on June 15, 2010. *Id.* Hummel was published December 22, 2011 and therefore qualifies as pre-AIA prior art under 35 U.S.C. § 102(b). *Id.*

Hummel discloses “an interior tube for an insert tube for refurbishing underground pipes” – i.e., a UV CIPP liner. EX1005,² p. 2. Hummel further discloses a UV CIPP liner that has an inner tube (105), an outer tube (103), and a carrier material (104) impregnated with UV reactive resin. EX1005, 15:13-24. Hummel further discloses that the UV CIPP liner is inflated inside of the sewage pipe (101) to be repaired, a UV lamp is moved through the interior of the inflated UV CIPP liner and then the inner tube (105) is removed after the UV reactive resin has cured. *Id.*

² EX1005 is the certified English translation of International Publication No. WO2011/157356 (Hummel) where the original document is shown in EX1006.

Below is Figure 1 from Hummel showing the UV CIPP liner inflated against the sewage pipe to be repaired:



Hummel further discloses that the inner tubular film incorporates in the outer layers various *migrating compounds* such as “**waxes**,” “**processing aids**,” “**lubricants**” and “**surfactants**.” EX1005, 11:18-26. The ’882 Patent extensively identifies “waxes” as a “migrating compound” and gives examples of using waxes to achieve the claimed invention. EX1001, 4:15-19, 5:39-67, 15:15-18, 16:3-57; 18:10-28. The ’882 Patent further gives examples of “advantageous waxes” such as “surfactants.” EX1001, 5:52-55. Buergofol has alleged during the District Court Litigation that “waxes” are a “migrating compound.” EX1037, ¶¶15, 28, 40.

Hummel further discloses that, after curing the resin, the inner tubular film “can be peeled off as an inner tube, preferably without tearing or seizing therefrom.”

EX1005, 23:3, *see also*, 7:9-10, and 15:7-10. Hummel discloses a “multilayer film according to the invention ... after the resin has cured, can be peeled off from it without being torn.” EX1005, 7:4-10.

C. Schuhmann (EX1007).

International Publication No. WO2011/054434 (“**Schuhmann**”) entitled “Adhesive Products Having an Embossed Release Film” named Michael Schuhmann, Roland Kelm, **Kurt Stark**, and Andreas Malz as co-inventors and was applied for by **Huhtamaki**. EX1007,³ Cover. Schuhmann was filed on October 13, 2010 and claims priority to German Application No. DE 10 2009 049 414.6 filed on October 14, 2009. *Id.* Schuhmann was published May 12, 2011 and therefore qualifies as pre-AIA prior art under 35 U.S.C. § 102(b). *Id.*

Schuhmann discloses various types of release films for sticky substances including (1) siliconized release films, (2) release films “coated on one side with the lipophilic compound”, and (3) release films that “have occupancy on at least one of its surfaces by at least one **migrated lipophilic compound**.” EX1007, 4:9-12, 5:6-15. Schuhmann specifically identifies “**wax**” as a preferred lipophilic compound. EX1007, 8:28-30.

³ EX1007 is the certified English translation of International Publication No. WO2011/054434 (Schuhmann) where the original document is shown in EX1008.

The '882 Patent extensively identifies “waxes” as a “migrating compound” and gives examples of using waxes. EX1001, 4:15-19, 5:39-67, 15:15-18, 16:3-57; 18:10-28. Buergofol has alleged during the District Court Litigation that “waxes” are a “migrating compound.” EX1037, ¶¶15, 28, 40.

Schuhmann discloses the release film may be used with various products including adhesive tapes, adhesive pharmaceutical products, and “when processing possibly molded, tacky resins, fibers, fabrics or other materials.” EX1007, 21:1-8.

To the extent that Schuhmann is argued to be from a different field from the claimed invention in the '882 Patent, Schuhmann is analogous prior art because it is reasonably pertinent to the alleged problem faced by the inventor (i.e., alleged “excessively low release effect against adhesive resins” – EX1001, 2:30-43) and Schuhmann would have logically commended itself to the inventor’s attention in considering their alleged problem. EX1003, ¶¶171, 190, 191, 194. *In re Icon Health and Fitness, Inc.*, 496 F.3d 1374, 1379-80 (Fed. Cir. 2007) (quoting *In re Clay*, 966 F.2d 656,658 (Fed. Cir. 1992)). In this particular situation, Schuhmann would have indisputably commended itself to the inventor of the '882 Patent because the '882 Patent and Schuhmann share the same co-inventor – Dr. Kurt Stark. EX1001, Cover; EX1007, Cover.

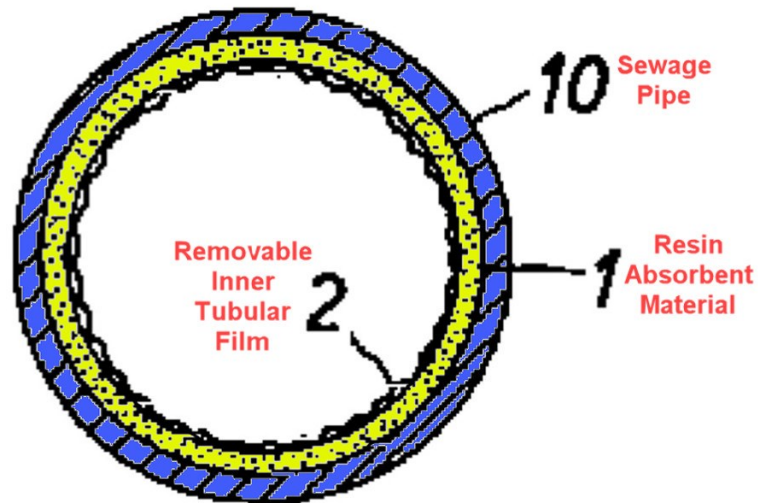
D. Nagai (EX1009).

Japanese Application Publication No. JP2002-1819 (“**Nagai**”) entitled “Tube lining method and tube lining material and manufacturing method thereof” named Michio Nagai and Hiroshi Awano as co-inventors. EX1009,⁴ Cover. Nagai was filed on June 16, 2000 and was published January 8, 2002, therefore Nagai qualifies as pre-AIA prior art under 35 U.S.C. § 102(b). *Id.*

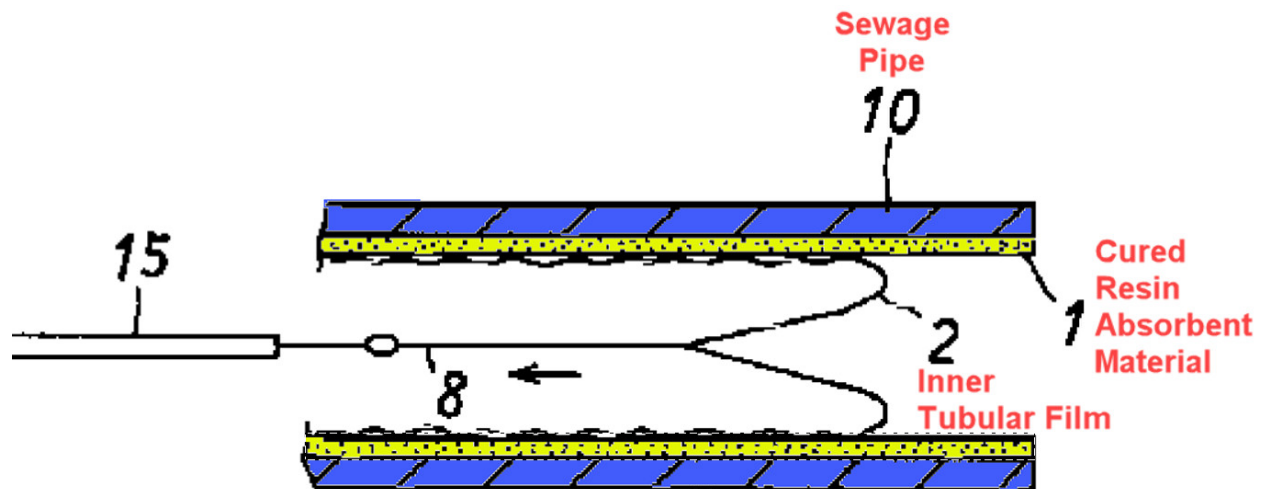
Nagai discloses a CIPP liner with the outer surface of the inner tubular film (2) coated with a “release agent such as **silicone**, ... **wax**, fatty acid, or surfactant ... to form a release layer between the resin absorbent material 1 and the thin film 2” so the film may be released from the cured resin. EX1009, ¶0016.

⁴ EX1009 is the certified English translation of Japanese Application Publication No. JP2002-1819 (Nagai) where the original document is shown in EX1010.

Below is Figure 10 from Nagai showing the CIPP liner inflated against the inner surface of a sewage pipe:



Below is Figure 11 from Nagai showing the inner tubular film (2) being removed from the cured resin:



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).

This Petition applies the ordinary and customary meaning to each of the other claim terms except with respect to sub-element (2) of claim element [1e] for the term “coating” (“*a coating of at least one of ... (2) a coating or covering with at least one migrating compound*”) where Petitioner uses Patent Owner’s expected construction solely for this Petition.

The ’882 Patent discloses two embodiments relating to “migrating compound.” EX1001, 5:23-34. The first embodiment is where the migrating compound “is ***incorporated in*** that outermost layer of the one- or multilayered film to whose external side the migrating compound should migrate.” EX1001, 5:23-29 (emphasis added). The second embodiment is where “a coating with the migrating compound can be ***done on the external side*** in question.” EX1001, 5:30-34 (emphasis added).

In the pending District Court Litigation filed by the Patent Owner against the Petitioner, the Patent Owner contends that subpart (2) of claim element [1e] for “coating” covers both the first embodiment and the second embodiment for the migrating compound. EX1035, pp. 11-14, EX1037, ¶¶15, 40. With respect to independent claim 1, Buergofol’s preliminary infringement contentions contend that a “coating” includes “an external layer that faced the resin, and this *external layer included an amount of a migrating compound*, specifically EBS wax.” EX1039, p. 6. With respect to dependent claim 7, Buergofol’s preliminary infringement contentions contend that a “coating” is a “migrating compound *on the surface* of the inner tubular film.” EX1039, p. 7. The Patent Owner has also alleged in the pending District Court Litigation that “migrating compound” includes a release “wax” such as “EBS wax.” EX1033, ¶¶15, 28, 40; EX1037, ¶¶15, 28, 40.

Solely for this Petition, Petitioner applies Patent Owner’s expected construction for only claim element [1e] “coating”, where the term “coating” includes (1) a migrating compound *incorporated into* the outermost layer of the inner tubular film or (2) a migrating compound *applied over* the external side of the inner tubular film.

Petitioner reserves all rights to take different positions with respect to claim construction in the pending District Court Litigation.

IX. Identification of Challenge and Relief Requested.

Petitioner requests cancellation of Claims 1, 3-7, and 10-13 of the '882 Patent based on the following grounds:

Ground	Claims	Prior Art	Statutory Basis (35 U.S.C.)
1	1, 4-7, 10-11	Hummel	§ 102(b)
2	3	Hummel	§ 103
3	1, 3-7, 10-13	Hummel + Schuhmann	§ 103
4	1, 3-7, 10-11	Hummel + Nagai	§ 103

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

Grounds 1-4 are not cumulative of the art of record they address limitations not found by the Examiner in the prior art references considered during prosecution. Grounds 3 and 4 are not cumulative because they use different secondary references that address different alternative limitations of the “coating” limitation of claim 1 and also address different dependent claims.

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, 4-7, 10 and 11 Are Anticipated by Hummel.

Hummel discloses each and every element of claims 1, 4-7, 10 and 11 pursuant to pre-AIA 35 U.S.C. § 102(b). *See infra* Sections X(A)(1)-(7); EX1003, ¶¶109-170. Claims 1, 4-7, 10 and 11 are therefore anticipated under pre-AIA 35 U.S.C. § 102(b) by Hummel. As explained in Section VIII, this ground is presented solely under Patent Owner’s expected interpretations of claim element [1e].

1. Claim 1.

a) [1pre] “An insertion tube for use in trenchless sewage pipe renovation, comprising:”

Hummel discloses “an **insertion tube** and a pipe repair system suitable for the repair of underground pipes, preferably underground sewer pipes.” EX1005, 4:10-11, Figure 1. Hummel therefore discloses “An insertion tube for use in trenchless sewage pipe renovation” as recited in claim 1. EX1003, ¶111.

b) [1a] “an opaque external tubular film that is impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths;”

Hummel discloses “it is necessary for the outer tube of the insertion tube to have or consist of a protective layer to prevent premature exposure to UV radiation from the outside and thus premature resin curing.” EX1005, 5:7-9. Hummel further discloses “a liquid-tight, UV radiation and/or short-wave visible light absorbing

and/or reflecting outer single- or multilayer tubular film as **an outer tube (103).**”

EX1005, 15:15-16, Figure 1.

Hummel therefore discloses “an opaque external tubular film that is impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths” as recited in claim 1. EX1003, ¶¶112-114.

c) [1b] “an inner tubular film;”

Hummel discloses “a liquid-tight preferably non-conditioned multilayer film according to the invention, preferably in the form of a tubular film, as **an inner tube (105).**” EX1005, 15:16-18, Figure 1. Hummel therefore discloses “an inner tubular film” as recited in claim 1. EX1003, ¶¶115-117.

d) [1c] “a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film; and”

Hummel discloses “a **carrier material [(104)]** impregnated with a reactive plastic resin lying between the two tubes [inner and outer tubes].” EX1005, 15:5-6, 18-19, Figure 1. Hummel therefore discloses “a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film” as recited in claim 1. EX1003, ¶¶118-120.

e) [1d] “wherein the inner tubular film comprises: one or multiple layers an inner facing external side and an outer facing external side facing the carrier material;”

Hummel discloses “a liquid-tight preferably non-conditioned multilayer film according to the invention, preferably in the form of a tubular film, as **an inner tube**

(105).” EX1005, 15:16-18, Figure 1. Hummel further discloses “a layer (a) ... as one of the outside layers” and “a layer (e) as one of the outside layers.” EX1005, Abstract. Figure 1 of Hummel discloses that the inner tube (105) of Hummel has an inner facing external side and an outer facing external side facing the carrier material (104). EX1005, Figure 1.

Hummel therefore discloses “wherein the inner tubular film comprises: one or multiple layers an inner facing external side and an outer facing external side facing the carrier material.” EX1003, ¶¶121-125.

- f) **[1e] “a coating of at least one of (1) a coating with a polysiloxane; or (2) a coating or covering with at least one migrating compound; and”**

As discussed previously, solely for this Petition, Petitioner applies Patent Owner’s construction for claim element [1e] “coating”, where the term “coating” includes (1) a migrating compound *incorporated into* the outermost layer of the inner tubular film **or** (2) a migrating compound *applied over* the external side of the inner tubular film. *See supra* Section VIII. Sub-elements (1) and (2) of claim limitation [1e] are stated in the disjunctive “or” meaning that if either sub-element (1) or (2) of claim limitation [1e] is found in Hummel, then limitation [1e] is disclosed.

Hummel discloses that “[t]he repaired pipe (108) is formed from this impregnated carrier material (104) after curing and, if necessary, after removal or extraction of the internal tube (105).” EX1005, 15:23-24. Hummel further discloses

“[h]igh mechanical requirements are placed on the inner tube ... so that it can withstand the loads occurring during its handling, which occur, for example, ... during removal from the pipe.” EX1005, 5:13-17. Hummel further discloses that “[a]fter curing, ...the multilayer film according to the invention, preferably in the form of a tubular film, can be peeled off as an inner tube, preferably without tearing or seizing therefrom.” EX1005, 23:1-3. Hummel further discloses that the inner tubular film “can be peeled off from it without being torn, torn in or torn off.” EX1005, 7:9-10.

Hummel discloses that any of the layers, including the external layers (a) or (e), may “be treated with additives selected from the group consisting [of] ... ant[i] blocking agents, ... **lubricants**, ... **waxes**, ... surface-active compounds, preferably **surfactants**, and dispersants.” EX1005, 11:18-25; EX1003, ¶¶127-130, 133. A POSITA would recognize that anti blocking agents, lubricants, waxes, surface-active compounds (e.g., surfactants) and dispersants are “migrating compounds” that migrate to the surface of the plastic film. EX1003, ¶¶64-65. Furthermore, the ’882 Patent extensively discusses how “wax” is a “migrating compound” and gives examples of using “waxes” as an additive to the outer layer of the inner tubular film. EX1001, 4:15-19, 5:39-67, 15:15-18, 16:3-57; 18:10-28; EX1003, ¶¶130-132. The ’882 Patent further gives examples of “advantageous waxes” such as “surfactants.” EX1001, 5:52-55.

Furthermore, Patent Owner has asserted in the District Court Litigation that the term “migrating compound” includes “wax” incorporated into the outer layer of the inner tubular film satisfies the “coating” limitation of claim 1. EX1037, ¶¶15, 28, 40. The ’882 Patent further describes the “migrating compound” as being, for example, a “wax” and gives examples of using wax as an additive to the outer layer of the inner tubular film. EX1001, 4:15-19, 5:39-55, 15:15-18, 16:3-57; 18:10-28.

Hummel discloses “a coating of ... (2) a coating or covering with at least one migrating compound” and therefore discloses sub-element (2) of limitation [1e] as recited in claim 1. Limitation [1e] is therefore disclosed by Hummel. EX1003, ¶¶126-133.

g) [1f] “wherein the coating is applied over a section of or an entire circumferential area of the outer facing external side facing the carrier material.”

Hummel discloses that the inner tubular film “after the resin has cured, can be peeled off from it without being torn, torn in or torn off.” EX1005, 7:9-10. Hummel also discloses that “[a]fter curing ... [the tubular film] can be peeled off as an inner tube, preferably without tearing or seizing therefrom.” EX1005, 23:1-3. Hummel therefore discloses the motivation to have a release coating that is at least over a section of or the entire area of the outer facing external side facing the carrier material so that the inner tubular film can be removed without tearing. *Id.*

Using Patent Owner’s expected construction for claim element [1e] “coating,” Petitioner discussed in the previous section how Hummel discloses treating both external layers, which includes the external layer with the outer facing external side facing the carrier material, with an additive such as “waxes,” “lubricants,” or “anti blocking agents,” all recognized as “migrating compounds.” *See supra* Section X(A)(1)(f). Thus, because “migrating compounds” migrate to the surface of a material, treating the external layer with “waxes” or other migrating compounds creates a “coating” that is “over a section of or an entire circumferential area of the outer facing external side facing the carrier material.” EX1003, ¶134.

Hummel therefore discloses “wherein the coating is applied over a section of or an entire circumferential area of the outer facing external side facing the carrier material” as recited in claim 1. EX1003, ¶134.

Hummel discloses all of the limitations of independent claim 1 and therefore anticipates independent claim 1.

2. Claim 4.

[4] “The insertion tube according to claim 1, wherein the inner tubular film has a total thickness between 10 μm and 5000 μm .”

Hummel discloses “the multilayer [inner tubular] film according to the invention has a total layer thickness of from 20 to 2000 μm .” EX1005, 12:8-9.

Hummel therefore discloses “wherein the inner tubular film has a total thickness between 10 μm and 5000 μm ” as recited in claim 4. EX1003, ¶¶140-141.

Hummel discloses all of the limitations of dependent claim 4 and therefore anticipates dependent claim 4.

3. Claim 5.

- a) **[5a] “The insertion tube according to claim 1, the inner tubular film further comprising at least one internal layer in the form of an adhesion promoter layer, wherein at least one of the external layers comprising the coating, and wherein:”**

The Petitioner has previously discussed how Hummel discloses at least one of the external layers comprises the coating. *See supra* Section X(A)(1)(f). Hummel further discloses “an adhesion promoter layer (b)” and “an adhesion promoter layer (d)” that are each internal layers within the inner tube. EX1005, Abstract, Claim 1, 6:13, 15, 11:5-8; EX1003, ¶¶144-145.

Hummel therefore discloses “the inner tubular film further comprising at least one internal layer in the form of an adhesion promoter layer, wherein at least one of the external layers comprising the coating” as recited in claim 5. EX1003, ¶¶144-145.

- b) [5b] “one of the external layers has at least one homo- and/or copolyamide and the other external layer has at least one thermoplastic olefin homo- or copolymer with a proportion by weight expressed in percent of more than 25% by weight, or”**

Hummel discloses “a layer (e) based on at least one homo- and/or copolyamide as one of the outer layers or surface layers” and “a layer (a) based on at least one thermoplastic olefin homo- or copolymer as one of the outer layers.” EX1005, 6:11-17; EX1003, ¶¶146-147.

Hummel further discloses where the “layers (a), (c) and (e) and the adhesion promoter layers (b) and (d) of the multilayer film according to the invention may, if necessary, each independently contain at least 0.01-20% by weight, preferably at least 0.1-10% by weight, in each case based on the total weight of a single layer, of at least one of the above additives” thereby each layer would be 80-99.99% bulk polymer. EX1005, 12:3-4; EX1003, ¶148. In other words, “the proportion by weight” of the “copolymer” is “expressed in percent of more than 25% by weight.” EX1005, 12:3-4; EX1003, ¶148.

Hummel therefore discloses “one of the external layers has at least one homo- and/or copolyamide and the other external layer has at least one thermoplastic olefin homo- or copolymer with a proportion by weight expressed in percent of more than 25% by weight” as recited by claim 5. EX1003, ¶¶143-150.

Because limitation [5c] of claim 5 is optional (limitation [5c] is listed in the alternative after the disjunctive word “or” in limitation [5b] in claim 5) and Hummel discloses limitations [5a] and [5b], Hummel therefore discloses the limitations of claim 5. EX1003, ¶¶143-150.

4. Claim 6.

- a) [6a] “The insertion tube according to claim 5, the inner tubular film further comprising an additional internal layer comprising one of:”**

Hummel discloses “an inner layer (c).” EX1005, 6:14, Claim 1. Hummel therefore discloses “the inner tubular film further comprising an additional internal layer.” EX1003, ¶¶152-153.

- b) [6c] “a barrier material against oxygen, water vapor, or oil; or”**

Hummel discloses the “inner layer (c) based on at least one homo- and/or copolyamide.” EX1005, 6:14, Claim 1; EX1003, ¶¶152-153. Hummel further discloses “at least one barrier layer, particularly preferably an oxygen barrier layer, water vapor barrier layer or an oil barrier layer”. EX1005, 20:4-5; EX1003, ¶¶154-155. Hummel further discloses that “at least one homo- or copolyamide, is preferably suitable for producing the barrier layer.” EX1005, 20:8-9; EX1003, ¶¶155-156.

Hummel therefore discloses “an additional internal layer” comprising “a barrier material against oxygen, water vapor, or oil” as recited by claim 6. EX1003, ¶¶151-159.

Because limitations [6b] and [6d] in claim 6 are optional (listed in the alternative with the disjunctive word “or” in limitation [6c] in claim 6) and Hummel discloses limitations [6a] and [6c], Hummel therefore discloses the limitations of claim 6. EX1003, ¶¶151-159.

5. Claim 7.

[7] “The insertion tube tubular film according to claim 5, wherein the coating has a thickness no more than 15 μm .”

As discussed above in limitation [1e], the external layer (e) of Hummel is “(2) a coating or covering with at least one migrating compound.” *Supra* Section X(A)(1)(f); EX1003, ¶¶160. Hummel further discloses that “The layers (c) and (e) of the multilayer film according to the invention preferably each have a layer thickness of 5 μm to 100 μm , particularly preferably of 10 μm to 60 μm , independently of one another.” EX1005, 11:2-4. The external layer (e) of Hummel having a thickness of 5 μm or 10 μm are both less than 15 μm . EX1003, ¶164.

In addition, a POSITA would know that the thickness of a coating on an external surface of external layer (e) that is an additive (e.g., wax) that migrated to

the surface of external layer (e) in Hummel would have a thickness of less than 15 μm . EX1003, ¶164.

Hummel therefore discloses an insertion tube tubular film “wherein the coating has a thickness of no more than 15 μm ” as recited by claim 7. EX1003, ¶¶160-165.

6. Claim 10.

- a) **[10a] “The insertion tube according to claim 1, wherein the coating is a coating or covering with at least one migrating compound, and the migrating compound is one of:”**

As discussed above in limitation [1e], Hummel discloses the external layer (e) is “(2) a coating or covering with at least one migrating compound.” *See supra* Section X(A)(1)(f). Hummel therefore discloses “wherein the coating is a coating or covering with at least one migrating compound” as recited by claim 10 in limitation [10a].

- b) **[10b] “(1) a lipophilic compound from the group of a wax, paraffin, fatty acid, or a fat, or”**

Hummel discloses that potential additives that can be added to external layer (e) include “waxes.” EX1005, 11:18-25. Hummel therefore discloses “a lipophilic compound from the group of a wax, paraffin, fatty acid, or a fat.” EX1003, ¶¶166-168.

Because limitation [10c] in claim 10 is optional (listed in the alternative after the disjunctive word “or” in limitation [10b] of claim 10) and Hummel discloses

limitations [10a] and [10b], Hummel therefore discloses the limitations of claim 10. EX1003, ¶¶166-168.

7. Claim 11.

[11] “The insertion tube according to claim 10, wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer or a homo- or copolyamide.”

Hummel discloses “the multilayer film according to the invention is preferably used as an inner tube in such a way that the resin to be cured or the substrate impregnated with a resin to be cured is directly adjacent to its outer layer or surface layer (e).” EX1005, 16:3-5. Hummel discloses the “layer (e) [is] based on at least one homo- and/or copolyamide.” EX1005, 6:16. Hummel further discloses that potential additives that can be added to external layer (e) include “waxes” which are lipophilic compounds. EX1005, 11:18-25; EX1003, ¶169.

Hummel therefore discloses “wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer or a homo- or copolyamide” as recited in claim 11. EX1003, ¶169.

B. Ground 2: Claim 3 is Obvious Over Hummel.

As discussed previously, Hummel discloses all of the limitations of independent claim 1 which claim 3 depends from. *See supra* Section X(A)(1).

[3] The insertion tube according to claim 1, the inner tubular film further comprising a layer that contains a thermoplastic elastomer (TPE) within a range of more than 20% by weight up to 100% by weight.

Claim 3 of the '882 Patent is rendered obvious pursuant to pre-AIA 35 U.S.C. § 103 over Hummel (EX1005) in light of the general knowledge of a POSITA regarding the use of a thermoplastic elastomer (TPE) layer in film in percentages from 20% to 100% by weight, which would have provided a reasonable expectation of success and yielded predictable results. EX1003, ¶¶136-139.

Patent Owner may attempt to argue that POSITA knowledge cannot be used in an inter partes review, but Patent Owner would be incorrect. “Although the prior art that can be considered in inter partes reviews is limited to patents and printed publications, it does not follow that we ignore the skilled artisan’s knowledge when determining whether it would have been obvious to modify the prior art.” *Koninklijke Philips N.V. v. Google LLC*, 948 F.3d 1330, 1337 (Fed. Cir. Jan. 30, 2020). “Regardless of the tribunal, the inquiry into whether any ‘differences’ between the invention and the prior art would have rendered the invention obvious to a skilled artisan necessarily depends on such artisan’s knowledge.” *Id.*, citing *Dow Jones & Co. v. Abblaise Ltd.*, 606 F.3d 1338, 1349, 1353 (Fed. Cir. 2010) (affirming the district court’s grant of summary judgment of invalidity on “grounds of obviousness under [a single prior art reference] in view of general knowledge in the field,” in part because the obviousness “analysis requires an assessment of the ‘.

. . background knowledge possessed by a person having ordinary skill in the art” (emphasis added) (quoting *KSR Int’l Co. v. Teleflex, Inc.*, 550 U.S. 398, 401 (2007))); see also *Arendi S.A.R.L. v. Apple Inc.*, 832 F.3d 1355, 1361 (Fed. Cir. 2016) (in an inter partes review, acknowledging that common sense and common knowledge can, under certain circumstances, be used to supply a missing limitation); *Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–63 (Fed. Cir. 2013) (in an ex parte reexamination, in which the applicable prior art is similarly limited to patents and printed publications, determining that “[a]s KSR established, the knowledge of such an artisan is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious”).

Hummel discloses that desirable mechanical properties of the inner tubular film include “very good elasticity, so that it withstands the stresses occurring during the repair of underground pipes, in particular during inflation in the pipe system.” EX1005, 7:5-12. A POSITA would have been motivated to add a layer of thermoplastic elastomer (TPE) to the layers of the inner tube of Hummel because TPE has elastic qualities that prevent rupturing or tearing of the inner tubular film. EX1003, ¶138. It would have therefore been obvious for a POSITA to try adding a TPE layer to the multilayer inner tubular film of Hummel to enhance the mechanical properties of the film with a reasonable expectation of success because TPEs were well-known for their excellent mechanical properties and their ease of processing at

the time of the invention thereby yielding predictable results. EX1003, ¶138. Further, it would be obvious for a POSITA to try adding a TPE layer with a composition of at least 20% by weight of TPE and more preferably 100% by weight of TPE in order to achieve the predictable results of increased mechanical properties desired from the addition on a TPE layer. EX1003, ¶138.

Therefore, it would have been obvious to a POSITA to modify the inner tubular film of Hummel to include an additional layer of TPE of at least 20% by weight in light of the general knowledge of a POSITA regarding the use of a thermoplastic elastomer (TPE) layer to achieve an “inner tubular film further comprising a layer that contains a thermoplastic elastomer (TPE) within a range of more than 20% by weight up to 100% by weight” as recited by claim 3.

As such, the limitations of dependent claim 3 would have been obvious to a POSITA over Hummel. And because the limitations of claim 3 would have been obvious to a POSITA, claim 3 is obvious over Hummel.

C. Ground 3: Claims 1, 3-7 and 10-13 Are Obvious Over Hummel in View of Schuhmann.

To the extent that Hummel is determined not to disclose “a coating of at least one of (1) a coating with a polysiloxane; or (2) a coating or covering with at least one migrating compound,” claims 1, 3-7, and 10-13 are unpatentable under pre-AIA 35 U.S.C. § 103 over Hummel in view of Schuhmann (EX1007). Dr. Kurt Stark,

the first inventor for the '882 Patent, is a named co-inventor on Schuhmann. EX1007, Cover.

Every limitation of claims 1, 3-7, and 10-13 is disclosed or suggested by Hummel and Schuhmann. *See infra X(C)(1)-(10)*. Thus, a POSITA would have had a reasonable expectation of success in making the claimed invention using well-known, standard techniques. EX1003, ¶¶171-225. A POSITA would have known that Schuhmann's disclosure of release films that are (1) "siliconized on at least one side," (2) "coated with [a waxy additive]," or "whose carrier layer contains waxy additives" would create an increased release effect for films from adhesives and cured resins. EX1007, 4:9-12.

Thus, a POSITA would have been motivated to combine "coating or covering based on at least one lipophilic compound" from Schuhmann to the external side facing the carrier material of the inner tubular film of Hummel to provide the desired release effect between the inner tubular film and the carrier material. EX1003, 191. A POSITA would have been motivated to combine Hummel with Schuhmann to provide the desired "release effect" of the inner tubular film from the cured resin as discussed in the '882 Patent. EX1001, 1:48-50, 2:30-43, 2:53-66, 4:64-67, 5:9-18, 8:57-64, 13:13-21, 15:42-52.

Claims 1, 3-7, and 10-13 are obvious over Hummel in view of Schuhmann. EX1003, ¶¶171-225.

1. Claim 1.

- a) [1pre] “An insertion tube for use in trenchless sewage pipe renovation, comprising:”**

Hummel discloses “An insertion tube for use in trenchless sewage pipe renovation” as recited in claim 1. *See supra* X(A)(1)(a).

- b) [1a] “an opaque external tubular film that is impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths;”**

Hummel discloses “an opaque external tubular film that is impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths” as recited in claim 1. *See supra* X(A)(1)(b).

- c) [1b] “an inner tubular film;”**

Hummel discloses “an inner tubular film” as recited in claim 1. *See supra* X(A)(1)(c).

- d) [1c] “a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film; and”**

Hummel discloses “a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film” as recited in claim 1. *See supra* X(A)(1)(d).

- e) [1d] “wherein the inner tubular film comprises: one or multiple layers an inner facing external side and an outer facing external side facing the carrier material;”

Hummel discloses “wherein the inner tubular film comprises: one or multiple layers an inner facing external side and an outer facing external side facing the carrier material.” *See supra* X(A)(1)(e).

- f) [1e] “a coating of at least one of (1) a coating with a polysiloxane; or (2) a coating or covering with at least one migrating compound; and”

As discussed previously, solely for this Petition, Petitioner applies Patent Owner’s construction for claim element [1e] “coating”, where the term “coating” includes (1) a migrating compound *incorporated into* the outermost layer of the inner tubular film **or** (2) a migrating compound *applied over* the external side of the inner tubular film. *See supra* Section VIII. The Petitioner further specifically incorporates by reference Section X(A)(1)(f) into this section.

Furthermore, Schuhmann discloses “release films are already known from the prior art whose carrier layer contains waxy additives or is coated with such additives.” EX1007, 4:11-12. Schuhmann further discloses “a release film comprising at least one layer (a) based on at least one thermoplastic polymer, which has **at least on one side as a finish a coating or covering based on at least one lipophilic compound.**” EX1007, 5:6-13; EX1003, ¶¶180-182. Schuhmann further discloses “layer (a) may be **coated on one side with the lipophilic compound** or

have occupancy on at least one of its surfaces by at least one **migrated lipophilic compound.**” EX1007, 5:13-15. Schuhmann further discloses “In another preferred embodiment, the layer (a) of the release film used according to the invention has an external coating based on at least one lipophilic compound as a *finish*.” EX1007, 6:1-2. Schuhmann further discloses how to manufacture a polymer film that includes a “**migratable lipophilic compound.**” EX1007, 18:9-33; EX1003, ¶185.

Schuhmann discloses that “[a] wax is preferably present as the lipophilic compound for achieving the required release effect of the release film.” EX1007, 6:10-11; EX1003, ¶¶183-184. Schuhmann provides additional examples of suitable waxes including “fatty acids,” “fatty acid amides,” and “surfactants.” EX1007, 6:12-22. Schuhmann specifically discloses that “[a] particularly preferred fatty acid amide is ethylene-bis-stearylamine” – a.k.a. EBS wax. EX1007, 8:28-30. “EBS wax” is specifically the “migrating compound” the Patent Owner alleges in its Complaint that is within the scope of limitation [1e]. EX1037, ¶¶15, 28, 40.

Consequently, a POSITA would have been motivated to modify the external surface of the tubular film of Hummel to include the “coating or covering based on at least one lipophilic compound” from Schuhmann to provide a good release effect between the inner tubular film and the cured carrier material to prevent “tearing” of the inner tubular film as desired by Hummel. EX1003, ¶194; EX1005, 23:1-3.

Hummel and Schuhmann disclose or suggest sub-element (2) of limitation [1e] of claim 1 comprising “a coating of ... (2) a coating or covering with at least one migrating compound” as recited in claim 1. EX1003, ¶¶178-192.

- g) [1f] **“wherein the coating is applied over a section of or an entire circumferential area of the outer facing external side facing the carrier material.”**

Using Patent Owner’s expected construction for claim element [1e] “coating,” Petitioner has discussed in the previous section how Schuhmann discloses (1) release films on one side, (2) release films “coated on one side with the lipophilic compound,” and (3) release films that “have occupancy on at least one of its surfaces by at least one **migrated lipophilic compound**.” *See supra* Section X(C)(1)(f). Coating on one side with a lipophilic compound or treating the external layer with a “migrated lipophilic compound” such as EBS wax creates a “coating” that is “over a section of or an entire circumferential area of the outer facing external side facing the carrier material.” As stated in the previous Section X(C)(1)(f), a POSITA would have been motivated to modify the external surface of the tubular film of Hummel to include the “coating or covering based on at least one lipophilic compound” from Schuhmann to provide a good release effect between the inner tubular film and the cured carrier material to prevent “tearing” of the inner tubular film as desired by Hummel. EX1003, ¶194; EX1005, 23:1-3.

Hummel and Schuhmann therefore disclose “wherein the coating is applied over a section of or an entire circumferential area of the outer facing external side facing the carrier material” as recited in claim 1. EX1003, ¶¶193-195.

Independent claim 1 is therefore obvious over Hummel in view of Schuhmann. EX1003, ¶¶172-195.

2. Claim 3.

[3] **The insertion tube according to claim 1, the inner tubular film further comprising a layer that contains a thermoplastic elastomer (TPE) within a range of more than 20% by weight up to 100% by weight.**

The release film disclosed by Schuhmann includes “at least one layer (a) based on at least one thermoplastic polymer, which has at least on one side as a finish a coating or covering based on at least on lipophilic compound...” EX1007 5:7-8; EX1003, ¶196. Schuhmann further teaches that the “thermoplastic polymer” is selected from “the group comprising polyolefins, polyamides, polyesters, polystyrenes, biodegradable polymers and **copolymers of at least two monomers of said polymers...**”. EX1007 9:20-10:1-2; EX1003, ¶196.

A POSITA would have understood that copolymers of the monomers contemplated by Schuhmann include TPEs. EX1003, ¶197. Therefore, Schuhmann discloses a release film, comprising a TPE, which has at least on one side as a finish a coating or covering based on at least one lipophilic compound. *Id.*

A POSITA would have found it obvious to replace the polyamide based exterior layer (e) of Hummel with the TPE layer (a) of Schuhmann. EX1003, ¶¶198-200. A POSITA would also been motivated to use at least 20% by weight, and preferably 100% by weight, of TPE for the exterior layer (e) to achieve the desired mechanical properties of Hummel (i.e., elasticity and toughness). EX1003, ¶¶200-201.

Therefore, it would have been obvious to a POSITA to combine Hummel with Schuhmann to achieve an “inner tubular film further comprising a layer that contains a thermoplastic elastomer (TPE) within a range of more than 20% by weight up to 100% by weight” as recited by claim 3. EX1003, 196-201.

Dependent claim 3 is therefore obvious over Hummel in view of Schuhmann. EX1003, ¶¶196-201.

3. Claim 4.

[4] **“The insertion tube according to claim 1, wherein the inner tubular film has a total thickness between 10 μm and 5000 μm .”**

Hummel discloses “wherein the inner tubular film has a total thickness between 10 μm and 5000 μm ” as recited in claim 4. *See supra* X(A)(2); EX1003, ¶202.

Dependent claim 4 is obvious over Hummel in view of Schuhmann. EX1003, ¶202.

4. Claim 5.

- a) **[5a] “The insertion tube according to claim 1, the inner tubular film further comprising at least one internal layer in the form of an adhesion promoter layer, wherein at least one of the external layers comprising the coating, and wherein:”**

Hummel discloses “the inner tubular film further comprising at least one internal layer in the form of an adhesion promoter layer, wherein at least one of the external layers comprising the coating.” *See supra* X(A)(3)(a); EX1003, ¶203.

- b) **[5b] “one of the external layers has at least one homo- and/or copolyamide and the other external layer has at least one thermoplastic olefin homo- or copolymer with a proportion by weight expressed in percent of more than 25% by weight, or”**

Hummel discloses “one of the external layers has at least one homo- and/or copolyamide and the other external layer has at least one thermoplastic olefin homo- or copolymer with a proportion by weight expressed in percent of more than 25% by weight” as recited by claim 5. *See supra* X(A)(3)(b); EX1003, ¶203.

Dependent claim 5 is obvious over Hummel in view of Schuhmann. EX1003, ¶203.

5. Claim 6.

- c) **[6a] “The insertion tube according to claim 5, the inner tubular film further comprising an additional internal layer comprising one of:”**

Hummel discloses “the inner tubular film further comprising an additional internal layer.” *See supra* X(A)(4)(a); EX1003, ¶204.

d) [6c] “a barrier material against oxygen, water vapor, or oil; or”

Hummel discloses “an additional internal layer” comprising “a barrier material against oxygen, water vapor, or oil” as recited by claim 6. *See supra* X(A)(4)(b); EX1003, ¶204.

Dependent claim 6 is obvious over Hummel in view of Schuhmann. EX1003, ¶204.

6. Claim 7.

[7] “The insertion tube tubular film according to claim 5, wherein the coating has a thickness no more than 15 μm .”

Hummel discloses an insertion tube tubular film “wherein the coating has a thickness of no more than 15 μm .” *See supra* X(A)(5); EX1003, ¶205.

As discussed previously with respect to limitations [1e] and [1f], it would have been obvious to a POSITA to modify Hummel to include the “coating or covering based on at least one lipophilic compound” from Schuhmann to the external side facing the carrier material of the inner tubular film of Hummel to provide the release effect between the inner tubular film and the carrier material as desired by Hummel. EX1003, ¶206. Schuhmann discloses a “[t]he layer (a) of the release film used according to the invention can have a thickness of 2 μm to 200 μm .” EX1007, 12:5-6. Therefore, the thickness of the coating disclosed by Schuhmann is less than 15 μm . EX1003, ¶206.

Hummel and Schuhmann therefore disclose “wherein the coating has a thickness no more than 15 μm ” as recited by claim 7. Dependent claim 7 is therefore obvious over Hummel in view of Schuhmann. EX1003, ¶¶205-207.

7. **Claim 10.**

- a) **[10a] “The insertion tube according to claim 1, wherein the coating is a coating or covering with at least one migrating compound, and the migrating compound is one of:”**

Hummel discloses “wherein the coating is a coating or covering with at least one migrating compound” as recited by claim 10 in limitation [10a]. *See supra* X(A)(6)(a).

Schuhmann also discloses a release film “which has at least on one side as a finish **a coating or covering based on at least one lipophilic compound.**” EX1007, 5:7-8, 11-13; EX1003, ¶210. Schuhmann further discloses “the layer (a), a mixture of at least one thermoplastic polymer and at least one **migratable lipophilic compound.**” EX1007, 18:9-10.

Hummel and Schuhmann therefore disclose “wherein the coating is a coating or covering with at least one migrating compound” as recited by claim 10 in limitation [10a].

b) [10b] “(1) a lipophilic compound from the group of a wax, paraffin, fatty acid, or a fat, or”

Hummel discloses “a lipophilic compound from the group of a **wax**, paraffin, fatty acid, or a fat.” *See supra* X(A)(6)(a). Schuhmann also discloses a lipophilic compound that is a **wax** or fatty acid. EX1007, 6:10-11, 21; EX1003, ¶210.

Dependent claim 10 is therefore obvious over Hummel in view of Schuhmann. EX1003, ¶¶208-211.

8. Claim 11.

[11] “The insertion tube according to claim 10, wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer or a homo- or copolyamide.”

Hummel discloses “wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer or a homo- or copolyamide” as recited in claim 11. *See supra* X(A)(7).

Schuhmann also discloses “it is also possible to add the lipophilic compound and/or additive to the melted polymer component(s) of the respective layer...” EX1007 18:27-29; EX1003, ¶213. Schuhmann further discloses that the external side, layer (a) is based on “at least one thermoplastic polymer” selected from a group of thermoplastics, including specifically polyolefins and polyamides. EX1007, 9:20-10:1-3. EX1003, ¶213.

Dependent claim 11 is therefore obvious over Hummel in view of Schuhmann. EX1003, ¶¶212-215.

9. Claim 12.

[12] The insertion tube according to claim 10, wherein the migrating lipophilic or hydrophilic compound has a proportion of at least 1% by weight of a respective layer in which it is contained.

Schuhmann teaches that the lipophilic compound can be incorporated into the thermoplastic release layer (a). EX1007, 18:9-11; EX1003, ¶216. Schuhmann discloses where “[t]he lipophilic compound is preferably present in an amount of $\leq$ 20 wt. % ... in each case based on the total weight of the release film used according to the invention.” EX1007, 11:23-12:2; EX1003, ¶216. Schuhmann further discloses where “the lipophilic compound of the release film used according to the invention comprising at least one layer (a) ... is present in an amount of $\leq$ 20 wt. % ... based on the total weight of the release film.” EX1007, 13:8-12; EX1003, ¶216.

Schuhmann therefore discloses “wherein the migrating lipophilic or hydrophilic compound has a proportion of at least 1% by weight of a respective layer in which it is contained.” A POSITA would have been motivated to use an amount of migrating lipophilic compound (e.g., wax) at least 1% by weight of the layer as disclosed in Schuhmann to provide an increased release effect of the inner tubular film of Hummel. EX1003, EX1003, ¶217.

Dependent claim 12 is therefore obvious over Hummel in view of Schuhmann. EX1003, ¶¶216-218.

10. Claim 13.

[13pre] The insertion tube according to claim 12, wherein the migrating lipophilic or hydrophilic compound is one of:

[13e] of claim 13 is deemed to not provide any additional limitations as it is merely a preamble. To the extent that [13e] is considered a limitation, both Hummel and Schuhmann disclose migrating lipophilic compounds as discussed previously. *See supra* Sections X(A)(1)(e) and X(C)(1)(e).

[13a] a short-chain compound or an oligomer with 1 to 50 carbon atoms;

Schuhmann discloses that the “migratable lipophilic compound” can be either fatty acids, fatty alcohols or long-chain amines which would be understood by a POSITA to constitute “a short-chain compound or an oligomer with 1 to 50 carbon atoms.” EX1007, 6:23-7:1-6; EX1003, ¶¶220-222. Hummel in view of Schuhmann therefore discloses a migrating lipophilic compound of “a short-chain compound or an oligomer with 1 to 50 carbon atoms” as recited by claim 13.

Because limitations [13b] and [13c] of claim 13 are optional (limitations [13b] and [13c] are listed in the alternative with the disjunctive word “or” in limitation [13b] in claim 13) and Schuhmann discloses limitations [13a] and [13b], Hummel and Schuhmann therefore disclose the limitations of claim 13.

Dependent claim 13 is therefore obvious over Hummel in view of Schuhmann. EX1003, ¶¶219-225.

D. Ground 4: Claims 1, 3-7 and 10-11 Are Obvious Over Hummel in View of Nagai.

To the extent that Hummel is argued not to disclose “a coating of at least one of (1) a coating with a polysiloxane; or (2) a coating or covering with at least one migrating compound,” claims 1, 3-7, and 10-11 are unpatentable under pre-AIA 35 U.S.C. § 103 over Hummel in view of Nagai (EX1009).

Every limitation of claims 1, 3-7, and 10-11 is disclosed or suggested by Hummel and Nagai. *See infra X(D)(1)-(10)*; EX1003, ¶226. Thus, a POSITA would have had a reasonable expectation of success in making the claimed invention using well-known, standard techniques. EX1003, ¶¶256, 260. A POSITA would have known that Nagai’s disclosure of coating the inner tubular film of a CIPP liner with a “release agent” (e.g., silicone, wax) would create an increased release effect for the inner tubular film of Hummel from cured resins. EX1007, 4:9-12.

A POSITA would have been motivated to combine the inner tubular film of Hummel with the “release agent” of Nagai to achieve the desired “release effect” of the inner tubular film from the cured resin. EX1001, 1:48-50, 2:30-43, 2:53-66, 4:64-67, 5:9-18, 8:57-64, 13:13-21, 15:42-52; EX1003, ¶238.

Thus claims 1, 3-7, and 10-13 are obvious over Hummel in view of Nagai. EX1003, 226-267.

1. Claim 1.

- a) [1pre] “An insertion tube for use in trenchless sewage pipe renovation, comprising:”**

Hummel discloses “An insertion tube for use in trenchless sewage pipe renovation” as recited in claim 1. *See supra* X(A)(1)(a).

- b) [1a] “an opaque external tubular film that is impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths;”**

Hummel discloses “an opaque external tubular film that is impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths” as recited in claim 1. *See supra* X(A)(1)(b).

- c) [1b] “an inner tubular film;”**

Hummel discloses “an inner tubular film” as recited in claim 1. *See supra* X(A)(1)(c).

- d) [1c] “a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film; and”**

Hummel discloses “a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film” as recited in claim 1. *See supra* X(A)(1)(d).

- e) [1d] “wherein the inner tubular film comprises: one or multiple layers an inner facing external side and an outer facing external side facing the carrier material;”

Hummel discloses “wherein the inner tubular film comprises: one or multiple layers an inner facing external side and an outer facing external side facing the carrier material.” *See supra* X(A)(1)(e).

- f) [1e] “a coating of at least one of (1) a coating with a polysiloxane; or (2) a coating or covering with at least one migrating compound; and”

As discussed previously, solely for this Petition, Petitioner applies Patent Owner’s construction for claim element [1e] “coating”, where the term “coating” includes (1) a migrating compound *incorporated into* the outermost layer of the inner tubular film **or** (2) a migrating compound *applied over* the external side of the inner tubular film. *See supra* Section VIII. The Petitioner incorporates by reference Section X(A)(1)(f) into this section.

To the extent that Hummel can be argued not to disclose or suggest limitation [1e] of claim 1, Nagai discloses the following:

It is preferable to **apply a release agent** such as **silicone**, fluoridated oil, high melting point **wax**, **fatty acid**, or surfactant in advance **to the inner circumferential surface of the thin film 2** or the outer circumferential surface of the resin absorbent material 1 **to form a release layer between the resin absorbent material 1 and the thin film 2** so that the thermosetting resin does not function as an adhesive even

after impregnating the resin absorbent material 1 with the liquid thermosetting resin.

EX1009, ¶0016; EX1003, ¶235. Wax is understood to be a “migrating compound” as asserted by the Patent Owner in its Complaint. EX1037, ¶¶15, 28, 40. Waxes and fatty acids are also identified as “migrating compounds” in the ’882 Patent. EX1001, 4:15-17, 5:39-60, 15:14-17, 16:3-50; EX1003, ¶236. Therefore, Nagai teaches the same release agents as the ’882 Patent: silicone, and migrating compounds, such as waxes, fatty acids, or surfactants. EX1009, ¶0016; EX1003, ¶¶236-237.

Nagai further discloses the removal of inner tubular film (2) from the cured resin which is easily done because of the “release layer.” EX1009, ¶¶0025-0027. Nagai further discloses that “there is no tearing of the thin film after construction as before, such as to clog the pipe.” EX1009, ¶0029.

A POSITA would have found it obvious to combine Nagai with Hummel as they are both in the CIPP technology and both address the need for the easy release of the inner tubular film from the cured resin with “no tearing.” EX1009, ¶¶0016, 0026, 0027, 0029; EX1003, ¶238. A POSITA would have been motivated to combine the “release agent” (silicone, wax, fatty acid) of Nagai to the external surface of the inner tubular film of Hummel to increase the release effect between

the inner tubular film and the cured resin to prevent sticking of the inner tubular film to the cured resin. EX1003, ¶238.

Hummel in view of Nagai therefore disclose “a coating of ... a coating or covering with at least one migrating compound” as recited in claim 1.

g) [1f] **“wherein the coating is applied over a section of or an entire circumferential area of the outer facing external side facing the carrier material.”**

Using Patent Owner’s expected construction for claim element [1e] “coating,” Petitioner has discussed in the previous section how Nagai discloses applying a “release layer” over the external side of the inner tubular film to form a release coating between the inner tubular film and the resin to be cured. *See supra* Section X(C)(1)(f). Nagai further discloses that “[i]t is preferable to **apply a release agent** such as silicone, fluoridated oil, high melting point wax, fatty acid, or surfactant in advance **to the inner circumferential surface** of the thin film 2.” EX1009, ¶0016. It would have been obvious to a POSITA to apply the release agent of Nagai as a coating over a section of or the entire external surface of the inner tubular film of Hummel. EX1003, ¶241.

Hummel in view of Nagai therefore disclose “wherein the coating is applied over a section of or an entire circumferential area of the outer facing external side facing the carrier material” as recited in claim 1. EX1003, ¶¶233-238.

Independent claim 1 is therefore obvious over Hummel in view of Schuhmann. EX1003, ¶¶226-242.

2. Claim 3.

[3] The insertion tube according to claim 1, the inner tubular film further comprising a layer that contains a thermoplastic elastomer (TPE) within a range of more than 20% by weight up to 100% by weight.

Nagai discloses “The thin film 2 may also be a single layer structure made of a thermoplastic resin such as polyethylene, polyvinyl chloride, or **polyurethane**.” EX1009, ¶0013. A POSITA would have understood polyurethane, contemplated by Nagai as a possible material for its inner tubular film, to be a TPE. EX1003, ¶244.

A POSITA would have been motivated to combine the TPE layer of Nagai with inner tubular film of Hummel to increase the elasticity, tear strength and abrasion resistance of the inner tubular film along with improving other mechanical properties. EX1003, ¶244. A POSITA would have also been motivated to use more than 20% TPE by weight (preferably 100% TPE) for the TPE layer to achieve the predictable results of the desired mechanical properties (e.g., elasticity, tear strength, abrasion resistance). EX1003, ¶246.

Therefore, it would have been obvious to a POSITA to combine the inner tubular film of Hummel with Nagai’s TPE layer to achieve an “inner tubular film further comprising a layer that contains a thermoplastic elastomer (TPE) within a range of more than 20% by weight up to 100% by weight” as recited by claim 3.

Dependent claim 3 is therefore obvious over Hummel in view of Nagai.
EX1003, ¶¶243-247.

3. Claim 4.

- [4] “The insertion tube according to claim 1, wherein the inner tubular film has a total thickness between 10 μm and 5000 μm .”**

Hummel discloses “wherein the inner tubular film has a total thickness between 10 μm and 5000 μm ” as recited in claim 4. *See supra* X(A)(2).

Dependent claim 4 is therefore obvious over Hummel in view of Nagai.
EX1003, ¶248.

4. Claim 5.

- a) [5a] “The insertion tube according to claim 1, the inner tubular film further comprising at least one internal layer in the form of an adhesion promoter layer, wherein at least one of the external layers comprising the coating, and wherein:”**

Hummel discloses “the inner tubular film further comprising at least one internal layer in the form of an adhesion promoter layer, wherein at least one of the external layers comprising the coating.” *See supra* X(A)(3)(a).

- b) [5b] “one of the external layers has at least one homo- and/or copolyamide and the other external layer has at least one thermoplastic olefin homo- or copolymer with a proportion by weight expressed in percent of more than 25% by weight, or”**

Hummel discloses “one of the external layers has at least one homo- and/or copolyamide and the other external layer has at least one thermoplastic olefin homo-

or copolymer with a proportion by weight expressed in percent of more than 25% by weight” as recited by claim 5. *See supra* X(A)(3)(b).

Dependent claim 5 is therefore obvious over Hummel in view of Nagai. EX1003, ¶249.

5. Claim 6.

- a) **[6a] “The insertion tube according to claim 5, the inner tubular film further comprising an additional internal layer comprising one of:”**

Hummel discloses “the inner tubular film further comprising an additional internal layer.” *See supra* X(A)(4)(a).

- b) **[6c] “a barrier material against oxygen, water vapor, or oil; or”**

Hummel discloses “an additional internal layer” comprising “a barrier material against oxygen, water vapor, or oil” as recited by claim 6. *See supra* X(A)(4)(b).

Dependent claim 6 is therefore obvious over Hummel in view of Nagai. EX1003, ¶250.

6. Claim 7.

- [7] **“The insertion tube tubular film according to claim 5, wherein the coating has a thickness no more than 15 µm.”**

Hummel discloses an insertion tube tubular film “wherein the coating has a thickness of no more than 15 µm.” *See supra* X(A)(5).

A POSITA would have known that the coatings of Nagai, such as silicone and waxes, used as external lubricants of no more than 15 μm in thickness would provide the predictable result of preventing adhesion between the resin impregnated carrier material and the inner tubular film, with a reasonable expectation of success. EX1003, ¶¶255-256.

A POSITA would also have been motivated to use a thin coating of 15 μm or less of a release agent to save money on the cost of coating the inner tubular film and to also prevent contamination of the resin with an excessively thick coating of a release agent which could weaken the strength of the cured resin. A POSITA would be motivated to apply the minimal thickness of coating to the surface of the inner tubular film for well-known practical reasons.

Hummel in view of Nagai discloses “wherein the coating has a thickness no more than 15 μm ” as recited by claim 7. EX1003, ¶257.

Dependent claim 7 is therefore obvious over Hummel in view of Nagai. EX1003, ¶¶251-257.

7. Claim 10.

- a) [10a] “The insertion tube according to claim 1, wherein the coating is a coating or covering with at least one migrating compound, and the migrating compound is one of:”**

Hummel discloses “wherein the coating is a coating or covering with at least one migrating compound” as recited by claim 10 in limitation [10a]. *See supra*

X(A)(6)(a). Nagai also discloses a coating with at least one migrating compound including “high melting point wax” and a “fatty acid.” EX1009, ¶0016; EX1003, ¶260. Hummel and Nagai therefore disclose “wherein the coating is a coating or covering with at least one migrating compound” as recited by claim 10 in limitation [10a].

b) [10b] “(1) a lipophilic compound from the group of a wax, paraffin, fatty acid, or a fat, or”

Hummel discloses “a lipophilic compound from the group of a wax, paraffin, fatty acid, or a fat.” *See supra* X(A)(6)(a). Nagai also discloses a lipophilic compound that is a wax or fatty acid. EX1007, 6:10-11, 21; EX1003, ¶260.

Dependent claim 10 is therefore obvious over Hummel in view of Nagai. EX1003, ¶¶258-262.

8. Claim 11.

[11] “The insertion tube according to claim 10, wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer or a homo- or copolyamide.”

Hummel discloses “wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer or a homo- or copolyamide” as recited in claim 11. *See supra* X(A)(7).

Nagai also discloses adding the “release agent” of a migrating lipophilic compound (wax) to the external side of the inner tubular film that is an external layer

of polyethylene which is a thermoplastic olefin homopolymer. EX1009, ¶0010. Furthermore, a POSITA would have been motivated to apply the migrating lipophilic compound (wax) of Nagai to the external side of the inner tubular film of Hummel comprising layer (e) of a homo- and/or copolyamide adjacent to the resin impregnated material. EX1005, 16; EX1003, ¶¶265-266.

Hummel in view of Nagai therefore discloses “wherein the migrating lipophilic or hydrophilic compound is added to an external side containing a thermoplastic olefin homo- or copolymer or a homo- or copolyamide” as recited in claim 11. EX1003, ¶266-267.

Dependent claim 11 is therefore obvious over Hummel in view of Nagai. EX1003, ¶¶263-267.

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. EX1038, 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 (EX1041).

Although the Board need not address additional *Fintiv* considerations in light of Omega’s *Sotera* stipulation (*see* EX1041), 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. EX1036.

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 (EX1037), 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. EX1036.

Factor 4 favors institution because Petitioner challenges claims 1, 3-7 and 10-13, whereas Patent Owner has only asserted a subset (claims 1, 3-7 and 10-11) in the District Court Litigation. 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. EX1041. *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).

Institution should not be denied under 35 U.S.C. §325(d) because the arguments and evidence presented here were not previously and/or properly considered by the Office. *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 (PTAB Feb. 13, 2020); *Becton, Dickinson*

& Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8 (PTAB Dec. 15, 2017) (precedential).

None of the applied prior art references (Hummel, Schuhmann and Nagai) were disclosed to the USPTO or found by the Examiner. Each of these new applied prior art references has its own strengths and are not cumulative of the prior art considered by the Examiner.

Buergofol may attempt to argue that it disclosed U.S. Patent No. 8,361,580 to Stark (“**the ’580 Patent**”) to the USPTO (EX1002, p. 210) and that Hummel is somehow cumulative of Stark because they both disclose using “waxes” (migrating compound) in all of the layers of inner tubular film for a UV CIPP liner. However, such an argument fails for a number of reasons.

First, Buergofol chose to only disclose the ’580 Patent which issued on January 29, 2013 – less than one-year before the March 11, 2013 asserted priority date of the ’882 Patent. EX1002, p. 210. The ’580 Patent is not prior art to the ’882 Patent under pre-AIA 35 U.S.C. § 102 because (a) it was published less than one-year before the March 11, 2013 earliest filing date of the ’882 Patent and (b) it shared a common joint inventor (Dr. Kurt Stark).

Second, Buergofol did not disclose United States Publication No. 2011/0083765 (Stark), the published application of the ’580 Patent, which published on April 11, 2011 – more than one-year before the March 11, 2013 asserted priority

date of the '882 Patent and is therefore prior art to the '882 Patent under pre-AIA 35 U.S.C. § 102(b). EX1011, Cover. Buergofol also chose not to disclose International Publication No. WO 2010/075946 A1, which the '580 Patent claims priority to and was published on July 8, 2010, making it also prior art under pre-AIA 35 U.S.C. § 102(b). *See, generally*, EX1002.

Third, the Examiner did not apply the '580 Patent nor United States Publication No. 2011/0083765 (Stark). The Examiner was apparently unaware of United States Publication No. 2011/0083765 (Stark) and/or the use of “waxes” (“migrating compounds”) within the external layer of inner tubular film discussed in Stark.

Fourth, Buergofol did not bring to the Examiner’s attention that United States Publication No. 2011/0083765 (Stark) discloses the use of the specific “migrating compound” (*i.e.*, “waxes”) in the inner tubular film that Buergofol alleges infringes the '882 Patent in the District Court Litigation. EX1037, ¶¶15, 28, 40; *See also*, EX1039, pp. 3, 4 and 6, Buergofol’s Infringement Contentions.

Fifth, the Examiner issued a Notice of Allowance not issuing any substantive analysis or rejection of the claims. For the Reasons for Allowance, the Notice of Allowance stated that “WO 98/12465 is the closest prior art” (EX1002, p. 460) but WO 98/12465 merely disclosed a “coating applied onto the internal surface of a pipe.” EX1002, p. 262.

Sixth, the Examiner was led astray by Buergofol's many unsupported and incorrect statements in the '882 Patent that a POSITA would not know that adding additional wax to the external layer of inner tubular film would increase the release effect of the film from the adhesive resin. For example, Buergofol stated "In the films according to the invention, it came as a surprise to discover that a good release effect against adhesive resins is also accompanied by a reduction of the coefficients of friction of film against film. Such a result was unexpected." EX1001, 2:63-67. As another example of an unsupported statement, Buergofol incorrectly stated "Going back to the tubular liner and, in particular, to its inner tube film, a disadvantage of the PE/PA or PE/AP/PA film (AP: adhesion promoter) used so far as inner tube film mentioned above is its excessively low release effect against adhesive resins." EX1001, 2:30-34. As another example, Buergofol incorrectly stated in the '882 Patent "Regarding their release effect towards resins or adhesive substances, the inner tube films known to date are, by and large in need of improvement." EX1001, 2:40-43.

For at least the above reasons, a discretionary denial under 35 U.S.C. § 325(d) would be unwarranted.

XIII. Conclusion.

Petitioner has demonstrated by a preponderance of the evidence that Claims 1, 3-7, and 10-13 of the '882 Patent are invalid and respectfully requests the Board institute a trial and cancel Claims 1, 3-7, and 10-13 of the '882 Patent.

Dated: September 12, 2023

Respectfully submitted,

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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 13,811 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 listings).

Dated: September 12, 2023

Respectfully submitted,

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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 12, 2023, a complete and entire copy of this **PETITION FOR INTER PARTES REVIEW OF U.S. PATENT NO. 9,657,882** and all supporting exhibits (**Exhibits EX1001-EX1041**) were served on the Patent Owner via USPS Priority Mail Express at the correspondence address of record for U.S. Patent No. 9,657,882 as follows:

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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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