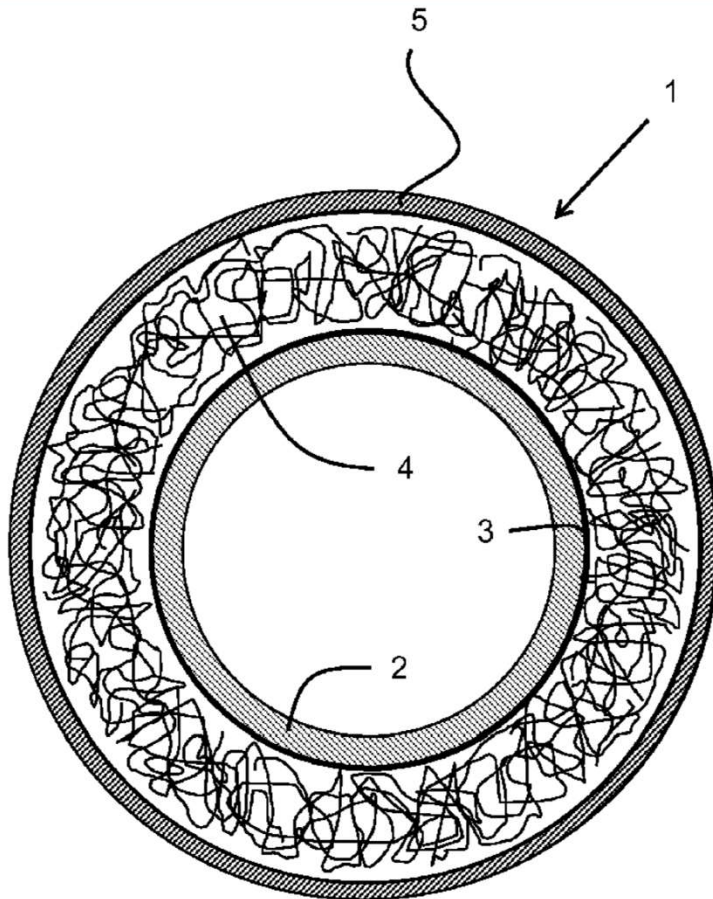


PATENT OWNER BUERGOFOL GMBH'S DEMONSTRATIVES

Hearing on December 17, 2024, for:

Case IPR2023-01372 for
U.S. Patent No. 9,657,882



pillsbury

Introduction



Introduction

- Petitioner Omega Liner Company has not carried its burden in establishing that the claimed invention recited by the Challenged Claims is invalid over the documents cited in the Petition.
- **Challenged Claims:**
 - **Claims 1, 3-7, and 10-13 of U.S. Patent No. 9,657,882 (the “882 Patent”)**
- **ISSUES:**
 - Does Hummel anticipate claims 1, 4-7, 10, and 11, or render obvious claim 3?
 - **No**
 - Does Hummel in view of Schuhmann render obvious claims 1, 3-7, and 10-13?
 - **NO**
 - Does Hummel in view of Nagai render obvious claims 1, 3-7, 10, and 11?
 - **NO**

Challenged Claim Elements

- Claim 1 – An insertion tube for use in trenchless sewage pipe repair renovation, comprising:
 - an opaque external tubular film impermeable to liquids and at least partially reflects or absorbs UV radiation or visible light of short wavelengths;
 - an inner tubular film;
 - a carrier material impregnated with a reactive plastic resin arranged between the external tubular film and the inner tubular film; and
 - the inner tubular film comprises:
 - one or more multiple layers;
 - an inner facing external side and an outer facing external side facing the carrier material;

Challenged Claim Elements

- Claim 1, cont'd
 - 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;
 - 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 10 – The insertion tube according to claim 1, wherein **the coating is a coating or covering** with at least one migrating compound . . .
 - The **“coating or covering”** refers to number (2) from claim 1 above.
- Claim 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 homo- or copolyamide.
 - **“added to”** means it is added to either the inner facing or external facing external side – NOT “applied over” as is the coating of claim 1.

The Surprising and Unexpected Results



Surprising and Unexpected Advantages of Invention

A task of this invention is therefore to make a one- or multilayered film, particularly a multilayered film, available to meet the strict requirements made to its **mechanical stability** and with an outstanding **release effect** against adhesive substances such as resins

EX1001, 2:53-57
PO Response – pg. 6

Example	Initial circumference in mm	Splice in mm	Splice in %	Break in mm	Break in %
V1	1054	1222	15.9	1902	80.5
B1	1044	1220	17.9	2050	96.4
B2	1042	1280	22.8	2170	108.3
B3	1050	1250	19.0	2100	100.0
B4	1050	1229	17.0	1985	89.0
B5	1052	1245	18.3	2016	91.6
B6	1050	1243	18.4	2025	92.9

EX1001, 19:26-41
PO Response – pg. 7

A **surprising** finding was that the elasticity until break increased significantly with coating with polysiloxane and wax additivation

Surprising and Unexpected Advantages of Invention

As already mentioned above, it was **surprisingly** found out that the tubular film according to the invention is characterized by very good mechanical properties.

EX1001, 8:46-53
EX2001, ¶28

During our research, we were **surprised** when we discovered that forming a coating or covering on a polyamide-containing external layer, either by applying a coating of polysiloxane or migrating compound over the external surface, or by forming a covering of a migrating compound due to migration to the surface of the external side of the film, ***not only improved the release effect, which we had anticipated, but unexpectedly improved the mechanical properties of the tubular film.***

EX2004 ¶21
EX2001, ¶33

As we researched ways to form coatings or coverings..., we assumed that the coatings or coverings ***might worsen one or more important mechanical properties*** of the tubular film. For example, we thought that the ***strength of the film might deteriorate*** as we added more migrating compound to the polyamide layer.

EX2004 ¶20
EX2001, ¶33

Surprising and Unexpected Advantages of Invention

- Expert Testimony – EX2001, Inventor Testimony – EX2004, and ‘882 Patent – EX1001 regarding unexpectedly improved mechanical properties are:
 - NOT addressed by Petitioner in the Petition,
 - NOT Cross-Examined,
 - NOT Refuted, and
 - NOT Rebutted with evidence
- Patent Owner has established as a matter of unrefuted and un-rebutted evidence that the claimed invention provides unexpected results
- Even if it would have been obvious to combine or modify Petitioner’s cited art to improve release, Petitioner has presented no evidence to rebut Patent Owner’s evidence of surprising and unexpected results

Unexpected Results Are Objective Indicia Of Non-Obviousness And Must Be Considered

- Petitioner has presented no evidence to rebut Patent Owner's evidence that the inventive coating and covering resulted in unexpectedly improved mechanical properties, such as increased elongation until break.
- Even if the Board were inclined to find that it would have been obvious to combine or modify Petitioner's cited art, the unrefuted and un-rebutted evidence of unexpected results indicate that it would not have been obvious.
- Patent Owner's unexpected results are not "secondary considerations" but rather objective indicia of non-obviousness that must be considered and can be the most probative indicia of nonobviousness in the record. *Crocs, Inc. v. Int'l Trade Comm'n*, 598 F.3d 1294, 1310 (Fed. Cir. 2010)

Claim Construction



Patent Owner's Construction Covers All Embodiments

- Claim 1 recites three embodiments:
 - (1) a **coating** with polysiloxane,
 - (2) a **coating** with a migrating compound, and
 - (3) a covering with a migrating compound.
- The terms “coating” and “covering” in claim 1 must be interpreted consistently with their usage in claims 10-11, which depend from claim 1. Claim 10 recites, “the **coating** is a **coating** or covering”. Thus, the term “coating” in claim 1 has both broad and narrow usages. The term “**coating**” is used broadly to cover all of (1) a **coating** with polysiloxane, (2) a **coating** with migrating compound, and (3) a covering with migrating compound. The term “**coating**” is also used narrowly to cover a coating with polysiloxane or migrating compound that is “**applied over**” the external side of the film as opposed to migrating to the surface of the film.

“Coating” and “Covering” MUST be Different

- Although claim 1 recites a coating of (1) a “coating” of polysiloxane and (2) a “coating or covering” with migrating compound, and the broad usage of “coating” might arguably include “covering”, the terms “coating” and “covering” never have the same meaning.
- Different claim terms are presumed to have different meanings – *Helmsderfer v. Bobrick*, 527 F.3d 1379 (Fed. Cir. 2008) – PO Response, 13.
- The ‘882 Patent, its prosecution history including prosecution of related applications in other countries, compels the conclusion that the recited “coating” is different from the recited “covering.”

Patent Owner's Construction is Consistent with Specification and Prosecution History

- Under the proper construction of the '882 patent claims, including dependent claims 10-11, the outer facing external side of the inner tubular film that faces the carrier material may contain one of the following:
 - a coating with a polysiloxane;
 - a coating with a migrating compound; or
 - a **covering** with a migrating compound that is **added to** the outer polymer layer and migrates to the surface.

(EX2001, ¶22; PO Response, 12-13; EX1001, claim 11)

Patent Owner's Construction – Support in Original Claims

Original Claim 1 (EX1002, 116)

1. Tubular film with one or several layers, in which case at least one of the two external sides of the tubular film (2, 8) have, at least sectionally, a coating (3) with at least one polysiloxane and/or a coating and/or covering with at least one migrating compound.

Original Claim 1 recited an external side having a coating with polysiloxane and/or a coating and/or covering with a migrating compound. (PO Sur-Reply, 15:5-14; PO Response, 14:17-19)

Patent Owner's Construction – Support in Original Claims

Original Claim 8 (EX1002, 117)

8. Tubular film according to one or several of the preceding claims, characterized in that the at least one migrating lipophilic or hydrophilic compound is added to an external layer containing a thermoplastic olefin homo- or copolymer or a homo- and/or copolyamide.

The migrating compound is “added to” an external layer. (PO Sur-Reply, 15:11-12 "originally filed claims EX1002, at 116-120")

Original Claim 13 (EX1002, 118)

13. Tubular film according to one or several of the preceding claims, characterized in that the film thickness of said coating (3) is no more than 15 μm , preferably no more than 5 μm , especially preferably between 0.1 μm and 3 μm , and that the film thickness of said covering is no more than 15 μm , preferably no more than 5 μm , especially preferably between 5 nm and 3 μm .

The coating has a different thickness than the covering. (PO Sur-Reply, 15:11-12 "originally filed claims EX1002, at 116-120")

Patent Owner's Construction – Support in Specification

- “According to another preferred alternative, at least one wax, paraffin, . . . compound is contained in at least one of the two outer layers. A coating with these substances is also possible.” EX1001, 4:15-20; EX2001, ¶18; PO Response, 15-16.
- “The film thickness of the coating and/or covering. . . Is between 5 nm and 3 µm in case of a covering and between 0.1 to 3 µm in case of a coating.” EX1001, 7:6-10; EX2001, ¶19, PO Response at 16.
- “The behavior is similar when a covering or coating with migrating compounds is provided in addition to the above-mentioned polysiloxane coating or instead of it.” EX2001, 12:48-50, PO Response, 17.

Petitioner's Construction Relies On Obvious Translation Error In The Specification

- Petitioner's construction of "coating" and "covering" relies on an obvious translation error at just one location in the '882 patent (EX1001, 5:23-30), which conflates the translation of "Beschichtung" (coating) and "Belegung" (covering) that are correctly used in the original German specification. (See EX1002, page 379 of 489, the original German "Alternative der Belegung" refers to the covering—not coating—alternative.) (PO Sur-Reply, 14)
- Other than at that one location, the claims and the specification consistently use "coating" (Beschichtung) and "covering" (Belegung) correctly.
- Petitioner's construction of "coating" and "covering" is also inconsistent with the corresponding Danish patent DK/EP 2777925, which correctly translates the aforementioned location in the '882 patent as: "In the alternative of a **covering** with a migrating compound." The '882 patent states in the very same portion of the specification (EX1001, 5:23): "In the **coating** alternative with a migrating compound."

No Support For Petitioner's Claim Construction

- Petitioner offers no evidence that a POSITA would have construed the claims in the manner Petitioner construes them such that the adding of a migrating compound to the external layer, as recited by claim 11, forms a coating instead of a covering.
- Petitioner's construction, in which adding a migrating compound to a layer forms a coating instead of a covering, excludes the preferred examples B4-B6.
- The preferred examples B4-B6 do not coat the outer surface of the external layer with a migrating compound, but rather add the migrating compound into the layer during its formation, and would not be included within the scope of claim 1 under Petitioner's construction.

Patent Owner's Construction – Consistent with Foreign Prosecution

- The Federal Circuit has held that statements made in foreign prosecution may be considered during claim construction. *Apple v. Motorola, Inc.*, 757 F.3d 1286, 1312 (Fed. Cir. 2014), overruled in part by *Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015); *see also, e.g., Microsoft Corp. v. Multi-Tech Systems Inc.*, 357 F.3d 1340, 1350 (Fed. Cir. 2004).
- During prosecution of EP2777925, the EP counterpart of the '882 patent, the patentee noted that the invention included distinct embodiments:

“According to one alternative, a **coating with at least one polysiloxane and/or at least one migrating compound** is claimed and according to another alternative, a **covering with a migrating compound** is claimed (as well as a combination of these two alternatives). The covering is produced by introducing the migrating compound into said outer layer and its subsequent migrating movement to the surface of this outer layer. The latter alternative is disclosed, for example, on page 9 in the fourth paragraph of the original description.”

EX2006, 9 of 15; EX2001, ¶23; PO Response, 17-18

Patent Owner's Construction Also Permits "Applied Over" To Recite A Structure Of The Apparatus

- If the Board does not adopt PO's interpretation that the narrow usage of "coating" in the last clause of claim 1 concerns only a coating that is applied over and not a covering that migrates out, the proper interpretation of "applied over" as describing a structure in an apparatus claim (as opposed to a step of a method claim) permits "applied over" to describe both structures of the broad usage of "coating," which include both a coating that is coated on the external side as well as a covering formed by migrating out to the external side. (PO Sur-Reply, 15:5-10)
- Regardless of where the polysiloxane or migrating compound originated from, the structures of the coating (narrow usage) and covering are both disposed "applied over" the external side of the inner tubular film. The last clause recites that the structures are disposed over "a section of or an entire circumferential area of" the side of the film, so the covering could only be applied over the entire circumferential area, whereas the coating (narrow usage) could be applied over either a section of or the entire circumferential area of the side of the film. (PO Response, 15:1-5; 19:6-7; EX2001, ¶66)

A POSITA, including Petitioner's Expert, Knows Whether A Coating Or Covering Exists Is Based On Its Purpose

- The claimed coating or covering is very thin and not readily seen with the naked eye. So how do you know if you've formed a covering when using a migrating compound?
- Both Petitioner's and PO's experts agreed:
 - ***It depends on whether the objective of the coating is achieved.***
- Petitioner's expert Dr. MacLean testified that a "coating" may or may not exist if a small amount of migrating compound migrated to the surface, "depending on what the objective of the coating is." EX2015, 15:7-11
- PO's expert Dr. Brant testified if a small amount of material were present on the external surface of the inner tubular film, but did not perform the function of improved release effect and mechanical properties, that small amount "would not be considered by a POSITA to be a coating or covering in the context of the '882 patent." EX2001, ¶13.

The Challenged Claims Are Patentable Over Petitioner's Cited Art



Ground I Fails Because Hummel Cannot Anticipate Claim 1

- Hummel Does NOT disclose a coating or a covering. (PO Response, 34:10-1; EX2015, 62)
- Not a single example out of Hummel's 4 inventive and 3 comparative examples includes a coating or covering.
- Hummel discloses that the inner tubular film, after curing, can be removed without tearing or seizing, but yet no example includes a coating or covering
- Petitioner's expert contends that a "release" agent is required for Hummel's film to be removed without tearing, despite Hummel's disclosure otherwise.
- ***Petitioner's expert admits Hummel does not expressly disclose using a migrating compound*** (EX2015, 63:12-14; PO Response, 38:15-39:4)

Ground I Fails Because Hummel Cannot Anticipate Claim 1

- To arrive at the claimed coating or covering from the disclosure of Hummel, a POSITA would have had to **make a selection from a list of countless additives**, and then add those additives to **a particular one of five layers**. **(EX1005, 11:18-26)**

The layers (a), (c), and (e), and also the adhesive-promoter layers (b) and (d), of the multilayer film of the invention can, if necessary, respectively mutually independently comprise additives selected from the group consisting of antistatic agents, antioxidants, antiblocking agents, antifogging agents, antimicrobial ingredients, dyes, color pigments, stabilizers, preferably heat stabilizers, process stabilizers, processing aids, flame retardants, nucleating agents, crystallization aids, preferably crystal-nucleating agents, lubricants, optical brighteners, flexibilizers, sealing aids, plasticizers, silanes, spacers, fillers, peel additives, waxes, wetting agents, surface-active compounds, preferably surfactants, and dispersing agents, to the extent that these additives do not impair permeability to UV radiation.

(EX1005, 11:18-26; PET. at 28; EX1003, ¶¶127-130, 133; PO Response, 41-43)

Ground I Fails Because Hummel Cannot Anticipate Claim 1

- Prior art CANNOT anticipate when a POSITA must select from a large list of possible additives to arrive at the claimed invention. *Ex Parte Smith*, Appeal 2011-00337, application No. 11/890,109, BPAI Decision dated February 28, 2012, designated *Informative*. See also, *In re Meyer*, 599 F.2d 1026 (CCPA 1979), and *Akzo N.V. v. International Trade Comm’n*, 808 F.2d 1471 (Fed. Cir. 1986). **PO Response, 39-40.**
- A POSITA would not have “at once envisaged” first selecting a migrating compound from the large list of possible additives, none of which is disclosed as a migrating compound, then add it to the external layer facing the carrier material, and add it in an appropriate amount to form a covering. **PO Response, 42-43.**

Ground II Fails Because Hummel Does Not Disclose Claim 1, from which Claim 3 depends

- Hummel cannot render obvious dependent claim 3 because Hummel does not disclose independent claim 1, from which claim 3 depends. **PO Response, 43-44.**
- Petitioner improperly relies on “general knowledge of a POSITA” to teach the limitations recited by claim 3. **PO Response, 43.**

Ground III Fails Because There Was No Apparent Reason To Combine Hummel and Schuhmann

- Petitioner has presented no apparent reason for a POSITA to modify Hummel to increase release effect, e.g., by using Schuhmann's embossed release film.
- Hummel discloses that its film "can be removed without tearing." (EX1005, 7:9-10)
- Petitioner inaccurately translates Hummel to disclose "peeling off without tearing." But Hummel never mentions "peeling off" or recognizes any release effect problem. (PO Response, 27-28)
- Hummel uses high-VICAT polymers to make its film stronger and tear resistant.
- Hummel's film has no sticking and tearing problem, so a POSITA would have had no motivation to use a coating or covering from Schuhmann in Hummel's film.

No Reason To Combine Hummel and Schuhmann Was Apparent To A POSITA Because The Problem Was Not Recognized In The Prior Art

- A POSITA would have had no motivation to use a coating or covering from Schuhmann in Hummel's film because Hummel does not recognize any tearing problem during removal of inner film from a pipe after curing of UV resin.
- The inventors were the first to recognize the problem of film tearing due to a chemical interaction between the curable resin and the outer layer of the inner tumular film. This problem was not recognized in the prior art regardless of when the inventors first recognized the problem. PO Sur-Reply, 6; EX2003, ¶21; EX2004, ¶15
- The recognition of the problem is part of the invention and an indication of nonobviousness. *Leo Pharm. Prods. Ltd. v. Rea*, 726 F.3d 1346, 1353 (Fed. Cir. 2013)

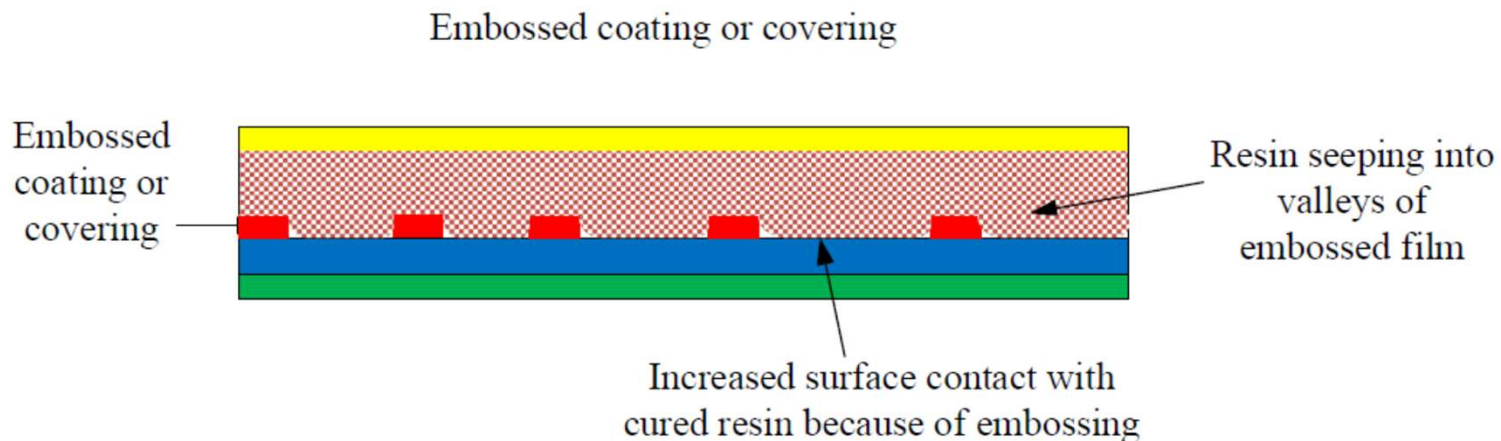
Ground III Fails Because There Is No Reasonable Expectation Of Success In Combining Schuhmann's Embossed Layer With Hummel's Insertion Tube

- Schuhmann's release film requires the outer surface to be embossed. Schuhmann's non-embossed (smooth) example V1b has a much higher separation force (203 cN/cm) than the same film with embossing (Example B1, 44 cN/cm). EX1007, 23-24; PO Response, 46
- Schuhmann uses the embossed pattern to reduce surface contact between the materials and is not concerned with adhesive material flowing into the embossed pattern.
- Schuhmann's embossing could not be performed on the external surface of Hummel's tubular film, and Petitioner has provided no evidence that embossing the external surface of tubular film is even possible.

Ground III Fails Because There Is No Reasonable Expectation Of Success In Combining Schuhmann's Embossed Layer With Hummel's Insertion Tube

- Using Schuhmann's embossed layer with Hummel's coating or covering would result in mechanical interlocking as the UV-curable resin seeps into the valleys of the embossed film. EX2001, ¶54-55

Hummel modified by Schuhmann



Ground IV Fails Because There Was No Apparent Reason To Combine Hummel and Nagai

- Petitioner has presented no apparent reason for a POSITA to modify Hummel to increase release effect, e.g., by using Nagai's release layer.
- Hummel discloses that its film "can be removed without tearing" (EX1005, 7:9-10) Hummel never mentions "peeling off" or recognizes any release effect problem. (PO Response, 27-28)
- Nagai does not recognize any problem with film tearing while being withdrawn from the pipe after curing.
- Hummel's film has no sticking and tearing problem, so a POSITA would have had no motivation to use Nagai's release layer in Hummel's film

No Reasonable Expectation Of Success In Combining Nagai's Release Layer With Hummel's Insertion Tube

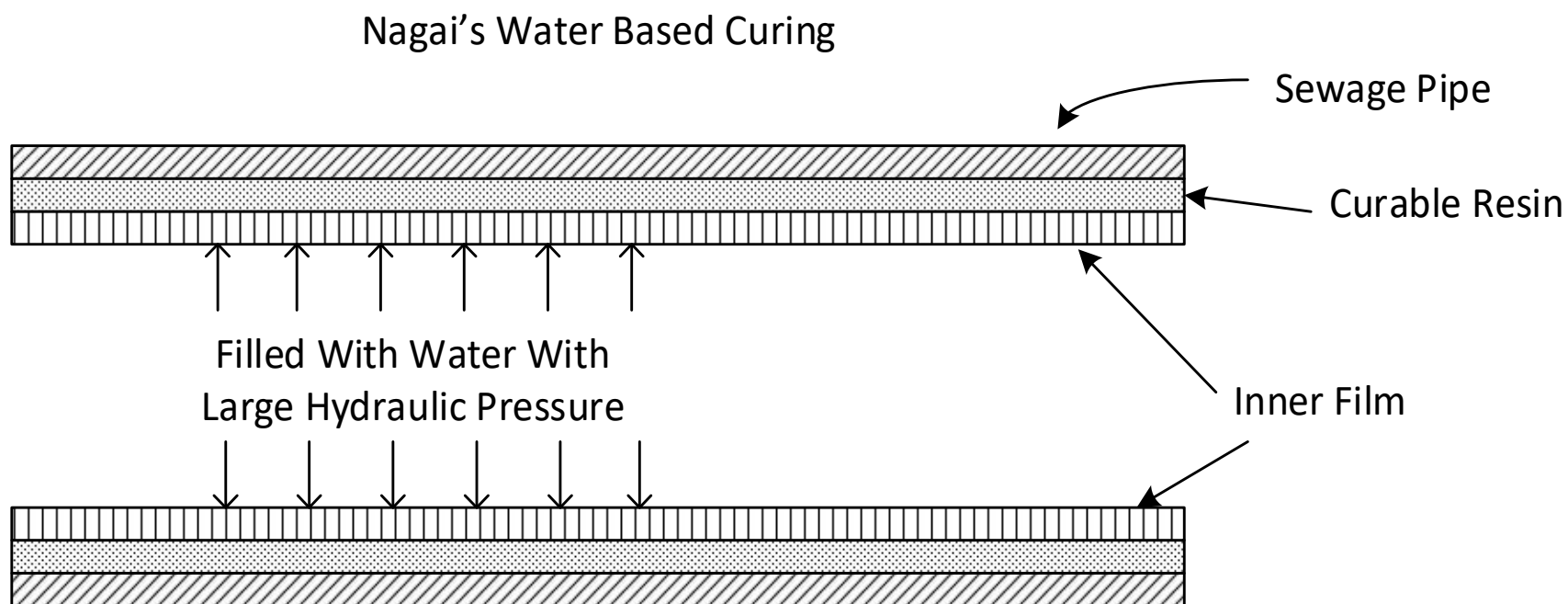
- Nagai's release layer completely prevents adhesion (“forming a release layer between them, **adhesion** of thin film 2 and resin absorbent material 1 due to curing of the thermosetting resin **can be completely prevented**” – EX1009, ¶[0027]), which works perfectly fine in Nagai's water-filled system due to hydraulic pressure (EX1009, ¶[0022]). Unworkable in Hummel's UV-curable system, which uses air, not water.
- Nagai uses a release layer in a water-filled tubular liner under hydraulic pressure that cures the resin with hot water, not UV radiation.

Combining Nagai's Release Layer With Hummel's Insertion Tube Would Have Been Unworkable

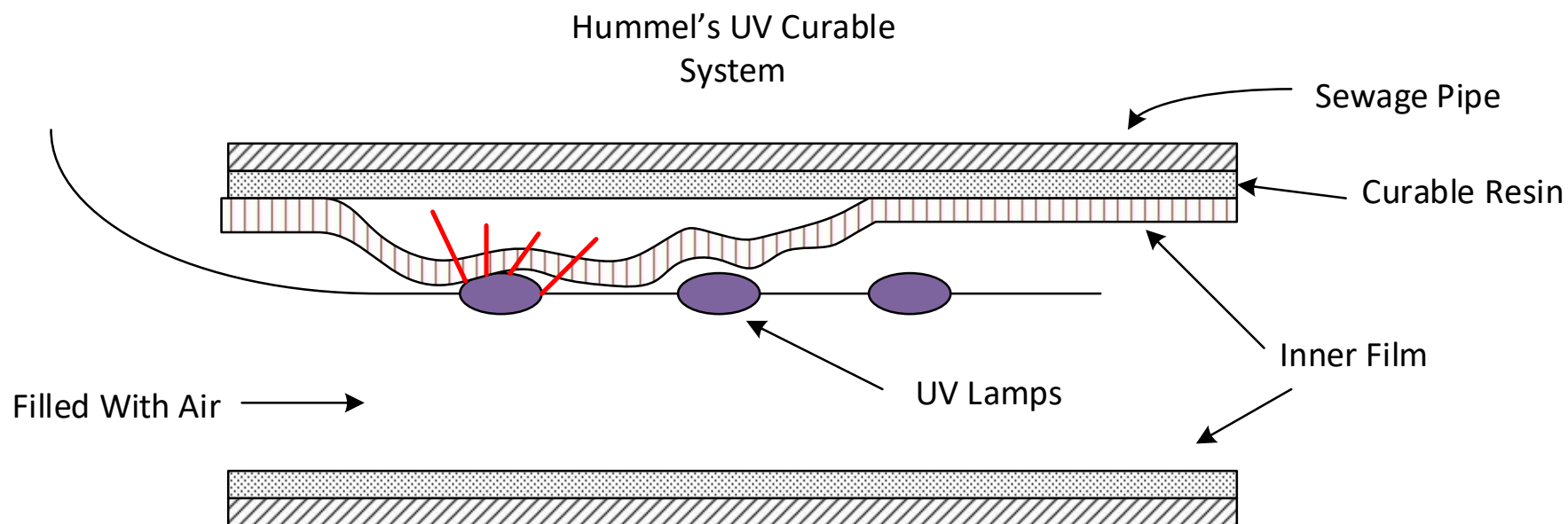
- Petitioner has not refuted the testimony that Nagai's release layer would be unworkable in Hummel's UV-curable system
- Patent Owner has established that a POSITA would not have found it obvious to use a release layer like Nagai's, which "completely prevents" adhesion, in a UV-curable system like Hummel's because the film would collapse onto the hot UV light bulbs as soon as the air pressure is released to remove the light bulbs and film, causing the film to burn. (EX2001, ¶41 "if the air pressure ... decreases"; PO Sur-Reply, 12:14-19; PO Response, 55:2-7)
- The outer polyethylene layer of Nagai's film on which the release layer is formed would melt in the high temperatures of the exothermic UV curing reaction and hot UV light bulbs. EX1009, ¶[0010]; PO Sur-Reply, 11-12.

Combining Nagai's Release Layer With Hummel's Insertion Tube Would Have Been Unworkable

- Illustrations on next two pages show the effect of using a release layer that completely prevents adhesion in Nagai's water-based system, and in Hummel's UV curable system. (EX2001, ¶41; PO Sur-Reply, 12:14-19; PO Response, 55:2-7)



Combining Nagai's Release Layer With Hummel's Insertion Tube Would Have Been Unworkable



Inner film in Hummel's system would collapse if adhesion to the curable resin is "completely prevented" and would could cause fire and emit toxic fumes (PO Response, 55:2-7; EX2001, ¶41; PO Sur-Reply, 12:14-19; drawings analogous to Nagai figs. 8-9 & 11 at EX1009, 13)

Even if Combined, Hummel in View of Nagai Cannot Render Obvious Claim 11

- Nagai discloses only a coating with a release material.
- Claim 11 recites **adding** a migrating lipophilic or hydrophilic compound to a side layer so that it migrates (as in Examples B4-B6) to the surface to form a covering.
- Nagai discloses only an externally applied coating and does not disclose a covering as recited by claim 11.
- Any modification of Hummel by Nagai would only include a coating and not a covering.

The PTAB Should Not Decide in Favor of Petitioner

