

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BLD SERVICES, LLC,
Petitioner,

v.

LMK TECHNOLOGIES, LLC,
Patent Owner.

Case IPR2014-00772
Patent 8,667,992 B2

Before GRACE KARAFFA OBERMANN, SHERIDAN K. SNEDDEN,
and ZHENYU YANG, *Administrative Patent Judges*.

YANG, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

I. INTRODUCTION

BLD Services, LLC (“BLD”) filed a Petition for an *inter partes* review of claims 1–16 of U.S. Patent No. 8,667,992 B2 (Ex. 1001, “the ’992 patent”). Paper 1 (“Pet.”). On November 20, 2014, the Board instituted trial to review patentability of the challenged claims. Paper 13 (“Dec.”).

Thereafter, LMK Technologies, LLC (“Patent Owner”) filed a Patent Owner Response (Paper 19 (“PO Resp.”)), relying on the Declarations of Norman E. Kampbell (Ex. 2005) and Larry W. Kiest, Jr. (Ex. 2006). After deposing Mr. Kampbell (Ex. 1010), Petitioner filed a Reply (Paper 27), relying on the Declaration of David A. Fletcher (Ex. 1013). After deposing Mr. Fletcher (Ex. 2010), Patent Owner filed its Observations on the cross-examination. Paper 30. Petitioner filed its Response to Patent Owner Observations. Paper 32. Oral hearing was held on July 15, 2015. *See* Paper 38 (“Tr.”).

We have jurisdiction under 35 U.S.C. § 6(c) and issue this final written decision pursuant to 35 U.S.C. § 318(a) and 37 C.F.R. § 42.73. We determine that Petitioner has established by a preponderance of the evidence that claims 1–16 of the ’992 patent are unpatentable.

A. *Related Proceedings*

According to the parties, Patent Owner has asserted the ’992 patent against Petitioner in *LMK Technologies, LLC v. BLD Services, LLC*, Case No. 1:14-cv-00956 (N.D. Ill., filed February 11, 2014). Pet. 2; Paper 6, 1. The parties are involved in two other *inter partes* reviews based on patents claiming similar subject matter: IPR 2014-00768 (US 7,975,726) and IPR 2014-00770 (US 8,667,991).

B. The '992 patent

The '992 patent relates to a device and method for repairing pipe, such as underground sewer pipe. Ex. 1001 1:16–17. Specifically, it provides an apparatus for repairing the juncture between a main pipe line and a lateral pipe line. *Id.* at 2:33–34. The apparatus includes a liner assembly, which includes a main liner member and a lateral liner tube, and a hydrophilic gasket or band that seals against entry of ground water at the pipe junction. *Id.* at 2:35–59. Figure 5 of the '992 patent is provided below.

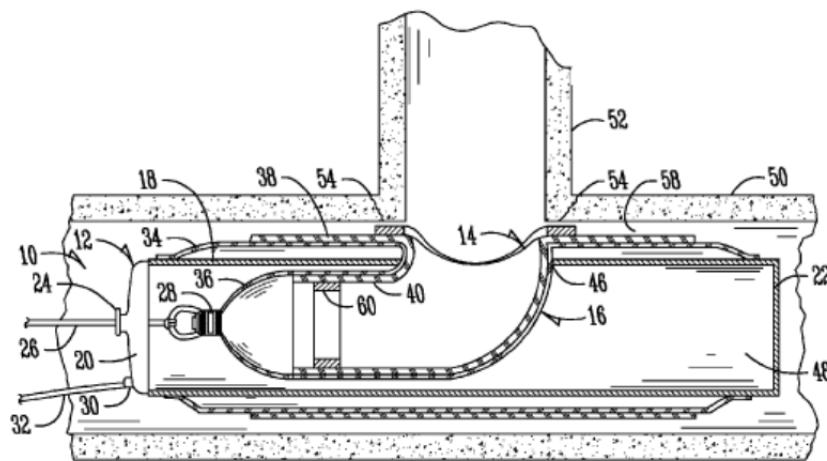


Fig. 5

Figure 5 is a sectional view of a repair assembly placed at the juncture of main pipe line 50 and lateral pipe line 52 in order to repair damaged portion 54. *Id.* at 3:18–19, 65–67.¹ Liner assembly 14 includes main liner tube 38 and lateral liner tube 40. *Id.* at 3:48–50. Fitted on the interior of

¹ In explaining Figures 5 and 6, we cite certain descriptions of Figures 2 and 3 as the two embodiments only differ in whether a gasket (Figures 2 and 3) or a band (Figures 5 and 6) is positioned around the juncture between the main liner tube and the lateral liner tube. See Ex. 1001, 5:21–24.

liner assembly **14** is bladder tube assembly **16**, which includes main bladder tube **34** and lateral bladder tube **36**. *Id.* at 3:46–48, 50–51. To prevent the seepage of ground water, ring-shaped band **62** is positioned on the main liner tube **38** and extends around the juncture between the main liner tube **38** and the lateral liner tube **40**. *Id.* at 5:21–26. Before launch, lateral bladder tube **36** and lateral liner tube **40** are contained within launcher device cavity **48**. *Id.* at 4:24–26.

After launch, lateral bladder tube **36** and lateral liner tube **40** are inverted outwardly through the launcher device opening into the lateral pipe line **52**, as shown in Figure 6 of the '992 patent. *Id.* at 4:35–38.

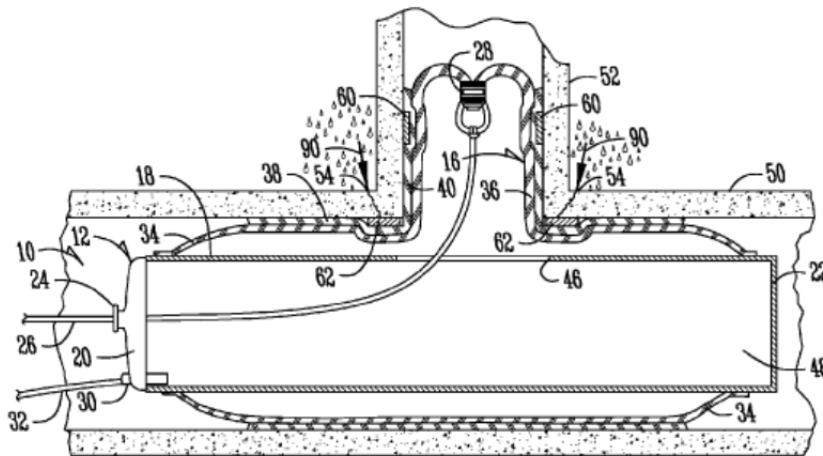


Figure 6 shows the liner assembly in its inflated position. *Id.* at 3:20–21. In this position, band **62** is positioned between the main liner tube assembly **14** and the interior walls of the main pipe line **50**. *See id.* at 4:43–45.

Band **62** is preferably made of a hydrophilic material and swells in response to being exposed to water or other liquid. *Id.* at 5:26–28. One such hydrophilic material is manufactured by DeNeef Construction Chemical Co., under the trademark SWELLSEAL™. *Id.* at 4:54–57, 5:37–39. According

to the '992 patent, the band may be made of a hydrophilic paste. *Id.* at 5:40–44. Upon exposure to liquid, the hydrophilic band expands to effectively seal the area between the liner assembly and the juncture between main pipe line 50 and lateral pipe line 52. *Id.* at 5:26–32.

C. Illustrative Claims

Independent claims 1 and 11 are representative of the challenged claims. They are reproduced below:

1. A method of repairing a main pipe and a lateral pipe connected thereto and in communication therewith to form a pipe joint, comprising:

taking a bladder assembly comprising a main bladder tube and a lateral bladder tube;

taking a liner assembly comprising a main liner member and a lateral liner tube in communication with one another at a liner juncture;

impregnating the liner assembly with a material capable of curing and hardening;

applying a hydrophilic paste to the liner assembly about at least a portion of the liner juncture;

expanding the bladder assembly to position the lateral liner tube against the lateral pipe and the main liner member against the main pipe with the hydrophilic paste at least partially disposed between the main liner member and the main pipe; and

allowing the material capable of curing and hardening to cure and harden.

11. An apparatus for repairing a main pipe and a lateral pipe connected thereto and in communication therewith to form a pipe joint, comprising:

a bladder assembly comprising a main bladder tube and a lateral bladder tube extending from the main bladder tube;

a liner assembly comprising a main liner member at least partially surrounding the main bladder tube and a lateral

- liner tube extending from the main liner member and in communication with the main liner member at a liner juncture;
- the lateral liner tube and lateral bladder tube extendable to a position within the lateral pipe line with the lateral liner tube between the lateral pipe line and the lateral bladder tube; and
- a hydrophilic paste disposed on the liner assembly and at least partially around the liner juncture when the lateral liner tube is extended into the lateral pipe line.

Claims 2–10 depend from claim 1 directly or indirectly. Claims 12–16 depend from claim 11 directly or indirectly.

D. Reviewed Grounds of Unpatentability

The Board instituted trial on the following grounds of unpatentability:

References	Basis	Claim(s) challenged
Kiest '118, ² Kiest '597, ³ De Neef Instructions, ⁴ and De Neef Brochure ⁵	§ 103(a)	1–4 and 6–16
Kiest '118, Kiest '597, De Neef Instructions, De Neef Brochure, Kempenaers, ⁶ and Kiest Study ⁷	§ 103(a)	5

² Kiest et al., U.S. Patent No. 6,994,118 B2, issued February 7, 2006 (Ex. 1002, “Kiest '118”).

³ Kiest et al., U.S. Patent No. 5,765,597, issued June 16, 1998 (Ex. 1003, “Kiest '597”).

⁴ Installation Instructions, SWELLSEAL® WA, De Neef Construction Chemicals, Inc., Rev. 3/2006 (Ex. 1004, “De Neef Instructions”).

⁵ Swellseal® Hydrophilic Waterstop Solutions, De Neef Construction Chemicals, Inc. (Ex. 1005, “De Neef Brochure”).

⁶ Piet Kempenaers, The pressure resistance of SWELLSEAL Sealant WA (Ex. 1006, “Kempenaers”).

II. ANALYSIS

Obviousness is a question of law based on underlying facts. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). In an obviousness determination, we analyze: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art; and (4) objective evidence of nonobviousness, i.e., secondary considerations. *Id.*

A. Expert Testimony

As an initial matter, we note that the Petition was not accompanied by any expert declaration. “The Board expects that most petitions and motions will rely upon affidavits of experts.” Office Patent Trial Practice Guide, 77 Fed. Reg. 48,756, 48,763 (Aug. 14, 2012). Especially in complex cases where obviousness is asserted as a ground of unpatentability, “expert testimony may be critical, for example, to establish the existence of certain features in the prior art or the existence (or lack thereof) of a motivation to combine references.” *Wyers v. Master Lock Co.*, 616 F.3d 1231, 1240 n.5 (Fed. Cir. 2010) (citations omitted). But expert testimony is not a *per se* requirement—where the technology is simple, where the references are easily understandable without the need for expert explanatory testimony, or where the factual inquiries underlying the obviousness determination are not in material dispute, expert testimony, though it might be helpful, may not be indispensable. *Allergan, Inc. v. Barr Labs., Inc.*, 501 F. App’x 965, 972 (Fed. Cir. 2013). In addition, a reason to combine prior art teachings may

⁷ Larry W. Kiest Jr., A Case Study In Infiltration Reduction Through Trenchless Technology, March 1999 (Ex. 1007, “Kiest Study”).

exist “in the content of the public prior art, in the nature of the problem addressed by the invention, or even in the knowledge of one of ordinary skill in the art.” *Princeton Biochemicals Inc. v. Beckman Coulter Inc.*, 411 F.3d 1332, 1338-39 (Fed. Cir. 2005). And in some cases, “the legal determination of obviousness may include recourse to logic, judgment, and common sense, in lieu of expert testimony.” *Wyers*, 616 F.3d at 1239.

Patent Owner challenges the credibility and qualification of Mr. Fletcher, an expert who submitted a declaration in support of Petitioner’s Reply. *See, e.g.*, Paper 30, 1–2, 4. Petitioner, on the other hand, urges that we ignore the declaration of Mr. Kampbell, an expert for Patent Owner, due to his alleged bias and lack of qualification. Reply 13 & nn. 5–6. Neither party, however, seeks to disqualify the expert for the other side. We, thus, consider the declarations from both Mr. Fletcher and Mr. Kampbell, but take account of the credibility challenges raised by each party and accord proper weight to the testimonies.

B. Claim Construction

In an *inter partes* review, we interpret a claim term in an unexpired patent according to its broadest reasonable construction in light of the specification of the patent in which it appears. 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Techs., LLC*, 793 F.3d 1268, 1281 (Fed. Cir. 2015). Under that standard, and absent any special definitions, we assign claim terms their ordinary and customary meaning, as understood by a person of ordinary skill in the art, in the context of the entire patent disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007).

Claim terms need only be construed to the extent necessary to resolve the controversy. *Wellman, Inc. v. Eastman Chem. Co.*, 642 F.3d 1355, 1361 (Fed. Cir. 2011). For purposes of this Decision, we see no need to construe any term expressly.

C. Prior Art Disclosures

1. Kiest '118

Kiest '118 teaches that damages often occur at the junction between a lateral pipe line and a main pipe line. Ex. 1002, 1:17–18. Kiest '118 relates to a device and method for repairing a pipe using hydrophilic seals. *Id.* at 1:6–7. Figure 2 of Kiest '118 is provided below.

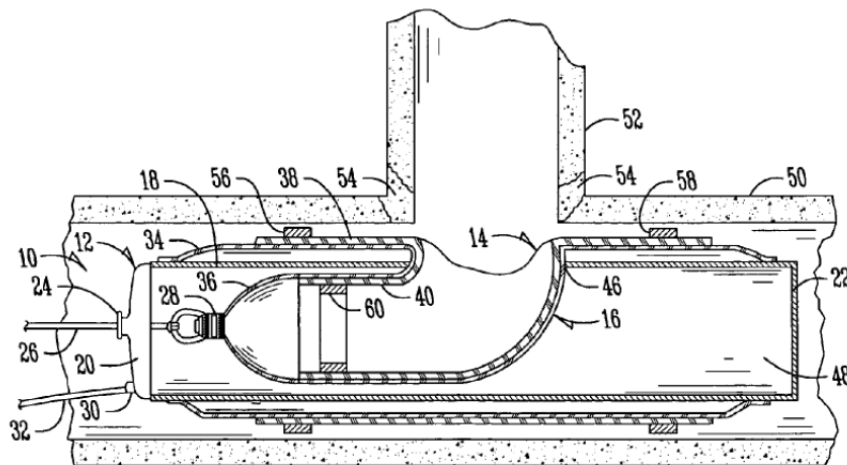


Figure 2 is a sectional view of main pipe line 50 and lateral pipe line 52 showing a repair assembly of Kiest '118 for repairing damaged portion 54. *Id.* at 4:1–2. The repair assembly includes line assembly 14 and bladder assembly 16. *Id.* at 4:16–19. Liner assembly 14 includes main liner tube 38 and lateral liner tube 40. *Id.* at 4:33–34. Fitted on the interior of liner assembly 14 is bladder tube assembly 16, which includes main bladder tube 34 and lateral bladder tube 36. *Id.* at 4:31–32, 35–36. Before launch, lateral

bladder tube **36** and lateral liner tube **40** are contained within launcher device cavity **48**. *Id.* at 4:65–5:1.

To prevent the seepage of ground water into the interior of pipe lines **50** and **52** through the damaged portion **54**, Kiest '118 teaches hydrophilic seals **56** and **58** are wrapped around the main liner tube **38**. *Id.* at 4:48–56. Kiest '118 further teaches that “a third hydrophilic seal **60** may be optionally placed within the interior of the lateral liner tube **40**.” *Id.* at 4:57–58. Hydrophilic seals **56**, **58**, and **60** are made of a hydrophilic material capable of expanding in response to encountering ground water, such as SWELLSEAL®. *Id.* at 5:28–34.

After launch, lateral bladder tube **36** and lateral liner tube **40** are inverted outwardly into the lateral pipe line **52**, as shown in Figure 3 of Kiest '118. *Id.* at 5:5–10.

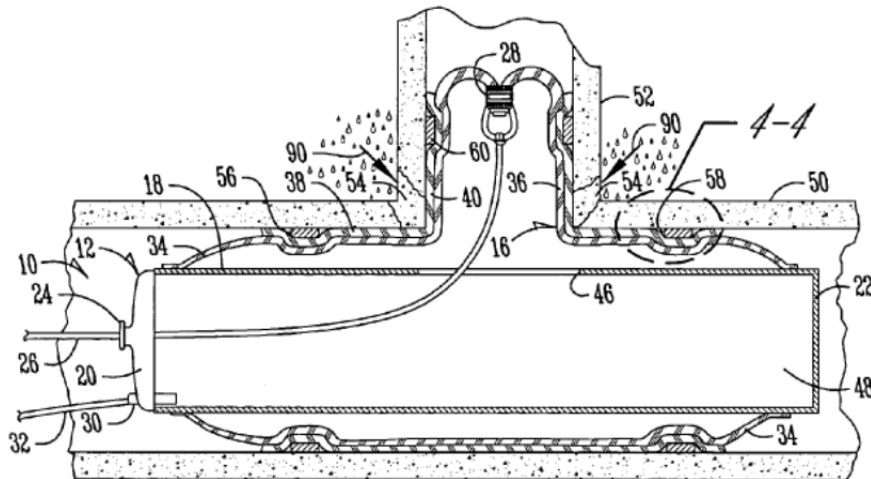


Figure 3 shows the liner assembly in its inflated position. *Id.* at 4:3–4. In this position, the hydrophilic seals **56** and **58** are positioned between the main liner tube **38** and the interior wall of main liner tube **50**, while optional hydrophilic seal **60** is positioned between the lateral liner tube **40** and lateral

liner tube **52**. *Id.* at 5:19–22. Upon encountering water, the hydrophilic seals expand and form watertight seals between liner assembly **14** and the interior walls of main pipe line **50** and lateral pipe line **52**. *Id.* at 5:36–41.

2. Kiest '597

Kiest '597 relates to an apparatus and method for repairing a pipeline. Ex. 1003, 1:8–9. According to Kiest '597, it is common that the junctures between lateral sewer pipelines and main pipelines become damaged or destroyed, which results in ground water infiltrating into the sewer system at the juncture. *Id.* at 9:22–26. Kiest '597 teaches a method for repairing the juncture between a lateral sewer pipe and a mainline sewer pipe. *Id.* at 2:63–65. Figure 19 of Kiest '597 is reproduced below.

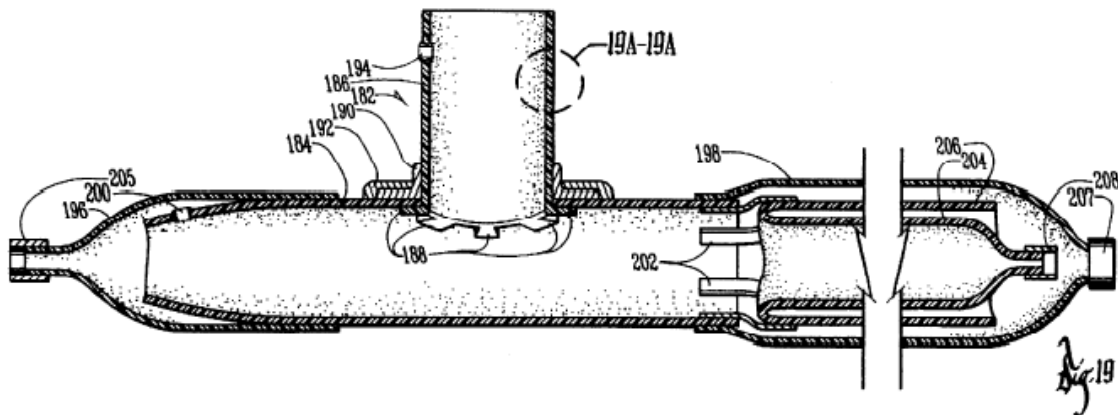


Figure 19 provides a sectional view of T-liner assembly **182** for use in a method for repairing a sewer pipe junction. *Id.* at 6:5–7. T-liner assembly **182** includes main liner sleeve **184** and lateral liner sleeve **186**. *Id.* at 10:65–67. Urethane collar **190**, fused to lateral liner sleeve **186** and main liner sleeve **184** at the juncture thereof, connects and provides an airtight seal between the two liner sleeves. *Id.* at 11:28–32.

Kiest '597 further teaches that gasket **192** is slid down over the lateral liner sleeve **186** until it reaches the junction between lateral liner sleeve **186** and main liner sleeve **184**. *Id.* at 11:34–36. Gasket **192**, in the shape of a donut, is made of absorbent material, such as an open cell foam. *Id.* at 11:32–34. It is impregnated with a hydrophilic chemical grout just before installation. *Id.* at 11:36–38. According to Kiest '597, gasket **192** provides a seal between the liner sleeves and the main pipe, thereby eliminating ground water from infiltrating into the main line sewer pipe. *Id.* at 11:38–41.

3. De Neef Instructions and Kempenaers

Whether a reference qualifies as a “printed publication” involves a case-by-case inquiry into the facts and circumstances surrounding the reference’s disclosure to the public. *In re Klopfenstein*, 380 F.3d 1345, 1350 (Fed. Cir. 2004). A reference is publicly accessible upon a satisfactory showing that such document has been disseminated or otherwise made available to the extent that persons interested and ordinarily skilled in the subject matter or art exercising reasonable diligence, can locate it. *Kyocera Wireless Corp. v. ITC*, 545 F.3d 1340, 1350–51 (Fed. Cir. 2008). After reviewing the parties’ arguments and supporting evidence, we determine that Petitioner has not satisfied its burden to show that De Neef Instructions and Kempenaers are printed publications.

In our Decision to Institute, we acknowledged Patent Owner’s challenge of De Neef Instructions, De Neef Brochure, and Kempenaers as printed publications under 35 U.S.C. § 102. Dec. 10. We stated that Petitioner made a threshold showing that those documents qualify as printed

publications. *Id.* That threshold showing, however, only translates into a *reasonable likelihood* that Petitioner would prevail on the obviousness grounds based, in part, on those documents. Indeed, we contemplated that Petitioner would supplement the record to support the prior art status of those documents. *Id.* n.1. Petitioner did not do so.

In its Response, Patent Owner continues to argue that Petitioner has failed to provide sufficient evidence to establish that De Neef Instructions, De Neef Brochure, and Kempenaers constitute printed publications. PO Resp. 50–56. Patent Owner contends that neither De Neef Instructions (Ex. 1004) nor Kempenaers (Ex. 1006) bears any indication, and Petitioner has not provided any supporting evidence to show, that either was publicly disseminated. PO Resp. 52–53, 55–56. We agree. Even though De Neef Instructions shows “Rev. 03/2006” (Ex. 1004, 3⁸) and Kempenaers shows “09/05/2005” (Ex. 1006, 3), it is unclear what these dates represent. See PO Resp. 52, 55. As Patent Owner contends, for example, “Rev. 03/2006” may simply be a revision date. *Id.* at 52. Petitioner does not point to any persuasive evidence or provide any credible explanation that De Neef Instructions and Kempenaers were publicly accessible on the respective date shown on the documents. As a result, we conclude Petitioner has not provided competent evidence to qualify either De Neef Instructions or Kempenaers as printed publication.

Patent Owner asserts that we must rule in its favor because Petitioner has failed to show that De Neef Instructions and Kempenaers are prior art.

⁸ Exhibits 1004–07 do not include page numbers. We number the pages sequentially in these exhibits.

See, e.g., Tr. 60:4–8. We disagree. As explained later in this Decision, the combination of the rest of the references, all of which qualify as prior art, renders the challenged claims obvious. Patent Owner does not contend that either De Neef Instructions or Kempenaers teaches away from the combination. To the contrary, counsel for Patent Owner concedes that the “DeNeef SWELLSEAL documents . . . are, in fact, merely cumulative and . . . that’s been acknowledged [] in the subject patents that SWELLSEAL is and was a known water stop material.” Tr. 26:5–9. Thus, we decline to dismiss the Petition on this basis. Instead, we do not consider the disclosures of De Neef Instructions and Kempenaers in rendering this Decision.

4. De Neef Brochure

Patent Owner similarly challenges the prior art status of De Neef Brochure. PO Resp. 53–55. Here, we determine that Petitioner has shown that De Neef Brochure is a printed publication.

Patent Owner points out that De Neef Brochure itself does not bear any indication of whether it was publicly disseminated. *Id.* at 53. We agree with this observation. Petitioner, however, provides a declaration from Christopher W. Adams, an attorney with Patton Boggs LLP and counsel for Petitioner. Ex. 1008 ¶ 3. According to Mr. Adams, he obtained De Neef Brochure through a Google search using a custom date range of “01/01/1990” to “03/31/2007.” *Id.* ¶ 6. Mr. Adams testifies that De Neef Brochure was created on “03/13/2006 6:48:56 PM,” last modified on “03/13/2006 6:57:02 PM,” and posted on the internet by at least January 1, 2007. *Id.* ¶¶ 7, 8 (citing Annex 3).

Patent Owner first challenges Mr. Adams as an interested party, and contends that his declaration alone is insufficient to establish that De Neef Brochure constitutes a prior art printed publication. PO Resp. 54–55. We are not persuaded that Mr. Adams, an attorney who originally represented Petitioner, is an interested party. But even if he were, we still would not discount his testimony because it was accompanied by Annex 2—corroborating, documentary, evidence. *See Checkpoint Sys., Inc. v. All-Tag Sec. S.A.*, 412 F.3d 1331, 1339 (Fed. Cir. 2005) (“Physical, documentary, or circumstantial evidence, or reliable testimony from individuals other than the alleged inventor or an interested party, may corroborate.”). We, therefore, conclude that De Neef Brochure was published on the internet on or before January 1, 2007.

Patent Owner next contends that “mere publication on the Internet does not mean that a document was available as of January 1, 2007 such that persons interested and ordinarily skilled in the art, exercising reasonable diligence, can locate it.” PO Resp. 55. We disagree. The website from which Mr. Adams retrieved De Neef Brochure appears to be open to any internet user. Thus, a person of ordinary skill interested in obtaining information about SWELLSEAL®, with reasonable diligence, would have found De Neef Brochure through a simple internet search. *See Voter Verified, Inc. v. Premier Election Solutions, Inc.*, 698 F.3d 1374, 1381 (Fed. Cir. 2012). Based on the evidence of record, we conclude that De Neef Brochure was publicly available by January 1, 2007, and therefore, qualifies as a printed publication under 35 U.S.C. § 102(b).

De Neef Brochure contains product information about various SWELLSEAL® products, including SWELLSEAL® WA, which is described in De Neef Brochure as a gunnable paste. Ex. 1005, 4.

5. Kiest Study

Kiest Study is a case study report of a pipe rehabilitation project conducted by the Patent Owner's predecessor company for a township sanitary district. Ex. 1007, 1. It describes a cured-in-place T-Liner system for repairing a sewer main at the lateral connection, in which the integrally manufactured lateral liner is inverted from the center of the sewer main liner up the lateral. *Id.* at 6.

D. *Level of Ordinary Skill*

Petitioner contends that a person of ordinary skill in the art at the time of the '992 patent invention "would have at least an undergraduate degree in engineering and/or ten years of experience in the pipe repair and/or pipe installation industry." Pet. 7. Patent Owner points out that Petitioner does not cite any support for this assertion. PO Resp. 7.

The skill-level determination is an important guarantee of objectivity in an obviousness analysis. *Graham*, 383 U.S. at 17. Usually, we expect evidence, such as affidavits of experts, to aid our analysis in this respect. Sometimes, however, the prior art may reflect an appropriate skill level. *Litton Indus. Products, Inc. v. Solid State Sys. Corp.*, 755 F.2d 158, 163–64 (Fed. Cir. 1985). Such is the case here. *See, e.g.*, Ex. 1002, 1:6–2:28 (discussing methods for repairing damaged pipe lines using liner tubes impregnated with a liquid material capable of curing and hardening and hydrophilic bands); Ex. 1003, 4:6–23 (discussing methods for repairing the

juncture of a lateral sewer pipe and a mainline sewer pipe by inverting a preliner tube to a position where a gasket impregnated with grout forms a water tight seal between the preliner tube and the sewer pipes).

Patent Owner asserts “the relevant art is sewer pipe renewal and particularly trenchless, cured-in-place pipelining” (PO Resp. 7), and one of ordinary skill in the art is “someone with knowledge of cured-in-place pipelining materials and techniques, and at least several years of experience involving the design and application of cured-in-place pipelining technologies” (*id.* at 8 (citing Ex. 2005 ¶ 21)). For purpose of this Decision, we generally accept Patent Owner’s definition of the art and the statement of the level of skill, with one modification. We determine that an ordinary artisan does not have to be experienced in both designing and applying the technology.

As Patent Owner recognizes, hands-on experience, rather than formal education, serves better in the field of sewer pipe repair. PO Resp. 7–8. Further, Patent Owner’s own document supports our modification. Indeed, ASTM F 2561-06, an alleged “industry standard specifying the arrangement of the ’118 patent” (PO Resp. 25), states that the practice is for use by “designers *and* specifiers, regulatory agencies, owners, and inspection organizations who are involved in the rehabilitation of sewer service laterals and its connection to the main through the use of a resin-impregnated tube installed within an existing sewer lateral” Ex. 2005, 40 (emphasis added). Thus, in this respect, we agree with Petitioner that an ordinary artisan would include both “designers and field engineers, including those that were

specifying repair methods and procedures along with overseeing on-site repairs and who may not publish all their work.” Reply 2; Ex. 1013 ¶ 4.

E. Patentability Analysis

1. Claims 1–4 and 6–16

Petitioner argues that claims 1–4 and 6–16 would have been obvious over the combination of Kiest ’118, Kiest ’597, and De Neef Brochure. Pet. 8–26. After reviewing the complete record, we conclude Petitioner has shown by a preponderance of the evidence that the challenged claims are unpatentable as obvious.

Kiest ’118 relates to a device and method for repairing a pipe using hydrophilic seals. Ex. 1002, 1:6–7. Petitioner contends that Kiest ’118 teaches all the limitations of challenged claim 1, except “applying a hydrophilic *paste* to the liner assembly *about at least a portion of the liner juncture*.” Pet. 9–14, 31–33.

Regarding the “hydrophilic paste,” Petitioner refers to De Need Brochure for teaching SWELLSEAL® products in the form of a paste. *Id.* at 11 (citing Ex. 1005, 2).⁹ Petitioner also points out that Kiest ’118 specifically teaches seals made of SWELLSEAL®. *Id.* (citing Ex. 1002, 5:28–33). We agree with Petitioner that an ordinary artisan would have used

⁹ Even if De Neef Brochure, like De Neef Instructions and Kempenaers, did not qualify as prior art, it would not affect our obviousness analysis. Patent Owner does not dispute that SWELLSEAL® products exist in the form of a hydrophilic paste. See Tr. 26:5–9 (“DeNeef SWELLSEAL documents . . . are, in fact, merely cumulative and . . . that’s been acknowledged [] in the subject patents that SWELLSEAL is and was a known water stop material.”); see also Ex. 1010, 63:2–3 (Mr. Kampbell, the expert for Patent Owner, confirming SWELLSEAL® is a hydrophilic paste).

SWELLSEAL® paste as a hydrophilic material to form a seal. *See id.* at 11–12.

Regarding the position of the hydrophilic seal, Petitioner asserts that “it would have been obvious to one of ordinary skill in the art at the time of the invention to use a well-known hydrophilic paste to seal one or more locations, particularly known weak portions of the pipe system,” such as the juncture of a main pipe line and a lateral pipe line.¹⁰ Pet. 12. Petitioner refers to Kiest ’597 for teaching a gasket, impregnated with grout, located on the exterior of the preliner and positioned at the juncture between the lateral sewer pipe and the main line sewer pipe. Pet. 13 (citing Ex. 1003, 4:18–22, 9:42–44). According to Petitioner, “it would have been obvious to one of ordinary skill in the art at the time of the invention to position the band of Kiest ’118 at the location disclosed in Kiest ’597 to improve sealing properties at a weak point in the pipe system.” *Id.*

In its Response, Patent Owner does not appear to dispute that the combination of the asserted references teaches all limitations of claim 1. Instead, Patent Owner contends that placement of hydrophilic bands at the liner juncture would not have been, as we stated in the Decision to Institute, “a predictable variation within the technical grasp of a person of ordinary skill in the art.” PO Resp. 34 (citing Dec. 17). Patent Owner’s arguments appear to center on two main points. First, Patent Owner asserts Kiest ’118 and Kiest ’597 are not combinable because they embody different principles

¹⁰ Petitioner cites the Background section of the ’992 patent to support that the juncture is a weak point of the pipe system. Pet. 12 (citing Ex. 1001, 1:27–46). We note Kiest ’118 includes the same discussion. *See* Ex. 1002, 1:16–35.

of operation. *Id.* at 13–15, 22–25, 40–47. Second, Patent Owner argues that because the T-liner of Kiest ’118 is watertight, adding a hydrophilic band at the liner juncture “would have served no purpose” and “would have been superfluous.” *Id.* at 35–41. We address each argument in turn.

According to Patent Owner, the approach in Kiest ’118 allows groundwater to flow through damaged pipe portions and in between the T-Liner and the pipe. *Id.* at 24. The infiltrated groundwater is then contained because the T-Liner remains watertight and because seal gaskets prevent water from flowing past the ends of the T-Liner. *Id.* In contrast, the approach in Kiest ’597 blocks groundwater from entering the pipe. *Id.* at 15. It creates a seal by enveloping the damaged pipe areas and penetrating the surrounding soil with chemical grout. *Id.* As a result, Patent Owner asserts, “[t]he proposed obviousness rationale based on modifying the ’118 patent technique in view of the ’597 patent technique is untenable because the ’597 technique’s principle of operation is completely different than the principle of operation of the ’118 patent techniques.” *Id.* at 46. We disagree.

Where “a patent claims a structure already known in the prior art that is altered by the mere substitution of one element for another known in the field, the combination must do more than yield predictable results.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). Combinations that change the basic principles under which the prior art was designed to operate, however, may fail to support a conclusion of obviousness. *In re Ratti*, 270 F.2d 810, 813 (CCPA 1959). As explained below, we find that modifying Kiest ’118 with Kiest ’597 does not change the principle of operation of Kiest ’118.

First, Patent Owner bases its argument on the premise that the hydrophilic seal of Kiest '118 is located between the T-Liner and the host pipes (PO Resp. 25), whereas the seal of Kiest '597 is located outside of the pipe (*id.* at 14). Evidence of the record, however, shows otherwise. Indeed, Kiest '597 repeatedly and explicitly states that “[t]he gasket impregnated with grout forms a water tight seal *between* the preliner tube and the main sewer pipe and the lateral sewer pipe.” Ex. 1003, 4:21–23 (emphasis added); *see also id.* at 9:59–61 (“This fluid tight seal provides a sealing between the exterior of the preliner 148 and the interior of the existing pipelines 138, 140 at the juncture 142.”); 11:37–40 (“The grout gasket will provide for a seal between the liners and the main host pipe, thereby eliminating any ground water from infiltrating into the main line sewer pipe 210.”). These disclosures directly contradict Patent Owner’s assertion that the seal of Kiest '597 is outside of the pipe.

Second, Patent Owner asserts that the gasket of Kiest '597 “is not a gasket in the conventional sense of the term” because it “does not provide any sort of compression seal.” PO Resp. 44. Again, the disclosures of Kiest '597 quoted in the last paragraph, stating that the gasket forms a watertight seal, directly contradict Patent Owner’s position.¹¹

¹¹ Kiest '597 is not the challenged patent, and none of the challenged claims of the '992 patent recites a “gasket.” Thus, we do not need to construe the term. But even if we were to construe the term “gasket” in Kiest '597, an already expired patent, we would give no weight to extrinsic evidence that contradicts claim meaning that is unambiguous in light of the intrinsic evidence. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1322–23 (Fed. Cir. 2005) (en banc).

Third, an embodiment of the '992 patent invention, as illustrated in Figure 6, casts further doubt on Petitioner's principle-of-operation argument. In Figure 6, hydrophilic band **62** is positioned on the main liner tube and extends around the liner juncture. Ex. 1001, Fig. 6. The same figure also shows band **60**, positioned on, and wrapping around, the lateral liner tube. *Id.* Upon encountering water, both bands expand: band **62** forms a seal between the main liner tube and the pipe line juncture; whereas band **60** forms a seal between the lateral liner tube and the lateral pipe line. *Id.* Thus, it appears that this embodiment of the '992 patent invention includes a containment region formed between bands **60** and **62**, similar to, albeit smaller than, the one formed between bands **56** and **60** in Figure 3 of Kiest '118. *See* Reply 20; *compare* Ex. 1001, Fig. 6 *with* Ex. 1002, Fig. 3. In other words, modifying Kiest '118 by including a hydrophilic band at the liner juncture, as Kiest '597 teaches, does not destroy its principle of operation. *See In re Mouttet*, 686 F.3d 1322, 1332 (Fed. Cir. 2012) (comparing prior-art disclosure with the claimed invention and concluding that the combination of asserted references does not destroy the principle of operation of the prior art). Patent Owner's argument confirms our conclusion. *See* PO Resp. 41 (asserting that moving the bands of Kiest '118 only reduces the size of the containment region).

Patent Owner contends that the T-liner of Kiest '118 is watertight. PO Resp. 36–41. As a result, according to Patent Owner, reducing the size of the containment region “would serve no apparent useful purpose, and would have been seen as having the negative effect of increasing the likelihood of leaks occurring outside the containment region resulting in

flows that would not be contained but rather would flow into the sewer.” *Id.* at 41. We are not persuaded. First of all, common sense dictates that hardly anything in sewer-pipe-repair industry remains watertight. Indeed, Patent Owner itself recognizes so. *See id.* at 25 (stating leakage occurs through T-liner of Kiest ’118). More importantly, Patent Owner emphasizes that Kiest ’118 operates by containing groundwater in the annular space, i.e., the space between the liner and the pipe. PO Resp. 47. As Mr. Kampbell, Patent Owner’s expert, testifies, a sewer pipe is more likely to buckle (or fracture) with a larger annular space. Ex. 1010, 336:9–11, 336:22–337:1. Thus, it appears that reducing the size of the containment region would be useful. We appreciate the scenario Patent Owner puts forth, that is, a smaller containment region would not repair the damage to the pipe outside of the containment region. But, an ordinary artisan would have set out to modify an existing method or apparatus, even if the result is not a panacea. Indeed, as Kiest ’118 recognizes, one of ordinary skill the art would have understood that, depending on different working conditions, “many modifications, substitutions, and additions may be made which are within the intended spirit and scope of the invention.” Ex. 1002, 6:25–28.

We find Patent Owner’s other arguments similarly unpersuasive. For example, Patent Owner asserts that an ordinary artisan would not have modified Kiest ’118 with the teachings of Kiest ’597 because, in actual practice, the approach of Kiest ’597 was unsuccessful whereas the approach of Kiest ’118 was highly successful. PO Resp. 46–47. We disagree. None of the alleged problems associated with Kiest ’597 result from the location of the seal. *See* PO Resp. 17. Instead, they relate to the amount or

application of grout, something not used in Kiest '118. *Id.* Moreover, the test for obviousness is “not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference,” but rather “what the combined teachings of the references would have suggested to those of ordinary skill in the art.” *In re Keller*, 642 F.2d 413, 425 (CCPA 1981). Both Kiest '118 and Kiest '597 teach methods for repairing sewer pipes using seals to stop water from entering the sewer line. Petitioner relies on Kiest '597 only for teaching a seal between the liner and the pipe at the liner juncture. *See* Pet. 13. As a result, we are not persuaded that one of ordinary skill in the art would have been dissuaded from considering Kiest '597 when seeking to improve Kiest '118.

Patent Owner further argues that the “thin and narrow” hydrophilic “bands or O-rings” of Kiest '118, while perfectly suitable as end seals, “would not have been considered suitable for directly targeting unpredictably located and configured cracks and voids at the pipe juncture for sealing the same.” PO Resp. 43. We are not persuaded. Kiest '118 does not describe the hydrophilic seals as thin or narrow. Nor does it characterize them as O-rings. More importantly, as ASTM F 2561-06, an alleged industry standard embodying Kiest '118 patent, recognizes that “[a]s for any practice, modifications may be required for specific job conditions.” Ex. 2005, 40. Thus, we agree with Petitioner that an ordinary artisan would have altered the size of the seals in response to varying conditions at the job sites. Reply 20.

In sum, we conclude that at the time of the '992 patent invention, it would have been obvious to one of ordinary skill in the art to place the type

of seal taught in Kiest '118 at the position taught in Kiest '597 to arrive at the subject matter of challenged claim 1. *See KSR*, 550 U.S. at 401 (“The combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results.”).

In our Decision to Institute, we stated that Petitioner has also demonstrated a reasonable likelihood that it would prevail in showing the obviousness of challenged claims 2–4 and 6–16. Dec. 17; *see also* Pet. 14–26, 33–39 (analyzing the obviousness of claims 2–4 and 6–16). In its Response, Patent Owner does not address those claims separately. After reviewing the entire record, we conclude Petitioner has shown, by a preponderance of the evidence, that claims 2–4 and 6–16 would have been obvious over the combination of Kiest '118, Kiest '597, and De Neef Brochure.

2. Claim 5

Claim 5 depends indirectly from claim 1. It requires the hydrophilic paste is applied to form a ring or band around, and fully encircles, the liner juncture. Petitioner asserts that claim 5 would have been obvious over the combination of Kiest '118, Kiest '597, De Neef Brochure, and Kiest Study. Pet. 26–29, 39–40.

Patent Owner argues that Kiest Study does not remedy the deficiencies in the combination of Kiest '118, Kiest '597, and De Neef Brochure, as asserted in relation to claims 1–4 and 6–16. PO Resp. 49–50. In addition, Patent Owner contends that Kiest Study “in fact supports the patentability of the claims” because it teaches a “watertight seal at the connection point between the . . . lateral and the main.” *Id.* at 50 (citing

Ex. 1007, 6). According to Patent Owner, this statement confirms that the T-Liner system “was effective for guaranteeing a watertight seal at its juncture,” and thus, “teaches against” modifying Kiest ’118 approach. *Id.* We are not persuaded.

First, as explained above, we find no deficiencies in the combination of Kiest ’118, Kiest ’597, and De Neef Brochure. Second, Petitioner refers to Kiest ’118 for teaching hydrophilic bands that are “circular and stretchable in the same fashion as rubber bands.” Pet. 28 (citing Ex. 1002, 5:52–54). Petitioner also refers to Kiest ’597 for teaching a donut-shaped gasket positioned at the juncture of a lateral liner tube and a main liner tube. *Id.*; Ex. 1003, 11:32–36. Thus, the teachings in Kiest Study are not essential to show the obviousness of claim 5. Third, there is no guarantee, in life in general, and perhaps in sewer-pipe-repair industry in particular. As Petitioner points out, the T-Liner system only reduced the water infiltration to various degrees (from 19.8% to 59.6%). Reply 17 (citing Ex. 1007, 8). Thus, we agree with Petitioner that Kiest Study “does not support an assertion of a leakless system,” and would not have dissuaded one of ordinary skill from seeking improvement of the T-Liner system. *See id.*

In sum, we conclude that Petitioner has shown, by a preponderance of the evidence, that claim 5 would have been over the combination of Kiest ’118, Kiest ’597, De Neef Brochure, and Kiest Study.

III. CONCLUSION

Petitioner has shown, by a preponderance of the evidence, that the combination of Kiest ’118, Kiest ’597, and De Neef Brochure would have rendered claims 1–4 and 6–16 of the ’992 patent obvious; and that the

combination of Kiest '118, Kiest '597, De Neef Brochure, and Kiest Study would have rendered claim 5 obvious.

IV. ORDER

For the reasons given, it is

ORDERED that claims 1–16 of the '992 patent are determined to be unpatentable;

FURTHER ORDERED that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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