

IN THE UNITED STATES DISTRICT COURT  
FOR THE DISTRICT OF DELAWARE

PRAXAIR, INC. and PRAXAIR )  
TECHNOLOGY, INC., )  
 )  
Plaintiffs, )  
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v. ) Civ. No. 03-1158-SLR  
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ATMI, INC. and ADVANCED )  
TECHNOLOGY MATERIALS, INC., )  
 )  
Defendants. )

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OPINION

Dated: August 17, 2006  
Wilmington, Delaware

  
ROBINSON, Chief Judge

## I. INTRODUCTION

1. The court tried the single issue of inequitable conduct in a bench trial on December 12, 2005. The court has jurisdiction over this action pursuant to 28 U.S.C. §§ 1331, 1338(a) and 2201(a). Having considered the documentary evidence and testimony, the court makes the following findings of fact and conclusions of law pursuant to Fed. R. Civ. P. 52(a). Also before the court is ATMI's post trial motion to compel the production of documents (D.I. 273).

## II. FINDINGS OF FACT AND CONCLUSIONS OF LAW

### A. Procedural History

2. On December 22, 2003, Praxair, Inc. and Praxair Technologies, Inc. (collectively called "Praxair") filed this action against ATMI, Inc. and Advanced Technology Materials, Inc. (collectively called "ATMI") for infringement of certain claims of United States Patent Nos. 6,045,115 ("the '115 patent"), 6,007,609 ("the '609 patent") and 5,937,895 ("the '895 patent"). (D.I. 1) The case was tried to a jury<sup>1</sup> and on December 7, 2005, the jury returned a verdict in favor of Praxair finding all the asserted claims were infringed by ATMI and the patents were not invalid. (D.I. 282)

3. Following the jury trial, the court held a bench

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<sup>1</sup>Only the '115 patent and the '609 patent were tried to the jury.

trial regarding ATMI's inequitable conduct defenses.

4. During both phases of the trial, the court faced several evidentiary issues regarding timeliness of disclosure during discovery. Relevant to this opinion, the deadline to file any motion to amend the pleadings was November 29, 2004. On that date, ATMI moved to file a first amended answer and counterclaims that included the inequitable conduct defense. The unopposed motion was granted by the court. (D.I. 63) On May 19, 2005, ATMI filed a motion for leave to file a second amended answer and counterclaims seeking to add additional grounds for its allegations of inequitable conduct. On July 18, 2005, the court denied ATMI's motion as untimely. (D.I. 124) At trial, ATMI sought to introduce evidence regarding the allegations the court previously had found to be untimely. ATMI's request was denied, but the court allowed ATMI to submit a written proffer on its belatedly-disclosed inequitable conduct charges to create a record for the Federal Circuit on appeal.<sup>2</sup> (D.I. 283 at 14:18-15:21)

**B. The Patents In Suit And The Technology At Issue**

5. The patents in suit disclose embodiments of an apparatus which safely controls the discharge of pressurized fluids from the outlet of pressurized tanks. (D.I. 131 at 7)

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<sup>2</sup>As a result of the untimely disclosure, the court will not consider these theories of inequitable conduct.

The inventions disclosed by the patents help control the handling, storage and delivery of toxic fluids and constrain the flow of gas during normal operation, as well as during any kind of valve mishandling or downstream failure. (Id. at 8)

6. The '115 patent, entitled "Fail-Safe Delivery Arrangement for Pressurized Containers," teaches the use of a flow restrictor inside the pressurized container that minimizes the discharge of gas flow from the container. (D.I. 131 at 10) The '609 patent, entitled "Pressurized Container with Restrictor Tube Having Multiple Capillary Passages," teaches a flow restrictor in the form of multiple capillary passages which minimize the discharge of toxic gas from the pressurized tank. (D.I. 131 at 11)

7. In 1997, ATMI developed a gas cylinder product named VAC<sup>®</sup> (Vacuum-Actuated Cylinder). (D.I. 139 at 6) VAC<sup>®</sup> is designed to reduce the risks associated with using high-pressure toxic gases by pre-regulating the pressure at which gas leaves the cylinder with either one or two pressure regulators inside the cylinder. (D.I. 139 at 6) The VAC<sup>®</sup> technology incorporates a pressure regulator in the cylinder before the valve assembly. Id. The VAC<sup>®</sup> pressure regulator controls pressure using an internal pressure-sensing assembly ("PSA"). (D.I. 139 at 12) The PSA is calibrated by filling an internal bellows with a helium/argon mixture to a preset pressure and sealing it. When a

pressure below the PSA set point is applied downstream of the pressure regulator, the bellows in the PSA expands, opening the valve and allowing gas to flow through the regulator. (D.I. 139 at 12) The VAC<sup>®</sup> products also incorporate two or three sintered<sup>3</sup> metal filters manufactured by Mott Corporation. (D.I. 139 at 10)

### C. Prior Art References

8. ATMI asserts, and timely disclosed, three prior art references: United States Patent No. 5,409,526 (the "Zheng patent"); Max Light devices; and Restricted Flow Orifices ("RFOs").

9. The Zheng patent, entitled "Apparatus for Supplying High Purity Fluid," was filed on October 5, 1993 and issued on April 25, 1995. The Zheng patent discloses "[a]n apparatus for supplying high purity gas" which includes a filtering unit comprising "an inlet, a first filter for removing fine particulates, layers of adsorbent and absorbent for removing impurities, and a second filter for removing fine particulates." (D.I. 301 at ¶ 21)

10. David LeFebre, one of the inventors of the patents at issue, testified that from 1975 to 1981 he owned a company

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<sup>3</sup>The term "sintering" refers to a high temperature solid-state diffusion bonding process in which metal powder is heated to a temperature just below the melting point of metal. The metal bonds to create a porous media having a random internal structure that can be seen in a Scanning Electron Microscope ("SEM") image. (D.I. 139 at 11)

called Max Light Optical Wave Guide, Inc. ("Max Light"). (D.I. 283 at 147:12-148:13, 150:8-15) More than 20 years before the patents in suit were filed, Mr. LeFebre created and began commercially using the Max Light devices. (D.I. 283 at 147:15-148:17) Mr. LeFebre testified about the Max Light devices, but did not clearly remember specific configurations. His testimony was that the Max Light devices stored gas in a tank. Some configurations had gas above atmospheric pressure, some had gas below atmospheric pressure. (Id. at 15:24-151:1) Mr. LeFebre did not remember all the gases used. (Id. at 151:9-10) He testified that some configurations had a flow restrictor inside a tube extending into the tank. (Id. at 152:9-11) "Sometimes" the tube extended to the bottom of the tank and "sometimes" just in the neck of the tank. (Id. at 153:2-7) Mr. LeFebre testified to one specific configuration where silicon tetrachloride liquid was transferred to a second vessel where it was heated and the gas went through a restrictor. (Id. at 160:8-16) Mr. LeFebre did not recall what type of filter was utilized. (Id. at 163:6-8) He did not recall whether the filter functioned as a flow restrictor. (Id. at 164:3-7)

11. ATMI also asserts that prior to the filing of the patents in suit, RFOs protected by sintered metal filters were conventionally used to limit the discharge of toxic gas from the valve outlet of non-adsorbent and mechanical high pressure

compressed gas cylinders. (D.I. 283 at 181:12-21, 184:15-21) Mr. LeFebre, Mr. Martin and Mr. Tolomei each were aware of this conventional use. (D.I. 283 at 144:21-145:15, 146:8-147:11 (LeFebre), 193:8-194:25 (Martin, 91:10-19 (Tolomei))

**D. Parties Charged With Inequitable Conduct**

12. ATMI accuses four individuals of committing inequitable conduct during the prosecution of the '609 and '115 patents: Mr. John Tolomei, Mr. David LeFebre, Mr. Thomas Martin and Mr. Roy Semerdjian.

13. ATMI accuses UOP's attorney John Tolomei of intentionally withholding the Zheng patent and the RFO art from the examiners during the prosecution of the '609 and '115 patents.

14. Mr. Tolomei has been practising law as a patent attorney since 1983 and is currently employed as Chief Patent Counsel for UOP, LLP ("UOP") in Chicago, Illinois. (D.I. 283 at 20-21) During his 23 years as a patent attorney, Mr. Tolomei has been responsible for prosecuting over 400 issued patents, most of which have been licensed to third parties. Prior to this case, Mr. Tolomei has never been charged with committing inequitable conduct. (Id. at 22:7-23:3)

15. ATMI accuses Mr. LeFebre of intentionally withholding the Zheng patent, the Max Light devices and the RFO art from the Patent Office during the prosecution of the '609 and

'115 patents. From 1992 to 1999, Mr. LeFebre worked at the Mat/Sen group of UOP. (Id. at 136:19-138:4) During that time, Mr. LeFebre was named as an inventor on both the '609 and '115 patents.

16. ATMI accuses Mr. Martin of intentionally withholding the RFO art from the Patent Office during the prosecution of the '609 and '115 patents. Mr. Martin also worked at the Mat/Sen group of UOP and is a named inventor on the '609 and '115 patents.

17. ATMI accuses Mr. Semerdjian of intentionally withholding the RFO art from the Patent Office during the prosecution of the '609 patent. Mr. Semerdjian also worked at the Mat/Sen group of UOP and is a named inventor on the '609 patent.

**E. Inequitable Conduct Standard**

18. Applicants for patents and their legal representatives have a duty of candor, good faith, and honesty in their dealings with the PTO. Molins PLC v. Textron, Inc., 48 F.3d 1172, 1178 (Fed. Cir. 1995); 37 C.F.R. § 1.56(a). This duty is predicated on the fact that "a patent is an exception to the general rule against monopolies and to the right of access to a free and open market." Precision Instrument Mfg. Co. v. Auto. Maint. Mach. Co., 324 U.S. 806, 816 (1945). The duty of candor, good faith, and honesty includes the duty to submit truthful



information and the duty to disclose to the PTO information known to patent applicants or their attorneys which is material to the examination of a patent application. Elk Corp. of Dallas v. GAF Bldg. Materials Corp., 168 F.3d 28, 30 (Fed. Cir. 1999). A breach of this duty constitutes inequitable conduct. Molins, 48 F.3d at 1178.

19. If it is established that a patent applicant engaged in inequitable conduct with respect to one claim, then the entire patent application is rendered unenforceable. Kingsdown Med. Consultants v. Hollister Inc., 863 F.2d 867, 877 (Fed. Cir. 1988). Additionally, "[a] breach of the duty of candor early in the prosecution may render unenforceable all claims which eventually issue from the same or a related application." Fox Indus., Inc. v. Structural Pres. Sys., Inc., 922 F.2d 801, 803-04 (Fed. Cir. 1991).

20. A finding of inequitable conduct is "an equitable determination" and, therefore, "is committed to the discretion of the trial court." Monon Corp. v. Stoughton Trailers, Inc., 239 F.3d 1253, 1261 (Fed. Cir. 2001).

21. In order to establish unenforceability based on inequitable conduct, a defendant must establish by clear and convincing evidence that: (1) the omitted or false information was material to patentability of the invention; (2) the applicant had knowledge of the existence and materiality of the

information; and (3) the applicant intended to deceive the PTO. Molins, 48 F.3d at 1178.

22. A determination of inequitable conduct follows a two step analysis. First, the court must determine whether the withheld information meets a threshold level of materiality. A reference is considered material if there is a substantial likelihood that a reasonable examiner would consider it important in deciding whether to allow the application to issue as a patent. Allied Colloids, Inc. v. American Cyanamid Co., 64 F.3d 1570, 1578 (Fed. Cir. 1995) (citations omitted); see also 37 C.F.R. 1.56(b)(2) ("[I]nformation is material to patentability when it . . . establishes . . . a prima facie case of unpatentability of a claim; or . . . refutes, or is inconsistent with, a position the applicant takes in [o]pposing an argument of unpatentability relied on by the [o]ffice, or [a]sserting an argument of patentability."). A reference, however, does not have to render the claimed invention unpatentable or invalid to be material. See Merck v. Danbury Pharmacal, 873 F.2d 1418 (Fed. Cir. 1989).

23. After determining that the applicant withheld material information, the court must then decide whether the applicant acted with the requisite level of intent to mislead the PTO. See Baxter Int'l, Inc. v. McGaw Inc., 149 F.3d 1321, 1327 (Fed. Cir. 1998). "Intent to deceive cannot be inferred solely

from the fact that information was not disclosed; there must be a factual basis for finding a deceptive intent." Hebert v. Lisle Corp., 99 F.3d 1109, 1116 (Fed. Cir. 1996). That is, "the involved conduct, viewed in light of all the evidence, including evidence indicative of good faith, must indicate sufficient culpability to require a finding of intent to deceive."

Kingsdown, 863 F.2d at 876. A "smoking gun" is not required in order to establish an intent to deceive. See Merck, 873 F.2d at 1422. An inference of intent, nevertheless, is warranted where a patent applicant knew or should have known that the withheld information would be material to the PTO's consideration of the patent application. Critikon, Inc. v. Becton Dickinson Vascular Access, Inc., 120 F.3d 1253, 1256 (Fed. Cir. 1997).

24. Once materiality and intent to deceive have been established, the trial court must weigh them to determine whether the balance tips in favor of a conclusion of inequitable conduct. N.V. Akzo v. E.I. DuPont de Nemours, 810 F.2d 1148, 1153 (Fed. Cir. 1988). The showing of intent can be proportionally less when balanced against high materiality. Id. In contrast, the showing of intent must be proportionally greater when balanced against low materiality. Id.

25. Because a patent is presumed valid under 35 U.S.C. § 282, inequitable conduct requires proof by clear and convincing evidence. Manville Sales Corp. v. Paramount Sys., Inc., 917 F.2d

544, 551 (Fed. Cir. 1990).

**F. Materiality**

26. The court concludes that the Zheng patent was material to the prosecution of the '609 and '115 patents. That the jury found the Zheng patent not to anticipate the patents in suit is not dispositive on this issue.

27. Praxair asserts that the Zheng patent does not disclose use of multiple capillary passages as flow restrictors.<sup>4</sup> However, the Zheng patent discloses the use of sintered metal filters in the gas flow path. At trial, there was evidence that sintered metal filters may contain capillary passages. Furthermore, Mr. LeFebre testified that anytime "you put an obstruction in a path, it functions as a flow restrictor. If you have a filter, every filter I know of functions as some sort of a restrictor, inherent in the filter." (D.I. 279 at 164:8-17) Mr. Tolomei testified that the Zheng patent does disclose a flow restrictor in the outlet flow path. (D.I. 283 at 73:12-75:25) ("Q: Does [Zheng] have a flow restrictor? . . . A: Yes. There is a restriction in flow.") The court finds this reference was material to the prosecution of the patents in suit.

28. The Zheng patent is not cumulative. The Zheng patent discloses a pressure drop across the filter, suggesting a

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<sup>4</sup>The disclosure of this limitation appears to be the only one at issue.

restriction in flow. Mr. Tolomei testified that the Zheng patent "discloses the pressure drop across . . . unit 108 can be up to 20 bar." (D.I. 283 at 70:22-71:5) The cited prior art references in the prosecution of the '609 and '115 patents do not teach this pressure drop and, thus, do not show the restriction in gas flow. As such, the Zheng patent teaches a more complete combination of the claimed elements. See Semiconductor Energy Lab. Co. v. Samsung Elects. Co., 204 F.3d 1368, 1374 (Fed. Cir. 2000).

29. The Max Light devices are not material to the prosecution of the '609 and '115 patents. Simply put, there is too little evidence concerning the Max Light devices. The court concluded that the evidence of the Max Light devices was not sufficient to support a theory of invalidity. (D.I. 279 at 889:5-890:9) Mr. LeFebre's testimony was incomplete and vague,<sup>5</sup> described only a variety of potential processes, fluids and devices as opposed to one infringing device,<sup>6</sup> and was

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<sup>5</sup>D.I. 283 at 149:14-19 ("I don't recall. It's been so long ago."); 154:19-24 ("I'd be guessing which ones now. You're taking me back a few years."); 157:21-158:2 ("For certain dopants, I'm sure that's the case, but I couldn't tell you which ones."); 161:10-12 ("I have no remember to that."); 161:16-20 ("It was somewhere in the tank. It was probably above halfway, but I'm guessing."); 161:21-23 ("I don't recall."); 161:24 ("I don't recall."); 163:6-8 ("It's been so long ago, I don't really recall."); 164:3-7 ("It's been so long ago, I don't recall.").

<sup>6</sup>D.I. 283 at 150:24-151:1 ("Some were; some weren't."); 151:11-15 ("Typically after the tank or in the tank."); 152:7-15 ("Sometimes it was; sometimes it wasn't."); 152:2-152:3

unsubstantiated by any other evidence.<sup>7</sup> A reasonable examiner would not have considered such cursory information material to the prosecution of the patents in suit.

30. Messrs. LeFebvre, Martin and Tolomei all admitted to an awareness of the RFO prior art. A Praxair employee, Ronald Furhop, also testified as to the conventional use of RFOs with gas vessels. ATMI produced an article by Suzanne Larson entitled "The Flow Restrictor Orifice in the Outlet of the Compressed Gas Cylinder Valve" (the "Larson Article") to demonstrate the prior commercial use of RFOs. Prior commercial use is 102(b) prior art and can be material during a patent prosecution. See, e.g., Monon Corp. v. Stoughton Trailers, Inc., 239 F.3d 1253 (Fed. Cir. 2001).

31. The RFO art is material to the prosecution of the patents in suit. An RFO is a flow restrictor device presenting a small hole, as small as 0.1 millimeters (mm), through which gas

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("Sometimes the tube went to the bottom of the tank or very near the bottom of the tank."); 153:4-7 ("Sometimes just in the neck of the tank or the bottle."); 152:10-13 ("It was a straight tube, generally."); 153:18-20 ("One example, silicon tetrachloride."); 153:21-24 ("You could either get them in a liquid state or a gaseous state."); 154:25-155:5 ("Sometimes liquid; sometimes a glass - a gas."); 155:20-22 ("Sometimes yes; sometimes no."); 155:23-156:12 ("It's all over the place, depending upon what your design, determine the structure and components of any single device.").

<sup>7</sup>ATMI presented evidence in the form of testimony and exhibits created by Dr. Glew based on Mr. Febre's testimony. As in the validity case, the court finds these are irrelevant and unreliable.

flows. (D.I. 279 at 833:7-13) The size of the hole determines the rate of flow. This description is similar to that of a capillary, as required in the patents, and, therefore, would have been material to an examiner. Furthermore, the RFO art would have been material to an examiner to analyze several arguments made by applicants in the prosecution of the '115 patent.<sup>8</sup>

#### G. Intent to Deceive

32. ATMI asserts that UOP waived attorney-client privilege and work product immunity during Mr. Tolomei's testimony. As a result, ATMI was not able to adequately question Mr. Tolomei regarding an intent to deceive the Patent Office.

33. For the purpose of waiver, a difference exists between testifying that a conversation occurred and testifying as to the substance of the conversation.<sup>9</sup> In the first instance,

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<sup>8</sup>For example, applicants argued that: (1) The prior art did not teach the claimed "extreme limitation in flow" used "to provide a commercially practical container" that prevents "the catastrophic discharge" of toxic contents; (2) Existing safety measures were limited to "highly complex methods" and "elaborate systems;" (3) There was no indication in the prior art to use "severe flow restriction" to "overcome[] the problems of delivering highly toxic fluids from portable containers;" and (4) "[N]one of the prior art comes close to disclosing a restriction in the flow path from a pressurized container that has a diameter that does not exceed 0.2 mm."

<sup>9</sup>The court finds the only waiver asserted is that of attorney-client privilege regarding discussions of the relevant prior art. Attorney-client privilege and work product are "two concepts [that] are treated quite differently and, in the eyes of the law, are independent legal concepts." Hercules Inc. V. Exxon Corp., 434 F.Supp. 136, 150 (D. Del. 1977). "It does not follow that a waiver of one necessarily means, or ought to mean, a

privilege is not waived; in the second, it is. The court found several instances of when Mr. Tolomei, without objection, testified as to the substance of a conversation<sup>10</sup> as opposed to merely the existence of the conversation.<sup>11</sup> The court concludes

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waiver of the other." Rhodia Chimie v. PPG Ind., Inc., 218 F.R.D. 416, 421 (D. Del. 2003). The court finds that only attorney-client privilege is at issue here.

<sup>10</sup>E.g., D.I. 283 at 54:4-16) ("Q: And it's your testimony now that you can't recall one way or the other whether he told you about his work at his prior companies relating to MaxLite? A: To the best of my knowledge, I can't recall him ever having told me anything about a MaxLite Company. Q: Do you recall him ever telling you about anything about restricted flow orifices? A: Yes. Q: And what did he tell you about restricted flow orifices? A: I don't remember precisely. To the best of what I can say, it would be reflected in the patents that I wrote."); 69:21-25 (Q: So that you had the Zheng patent and had discussed it with the inventors of the '599 application prior to April of 1997; correct? A: I don't recall whether I discussed the Zheng reference with the inventors."); 88:12-18 ("Q: Did you ever have a conversation with any of the inventors in which they told you that it was a simple matter of geometry to put the inlet tube in the geometric center of the cylinder once you decide you want the tube to be free of the liquid? A: No, I can't recall whether they specifically told me, if that's the question."); 91:5-7 ("Q: Did Mr. Martin tell you about the use of restricted flow orifices in the outlet port of a valve head of a pressurized gas cylinder? A: Other than what's already been disclosed in his MOI, no."); 93:7-19; 96:4-20 ("Q: The first question, Mr. Tolomei, was whether you ever asked the inventor, Mr. LeFebre, to disclose to you the prior art of which he was aware. A: Yes. Q: The second question was whether you asked the inventor, Mr. Martin, to disclose to you the prior art of which he was aware? A: Yes. The last question . . . was whether you ever asked the inventors or whether you ever told the inventors that they had a duty to disclose to you and the Patent and Trademark Office a specific prior-art reference . . . A: No.").

<sup>11</sup>E.g., D.I. 283 at 42:14-16 ("Q: Do you recall ever discussing th Zheng or the Summerfield patents with any of those gentlemen? A: No, I do not recall."); 56:22-25 ("Q: [] You also had a number of conversations with Mr. Martin in preparation of the application, did you not? A: Yes, I did.").



that UOP has waived privilege relating to communications between Mr. Tolomei and the inventors. The documents that ATMI requests relating to these conversations are ordered to be submitted to the court for in camera review to determine if they are relevant to the issue of intent to deceive with respect to the material prior art references at issue.

### III. CONCLUSION

34. For the reasons discussed above, the court concludes that ATMI has failed to prove, by clear and convincing evidence, that the '609 and '115 patents are unenforceable due to inequitable conduct in the prosecution of the patents based on the Max Light devices. The court further concludes that the attorney client privilege is waived regarding communications between Mr. Tolomei and the inventors of the '609 and '115 patents related to the Zheng patent and the RFO art. The court, therefore, defers further findings on the intent to deceive the Patent and Trademark Office on the Zheng patent and the RFO art.