

United States District Court,  
E.D. Louisiana.

**SHELL OIL COMPANY,**

v.

**ICI AMERICAS, INC. and P.E.T. L.L.C.**

**Jan. 11, 1999.**

Patentee brought action for infringement of patent relating to process of making polyethylene naphthalate prepolymer. Following hearing for claim interpretation, the District Court, Duval, J., construed claims of patent.

Patent construed.

4,963,644. Construed.

William Forrester Jr., Lemle & Kelleher, New Orleans, LA, Kimberley L. Muller, Houston, TX, Edmund J. Sease, Jeffrey D. Harty, Des Moines, IA, for Plaintiff.

Danny Gerald Shaw, Paul Lee Peyronnin, Phelps Dunbar, LLP, New Orleans, LA, Richard L. Catania, Stephen D. Murphy, Scully, Scott, Murphy & Presser, Garden City, NY, for Defendant.

### ***ORDER AND REASONS***

**DUVAL, District Judge.**

This case came before the court on a Markman Hearing for Claim Interpretation on January 8, 1999. The court, having read the submissions of the parties, and considered the arguments of counsel, issues the following order and reasons.

#### **I. FACTS**

This is a patent infringement suit filed by Shell Oil Company ("Shell") against ICI Americas ("ICI") and P.E.T. Processors. The patent-in-suit, U.S. Patent No. 4,963,644 ("the '644 patent"; "Shell's patent"), relates to a process of making a polyester known as polyethylene naphthalate ("PEN"). To make it more useful in the manufacture of products such as electrical equipment, fabrics, and tires, chips or pellets of amorphous PEN are first crystallized, and then can be solid stated to raise their molecular weight. A difficulty that often arises in the crystallization and solid stating stages is that the pellets "puff" so as to create lumps, which can make the crystallized or solid state PEN useless for some commercial purposes.

The inventor of the '644, Dr. Ben Duh, discovered a way to prevent this lumping. Dr. Duh discovered that if

the pellets of amorphous PEN were devolatilized prior to reaching crystallization temperatures, the puffing and lumping could be prevented. Crystallization temperatures begin at approximately 150 (deg.) C, so Dr. Duh held the amorphous PEN at a temperature in the range of 80 (deg.) C and 140 (deg.) C for a period of time long enough to remove the volatiles from the chips, and then raised it to a temperature above 150 (deg.) C to be crystallized. This invention was patented in 1990, and the basic process is described in precise detail in Claims One and Two of the patent. Claim One describes a process for first devolatilizing the amorphous PEN and then crystallizing it:

**Claim One:** *A process for crystallizing amorphous polyethylene naphthalate prepolymer [PEN] which comprises: (1) heating the amorphous [PEN] to a temperature which is within the range of about 80 (deg.) C to about 140 (deg.) C in the presence of a stream of an inert gas or under a vacuum for a period of time which is sufficient to devolatilize the amorphous [PEN]; and (2) subsequently heating the devolatilized [PEN] to a temperature which is within the range of about 150 (deg.) C to about 260 (deg.) C while providing agitation to produce the crystallized [PEN].*

Claim two reiterates the first two steps of Claim One, and adds a third step, for solid-stating the PEN to create a resin:

**Claim Two:** *A process for solid state polymerizing [PEN] into high molecular weight polyethylene naphthalate resin comprising:(1) devolatilizing the [PEN] at a temperature which is within the range of about 80 (deg.) C to 140 (deg.) C in the presence of a stream of an inert gas or under a vacuum; (2) crystallizing the devolatilized [PEN] by heating it to a temperature which is within the range of about 150 (deg.) C to about 260 (deg.) C while providing agitation; and (3) subsequently heating the crystallized [PEN] to a temperature from about 50 (deg.) C to about 1 (deg.) C below its sticking temperature for a period of time sufficient to produce the high molecular polyethylene naphthalate resin.*

Shell has accused ICI of infringing its patent by having PEN crystallized and solid state polymerized by co-defendant P.E.T. Processors in a commercial arrangement known as "toll conversion." ICI denies infringing the '644 patent for a variety of reasons.

## II. CLAIM CONSTRUCTION

[1] [2] [3] [4] [5] The Supreme Court of the United States has held that the construction of a patent's claims is a question of law, to be determined by the court. *Markman v. Westview Instruments, Inc.*, 517 U.S. 370, 372, 116 S.Ct. 1384, 1387, 134 L.Ed.2d 577 (1996). A patent application has two distinctive parts: the specification and the claims. The specification is essentially a description of the invention that explains to one skilled in the art how to make and use the invention. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed.Cir.1995) ( *en banc* ), *aff'd*, 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). The claims define the inventor's rights. *Id.* Often, a patent will include several claims; complete infringement of any single claim infringes the patent, but each step in that individual claim must be infringed for the patent to be infringed. The claim language, and not the specification, defines the scope of the claim. *See York Products, Inc. v. Central Tractor Farm & Family Center*, 99 F.3d 1568, 1572 (Fed.Cir.1996), *citing*, *Bell Communications Research, Inc. v. Vitalink Communications Corp.*, 55 F.3d 615, 619-20 (Fed.Cir.1995). The claims, however, are read "in view of the specification, of which they are a part." *Id.*, *quoting* *Autogiro Co. of Am. v. United States*, 181 Ct.Cl. 55, 384 F.2d 391, 397 (1967), *see also*, *York Products*, 99 F.3d at 1572; *Whittaker Corp. v. UNR Indus., Inc.*, 911 F.2d 709, 711 (Fed.Cir.1990). In construing the claims, the court also considers the patent's prosecution (or "file") history. *Markman*, 52 F.3d at 979. The patent itself,

including the claims, the specification, and, if it is in evidence, the prosecution history, make up the "intrinsic evidence" used in claim construction.

[6] [7] If a court so chooses, it may also consider "extrinsic evidence," such as the testimony of expert witnesses, the testimony of the inventor, or the prior art, to aid it in construing the claims. The court, however, should look first to the intrinsic evidence, as it is the most significant source of the legally operative meaning of disputed claim language. *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed.Cir.1996), *citing*, *Markman*, 52 F.3d at 979, *see also*, *CVI/Beta Ventures, Inc. v. Tura LP*, 112 F.3d 1146, 1152 (Fed.Cir.1997). Where the meaning of the disputed claim term is "clear from a reading of the claim itself and the patent specification," the court need not resort to extrinsic evidence to construe the claim. *Id.* at 1584.

Here, the court, upon reading the briefs provided by the parties, concluded that it did not need to consider extrinsic evidence at that time, because the claims were sufficiently clear for the court to construe the claims using the intrinsic evidence alone. The court ordered the parties to hold a "Markman" hearing, so called because the *Markman* case stated that claim construction is a question of law for the court, and instructed the parties that the court would hear only intrinsic evidence at that time. Having heard the arguments of the parties, the court reiterates its conclusion that the claims are not ambiguous, and that no extrinsic evidence is needed for this court to properly construe the claims.

### III. THE TEMPERATURE ISSUE

[8] The first issue of contention between the parties is the construction of the following phrase from Claim One of the patent: "Heating [PEN] to a temperature which is within the range of about 80 (deg.)C to about 140 (deg.)C." This language is repeated in Claim Two, and similar language, with different temperatures, is used in Part 2 of Claims One and Two. *See Claim One and Claim Two, supra*, at 2-3. FN1 According to ICI, this language means that the PEN is heated to a single, constant temperature in the range and held at that temperature for the duration of the subject step. Shell contends that the language means that PEN is allowed to traverse more than one temperature, so long as those temperatures are within the claimed range for a time sufficient to devolatilize.

FN1. In construing the temperature language, the court concentrates its analysis, for simplicity's sake, on the temperature range discussed in Step 1 of Claim One and Step 1 of Claim Two. The court's analysis, however, is applicable as well to the higher temperature range described in Step 2 of Claim One and Step 2 of Claim Two.

The court finds that Shell's interpretation of the temperature language is the correct construction of the claim. ICI's position, that the temperature must be held at a single, constant temperature, does not make sense. If the court were to take ICI's construction seriously, it would have to conclude that the only temperature at which the PEN could be devolatilized within the meaning of the '644 patent would be 80 (deg.) C. Any other temperature would require that the temperature of the PEN be increasing over several discrete temperatures, for at least a limited amount of time, until it reached its constant temperature. For example, if one were to devolatilize PEN at a "constant" temperature of 115 (deg.), the devolatilization process would begin the instant the PEN reached a temperature of 80 (deg.), continue until the PEN reached 115 (deg.), and continue until the PEN finally devolatilized. Achieving a "constant" temperature of 115 (deg.), then, is well-nigh impossible, and construing the claims to require a constant temperature would

render the patent virtually useless.

The court is also convinced that the word "a" as used in the phrase "a temperature which is within the range of about ..." means several discrete temperatures within the range described in the patent, not merely a single, constant temperature, because this is the most sensible reading of the claim. It is a generally accepted rule that the word "a," as used in claims drafting, can mean "any" or "one or more." *North American Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 1575-76 (Fed.Cir.1993), *citing*, Robert C. Faber, *Landis on Mechanics of Patent Claim Drafting* s. 20 (4th Ed.1997). (In drafting a claim, the "minimum" number of elements necessary should be recited; "where one or more will function, then one merely claims "a" member (singular) and this covers more than one"). This principle is especially true where a claim uses the transitional phrase "comprising," as do the claims in the '644 patent. *Abtox, Inc. v. Exitron Corp.*, 122 F.3d 1019, 1023 (Fed.Cir.1997). Had Shell meant to limit its patent to processes utilizing single, constant temperatures, it easily could have written the patent in this way, for example, by claiming a process whereby the PEN is heated to "a single temperature" or "a constant temperature" or "a temperature ... and held at that exact temperature." Shell wrote its patent more broadly than this, and is entitled to the protection that its careful, broad claims provide.

The arguments asserted by ICI in support of its construction of the temperature language are unpersuasive. In addition to arguing that the plain language supports its interpretation, an argument which the court rejected, above, ICI also argues that the examples provided in the patent specification and the file history of the '644 patent also indicate that the temperature must be a constant one. The court disagrees. The examples used in the patent specification, for the most part, indicate constant temperatures (although the court notes that Example 4 may indicate multiple temperatures in that it says that the PEN was crystallized "at various temperatures for various periods of time"). The Examples, however, do not limit the claims; they are merely illustrative. *See, e.g.*, *Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1566 (Fed.Cir.1992) (limitations appearing in specification but not in claim should not be read into claim); *Electro Medical Systems, S.A. v. Cooper Life Sciences, Inc.*, 34 F.3d 1048, 1054 (Fed.Cir.1994) (embodiments appearing in the specification not read into the claims when claim language is more broad). In the '644 patent, the Examples are provided, in part, to demonstrate that the time required for devolatilization varies in proportion to the intensity of the temperature. Conducting experiments using constant temperatures is the most straightforward method of demonstrating this principle. It does not follow however, that once these experiments have been used to prove the a separate devolatilization step prevents lumping, that the same model (i.e., a constant temperature) used in the experiments should be read into the much broader language of the claims themselves.

Similarly, ICI points out that '644 patent acknowledges that "ramping" through several discrete temperatures may occur during the solid stating step, and no such reference is made during the devolatilization or crystallization steps. ICI argues that this omission means that no ramping can occur during the devolatilization or crystallization steps. ICI is correct that the specifications in the '644 patent note that the temperature during the solid-stating step (Step 3 of Claim Two) can be incrementally increased, but a close reading of Claim Two shows that this merely means that the temperature range can be increased as the sticking temperature increases. Step 3 of Claim Two provides for heating the crystallized PEN to "a temperature from about 50 (deg.) C to about 1 (deg.)C below its sticking temperature ..." Since the sticking temperature increases as the PEN solid states, the temperature described by "1 (deg.)C below its sticking temperature" also increases as the solid-stating process takes place. Thus, the upper limit of the entire temperature range increases, and, if the PEN was being solid-stated at the highest possible temperature, it could be incrementally increased as the highest possible temperature increased. That the specification

acknowledges this aspect of Step 3 in no way limits the court's reading of the very different processes occurring in Steps 1 and 2.

ICI also argues that the prior art discussed in the prosecution file supports its position. The prior art, specifically the Duh Patent and the Rinehart Patent, describes processes in which the temperature of the substance "ramped" through the 80 (deg.)C-140 (deg.) C range (processes where the temperature is gradually increased). ICI interprets the existence of this prior art to indicate that, in order for the '644 patent to be sufficiently unique, it would have to require that the PEN be held at a constant temperature. In the prior art, however, the substance was not required to devolatilize before leaving the 80 (deg.)C-140 (deg.)C zone. The essential difference of the '644 patent is not that temperatures are held constant; rather it is that the PEN goes through a separate devolatilization step before reaching crystallization temperatures. This devolatilization step can occur at any temperature, or temperatures, in the specified range.

#### IV. THE LUMPING ISSUE

[9] The second issue of contention concerns the construction of word "devolatilized" as used in Claims One and Two in conjunction with the phrase "while providing agitation" as used in Claims One and Two. ICI contends that the claim's use of the word "devolatilized" indicates that there is a tangible end point where the PEN is considered "devolatilized." This end point, ICI argues, occurs when the volatiles have been removed so that no "lumping" will occur. Once the PEN has been devolatilized, it can be heated to its crystallization temperature. If agitation is provided as stated in the claims, further lumping will not occur. ICI thus asks this court to construe the patent to require that the result of the process for crystallization and/or solid state polymerization are uniquely characterized by the absence of agglomeration and lumping of PEN. In other words, if PEN is heated and lumping occurs, the patent has not been infringed, because the process must have occurred outside of the scope of the processes covered by the patent.

Shell argues that "devolatilized" PEN may still have lumps: they can come from other process parameters such as not handling the PEN chips properly or not providing agitation during the solid stating step. The invention, according to Shell's brief, merely forestalls lumping that results from the escaping volatiles, not lumping that may occur for other reasons. For example, a person could perform both of the steps of Claim One, and perform the "agitation" that is required by Step 2 unsatisfactorily, resulting in lumping. Despite the lumping, the patent would have been infringed.

Similarly, even if the process describing in Claim One and in the first two steps of Claim Two was performed perfectly, and no lumping resulted, lumps could still develop during the third step of Claim Two (the solid-stating step). The solid-stating step could be performed with no agitation, for example, as the patent does not require any, resulting in lumping. Or the solid-stating step could be performed in a way entirely inconsistent with Step 3 of Claim Two, also resulting in lumping. Since the first two steps are identical to the entirety of Claim One, in this scenario Claim One would have been infringed, even though Step 3 of Claim Two had been performed improperly. In short, the '644 patent describes a process which can sometimes result in lumping, even though the purpose of the patent is to prevent such lumping.

The court concludes that the word "devolatilized" as it modifies "PEN" means "lump-free" *at the beginning of the crystallization step*. In other words, if the PEN has any significant lumping in it at the end of Step 1 of either Claim One or Claim Two, when the temperature is increased to a crystallization temperature, it has not been sufficiently devolatilized, and the process undertaken is outside the scope of the patent. The word "devolatilized," however, does not mean "never to be lumpy again." Devolatilized PEN could begin to lump

after it has been devolatilized. Reasons for this lumping could include: insufficient agitation during the crystallization process, a lack of agitation during the solid-stating process, or poor handling of the PEN.

The court does not find that "while providing agitation" means that the PEN at the end of the crystallization step is necessarily lump-free. It is true that the process described in the patent is intended to create lump-free PEN; however, the patent itself unambiguously states "while providing agitation" and does not state the degree of agitation. It is theoretically possible to perform a process within the scope of Step 2 of the claims and still get some lumping.

Finally, the court does not find that the patent, taken as a whole, guarantees a lump-free end product, especially if that final product is solid-state PEN. The process described in Claim One can be successfully performed independently of Claim Two. Any lumping observed for the first time at the end of the process described by Claim Two could result from occurrences during Step 3.

Whether ICI did indeed infringe Shell's patent is a question of fact for the jury to consider. In making this determination, the existence of lumping will certainly be an important factor: if the PEN processed by ICI or PET has lumps, this fact might allow the jury to infer that the devolatilization or crystallization steps were not performed within the meaning of the patent. Shell, however, is entitled to demonstrate to the jury alternative causes of the lumping, if such causes exist. The patent claims themselves are entirely silent on the issue of whether successfully devolatilized and crystallized PEN could ever develop lumps.

E.D.La.,1999.

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