UNITED STATES DISTRICT COURT
NORTHERN DISTRICT OF ILLINOIS
EASTERN DIVISION

HOSPIRA, INC.,	)	
	)	
Plaintiff,	)	
	)	
v.	)	**No. 16 C 651**
	)	
FRESENIUS KABI USA, LLC,	)	**Judge Rebecca R. Pallmeyer**
	)	
Defendants.	)	

MEMORANDUM OPINION AND ORDER

Plaintiff Hospira, Inc., a Delaware corporation with its primary place of business in Illinois, manufactures pharmaceuticals and medical supplies. At issue in this case is a chemical compound known as dexmedetomidine, which Hospira sells to health care providers under the brand name Precedex. Between 2012 and 2014, Hospira obtained four patents covering a new product made from dexmedetomidine: U.S. Patent Nos. 8,242,158 (the " '158 Patent"), 8,338,470 (the " '470 Patent"), 8,455,527 (the " '527 Patent"), and 8,648,106 (the " '106 Patent"). (Complaint [1] ("Pl.'s Compl."), 3.)

Defendant Fresenius Kabi USA, LLC, is an American subsidiary of a German pharmaceutical manufacturer which is also registered in Delaware and headquartered in Illinois. On December 4, 2015, Fresenius Kabi notified Hospira that it had filed an abbreviated new drug application ("ANDA") with the FDA, seeking approval to market its own proposed dexmedetomidine products prior to the expiry of Hospira's patents. (Answer to Complaint, Affirmative Defenses, and Counterclaims [10] ("Def.'s Answer"), ¶ 16.) Hospira filed suit a month later, alleging patent infringement. (Pl.'s Compl. 8–9.) Fresenius Kabi has denied the allegations and counterclaimed for a declaration that the four patents at issue are invalid or, alternatively, that Fresenius Kabi's actions will not infringe. (Def.'s Answer 22.)

The parties have presented competing interpretations of two terms common to all four patents-in-suit, and of one term unique to the '527 Patent. The court's construction of those terms follows.

BACKGROUND

A. The Patented Invention

Dexmedetomidine is a chemical compound known as an alpha$_2$-adrenergic agonist. ('158 Patent, JA-2, col. 1 ll. 21–24.) In layman's terms, this means it stimulates certain receptors in the central nervous system to produce a desired effect. U.S. National Library of Medicine, *Adrenergic Agonists*, Medicinal Subject Headings 2018 (last visited Nov. 27, 2017), https://meshb-prev.nlm.nih.gov/record/ui?ui=D000322. Dexmedetomidine is used primarily as a sedative, though it is also used to treat pain, anxiety, and high blood pressure. ('158 Patent, JA-2, col. 1 ll. 21–24.) The compound was originally isolated and patented in 1990 by a Finnish corporation, which later licensed the sales rights to Hospira's predecessor organization, Abbott Laboratories. (Fresenius Kabi USA, LLC's Opening Claim Construction Brief [43] ("Def.'s Opening Br."), 2, 4.) Plaintiff Hospira has sold dexmedetomidine-based medications under the Precedex trade name since 1999. (Hospira's Responsive Claim Construction Brief [47] ("Pl.'s Resp. Br."), 1.)

The original Precedex product, known as Precedex Concentrate, is sold in 2-mL glass vials containing a concentration of 100 micrograms per milliliter (µg/mL) of dexmedetomidine. (*Id*.) This concentration is too strong to administer directly to patients. Accordingly, hospital personnel are required to dilute Precedex Concentrate with a 0.9% sodium chloride solution to a reach a concentration of just 4 µg/mL before injecting patients with the medication. (*Id*. at 2; JA-260 ("Precedex Concentrate Label").) In addition, once diluted, the prepared dexmedetomidine solution must be used within 24 hours for maximum potency. (*Id*.)

As Hospira notes, this extra dilution step has obvious drawbacks, including inconvenience, added cost, and increased safety concerns resulting from possible contamination or overdose. (*Id*.) To address these concerns, Hospira developed a new, pre-diluted dexmedetomidine formulation, which it calls Precedex Premix. (*Id*. at 3.) It is for this invention that Hospira filed for and obtained the patents at issue in this case.

Hospira summarized its invention as "premixed pharmaceutical compositions of dexmedetomidine, or a pharmaceutically acceptable salt thereof, that are formulated for administration to a patient, without the need to reconstitute or dilute the composition prior to administration." ('158 Patent, JA-2, col. 1 ll. 61–65.) While surmounting the shortcomings of its original, concentrated formulation, Hospira faced several challenges in developing Precedex Premix: namely, the need to ensure that the product remained stable and potent over a much longer shelf-life. (Pl.'s Resp. Br. 2–3.) After conducting trials with modified chemical formulas, Hospira identified the packaging as the solution to its problems. (*Id*.) Specifically, Hospira asserts, it "discovered that glass packaging exhibited superior stability relative to other packaging materials" such as plastic infusion bags or pre-filled syringes. (*Id*.; '158 Patent, JA-8, col. 13 ll. 22–67.) Hospira found further that "developing a sealed system" could ensure shelf-life stability and product sterility. (Pl.'s Resp. Br. 3.) On this front, Hospira "tested several closure systems for integrity without success before finding a stopper that was compatible with the glass container[.]" (*Id*.)

The '158, '470, and '106 Patents all cover the same basic subject matter—the medication itself—and share a title: "Dexmedetomidine Premix Formulation." (*See*, *e.g.,* '158 Patent, JA-1.) The final, '527 Patent addresses "Methods of Treatment using a Dexmedetomidine Premix Formulation." ('527 Patent, JA-29.) All the patents share a common specification. The core of the invention, Hospira states, is "a 'ready to use' dexmedetomidine formulation in a 'sealed glass container.'" (Pl.'s Resp. Br. 3.)

B. The Disputed Claim Terms

The parties contest three claim terms: "ready to use," "sealed glass container," and "intensive care unit." The first two of these terms are present in every asserted claim throughout all four patents, while the third relates to just one claim in the '527 Patent.

The '158 Patent is representative of the manner in which the terms "ready to use" and "sealed glass container" are used in all four patents.[1] It claims:

> 1. A **ready to use** liquid pharmaceutical composition for parenteral administration to a subject, comprising dexmedetomidine or a pharmaceutically acceptable salt thereof at a concentration of about 4 µg/mL disposed within a **sealed glass container**.
> 2. The **ready to use** liquid pharmaceutical composition of claim 1, further comprising sodium chloride at a concentration of between about 0.01 and about 2.0 weight percent.
> 3. The **ready to use** liquid pharmaceutical composition of claim 2, wherein the sodium chloride is present at a concentration of about 0.9 weight percent.
> 4. The **ready to use** liquid pharmaceutical composition of claim 1, wherein the composition is formulated as a total volume selected from the group consisting of 20 mL, 50 mL and 100 mL.

('158 Patent, JA-14, col. 26 ll. 4–18) (emphasis added).

The '527 Method Patent contains 15 claims covering various concentrations, delivery methods, and settings in which the premixed dexmedetomidine formulation may be administered. ('527 Patent, JA-42, col. 25 l. 24–col. 26 l. 31.) Claim 8 contains the disputed term:

> 1. A method of providing sedation to a patient in need thereof, the method comprising administering to the patient an effective amount of a composition, wherein the composition comprises dexmedetomidine or a pharmaceutically acceptable salt thereof at a concentration of about 0.005 to about 50 µg/mL, wherein the composition is a ready to use liquid pharmaceutical composition for parenteral administration to the patient disposed within a sealed glass container.
>
> . . .
>
> 8. The method of claim 1, wherein the composition is administered to the patient in an **intensive care unit**.

[1] The parties agree on this point, and cite to the first-filed '158 Patent in the Joint Appendix when discussing these two terms throughout their briefs. (*See* Def.'s Opening Br. 4 n.3.)

(*Id*. at col. 25 ll. 25–32, col. 26 ll. 16–17) (emphasis added).

C. Prosecution History

The inventors filed the four patent applications between January 4, 2012, and April 22, 2013. ('158 Patent, JA-1; '106 Patent, JA-43.) The Patent Office issued the patents between August 14, 2012, and February 11, 2014, in the order in which they were filed. (*Id*.) The prosecution history of the first-filed '158 Patent reflects the history of the family of patents as a whole.

In the original application, the independent claim of the '158 Patent read:

> 1. A pharmaceutical composition comprising dexmedetomidine or a pharmaceutically acceptable salt thereof at a concentration of about 4 µg/mL, wherein the composition is formulated as a liquid for parenteral administration to a subject, and wherein the composition is disposed with a sealed container as a premixture.

(JA-175.) The phrase "ready to use" and word "glass" to describe the sealed container were not yet present. The Patent Office rejected all four claims as anticipated or made obvious by the prior art: in this case, the label that appears on the Precedex Concentrate product. (*Id*. at 286.) The examiner's comments explained that the Precedex Concentrate label "teaches that the dexmedetomidine HCL formulation must be diluted in 0.9% sodium chloride solution prior to administration" and "provides instructions for dilution." (*Id*.) (emphasis in original). Notably, the label disclosed that Precedex Concentrate was sold in "clear glass vials and . . . ampules." (*Id*. at 261.) The examiner further stated in regards to the claimed "sealed container" that, given the choice between diluting the solution in a sealed versus unsealed container, "[t]he artisan would clearly immediately envisage the mixing of the formulation in a sealed container in order to maintain the sterility of the composition for parenteral administration." (*Id*. at 287.)

In response, the inventors amended the claim to read "wherein the composition is disposed within a sealed glass container as a ready to use premixture." (JA-298) (emphasis in original). In support of these amendments, the record states:

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