

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

UNITED STATES GYPSUM COMPANY,))	
)	
Plaintiff,)	
)	
v.)	Civil Action No. 17-130-JFB-SRF
)	
NEW NGC, INC.,)	
)	
Defendant.)	

REPORT AND RECOMMENDATION

I. INTRODUCTION

In this patent infringement action filed by plaintiff United States Gypsum Company (“USGC”) against defendant New NGC, Inc. (“NGC”), USGC alleges infringement of United States Patent Nos. 6,342,284 (“the ‘284 patent”); 6,632,550 (“the ‘550 patent”); 7,425,236 (“the ‘236 patent”); 7,758,980 (“the ‘980 patent”); 7,964,034 (“the ‘034 patent”); 8,142,914 (“the ‘914 patent”), and 8,500,904 (“the ‘904 patent”) (collectively “the patents-in-suit”). (D.I. 1) Presently before the court is the matter of claim construction. This decision sets forth the court’s recommendations of constructions for the disputed claim terms discussed in the briefing and at the *Markman* hearing held on July 18, 2018.

II. BACKGROUND

USGC develops and manufactures gypsum products used to construct walls, ceilings, roofs and floors of various types of buildings. (D.I. 1 at ¶ 4) NGC is a direct competitor of USGC in manufacturing, marketing and selling gypsum products. (*Id.* at ¶ 5)

The patents-in-suit are a group of related patents with overlapping specifications¹ and common inventors, which are directed to gypsum products with increased resistance to sag, less density, and other improved properties. (‘284 patent, col. 3:54-55; col. 5:31-33) During the *Markman* hearing, counsel categorized the challenged claims into four groups. (7/18/18 Tr. at 5:15-7:1) The composition claims describe the components of a composition used to create a set gypsum product. (‘284 patent, claim 1) The product claims of the patents-in-suit involve mixing calcium material with water and various enhancing materials to form a set gypsum product. (‘284 patent, claim 10) The method claims involve steps to mix and form the set gypsum. (‘236 patent, claim 2) The final category includes product-by-process claims, which recite the gypsum board product made by particular method steps identified in the rest of the claim. (‘284 patent, claim 40)

III. LEGAL STANDARD

Construing the claims of a patent presents a question of law, although subsidiary fact finding is sometimes necessary. *Teva Pharms. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 837-38 (2015) (citing *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977-78 (Fed. Cir. 1995), *aff’d*, 517 U.S. 370, 388-90 (1996)). “It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (internal quotation marks omitted). “[T]here is no magic formula or catechism for conducting claim construction.” *Id.* at 1324. Instead, the court may attach the appropriate weight to appropriate sources “in light of the statutes and policies that inform patent law.” *Id.*

¹ Although the specifications of the patents-in-suit are substantially similar, they do not share a common specification. (D.I. 74 at 3 n.5)

The words of the claims “are generally given their ordinary and customary meaning,” which is “the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application.” *Phillips*, 415 F.3d at 1312-13 (internal citations and quotation marks omitted). “[T]he ordinary meaning of a claim term is its meaning to the ordinary artisan after reading the entire patent.” *Id.* at 1321 (internal quotation marks omitted); *see also Eon Corp. IP Holdings v. Silver Spring Networks, Inc.*, 815 F.3d 1314, 1320 (Fed. Cir. 2016). Claim terms are typically used consistently throughout the patent, and “usage of a term in one claim can often illuminate the meaning of the same term in other claims.” *Phillips*, 415 F.3d at 1314 (observing that “[o]ther claims of the patent in question, both asserted and unasserted, can also be valuable sources of enlightenment . . . [b]ecause claim terms are normally used consistently throughout the patent . . .”).

It is likewise true that “[d]ifferences among claims can also be a useful guide For example, the presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim.” *Id.* at 1314-15 (internal citation omitted). This “presumption is especially strong when the limitation in dispute is the only meaningful difference between an independent and dependent claim, and one party is urging that the limitation in the dependent claim should be read into the independent claim.” *SunRace Roots Enter. Co., Ltd. v. SRAM Corp.*, 336 F.3d 1298, 1303 (Fed. Cir. 2003) (citing *Ecolab Inc. v. Paraclipse, Inc.*, 285 F.3d 1362, 1375 (Fed. Cir. 2002).

Other intrinsic evidence, including the patent specification, “is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.” *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996). “[T]he specification may reveal a special definition given to a claim term by the

patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs." *Phillips*, 415 F.3d at 1316 (citing *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002)). It bears emphasis that "[e]ven when the specification describes only a single embodiment, the claims of the patent will not be read restrictively unless the patentee has demonstrated a clear intention to limit the claim scope using words or expressions of manifest exclusion or restriction." *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 906 (Fed. Cir. 2004) (internal quotation marks omitted), *aff'd*, 481 F.3d 1371 (Fed. Cir. 2007). The specification "is not a substitute for, nor can it be used to rewrite, the chosen claim language." *SuperGuide Corp. v. DirecTV Enters., Inc.*, 358 F.3d 870, 875 (Fed. Cir. 2004).

In addition to the specification, a court "should also consider the patent's prosecution history, if it is in evidence." *Markman*, 52 F.3d at 980. The prosecution history, which is also "intrinsic evidence," "consists of the complete record of the proceedings before the PTO [Patent and Trademark Office] and includes the prior art cited during the examination of the patent." *Phillips*, 415 F.3d at 1317. "[T]he prosecution history can often inform the meaning of the claim language by demonstrating how the inventor understood the invention and whether the inventor limited the invention in the course of prosecution, making the claim scope narrower than it would otherwise be." *Id.*

A court also may rely on "extrinsic evidence," which "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Markman*, 52 F.3d at 980. For instance, technical dictionaries can assist the court in determining the meaning of a term to those of skill in the relevant art because such dictionaries "endeavor to collect the accepted meanings of terms used in various fields of science

and technology.” *Phillips*, 415 F.3d at 1318. In addition, expert testimony can be useful “to ensure that the court’s understanding of the technical aspects of the patent is consistent with that of a person of skill in the art, or to establish that a particular term in the patent or the prior art has a particular meaning in the pertinent field.” *Id.* Nonetheless, courts must not lose sight of the fact that “expert reports and testimony [are] generated at the time of and for the purpose of litigation and thus can suffer from bias that is not present in intrinsic evidence.” *Id.* (“[C]onclusory, unsupported assertions by experts as to the definition of a claim term are not useful to a court.”). Overall, while extrinsic evidence may be useful to the court, it is less reliable than intrinsic evidence, and its consideration “is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence.” *Id.* at 1318-19.

Finally, “[t]he construction that stays true to the claim language and most naturally aligns with the patent’s description of the invention will be, in the end, the correct construction.” *Renishaw PLC v. Marposs Societa’ Per Azioni*, 158 F.3d 1243, 1250 (Fed. Cir. 1998). It follows that “a claim interpretation that would exclude the inventor’s device is rarely the correct interpretation.” *Osram GmbH v. Int’l Trade Comm’n*, 505 F.3d 1351, 1358 (Fed. Cir. 2007).

IV. CONSTRUCTION OF DISPUTED TERMS

1. **“set gypsum”** (‘284 patent, claims 4, 5, 6, 12, 26, 29, 32, 33, 34, 40; ‘550 patent claims 1, 54, 55; ‘236 patent, claim 2; ‘980 patent, claims 1, 6, 7; ‘914 patent, claim 1; ‘034 patent, claims 1, 8; ‘904 patent, claims 1, 15)

USGC	NGC	Court
a crystallized gypsum structure produced from the rehydration of calcium sulfate hemihydrate into calcium sulfate dihydrate by mixing with water	calcium sulfate dihydrate	calcium sulfate dihydrate

I recommend that the court adopt NGC’s construction, which is supported by the intrinsic evidence. The specifications of the patents-in-suit expressly define “set gypsum” as “calcium sulfate dihydrate,” providing that “[m]any well known useful products contain set gypsum (calcium sulfate dihydrate) as a significant, and often as the major, component,” and explaining that “the terms, ‘set gypsum’ and ‘hydrated gypsum,’ are intended to mean calcium sulfate dihydrate.”² (‘284 patent, col. 1:42-44; col. 4:33-34; *see also* col. 7:53-54; 12:65-67; 13:65-67) “When the specification explains and defines a term used in the claims, without ambiguity or incompleteness, there is no need to search further for the meaning of the term.” *Sinorgchem Co., Shandong v. Int’l Trade Comm’n*, 511 F.3d 1132, 1138 (Fed. Cir. 2007) (quoting *Multiform Desiccants, Inc. v. Medzam, Ltd.*, 133 F.3d 1473, 1478 (Fed. Cir. 1998)). Viewing the specifications of the patents-in-suit as “the single best guide to the meaning of [the] disputed term,” I recommend that the court construe “set gypsum” to mean “calcium sulfate dihydrate.” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1315 (Fed. Cir. 2005) (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)).

2. “set gypsum-containing product,” “set gypsum product,” and “set gypsum material” (‘550 patent, claims 1, 54, 55; ‘034 patent, claims 1, 7-8; ‘904 patent, claims 1-4, 6, 8, 11-13, 15, 18; ‘236 patent, claim 2)

USGC	NGC	Court
No construction necessary apart from the term “set gypsum”	a product containing calcium sulfate dihydrate, including but not limited to gypsum boards, reinforced gypsum composite boards, plasters, machinable materials, joint	No construction necessary apart from the term “set gypsum”
If construed: a product containing set gypsum		

² The record reflects that “set gypsum” is defined as “calcium sulfate dihydrate” in multiple other patents beyond the patents-in-suit in the present litigation, supporting NGC’s contention that its proposed construction is consistent with the understanding of a person of ordinary skill in the art. (D.I. 74, Ex. 8 at col. 6:7-12; Ex. 9 at 2:58-62; Ex. 10 at col. 2:56-58)

	treatment materials, and acoustical tiles	
--	--	--

I recommend that the court adopt USGC’s proposal and decline to construe the terms apart from the preceding construction of “set gypsum.” In support of its proposed construction, NGC stresses that its non-limiting list of products finds support in the specifications of the patents-in-suit and prevents USGC from improperly distinguishing the prior art in a manner inconsistent with the patentee’s definition of “set gypsum.” (D.I. 74 at 4-5) USGC contends that NGC’s proposed list of examples does not resolve any ambiguity in the claim term. (D.I. 77 at 14-15)

The disputed terms require no further construction. The recommended construction for “set gypsum” is consistent with NGC’s proposal to define the term as “a product containing calcium sulfate dihydrate.” The parties do not dispute that the non-limiting list of examples included in NGC’s proposed construction is consistent with the specifications of the patents-in-suit. (‘284 patent, col. 1:11-16; 1:42-61) However, NGC does not explain how this open-ended list clarifies the scope of the term. For these reasons, I recommend that no construction is necessary for the disputed terms.

- 3. “calcined gypsum” (‘284 patent, claims 10, 11; ‘550 patent, claims 1-3, 7, 8, 54, 55; ‘236 patent, claim 2; ‘980 patent, claims 1, 2; ‘914 patent, claims 1-3; ‘034 patent, claims 1, 2, 4, 7)**

USGC	NGC	Court
alpha calcium sulfate hemihydrate, beta calcium sulfate hemihydrate, water-soluble calcium sulfate anhydrite, or mixtures of any or all thereof	calcium sulfate hemihydrate and/or calcium sulfate anhydrite	alpha calcium sulfate hemihydrate, beta calcium sulfate hemihydrate, water-soluble calcium sulfate anhydrite, or mixtures of any or all thereof

I recommend that the court adopt USGC’s proposed construction, which is consistent with the intrinsic record. According to NGC, the specifications of the patents-in-suit set forth two variations of a definition for the disputed term, and the broader definition should control. (D.I. 74 at 6-7) In support of its position, NGC points to a portion of the specifications reciting “calcined gypsum (calcium sulfate hemihydrate and/or calcium sulfate anhydrite).” (‘284 patent, col. 1:63-64) USGC argues that this portion of the specification is not definitional, and instead proposes construing the term consistent with the express definition in the specifications: “(as used herein, the term, ‘calcined gypsum,’ is intended to mean alpha calcium sulfate hemihydrate, beta calcium sulfate hemihydrate, water-soluble calcium sulfate anhydrite, or mixtures or any or all thereof . . .).” (*Id.* at col. 4:29-32)

The specification of the ‘284 patent expressly defines “calcined gypsum” in accordance with USGC’s proposed construction: “(as used herein, the term, ‘calcined gypsum,’ is intended to mean alpha calcium sulfate hemihydrate, beta calcium sulfate hemihydrate, water-soluble calcium sulfate anhydrite, or mixtures of any or all thereof . . .).” (‘284 patent, col. 4:29-34) USGC’s proposed construction is also consistent with other portions of the written description and the understanding of a person of ordinary skill in the art. The specification elsewhere reiterates that “[t]he calcined gypsum employed in the invention . . . can be alpha calcium sulfate hemihydrate, beta calcium sulfate hemihydrate, water-soluble calcium sulfate anhydrite, or mixtures of any or all thereof, from natural or synthetic sources.” (*Id.* at col. 9:6-12) The portion of the specification identified as an alternative definition by NGC does not contain the definitional language recited in the above passage. (*Id.* at col. 1:63:64) Consequently, the portion of the specification using clear definitional language controls. *See The Medicines Co. v.*

Teva Parenteral Medicines, Inc., C.A. No. 09-750-RGA, 2013 WL 3658020, at *5 (D. Del. July 11, 2013) (identifying the language “as used herein” as explicit definitional language).

NGC’s reliance on the Federal Circuit’s decision in *Johnson Worldwide Associates, Inc. v. Zebco Corp.* does not alter the court’s conclusion because the facts in *Johnson Worldwide* are not sufficiently analogous to the circumstances presently before the court. 175 F.3d 985, 989 (Fed. Cir. 1999). Specifically, the Federal Circuit addressed “the question of when it is permissible to narrow the scope of broad claim language by reference to embodiments described and depicted in the balance of the specification,” and ultimately concluded that narrowing a claim term based on a description in a preferred embodiment, without definitional language, was not permissible. *Id.* at 989-91. In contrast, the intrinsic evidence before the court in this matter establishes that the patentee used definitional language to narrow the scope of the disputed term, as opposed to inferring a narrowed scope from preferred embodiments in the written description. Thus, unlike the circumstances in *Johnson Worldwide*, the use of “calcined gypsum” in conjunction with definitional language in the ‘284 patent specification supports a “special and particular definition created by the patent applicant” sufficient to limit the scope of the term. *Johnson Worldwide*, 175 F.3d at 991.

4. “a calcium sulfate material” (‘284 patent, claims 1, 2, 40)

USGC	NGC	Court
calcium sulfate anhydrite, calcium sulfate hemihydrate, calcium sulfate dihydrate, ions of calcium and sulfate, or mixtures of any or all thereof	calcium sulfate hemihydrate and/or calcium sulfate anhydrite	calcium sulfate anhydrite, calcium sulfate hemihydrate, calcium sulfate dihydrate, ions of calcium and sulfate, or mixtures of any or all thereof

I recommend that the court adopt USGC’s proposed construction, which is consistent with the intrinsic record. The parties’ dispute centers on whether “calcium sulfate dihydrate”

and “ions of calcium and sulfate” should be included in the construction of the disputed term. (D.I. 74 at 7) Where, as here, “a patentee explicitly defines a claim term in the patent specification, the patentee’s definition controls.” *Martek Biosciences Corp. v. Nutrinova, Inc.*, 579 F.3d 1363, 1380 (Fed. Cir. 2009) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1321 (Fed. Cir. 2005)). The express definition of the term in the specification confirms that “calcium sulfate material” includes calcium sulfate dihydrate and ions of calcium and sulfate, in accordance with USGC’s proposed construction. Specifically, the written description states that calcium sulfate material “is intended to mean calcium sulfate anhydrite; calcium sulfate hemihydrate; calcium sulfate dihydrate; ions of calcium and sulfate; or mixtures of any or all thereof.” (‘284 patent, col. 3:66-4:2)

- 5. “enhancing materials” (‘284 patent, claim 1, 2, 4, 40; ‘550 patent claim 1, 2, 3, 5, 9, 54, 55, 57; ‘236 patent claim 2; ‘914 patent claim 1, 2, 4; ‘034 patent claim 1, 2, 5, 7; ‘904 patent claim 1, 3, 4, 6)**

USGC	NGC	Court
phosphoric acids, each of which comprises 1 or more phosphoric acid units; salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units; and monobasic salts or monovalent ions of orthophosphates	an additive that improves at least one of: resistance to permanent deformation, strength, and dimensional stability in set gypsum-containing products	phosphoric acids, each of which comprises 1 or more phosphoric acid units; salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units; and monobasic salts or monovalent ions of orthophosphates

I recommend that the court adopt USGC’s construction, which is supported by the weight of the intrinsic evidence. The parties’ dispute focuses on whether the term should be defined as a list of chemicals or, alternatively, by describing how the claimed “enhancing materials” function.

USGC's proposed construction is consistent with the guidance provided by the claim language and specifications of the patents-in-suit. The asserted claims of the '284 patent recite "one or more enhancing materials selected from the group consisting of: condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units, and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units." ('284 patent, col. 31:53-56; col. 31:63-66) Similarly, the specification of the '284 patent describes the preparation of set gypsum as a mixture including "one or more enhancing materials chosen from: condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units." ('284 patent, col. 3:58-62) The '284 patent specification goes on to explain that "enhancing materials can be chosen from the group consisting of: phosphoric acids, each of which comprises 1 or more phosphoric acid units, salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units, and monobasic salts or monovalent ions of orthophosphates." ('284 patent, col. 4:4-9)

Contrary to NGC's contentions, the remaining patents-in-suit use the disputed term in a manner consistent with its use in the '284 patent. The '550 patent has the same disclosure as the '284 patent. ('550 patent, col. 1:6-11) The '980, '914, '034 and '904 patents are in the same patent family as the '284 patent, and they incorporate by reference the specification of the '284 patent. ('980 patent, col. 1:4-17; '034 patent, col. 1:4-19; '914 patent, col. 1:4-22; '904 patent, col. 1:3-25) Although NGC challenges USGC's position regarding the incorporation by reference of the '284 patent specification based on an alleged lack of particularity regarding which material is incorporated, the Federal Circuit has held that language similar to that used in the patents-in-suit is sufficient to incorporate by reference a previous patent into a continuation

or divisional application. *See Dealertrack, Inc. v. Huber*, 674 F.3d 1315, 1323 (Fed. Cir. 2012) (“The ‘817 patent incorporates the ‘403 patent using the following language: ‘This is a division of application Ser. No. 08/526,776 (“‘776 Application”), filed Sep. 12, 1995, hereby incorporated by reference. Now U.S. Pat. No. 5,878,403.’”).

Both parties direct the court to the Federal Circuit’s decision in *AquaTex Industries, Inc. v. Techniche Solutions*, which determined that AquaTex “incorporate[d] by reference the teachings of three United States Patents to define the scope of the term ‘fiberfill,’” rendering these publications “highly relevant to one of ordinary skill in the art for ascertaining the breadth of the claim term.” 419 F.3d 1374, 1381 (Fed. Cir. 2005). A review of the patent at issue in *AquaTex*, U.S. Patent No. 6,371,977 (“the ‘977 patent”), reveals that the patentee identified “U.S. Pat. Nos. 5,104,725; 4,304,817; and 4,818,599; all of which hare [sic] incorporated by reference” because they “disclose fiberfill fibers and blends suitable for certain applications of the present invention.” (‘977 patent, col. 3:62-65) Although the *AquaTex* court incorporated the three patents by reference for a specifically identified purpose in this instance, other binding precedent from the Federal Circuit, such as *Dealertrack*, suggests that a broader incorporation by reference is also appropriate in instances involving divisional or continuation applications. *See Dealertrack*, 674 F.3d at 1323.

The cases cited by NGC regarding incorporation by reference are inapposite. In *Zenon Environmental, Inc. v. U.S. Filter Corp.*, the Federal Circuit found no incorporation by reference of the entire prior art reference where the relevant language stated that

The vertical skein is not the subject matter of this invention and any prior art vertical skein may be used. Further details relating to the construction and deployment of a most preferred skein are found in the parent U.S. Pat. No. 5,639,373, and in Ser. No. 08/690,045, the relevant disclosures of each of which are included by reference thereto as if fully set forth herein.

506 F.3d 1370, 1379 (Fed. Cir. 2007). The Federal Circuit determined that this language did not sufficiently incorporate by reference the entire disclosures of the prior art patents, because the plain language of the statement “expressly limits the incorporation to only relevant disclosures of the patents, indicating that the disclosures are not being incorporated in their entirety.” *Id.* In contrast, the incorporation by reference language in the present case supports incorporation of the full disclosure of patents within the same patent family regarding the same subject matter. Moreover, in *Droplets, Inc. v. E*TRADE Bank*, the Federal Circuit addressed incorporation by reference in the specific context of 35 U.S.C. § 120 regarding a priority claim, unlike the circumstances presently before the court. 887 F.3d 1309, 1318-20 (Fed. Cir. 2018).

It is undisputed that the ‘236 patent does not incorporate the ‘284 patent by reference. (‘236 patent, col. 1:4-14; 7/18/18 Tr. at 18:6-8) However, the disclosure of the ‘236 patent is consistent with that of the other patents-in-suit. For example, the ‘236 patent specification identifies “enhancing materials chosen from: condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units.” (‘236 patent, col. 3:61-64; 5:55-63; 6:7-11; 6:21-24; 6:32-36; 6:43-46; 6:54-57) The data tables in the ‘236 patent are the same as those included in the ‘284 patent. Likewise, claims 1 and 3 of the ‘236 patent claim a method of spraying or soaking set gypsum “with a solution comprising one or more enhancing materials selected from the group consisting of phosphoric acid; condensed phosphoric acids, each of which comprises two or more phosphoric acid units; salts or ions of condensed phosphate, each of which comprises two or more phosphate units; and monobasic salts or monovalent ions of orthophosphates.” (‘236 patent, col. 31:10-15, 32:7-13) This claim language is consistent with

the broadest definition of “enhancing materials” identified in the specifications of the other patents-in-suit. (D.I. 79 at ¶ 67)

NGC’s proposed construction is overly broad because it encompasses conventional additives which exceed the intended scope of the claim term. For example, the specification identifies boric acid as a non-inventive additive, and compares samples with no additive as a control group to inventive samples with an STMP additive and “comparative samples” with “other additives.” (‘284 patent, col. 13:61-63) Table 2 of the ‘284 patent explains that “additives employed in the comparative samples” fall “outside the scope of the invention,” although they “have been employed to attempt to improve resistance of gypsum board to sagging under conditions of high humidity.” (‘284 patent, col. 14:26-30) These conventional additives include boric acid, which is shown in Table 2 to increase the sag resistance of gypsum board as compared to the control group with no additives. (‘284 patent, col. 14:46-50) Although the specification expressly excludes conventional additives such as boric acid from the scope of inventive additives constituting the term “enhancing materials,” these additives fall within NGC’s proposed construction because they improve the sag resistance of gypsum-containing products. For this reason, NGC’s proposed construction does not find adequate support in the intrinsic record.

NGC contends that USGC’s proposed construction is not viable because the portions of the specification supporting USGC’s proposal apply only to post-set treatments of calcium sulfate dihydrate. (‘284 patent, col. 4:3-10; 30:60-67) However, the specification of the ‘284 patent defines enhancing materials used in pre-set formulations in a manner consistent with enhancing materials used in post-set spray treatments: “[I]n general, any enhancing materials that fall within the general definition of enhancing materials previously discussed will produce

beneficial results . . . in treatment of calcined gypsum.” (‘284 patent, col. 27:19-23) These enhancing materials “are condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units; and salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units.” (*Id.* at col. 27:23-27) This definition finds further support in the claim language of the ‘284 patent, which establishes that USGC’s definition of enhancing materials encompasses the subcategory of phosphoric acids and salts or ions of condensed phosphates present in the claimed pre-set gypsum slurry. (‘284 patent, col. 31:50-57) The description of enhancing materials in claim 1 of the ‘284 patent, which is directed to the composition of a gypsum slurry, is therefore consistent with USGC’s proposed construction.

NGC also alleges that USGC’s proposed construction is not viable because the specifications of the patents-in-suit suggest that the combination of phosphoric acid in a gypsum slurry worsens the sag resistance of the product, in contravention of the stated purpose of enhancing materials to “increase[] resistance to permanent deformation (e.g. sag resistance).” (D.I. 74 at 12-13; Ex. 1 at col. 1:16-29) Specifically, NGC relies on Table 13 of the ‘236 patent, which identifies a mixture containing phosphoric acid as having an increase of 0.062 inches in the ten day humidified sag deflection over the control group. (D.I. 74, Ex. 3 at Table 13) However, the intrinsic record reveals that the data in Table 13 of the ‘236 patent does not render USGC’s proposed construction unworkable.

Claim 2 of the ‘236 patent is the only claim containing the disputed term that is broad enough to encompass phosphoric acid in relation to a pre-set gypsum slurry, because the other claims reciting “enhancing materials” in pre-set mixtures identify a particular subcategory of enhancing material compounds encompassed by the claim language. (*Compare* ‘236 patent, col. 31:15-32:3, *with* ‘284 patent, col. 31:50-59) Also, claim 2 of the ‘236 patent is the only

challenged claim containing the disputed term that does not recite increased sag resistance in the claim language itself. (*Id.*) Table 13 recites other improved characteristics in compositions containing phosphoric acid that are consistent with the desired effects of including an enhancing material in the mixture, such as “increased strength, resistance to permanent deformation (e.g., sag resistance), and dimensional stability (e.g., non-shrinkage during drying of set gypsum).” (‘236 patent, col. 1:30-32) Table 13 demonstrates that the use of phosphoric acid in a gypsum slurry significantly improves the compressive strength of the product, despite the decrease in sag resistance. (‘236 patent, Table 13) Consequently, USGC’s proposed construction accurately encompasses the usage of “enhancing materials” in claim 2 of the ‘236 patent.

The extrinsic evidence also shows that a person of ordinary skill in the art at the time of invention would understand the term "enhancing materials" in the manner proposed by USGC. USGC’s expert, Dr. Bruce, explained that the term "did not have an ordinary or customary meaning in the field of set gypsum" at the time of the patent's earliest filing date, and that a person of ordinary skill in the art would understand the term to be consistent with the specific meaning used in the patents-in suit. (D.I. 79 at ¶¶ 58-59) Similarly, Dr. Harlos indicated that "[t]here is no suggestion in the patent specifications that all materials that potentially improve the resistance to deformation, strength or dimensional stability . . . of a set gypsum . . . are within what the claim refer[red] to as ‘enhancing materials,’” and NGC’s proposed construction would "[define] enhancing materials beyond the particular additives that the term . . . [was] intended to describe in the [p]atents-[i]n-[s]uit." (D.I. 79 at ¶¶ 60, 68) For these reasons, I recommend that the court adopt USGC’s proposed construction of “enhancing materials.”

6. “a sag resistance, as determined according to ASTM C473-95, of less than about 0.1 inch per two foot length of said board” (‘284 patent, claims 1, 2, 4, 5, 10, 34, 40; ‘550 patent, claims 1, 54, 55; ‘980 patent, claim 4; ‘914 patent, claim 1; ‘034 patent, claims 1, 7; ‘904 patent, claim 1)

USGC	NGC	Court
an amount of sag, as determined according to ASTM C473-95, of less than 0.125 inch per two foot length of said board	a measured sag, as determined according to ASTM C473-95, of less than 0.11 inch per two foot length of said board	an amount of sag, as determined according to ASTM C473-95, of less than 0.125 inch per two foot length of said board

I recommend that the court adopt USGC’s proposed construction, which finds support in the extrinsic evidence. The parties’ dispute focuses on the proper value of the amount of variance represented by “about.” According to NGC, the court should apply the confidence interval for experimental error of +/- 5%, which is disclosed in the specification, to arrive at 0.105, rounded to 0.11. (D.I. 74 at 15) USGC contends that the sag resistance value should be determined under the ASTM C473-95 test in accordance with the intrinsic record and the understanding of a person of ordinary skill in the art, which do not require a narrow variance. (D.I. 77 at 15-17)

The intrinsic record does not clarify the scope of the disputed claim term in this instance. NGC advocates applying the confidence interval of +/-5% for experimental error identified in the ‘284 patent specification. However, the written description of the ‘284 patent recites the confidence interval in the context of a compressive strength measurement performed on a SATEC testing machine. (‘284 patent, col. 13:4-16) Nothing in the written description supports extending the application of the confidence interval to the context of sag resistance.

The ASTM C473-95 standardized sag measurement procedure provides some guidance regarding the scope of acceptable variance by specifying that measurements of sag resistance should be estimated to the nearest $\frac{1}{16}$ of an inch. (D.I. 74, Ex. 14 at ¶ 51.2) Specifically, the

procedure entails “[m]easur[ing] the humidified deflection of each specimen as the distance between a straightedge placed on the top end edges of the board and the upper surface of the board at its center. Take measurements to the nearest $\frac{1}{16}$ in. (1.6 mm).” (*Id.*) Moreover, sag values reported to the industry must be stated “as the average of the specimens to the nearest $\frac{1}{8}$ in. (3.2 mm).” (*Id.* at ¶ 52.1) Applying the standardized sag measurement procedure under the ASTM C473-95 test to the disputed claim term, the extrinsic evidence supports USGC’s position that there is no statistically significant difference to a person of ordinary skill in the art between sag measurements of 0.1 and 0.125 inches. (D.I. 79 at ¶¶ 94-95) For this reason, I recommend adopting USGC’s proposed construction of the disputed term.

- 7. “mixture” (‘284 patent, claims 1-4, 14, 40; ‘550 patent, claims 1-3, 6, 54-56; ‘236 patent, claim 2; ‘914 patent, claims 1, 2, 6, 8, 10; ‘034 patent, claims 1, 2, 7, 9; ‘904 patent, claims 1, 3, 4, 11-13, 15, 18)**

USGC	NGC	Court
No construction necessary	Physical combination of substances that are not chemically combined	No construction necessary
If construed: a combination made by mixing		

I recommend that the court adopt USGC’s proposal and conclude that no construction is necessary. The intrinsic evidence does not support NGC’s proposal to limit the term to a physical combination of substances. Instead, the patents-in-suit consistently describe forming set gypsum products from mixtures of calcined gypsum, water, and other ingredients, requiring chemical reactions to combine the components.

The specification of the ‘284 patent describes how calcined gypsum, water, and other components are mixed “to form set (i.e., rehydrated) gypsum by reaction of the calcined gypsum with the water to form a matrix of crystalline hydrated gypsum (calcium sulfate dihydrate).” (‘284 patent, col. 1:62-2:3) Likewise, claim 1 of the ‘550 patent describes “forming a mixture of

calcined gypsum, water, an accelerator, and one or more enhancing materials,” which is then maintained “under conditions sufficient for the calcined gypsum to form an interlocking matrix of set gypsum.” (‘550 patent, col. 37:61-38:3) The extrinsic evidence establishes that the claim language recites a chemical reaction because “one skilled in the art understands that water contained in the recited mixture reacts with calcined gypsum of the mixture to form calcium sulfate dihydrate. Both the calcium sulfate hemihydrate in calcined gypsum and the calcium sulfate dihydrate consist of calcium sulfate molecules chemically bonded to water molecules.” (D.I. 79 at ¶ 100) Therefore, limiting the mixture to a physical combination of substances would be inconsistent with the claim language and specifications of the patents-in-suit.

8. “accelerator” (‘550 patent, claims 1, 56; ‘236 patent, claim 2; ‘914 patent, claim 1; ‘034 patent, claims 1, 9; ‘904 patent, claims 1, 8)

USGC	NGC	Court
an additive effective to increase the rate of formation of set gypsum	plain and ordinary meaning	an additive effective to increase the rate of formation of set gypsum

I recommend that the court adopt USGC’s proposed construction, which is supported by the intrinsic record. NGC withdrew its original proposed construction and now contends that the term requires no construction. (D.I. 74 at 19) However, NGC does not identify the plain and ordinary meaning of the term or explain its position that “not all ‘accelerators’ always result in acceleration.” (*Id.*) USGC’s proposed construction is supported by the patent specifications, which explain that “trimetaphosphate ion actually accelerates the rate of hydration of calcined gypsum to form set gypsum,” despite the fact that “it has been generally thought in the gypsum art that phosphoric or phosphate materials retard the rate of formation of set gypsum.” (‘550 patent, col. 4:61-5:1) Table 17 of the ‘550 patent discloses the use of an accelerator to reduce the set time of gypsum slurry compositions. (*Id.*, col. 35:25-40) Because the patents-in-suit

consistently use the term “accelerator” to describe a substance that speeds up the rate of formation of set gypsum, I recommend that the court adopt USGC’s proposed construction.

9. “a composition comprising set gypsum . . . wherein the composition comprises a mixture of: . . . calcium sulfate hemihydrate” (‘284 patent, claim 4)

USGC	NGC	Court
This claim element does not require construction and is not indefinite	This term is indefinite under pre-AIA 35 U.S.C. § 112, second paragraph	This claim element does not require construction and is not indefinite

I recommend that the court adopt USGC’s proposal that the term does not require construction. Claim 4 of the ‘284 patent recites:

A composition comprising set gypsum and host particles, at least a portion of the set gypsum being positioned in and about accessible voids in the host particles, wherein the composition comprises a mixture of: the host particles having the accessible voids therein; calcium sulfate hemihydrate, at least a portion of which is in the form of crystals in and about the voids of the host particles; and one or more enhancing materials selected from the group consisting of: condensed phosphoric acids, each of which comprises 2 or more phosphoric acid units . . .

(‘284 patent, col. 32:5-17) According to NGC, the term is indefinite because claim 4 of the ‘284 patent refers to both set gypsum and calcium sulfate hemihydrate, and a person of ordinary skill in the art would therefore be confused as to whether the claim covers finished gypsum board or gypsum slurry. (D.I. 74 at 20-21) However, the claim language does not suggest that the two are mutually exclusive in this context, as indicated by inclusion of the word “comprising.” (D.I. 79 at ¶¶ 126-29) Specifically, both set gypsum and calcium sulfate hemihydrate may be present as calcium sulfate hemihydrate converts to set gypsum during the setting process. (7/18/18 Tr. at 130:22-131:8)

10. “when [said composition/the mixture] is cast in the form of ½ inch gypsum board, said board has a sag resistance, as determined according to ASTM C473-95, of less than about 0.1 inch per two foot length of said board” (‘284 patent, claims 1, 2, 4; ‘550 patent, claims 1, 54, 55; ‘034 patent, claims 1, 7; ‘904 patent, claims 1)

USGC	NGC	Court
This claim element does not require construction and is not indefinite	This term is indefinite under pre-AIA 35 U.S.C. § 112, second paragraph	This claim element does not require construction and is not indefinite

I recommend that the court adopt USGC’s proposal and conclude that the term is definite and does not require construction. The parties dispute whether a person of ordinary skill in the art would be capable of making wallboard of varying thicknesses using an identical gypsum slurry composition. (D.I. 91, Ex. A at 2; 7/18/18 Tr. at 64:19-65:19) Moreover, the parties disagree as to the impact of differences between papered versus unpapered board, and laboratory versus commercial board, on the sag resistance of the product. (7/18/18 Tr. at 56:4-13)

The record supports USGC’s contention that a person of ordinary skill in the art would be able to evaluate whether an accused slurry, product, or method infringes a formulation used for 5/8 inch boards. In a June 12, 2017 Report and Recommendation on NGC’s motion to dismiss the complaint, the court held that:

[t]he reference to casting the mixture as a ½ inch gypsum board is not a thickness limitation for a board made by the claimed methods, but rather refers to an objective test procedure for determining whether the mixture contains a sufficient amount of enhancing material. Indeed, the ½ inch measurement in the claimed patents references the industry standard for testing sag resistance and strength of gypsum wallboards. It is not a limitation on the thickness of USGC’s wallboard products as NGC claims.

(D.I. 14 at 7) Consistent with the court’s ruling, a person of ordinary skill in the art would understand that the claim term does not restrict the thickness of the board produced by practicing the claim, but instead states the required characteristics of the mixture used in forming the product regardless of its form or thickness. (D.I. 79 at ¶ 112)

Moreover, the evidence before the court establishes that a person of ordinary skill in the art can use a gypsum mixture used to make $\frac{5}{8}$ inch or $\frac{3}{8}$ inch boards for performance testing under the ASTM C473-95 standard by adjusting the thickness parameter on a commercial production line or by pouring the mixture into a $\frac{1}{2}$ inch thick laboratory board mold to assess the sag resistance. (D.I. 79 at ¶ 118) According to USGC's expert, Dr. Bruce, "[c]hanging the thickness from $\frac{5}{8}$ inch to $\frac{1}{2}$ inch on a commercial production line can be accomplished without changing the speed or the gypsum slurry formulation." (D.I. 85 at ¶ 9) Specifically, a person of ordinary skill in the art would "reduc[e] the flow rates of the ingredients into the mixer so that the lower volume of the same gypsum slurry formulation needed to make the thinner $\frac{1}{2}$ inch board is deposited onto the line," and would "reduc[e] the dryer temperatures to accommodate the reduced water load." (*Id.*) A person of ordinary skill in the art would adopt similar modifications when testing the formulation for gypsum slurries used in making acoustic tiles. (*Id.* at ¶¶ 6-7) In these circumstances, "[i]t is not necessary to change the concentration of accelerator or retarder in the composition . . . because a formulation that has already been shown to set to an acceptable degree at the faster line speed will also do so at the slower speed. Thus, the formulation can remain the same." (*Id.* at ¶¶ 11-12) The specification of the '284 patent supports Dr. Bruce's assessment, describing the preparation of gypsum board samples cast into trays with $\frac{1}{2}$ inch dimensions and dried in an oven. ('284 patent, col. 13:53-14:1)

NGC's expert, Dr. Harlos, contends that reformulation of the slurry is necessary to accommodate the difference in thickness and amount of excess water. (D.I. 75 at ¶ 20) However, Dr. Harlos' analysis is based on running the $\frac{1}{2}$ inch wallboard through the kiln at the same speed as $\frac{5}{8}$ inch wallboard, without accounting for potential modifications in the feed rate to compensate for certain line speeds and board thicknesses. (*Id.*) As explained by Dr. Bruce, a

person of ordinary skill in the art would alter the feed rate of ingredients into the mixer to adjust the volume of slurry deposited onto the line during production, as opposed to modifying the speed or the composition of the formulation itself. (D.I. 85 at ¶¶ 9, 11-12)

Turning to the parties' dispute regarding the effect of papered versus unpapered board, the '284 patent specification identifies two ways of preparing ½ inch gypsum board samples for sag resistance testing: either as laboratory board or commercial board. ('284 patent, col. 13:49-14:54; 14:56-16:26) The specification of the '284 patent recites one example of sag resistance testing on commercial gypsum board in accordance with the conditions set forth in the ASTM C473-95 standard. (*Id.*, col. 18:58-19:14) Example 5 specifies that the tested boards were "[p]aper-covered foamed gypsum boards . . . prepared on a typical full scale production line in a commercial gypsum board manufacturing facility." (*Id.* at col. 17:21-23)

The specification also contains an example illustrating that paper covers may be used on laboratory boards in accordance with ASTM C473-95 testing requirements. (*Id.* at col. 16:30-43) Specifically, Example 4 provides that "[l]aboratory prepared samples of typical paper-covered gypsum boards produced in accordance with the invention were compared with control boards The test . . . is carried out in accordance with ASTM C473-95." (*Id.*) Although Example 4 was directed to laboratory gypsum board nail pull resistance, as opposed to humidified deflection, a person of ordinary skill in the art viewing the specification in its entirety would be able to apply the papered laboratory board conditions of Example 4 to the humidified deflection testing in accordance with ASTM C473-95 standards outlined in Example 5. NGC's allegations regarding the distinctions between papered and unpapered board ignore the fact that the specification supports the performance of ASTM C473-95 testing on papered laboratory board. (*Id.*)

In sum, the disputed term recites the ASTM C473-95 standard, which is an objective test for determining whether a gypsum composition can be used to make a gypsum board with the specified sag resistance. The '284 patent specification demonstrates that the ASTM standard may be applied to either laboratory or commercial gypsum boards, and laboratory board may either be papered or unpapered. A person of ordinary skill in the art would be capable of making wallboard of varying thicknesses using the identical gypsum slurry composition. In view of the foregoing, I recommend that the court adopt USGC's proposal and determine that the disputed term does not require construction.

V. CONCLUSION

For the reasons set forth above, I recommend that the court construe disputed terms as follows:

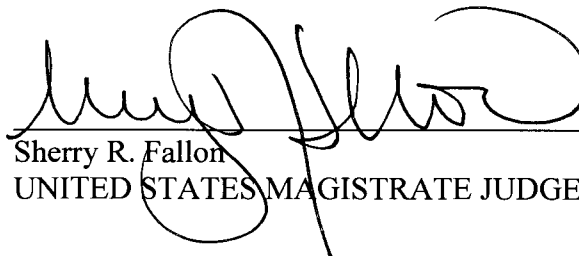
<u>Claim Term</u>	<u>Recommended Construction</u>
"set gypsum"	calcium sulfate dihydrate
"set gypsum-containing product," "set gypsum product," and "set gypsum material"	No construction necessary apart from the term "set gypsum"
"calcined gypsum"	alpha calcium sulfate hemihydrate, beta calcium sulfate hemihydrate, water-soluble calcium sulfate anhydrite, or mixtures of any or all thereof
"a calcium sulfate material"	calcium sulfate anhydrite, calcium sulfate hemihydrate, calcium sulfate dihydrate, ions of calcium and sulfate, or mixtures of any or all thereof
"enhanced materials"	phosphoric acids, each of which comprises 1 or more phosphoric acid units; salts or ions of condensed phosphates, each of which comprises 2 or more phosphate units; and monobasic salts or monovalent ions of orthophosphates
"a sag resistance, as determined according to ASTM C473-95, of less than about 0.1 inch per two foot length of said board"	an amount of sag, as determined according to ASTM C473-95, of less than 0.125 inch per two foot length of said board
"mixture"	No construction necessary
"accelerator"	an additive effective to increase the rate of formation of set gypsum

“a composition comprising set gypsum . . . wherein the composition comprises a mixture of: . . . calcium sulfate hemihydrate”	This claim element does not require construction and is not indefinite.
“when [said composition/the mixture] is cast in the form of ½ inch gypsum board, said board has a sag resistance, as determined according to ASTM C473-95, of less than about 0.1 inch per two foot length of said board”	This claim element does not require construction and is not indefinite

This Report and Recommendation is filed pursuant to 28 U.S.C. § 636(b)(1)(B), Fed. R. Civ. P. 72(b)(1), and D. Del. LR 72.1. The parties may serve and file specific written objections within fourteen (14) days after being served with a copy of this Report and Recommendation. Fed. R. Civ. P. 72(b)(2). The objections and responses to the objections are limited to ten (10) pages each. The failure of a party to object to legal conclusions may result in the loss of the right to de novo review in the District Court. *See Sincavage v. Barnhart*, 171 F. App’x 924, 925 n.1 (3d Cir. 2006); *Henderson v. Carlson*, 812 F.2d 874, 878-79 (3d Cir. 1987).

The parties are directed to the court’s Standing Order For Objections Filed Under Fed. R. Civ. P. 72, dated October 9, 2013, a copy of which is available on the court’s website, <http://www.ded.uscourts.gov>.

Dated: September 5, 2018


 Sherry R. Fallon
 UNITED STATES MAGISTRATE JUDGE