

# United States Court of Appeals for the Federal Circuit

00-1402

ECOLAB, INC.,

Plaintiff-Appellee,

v.

ENVIROCHEM, INC.,

Defendant-Appellant.

Thomas L. Hamlin, Robins, Kaplan, Miller & Ciresi L.L.P, of Minneapolis, Minnesota, argued for plaintiff-appellant. With him on the brief were Randall Tietjen, and Emily M. Rome.

Charles A. Weiss, Kenyon & Kenyon, of New York, New York, argued for defendant-appellant. With him on the brief was Richard L. DeLucia.

Appealed from: United States District Court for the District of New Jersey

Judge Joseph A. Greenaway, Jr.

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DECIDED: September 6, 2001

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Before NEWMAN, Circuit Judge, FRIEDMAN, Senior Circuit Judge, and LINN, Circuit Judge.

LINN, Circuit Judge.

On cross-motions for summary judgment the United States District Court for the District of New Jersey determined that Envirochem, Inc.'s ("Envirochem") product line literally infringed claim 1 of Ecolab, Inc.'s ("Ecolab") United States Reissue Patent No. 32,818 (the "818 patent"). Ecolab, Inc. v. Amerikem Labs., Inc., Nos. 96-437, 90-4712 (D.N.J. May 23, 2000) (infringement opinion) ("Ecolab I"). The district court also determined that neither equitable estoppel nor laches precluded Ecolab from obtaining an injunctive remedy against Envirochem for its literal infringement. Ecolab, Inc. v. Amerikem Labs., Inc., (D.N.J. Jan 8, 1999) (claim construction and equitable defenses opinion) ("Ecolab II"). Envirochem appeals both decisions. We conclude that the district court erred in construing the claim term "substantially uniform." In view of this error, we vacate the grant of summary judgment of literal infringement, and remand to the district court for further proceedings not inconsistent with this opinion. As for the district court's determination that

neither estoppel nor laches precludes Ecolab from obtaining an injunction against Envirochem, we affirm.

## BACKGROUND

The invention at issue is a solid detergent cast contained within a disposable container that surrounds the cast on all but one surface for use in commercial dishwashing machines. The main ingredients of the cast are alkali caustics, e.g., sodium hydroxide, and water conditioners—also called hardness sequestering agents, e.g., sodium tripolyphosphate. In particular, claim 1 recites:

1. A detergent-containing article of commerce comprising:
  - (a) a three-dimensional, solid, cast, hydrated, substantially uniform alkaline detergent for ware and hard surface washing comprising:
    - (1) at least about 30% by weight of an alkaline hydratable chemical consisting essentially of alkali metal hydroxide;
    - (2) an effective amount of a hardness-sequestering agent;
    - (3) water of hydration, at least a portion of said water of hydration being associated with said alkali metal hydroxide, wherein the alkali metal hydroxide and the hardness sequestering agent are present in an amount sufficient to render the cast detergent a solid at room temperature by virtue of the water of hydration; and
  - (b) a receptacle-shaped disposable container surrounding and in contact with said solid, cast, hydrated alkaline detergent composition on all but one surface thereof.

'818 patent, col. 27, ll. 38-60.

To form the cast, the ingredients are heated in a vat with water, poured into the container in a molten state and cooled. In use, the container is placed upside down in a dispenser in the dishwasher and water is intermittently sprayed against the exposed surface of the cast to dissolve it and allow it to flow into a tank of water to form the wash solution for a dishwashing cycle. A single cast can last through several hundred wash cycles.

Prior to the claimed invention, the commercial ware cleaning industry desired to increase sanitary standards and have shorter wash times. As a consequence, higher

alkalinity detergents, e.g., detergents with greater concentrations of sodium hydroxide, began to be used. The higher alkalinity detergents, however, had stability problems because other components of the detergent such as chlorine-containing compounds and defoamers are not stable in the presence of highly alkaline chemicals. In addition, the increase in alkalinity made the detergents difficult to dissolve in a satisfactorily uniform manner because all the components of the detergent do not dissolve at the same rate. Furthermore, segregation of the chemicals during manufacturing, handling, and shipping was a problem because of the differing particle sizes and densities of the components of the detergent. The '818 patent was Ecolab's effort to solve the above problems.

The instant suit is not the first time Ecolab and Envirochem have been before the federal court in the District of New Jersey as adversaries. Indeed, prior to the instant suit, Ecolab sued Envirochem alleging that Envirochem's Jardian products infringed the '818 patent. The parties entered into a settlement agreement to resolve that infringement issue. The settlement agreement resulted in a consent judgment issuing from the district court on January 5, 1993. In that agreement, Envirochem conceded literal infringement and agreed to discontinue the manufacture and sale of solid cast detergent products that infringe the '818 patent by December 31, 1992. It also agreed not to manufacture or sell any such infringing products after that date.

After the litigation, Envirochem developed what it considered to be a new line of noninfringing products, eight in number. The new product line is a solid cast containing alkali caustics and water conditioners; but, according to Envirochem, the new product line is a substantially nonuniform cast of these materials, in which a substantially higher percentage of water conditioners is present in the last portion of the cast to be dissolved. This new cast was allegedly made pursuant to Envirochem's United States Patent No. 5,482,641. Before marketing its new product line, Envirochem claims to have sent

Ecolab's counsel a letter on September 8, 1993 informing counsel of the new casts and its intent to begin distribution. Envirochem also claims to have forwarded Ecolab a sample of the new cast for testing. In the letter, Envirochem noted that "physical and chemical analysis [of the new cast] will reveal that . . . [it] is consistently non-uniform and contains substantially more than 25% sodium hydroxide." In view of the foregoing, Envirochem stated that "the new . . . [cast] cannot infringe the . . . ['818 patent, but] . . . if for some reason Ecolab disagrees, please advise . . . as soon as possible." Envirochem also indicated that they would begin shipping the new product line on September 17, 1993. Envirochem never received a response from Ecolab. However, Ecolab contends that they never received the letter and that its counsel returned the package unopened. Envirochem began distribution in September 1993.

In January of 1994, Ecolab began questioning Envirochem's distributors about the sale of the new Envirochem casts. On February 18, 1994, Envirochem, responding to what it perceived as harassment, sent Ecolab a letter pointing out that it had already sent Ecolab samples of the new product line. Ecolab did not respond to this letter and, in fact, did not begin to communicate directly with Envirochem until early in the summer of 1995. The letters exchanged at that time evidence that Envirochem again sent samples to Ecolab and that Ecolab was in the process of testing those samples.

The instant suit began, without warning, in December 1995 when Ecolab served Envirochem with a motion for an "immediate injunction" for violating the consent judgment in the earlier suit. The motion was denied and converted to a motion for a preliminary injunction. Ecolab, Inc v. Amerikem Labs., Inc., No. 90-4712 (D.N.J. May 31, 1996) (preliminary injunction) ("Ecolab III"). The district court (Barry, J.) found in particular that Ecolab had not shown that it was likely to carry its burden of proving that Envirochem's accused products were "substantially uniform" within the meaning of claim 1. Ecolab III, slip

op. at 17. Ecolab asserted that “substantially uniform” means “containing effective amounts of phosphate and alkali sources throughout the cast so as to ensure the product’s effectiveness.” Id. at 11. In other words, according to Ecolab, if Envirochem’s products work effectively at all times, they must be substantially uniform. Id.

The court expressly rejected Ecolab’s construction noting that the phrase “‘substantially uniform’ clearly implies some degree of uniformity rather than simply a degree of effectiveness.” Id. at 12. The court also rejected Envirochem’s asserted definition of “homogeneity throughout the cast” because that definition reads out the term “substantially.” Id. The court construed the phrase “substantially uniform” as describing “a cast in which the concentration of alkalinity and phosphates may vary from between 0.0% and 6.6%.” Id. at 13-14. The percentages were derived from data presented to the Patent and Trademark Office during prosecution in the “Tinker Affidavit” comparing the chemical composition of the claimed “substantially uniform” product and several prior art solid cast compositions.

In view of that claim construction, Envirochem moved for summary judgment of noninfringement. The case was reassigned to Judge Greenaway, who denied Envirochem’s motion in view of a wholly new claim construction. Ecolab II, slip op. at 17-19. Judge Greenaway reconstrued the term “substantially uniform” to mean “a level of continuity of the elements from top-to-bottom throughout the cast such that a homogeneous cleaning solution is formed over the life of the cast.” Id. at 16. Judge Greenaway also granted an outstanding motion by Ecolab for partial summary judgment dismissing Envirochem’s defenses of equitable estoppel and laches. Id. at 22. The court found that Envirochem could not establish material prejudice because Envirochem’s belief that its new product was noninfringing indicated that its conduct did not occur as a result of Ecolab’s delay. Id. at 27-31.

Based on the new claim construction, Ecolab moved for summary judgment of literal infringement, which motion was granted as to seven of the eight products in Envirochem's new product line. Ecolab slip op. at 2, 28. The district court determined that the underlying data of the expert reports of Dr. Steven Lentsch and Dr. Martin P. Rigney were properly admissible and the testing procedures were reliable. Id. at 7-15. The district court also determined that although not all products in Ecolab's new product line were tested, extrapolation to the remaining products was appropriate in view of the Fernholz\* affidavit that the products were prepared following a virtually identical formula and in accordance with standard production methods. Id. at 18. The district court additionally determined that the affidavits of Dr. Theodorus Van Es and Dr. Howard Fleisher were not relevant to whether or not Envirochem's products infringed because "any argument on nonuniformity based on the figures in the Tinker affidavit is irrelevant, and does not point to the existence of genuine issues of material fact." Id. at 31. The court determined that the Lentsch, Rigney, and Fernholz evidence established that Envirochem's products literally infringed claim 1 of the '818 patent. In view of its literal infringement determination, the district court enjoined Envirochem from making, using, or selling the seven products. Ecolab, Inc. v. Amerikem Labs., Inc., Nos. 96-437 and 90-4712 (D.N.J. May 23, 2000) (order). Envirochem timely appealed the district court's grant of summary judgment and entry of injunction. We have jurisdiction under 28 U.S.C. § 1295(a)(1) (1994).

## DISCUSSION

### I. Standard of Review

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\* Fernholz is the named inventor of the '818 patent and was the only Ecolab employee permitted to review Envirochem's product formula sheets because of trade secret concerns.

We review a district court's grant of summary judgment de novo. Ethicon Endo-Surgery, Inc. v. U. S. Surgical Corp., 149 F.3d 1309, 1315, 47 USPQ2d 1272, 1275 (Fed. Cir. 1998). However, in reviewing a denial of a motion for summary judgment, we give deference to the trial court, and "will not disturb the trial court's denial of summary judgment unless we find that the court has indeed abused its discretion." Suntiger, Inc. v. Scientific Research Funding Group, 189 F.3d 1327, 1333, 51 USPQ2d 1811, 1815 (Fed. Cir. 1999). When both parties move for summary judgment, the court must evaluate each motion on its own merits, resolving all reasonable inferences against the party whose motion is under consideration. McKay v. United States, 199 F.3d 1376, 1380 (Fed. Cir. 1999).

Summary judgment is appropriate only when there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(c). "In determining whether there is a genuine issue of material fact, the evidence must be viewed in the light most favorable to the party opposing the motion, with doubts resolved in favor of the opponent." Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc., 145 F.3d 1303, 1307, 46 USPQ2d 1752, 1755 (Fed. Cir. 1998). If there are no material facts in dispute precluding summary judgment, "our task is to determine whether the judgment granted is correct as a matter of law." Prochorenko v. United States, 243 F.3d 1359, 1362 (Fed. Cir. 2001).

A determination of infringement requires a two-step analysis. "First, the claim must be properly construed to determine its scope and meaning. Second, the claim as properly construed must be compared to the accused device or process." Carroll Touch, Inc. v. Electro Mech. Sys., Inc., 15 F.3d 1573, 1576, 27 USPQ2d 1836, 1839 (Fed. Cir. 1993). "In order for a court to find infringement, the plaintiff must show the presence of every '[limitation]' or its substantial equivalent in the accused device." Wolverine World Wide, Inc.

v. Nike, Inc., 38 F.3d 1192, 1199, 32 USPQ2d 1338, 1341 (Fed. Cir. 1994). Claim construction is an issue of law, Markman v. Westview Instruments, Inc., 52 F.3d 967, 970-71, 34 USPQ2d 1321, 1322 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370 (1996), that we review de novo. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1456, 46 USPQ2d 1169, 1172 (Fed. Cir. 1998) (en banc). The determination of infringement, whether literal or under the doctrine of equivalents, is a question of fact. Bai v. L & L Wings, Inc., 160 F.3d 1350, 1353, 48 USPQ2d 1674, 1676 (Fed. Cir. 1998).

The standard of review for both laches and equitable estoppel is abuse of discretion. A.C. Aukerman Co. v. R.L. Chaides Constr. Co., 960 F.2d 1020, 1028, 22 USPQ2d 1321, 1325 (Fed. Cir. 1992) (en banc). This court may reverse a discretionary decision if that decision rests on an erroneous interpretation of law or clearly erroneous factual underpinnings. Id. at 1039, 22 USPQ2d at 1333.

## II. Analysis

### A. Claim Construction

In arriving at the ultimate claim construction of the phrase “substantially uniform,” the district court noted that the “claim language makes clear the ’818 patent protects a detergent cast containing . . . [the particularly recited ingredients] in a manner such that the active elements are present throughout the cast without significant variation in the amounts of each ingredient.” Ecolab II, slip op. at 12. The court then looked to the written description and noted that “the ‘substantially uniform’ nature of Ecolab’s cast was advanced as a solution to the problems associated with the casts of the prior art . . . [and that a] substantially uniform product meant less segregation in the ingredients and similar solubility throughout the entire cast, which in turn resulted in chlorine stability in the wash solution throughout the life of the cast.” Id. at 13. Next, the court examined the prosecution history noting that Ecolab pointed out the homogeneity problems of highly alkaline

detergent products unless flaked or granularized immediately from a melt. Moreover, the court noted that Ecolab presented the Tinker affidavit to show the problems in casting homogeneous prior art composition versus the claimed composition. Thus, the court concluded that Ecolab's efforts in obtaining allowance of its claims were directed at defining "its patent claim in a manner reflecting that its casts consisted of a homogeneous composition of elements from top-to-bottom, and therefore, Ecolab's process and casts had solved the problems associated with the prior art." Id. at 14. It was the foregoing analysis that prompted the district court to ultimately construe the phrase "substantially uniform" to mean "a level of continuity of the elements from top-to-bottom throughout the cast such that a homogeneous cleaning solution is formed over the life of the cast." Id. at 16.

Envirochem urges that the court's definition does not provide a meaningful standard against which infringement can be judged because at one extreme it requires absolute uniformity in composition of the cast and at the other extreme no uniformity, i.e., even a perfectly nonuniform cast would provide a "homogeneous" solution if the entire cast were dissolved in water. Envirochem contends on appeal that the proper construction of "substantially uniform" in view of the Tinker affidavit is that the top-to-bottom variation of ingredients in the cast does not exceed 5.57% on a relative basis. Arguing against Envirochem's asserted definition, Ecolab contends that a numerical limitation on the range of the ingredients in the cast from top-to-bottom is inappropriate because the claim language does not present any basis for inferring an unwritten numerical range, and because the claims, specification, and prosecution history do not evince an intent to impart such a novel meaning to the phrase "substantially uniform."

In support of the district court's construction, Ecolab relies on Laitram Corp. v. Cambridge Wire Cloth, 863 F.2d 855, 858, 9 USPQ2d 1289, 1293 (Fed. Cir. 1988), and

asserts that descriptive claim terms that are not limited numerically are commonly defined according to the purpose or function of the invention. In this case, Ecolab asserts that the function of the invention is to provide sufficient alkalinity and sufficient phosphate to effectively clean the dishes and soften the water throughout the life of the product.

We agree with the reasoning expressed and the conclusion reached by the district court that no basis exists for inferring a numerical limitation as to what is a “substantially uniform” cast. However, we hold that the district court erred as to the proper construction of the phrase “substantially uniform.” That error was in: (1) defining nonnumerically limited claim terms according to the purpose of the invention; (2) not giving the phrase “substantially uniform” its ordinary and accustomed meaning; and (3) not recognizing the proper relevance and effect of the Tinker affidavit on the scope of the ’818 patent claims.

#### 1. Nonnumerically Limited Descriptive Claim Terms

We disagree with Ecolab that nonnumerically limited descriptive claim terms are “commonly defined according to the purpose of the invention.” Contrary to Ecolab’s contention, nonnumerically limited descriptive claim terms are construed using the same rules of construction as any other claim term. In Laitram, we affirmed the district court’s construction of the term “slightly greater” as related to the term “spacing” in terms of the purpose of the spacing. 863 F.2d at 858, 9 USPQ2d at 1293. However, we deemed this appropriate at least in part because the claim language itself contained functional limitations related to the spacing limitation. The prosecution revealed that the functional limitations in the claim required spacing that would minimize bending and maximize shear. Id., 9 USPQ2d at 1292-93 (the limitation at issue was: “said link ends being dimensioned and spaced apart by a distance slightly greater than said width so that said module is end-to-end reversible, so that a plurality of said modules may be engaged with each other at said ends.”). We are not faced with the same facts in this case. While the claimed “three-

dimensional, solid, cast, hydrated, substantially uniform alkaline detergent” is “for ware and hard surface washing,” there is no claimed functional requirement as to forming a homogeneous wash solution throughout the cast life. The only functional requirement of the claimed “three dimensional, solid, cast, hydrated, substantially uniform alkaline detergent” is for that detergent to contain components capable of “ware and hard surface washing.” Thus, while we agree with the district court and Ecolab that there is no basis in the intrinsic record on which to infer adding a numerical limitation to the phrase “substantially uniform,” there is also no basis on which to require adding a functional limitation.

## 2. The Claim Language and the Written Description

In construing the claims of a patent, we review the intrinsic evidence, which consists of the claim language, the written description, and the prosecution history. Interactive Gift Express, Inc. v. CompuServe Inc., No. 99-1324, 2001 WL 792669, at \*5 (Fed. Cir. July 13, 2001). We first look to the claims themselves and turn next to the written description and the prosecution history, which should always be consulted to construe the language of the claims. Gart v. Logitech, 254 F.3d 1334, 1339-40, 59 USPQ2d 1290, 1293-94 (Fed. Cir. 2001). This intrinsic evidence is consulted to determine if the patentee has chosen to be his or her own lexicographer, or when the language itself lacks sufficient clarity such that there is no means by which the scope of the claim may be ascertained from the claim language itself. Id. (internal citations omitted). When the foregoing circumstances are not present, we presume that the terms in the claim mean what they say. Id. In other words, we follow the general rule that terms in the claim are to be given their ordinary and accustomed meaning. Id.

We begin with the phrase “substantially uniform” itself. Ordinarily, “uniform” means “always the same as in form or degree; unvarying.” The American Heritage Collection Dictionary 1475 (3d ed. 1997). Additionally, “ordinarily . . . ‘substantially’ means

'considerable in . . . extent,' American Heritage Dictionary Second College Edition 1213 (2d ed. 1982), or 'largely but not wholly that which is specified,' Webster's Ninth New Collegiate Dictionary 1176 (9th ed. 1983)." York Prods., Inc. v. Cent. Tractor Farm & Family Cent., 99 F.3d 1568, 1573, 40 USPQ2d 1619, 1622 (Fed. Cir. 1996). Furthermore, the language "substantially uniform" expressly modifies the term "alkaline detergent." Thus, the claim language itself explicitly ties "substantially uniform" to the detergent itself, not to any overall function of the detergent-containing article of commerce.

The '818 written description does not reveal any special definition for the terms "substantially" or "uniform" or the phrase "substantially uniform." See, e.g., '818 patent, col. 18, ll. 30-31 ("the mixture was sufficiently viscous so that a uniform dispersion was maintained"); id. at col. 22, ll. 62-64 ("the solid cast detergent of this invention provides very uniform chlorine recovery when compared to a prior art formulation"); id. at col. 5, ll.13-15 ("an article of commerce capable of dispensing dissolved solids from substantially only one surface"); id. at col. 5, ll. 41-43 ("the cast detergent can be demolded and inserted in an inexpensive container or receptacle which has substantially the same configuration as the mold"). Furthermore, the use of the term "substantially" to modify the term "uniform" does not render this phrase so unclear such that there is no means by which to ascertain the claim scope.

We note that like the term "about," the term "substantially" is a descriptive term commonly used in patent claims to "avoid a strict numerical boundary to the specified parameter." Pall Corp. v. Micron Seeps., 66 F.3d 1211, 1217, 36 USPQ2d 1225, 1229 (Fed. Cir. 1995); See, e.g., Andrew Corp. v. Gabriel Elecs. Inc., 847 F.2d 819, 821-22, 6 USPQ2d 2010, 2013 (Fed. Cir. 1988) (noting that terms such as "approach each other," "close to," "substantially equal," and "closely approximate" are ubiquitously used in patent claims and that such usages, when serving reasonably to describe the claimed subject

matter to those of skill in the field of the invention, and to distinguish the claimed subject matter from the prior art, have been accepted in patent examination and upheld by the courts). In this case, “substantially” avoids the strict 100% nonuniformity boundary.

Certainly the written description teaches that Ecolab’s inventive cast was advanced as a solution to the problems associated with prior art solid detergents. We also acknowledge that accompanying its amendment adding the term “substantially uniform” to the claim, the patentee noted it is “of vital importance to maintain the homogeneity of the cast so that sufficient hardness sequestering agent and alkali metal hydroxide are available at all times.” However, this statement about the vital importance of having a homogeneous cast says nothing about having a homogeneous solution. Furthermore, the fact that the claimed composition was designed to solve certain problems of the prior art and the fact that the patentee noted the functional import of having a homogeneous cast does not mean that we must attribute a function to the nonfunctional phrase “substantially uniform.” Where the function is not recited in the claim itself by the patentee, we do not import such a limitation. See Jenric/Pentron, Inc. v. Dillon Co., Inc., 205 F.3d 1377, 1382, 54 USPQ2d 1086, 1090 (Fed. Cir. 2000) (“This court rejects any attempt to carve out a portion of cerium oxide according to functions not recited in the claim.”).

### 3. The Prosecution History

We turn next to the Tinker affidavit, which was submitted to overcome a 35 U.S.C. § 103 rejection of the claims over a combination of prior art references. The tabular results presented in the Tinker affidavit are reproduced below.

Table II

Segregation of Caustic

<u>Formula</u>	<u>%Na<sub>2</sub>O, Active</u>			<u>Theoretical</u>
	<u>Initial</u>	<u>3 Hours</u>	<u>24 Hours</u>	

I	top*	46.2	44.5	50.3	44.6
	bottom**	38.8	37.8	41.8	
II	top	40.1	39.8	43.8	44.6
	bottom	43.5	37.7	40.9	
III	top	45.2	45.0	48.9	44.6
	bottom	41.9	35.8	38.8	
IV	top	41.7	42.0	40.7	37.3
	bottom	27.1	15.7	27.0	
V	top	30.1	28.7	30.3	33.9
	bottom	32.1	27.6	30.3	

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\* top 1/4"

\*\* bottom 1/4"

Table III  
Segregation of Tripolyphosphate

<u>Formula</u>	<u>% Phosphate, as Tripolyphosphate</u>			
	<u>Initial</u>	<u>3 Hours</u>	<u>24 Hours</u>	<u>Theoretical</u>
I top	11.4	6.8	1.1	15.0
I bottom	12.9	16.8	20.7	
II top	10.2	5.6	1.0	15.0
II bottom	15.5	19.4	19.3	
III top	11.8	2.3	0.5	15.0
III bottom	15.5	22.0	22.0	
IV top	9.3	6.3	2.5	34.0
IV bottom	41.3	45.2	43.9	
V top	32.3	32.3	32.3	34.0
V bottom	32.3	33.6	32.3	

We note that Tinker asserted that the data demonstrated a significant difference in alkalinity and tripolyphosphate concentration between the top and bottom quarter of the casts of the prior art compositions, i.e., Formulae IV, but not in the claimed composition, i.e., Formula V. The data were not obtained by measuring the homogeneity of the cleaning solution formed after spraying the exposed surface of the cast with water. Rather, it was gathered by measuring the concentrations of these ingredients in the top and bottom quarters of the casts. Consequently, there is nothing in the Tinker affidavit requiring that the nonfunctional phrase “substantially uniform” be limited functionally.

We recognize that the patentee states in the written description that a cast detergent prepared according to the invention had a “very uniform chlorine recovery” as compared to a conventional powdered detergent. ’818 patent, Figure 5 and col. 22, ll. 61-65. Moreover, we agree with Ecolab that the term “very uniform” is more restrictive than “substantially uniform.” However, the uniformity of the delivery of chlorine to the effluent does not aid our interpretation of the uniformity of the distribution of ingredients throughout the cast when there are no functional constraints on the terms “substantially” or “uniform.” Consequently, any percentage difference in chlorine recovery of the claimed invention versus the prior art determined from Figure 5 of the ’818 patent has no bearing on the percentage difference that “substantially uniform” would encompass as it relates to the distribution of ingredients throughout the cast.

We disagree with Envirochem that the Tinker affidavit limits the meaning of “substantially uniform” numerically, at least to the extent of what is “substantially uniform.” Nowhere in the affidavit is it asserted that Formula V, made according to the claimed invention, is “the invention.” Thus, while the percentage difference of the components from top-to-bottom of Formula V is within the scope of “substantially uniform,” that percentage difference does not mark the outer bounds of the descriptive phrase.

However, we note that “all express representations made by or on behalf of the applicant to the examiner to induce a patent grant” limit the interpretation of the claims “so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance.” Standard Oil Co. v. Am. Cyanamid Co., 774 F.2d 448, 452, 227 USPQ 293, 296 (Fed. Cir. 1985); Pall Corp. v. PTI Techs., Inc., Nos. 00-1203 and –1215, 2001 WL 881465, \*7 (Fed. Cir. Aug. 3, 2001) (noting that if the patentee has defined a claim term as excluding a broader interpretation with reasonable clarity and deliberateness then the patentee has disclaimed certain subject matter and the claims must be so limited); Hockerson-Halberstadt, Inc. v. Avia Group Int’l, Inc., 222 F.3d 951, 955, 55 USPQ2d 1487, 1490 (Fed. Cir. 2000) (“Review of the prosecution history . . . reveals that the inventor disclaimed a particular interpretation of groove, thereby modifying the term’s ordinary meaning.”); Cultor Corp. v. A.E. Staley Mfg. Co., 224 F.3d 1328, 1331, 56 USPQ2d 1208, 1210 (Fed. Cir. 2000) (“Claims are not correctly construed to cover what was expressly disclaimed.”); Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576, 34 USPQ2d 1673, 1676 (Fed. Cir. 1995) (“The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.”); cf. Intervet Am., Inc. v. Kee-Vet Labs., Inc., 887 F.2d 1050, 1054, 12 USPQ2d 1474, 1477 (Fed. Cir. 1989) (noting that an erroneous remark by an attorney in the course of prosecution cannot control the interpretation of a claim as finally worded and

issued by the United States Patent and Trademark Office). In view of the foregoing, we determine that the Tinker affidavit is relevant to determining whether the express terms of the claim must be limited to exclude disclaimed subject matter. Ekchian v. Home Depot, Inc., 104 F.3d 1299, 1304, 41 USPQ2d 1364, 1368 (Fed. Cir. 1997).

As stated above, Tinker noted that there was a significant segregation of ingredients of caustic and hardness sequestering agent at the top and the bottom of Formulae I through IV, which were casts made according to the prior art. In other words, the patentee through the Tinker affidavit clearly asserted that these casts were not substantially uniform. It is clear, therefore, that the patentees disclaimed from "substantially uniform" the nonuniformity of caustic and tripolyphosphate exhibited by Formulae I through IV.

In view of the foregoing, i.e., the claim language, written description, and prosecution history, we presume that "substantially uniform" as related to the "alkaline detergent cast" means what it says, "largely, but not wholly the same in form." In the terms that the district court applied, that is "very near consistency of elements from top-to-bottom throughout the cast." None of the claim language, the syntax of the claim, the written description, the prosecution history, or our case law supports the addition of a functional limitation to this phrase.

The parties did not focus on the disclaimed subject matter in the Tinker affidavit in their briefs to the trial court and thus the trial court did not address it. Moreover, the parties did not focus on this issue in their briefs on appeal. In view of the foregoing, we think it better for the trial court to make an informed interpretation of the data in the first instance. See AFG Indus., Inc. v. Cardinal IG Co., 239 F.3d 1239, 1251, 57 USPQ2d 1776, 1785 (Fed. Cir. 2001) (leaving the trial court to determine on remand what constitutes a "top coat," as distinguished from a "layer"). In so doing, however, the trial court must bear in

mind that any cast composition having a percentage segregation of caustic and tripolyphosphate like that of Formulae I through IV of the Tinker affidavit cannot be “substantially uniform.”

## B. Infringement

After claim construction, the next step in an infringement analysis is comparing the properly construed claims with the allegedly infringing devices. Kemco Sales, Inc. v. Control Papers Co., 208 F.3d 1352, 1360, 54 USPQ2d 1308, 1312 (Fed. Cir. 2000). This comparison is a question of fact. Id. Thus, we must remand to the district court for a determination of the factual issues raised by our claim construction unless we are able to conclude on the record before us that there are no genuine issues of material fact, and the movant is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(c); Celotex Corp. v. Catrett, 477 U.S. 317, 322 (1986); see Vehicular Techs. Corp. v. Titan Wheel Int'l, Inc., 212 F.3d 1377, 1381, 54 USPQ2d 1841, 1843 (Fed. Cir. 2000) (holding that a fact issue is not in genuine dispute if a reasonable jury could only find in favor of the moving party).

### 1. Literal Infringement

In this case, the district court determined that seven of Ecolab’s eight products literally infringe claim 1 based on an incorrect claim interpretation, namely that the phrase “substantially uniform” means “a level of continuity of the elements from top-to-bottom throughout the cast such that a homogeneous cleaning solution is formed over the life of the cast.” However, as we noted above, infringement of the claim limitation at issue does not depend on whether a homogeneous solution is formed but whether the cast has a very near consistency of elements from top-to-bottom. Consequently, we remand to the district court in light of our claim construction and provide the following guidance for the district court in revisiting the infringement issue.

We note that the district court's literal infringement finding was based in part on Dr. Lentsch's tests of three of Envirochem's products and Dr. Rigney's test of five of Envirochem's products. We note that both Lentsch and Rigney recognized that there is a variation in the percentages of caustic and hardness sequestering agent throughout the casts. Lentsch concluded that the variations are "considered small and insignificant from a dishwashing performance standpoint" and "are as expected in an industrial machine." Rigney concluded that each product revealed "absolute variation in tripoly content throughout the capsule of significantly less than 20%." The question that remains is whether or not this variation is substantial or not. In view of the proper construction of the phrase "substantially uniform," this is a new factual issue that the district court, as the trier of fact in a summary judgment context, should consider in the first instance. See Seattle Box Co. v. Indus. Crating & Packing, Inc., 731 F.2d 818, 829, 221 USPQ 568, 576 (Fed. Cir. 1984) (noting that the trier of fact must make express findings in response to the new literal infringement inquiry of whether spacer blocks one-quarter of an inch less than the diameter of the separated pipe are "substantially equal to" the diameter of those separated pipes).

We note that upon considering this issue, the district court should not disregard evidence that makes a comparison of the percent variation of the alleged infringing products and the variation set forth in Formulae I through IV of the Tinker affidavit. Such a comparison is relevant in view of the disclaimer the patentee made as to what is not "substantially uniform." In other words, if the percent variation of the alleged infringing products is the same as or greater than that which is set forth in Formulae I through IV of the Tinker affidavit, then such products cannot literally infringe.

## 2. Infringement under the Doctrine of Equivalents

Because the district court found literal infringement by Ecolab, it had no occasion to reach the question of whether there was infringement under the doctrine of equivalents.

We note the following in this regard: infringement under the doctrine of equivalents requires that the accused product contain each limitation of the claim or its equivalent. Warner-Jenkinson Co. v. Hilton Davis Chem. Co., 520 U.S. 17, 40 (1997) (noting that because each limitation contained in a patent claim is material to defining the scope of the patented invention, a doctrine of equivalents analysis must be applied to individual claim limitations, not to the invention as a whole). An element in the accused product is equivalent to a claim limitation if the differences between the two are “insubstantial” to one of ordinary skill in the art. Id. However, when a claim limitation has been amended for a reason relating to patentability so as to narrow the scope of the claim, no range of equivalents is available for that amended claim limitation. Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co., 234 F.3d 558, 569, 576, 56 USPQ2d 1865, 1872, 1878 (Fed Cir. 2000) (en banc), cert. granted, 121 S. Ct. 2519 (2001).

It is undisputed that the limitation “substantially uniform” was added to the claim by amendment for a reason related to patentability and that this limitation narrowed the scope of the claim. Thus, under Festo, prosecution history estoppel bars a finding of infringement under the doctrine of equivalents in this case as to the “substantially uniform” limitation.

### C. Equitable Estoppel and Laches

Three elements must be established to bar a patentee’s suit by means of equitable estoppel: 1) the patentee, through misleading conduct, leads the alleged infringer to reasonably infer that the patentee does not intend to enforce its patent against the alleged infringer, 2) the alleged infringer relies on that conduct, and 3) due to its reliance, the alleged infringer will be materially prejudiced if the patentee is allowed to proceed with its claim. Scholle Corp. v. Blackhawk Molding Co., Inc., 133 F.3d 1469, 1473, 45 USPQ2d 1468, 1470-71 (Fed. Cir. 1998).

Laches requires proof that the patentee unreasonably and inexcusably delayed filing suit and that the delay resulted in material prejudice to the defendant. Wanlass v. Gen. Elec. Co., 148 F.3d 1334, 1337, 46 USPQ2d 1915, 1917 (Fed. Cir. 1998). The length of time that may be deemed unreasonable has no fixed boundaries, but rather depends on the circumstances of the case. A.C. Aukerman, 960 F.2d at 1030, 22 USPQ2d at 1330. A presumption of laches arises if the patentee delays bringing suit for more than six years after actual or constructive knowledge of the defendant's infringing activity. Id. at 1035-36, 22 USPQ2d at 1332.

The district court determined that even if Ecolab's inaction could support an inference that it had decided not to enforce the parties' settlement agreement, and that Envirochem relied on Ecolab's misleading conduct, it could not demonstrate that it would be materially prejudiced if Ecolab were permitted to pursue its infringement action. In addition, the court noted that because prejudice is an element that must be proved in equitable estoppel and laches, Envirochem could not prevail on either defense.

The court found that Envirochem had failed to present evidence regarding economic prejudice, i.e., a change in the economic position of Envirochem during the period of delay that would not have occurred had Ecolab sued earlier. According to the court, the hiring of new employees, modification of equipment, and engagement in sales and marketing activities related to the new cast are damages normally associated with a finding of infringement and do not constitute the type of damages necessary for a finding of economic prejudice. The court noted that Envirochem's firm belief from the outset that its product was noninfringing, coupled with its conduct after being contacted by Ecolab, led the court to the conclusion that the foregoing economic decisions were merely business decisions to capitalize on a market opportunity.

The court also found that the record does not show, and Envirochem does not allege, that it suffered defense prejudice; i.e., that Envirochem would be unable to present a full and fair defense on the merits in view of Ecolab's delay. Envirochem has not convinced us that the district court abused its discretion in any way in declining to find equitable estoppel or laches.

#### CONCLUSION

For the foregoing reasons, we vacate the district court's grant of summary judgment in favor of Ecolab as to Envirochem's literal infringement of claim 1, and remand for a determination of infringement based on the claim as construed herein. However, we affirm the district court's grant of summary judgment in favor of Ecolab as to the determination that neither equitable estoppel nor laches precludes an injunction from issuing against Envirochem if it is found to infringe claim 1 of the '818 patent and to be otherwise entitled to injunctive relief.

AFFIRMED-IN-PART, VACATED-IN-PART, REVERSED-IN-PART, AND REMANDED

#### COSTS

Each party shall bear its own costs.