United States District Court,
E.D. Missouri, Eastern Division.

LEGGETT & PLATT, INC. and L & P Property Management Company,
Plaintiffs.
v.
VUTEK, INC,
Defendant.

No. 4:05CV788 CDP

May 25, 2006.

David A. Roodman, K. Lee Marshall, Robert G. Lancaster, James B. Surber, Bryan Cave LLP, St. Louis, MO, for Plaintiffs.

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MEMORANDUM AND ORDER

PERRY**, J.**

Plaintiffs Leggett & Platt, Inc. and L & P Management Company (together "L & P") are the owners of Patent No. 6,755,518 ('518 Patent) which covers a "cold UV" printing technology used to print on heat-sensitive substrates such as poster board, foam board or rigid plastics without deforming the substrate. L & P claims that defendant Vutek, Inc. is infringing on the '518 Patent. The parties dispute certain patent claim terms, which I must construe. The parties have fully briefed the issues and I held a two-day *Markman* hearing last month.

The invention disclosed in the '518 Patent consists of methods and apparati for jetting, freezing, and substantially curing UV-curable inks onto a substrate without deforming the substrate. One of the distinguishing features of the '518 Patent is the use of "cold UV" lamps to freeze and substantially cure the dots of ink at the printing station. As described in the Patent, a "cold UV" light source produces a sufficient amount of UV radiation to substantially cure the dots of ink without exposing the dots to an amount of infrared radiation (IR) that would deform a heat-sensitive substrate.

The parties have identified five terms or phrases in the '518 patent claims that I must construe: (1) cold UV; (2) deform, deforming, and deformation; (3) freeze; (4) substantially cure; and (5) "the track incrementally moves longitudinally to the substrate." The following discussion addresses each of these terms and phrases in turn.

I. Legal Standards Governing Claim Construction

Claim construction is a matter of law. Markman v. Westview Instruments, Inc., 517 U.S. 370, 388-89, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). In construing a claim, a court looks first to the intrinsic evidence of record, that is, the claim's language, the specification and the prosecution history. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). Intrinsic evidence is "the most significant source of the legally operative meaning of disputed claim language." *Id.*

Within the realm of intrinsic evidence, the "appropriate starting point" in construing patent claims is always the claim language itself. Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1186 (Fed.Cir.1998). The words of a claim are generally given "their ordinary and customary meaning," Vitronics Corp., 90 F.3d at 1582, 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 v. AWH Corp., 415 F.3d 1303, 1313 (Fed.Cir.2005) (citation omitted). A person of ordinary skill in the art reads the claim term "not only in the context of the particular claim in which the disputed term appears, but in the context of the entire patent, including the specification." *Id.*

A patentee may assign a special definition to a word, so long as that definition is clearly stated in the patent specification or prosecution history. Vitronics Corp., 90 F.3d at 1582. To determine whether a patentee has used any terms in a manner inconsistent with their ordinary meaning, a court must review the specification, which is usually "dispositive" and always "highly relevant" to the claim construction analysis. *Id.* The Federal Circuit recently reaffirmed the principle that it is "entirely appropriate for a court ... to rely heavily on the written description for guidance as to the meaning of the claims." Phillips, 415 F.3d at 1317. In *Phillips,* the Court cautioned against elevating dictionary definitions above the express or implied definitions of claim terms found in the specification. FN1 *Id.* at 1320-22.

FN1. The *Phillips* Court specifically rejected the approach endorsed by the Federal Circuit in Texas Digital Sys. v. Telegenix, Inc., 308 F.3d 1193, 1202 (Fed.Cir.2002). In *Texas Digital,* the Court limited the role of specification in claim construction to serving as a check on the dictionary meaning of a claim term if the specification requires the court to conclude that fewer than all the dictionary definitions apply, or if the specification contains a specific alternative definition or disavowal. *Id.* at 1202. In *Phillips,* the Court held that the *Texas Digital* approach improperly restricted the role of specification by essentially elevating abstract definitions over the contextual use of the terms. 415 F.3d at 1320-21.

A court may also consider the patent's prosecution history, which contains "the complete record of all the proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims." *Id.* Indeed, the prosecution history is of primary significance in understanding the claims." *Markman,* 52 F.3d at 980. Although the prosecution history is always relevant to claim construction, it cannot be used to infer the intentional narrowing of a claim term, unless there has been a "clear disavowal" of the claim coverage. Amgen, Inc. v. Hoechst Marion Roussel, Inc., 314 F.3d 1313, 1327 (Fed.Cir.2003). An example of such disavowal is when the applicant amends a claim to overcome a rejection by the Examiner. *Id.*

Extrinsic evidence, i.e., evidence that is external to the patent and prosecution history, is not to be consulted when the intrinsic evidence is unequivocal. Bell & Howell Document Mgmt. Prods. Co. v. Altek Sys., 132 F.3d 701, 706 (Fed.Cir.1997); Vitronics Corp., 90 F.3d at 1583 ("[W]here the public record unambiguously

describes the scope of the patented invention, reliance on any extrinsic evidence is improper."). It is appropriate, however, "for a court to consult trustworthy extrinsic evidence to ensure that the claim construction ... is not inconsistent with clearly expressed, plainly apposite and widely held understandings in the pertinent technical field." Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1308 (Fed.Cir.1999). In the end, "extrinsic evidence may be useful to the court, but it is unlikely to result in a reliable interpretation of patent claim scope unless considered in the context of the intrinsic evidence." Phillips, 415 F.3d at 1319.

II. Disputed Claim Terms & Discussion

A. Cold UV

L & P's proposed construction of "cold UV" is "a UV light source which: (i) employs selected wavelengths to limit; or (ii) has been adapted to selectively reduce the amount of; radiation (and thus heat) that impinges upon a substrate." Vutek agrees with the first part of L & P's proposed construction, but wishes to qualify the radiation reduction referred in the second part to read "(ii) has been adapted to selectively reduce by at least 80% the amount of unwanted radiation (and thus heat) that impinges upon a substrate." Thus, the only issue for me to resolve is whether a UV light source must reduce unwanted radiation, or IR, by 80%-or by any other specific amount-in order to qualify as "cold UV." After reviewing both the intrinsic and extrinsic evidence, I find no basis to read such a limitation into the term "cold UV" and thus will adopt the proposed construction offered by L & P.

Turning first to the intrinsic evidence, neither the claims nor the specification support Vutek's narrow construction of "cold UV." Throughout the claims and specification, "cold UV" is defined broadly to encompass various types of UV light sources including selective bandwidth sources, as well as UV lights that use cold mirrors, filters, and water-cooling systems to reduce unwanted IR. The specification defines these sources by the types of adaptations they use and the effect that they have on heat-sensitive substrates, not by a common threshold of IR reduction that they all achieve. According to the specification, as long as a light source "limit[s] energy of wavelengths that are not effective to cure ink from otherwise striking or heating the substrate," the source is considered "cold UV."

While it is true that the preferred embodiment teaches the use of "cold UV" source that "absorbs approximately 80-85% of the infrared energy passing therethrough," there is no indication that this or any other specific percentage reduction is common to all "cold UV" sources. Indeed, such an inference would contradict the general rule that "claims of a patent are not limited to the preferred embodiment ... or to the examples listed within the patent specification." Dow Chemical Co. v. United States, 226 F.3d 1334, 1342 (Fed.Cir.2000).

Moreover, a review of the extrinsic evidence reveals that L & P's broad construction of "cold UV" is the only construction that would make sense to a person of ordinary skill in the art. Neither Richard Codos, the inventor of the '518 Patent, nor Daniel Whittle, Vutek's expert, could identify a specific range of IR reduction that is common to all "cold UV" sources. A survey of industry literature supports their understanding of the term, as "cold UV" is used to describe a variety of adaptations that reduce IR by a wide range of percentages. FN2 Additionally, the Patent Examiner identified two previous patents which taught the use of "cold UV," the Troue Patent, No. 4,048,490, and the Scheffer Patent, No., 4,563,589, yet neither of these patents mentions a specific percentage of IR reduction that is achieved with the use of the patent. In sum, after applying the available tools of claim construction, I find that L & P's proposed construction of "cold UV" appropriately captures the use of the term in both the intrinsic and extrinsic

evidence.

FN2. For example, L & P produced evidence of various "cold UV" sources that were reviewed by Codos during his research and development of the '518 Patent. These sources include a Maxim0 UV-curing lamp which uses a "dichroic-coated quartz reflector" that reduces IR "by up to 50%," and an EYE UV brand UV-curing lamp which combines cold mirror and cut IR filter technology to reduce the "heat rise" in a substrate by "over 60%." L & P also introduced a technical paper written in 1983 which concludes that at best, use of a dichroic filter in a UV-curing lamp will reduce IR by 75%.

Despite the lack of support for Vutek's narrow construction, Vutek contends that I must construe "cold UV" with the 80% restriction in order to maintain the validity of the '518 Patent. Generally, "[c]laims should be so construed, if possible, as to sustain their validity," Rhine v. Casio, Inc., 183 F.3d 1342, 1345 (Fed.Cir.1999) (quoting Carman Indus., Inc. v. Wahl, 724 F.2d 932, 937 n. 5 (Fed.Cir.1983)). Nevertheless, the Federal Circuit stated in *Phillips* that "we have certainly not endorsed a regime in which validity analysis is a regular component of claim construction." 415 F.3d at 1327 (citations omitted). Indeed, "claims can only be construed to preserve their validity where the proposed claim construction is 'practicable,' is based on sound claim construction principles, and does not revise or ignore the explicit language of the claims." Generation II Orthotics Inc. v. Med. Tech. Inc., 263 F.3d 1356, 1365 (Fed.Cir.2001).

The Federal Circuit has instructed courts to refrain from rewriting claims so as to preserve validity. Rhine, 183 F.3d at 1345. I see no reason to disregard that instruction here. Not only is there no support in the intrinsic or extrinsic evidence for narrowing the term "cold UV" in this way, such a restriction would not be practicable. As Codos explained, there are many variables which determine the effect that a "cold UV" source will have on a substrate, including bulb type (mercury or halide), bulb wattage, heat tolerance of the particular substrate, printing speed, and print type, among others. These variables make it difficult to pin down a specific percentage of IR that must be reduced to qualify as "cold UV." Vutek's proposal is not practicable, and I lack a sufficient basis to conclude that it is necessary to preserve validity. I leave validity issues for determination at a later stage of this case, if necessary.

In the end, I am convinced that a person of ordinary skill in the art would understand the term "cold UV" to not be limited to sources that reduce IR by any specific percentage. For all these reasons, I reject Vutek's arguments in support of a narrow definition of "cold UV," and will adopt L & P's proposed construction.

B. Deform, Deforming, and Deformation

One of the defining features of the '518 Patent is that it enables a user to substantially cure ink without deforming the substrate, even temporarily. As a general matter, both parties agree that the terms deform, deforming, and deformation refer to a change in the shape or form of the substrate. They disagree, however, as to what types or degrees of substrate changes qualify as deformations. Additionally, they dispute whether a deformation must be determined without the use of mechanical restraints. I will address each of these elements in turn.

i. Type of Deformation

Throughout their briefs and oral arguments, the parties refer to two types of deformation: (1) horizontal, or "in-plane," changes to the substrate; and (2) vertical, or "out-of-plane," changes to the substrate. L & P contends that "deform" only encompasses the latter type of change. Vutek maintains that the term "deform"

is used broadly to include both in-plane and out-of-plane changes to the substrate. After reviewing the '518 Patent and its specification, I agree with Vutek that the term "deform" does not contain any directional limitations.

The express limitations and qualifications which accompany the term "deform" in the claims demonstrate that the drafters of the '518 Patent did not believe a person of ordinary skill in the art would understand "deform" to contain inherent limitations on the direction a substrate may move. For example, in both claims 1 and 10, the particular substrate on which this invention is designed to print is identified as a "rigid substrate formed of a material that has a tendency to at least temporarily deform *in the direction of the printhead* if exposed to radiant curing energy while at a printing station." (Emphasis added). Both of these claims qualify "deform" as referring only to out-of-plane movements of the substrate, that is, movement upward from the plane for printing and towards the printhead. If persons of ordinary skill in the art understood "deform" to only apply to out-of-plane movements, the explicit qualifications of claims 1 and 10 would be superfluous. *See* Phillips, 415 F.3d at 1324-25 ("Independent claim 17 further supports [the proposition that the term 'baffle' should be defined broadly]. It states that baffles are placed 'projecting inwardly from the outer shell at angles tending to deflect projectiles that penetrate the outer shell.' That limitation would be unnecessary if persons of skill in the art understood that baffles inherently service such a function.").

Similarly, a comparison of the three independent claims, 1, 10, and 20, demonstrates that "deform" should not be defined with inherent directional limitations. Claim 1 describes the amount of thermal energy provided by the '518 Patent's UV curing assembly as an amount sufficient "to substantially cure the ink without impinging radiation that would heat the substrate so as to deform it, even temporarily, while at the printing station." Likewise, claim 20 teaches the application of "sufficiently low thermal energy to the substrate in the vicinity of the printhead to avoid even temporary deformation of the substrate where ink is being jetted thereon." Claim 10, however, describes the required level of energy as enough "to substantially cure the ink jetted onto the substrate without heating and thermally deforming, even temporarily while at the printing station ... *so that the surface of the material being printed upon does not move from the plane for printing*." (Emphasis added).

In review, claims 1 and 20 contain no limitation on the type of deformation that the invention was designed to prevent, while claim 10 explicitly limits the deformation to movement "from the plane for printing." In *TurboCare Div. of Demag Turbomachinery Corp. v. General Elec. Co.,* the Federal Circuit faced a similar situation and held that claim terms should not be read to contain a limitation "where another claim restricts the invention in exactly the [same] manner." 264 F.3d 1111, 1123 (Fed.Cir.2001). Likewise, "deform" should not be read in claims 1 and 20 as including the vertical limitation that is explicitly contained in claim 10.

Finally, as a matter of physics, even if "deform" were intended to apply only to situations where the substrate bubbled, rose, or warped toward the printhead, such movement is the product of both in-plane and out-of-plane changes in the substrate. L & P acknowledged this in the prosecution history when it stated that "[w]ith a heat sensitive rigid substrate ... heat from the lamps *expands the surface of the substrate relative to the core* and opposite surface of the substrate and causes the substrate to bubble or bow away from the support and toward the printhead." For the foregoing reasons, I reject L & P's attempt to read any directional limitation into the term "deform," as it is used in the '518 Patent.

ii. Degree of Deformation

The second issue raised with respect to the term "deform" is whether there is a threshold level of movement that the substrate must undergo before it can be said to have deformed. L & P proposes construing "deform" to refer only to a change in a substrate "which unacceptably degrades print quality." Vutek argues that "deform" should encompass any change in substrate shape "measurable by those of ordinary skill in the art." After reviewing the intrinsic and extrinsic evidence, I conclude that a person of ordinary skill in the art would interpret "deform" to mean a change in a substrate which degrades print quality such that the print is commercially unacceptable for its intended purpose.

First, as both parties' proposed constructions suggest, the term "deform" is inherently limited by degree. Not all changes in a substrate necessarily rise to the level of "deformation." Codos explained that it is a physical fact that exposure to any level of light, regardless of the level of IR, will result in some movement of the particles that make up a substrate. Thus, a person of ordinary skill in the art would not read the claim language "without heating and thermally deforming, even temporarily" to exclude *any* movement of the substrate particles.

The issue thus becomes where to draw the line. Vutek proposes to draw this line at those changes in substrate shape "measurable by those of ordinary skill in the art." L & P proposes to draw this line at changes in a substrate "which unacceptably degrade print quality."

Although the claims themselves do not qualify the term "deform" by any threshold of degree, the specification and prosecution history demonstrate that the '518 Patent was solely concerned with changes in the substrate that affect print quality. There are numerous excerpts throughout the specification which establish the cause-and-effect relationship between deformations in the substrate and degradations in print quality. FN3 The drafters of the '518 Patent reinforced their concept of deformations as those changes in a substrate which degrade print quality in following remarks during the prosecution of the Patent:

FN3. "[E]ven temporary deformation can adversely affect the print quality if it exists when ink is being jetted onto the substrate." Col. 1, ln. 50-52.

"Deformation of the substrate surface that occurs due to heat in spot curing can extend to the portion of the substrate that is still to be printed, thereby changing the printhead-to-substrate spacing and adversely affecting the quality of the ink jet printing operation." Col. 3, ln. 18-23.

"Deformation at the printing site, even if temporary such that the material returns to its undeformed state when it cools, adversely affects the print quality because spot curing deforms the substrate as the ink jets are making single or multiple passes over the print area." Col. 3, ln. 41-44.

"Where carriage mounted UV curing heads are used and the freezing of the dots at the point of jetting is desired, deforming the substrate at the location where the ink drops are being deposited would degrade the printed image." Col. 7, ln. 66-Col. 8, ln. 3.
The claims have been amended to more clearly focus the claims on the problem solved by the invention. The present invention deals with problems of temporary substrate deformation, and deformation at the printing site. This deformation changes the distance between the printhead and the substrate, *which affects print quality*.
(Emphasis added). I find that the specification and prosecution history would indicate to a person of

ordinary skill in the art that deformations which do not affect print quality are outside the scope of the '518 Patent.
Print quality depends on many variables including the type of printer, the substrate, the ink, and the intended use of the print. Once these parameters are determined, however, I find that a person of ordinary skill in the art would know what can be sold and what can't be sold. As Whittle explained in his deposition, by speaking with customers and considering the viewing conditions for a particular print, one can determine what print quality standard will be commercially acceptable. A particular print quality standard, of course, will not necessarily be acceptable to every customer or for every use. It is reasonable to expect, however, that those customers demanding a higher standard would be willing to pay more to satisfy their higher quality demands. In sum, I conclude that the ordinary meaning of "deform" to one of ordinary skill in the art only includes those changes in a substrate which degrade print quality such that the print is unacceptable for its intended purpose.

iii. Use of Mechanical Restraints

Vutek contends that an additional limitation should be included in the construction of "deform" which would provide that "deformation must be determined without use of a vacuum or other mechanical restraint to control deformation." According to Vutek, the '518 Patent does not teach the use of a vacuum or any other mechanical restraint to minimize the impact of deformation of the substrate. L & P maintains that the '518 Patent does not prohibit the use of a vacuum or other mechanical restraint to hold substrates flat on the printing plane. For several reasons, I agree with L & P.

First, while the claims may be silent as to the use of mechanical restraints, the are open-ended claims, and thus do not preclude the addition of other elements. Specifically, claims, 1, 10, and 20 are prefaced with the word "comprising," a word that "indicates that the claim is open-ended and allows for additional steps." Invitrogen Corp. v. Biocrest Mfg., L.P., 327 F.3d 1364, 1368 (Fed.Cir.2003).

Second, the preferred embodiment of the '518 Patent explicitly teaches the use of a vacuum. In the written description of the conveyor belt system, the specification provides that the conveyor "belt has a high friction rubber-like surface to help prevent a horizontal sliding of a panel resting on it, through which an array of holes or open mesh is provided to facilitate communication of the *vacuum* from the table to the substrate." Col. 5:6-10 (emphasis added).

Finally, Whittle confirmed during his testimony at the *Markman* hearing that vacuum tables are common throughout the printing industry. In fact, all of the printers that Whittle himself had developed used some sort of fan or vacuum device to ensure that the substrate remains flat during printing. For the foregoing reasons, I conclude that a person of ordinary skill the art would not interpret the '518 Patent to preclude the use of a vacuum when determining whether a deformation has occurred.

C. Freeze

Several of the '518 Patent claims describe how the cold UV curing assembly is placed "sufficiently close to where the ink is being jetted onto the surface to freeze dots of the jetted ink on the [substrate] surface." The parties offer slightly different construction of what the term "freeze" should mean in these claims. According to L & P, "freeze dots of the jetted ink" means "exposing ink to a sufficient amount of UV energy to create a film over the wet ink to prevent it from spreading." Vutek's proposed construction reads "exposing ink to a sufficient amount of UV energy to at least partially cure the ink immediately after printing, thereby preventing ink dots from spreading on or wicking into or otherwise moving on the

substrate." After reviewing the intrinsic and extrinsic evidence, I conclude that a person of ordinary skill in the art would interpret "freeze" to mean exposing ink to a sufficient amount of UV energy to sufficiently cure the ink such that it will not spread, wick, or otherwise move on the substrate.

The Summary of the Invention section of the specification reads, in pertinent part, "[b]y so mounting the UV curing lights on the printhead carriage, the jetted ink can 'spot cure' the ink, or to cure the ink immediately upon its contacting the substrate. Such spot curing 'freezes the dots' in position and prevents their spreading on or wicking into or otherwise moving on the substrate." Thus, "freezing" refers to a physical state of the dots of ink in which they do not spread, wick, or otherwise move.

Additionally, after reviewing the extrinsic evidence, I find that "freezing" does not necessarily involve creating a film over the wet ink, as L & P suggests. As Whittle explained during the *Markman* hearing, within a drop of ink, there are many monomers. Once exposed to UV energy, these monomers enter a free radical state in which they begin to stick to one another and create spaghetti-like polymer chains. These polymer chains extend throughout the drop of ink, not just at the surface. Thus, as a drop of cures, the entire drop becomes more viscous, or pasty, rather than just hardening on the exterior. In sum, I conclude that a person of ordinary skill in the art would interpret the phrase "freeze the dots" to mean sufficiently cure the dots of ink such that they will not spread, wick, or otherwise move on the substrate.

D. Substantially Cure

Claims 1 and 10 both describe the level of energy emitted by the cold UV assembly as being effective to "substantially cure the ink." The parties dispute the level of cure that the term "substantially" requires. According to L & P, "substantially cure" must be given its plain and ordinary meaning, "to a great extent or almost completely cured." Vutek, on the other hand, claims that "substantially cure" should be interpreted broadly to mean "at least partially cure so as to freeze dots of ink" as well as greater levels of curing.

The claims themselves offer some insight into the appropriate interpretation of the phrase "substantially cure." First, the use of "substantially cure" in conjunction with the term "freeze" in claims 1 and 10 indicates that "substantially cure" refers to a level of curing above and beyond that which is required to "freeze" dots of ink. Claim 1, which is very similar to claim 10, reads as follows:

A method of ink jet printing ...

providing at least one cold UV curing assembly on the carriage, adjacent to and moveable with the printhead, and oriented to direct UV energy onto the surface of the substrate at the printing station sufficiently close to where the ink is being jetted onto the surface to freeze dots of the jetted ink on the surface; and

the cold UV assembly being effective to impinge sufficient UV light on the ink to substantially cure the ink without impinging radiation that would heat the substrate so as to deform it, even temporarily, while at the printing station.

The use of the word "freeze" alongside "substantially cure" implies that the two terms do not mean the same thing. If "substantially cure" simply referred to a level of cure sufficient to "freeze" dots of ink, the phrase would be redundant. Instead, as Codos testified, the words "freeze" and "substantially cure" in claims 1 and 10 describe what is essentially a two-step printing process: first the dot of ink is frozen, then it is

substantially cured. According to Whittle, this initial "freezing" step can be accomplished with as little as a one to five-percent cure. Codos explained that depending on the thickness of the ink drop and print speed, among other factors, the two steps can occur instantaneously in a single pass of the printhead. More typically, however, the printhead (and attached UV curing assembly) makes multiple passes over each drop of ink. On each additional pass, the curing, or polymerization, process progresses with the increased exposure to the UV light.

While I recognize that a court should be cautious when considering an inventor's post hoc interpretation of his own patent, the Federal Circuit has held that "[a]n inventor is a competent witness to explain the invention and what was intended to be conveyed by the specification and covered by the claims." Voice Technologies Group, Inc. v. VMC Systems, Inc., 164 F.3d 605, 615 (Fed.Cir.1999) (citation omitted). This is especially true where, as here, the inventor's interpretation is consistent with the Patent Examiner's interpretation of the Patent. In this case, the Patent Examiner specifically recognized the two-step, freeze-then-substantially-cure, printing process as a basis for allowing the '518 Patent:

The primary reason for the allowance of claims 1-8 and 20 is the inclusion of the limitation of a method of an ink jet printing UV curable ink comprising the combination of two cold UV curing assemblies on the carriage, adjacent to the printhead and movable with the print head, oriented to direct UV energy onto the surface of the substrate at the printing station close to where ink is being jetted onto the surface *to freeze dots of the jetted ink on the surface and being effective to impinge sufficient UV light to substantially cure the ink* without impinging radiation that would heat the substrate so as to deform it. It is limitation found in each claims, as it is claimed in the combination, that has not been found, taught, or suggested by the prior art of record which makes these claims allowable over the prior art.

(Emphasis added). In sum, I find that a person of ordinary skill in the art would interpret "substantially cure" to refer to a greater level of curing than that which is required to "freeze" dots of ink.

The specification and prosecution history offer little, if any, guidance as to how much more curing "substantially cure" requires above the "freezing" level. The phrase "substantially cure" only appears in claims 1 and 10. There is no mention of the word "substantially" in the specification, nor does the prosecution history use the phrase outside of quotations to the claim language. Thus, I agree with Whittle's observation that a person of ordinary skill in the art would not be able to review the intrinsic evidence of the '518 Patent and identify a specific percentage of monomers that must be polymerized in order to be "substantially cured."

Nevertheless, I do find that the term "substantially" carries an ordinary and customary meaning that would be readily apparent to a person of ordinary skill in the art. "Substantially" is "a term of approximation or a term of magnitude." Deering Precision Instruments, L.L.C. v. Vextor Distribution Sys., Inc., 347 F.3d 1314, 1322-23 (Fed.Cir.2003) (citation omitted). Common definitions of "substantially" include "considerably," "significantly," "largely," or "essentially." Id. at 1323 (citations omitted). L & P's proposed construction, "to a great extent or almost completely cured" captures this ordinary and customary meaning. FN4

FN4. In this case, the term "substantially" could be considered both a term of approximation or a term of magnitude. On one hand, "substantially cure" could refer to the physical state of being fully cured. If this were the case, "substantially" functions as a term of approximation. On the other hand, "substantially cure" could refer to the number of ink monomers that have polymerized. "Substantially" would then serve as a term connoting magnitude. The difference between these two interpretations is immaterial in the present

case, in contrast to the facts of *Deering*.

Vutek contends that the use of "at least partially cure" in claim 5 indicates that "substantially cure" in the '518 Patent covers a broader range of cure levels than the ordinary and customary meaning that the word "substantially" implies. Vutek relies on the doctrine of claim differentiation, which creates a "rebuttable presumption that each claim in a patent has a different scope." Dow, 226 F.3d at 1341. Thus, limitations stated in a dependent claim ordinarily should not be read into the related independent claim. *Id*. Put another way, the inclusion of a specific limitation on a term in a dependent claim "makes it likely that the patentee did not contemplate the term ... already contained that limitation." Phillips, 415 F.3d at 1324.

Applying this doctrine to the '518 Patent claims, Vutek argues that the use of "substantially cure" in claim 1 and "at least partially cure" in dependent claim 5 indicates that "substantially cure" must include "at least partially cure." While this may be true, I do not find that the phrase "at least partially cure," as it is used in the '518 Patent, alters the ordinary and customary meaning of "substantially cure."

Claim 5 reads as follows:

The method of claim 1 further comprising:

at least partially curing the ink jetted onto the surface by exposing the jetted ink to ultraviolet light and then heating the surface having the at least partially cured ink thereon to reduce the content of unpolymerized monomers of the ink on the substrate.

This claim refers to the use of a drying station to further cure the ink when printing on certain substrates, particularly fabrics. Although claim 5 does not explicitly reference fabric substrates, a person of ordinary skill in the art would recognize that the claim derives from Codos' own prior art, U.S. Patent No. 6,312,123 (the '123 Patent).

The '123 Patent, which is expressly incorporated into the '518 Patent, covers a method and apparatus for printing UV curable ink on fabrics such as mattress covers, comforters, and bedspreads. As the '123 Patent specification explains, due to the textured surface of fabric substrates, "UV light proceeds to cure only about 90%, or 97%, and can be even up to about 99% of the ink when deposited on fabric. However, if more than an order of magnitude of approximately 100 parts per million (PPM) (0.01%) of the total volume of jetted ink remains uncured, persons sensitive to the uncured monomers can suffer reactions." Thus, the '123 Patent, like claim 5 of the '518 Patent, teaches the use of a drying station to further cure ink on a fabric substrate before it is ready for its intended use. FN5

FN5. In fact, the '518 Patent copies, almost verbatim, the paragraph from the '123 Patent specification discussing the use of the drying station. *Compare* '123 Patent, Col. 5:21-34 *with* '518 Patent, Col 8:51-65.

Throughout the '123 Patent, "partially cured jetted ink" is defined as ink which is 90 to 97% cured, or polymerized. The '518 Patent incorporates this understanding of "partial cure" into its specification where it states, "[w]ith a 97% cure, the ink will be sufficiently colorfast so as to permit the drying station to be off-line." Thus, based on the specifications of the '123 and '518 Patents, I find that the phrase "at least partially cure" in claim 5 refers to a high level of cure that would fall within the scope of the ordinary and customary

meaning of "substantially cure." In sum, even if "substantially cure" includes "at least partially cure," this fact does not indicate that the drafters of the '518 Patent used "substantially cure" in a manner inconsistent with the phrase's ordinary and customary meaning.

For foregoing reasons, I conclude that a person of ordinary skill in the art would interpret the phrase "substantially cure" to mean "to a great extent or almost completely cured." This level of cure includes the 90 to 97% "partial cure" discussed in the '123 and '518 Patent specifications that must be subjected to additional curing, as well as other levels of cure that render a substrate fully usable for its intended purpose.

E. Longitudinal Movement

Finally, the parties dispute the meaning of the phrase "the track incrementally moves longitudinally relative to the substrate" in claim 20 of the '518 Patent. Claim 20, in pertinent part, reads as follows:

An apparatus for printing on substrates having a tendency to deform when exposed to energy from a curing head comprising:

a substrate support to support a substrate for printing thereon;

a printhead track extending transversely of the support having a printhead carriage moveable thereon;

a drive operative to impart longitudinal movement between a substrate on the support and the track;

a carriage motor operative to move the carriage in a scanning motion transversely on the track;

at least one ink jet printhead on the carriage;

a controller operative to control the drive, the [carriage] motor and the printhead, to selectively jet UV curable ink onto a substrate on the support from the printhead with the carriage moving bidirectionally in successive transverse rows as the track incrementally moves longitudinally relative to the substrate.

L & P contends that the use of the word "relative" in the phrase "the track incrementally moves longitudinally relative to the substrate" means that either the printhead track *or* the substrate may move relative to the other. Vutek maintains that claim 20 only refers to movement by the printhead track.

This dispute is significant in light of the two possible arrangements of the printhead discussed in the specification. The first, a "fixed bridge" embodiment, requires the printhead to travel transversely, or side-to-side, over a substrate along a "bridge" that remains in a fixed position on the printing machine frame. In this embodiment, a conveyor belt moves the substrate longitudinally under the "fixed bridge." The preferred embodiment teaches the opposite arrangement. In the preferred embodiment, the substrate remains in a fixed position while the "bridge" moves longitudinally along the "longitudinal tracks" labeled numbers 133b and 134b in Figure 1 of the specification.

While the specification clearly allows for either the "bridge" or the substrate to move relative to the other, the specific apparatus described in claim 20 does not encompass both of these arrangements. Claim 20 refers to the "bridge" as "a printhead *track* extending transversely of the support having a printhead carriage moveable thereon." (Emphasis added). The claim further provides that "the *track* incrementally moves

longitudinally relative to the substrate." (Emphasis added). The subject of the verb "moves" is "track," thus clearly indicating that the "track," not the substrate, is the object that must move.

This interpretation is consistent with the use of the terms "move" and "relative to" in the specification. For example, when describing the "fixed bridge" embodiment, the specification states that the conveyor belt is "used to move the [substrate] *relative to* a printhead on a fixed bridge." (Emphasis added). It is clear from the description of the "fixed bridge" arrangement that the substrate, not the bridge, is the object that must move in the printing process. Likewise, the plain language of the phrase "the track incrementally moves longitudinally relative to the substrate" requires the "track," or "bridge," to move, not the substrate.

Accordingly,

IT IS HEREBY ORDERED that the disputed terms, as used in the claims at issue, are construed as follows:

1. "Cold UV," as used in independent claims 1 and 20, and dependent claim 9 means an ultraviolet light source which: (i) employs selected wavelengths to limit; or (ii) has been adapted to selectively reduce the amount of; radiation (and thus heat) that impinges upon a substrate.

2. "Deform, Deforming, and Deformation," as used in independent claims 1, 10, and 20, respectively, means a change in the shape or form of a substrate which degrades print quality such that the print is unacceptable for its intended purpose.

3. "Freeze dots of the jetted ink" and "freeze dots of ink in position," as used in independent claims 1, 10, and 20, and dependent claims 9 and 19, means to sufficiently cure the dots of ink such that they will not spread, wick, or otherwise move on the substrate.

4. "Substantially cure," as it appears in independent claims 1 and 10, means cured to a great extent or almost completely cured.

5. "The track incrementally moves longitudinally relative to the substrate," as it appears in independent claim 20, means that the track moves longitudinally, not the substrate.

IT IS FURTHER ORDERED that the Case Management Order is amended to add that any *Daubert* motion shall be filed no later than *October 10, 2006;* briefs in opposition must be filed no later than *November 1, 2006,* and any reply briefs must be filed no later than *November 13, 2006*.

E.D.Mo.,2006.
Leggett & Platt, Inc. v. Vutek, Inc.