United States Court of Appeals for the Federal Circuit

2006-1282

OSRAM GMBH,
and OSRAM OPTO SEMICONDUCTORS GMBH,

Appellants,

v.

INTERNATIONAL TRADE COMMISSION,

Appellee.

Alan D. Smith, Fish & Richardson P.C., of Boston, Massachusetts, argued for appellant. With him on the brief were Charles H. Sanders and Christopher D. Agnew.

Michelle Walters, Attorney, Office of the General Counsel, United States International Trade Commission, of Washington, DC, argued for appellee. With her on the brief were James M. Lyons, General Counsel, and Wayne W. Herrington, Acting Assistant General Counsel.

Appealed from: United States International Trade Commission

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OSRAM GMBH,
and OSRAM OPTO SEMICONDUCTORS GMBH,

Appellants,

v.

INTERNATIONAL TRADE COMMISSION,

Appellee.

DECIDED: October 31, 2007

Before NEWMAN, RADER, and DYK, Circuit Judges.

Opinion for the court filed by Circuit Judge NEWMAN. Dissenting opinion filed by Circuit Judge DYK.

NEWMAN, Circuit Judge.

OSRAM GmbH and OSRAM Opto Semiconductors GmbH (collectively OSRAM) appeal certain portions of the Final Determination of the United States International Trade Commission (ITC or Commission) in an investigation conducted under Section 337 of the Tariff Act of 1930 as amended, 19 U.S.C. §1337.[1] The patents subject of this appeal are for a wavelength-converting composition wherein luminous phosphor particles convert the

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1 In the Matter of Certain Light-Emitting Diodes and Products Containing Same, Inv. No. 337-TA-512 (Int'l Trade Comm'n, Jan. 11, 2006) (Final Determination); Oct. 31, 2005 (Remand Initial Determination); Aug. 12, 2005 (validity and claim construction); May 10, 2005 (Final Initial Determination).

emitted light of light-emitting diodes (LEDs) to light of a different wavelength in order to produce the desired white light. At OSRAM's request the ITC initiated an investigation charging Dominant Semiconductors Sdn. Bhd. (and two other respondents no longer in the case) with violating Section 337 by importing and selling compositions that infringe one or more claims of OSRAM's patents called the "Particle Size Patents."

The Commission construed the claims of the Particle Size Patents, applied that construction both to Dominant's accused products and OSRAM's domestic industry products, and concluded that some of Dominant's imported products and all of OSRAM's domestic products were not within the scope of the claims as construed. On this basis, the ITC held that Section 337 was not violated.

We conclude that the ITC erred in its claim construction, and that on the correct claim construction the Particle Size Patent claims are infringed and the domestic industry prong of Section 337 is satisfied. The Commission's decision is reversed.

BACKGROUND

The Particle Size Patents are U.S. Patents No. 6,066,861 (the '861 patent); No. 6,277,301 (the '301 patent); No. 6,613,247 (the '247 patent); No. 6,245,259 (the '259 patent); and No. 6,592,780 (the '780 patent). The patents are directed to compositions, methods, and uses wherein luminous pigment powders contain phosphors that produce a spectral shift in the light emitted by electroluminescent components such as LEDs. The phosphors absorb wavelengths in the ultraviolet, blue, or green ranges, and convert some of the radiation to a higher wavelength, particularly in the yellow spectral range, whereby the ensuing combination of complementary wavelengths appears white to observers.

Light-emitting diodes are described as lasting longer than and using less energy than traditional light sources, and the patented subject matter is described as overcoming several disadvantages of prior products. The aspect of the claims relevant to this suit is the grain size[2] of the pigment powders, claimed as having a maximum size of 20 micrometers and a mean grain diameter of no more than 5 micrometers (μm)[3]. The meaning and the measurement of this limitation are determinative of infringement. Claim 1 of the '861 patent is representative, with the term at issue shown in boldface:

> 1. A wavelength-converting casting composition, for converting a wavelength of ultraviolet, blue or green light emitted by an electroluminescent component, comprising:
>
> a transparent epoxy casting resin;
>
> an inorganic luminous substance pigment powder dispersed in said transparent epoxy resin, said pigment powder comprising luminous substance pigments from a phosphorus [sic: phosphor] group having the general formula $A_3B_5X_{12}$:M, where A is an element selected from the group consisting of Y, Ca, Sr; B is an element selected from the group consisting of Al, Ga, Si; X is an element selected from the group consisting of O and S; M is an element selected from the group consisting of Ce and Tb;
>
> said luminous substance pigments having grain sizes ≤ 20 μm and a **mean grain diameter d_{50} ≤ 5 μm.**

Dominant conceded that its imported powders meet all of the claim limitations except for the "mean grain diameter d_{50} ≤ 5 μm." Whether that limitation is met depends on how the grain diameter is measured.

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2 The terms "particle size" and "grain size" are used interchangeably by the parties and in this opinion.

3 "μm" stands for micron or micrometer, denoting a millionth of a meter.

In the first Initial Determination, the ALJ observed that the claims use the word "mean," but with the symbol d_{50} whose conventional meaning is "median." Mean and median do not always produce the same result, for "mean" is the average diameter, while "median" is the diameter at which 50% of the particles are smaller and 50% of the particles are larger. On this ground the ALJ held all of the claims invalid for indefiniteness. The full Commission did not accept this ruling, and held that the claims can reasonably be construed by application of the general rule that words prevail over symbols and that the patentee can be its own lexicographer. The Commission explained that d_{50} is "a variable defined by the words 'mean grain diameter' directly preceding it," and that the word "mean" is used throughout the specifications and claims, whereas "median" does not appear in the patents. Thus the full Commission concluded that "mean grain diameter d_{50}" means the mathematical average diameter of the grains, and rejected the ALJ's holding of invalidity on the ground of indefiniteness.

The full Commission also deemed it unclear whether the mean grain diameter is measured as the average diameter based on the number of grains, or the average diameter based on the volume of the grains. This aspect of the claim construction had evolved during the trial, as it became apparent that its resolution could be dispositive of infringement. The Commission observed that the patent specifications did not state how the mean diameter is determined, and selected the volume-based method; this is a principal focus of this appeal. On this construction, the Commission remanded to the ALJ for application to the products at issue. Applying the volume-based method, the ALJ found that Dominant's "Fine Series LED" phosphors are within the claim limitation of having a mean diameter of $\leq$ 5μm, but that Dominant's "Normal Series LED" phosphors have a

volume-based mean diameter higher than 5μm. Thus the ALJ found that the Fine Series products infringe the patents, but the Normal Series do not.

The ALJ also determined that OSRAM's own products of the domestic industry are outside this claim limitation when measured by the volume-based method. The ALJ concluded that OSRAM did not meet the "technical prong" of the domestic industry requirement of Section 337, 19 U.S.C. §1337(a)(2). On this ground the ALJ ruled that Section 337 was not violated as to any of the imported products. The full Commission affirmed, and this appeal followed.

DISCUSSION

Rulings of the International Trade Commission are reviewed on the standard of the Administrative Procedure Act, 5 U.S.C. §706(2)(E). 19 U.S.C. §1337(c). Rulings of law by the ITC are reviewed for correctness, and findings of fact are reviewed to ascertain whether they were supported by substantial evidence on the record as a whole. See Jazz Photo Corp. v. International Trade Comm'n, 264 F.3d 1094, 1099 (Fed. Cir. 2001). Substantial evidence is "such relevant evidence as a reasonable mind might accept as adequate to support a conclusion." Consolidated Edison Co. v. N.L.R.B., 305 U.S. 197, 217 (1938). Claim construction is reviewed as a matter of law. See Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed. Cir. 1995) (*en banc*), aff'd, 517 U.S. 370 (1996); Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1451 (Fed. Cir. 1998) (*en banc)*.

I

No appeal is taken from the Commission's determinations that the claims are not invalid for indefiniteness, or that the "mean grain diameter d_{50}" is the arithmetic average diameter. The issues on appeal flow from the ruling that the average or mean grain

diameter of the phosphor grains is based on the volume, not the number, of grains. OSRAM states that the mean or average diameter of the grains as set forth in the patents would be readily understood by persons of experience in this field as the number-based average, and that the Commission erred in choosing the volume-based average.

The number-based average is calculated as the sum of the diameters of all the grains, divided by the number of grains. The volume-based average is calculated by multiplying the diameter of each grain by its volume, summing the products thereof, and dividing that sum by the sum of the volumes of the grains. These methods can produce divergent results; OSRAM gives the example that by the number method the mean diameter of a 1 μm grain and a 10 μm grain is 5.5 μm, whereas the mean diameter calculated by the volume method is 9.99 μm[4].

The Commission states that its choice of the volume method was "art-specific", and thereby distinguished from the "general understanding" of how to describe the average diameter of particles. The Commission cited two technical treatises: the Phosphor Handbook and Perry's Chemical Engineers Handbook. The Phosphor Handbook discusses the number-based method as generally used for phosphors, stating that the number-based method "is easy to use, but both 'area-based' (volume-based) and weight-based methods are frequently adopted to express the characteristics of actual powders." Perry's Chemical Engineers Handbook states, in a general section for particle size designation, that "[i]t is common to use a weight basis for percentage of frequency but surface or number may, in some cases, be more relevant." The Commission placed primary reliance on these

4 Calculated by volume: $((1x1^3)+(10x10^3))/(1^3+10^3) = 9.99$.

sources, plus the evidence that it is common for manufacturers of phosphors to report phosphor size for sale to customers by volume. The Commission held that a person of ordinary skill in this field would understand "mean grain diameter" to be based on the volume method of measurement.

OSRAM states that this construction was incorrect, and contrary to the great weight of evidence. The experts for both sides were in full and emphatic agreement that the ordinary meaning of the average diameter of these particles is the number-based average -- until Dominant's expert changed his position. OSRAM'S three expert witnesses testified that average diameter of phosphors is generally measured by the number-based method, and that the patents would be so understood by persons of ordinary skill in this field. This testimony was not disputed. Dominant's expert testified unequivocally in his deposition that "[t]o one skilled in the art, the term 'mean grain diameter d_{50}' means that one determines the mean or average grain diameter, which is defined as 'the integral (or sum) of the diameter times the grain (particle) size distribution divided by the total number of grains (particles);'" the witness later changed his position when it became apparent that this question could determine liability. In addition, Dominant in its motion for summary judgment had stated:

> Here, the "mean grain diameter d_{50}" refers to the average grain or particle diameter, where "mean" is defined by its standard, well-known and accepted meaning -- namely, the sum of the diameters of the grains or particles times the grain size distribution divided by the total number of grains.

OSRAM's witness distinguished the way powders are sold from the way they are characterized by scientists working on LED development, stating that "the R&D guy [measures phosphor size] on a number basis only."

The descriptive text in the patents is in accordance with the number-based measurement, as both Dominant and OSRAM had presented it. The patent specification is the primary resource for determining how an invention would be understood by persons experienced in the field. See Phillips v. AWH Corp., 415 F.3d 1303, 1312-13 (Fed. Cir. 2005); Multiform Desiccants, Inc. v. Medzam, Ltd., 133 F.3d 1473, 1477 (Fed. Cir. 1998). The patent specifications are in accordance with a number-based mean, for the invention stresses the homogeneity of size, not volume, of the phosphor particles. It is not disputed that homogeneity of size is better reflected in a number average than a volume average, for a few large particles have a greater effect on the volume-based calculation. Expert witness Dr. Zachau explained that "if you really said you want to do it on a volume basis, large particles would be heavily overemphasized." Dr. Zachau explained that such distortion arises because volume is calculated as the cube of the diameter,[5] and the cube of a larger particle, for example a particle having a diameter of 10 μm, is a thousand times the cube of a particle with a diameter of 1 μm. He explained that this cubing effect of the volume-method obscures the information that particle size measurement is intended to convey, that is, the average size of the particles.

As applied to the products at issue, OSRAM presents the example that for a powder hypothetically containing 6,250 1-μm particles, 50 5-μm particles, and 1 20-μm particle, the mean grain diameter calculated by the number-based method is 1.03 μm. In contrast, the mean diameter calculated by the volume-based method is 9.6 μm. Dr Zachau testified that

5 Volume = $4/3\ \pi r^3$, where r = diameter/2

to achieve optimum homogenous light output, the number-based method provides the more useful information:

> For this context, [persons in this field] do it on a number basis only. . . . The number distribution best measures–is more appropriate for this application, and for this device application. . . . Large particles, if they are very large, the core doesn't even contribute because the light doesn't get fully in. . . . [T]he small particles of the phosphor are very, very important, as we have seen before, for the scattering . . . . So the small particles do have the most important function here in the device. It's those we want to count. It's not the large ones.

This testimony was not disputed by the witnesses for either side, although Dominant's witness later amended his statement after it became clear that Dominant's position was affected; the ALJ questioned the witness on this point, and it is noted that the ALJ did not adopt the volume-based method in the Initial Determination.

We agree that the number-average measurement is better supported by the specification, and that it provides the better description of a product whose purpose is homogeneous distribution. See '861 patent, col.3, lines 21-25 ("[t]he luminous substance pigments, with the above-indicated particle size, can advantageously . . . be dispersed homogeneously in the epoxy casting resin."). When there is more than one method of measurement and the patent does not explicitly discuss the methods, persons experienced in the field are reasonably deemed to select the method that better measures the parameters relevant to the invention. See Howmedica Osteonics Corp. v. Tranquil Prospects, Ltd., 401 F.3d 1367, 1372 (Fed. Cir. 2005) (when a person of ordinary skill would recognize which measurement is appropriate to the invention, that is the measurement that applies). All of the experts agreed that the volume-based measure is more sensitive to large particles, which do not function in the invention, and that the

number-based measure is more sensitive to the size and distribution of the particles that perform the inventive function. There was no contrary evidence. Two commercial product specification sheets that describe phosphor particles by mean volume and mean weight had been submitted by OSRAM in the Patent and Trademark Office with its disclosure documents, but not referred to by either OSRAM or the examiner during prosecution. It is rare that references that were submitted with a disclosure document, but not even cited by the examiner, are probative of an intent to depart from the plain technical meaning of terms used in the specification and claims. See Boehringer Ingelheim Vetmedica, Inc. v. Schering-Plough Corp., 320 F.3d 1339, 1347 (Fed. Cir. 2003) (references considered for other purposes during prosecution do not establish that the patentee renounced the ordinary meaning of a term as used in the specification and claims).

OSRAM states that the volume-based statement of particle size gives a less accurate measure of the function of the LED, whereas the average diameter by number better informs a person of ordinary skill whether the LED will operate well. Although the Commission argues that the volume-based method, since more sensitive to "boulders," can indicate whether boulders are present, OSRAM correctly states that the purpose of the claim limitation is to state the parameters of the products that work in the desired way, not those that may not. See Howmedica, 401 F.3d at 1372. The Commission erred in construing the claims as requiring the volume-based method, contrary to the ordinary meaning of the term as reflected in the specification and the testimony, and at odds with the purposes of the invention. See Phillips, 415 F.3d at 1314 (claim terms are given the meaning with which they are used in the patent specification); the court may consider extrinsic evidence such as the testimony of experts in the field of the invention.

This conclusion is reinforced by the undisputed fact that the volume-based measure would exclude the OSRAM products that the patents were designed to cover. Cf. Hoechst Celanese Corp. v. BP Chemicals, 78 F.3d 1575, 1581 (Fed. Cir. 1996) (a claim construction that excludes the preferred embodiment is rarely, if ever, correct); Modine Mfg. Co. v. United States International Trade Comm'n, 75 F.3d 1545, 1550 (Fed. Cir. 1996) ("a claim interpretation that would exclude the inventor's device is rarely the correct interpretation").

We conclude that the Commission erred in construing "mean grain diameter" as the volumetric mean, not the number-based mean. This ruling is reversed.

II

The ITC's ruling that Dominant's Normal Series LED products are not within the claimed particle size was based on its application of the volume-based method. The record before the ITC was that the average grain diameter of the Normal Series is significantly above 5 μm[6] when measured by the volume-based method, and well below 5 μm when measured by the number-based method. On the correct claim construction, Dominant's Normal Series phosphor products are well within the literal scope of the claims.

The ITC states that if we should conclude that the correct measurement is indeed the number-based method, infringement as to the Normal Series is unresolved because that series is a "mixture" of two powders, one of which is outside of the claims before mixture, although the mixture itself is within the 5 μm limitation. The Commission's position is that "all of the pigments in the powder must together have a mean grain diameter d_{50} less than or equal to 5 μm." That is not the structure of the claims, which require that all

6 Dominant's actual particle sizes have been requested to be kept confidential.

particles be below 20 μm with the average diameter below 5 μm, but the claims do not require that each of the separate powders that are mixed together meet the 5 μm limit before mixing. The Commission did not respond to the record evidence showing, without dispute, that the Dominant products include "mixed phosphor particles" having a number-based mean grain diameter within the literal scope of the claims. On the Commission's sketchy statement, and its incorrect view of the law, the requested remand for further trial proceedings is without support.

On the correct construction that "mean grain diameter d_{50}" is measured by the number-based method, the ruling of noninfringement as to the Normal Series is reversed.

III

19 U.S.C. §1337 requires that the domestic industry meets certain criteria, in order to invoke the right to exclude importation of infringing products. Section 337(a)(3) provides that the requirement may be met when the patented inventions are the subject of, inter alia, significant investment in plant and equipment by United States industry. See Texas Instruments, inc. v. United States International Trade Comm'n, 988 F.2d 1165, 1180 (Fed. Cir. 1993). The ITC concluded that OSRAM's investments in OSRAM Opto Inc. and OSRAM Sylvania Inc. satisfy this requirement. However, the ITC found that OSRAM had not shown that the phosphor particles so produced were covered by the Particle Size Patents when measured by the volume-based method, that is, the method that the Commission had designated as the correct measure of particle size.

The domestic product, to meet the technical prong test, Section 337(a)(2), must be covered by the asserted claims; the test "is essentially the same as that for infringement, i.e., a comparison of domestic products to the asserted claims." Alloc, Inc. v. International

Trade Comm'n, 342 F.3d 1361, 1375 (Fed. Cir. 2003). The Commission's ruling concerning the domestic product was founded on the erroneous adoption of the volume-based method, for the Commission observed that OSRAM showed only the number-based mean particle size of its phosphors, whereas the Commission had ruled that the volume mean is the correct measure. Thus the Commission held that OSRAM had not met its burden of showing that it complied with the technical prong of Section 337. However, when the domestic product's grain size is measured by the number-based method, it was undisputed that the powders have a mean diameter below 5 μm. Dominant stated in its post-trial brief that "Dominant does not challenge that OSRAM's products sold in the United States are covered by the Particle Size Patents." OSRAM's evidence to this effect was unopposed at trial.

On the corrected claim construction based on the number-based measure of mean diameter, OSRAM's evidence was clear and unrebutted that the domestic product was within the literal scope of the claims. The ITC's ruling that OSRAM did not meet the technical prong of the domestic industry requirement is not supported by substantial evidence on the record as a whole, and is reversed.

CONCLUSION

The ruling of noninfringement with respect to Dominant's Normal Series LED products is reversed, as is the ruling that OSRAM did not meet the domestic industry requirements. Thus, violation of Section 337 is established. We remand to the ITC for proceedings consistent with this decision.

REVERSED and REMANDED

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DYK, Circuit Judge, dissenting.

I respectfully disagree with the majority's construction of the term "mean grain diameter d_{50}," which is included as a limitation of the asserted claims in the five patents at issue here—patents which the majority designates the "Particle Size Patents."[1]

In my view, the International Trade Commission ("ITC") reached the correct claim construction. Accordingly, I would affirm the ITC's holding, based on its claim construction, that the "Normal Series" products of the accused infringer, Dominant Semiconductors Sdn. Bhd. ("Dominant"), do not infringe the Particle Size Patents. I also would affirm the ITC's holding, based on its claim construction, that appellants (collectively "OSRAM") do not practice the Particle Size Patents in their domestic

[1] The disputed language is present in each of the claims of the Particle Size Patents that appellants assert were infringed: claims 1, 3, 6-7, and 10-13 of Patent No. 6,066,861; claims 1-2, 6-7, 11-12, and 14-15 of Patent No. 6,277,301; claims 1, 3, 6-7, 10-15, 17, and 20-21 of Patent No. 6,613,247; claims 1, 3, 6-7, 10-13, and 15 of Patent No. 6,245,259; and claims 2-5, 7, and 10 of Patent No. 6,592,780.

operations and therefore have failed to make the showing required by the domestic industry prong of section 337 of the Tariff Act of 1930, as amended, 19 U.S.C. § 1337.

The Particle Size Patents relate to the use of a phosphor powder in a light-emitting diode ("LED") to transform some light emitted by the LED from one wavelength to another to give the appearance that the LED emits white light. Relatively small phosphor grains absorb light of one wavelength and emit and scatter light of a different, complementary wavelength to produce the appearance of white light. Larger particles, however, are detrimental to the invention. They do not function in the same way as smaller particles to absorb and emit light and are not as effective at scattering light to produce a uniform color and intensity. Larger particles also cause problems related to uneven sedimentation during the manufacturing process.

As the majority recognizes, Maj. Op. at 5-6, there are two possible methods to calculate the "mean grain diameter d_{50}" of a pigment powder. The first is an average diameter by number of particles, and the second is an average diameter by volume. Neither the claims nor the specifications of any of the Particle Size Patents state which of the two methods is to be used.

Contrary to the majority's assertion, the expert witness testimony did not reflect "full and emphatic agreement that the ordinary meaning of the average diameter of the[] particles is the number-based average." Maj. Op. at 7. Rather, the record indicates that both methods were used in the industry for differing purposes. When phosphor powders were sold, including by OSRAM, the particle size was measured as an average diameter by volume. J.A. at 3404, 4318-19, 4330. When conducting research and development of new products, researchers employed a number-based average to

measure particle size. J.A. at 4330. Despite the majority's suggestion that Dominant's expert witness changed his testimony on this point, there is in fact no conflicting testimony. Indeed, OSRAM's employee and expert, Dr. Zachau, testified that the volume-based average particle diameter is used commercially in the sale of phosphor powders, while the numerical average diameter is used for research and development purposes. Id. He explained that the measurement required to compute the average diameter by volume is "an easy, fast, an [sic] inexpensive measurement," but that a numerical average diameter must be calculated from less efficient measurements that require the use of a scanning electron microscope. Id. The central issue here is whether the "mean grain diameter d_{50}" should be defined from the perspective of commercial sales or research and development.

In my view, the ITC was correct to choose the commercial sales definition—that is, an average by volume—as the correct construction of the "mean grain diameter d_{50}." The specifications here make it quite clear that a commercial invention is being described. See, e.g., J.A. at 114 (describing, as an object of the invention, to "enable[] mass production at reasonable engineering effort and expense and with maximally replicable component characteristics"). There was objective evidence of the widespread commercial use of this calculation method, and undisputed evidence that the measurements required are relatively cheap and efficient, as would be required for commercial use. Those who secure patents typically are describing devices and methods designed for commercial use, rather than devices designed only for research. It follows, I believe, that the patent should be interpreted to utilize this commercial measurement rather than the research measurement.

The ITC also properly relied on two technical treatises, the Phosphor Handbook and Perry's Chemical Engineers Handbook. See Phillips v. AWH Corp., 415 F.3d 1303, 1318 (Fed. Cir. 2005) (en banc) (noting usefulness of technical treatises in construing claims). While those treatises do not define the term "mean grain diameter," the ITC concluded that both "indicate that the weight basis is more often used to describe real powders than other bases." J.A. at 48. Weight- and volume-based average particle diameters are essentially equivalent because they are related based on a known constant, the particles' density. The commercial sales literature and the technical treatises both constitute particularly strong sources of extrinsic evidence under the circumstances of this case because they provide objective, contemporaneous, unbiased, and publicly available descriptions of how mean particle size was measured by those skilled in the art. See Phillips, 415 F.3d at 1322 (describing proper use of contemporaneous extrinsic evidence, especially evidence from an "unbiased source 'accessible to the public in advance of litigation'" (quoting Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1585 (Fed. Cir. 1996))).

The majority reasons that the purposes of the invention described in the Particle Size Patents are better served by a numerical average, because the majority assumes that the disputed claim language sought to emphasize the prevalence of small particles rather than the absence of large particles.[2] The difference between an average

[2] The majority also relies on the fact that OSRAM's own products do not fall within the claim limitation when measured by a volume-based average particle size. Maj. Op. at 11. In relying on this court's opinion in Hoechst Celanese Corp. v. BP Chemicals, 78 F.3d 1575, 1581 (Fed. Cir. 1996), however, the majority mistakenly equates OSRAM's products with the preferred embodiment of the patent. See Int'l Visual Corp. v. Crown Metal Co., 991 F.2d 768, 771-72 (Fed. Cir. 1993) (reversing claim

diameter based on the number of particles and an average diameter based on volume is that the former tends to emphasize the presence of many useful small particles, while the latter gives greater emphasis to the presence (or absence) of any larger, undesirable particles. The majority's conclusion that the concern was with the number of small particles is unsupported by any language in the claims or specifications of the Particle Size Patents, and in my view is entirely speculative. In other words, there is no intrinsic evidence to suggest that the patents sought to emphasize the presence of many useful small particles, rather than the relative absence of larger, harmful particles. Under these circumstances, it is just as likely that the disputed claim language sought to emphasize the absence of larger particles. One of OSRAM's experts explained that in the process of invention, larger particles proved harmful to both the manufacturing process and the function of the final product, and that OSRAM obtained better results by using smaller particles. J.A. at 5041-43.

The majority's contention that a claim limitation necessarily seeks to "state the parameters of the products that work in the desired way," rather than specifying in the negative parameters that have proven detrimental, Maj. Op. at 10 (citing Howmedica Osteonics Corp. v. Tranquil Prospects, Ltd., 401 F.3d 1367, 1372 (Fed. Cir. 2005)), is

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construction based on commercial embodiment because "'[i]nfringement is determined on the basis of the claims, not on the basis of a comparison with the patentee's commercial embodiment of the claimed invention.'" (quoting ACS Hosp. Sys., Inc. v. Montefiore Hosp., 732 F.2d 1572, 1578 (Fed. Cir. 1984))); see also SmithKline Beecham Corp. v. Apotex Corp., 403 F.3d 1331, 1339 (Fed. Cir. 2005) (rejecting claim interpretation based on commercial embodiment of invention). At oral argument, OSRAM was unable to identify any record evidence establishing that its products were designed to practice the Particle Size Patents or that the preferred embodiments under the patents would not be within the claim limitation if the average particle size were measured as a volume-based mean.

unsupported as a matter of law and contrary to common sense. This court's opinion in Howmedica did not discuss whether claim limitations properly are interpreted as describing either virtuous qualities or the avoidance of undesirable qualities. In Howmedica, there were two possible methods to measure the "transverse sectional dimensions" of a stem part designed to secure a prosthetic limb to a bone socket. 401 F.3d at 1371. This court reasoned that the method relying on two-dimensional surface area was the appropriate construction because in several places the specification indicated the need for the stem part to fit closely into the bone socket, and the two-dimensional surface area method would produce a more exact fit than the other method. Id. at 1372. Thus, while the two-dimensional surface area measurement method in Howmedica was directed to specifying a parameter with useful effects, there was no indication that the rejected method sought to avoid a parameter with detrimental effects.

Here a different situation prevails, and the purposes of the invention could be served either by utilizing the volume-based or the number-based measurement. Under these circumstances, the objectives of the invention do not answer the claim construction question, and resort to the commercial standard of a volume-based average is appropriate. I dissent from the majority's refusal to sustain the ITC's adoption of the commercial standard.