

Price Erosion As Factor In Damages

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Reasonable royalty damage award should turn back clock to start of infringement, model shows how

The introduction of an infringing device into the marketplace disturbs the natural order. The patentee's pricing, structured to maximize revenue and, hopefully, to provide an adequate return on the investment in research, development and marketing of the patented product, may crumble under the weight of the unlawful competition of an infringer. Because infringers may often produce copycat products with little or no investment in development, they are able to manufacture their products at costs below those of the patentee, and so sell the products at a lower price. The infringer can often charge considerably less for its product and still realize a healthy profit margin, all while capturing significant market share. The patentee is further damaged when it has extensively marketed its product, and then the infringer free-rides into the marketplace on the patentee's prior efforts to establish market recognition for the product.

Competition from a lower-priced infringing product detrimentally affects the patentee's profits in at least two ways. First, the patentee loses the profit on sales it would have made absent the infringer's unlawful competition. Second, even the sales the patentee actually does make are often made at reduced prices in order to meet the infringer's competition. The infringer forces the patentee to choose between maintaining pre-infringement pricing levels (and possibly losing market share) or cutting prices to meet the competition (and so realizing lower returns on its own sales). The patentee suffers damages in the form of reduced margins on its own

sales, commonly referred to as "price erosion" damages, when forced to cut prices or forego planned price increases.

Although price erosion damages are often associated with lost profits damage awards, they may also be recovered as part of general damages under the reasonable royalty rubric. Support for this approach comes from the purpose of damage awards in patent cases and the evolution of price erosion within the damages framework.

GENERAL PURPOSE OF PATENT DAMAGES

"In patent law, the fact of infringement establishes the fact of damage because the patentee's right to exclude has been violated."¹ The measure of recovery for patent infringement is governed by 35 U.S.C. § 284, which provides in pertinent part:

Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court.²

The predecessor statute to Section 284 had been substantially amended in 1946. Under the pre-1946 patent damages statute, the owner of a patent could recover both his own damages and the infringer's profits.³ Because the determination of the infringer's profits often required protracted litigation, including lengthy accounting proceedings before special masters, Section 284 was amended in 1946 to exclude recovery of the infringer's profits as a specific element of damages.⁴ "The purpose of the change was precisely to eliminate the recovery of profits as such and allow recovery of damages only.⁵

However, Congress' definition of

"damages" was quite broad. The legislative history to the 1946 act shows that Congress intended "to make the basis of recovery in patent-infringement suits general damages, that is, any damages the complainant could prove, not less than a reasonable royalty..."⁶ and "Congress sought to ensure that the patent owner would in fact receive full compensation for 'any damages' he suffered as a result of the infringement."⁷ In short, Congress' "overriding purpose" was to "afford[] patent owners complete compensation."⁸

In terms of Section 284, "[d]amages is the amount of loss to a patentee."⁹ In *Arvo*, a leading case, the Supreme Court held that patent damages constitute "the difference between [the patentee's] pecuniary condition after the infringement, and what his condition would have been if the infringement had not occurred." The question to be asked in determining damages is "how much had the Patent Holder... suffered by the infringement. And that question [is] primarily: had the Infringer not infringed, what would Patent Holder... have made?"¹⁰ The "adequate-to-compensate" requirement thus parallels and differs little from the criterion long-applicable to damage questions in other fields of law:

The general rule is that when a wrong has been done, and the law gives a remedy, the compensation shall be equal to the injury.

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The latter is the standard by which the former is to be measured. The injured party is to be placed, as near as may be, in the situation he would have occupied if the wrong had not been committed.¹¹

For these reasons, in "patent cases, as in other commercial torts, damages are measured by inquiring: had the tortfeasor not committed the wrong, what would have been the financial position of the person wronged?"¹² Accordingly, the Federal Circuit has emphasized that the phrase "reasonable royalty" is "handy shorthand for damages. As [Section 284] provides, the royalty is 'for the use made of the invention by the infringer.' Thus, the calculation is not a mere academic exercise in setting some percentage figure as a 'royalty.' The determination remains one of *damages* to the injured party."¹³

THE RECOGNIZED APPROACHES OF DETERMINING DAMAGES "ADEQUATE TO COMPENSATE" FOR INFRINGEMENT

Courts have imposed damages under Section 284 under four somewhat distinct theories: (a) lost profits; (b) "reasonable royalty" damages either as (1) an *established royalty* or (2) an imagined *reasonable royalty* based on a "hypothetical negotiation" and (c) the "analytical method." Regardless of which approach a patentee takes, the focus remains adequate compensation for the harm done.

Lost Profits

To recover lost profits, a patentee must demonstrate causation by proving by a reasonable probability that, "but for" the infringement, it would have made the infringer's sales.¹⁴ While the amount of lost profits cannot be speculative, "the patentee does not need to negate *all* possibilities that a purchaser might have bought a different product or might have foregone the purchase altogether."¹⁵

Causation is most easily established where only the patentee and the infringer supply the relevant market. Where there are many suppliers, however, causation is significantly more difficult to prove since

third-party competitors, rather than the patentee, could have made the infringer's sales.¹⁶ In a multi-supplier situation, a litigant may be entitled to lost profits damages calculated on a portion of an infringer's sales based on the patentee's market share.¹⁷

Factual evidence supporting lost profits calculations may include the number of lost sales, price decreases in the particular market, and increased expenses.¹⁸ Additionally, to show that infringement caused the loss of profits, a patent owner may present evidence satisfying either one of two tests: (a) the four-part *Panduit* test¹⁹ or (b) the two-supplier market test.²⁰ Evidence sufficient to satisfy either test creates the inference that the infringement caused the lost sales.²¹

Under the *Panduit* approach, a patent owner must prove (1) a demand for the patented product, (2) the marketing and manufacturing capability to exploit that demand, (3) an absence of acceptable noninfringing substitutes, and (4) the amount of profit the patent owner would have made.²² Under the second test (the two-supplier market test), the patent owner must show that the infringer was the only other supplier of the patented product. Where the product owner and the infringer were the only suppliers of the product, causation may be inferred.²³

Reasonable Royalty

The patentee may opt — for reasons of proof, trial strategy, or otherwise — for damages in the form of a reasonable royalty.²⁴ While the determination of lost profits focuses on actual damages suffered by the patentee, the setting of a reasonable royalty generally focuses on compensating the patentee for the use made of the invention by the infringer.²⁵ However, any reasonable royalty analysis should not lose sight of the purpose of Section 284 to provide full compensation to the patentee: the "royalty is 'for the use made of the invention by the infringer' The determination remains one of *damages* to the injured party."²⁶

A reasonable royalty may be based upon (1) an established royalty,

or (2) upon a "hypothetical royalty resulting from arm's length negotiations between a willing licensor and a willing licensee."²⁷

Established Royalty. Where an established royalty exists, it can be the best measure of what is reasonable.²⁸ However, it is difficult to prove an established rate. "For a royalty to be 'established,' it 'must be paid by such a number of persons as to indicate a general acquiescence in its reasonableness by those who have occasion to use the invention.'"²⁹ Therefore, if a patent-in-suit has been repeatedly licensed, the patentee should recover at least the established royalty.

However, and in accordance with the overriding purpose of the patent statute to provide adequate compensation, a royalty may be "reasonable" and still exceed an established royalty.³⁰ "Though established royalty rates are normally applicable, they do not necessarily establish a ceiling for the royalty that may be assessed after an infringement trial."³¹ The Federal Circuit has implied that the reason is the need "to distinguish between royalties payable by infringers and non-infringers" because absent an increased rate infringers could freely disregard patent rights, even those rights so strong that they have been acknowledged by a number of competitors.³²

The Reasonable Royalty Floor. In the absence of an established royalty, a reasonable royalty must be determined to locate "the floor below which a damage award may not fall."³³ The purpose of the reasonable royalty "alternative is not to provide a simple accounting method, but to set a floor below which the courts are not authorized to go."³⁴

Most often, courts determine the reasonable royalty through an imaginary "hypothetical negotiation," which is deemed to have occurred at the time infringement began.³⁵ The hypothetical negotiation was memorably described by Judge Markey in *Panduit*:

Determination of a "reasonable royalty" after infringement, like many devices in the law, rests on a legal fiction. Created in an effort to "compensate" when profits are not provable, the "reasonable roy-

alty" device conjures a "willing" licensor and licensee, who like Ghosts of Christmas Past, are dimly seen as "negotiating" a "license." There is, of course, no actual willingness on either side, and no license to do anything...³⁶

A "reasonable royalty" has been described as "an amount which a person, desiring to manufacture and sell a patented article, as a business proposition, would be willing to pay as a royalty and yet be able to make . . . a reasonable profit."³⁷ However, "the setting of a reasonable royalty after infringement cannot be treated . . . as the equivalent of ordinary royalty negotiations among truly 'willing' patent owners and licensees. That view would constitute a pretense that the infringement never happened," and essentially impose a "compulsory license" upon the injured patentee.³⁸

Some factors courts have considered in determining a reasonable royalty were listed in the oft-cited district court opinion of *Georgia-Pacific*³⁹ as follows:

1. The royalties received by the patentee for the licensing of the patent in suit, proving or tending to prove an established royalty.

2. The rates paid by the licensee for the use of other patents comparable to the patent in suit.

3. The nature and scope of the license, as exclusive or nonexclusive; or as restricted or nonrestricted in terms of territory or with respect to whom the manufactured product may be sold.

4. The licensor's established policy and marketing program to maintain his patent monopoly by not licensing others to use the invention or by granting licenses under special conditions designed to preserve that monopoly.

5. The commercial relationship between the licensor and the licensee, such as, whether they are competitors in the same territory in the same line of business; or whether they are inventor and promoter.

6. The effect of selling the patented specialty in promoting sales of other products of the licensee; the existing value of the invention to the licensor as a generator of sales of his non-patented items; and the extent of such derivative or con-

voyed sales.

7. The duration of the patent and the term of the license.

8. The established profitability of the product under the patent; its commercial success; and its current popularity.

9. The utility and advantages of the patent property over the old modes or devices, if any, that had been used for working out similar results.

10. The nature of the patented invention; the character of the commercial embodiment of it as owned and produced by the licensor; and the benefits to those who have used the invention.

11. The extent to which the infringer has made use of the invention; and any evidence probative of the value of that use.

12. The portion of the profit or of the selling price that may be customary in the particular business or in comparable businesses to allow for the use of the invention or analogous inventions.

13. The portion of the realizable profit that should be credited to the invention as distinguished from non-patented elements, the manufacturing process, business risks, or significant features or improvements added by the infringer.

14. The opinion testimony of qualified experts.

15. The amount that a licensor (such as the patentee) and a licensee (such as an infringer) would have agreed upon (at the time the infringement began) if both had been reasonably and voluntarily trying to reach an agreement

Notably, the outcome of a hypothetical negotiation (factor 15) between a willing licensor and a willing licensee is just one of the 15 factors to be considered. For example, the Federal Circuit in *Deere & Co.* adopted the following district court rationale:

In determining a reasonable royalty, such factors as increased profitability, market share, cost savings, and collateral benefits from the sales of related products are to be considered. *In addition*, the reasonable royalty allowed *should take into consideration* that which would be accepted by a prudent licensee who wished to obtain a license but was not so compelled, and by a prudent pa-

tentee who wished to grant a license but was not so compelled.⁴⁰

Analytical Approach

There is no way to determine a "reasonable royalty." Section 284 does not mandate how the district court must compute a reasonable royalty after infringement, only that it adequately compensate for the infringement.⁴¹ There are as many ways to determine a reasonable royalty after infringement as logic and the facts of a particular case allow. Two approaches often used to calculate a reasonable royalty include: (1) a percentage of the economic advantage to the infringer or (2) "analytically." Other approaches, or combinations or hybrids of these, have also been approved by the courts when the facts warrant.

Under the percent of economic advantage method, some portion or all of the infringer's profits or cost savings are awarded to the patentee,⁴² giving due consideration to the *Georgia-Pacific* factors. Usually, the infringer's usual or acceptable profit is subtracted from the profit realized from sales of infringing devices, and the difference is awarded to the patentee as a "reasonable royalty."⁴³

Thus, for example, if an infringer's profit from infringing sales average 30% and its usual profit averages 20%, under the percent of economic advantage method, a patentee may be awarded 50% to 100% of the infringer's profits, or 15% to 30% of sales revenues. On the other hand, using the analytical method, the patentee may receive only 10% (30% minus 20%) of the infringer's revenues.

PRICE EROSION

Yale Lock

Price erosion damages were first recognized by the Supreme Court over 100 years ago. *Yale Lock Mfg. Co. v. Sargent*⁴⁴ involved a reissue patent for an improved lock for a safe or vault door. After holding that Yale's lock infringed Sargent's patent, the court considered the master's report on damages and the defendant's exceptions thereto:

The master reports that . . . in con-

sequence of the defendant's offering and selling to the plaintiff's principal customers and to the trade generally, locks containing the infringing device at a less price than the plaintiff was obtaining, a reduction of prices was enforced on the plaintiff, such reduction being . . . \$1 on each No. 5 lock, and \$2 on each No. 3 lock.⁴⁵

The defendant excepted to the master's report, arguing that there was no proof that any price reduction was caused by the defendant's infringement, and that there was no method of computing such reduction, even if it actually existed. The court stated that "[r]eduction of prices, and consequent loss of profits, enforced by infringing competition, is a proper ground for awarding damages. The only question is as to the character and sufficiency of the evidence in the particular case."⁴⁶ The court then held that plaintiff's price reduction was "directly and solely caused by the defendant's infringement" and that the master had properly fixed damages at one-half the amount of the reduction in prices.⁴⁷

The price erosion damages awarded in *Yale Lock* were actual damages suffered by the patentee as a result of the infringer's unlawful competition. Because the patentee was forced to reduce its own prices following the infringer's entry into the market, it suffered reduced profits on its own sales. The *Yale Lock* case also introduced a second type of price erosion damages: reduced profits on sales lost to the infringer.

The master also reports that . . . the plaintiff would have made sales to many of the persons who were induced to purchase from the defendant at his own established prices, had not the defendant offered its locks at lower prices.⁴⁸

Because the master did not award any damages for sales lost to the infringer, the question of whether plaintiff's damages as a result of lost sales should be calculated based on an uneroded price was not before the court. However, the court expressly held that price erosion damages in the form of reduced profits on the patentee's sales is proper:

That [plaintiff's lost profit] is a proper item of damages, if proved, is clear. It is a pecuniary in-

jury caused by the infringement, and is the subject of an award of damages, although the defendant may have made no profits and the plaintiff may have had no established license fee. As the plaintiff, at the time of the infringement, availed himself of his exclusive right by keeping his patent a monopoly, and granting no licenses, the difference between his pecuniary condition after the infringement, and what his condition would have been if the infringement had not occurred, is to be measured, so far as his own sales . . . are concerned, by the difference between the money he would have realized from such sales if the infringement had not interfered with such monopoly, and the money he did realize from such sales. If such difference can be ascertained by proper and satisfactory evidence, it is a proper measure of damages.⁴⁹

Interestingly, in 1964 the Supreme Court relied upon and reaffirmed *Yale Lock* in *Aro Mfg.* when it comprehensively addressed the issue of damage standards in patent infringement cases.⁵⁰

Price Erosion as Recognized in Lost Profit Cases

Over 90 years passed before the courts had occasion to revisit the price erosion concepts first raised in *Yale Lock*. Then, in 1978, the district court in *W.L. Gore & Assocs., Inc. v. Carlisle Corp.*⁵¹ adopted a special master's finding⁵² that plaintiff suffered \$147,288 in price erosion damages on its own sales as a result of price cuts necessary to meet the infringing competition.⁵³ Although the court discussed the reasonableness of the special master's assumptions in arriving at the damages figure, it cited no case law in support of the award.

Two years later, in *Saf-Gard Prods., Inc. v. Service Parts, Inc.*, an Arizona district court held that the patentee was entitled to a lost profits award from sales lost to the infringer based on an uneroded selling price.⁵⁴ The court cited *Yale Lock* for the proposition that a patentee's lost profits are properly based on its average selling price before the infringer enters the market, rather than any reduced selling price caused by the infringer's unlawful competition.⁵⁵

In 1983, the Federal Circuit joined in the growing consensus that

price erosion is a proper component of lost profits damages. In *Lam, Inc. v. Johns-Manville Corp.*,⁵⁶ the Federal Circuit, citing *Yale Lock*, affirmed an award of damages including reduced profits on the patentee's actual sales. That holding was based on the district court's finding that the market had only two suppliers and that the patentee had reduced its prices to meet the infringer's competition.⁵⁷

Two years later, in *King Instrument Corp. v. Otari Corp.*,⁵⁸ the court affirmed an award based on the other type of price erosion damages. The court held that the district court properly used an uneroded selling price to calculate the patent owner's profit margin on sales lost to the infringer.⁵⁹

In 1986, the Federal Circuit affirmed an award of lost profits incorporating both types of price erosion damages: reduced profits on the patentee's actual sales and reduced profits on sales lost to the infringer. In *TWM Mfg. Co., Inc. v. Dura Corp.*,⁶⁰ the court affirmed the special master's damage calculation, which included:

- (2) \$100 for each sale made by [patentee] at prices forced lower by the infringement . . . ;
- (3) special discounts by [patentee] on some sales to compete with [infringer's] pricing practices . . . ;
- and (4) \$100 for each sale by [infringer] . . . because [patentee] would have made those sales at a \$100 higher price⁶¹

Since its decision in *TWM*, the Federal Circuit has reviewed many lost profits damage awards which include the effects of price erosion. Such damage awards have generally been affirmed where the patentee successfully established causation and the amount sought was not based on mere speculation.⁶² The Federal Circuit has repeatedly held that price erosion damages can be a form of lost profits damages.⁶³

Apart from the Federal Circuit cases, one noteworthy district court decision deserves mention. In *In re Mahurkar Double Lumen Hemodialysis Patent Litigation*,⁶⁴ the court discussed a patentee's entitlement to compensation for price erosion at length. In a detailed and insightful analysis, Judge Easterbrook held that the patent owners were entitled

"to damages measured by the profit they lost as a result of the infringement, and that the lost profit has two components: sales diverted to [the infringer], and a reduction in the price [the patent owner] realized for the catheters it sold itself."⁶⁵ In determining the lost profit per unit sold by the infringer, the court concluded that damages should be calculated as the difference between *actual costs* of goods and the *potential price* — that is, the price the patent holders could have realized had there been no competition from the infringer.⁶⁶

The defendant challenged the court's lost profits damage model as resulting in "off-the-wall" numbers because they exceeded what defendant viewed as a "reasonable royalty." In rejecting defendant's argument, the court noted that during the period of infringement, the exclusive licensee had been paying the patentee a "hefty royalty" of 9% on its sales of all products containing the patented product and that the invention was "a very valuable piece of intellectual property indeed."⁶⁷

In addition to the decision in *In re Mahurkar*, at least four district courts have awarded lost profits damages that compensate the patentee for reduced profits on its own sales, as well as reduced profits on lost sales based on an uneroded sales price.⁶⁸ Thus, there is ample authority recognizing that price erosion damages may be recovered as lost profits in order to provide adequate compensation for infringement.

Cases Recognizing Price Erosion in Reasonable Royalty Cases

Although price erosion has been most often treated as an element of lost profits damages, it is also properly considered as a factor in setting a reasonable royalty. As previously discussed, *Georgia-Pacific* lists 15 factors to be considered in determining the reasonable royalty amount. However, *Georgia-Pacific* is not an exclusive list of such factors. The Federal Circuit has stated that in "determining an award 'adequate to compensate,' 35 U.S.C. § 284, there must be room to take into account the totality of the circumstances."⁶⁹ Moreover, the Federal Circuit has

identified additional factors, not specifically mentioned in *Georgia-Pacific*, which are properly considered as part of a reasonable royalty determination.⁷⁰ Although the Federal Circuit has not yet affirmed an award of price erosion in a reasonable royalty context, three early cases and two modern decisions lay the groundwork upon which a future decision may rest.

The earliest case awarding damages for price erosion in a reasonable royalty context was decided in 1927. The court in *Motor Player Corp. v. Piano Motors Corp.*⁷¹ not only recognized that price erosion is properly considered in fixing a reasonable royalty rate, it based its reasonable royalty damage award on the uneroded price of the invention. In that case, a master had set the reasonable royalty at \$3.77 per infringing device (a motor for player pianos) where the average sales price of the infringing device was \$45.58. In reviewing the master's award, the court stated: "It is deemed inferable, from the evidence in this case, that the sales price per [plaintiff's piano motor] would not have been less than \$65, except for the unlawful interference by the defendant."⁷² The court then increased the royalty to \$6 per infringing device.⁷³

A year later, the Sixth Circuit in *Egry Register Co. v. Standard Register Co.*⁷⁴ recognized that the patentee's profits are relevant to the determination of what royalty a patentee would have accepted in a hypothetical royalty negotiation:

In fixing a reasonable royalty, the primary inquiry, often complicated by secondary ones, is what the parties would have agreed upon, if both were reasonably trying to reach an agreement. This must be modified by the commercial situation, and when the result is to interfere with a patent monopoly, which the patentee was in position to and desired to keep, by retaining the entire market himself, *his compensation for parting against his will with that opportunity must take due account of the loss to him of anticipated profits on the business which the licensees will thus get away from him.*⁷⁵

The Sixth Circuit did little more than state the obvious. In a real licensing negotiation, the patent

holder who anticipates competing with a prospective licensee in the marketplace would be foolish not to consider the economic reality of price competition. Anticipating erosion of market prices upon entry of the licensee into the marketplace, the prudent patentee seeks a royalty that will compensate him for reduced profits due to anticipated price cuts or inability to raise prices.

Five years after the Sixth Circuit's decision, the Second Circuit expressly held that reductions in price caused by the infringer's competition are properly considered in a reasonable royalty context. In *Overman Cushion Tire Co. v. Goodyear Tire & Rubber Co.*⁷⁶ the court reviewed a master's reasonable royalty determination after holding that Goodyear infringed Overman's automobile tire patent. Overman has placed its patented tire on the market in 1911 and licensed its patent to other large manufacturers. Rather than taking a license from Overman, Goodyear hired a former sales manager of Overman and began selling infringing tires to many of Overman's customers at a lower price.⁷⁷ Overman was forced to give discounts on its tires because of Goodyear's competition. The court stated:

The master found, properly, that [Goodyear, the infringer] could not take advantage of any reduction in price caused by its own or any other infringer's wrongdoing, and, if there had been no infringement, there probably would have been a higher price obtained.⁷⁸

The court affirmed the master's damage award of \$5 per tire after finding that it amounted to only twenty percent of the plaintiff's profits at an uneroded sales price.⁷⁹

At least two modern cases have recognized the wisdom of taking into account the effects of price erosion in calculating a reasonable royalty, although neither actually awarded price erosion damages along with reasonable royalty amounts. Most important is a decision from the Sixth Circuit decision authored by former Chief Judge Markey, *Panduit Corp. v. Stahl Bros. Fibre Works, Inc.*⁸⁰ In *Panduit*, the patentee sought to reverse the district court's denial of price erosion

caused by the infringement on the patentee's own actual sales.⁸¹ Writing for the Sixth Circuit, Chief Judge Markey noted that "damages adequate to compensate for the infringement" raises primarily the question: "[H]ad the infringer not infringed, what would Patent Holder-Licensee have made?"⁸² Although the court affirmed the denial of price erosion damages, it did so only because of a failure of proof.⁸³

In the most recent case recognizing that price erosion is relevant to the reasonable royalty analysis, the court in *Syntex, Inc. v. Paragon Optical, Inc.*,⁸⁴ had to determine a reasonable royalty on sales of infringing contact lenses. The plaintiff's royalties expert, Mr. Dudley Smith, convinced the court that a 50-50 split of the 38% profit was appropriate. The court astutely recognized that applying the royalty to an eroded lens price was conservative, given that the price had dropped \$7 over the years because of the defendants' infringement: "Defendants are thus gaining the benefit of their own infringement by cutting down the measure of the reasonable royalty on the lens price."⁸⁵ The court therefore recognized that its award was conservative, but it did not increase its award to take into account the price erosion.⁸⁶

Although the Federal Circuit has not explicitly considered the question of whether price erosion can be considered in a reasonable royalty context, dicta in *Sun Studs, Inc. v. ATA Equip. Leasing, Inc.*⁸⁷ hints at the court's future position. In *Sun Studs*, damages were awarded by a jury in the form of a reasonable royalty. On appeal, the defendant argued that the instructions on damages were erroneous. The Federal Circuit held that the jury acted reasonably in measuring damages and affirmed the damage award (subject to recalculation, on remand, of damages to include those incurred during the period that had been excluded for laches). In reviewing the jury instruction for error, the court stated:

We have recognized that compensation for infringement can take cognizance of the actual commercial consequences of the infringement, and that the hypothetical negotiators need not act as if there had been no infringement, no liti-

gation, and no erosion of market position or patent value.⁸⁸

These cases recognize the obvious: there is nothing in the statute which precludes an award of price erosion damages under a reasonable royalty analysis, so long as the award is adequate to compensate for the infringement. Price erosion — if supported by the facts of a particular case — is a factor to consider when determining reasonable royalty damages. It is logical to do so given the expectation that a licensor would consider the effects of price competition when negotiating a royalty rate, and, moreover, it satisfies the overriding objective of Section 284 that the patentee receive adequate compensation for the infringement.⁸⁹

A REASONABLE ROYALTY DAMAGE MODEL INCLUDING MARKET EFFECTS

In seeking adequate compensation for infringement, a patentee may want to prove up the full commercial consequences of the unlawful competition, including price erosion. If a lost profits analysis is complicated by a multi-supplier market or an inability to meet all four of the *Panduit* requirements, the innovative patentee need not despair. If the appropriate factual support exists, a two-tiered reasonable royalty damage model which incorporates the effects of price erosion in a competitive market may be constructed as the sum of an "indifference royalty" and a "market value royalty." The indifference royalty, if paid by the infringer at the time infringement began, would have prevented price erosion from occurring. Because the infringer did not pay any royalty and competed at reduced prices, the market price of the patented product was eroded. To adequately compensate the patentee for the infringement, it should be recompensed for the reduced profits it realized on its own sales. Thus, calculation of a second royalty component — a "market value royalty" — is required.

The Indifference Royalty

The first tier of the damage model could be called the indifference

royalty — the royalty rate which would have made the infringer's customer indifferent as to whether it was buying a royalty-burdened (*i.e.* licensed) product or the next-highest priced, available and acceptable noninfringing substitute. The calculation of the indifference royalty focuses on the infringer's choices on the date infringement began. The options available to the infringer thus initially depend on whether a noninfringing alternative was available at the time of the negotiation, or if not, what the cost to develop and market a substitute would have been.⁹⁰

This example also assumes a fact situation where (a) the infringer controls enough of the market or has a lower cost structure so that it has been a price leader, (b) the market is such that price changes are generally communicated, even if indirectly, among competitors, and (c) the infringer believes that competitors will generally follow its price lead. In short, the damage model assumes a market in which the infringer is the dominant player in a slightly oligopolistic market where tacit price coordination is at least theoretically possible, if not historically demonstrable.⁹¹

Higher Cost Noninfringing Product Available. If a more expensive noninfringing alternative product is available at the time infringement began, the infringer had three choices: (1) sell the noninfringing product at a higher price than the infringing price, (2) negotiate a license and pay a royalty, and so sell the infringing product at a higher price, or (3) infringe the patent and continue to sell infringing products at prices unburdened by any royalty, thus causing price erosion.

Although the infringer actually chose the third option, to infringe at unlicensed prices, the damage calculation imagines that the infringer did what it should have done if it was going to do what it in fact did: if it was going to sell infringing products, it should have taken a license. When the infringer is a price leader in a concentrated market, the indifference royalty should be designed to make the infringer's customers indifferent as to whether they buy infringing prod-

ucts at a royalty-laden price as compared to noninfringing, acceptable substitutes.

Thus, the indifference royalty is simply the price difference between the sales price of (a) infringing products and (b) noninfringing substitute products. Where the facts support the conclusion that had the infringer actually paid a royalty throughout the "infringement period," it would have raised the sales price of the licensed product a sufficient amount to retain the same gross margin, recovery of price erosion damages may be in order. This approach may be particularly applicable if the businesses use gross margin as a percent of revenue as an indicator of the success of a particular product. Gross margin targets are commonly set, and sales prices are determined accordingly. For example, if it costs \$50 to manufacture a product, and the company desires a 50% gross margin on sales of that product, it will set the sales price at \$100.

The indifference royalty is the difference between the sales price of the noninfringing alternative and the actual price of the infringing product. Such a royalty makes the infringer indifferent, from a gross margin standpoint, as to whether it sells the higher cost noninfringing alternative or the lower cost patented product burdened by a royalty.⁹²

No Noninfringing Product Available Within a Reasonable Time. If there was no noninfringing product available at the time infringement began, the infringer's choices were limited to negotiating a license or infringing the patent. Under these circumstances, there is no true indifference royalty. However, a variant of the indifference royalty may be calculated as the difference between the patentee's preinfringement sales price (or, if none existed, then the expected sales price) and the actual eroded sales price. The purpose of this royalty is to discourage the licensee from selling at a lower price, thereby causing price erosion.

This calculation rests on the same assumption underlying the indifference royalty — that if the infringer had paid a royalty throughout the infringement period, it would have raised prices to retain

its targeted gross margin.⁹³ Thus, the purpose of the royalty is to allow adequate prices during the patent period so that the patentee gets the full compensation for violation of his patent monopoly.

The Market Value Royalty

The second tier of the damage model is called the market value royalty — representing a time-lag adjustment designed to ensure that the economic benefits to the patent holder of the reasonable royalty would operate as if the royalty had been paid since the beginning of the infringement, and thus be fully compensating. The calculation of the market value royalty is based on the assumption that, on the date infringement began, the infringer did not take a license under the patent; thus, the market was depressed by the fact that the infringement occurred. Again, in this example, the calculation assumes that, had the infringer taken a royalty, it would have raised its prices by the royalty amount in order to retain the same gross margin. Under this scenario, the patentee would have been able to sell its products at an uneroded price.

The market value royalty is the difference between the (a) actual sales price charged by the infringer on infringing products and (b) the price that would have been charged had the infringer taken a license at the indifference royalty rate. On the facts of the same example mentioned above, the market value royalty is equal to the amount that the infringer would have raised its prices to retain its gross margin. This royalty, however, is applied to the number of units actually sold by the patentee — not the infringer. The market value royalty is multiplied by the number of units sold by the patentee.

The Reasonable Royalty Including Market Effects

The reasonable royalty adequate to compensate for the infringement is the sum of (a) the indifference royalty and (b) the market value royalty. Again, the indifference royalty is equal to the indifference royalty (\$/unit) times the *number of infringing units sold by the infringer,*

and the market value royalty is equal to the market value royalty (\$/unit) times the *number of units sold by the patentee.* The sum of the indifference royalty and the market value royalty are the patentees damages. This amount may be sought outright or it may then be divided by the infringer's gross revenue during the infringement period to determine a reasonable royalty as a percent of the infringer's revenue.

This reasonable royalty model assumes that the infringer and the patentee would have held the same market shares that they actually had during the period of unlawful competition. In reality, the patentee would probably have increased its market share, possibly at the expense of the infringer, had the infringer chosen a legal option. In that sense, the model is conservative.

CONCLUSION

We hope to have shown that price erosion is properly considered as a factor in determining a reasonable royalty damage award. A two-tiered reasonable royalty damage model that includes an indifference royalty and a market value royalty compensates the patentee for the full commercial impact of the infringement by turning back the clock to the date the infringement began and reshaping history. The model assumes that, rather than infringing the patent, the infringer negotiated a license and increased its prices to retain a constant gross margin, and that the patentee followed suit by increasing its prices. Had the negotiation actually occurred, the patentee would have received a royalty on the sales of the licensed products (an "indifference royalty") as well as increased margins on the sales of its own products (a "market value royalty"). This places the patentee, as nearly as possible, in the position he would have occupied had the infringer taken a license — the fundamental tenant of Section 284.

NOTES

1. *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 895 F.2d 1403, 1406 (Fed.Cir. 1990).

2. 35 U.S.C. § 284 was enacted as part of

the Patent Act of 1952 with only insubstantial changes from the 1946 predecessor statute, discussed below, and with no apparent intent to change the meaning of the 1946 version. See generally, authorities cited in notes 6 and 7, *infra*. Section 284 has not been amended since its passage in 1952.

3. See *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 654 (1983).

4. See *Devex Corp.*, 461 U.S. at 654 (citing H.R. Rep. No. 1587, 79th Cong., 2d Sess. 1-2 (1946)); S. Rep. No. 1503, 79th Cong., 2d Sess. 2 (1946); U.S. Code Cong. Serv. 1946, p. 1386, 92 Cong. Rec. 9188 (1946) (remarks of Sen. Pepper).

5. *Aro Mfg. Co. v. Convertible Top Replacement Co.*, 377 U.S. 476, 505-08 (1964).

6. *Aro*, 377 U.S. at 505-06, quoting H. Rep. No. 1587, 79th Cong., 2d Sess. (1946). See *Smithkline Diagnostics*, 926 F.2d at 1164 n.1.

7. *Fromson*, 853 F.2d at 1574, quoting *General Motors Corp. v. Devex Corp.*, 461 U.S. 648, 654-55 (1983).

8. *General Motors Corp. v. Devex Corp.*, 461 U.S. 648 (1983) (discussing legislative history and purpose of § 284).

9. *Smithkline Diagnostics*, 926 F.2d at 1164.

10. *Aro*, 377 U.S. at 507, quoting *Yale Lock Mfg. Co. v. Sargent*, 117 U.S. 536, 552 (1888), citing *Livesay Window Co. v. Livesay Indus., Inc.*, 251 F.2d 469, 471 (5th Cir. 1958). See *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152, (6th Cir. 1978) (Markey, J., sitting by designation).

11. *Fromson v. Western Litho Plate & Supply Co.*, 853 F.2d 1568, 1574 (Fed. Cir. 1988) (citing *Albemarle Paper Co. v. Moody*, 422 U.S. 405, 418-19 (1975)).

12. *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1579 (Fed. Cir. 1992).

13. *Fromson*, 853 F.2d at 1574 (emphasis in original).

14. *Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1577 (Fed. Cir. 1992) (citing *State Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.2d 1573, 1577 (Fed. Cir. 1989), *cert denied*, 493 U.S. 1022 (1990)).

15. See *Paper Converting Mach. Co. v. Magna-Graphics Corp.*, 745 F.2d 11, 21 (Fed. Cir. 1984); *Bio-Rad Labs., Inc. v. Nicolet Instrument Corp.*, 739 F.2d 604, 616 (Fed. Cir.), *cert denied*, 469 U.S. 1038 (1984).

16. Precedent supports finding causation despite an existing alternative source of supply if that producer is itself an infringer, who (a) sells a noninfringing product that is an unacceptable substitute, or (b) has insignificant sales. See, e.g., *Bio-Rad Labs., Inc.*, 739 F.2d at 616 (proof of no acceptable substitutes); *Gyromat Corp. v. Champion Spark Plug Co.*, 735 F.2d 549, 553-54 (Fed. Cir. 1984) (no alternative competing source where only five or six machines sold); *Central Soya Co. v. George A. Hormel & Co.*, 723 F.2d 1573, 1579 (Fed. Cir. 1983) (no acceptable alternatives because scale of operations of others was insignificant).

17. See *State Indus., Inc. v. Mor-Flo Indus., Inc.*, 883 F.2d at 1577-78 (awarding patentee profits lost on 40% of the infringing sales based on proof that patentee's market share was 40%); see also *Atlantic Thermoplastics Co. v. Faytex Corp.*, 970 F.2d 834, 847 (Fed. Cir. 1992) (dicta indicating that market share approach to lost profits is an appropriate method for determining damages).

18. *Lam, Inc. v. Johns-Manville Corp.*, 718 F.2d 1056, 1065 (Fed. Cir. 1983).

19. *Panduit Corp. v. Stahlin Bros. Fibre Works, Inc.*, 575 F.2d 1152, 1156 (6th Cir. 1978).

20. *Kaufman Co. v. Lantech, Inc.*, 926 F.2d 1136, 1141 (Fed. Cir. 1991).

21. *Standard Havens Prods., Inc. v. Gencor Indus., Inc.*, 953 F.2d 1360, 1372-73 (Fed. Cir.

1991), *cert. denied*, 113 S. Ct. 60 (1992); *Lam*, 718 F.2d at 1065.

22. *Standard Havens*, 953 F.2d at 1372-73.

23. *Amstar Corp. v. Envirotech Corp.*, 823 F.2d 1538, 1543 (Fed. Cir. 1987); *Lam*, 718 F.2d at 1065.

24. See 35 U.S.C. § 284; *Amstar*, 823 F.2d at 1543.

25. 35 U.S.C. § 284.

26. *Fromson*, 853 F.2d at 1574 (emphasis in original).

27. *Hanson v. Alpine Valley Ski Area, Inc.*, 718 F.2d 1075, 1078 (Fed. Cir. 1983).

28. *Nickson Indus., Inc. v. Rol Mfg. Co.*, 847 F.2d 795, 798 (Fed. Cir. 1988).

29. *Hanson*, 718 F.2d at 1078 (licenses did not show established rate) (quoting *Rude v. Westcott*, 130 U.S. 152, 165 (1889)).

30. *Nickson Indus., Inc. v. Rol Mfg. Co., Ltd.*, 847 F.2d 795, 798 (Fed. Cir. 1988), citing *Bio-Rad Labs., Inc. v. Nicolet Instrument Corp.*, 739 F.2d 604, 617 (Fed. Cir.), *cert. denied*, 469 U.S. 1038 (1984).

31. *Bio-Rad Labs.*, 739 F.2d at 617 (citations omitted).

32. *Fromson*, 853 F.2d at 1575, citing *Panduit Corp.*, 575 F.2d at 1158 and *Bott v. Four Star Corp.*, 229 USPQ 241, 247-48 (E.D. Mich. 1985) (5% royalty though established industry rate was 3%), *aff'd in part, rev'd in part on other grounds*, 807 F.2d 1567 (Fed. Cir. 1986).

33. *Fromson*, 853 F.2d at 1574.

34. *Del Mar Avionics, Inc. v. Quinton Instrument Co.*, 836 F.2d 1320, 1327 (Fed. Cir. 1987), citing *Seattle Box Co. v. Industrial Crating & Packing, Inc.*, 756 F.2d 1574, 1581 (Fed. Cir. 1985).

35. *Wang Labs., Inc. v. Toshiba Corp.*, 993 F.2d 858, 870 (Fed. Cir. 1993).

36. *Panduit Corp.*, 575 F.2d at 1159.

37. *Panduit Corp.*, 575 F.2d at 1157-58.

38. *Id.* at 1158.

39. *Georgia-Pacific Corp. v. United States Plywood Corp.*, 318 F.Supp. 1116, 1120 (S.D.N.Y. 1970), *mod.*, 446 F.2d (2d Cir.), *cert. denied*, 404 U.S. 870 (1971).

40. *Deere & Co. v. Int'l Harvester Co.*, 710 F.2d 1551, 1554 (Fed. Cir. 1983) (emphasis added). See *Super Sack Mfg. Corp. v. Bulk-Pack, Inc.*, 1992 WL 96863 *11 (E.D. Tex. 1992) ("determination of a reasonable royalty after infringement is not the equivalent of ordinary royalty negotiations among truly willing patent owners and licensees. Thus, a reasonable royalty for an infringer may be greater than the royalty which a hypothetical patent owner and willing licensee would have agreed upon on the date the infringement commenced.") (citations omitted). Arguably, some cases lost sight of the fact that the amount "agreed on" in the "hypothetical negotiation" is just one of the Georgia-Pacific factors. See, e.g., *Wallace Business Forms, Inc. v. UARCO Inc.*, 1988 WL 105381, *6 (N.D. Ill. Sept. 30, 1988) ("These hypothetical negotiations are not merely one factor among the fifteen various factors listed in Georgia-Pacific; rather, they are a convenient method for incorporating and considering the other factors in arriving at a reasonable rate."), citing *Studiengesellschaft Kohle m.b.H. v. Dart Indus.*, 666 F.Supp. 674, 680-81 (D.Del. 1987), *aff'd*, 862 F.2d 1564 (Fed. Cir. 1988).

41. *TWM Mfg. Co. v. Dura Corp.*, 789 F.2d 895, 899 (Fed. Cir.), *cert denied*, 479 U.S. 852 (1986).

42. See, e.g., *State Indus., Inc.*, 883 F.2d at 1580-81; *Fromson*, 853 F.2d at 1576-78; *Hanson*, 718 F.2d at 1080-82; *Deere & Co. v. International Harvester Co.*, 710 F.2d 1551, 1558-59 (Fed. Cir. 1983).

43. See, e.g., *TWM Mfg. Co.*, 789 F.2d at 899-900 (usual net profit of 6.56% to 12.5%

subtracted from projected averaging 37-42% for a reasonable royalty of 30%).

44. 117 U.S. 536 (1886).

45. *Id.* at 548 (emphasis added) (quoting 17 Blatchf. 244).

46. *Id.* at 551.

47. *Id.* at 551-53.

48. *Id.* at 549 (emphasis added).

49. *Id.* at 552-53.

50. *Aro Mfg.*, 377 U.S. at 507.

51. 198 U.S.P.Q. 353 (D. Del. 1978).

52. The parties did not challenge the special master's calculation of damages due to price erosion. *Id.* at 358.

53. *Id.*

54. 491 F.Supp. 996 (D. Ariz. 1980).

55. *Id.* at 1009.

56. 718 F.2d 1056 (Fed. Cir. 1983).

57. *Id.* at 1067.

58. 767 F.2d 853 (Fed. Cir. 1985), *cert. denied*, 475 U.S. 1016 (1986).

59. *Id.* at 864.

60. 789 F.2d 895 (Fed. Cir.), *cert. denied*, 479 U.S. 852 (1986).

61. *Id.* at 898.

62. See, e.g., *Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555, 1578-81 (Fed. Cir. 1992) (affirming an award of lost profits which included compensation for reduced profits on patentee's sales due to price cuts under the Semiconductor Chip Protection Act); *Minnesota Mining & Mfg. Co. v. Johnson & Johnson Orthopaedics, Inc.*, 976 F.2d 1559, 1578-79 (Fed. Cir. 1992) (affirming an award of lost profits based on price erosion where infringing competition prevented patentee from implementing annual price increases of 2%); *Kalman v. The Berlyn Corp.*, 914 F.2d 1473, 1485 (Fed. Cir. 1990) (affirming an award of an additional 15% over the actual sales price for maintenance of depressed prices); *Amstar Corp. v. Envirotech Corp.*, 823 F.2d 1538, 1542-44 (Fed. Cir. 1987) (affirming award of lost profits for reduced profits on patentee's sales due to foregone price increases).

63. See, e.g., *Brooktree Corp.*, 977 F.2d at 1580-81; *Minnesota Mining & Mfg. Co.*, 976 F.2d at 1578; *Amstar Corp.*, 823 F.2d at 1543; *TWM Mfg. Co.*, 789 F.2d at 901-02; *Lam, Inc.*, 718 F.2d at 1065.

64. 831 F.Supp. 1354 (N.D. Ill. 1993).

65. *Id.* at 1385.

66. *Id.* at 1386.

67. *Id.* 1391-92.

68. See *Ristvedt-Johnson, Inc. v. Brandt, Inc.*, 805 F.Supp. 557, 566-68 (N.D. Ill. 1992); *Micro Motion, Inc. v. Exac Corp.*, 761 F.Supp. 1420, 1430-34 (N.D. Cal. 1991); *Ziggity Sys., Inc. v. Val Watering Sys.*, 769 F.Supp. 752, 823-24 (E.D. Pa. 1990); *Sun Prods. Group, Inc. v. B&E Sales Co.*, 700 F.Supp. 366, 383-84 (E.D. Mich. 1988).

69. *TWM Mfg. Co.*, 789 F.2d at 902.

70. See, e.g., *State Indus., Inc.*, 883 F.2d at 1580 (court considered fact that infringer did not consider using an alternative type of insulation and risked infringement with foam insulation); *TWM Mfg. Co.*, 789 F.2d at 900 (court considered the invention's immediate commercial success, its satisfaction of a long-felt need, and the absence of a competing suspension possessing all its beneficial characteristics in affirming 30% royalty); *CPG Prods. Corp. v. Pegasus Luggage, Inc.*, 776 F.2d 1007, 1010 (Fed. Cir. 1985) (affirming royalty where district court considered evidence that patentee would not voluntarily grant a license for less than a 20% royalty).

71. 19 F.2d 993 (D.N.J. 1927).

72. *Id.* at 997.

73. *Id.*

74. 23 F.2d 438 (6th Cir. 1928).

75. *Id.* at 443 (emphasis added).

76. 66 F.2d 361 (2d Cir.), *cert. denied*, 290

U.S. 681 (1933).

77. *Id.* at 361-62.

78. *Id.* at 362.

79. *Id.* In addition, price erosion is routinely taken into account by the courts when they recognize that licenses taken during a period of infringement are not accurate evidence of the worth of the invention because they would be at a reduced rate due to infringement. See, e.g., *Trio Process Corp. v. L. Goldstein's Sons, Inc.*, 533 F.2d 126, 128-29 (3rd Cir. 1975) (holding that district court did not err in considering that licenses taken during infringement had been at depressed rate).

80. 575 F.2d 1152 (6th Cir. 1978).

81. 575 F.2d at 1156.

82. *Id.* (quoting *Aro*, 377 U.S. at 507).

83. *Id.* 575 F.2d at 1157.

84. 7 U.S.P.Q.2d 1001 (D. Ariz. 1987).

85. *Id.* at 1028.

86. *Id.*

87. 872 F.2d 978 (Fed. Cir. 1989).

88. *Id.* at 994 (citations omitted).

89. However, it should be emphasized that it may be more difficult for a patentee to recover price erosion damages where it has licensed the patent-in-suit often enough to have set an established royalty. The difficulty would be one of proof, not law. If, as a matter of fact, there are several licensed competitors in the marketplace, the infringer probably could not erode the price unless the infringer had a lower cost structure than the patentee and the other licensed competitors or the royalty rate was sufficiently high so as to create a price "ceiling" for the infringer to undercut. This point is explained in *In re Mahurkar Double Lumen Hemodialysis Patent*

Litig., 831 F.Supp. at 1383-84.

90. A further consideration will often be whether the infringer would have been unable to immediately switch to acceptable, noninfringing alternatives. If not, then the infringer would have faced risks, such as the potential loss of business if a customer had been unwilling to wait for an acceptable product to be developed. In addition, the infringer may have enormous sunk capital costs which cannot be recouped by switching to noninfringing products. For example, the infringer could have spent millions to tool a plant to manufacture a certain product, and the plant has no use except for that purpose.

91. Tacit price collusion can result in supracompetitive prices, but is not by itself illegal, as recently recognized by the Supreme Court:

Tacit collusion, sometimes called oligopolistic price coordination or conscious parallel describes the process, not in itself unlawful, by which firms in a concentrated market might in effect share monopoly power, setting their prices at a profit-maximizing, supracompetitive level by recognizing their shared economic interests and their interdependence with respect to price and output decisions.

Brook Group Ltd. v. Brown & Williamson Tobacco Corp., 113 S.Ct. 2578, 2590 (1993). As a commentator recently observed:

Tacit collusion has not been held unlawful because it is inevitable that firms in a concentrated market will recognize their interdependence and act accordingly, and there is no effective remedy against such behavior. As

stated the First Circuit in an opinion authored by Judge Breyer, "How does one order a firm to set its prices without regard to the likely reactions of its competitors?"

Susan S. DeSanti & Ernest A. Nagata, *Competitor Communications: Facilitating Practices or Invitations to Collude? An Application of Theories to Proposed Horizontal Agreements Submitted for Anti-Trust Review*, 63 Antitrust L.J. 93, 95 (1994) (quoting *Clamp-All Corp. v. Cast Iron Soil Pipe Inst.*, 851 F.2d 478, 484 (1st Cir. 1988), cert. denied, 488 U.S. 1007 (1989) (emphasis omitted) (footnotes omitted)).

92. For example, assume that the noninfringing alternative costs \$50 to manufacture and the infringing product costs \$40. At a 50% gross margin, the sales price of the noninfringing product would be \$100. In order to make a 50% gross margin on the infringing product, the infringer sets its price at \$80. If the infringer instead paid a \$20 royalty to license the patented product, it could retain its \$40 gross margin by raising the sales price of the licensed product to \$100. Thus, the indifference royalty in this example is \$20. The indifference royalty may be applied to the number of products actually sold by the infringer.

93. For example, assume that, prior to the infringer's entry into the marketplace, the sales price of the patented product was \$100. Thereafter, the infringer introduced its product at a price of \$80 and received a 50% gross margin. If instead the infringer had licensed the product for \$20, it would have raised its price to \$100 in order to retain a 50% margin.