

In the Matter of

CERTAIN GLASS TEMPERING SYSTEMS

Investigation No. 337-TA-171



USITC PUBLICATION 1816

FEBRUARY 1986

UNITED STATES INTERNATIONAL TRADE COMMISSION

COMMISSIONERS

Paula Stern, Chairwoman

Susan W. Liebeler, Vice Chairman

Alfred E. Eckes

Seeley G. Lodwick

David B. Rohr

Anne E. Brunsdale

**Address all communications to
Kenneth R. Mason, Secretary to the Commission
United States International Trade Commission
Washington, DC 20436**

RECEIVED

NOV 16 1984

OFFICE OF THE SECRETARY
U.S. INTL. TRADE COMMISSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of)

CERTAIN GLASS TEMPERING SYSTEMS)

Investigation No. 337-TA-171

NOTICE OF ISSUANCE OF EXCLUSION ORDER

AGENCY: U.S. International Trade Commission

ACTION: Issuance of a limited exclusion order.

SUMMARY: The Commission has issued a limited exclusion order in the above-captioned investigation.

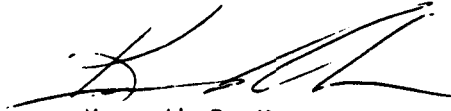
FOR FURTHER INFORMATION CONTACT: Carol McCue Verratti, Esq., Office of the General Counsel, U.S. International Trade Commission, telephone 202-523-0079.

SUPPLEMENTARY INFORMATION: The presiding officer issued an initial determination (ID) on August 15, 1984, in which she determined that there has been a violation of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) in the unauthorized importation or sale of certain glass tempering systems including frictionally driven oscillating roller hearth furnaces which infringe claim 1 of U.S. Letters Patent 3,994,711. On September 17, 1984, the Commission issued a notice that it had determined not to review the ID (49 F.R. 37858). Therefore, a violation of section 337 exists in the unauthorized importation or sale of certain glass tempering systems including frictionally driven oscillating roller hearth furnaces which infringe claim 1 of U.S. Letters Patent 3,994,711, the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States.

The Commission has determined that a limited exclusion order is the appropriate remedy in this investigation and that the public interest factors enumerated in section 337(d) do not preclude the issuance of such an order. Pursuant to section 337(g), the Commission has determined that 50 percent of the entered value of the articles concerned is the appropriate bond applicable to infringing glass tempering systems entered during the 60-day Presidential review period.

Copies of the Commission's Action and Order, its Opinion, the public version of the presiding officer's ID, and all other nonconfidential documents filed in connection with this investigation are available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 701 E Street, NW., Washington, D.C. 20436, telephone 202-523-0161.

By order of the Commission.

A handwritten signature in black ink, appearing to read 'K. R. Mason', written over a horizontal line.

Kenneth R. Mason
Secretary

Issued: November 16, 1984

were dismissed from this investigation with prejudice against complainant as to the respondents, but without prejudice to the introduction by any party of evidence relating to the '312 patent relevant to issues relating to the '711 patent.

On August 16, 1984, the presiding officer issued an initial determination (ID) that there is a violation of section 337 in the importation and sale of the glass tempering systems under investigation. Respondents filed a petition for review of the ID. On September 17, 1984, the Commission issued a notice of its decision not to review the ID and establishing a deadline for filing written submissions on the issues of remedy, the public interest, and bonding. 49 F.R. 37858.

Action

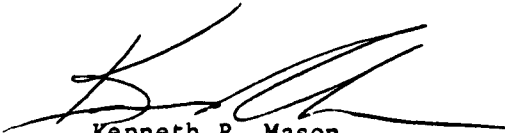
Having reviewed the submissions received on the questions of remedy, the public interest, and bonding, and the record compiled in this investigation, the Commission has determined that a limited exclusion order should be issued barring importation of glass tempering systems including frictionally driven oscillating roller hearth furnaces and components thereof which are manufactured by or on behalf of respondent AB Kyro OY or related entities and that infringe claim 1 of U.S. Letters Patent 3,994,711; that the public interest factors enumerated in section 337(d) do not preclude issuance of this remedy; and that a bond of 50 percent of the entered value of the articles concerned should be imposed during the Presidential review period.

Order

Accordingly, it is hereby ORDERED THAT--

1. Glass tempering systems including frictionally driven oscillating roller hearth furnaces and components thereof which infringe claim 1 of U.S. Letters Patent 3,994,711, and are manufactured by or on behalf of respondent AB Kyro OY or any of its affiliated companies, parents, subsidiaries, or other related business entities, or its successors or assigns, are excluded from entry into the United States except under license of the patent owner for the remaining term of the patent.
2. The articles ordered to be excluded from entry into the United States shall be entitled to entry under bond in the amount of 50 percent of the entered value of the subject articles from the day after this order is received by the President pursuant to subsection (g) of section 337 of the Tariff Act of 1930, and until such time as the President notifies the Commission that he approves or disapproves this action, but in any event, not later than 60 days after the date of receipt of this action.
3. The Commission may amend this order in accordance with the procedure described in section 211.57 of the Commission's Rules of Practice and Procedure (19 C.F.R. § 211.57).
4. The Secretary shall serve copies of this Commission Action and Order and the Commission Opinion in support thereof upon each party of record to this investigation and publish notice of this action in the Federal Register.

By order of the Commission.



Kenneth R. Mason
Secretary

Issued: November 16, 1984

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

_____)
In the Matter of)
)
CERTAIN GLASS TEMPERING SYSTEMS)
_____)

Investigation No. 337-TA-171

COMMISSION OPINION ON REMEDY, THE PUBLIC INTEREST, AND BONDING

I. Remedy

A limited exclusion order is the appropriate remedy in this investigation. Such an order will prohibit the entry of glass tempering systems and their components that infringe claim 1 of U.S. Letters Patent 3,994,711 and that are manufactured by or on behalf of respondent AB Kyro OY of Finland.

Both complainant and the Commission investigative attorney requested a limited exclusion order. No party has urged that a cease and desist order would be a more appropriate remedy. In the case of patent infringement, an exclusion order is usually the least burdensome type of remedial order to administer and is more likely to be effective than a cease and desist order. Available information indicates that, because glass tempering systems are large capital goods, the U.S. Customs Service will have no difficulty identifying infringing imports originating with respondent AB Kyro OY of Finland. 1/

To be effective, the order also excludes components of the infringing systems. The components are large and should be readily identifiable by the

1/ Complainant Glasstech's Submissions on Remedy, the Public Interest, and Bonding at 3.

Customs Service. The components are described in detail in claim 1 of the patent in controversy. 2/

II. Public Interest

We determine that the issuance of a limited exclusion order in this investigation will have no adverse effect on the public interest factors enumerated in section 337(d). Tempered glass produced by the subject glass tempering systems does have safety benefits for consumers. Tempered glass breaks less easily than untempered glass, and, when tempered glass does break, the pieces are small and relatively safe compared with those resulting from the breakage of untempered glass.

Despite this safety benefit, purchasers of glass for construction do not purchase tempered glass exclusively. Untempered glass continues to be used in construction, although tempered glass is used extensively for glass panel walls and glass doors. 3/ Thus, tempered glass is not essential for the public health and welfare.

There is a sufficient supply of glass tempering systems in the U.S. market to meet the demand for the systems and for tempered glass. Complainant alone has sufficient capacity to meet the entire demand for such systems in

2/ Complainant Glasstech requested the exclusion of spare parts. However, there are numerous spare parts, many of which may have noninfringing uses. We have therefore determined not to include spare parts within the scope of the order.

3/ Respondents' Statement on Remedy, Public Interest, and Bonding at 6.

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

_____)
In the Matter of)
)
CERTAIN GLASS TEMPERING SYSTEMS)
_____)

Investigation No. 337-TA-171

COMMISSION OPINION ON REMEDY, THE PUBLIC INTEREST, AND BONDING

I. Remedy

A limited exclusion order is the appropriate remedy in this investigation. Such an order will prohibit the entry of glass tempering systems and their components that infringe claim 1 of U.S. Letters Patent 3,994,711 and that are manufactured by or on behalf of respondent AB Kyro OY of Finland.

Both complainant and the Commission investigative attorney requested a limited exclusion order. No party has urged that a cease and desist order would be a more appropriate remedy. In the case of patent infringement, an exclusion order is usually the least burdensome type of remedial order to administer and is more likely to be effective than a cease and desist order. Available information indicates that, because glass tempering systems are large capital goods, the U.S. Customs Service will have no difficulty identifying infringing imports originating with respondent AB Kyro OY of Finland. 1/

To be effective, the order also excludes components of the infringing systems. The components are large and should be readily identifiable by the

1/ Complainant Glasstech's Submissions on Remedy, the Public Interest, and Bonding at 3.

Customs Service. The components are described in detail in claim 1 of the patent in controversy. 2/

II. Public Interest

We determine that the issuance of a limited exclusion order in this investigation will have no adverse effect on the public interest factors enumerated in section 337(d). Tempered glass produced by the subject glass tempering systems does have safety benefits for consumers. Tempered glass breaks less easily than untempered glass, and, when tempered glass does break, the pieces are small and relatively safe compared with those resulting from the breakage of untempered glass.

Despite this safety benefit, purchasers of glass for construction do not purchase tempered glass exclusively. Untempered glass continues to be used in construction, although tempered glass is used extensively for glass panel walls and glass doors. 3/ Thus, tempered glass is not essential for the public health and welfare.

There is a sufficient supply of glass tempering systems in the U.S. market to meet the demand for the systems and for tempered glass. Complainant alone has sufficient capacity to meet the entire demand for such systems in

2/ Complainant Glasstech requested the exclusion of spare parts. However, there are numerous spare parts, many of which may have noninfringing uses. We have therefore determined not to include spare parts within the scope of the order.

3/ Respondents' Statement on Remedy, Public Interest, and Bonding at 6.

the United States. 4/ There are also several foreign and domestic suppliers of glass tempering systems that do not infringe complainant's patent.

III. Bonding

The Senate Finance Committee Report on the 1974 amendments to section 337 states that the bond during the Presidential review period is to be set at a level sufficient to "offset any competitive advantage resulting from the unfair method of competition or unfair act enjoyed by the persons benefitting from the importation." 5/ When possible, the Commission has based the bond on the difference between complainant's U.S. selling price and the entered value of the imported product.

In this case the difference between the prices varies with each transaction because the prices are negotiated. The presiding officer did find an average price differential for a specific size system. 6/ However, there is information on the record that respondents enjoy other advantages in their sales beyond the price difference. 7/ To compensate for those advantages, we have determined that the bond should be set at 50 percent of the entered value of the infringing goods during the Presidential review period.

4/ Brief of the Commission Investigative Staff on Remedy, Bonding, and the Public Interest [at 8]. Respondents argued that they can provide systems that can temper wider and thicker glass than systems from other sources. The information on the record does not support this argument. Equivalent systems have been offered in the U.S. market, and there is no proof that respondents have actually sold and supplied these systems in the United States. Response of the Commission Investigative Staff to Submissions on Remedy, Bonding, and the Public Interest [at 2].

5/ Trade Reform Act of 1974: Report of the Committee on Finance . . . , S. Rept. 94-1298 (94th Cong., 2d sess.), 1974, p. 198.

6/ Initial determination, Finding of Fact 300.

7/ Initial determination, Findings of Fact 276, 280, 281, 301; Glasstech Ex. 45-5 at 35, 43, 52; Transcript of Evidentiary Hearing at 1002-04, 1024-25.

PUBLIC VERSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C.

In the Matter of)

CERTAIN GLASS TEMPERING)
SYSTEMS)

Investigation No. 337-TA-171

INITIAL DETERMINATION

APPEARANCES

For Glasstech, Inc.:

Ernie L. Brooks
Mark A. Cantor
BROOKS & KUSHMAN

For Tamglass, Inc.:

Ronald L. Grudziecki
Frederick G. Michaud, Jr.
David D. Reynolds
George A. Hovanec, Jr.
James A. LaBarre
BURNS, DOANE, SWECKER & MATHIS

For United States International Trade Commission:

Lynn I. Levine
Patricia Ray

ID rec'd 8-16-84
Conf. 8-16-84
Public 8-16-84
ID svd 8-17-84
Petition due 9-4-84
Resp to pet. due _____
Gov't comments due _____
Public comments due _____
Comm. decision due 9-17-84

613549

TABLE OF CONTENTS

	<u>Page</u>
HISTORY OF THE CASE	1
VALIDITY OF THE '711 PATENT.....	3
INFRINGEMENT.....	22
(a) Literal infringement.....	22
(b) Infringement under the doctrine of equivalents.....	23
THE DOMESTIC INDUSTRY.....	32
INJURY.....	36
CONCLUSIONS.....	40

HISTORY OF THE CASE

On October 11, 1983, complainant Glasstech, Inc. filed a complaint with the U. S. International Trade Commission alleging violations of Section 337 of the Tariff Act of 1930, as amended. 19 U.S.C. §1337.

On November 10, 1983, the Commission published a notice of investigation initiating an investigation to determine whether there is a violation of Section 337 in the unlawful importation of certain glass tempering systems including frictionally driven oscillating roller hearth furnaces into the United States, or in their sale, by reason of alleged (1) infringement of claims 39-42 of U. S. Letters Patent 3,806,312; or (2) infringement of claim 1 of U. S. Letters Patent 3,994,711, the effect or tendency of which is to destroy or injure substantially an industry efficiently and economically operated in the United States.

On June 4, 1984, the parties stipulated that issues relating to the '312 patent were dismissed from this investigation with prejudice against complainant as to the respondents in this investigation before this Commission, without prejudice to the introduction by any party of evidence relating to the '312 patent relevant to issues relating to the '711 patent. (Prehearing Conference TR 5).

The two respondents in this investigation are AB Kyro OY, a corporation of Finland, and Tamglass, Inc., a Pennsylvania corporation which is a wholly owned subsidiary of AB Kyro OY. (Stipulation).

All parties participated in the hearing and filed post trial briefs. The Commission therefore has personal jurisdiction over all the parties.

The Commission has subject matter jurisdiction over alleged unfair acts in connection with the importation of products alleged to infringe a U. S. patent under Section 337 of the Tariff Act of 1930 (19 USCA §1337).

Findings and Conclusions are attached hereto as Appendix A.

VALIDITY OF THE '711 PATENT

1. Background

Glass is tempered by heating the glass to its softening point and then rapidly cooling it. (TR 94). Tempered glass is tougher than untempered glass and when it breaks, the particles are small and relatively safe. (TR 109-110). Tempered glass is used principally for doors and windows in buildings and in car windows (except the windshield).

The glass tempering equipment in issue here makes wide pieces of tempered glass (about 80 inches wide). Wide glass usually is custom-ordered and therefore is produced in low volume. Before the McMaster invention, custom-ordered wide glass was made in batches by a vertical tempering process. The pieces of glass were held by tongs, heated, and then cooled. This was called the vertical batch tempering process. A few large pieces of glass could be tempered at a time, but the tongs left dents in the glass and the glass produced by this process was not always flat. (TR 114-15, 125, 140-42).

Various horizontal tempering processes were tried in the 1930's, but these processes resulted in roller distortion and scratches in the glass. (TR 390-91, 124-25, 146, 575).

In the early 1960's, Harold McMaster and others working for Permaglass developed a continuous gas hearth process for horizontal tempering. PPG Industries also developed a continuous gas hearth process for horizontal tempering at about the same time. (TR 170-71, 575-76).

All commercial horizontal glass tempering systems in 1973 were continuous systems. Glass was loaded continuously, heated and quenched, producing large volumes of tempered glass. (TR 145, 146).

A continuous horizontal roller hearth tempering system was developed at Glasstech in the early 1970's.

The continuous horizontal tempering systems produced large volumes of glass, and were costly to operate for small orders. A batch horizontal tempering system was needed to produce small orders of wide glass at a lower cost.

In May, 1974, Harold McMaster, working at Glasstech, had the idea of using oscillation in a horizontal roller hearth tempering system so that a shorter furnace could be used. (TR 145). By oscillating the glass, small amounts of wide tempered glass could be processed in a shorter glass tempering system. This meant that custom orders for wide glass could be made by a less expensive process than in the large continuous glass tempering systems.

On September 15, 1975, McMaster filed an application for a patent on his invention. The application resulted in the '711 patent entitled "Glass Tempering System Including Oscillating Roller Furnace." (Glasstech Ex. 19-1). The '711 patent sets forth McMaster's horizontal batch tempering system.

2. The '711 Patent Invention

In the original patent application, McMaster claimed an oscillating roller hearth furnace for glass tempering. The claims relating to an oscillating furnace were rejected by the Examiner who cited U. S. Patent No. 1,856,669 to Sylvester. The Sylvester '669 patent disclosed a glass heating (annealing) system in which conveyors were moved through a furnace two steps forward and one step backward during the annealing process. (Tamglass Ex. 40).

The Examiner made the following comment:

Invention appears to lie in the broad heating and/or tempering structure including either the structure of the roll lifting means and/or the upper roof lifting means and/or the structure of the means to alternately connect the several sections for oscillation and forward feeding.
(Glasstech Ex. 19-2, at 93).

The Examiner saw a possible invention in the heating structure, or the tempering structure, or both, including either the structure of the roll lifting means or the upper roof lifting means, or both, or the structure of the means to connect and disconnect alternately the several sections for oscillation and forward feeding.

After an interview with the Examiner, McMaster's attorney then chose to limit the claims to "a glass tempering system," giving up the broader claims to an oscillating furnace alone. The revised application

claimed a glass tempering system but it did not claim as the invention the specific structure of the means to connect and disconnect alternately the several sections for oscillation and forward feeding. (Glasstech Ex. 19-2 at 99-115). In the amendment (Glasstech Ex. 19-2, at 111) applicant stated:

As suggested in paragraph 5 of the Office Action, it is believed that the manner in which the furnace conveyor and the quench unit conveyor of the glass tempering system are alternately connected during the index cycles for forward feeding and uncoupled during oscillation within the furnace is a novel feature not shown or suggested by the references of record.

The Examiner had talked about the "structure of the means," but the applicant talked about the "manner" in which the alternating oscillation and index cycles worked.

The applicant revised claim 1 (and some other claims) and the Examiner rewrote the patent abstract, but the description of the glass tempering system in the patent specification remained basically unchanged. The revised abstract does not even mention the specific structure of the means to connect and disconnect the different sections of the tempering system during oscillation and the index cycle. The Examiner's revised abstract describes what McMaster generally claims as his invention in claim 1. The revised claims were granted without further action. (Glasstech Ex. 19-2 at 117-18). The '711 patent issued on November 30, 1976. (Glasstech Ex. 19-1).

Only claim 1 of the '711 patent is alleged to have been infringed by the Tamglass respondents.

Claim 1

Claim 1 of the '711 patent reads as follows:

1. A glass tempering system comprising:

a furnace including a housing defining a horizontally elongated heating chamber; a furnace conveyor including a plurality of elongated rollers spaced along the elongated length of the chamber extending transversely with respect thereto in a horizontal manner so as to support a sheet glass load within the chamber in a horizontal orientation; a furnace conveyor drive mechanism that alternately rotates the rollers in one direction and then in the other for the same extent of rotation so as to convey the sheet glass load between the opposite ends of the chamber in an end-for-end oscillating manner; heating means for heating the sheet glass load to a quench temperature during the oscillating movement thereof between the ends of the chamber; said oscillating movement being at a sufficient speed and engaging each portion of the glass load with a plurality of the rollers such that there is no sagging of heated glass between the rollers; and said drive mechanism having an index cycle that rotates all of the furnace rollers to convey a heated glass sheet glass load out of the furnace or to receive a sheet glass load to be heated;

a quench unit including a horizontal roller conveyor having an index cycle for receiving a heated sheet glass load from the furnace and including means for quenching the heated glass load to provide tempering thereof; and

control means for coupling the furnace conveyor drive mechanism during the index cycle thereof with the roller conveyor of the quench unit during the index cycle thereof to provide coordinated sheet glass load conveyance from the furnace to the quench unit; said control means uncoupling the furnace conveyor drive mechanism from the quench unit conveyor after the coordinated index cycles thereof such that the furnace conveyor drive mechanism can oscillate a sheet glass load to be heated within the furnace independently of a sheet glass load being quenched in the quench unit.

(Glasstech Ex. 19-1).

Claim 1 makes it clear that a glass tempering system, not just a furnace, is claimed. Claim 1 includes a furnace with an elongated horizontal heating chamber. The furnace conveyor includes rollers spaced along the length of the chamber to support a sheet glass load. The furnace conveyor has a drive mechanism that alternately rotates the rollers in one direction and then the other to convey the glass between the opposite ends of the chamber in an oscillating manner. There is a means to heat the glass. The oscillating movement must be at a "sufficient speed" so that the heated glass does not sag between the rollers. The drive mechanism has an "index cycle" (or transfer cycle) that rotates all the furnace rollers to convey the glass load out of the furnace or to receive a new glass load. There is a quench unit with a horizontal roller conveyor having an index cycle for receiving heated glass from the furnace. There is a means to quench the heated glass to temper it. Finally, there is a control means for coupling the furnace conveyor drive mechanism with the roller conveyor of the quench unit during the index cycle to provide coordinated sheet glass load conveyance from the furnace to the quench unit. The control means uncouples the furnace conveyor drive mechanism from the quench unit conveyor after the coordinated index cycle, so that the furnace conveyor drive mechanism can oscillate a sheet glass load to be heated in the furnace independently of a sheet glass load being quenched in the quench unit.

The subject matter in claim 1 is a description of McMaster's invention. Before McMaster's invention, tempering of wide sheets of glass in a continuous horizontal tempering system was expensive because the furnace was required to be so long and because the horizontal tempering system in use at

that time produced glass continuously, whereas most wide sheets of glass were custom-ordered in small batches.

McMaster's solution to this problem was to build a tempering system with a shorter furnace and to use rollers in the furnace and the quench unit to oscillate the glass back and forth.

In McMaster's invention, the furnace conveyor mechanism and the quench unit conveyor would be uncoupled during oscillation of the glass and then coupled during the index stage or transfer cycle when the glass was moved into the furnace, from the furnace to the quench unit, or from the quench unit to the unload table. During the index cycle, all the rollers would move at the same high speed. The clear meaning of claim 1, as construed in connection with the entire specification and in the light of what was known to one with ordinary skill in the art in 1974, is that the glass would be oscillated at a different speed or for a different stroke length (or both) in the furnace as opposed to the quench unit, although this is not expressly stated in claim 1 or the patent specification.

Column 1 of the patent points out that wide glass has to be moved into the quench at a higher speed than narrow glass to make sure that the front end would not be cooled while the trailing end was still hot. Before the McMaster invention, the high speed and prolonged high temperature necessary to temper wide glass required a long furnace. The length of the furnace made

it uneconomical to market wide glass because of the high cost and relatively small market for this glass. This was the principal problem to which the invention was addressed.

In column 2, the patent points out that the furnace can be shorter if the glass is oscillated from one end of the furnace to the other, instead of moving once through the entire length of the furnace, offering economy without sacrificing the quality of the glass. (Columns 3 and 11).

Columns 2 and 3 describe the index cycle for moving the glass from one unit to another. Two motor drive mechanisms are described as being "electrically coupled" during the index cycle. After indexing, the first drive mechanism begins to oscillate the glass within the furnace. The second drive mechanism oscillates the glass in the quench unit. (Claim 1 does not require two motor drive mechanisms, but it does refer to coupling the furnace drive mechanism with the roller conveyor of the quench unit during indexing.)

Column 3 describes the accelerated rate of indexing as opposed to the reduced speed during oscillation, so that the leading end of the glass will not be cooled during indexing while the trailing end is still hot. After indexing, the operator can control the extent of the glass oscillation within the furnace and quench unit, the rates of acceleration and deceleration during the oscillation, and commencement and termination of the index cycle. (Lines 47-52).

--

In column 10 the control of the extent of oscillation is discussed. Columns 11 and 12 describe the oscillation in the quench unit occurring at the same time as the oscillation in the furnace unit. Again, the patent states that during indexing, the two drive mechanisms are electrically coupled to insure the smooth flow of glass between the furnace and the quench unit. This implies that the rollers are not oscillating at the same speed and stroke length in both units when the motors are not coupled. Column 10 points out that there are switches to reverse the direction of oscillation within the furnace and to accelerate and decelerate the furnace conveyor during reversals of direction of movement. Column 11 points out that a second electric motor drive mechanism includes a reversible electric motor and a speed reducing gear unit, and that it oscillates a sheet glass load being quenched in the quench unit. This indicates that the furnace and quench motors individually can be accelerated and decelerated at different rates, and that the direction of rotation of the rollers can be reversed in the quench and furnace units at different times.

In reading claim 1 and the rest of the patent specification, one with ordinary skill in the art of glass tempering in 1974 would have known certain other facts as well. In 1974 before the McMaster invention, it was known that the furnace had to be a certain length to heat glass adequately. (TR 575, 634, 744). The furnace had to be long enough to heat the glass for about two minutes, and the glass had to move at a minimum speed from the furnace to the quench to avoid warping (TR 143), so that a system about 220 feet long was required. (TR 135, 575). Although such a system would be economical for narrow glass for which there was a large demand (TR 143), it would be too expensive for wide glass, for which there was less demand. (TR 144).

McMaster's solution was to shorten the length of the furnace and to oscillate the glass in the furnace and the quench unit at independent stroke lengths and speeds, while the transfer of the glass from furnace to quench took place at a single high speed. The specification made it clear that the oscillation may be at different speeds or different stroke lengths in the furnace and quench, and although claim 1 does not state this expressly, there would be no other reason for uncoupling the drive mechanism from the quench conveyor during oscillation. Moreover, those with ordinary skill in the art of glass tempering in 1974 knew that the quench unit should be shorter than the furnace because a smaller quench unit requires a smaller motor to accomplish quenching. (TR 633-34, 744). It would have been obvious to such a person that if the quench unit is smaller than the furnace, and if the entire furnace length is used during oscillation, the quench unit would require a shorter stroke length than the furnace. (TR 149-51). It would have been obvious to such a person that if the glass stood still in the furnace for too long between reversals the glass could be damaged or sag. (Glasstech Ex. 19-1, Col. 1, TR 144, 149, 250, 575). It also would have been obvious to such a person that a long stroke was preferable to a short stroke in the furnace, and that it would not be desirable to use the same short stroke length in the furnace and quench, and use only part of the furnace, so that the glass would fit in the shorter quench during oscillation. (TR 149-51, 216, 750).

Anyone reading the '711 patent in 1974 who had ordinary skill in the art of glass tempering therefore would have had all the information necessary to give him an adequate understanding of the McMaster invention.

3. Section 102

Section 102 has been construed as meaning that an invention cannot be patented if it was "anticipated" in the prior art. The Federal Circuit has held that "anticipation" requires that all elements of a claim be found in a single piece of prior art. [SSIH Equipment S.A. v. USITC, 718 F.2d 35, 218 USPQ 678 (Fed. Cir. 1983).] The same court in In re Donohue 632 F.2d 123, 207 USPQ 196 at 199 (CCPA 1980) earlier reflected the minority view that anticipation can be found if the prior art, when taken in conjunction with the knowledge of those skilled in the art to which it pertains, is capable of placing the invention in the possession of the public. Under the Donohue case, anticipation under Section 102 is difficult to distinguish from a finding of nonobviousness under Section 103.

It is found that the '711 patent invention was not anticipated under Section 102 under the theory of either the SSIH case or the Donohue case.

Respondents contend that German Patent No. 704,219 (Tamglass Ex. 52) anticipates the McMaster invention. This patent was not cited by the Examiner as prior art. There is therefore no presumption that the Examiner was aware of this patent and decided that it did not anticipate the McMaster invention.

The German '219 patent, however, does not anticipate claim 1 of the '711 patent either under the SSIH standard or under the Donohue standard. This patent discloses one roller conveyor through the furnace and the quench

unit, and this single conveyor oscillates the glass in the furnace and quench at the same speed and stroke length. It has two drives, one causing oscillation and one causing continuous motion in one direction. The '219 patent does not disclose alternately connecting the drive motor for the furnace conveyor and the drive motor for the quench conveyor during the index cycle. It also does not disclose disconnecting these motors from each other during oscillation.

The German '219 patent is the only prior art offered by respondents to show that the invention of claim 1 of the '711 patent was anticipated under Section 102. Anticipation was not established because respondents did not show that one skilled in the art in 1974 would have known already or been taught by '219 patent that the drive motor for the furnace could be disconnected from the quench unit conveyor so that glass could be oscillated in one section at a different speed or stroke length than in the other section, or that such a person would have known from what was taught that the two could be reconnected during the index cycle for transferring the glass at a uniform high speed.

The '711 patent is not invalid under Section 102.

4. Section 103

A patent claim will be found invalid if the differences between the prior art and the subject matter of the claims in issue are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art. 35 U.S.C. §103; Graham v. John Deere Co., 383 U.S. 1, 148 U.S.P.Q. 459 (1966). Graham v. Deere requires a determination of the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of ordinary skill in the pertinent art. The obviousness or nonobviousness of the subject matter may then be determined. 148 U.S.P.Q. at 467.

Ordinary Skill in the Art

A person with ordinary skill in the art of glass tempering in early 1974 would have had an engineering education or experience in glass tempering or both. (TR 1232-34, 1265-67). One with ordinary skill in the art of this case would not necessarily be an electrical engineer with skills relating to the electrical control system, because the McMaster invention had to do with the idea of oscillating glass in the furnace at one speed or stroke length while oscillating glass in the quench unit at another speed or stroke length. The invention did not lie in the electrical control means used to make this happen, and any means readily available at that time could have been used to practice McMaster's invention.

The scope and content of the prior art and the differences between the prior art and claim 1

The most relevant prior art relied upon by respondents includes the German '219 patent, the Sylvester '669 patent cited by the Examiner, and U. S. Patent No. 1,749,798.

The German '219 patent (Tamglass Ex. 52), discussed under Section 102, disclosed oscillation of glass in a furnace and quench, but it did not teach that the oscillation could be at different stroke lengths or different speeds in the furnace as opposed to the quench unit. It would not have been obvious to one with ordinary skill in the art in early 1974 to oscillate the glass at different stroke lengths or different speeds in the furnace and quench unit.

The Sylvester '669 patent (Tamglass Ex. 40) was discussed by the Examiner, who indicated that it disclosed the structure of a heating furnace with an oscillating conveyor therein as "old and well known in the art." (Glasstech Ex. 19-2, at 93). Sylvester, however, did not teach McMaster's oscillation in the quench unit and furnace at different stroke lengths or different speeds. This was the heart of McMaster's invention.

The '798 patent (Tamglass Ex. 37) discloses a furnace for annealing glass in which different conveyor sections can be operated at different speeds. (TR 1106). These speeds are independent of one another. The patent teaches conveyor rollers driven by a variable speed motor, idler rollers, and rollers driven by a constant speed motor. It does not teach the concept of oscillating the glass, nor does it teach one to oscillate the glass at one speed or stroke length in the furnace and another in the quench unit. This patent is not as relevant prior art as the German '219 patent, nor is there

anything in the record to suggest that it would have been obvious to one with ordinary skill in the art in 1974 to combine the concept of oscillation caught by the German '219 patent with the concept of conveyor rollers in which different sections moved at different speeds. The critical concept of the McMaster invention, the oscillation at one speed and/or stroke length in the furnace and another in the quench unit and the transfer of the glass at one synchronized high speed from the furnace to the quench, is not suggested by either the German '219 patent or the '798 patent, nor would it have been obvious to one with ordinary skill in the art to have combined these two unrelated patents to create a glass tempering system like McMaster's that would solve the problem McMaster was trying to solve.

When McMaster's system was produced commercially it had significant commercial success (TR 534, Glasstech Exs. 37 and 62). A long felt need for the invention also was established. (TR 142). Both of these factors are secondary evidence that McMaster's invention was not obvious.

The subject matter of claim 1 of the '711 patent was nonobvious under Section 103 and was patentable.

5. Section 112

Under Section 112 (35 U.S.C. 112), the specification must describe the invention in such a way as to enable any person skilled in the art "to make and use" the invention.

The '711 patent is valid under this part of Section 112 because the patent enables one with ordinary skill in the art, using the electrical equipment readily available at the time of the invention, to make and use the invention.

Although an electrical engineer in 1974 would have needed to find out certain information from the person designing the glass tempering system described in the '711 patent, one with ordinary skill in the art of glass tempering in 1974 would have been able to furnish the necessary information to any electrical engineer. For example, the '711 patent taught that heated glass could be oscillated without sagging. One with ordinary skill in the art would know that the glass would sag if dwell between reversals during oscillation were too long, and could tell the electrical engineer what dwell times to try. If the dwell times were too long, the engineer could make them shorter.

The electrical engineer in 1974 would have had the necessary information regarding the required speed match tolerances and all other information necessary to construct an operating circuit to control the conveyors of an oscillating tempering system as described in the '711 patent. Although McMaster first had the idea of oscillating the glass in a horizontal tempering system in May, 1974, the first Glasstech system under the patent was operating before the patent application was filed in September, 1975.

(TR 176). Nothing in the record suggests that the electrical contractor had to solve difficult or unusual problems before an operating system could be built. Some modifications were required, but that is to be expected when a new idea is incorporated into commercial equipment.

The '711 patent also meets the "best mode" requirement of Section 112. As stated in In re Sherwood, 613 F.2d 809, 204 USPQ 537, 544 (CCPA 1980),

there is no objective standard by which to judge the adequacy of a best mode disclosure. Instead, only evidence of concealment (accidental or intentional) is to be considered. That evidence, in order to result in affirmance of a best mode rejection, must tend to show that the quality of an applicant's best mode disclosure is so poor as to effectively result in concealment.

It is not necessarily fatal to the patent's validity that the inventor "had more information in his possession concerning his contemplated best mode than he disclosed in the specification." Id.

The best mode of practicing McMaster's invention as set forth in claim 1 was adequately disclosed in the '711 patent. The invention lies in the concept of oscillating the glass at different speeds or stroke lengths in the furnace and quench and reconnecting them during the index cycle. The invention does not lie in the particular structure of the control means used to connect and disconnect the motors. (See p. 6 above).

The '711 patent discloses how to solve a particular problem, that of needing a long expensive furnace and quench to make small batches of wide glass. Harold McMaster did not intentionally withhold any information about his invention that he knew in 1974. Electrical engineers in 1974 had the ability to construct a control means for the drive mechanism to accomplish the independent oscillation in the furnace and quench unit, followed by single forward movement during the index cycle. This was not the invention but was only a readily available means to allow someone to construct a tempering system that would operate in the manner described in the '711 patent. If this electrical work had not been readily available in 1974, it would not be expected that an operating unit could have been built so quickly after the date of the invention. Although the original control means tried by Glasstech did not work, the digital tachometers which ultimately were used to achieve the required accuracy of motor speed were "on the market" at that time. (TR 189). No particular inventiveness was required to put together the control means referred to in the patent.

Finally, the '711 patent meets the requirement that one or more claims particularly point out and distinctly claim the subject matter of the invention.

Claim 1 particularly points out and distinctly claims the subject matter of McMaster's invention. Although the word "independently" is capable of more than one construction, the patent specification spells out that this meant that the speed or stroke length in the quench unit during oscillation would not be the same as or dependent on the speed or stroke

length in the quench unit. The specification also indicates that the conveyor in the furnace would be controlled by one motor and the conveyor in the quench unit could be controlled by another, and that the two motors are disconnected during the oscillation cycle and connected during the index cycle.

The '711 patent is not invalid under Section 112.

Complainant is entitled under Section 282 of the Patent Act to a presumption that the '711 patent is valid. The burden of overcoming this presumption with clear and convincing evidence rests upon the respondents. American Hoist & Derrick v. Sowa & Sons, 725 F.2d 1350, 220 USPQ 763, 770 (Fed. Cir. 1984). Respondents have failed to present evidence adequate to overcome the presumption of validity.

INFRINGEMENT

(1) Literal Infringement

In all Tamglass horizontal tempering systems in issue, Tamglass uses only one single drive motor to operate the roller conveyors in the furnace and those in the quench unit. The motor has a reduction gear arrangement that permits the motor to operate the quench conveyor at one or more reduced speeds during the oscillating phase and to operate it at the same speed as the furnace conveyor during the index cycle. The furnace conveyor is operated directly by the motor, and the quench conveyor is operated either at the same speed or at a fixed ratio to the speed of the furnace conveyor.

Although the Tamglass system has a "control means" to provide coordinated conveyance of the glass from the furnace to the quench unit as required by claim 1, the control means does not accomplish this by "coupling" the furnace conveyor drive mechanism with the roller conveyor of the quench unit during the index cycle. Since Tamglass has a single motor drive controlling both the furnace conveyor and the quench roller conveyors, the furnace conveyor drive mechanism and the roller conveyor of the quench unit are not coupled or uncoupled during any part of the oscillating stage or the indexing stage. Moreover, in the Tamglass system, the quench unit is dependent on the furnace motor for its speed and the length of the stroke, because these are determined by the gear arrangement on the furnace motor. Although claim 1 does not require two independent motors, it requires that the oscillation in the furnace be independent of the oscillation in the quench unit. In the Tamglass system, the oscillation in the quench unit can be done only at a

speed in a fixed ratio to the speed of the furnace motor. The speeds in the quench and the furnace may be different from one another but they are not independent of one another. Claim 1 therefore is not literally infringed.

(2) Infringement under the doctrine of equivalents

When literal infringement is not found, the doctrine of equivalents sometimes can be used to establish infringement. Graver Tank and Mfg. Co., Inc. v. Linde Air Products Co., 339 U.S. 605, 85 USPQ 328, 330 (1950). The purpose of the doctrine is to "temper unsparing logic and prevent an infringer from stealing the benefit of an invention." Royal Typewriter Co. v. Remington Rand, 168 F.2d 691, 692, 77 USPQ 517, 518 (2d Cir. 1948). The theory on which the doctrine is based is that "if two devices do the same work in substantially the same way, and accomplish substantially the same result, they are the same, even though they differ in name, form, or shape." Machine Co. v. Murphy, 97 U.S. 120, 125 (1877).

In the Graver Tank case, the Supreme Court discussed the doctrine of equivalents as follows, at 85 USPQ 330-331:

Equivalence, in the patent law, is not the prisoner of a formula and is not an absolute to be considered in a vacuum. It does not require complete identity for every purpose and in every respect. ... Consideration must be given to the purpose for which an ingredient is used in a patent, the qualities it has when combined with other ingredients, and the function which it is intended to perform. An important factor is whether persons reasonably skilled in the art would have known of the interchangeability of an ingredient not contained in the patent with one that was. ...

Tamglass has infringed claim 1 of the '711 patent under the classic definition of the doctrine of equivalents. The Tamglass horizontal oscillating glass tempering system and the Glasstech system do the same work (batch tempering wide pieces of glass) in substantially the same way (oscillating the glass in the furnace and in the quenching unit at different speeds and stroke lengths and then transferring the glass at a single synchronized high speed from the furnace to the quench unit to the unload cable), and accomplishing substantially the same result (tempering small batches of wide pieces of glass by an inexpensive process).

Although Tamglass uses only one motor and does not disconnect two motors during oscillation and reconnect them during the index cycle, it does have a gear system allowing the single motor to drive the furnace rollers at one speed and one stroke length while driving the quench roller conveyors at a different speed and stroke length. During the index cycle, the motor drives both the furnace rollers and the quench unit rollers at the same high speed in a single direction. Although slightly different means are used, the Tamglass system does the same work in substantially the same way with exactly the same result as in the Glasstech system.

On January 8, 1980, Tamglass filed an application for a patent in the United States on an invention of Mr. Reunamaki involving a horizontal oscillator. (Glasstech Exs. 32 and 33). The application claimed the structure found in the Tamglass horizontal oscillator that is sold today (TR 881-82), but the application was not limited to the commercial Tamglass oscillator alleged to infringe the '711 patent.

In the process of trying to obtain a patent, the attorneys for Reunamaki noted that Reunamaki had solved the same problem as that solved by McMaster in the '711 patent. (Glasstech Ex. 33). That problem was described as follows:

How could one provide two separate conveyors, one for the furnace station and one for the tempering station, each with two separate modes of operation, a first mode (during the tempering portion of the cycle) whereby the two conveyors operate with different stroke lengths, and a second mode (during the transfer portion of the cycle) whereby both conveyors operate together as a single synchronized unit?
(Glasstech Ex. 33, at 227).

Subsequently, on appeal to the Board of Appeals, the attorneys made it clear that Reunamaki thought that he had a better solution:

McMaster ... fails to provide a solution as simple and complete as the present invention.
(Glasstech Ex. 33, at 246-47).

In Reunamaki's brief on appeal to the Federal Circuit after his proposed patent claims had been rejected, the Reunamaki oscillator was compared with McMaster's oscillator as claimed in the '711 patent:

Applicant's invention of a system which permitted the omission of one of the two motors [in the preferred embodiment of the '711 patent] without a corresponding elimination of the independence of the conveyors thus represents the omission of a part without a sacrifice of its function and comprises an unobvious invention.
(Glasstech Ex. 33, at 22-23).

The independence of the stroke lengths in the quench unit and in the furnace of Reunamaki's claimed invention was emphasized repeatedly by Reunamaki's attorneys during the proceedings on Reunamaki's application for a U. S. patent. (Glasstech Ex. 33, at 11, 12, 14, 16, 19-21, 23, 91, 92, 176, 179, 227, 246). In the present case, however, respondents argue that their quench unit conveyors are not independent of the furnace motor. It has been found here that the Tamglass quench unit conveyor is not independent of the furnace motor, but this argument made by Reunamaki's attorneys in connection with his U. S. patent application clearly demonstrates that the Tamglass furnace motor with its gear arrangement controlling the quench unit conveyor performs the same function as the '711 patent system.

In its opinion affirming the Board of Appeals the Federal Circuit held:

Appellant, having continued to rely upon factually unsupported argument of counsel rather than evidence of superiority over the prior art, has failed to convince us of any error in the Board's conclusion that the glass tempering apparatus of Claims 1-3 and 14 would have been obvious from McMaster to one of ordinary skill in the art. Appellant's argument that McMaster "teaches away from" appellant's invention misses the difference between "teaching away from" and teaching an alternative to an invention. McMaster teaches an alternative, not that other systems would be impracticable. We agree with the board that it would have been within the skill of the art to substitute, with necessary modifications thereby required, a single drive motor for McMaster's two motors. (Emphasis added.) (Glasstech Ex. 33, at 173-74).

Persons reasonably skilled in the art in 1974 would have known that it was possible to substitute a single drive motor with a gear arrangement for McMaster's two motors. This is one of the factors to be considered in determining equivalence under Graver Tank.

McMaster and Reunamaki both designed a horizontal roller hearth tempering system with two separate modes of operation. In the first cycle (when the glass is heated in the furnace and quenched in the quench unit) the two conveyors oscillate with different stroke lengths. In the second cycle (during the transfer of the glass) both conveyors operate together at a single synchronized high speed in a single direction. The two systems had the same purpose and the same results were achieved. (TR 763, 1191-93; Tamglass Ex. Z, Roberts Dep., June 4, at 19).

Reunamaki's oscillator falls within the scope of the '711 patent under the doctrine of equivalents. It performs substantially the same function in substantially the same way, and it achieves the same results as the McMaster oscillator.

The McMaster '711 patent at issue here is not a pioneer patent but it was a significant and novel advance in the art of tempering wide glass in small batches. It is entitled to a rather broad range of equivalents unless this is restricted by the doctrine of file wrapper estoppel.

Under the doctrine of file wrapper estoppel or prosecution history estoppel as defined by the Court of Appeals for the Federal Circuit in Hughes Aircraft Co. v. United States, 717 F.2d 1351, 219 USPQ 473 at 481

(1983), a patent owner is precluded "from obtaining a claim construction that would resurrect subject matter surrendered during prosecution of this patent application." The estoppel applies to claim amendments to overcome rejections based on prior art, as well as to arguments submitted to obtain the patent. The court took the position that a patent that has been severely limited to avoid the prior art will only have a small range of equivalents between the literal wording of the patent claims and the point at which a broader reading of the claims will violate the doctrine of file wrapper estoppel. 219 USPQ at 482.

In the present case, complainant is not taking any position in this proceeding that is inconsistent with an argument made by McMaster to obtain the patent or with any amendment made to overcome rejections, based on prior art. The '711 patent is still entitled to a rather broad range of equivalents with respect to the issues in this case, and the doctrine of file wrapper estoppel does not limit the scope of the doctrine of equivalents in this case.

The prosecution record before the Patent and Trademark Office will not support a finding of file wrapper estoppel because there was no prosecution of claims in the '711 patent on "a glass tempering furnace." Glasstech does not now seek to extend the claims limited during prosecution to "a glass tempering system" to a "furnace."

The original application was directed to "a furnace for a glass tempering system." On September 15, 1975, the Examiner rejected claim 1 (among other claims). The reason given was that the structure of a heating

furnace with an oscillating conveyor therein was "old and well known in the art." (Glasstech Ex. 19-2, at 93). The '669 patent to Sylvester was cited as prior art.

On May 27, 1976, the applicant filed an amendment, after an interview was held with the Examiner. The applicant had rewritten the claims so that they did distinguish over the references of record. (Glasstech Ex. 19-2, at 99, 111).

Among the amendments were these:

Each of the claims was changed to recite a glass tempering system including a furnace having a roller conveyor mechanism that oscillates as it is heated, a quench unit having a roller conveyor and means for quenching the glass, and control means for coupling the furnace conveyor drive mechanism and the quench unit roller conveyor during index cycles of each to provide coordinated glass conveyance from the furnace to the quench unit. The control means was described as uncoupling the furnace conveyor drive mechanism from the quench unit after the coordinated index cycle so that the furnace conveyor drive mechanism could oscillate the glass to be heated within the furnace independently of glass being quenched in the quench unit.

The applicant stated:

it is believed that the manner in which the furnace conveyor and the quench unit conveyor of the glass tempering system are alternately connected during the index cycles for forward feeding and uncoupled during the oscillation within the furnace is a novel feature not shown or suggested by the references of record.

The Sylvester '669 patent was distinguished as disclosing an oscillating furnace but not teaching a glass tempering system having furnace and quench unit conveyors that are coupled and uncoupled by a control means to provide coordinated glass conveyances from the furnace to the quench unit during indexing cycles and independent oscillation of the glass within the furnace after the indexing cycles.

Claim 1 was then allowed, and the Examiner rewrote the abstract of the disclosure as follows (Glasstech Ex. 19-2, at 117):

The glass tempering system includes an elongated furnace in which a horizontal conveyor oscillates a glass sheet between opposite ends of the chamber in a manner to shorten the necessary furnace length to heat the glass to its quench temperature. A load station at one end includes a horizontal conveyor driven by the same drive mechanism as the furnace conveyor during the index cycle so that a glass sheet is received while another glass sheet is being indexed to the quench unit. A second motor drives the quench unit conveyor in an oscillating manner. The two drive mechanisms are coupled during the index cycle so that a tempered glass sheet is conveyed from the quench unit to an unload station as a heated glass sheet is being conveyed to the quench unit. The conveyor of the unload station is driven by the quench unit drive during the index cycle to receive the tempered glass sheet. Each of the conveyors includes drive chains which frictionally drive their conveyor rollers. The conveyor rollers of the load and unload stations are lifted off their respective drive chains to stop the rollers for unloading of the glass thereon.

Although the abstract, as rewritten, refers to a second motor driving the quench unit conveyor, claim 1 does not. Other claims in the patent do refer to a quench unit drive mechanism. The abstract as rewritten by the Examiner just before the patent issued described McMaster's invention generally as it is described here.

Glasstech does not seek to extend claim 1 to cover subject matter abandoned by Glasstech during the prosecution of the patent, nor does Glasstech now take a position with respect to the scope of claim 1 that is inconsistent with the position McMaster took in the prosecution of the patent.

Since the Tamglass oscillator achieves substantially the same result in substantially the same way as described in claim 1 of the '711 patent, infringement is found under the doctrine of equivalents.

THE DOMESTIC INDUSTRY

Glasstech contends that the unfair acts of the respondents have the effect or tendency to destroy or to injure substantially an industry efficiently and economically operated in the United States. The domestic industry has been defined by the Commission as that portion of the facilities of the patentee and his licensees devoted to the lawful manufacture and sale of products covered by the patents in issue. [See Schaper Manufacturing Co. v. U. S. International Trade Commission, 717 F.2d 1368 (Fed. Cir. 1983).]

The existence of a domestic industry is not contested by Tamglass, but the scope of the domestic industry and whether it is efficiently and economically operated are disputed.

In September, 1983, about one month prior to the filing of the complaint in this matter, substantial changes in the structure of the domestic industry were made. Before September, 1983, ownership of certain patents, including the '711 patent, was vested in the McMaster-Nitschke-Larimer partnership. The partnership had been formed in 1971 to own the patents and to grant an exclusive license to Glasstech to build furnaces. (TR 171). At that time, the sole shareholders of Glasstech were the three partners, McMaster, Nitschke, and Larimer. In 1979, two additional persons were brought into the partnership and, as shareholders, into the Glasstech corporation. Royalties paid by purchasers or users of Glasstech furnaces were collected by Glasstech and transferred to the partnership. The partnership acquired ownership of all inventions in the research and development division of Glasstech and reimbursed Glasstech for certain research and development

expenditures. Glasstech then acquired a license to utilize the patents when commercial products were developed. Glasstech paid royalties to the partnership for using these patents, even though they were developed in Glasstech's R&D Division.

The domestic industry before 1983 would have to include both the partnership and the corporation, since both shared in the exploitation of the patent in issue. Looking at the partnership and the corporation as a unit, the domestic industry was efficiently operated, although the partnership received many benefits from the efforts of the corporation.

In defining the scope of the domestic industry and assessing its efficiency, however, the time before the complaint was filed is irrelevant. Whether an industry was efficiently operated at some time in the past is irrelevant to the issue of whether it is presently entitled to Section 337 relief.

By the time the complaint was filed, the partnership already had sold its patents to Glasstech at a price of [REDACTED]. The partnership retained the rights to residual royalties on sales contracted before July 1, 1983. (TR 172, 259). Of the [REDACTED], [REDACTED] has been paid and [REDACTED] remains to be paid over a [REDACTED]-year period. (TR 260). The [REDACTED] is a payment for all patents held by the partnership, not just the '711 patent. (TR 259). It is impossible to ascertain from the record whether the amount Glasstech agreed to pay was higher than an efficiently operated corporation would have been willing to pay for the '711 patent in an arms-length business relationship.

The record does not disclose the value of the other patents transferred to Glasstech or suggest how much of the total purchase price was for the '711 patent. Moreover, the transaction took place at a time irrelevant to the issue of whether the industry is now efficiently operated.

As of the time of filing the complaint, Glasstech's research and development division was completely owned by Glasstech and all inventions and improvements resulting from the work of this division would belong only to Glasstech.

The domestic industry as of the time of filing the complaint consists of that portion of Glasstech devoted to the manufacture, sale and service of horizontal oscillating glass tempering systems under the '711 patent. The current horizontal batch tempering systems manufactured by Glasstech practice claim 1 of the '711 patent. Harold McMaster testified that the system oscillates the glass at different speeds and stroke lengths in the furnace and in the quench unit, and the indexing cycle transfers the glass from one unit to another at high synchronized speed. (TR 186 and 619). Glasstech manufactures all of its horizontal oscillating glass tempering systems and replacement parts and retrofit improvements at its facilities in Perrysburg, Ohio. (TR 295-96, 321, Glasstech Ex. 8).

Glasstech's facilities and personnel are not divided according to product line. Glasstech employs [REDACTED] people. (Glasstech Ex. 6). Approximately [REDACTED] % of the [REDACTED] employees working in Glasstech's manufacturing department and [REDACTED] % of the [REDACTED] employees working in the drafting department are involved in projects relating to horizontal oscillating glass tempering furnaces. (TR 675).

Intentionally Left Blank

INJURY

Tamglass has sold in the United States horizontal oscillating systems which infringe the '711 patent. (Glasstech Ex. 41, 46-2, 46-5, 46-6; Tamglass Ex. 62-72; TR 976). Under the U. S. patent laws, Glasstech is entitled to exclude all others, including Tamglass, from making, using, or selling glass tempering systems in the United States made in accordance with the patent claims. 35 USC §271. To show a violation of Section 337 of the Tariff Act, Glasstech also must show a causal relationship between the infringement and an effect or tendency to injure the domestic industry substantially.

Glasstech relies upon a number of sales made by Tamglass in the United States to show substantial injury to the domestic industry. The record shows, however, that all but one of the sales by Tamglass probably would not have been made by Glasstech if Tamglass had not made them. All of the Tamglass sales involved furnaces with a hearth width of 84 inches. Until recently, Glasstech was precluded from selling furnaces of that width to anyone other than the Indal/ Tempglass group because of a 1975 exclusivity agreement between Glasstech and Tempglass. In that agreement, Glasstech agreed not to sell a furnace having a hearth width greater than 60 inches to anyone but Tempglass.

Deposition testimony of some Tamglass customers indicates that the 84-inch width offered by Tamglass was critical to their decision to purchase. (Tamglass 56, at 13-14, Glasstech Ex. 51-10, at 14-15, Tamglass Ex. 86, at 11-12 and 21-23.) One customer stated that if he had not purchased from Tamglass, he would have purchased from Sack (a German company) rather than from Glasstech. (Glasstech Ex. 51-10, at 23).

One sale of an 84-inch furnace by Tamglass probably would have gone to Glasstech if the Glasstech price had been lower. Three Rivers Aluminum Co. (TRACO) at one time was considering the purchase of a 60-inch wide furnace from either Glasstech or Tamglass. (Staff Ex. 32, Glasstech Ex. 44-8). TRACO eventually purchased an 84-inch furnace from Tamglass at a contract price less than [REDACTED] more than the price quoted by Glasstech for a 60-inch furnace. (Glasstech Ex. 46-14 and 44-8).

Glasstech's Director of Marketing testified that he was told later by a TRACO executive that the sale would have gone to Glasstech if Glasstech's price had been lower. (TR 445). This sale by Tamglass represents a lost sale to Glasstech. Glasstech lost about \$ [REDACTED] in revenue, and this one lost sale must be viewed as substantial. Considering the large profit that would have been received by the partnership as well as the corporation if the sale had been made by Glasstech, the loss incurred by the domestic industry was large. The company is small and each individual sale is significant in terms of impact on the domestic industry.

It is found that the importation and sale in the United States of an infringing horizontal oscillating glass tempering system by Tamglass had the effect of substantially injuring the domestic industry.

There is more support in the record for a finding that the continued importation by Tamglass of infringing glass tempering systems has the tendency to injure substantially the domestic industry.

Tamglass and Glasstech are the major competitors in the U. S. market for horizontal oscillating glass tempering systems. (Glasstech Ex. 38-2, at p. 3). Tamglass has sold more horizontal oscillating glass tempering systems

in the United States since 1978 than any other company, and expects to manufacture [REDACTED] of the systems to be installed in the United States in 1984. (TR 1007). Tamglass can produce approximately [REDACTED] systems per year at its plant in Finland, and expects to install [REDACTED] systems in the United States in 1984. (TR 897-99, 919, 969, 990). Tamglass is adding an additional sales person to its U. S. staff in order to increase its U. S. sales. (TR 998, 1008, 1010).

Tamglass can arrange financing through a Finnish commercial bank. (TR 981-83). For example, in 1983, the major portion of sales to Labrador Glass and Empire Glass were financed by such a loan at [REDACTED] % annual interest, for five years. (Tamglass Ex. 68, Glasstech Ex. 46-6). Tamglass also has agreed to make [REDACTED] in some U. S. purchasers of its horizontal oscillating systems. (TR 964-65, 1001-04, 1024-25, Glasstech Ex. 45-5, at p. 35).

Glasstech's exclusivity agreement with Tempglass was terminated in September, 1983. (TR 521). Glasstech is now in active competition with Tamglass for sales of systems having hearth widths above 60 inches. For example, both have submitted quotes for a 96-inch horizontal oscillating system to [REDACTED]. Glasstech's quoted price was \$ [REDACTED]. (Glasstech Ex. 44-9). Tamglass' quoted price was \$ [REDACTED], with Tamglass offering to invest \$ [REDACTED] back into [REDACTED]. (Glasstech Ex. 45-5, at 35, 43, 52).

Both companies have submitted quotations for an 84-inch system to [REDACTED]. Glasstech's quoted price was \$ [REDACTED] while the Tamglass price was \$ [REDACTED]. (TR 472-74, 557-58, 559; Glasstech Ex.

45-3). Neither [REDACTED] nor [REDACTED] has purchased one of these glass tempering systems yet.

One glass tempering executive testified that the market for horizontal oscillating furnaces is saturated and has been since 1980. (TR 529, 532). Tamglass, however, sold [REDACTED] 84-inch horizontal oscillating systems in 1982 and 1983, and Glasstech has sold [REDACTED] 84-inch systems since September, 1983. (Glasstech Exs. 41, 46-2, 46-5, 46-6; Tamglass Exs. 62-72; Staff Ex. 63, TR 396-97). Glasstech expects a continuing market for horizontal oscillating systems. (TR 398). Even if this market is shrinking, and Glasstech's profits would be declining anyway, Glasstech is entitled to exclude infringers from sharing in it.

Efforts to obtain information on Tamglass' costs of production were largely unsuccessful. It is not likely that Tamglass had to sell below cost in order to undersell Glasstech, in view of the large royalties received by the partnership prior to Glasstech's acquisition of the '711 patent in 1983. (TR 666). After Glasstech acquired the patent, the royalty was reduced to [REDACTED], and Glasstech's total profit, including royalties, on sales of the patented product are about [REDACTED] at this time.

It is clear that Tamglass has the capability and the intent to have a serious and deleterious impact on Glasstech's U. S. business in horizontal oscillating glass tempering systems.

It is found that the unauthorized importation of infringing glass tempering systems has the effect and tendency of substantially injuring the domestic industry.

CONCLUSIONS

After consideration of the evidentiary record and the arguments of the parties, it is found that respondents AB Kyro OY and Tamglass, Inc. have engaged in unfair acts violating Section 337 of the Tariff Act in connection with the unlawful importation into the United States of certain glass tempering systems including frictionally driven oscillating roller hearth furnace by reason of infringement of claim 1 of U. S. Letters Patent 3,994,711 and that these unfair acts have the effect and tendency to injure substantially the domestic industry.

The record in this case consists of all exhibits identified in the following exhibits of the parties: Tamglass Ex. 116, Glasstech Ex. 53, and Staff Ex. 0, and the transcript of the testimony at the hearing, and all papers and requests filed in this proceeding.^{1/}

Janet D. Saxon

Janet D. Saxon
Administrative Law Judge

Issued: August 15, 1984

^{1/} Pursuant to Section 210.53(h) of the Commission's Rules the initial determination shall become the determination of the Commission unless a party files a petition for review of the initial determination pursuant to Section 210.54, or the Commission pursuant to Section 210.55 orders on its own motion a review of the initial determination or certain issues therein. For computation of time, see Section 201.14. For computation of additional time after service by mail, see Section 201.16(d).

FINDINGS OF FACT AND CONCLUSIONS

A. JURISDICTION

1. The Commission has subject matter jurisdiction in this investigation under Section 337 of the Tariff Act of 1930, as amended, in connection with an alleged unfair practice relating to the importation of certain glass tempering systems.

2. All the parties appeared and participated in the hearing, and no party contests the Commission's personal jurisdiction over the parties.

B. HISTORY OF THE CASE

3. Complainant Glasstech, Inc. is a closely held corporation organized under the laws of the State of Ohio in 1971, having principal offices at 995 Fourth Street, Ampoint Industrial Park, Perrysburg, Ohio. (Stipulation).

4. Tamglass OY, originally named as a respondent, is now the Tamglass Division of AB Kyro OY. After this investigation was initiated, Tamglass OY was acquired by AB Kyro OY, a corporation of Finland, and a stipulation was filed substituting AB Kyro OY for Tamglass OY. (Stipulation).

5. Respondent Tamglass, Inc. was organized in 1982 under the laws of the Commonwealth of Pennsylvania. (Stipulation).

6. Tamglass, Inc. was originally wholly owned by Tamglass OY. Tamglass, Inc. is now a wholly owned subsidiary of AB Kyro OY. (Stipulation).

7. On October 11, 1983, complainant Glasstech, Inc., filed a complaint with the U. S. International Trade Commission alleging an unfair act under Section 337 of the Tariff Act of 1930, as amended (19 USC §1337), in connection with the importation of certain glass tempering systems.

8. On November 10, 1983, the Commission initiated an investigation under Section 337 to determine whether there is a violation of subsection (a) of Section 337 in the unlawful importation of certain glass tempering systems including frictionally driven oscillating roller hearth furnace into the United States, or in their sale, by reason of alleged (1) infringement of claims 39-42 of U. S. Letters Patent 3,806,312; or (2) infringement of claim 1 of U. S. Letters Patent 3,994,711, the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States.

9. U. S. Patent No. 3,994,711 issued November 30, 1976, for "Glass Tempering System Including Oscillating Roller Furnace" in the name of Harold A. McMaster as sole inventor. (Glasstech Ex. 19-1).

10. The '711 patent was assigned to complainant Glasstech on September 9, 1983. Since September 9, 1983, Glasstech has been sole owner of the '711 patent. (Glasstech Ex. 4).

11. Before the '711 patent was assigned to Glasstech on September 9, 1983, Glasstech held an exclusive license under the '711 patent to make, use and sell oscillating horizontal roller hearth tempering equipment in the United States using the invention of the '711 patent. (Glasstech Ex. 2).

12. The Tamglass respondents (Tamglass) first sold an oscillating horizontal roller hearth tempering unit in the United States in 1979. Tamglass has continued to sell oscillating horizontal roller hearth tempering equipment in the United States since 1979. (Glasstech Ex. 41).

C. VALIDITY OF THE '711 PATENT

1. Background

13. Glass is tempered by heating the glass to its softening point and rapidly cooling or quenching the glass. (TR 94; Glasstech Exs. 9 and 10).

14. The tempering process affects the physics of the glass, creating compressive forces in the outer skin or envelope and tension forces in the inner volume. (TR 110, 116; TR 541; Glasstech Exs. 9 and 10).

15. The physics of tempered glass affects the break characteristics of the glass. Tempered glass is tougher than untempered glass and it breaks into relatively safe particles. (TR 109-10; Glasstech Exs. 9 and 10, and Glasstech Phys. Exs. A and B).

16. Tempered glass is used widely today in both architectural and automotive applications. Nearly 1.5 billion square feet of tempered glass is used annually. (TR 126; 570).

17. Tempered glass of standard sizes is used in great volumes in shower enclosures, patio doors, and other applications. (TR 564-70).

18. Large size glass, tempered in low volumes, is a separate architectural market segment. The glass for this market segment is produced by the equipment in issue here. (TR 406; TR 530-32).

19. Tempered glass also is widely used for automobile windows, except for windshields which in the United States are all made with two sheets of untempered glass laminated with a plastic core. (TR 100, 111-12).

20. In the vertical process, glass usually is hung by tongs from an overhead conveyor. (TR 114-15).

21. Glass tempered by vertical processes has objectionable distortion in the area of the tongs, which press into the soft glass at tempering temperature, as well as other support problems adversely affecting the flatness of the tempered glass. (TR 114-15, 125, 140-42; Glasstech Phys. Ex. E).

22. Horizontal processes were first proposed for glass tempering in the 1930's. (TR 94; Glasstech Exs. 49-50; 49-51).

23. Early horizontal roller hearth glass tempering furnaces were characterized by considerable roller distortion and scratches in the glass product, as well as other problems resulting from the high temperatures required for glass tempering. (TR 390-91, 124-25, 575).

24. Harold McMaster, the inventor named in the '711 patent, and Norman Nitschke, while they were still employed by Permaglass, developed a gas hearth for horizontal tempering in the early 1960's. Although horizontal roller hearth tempering had been used before that time, such use was not widespread. (TR 97-99, 124-26).

25. PPG Industries developed a gas hearth process simultaneously with Permaglass, and that process was used to make horizontally tempered architectural and automotive glass. (TR 97-100).

26. Both McMaster and Nitschke became associated with Glasstech when it was formed in 1971. (TR 170-71, 575-76).

27. All commercial horizontal tempering systems known in 1973, the roller hearth and the gas hearth, were continuous systems, i.e., glass was loaded continuously at the load table and moved continuously in one direction through the furnace and quench to the unload table. (TR 145-46, 262).

28. The first horizontal roller hearth tempering system designed at Glasstech (shown in U. S. Patent No. 3,806,312, Glasstech Ex. 13-1) was a continuous system. That unit, and related second generation horizontal continuous roller hearth equipment developed by Glasstech, gained wide acceptance and improved the glass optics reputation of horizontal roller hearth equipment during the early 1970's. (TR 390-91, 534).

29. The gas hearth became obsolete after the successful introduction of the Glasstech horizontal roller hearth tempering equipment for the production of tempered glass because of the improved optics and minimal distortion achieved by the Glasstech equipment. (TR 100).

30. Continuous horizontal roller hearth tempering systems, like the continuous gas hearth systems they displaced, did not compete with vertical equipment for tempering large size glass for custom orders. (TR 406, 411-12; 144, 282-83; 531).

31. The vertical process was known as a batch process. The vertical process tempered one large sheet of glass at a time. (TR 411-12; Tamglass Phys. Ex. BB, Smith Dep., May 30, at 7).

2. The '711 Patent Invention

32. In May, 1974, Harold A. McMaster first thought of using oscillation in the horizontal roller hearth tempering process for what he believed would be the first horizontal batch tempering system. (TR 145, 262; Glasstech Ex. 16).

33. McMaster believed he was the first person to conceive of the idea of oscillation in a horizontal roller hearth tempering furnace. (TR 20, 27, 52, 145, 262).

34. By 1974, McMaster had spent nearly 35 years in the glass tempering arts and he was recognized as an expert in this art. (TR 821). He had no knowledge in early 1974 of any use of an oscillating conveyor in a horizontal roller hearth process. (TR 145, 262).

35. On September 15, 1975, McMaster filed an application for a patent on his invention. The application resulted in the issuance of the '711 patent. The patent is entitled "Glass Tempering System Including Oscillating Roller Furnace." (Glasstech Ex. 19-1).

36. As originally filed, the application for the '711 patent broadly claimed an oscillating roller hearth furnace for glass tempering (Glasstech Ex. 19-2, at 58), although it also disclosed as the preferred embodiment McMaster's entire tempering system.

37. The claims granted in the '711 patent as issued are limited to McMaster's entire "glass tempering system." The broader claims relating to the oscillating furnace alone were rejected. (Glasstech Ex. 19-2, at 93).

38. The patent specification directed the Examiner to three U. S. patents in the name of Julius Sylvester: U. S. Patent No. 1,856,668 (Glasstech Ex. 49-29); U. S. Patent No. 1,856,669 (Glasstech Ex. 49-30); and U. S. Patent No. 1,879,998 (Glasstech Exs. 49-34).

39. All of the cited Sylvester patents disclose annealing systems using conveyors alternately rotated clockwise and counterclockwise to effect conveyance through a furnace in a two steps forward and one step backward manner during the annealing process.

40. In an office action mailed on February 9, 1976, the Examiner rejected the broad oscillating furnace claims in Mr. McMaster's application because of the earlier Sylvester '669 patent. (Glasstech Ex. 19-2, at 92-95).

41. In his handwritten notes on the second page of his official action, the Examiner wrote "the invention appears to lie in the broad ... tempering structure including ... the structure of the means to alternately connect the several sections for oscillating or for forward feeding." (Glasstech Ex. 19-2, at 93).

42. McMaster's attorney then limited the broadest claims in the application to "a glass tempering system," giving up the claim to the oscillating furnace alone (Glasstech Ex. 19-2, at 99-115). The Examiner granted the revised claims without further action. (Glasstech Ex. 19-2, at 117-18).

43. The Examiner accepted the recitation of the elements required for "alternately connecting the several sections for oscillation or for forward feeding" without requiring any details of the preferred embodiment in the specification. (Glasstech Ex. 19-2, at 117-18).

44. There was no further office action after the broad claims covering an oscillating furnace were rewritten to cover a glass tempering system rather than the furnace per se. (Glasstech Ex. 19-2, at 117-18).

44a. Claim 1 of the '711 patent reads as follows:

1. A glass tempering system comprising:

a furnace including a housing defining a horizontally elongated heating chamber; a furnace conveyor including a plurality of elongated rollers spaced along the elongated length of the chamber extending transversely with respect thereto in a horizontal manner so as to support a sheet glass load within the chamber in a horizontal orientation; a furnace conveyor drive mechanism that alternately rotates the rollers in one direction and then in the other for the same extent of rotation so as to convey the sheet glass load between the opposite ends of the chamber in an end-for-end oscillating manner; heating means for heating the sheet glass load to a quench temperature during the oscillating movement thereof between the ends of the chamber; said oscillating movement being at a sufficient speed and engaging each portion of the glass load with

a plurality of the rollers such that there is no sagging of heated glass between the rollers; and said drive mechanism having an index cycle that rotates all of the furnace rollers to convey a heated glass sheet glass load out of the furnace or to receive a sheet glass load to be heated;

a quench unit including a horizontal roller conveyor having an index cycle for receiving a heated sheet glass load from the furnace and including means for quenching the heated glass load to provide tempering thereof; and

control means for coupling the furnace conveyor drive mechanism during the index cycle thereof with the roller conveyor of the quench unit during the index cycle thereof to provide coordinated sheet glass load conveyance from the furnace to the quench unit; said control means uncoupling the furnace conveyor drive mechanism from the quench unit conveyor after the coordinated index cycles thereof such that the furnace conveyor drive mechanism can oscillate a sheet glass load to be heated within the furnace independently of a sheet glass load being quenched in the quench unit. (Emphasis added.)

(Glasstech Ex. 19-1).

45. Before McMaster's invention, long furnaces were required for the horizontal tempering of glass. While these furnaces were economical for continuous production of large volumes of glass, they were not economical for tempering small batches of custom orders for large sized pieces of tempered glass.

46. McMaster's solution to this problem (his invention) was to oscillate the glass in the furnace and to oscillate independently the glass in the quench, and to synchronize or index the conveyor rolls only when the glass was loaded into the furnace, moved from the furnace to the quench, and moved from the quench to the unloading station. The independent oscillation in the furnace and quench units permitted tempering in a shorter furnace-quench system.

47. In the McMaster invention, the furnace and the quench unit conveyors oscillated at different stroke lengths and at different speeds. (TR 186).

48. In May, 1974, Harold McMaster asked Ford Motor Company to make a test to determine how long glass could be stopped on the rolls without damage. At that time McMaster was thinking about designing an oscillator. (TR 137-138).

49. Before Harold McMaster's invention, the jets had been oscillated in the quench unit while the glass stood still. In the McMaster invention, the glass had to oscillate and the jets stood still. This created new problems. (TR 185, 186).

50. At the time of development of the oscillating roller hearth furnace, Glasstech was concerned with the possibly damaging effect of oscillations in the furnace, and wanted to have a long stroke in the oscillating cycle. This would mean fewer reversals and less risk of damage to the glass. (TR 149, 150).

51. It was known in the art in early 1974 that the quench unit should be shorter than the furnace. (TR 634, 744, 1171, Tamglass Ex. 48).

52. McMaster's invention did not lie in the specific control means used. Adequate control means could have been easily designed in 1974 by electrical engineers with ordinary skill in electrical engineering if they were given the necessary glass tempering information by one skilled in the art of glass tempering in 1974.

3. Section 102

(a) Anticipation

53. The prior art does not contain sufficient teaching to build the horizontal oscillator of the '711 patent. (TR 1188-89).

54. Tamglass has not shown by clear and convincing evidence that the prior art anticipates the invention of claim 1 of the '711 patent or that claim 1 is invalid under Section 102 of the Patent Act, 35 USC §102.

(b) The inventor

55. The invention defined above was the sole invention of Harold McMaster.

56. McMaster did not invent the control means for coupling the furnace conveyor drive mechanism during the index cycle with the roller conveyor of the quench unit.

57. Dean Nitschke was in charge of the group that revised Allen-Bradley's drive device for use with McMaster's horizontal oscillator. (TR 248).

58. McMaster did not build or operate the drive systems for Glass tech's oscillating tempering system. (TR 265).

59. McMaster had no involvement in the design of the electrical circuits for controlling the oscillating conveyor systems. (TR 245, 248, 267).

60. Harold A. McMaster was the sole inventor of the subject matter of the '711 patent.

61. McMaster was the person at Glasstech solely responsible for the concept of oscillation in a horizontal roller hearth glass tempering system.

62. Norm Nitschke, Stan Joehlin, Dean Nitschke, Steve Nitschke, and others at Glasstech, together with sales and engineering personnel from Allen Bradley, helped McMaster develop a commercial embodiment for his oscillator. (TR 1229-31).

63. There is no evidence in the record that the contributions from those who assisted McMaster rose to the level of invention.

64. Tamglass has not proved by clear and convincing evidence that Harold McMaster is not correctly named in the '711 patent as the sole inventor, or that McMaster had any motive to conceal any joint inventorship by others.

65. Tamglass has not proved by clear and convincing evidence that Harold McMaster did not himself invent the subject matter sought to be patented under claim 1 or that claim 1 is invalid under Section 102(f) of the Patent Act, 35 USC §102(f).

4. Section 103

66. Section 103 reads as follows:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made. ...

(a) One with ordinary skill in the art

67. The one with ordinary skill in the art of the subject matter of claim 1 of the '711 patent would be skilled in the art of glass tempering, but not necessarily in the art of electrical engineering.

68. One with ordinary skill in the glass tempering art as of the time of Mr. McMaster's invention in early 1974 would have had an engineering education or experience in glass tempering. (TR 1232-34, 1265-67).

69. One with ordinary skill in the art at that time would be competent to make design improvements in the details of a glass tempering system. (TR 1232-34, 1265-67).

70. One with ordinary skill in the art in early 1974 would have been aware of the time required to heat glass (TR 1232-33, 1211-131), the need to minimize quench surface area to minimize the blower power required for the quench (TR 744, 1081-82), the relative sizes of quench and furnace (TR 744), the criticality of optics including problems of roller distortion (TR 388, 390; 127, 149; 534, 536; Tamglass Phys. Ex. Q, Mroczek Dep., May 29, at 9), and the engineering principles applicable to tempering (TR 1232-34, 1266-67, 745-46).

71. One with ordinary skill in the art in early 1974 would have been aware that the oscillation stroke may be shorter in the quench unit than in the furnace unit. (TR 744).

(b) The Prior Art

72. Prior art glass tempering and annealing patents are pertinent prior art in connection with claim 1 of the '711 patent.

73. Prior art horizontal roller hearth conveyor patents are also relevant to claim 1 as analogous art.

74. The most relevant prior art patents are the following:

- (a) The German '219 patent (Tamglass Ex. 52),
- (b) U. S. Patent No. 1,356,669, the Sylvester patent cited by the Examiner (Tamglass Ex. 40), and
- (c) U. S. Patent No. 1,749,798 (Tamglass Ex. 37).

The German '219 Patent

75. Tamglass first learned of the German '219 patent in February, 1978, in an office action by the West German Patent Office against an oscillator application filed by Tamglass in West Germany. (Glasstech Ex. 31-2, Tamglass Ex. 52).

76. Tamglass, although aware of the German '219 patent, did not cite it to the U. S. Patent and Trademark Office as pertinent to the three Tamglass patent applications filed in the United States (Glasstech Exs. 32, 62 and 63). The '711 patent was cited by Tamglass to the Patent Office in connection with these applications.

77. The German '219 patent discloses only a single conveyor throughout furnace and quench. Oscillation is synchronized for all furnace and quench rollers at all times. (TR 1231-32; 1093-94, 1111-12, 1127-28).

78. The German '219 patent discloses two drives: A first drive for oscillation, and a second drive for the transfer or index cycle. (TR 1093-94, Tamglass Ex. 52, at 104053).

79. The description of the two drives for the German '219 patent is silent as to whether the two drives comprise two motors or two mechanical linkages to a single motor. (Tamglass Ex. 52).

80. The German '219 patent discloses a horizontal roller glass tempering system in which glass is oscillated in the furnace and in the quench. (TR 1079).

81. The '219 patent discloses that glass is indexed from the furnace to the quench at a uniform velocity so that the glass is not damaged. (TR 1079, 1094-96).

82. During oscillation as described in the '219 patent, if the quench unit is shorter than the furnace, the stroke length in the quench would not necessarily have to be shorter than the stroke length in the furnace during oscillation. This would depend upon whether the glass could be oscillated inside the quench unit using the same stroke length as that used in the furnace. The entire length of the furnace would not have to be used. (See TR 1083-97).

83. In the '219 patent, the roller conveyor is coupled at will with two different drives. One oscillates the rollers and one drives them in one direction for indexing. (TR 1093).

The '669 Patent

84. The '669 patent to Sylvester was the principal reference applied by the Examiner in rejecting the first filed claims in the application leading to the '711 patent. (Glasstech Ex. 19-2, at 92-95).

85. The '669 patent includes three different conveyors: A primary conveyor on which the heating takes place; a transfer conveyor that receives the heated glass from the primary conveyor; and a reversing conveyor that receives the heated glass from the transfer conveyor and provides movement during cooling in a "two steps forward/one step backward" fashion.

86. The Sylvester patent discloses oscillation in a furnace for a glass annealing system by selectively controlling clutches. (TR 1104-05; Tamglass Ex. 40, page 3, lines 48-49).

87. The Sylvester patent discloses a conveyor system driven by a single motor in which movements of certain sections of the conveyor are dependent upon the movement in the other sections. (TR 1104-05).

88. The Sylvester patent states that its disclosed apparatus can be used for tempering. (TR 1130-31).

89. The use of two-speed drives and acceleration from furnace to quench was known in the roller hearth tempering systems at the time of McMaster's concept of an oscillating system. (TR 145-46, 737; Tamglass Ex. 48).

90. The use of fused silica rolls in a tempering system was known prior to the development of the Glasstech oscillator. (TR 250, 1103).

91. At the time of filing of the '711 patent application it was known that, in practical applications, tempering systems are made with the furnace being longer than the quench. (TR 634, 744).

92. The horizontal tempering equipment that was developed in 1969 by Lamino Company in Finland had a furnace that was longer than the quench section. (TR 738, 744).

93. The glass tempering system sold by Glasstech in 1972 had a quench unit that was shorter than the furnace. (TR 134-5, 252).

94. If a quench unit is made substantially shorter than the furnace and the entire furnace length is used during oscillation, the drive

system must be made to accommodate different stroke lengths in the furnace and quench. (TR 1248, 1252-53).

The '798 Patent

95. The '798 patent is directed to annealing. It also uses three conveyors. The three conveyors of the '798 patent include: conveyor rollers driven by a variable speed motor; idler rollers to receive the glass from the conveyor rollers; and rollers driven by a constant speed motor to transfer the glass sheets from the second conveyor to the third conveyor.

96. The '798 patent discloses a glass annealing furnace having a conveyor system in which different sections of the conveyors are operated at different speeds by the actuation of clutches. (TR 1106).

97. The '798 patent discloses a conveyor system for glass annealing in which different sections of the conveyor are operated independently of one another. (TR 1106).

98. The other patents relied upon by Tamglass are less relevant to claim 1 than the three patents discussed above.

99. Ritter U. S. Patent 3,792,993 (Tamglass Exhibit 48) discloses a tempering system in which the quench unit is significantly shorter than the furnace. (TR 1171).

100. The Ritter patent teaches that glass should be moved through a quench unit at a slow speed so that the quench can be shorter than the furnace. (TR 1171-72).

101. Drake U. S. Patent No. 2,247,118 (Tamglass Ex. 44) discloses a furnace in which individual sections of the conveyor are controlled independently of one another. (TR 1172).

102. No other publications are relied upon by the parties to demonstrate the scope and content of the prior art.

103. There is no evidence in the record of any commercial use of conveyor oscillation in a horizontal glass tempering process before McMaster's invention in May, 1974.

104. As of the date of McMaster's invention, the scope and content of the prior art can be summarized as follows:

(a) There was no evidence of the commercial use of oscillation in horizontal roller hearth tempering processes.

(b) The concept of oscillation in horizontal tempering had been published in the German '219 patent. There, oscillation was carried out with a single conveyor extending through the furnace and quench.

(c) Required heating times, desirable transport speeds in the furnace, and desirable quench design would have been known to one with ordinary skill in the art of glass tempering in early 1974.

105. Nothing in the prior art in 1974 taught McMaster's horizontal roller hearth tempering system, including independent oscillation of furnace and quench roller conveyors as set forth in Claim 1.0 (TR 1188-89).

system must be made to accommodate different stroke lengths in the furnace and quench. (TR 1248, 1252-53).

The '798 Patent

95. The '798 patent is directed to annealing. It also uses three conveyors. The three conveyors of the '798 patent include: conveyor rollers driven by a variable speed motor; idler rollers to receive the glass from the conveyor rollers; and rollers driven by a constant speed motor to transfer the glass sheets from the second conveyor to the third conveyor.

96. The '798 patent discloses a glass annealing furnace having a conveyor system in which different sections of the conveyors are operated at different speeds by the actuation of clutches. (TR 1106).

97. The '798 patent discloses a conveyor system for glass annealing in which different sections of the conveyor are operated independently of one another. (TR 1106).

98. The other patents relied upon by Tamglass are less relevant to claim 1 than the three patents discussed above.

99. Ritter U. S. Patent 3,792,993 (Tamglass Exhibit 48) discloses a tempering system in which the quench unit is significantly shorter than the furnace. (TR 1171).

100. The Ritter patent teaches that glass should be moved through a quench unit at a slow speed so that the quench can be shorter than the furnace. (TR 1171-72).

101. Drake U. S. Patent No. 2,247,118 (Tamglass Ex. 44) discloses a furnace in which individual sections of the conveyor are controlled independently of one another. (TR 1172).

102. No other publications are relied upon by the parties to demonstrate the scope and content of the prior art.

103. There is no evidence in the record of any commercial use of conveyor oscillation in a horizontal glass tempering process before McMaster's invention in May, 1974.

104. As of the date of McMaster's invention, the scope and content of the prior art can be summarized as follows:

(a) There was no evidence of the commercial use of oscillation in horizontal roller hearth tempering processes.

(b) The concept of oscillation in horizontal tempering had been published in the German '219 patent. There, oscillation was carried out with a single conveyor extending through the furnace and quench.

(c) Required heating times, desirable transit speeds in the furnace, and desirable quench design would have been known to one with ordinary skill in the art of glass tempering in early 1974.

105. Nothing in the prior art in 1974 taught McMaster's horizontal roller hearth tempering system, including independent oscillation of furnace and quench roller conveyors as set forth in Claim 1. (TR 1188-89).

106. The '711 patent described a new horizontal process for batch tempering and this process made the vertical batch process obsolete. (TR 390-91; 529; 125-26; 819-20; Tamglass Phys. Ex. Q, Mroczek Dep., May 29, at 5-6; Tamglass Phys. Ex. AA, Shaw Dep., May 22, at 15; Tamglass Phys. Ex. BB, Smith Dep., May 30, at 39; Glasstech Ex. 37).

107. The McMaster process described in the '711 patent was a significant patentable invention.

108. McMaster's invention answered a long felt need for improved glass optics and flatness, a need known at least as early as 1939, when it was mentioned in the German '219 patent. (TR 390-91; 114-15, 124-25; 575).

109. There had been a long felt need for improvement in the vertical batch process for tempering of large size, custom-ordered glass used from the 1930's until McMaster's invention in 1974. (TR 125, 140-42).

110. Horizontal roller hearth glass tempering using the invention of the '711 patent gained recognition in the market, and "toppled" the vertical batch process. (Glasstech Ex. 37).

111. Glasstech has had substantial commercial success with oscillators using the '711 patent. (TR 534). Glasstech has made 35 unit sales worldwide, including 13 units sold in the United States. (Glasstech Ex. 52).

112. The success of a tempering system depends in part upon the uniformity of heating and quenching of the glass. (TR 268, 749-50).

113. Glasstech has maintained as a trade secret the details relating to the uniformity of heating in its systems. (TR 273).

114. Fused silica rolls contribute to the commercial success of the Glasstech system. (TR 280, 288).

115. Tamglass has not established by clear and convincing evidence that claim 1 of the '711 patent is not patentable under Section 103 of the Patent Act.

5. Section 112

116. Section 112 of the Patent Act reads as follows:

... The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. A claim may be written in independent or dependent form, and if in dependent form, it shall be construed to include all the limitations of the claim incorporated by reference into the dependent claim.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

117. The '711 patent meets the disclosure requirements of Section 112 of the Patent Act (35 USC §112) by disclosing the best mode known by the inventor for practicing the invention.

118. The '711 patent discloses that the the market for glass 80" wide is small (col. 1, lines 52-60). It discloses that there is a need for high speed transfer of wide glass from furnace to quench (col. 1, lines 52-60).

119. In the embodiment disclosed, the drive chains of the load and unload stations carry dogs that actuate adjustable limit switches to set independently the stroke lengths in the furnace and the quench unit. (Col. 3, lines 47-52; col. 10, lines 21-50; col. 12, lines 50-59; Figs. 4, 14, and 18; TR 1267-72).

120. The motor drive described in the patent was available in elevator systems in 1974. It is shown in schematic form in Figure 18. (Column 13, line 45 through col. 14, line 2; Fig. 18; TR 1229-31).

121. The patent discloses coupling of the furnace and quench conveyors for indexing (col. 11, line 53 through col. 12, line 9), temperatures, roller spacing, furnace transport speed (col. 6, lines 13-28), a preferred furnace length for the new oscillator design (col. 5, lines 60-65), a preferred furnace stroke length (col. 6, lines 29-46), and other details.

122. One problem that the invention of the '711 patent tried to solve was how to shorten the length of a tempering system for wide glass when continuous production was not required. (TR 144, 1542; Glasstech Ex. 19, col. 1).

123. The '711 patent does not expressly describe the quench unit as shorter than the furnace. (TR 633).

124. There is no description in the '711 patent regarding the relative phase or frequency of the oscillation strokes in the furnace and quench units. (TR 650-51).

125. The '711 patent does not disclose the speed or stroke length in the quench. (TR 151, 657, 1077-78, 1122, 1175, 1183, 1215-16).

126. In order to construct an operative control circuit for an oscillating tempering system of the type described in the '711 patent, a circuit designer would need to know the timing sequence for the operation of various conveyors. (TR 1142, 1173, 1205-09).

127. The '711 patent does not disclose a timing sequence chart. (Glasstech Ex. 19-1).

128. The timing information in the '711 patent was adequate to enable someone with ordinary skill in the art of glass tempering to practice claim 1 of the patent if he had available the electrical skills provided by an electrical engineer with ordinary skill in his art in early 1974. (1974) (TR 1211-14). -

129. All of the information required to practice the '711 patent was within reach of those with ordinary skill in the glass tempering arts in early 1974. (TR 1211-14).

130. To provide a circuit to control the operation of the conveyors in the Glasstech oscillating system, an electrical engineer had to be provided with the glass tempering program requirements. (TR 248; Tamglass Ex. 29, at 12-13).

131. The '711 patent does not disclose the program requirements needed to convert a commercially available motor control system into a system for an oscillating tempering system. To construct an operative control circuit for an oscillating tempering system of the type described in the '711 patent, a circuit designer would need to know the acceptable dwell times between reversals. (TR 1142, 1173, 1205-09).

132. The '711 patent does not disclose what an acceptable dwell time would be between reversals of the furnace rollers during oscillation. (Glasstech Ex. 19-1, TR 1102).

133. To construct an operative control circuit for an oscillating tempering system of the type described in the '711 patent, a circuit designer would need to know the required tolerance to match speeds of conveyors. (TR 1142, 1173, 1205-09).

134. The '711 patent does not disclose speed match tolerances. (TR 1100; Glasstech Ex. 19-1).

135. A control circuit designer would not be able to design an operating circuit to control the conveyors of an oscillating horizontal roller hearth tempering system based upon the information contained in the '711 patent alone (TR 1140-41, 1174), but he would be expected to convert the information received from one skilled in the glass tempering art to the information he needed to create the system claimed in claim 1 of the '711 patent.

136. One with ordinary skill in the art of glass tempering in 1974 would have been able to tell an electrical engineer all of the information needed for that engineer to design and construct an operating circuit to control the conveyors of an oscillating horizontal roller hearth tempering system as set forth in the '711 patent.

137. The first Glasstech oscillating tempering furnace was built and operating before the patent application which matured into the '711 patent was filed. (TR 176).

138. At the time of filing its patent application on the oscillating tempering system, Glasstech knew that simple speed control circuits for DC motors were not sufficiently accurate to match the speed of the furnace and quench rollers. (TR 189).

139. At the time of filing the patent application, Glasstech knew that precision tachometers had to be used in the speed control circuits if a mechanical link-up between the furnace and quench rollers was to be avoided. (TR 189, 190, 204).

140. At the time of filing its patent application, Glasstech knew that the tolerance of the electronic speed control system had to be one part in 1000 if a mechanical link-up was to be avoided. (TR 205).

141. The '711 patent does not describe the tolerance range that would produce acceptable matching of the furnace and quench roller speeds. (TR 1100).

142. The first Glasstech oscillating system had precision tachometers for controlling the conveyor speeds. (TR 206).

143. Tachometers are not disclosed in the '711 patent. (TR 213, 640).

144. The first Glasstech oscillating system had a control circuit including three large cabinets full of relays to control the operation of the conveyors. (TR 183).

145. No relay circuit for controlling the oscillation of the furnace and quench conveyors is shown in the '711 patent. (TR 215, 216).

146. A parabolic control signal was used in the first Glasstech oscillating system to control the speed of the conveyors rollers. (TR 219).

147. At the time of filing its patent application, Glasstech knew that a parabolic control signal was more suitable than a sine wave signal. (TR 218, 220).

148. A parabolic control signal is not disclosed in the '711 patent. (Glasstech Ex. 19-1).

149. The disclosure of the control system was adequate to enable one with ordinary skill in the art of glass tempering to practice claim 1 of the '711 patent if he went to an electrical engineer with ordinary skill in that art in 1974 for assistance.

150. The word "independently" does not appear in the '711 patent except in the claims. The terms "independently" and "uncoupled" were added to the claims by amendment made during prosecution of the application that matured into the '711 patent. [Glasstech Ex. 19-2, at 99-100 (appearing in lower right hand corner)].

151. The electronics for the '711 oscillator were available off-the-shelf in 1974. (TR 1230-31). The drives were listed by Allen Bradley in their 1974 Bulletin 1373. (Tamglass Exs. 95-99).

152. McMaster disclosed not only his concepts and the details that he himself had personally contributed, but also details brought to the development program by those working with him. (TR 265-66; 1229-31).

153. Tamglass has not proved by clear and convincing evidence any failure to disclose the best mode to practice the invention or that Mr. McMaster had any intent to withhold any best mode disclosure.

154. Tamglass has not shown by clear and convincing evidence that the disclosure of the '711 patent fails the disclosure requirements of 35 U.S.C. §112, or that McMaster had any intent to withhold any disclosure.

155. Tamglass has not proved by clear and convincing evidence that the '711 patent is invalid under 35 U.S.C. §§ 102, 103, or §112.

156. The '711 patent is valid.

D. INFRINGEMENT

1. Literal Infringement

157. Tamglass began development of its first oscillating tempering system in 1974. (TR 744-46).

158. The Tamglass system uses a single motor to drive the furnace and quench unit conveyors. (TR 746; Glasstech Phys. Ex. L, Glasstech Ex. 35).

159. In the Tamglass system, one conveyor system is always totally dependent on the other. (TR 1151).

160. Glasstech never built a single-motor oscillating system. (TR 188-89, 198-99, 1238-40).

161. The first Tamglass system included a single reduction gear arrangement. The quench conveyor operated at approximately one-half the speed (and hence one-half the stroke length) of the furnace conveyor during oscillation. (TR 746, 747; Tamglass Ex. 104).

162. One Tamglass system operating in the United States utilizes only a single magnetic clutch (with a 5:1 ratio) during oscillation with any length sheet glass load. (TR 876).

163. The second generation Tamglass system includes four fixed-ratio gear-clutch arrangements to permit the quench unit conveyor to operate at a preselected different, slower speed than the furnace conveyor during oscillation. (TR 751).

164. Three additional gear-clutch arrangements were added in the second generation Tamglass system in order to maintain the glass within the quench unit during oscillation. (TR 751).

165. The only significant difference between the drive system of the first and second generation Tamglass systems is the inclusion of three additional magnetic clutches to provide three additional gear ratios. (TR 753).

166. All Tamglass systems include a gearing arrangement between the motor and the quench unit conveyor which permits the quench unit conveyor to operate at the same speed as the furnace conveyor during transfer of the glass from one unit to another. (Glasstech Phys. Ex. L).

167. The furnace conveyor never is uncoupled from the quench conveyor in the Tamglass system. (TR 768, 1072, 1193).

168. At all times in the Glasstech system now used and in the system described in the '711 patent the operation of the two conveyors is under the control of the operator of the system, but during the time when the two motors are uncoupled, the stroke lengths or the speed may be different in the furnace as opposed to the quench unit.

169. In the Tamglass system, the quench unit conveyor never is uncoupled from the single drive motor for the furnace. (Tamglass Phys. Ex. A, Tamglass Ex. 120). The stroke length and speed in the Tamglass quench unit are changed by changing the speed ratio between the drive motor and the quench unit conveyor. (TR 831-32, 838).

170. The speeds of the furnace and quench conveyors in the Tamglass system are not independent of one another. (TR 811, 1177, 1253).

171. The stroke length and speed in the quench unit in the Tamglass system may be different from, but they are not independent of, the stroke length and speed in the furnace during oscillation. (TR 811, 832, 1177, 1253).

172. The quench and furnace conveyors in the Tamglass oscillator are not uncoupled to operate independently during the heating cycle and coupled for synchronized operation during the index or transfer cycle.

173. Reunamaki drew a sketch of an oscillator concept in 1974. (Tamglass Ex. 2).

174. There is no drive shown in that sketch by Reunamaki, nor in any other early Tamglass document in evidence. It is not clear from the documents in the record when the Tamglass drive solution was worked out, but Mr. Reunamaki testified that he did not work on the drive. (TR 745-46).

175. On July 17, 1974, the Finnish government made a grant to Tamglass in the amount of 400,000 Finmarks for the development of an oscillator. (Glasstech Ex. 27).

176. Thereafter, Tamglass completed the design of an oscillator. A patent application based on oscillation in glass tempering was filed in Finland and elsewhere, including the United States (Glasstech Ex. 62), in the name of Jouko-Vaha-antilla, who left Tamglass before this investigation was initiated.

177. Mr. Reunamaki returned to work on the Tamglass oscillator in early 1978. (TR 744-45).

178. In 1978, Mr. Reunamaki had knowledge of the '711 patent. (TR 807-08, 811).

179. Mr. Reunamaki eliminated the chain and sprocket drive Tamglass had used previously, replacing it with a rolling friction drive of the general type described in the '711 patent. (TR 810-811; Glasstech Phys. Ex. D).

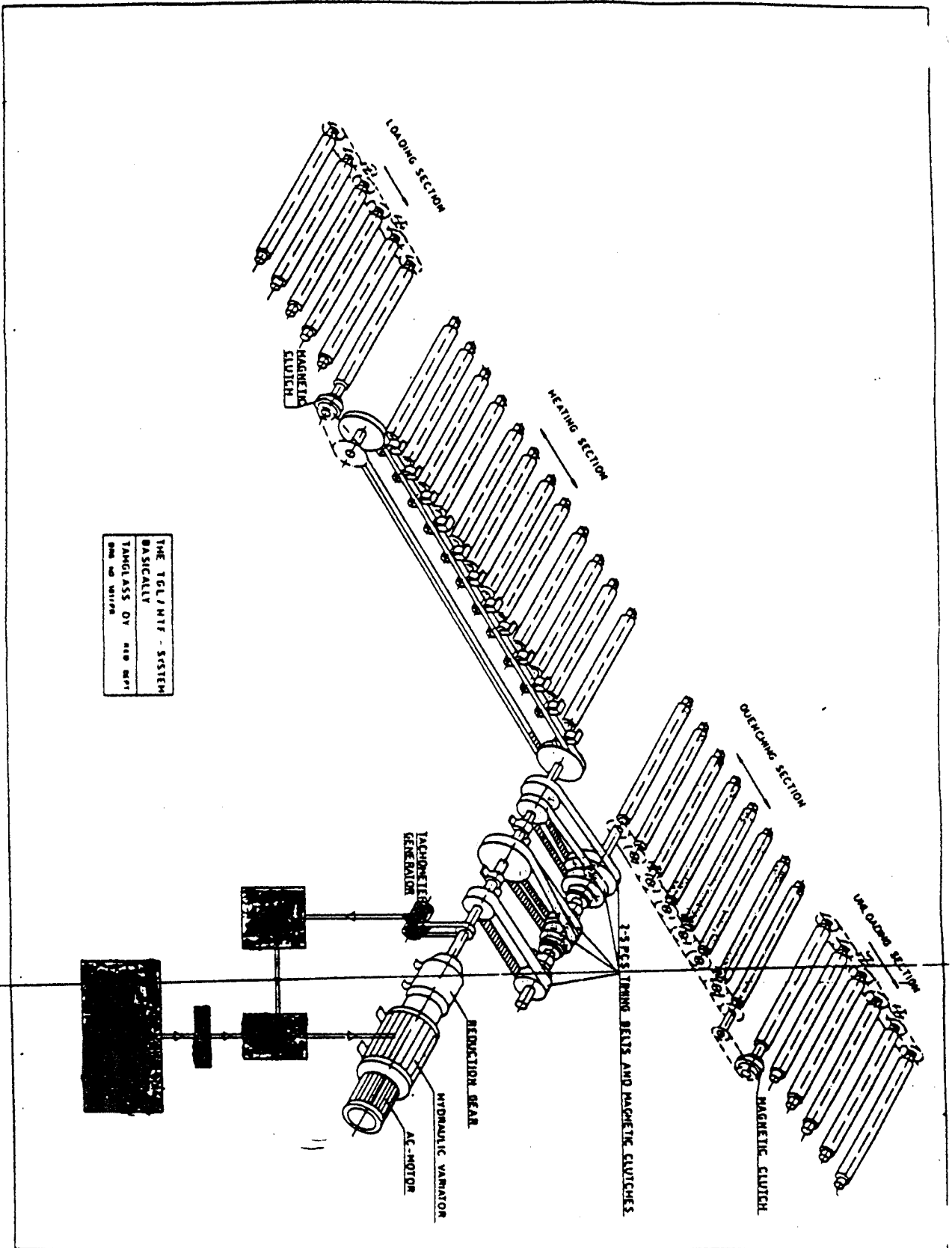
180. Mr. Reunamaki eliminated the steel rolls Tamglass had used, replacing those rolls with silica rolls. Silica rolls are disclosed in the '711 patent. (TR 809-10; Glasstech Phys. Ex. C).

181. Mr. Reunamaki worked on the oscillator-transfer drive, making changes that substantially increased the difference in stroke length between furnace and quench. (TR 750-51, 873-74).

182. After Mr. Reunamaki's changes, Tamglass first sold an oscillator in the United States. Thereafter Tamglass enjoyed considerable commercial success in selling this oscillator both in the United States and throughout the world. (TR 859; Tamglass Phys. Ex. X, Reunamaki Dep., Feb. 28, at 48; Glasstech Ex. 41).

183. Glasstech Ex. 35, a Tamglass schematic of the Tamglass oscillator, is reproduced on page 36 of these findings.

184. The Tamglass oscillator includes a furnace, a quench, a furnace conveyor, and a quench conveyor, all operating in a glass tempering system.



185. Claim 1 requires:

control means for coupling the furnace conveyor drive mechanism during the index cycle thereof with the roller conveyor of the quench unit during the index cycle thereof to provide coordinated sheet glass load conveyance from the furnace to the quench unit; said control means uncoupling the furnace conveyor drive mechanism from the quench unit conveyor after the coordinated index cycles thereof such that the furnace conveyor drive mechanism can oscillate a sheet glass load to be heated within the furnace independently of a sheet glass load being quenched in the quench unit.

186. Claim 1 refers to coupling the "furnace conveyor drive mechanism" with the roller conveyor in the quench unit. Claim 1 does not require the roller conveyor in the quench unit to have its own drive mechanism.

187. Col. 3, lines 30-32 and col. 4, lines 7 and 33 of the '711 patent specification refer to the "furnace conveyor drive mechanism" and the "roller conveyor of the quench" as two drive mechanisms. The patent also refers to the respective drive mechanisms of the furnace rollers and the quench unit conveyors.

188. The Tamglass tempering system has a furnace conveyor drive mechanism as required by claim 1.

189. The Tamglass oscillator includes a "control means," but only one drive mechanism. It has no "coupling" of the furnace conveyor drive mechanism with the roller conveyor of the quench unit during the index cycle. Tamglass has a single motor drive controlling both the furnace conveyor and the quench roller conveyor.

190. Claim 1 of the '711 patent requires only one drive mechanism, in contrast to claim 16 which refers to two drive mechanisms.

191. The Tamglass oscillator does not literally infringe claim 1 because it does not have coupling or uncoupling of the furnace conveyor drive mechanism and the roller conveyor of the quench unit.

(2) Infringement under the Doctrine of Equivalents

192. Tamglass filed a patent application in Finland and in the United States on the drive Mr. Reunamaki designed in 1978 for the Tamglass horizontal oscillator. (TR 881; Glasstech Exs. 32 and 33).

193. The patent application which Tamglass filed on the 1978 developments to its oscillator claimed structure found in the present commercial embodiment of the Tamglass horizontal oscillator. (TR 881-82).

194. That patent application is not limited to the commercial embodiment of the Tamglass oscillator at issue in this investigation. (TR 881).

195. Some of the arguments made in the prosecution of the Reunamki patent application by Mr. Reunamaki's attorneys are inconsistent with the positions taken here by Tamglass.

196. Reunamaki solved the same problem that was solved by McMaster. (Tamglass Ex. X, Reunamaki Dep., Feb. 28, at 7, 68-69; Glasstech Ex. 33, at 15, 20, 227, 246, 291).

197. That common problem was stated in the following words in the Amendment filed on May 13, 1981, with the Examiner:

It should be understood that McMaster was initially presented with a problem. How could one provide two separate conveyors, one for the furnace station and one for the tempering station, each with two separate modes of operation, a first mode (during the tempering portion of the cycle) whereby the two conveyors operate with different stroke lengths, and a second mode (during the transfer portion of the cycle) whereby both conveyors operate together as a single synchronized unit?
(Glasstech Ex. 33, at 227).

198. Subsequently, on appeal to the Board of Appeals, the applicant made it clear that Reunamaki was faced with the same problem as McMaster, but that Reunamki thought that he had a better solution:

McMaster is characterized by applicant (in the first full paragraph of specification page 5) as prior art addressed to the same problem as the present invention, but which fails to provide a solution as simple and complete as the present invention.
(Glasstech Ex. 33, at 246-47).

199. The Reunamaki oscillator was compared with the oscillator of the '711 patent in terms of results, in the applicant's brief on appeal to the Federal Circuit:

Applicant's invention of a system which permitted the omission of one of the two motors [in the preferred embodiment of the '711 patent] without a corresponding elimination of the independence of the conveyors thus represents the omission of a part without a sacrifice of its function and comprises an unobvious invention.
(Glasstech Ex. 33, at 23-24).

200. The importance of independent stroke lengths in the quench unit and in the furnace was emphasized repeatedly during the proceedings on Reunamaki's application for a U. S. patent. (Glasstech Ex. 33, at 11, 12, 14, 16, 19-21, 23, 91, 92, 176, 179, 227, 246).

201. Reunamaki argued to the Federal Circuit that his single motor system was patentably different from the preferred embodiment of the '711 patent:

Finally, Claims 1 and 14 define Applicant's combination of alternately operable fixed transmission means and variable gear means which enable alternately common and independent operation of the furnace and quench unit conveyors.
(Glasstech Ex. 33, at 41-42).

202. The Federal Circuit held its opinion affirming the Board of

Appeals:

Appellant, having continued to rely upon factually unsupported argument of counsel rather than evidence of superiority over the prior art, has failed to convince us of any error in the Board's conclusion that the glass tempering apparatus of Claims 1-3 and 14 would have been obvious from McMaster to one of ordinary skill in the art. Appellant's argument that McMaster "teaches away from" appellant's invention misses the difference between "teaching away from" and teaching an alternative to an invention. McMaster teaches an alternative, not that other systems would be impracticable. We agree with the board that it would have been within the skill of the art to substitute, with necessary modifications thereby required, a single drive motor for McMaster's two motors. (Emphasis added.)
(Glasstech Ex. 33, at 173-74).

203. McMaster and Reunamaki both designed a horizontal roller hearth tempering system with two separate modes of operation, a first mode (during the tempering portion of the cycle) in which the two conveyors operate with different stroke lengths, and a second mode (during the transfer portion of the cycle) in which both conveyors operate together as a single synchronized unit.

204. The same results were achieved. (TR 763, 1191-93; Tamglass Ex. 2, Roberts Dep., June 4, at 19).

205. Under the doctrine of equivalents, it would have been within the skill of the art to substitute, with necessary modifications thereby required, a single drive motor for McMaster's two motors. Reunamaki's oscillator falls within the scope of the '711 patent under the doctrine of equivalents. It performs substantially the same function in substantially the same way, and it achieves the same results as the McMaster oscillator.

206. Although literal infringement is not found, infringement is found under the doctrine of equivalents.

207. The doctrine of file wrapper estoppel does not limit the doctrine of equivalents in this case.

208. The prosecution record before the Patent and Trademark Office will not support a finding of file wrapper estoppel because there was no prosecution of claims in the '711 patent on "a glass tempering furnace." Glasstech does not now seek to extend the claims limited during prosecution to "a glass tempering system" to a "furnace."


209. Glasstech does not seek to extend the claims to cover subject matter abandoned by Glasstech during the prosecution of the patent, nor does Glasstech now take a position with respect to the scope of claim 1 that is inconsistent with the position McMaster took in the prosecution of the patent.

210. Since the Tamglass oscillator achieves substantially the same result in substantially the same way as described in claim 1 of the '711 patent, infringement is found under the doctrine of equivalents.

E. THE DOMESTIC INDUSTRY

211. Respondent Tamglass, Inc. is a wholly owned subsidiary of respondent AB Kyro OY. (Stipulated).

212. The Tamglass division of respondent AB Kyro OY and respondent Tamglass, Inc. (hereinafter collectively referred to as "Tamglass") markets horizontally oscillating glass tempering equipment in the United States, originally directly or through its agent and now directly and through Tamglass, Inc. (Stipulated).

213. Tamglass has exported  horizontal oscillating glass tempering systems, manufactured in Finland, to customers in the United States since 1979. (Glasstech Ex. 41, TR 914). Components produced in the United States constitute approximately 25 to 30 percent of the total component and material costs of these Tamglass systems. (TR 906-07).

214. Purchasers of horizontal oscillating glass tempering system sell the glass they temper on these systems primarily to the commercial building industry which purchases flat safety glass for large size windows. (TR 530-32).

215. Continuous and semi-continuous horizontal furnaces, as well as horizontal oscillating furnaces, are used for architectural glass tempering. Continuous furnaces are used primarily by companies with large production requirements, such as firms that produce patio doors.

Semi-continuous furnaces are also used by firms with large production requirements. Horizontal oscillating furnaces, which have production rates substantially below those of continuous and semi-continuous furnaces, are primarily used by specialty firms that specialize in smaller jobs where tempered glass is used. (TR 391-94).

216. Because continuous and semi-continuous horizontal glass tempering furnaces are substantially longer than oscillating furnaces, glass tempering firms that have relatively limited space in which to locate their furnaces may, as a practical matter, be unable to purchase a continuous or semi-continuous furnace. (Shaw Dep., Tamglass Ex. 56, at 6, 7-8, 54).

217. Some purchasers of glass tempering systems insist upon an 84-inch wide furnace. (Smith Dep., Glasstech Ex. 51-10, at 14-15; Shaw Dep., Tamglass Ex. 56, at 47; Mroczek Dep., Glasstech Ex. 51-4, at 38-40; Riley Dep., Tamglass Ex. 86, at 11-12, 21-22). Other purchasers find that a 60-inch wide glass tempering furnace is sufficient for their requirements. (Mroczek Dep., Glasstech Ex. 51-4, at 38-40).

218. Glasstech projects that there will be a continuing demand for horizontal oscillating glass tempering equipment in the United States. Others in the industry believe that the U. S. market for horizontal oscillating glass tempering furnaces was saturated in 1980 and that the U. S.

market is saturated at the present time. (TR 529, 532). On an industry-wide basis, horizontal oscillating glass tempering furnaces were running well below capacity in 1983. (TR 530). Glasstech itself is now developing a new glass tempering system. (TR 180, 673-74 and 685). It is found that the high point in the market for the horizontal oscillating glass tempering system under the '711 patent has passed.

219. Glasstech has sufficient capacity to meet the entire demand for such equipment in the United States. (Blumer, TR 398, 410-11, 413-14).

220. The domestic industry is comprised of that portion of complainant's business engaged in the manufacture, sale and service of horizontal oscillating glass tempering systems in the United States that fall within the scope of the claims of the '711 patent.

221. Complainant manufactures horizontal oscillating glass tempering furnaces, as well as continuous and semi-continuous furnaces, at its plant in Perrysburg, Ohio. (TR 318-21). Glasstech offers horizontal oscillating, continuous, and semi-continuous furnaces in the following widths: 36 inches, 48 inches, 60 inches, 84 inches and 96 inches. (TR 318-20; TR 391-93).

222. Approximately [REDACTED] square feet of space at complainant's Perrysburg, Ohio, facilities is used for manufacturing the various types of glass tempering equipment produced by complainant. Another [REDACTED] square feet is used for research and development and an additional [REDACTED] square feet is used for administrative and engineering purposes. (TR 295, 303, 321; Glasstech Ex. 8).

223. As of May, 1984, complainant employed [REDACTED] people in the United States. These employees were assigned various duties as follows:

<u>Assigned Duties</u>	<u>Number of Employees</u>
Drafting	[REDACTED]
Supervision	[REDACTED]
Administration	[REDACTED]
Product Development	[REDACTED]
Technical Services	[REDACTED]
Advanced Engineering	[REDACTED]
Manufacturing	[REDACTED]

(TR 294, 321; Glasstech Ex. 6). Approximately [REDACTED] percent of the Glasstech employees who work in the manufacturing area and approximately [REDACTED] percent of the Glasstech employees who work in the drafting area are presently involved in projects relating to horizontal oscillating glass tempering furnaces. (TR 675).

224. Glasstech estimates that between July 1, 1975, and June 30, 1983, its employees spent [REDACTED] man-years (calculated on the basis of an average of [REDACTED] hours perman-year) in drafting, engineering and in-house manufacturing activities relating to Glasstech's sale of horizontal oscillating glass tempering furnaces in the United States. (TR 1316; Staff Ex. 64-5).

225. Glasstech is not divisionalized by product line. Thus, Glasstech may manufacture different types of products in the same manufacturing space at different times and a given employee may work on several types

of furnaces. (TR 309, 321; TR 676-77). Additionally, a given research and development project may relate to more than one type of equipment offered for sale by Glasstech. (TR 1304).

226. Glasstech generates its financial statements for internal reporting purposes on a "percentage completion basis." (TR 299-300, 1286-87; Staff Ex. 64-4). "Percentage completion" refers to the extent of completion of manufacture of a product under a particular contract during a given period. (TR 326; Staff Ex. 64-4). "Percentage completion" is calculated by dividing the actual material, direct labor and overhead associated with a particular contract during a given reporting period by the estimated total material, labor and overhead for the contract. (TR 1283; Staff Ex. 64-4).

227. Because Glasstech is not divisionalized, Glasstech allocates general and administrative/other expenses, including research and development expenses, to its horizontal oscillating furnaces on the basis of the proportion of the sales of this type of furnace (calculated on a percentage completion basis) to the company's total sales of all types of furnaces during a given reporting period. (TR 330-31, 1297-98; Staff Ex. 64-4). Factory overhead is allocated to a given furnace by multiplying the direct labor for a given furnace by a furnace absorption factor (determined by dividing total factory overhead by total direct labor for all furnaces manufacturing during the reporting period). (Staff Ex. 64-4).

228. Glasstech's fiscal year begins on July 1 of the preceding year and ends on June 30. (TR 294, 304).

229. On a percentage completion basis, Glasstech's total sales, gross profit on total sales, and net profit after tax on total sales for fiscal year 1975 through fiscal year 1983 were as follows:

<u>Fiscal Year</u>	<u>Total Sales</u>	<u>Gross Profit</u>	<u>Net Profit After Tax</u>
1975			
1976			
1977			
1978			
1979			
1980			
1981			
1982			
1983			

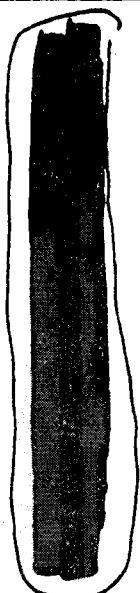
"Total sales" include sales of furnaces, customer service and retrofit sales, and sales of prototype automotive bending parts. Gross profit on total sales is calculated by subtracting material, labor and overhead expenses from total sales. (TR 1287-89; Staff Ex. 64-1).

230. On a percentage completion basis, Glasstech's sales of horizontal oscillating furnaces in the United States, gross profit on such sales, and net profit after tax on such sales for fiscal year 1975 through fiscal year 1983 were as follows:

<u>Fiscal Year</u>	<u>Sales of Horizontal Oscillators in the U.S.</u>	<u>Gross Profit</u>	<u>Net Profit After Tax</u>
1975			
1976			
1977			
1978			
1979			
1980			
1981			
1982			
1983			

(TR 1289-96; Staff Ex. 64-2). Research and development expenses and patent-related expenses for which Glasstech received reimbursement from the McMaster, Nitschke & Larimer Partnership ("M, N & L Partnership") are not reflected in these profit figures. (TR 1312).

231. The proportion of Glasstech's total furnace sales attributable to sales of horizontal oscillating glass tempering furnaces within the United States during fiscal years 1975 through 1983, on a percentage completion basis, is as follows:

<u>Fiscal Year</u>	<u>Domestic Oscillator Sales As A % of Glasstech's Total Furnace Sales</u>
1975	
1976	
1977	
1978	
1979	
1980	
1981	
1982	
1983	

(TR 1313-15; Staff Ex. 64-3).

232. Glasstech is recognized as a leader in the glass tempering industry by others in the glass tempering field. (Mroczek Dep., Glasstech Ex. 51-4, at 37).

233. In recent years, Glasstech has increased the efficiency of its plant and substantially reduced the lead time required for production of new furnaces. (TR 666; TR 414).

234. Glasstech promotes its products, including horizontal oscillating glass tempering furnaces, through advertisements in more than a half dozen trade publications distributed in the United States. (TR 401). Glasstech also attends and promotes its tempering equipment at trade shows in the United States and Europe. (TR 401-02, 421).

235. Between July 1, 1983, and March 31, 1984, Glasstech spent [REDACTED] on research and development. (TR 298; Glasstech Ex. 23).

236. Between July 1, 1983, and March 31, 1984, complainant spent [REDACTED] on equipment for manufacturing and research and development. (TR 297; Glasstech Ex. 23).

237. Glasstech's research and development efforts are divided into two areas, advanced engineering and product development. Advanced engineering attempts to develop new concepts and then carries these concepts through various stages of experimentation and development. Once it is determined that a concept can be developed into a commercial product, the product development area attempts to refine the product so that Glasstech can introduce it in the marketplace. (TR 316-17, 1307-08).

238. In December, 1971, Harold McMaster, Norman Nitschke and Frank Larimer formed a partnership (the "M, N & L Partnership") which was to act as a patent holding group. The partnership was to finance the development work of Glasstech and to grant exclusive licenses to Glasstech to manufacture glass tempering systems covered by patents owned by the partnership. (TR 163; Glasstech Ex. 1).

239. At the time of the formation of the M, N & L Partnership in 1971, McMaster, Nitschke and Larimer were the owners of Glasstech. (TR 172). In approximately 1979, Steven Nitschke and Stan Joehlin acquired an ownership interest in Glasstech and were included in the M, N & L Partnership on a prorated basis. Only members of the M, N & L Partnership were owners of Glasstech and the percentage participation of an individual in the partnership remained equivalent to his percentage ownership of Glasstech. (TR 172). In July, 1983, Glasstech reorganized to broaden its ownership base so that the number of stockholders increased from five to [REDACTED] (TR 687, 690-91).

240. Beginning in 1971, the M, N & L Partnership entered into licensing agreements with Glasstech under which Glasstech was granted the right to make, use and sell certain horizontal glass tempering furnaces. Under these licensing agreements, Glasstech was permitted to grant sublicenses to purchasers of licensed furnaces and required to collect and remit to the M, N & L Partnership royalty payments from the sublicenses. Under a consolidated License Agreement between the M, N & L Partnership and

Glasstech entered into in December, 1977, Glasstech was granted an exclusive license to manufacture, use and sell furnaces covered by the '711 patent. (Glasstech Ex. 2, 3, TR 1327).

241. Until September, 1983, Glasstech acted as a collection agent for the M, N & L Partnership with respect to royalties paid by customers in connection with the purchase of glass tempering furnaces from Glasstech. In computing its sales and profits, Glasstech did not treat such royalties as income to or an expense of Glasstech. (TR 332-333, 1311).

242. In September, 1983, the M, N & L Partnership sold the patent rights owned by the partnership (including the rights to the '711 patent) to Glasstech. Glasstech purchased the patent rights for [REDACTED], [REDACTED] of which has been paid to date with the remainder to be paid over the next [REDACTED]. (TR 259-60). As a result of this sale, Glasstech is entitled to all royalties on contracts for horizontal glass tempering furnaces entered into after July 1, 1983, and Glasstech will own any additional inventions developed at Glasstech. (TR 172, 174). The M, N & L Partnership remains entitled to royalties on contracts executed prior to July 1, 1983. (TR 258, 334).

243. Until September, 1983, the M, N & L Partnership reimbursed Glasstech for research and development expenses incurred by Glasstech which related to the development of new technology. (TR 1303; 257-258). Glasstech was not reimbursed for research and development expenses relating to the

additional development, refinement, or engineering of existing technology to provide a more commercially saleable product, nor was it reimbursed for the cost of providing facilities for the development of new technology. (TR 1303; TR 258).

244. Between July 1, 1979, and June 30, 1983, Glasstech spent approximately \$ [REDACTED] on research and development, of which \$ [REDACTED] was ultimately paid by Glasstech and [REDACTED] was ultimately paid by the M, N & L Partnership. (TR 1300-03, Staff Ex. 66).

245. Until September, 1983, the M, N & L Partnership reimbursed Glasstech for all patent-related expenditures made by Glasstech in connection with patents and patent applications owned by the partnership or the partnership's individual members. (TR 258; TR 333, 1327).

246. Until July 1, 1983, all patents relating to developments by Glasstech personnel were owned by the partnership of McMaster, Nitschke & Larimer. (Tr 171-2).

247. Until July 1, 1983, the partnership of McMaster, Nitschke & Larimer collected all royalties generated by the patents due to Glasstech developments. (TR 171-2).

248. The McMaster, Nitschke & Larimer partnership still receives royalties on patents now owned by Glasstech. (TR 258).

249. Glasstech entered into a ten-year exclusive license with Indal for the sale of oscillating tempering systems greater than 60 inches in width. (TR 177-9).

250. During the ten-year exclusive license with Indal, Glasstech engineered and sold to others non-oscillating, semi-continuous furnaces for architectural glass that was greater than 60 inches in width. (TR 179).

251. The exclusive license arrangement between Glasstech and Indal, combined with Indal's failure to expand its tempering operations in the United States beyond four locations, prevented Glasstech from selling more oscillating tempering systems greater than 60 inches in width during the period 1975-1983. (TR 283-4, 286).

252. In addition to oscillating furnaces covered by the '711 patent, Glasstech manufactures and sells non-oscillating tempering equipment. (TR 318-9).

253. Glasstech's facilities included a Research and Development department which was at least partially engaged in the improvement of Glasstech's horizontal roller hearth furnace. (TR 171-72).

254. Prior to July, 1983, Glasstech did not own any of the fruits of its Research and Development department. (TR 171-72).

255. The partnership reimbursed Glasstech for direct costs related to the Research and Development endeavors and in exchange, ownership of the patent rights vested in the partnership. (TR 257-58, 334).

256. In 1983, Ford Motor Company analyzed samples of glass tempered by Glasstech, Tamglass, Hordis and Mroczek for optical clarity and strength. Ford gave the highest rating to the samples tempered on the Glasstech horizontal oscillating furnace at Tempglass, Inc. (TR 534-36).

257. Batch tempering with the oscillating horizontal roller hearth tempering system ended the marketing of new vertical glass tempering equipment, although many vertical units still are in operation today. (TR 956; TR 390-91; TR 529; TR 125-26; TR 819-20).

F. INJURY

258. Tamglass has one plant, located in Tampere, Finland, which manufactures horizontal oscillating glass tempering systems. (TR 897; Staff Ex. 4, at 2-4).

259. Tamglass has exported [redacted] horizontal oscillating glass tempering systems, manufactured in Finland, to the United States. (Glasstech Exs. 41 and 12; TR 914; 976). In November, 1983, Tamglass signed a contract with Empire Glass of New York, New York, for the sale of another horizontal oscillating glass tempering system. (Glasstech Ex. 46-6).

260. The quality of the tempered glass produced by a system is of primary importance to purchasers of glass tempering systems. Price, maintenance/service and delivery are additional factors that purchasers weigh in choosing a glass tempering system. (Shaw Dep., Tamglass Ex. 56, at 9; Mroczek Dep., Glasstech Ex. 51-4, at 9-10).

261. Glasstech, Tamglass, Sack and Mroczek, Inc. are the principal competitors in the United States for sales of horizontal oscillating glass tempering furnaces. (TR 484; 402, Mroczek Dep., Glasstech Ex. 51-4 at 7-8).

262. Mroczek, Inc. of Vancouver, Washington, has sold [redacted] horizontal oscillating furnaces with hearth widths of 40, 60 and 84 inches in the United States since 1980. (Mroczek Dep., Glasstech Ex. 51-4, at 6, 30-31). At present, Mroczek, Inc. has the capability to manufacture [redacted] horizontal oscillating glass tempering systems per year. (Mroczek Dep., Glasstech Ex. 51-4, at 6).

263. Sack has sold at least [redacted] horizontal oscillating furnaces with hearth widths of 84 inches in the United States. (Staff Ex. 7, at 4).

264. Steve Palmer of California has sold [redacted] horizontal oscillating furnaces with hearth widths of 48 inches in the United States. (Staff Ex. 7, at 3).

265. Hordis Brothers, Inc. of Moorestown, New Jersey, has constructed several horizontal oscillating furnaces with hearth widths of 60 or 84 inches for its own factories in the United States. (Staff Ex. 7, at 4; Mroczek Dep., Glasstech Ex. 51-4, at 33-34). Hordis has offered to sell a horizontal oscillating furnace to others in the United States. (TR 402).

266. Berlyne-Bailey, a firm based in England, sold a horizontal oscillating furnace in the United States to General Glass. (TR 500). This furnace never produced commercially acceptable glass. (TR 510-511, 513; Shaw Dep., Tamglass Ex. 56, at 16; Smith Dep., Glasstech Ex. 51-10, at 11).

267. Selas Corporation of America has sold horizontal oscillating furnaces in the United States, but is no longer active in the United States. (TR 484; Mroczek Dep., Glasstech Ex. 51-4, at 32-33; Smith Dep., Glasstech Ex. 51-10, at 14; Staff Ex. 7 at 4). A horizontal oscillating furnace manufactured by Selas for Viracon has never been successfully operated. (TR 512-14).

268. [redacted] of the [redacted] vertical and horizontal glass tempering systems that have been sold by Mroczek, Inc. have been sold to customers that had previously purchased a glass tempering system from Mroczek. (Mroczek Dep., Glasstech Ex. 51-4, at 12-13).

269. Between 1975 and the end of 1981, Glasstech made the following sales of horizontal oscillating glass tempering furnaces in the United States:

<u>Customer</u>	<u>Delivery</u>	<u>Furnace Width/ Thickness Capability</u>	<u>Contract Price</u>	<u>Royalties</u>
-----------------	-----------------	--	---------------------------	------------------

(Staff. Ex. 50, 64-2, 65).

270. Glasstech did not enter into any contracts for the sale of horizontal oscillating glass tempering furnaces in the United States during 1982 or 1983. (TR 396; Staff Ex. 52).

271. Since January 1, 1984, Glasstech has signed contracts for the sale of [redacted] horizontal oscillating furnaces to customers in the United States. (TR 396; Glasstech 52). Of the [redacted] contracts signed by Glasstech in 1984 for the sale of horizontal oscillating furnaces, one is for a sale to Glasstemp, a company owned by Glasstech, and the others are for sales to [redacted] (TR 396-97; Staff Ex. 63).

272. In some instances, Glasstech has made price concessions to meet competition. (TR 492). Such concessions have generally been in the range of five percent of the initially quoted price. (TR 492-93). Such concessions are made more frequently now than in the early 1980's because of competition from imports. (TR 550).

273. Glasstech's price for the 84-inch horizontal oscillating furnace with 4-millimeter capability it contracted to sell to [redacted] on March 12, 1984, was \$ [redacted], inclusive of all royalties. (Staff Ex. 63, at 18; TR 592). Glasstech anticipates a profit of approximately [redacted] percent on this sale. (TR 680-81). If the formula that had been used by Glasstech for pricing 84-inch horizontal oscillating furnaces sold to Temp-glass had been used in pricing the [redacted] furnace, the [redacted] furnace would have been priced at approximately \$ [redacted] before the inclusion of royalties. (TR 589-92).

274. Since approximately 1982, Glasstech has adopted a policy of quoting a total price, which includes all royalties, to its customers unless a customer requests a separate royalty breakdown. (TR 662-664). At

the present time, in pricing its horizontal oscillating furnaces, Glasstech generally includes a royalty fee equivalent to [REDACTED] percent of the cost of the equipment to be sold. (TR 666). Prior to 1982, royalties charged in connection with sales of horizontal oscillating furnaces were substantially higher than [REDACTED] percent. (TR 666). Glasstech believes that the present [REDACTED] percent royalty is reasonable both to meet competition and in view of the age of the technology. (TR 666).

275. Tamglass is Glasstech's foremost competitor in the United States for sales of horizontal oscillating furnaces. (TR 491, 666-67).

276. Tamglass has sold the following horizontal oscillating glass tempering systems in the United States under the following terms:

<u>Customer</u>	<u>Contract Date (Year of Delivery</u>	<u>Furnace Width/ Thickness Capability</u>	<u>Price</u>	<u>Tamglass Financing</u>
-----------------	--	--	--------------	-------------------------------

<u>Customer</u>	<u>Contract Date (Year of Delivery)</u>	<u>Furnace Width/ Thickness Capability</u>	<u>Price</u>	<u>Tamglass Financing</u>
-----------------	---	--	--------------	---------------------------

(Tamglass Ex. 62-72, TR 976, Glasstech Exs. 46-2, at 20, 46-5, at 83, 46-6, at 119, 127-128 and 41).

277. In January, 1981, Tamglass OY moved one of their employees, Seppo Tiitto, to Pittsburgh, Pennsylvania, for the purpose of increasing Tamglass' market penetration into the North American market. (TR 950).

278. In 1981, Mr. Tiitto of Tamglass retained InfoSource, Inc. to conduct a survey of the North American market for safety glass. (TR 951; Glasstech Exs. 38-1, 38-2). At Mr. Tiitto's request, the InfoSource study

included a competitive profile of only one competitor, Tamglass' "key competition" in North America, Glasstech. (TR 951-53; Glasstech Exs. 38-1, 38-2, at 3). Information concerning Glasstech was compiled by employees of InfoSource who arranged interviews with Glasstech representatives under the pretext of representation of a potential purchaser for Glasstech. (Glasstech Ex. 38-6; TR 954-56).

279. Tamglass expects to install [REDACTED] tempering systems in the United States during 1984. (TR 969, 990). This estimate includes the systems that Tamglass has sold to Labrador and Empire.

280. Tamglass offers to arrange financing from a commercial Finnish bank for U.S. purchasers of Tamglass tempering systems. (TR 981-83). At present, Tamglass offers financing for [REDACTED] percent of the machinery price at an interest rate between [REDACTED] and [REDACTED] percent. The loan would run for four years if the machinery price is less than [REDACTED], and for five years if the machinery is priced at [REDACTED] or more. (TR 982-83).

281. The following U. S. purchasers of Tamglass horizontal oscillating furnaces have availed themselves of financing arranged by Tamglass through a Finnish commercial bank: [REDACTED]

[REDACTED] (TR 986).

282. Tamglass, Inc. places monthly advertisements for its glass tempering furnaces in U. S. glass trade journals. During 1983, representatives of Tamglass, Inc. attended two glass industry trade shows in the United States. (Staff Ex. 5 at 11).

283. In 1982, Tamglass, Inc. spent [REDACTED] on advertising and promotional activities in the United States relating to glass tempering furnaces and, during the first nine months of 1983, Tamglass, Inc. spent [REDACTED] on such activities. (Staff Ex. 5, at 11-12).

284. Tamglass has employees located in the United States who service Tamglass horizontal oscillating glass tempering furnaces. (TR 924; Shaw Dep., Tamglass Ex. 56, at 41-42; Smith Dep., Glasstech Ex. 51-10, at 21-22; Riley Dep., Tamglass Ex. 86, at 49-51).

285. In 1983, virtually all sales made by Tamglass, Inc. were of horizontal oscillating glass tempering systems. (TR 987).

286. Mr. Kassi, director of Tamglass' engineering division, considers Tamglass' horizontal oscillating glass tempering business in the United States to be profitable. (TR 912). Tamglass does not maintain records which show profitability in terms of individual systems or markets. (TR 912-13).

287. Tamglass can produce approximately [REDACTED] horizontal oscillating glass tempering systems per year at its Tampere plant depending upon the size and specifications of the systems in question and assuming all of the plant's capacity was devoted to the production of such systems. (TR 898-99, 919). Historically, [REDACTED] to [REDACTED] percent of the capacity of the Tampere plant has been devoted to the production of laminating equipment. (TR 899). Tamglass expects to produce [REDACTED] horizontal oscillating glass tempering systems during 1984. (TR 920).

288. Since 1979, there has been only one instance on which Tamglass has been unable to negotiate an acceptable date for delivery of a horizontal oscillating glass tempering system to a U. S. customer. (TR 932-33).

289. Tamglass intends to continue to sell horizontal oscillating glass tempering systems in the United States as long as there is a demand for such systems in the United States. (TR 914).

290. Tamglass estimates that approximately [redacted] percent of the horizontal oscillating glass tempering systems installed in the United States in 1984 will be manufactured by Tamglass. (TR 1007). Tamglass believes that it has to increase its market share in the United States above its current [redacted] percent share in 1985 if it is to maintain the level of business it experienced in 1984 because fewer systems will be installed in 1985. (TR 1007-08).

291. Tamglass has formulated a strategy directed at increasing its market share of horizontal oscillating glass tempering systems. (TR 1008). In accordance with this strategy, Tamglass is hiring a sales manager to work with Mr. Tiitto on U. S. furnace sales. This sales manager will concentrate on finding and keeping in contact with prospective furnace customers. (TR 1010).

292. In 1978, Shaw Glass Company purchased the first Tamglass horizontal oscillating glass tempering furnace to be installed in the United States. (Shaw Dep., Tamglass Ex. 56, at 12). In negotiating the terms of sale for this furnace, Tamglass requested that Shaw Glass permit potential

Tamglass customers to inspect the furnace once it was operational. (Shaw Dep., Tamglass Ex. 56, at 21).

293. In 1981 or 1982, Mroczek, Inc. found it necessary to offer financing to its customers in order to compete with Tamglass. (Mroczek Dep., Glasstech Ex. 51-4, at 10-12). At that time, customers advised Mroczek, Inc. that Tamglass was offering 60 percent financing at 9-1/2 percent interest over a five-year period to purchasers of horizontal oscillating furnaces. (Mroczek Dep., Glasstech Ex. 51-4, at 11-12). Mroczek offered 50 percent financing at 12 percent for eight years in response to the financing terms offered by Tamglass. (Mroczek Dep., Glasstech Ex. 51-4, at 12).

294. In 1981 or 1982, Mroczek, Inc. submitted a proposal for a horizontal oscillating glass tempering system to Edwin J. Berkowitz. Berkowitz rejected Mroczek's sales proposal and purchased a horizontal oscillating system from Tamglass. (Mroczek Dep., Glasstech Ex. 51-4, at 15). Mroczek also submitted a proposal to Guardian Industries. Guardian ultimately purchased a horizontal oscillating system from Tamglass. (Mroczek Dep., Glasstech Ex. 51-4, at 16).

295. Glasstech has lost one sale to Mroczek--the sale of a 60-inch wide horizontal oscillating glass tempering system to California Glass Distributors. (Mroczek Dep., Glasstech Ex. 51-4, at 13, 22). Glasstech probably lost this sale because of the special financing terms offered by Mroczek in response to financing terms offered by Tamglass. (Mroczek Dep., Glasstech Ex. 51-4, at 13).

296. The initial instinct of Shaw was to go back to Tamglass when it decided to purchase its second horizontal oscillating furnace in October, 1982. (Shaw Dep., Tamglass Ex. 56, at 39-40, 56, 62). Shaw already was familiar with the Tamglass furnace. Shaw heard about Mroczek by accident and eventually purchased a furnace from Mroczek rather than Tamglass. (Shaw Dep., Tamglass Ex. 56, at 62).

297. A critical factor in Labrador's decision in 1983 to purchase a horizontal oscillating furnace from Tamglass rather than Sack was Tamglass' superior technology. (Smith Dep., Glasstech Ex. 51-10, pp. 17-19). The prices quoted by Tamglass, Sack and Mroczek were very close. (Smith Dep., Glasstech Ex. 51-10, at 14, 20).

298. Both Tamglass and Sack offered to assist Labrador Glass with financing for the purchase of a horizontal oscillating furnace. (Smith Dep., Glasstech Ex. 51-10, at 20). Tamglass provided Labrador with financing for [redacted] percent of the purchase price at [redacted] percent per year for five years. (Glasstech Ex. 46-10, at 239-40). When Labrador purchased its furnace in October, 1983, the financing package offered by Tamglass was the most favorable financing packaging available to Labrador. (Smith Dep., Glasstech Ex. 51-10, at 20).

299. In June, 1983, Tamglass quoted a price of approximately [redacted] to [redacted] for an 84-inch wide horizontal oscillating furnace with the capability to temper three millimeter glass. (Glasstech Ex. 45-3). Glasstech provided [redacted] with a verbal quote in the

range of [REDACTED] for an 84-inch horizontal oscillating furnace capable of handling one-eighth inch glass. (TR 472-474, 557-58, 559). [REDACTED]

[REDACTED] has not purchased a furnace and may be closing its plant. (TR 474).

300. The Tamglass price for a horizontal oscillating furnace in the United States with an 84-inch wide hearth is now approximately [REDACTED] below the Glasstech price for the same type and size furnace. (TR 544, 472-474, 546-47, 550-552, 557-59).

301. On January 31, 1984, Glasstech submitted a sales proposal to Carroll Glass in Wellington, Kansas, for a 96-inch wide horizontal oscillating glass tempering furnace at a price of [REDACTED] (Glasstech Ex. 44-9).

302. On December 29, 1983, Tamglass submitted a sales proposal to [REDACTED] for a 96-inch wide horizontal oscillating glass tempering furnace at a price of [REDACTED] (Glasstech Ex. 45-5, at 35, 43, 52). At that time, Tamglass offered to invest [REDACTED] in [REDACTED] if [REDACTED] purchased a horizontal oscillating glass tempering system from Tamglass. (TR 964-65; Glasstech Ex. 45-5, at 35). Mr. Sumelius, president of Kyro AB, authorized Tamglass to make this offer to invest [REDACTED] in [REDACTED] (TR 1001). Tamglass recently received authority from Finland to make a capital investment of approximately [REDACTED] in another prospective purchaser of a horizontal oscillating glass tempering system in the United States. (TR 1002-04, 1024-25).

303. Since January 1, 1983, Tamglass has submitted sales quotations for horizontal oscillating glass tempering furnaces to the following prospective customers in the United States:

<u>Prospective Customer</u>	<u>Date of Proposal</u>	<u>Furnace Width</u>

(Glasstech Exs. 45-6; 45-10; 45-13; 45-11; 45-14; 45-15; 45-3; 45-9, 45-5).

304. At the present time, Tamglass has a serious inquiry regarding the possible purchase of a horizontal oscillating furnace from a firm that had previously purchased a horizontal oscillator from Glasstech. (TR 998).

305. Tamglass OY received a subsidy of [REDACTED] Finnish marks from the Finnish government in 1974 to develop its glass tempering equipment. (Glasstech Ex. 27, 28, 29; Suomi Dep., Glasstech Ex. 51-12, at 2, 4).

306. The direct cost to Tamglass of producing the 84-inch wide horizontal oscillating furnaces it imported into the United States between January 1, 1979, and September 30, 1983, (converted to U. S. dollars on the basis of the average value of the Finnish mark relative to the U. S. dollar during each of these years) was as follows:

<u>Year</u>	<u>Units Produced</u>	<u>Direct Cost of Production</u>	<u>Average Per Unit</u>
1979			
1980			
1981			
1982			
1983			
(1st 9 mos.)			

(Staff Ex. 4, at 5-8, Appendix D). Tamglass does not as a matter of internal accounting practice allocate indirect costs to its various operations and products. (Staff Ex. 4, at 8). The real cost to Tamglass cannot be determined based on the facts in this record.

307. In 1975, Glasstech's principals decided to accept an offer from Indal, Inc., a Canadian corporation, under which Indal agreed to purchase and build a plant for a Glasstech horizontal oscillating glass tempering furnace and to make the individual principals of Glasstech partners in the plant with a combined [REDACTED] percent ownership interest in the plant. (TR 176-77). Indal built this glass tempering plant, the Tempglass, Inc. plant, in Perrysburg, Ohio. (TR 178).

308. The principals of the M, N & L Partnership sold their [REDACTED] percent interest in the Tempglass, Inc. plant and their [REDACTED] percent interest in the Tempglass Western plant in Fremont, California, to Indal in 1981. (TR 182, 260, -261-62).

309. In 1975, Glasstech and Indal entered into negotiations regarding a horizontal glass tempering furnace for the Tempglass, Inc. plant to be built by Indal near Toledo, Ohio. Under the agreement signed by

Glasstech and Tempglass, Inc. on December 17, 1975, Glasstech granted Tempglass, Inc. an exclusive license to use in the United States Glasstech's patents and technical information for horizontal oscillating glass tempering furnaces for tempering glass in excess of 60 inches in width. (TR 177-78, 179; Glasstech Ex. 58).

310. Glasstech's exclusivity arrangement with Tempglass for horizontal oscillating glass tempering furnaces only related to furnaces for tempering glass more than 60 inches wide because Tempglass was targeting the architectural market and that market was primarily concerned with glass wider than 60 inches. (TR 282).

311. Under the agreement reached between Glasstech and Tempglass Inc. on December 17, 1975, the term of the exclusive license granted to Tempglass, Inc. to use Glasstech's patents and technical information for horizontal oscillating glass tempering furnaces for tempering glass in excess of 60 inches in width varied depending upon the number of such furnaces subsequently purchased by Tempglass, Inc. or other entities in which Indal held the majority of outstanding stock. (Glasstech Ex. 58). Specifically, the agreement provided that Tempglass, Inc. would receive a three-year exclusive license throughout the continental United States and a five-year exclusive license in Ohio, Michigan, Indiana, Illinois, Missouri, Iowa, Minnesota and Wisconsin, which was subject to extension, as detailed below, if Tempglass, Inc. or other entities in which Indal had a majority interest purchased additional horizontal oscillating glass tempering furnaces from Glasstech within specified periods:

<u>Number of Additional Furnace Purchases</u>	<u>Term and Scope of Exclusive License</u>
1 furnace within 3 years after December 17, 1975	Until December 17, 1980, for U. S. and December 17, 1982, for territories in which furnaces are located
2 furnaces within 4 years after December 17, 1975	Until December 17, 1981, for U. S. and December 17, 1983, for territories in which furnaces are located
3 furnaces within 5 years after December 17, 1975	Until December 17, 1983, for U. S. and December 17, 1984, for territories in which furnaces are located
4 furnaces within 6 years after December 17, 1975	Until December 17, 1985, for U. S. and all territories in which furnaces are located

(Glasstech Ex. 58).

312. Pursuant to an agreement dated April 20, 1977, Tempglass Western, Inc. purchased a horizontal oscillating glass tempering furnace from Glasstech to temper flat glass up to a maximum width of 80 inches for a plant in California. (Glasstech Ex. 60).

313. Pursuant to an agreement dated December 18, 1977, Tempglass Southern, Inc. purchased a horizontal oscillating glass tempering furnace from Glasstech to temper flat glass up to a maximum width of 80 inches for a plant in Texas. (Glasstech Ex. 59).

314. Pursuant to an agreement dated May 23, 1979, Tempglass Eastern, Inc. purchased a horizontal oscillating glass tempering furnace from Glasstech to temper flat glass up to a maximum width of 80 inches for a plant in Georgia. (Glasstech Ex. 61).

315. Tempglass, Inc., Tempglass Eastern, Inc., Tempglass Western, Inc., and Tempglass Southern, Inc. are subsidiaries of Indal, Inc. (TR 286).

316. Glasstech's sales to Tempglass Western, Inc., Tempglass Southern, Inc. and Tempglass Eastern, Inc. extended the term and scope of the exclusive license originally granted to Tempglass, Inc. By May 23, 1979, these Tempglass companies had acquired an exclusive license from Glasstech for patents and technical information relating to horizontal oscillating furnaces for tempering glass in excess of 60 inches in width (a) until December 17, 1983, throughout the 48 contiguous, continental states of the United States and the District of Columbia except Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, Delaware, Maryland and New Jersey. (Glasstech Exs. 58, 61).

317. At the time of the signing of the original purchases and licensing agreement between Tempglass, Inc. and Glasstech in December, 1975, the parties to the agreement contemplated that [REDACTED] Glasstech horizontal oscillating furnaces would be built for Tempglass plants in the United States. (TR 524, 527).

318. The exclusive license from Glasstech to Tempglass relating to horizontal oscillating glass tempering furnaces was terminated by agreement in September, 1983. (TR 521). Glasstech conceded approximately [REDACTED] in royalties in connection with the termination of the license. (TR 521, 523-24).

319. Prior to termination of the Tempglass exclusive license, Irvin Fintel, the chief executive officer of Tempglass, Inc. and divisional vice president for glass at Indal, Inc., recommended against a purchase of a

fifth horizontal oscillating furnace by Tempglass for the northeast area. The Tempglass, Inc. plant in Perrysburg, Ohio, which was not running at capacity, had been servicing that area, and Mr. Fintel was not certain that a fifth plant would be profitable in light of the number of horizontal furnaces that had been and were being installed in the northeast area. (TR 526, 527-28). Indal had not made a decision whether or not to purchase a fifth furnace as of the date it agreed to terminate the license. (TR 526).

320. Because Indal chose to refrain from purchasing a fifth furnace and to invest its capital in fields other than glass tempering a large part of the U. S. glass tempering market was left unattended by the Tempglass companies. (TR 283, 286).

321. Tamglass, Sack and Mroczek were given an opportunity to enter the U. S. horizontal oscillator market because Tempglass did not expand to meet market demand and Glasstech was unable to meet that demand due to its exclusive arrangement with Tempglass. (TR 283-84, 286).

322. Glasstech probably lost sales of horizontal oscillating furnaces at In-Sol-Air Glass, Northwestern Industries and Virginia Glass to Sack, a furnace manufacturer based in the Federal Republic of Germany. (TR 485; Staff Ex. 62). PPG in Texas also purchased a horizontal oscillating furnace from Sack after receiving a bid from Glasstech. (TR 485; Staff Ex. 7, at 4).

323. Mroczek, Inc. is a domestic manufacturer of horizontal oscillating glass tempering furnaces. This company's prices are approximately 25 to 35 percent below those of Glasstech, Tamglass and Sack. (Mroczek Dep., Glasstech Ex. 51-4, at 8-9).

324. Glasstech probably lost sales of horizontal oscillating furnaces to Mroczek at California Distributors. Advanced Coatings and Texas Tempering. (TR 486; Staff Ex. 62).

325. If Labrador Glass had not purchased a furnace from Tamglass in October, 1983, it would have purchased a furnace from Sack. (Smith Dep., Glasstech Ex. 51-10, at 23).

326. Prior to September, 1983, Glasstech made the following proposals to each of the prospective customers listed below:

<u>Prospective Customer</u>	<u>Date of Proposal</u>	<u>Type of Furnace Offered by Glasstech</u>	<u>Price Quoted</u>
---------------------------------	-----------------------------	---	-------------------------

<u>Prospective Customer</u>	<u>Date of Proposal</u>	<u>Type of Furnace Offered by Glasstech</u>	<u>Price Quoted</u>
[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]

(Glasstech Exs. 44-1, at 1-3; 44-2, at 3, 8-9; 44-3, at 53, 56, 83-44; 44-4, at 89-90; 44-5, at 101, 105, 113-14; 44-6, at 131-33; 44-7, at 135; 44-8, at 154, 159, 168). Each of these customers later purchased an 84-inch oscillating furnace from Tamglass. (Glasstech Ex. 41; TR 976).

327. Between December, 1975, and September, 1983, Glasstech could not sell horizontal oscillating glass tempering furnaces capable of tempering glass in excess of 60 inches in width to any customer in the United States except Tempglass. (Glasstech Exs. 58 and 61, TR 521, 453).

328. In 1977 or 1978, Shaw Glass asked Glasstech about the possible purchase of an 84-inch wide horizontal oscillating furnace and was advised that Glasstech could not provide the furnace that Shaw Glass required. (Shaw Dep., Tamglass Ex. 56, at 14). Shaw Glass purchased an 84-inch wide horizontal oscillating furnace from Tamglass in 1978. (Tamglass Ex. 71).

329. Shaw Glass stopped purchasing tempered glass from Tempglass prior to Shaw's purchase of its own glass tempering furnace because Tempglass' delivery times were too long and Tempglass' prices were above those charged by other tempered glass suppliers. (Shaw Dep., Tamglass Ex. 56, at 45-46, 51).

330. Laborador Glass Specialties, an architectural flat glass fabricator and temperer located in Arizona, purchased an 84-inch wide horizontal oscillating glass tempering furnace from Tamglass in October, 1983. (Smith Dep., Glasstech Exs. 51-10, at 8-10; and 46-10). Laborador was interested in purchasing an 84-inch wide furnace and would not even consider a 60-inch wide furnace. (Smith Dep., Glasstech Ex. 51-10, at 14-15).

331. In 1980, when Laborador Glass first considered purchasing a horizontal oscillating furnace, Laborador sent a letter to Glasstech and received a Glasstech brochure. (Smith Dep., Glasstech Exs. 51-10, at 10-13; and 44-7). When Laborador again considered purchasing a horizontal oscillator in August, 1981, Laborador did not contact Glasstech. (Smith Dep., Glasstech Ex. 51-10, at 12-14).

332. When San Jacinto glass began investigating the purchase of a horizontal oscillating glass tempering furnace in 1981, San Jacinto considered Glasstech, Tamglass, Mroczek and Selas. (Riley Dep., Tamglass Ex. 86, at 16-18). San Jacinto decided against purchasing a furnace from Glasstech because of price, financing terms, and ease of installation. (Riley Dep., Tamglass Ex. 86, at 23, 30-32; Glasstech Ex. 44-6, at 134).

333. Glasstech proposed and submitted a quote on a 60-inch wide horizontal oscillating furnace to San Jacinto in 1981. (Riley Dep., Tamglass Ex. 86, at 23; Glasstech Ex. 44-46, at 131-33). San Jacinto decided that it required an 84-inch wide furnace. (Riley Dep., Tamglass 86, at 11-12, 21-22).

334. In 1981, San Jacinto was close to signing a contract with Mroczek for a 60-inch wide furnace when it decided that it needed an 84-inch wide furnace. (Riley Dep., Tamglass Ex. 86, at 21-22). At that time Mroczek had not built an 84-inch wide furnace and San Jacinto decided to purchase from Tamglass rather than purchase Mroczek's first 84-inch furnace. (Riley Dep., Tamglass Ex. 86, at 21-23; Mroczek Dep., Glasstech Ex. 51-- , at 18).

335. Three Rivers Aluminum Co. (TRACO) considered purchasing a horizontal oscillating system with a 60-inch wide hearth from either Glasstech or Tamglass. (Staff Ex. 32, Glasstech Ex. 44-8).

336. TRACO purchased an 84-inch wide system from Tamglass, at a contract price of \$ [REDACTED]. (Glasstech Ex. 46-14).

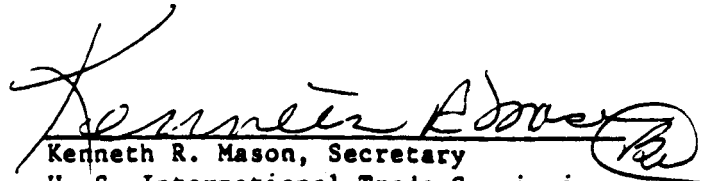
337. Glasstech had offered to sell to TRACO a 60-inch wide system for \$1,352,000. (Glasstech Ex. 44-8).

338. If Glasstech had lowered its price, TRACO would have purchased from Glasstech rather than Tamglass. (TR 445).

339. Glasstech is presently engaged in the development of significantly improved tempering systems which may render the current oscillating systems of Glasstech and Tamglass obsolete just as the vertical systems were rendered obsolete. (TR 180, 673-74 and 685).

CERTIFICATE OF SERVICE

I, Kenneth R. Mason, hereby certify that the attached Determination (Confidential Version) was served upon Patricia Ray, Esq., and upon the following parties via first class mail, and air mail where necessary, on August 17, 1984.


Kenneth R. Mason, Secretary
U. S. International Trade Commission
701 E Street, N.W.
Washington, D. C.

For Glasstech, Inc.:

Ernie L. Brooks
Mark A. Cantor
James A. Kushman
Robert C. J. Tuttle
BROOKS & KUSHMAN
Suite 2121, 3000 Town Center
Southfield, Michigan 48075

For Tamglass OY and
AB Kyro OY:

Robert S. Swecker
Joel M. Freed
Ronald L. Grudziecki
David D. Reynolds
Frederick G. Michaud, Jr.
George A. Hovanec, Jr.
James A. LaBarre
Eric H. Weisblatt
Lance W. Chandler
BURNS, DOANE, SWECKER & MATHIS
George Mason Building
Washington & Prince Streets
P. O. Box 1404
Alexandria, Virginia 22313-1404

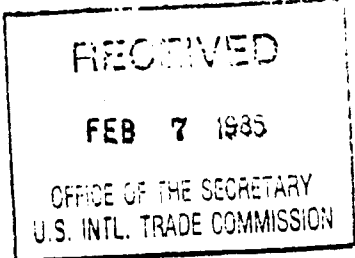
GOVERNMENT AGENCIES:

Mr. Charles S. Stark
Antitrust Div./U.S. Dept of Justice
Room 7115, Main Justice
Pennsylvania Avenue & Tenth Street, N.W.
Washington, D.C. 20530

Edward F. Glynn, Jr., Esq.
Asst Dir for Intl Antitrust
Federal Trade Commission
Room 502-4, Logan Building
Washington, D.C. 20580

Darrel J. Grinstead, Esq.
Dept of Health & Human Svcs.
Room 5362, North Building
330 Independence Avenue, S.W.
Washington, D.C. 20201

Richard Abbey, Esq.
Chief Counsel
U.S. Customs Service
1301 Constitution Ave., N.W.
Washington, D.C. 20229



UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC 20436

_____)
In the Matter of)
)
CERTAIN GLASS TEMPERING SYSTEMS)
_____)

Investigation No. 337-TA-171

NOTICE OF THE AMENDMENT OF AN ERRONEOUS FINDING
OF FACT AND DENIAL OF RESPONDENTS'
PETITION FOR RECONSIDERATION

AGENCY: U.S. International Trade Commission.

ACTION: Amendment of an erroneous finding of fact and denial of respondents' petition for reconsideration.

SUMMARY: The Commission has granted a motion to amend Finding of Fact 276 contained in the initial determination (ID) on violation, which is now the Commission's determination in this investigation. This finding of fact will now indicate that two of the sales of glass tempering systems that were made in the United States by respondents involve glass tempering systems that can produce 96-inch-wide tempered glass instead of 84-inch-wide tempered glass.

The Commission has denied respondents' petition for reconsideration because the Commission's reliance on the erroneous finding of fact in its opinion on remedy, the public interest, and bonding was harmless error and because the respondents had ample opportunity to correct the record before this finding of fact was relied on by the Commission.

FOR FURTHER INFORMATION CONTACT: Carol McCue Verratti, Esq., Office of the General Counsel, U.S. International Trade Commission, telephone 202-523-0079.

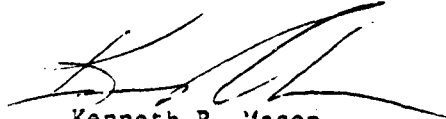
SUPPLEMENTARY INFORMATION: On November 16, 1984, the Commission issued a limited exclusion order in this investigation against infringing glass tempering systems produced by AB Kyro OY of Finland. This order was based on an unreviewed ID by the administrative law judge that there was a violation of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337). After considering submissions on remedy, the public interest, and bonding, the Commission decided that there were no public interest factors precluding issuance of a limited exclusion order.

Respondents moved (Motion 171-30) for amendment of Finding of Fact 276, which was relied on by the Commission when it indicated in a footnote to its opinion that the record did not support respondents' allegations that they had

sold in the United States glass tempering systems with the capability of producing 96-inch-wide glass tempering systems. Respondents also petitioned for reconsideration of the Commission's decision to issue its limited exclusion order because the Commission had relied on an erroneous finding of fact.

Copies of the Commission's Action and Order and all other nonconfidential documents filed in connection with this investigation are available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 701 E Street NW., Washington, DC 20436, telephone 202-523-0161.

By order of the Commission.



Kenneth R. Mason
Secretary

Issued: February 7, 1985

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, DC 20436

In the Matter of)
)

CERTAIN GLASS TEMPERING SYSTEMS)
)
_____)

Investigation No. 337-TA-171

COMMISSION ACTION AND ORDER

Procedural History

On October 11, 1983, complainant Glasstech, Inc., filed a complaint with the U.S. International Trade Commission alleging violation of subsection (a) of section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) in the unlawful importation of certain glass tempering systems including frictionally driven oscillating roller bearer furnaces into the United States, or in their sale, by reason of alleged (1) infringement of claims 39-42 of U.S. Letters Patent 3,806,312 ('312 patent), and (2) infringement of claim 1 of U.S. Letters Patent 3,994,711 ('711 patent), the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States. A notice of investigation was published in the Federal Register on November 16, 1983 (43 F.R. 52136).

The complaint and notice of investigation named two respondents: (1) AB Kyro OY, a Finnish corporation, and (2) Tamglass, Inc., a Pennsylvania corporation that is a wholly owned subsidiary of AB Kyro OY. On June 4, 1984, the parties stipulated that issues relating to the '312 patent were

dismissed from this investigation with prejudice against the complainant as to the respondents but without prejudice to the introduction by any party of evidence relating to the '312 patent relevant to issues relating to the '711 patent.

On August 16, 1984, the administrative law judge issued an initial determination (ID) that there is a violation of section 337 in the importation and sale of the glass tempering systems under investigation. Respondents filed a petition for review of the ID. On September 17, 1984, the Commission issued a notice announcing its decision not to review the ID and establishing a deadline for filing written submissions on the issues of remedy, the public interest, and bonding (49 F.R. 37858).

After considering the submissions on remedy, the public interest, and bonding, the Commission on November 16, 1984, issued a limited exclusion order against infringing glass tempering systems produced by AB Kyro OY of Finland. The Commission found that the public interest in the availability of glass tempering systems was not strong enough to preclude issuance of its remedy against the unfairly traded imports.

On December 6, 1984, respondents filed a motion to amend Finding of Fact 276, contained in the ID, because it is erroneous (Motion 171-30). In addition, respondents filed a petition for reconsideration of the issuance of the limited exclusion order, pursuant to section 210.60 of the Commission's rules, because the Commission had relied on Finding of Fact 276 in preparing footnote 4 of its opinion on remedy, the public interest, and bonding.

Action

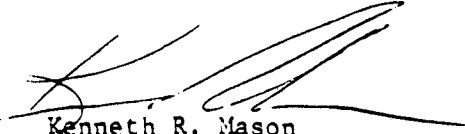
Having reviewed the relevant record evidence, including Motion 171-30, the petition for reconsideration, and the responses by the other parties to these documents, the Commission has determined to grant Motion 171-30 and amend Finding of Fact 276 to indicate that two U.S. sales of respondents' glass tempering systems involved systems capable of producing 96-inch-wide tempered glass. The Commission has also determined to deny the respondent's petition for reconsideration because reliance on Finding of Fact 276 was harmless error, respondents had ample time to correct the record before the Commission relied on the finding of fact in question, and because ready availability of 96-inch-wide tempered glass from other existing suppliers precludes the issuance of an exclusion order on the basis of public interest factors.

Order

Accordingly, it is hereby ORDERED THAT--

1. Motion 171-30 is granted;
2. Respondents' petition for reconsideration is denied; and
3. The Secretary shall serve copies of this Action and Order on the parties and publish notice thereof in the Federal Register.

By order of the Commission.

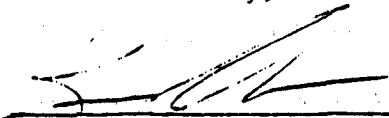


Kenneth R. Mason
Secretary

Issued: February 7, 1985

CERTIFICATE OF SERVICE

I, Kenneth R. Mason, hereby certify that the attached Notice of the Amendment of an Erroneous Finding of Fact and Denial of Respondents' Petition for Reconsideration, was served upon the following parties via first class mail, and air mail where necessary, on February 8, 1985.


Kenneth R. Mason, Secretary
U.S. International Trade Commission
701 E Street, N.W.
Washington, D.C. 20436

Behalf of Glasstech, Inc.

Ernie L. Brooks, Esq.
Mark A. Cantor, Esq.
Brooks & Kushman
3000 Town Center, Suite 2121
Southfield, MI 48075

Behalf of Tamglass OY & Tamglass, Inc.

Robert S. Swecker, Esq.
Burns, Doane, Swecker & Mathis
George Mason Bldg. - Washington & Prince St.
P.O. Box 1404
Alexandria, VA 22313-1404

RECEIVED

SEP 27 1984

OFFICE OF THE SECRETARY
U.S. INTERNATIONAL TRADE COMMISSION

UNITED STATES INTERNATIONAL TRADE COMMISSION
Washington, D.C. 20436

In the Matter of)
)
CERTAIN GLASS TEMPERING SYSTEMS)
_____)

Investigation No. 337-TA-171

NOTICE OF COMMISSION DECISION NOT TO REVIEW INITIAL DETERMINATION;
DEADLINE FOR FILING WRITTEN SUBMISSIONS ON REMEDY,
THE PUBLIC INTEREST, AND BONDING

AGENCY: U.S. International Trade Commission.

ACTION: Notice is hereby given that the Commission has determined not to review the presiding officer's initial determination (ID) that there is a violation of section 337 of the Tariff Act of 1930 in the above-captioned investigation. The parties to the investigation and interested government agencies are requested to file written submissions on the issues of remedy, the public interest, and bonding.

AUTHORITY: The authority for the Commission's action is contained in section 337 of the Tariff Act of 1930 (19 U.S.C. § 1337) and in sections 210.53-56 of the Commission's Rules of Practice and Procedure. 19 C.F.R. §§ 210.53-56.

SUPPLEMENTARY INFORMATION: The Commission instituted this investigation in response to a complaint filed by Glasstech, Inc., on October 11, 1983, to determine whether there is a violation of subsection (a) of section 337 in the unlawful importation of certain glass tempering systems including frictionally driven oscillating roller hearth furnaces into the United States, or in their sale, by reason of alleged (1) infringement of claims 39-42 of U.S. Letters Patent 3,806,312 ('312 patent); or (2) infringement of claim 1 of U.S. Letters Patent 3,994,711 ('711 patent), the effect or tendency of which is to destroy or substantially injure an industry, efficiently and economically operated, in the United States.

The two respondents in the investigation are AB Kyro OY, a corporation of Finland, and Tamglass, Inc., a Pennsylvania corporation which is a wholly-owned subsidiary of AB Kyro OY.

On June 4, 1984, the parties stipulated that issues relating to the '312 patent were dismissed from this investigation with prejudice against complainant as to the respondents, but without prejudice to the introduction by any party of evidence relating to the '312 patent relevant to issues relating to the '711 patent.

On August 16, 1984, the presiding officer issued an ID that there is a violation of section 337 in the importation and sale of the glass tempering systems under investigation. Specifically, the presiding officer determined that the '711 patent is valid, that it is being infringed under the doctrine of equivalents, and that the importation of the infringing product has the effect and tendency of substantially injuring an efficiently and economically operated domestic industry.

Respondents filed a petition for review of the ID with respect to the issues of validity and infringement of the '711 patent and of substantial injury. Complainant filed a reply to respondents' petition for review. No other petitions or agency comments were received.

WRITTEN SUBMISSIONS: Inasmuch as the Commission has found that a violation of section 337 has occurred, it may issue (1) an order which could result in the exclusion of the subject articles from entry into the United States and/or (2) cease and desist orders which could result in one or more respondents being required to cease and desist from engaging in unfair acts in the importation of such articles. Accordingly, the Commission is interested in receiving written submissions which address the form of relief, if any, which should be ordered.

If the Commission contemplates some form of relief, it must consider the effect of that relief upon the public interest. The factors which the Commission will consider include the effect that an exclusion order and/or a cease and desist order would have upon (1) the public health and welfare, (2) competitive conditions in the U.S. economy, (3) the U.S. production of articles which are like or directly competitive with those which are the subject of the investigation, and (4) U.S. consumers. The Commission is therefore interested in receiving written submissions concerning the effect, if any, that granting relief would have on the public interest.

If the Commission orders some form of relief, the President has 60 days to approve or disapprove the Commission's action. During this period, the subject articles would be entitled to enter the United States under a bond in an amount determined by the Commission and prescribed by the Secretary of the Treasury. The Commission is therefore interested in receiving written submissions concerning the amount of the bond, if any, which should be imposed.

The parties to the investigation and interested Government agencies are requested to file written submissions on the issues of remedy, the public interest, and bonding. The complainant and the Commission investigative

attorney are also requested to submit a proposed exclusion order and/or a proposed cease and desist order for the Commission's consideration. Persons other than the parties and Government agencies may file written submissions addressing the issues of remedy, the public interest, and bonding. Written submissions on remedy, the public interest, and bonding must be filed not later than the close of business on the day which is fourteen (14) days after publication of this notice in the Federal Register.


COMMISSION HEARING. The Commission does not plan to hold a public hearing in connection with final disposition of this investigation.

ADDITIONAL INFORMATION. Persons submitting written submissions must file the original document and 14 true copies thereof with the Office of the Secretary on or before the deadline stated above. Any person desiring to submit a document (or a portion thereof) to the Commission in confidence must request confidential treatment unless the information has already been granted such treatment by the presiding officer. All such requests should be directed to the Secretary to the Commission and must include a full statement of the reasons why the Commission should grant such treatment. Documents containing confidential information approved by the Commission for confidential treatment will be treated accordingly.

Copies of the public version of the ID and all other nonconfidential documents filed in connection with this investigation are available for inspection during official business hours (8:45 a.m. to 5:15 p.m.) in the Office of the Secretary, U.S. International Trade Commission, 701 E Street NW., Washington, D.C. 20436, telephone 202-523-0161.

FOR FURTHER INFORMATION CONTACT: Hannelore V. M. Hasl, Esq., Office of General Counsel, United States International Trade Commission, telephone 202-523-0359.

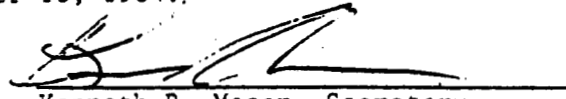
By order of the Commission.


Kenneth R. Mason
Secretary

Issued: September 17, 1984

CERTIFICATE OF SERVICE

I, Kenneth R. Mason, hereby certify that the attached NOTICE OF COMMISSION DECISION NOT TO REVIEW INITIAL DETERMINATION; DEADLINE FOR FILING WRITTEN SUBMISSIONS ON REMEDY, THE PUBLIC INTEREST, AND BONDING., was served upon Lynn I. Levine, Esq., and upon the following parties via first class mail, and air mail where necessary, on September 18, 1984..


Kenneth R. Mason, Secretary -
U.S. International Trade Commission
701 E Street, N.W.
Washington, D.C. 20436

FOR COMPLAINANT Glasstech, Inc.:

Ernie L. Brooks
Mark A. Cantor
BROOKS & KUSEMAN
Suite 2121, 3000 Town Center
Southfield, Michigan 48075

RESPONDENTS

For Tamglass, Inc. and
AB Kyro OY:

Robert S. Swecker
Frederick G. Michaud, Jr.
Ronald L. Grudziecki
David D. Reynolds
BURNS, DOANE, SWECKER & MATHIS
P. O. Box 1404
Alexandria, Virginia 22313-1404

GOVERNMENT AGENCIES:

Mr. Charles S. Stark
Antitrust Div./U.S. Dept of Justice
Room 7115, Main Justice
Pennsylvania Avenue & Tenth Street, N.W.
Washington, D.C. 20530

Edward F. Glynn, Jr., Esq.
Asst Dir for Intl Antitrust
Federal Trade Commission
Room 502-4, Logan Building
Washington, D.C. 20580

Darrel J. Grinstead, Esq.
Dept of Health and Human Svcs.
Room 5362, North Building
330 Independence Avenue, S.W.
Washington, D.C. 20201

Richard Abbey, Esq.
Chief Counsel
U.S. Customs Service
1301 Constitution Avenue, N.W.
Washington, D.C. 20229

