

UT 13-07

Tax Type: Use Tax

Tax Issue: Manufacturing & Equipment Exemption – Manufacturing

**STATE OF ILLINOIS
DEPARTMENT OF REVENUE
OFFICE OF ADMINISTRATIVE HEARINGS
CHICAGO, ILLINOIS**

ABC BUSINESS,)	Docket No.	XXXX
Taxpayer)	IBT No.	XXXX
v.)		
THE DEPARTMENT OF REVENUE)	John E. White,	
OF THE STATE OF ILLINOIS)	Administrative Law Judge	

RECOMMENDATION FOR DISPOSITION

Appearances: Brian Browdy and Scott Browdy, XYZ Law Firm, LLP, appeared for ABC Business; George Foster, Special Assistant Attorney General, appeared for the Illinois Department of Revenue.

Synopsis:

This matter involves an amended return that ABC Business (ABC BUSINESS) filed to claim a refund of Illinois use tax it had previously paid to the Illinois Department of Revenue (Department) regarding hydrogen and nitrogen gases that ABC BUSINESS purchased for use in Illinois. The purchases took place during January 2004 through and including December 2006. The Department denied ABC BUSINESS's claim, and ABC BUSINESS protested those denial and asked for a hearing.

The parties agreed that the issue at hearing was whether the hydrogen and nitrogen gases purchased by Taxpayer for use in its glass manufacturing process in Illinois qualified for the manufacturing and assembly exemption from use tax. 35 ILCS 105/3-50. I have reviewed the evidence adduced at hearing, and I am including in this recommendation findings of facts and conclusions of law. I recommend that the issue be resolved in favor of the Department.

Stipulations & Findings of Fact:

1. ABC BUSINESS is a Anyplace based manufacturer with a glass production facility in Anywhere, Illinois. Stipulation (Stip.) ¶ 1.
2. ABC BUSINESS's Anywhere facility manufactures flat glass for residential and commercial construction, automotive original and replacement markets, and industrial applications. Stip. ¶ 2.
3. The dispute here is whether Illinois use tax applies to hydrogen and nitrogen ABC BUSINESS purchased for use in manufacturing glass at its facility in Anywhere, Illinois. Stip. ¶ 3.

Facts Regarding ABC BUSINESS's Glass Manufacturing Facility in Illinois

4. ABC BUSINESS uses a "float process" to manufacture flat glass at the Anywhere plant. Stip. ¶ 4.
5. The float process uses a tin bath where molten glass flows from a melting furnace into a shallow bath of molten tin. Stip. ¶ 5.
6. The molten glass floats on top of and spreads over the heavier molten tin to form a flat, smooth ribbon. Stip. ¶ 6. As the glass cools and hardens, it creates a flat, smooth sheet of glass. Stip. ¶ 7. During the float process, ABC BUSINESS introduces controlled volumes of gaseous hydrogen and gaseous nitrogen into the bath atmosphere. Stip. ¶ 8.
7. The float process is more fully described in two articles Taxpayer offered, and which were admitted, into evidence. *See* Taxpayer Exs. 2 (photocopy of Jane Doe, Controlling Top Surface Defects in Float Glass, Ceramic Industry 31-35 Dec. 1995) 3 (photocopy of pertinent pages of Jane Doe and Jack Black, Float Glass Technology: The Bath Atmosphere System, 2 ABC BUSINESS Tech. Journal 61-70 (Feb. 1996)). Those two articles were written, in

whole or in part, by ABC BUSINESS's witness at hearing, Jane Doe. Hearing Transcript (Tr.) pp. 30, 34 (Jane Doe).

8. Taxpayer Exhibit 2 provides, in part:

The float process

The process begins by feeding raw materials into a glass furnace, as shown in Fig. 1, which is refractory lined and typically 200 ft long by 30 ft wide. Glass can be 3-5 ft deep in the melter portion of the furnace. Batch materials are fed into the furnace at a constant rate. Overhead gas fires melt the batch materials in the furnace that holds nearly 1500 tons of molten glass. After 24-72 hr of melting and refining the materials exit the furnace as molten glass. A typical through-put of glass is 500 tons/day.

Once the raw materials are melted and refined, the molten glass is poured onto a pool of molten tin. In this chamber, a continuous glass ribbon forms. Once the ribbon is formed, it is delivered to a controlled cooling chamber called the annealing lehr, which removes stresses in the glass. After annealing, the product is cut and packed for the customer.

Taxpayer Ex. 2, p. 1.

9. Below is a copy of Figure 1 from Taxpayer Exhibit 2, with the following caption:

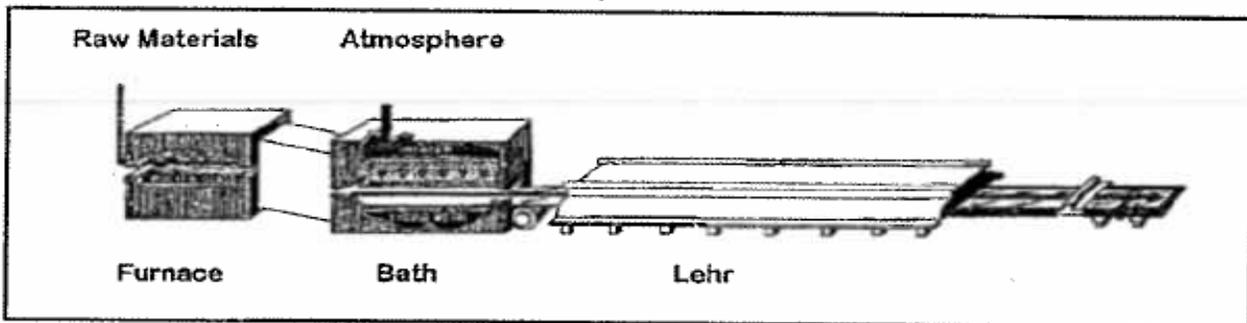


Fig. 1: A schematic of a typical float line process. Adapted from R.W. Yunker.

Taxpayer Ex. 2, p. 1.

10. The bath is contained within a long chamber that begins when molten glass flows into the bath from a tank, and extends approximately 60 meters to the lehr. Taxpayer Ex. 3, pp. 62-63

& Figure 1; Taxpayer Ex. 5 (copy of printed slide show prepared by Jane Doe, describing the float process), p. 2 (illustration titled, Overview of Float Bath).

11. Taxpayer Exhibit 2 also provides, in part:

The float bath

The float bath is a multifunctional chamber in which three key activities are performed: The glass is sized, a uniform thickness is established across the ribbon and the glass is controllably cooled. As displayed in Fig. 2, the bath is divided into upper and lower plenums. The upper plenum, a metal shell, houses all the electrical devices, thermocouple wires and heating elements. The lower plenum contains the tin and glass. Refractories line the bath bottom, sidewalls and roof. Several zones of heating elements project down through the lower plenum roof and hang several inches above the glass. Several zones of heating elements are present in the bath.

Temperature measuring devices also protrude into the lower plenum and are placed at any location and distance from the glass. Since these electrical devices cannot survive in extreme temperatures, nitrogen is used to cool the upper plenum and eventually enters the lower plenum. In a typical bath, 50,000 cfh or more nitrogen flows through the chamber continuously. The total atmosphere in the lower plenum replenishes several times an hour.

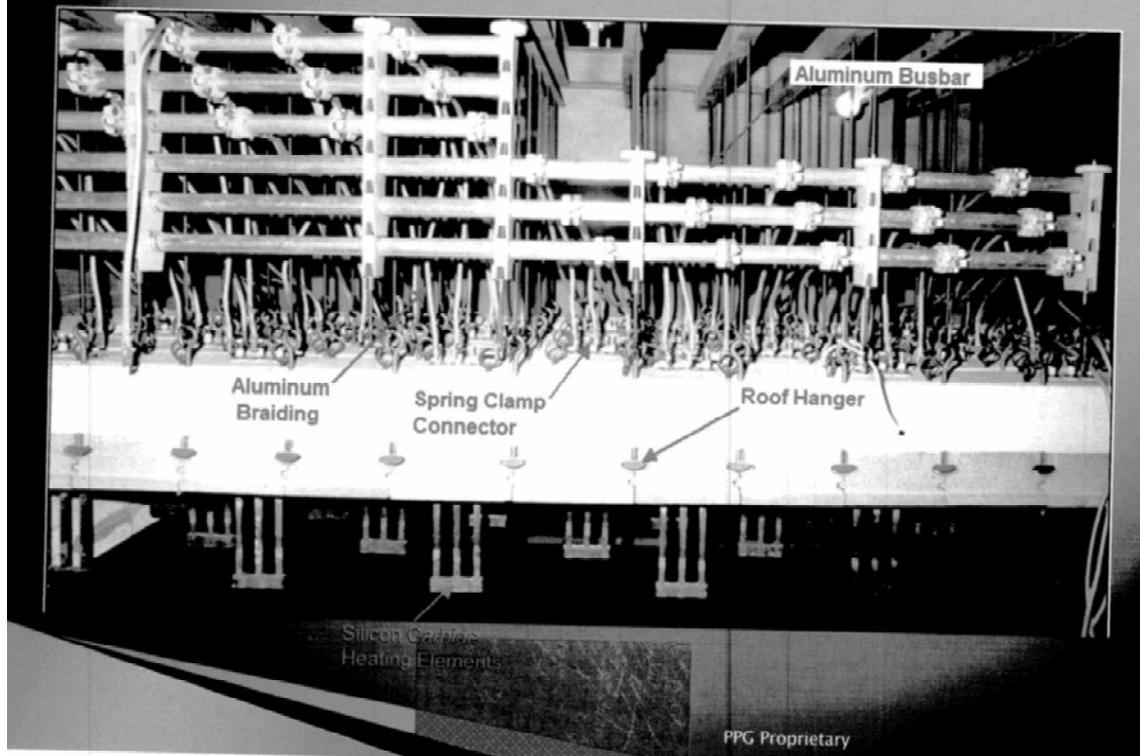
Cooling of the glass occurs by heat exchange from the glass to ambient and by coolers placed through the sides of the bath above the glass. Glass enters the bath at ~ 1900° F and exits at ~ 1050° F; this constitutes the bath operating temperature range. Two hundred tons of tin at elevated temperatures creates a chemically active environment that leads to the formation of bath-related defects.

Taxpayer Ex. 2, pp. 1-2. Additionally, the caption to Figure 2, which shows a side view of a typical float bath, provides, in part: “The upper plenum contains electrical devices and is filled with nitrogen to cool devices. The lower plenum contains the glass.” *Id.*

12. The bath has a hot end, near the tank, and a cool end, near the Lehr. Taxpayer Ex. 2, p. 2; Taxpayer Ex. 3, p. 63 (Figure 1); Taxpayer Ex. 4 (copy of unpublished ABC BUSINESS work titled, Bath Chemistry, written by Jane Doe, Ed Red and Gene Green, and dated 2007). The terms hot and cool are relative to one another, and to the temperature of the molten glass when poured into the bath from the tank. Taxpayer Ex. 4, pp. 1, 21; Taxpayer Ex. 5, pp. 16-

17. At the hot end, the bath atmosphere is approximately 1,900° F, at the cool end, it is approximately 1,100° F. Taxpayer Ex. 4, pp. 1, 21; Taxpayer Ex. 5, pp. 16-17.
13. From the time the molten glass is poured onto the molten tin in the bath, the manufacturing process requires a slow, controlled cooling of the glass as it changes from a liquid to a solid. Taxpayer Ex. 2, pp. 1-2; Taxpayer Ex. 5, p. 2.
14. Although the lehr is the place within the manufacturing process where most of the controlled cooling of the glass takes place, controlled cooling also takes place within the bath chamber. Taxpayer Ex. 2, pp. 1-2; Taxpayer Ex. 4, pp. 12-28; Taxpayer Ex. 5, p. 2; Tr. pp. 40-41, 45-49 (Jane Doe).
15. The cooling that occurs within the bath chamber is controlled using silicon carbide heating elements that are situated along the bath line in the upper plenum, and which extend downward toward the bath (Taxpayer Ex. 5, pp. 2, 4), and later, using tin coolers situated along the lower plenum. Taxpayer Ex. 3, pp. 7-8 & Figure 5 (showing typical atmosphere flow pattern with the lower plenum of the bath chamber); Taxpayer Ex. 5, pp. 2, 4.
16. The heaters are suspended and fixed in the upper plenum with aluminum braids. Taxpayer Ex. 2, p. 1; Taxpayer Ex. 4, p. 12; Taxpayer Ex. 5, p. 4.
17. Taxpayer Ex. 5, page 4, consists of a photograph of some of the different types of machinery and equipment situated within the upper plenum of ABC BUSINESS's bath chamber, and that photo is labeled to identify such items. Taxpayer Ex. 5, p. 4. A copy of that page is depicted here:

Upper Plenum Operating Temperature Limit 315°C – to avoid fatigue of materials



Taxpayer Ex. 5, p. 4 (the items that look like squared-off “W’s,” at the bottom of the photo, are labeled, “Silicon Carbide Heating Elements”).

18. The temperature of the molten glass at the hot end of the bath is greater than the operating temperature limit of the upper plenum. Taxpayer Ex. 5, pp. 2, 4.
19. The manufacturing process requires ABC BUSINESS to cool the machines and equipment in the upper plenum, so they may work effectively. Taxpayer Ex. 2, p. 1; Taxpayer Ex. 5, pp. 3-4; Tr. pp. 45-47 (Jane Doe).
20. The temperature of the molten glass would be sufficient to fatigue, or degrade the integrity of, the aluminum braids, the metal connectors securing the heaters, the heaters themselves, as well as other machinery and equipment in the upper plenum, if the upper plenum were not

cooled. Taxpayer Ex. 2, p. 2 (“Since these electrical devices [i.e., temperature measuring devices] cannot survive in extreme temperatures, nitrogen is used to cool the upper plenum and eventually enters the lower plenum.”); Taxpayer Ex. 5, p. 4; Tr. p. 46 (Jane Doe) (“nitrogen is used to maintain the integrity of all of the physical metals that are necessary to keep those heating elements active.”).

21. ABC BUSINESS uses nitrogen to cool the machinery and equipment in the upper plenum. Taxpayer Ex. 2, p. 1; Taxpayer Ex. 4, p. 12; Taxpayer Ex. 5, p. 3; Tr. pp. 35-39, 74-75 (Jane Doe). The nitrogen then becomes the largest proportion of gas that makes up the bath atmosphere in the lower plenum. Taxpayer Ex. 4, p. 12; Tr. p. 45 (Jane Doe).
22. Taxpayer Exhibit 4 provides, in pertinent part, as follows:

Bath Atmosphere

Bath atmosphere has two purposes. First it is used to keep the aluminum braids on the bus bars cool in the upper plenum; second it is used to pressurize the lower plenum to reduce free movement of oxygen into the lower plenum. The atmosphere must be inert with the materials in the bath. Nitrogen serves as the inert atmosphere. The use of hydrogen mixed with nitrogen allows the atmosphere to be reducing for the oxygen, and tin oxide that is in the bath.

Hydrogen is mixed with nitrogen at levels of 1 to 5% total volume. Figures 7 and 8 depict important thermodynamic and kinetic information about the reduction of tin oxide that can be used to control bath chemistry. Figure 7 shows that at higher temperatures less hydrogen is needed to reduce the same amount of tin oxide. In the exit end of the bath nearly 7% hydrogen is required to reduce tin oxide, while at the hot end only 3% hydrogen is required. Figure 8 demonstrates how temperature affects the rate of reaction. The graph shows that increasing temperature increases the reaction rate, or reduces the time to react. At the hot end of the bath the reaction time is a few minutes, while at the exit end the same quantities of reactants would take 30 minutes to react. Both figures show that exit end reactivity is low and slow. So in the float bath, hydrogen is used most efficiently in the hot end of the process for tin cleaning.

Taxpayer Ex. 4, p. 12; Tr. pp. 35-39 (Jane Doe).

23. Oxygen is a contaminant within the bath and bath atmosphere. Taxpayer Ex. 2, pp. 2-3; Taxpayer Ex. 5, pp. 20 (“The oxygen cycle is the root cause of more bath defects than any other mechanism”) – 28; Tr. pp. 51-56 (Jane Doe).
24. ABC BUSINESS introduces controlled volumes of nitrogen and hydrogen into the bath atmosphere to limit the amount, and effect, of the oxygen present within the bath and bath atmosphere. Stip. ¶ 8; Taxpayer Ex. 2, pp. 2-3; Taxpayer Ex. 5, pp. 20-28; Tr. pp. 51-56 (Jane Doe).
25. Using nitrogen as the largest portion of the bath atmosphere creates a positive pressure environment in the lower plenum. Taxpayer Ex. 3, p. 7; Taxpayer Ex. 4, p. 12; Tr. p. 49 (Jane Doe). That means that the pressure within the lower plenum is greater than the air pressure outside the lower plenum, which helps to keep oxygen, and other gases that are in the air outside of the lower plenum, out of the lower plenum. Taxpayer Ex. 4, p. 12; Tr. p. 49 (Jane Doe) (“The main purpose [of using nitrogen in the lower plenum] there is to create a little bit of pressure inside the lower plenum as a way of keeping out a direct influx of oxygen. You cannot stop the oxygen from coming in but by pressurizing the lower chamber just a bit, it’s helping us in the efforts of keeping the oxygen out.”).
26. ABC BUSINESS uses nitrogen as the greatest proportion of the bath atmosphere in the lower plenum because nitrogen is the most readily available, inert — i.e. non-reactive — gas. Tr. pp. 46-47 (Jane Doe) (“... of all the inert gases that would have been chosen, nitrogen is the most readily available.” Q: By inert, that means it doesn’t tend to react?” A: “It won’t react, that’s right.”).
27. With regard to ABC BUSINESS’s use of hydrogen in the bath chamber, Taxpayer Exhibit 2 provides:

Tin chemistry

Tin has many properties that make it the material of choice for forming glass. ***

Tin is not highly reactive with nitrogen; however it is highly reactive to oxygen. Oxygen contamination in the float bath is shown in Fig. 3. There are two potential sources of oxygen, air ingress and migration from the glass. The amount of oxygen from the glass contributes a minor amount to the total oxygen found in the float bath. Oxygen dissolves into the tin, forming tin oxide, Tin oxide vaporizes and condenses onto cooler parts of the bath superstructure.

Oxygen solubility is temperature dependent, as shown in Fig. 4. At the exit end of the bath where the solubility is much lower, 10 ppm, tin oxide dross forms as a result of saturation. **Hydrogen is added to the bath atmosphere as a reducing agent; it will react with the oxygen in the atmosphere and with the surface tin to remove free oxygen from the system. Hydrogen will also reduce the tin oxide that has condensed on the roof, forming elemental tin that may fall from the roof onto the glass surface creating defects.**

Taxpayer Ex. 2, pp. 2-3 (emphasis added); *see also* reactive. Dictionary.com. *Collins English Dictionary-Complete & Unabridged 10th Edition*. HarperCollins Publishers. <http://dictionary.reference.com/browse/reactive> (last accessed: November 15, 2012) (reactive means “readily partaking in chemical reactions: *sodium is a reactive metal; free radicals are very reactive.*”).

28. With further regard to ABC BUSINESS’s use of hydrogen in the bath chamber, Taxpayer Exhibit 3 provides, in pertinent part:

Hydrogen in the bath atmosphere reacts with any oxygen present, forming water, thus preventing dissolution into the tin. The amount of water formed is obtained by measuring the dew point. Figure 3 shows the relationship between the dew point and the parts per million of water vapor in a gas sample.[footnote omitted] With this information one can estimate the quantity of oxygen leaking into the bath. If insufficient hydrogen is present, oxygen will dissolve in the tin, building up over time. This buildup can be fairly rapid; observation of the tin surface in situations when the bath is open (e.g., during a ribbon startup or during a bath emergency) shows that saturation, as indicated by the formation of dross, is reached in a matter of minutes.

The kinetics of the reaction of hydrogen with the oxygen present in the bath atmosphere are quite rapid at the hot end of the bath, and are not a rate-limiting feature of the bath chemistry. When viewed from a [] chemical equilibrium standpoint, the amount of hydrogen present is usually many times that required for effective control of oxygen levels in the tin. If dross formation is a problem under these conditions, it is a clear sign that bath pressure is low and/or that bath sealing is inadequate.

Taxpayer Ex. 3, p. 5.

29. Taxpayer Exhibit 3 additionally provides:

Hydrogen in the bath atmosphere will reduce both tin sulfide and tin oxide to elemental tin. Its usage, therefore, should be carefully controlled; it is necessary to use a sufficient amount to keep the tin clean by reacting with the oxygen present, but not so much as to accelerate the reduction of tin sulfide. This operating tightrope has been recognized for several decades, with the gradual reduction in practice in the use of hydrogen, as sealing techniques have improved and as bath defects have become more predominant.

Taxpayer Ex. 3, p. 8.

Facts Regarding The Department's Audit of ABC BUSINESS's Claim

30. The Department audited ABC BUSINESS for the period at issue. Stip. ¶ 9. As part of the audit, ABC BUSINESS submitted an amended return/claim for refund of the use tax it has previously remitted regarding the hydrogen and nitrogen gases it purchased and used at its Anywhere glass plant. Stip. ¶ 10.

31. The total amount of Taxpayer's claim is \$329,761. Stip. ¶ 11.

32. The Department auditor conducting the audit of ABC BUSINESS, including its claim for refund at issue here, prepared a narrative report to document his review of ABC BUSINESS's claim. Department Ex. 1, pp. 2-3 (copy of Audit Narrative report). That Audit Narrative provides, in part:

Purchases:

Consumable Goods — The taxpayer hired a consultant to file a claim for purchases made during the audit period. The purchases that are being made are for chemicals being used to keep air bubbles and other imperfections from forming in the glass during the manufacturing process. In a previous audit that taxpayer went to ICB and Allan Schell, Columbus, Ohio based Illinois Sales Tax Auditor performing the audit, requested that a chemist review the process to determine if the chemicals could be considered tax exempt for Manufacturing. The chemists findings were that the liquid hydrogen and nitrogen used in this process did not qualify for a Manufacturing exemption. This stance taken in the previous audit was verified and used in the audit that generated the Claim filed by XYZ, Inc., the consultant. The results are that the full amount of the claim \$329,761 has been denied.

Department Ex. 1, pp. 2-3.

33. The Department denied ABC BUSINESS's claim and ABC BUSINESS protested the Department's denial. Stip. ¶ 12; Department Ex. 1, p. 1 (copy of Notice of Audit Claim Denial).

Conclusions of Law

Illinois' Use Tax Act (UTA) imposes a tax on the privilege of using in Illinois tangible personal property purchased at retail from a retailer. 35 ILCS 105/3. Section 3-5 of the UTA contains a number of exemptions from tax, and during the years at issue, it provided as follows:

Sec. 3-5. Exemptions. Use of the following tangible personal property is exempt from the tax imposed by this Act:

(18) Manufacturing and assembling machinery and equipment used primarily in the process of manufacturing or assembling tangible personal property for wholesale or retail sale or lease, whether that sale or lease is made directly by the manufacturer or by some other person, whether the materials used in the process are owned by the manufacturer or some other person, or whether that sale or lease is made apart from or as an incident to the seller's engaging in the service occupation of producing machines, tools, dies, jigs, patterns, gauges, or other similar items of no commercial value on special order for a particular purchaser.

35 ILCS 105/3-5(18). From August 23, 2001 through January 11, 2008, § 3-50 of the UTA provided as follows:

Sec. 3-50. Manufacturing and assembly exemption. *** For the purposes of this exemption, terms have the following meanings:

(1) "Manufacturing process" means the production of an article of tangible personal property, whether the article is a finished product or an article for use in the process of manufacturing or assembling a different article of tangible personal property, by a procedure commonly regarded as manufacturing, processing, fabricating, or refining that changes some existing material into a material with a different form, use, or name. In relation to a recognized integrated business composed of a series of operations that collectively constitute manufacturing, or individually constitute manufacturing operations, the manufacturing process commences with the first operation or stage of production in the series and does not end until the completion of the final product in the last operation or stage of production in the series. For purposes of this exemption, photoprocessing is a manufacturing process of tangible personal property for wholesale or retail sale.

(2) "Assembling process" means the production of an article of tangible personal property, whether the article is a finished product or an article for use in the process of manufacturing or assembling a different article of tangible personal property, by the combination of existing materials in a manner commonly regarded as assembling that results in an article or material of a different form, use, or name.

(3) "Machinery" means major mechanical machines or major components of those machines contributing to a manufacturing or assembling process.

(4) "Equipment" includes an independent device or tool separate from machinery but essential to an integrated manufacturing or assembly process; including computers used primarily in a manufacturer's computer assisted design, computer assisted manufacturing (CAD/CAM) system; any subunit or assembly comprising a component of any machinery or auxiliary, adjunct, or attachment parts of machinery, such as tools, dies, jigs, fixtures, patterns, and molds; and any parts that require periodic replacement in the course of normal operation; but does not include hand tools. **Equipment includes chemicals or chemicals acting as catalysts but only if the chemicals or chemicals acting as catalysts effect a direct and immediate change upon a product being manufactured or assembled for wholesale or retail sale or lease.**

*** Informal rulings, opinions, or letters issued by the Department in response to an inquiry or request for an opinion from any person regarding the coverage and applicability of this exemption to specific devices shall be published, maintained as a public record, and made available for public inspection and copying. If the informal ruling, opinion, or letter contains trade secrets or other confidential information, where possible, the Department shall delete that information before publication. Whenever informal rulings, opinions, or letters contain a policy of general applicability, the Department shall formulate and adopt that policy as a rule in accordance with the Illinois Administrative Procedure Act.

The express text of § 3-50(4) shows that the legislature distinguished chemicals from other types of manufacturing equipment, and limited the exemption's availability for chemicals used in a manufacturing or assembly process. 35 ILCS 105/3-50(4). Whereas any independent devices or tools that are separate from machinery but essential to an integrated manufacturing or assembly process are included within the definition of exempt equipment, chemicals or chemicals acting as catalysts are included in the definition of exempt equipment "only if the chemicals or chemicals acting as catalysts effect a direct and immediate change upon a product being manufactured or assembled for wholesale or retail sale or lease." *Id.*

Complementary MM&E exemption provisions are also included within the Illinois Retailers' Occupation Tax Act (ROTA) (35 ILCS 120/2-5(14); 35 ILCS 120/2-45). During the years at issue, there was no regulation published under the UTA regarding the MM&E exemption. There was, however, a regulation that announced how the Department would interpret and administer the ROTA's complementary MM&E exemption. 86 Ill. Admin. Code § 130.330. During the years at issue, that applicable ROT regulation (ROTR) provided, in pertinent part:

Section 130.330 Manufacturing Machinery and Equipment

- a) General. Notwithstanding the fact that the sales may be at retail, the Retailers' Occupation Tax does not apply to sales of machinery and equipment used primarily in the manufacturing or assembling of tangible personal property for wholesale or retail sale or lease.

c) Machinery and Equipment

- 1) The law exempts only the purchase and use of "machinery" and "equipment" used in manufacturing or assembling. Accordingly, no other type or kind of tangible personal property will qualify for the exemption, even though it may be used primarily in the manufacturing or assembling of tangible personal property for sale or lease. ***

- 6) *The exemption includes chemicals or chemicals acting as catalysts but only if the chemicals or chemicals acting as catalysts effect a direct and*

immediate change upon a product being manufactured or assembled for sale or lease. (Section 2-45 of the Act) The following examples are illustrative:

- A) Example 1. A chemical acid is used to etch copper off the surface of a printed circuit board during the manufacturing process. The acid causes a direct and immediate change upon the product. The acid qualifies for the exemption.
 - B) Example 2. An aluminum oxide catalyst is used in a catalytic cracking process to refine heavy gas oil into gasoline. In this process, large molecules of gas oil or feed are broken up into smaller molecules. After the catalyst is injected into the feed and used in the cracking process, it is drawn off and reused in subsequent manufacturing processes. The catalyst qualifies for the exemption.
- d) Primary Use
- 1) The law requires that machinery and equipment be used primarily in manufacturing or assembling. Therefore, machinery that is used primarily in an exempt process and partially in a nonexempt manner would qualify for exemption. However, the purchaser must be able to establish through adequate records that the machinery or equipment is used over 50 percent in an exempt manner in order to claim the deduction.
 - 2) The fact that particular machinery or equipment may be considered essential to the conduct of the business of manufacturing or assembling because its use is required by law or practical necessity does not, of itself, mean that machinery or equipment is used primarily in manufacturing or assembling.

86 Ill. Admin Code § 130.330.

Is the Nitrogen Exempt Equipment Under UTA § 3-50?

Taxpayer argues that the nitrogen effects a direct and immediate change on the glass being manufactured at its Anywhere plant. Taxpayer ABC Business's Initial Post-Hearing Brief (ABC BUSINESS's Brief), pp. 4-5. Specifically, ABC BUSINESS argues that:

*** First, [adding] nitrogen to the float bath allows the glass to cool in a controlled manner. Adding nitrogen to the upper plenum of the bath cools the bath structure and heating elements, thus allowing ABC BUSINESS to maintain the glass in a temperature range suitable for forming. (Tr. at 47-49, Ex. V, "Upper Plenum Operating Temperature Limit.") As Ms. Jane Doe's testimony unambiguously confirmed, the direct, immediate, and necessary result of adding nitrogen is controlled cooling of the glass in the bath so that it remains within a pre-determined temperature range (1400-1700 degrees) for forming. (Tr. at 7-49, 83-84.) Only by maintaining the glass at this defined

temperature range is it possible [to] establish the viscosity (which Ms. Jane Doe defined as “taffy”) that is required for forming into a usable depth, smoothness, and shape. ([Tr. at] 48-49, 84.) Acquiring the desired taffy viscosity, Ms. Jane Doe confirmed, is a direct and immediate result of treating the bath atmosphere with nitrogen. (Tr. at 49, 83-84.)

Absent controlled cooling, ABC BUSINESS’s glass would contain various distortion defects: (Tr. at 84) It would be like taking a piece of Saran wrap and pulling it on the edges ... you get a ripple.” (Tr. at 84) In fact, the float process itself would not be possible without the cooling effect of nitrogen or a replacement inert gas. Ms. Jane Doe’s testimony in this regard was clear: the entire bath structure would fall apart absent the nitrogen’s cooling effect. (Tr. at 85).

ABC BUSINESS’s Brief, pp. 4-5.

The Department argues that, since the primary purpose for which Taxpayer uses the nitrogen is to cool the machinery and equipment contained in the upper plenum, and not the glass, then the nitrogen does not effect a direct and immediate change upon the product that ABC BUSINESS is manufacturing here. Department’s Brief, p. 3. The Department argues that it is the heaters, and not the nitrogen, that effect a direct change to the glass being manufactured, by cooling it. *Id.* It asserts that the nitrogen has only an indirect effect on the glass, by allowing the heaters and other equipment in the upper plenum to work and to gradually cool the glass. *Id.*

Taxpayer acknowledges that there is no Illinois case law in which an Illinois court has been called upon to analyze or interpret whether a chemical should be considered included within the statutory definition of exempt manufacturing equipment, under UTA § 3-50(4). ABC BUSINESS’s Brief, p. 7. Instead, it cites to two private letter rulings and to a general information letter that the Department published, following requests for rulings by different taxpayers. *Id.*, pp. 7-8 (*citing* Private Letter Ruling (PLR) 85-0155, 05-0011 and General Information Letter (GIL) ST-02-0223). ABC BUSINESS argues that those rulings support a conclusion that its use of nitrogen and hydrogen is exempt from use tax. *Id.*

In PLR 85-0155, the Department ruled that a resin that a taxpayer purchased and used in the process of manufacturing high dextrose and high fructose corn syrups, to filter and remove undesired contaminants from the syrups, qualified for the exemption. PLR 85-0155 (February 6, 1985).

In GIL 02-0223, the taxpayer, a manufacturer of frozen dinners, asked for a determination of whether its use of liquid nitrogen to flash freeze its product before shipment to retailers might be subject to the MM&E exemption. GIL 02-0223 (October 22, 2002). In response to that request, the Department noted that, “[a]s a general proposition, liquid nitrogen that makes a direct and immediate change upon a product being manufactured, such as freezing the product, can qualify for the exemption.” *Id.*

Finally, in PLR 05-0011, the Department was asked to determine whether certain chemicals that a taxpayer used in its business of cleaning steel were exempt from use tax. PLR 05-0011 (August 31, 2005). Specifically, the taxpayer described that it used a series of tanks, each filled with cleaners, hydrochloric acid, or oil, into which it submerged the steel it was hired to clean. *Id.* By submerging the steel into the tanks of cleaners and acid, rust and scale were removed from the steel. *Id.* Afterwards, the taxpayer submerged the cleaned steel into a tank of oil, to give the steel a protective coating that prevented it from rusting prior to or during shipment. *Id.* In response to that request, the Department ruled that the cleaners and acid would be exempt, because they effected a direct and immediate change in the steel, but that the oil would not be exempt, because it did not effect any change to the steel. *Id.*

Taxpayer argues that the nitrogen and hydrogen it uses when manufacturing glass are like the chemicals the Department had previously determined were exempt in the cited ruling and

information letters. ABC BUSINESS's Brief, pp. 7-8. This part of the recommendation will focus on ABC BUSINESS's arguments regarding its use of nitrogen.

ABC BUSINESS argues that "nitrogen pressurizes (or filters) the atmosphere so that oxygen cannot react with tin at the glass-tin interface. Just as the filters in PLR 85-0155, nitrogen ... remove[s] an undesirable element (oxygen) from the manufacturing process, and thus qualif[ies] for the machine manufacturing exemption." *Id.* It also argues that the nitrogen performs a function that is similar to that of the liquid nitrogen that the taxpayer in GIL ST 02-0223 used to flash freeze its frozen dinners. *Id.*, p. 8. Finally, ABC BUSINESS contends that the nitrogen is substantively no different than the chemicals, discussed in PLR 05-0011, that removed defects in the steel cleaning tanks, since the nitrogen here "remove[s,] eliminate[s,] or reduce[s] impurities in the float bath process." *Id.*

These arguments, however, do not persuade. First, it is important to stress that all of ABC BUSINESS's arguments, in general, conflate the bath atmosphere and the tin bath as though those environments were indistinguishable from, or the same as, the glass ABC BUSINESS manufactures at its Anywhere plant. ABC BUSINESS's use of nitrogen to pressurize the atmosphere in the lower plenum bath chamber is not analogous with a chemical that actually filters out contaminants that are present on or within the product being manufactured for sale. 86 Ill. Admin. Code § 130.330(c)(6)(A)-(B). ABC BUSINESS manufactures glass, not bath atmosphere, or tin. ABC BUSINESS's pressurization of the bath atmosphere does not act as any kind of a filter of or through the glass. To be exempt, the statute requires a chemical to have a direct and immediate effect on the product being manufactured for sale, and not just that the chemical be required by the manufacturing process. 35 ILCS 105/5-30(4); 86 Ill. Admin. Code § 130.330(c)(6), (d)(2). By creating a positive pressure environment within the bath atmosphere,

ABC BUSINESS limits the accessibility of oxygen present in the atmosphere outside the chamber from entering the chamber. Taxpayer Ex. 3, p. 7; Tr. pp. 49, 51 (Jane Doe). But the nitrogen does not extract or filter oxygen from within the glass itself. *See* 86 Ill. Admin. Code § 130.330(c)(6)(A)-(B).

Next, the way that ABC BUSINESS uses nitrogen to cool the machinery and equipment in the upper plenum of its bath chamber is not analogous to the way the taxpayer described in GIL ST 02-0223 used liquid nitrogen to flash freeze its frozen dinners. There can be no doubt that the entire manufacturing process of gradually cooling the glass within the bath chamber effects a direct and gradual change on the physical structure of the glass during the earlier and middle stages within the bath chamber. Taxpayer Ex. Tr. pp. 40-49 (Jane Doe). As Jane Doe described at hearing, when the glass is poured onto the molten tin within the bath chamber, “the glass is pretty much like molasses.” Tr. p. 40 (Jane Doe). In the middle part of the bath, where the glass has begun to slowly cool, the bath system allows ABC BUSINESS to pull, stretch and shape the glass to get it into a particular uniform thickness and viscosity. Taxpayer Ex. 5, p. 2; Tr. pp. 40-41, 48-49 (Jane Doe). Jane Doe agreed that “adding the nitrogen allows [ABC BUSINESS] to get the proper form of taffy.” Tr. p. 49 (Jane Doe). Yet she also consistently testified that the nitrogen’s primary purpose was to cool the heaters and other machinery and equipment in the upper plenum, so the heaters could work. Tr. pp. 45-46, 74-75, 80-81, 86-87 (Jane Doe); *accord*, Taxpayer Ex. 2, p. 2 (“Since these electrical devices cannot survive in extreme temperatures, nitrogen is used to cool the upper plenum.”); Taxpayer Ex. 5, p. 3 (“Bath Atmosphere [...] Nitrogen 95-99%, cools the roof hangers and electrical braids”).

In its brief, Taxpayer suggests that the cooling of the glass within the bath chamber is a direct effect of the nitrogen that is introduced into the upper plenum. ABC BUSINESS’s Brief,

pp. 4-5 (*quoted supra*, pp. 15-16). But that is not what the evidence shows. Taxpayer Ex. 2, p. 2; Taxpayer Ex. 5, p. 4. The controlled cooling that takes place in the bath chamber is a direct effect of the entire system of the machinery and equipment that *delays* the cooling of the glass while it is flowing through the bath chamber. *See* Tr. p. 45 (Jane Doe) (“If the glass cool too fast and you’re continuing to pull [it], then you end up with distortion in the glass.”). The direct and immediate effect of the nitrogen that ABC BUSINESS introduces into the upper plenum of the bath chamber is to cool the machinery and equipment within it, so they will function. Taxpayer Ex. 2, p. 2; Taxpayer Ex. 5, p. 3. Indeed, if ABC BUSINESS used nitrogen in the same way that the taxpayer in GIL ST-02-0223 used it, its glass would be ruined. Tr. p. 45 (Jane Doe).

The Department is correct that the evidence shows that ABC BUSINESS does not use the nitrogen to cool the glass, and thereby, to effect a direct and immediate change to it. Taxpayer Ex. 2, pp. 2-3; Taxpayer Ex. 3, p. 7; Taxpayer Ex. 5, pp. 3-4. Department counsel was explicit in his cross-examination of Jane Doe on this point, and she was equally clear that the nitrogen was primarily used to cool the machinery and equipment within the upper plenum, so they could work to gradually allow the glass to form and cool. Tr. pp. 74-75, 80-81 (Jane Doe). The situation described in GIL ST-0200223 was that nitrogen was used to directly flash freeze food prepared for sale as frozen dinners. Here, in contrast, the direct effect of the nitrogen ABC BUSINESS used was to cool machinery and equipment, in one step of a manufacturing process, that ABC BUSINESS used to delay the cooling of the glass that it was manufacturing. I agree that ABC BUSINESS’s use of the nitrogen here did not effect a direct and immediate change in the glass being manufactured.

Finally, I do not agree that ABC BUSINESS’s use of nitrogen is analogous to the chemicals that the taxpayer described in PLR 05-0011 used to remove rust and scale from steel.

There, the taxpayer submerged steel into tanks filled with cleaners and acids, and those cleaners and acids removed the rust and scale from the steel surface. PLR 05-0011 (Aug. 31, 2005). Here, however, the nitrogen that ABC BUSINESS uses to cool the upper plenum, and which then filters down to the lower plenum, does not remove oxygen from the glass. Taxpayer Ex. 3, pp. 7-8 (and Fig. 5). Rather, and as ABC BUSINESS itself argued, “these chemicals [nitrogen and hydrogen] *remove oxygen from the bath atmosphere* and, in particular, slow or eliminate various chemical reactions that cause tin to deposit on the surface of the glass.” ABC BUSINESS’s Brief, pp. 8-9 (emphasis added).

Is the Hydrogen Exempt Equipment Under UTA § 3-50?

At hearing, Jane Doe testified that introducing hydrogen into the bath atmosphere effected a direct and immediate change in the glass, by limiting the amount of oxygen related defects in the glass while it was flowing through the bath chamber. Tr. pp. 55-71 (Jane Doe). But Jane Doe’s own published and presented papers reflect that what hydrogen directly and immediately affects is the bath atmosphere and tin. Taxpayer Ex. 2, pp. 2-3 (“Hydrogen is added to the bath atmosphere as a reducing agent; it will react with the oxygen in the atmosphere and with the surface tin to remove free oxygen from the system. Hydrogen will also reduce the tin oxide that has condensed on the roof, forming elemental tin that may fall from the roof onto the glass surface creating defects.”); Taxpayer Ex. 3, p. 8 (“it is necessary to use a sufficient amount [of hydrogen] to keep the tin clean by reacting with the oxygen present, but not so much as to accelerate the reduction of tin sulfide.”); Taxpayer Ex. 4, p. 12 (“So in the float bath, hydrogen is used most efficiently in the hot end of the process for tin cleaning.”). When Jane Doe’s own writings describing how ABC BUSINESS controls its float bath atmosphere repeatedly state that

hydrogen is used to clean tin, I give those books and records more weight than her conclusory hearing testimony.

Here, too, ABC BUSINESS has not shown that its use of hydrogen is analogous to the chemicals the Department has previously determined were exempt manufacturing equipment. As it did with nitrogen, ABC BUSINESS argues that “[j]ust as the filters in PLR 85-0155, ... hydrogen remove[s] an undesirable element (oxygen) from the manufacturing process, and thus qualify for the machine manufacturing exemption.” ABC BUSINESS’s Brief, p. 8. But to be included within the definition of exempt equipment, a chemical must do more than have an effect on some part of the manufacturing process; it must “effect a direct and immediate change upon a product being manufactured” 35 ILCS 105/3-50(4); 86 Ill. Admin. Code § 130.330(c)(6). Here, the hydrogen does not act as a direct filter of oxygen from the glass, nor is it scrubbing or removing oxygen from the surface of the glass. *See* 86 Ill. Admin. Code § 130.330(c)(6)(A)-(B). Rather, the hydrogen directly and immediately reacts with the oxygen that is present in the bath atmosphere and in the tin bath. Taxpayer Ex. 2, p. 3; Taxpayer Ex. 3, p. 8; Taxpayer Ex. 4, p. 12. It is not being used like the chemicals described in PLR 85-0155, PLR 05-0011 or in GIL ST 02-0223.

On the whole, I agree with the Department’s arguments that the chemicals here do not effect “direct” changes to the product ABC BUSINESS manufactures. Department’s Brief, pp. 6-7. When the Department construed that undefined word within the statutory text, it referred to dictionary definitions of it. *Id.*, p. 7. This is consistent with ordinary rules of statutory construction. Texaco-Cities Service Pipeline Co. v. McGaw, 182 Ill. 2d 262, 270, 695 N.E.2d 481, 485 (1998) (“Each undefined word in the statute must be ascribed its ordinary and popularly understood meaning.”). Taxpayer, on the other hand, suggests that a “direct” effect should be

understood to have the same meaning as proximate cause. Taxpayer ABC Business's Reply to Department of Revenue's Initial Post-Hearing Brief (ABC BUSINESS's Reply), pp. 1-3. I cannot agree. The text of UTA § 3-50(4) expressly limits the availability of the exemption for manufacturing equipment to only certain types of chemicals. 35 ILCS 105/3-50(4); 86 Ill. Admin. Code § 130.330(c)(6)(A)-(B). Chemicals are included within the definition of equipment "only if the chemicals ... effect a direct and immediate change upon a product being manufactured or assembled for wholesale or retail sale or lease." 35 ILCS 105/3-50(4). That text is clear. The meaning of proximate cause provides no help to understand UTA § 3-50(4).

The direct and immediate effect of the nitrogen that ABC BUSINESS introduces into the upper plenum, is that the upper plenum, and the machinery and equipment situated there, are cooled and remain within operating temperature limits. Taxpayer Ex. 2, p. 2; Taxpayer Ex. 5, pp. 3-4. The indirect effect of using the nitrogen to cool the upper plenum is that ABC BUSINESS can delay and control the gradual cooling of the glass that it is manufacturing, while the glass flows through the lower plenum of the bath chamber. The direct and immediate effect of the hydrogen that ABC BUSINESS introduces into the bath atmosphere is that the amount of oxygen that is present in the bath atmosphere and in the tin bath is reduced. Taxpayer Ex. 2, pp. 2-3; Taxpayer Ex. 3, p. 8; Taxpayer Ex. 4, p. 12. The indirect effect of introducing hydrogen into the bath atmosphere is that ABC BUSINESS is able to reduce, but not wholly eliminate, the amount of defects in the glass that are created as a result of the chemical reactions that occur between oxygen and the other elements present in the bath atmosphere and tin bath.

In sum, ABC BUSINESS has shown that it uses nitrogen and hydrogen in its manufacturing process. It has also shown that using nitrogen is essential to manufacturing float glass, and that, by using hydrogen, it limits the number of oxygen related defects that occur in

the bath chamber of its Anywhere plant. If the statutory exemption treated chemicals like other types of devices or tools (other than hand tools) that are essential to an integrated manufacturing or assembly process, then the nitrogen and hydrogen ABC BUSINESS used here would be exempt equipment. But the legislature made its intent clear that chemicals are not like other items of equipment primarily used in a manufacturing or assembly process. 35 ILCS 105/3-50(4).

ABC BUSINESS has not established that the nitrogen and hydrogen effect a direct and immediate change on the glass it manufactures. Therefore, those chemicals are not included within the type of equipment that is exempt under UTA § 3-50(4). 35 ILCS 105/5-30(4). Since the Illinois legislature expressly limited the statutory definition of equipment to include only those chemicals that effect a direct and immediate change in the product being manufactured, it would be improper to ignore that clear legislative intent. The Department's determination to deny ABC BUSINESS's refund was correct, and that denial should be finalized.

Conclusion:

I recommend that the Director finalize the Department's prior denial of ABC BUSINESS's amended sales and use tax returns.

November 29, 2012

John E. White

Administrative Law Judge