

Glassmaking & Factory Notes

The following are general notes contained in the Emmet E. Olson material. Some were typed, but many notes were handwritten, apparently at different times. Olson probably had conversations with others and made his own observations when experimenting with glass, and wished to record these observations so as not to forget them.

Bold face and italic have been added to simplify interpretation of entries. Often spelling was corrected when the meaning was obvious.

This group was typed:

Annealing:

High critical point where glass anneals in few seconds, and slow gradual cooling down to low critical range, about 500 degrees.

Chemicals:

Pure and low in IRON.

Chords:

Generally from pot or from cold glass, also, from poor mixing.

Mix:

Use pure chemicals.

Mix Thoroughly.

Have no lumps.

Lime:

Burned lime takes up water and carbon dioxide and deteriorates. Should have two bens. [sic] Use all lime out of one before using the other.

Cullet:

Do not crush too fine, about ¼ to 1¼ inches seems to give the best results. Use same amount in different batches.

Calculations:

Glasses to be used together should have same coefficient of expansion.

Pink Glasses:

Get darker when stirred with a wooden stick.

Acids in Glass:

Silica

Boric Acid

Phosphates

Alkalis:

Soda

Potash

Lithia

Bases:

Calcium Oxide

Magnesium Oxide

Lead Oxide

Zinc Oxide

Barium Oxide

Alumina

Iron

HIGH EXPANSION

Soda-Soluable.

Potash-Soluable.

Lead-Less Soluable.

Lime-Least Soluable.

LOW EXPANSION

Silica.

Boric Acid.

Zinc Oxide.

Magnesia.

Boro silicate glasses are least soluable.

Nitre:

Helps melting, and oxidizes.

Arsenic:

Is a clarifier, and, part remains in the glass.

Antimony:

It plains.

Decolourizer:

Manganese—Selenium.

Devitrification:

Stony metal. Not mixed well. Too low in temperature of founding, or attack on refractories.

REMEMBER THIS IN COMBINATION GLASSES.**IMPORTANT**

1. Soda glasses are as a rule harder than Potash glasses containing an equal volume of silica.
2. For pure soda lime glasses, hardness increases with increase of lime and decrease of soda.
3. Boric oxide gives great hardness to glass.
4. Lead glasses are increased in hardness by addition of soda and of lime.

Essential glass forming substances

Fluxes.

Oxidizing agents.

Fining agents.

Reducing agents.

Coloring agents.

Boric Acid— B_2O_3

Takes place of silica in some glasses.

Phosphoric acid P_2O_5 & Arsenious acid As_2O_3

Bone Ash

Calcium phosphate

Opacifier.

Arsenious

oxide.

Clarifier.

Bases—Alkalies.

The alkalies employed in bottle, window, plate and lime flint glasses is sodium, while in the case of lead flint it is potassium.

Sodium glass melts more clear quicker than Potash glass.

Sodium oxide, Na_2O

Sodium carbonate is soda ash.

Sodium sulphate is salt cake.

Sodium chloride or sodium nitrate are used in small quantities but not to produce alkalies.

Cryolite as an opacifier, contains sodium as does borax.

Potassium Oxide K_2O

Used in place of sodium in the manufacture of lead flint glass. Greater brilliancy & smoothness to the glass than sodium. Potash melts slower than sodium glass. Potash most expensive and is used in more expensive glass.

Lithium oxide.

Used for fine optical glass, very rare.

Lime

Gives smoothness & brilliancy to glass, also increases its power of resistance to chemical agents. Hard & brittle. Must be annealed more carefully. 12.83% glass becomes too hard and brittle. When it goes about 13.2% it decreases in these properties.

Increase in lime increases the fusibility of glass up to a certain point. Prevents the formation of cords. It also increases tendency to devitrify.

Lime is introduced in glass as fluoride—a calcium fluoride or bone ash which consists of calcium phosphate, are used to produce translucent opal, and opaque white glasses.

Magnesia MgO

Only used in special glasses when the properties it confers are of special value.

Barium oxide BaO

Barium glass has greater brilliancy than lime glass. Resembling a lead glass. In hardness and coefficient of expansion it is practically the same as lead glass. Barium glasses can be melted in open pots or tanks.

Barium cannot be used in lead glasses.

Barium cannot be polished like lead by Hydrofluoric acid.

Zinc Oxide ZnO

Have high tenacity & compressive strength resistant to chemical decomposition. High fluidity & low coefficient of expansion. Devitrifies readily. Large amounts of zinc in glass remains in suspension or separates out on cooling, causing the glass to become opaque. Added in the form of white oxide of zinc.

Lead Oxide PbO

Red lead.

Increases the specific gravity or density of glasses and gives a high refractive index. Are resistant to chemical action and do not devitrify readily.

Added to batch as Minium (Litharge PbO) or red lead (Pb₃O₄)

Alumina Al₂O₃

Hard to melt and hard to dissolve.

The following entries relate to etching glass.

(Knight's Acid Mix.)

White Acid.

Two parts Carbonate of Ammonia.

Three parts of Hydrofluoric Acid.

Bright Acid.

Two parts Hydrofluoric Acid.

One part Sulfuric Acid.

One half part Water.

Be sure the above has been cooled off before using.

Acid for pressed or lime glass.

Acetic [acetic?] acid—one half tumbler to vat.

Three ounces Nitric Acid.

Wax for etching or needle etching.

Use only Pure Bees Wax and nothing else.

Etching Ink Used by Heisey & Co.

(GOOD)

24 oz. Pure Bees Wax.

18 oz. Resin.

4 oz. White Bees Wax.

2 oz. Parafine.

2 oz. Stearin.

3 oz. Turpentine Pure.

2½ oz. Asphaltine Varnish.

6½ oz. Lamp Black.

This Ink Use In Hot Weather.

This Ink Use in Cold Weather.

24 oz. Bees Wax. Pure.

16 oz. Rosin Lumps.

4 oz. White Bees Wax.

2 oz. Parfine.

2 oz. Stearin.

6 oz. Lamp Black.

2 oz. Asphaltine Varnish.

2 oz. Burgundy Pitch.

3 oz. Turpentine.

If ink is too stiff add one ounce of linseed oil—if still too stiff add one ounce SPERM ACETI.

June 25, 1957:

Mould Paste, for Punch & Stemware –

6 qts. Raw Linseed Oil
10 ozs. Pure Gum Rubber
6 ozs. Asphaltum
5 ozs. Rosin
3 ozs. Turpentine
4 cakes Shoemakers Wax
8 ozs. Beeswax

Ink for Plate Etching

6 lbs. Beeswax
1¼ lbs. Parafin
4½ lbs. Rosin
1¼ lbs. Burgundy Pitch
3 ozs. Castor Oil
8 ozs. Asphaltum Varnish
8 ozs. Turpentine
2 lbs. Lamp black—Fine Grade (Important)

Acid for Plate Etching

For New Batch: 70% Hydrofluoric acid 100 lbs
Water 50 lbs.

White Acid

For New Batch 70% Hydrofluoric Acid 100#
Ammonia 70#

The following are miscellaneous handwritten notes scattered throughout the Olson papers.

1. To dissolve gold:
One part Nitric Acid
Three parts Muriatic Acid or Hydrochloric [sic] Acid.
2. Soda Ash should not be over 37 lbs. To the 100 of sand.
Lime should not be over _____ lbs. To the 100 of sand.
3. 11-24-47 When you use Neodymium Carbonate take out P. Blue & cobalt! Use ½ as much Potassium Permanganate. 1000# Sand, 12 ozs. Neodymium Carbonate

PREPARE FOR THESE THINGS

6-26-1933

- 1st We must have new items or short lines to shoot out all at one time.
A—Moulds must all be complete
B—Samples to be sent out to salesman at the same time.
C—Prices must be right and on samples when sent out.
D—Lines should be short.
- 2nd Salesman enough to cover all important spots.
A—They should be allowed to give percent discounts according to their judgement and the firm should quote the greatest percent to be given.
B—Salesmen must step on it.
- 3rd We must all drive and work together for new ideas and for production.
- 4th The eighteenth amendment is going to be repealed and the company to show nice clean lines of bar and drinking sets will come out on top.
~~If we come out this fall with some new lines of classy whisky glasses, decanters or containers, old fashions, cocktails, highballs and some novelty pieces made up in sets, our company will shine.~~
The prices must be fairly cheap for a high class item.
- 5th Cartons are cheap and the freight and express rates are not so great on them.