

OUR SUBJECT —

GLASS

For the guidance of Architects, Builders, Merchants,
Carpenters, Painters and Decorators.




COMPLIMENTS OF
HIRES & CO., LIMITED,
IMPORTERS, MANUFACTURERS
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— GLASS —
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GLASS

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1911

 DESCRIPTION of the different kinds of Glass ordinarily specified by Architects, showing what characteristics must be present in each to fully comply with the specifications.

We are often asked what the word "Crystal" signifies when applied to Glass in Architects' Specifications, as "Double Crystal," "Crystal Sheet free from waves and blemishes," and other terms not fully understood by the trade. We find that misapprehension about these terms often leads to unpleasant disputes between the contracting parties, and, therefore, to contribute as far as possible to uniformity in the writing and construing of specifications, we submit this brief outline of the different kinds of glass and their names as used by the trade.

POLISHED PLATE.

This is, as its name indicates, a glass with polished surfaces, and is, consequently, free from all waviness. When not otherwise specified it averages from one-quarter ($\frac{1}{4}$) to three-eighths ($\frac{3}{8}$) inch thick and weighs from three and a quarter ($3\frac{1}{4}$) to four (4) pounds per square foot. For a small advance in price it can be selected three-sixteenths ($\frac{3}{16}$) inch thick, which admits the use of iron instead of lead sash weights. In addition to the general term "Polished Plate," it is sometimes designated as "French" or "American" plate, indicating respectively the preference for the foreign or domestic make, although by reason of the vast improvement in the home product, the actual differences have long since disappeared.

This glass can be furnished in sizes containing from one (1) to two hundred (200) square feet.

CRYSTAL PLATE.

This is the same glass as Polished Plate in all particulars, except the thickness. It is one-eighth ($\frac{1}{8}$) inch thick, and on this account largely used in thin or light-weight sash. It has the same brilliant and polished surface as the quarter ($\frac{1}{4}$) inch thick Polished Plate. It is used for dwellings and all first-class railroad cars.

It is the only glass one-eighth ($\frac{1}{8}$) inch thick that is free from waves.

This glass can be furnished in the following sizes:—

10 ins. wide, 12 to 32 ins. long							22 ins. wide, 22 to 48 ins. long							
12	"	"	14	"	36	"	24	"	"	24	"	48	"	"
14	"	"	14	"	48	"	26	"	"	26	"	48	"	"
16	"	"	16	"	48	"	28	"	"	28	"	48	"	"
18	"	"	18	"	48	"	30	"	"	30	"	48	"	"
20	"	"	20	"	48	"	32	"	"	32	"	46	"	"

SINGLE AND DOUBLE THICK FRENCH SHEET

This glass is blown into a cylindrical shape and is afterwards cut, opened and flattened out. This process gives it the peculiar wavy appearance that is so familiar in all sheet glass. The thickness can be approximately stated as: Single, one-twelfth ($\frac{1}{12}$) inch; Double, one-eighth ($\frac{1}{8}$) inch. There is always a slight bend in it, the result of its original cylindrical shape, which the flattening process does not entirely remove. This glass cannot be furnished free from waves and imperfections.

DOUBLE THICK FRENCH CRYSTAL.

This is the same in appearance as "Double Thick French Sheet," but is selected with more care and is a little thicker. Many suppose that the designation "Double Crystal" will secure a glass free from all waves and blemishes. This is a mistake, as any number of terms and names will not change the nature of this glass, which will

still be sheet glass. It is always wavy by reason of the peculiarity of its manufacture.

TO OBTAIN A THIN GLASS FREE FROM WAVINESS "CRYSTAL PLATE" OR "POLISHED PLATE THREE-SIXTEENTHS (3-16) INCH THICK" MUST BE SPECIFIED.

Some years ago "Double Thick French Crystal" was largely used, but of late years it has not been in demand. Now it is not current in stock by the trade, and whenever called for is selected from "Double Thick French Sheet."

26-OZ. ENGLISH CRYSTAL.

This glass to all appearances is the same as "Double Thick French Sheet." It is a little thicker than the ordinary double thick glass, hence the term "26-oz.," which indicates the weight per square foot. The word "Crystal" used in connection with this kind of glass has no significance as to purity, for it is not free from waviness and imperfections.

SINGLE AND DOUBLE THICK AMERICAN.

This is made in the same manner as "Single and Double Thick French Sheet," and does not differ from it in any particular. The characteristics of "American" and "French Sheet" are identical.

Among those who have the opportunity of extended observation, our own make of American glass, the celebrated "Quinton" brand, has a reputation that places it on a par with the French makes. Some architects specify "Quinton" brand, knowing that satisfaction will be assured. Comparisons repeatedly made demonstrate that it can be specified in place of the French, thus securing the same results at a lower price.

✧ **IMPORTANT NOTE.** ✧

It should always be remembered that the difference between "Plate" glass and "Sheet" glass is in the matter of waviness. Many make the mistake of specifying "Double French Crystal" or "Crystal Sheet" to be free from all waves and blemishes, forgetting that no matter how high sounding and suggestive of perfection the name, no glass is free from waviness except "Polished Plate" and "Crystal Plate."

POLISHED PLATE GLASS.

HOW IT IS MANUFACTURED.

The materials used are white sand, ground lime, sulphate of soda, arsenic and charcoal, mixed in special propor-

tions. The melting pots are made of fire-clay. Having been properly mixed, it is trodden by men barefoot until it gets to the right consistency, when it is divided into small rolls, and piled up for use. One man has eighteen pots under manipulation at once, building up each by "spells" of six inches a day, and taking twelve days to finish the lot. This rather tedious process is necessary in order to allow time for the clay to harden as it is built up.

No machine has yet been devised competent to be substituted for the human hand in this important process. When it is remembered that a pot is required to hold from 1000 to 2500 pounds of molten glass while being handled by a dozen men, it is clear that the greatest care and thoroughness must be demanded in its manufacture. Every pot bears the initials of its maker, as well as the date of making, and all are allowed to stand for

seasoning a considerable time before being used. The average life of a pot in constant use is about thirty days. The heat required to properly melt the ingredients of which the glass is composed is 3000° Fah.

When the glass in any pot is properly melted, the pot is run out of the furnace room on a tramway to the annealing room, lifted by a crane, meanwhile being steadied by great tongs, and the contents emptied directly on the casting table. This is a heavy, flat table of iron, somewhat larger than the largest plate that may ever have to be cast upon it. At one end is a heavy cast-iron roller, the full breadth of the table, and fitted so as to roll the entire length of the table by means of gearing along its sides. Narrow strips along the edge determine the height at which the roller runs above the table, and this again determines the thickness of any given plate of glass. An adjustable apparatus also fixes the breadth of the plate. The semi-fluid mass poured from the melting pot on the table is pushed before the roller, leaving a uniform layer between the moving surface of the latter and the casting table. The glass does not instantly solidify, hence the edges have a rounded appearance. A bar pressed against the end farthest from the oven thickens the plate for a few inches to enable its being pushed along without wrinkling. The roller having been rolled back to its carriage, is trundled out of the way, the casting table is moved up to the edge of the annealing

oven, whose heat has been carefully raised to a required temeperature, and then by means of long iron pushers the red-hot plate is shoved to its place. All this work has to be done with the greatest rapidity, and by men who may have been idle for an hour waiting for the turn of their gang.

When the plates have been in the oven four or five days, the temperature meanwhile having been slowly reduced to that of the ordinary atmosphere, they are withdrawn. At this stage they have a rough, undulating appearance, and seem to be opaque, however pure and clear they may be in fact. They are now inspected for flaws, bubbles, blotches, and any other defects, which are marked for removal, or, if necessary, to be cut out. The edges are then squared by cutters and the plates go to the grinding room. The grinding tables used consist of an octagonal revolving flat table of wrought-iron, 25 feet in diameter, pierced by holes for pegging the plates to their place, across which extends a fixed bar carrying a pair of revolving runners (or "shoes") that get their motion from friction with the edges of the more rapidly whirling table. These compound revolutions have the effect of grinding uniformly all the surfaces of the plates exposed to their action. This is done, first, by sharp sand, and then by carefully prepared emery, the table being constantly wet by a stream of water.

The process of fixing the plates for grinding is interesting. Twelve men carry the great plate by straps edgewise, while a thirteenth guides them along, taking notice that the plate does not tip too far one way or the other, and that its top does not strike anything. When all is ready the grinding table is flooded with plaster of Paris, which is distributed by mops. Then the glass is slowly and very carefully lowered on to the table. What follows is unique and exciting. A dozen men mount upon the prostrate plate and execute very odd and grotesque dances in order to set the glass properly in the plaster. This is called "the plate glass jig." When the plate, or plates, that have to be ground are set, they are pegged securely by wooden pins; and then the rotary motion begins, slowly at first, but increasing to 60 revolutions per minute. Once in a while, but not very often, a plate that has been insecurely fixed flies from the wheel, to the damage of itself and whatever it may strike.

Although the sand and emery are selected and prepared with the greatest care, it is out of the question to prevent occasional scratches by coarse particles that creep in. Therefore all plates on emerging from the grinding room are inspected, and every blur or scratch is marked, to be rubbed down by hand in the rubbing room. The edges are also inspected for nicks and fractures, and properly squared. The plates then go to the polishing room.

The polishing material is rouge (peroxide of iron), applied in a liquid state by weighted blocks of felt. The tables are so arranged with reciprocating motions that all parts of each plate are brought evenly under the control of the rubbers. During these grinding and polishing operations the plate parts with about 40 per cent. of its thickness as seen in the rough. After final inspection the plates are cut to the required size, packed and shipped. In conclusion, it should be added that for clearness, freedom from every kind of flaw, homogeneousness of material, and lustre of finish, the American product compares favorably with the best results obtained by European manufacture.



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626 ARCH STREET, - - - - PHILADELPHIA.

*The only house in Philadelphia that carries a full stock of
POLISHED PLATE GLASS.*