Glass Campus

Bumple Glass

Experimenting with firing glass onto a steel screen, I discovered that firing the glass to a full fuse would cause the glass to form a uniform pattern of small round bumps where the softened glass slumped through the mesh. I call this technique “Bumple Glass”.

Selecting the Screen

Stainless steel is always best, but because the metal is thoroughly covered with kiln wash, you can use any material that will survive the full fuse kiln firing. Do NOT use aluminum or anything galvanized.

The metal mesh must be thick enough gauge to carry the weight of the glass – remembering that just as the glass will soften when heated, so will the metal mesh. The spacing must be large enough to allow the glass to slump into the openings (I recommend at least 1/4 inch) but not so large the glass will sag a lot more than you want it to.

Preparing the Screen

It is essential to thoroughly kiln wash the metal screen. Clean with warm soapy water to be sure you have removed any oil or other contaminants. Mix your kiln wash thin. I prefer 5 or 6 parts water per part of kiln wash. With a haik brush or soft bristle brush, apply a coat of kiln wash. When the first coat is completely dry, apply a second coat. Continue with at least 4 coats of kiln wash. More is better. It’s a good practice to apply each coat on a different brush angle. Apply North-South on first, East-West on 2nd then diagonal on 3rd and 4th application.

A handy trick for applying kiln wash is to place the mesh on a piece of tin foil or a cookie tray (to catch drips) on your kiln lid when the kiln is firing. The hot kiln will heat the metal which will cause the kiln wash to dry quickly.

You can spray on boron nitride or kiln wash but I prefer to brush on kiln wash. I prefer this because the process of applying it with a brush leaves some kiln wash in the corners of each opening. This extra kiln wash encourages a more rounded bubble and reduces the likelihood the fused project will be fused to the screen.

Kiln wash coated screen drying on kiln.

On small space mesh, the wet kiln wash will often form a film right across the opening that when dried leaves a coating of kiln wash. You don’t want this and will either have to remove any that forms or prevent it happening. Blow drying right after applying the kiln wash is an easy way to prevent it.

Film on screen.

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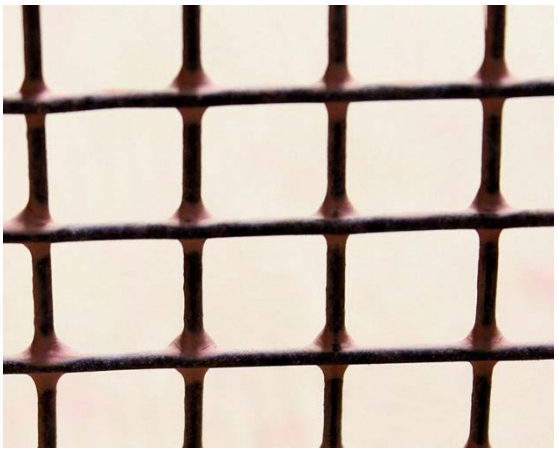
Using a blow dryer to remove film from screen.

Applying kiln wash to a screen with ½ inch grid.

Different Size Screen

The large the grid opening size, the larger the bumps will be. It's important to remember that in firing glass to drape or slump temperatures, the larger the span, the faster the glass will drop. Glass fired on a screen with 1/2 inch openings won't just drop twice as fast as on a screen with 1/4 inch openings but will do it 4 times as fast. The surface area of a 1/2 inch square is 4 times that of a 1/4 inch opening.

A slump fired to 1450 F worked perfectly on a 1/4 inch screen but 1475 F was too high. On a 1/2 inch grid screen, the same full bump effect will be produced at 1350 F. Firing higher is likely to embed the glass to the screen. It's always safe to fire to a little lower temperature and settle for slightly smaller bumps but firing higher risks ruining both the glass project and the screen.



Kiln wash filling corners in screen.

Firing

Lower temperature firing will produce some texture but maximum texture will be produced at full fuse temperature. The smaller the spacing in the mesh, the higher the temperature will be needed to make the glass slump into the openings.

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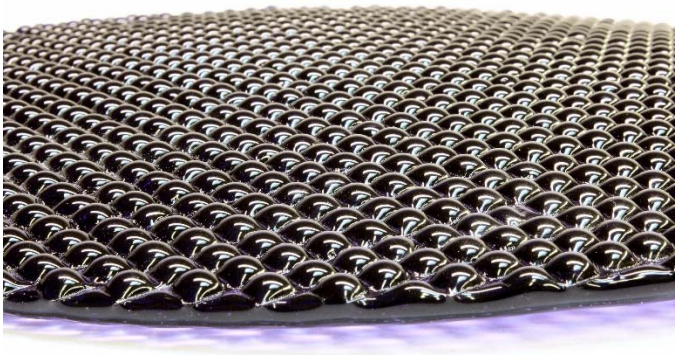
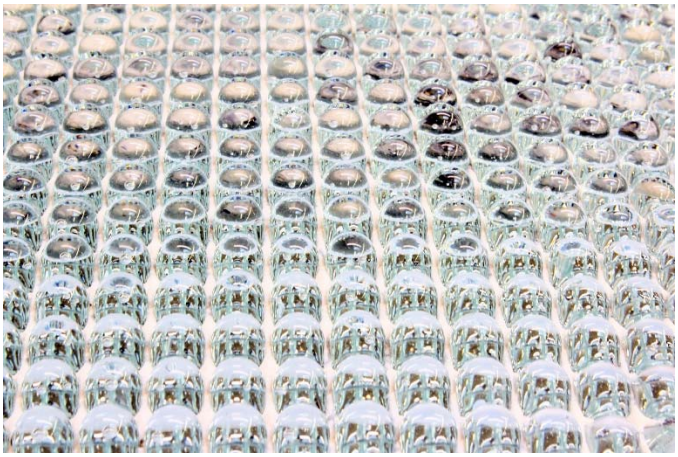


Fired to 1450 degrees F (790C) on 1/4 in grid screen.

Resist the temptation to fire higher or longer to produce bigger bumps. If the glass melts too far down through the screen, you won't get it off the screen. Better to fire a little less and have smaller bumps then to have the mesh permanently embedded in the glass.

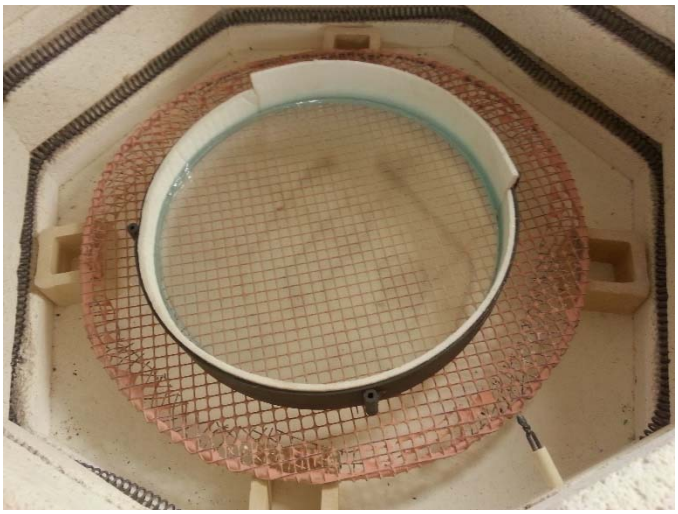
Fired to 1475º F glass stuck to screen.



Close up view of over fired project with the glass bumps bulged and mushroomed over the screen.

Volume Control Issue

To control the bump pattern, it's important you start with 1/4 inch (6mm) thick glass that will not move to become thicker or thinner. You can either use 2 uniform layers or full fuse the project before firing on the screen to create the bump pattern. If you fire with thinner or thicker glass, the pattern will distort as the glass changes size.



Clear glass in an 8 inch mold on a 12 inch diameter kiln washed screen with 1/4 inch grid spaces.

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Grid Alignment

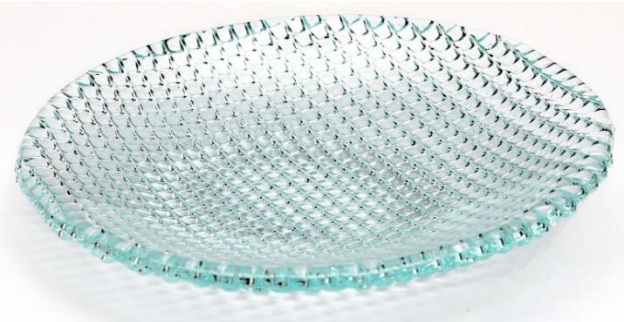
It makes no difference with a round project but if you're doing a square or rectangular project, you should take special care to ensure the edge of the glass either lines up with the wire grid or is set at some specific angle – perhaps 45 degrees.

Screen Sag

The weight of the glass will cause the mesh to sag resulting in the glass not being fully flat. You can fire to a low temperature slump to flatten it or just place it in or on a mold to be slumped or draped so it will adopt the shape of the mold when fired.

Slump or Drape Firing

If you fire with the bumps facing out, you will retain the rounded bumps but if you fire with the bumps pressing against the mold, you will slightly flatten the bumps. The higher the temperature, the more you will flatten them. A low temperate slump firing at 1200 F (650C) will minimize the amount of flattening. A 30 minute hold will ensure a full slump or drape. A drape can be fired at 1150 F (620C).



Clear glass bumple bowl slumped bumps down.

Violet glass Bumple bowl slumped bumps up.

Reusing the Screen

Kiln wash can not be trusted in a second firing at temperatures above those for slump firing. You must remove all old kiln wash and apply new coats for the next firing. It's not a big deal. It takes only about one minute to scrub off with water using a bristle brush or old toothbrush. If you take care to thoroughly clean after each use, and don't fire so hot the screen attaches to the glass, you can expect to get dozens (perhaps hundreds) of uses from your screen.

Varying Bump Size

Lower temperature firing will produce shallow bumps and higher temperature firing will produce deeper bumps.

You might find the larger bumps produced by higher temperature firings more attractive but higher temperature firings increase the possibility the glass will stick to the screen.

Here are examples of bumps created by firings at 1300, 1325, & 1350 F.

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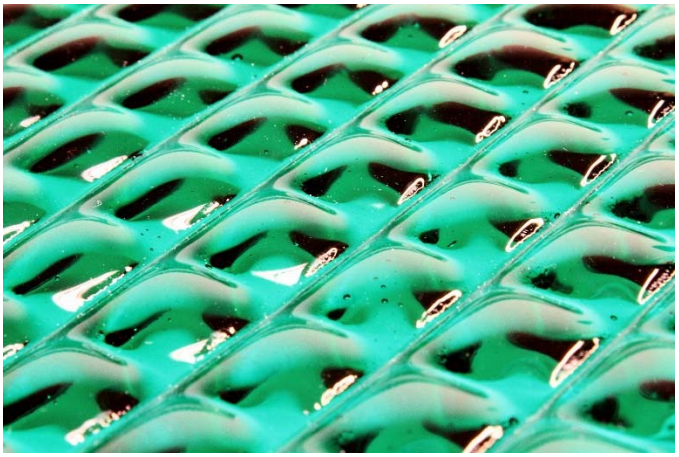
Bumps created firing to 1300 F



Bumps created firing to 1325 F

Bumps created firing to 1350 F

Firing Schedule – bumps on 1/4 inch grid

SEGMENT	RAMP	TEMP	HOLD (min)	
1	400F (200C)	1000F (515C)	20	
2	900F (500C)	1350F (730C)	20	*
3	FULL	960F (515C)	30	
4	400F (200C)	300F (150C)	0	

Firing Schedule – bumps on 1/2 inch grid

SEGMENT	RAMP	TEMP	HOLD (min)	
1	400F (200C)	1000F (515C)	20	
2	900F (500C)	1450F (790C)	20	*
3	FULL	960F (515C)	30	
4	400F (200C)	300F (150C)	0	

Firing Schedule – slump into mold

SEGMENT	RAMP	TEMP	HOLD (min)	
1	400F (200C)	1000F (515C)	20	
2	900F (500C)	1200F (650C)	30	*
3	FULL	960F (515C)	30	
4	400F (200C)	300F (150C)	0	

Firing Schedule –drape over mold

SEGMENT	RAMP	TEMP	HOLD (min)	
1	400F (200C)	1000F (515C)	20	
2	900F (500C)	1150F (620C)	30	*
3	FULL	960F (515C)	30	
4	400F (200C)	300F (150C)	0	

* Top temperatures are for COE 96 glass
For COE 90, add 20 degrees