

Design Resource

Glass Bangles - Firozabad

Making of bangles - Uttar Pradesh

by

Prof. Bibhudutta Baral, Divyadarshan C. S. and

Tejesh J.

NID Campus, Bengaluru

Source:

<http://www.dsource.in/resource/glass-bangles-firozabad>



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2. Tools and Raw Materials
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Introduction

Glass is one of the most unique material, which can shaped and molded into various shapes, size and designs. The glass making technology was believed to be accidentally created or buy product of metal. Glass is thought to have come to India by the Mughal Rulers, the existence of Glass in India have been dated over 2000 years by the archaeologist who discovered glass in Uttar Pradesh, glass was mainly used as Chandeliers, glass vials for perfume which were in demand by royal courts and nobles for decorating their assembling and drawing rooms. Firozabad, a city in Uttar Pradesh of India, has been famous since 17th century for its exquisite production of glass works, which is popularly known as Glass city, it is located about 240 kms from the capital of India, Delhi and 40 kms from Agra. The ancient name of this town was Chandwar nager, the name Firozabad was given in the regime of Akbar by Faraz Shah Mansab Dar in 1566. The City is stepped deep in the culture of making utility and decorative items of glass, which is being carried from generations by the master craftsmen's. Glass can be formed or molted into any shape so artisans were able to create a wide range of products like glass toys, candle stand, Christmas hangings, flower vase glass, chandeliers, bangles, street ware and scientific lab products.

The Glass industries in Firozabad is been able to provide indigenou need as well as international demand by producing variety of products, In Firozabad entire community is engaged in glass manufacture. It is a one of a kind cluster producing bangles, and catering to the growing demands and requirement in India, there are approximately 150 bangle making in the city. The manufacturing of glass bangles is different in technique as it required highly skilled labor work, with the mixing of materials like sand, ash, lime and melting in a furnace with temperatures around 1350 °C.

The making process of glass bangles requires great patience, because skilled Artisans mix borax, sand, lime stone in a suitable proportion and fed manually into a furnace and are melted in and around temperatures of 1300 to 1400 C to obtain molten glass. The molten glass is then drawn from the inside of the furnace to form a glob of molten glass, he then passes to another artisan who shapes the molten glass to a conical shape, Then it is taken to another furnace where he rotates the semi fused glob to form a roughly cylindrical shape by rotating the rod, finally it's been taken to another furnace, where there artisan works in synchronization. The first artisan rotates a long iron rod at a constant speed, then a thin filament of glass is placed on the rotating iron rod, constant turning/ rotation gives the glass a spiral shape. And then the uneven, wastage of glass is cut off at regular intervals with an abrasive tool.

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Maroon color glass bangles prepared and kept to dry.

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Plain bangles are decorated with sparkles and kept to dry.



Liquid glass material is wound on a metal bar in spiral form to make a series of bangles.



Sparkles is applied on the glass bangles.

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Craftsmen arranges the prepared bangles and ties into a bundle.



Work environment of the glass factory.



Craftsmen removing the prepared bangles from the rod.

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Yellow color decorative bangles arranged and kept for packing.

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Tools and Raw Materials

Different kind of tools are involved in making glass bangles as most of them are custom made by the Artisan to fit the needs.

Soda ash and silica are the main raw materials used in the production of glass.

- **Tank Furnace:** The raw materials are melted in the furnace at a temperature of about 1300 to 1400 C to obtain molten glass.
- **Pakai Bhatti:** The bangles are baked in a furnace called pakai bhatti which smoothens the sharp edges and makes the bangles bright and attractive.
- **Belan/Spindle:** Long steel rod that is rotated to draw glass melt into spirals, which are then cut to make raw bangles.
- **Zari:** A glittering strip used to make patterns on the bangle.
- **Hil:** Silver and gold polish on bangles.



Thread used to tie the bangles in a bundle.

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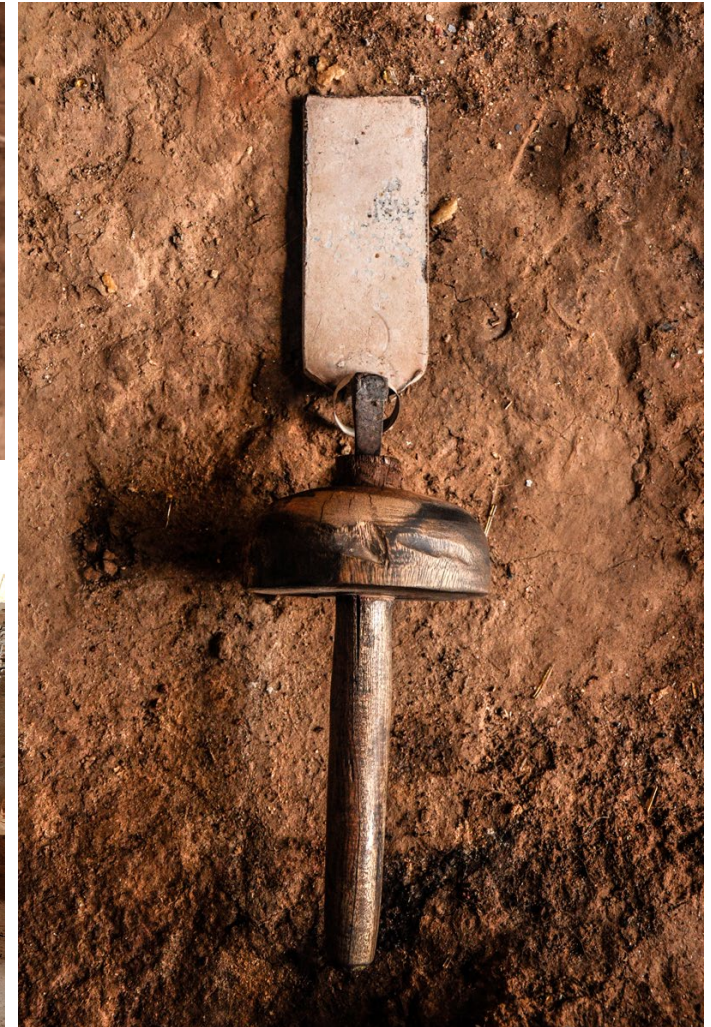
<http://www.dsource.in/resource/glass-bangles-firozabad/tools-and-raw-materials>



White chunks of glass which is melted to make the bangles.



Kiln where the glass material is melted at high temperature.



Tool used to flatten the molten glass.

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Black glass chunks is melted to make black color bangles.



Gold decorative polish is applied to the glass bangles.



Artificial diamond cutter used to cut the bangles.

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Making Process

Glass has been known to mankind for thousands of years, which offers utmost level of flexibility for shaping into different products. Glass bangles are one of the most common items in Glass products. Bangles are made from glass melted in a tank furnace with temperatures around 1300 °C to 1400 °C, bangles are made out of soda glass, Firstly the artisan uses a long iron pole to scoop out a glob of molten glass from the tank furnace, he then swiftly transfers it to an another artisan who shapes the glob into a conical shape by rotating the rod and with the help of a customized tool which looks like a trowel. Then it is transferred to another furnace where Artisans works in synchronization with the machine, he then draws a thin filament of glass from the melt and places it steadily on the rotating rod which is constantly rotated on a motor. The molten glass loops around the rod taking the shape of a bangle, thickness is controlled by exerting the requisite amount of full on the softened glass these rotating rods comes in different diameters depending on size of the bangle which is required. Before the molten glob exhausts, next glob is attached to the previous one to keep continuity. An another artisan who is on the other end of the furnace uses a metallic ruler/ pointed tool which prevents bangles from sticking to each other on the spindle and also makes sure that only one layer of glass is rolled on. When the spindle gets filled up it will be removed, and the glass bangles is taken out, which looks like a long glass spiral. These spiral are then cut with the help of a diamond cutter, which separates each bangle from another.

The separated bangles which are open ended and not complete are then taken to join them over a candle or a kerosene lamp which is called (Judai) which literally means joining. They melt the bangle slightly to join the ends which are usually done by women. Bangles are further decorated by zari, silver/golden powder with different intricate patterns and designs on the surface. The bangles are then finally baked in a furnace called pakai bhatti which smoothens the sharp edges and makes the bangles bright and attractive. Bangles are intertwined and strung together, packed in cardboard boxes to be transported, exported or sold in the market.



Raw material is first melted at high temperature.

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Molten glass is wound on a metal rod and taken out from furnace.



With a costumed tool the molten glass is shaped in a spherical shape.



Work environment of the bangle factory.



Prepared sphere is fixed in a kiln from which the material is pilled and placed on a metal rod.

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Metal rod is turned on which the wound into a thin strip in a spiral manner.



Cold water is sprayed on the prepared glass to cool down.

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Craftsmen removes the bangles from the kiln.



He places the prepared bangles on a sheet and arranges them in a line.

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Prepared bangles are taken for the further process.



These bangles are arranged on wooden stick.



The bangles are the cut with diamond cutter to break the spiral.



Other craftsmen arranges the cut bangles in a thread.

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These bangles are bundled and sent to other factories where they are joined one by one.



After they are joined sparkles re added on the bangles.



With the help of comb shaped tool sparkles mixed with adhesive is applied on the bangles.



Decorated bangles are arranged and kept to dry.

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Craftsmen separates the broken bangles.



All the good bangles are tied into bundles of dozens and transported to the market.



Bangles are produced in large numbers.

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Products

Glass Bangles are products of mass consumption throughout the country, in India the demand for bangles are high during occasions and festivals as it is considered auspicious. There is also a universal demand for bangles because of its uniqueness in character and also being attractive which comes in vivid designs and patterns.

Glass bangles comes in different sizes:

Size		Diameter in Inches	Inner Diameter in Centimeters	Circumference in Inches
S	2.4	2.250	5.7	7.06
M	2.6	2.375	6.0	7.46
L	2.8	2.5	6.5	4.85
XL	3.10	2.625	6.6	8.24



A set of glass bottles painted with warli art.

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Panorama



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