Design Resource

# Ceramics of Khurja

The Craft of Clay

by
Sakshi Gambhir
IDC, IIT Bombay

**Source:**
http://www.dsource.in/resource/ceramics-khurja

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## Introduction

Pottery is one of the most iconic and tangible elements of regional art. Its history is quite ancient in the Indian subcontinent. Though the products here are mostly slip-cast (one of the techniques of large scale production), their uniqueness lies in their design quotient and color palette. A lot of intricate patterns are hand-painted in bright blues, greens, oranges, yellows and reds.

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## Place

Khurja is a small city in the Bulandshahr District of Uttar Pradesh. It is often called as 'The Ceramics City' with its skyline dotted with chimneys. The industry manufactures products like tableware (crockery), sanitary-ware, insulators, hospital ware, chemical porcelain, electro ceramics, kiln furniture, decorative wares, toys and figurines. These are exported worldwide and some are distributed across India.

CGCRI (Central Glass and Ceramic Research Institute) has been continuously providing testing and technical facilities to the units for their upliftment. It works independently and is serving adequately for the growth of the industry.

Arriving at Khurja.

A signboard in the local market.

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Streets of Khurja.

Streets of Khurja.

A temple on the way to the ceramics factories.

Streets of Khurja.

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Streets of Khurja.

Central Glass and Ceramic Research Institute, Khurja.

Ceramics shops on the main highway.

Ceramics shops on the main highway.

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Ceramics factories.

Scrap (rejects) from the factories.

A ceramics factory.

Inside a ceramics factory.

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Inside a ceramics factory.

Inside a ceramics factory

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## People

This craft is mostly practiced by the Muslim community, specially the intricate hand-painting on the planters with cobalt oxide that gets fired into the legendary blue. Traditionally, in most of the potter communities in India, women are not allowed to work on the wheel. In Khurja too, the men do the casting while the women only take care of the finishing or 'cleaning up'. Ceramic production requires good teamwork and synchronization. The people here are terrific at that. Over 500 factories provide employment to more than twenty five thousand people in the city and around.

A karigar outside a ceramics factory.

Karigars in a ceramics factory.

Karigars in a ceramics factory

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Karigars in a ceramics factory.

A woman karigar in a ceramics factory.

Mrs. Monika Chhatwal of Chhatwal Ceramics.

A karigar in a ceramics factory.

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A karigar in a ceramics factory.

A karigar in a ceramics factory.

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A karigar in a ceramics factory.

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## Process

There are many forming techniques to make ceramics, one of them is casting. This is the most efficient and cost effective way for large-scale production. In one factory, on an average, fifty thousand cups are churned out everyday. The process includes the following steps:

Clay Preparation

Casting

Glaze Application

Firing

Sticker Application

Quality Check & Packaging

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## Clay Preparation

The basic raw material for making any ceramic product is clay and that could be of several types - china clay, fire clay, ball clay etc. Clay in powder form is sourced from Rajasthan and Gujarat. It is mixed in varying proportions with other raw materials to make clay that is ready-to-use. This is done in-house and the mix is churned in large machines. After this it goes to the filter press that makes cakes (discs) of clay and removes impurities. This is further rolled out through an electric pug-mill and becomes void of any kind of air bubbles, ready for casting.

Commonly used clay types while making Khurja include:

- **Stoneware** : 50% ball and china clay, 50% stone (25% quartz, 25% feldspar)
- **Bone China**: 50% ball and china clay, 50% bone ash (calcium phosphate)
- **Porcelain** : Quartz, feldspar and china clay

The choice of clay depends on temperature of firing, desired quality and finish of the product.

Clay churning machine.

Clay churning machine.

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Clay churning machine.

Bone ash (major constituent of bone china).

Clay cakes (discs) made by the filter press alongside a pug-mill.

Clay discs in the filter press (pressed between metal plates and canvas).

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The filter press.

Clay discs.

Clay being rolled out from a pug-mill.

Clay being rolled out from a pug-mill.

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## Casting

Once the clay is ready to use, type of product to be made is decided. For eg. Cup, plate, vase, planter etc. Then the 'master copy' (sample) of the product is made (by hand or on the wheel). This is used as reference to make the mould and then finally 'multiple copies' are made.

Mould Making

Slip Casting

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## Mould Making

Moulds are made with POP (Plaster of Paris) mixed in water. This liquid is poured in the gap between the 'master copy' and a plain POP cylindrical mould. A coat of oil and soap solution is brushed on each surface to prevent sticking. The POP that gets poured takes the shape of the master copy from the inside and remains plain outside. This mould is usually made in parts-that-make-up-a-whole to eventually make the clay-cast easy to remove. Many moulds are prepared for one type of product to make production faster.

Soap and oil to be brushed on the mould.

Soap and oil being brushed on the mould.

The mould.

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POP powder being mixed in water.

POP powder being mixed in water.

POP powder being mixed in water.

POP powder being mixed in water.

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POP powder being mixed in water.

Air bubbles being removed from the POP liquid.

POP mould ready to be used to cast clay.

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POP mould ready to be used to cast clay.

POP mould ready to be used to cast clay.

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## Slip Casting

In this step, the slip (clay mixed in water) is poured into the plaster moulds. The water in the slip is drawn out by the POP (as it absorbs water), leaving an inside layer of solid clay that acquires the shape of the mould. When this is thick enough, the excess slip is poured out from the mould. Nowadays, a lot of people use clay instead of slip to make simpler products like cups and mugs. This makes casting faster and less messy. The clay is 'thrown' in along the walls of the mould using a hand tool on a rotating wheel-head.

When the clay inside the mould is dry enough, it is removed by opening up parts of the mould that are held together with rubber bands. Handles of cups, animal shaped mugs, incense stick holders, flower shaped plates etc. are all cast in similar way. Mostly women take up the task of finishing ('cleaning up') the rough edges of these objects with a sponge soaked in water. These are then left to dry in the sun.

Clay ready to be cast in a mould.

Clay being 'thrown' in along the walls of the mould using a hand tool on a rotating wheel-head.

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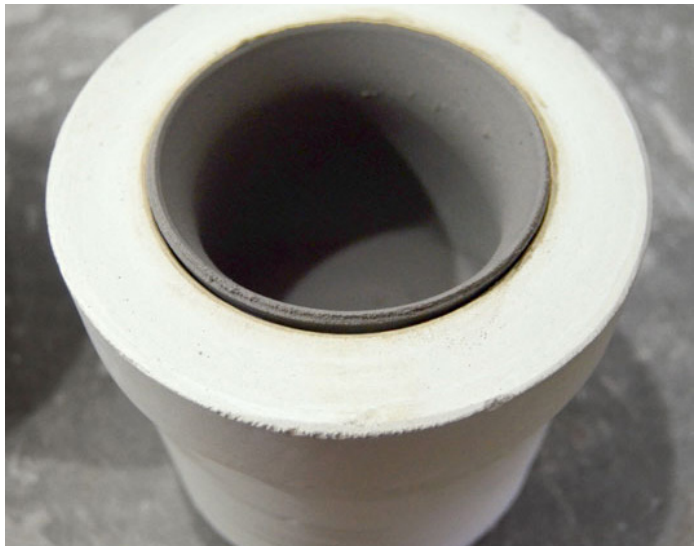
Clay being 'thrown' in along the walls of the mould using a hand tool on a rotating wheel-head.

Clay being 'thrown' in along the walls of the mould using a hand tool on a rotating wheel-head.

Clay being 'thrown' in along the walls of the mould using a hand tool on a rotating wheel-head.



Clay, dry enough to be removed from the mould.

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Clay cast being removed by opening up parts of the mould that were held together with rubber bands.

Round of coiling continue.

The clay cups, cast from the POP moulds.

Moulds and casts.

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Slip (clay mixed in water) poured into the plaster moulds.

Excess slip being poured out from the mould.

Clay cast being removed by opening up parts of the mould that were held together with rubber bands.

Clay cast being removed by opening up parts of the mould that were held together with rubber bands.

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Moulds for casting handles for cups.

Clay handles being removed from the mould.

Clay handles.

Clay handles.

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Clay handles being trimmed and finished.

Clay handles ready to be joined on cups.

Clay handles ready to be joined on cups.

Clay handles ready to be joined on cups.

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A clay handle being joined on a cup.

Clay handles just joined on cups.

Clay handles just joined on cups.

A woman finishing ('cleaning up') the rough edges of cups.

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The difference between a 'cleaned up' and not 'cleaned up' cup.

Rejects.

Sun drying the cups.

Sun drying the cups.

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Mould for an animal shaped mug.

An animal shaped mug.

An animal shaped mug.

An animal shaped mug.

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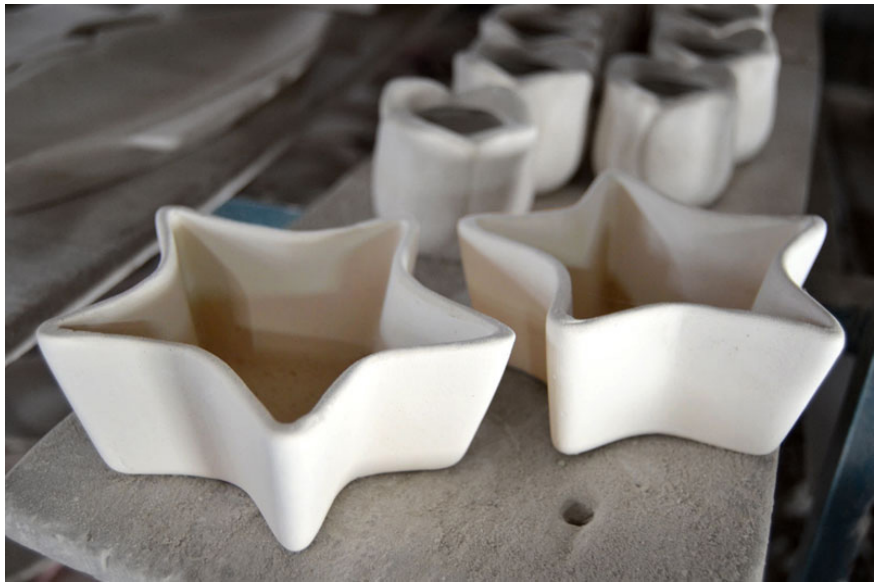

Star shaped bowls.

Leaf shaped incense stick holders.

Flower shaped plates.

Flower shaped plates.

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Flower shaped plates.

A saucer cast from a mould.

A saucer cast from a mould.

Saucers cast from a mould.

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Series of moulds to cast vases and planters.

Moulds to cast planters.

A karigar opening up parts of the mould that were held together with rubber bands.

The karigar removing the clay pot from the mould.

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The karigar removing the clay pot from the mould.

Just cast clay pots, ready to be finished.

The karigar trimming the rim of the pot.

The karigar trimming the rim of the pot.

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A woman karigar finishing ('cleaning up') the pot with a sponge soaked in water.

Sun drying the pots.

The pots are dry enough to be glazed.

The pot is dry enough to be glazed.

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http://www.dsource.in/resource/ceramics-khurja/process/glaze-application

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## Glaze Application

Once sun-dried, the karigars start painting on the product with 'stains' (ceramic colors, as they call it). These are usually applied as an under-glaze, and get fired to almost the same color as they are in powder form. A variety of patterns are painted, stenciled, sprayed on the ware. Once the stains are a bit dry, these pieces are dipped in clear glaze that would give them a glossy (glass) layer after firing. Sometimes, these are glazed plain white, without any stains, to be 'decorated' with stickers later.

Flowers being painted with stains on vases.

A flower being painted with stains on a vase.

Design Resource

# Ceramics of Khurja

The Craft of Clay

by
Sakshi Gambhir
IDC, IIT Bombay

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A flower being painted with stains on a vase.

A flower being painted with stains on a vase.

A flower being painted with stains on a vase.

Flowers painted with stains on vases.

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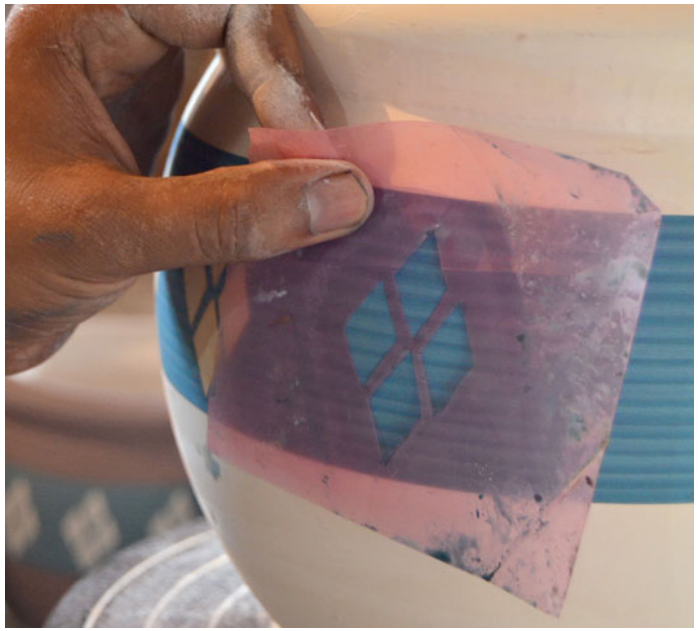
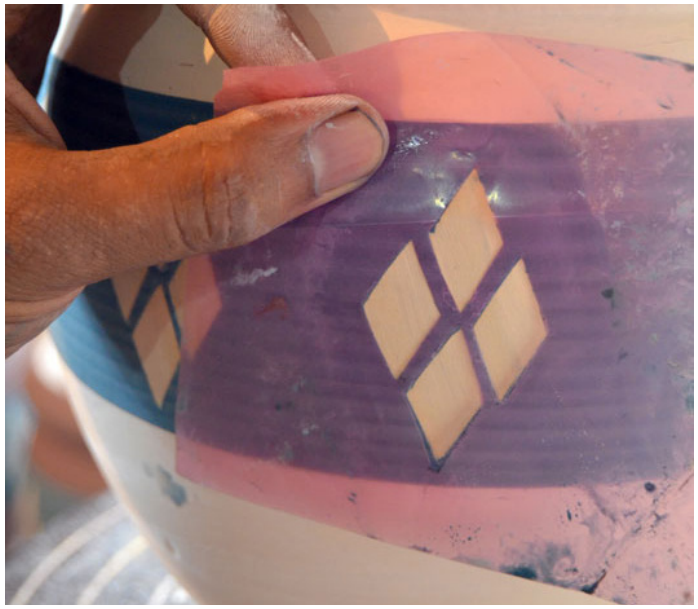
Design being stenciled with stains on a planter.



Design being stenciled with stains on a planter.

Design being stenciled with stains on a planter.



Design being stenciled with stains on a planter.

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Design being stenciled with stains on a planter.

Design being stenciled with stains on a planter.

A flower being painted with stains on a planter.

A flower being painted with stains on a planter.

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A flower being painted with stains on a planter.

A flower being painted with stains on a planter.

Flowers painted with stains on planters.

Hand-painted designs, made with stains on planters.

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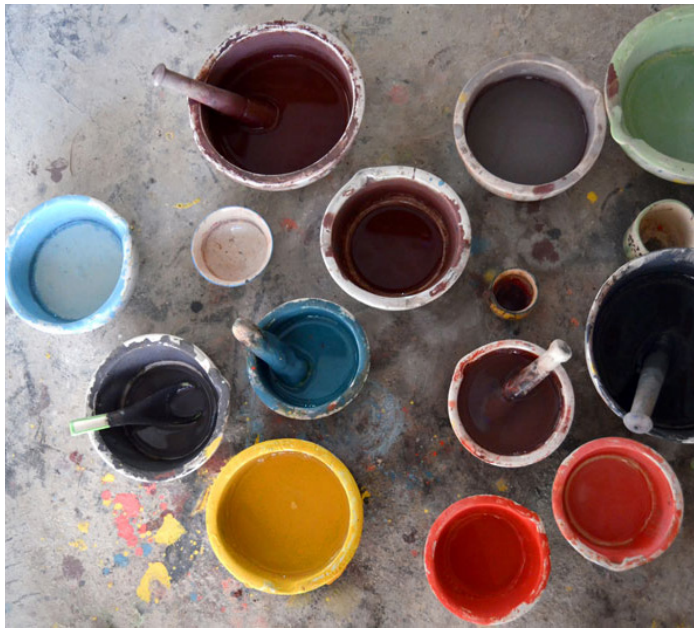

Stains (ceramic colors).

Sponge technique of color application.

Design being stenciled with sponge on cups.

Design being stenciled with sponge on cups.

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Design being stenciled with sponge on cups.

Hand-painted cups, ready to be dipped in clear glaze.

Hand-painted cups, ready to be dipped in clear glaze.

Hand-painted cups, ready to be dipped in clear glaze.

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Hand-painted cups, ready to be dipped in clear glaze.

A small bowl with a strawberry design on it.

The strawberry design gets painted red with stain.

And a dash of yellow stain, done using the spray technique.

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An animal shaped mug painted with bright stains.

An animal shaped mug painted with bright stains.

Beer mug with geometric design stenciled on it.

Beer mugs with floral motif.

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Hand-painted cups, ready to be dipped in clear glaze.

Difference between the two cups - one that has only stain painting done (right) and one that has been dipped in clear glaze and fired.

Hand-painted cups, ready to be dipped in clear glaze.

Hand-painted cups, ready to be dipped in clear glaze.

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Hand-painted cups being dipped in clear glaze.

Hand-painted cups being dipped in clear glaze.

Clear glaze being poured inside as well.

A karigar rubbing off the glaze from the bottom to prevent it from sticking on the furnace shelf.

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Marks of the glaze rub-off on the sponge.

Cups let to dry before they get fired.

Cups let to dry before they get fired.

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## Firing

In Khurja, all the stoneware pieces (that have stain painting and clear glaze on them) go through a single round of firing. This is greatly cost effective. Bone china, on the other hand usually undergoes three rounds - bisque firing, glaze firing and sticker firing - all separately. So, it is usually a bit more expensive. Mostly the firing is carried out with diesel fuel.

Firing in the kiln takes the ware through three zones:
- Pre - Heating zone (about 600 degrees),
- Heating zone (about 1200 degrees) and
- Ccooling zone (about 480 degrees).

On an average, one car (container trolley) of the furnace containing 1680 pieces of cups would take 15 hours to run the length of the furnace (about 110 feet). So, the ware that one feeds from the pre-heating end can be taken out from the cooling end in fifteen hours, ready to be used or worked upon further.

The shelves of the furnace.

The inside of the furnace (minus the container cars).

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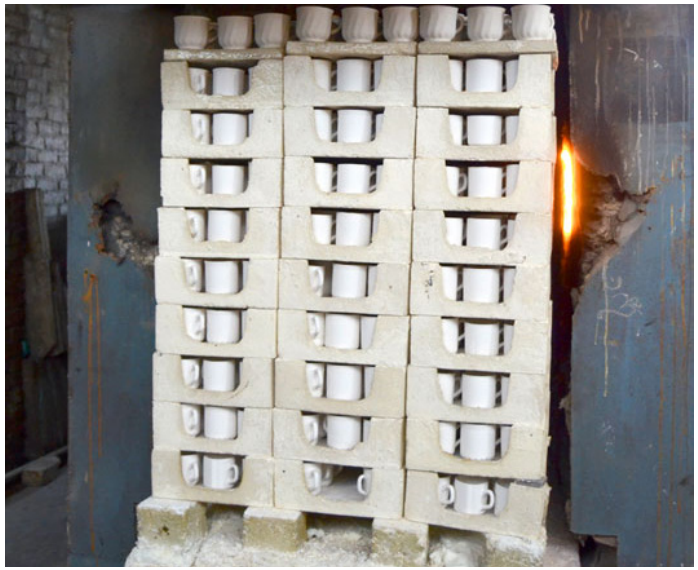
A karigar loading the car trays with cups.

A karigar loading the car trays with cups.

The fully loaded car of the furnace.



The fully loaded car entering the pre heating zone of the furnace.

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The temperature reading and other technical indicators.

Diesel fired furnace.

Diesel fired furnace.

A karigar pulling out the car from the cooling end of the furnace.

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The fired cups to be removed from the cooling end of the furnace.

The fired cups.

The fired cups.

The fired beer mug.

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The fired beer mug.

The fired vases.

Difference between an unglazed and glazed cup.

Difference between an unglazed and glazed cup.

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**Source:**
http://www.dsource.in/resource/ceramics-khurja/process/sticker-application

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## Sticker application

Stickers are usually applied as 'decoration' on bone chinaware. This involves soaking the sticker in water for about fifteen seconds and then placing its peel on to the cup. This 'sticking' is obviously temporary, unless fired. Sticker firing is done only to fuse it with the clay body and is carried out at a much lower temperature. Any design created digitally on the computer can be printed as a sticker. Most of the big tea companies get these cups and saucers custom-made in Khurja for their free-gift-with-tea-box offers!

Plain glaze fired bone china ware ready for sticker application.

Variety of sticker designs.

Stickers being cut out for the cups.

Stickers being cut out for the cups.

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Sticker being soaked in water for fifteen seconds.

Sticker peel being placed on to the cup.

Sticker peel being placed on to the cup.

Sticker well placed on the mug.

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A jug after the sticker firing.

Mugs with stickers on them, ready to be fired again.

Cups with stickers on them, ready to be fired again.

Cups with stickers on them, ready to be fired again.

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Difference between a cup with unfired sticker and fired sticker.

Cups with fired stickers.

Cups with fired stickers, ready to be packaged.

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**Source:**
http://www.dsource.in/resource/ceramics-khurja/process/quality-check-packaging

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## Quality Check & Packaging

Quality check largely includes discarding the pieces that have a fault or are not well finished. The ones that pass the quality check are carefully packed in thermocol and cardboard boxes to be transported to its buyer.

A karigar packing plates with paper in between two of them.

A karigar packing plates with paper in between two of them.

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Cups and saucers set packed in a thermocol box.

Cups and saucers set packed in a thermocol box.

The products are packed carefully in cardboard boxes.

The products are packed carefully in cardboard boxes.

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## Products

Khurja has a wide and interesting variety of products to offer in ceramics:

• **Tableware**: Cups, saucers, plates, bowls, trays, mugs, salt and pepper bottles, water jugs, pickle jars, napkin rings, etc.

• **Table Accessories**: Pen stands, incense stick holders, candle stands, soap dispensers, soap trays, piggy banks, photo frames etc.

• **Decorative**: Vases, figurines, wall plaques, hangings, lampshades, etc.

• **Garden Accessories**: Flowerpots, bonsai planters, tiles, etc.

• **Jewelry**: Pendants, earrings, etc.

• **Miscellaneous**: Laboratory apparatus and ceramic fuses etc.

Bright and colorful cups.

A set of six cups.

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Bright and colorful cups.

Bright and colorful cups.

Bright and colorful cups.

Bowls.

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Bright and colorful cups.

Tea-set.

Water jugs.

Water jugs.

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A set of six glasses and a jug.

Tea-set with golden (metallic) rim.

Bright and colorful bowls.

Blue bowls.

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Small multi-purpose saucers.

Soup bowls.

Soup bowls.

Bright and colorful bowls.

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A complete family dinner set (6 persons)

A complete family dinner set (6 persons).

A complete family dinner set (6 persons).

Plates.

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An intricately painted plate.

Plates.

Pickle jar.

A set of two pickle jars.

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A set of three pickle jars.

A set of three serving bowls.

Serving bowl.

A set of three serving bowls.

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A set of three serving bowls.

A set of three serving bowls.

A set of three serving bowls.

Star shaped multi-purpose bowls.

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Leaf shaped incense stick holder.

Pen stands.

Bathroom sets (soap dispensers, trays and toothbrush holders)

Bathroom set.

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Piggy banks.

Planters, piggy banks and cups.

Vases with Indian tricolor painted on them.

Planters in different colors.

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Planters with different patterns.

Tall vases.

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A photo frame.

Big pickle jars.

Elephant decorative piece.

Ceramic fuses.

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## Contact Details

This documentation was done by Sakshi Gambhir at IDC, IIT Bombay.

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