



INNOVATIONS IN **APPLICATOR ROLL** MANUFACTURING



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Polyurethane rollers are widely used in various industries due to their durability, flexibility, and resistance to solvents. Creating a perfect solvent-resistant polyurethane roller involves careful selection of materials, precise manufacturing processes, and thorough quality control. Below is a detailed guide on how to achieve this.

Materials Selection

Choosing the right materials is crucial for making a solvent-resistant polyurethane roller. The primary components include:

- **Polyurethane Resin:** Select a high-quality polyurethane resin that offers excellent resistance to solvents. The resin should have a high durability and flexibility.
- **Curative Agents:** Use appropriate curative agents that enhance the chemical resistance of the polyurethane resin.
- **Reinforcement Materials:** Incorporate reinforcement materials such as fiberglass or carbon fiber to improve the roller's structural integrity.
- **Roller Core:** Choose a core material that complements the polyurethane and provides the necessary support. Common core materials include aluminum, steel, or composite materials.



Manufacturing Process

The manufacturing process for polyurethane rollers involves several key steps:

Molding

- **Mold Preparation:** Ensure the mold is clean and free from contaminants. Apply a release agent to facilitate easy removal of the roller.
- **Mixing:** Accurately mix the polyurethane resin with curative agents. Maintain a controlled environment to prevent contamination.
- **Pouring:** Pour the mixed resin into the mold carefully to avoid air bubbles and ensure uniform distribution.
- **Curing:** Allow the resin to cure according to the manufacturer's instructions. Controlled temperature and humidity levels are essential for proper curing.

Post-Processing

- **Demolding:** After curing, carefully remove the roller from the mold. Inspect for any defects or irregularities.
- **Machining:** Machine the roller to achieve the desired dimensions and surface finish. Precision machining ensures the roller fits perfectly in its intended application.
- **Surface Treatment:** Apply surface treatments to enhance the chemical resistance and durability of the roller. Options include coatings, linings, or additional polymer layers.



Quality Control

Implementing a rigorous quality control process is vital to ensure the roller meets the required standards. Key aspects include:

- **Material Testing:** Test the raw materials for chemical composition, mechanical properties, and solvent resistance.
- **Dimensional Inspection:** Verify the dimensions of the roller using precise measuring instruments.
- **Surface Inspection:** Inspect the surface finish for uniformity, smoothness, and absence of defects.
- **Performance Testing:** Conduct performance tests to evaluate the roller's resistance to solvents, abrasion, and mechanical stress.
- By carefully selecting materials, following a precise manufacturing process, and implementing rigorous quality control, you can create a perfect solvent-resistant polyurethane roller that meets industry standards and performs reliably in various applications.



Application and Maintenance

Proper application and maintenance of the polyurethane roller are essential for its longevity and performance:

- **Installation:** Follow the manufacturer's guidelines for installing the roller. Ensure it is correctly aligned and securely fastened.
- **Regular Inspection:** Periodically inspect the roller for signs of wear, damage, or chemical degradation.
- **Cleaning:** Clean the roller using appropriate solvents and cleaning agents to remove contaminants and maintain its resistance properties.
- **Replacement:** Replace the roller if it shows significant signs of wear or damage to avoid compromising the application
- **To monitor polyurethane roll surface :** Keep a strict watch of surface deterioration after how many hours of use or how much tonnage has been processed.
- **Check weather paint formulation or cleaning thinner is compatible to Polyurethane**
- **Polyester Paints, PVC Plastisols, Epoxy Paints, PVDF Paints ,Chrome3,Chrome 6 and Chrome free solutions have different impact and abrasive effect of the on Polyurethane surface.**



How to Select the Best Useful Roll

Proper selection of Roller vis a vis to application is very important at times roll is picking up and transfers 2 micron worth coating:

The roll supplier should certify the roll has been tested for following

- No bubbles or air entrapment
- No flow marks visible which will affect transfer quality
- No foreign particles as print quality will have blank spot issues
- No delamination of Polyurethane lining from metal roll, which will lead to debonding in running condition
- Abrasion Loss ,cut resistance and Shore hardness is welcome data .

The best suitable roll to speak about Durable, Dependable product and ultimately gives less Down time.



How to Select the Best Useful Roll....2

Applicator rolls have been broadly used in 3 types:

VARNISHING ROLLS: Rolls are extensively used with aggressive solvents having better dispersible quality, viscous solutions hence demand higher shore hardness

Can coating industry is the major consumer of applicator rolls, many types of rubber formulations have been replaced by Polyester Polyurethane formulation with shore hardness range 60 A to 63 A whereas supplied shore hardness is recommended 62A to 65 A.

SKIN PASS APPLICATOR ROLL: These rolls are used in acidic environments and are subjected to use Chrome solutions with higher temperature scale. These rolls are necessarily formulated with specialized rubbers which can stand to temp. and corrosive solvents

The average life with local supplied product is as low as 12 to 15 days and good supply from OTAKA ,JAPAN runs minimum 55 days to 75 days ,these rolls have specific Ra value .



How to Select the Best Useful Roll...3

COLOR COATING ROLLS: In coil coating industry continuous innovation are happening with respect to speed ,the diameters of rolls have increased, the nature of paints such as Polyester paint, PVC Plastisol, Epoxy Paint, PVDF paint, leave different impact and abrasive mark on roller surface .Here Ra value(Surface finish) is important for quality pick up N effective transfer

Each paint system carries different thinner combinations for roll surface cleaning, Solvent naphtha, Isoforon, Acetone are prominent solvents to damage the surface also cause uneven swelling of Polyurethane surface.

Most occasions Polyester Polyurethane roll without fillers is recommended with best printable shore hardness as 52 A to 55 A whereas supplied shore hardness is recommended as 56A to 59 A.

For different paint systems Roll performance differs, solvent swell and softening of surface are common physical observations

To obtain better life of roll it is recommended to study to establish with reference to Paint System afer how many minimum number of hours the rll is required to be removed from operation. The roll can regain its all properties on evaporation of solvents when just kept in open air followed by Cello solve cleaning



RECOMMENDED TESTING OF POLYURETHANE ROLL

It is recommended that either user or supplier carry out following test procedure to find out bet usable life of roll

Arrange the paint samples and respective thinners in testing cans

Dip the available Polyurethane samples weighed and dimension noted in the testing cans at room temperature.

Remove every morning sample from every can to weigh ,note dimensions and shore hardness for the next 7 days ,call ed as dip test

After 7 days compute change in weight, dimensions due to swell and shore hardness.

Keep the samples wiped and dried in open to measure the evaporation for the next 7 days

Note every day regained weight, dimensions and shore hardness due to evaporation

Compute the % retention of weight change, dimensional change and shore hardness as well

The data tells what the proper time is to remove roll for allowing evaporation to regain its near by values

Also, the study reveals the suitability of paint system/Thinner with respect roller formulation. www.jayelastomers.com