

## How Does Rubber and Polymer Roll Maintenance Hinder Performance?

### Abstract

Rollers, regardless of their function, must be properly cared for to assure optimum performance of the entire roller assembly. Optimum performance yields high quality finished products and better utilization of equipment which translates to reduced downtime and maintenance costs along with higher product output.

Careless handling and haphazard maintenance can be very expensive to a roller user in time and profits. A scheduled maintenance program is an efficient and cost effective way to eliminate potential problems before they become actual issues. Breakdowns are always costly and disruptive to scheduling.

Included in this white paper are general care requirements for roller coverings, the bearing surface, and other specially machined areas of the core.

### Storage

Rollers should be stored in a cool, dark area where they won't be exposed to direct sunlight or large temperature or humidity variations from normal conditions. With rubber rollers, sunlight causes oxidation which makes the covering age prematurely. It hardens, shrinks in size and begins to crack. When rollers remain out of service for long periods of time, they should be refurbished by grinding off 1mm from the cover thickness, if dimensionally possible. Reducing the roller diameter by 2 mm, will usually remove the oxidized layer.

Whenever a roll is not in use, it should be supported on its shafts. This rule applies whether the roll is cradled vertically or positioned in a stand horizontally. Particular efforts should be made to protect the bearing surface or other specially machined areas (i.e., threads, keyways, internal bearing fits or seal surfaces). For example, a burr or displacement of metal on the shaft will not allow the precision bearing to be mounted on the roller.

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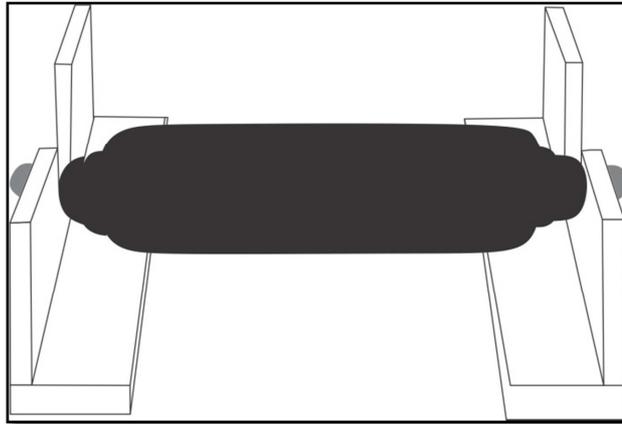
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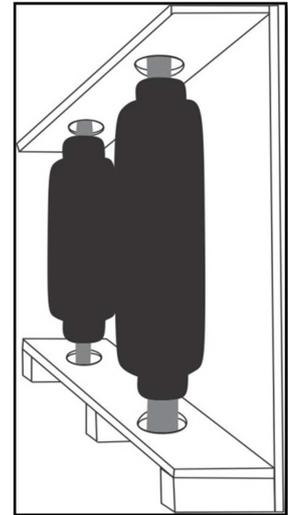
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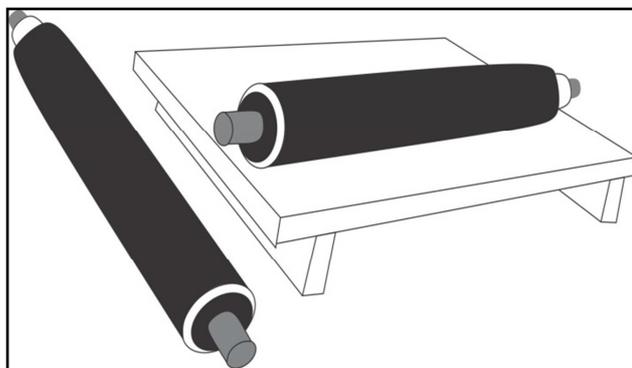
**Correct Horizontal Position**



**Correct Vertical Position**

Another acceptable way to support a roller in a vertical position is to set the end of the roll on a rubber mat and lean the roll, at an angle, against a wire screen or cyclone fence type material. The roll should be positioned such that the rubber and specially machined portion of the shaft will not be damaged.

The storage area should not be a high traffic area to avoid accidental damage. Where possible, rollers should be kept in their shipping boxes. For additional protection, the roller covering should be kept in the wrapping supplied by the manufacturer. This covering should be a waxed polyethylene coated paper or a similar type of material. Areas of ozone concentration, such as areas with motor generators or other electrical arc producing machinery should not be used for storage. Ozone is a gas that attacks rubber, causing deterioration of the surface.



With urethane coverings, care should be taken not to store rollers in high temperature or highly humid surroundings. Under these conditions, urethane could revert. Reversion is a chemical reaction which causes

the elastomer to go back to a liquid state. The process varies in degree depending on the urethane formulation and the ambience.

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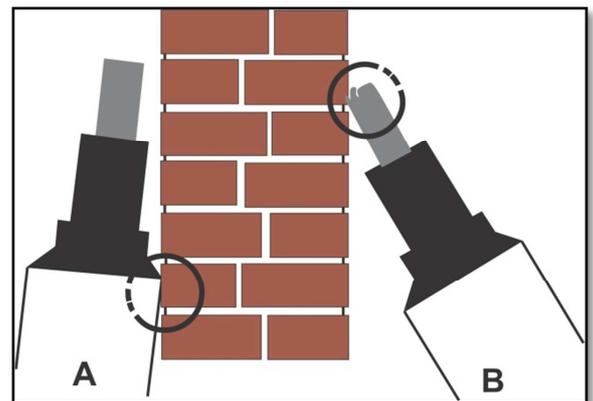
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Here are just a couple of examples of improperly supported rolls that are not in use. Notice, one roll has been laid flat on a skid, the other on the floor. The damage will be the same in both cases. Rollers should not be laid flat. If so, the elastomeric surface will develop a flat spot or, more technically, the covering will take a "set."

The longer the roller is allowed to rest in this position the greater the damage will become. If this is not the type of roller where much of the rubber can be removed to make it usable, the roller has been ruined and will need to be recoated. Depending on the wall thickness of the material, the depth of



the set and the tolerance requirements for the application, the covering may require regrinding to make it usable for recovering.

Additionally, here are two examples of damaged rollers that occur frequently because of improper roller support. In example, "A" the rubber end of the roller has gotten a "flat spot" as it was carelessly leaned against the wall.

This same carelessness has damaged the bearing fit area of the shaft in example, "B." The burr or displacement of metal here will not allow the bearing to be put on this roll. Expensive repairs will have to be made because of this careless handling.

## Surface Protection

Elastomeric coverings may deteriorate if oil, grease, kerosene, solvents, or other chemicals are allowed to remain on the surface. Similarly, the bond between the core and covering may be weakened or broken by contact with these materials.

Cleaning solutions should not be used indiscriminately in washing rollers. Elastomeric rollers should always be washed with an accepted commercial roller wash-up solution or

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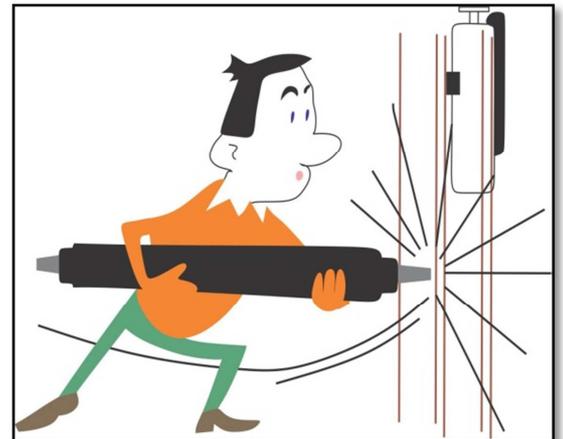


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solvent recommended by the roller manufacturer. After cleaning, rollers should be placed in a roller rack in such a way that they are exposed to good circulation

Cleaning by hand with abrasive paper is not desirable. Usually the rubber or urethane material is removed unevenly from the surface with resulting flat spots and, in turn, operating difficulties.

Precautions should also be taken in handling rollers to avoid damage by bumping or knocking the covering or critically machined surfaces. Often the critically machined area of the shaft is damaged when we least expect it.



We are all guilty of thinking metal is too hard to damage. The fact is metal has many different hardnesses and can be damaged quite easily if precautions are not taken while handling the roller. Do not attempt to repair a damaged critical surface of a shaft unless you have been trained to repair. Inform your supervisor of the damage immediately.

## Coating rollers

Choosing a roller compound compatible with the coating solvents is critical to minimize swell in operations that require a uniform laydown of the coating material. Clean-up solvent should also be compatible. The wrong cleaning agent may remove the coating but affect the roller covering, causing extraction of plasticizers, premature roller failure, and an increase in durometer or cracking.

If organic solvents are absorbed into the covering, the roller should be rotated periodically and allowed to air dry (preferably 24 hours) before grinding. This will prevent surface irregularities due to uneven or incomplete solvent evaporation.

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## **Maintenance**

Roller coverings should be used only for the service and operating conditions for which they were supplied. If these conditions are to change, the roller manufacturer should be consulted for changes in the application.

Rollers should be removed from service as soon as damage or deterioration is observed. Continuing to use the damage roller will accelerate the loss of performance and lead to premature failure.

If we all follow the good examples stated on these pages for handling and storage, we can expect a higher quality and longer life for the rollers.

## **References**

1. [www.americanroller.com](http://www.americanroller.com)
2. [www.plasmacoatings.com](http://www.plasmacoatings.com)

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