

# Upper Fuser Rollers: A Sourcing Guide for Dealers

In a printer or copier, it's where the rubber hits the road. Or, to be a bit more specific, it's where the toner hits the paper.

It's the upper fuser roller. Along with pressure rollers, heater lamps, cleaning systems and the toner itself, the fuser roller plays a pivotal role in determining the quality of the image output that customers see. And while many users may not know what a fuser roller is or does, they do know when it goes wrong — and you hear about it.

The fuser roller's job is to permanently fuse toner to paper or other media. It appears simple, but it takes a delicate balance of time, temperature and pressure for the fuser roller to perform perfectly. When these factors are combined correctly, the image will be fused properly to the media without defect. A slight deviation in any of these three variables, however, can cause smearing, streaking, double-printing, image permanence or paper-jamming problems.

In many of these cases, a bad or improper fuser roller is often both the culprit and one of the last components to be checked in a machine diagnosis. What causes a fuser roller to perform poorly or fail prematurely? There are dozens of possible reasons, from improper dimensions to poor material makeup, bad release characteristics and flawed heat-transfer capabilities. And there are vast differences between what's on the market from OEMs and OEM-compatible suppliers around the world.

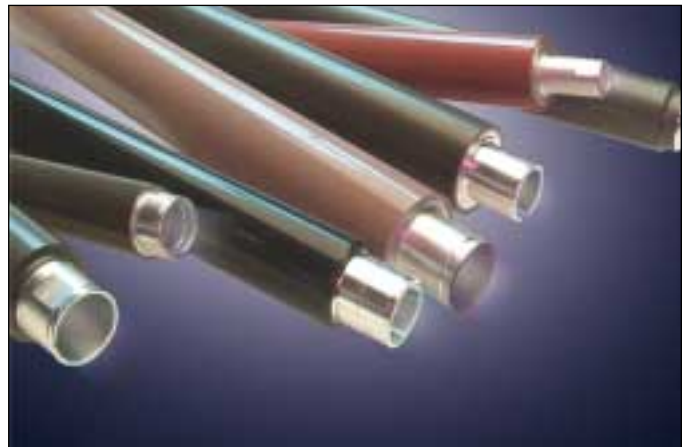
By asking some questions of their suppliers, dealers can help determine how to make the best choices for the fuser rollers they're sourcing.

## Fuser Rollers: How They Fail

First, let's look at how fuser rollers can fail. There are three main causes of failure.

1) **Hot off-setting:** In this case, too much heat is applied during fusing, causing the toner to smear on the copies. This can contaminate the roller as well as the cleaning system and destroy the fuser roller and/or mating parts.

2) **Cold off-setting:** Contrary to the above example, in this case not enough heat is applied during fusing, causing the toner to not fuse to the paper. This also can contaminate the roller as well as the cleaning system and harm the roller and mating parts.



**Fuser rollers aren't all alike. Different machines call for rollers with specific characteristics to meet unique fusing conditions. Look to suppliers to point out the differences and recommend the right match.**

3) **Rotational damage:** Wear from internal components (picker fingers, paper, thermistor, etc.) can cause deterioration of the roller surface, leading to oil and toner streaks on the copies.

A high-quality fuser roller must demonstrate proper temperature regulation, excellent toner-release characteristics, correct roundness, consistent coating and wall thickness, and more. Selecting the right one can help dealers and users avoid these problems or at least delay them.

But how can you tell?

Fuser rollers may look alike, but they're not — and you usually can't gauge quality by looking. In today's market, dealers face a wide range of supplier choices for replacement fuser rollers. How can you ensure that you're sourcing the best products that will lead to the best value and optimum customer satisfaction?

## Five Steps to Better Sourcing

Dealers can enhance their chances of success by evaluating suppliers with this five-step sourcing guide.

1) **Know what's inside.** Just as the aircraft and other industries rely on precision machining, quality fuser rollers incorporate top-grade aluminum alloy certified to high standards.

Others rely on lesser-quality material, often made up of recycled material. The implications of impure aluminum are many, from possible toner transfer difficulties to structural weaknesses that can lead to roller fracture or other failure. Dealers should expect suppliers to be able to describe the quality and alloy of the aluminum they use.

2) Consider the source. A quality fuser roller requires the correct materials and precision machining. This is typically optimized by suppliers that handle each step of the manufacturing process, from raw tube to the finished fuser roller.

Many suppliers are essentially coaters, meaning that they source machined aluminum cores (substrates) from a supplier and complete the process by applying a coating. Other suppliers are involved from the beginning, from specifying a precision extrusion at the smelter to machining, coating and packaging. In the former example, the supplier relies on another party to supply raw cores or substrates with properly machined dimensions and consistent wall thickness. The latter process allows for quality control, monitored by a single entry, throughout the entire process, which provides confidence to the end user that the specifications are correct.

3) Evaluate coating and curing processes. Applying many layers of coatings to a fuser roller is a challenging manufacturing process that leaves almost no room for error. In simple terms, curing temperatures that are too high can burn away certain critical properties of the fluoropolymer coating, which can



**It's not easy to tell by looking, but the right raw materials and precision machining mark the highest quality fuser rollers. It can pay to ask some questions about how your supplier approaches manufacturing.**

affect toner release characteristics. Lower temperatures will cause premature failure due to soft coatings or other problems.

Some suppliers cure fuser rollers with convection ovens, either in racks or conveyers, which can be difficult to regulate with accuracy. Others rely on infrared curing ovens that generally allow more precision in timing and application of heat. Suppliers should be able to describe the process they use and to explain the comparative benefits of their approach.

4) Look for coatings matched to the task. Fuser roller use resists a “one-size-fits-all” approach, and for good reason. Every copier and printer model is unique, and each machine places different demands on its fuser rollers.


Optimum fuser roller characteristics are determined by a number of interrelated factors, and a roller specified for a given machine should account for process speed, toner and developer characteristics as well as time, temperature and pressure variables that equate to proper fusing performance.

Machines with harsh fusing environments, for example, require certain levels of heat and abrasion resistance combined with excellent toner release characteristics. Other factors, such as the use of positive-charge and/or negative-charge toner, high-speed or high-demand machines, or the need for static dissipation can dictate which coatings are appropriate to the job. Dealers should expect suppliers to explain these differences and supply the right match.

Customers also should be aware of the common misconception that “more coating is better,” or that a coating that’s twice as thick should last twice as long. In many cases, the fusing window of the toner is so narrow that the optimum thickness of the coating can vary by no more than a micron or two. If the coating is too thick, the roller can’t conduct enough heat. If it’s too thin, it will become too hot too quickly.



**Many characteristics combine to create optimum fuser roller performance — and slight deviations can cause problems. Check with suppliers about pre-sale testing and quality assurance methods.**




## Factors such as ISO certification are a good sign. So is independent testing of coating thickness, electrical conductivity, dimensional properties, copy quality, in-machine function and fusing.

5) Compare testing and quality certification. As with other parts and supplies, fuser rollers should be manufactured and marketed with demonstrable quality in the foreground.

Dealers should look for indications of this commitment from fuser roller suppliers, but again, these indications are not often visible to the eye. Factors such as ISO certification are a good sign. So is independent testing of coating thickness, electrical conductivity, dimensional properties, copy quality, in-machine function and fusing. In short, your fuser roller supplier should be able to demonstrate to your satisfaction that the product they provide is a high-quality product — and also how they arrived at that conclusion.

### **Fuser Rollers: An Untapped Source for Better Business**

Admittedly, fuser rollers aren't an everyday consideration for most dealers and technicians, but they are worthy of some investigation. It's possible to save costs with low-quality fuser rollers, but often this decision can unknowingly lead to higher long-term costs and create service issues. With a minimal amount of time and effort, however, dealers can become much more knowledgeable about the fuser rollers they source. They should consider fuser rollers as an opportunity to keep customers more satisfied and enhance margins. Suppliers should welcome your inquiries and assist you in taking full advantage of this opportunity. 

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