

# Myths about Chemically Produced Toner

By Robert Moore  
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OEM's have eagerly embraced chemical toner ever since this technology was first introduced in the mid 1990's. Chemically produced toners have been marketed as providing a number of advantages over conventionally produced toner. OEM's contend that chemically produced particles are smaller and more consistent, so they are capable of rendering better image quality.

The OEM's have invested heavily in capital outlays to produce toners chemically and to educate the market on the merits of chemically produced toner. Many new machines have been designed and introduced under the guise of being optimized for these newer toners.

The OEM's have done an excellent job marketing chemically produced toner technology as something unique. At least one OEM has even branded their chemically produced toner to further differentiate it from both competing OEM's and aftermarket products. OEM's carefully protect their intellectual property surrounding the design and production of chemical toners, at times making it difficult to produce compatible aftermarket toners that are Intellectual Property (IP) friendly.

**Conventional toners are still more widely used than chemical toners**

The perceived benefits of chemical toners are well understood in the marketplace due to the marketing efforts of some OEM's and the swift market adoption of machines designed for use with chemically produced toners. However, conventional toners are still more widely used than chemical toners because of the large installed base of machines that use

conventional toner. It is important to note that not all major OEM's have jumped into production of machines designed for use with chemically produced toner. And, at least two major OEM's have announced future machines that return them to the realm of conventional toner production.

It is generally believed that the smaller the toner particle size, the higher the yields and print quality. In the past, conventional manufacturing processes have had an economic size limitation due to low manufacturing yields when pulverizing the toner to small particle sizes, whereas chemical toner production methods are able to produce small particles within a narrow distribution by either suspension polymerization or by emulsion aggregation, which are both methods for producing chemical toners.

**These new manufacturing techniques are enabling conventionally produced toner to more effectively compete against chemical toner**

New advances in pulverization manufacturing techniques, however, are allowing conventional toner to more efficiently generate smaller and more consistent particle sizes within a narrow distribution. These new manufacturing techniques are enabling conventionally produced toner to more effectively compete against chemical toner(s).

Research has shown that the manufacturing method is less important than particle size distribution, flow, charge, thermal and other characteristics specific to the toner particles. Even the particle

shape is less important than other functional characteristics of the toner particles. The end result – toner particles that act alike – is much more significant than the manufacturing method employed to create them. In fact, it is important to note that the types of raw material, or “ingredients”, in conventional and chemical toners are, in many cases, the same!

### **Common Questions about Chemical Toners**

***Q. How is it possible for conventionally produced toners to work properly in an application originally intended for chemically produced toners?***

Whether chemically or conventionally produced, the important functional characteristics must be present in the toner in order to function properly. These include:

- toner charging
- surface morphology
- dry powder flow
- thermal characteristics
- particle size

These characteristics must be balanced against the xerographic characteristics inherent in the copier or printer’s design. The bottom line is that only when all performance related characteristics of the toner closely match those of the original product, can conventional toners function properly in applications originally requiring chemically produced toners.

Suppliers should focus on the important functional characteristics of the toner particles. Dealers and end users should focus on the toner’s performance characteristics and end results – line quality, image density, adhesion, yield, etc. Neither should be concerned with the manufacturing method.

***Q. Are there negative aspects to using a conventional toner in an application originally intended for chemically prepared toner?***

The short answer is no, if designed correctly. The machine does not distinguish how the particles are manufactured – the toner simply must perform the same xerographic functions and behave as the machine expects.

***Q. How are the Katun toners different than the other aftermarket toners currently found in the market?***

Since 2005, Katun’s engineering team and the teams at our manufacturing partners worked closely to detail both the formulation/toner design and specific methods of

manufacturing in order to closely reproduce the OEM toner's functional characteristics to achieve the desired results for both monochrome and color applications. This includes:

- profiling the important functional characteristics described above as found in the OEM toners
- testing under many different environmental and operating conditions
- documenting the OEM toner performance as compared to the Katun product
- testing compatibility with the OEM product.

Katun and our partners utilize unique, proprietary modified conventional manufacturing methods to produce toner that closely matches the OEM's toner performance in important areas such as image density, adhesion, yield, etc.

***Q. Are chemically produced and conventionally produced toners compatible? Can I top load one over the other?***

Yes. Conventionally produced toner can co-exist with chemically produced toner when their important functional characteristics are closely approximated. However, it is necessary that this be designed into the product. By paying careful attention to flow, charging characteristics and color matching, a conventionally produced toner can "act" like a chemically manufactured product. The manufacturing process does not determine compatibility, rather, it is the characteristics of the produced particles that make that determination.

**Conventionally produced toner can co-exist with chemically produced toner when their important functional characteristics are closely approximated**

A properly produced conventional toner can be top loaded on a chemical toner because of the compatibility of the particle characteristics.

As part of the battery of tests each toner sample is subjected to, Katun's R & D laboratory tests both forward and reverse compatibility of Katun toner with OEM product.

***Q. My machines using chemical toner seem to run "dirty." Won't they run even dirtier with conventionally produced toner in them?***

First, a "dirty" machine indicates that excess waste toner, in the form of "dust," is present in the copier system. This dust remains on the surfaces of the OPC drum, belts and rollers.

To directly answer the question, no, it is not a function of the manufacturing process used. Chemical toners typically produce sharp images (dot control) by carefully

controlling the scatter of the toner particles. The consistency of the charge of particles as well as their size, shape and other characteristics control the scatter in the machine, which sometimes leads to a dirty running machine. A properly produced conventional toner, which has similar particle characteristics, will not run any dirtier than the chemical toner in the machine. In fact, research has shown some OEM chemical toners actually perform worse than similar conventional toners. Toner dusting is not a byproduct of the manufacturing process, but rather, of the toner particle characteristics.

***Q. Is using chemically produced toner more environmentally friendly than using conventional toner?***

While it is true that the chemical manufacturing process requires less energy than conventional toner production, as with everything, there are trade offs. Conventional toner uses electricity to pulverize the material into small particles. Chemical toner production uses a significant amount of water in the production process. Additional energy is required to recover, treat, and release the water back into the environment.

Machines designed for use with chemical toners are designed to fuse toner at a lower temperature. This saves some energy. Conventional toner manufacturers, such as Katun, do not require users to change the fusing temperature settings on the machine. Base materials are selected, in part, due to their fusing characteristics. The energy savings, in this case, are provided by the machine -- not the toner -- and is of benefit to all users.

Since 2005, Katun has been marketing monochrome and color toners for use in applications originally designed for chemical toners. Katun performs extensive research into each toner to understand the important functional and xerographic characteristics that must be present in the toner. This research is used to create toner that closely matches the same important characteristics while respecting the intellectual property of others. Katun works with leading toner manufacturers who are utilizing state of the art manufacturing equipment that is producing high quality products.

### **About the Author:**

Robert Moore is Vice President of the New Product Development area at Katun Corporation.

Bob joined Katun in October 1988 as a laboratory test technician. His first 12 years were spent working in and managing Technical Operations. In 2000, Bob transferred to the New Product Development area and has spent the last six years managing Katun's Imaging Supplies development efforts and, more recently, all of Katun's core business research and development activities.

Prior to joining Katun, Bob began his career in the dealer/BTA channel working nearly three years as a field service technician.

Bob holds an AA Degree in Computer Technology, BS in International Business with a minor in Philosophy, and an MBA in Finance and Marketing.

### **About Katun:**

Headquartered in Minneapolis, Katun Corporation is the world's leading alternative supplier of imaging supplies, photoreceptors, parts, fuser rollers and other select products, for the office equipment industry. With over 28 years of expertise and experience in the business equipment industry, the privately-held Katun now serves more than 19,000 customers in more than 170 countries.