



## Santech Technical Information

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### ***What Color Should an O-ring Be?***

In the Automotive Mobile Air Conditioning Market it would be convenient if the color would indicate the rubber material of the o-ring. Unfortunately, there is no standard color. Ford changed from Black Nitrile to Green HNBR when they introduced R134a. Volvo started using a blue HNBR in 1989 and later changed it to yellow HNBR. Denso was using black Nitrile but changed to red Nitrile when they introduced a black HNBR. Currently, almost every Automobile Manufacturer uses more than one color in their air conditioning systems.

Generally, green, yellow, tan, brown, and purple indicate HNBR. Black is the standard color for most rubber materials and has been used for Nitrile, Neoprene, HNBR, EPDM, and Viton in air conditioning systems. In some areas of the aftermarket, blue-painted o-rings could indicate Neoprene or Nitrile. Red has been used for Nitrile and HNBR. Each of these materials could be manufactured in multiple colors. The color will not tell you the material!

The Air Conditioning System Manufacturers changed the o-ring materials with the introduction of R134a. The new materials were chosen for their high temperature characteristics and their chemical compatibility. Colors were introduced to differentiate between the old and new materials. Many different colors were introduced because each AC System Manufacturer chose their material and color without consulting with the other System Manufacturers.

There are many different AC System Manufacturers located around the world that sell their complete systems to the Automobile Manufacturers. Most of the AC System Manufacturers have standardized to a single color in their own current designs but an Automobile Manufacturer may purchase designs for different platforms from several AC System Manufacturers. The different AC System Manufacturers use different colors so an Automobile Manufacturer ends up with multiple colors in their replacement part program. The following chart provides information on the colors used by each Automobile Manufacturer:

| <b>Automobile<br/>Manufacturer</b> | <b>Black</b> | <b>Green</b> | <b>Brown</b> | <b>Red</b> | <b>Purple</b> | <b>Tan</b> | <b>Solid<br/>Blue</b> | <b>Yellow</b> |
|------------------------------------|--------------|--------------|--------------|------------|---------------|------------|-----------------------|---------------|
| Alfa Romeo                         | X            | X            |              |            |               |            |                       |               |
| Aston Martin                       | X            |              |              |            |               |            |                       |               |
| BMW                                | X            | X            |              |            |               |            |                       |               |
| Chrysler                           | X            | X            |              | X          | X             | X          |                       |               |
| Citreon                            |              |              | X            |            |               |            |                       |               |
| Daewoo                             | X            |              |              | X          |               |            |                       |               |
| Fiat                               | X            | X            |              |            |               | X          |                       |               |
| Ford                               | X            | X            |              |            | X             | X          |                       |               |
| General Motors                     | X            |              |              |            |               |            |                       |               |
| Honda / Acura                      | X            |              | X            | X          |               |            |                       |               |
| Hyundai                            | X            | X            |              | X          |               | X          |                       |               |
| Isuzu                              | X            |              |              |            |               |            |                       |               |
| Jaguar                             |              | X            |              |            | X             |            |                       |               |
| Lexus                              | X            |              |              |            |               |            |                       |               |
| Mazda                              | X            | X            |              | X          |               |            |                       |               |
| Mercedes                           | X            | X            |              |            |               |            |                       |               |
| Mitsubishi                         | X            | X            |              | X          |               |            |                       |               |
| Nissan / Infinity                  | X            | X            |              |            |               |            |                       |               |
| Opel                               | X            | X            |              |            |               |            |                       |               |
| Peugeot                            |              |              | X            |            |               |            |                       |               |
| Porsche                            | X            | X            |              |            |               |            |                       |               |
| Renault                            | X            | X            |              |            |               | X          |                       |               |
| Rolls Royce                        | X            | X            |              |            |               |            |                       |               |
| Rover                              | X            | X            |              |            |               |            |                       |               |
| Saab                               | X            | X            |              |            |               |            |                       | X             |
| Saturn                             | X            | X            |              |            |               |            |                       |               |
| Seat                               |              |              |              |            | X             |            |                       |               |
| Subaru                             | X            |              |              |            |               |            |                       |               |
| Suzuki                             | X            |              | X            |            |               |            |                       |               |
| Toyota                             | X            | X            |              | X          |               |            |                       |               |
| Vauxhall                           | X            | X            |              |            |               |            |                       |               |
| Volkswagon / Audi                  | X            |              |              |            | X             |            |                       |               |
| Volvo                              | X            |              |              |            |               |            | X                     | X             |

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Many of the air conditioning o-rings are the same size but are manufactured in multiple colors. There are many different materials used but HNBR will work in all applications. Santech has chosen to supply Green HNBR for all U.S. applications of automotive air conditioning o-rings. Santech® HNBR is a high temperature material and is compatible with R12, R134a, Mineral Oil, PAG Oil, and Ester. Green was the most widely used color for HNBR and was chosen as the standard Santech color. Almost all aftermarket companies have followed Santech's lead and have standardized to this system. Santech also has most of the other colors available for the European market and for special order requirements.

For further information on materials and testing contact Santech Industries at 817-589-1212 or visit our Web Site at [www.santech.com](http://www.santech.com). Santech is the original supplier of Green HNBR o-rings to the aftermarket. Santech is a registered trademark of Santech Industries, Inc.