

O-Ring Color Changes

Prior to 1987, O-Rings for R-12 mobile AC applications were almost exclusively black. Material-wise, the rubber in these O-Rings may have been Nitrile (Buna-N), Neoprene, or a blend of these two compounds. In 1987, the Montreal Protocol mandated the change to a non-ozone-depleting refrigerant and OEMs around the world unanimously selected R-134a as the refrigerant to replace R-12. In the aftermarket, refrigerants were offered that were blends of various base refrigerants. Whether using R-134a or a blend of other refrigerants, the common trait among these new refrigerants is that a different O-Ring compound was recommended for sealing. Several new rubber compounds were identified as being suitable for sealing R-134a and the blend refrigerant. The O-Rings that were made from these new rubbers have commonly been colored in order to distinguish them from the earlier black O-Rings that were compatible only with R-12.

Over the past 15 years, O-Rings used in sealing hoses and components of mobile AC systems have routinely been one of three colors: black, blue, or green. Black O-Rings offered by Four Seasons are Neoprene and are fully compatible with R-134a, however, it is impossible to look at a black O-Ring and tell if it is Nitrile (R-12) or Neoprene (R-134a). That is the reason colors have been adopted. Blue and green have become the standard colors for those applications. The blue O-Rings that are available today are Neoprene. They are colored blue with an external coating to distinguish them from black nitrile O-Rings that are identical in appearance yet not recommended for use with R-134a. The green O-Rings are Highly Saturated Nitrile (also known as Hydrogenated Nitrile) and are commonly referred to as HNBR or, in some cases, HSN. In either case, the green color is molded into the rubber. The blue Neoprene and green HNBR O-Rings are interchangeable in their applications with R-134a, blended refrigerants, and R-12 as well.

Recently, there has been a move to consolidate the black Neoprene, blue Neoprene, and green HNBR O-Rings offered in the Four Seasons product line to all green HNBR O-Rings. The rationale behind this is that if all these O-Rings are equally compatible with R-134a, then it is unnecessary to offer more than just one type. The elimination of the numerous duplicate part numbers for black, blue, and green O-Rings will offer obvious benefit and will result in a general simplification of the O-Ring selection process. The elimination of black Neoprene from the mix is obvious as this compound presents an identification problem for the service technician. The reason for selecting green HNBR over blue Neoprene is twofold. First is the fact that green HNBR has OE acceptance and application whereas blue Neoprene has been predominantly an aftermarket phenomenon. The second reason is because green HNBR has a slightly higher operating temperature range when compared to Neoprene which makes it the slightly more desirable choice. Add to these the earlier mentioned benefit of a large reduction in O-Ring SKUs through the elimination of black and blue O-Ring part numbers and you have a clear picture of why this change is taking place.