

# Difference Between Neoprene and Nitrile Rubber

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## Key Difference – Neoprene vs Nitrile Rubber

Many rubber related product manufacturers rely on various types of [synthetic rubber](#) due to various reasons. The demand for synthetic rubbers over [natural rubber](#) has increased very rapidly over the recent past. There are many types of synthetic rubber and they are broadly classified into two categories, namely; general-purpose synthetic rubbers and special purpose rubber. General-purpose rubbers are more common and widely used in many manufacturing processes. Neoprene and nitrile rubber are two such widely used general-purpose rubbers. The key difference between neoprene and nitrile rubber is that **neoprene is produced by emulsion polymerization of chloroprene (2-chloro-1, 3-butadiene), whereas nitrile rubber is produced by emulsion polymerization of [copolymers](#) of butadiene and acrylonitrile.**

## What is Neoprene?

Neoprene is the trade name for **chloroprene rubber** or **polychloroprene (CPR)**. This chlorinated rubber is the first originally developed rubber in the 1930s, especially for oil resistance applications. It is produced by emulsion polymerization of chloroprene monomer and is vulcanized using [magnesium oxide](#) or zinc oxide because sulphur vulcanization is extremely slow. Neoprene has extremely good oxidative degradation properties due to the presence of chlorine atom in the polymer chain. Moreover, this rubber shows good chemical resistance to ageing, attack by ozone, and UV irradiation. Neoprene exhibits outstanding tensile and hardness properties; thus, it is resistance to damages caused by twisting, flexing, and elevated toughness. Neoprene is also known for its good flame resistance properties. However, its electrical properties are lesser when compared to natural rubber. These unique set of properties has led neoprene rubber to its wide range of applications, and to substitute natural rubber in many areas. Even though it was initially developed for its oil resistance, it shows low oil resistance when compared to nitrile rubber. Tires made out of neoprene show excellent properties but are expensive.

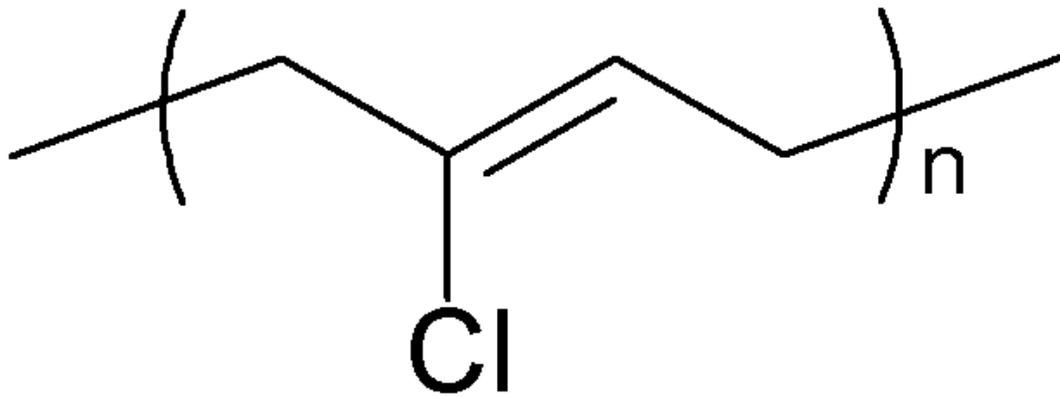


Figure 01: Neoprene

Neoprene is widely used to manufacture wire and cable jacketing, tubes, hose, and covers. It is also used in automotive industry to produce seals, boots, gaskets, belts, molded, and extruded products. Moreover, neoprene based sealants and adhesives are also in the market. In addition, neoprene is used in [latex](#) dipped product and paper industries. In civil engineering industry, products like bridge pads, soil pipe gaskets, waterproof membranes, asphalt-modified products are made by neoprene rubber.

## What is Nitrile Rubber?

Nitrile rubber is also known as **acrylonitrile-butadiene rubber (NRB)**. As the name implies, nitrile rubber is a copolymer of acrylonitrile and butadiene and produced in different ratios changing from 25:75 to 75:25. Unlike all other general-purpose synthetic rubbers, nitrile rubber has excellent oil and solvent resistant properties. However, it is not often used in tire industry due to its high cost. The oil resistance can be enhanced by increasing its acrylonitrile content. Nitrile does not show strong chemical resistance properties against strong acids. It is fairly resistant to UV irradiation and ozone. Nitrile rubber is used for manufacturing of fuel pumps diaphragm, fuel tanks, gasoline hoses, oil seals, gaskets, oil resistant shoes, seals, etc.

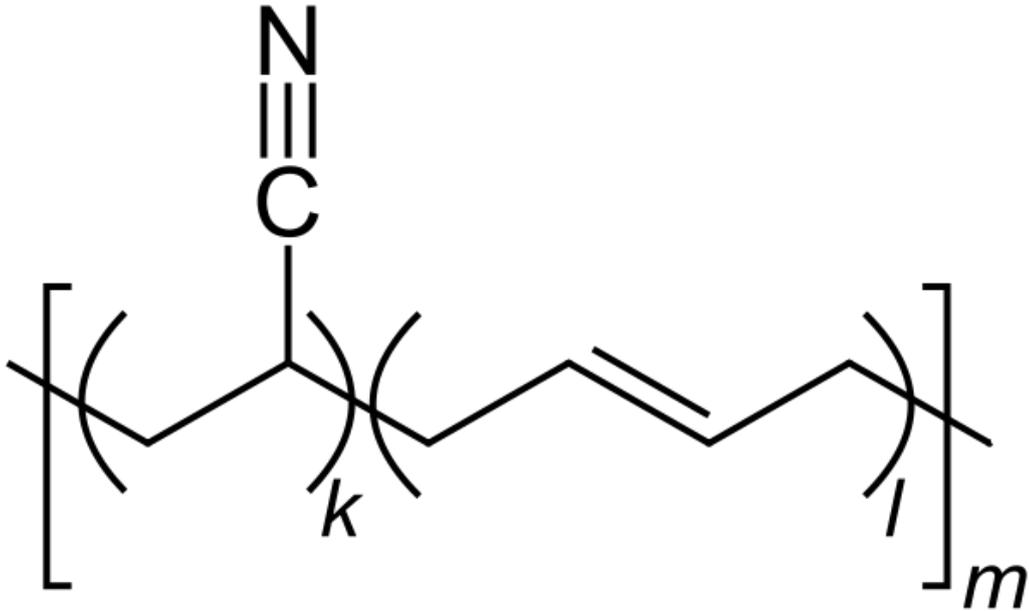


Figure 02: Nitrile Rubber

## What is the difference between Neoprene and Nitrile Rubber?

Neoprene vs Nitrile Rubber	
Neoprene is manufactured by emulsion polymerization of chloroprene.	Nitrile rubber is manufactured by emulsion polymerization of copolymers of butadiene and acrylonitrile.
Oil and Solvent Resistance Properties	
Neoprene has good resistance properties.	Nitrile rubber has very high resistance properties.
Ozone and UV Resistance	
Neoprene has a very high resistance.	Nitrile rubber has fairly low resistance properties.
Fire Resistance	
Neoprene has high fire resistance.	Nitrile rubber has low fire resistance.
Applications	

Neoprene is used for wire and cable jacketing, tubes, hose, and covers, sealants and adhesives, seals, boots, gaskets, belts, molded, and extruded products and dipped products such as balloons, and gloves.

Nitrile rubber is used for fuel pumps diaphragm, fuel tanks, gasoline hoses, oil seals, gaskets, oil resistant shoes, and seals.

## Summary – Neoprene vs Nitrile Rubber

Neoprene is a chlorinated rubber produced by emulsion polymerization of chloroprene. It has excellent UV and ozone resistance, good flame resistance, good oil and solvent resistance, and good tensile and harness properties. Nitrile rubber is a copolymer of butadiene and acrylonitrile and has excellent oil and solvent resistance, but low UV and ozone resistance. This is the difference between neoprene and nitrile rubber.

### References:

1. Cardarelli, F. Materials handbook: a concise desktop reference. Springer Science & Business Media, 2008.
2. Sivasankar, B. Engineering chemistry (pp. 145-150). New Delhi: Tata McGraw-Hill, 2008.

### Image Courtesy:

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