PowerNox™ PA100 Antioxidant

Introduction

Antioxidant PA100 (similar to Wingstay 100 of Goodyear and ACCINOX 100 of ICI) is a mixture of diaryl-p-phenylenediamines, which can be classified in p-phenylene antioxidant, is excellent antiozonant to chloroprene rubber. It is the effective antioxidant used in the tire industry and also widely used for rubber products.

PA100 can be used as an antioxidant, antiozonant, and anti-flex cracking agent for many natural and synthetic elastomer compounds. Its capacity to resist groove cracking and flex cracking is similar to antioxidant 4010 NA or 4020, superior to antioxidant A and antioxidant D.

Additional benefits of PA100 are low volatility, low reactivity, resistance to water extraction, and a low migration rate. These characteristics allow PA100 antidegradants to provide long-term protection in tires and other rubber goods.

In addition to compounded products, PA100 can be used for polymer stabilization and will provide excellent protection during drying, storage and processing of many types of polymers.

PA100 has no influence on vulcanization and scorch to its little basicity. PA100 is suitable for truck tire, cross-country tire, diagonal tire and radial tire, which are used in severe conditions.

PA100 can also make up the default that tire become red by using antioxidant 4010NA or 4020.

Chemical Name

Mixture of Diaryl-p-phenylenediamines (DTPD)

CAS Number

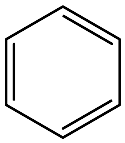
68953-84-4

EINECS Number

273-227-8

PowerNox™ PA100 Antioxidant

Chemical Structure



Physical Properties

Color and Appearance	Brownish Granules
Initial melting Point	92°C
Heating Loss (65°C)	0.5% Max.
Ash Content (800°C)	0.3% Max.
Active Components	80.0% Min.
Diphenylparaphenylenediamine	16~24% (CAS No.: 74-31-7)
Ditolylparaphenylenediamine	15~23% (CAS No.: 27417-40-9)
Phenyltolylparaphenylenediamine	40~48%
Diphenylamine Content	6.0% Max.
Iron Content	750ppm Max

Solubility

Insoluble in water. Moderately soluble in toluene and carbon tetrachloride.

Benefits & Applications

Tire Durability Application

Tire durability is affected by many factors including the ingredients and methods used in manufacture as well as the type and conditions of use by the consumer. Tire components are exposed to heat from constant flexing and appropriate antioxidants must be used to protect most commonly used rubbers from thermal degradation over the lifetime of the tire. Ozone in the

air can also degrade rubber, and antiozonants are employed to minimize this effect. Antiozonants are defined, as compounds, which react with ozone before it reacts with the polymer and usually, consist of para-phenylene diamines such as PA100.

Flex Cracking Application

Tires in service are subject to continuous bending and flexing, which gradually weaken the rubber compounds and may lead to failure by crack formation. The term “flex cracking” is generally used to describe the spontaneous formation and growth of cracks caused by periodic mechanical stressing of vulcanizates and accelerated when exposed to oxygen. This oxidative mechanism differs from ozone cracking. Obviously, good flex cracking resistance will be needed, especially for tire sidewall applications. However, most tire components will also require good fatigue resistance, especially the apex, the base, the belt skim coat and inner liner. Flex cracking resistance of the vulcanizates is strongly dependent on the type of polymer used and can be improved by addition of antioxidants. Antioxidants offering the best protection against flex cracking are amine-based, with p-phenylene diamines being extremely effective. Antioxidants are defined as compounds, which react with oxygen radicals before they have a chance to react with the polymer and consist of aminic and phenolic types of stabilizers.

Groove Cracking Application

Groove cracking describes splits or tears, which form at the base of the grooves of a tire tread pattern, due either to growth of cuts made mechanically or to spontaneous formation and growth of cracks. Tears during molding, poor tread pattern design, flexing fatigue of the rubber due to poor flex properties, flexing fatigue due to overload or under inflation of the tire, can contribute to groove cracking and cut growth. The groove cracking resistance of the tread is dependent on the polymer composition; the type of crosslinking agent and compounding ingredients employed (especially the Antidegradants). The classes of Para-phenylene diamine Antidegradants have demonstrated good protection against groove

cracking, especially the diaryl-para-phenylene types such as PA100.

PA100 particularly mixed with same amount 4020 or 4010 NA is the most antiozonant style to extend the useful life of tire. The reason is that the two kinds antioxidants have synergism. Antioxidant 4020 and 4010 NA provides the short-time protection at the beginning, while PA100 provides long-term ozone, oxygen and heat protection making it an excellent choice to minimize environment deterioration. Because PA100 inhibits flex cracking, it provides excellent long-term protection to dynamic products such as tires, belts, and other industrial goods.

Because of one or two solubilizing groups on the benzene rings in PA100, the solubility in rubber is enhanced highly and the bloom is reduced, so that large quantity of PA100 can be used in rubber..

Handling & Storage

In accordance with good industrial practice, handle with care and avoid unnecessary personal contact. Avoid continuous or repetitive breathing of dust. Use only with adequate ventilation. Protect skin. Avoid dust formation and ignition sources.

This product may be stored up to two years in a sealed container. Containers should be stored in a cool, dry area. Extended storage at elevated temperatures or exposure to direct heat or sunlight could reduce product life. Keep containers sealed when not in use.

For more detailed information please refer to the material safety data sheet.

Packing

Antioxidant PA100 is supplied in 25Kg HDPE lined paper sack.

Note

All information in the leaflet is based on our present knowledge and experience. We reserve the right to make any changes according to technological progress or further developments. Performance of the product described herein should be verified by testing.

We specifically disclaim any other express or implied warranty of fitness for a particular purpose or merchantability.

PowerNox™ PA100 Antioxidant

We disclaim liability for any incidental or consequential damages.

Chemical Name of Antioxidant 4010NA (IPPD):
N-isopropyl-N'-phenyl-p-phenylenediamine
CAS No.: 101-72-4

Chemical Name of Antioxidant 4020 (6PPD):
N-(1, 3-dimethylbutyl)-N'-phenyl-p-phenylenediamine
CAS No.: 793-24-8