



TECHNICAL INFORMATION

DPR® 400 Liquid Natural Rubber

PRODUCT DESCRIPTION

DPR 400 is a low molecular weight liquid polymer derived from natural rubber. This viscous, dark-brown liquid contains no additives, peptizers or solvents.

DPR 400 is the most viscous of the DPR liquid rubbers and accepts the maximum extension of plasticizer and filler. When used as a processing aid, DPR 400 demonstrates slightly higher retention of cured physical properties as compared to the lower viscosity grades of liquid natural rubber.

DPR 400 liquid rubber is compatible with many solvents, plasticizers, resins and reinforcements. It increases the polymer's capacity for fillers and improves the acceptance of non-compatible reinforcements.

APPLICATION

DPR 400 liquid rubber offers processing flexibility and performance options for a wide range of applications. The DPR products vulcanize at either ambient or elevated temperature with standard curatives for natural rubber. The cure cycles can be as short as a few minutes to as long as several days. The DPR products contain no solvents or additives; and they are compatible with a broad range of solvents, plasticizers, resins and polymers.

DPR 400 liquid rubber provides all the performance properties of natural rubber in a convenient liquid form for a wide range of applications including:

- Polymeric binder for grinding wheels and friction products.
- Reactive processing aid for natural rubber.
- Reactive processing aid for some synthetic rubbers.
- Reactive vehicle for rubber compounding additives.
- Rheology modifier for lubricants.
- Polymer base for automotive sealants.
- Asphalt modifier.

DPR liquid rubber has excellent wetting characteristics. It is a superior dispersion aid for many synthetic fibers and other rubber reinforcements. DPR can bind more than ten times its weight in abrasives for grinding wheels and for other abrasive or friction products.

DPR reduces the viscosity of uncured rubber when added at levels of 5-to-20 parts of rubber. This reduces power requirements, improves blend consistency, and reduces the risk of scorching. It can be used with natural rubber and such polymers as polychloroprene, EPDM, polybutadiene, SBR and acrylonitrile-isoprene.

Liquid rubber supports high carbon black loading without the problems associated with fugitive plasticizers. Typical process oils allow high loadings of carbon black, but they reduce the final hardness and they can migrate from the finished product. Liquid rubber allows similarly high carbon black loading and reacts into the final rubber matrix. The cured rubber has superior properties; it maintains the properties because the DPR does not become fugitive.

DPR liquid rubber improves the stability of heavy-duty lubricants by increasing the resistance to flow on vertical surfaces and by holding dry additives in a more stable suspension.

A minor addition of DPR liquid rubber to asphalt formulations reduces flow at high temperatures and maintains flexibility at cold temperatures. This combination of benefits is unique in asphalt compounds.

Elementis Performance Polymers offers a *Compounding Guide* with starting point formulas for these and other applications.

TYPICAL PROPERTIES

DPR liquid rubbers facilitate the compounding process and intermediate processing steps as well as final vulcanization processing. In the uncured state they function as a plasticizer to reduce cycle time and energy consumption. However, since DPR cures by the same mechanism as natural rubber, it becomes part of the polymer matrix and remains non-fugitive unlike ordinary processing oils.

Property	DPR 400
Color	Dark Brown
Viscosity, cps. @38°C	400,000
Avg. molecular wt.	80,000
Density, lb./gal.	7.7

Specific gravity	0.92
Volatiles, wt. %	0.16
Ash, wt. %	0.5-1.5
Unsaturation, mole %	98
Flash point, °C COC	271
Glass transition temp., Tg. °C	-65

VISCOSITY

DPR liquid rubber is a low molecular weight natural rubber. It is a viscous liquid at typical processing temperatures. The following table indicates the viscosity (cps.) at typical conditions.

Temperature	DPR 400
25°C/77°F	985,000
38°C/100°F	400,000
52°C/125°F	130,000
66°C/150°F	80,000
80°C/175°F	42,000
93°C/200°F	18,000
121°C/250°F	11,000
149°C/300°F	6,000

STORAGE AND HANDLING

DPR 400 is packaged in 350 lb. 55-gallon steel drums. Store in a dry environment to prevent damage to the drums. The liquid rubber products are stable over a wide temperature range. They are not damaged by freezing temperatures or occasional short-term exposure to temperatures of 66°C (150°F). The shelf life is a minimum of two years in an unopened container.

The DPR products are viscous polymers. Heating the drums lowers the viscosity for easier handling. Vent the drums before heating to avoid pressure build up.

DPR liquid rubber can be compounded with virtually any type of rubber processing equipment. Processing requirements vary with the desired finished properties and with the other formulation ingredients.

DPR liquid rubber cures by the same mechanism as natural rubber. It can replace natural rubber 1:1. A slight increase in curative levels may provide optimum performance when using levels above 15-20 phr of DPR. The formulary suggests the curatives and the ratios for a range of compounds.

SAFETY

These materials are intended for industrial use only and the practices of good housekeeping, safety and cleanliness should be followed before, during and after use.

The DPR products are not considered toxic by inhalation or ingestion.

In case of accidental skin contact, wash thoroughly with soap and water. In case of eye contact, flush eyes thoroughly with water and consult a physician immediately.

Use caution when handling hot material. Refer to Materials Safety Data Sheet for additional information.

ADDITIONAL INFORMATION

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NOTE

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