



DuPont™ Elvax®

EVA resins

Elvax® Resins for Hose and Tubing

- Longer Flex Life
- Flexibility Below Zero
- Easy Thermoplastic Processing

Elvax® resins offer a unique combination of processing and performance characteristics for use in flexible hose and tubing. These ethylene-vinyl acetate copolymers are inherently flexible, resilient and tough over a broad temperature range and have excellent resistance to flexural fatigue and environmental stress cracking.

With no plasticizer to migrate and low odor, Elvax® resins offer advantages in many applications traditionally served by plasticized vinyls and compounded rubbers. Subject to the extractional limits in F.D.A. regulation 177.1350, Elvax® resins can be used as articles or components of articles intended for contact with food. Typical applications include tubing for beverage dispensers and hoses for swimming pools, heavy duty vacuum cleaners and ice rink cooling systems.

Grades of Elvax® for Hose and Tubing

Commercial Elvax® resins range in vinyl acetate content from 9% to 40% and in melt index from 0.3 to 500 dg/min. Flexibility, resilience, toughness and clarity are directly proportional to vinyl acetate content. Elvax® resins containing from 9% to 25% vinyl acetate and having a melt index of 2.5 or below are generally preferred for hose and tubing applications. All of the resins in this range have a brittleness temperature^a below - 100°C (- 148°F). Table 1 shows other key properties of typical resin grades used for hose and tubing.

(^aASTM D 746)

Processing Capabilities

Hose and tubing of Elvax® resins can be produced using thermoplastic processing equipment or rubber processing equipment such as Banbury mixers, two-roll mills and cold feed extruders. Thermoplastic extrusions require temperatures of 120-200°C (248-392°F). The temperature profile will vary with machine type, size and screw design as well as die design.

Compounding

Elvax® resins are compatible with a variety of other resins and elastomers including polyethylene, polypropylene, crepe rubber and styrene-butadiene rubber. Clays and other inorganic fillers may be added to modify physical properties and lower cost.

Elvax® resins readily accept colorants. Either transparent or opaque colors can be used. Pigments are generally preferred to dyes since they are, typically, more stable at extrusion temperatures and show better light-fastness. Because of their near transparency, Elvax® resins provide an excellent base for developing strong colors at minimum pigment levels. Color concentrates based on Elvax® are preferred for ease of blending.

Safety Precautions

As with any hot material, care should be taken to protect the hands and other exposed parts of the body when handling molten polymer. At temperatures above 220°C (428°F), Elvax® resins can evolve fumes. Proper ventilation should be provided to insure that people do not breathe the fumes. Spilled resin should be swept up promptly since pellets present a slipping hazard. More detailed information on safe handling and disposal of Elvax® resins is provided in a Product Safety Bulletin and Material Safety Data Sheet available from your DuPont Ethylene Polymers representative or the nearest office.

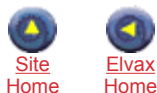
Table 1. Typical Properties of Elvax® Resins Used in Hose and Tubing^a

| Resin Grade | Vinyl Acetate, w% TGA | Melt Index, dg/min ASTM D 1238 | Density, kg/m³ (g/cm³) ASTM D 792 | Flexural Modulus @23°C MPa (psi) ASTM D 790 | Tensile Strength @23°C MPa (psi) ASTM D 638^b | Elongation, % ASTM D 638^b | Vicat Softening Temp., °C (°F) ASTM D 1525 | Hardness, Shore D ASTM D 2240 |
|--------------------|------------------------------|---------------------------------------|--|--|--|---|---|--------------------------------------|
| Elvax® 770 | 9.5 | .8 | 930 (0.930) | 98 (14 200) | 21 (3 000) | 700 | 82 (180) | 46 |
| Elvax® 760Q | 9.3 | 2.0 | 930 (0.930) | 93 (13 500) | 18 (2 600) | 700 | 79 (174) | 46 |
| Elvax® 670 | 12.0 | 0.3 | 933 (0.933) | 83 (12 100) | 25 (3 600) | 700 | 79 (174) | 44 |
| Elvax® 660 | 12.0 | 2.5 | 933 (0.933) | 77 (11 100) | 18 (2 600) | 700 | 74 (165) | 44 |
| Elvax® 560 | 15.0 | 2.5 | 935 (0.935) | 61 (8 800) | 18 (2 600) | 750 | 69 (156) | 41 |
| Elvax® 470 | 18.0 | 0.7 | 941 (0.941) | 49 (7 100) | 23 (3 400) | 750 | 66 (151) | 41 |
| Elvax® 460 | 18.0 | 2.5 | 941 (0.941) | 48 (6 900) | 19 (2 700) | 750 | 64 (147) | 39 |
| Elvax® 360 | 25.0 | 2.0 | 948 (0.948) | 22 (3 200) | 20 (2 900) | 750 | 53 (127) | 37 |

^aTest specimens (except for melt index and % vinyl acetate) prepared by compression molding.

^bASTM D 638, Type IV test specimens; crosshead speed 5.1 cm (2 in)/min.

Note: These data are represented to describe various grades of Elvax® and are not intended as specifications.



©2005 DuPont Company.
All rights reserved.



We welcome and respond promptly to e-mail.

The technical data contained herein are guides to the use of DuPont resins. The advice contained herein is based upon tests and information believed to be reliable, but users should not rely upon it absolutely for specific applications because performance properties will vary with processing conditions. It is given and accepted at user's risk and confirmation of its validity and suitability in particular cases should be obtained independently. The DuPont Company makes no guarantees of results and assumes no obligations or liability in connection with its advice. This publication is not to be taken as a license to operate under, or recommendation to infringe, any patents.

CAUTION: Do not use in medical applications involving permanent implantation in the human body. For other medical applications,

