

## Technical Information

### Introduction

Viton™ B-202\* fluoroelastomer is a low viscosity, “B-type” gum polymer that demonstrates improved processing and rheology when compared with existing fluoroelastomers.

Viton™ B-202 is designed to be cured with either Viton™ Curative No. 30 or Viton™ Curative No. 50. When using Viton™ Curative No. 30, use Viton™ Curative No. 20 in a ratio of about 1.8 Viton™ Curative No. 30 to Viton™ Curative No. 20. When using Viton™ Curative No. 50, use 0.3–0.5 phr of Viton™ Curative No. 20 to ensure a fast cure rate. Note that Viton™ Curative No. 20 can be difficult to mix into low viscosity stocks, such as those based on Viton™ B-202, and careful attention needs to be paid to mixing procedures.

Compared with other “B-family” terpolymers, Viton™ B-202 provides:

- Low viscosity
- Improved processing
- Increased mold flow
- Excellent mold release

### Applications

- Transfer and injection molding of complex shapes
- Extrusions (e.g., fuel hose and tubing)
- Solution coatings of fabrics, tanks, or chemical containers

Viton™ B-202 can be blended with other Viton™ types to modify viscosity, enhance processability, and/or improve flow.

### Use of Viton™ B-202

Table 1 compares Viton™ B-202 with Viton™ B-600 and blends of Viton™ B-202 and B-600 in a standard 30MT black formulation. Table 2 compares the effects of carbon black levels in Viton™ B-202.

### Safety and Handling

Before handling or processing Viton™ B-202, read and follow the recommendations as described in the Chemours technical bulletin, “Handling Precautions for Viton™ and Related Chemicals”.

Viton™ B-202 should be handled similar to other types of Viton™. Keep off skin and wash well after handling. For safe handling of other compounding ingredients, please refer to the respective manufacturers’ information.

### Product Description

|  |   |
|--|---|
| Chemical Composition                           | Terpolymer of hexafluoropropylene, vinylidene fluoride, and tetrafluoroethylene |
| Physical Form                                  | Slab  |
| Color  | Silver-gray, translucent  |
| Odor   | None  |
| Specific Gravity                               | 1.84  |
| Solubility                                     | Low molecular weight esters and ketones   |
| Storage Stability                              | Excellent   |
| Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F) | Nominal 20  |

\*Viton™ B-202 was formerly named VTR-7130.

**Table 1. Performance of Viton™ B-202 Alone and in Blends with Viton™ B-600**

|   | Blends of Viton™ B-202 and B-600 |      |      |      |      |
|---|----------------------------------|------|------|------|------|
|   | A                                | B    | C    | D    | E    |
| Viton™ B-202  | 100                              | 75   | 50   | 25   | —    |
| Viton™ B-600  | —                                | 25   | 50   | 75   | 100  |
| MT Black (N990)   | 30                               | 30   | 30   | 30   | 30   |
| Calcium Hydroxide   | 6                                | 6    | 6    | 6    | 6    |
| High-Activity MgO   | 3                                | 3    | 3    | 3    | 3    |
| Viton™ Curative No. 50  | 2.5                              | 2.5  | 2.5  | 2.5  | 2.5  |
| Viton™ Curative No. 20  | 0.5                              | 0.5  | 0.5  | 0.5  | 0.5  |
| <b>Stock Properties</b>   |                                  |      |      |      |      |
| <b>Mooney Viscosity, ML 1 + 10 at 121 °C (250°F)</b>                          |                                  |      |      |      |      |
| ML 1 + 10, $\mu\text{m}$  | 54                               | 60   | 67   | 77   | 93   |
| <b>Mooney Scorch, MS at 121 °C (250°F)</b>                                    |                                  |      |      |      |      |
| Minimum Viscosity, $\mu\text{m}$  | 28                               | 31   | 36   | 41   | 47   |
| Rise in 30', $\mu\text{m}$  | 0.5                              | 0.4  | 1.2  | 3.0  | 3.3  |
| <b>ODR at 177 °C (351 °F), 3° arch, 15 min motor</b>                          |                                  |      |      |      |      |
| Minimum torque, $M_L$ , dNm   | 6.8                              | 7.9  | 9.9  | 11.6 | 14.2 |
| Maximum torque, $M_H$ , dNm   | 104                              | 109  | 114  | 116  | 120  |
| Scorch time, $t_{s2}$ , min   | 2.4                              | 2.4  | 2.3  | 2.1  | 2.0  |
| Scorch time, $t_{c50}$ , min  | 3.6                              | 3.7  | 3.7  | 3.5  | 3.5  |
| Optimum cure time, $t_{c90}$ , min  | 4.1                              | 4.1  | 4.1  | 3.9  | 3.9  |
| <b>MDR2000 at 177 °C (351 °F), 0.5° arc, 12 min</b>                           |                                  |      |      |      |      |
| Minimum torque, $M_L$ , dNm   | 0.8                              | 1.0  | 1.2  | 1.4  | 1.7  |
| Maximum torque, $M_H$ , dNm   | 26.3                             | 27.0 | 27.7 | 28.5 | 29.7 |
| Scorch time, $t_{s1}$ , min   | 1.5                              | 1.5  | 1.4  | 1.3  | 1.2  |
| Scorch time, $t_{s2}$ , min   | 1.8                              | 1.8  | 1.7  | 1.6  | 1.5  |
| Scorch time, $t_{c50}$ , min  | 2.3                              | 2.3  | 2.2  | 2.1  | 2.0  |
| Optimum cure time, $t_{s2}$ , min   | 3.3                              | 3.3  | 3.1  | 2.9  | 2.8  |
| Optimum cure time, $t_{c90}$ , min  | 3.9                              | 3.8  | 3.7  | 3.4  | 3.3  |
| <b>Rosand Capillary Rheometer at 100 °C (212 °F), 1.5 mm Die, L/D = 0/1</b>   |                                  |      |      |      |      |
| <i>Shear Rate</i>   | <i>Pressure (MPa)</i>            |      |      |      |      |
| 113 sec <sup>-1</sup>   | 4.6                              | 4.9  | 5.3  | 5.6  | 5.3  |
| 452 sec <sup>-1</sup>   | 6.7                              | 7.1  | 7.0  | 7.7  | 7.2  |
| 1,129 sec <sup>-1</sup>   | 8.8                              | 9.1  | 9.0  | 9.6  | 9.2  |
| <b>Vulcanizate Properties</b>   |                                  |      |      |      |      |
| Slabs Cured 10 min at 177 °C (351 °F) and Post-Cured 24 hr at 232 °C (450 °F) |                                  |      |      |      |      |
| <b>Stress/Strain at 23 °C (73 °F)—Original, no post-cure</b>                  |                                  |      |      |      |      |
| Hardness, Shore A   | 77                               | 78   | 75   | 74   | 75   |
| M100, MPa   | 3.7                              | 3.7  | 3.9  | 3.8  | 3.7  |
| Tb, MPa   | 8.7                              | 9.3  | 9.4  | 9.1  | 8.8  |
| Eb, %   | 310                              | 315  | 305  | 300  | 265  |
| <b>Stress/Strain at 23 °C (73 °F)—Original, post-cure</b>                     |                                  |      |      |      |      |
| Hardness, Shore A   | 78                               | 76   | 79   | 79   | 77   |
| M100, MPa   | 5.1                              | 4.7  | 5.0  | 5.0  | 5.2  |
| Tb, MPa   | 13.2                             | 12.4 | 13.4 | 11.9 | 13.4 |
| Eb, %   | 240                              | 230  | 240  | 230  | 250  |

continued

**Table 1. Performance of Viton™ B-202 Alone and in Blends with Viton™ B-600 (continued)**

|   | Blends of Viton™ B-202 and B-600 |      |      |      |      |
|---|----------------------------------|------|------|------|------|
|   | A                                | B    | C    | D    | E    |
| <b>Stress/Strain at 23 °C (73 °F)—After aging 168 hr at 200 °C (392 °F)</b>                         |                                  |      |      |      |      |
| Hardness, Shore A   | 80                               | 78   | 77   | 77   | 77   |
| M100, MPa   | 5.8                              | 5.4  | 5.6  | 5.2  | 5.7  |
| Tb, MPa   | 13.5                             | 13.7 | 12.4 | 13.0 | 13.9 |
| Eb, %   | 230                              | 240  | 210  | 230  | 230  |
| Change M100, %  | 13                               | 13   | 12   | 5    | 11   |
| Change Tb, %  | 2                                | 11   | -8   | 9    | 4    |
| Change Eb, %  | -6                               | 3    | -11  | -1   | -6   |
| Change Hardness, pts  | 2                                | 2    | -2   | -2   | 0    |
| <b>Stress/Strain at 23 °C (73 °F)—After aging 168 hr at 250 °C (482 °F)</b>                         |                                  |      |      |      |      |
| Hardness, Shore A   | 79                               | 79   | 75   | 75   | 76   |
| M100, MPa   | 4.6                              | 4.2  | 4.3  | 4.3  | 4.5  |
| Tb, MPa   | 11.2                             | 10.9 | 11.1 | 10.9 | 12.8 |
| Eb, %   | 230                              | 240  | 230  | 230  | 240  |
| Change M100, %  | -10                              | -11  | -13  | -13  | -13  |
| Change Tb, %  | -15                              | -12  | -17  | -9   | -5   |
| Change Eb, %  | -6                               | 3    | -3   | 1    | -3   |
| Change Hardness, pts  | 1                                | 3    | -4   | -4   | -1   |
| <b>Stress/Strain at 23 °C (73 °F)—After aging 168 hr at 150 °C (302 °F) in ASTM 105 Oil</b>         |                                  |      |      |      |      |
| Hardness, Shore A   | 82                               | 81   | 81   | 81   | 81   |
| M100, MPa   | 5.5                              | 6.0  | 6.0  | 5.8  | 5.5  |
| Tb, MPa   | 6.7                              | 7.0  | 6.8  | 6.7  | 6.4  |
| Eb, %   | 135                              | 125  | 115  | 120  | 125  |
| Change M100, %  | 8                                | 26   | 20   | 18   | 6    |
| Change Tb, %  | -49                              | -44  | -49  | -44  | -52  |
| Change Eb, %  | -45                              | -46  | -52  | -47  | -50  |
| Change Hardness, pts  | 4                                | 5    | 2    | 2    | 4    |
| <b>Stress/Strain at 23 °C (73 °F)—After aging 70 hr at 2000 °C (3632 °F) in Stauffer 7700 Fluid</b> |                                  |      |      |      |      |
| Hardness, Shore A   | 69                               | 71   | 69   | 70   | 70   |
| M100, MPa   | 4.6                              | 4.2  | 4.4  | 4.6  | 4.2  |
| Tb, MPa   | 11.3                             | 11.4 | 11.5 | 11.4 | 11.2 |
| Eb, %   | 250                              | 255  | 235  | 265  | 265  |
| Change M100, %  | -10                              | -12  | -11  | -7   | -18  |
| Change Tb, %  | -15                              | -8   | -14  | -4   | -16  |
| Change Eb, %  | 4                                | 9    | 0    | 16   | 7    |
| Change Hardness, pts  | -9                               | -5   | -10  | -9   | -7   |
| <b>Fluid Resistance, Volume Swell, %</b>  |                                  |      |      |      |      |
| Fuel C, 70 hr at 23 °C (73 °F)  | 3                                | 3    | 3    | 3    | 3    |
| Methanol, 70 hr at 23 °C (73 °F)  | 17                               | 17   | 17   | 17   | 17   |
| Stauffer 7700 Fluid, 70 hr at 200 °C (392 °F)   | 9                                | 9    | 9    | 9    | 9    |
| ASTM 105 Oil, 70 hr at 150 °C (302 °F)  | -1                               | -1   | -1   | -1   | -1   |
| <b>Compression Set, %, Method B plied disks</b>   |                                  |      |      |      |      |
| Aged 70 hr at 150 °C (302 °F)   | 20                               | 17   | 16   | 14   | 14   |
| Aged 70 hr at 200 °C (392 °F)   | 34                               | 29   | 26   | 24   | 22   |
| Aged 168 hr at 200 °C (392 °F)  | 42                               | 37   | 31   | 29   | 26   |

**Table 2. The Effect of Carbon Black Level in Viton™ B-202**

|   | Blends of Viton™ B-202 and B-600 |        |        |       |         |
|---|----------------------------------|--------|--------|-------|---------|
|   | 4.5 phr                          | 30 phr | 15 phr | 5 phr | 2.5 phr |
| Viton™ B-202  | 97                               | 97     | 97     | 97    | 97      |
| Calcium Hydroxide   | 6                                | 6      | 6      | 6     | 6       |
| MT Black (N990)   | 45                               | 30     | 15     | 5     | 2.5     |
| High-Activity MgO   | 3                                | 3      | 3      | 3     | 3       |
| Viton™ Curative No. 50  | 2.5                              | 2.5    | 2.5    | 2.5   | 2.5     |
| Viton™ Curative No. 20  | 0.5                              | 0.5    | 0.5    | 0.5   | 0.5     |
| <b>Stock Properties</b>   |                                  |        |        |       |         |
| <b>Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)</b>                         |                                  |        |        |       |         |
| ML 1 + 10, $\mu\text{m}$  | 84                               | 65     | 51     | 43    | 41      |
| <b>Mooney Scorch MS at 121 °C (250 °F)</b>                                    |                                  |        |        |       |         |
| Minimum Viscosity, $\mu\text{m}$  | 44                               | 33     | 26     | 23    | 22      |
| Rise in 30', $\mu\text{m}$  | 1                                | 0      | 0      | 0     | 0       |
| <b>ODR at 177 °C (351 °F), 3° arch, 15 min motor</b>                          |                                  |        |        |       |         |
| Minimum torque, $M_L$ , dNm   | 10.8                             | 8.7    | 6.6    | 7.5   | 6.6     |
| Maximum torque, $M_H$ , dNm   | 88                               | 89     | 77     | 84    | 74      |
| Scorch time, $t_{s2}$ , min   | 1.9                              | 2.2    | 2.8    | 2.5   | 2.7     |
| Scorch time, $t_{c50}$ , min  | 3.1                              | 3.4    | 4.0    | 3.7   | 3.8     |
| Optimum cure time, $t_{c90}$ , min  | 4.0                              | 4.1    | 4.6    | 4.3   | 4.4     |
| <b>MDR2000 at 177 °C (351 °F), 0.5° arc, 12 min</b>                           |                                  |        |        |       |         |
| Minimum torque, $M_L$ , dNm   | 1.6                              | 0.9    | 0.7    | 0.5   | 0.5     |
| Maximum torque, $M_H$ , dNm   | 30.2                             | 22.5   | 15.5   | 12.3  | 11.5    |
| Scorch time, $t_{s1}$ , min   | 0.9                              | 1.3    | 1.5    | 1.8   | 1.7     |
| Scorch time, $t_{s2}$ , min   | 1.1                              | 1.5    | 1.7    | 1.9   | 1.8     |
| Optimum cure time, $t_{c90}$ , min  | 2.8                              | 3.0    | 3.0    | 3.1   | 2.9     |
| <b>Vulcanizate Properties</b>   |                                  |        |        |       |         |
| Slabs Cured 10 min at 177 °C (351 °F) and Post-Cured 24 hr at 232 °C (450 °F) |                                  |        |        |       |         |
| <b>Stress/Strain at 23 °C (73 °F)—Original, no post-cure</b>                  |                                  |        |        |       |         |
| Hardness, Shore A   | 83                               | 75     | 66     | 58    | 56      |
| M100, MPa   | 4.4                              | 3.2    | 2.3    | 1.6   | 1.4     |
| T <sub>b</sub> , MPa  | 8.0                              | 8.1    | 8.0    | 8.0   | 7.0     |
| E <sub>b</sub> , %  | 304                              | 384    | 358    | 367   | 337     |
| <b>Stress/Strain at 23 °C (73 °F)—Original, no post-cure</b>                  |                                  |        |        |       |         |
| MP50, MPa   | 2.2                              | 1.6    | 1.4    | 1.1   | 1.1     |
| M100, MPa   | —                                | 2.7    | —      | —     | —       |
| T <sub>b</sub> , MPa  | 3.3                              | 2.8    | 1.7    | 1.5   | 1.4     |
| E <sub>b</sub> , %  | 89                               | 103    | 70     | 75    | 74      |
| <b>Stress/Strain at 23 °C (73 °F)—Original, post-cured</b>                    |                                  |        |        |       |         |
| Hardness, Shore A   | 85                               | 78     | 65     | 56    | 56      |
| M100, MPa   | 5.7                              | 4.7    | 2.8    | 1.8   | 1.6     |
| T <sub>b</sub> , MPa  | 10.8                             | 11.4   | 11.3   | 9.7   | 8.4     |
| E <sub>b</sub> , %  | 238                              | 281    | 329    | 321   | 295     |
| <b>Compression Set, %, Method B plied disks</b>                               |                                  |        |        |       |         |
| Aged 70 hr at 150 °C (302 °F)   | 24                               | 18     | 15     | 15    | 16      |
| Aged 70 hr at 200 °C (392 °F)   | 38                               | 31     | 26     | 25    | 26      |
| Aged 168 hr at 200 °C (392 °F)  | 52                               | 45     | 41     | 40    | 42      |

## Test Procedures

| Property Measured   | Test Procedure   |
|---|--|
| Compression Set   | ASTM D3955, Method B (25% deflection)  |
| Compression Set—Low Temperature   | ASTM D1299, Method B (25% deflection)  |
| Compression Set, O-Rings  | ASTM D1414   |
| Hardness  | ASTM D2240, durometer A  |
| Mooney Scorch   | ASTM D1646, using the small rotor. Minimum viscosity and time to a 1-, 5-, or 10-unit rise are reported. |
| Mooney Viscosity  | ASTM D1646, ten pass 100 °C (212 °F) and 121 °C (250 °F)   |
| ODR (vulcanization characteristics measured with an oscillating disk cure meter)    | ASTM D2084   |
| Property Change After Oven Heat-Aging   | ASTM D573  |
| Stress/Strain Properties<br>100% Modulus<br>Tensile Strength<br>Elongation at Break | ASTM D412, pulled at 8.5 mm/sec (20 in/min)  |
| Stiffness, Torsional, Clash-Berg  | ASTM D1043   |
| Temperature Retraction  | ASTM D1329   |
| Volume Change in Fluids   | ASTM D471  |

Test temperature is 24 °C (75 °F), except where specified otherwise.

### For more information, visit [Viton.com](http://Viton.com)

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