

FLEXZONE[®] 4L

Antiozonant



Chemtura Corporation, Technical Business Support

199 Benson Road, Middlebury, CT 06747

(800) 243-5098 (203) 573-3773 FAX (203) 573-2525

www.chemtura.com

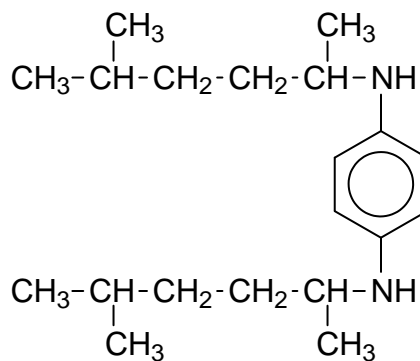
FLEXZONE[®] 4L

Flexzone 4L에 의해 제공되는 두드러지는 초기 정적 보호효과는 다른 Flexzone 제품보다 칭찬받을 만하다. 비록, 그 자체만으로도 효과적인 만능 오존노화방지제이지만, 본 제품은 Flexzone 3C, 5L, 7L 과 11L과 함께 혼합되어 최대의 잇점을 얻는데 사용될 수 있다.

오존노화방지제 이외에, Flexzone 4L은 산소에 의한 악화로부터 고무를 보호한다. 다른 Flexzone 오존노화방지제와 비교하면, 본 제품은 컴파운드의 가교를 촉진하는데 좀 더 활동적이다.

Flexzone 4L은 다른 p-phenylenediamine 유도체처럼 변색되고 접촉 오염이 있다.

화학 구조



N, N'-bis-(1, 4-dimethylpentyl)-p-phenylenediamine

| | |
|-------|--|
| 밀도: | 0.90 g/L at 15.6 °C (7.53 lb/gal at 60 °F) |
| 점도: | 35 cSt at 38 °C (170 SUS at 100 °F) |
| 응고온도: | -43 °C (-45 °F) |
| 용해도: | 아세톤, 톨루엔, 에탄올, 노말헥산과 유기용제에 용해, 물에 불용. |

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FLEXZONE 4L in Natural Rubber Stock

Flexzone[®] 4L 에 의해 제공된 열 노화 데이터는 노화보호효과를 보여주는 반면, 오존 결과는 오존 보호효과를 나타낸다.

NR Stock - Master Batch

| | |
|--|----------------|
| SMR 5CV | 100.0 |
| Zinc Oxide | 3.0 |
| Industrene [®] R Stearic Acid | 1.0 |
| N660 (GPF) Black | 50.0 |
| Aromatic Oil | 7.0 |
| Delac [®] NS | 1.0 |
| Sulfur | 2.0 |
| Antioxidant | As shown below |
| Total | 164.0 |

| | Test Stocks | | |
|---|-------------|--------|--------|
| | A | B | C |
| Carcass Masterbatch | 164.0 | 164.0 | 164.0 |
| Flexzone 4L | --- | 2.0 | 4.0 |
| Rheometer at 160°C (320°F) | | | |
| ML, dN-m | 1.9 | 1.3 | 1.3 |
| ML, dN-m | 18.6 | 15.6 | 15.5 |
| ts2, minutes | 3.9 | 2.5 | 2.5 |
| tc90, minutes | 6.0 | 4.8 | 4.4 |
| Physical Data Unaged | | | |
| Cure to tc90 +2 at 160°C (320°F) | | | |
| 300% Modulus, MPa | 13.9 | 12.8 | 12.9 |
| (psi) | (2015) | (1855) | (1870) |
| Tensile strength, MPa | 27.1 | 26.1 | 26.5 |
| (psi) | (3930) | (3785) | (3845) |
| Elongation, % | 520 | 500 | 510 |
| Shore A Hardness | 66 | 64 | 65 |
| Aged 2 weeks at 70°C (158°F) | | | |
| Tensile, % retained | 95 | 100 | 102 |
| Elongation, % retained | 96 | 102 | 100 |
| Hardness, points change | -7 | -2 | -3 |
| Ozone Resistance at 38°C (100°F) and 50 pphm Ozone | | | |
| Static (Bent Loop), hours to failure | 24 | 72 | 312 |
| Dynamic (25% Strain), hours to failure | 24 | 144 | 144 |

FLEXZONE 4L in NR/BR Stock

NR/BR에서 특히 4phr의 Flexzone[®] 4L 사용은, 우수한 열 노화와 탁월한 오존노화방지 효과를 보여준다.

NR/BR Stock - Master Batch

| | |
|--|----------------|
| SMR 5CV | 55.0 |
| Cis BR | 45.0 |
| Zinc Oxide | 3.0 |
| Industrene [®] R Stearic Acid | 1.0 |
| N660 (GPF) Black | 50.0 |
| Aromatic Oil | 7.0 |
| Delac [®] NS | 1.0 |
| Sulfur | 2.0 |
| Antioxidant | As shown below |
| Total | 164.0 |

| | Test Stocks | | |
|---|-------------|--------|--------|
| | D | E | F |
| Carcass Masterbatch | 164.0 | 164.0 | 164.0 |
| Flexzone 4L | --- | 2.0 | 4.0 |
| Rheometer at 160°C (320°F) | | | |
| ML, dN-m | 2.3 | 1.8 | 1.6 |
| ML, dN-m | 27.2 | 26.7 | 23.6 |
| ts2, minutes | 4.8 | 4.4 | 4.0 |
| tc90, minutes | 5.8 | 5.6 | 5.3 |
| Physical Data Unaged | | | |
| Cure to tc90 +2 at 160°C (320°F) | | | |
| 300% Modulus, MPa | 12.7 | 12.5 | 12.9 |
| (psi) | (1840) | (1815) | (1870) |
| Tensile strength, MPa | 20.8 | 18.8 | 19.0 |
| (psi) | (3015) | (2725) | (2755) |
| Elongation, % | 450 | 400 | 450 |
| Shore A Hardness | 61 | 56 | 60 |
| Aged 2 weeks at 70°C (158°F) | | | |
| Tensile, % retained | 124 | 81 | 105 |
| Elongation, % retained | 111 | 95 | 113 |
| Hardness, points change | -2 | +4 | +2 |
| Ozone Resistance at 38°C (100°F) and 50 pphm Ozone | | | |
| Static (Bent Loop), hours to failure | 24 | 144 | 460 |
| Dynamic (25% Strain), hours to failure | 24 | 48 | 192 |

FLEXZONE 4L in SBR Stock

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SBR Stock - Master Batch

| | |
|--|----------------|
| SBR 1500 | 100.0 |
| Zinc Oxide | 3.0 |
| Industrene [®] R Stearic Acid | 1.0 |
| N339 (HAF) Black | 55.0 |
| Aromatic Oil | 15.0 |
| Delac [®] NS | 1.5 |
| Sulfur | 1.8 |
| Antioxidant | As shown below |
| Total | 177.3 |

| | Test Stocks | | |
|---|-------------|--------|--------|
| | G | H | I |
| Carcass Masterbatch | 177.3 | 177.3 | 177.3 |
| Flexzone 4L | --- | 2.0 | 4.0 |
| Rheometer at 160°C (320°F) | | | |
| ML, dN-m | 2.1 | 2.1 | 2.0 |
| ML, dN-m | 21.9 | 21.3 | 21.7 |
| ts2, minutes | 4.2 | 4.2 | 4.0 |
| tc90, minutes | 8.2 | 7.9 | 7.3 |
| Physical Data Unaged | | | |
| Cure to tc90 +2 at 160°C (320°F) | | | |
| 300% Modulus, MPa | 10.4 | 9.7 | 9.8 |
| (psi) | (1510) | (1405) | (1420) |
| Tensile strength, MPa | 18.1 | 18.2 | 18.2 |
| (psi) | (2625) | (2640) | (2640) |
| Elongation, % | 510 | 520 | 530 |
| Shore A Hardness | 60 | 58 | 58 |
| Aged 2 weeks at 70°C (158°F) | | | |
| Tensile, % retained | 91 | 92 | 110 |
| Elongation, % retained | 63 | 73 | 85 |
| Hardness, points change | +5 | +6 | +4 |
| Ozone Resistance at 38°C (100°F) and 50 pphm Ozone | | | |
| Static (Bent Loop), hours to failure | 24 | 312 | 1,014 |
| Dynamic (25% Strain), hours to failure | 24 | 144 | 192 |

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