

Comparison of Thermax[®] N990 and Thermax[®] N907

Cancarb manufactures various grades of medium thermal carbon black which are sold under the tradename Thermax[®]. Pelletized, powder, ultra-pure, and stainless grades of thermal black are available. Thermax[®] is produced by the thermal decomposition of natural gas, with the resultant carbon having a particle size range of 100-700 nm. Stainless grades of Thermax[®], designated as N907 and N908, are characterized by lower extractable organics content which is determined by the toluene extract test. Thermax[®] N907 is a pelletized, stainless version of N990 while Thermax[®] N908 is a powder, stainless form of N991. Typical toluene extractable levels are as follows:

- Thermax[®] N990 - 0.25% (specification of 0.50% maximum)
- Thermax[®] N907 - 0.10% (specification of 0.15% maximum)

Thermax[®] N907 is commonly used in elastomeric applications where organics migration is of concern, such as seals, gaskets, and weather strip. In this report, the processing and physical properties of compounds made with Thermax[®] N990 and N907 are presented for comparison. Tests for staining are varied and are generally determined by the end-user. **According to the test data found on the following pages, there are no significant differences in processing or physical properties between the Thermax[®] grades in a Neoprene compound and an EPDM compound.**

Table 1. Neoprene Formulation

Ingredient	Loading Level (phr)
Neoprene WRT	100.0
Carbon Black	50.0
Naphthenic Oil	10.0
Zinc Oxide	5.0
Magnesium Oxide	4.0
Stearic Acid	1.0
ETU-22	1.0
MBTS	0.5

Table 2. EPDM Formulation

Ingredient	Loading Level (phr)
Royalene [®] 501	100.0
Carbon Black	100.0
Paraffinic Oil	30.0
Zinc Oxide	5.0
Stearic Acid	1.0
MBTS	1.5
ZDBC	1.0
TMTD	0.5
DPTT	1.0
Sulphur	1.0

Table 3. Neoprene Compound Data

	Thermax® N990	Thermax® N907
Loading, phr	50	50
Mooney Viscosity, 100°C		
ML1+4, MU	41	41
Mooney Scorch, 125°C		
t ₅ , min	23.8	23.2
t ₃₅ , min	49.7	48.3
t ₃₅ -t ₅ , min	25.9	25.1
MDR, 160°C, 0.5° arc		
ML, dNm	1.7	1.7
MH, dNm	7.1	7.2
t _{s1} , min	3.5	3.5
t'90, min	20.2	20.5
Physical Properties		
Stress at 100% Strain, MPa	0.75	0.73
Stress at 200% Strain, MPa	1.2	1.2
Stress at 300% Strain, MPa	2.1	2.1
Tensile Strength, MPa	9.8	10.1
Elongation at Break, %	725	747
Hardness	38	41
Oven Aged Physicals, 48 hours at 100°C		
Stress at 100% Strain, MPa	1.1	1.1
Stress at 200% Strain, MPa	2.0	2.0
Stress at 300% Strain, MPa	3.5	3.5
Tensile Strength, MPa	12.2	11.9
Elongation at Break, %	657	649
Hardness	48	50

Table 4. EPDM Compound Data

	Thermax® N990	Thermax® N907
Loading, phr	100	100
Mooney Viscosity, 100°C		
ML1+4, MU	38	38
Mooney Scorch, 125°C		
t ₅ , min	7.3	8.3
t ₃₅ , min	14.0	15.8
t ₃₅ -t ₅ , min	6.7	7.5
MDR, 160°C, 0.5° arc		
ML, dNm	0.76	0.76
MH, dNm	16.6	17.0
t _{s1} , min	1.5	1.6
t'90, min	6.6	7.5
Physical Properties		
Stress at 100% Strain, MPa	1.8	1.9
Stress at 200% Strain, MPa	3.0	3.1
Stress at 300% Strain, MPa	3.7	3.8
Tensile Strength, MPa	5.0	6.1
Elongation at Break, %	441	472
Hardness	60	61
Oven Aged Physicals, 48 hours at 100°C		
Stress at 100% Strain, MPa	2.2	2.2
Stress at 200% Strain, MPa	3.5	3.7
Stress at 300% Strain, MPa	4.1	4.0
Tensile Strength, MPa	4.4	4.6
Elongation at Break, %	339	318
Hardness	63	64