



Power Industry

Technical bulletin

# Benchmarking James Walker materials

AMORIM  
CORK  
COMPOSITES

# Benchmarking James Walker materials

Amorim T&D materials have been competing over a number of years with James Walker materials. Cork Rubber “Nebar” materials used in T&D applications are one of Amorim’s main competitors present in the market today with the following materials:

Nebar Range:

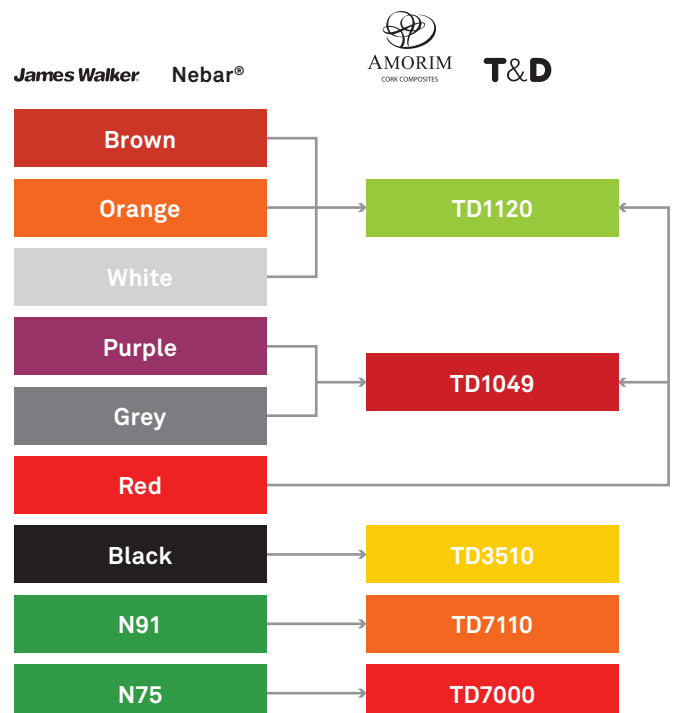
- Nebar Brown (former N I)
- Nebar Orange (former N7E)
- Nebar White (former N6/25)
- Nebar Purple (former N67)
- Nebar Grey (former NBO)
- Nebar Red (former HP)
- Nebar Black (former C947/3)
- Nebar N91
- Nebar N75

The Amorim T&D correspondence of the Nebar Range has been arranged by application requirements and material characteristics (see below). Detailed material characteristics (typical values) can be found on the back. Additional benchmarking information regarding Ageing and Oil Compatibility shows that the Amorim T&D range is ready for the future, and competes with the James Walker Nebar grades.



## Target applications/market

- General purpose, electric power industry
- Economical grade, switchgear & transformers
- Premium neoprene electrical grade
- Heavy duty electrical grade
- Premium nitrile electrical grade
- Switchgears & transformers
- Hydrogen coolers and SF6 gas filled switchgear
- Vapour phase drying of transformer cores
- Electrical equipment askarel or mineral oil type



### Typical values

	TD1120	Brown	Orange	White
Polymer or blend	NBR & CR	NBR & CR	NBR & CR & SBR	NBR & CR
Hardness IRHD/Shore A (ASTM D1415/ ASTM 2240)	60-80 Shore A	65-85 IRHD	65-80 IRHD	65-80 IRHD
Tensile strength (ASTM F152)	1.72 MPa	1.75 MPa	2.00 MPa	1.75 MPa
Compressibility (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	25-40 (%)	15-30 (%)	20-35 (%)	20-30 (%)
Recovery (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	Min. 75 (%)	Min. 75 (%)	Min. 75 (%)	Min. 80 (%)
Volume swell (ASTM F146) ASTM #1,72h @ 100°C	-10 to +10 (%)	-3 to +10 (%)	-5 to +10 (%)	-5 to +10 (%)
Volume swell (ASTM F146) ASTM #3,72h @ 100°C	0 to +15 (%)	0 to +30 (%)	0 to +30 (%)	+10 to +30 (%)
Volume swell (BS 148) Transformer oil -14 days @ 90°C	+5.4 (%)	+8 to +25 (%)	+5 to +15 (%)	+10 (%)

### Typical values

	TD1049	Purple	Grey
Polymer or blend	NBR	NBR & SBR	NBR
Hardness IRHD/Shore A (ASTM D1415/ ASTM 2240)	70-80 Shore A	60-80 IRHD	65-80 IRHD
Tensile strength (ASTM F152)	2.4 MPa	2.0 MPa	2.45 MPa
Compressibility (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	20-35 (%)	15-25 (%)	20-30 (%)
Recovery (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	Min. 80 (%)	Min. 75 (%)	Min. 85 (%)
Volume swell (ASTM F146) ASTM #1,72h @ 100°C	-10 to +10 (%)	-5 to +15 (%)	+2 to +10 (%)
Volume swell (ASTM F146) ASTM #3,72h @ 100°C	-5 to +15 (%)	+5 to +20 (%)	-2 to +15 (%)
Volume swell (BS 148) Transformer oil -14 days @ 90°C	+2.3 (%)	+1 to +10 (%)	+2.4 (%)

### Typical values

	TD1120	TD1049	Red
Polymer or blend	NBR & CR	NBR	CR
Hardness IRHD/Shore A (ASTM D1415/ ASTM 2240)	60-80 Shore A	70-80 Shore A	70-85 IRHD
Tensile strength (ASTM F152)	1.72 MPa	2.4 MPa	2.35 MPa
Compressibility (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	25-40 (%)	20-35 (%)	10-30 (%)
Recovery (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	Min. 75 (%)	Min. 80 (%)	Min. 80 (%)
Volume swell (ASTM F146) ASTM #1,72h @ 100°C	-10 to +10 (%)	-10 to +10 (%)	-5 to +5 (%)
Volume swell (ASTM F146) ASTM #3,72h @ 100°C	0 to +15 (%)	-5 to +15 (%)	+10 to +30 (%)
Volume swell (BS 148) Transformer oil -14 days @ 90°C	+5.4 (%)	+2.3 (%)	+10 (%)

### Typical values

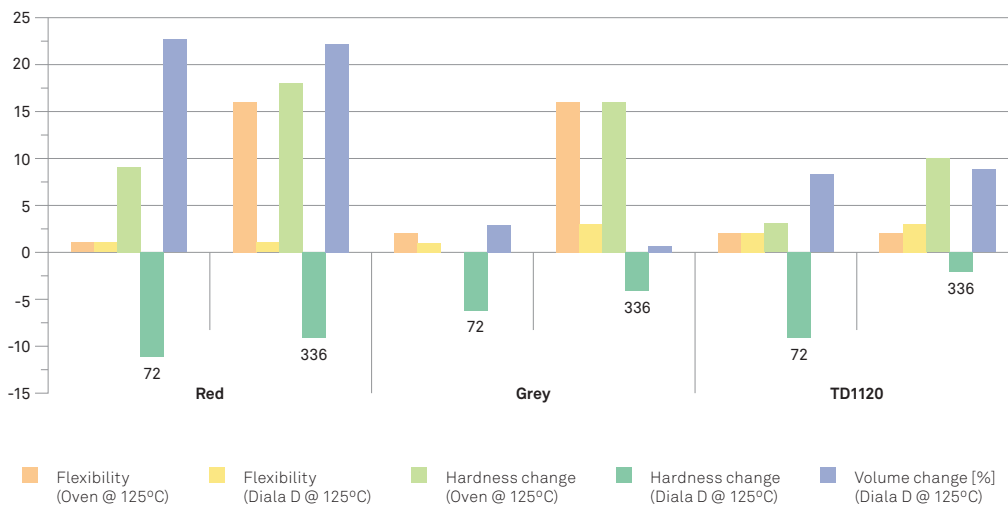
	TD3510	Black
Polymer or blend	EPDM	NBR & CR
Hardness IRHD/Shore A (ASTM D1415/ ASTM 2240)	65-75 Shore A	65-85 IRHD
Tensile strength (ASTM F152)	2.5 MPa	2.45 MPa
Compressibility (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	20-30 (%)	15-25 (%)
Recovery (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	Min. 80 (%)	Min. 85 (%)
Volume swell (ASTM F146) ASTM #1,72h @ 100°C		-2.7 (%)
Volume swell (ASTM F146) ASTM #3,72h @ 100°C		+10.5 (%)
Volume swell (BS 148) Transformer oil -14 days @ 90°C		+1.2 (%)

### Typical values

	TD7110	N91	TD7000	N75
Polymer or blend	ECO	ACM	VMQ	VMQ
Hardness IRHD/Shore A (ASTM D1415/ ASTM 2240)	70-85 Shore A	68-78 IRHD	60-80 Shore A	70 IRHD
Tensile strength (ASTM F152)	3.0 MPa	3.0 MPa	1.96 MPa	1.96 MPa
Compressibility (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	15-30 (%)	15-25 (%)	15-30 (%)	~25 (%)
Recovery (ASTM F36) 2.8 N/mm <sup>2</sup> (400 PSI)	Min. 60 (%)	Min. 80 (%)	Min. 75 (%)	Min. 75 (%)
Volume swell (ASTM F146) ASTM #1,72h @ 100°C	-10 to +10 (%)			
Volume swell (ASTM F146) ASTM #3,72h @ 100°C	+5 to +15 (%)			
Volume swell (BS 148) Transformer oil -14 days @ 90°C	+2.3* (%)	< +8 (%)	+29** (%)	+29** (%)

\*72h@100°C \*\*48h@90°C

### Ageing performance



Selected Nebar materials were benchmarked against TD1120 Amorim grade regarding their performance in oven and in oil aged conditions.

Amorim’s TD1120 delivers a better and steadier performance in both situations demonstrating why it has been successfully performing in the T&O industry in a variety of applications over the years.

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