

# Vendel N (Natural Acetal)

## Technical Data Sheet

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### **Product Description**

Vendel N has high hardness and stiffness, with very good mechanical properties. It has excellent creep resistance and dimensional stability, which makes it ideal for machining of precision parts. The co-efficient of friction is low, and the dielectric properties are excellent. It has very good stick/ slip properties. The acetal copolymer is the ideal combination of strength, stiffness and wear resistance. It absorbs very little moisture, is easily machinable and is genuinely porosityfree, making it the preferred grade for food contact and medical applications. The product exhibits an elevated resistance to hydrolysis. Dimensional stability makes acetal extremely good for use with press fitted metallic bearings.

### **Applications**

- Precision Gears
- Electrical Engineering Insulators
- Parts which operate in water up to 90°C
- High Speed Wheels and Rollers where High Dimensional Stability is needed to avoid flat spots
- Bearings with Close Tolerances
- Snap Fit Assemblies
- Low Water Absorption Parts

### **Other Material Properties**

The acetal copolymer is the ideal combination of strength, stiffness and wear resistance. It absorbs very little moisture, is easily machinable and is genuinely porosity-free, making it the preferred grade for food contact and medical applications. The product exhibits an elevated resistance to hydrolysis. Dimensional stability makes acetal extremely good for use with press fitted metallic bearings.

### **Key Features and Benefits**

- High Mechanical Strength
- Excellent Machinability
- Very Low Stick-Slip
- Low Moisture Absorption
- Dimensional Stability
- Good Creep Resistance
- Physiologically Intert
- Continuous Use at a temperature of 115°C

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### Physical Properties

|  | Value | Unit              | Verification |
|--|-------|-------------------|--------------|
| Density  | 1.41  | g/cm <sup>3</sup> | ISO 1183     |
| Moisture pick-up till saturation<br>(in normal climate 23 °C / 50% r.h.) | 0.20  | %                 | ISO 62       |
| Water absorption till saturation (in water at 23 °C)                     | 0.80  | %                 | ISO 62       |

### Mechanical Properties

|   | Value | Unit              | Verification |
|---|-------|-------------------|--------------|
| Tensile stress at break [ $v = 5$ mm/min]               | 63    | MPa               | ISO 527-2    |
| Nominal percentage elongation at break                  | 31    | %                 | ISO 527-2    |
| Tensile modulus of elasticity                           | 2600  | MPa               | ISO 527-2    |
| Flexural modulus of elasticity                          | 2500  | MPa               | ISO 178      |
| Ball indentation hardness (value at 30 sec.)            | 140   | MPa               | ISO 2039-1   |
| Rockwell hardness (measured with test pieces 10 mm thk) | M 84  |                   | ISO 2039-2   |
| Charpy impact strength (+23 °C)                         | 220   | kJ/m <sup>2</sup> | ISO 179/1eU  |
| Charpy impact strength - notched (+23 °C)               | 8     | kJ/m <sup>2</sup> | ISO 179/1eA  |

### Electric Properties

|  | Value     | Unit      | Verification |
|--|-----------|-----------|--------------|
| Specific insulation resistance [ $\geq$ ]        | $10^{13}$ | Ohm       | IEC 60093    |
| Specific surface resistance [ $\geq$ ]           | $10^{13}$ | Ohm       | IEC 60093    |
| Dielectric constant (at 1 MHz)                   | 3.8       | $10^8$ Hz | IEC 60250    |
| Dielectric constant (at 100 Hz)                  | 3.8       | $10^2$ Hz | IEC 60250    |
| Dissipation factor (at 1 MHz)                    | 0.008     | $10^5$ Hz | IEC 60250    |
| Dissipation factor (at 100 Hz)                   | 0.003     | $10^2$ Hz | IEC 60250    |
| Dielectric strength K20/K20 (in transformer oil) | 20        | kV/mm     | IEC 60243-1  |
| Comparative tracking index (CTI)                 | 600       |           | IEC 60112    |

### Thermal Properties

|  | Value | Unit        | Verification |
|--|-------|-------------|--------------|
| Temperature for usage in air (max. short term)               | 140   | °C          |              |
| Temperature for usage in air (max. lasting)                  | 105   | °C          |              |
| Minimum service temperature in air                           | -40   | °C          |              |
| Heat distortion temperature (HDT A process)                  | 96    | °C          | ISO 75-2     |
| Coefficient of linear expansion (at length, 23 – 60 °C)      | 1.1   | $10^{-4}/K$ | ISO 11359    |
| Thermal conductivity (+23 °C)                                | 0.31  | W/(K · m)   | DIN 52612    |
| Flammability according UL Standard<br>(thickness 3 and 6 mm) | HB    | Class       | UL 94        |
| Vicat softening temperature (VST/B/50)                       | 150   | °C          | ISO 306      |
| Melting point (DSC, 10 K/min)                                | 165   | °C          | ISO 3146     |