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VANDERBILT Technical Data

40% Wollastonite in Nylon

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40% Wollastonite in Nylon

PURPOSE

To compare the reinforcing effects of low aspect ratio, fine ground wollastonite in nylon: **VANSIL® W-50** wollastonite, **VANCOTE® W-50AS** treated wollastonite, **VANCOTE W-40AS**, treated wollastonite.

FILLER PROPERTIES

	VANSIL W-50	VANCOTE W-50AS	VANCOTE W-40AS
Median particle size, μm	2.8	2.8	5.6
Average aspect ratio	<5:1	<5:1	<5:1
BET surface area, m^2/g	4	4	3
Particle morphology	short needle and irregular/nodular	short needle and irregular/nodular	short needle and irregular/nodular

COMPOUND

Preblend: 57.3% nylon (PA 211 Nylon 6 or PA 111 Nylon 6,6: Clariant), 42% filler, 0.7% antioxidant/stabilizers (0.3% Bruggolen® H3346, 0.3% Bruggolen P130, 0.1% Bruggolen P22: Brueggemann Chemical). Compounded in ZSE-40 Leistritz Extruder (250 rpm; 300°C); molded in Boy 50M injection molder; properties dry as molded.

DATA

	Nylon 6			Nylon 6,6		
	VANSIL W50	**VANCOTE W50AS**	**VANCOTE W-40AS**	**VANSIL W50**	**VANCOTE W50AS**	**VANCOTE W40AS**
Flexural Modulus, GPa	4.32	4.23	4.33	5.58	5.38	5.02
Flexural Strength, MPa	140.8	137.4	138.0	153.0	163.9	157.8
Izod Impact, J/m	34.5	53.9	43.9	25.5	31.4	33.5
Tensile Strength, Yield, MPa	86.4	85.7	85	92.5	96.6	97.9
Tensile Strength, Break, MPa	83.6	78.9	80.2	90.4	96.6	97.9
Yield Elongation, %	3.4	3.4	3.4	2.2	3.2	3.9
Break Elongation, %	5.2	8.2	7.6	2.3	3.3	4.0
Young's Modulus, MPa	5.53	5.37	5.32	6.46	6.50	5.81

RESULTS

In Nylon 6:

- There was little difference in the stiffness (flexural modulus) imparted by the three wollastonite products.
- **VANCOTE W-50AS** aminosilane-treated wollastonite increased impact strength by 55% compared to untreated **VANSIL W-50** wollastonite.
- **VANCOTE W-40AS** aminosilane-treated wollastonite increased impact strength by 27% compared to **VANSIL W-50** wollastonite.
- **VANCOTE W-50AS** aminosilane-treated wollastonite provided the best overall balance of stiffness and impact strength.

In Nylon 6,6:

- Untreated **VANSIL W-50** wollastonite provided the greatest stiffness, by a small margin: 4% more than **VANCOTE W-50AS** aminosilane-treated wollastonite and 11% more than **VANCOTE W-40AS** aminosilane-treated wollastonite.
- **VANCOTE W-40AS** aminosilane-treated wollastonite provided the best impact strength: 7% more than **VANCOTE W-50AS** aminosilane-treated wollastonite and 31% more than untreated **VANSIL W-50** wollastonite.
- **VANCOTE W-50AS** aminosilane-treated wollastonite provided the best overall balance of stiffness and impact strength.

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