

## A new resin for glass fiber reinforced amorphous polymer solutions: Novadyn™ DT/DI polyamide



### Face any of the following challenges? Start a discussion with INVISTA

- Does your application require a combination of high strength, high stiffness, and good dimensional stability?
- Would a high Tg material help maintain properties in temperatures up to 120°C?
- Could you benefit from a lower-cost alternative to current transparent nylons?
- Does your part need scratch resistance without coating?
- Would you like to replace a glass fiber (GF) reinforced polycarbonate with a GF material with very good chemical resistance?
- Would you like to replace a GF reinforced high-cost amorphous nylon 12 with a lower-costs amorphous polyamide?

#### Performance

Novadyn™ DT/DI has very good chemical and stress crack resistance in many hydrocarbon environments where polycarbonate fails.

With a Tg of 145 °C, Novadyn™ DT/DI maintains stiffness up to 120 °C better than traditional nylons.

Novadyn™ DT/DI has better scratch resistance than polycarbonate.

Transparent nylons have excellent processability, mold shrinkage, dimensional stability, molding characteristics, and colorability.

#### Cost effectiveness

INVISTA is committed to becoming the transparent nylon cost leader, building upon its integrated low-cost raw material position.

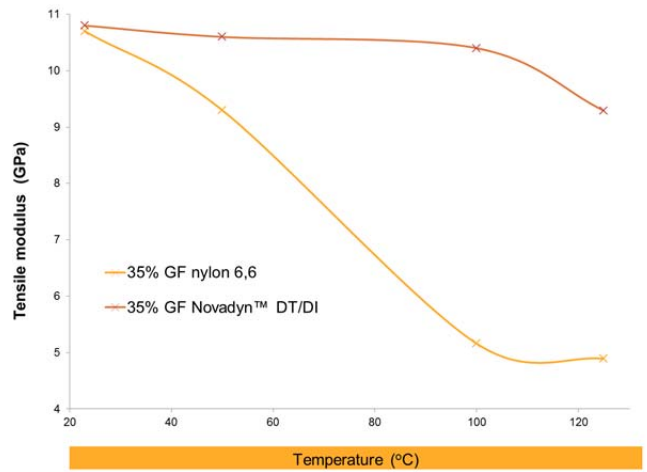
#### Recycled content

Novadyn™ DT/DI's unique combination of properties is derived from DYTEK® A Amine, a monomer which is used in many high performance polyamides. DYTEK® A Amine is typically 99% pure and manufactured from recovered and refined materials that would otherwise be burned with heat recovery, giving Novadyn™ DT/DI at least 43% recycled content.<sup>1</sup>

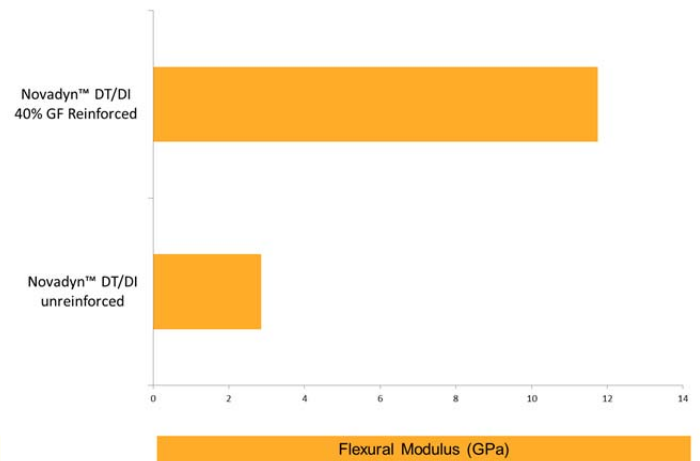
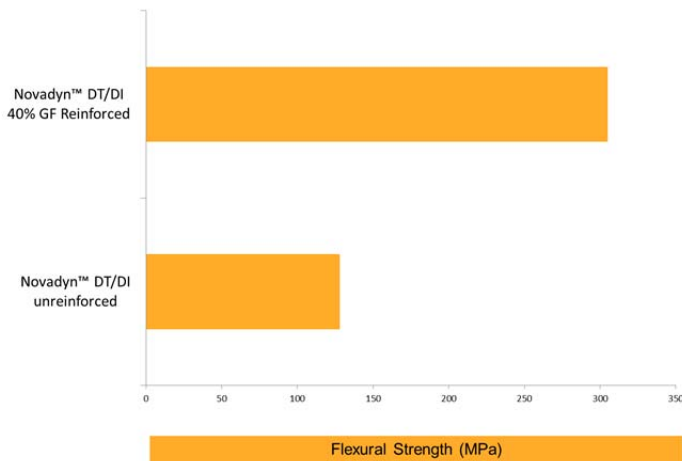
<sup>1</sup> Recycled content is defined by ISO 14021, section 7.8.

Product comparison (glass fiber reinforced)		
	Novadyn™ DT/DI	Polycarbonate
Chemical resistance	Very Good	Low
Scratch resistance	Very Good	Low
Strength, stiffness	Very Good	Good
Mold shrinkage	Very Good	Very Good
Heat resistance	Good: Better than other low-cost amorphous polyamides and nylon 6,6	Very Good
Moisture resistance	Beter than tradition nylons	Better than all nylons
Cost	Specialty: Lower than other amorphous polyamides	Commodity: Lower than amorphous polyamides

### Excellent tensile modulus at elevated temperatures



### Add glass fiber to boost Novadyn™ DT/DI's mechanical properties...



.... supplementing Novadyn™ DT/DI's other performance attributes (e.g., chemical resistance, Tg, scratch resistance, mold shrinkage, etc.).

Technical Properties							
PROPERTY	TEST METHOD	0% GF	10% GF	20% GF	30% GF	35% GF	40% GF
Tensile strength (MPa)	ISO 527	102	94	112	176	188	195
Tensile modulus (GPa)	ISO 527	3.0	4.9	7.4	9.7	10.7	13.0
Elongation @ yield (%)	ISO 527	7.0	3.8	4.6	5.1	4.8	4.9
Elongation @ break (%)	ISO 527	8.3	3.8	4.6	5.1	4.8	4.9
Flexural strength (MPa)	ISO 178	128	144	213	278	279	305
Flexural modulus (GPa)	ISO 178	2.9	4.6	6.7	9.5	11.1	11.8
Flex stress @ 3.5% strain (MPa)	ISO 178	95	145	200	265	-	-
Izod Notched Impact Strength (kJ/m <sup>2</sup> ) 23 °C	ISO 180	6.7	3.2	5.6	7.9	8.0	9.8
HDT @ 0.45 MPa	ISO 75	134	-	-	-	137	-
HDT @ 1.8 MPa	ISO 75	122	-	-	-	134	-
Glass transition temperature (°C)	ISO 11357-2	145					
Water Absorption (%)	ISO 62 (full immersion @23°C for 24 hrs)	1.0					
Moisture Absorption (%)	ISO 1110	3.8					
Hardness (Shore D)	ISO 868	84					
Mold shrinkage - transverse (%)	ISO 294-4	0.53					
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## Potential applications

GF reinforced Novadyn™ DT/DI could be considered for many existing and new applications, including:

- Electrical/electronic – enclosure, connectors, terminal blocks, etc.
- Telecommunications and consumer electronics – housing for smartphones, tablets, laptops, etc.
- Office furniture/machines – rollers, handles, computer chassis, printer heads, copy machine & projector parts, etc.
- Industrial – down hole oil well parts, manifolds, fluid handling components, etc.
- Other – instrument components, housing for power tools, recreational applications, etc.

INVISTA sells base resin Novadyn™ DT/DI to compounders for development in GF reinforced applications. INVISTA does not sell GF reinforced Novadyn™ polyamides. For further information please refer to the Novadyn™ DT/DI technical data sheet and the Novadyn™ HPPA website.

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