

Stanyl® 46HF4130



THE SIMPLE SOLUTION FOR BETTER HIGH TEMPERATURE APPLICATIONS REQUIRING EASY FLOW AND STIFFNESS

Engineering challenges encountered in high temperature applications.

- Long flow paths difficult to fill
- Better surface appearance wanted
- Molded in stresses causing warpage
- Want to avoid multiple gating
- Higher cavitation required
- Current clamp force needed is too high.

Stanyl® 46HF4130 provides the solutions. It offers greatly enhanced flow for a 30% glass filled material, provides greater design freedom, improves appearance, and gives higher quality parts. These benefits are delivered at virtually the same level of properties as the standard 30% reinforced Stanyl®.

Stanyl® 46HF4130

STANYL® 46HF4130 OVERCOMES DESIGN AND PROCESSING PROBLEMS!

When design requirements call for complex flow paths that normal materials cannot accommodate, this high flow grade can solve the problem. Stanyl® allows you to bring new metal replacement applications to market quicker, better and at lower cost because of the expanded design scope that the Stanyl® portfolio can now offer.

Stanyl® 46HF4130 extends DSM's High Flow Stanyl® series. Compared to Stanyl® TW200F6 it has 60-70% better flow offering:

- Lower clamp forces
- Lower molded in stress and lower tendency to warp
- Better surface appearance
- Long, thin-walled flow paths in complex parts
- Reduced number of gates
- Increased cavitation possible
- Longer tool lives due to lower wear

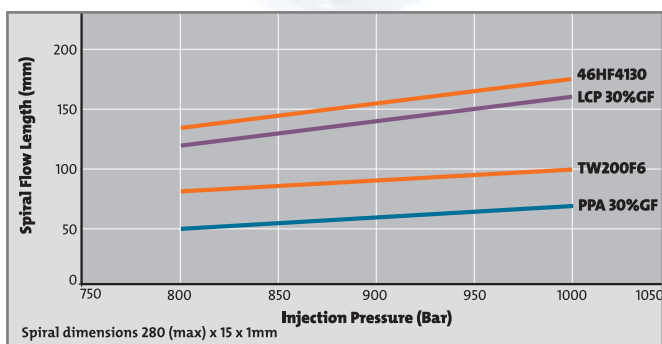


Figure 1 Flow of 46HF4130 versus other materials.

Mechanical properties of Stanyl® 46HF4130 are at least 90% or better than the properties of standard 30% glass grade, Stanyl® TW200F6 (as measured on test bars).

Due to better flow and reduced shear heating during molding, parts have lower molded-in stresses and glass fiber integrity is better maintained, giving improved properties in actual parts.

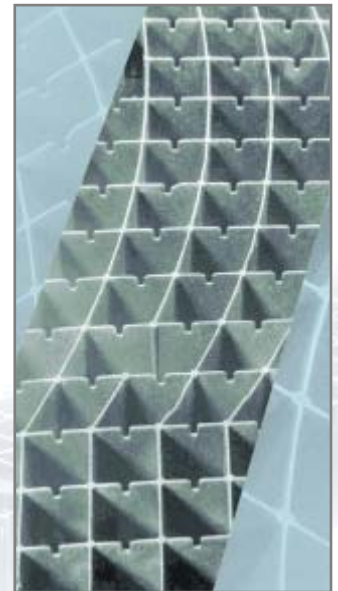


Figure 2 Intricate design realized in Stanyl® 46HF4130.

Marginally better dynamic properties

- Creep modulus up to 10% higher

Stanyl® 46HF4130 should be used instead of Stanyl® TW200F6 when:

- Parts are designed with very long, complex flow paths
- Molded in stresses need to be minimized for example to reduce the tendency to warp.
- Precision molding is wanted
- Stanyl® 46HF4130 should also be preferred when parts are being over-molded or encapsulated. The lower injection pressures maintain the original part integrity better

STANYL® - THE BEST OPTION FOR HIGH TEMPERATURE APPLICATIONS

Stanyl® is DSM's high performance polyamide 46. It offers an unmatched performance profile in respect of heat resistance, design flexibility and environmental compatibility.

Stanyl® is already well known for its ease of processing – with lower cycle times and better productivity than conventional engineering plastics such as PA66 – combined with high temperature capabilities similar or superior to those of materials such as PPS, LCP or even PEEK.

Stanyl® is safe, convenient, and economical to use. It uses water heated tools and requires no retooling to switch from PA6 or PA66 when better heat performance is demanded. Different parts that need to operate at high temperatures can be integrated into a single component. Weight is reduced and production steps are minimized, saving on assembly time and material cost.

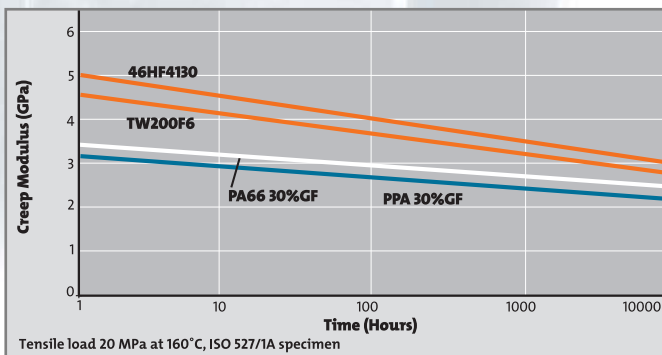


Figure 3 Creep modulus of 46HF4130 is better than standard Stanyl® and much higher than other high temperature resins.

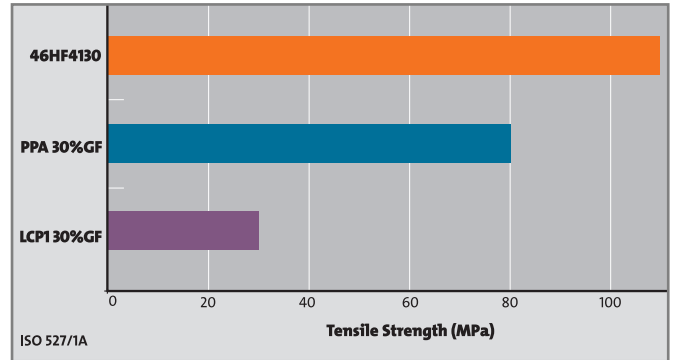


Figure 4 Weld line strength of Stanyl® at room temperature (23°C) is better than other materials. At higher temperatures Stanyl® outperforms even better.

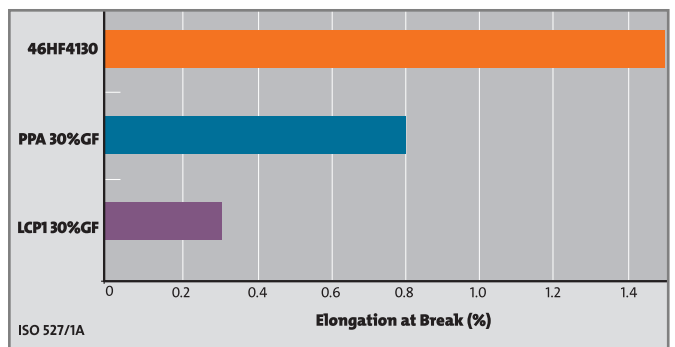


Figure 5 Elongation at break of weld line.

ADVANTAGES OF STANYL® OVER OTHER HIGH HEAT RESINS

Compared to PPA:

- Improved mechanical properties, creep and fatigue at high temperatures
- Better flow, easier processing
- Superior weld line strength
- Tougher material (see Fig 4)

Compared to LCP:

- Better weld line strength
- Much better creep properties
- Tougher material.
- Flow is similar

Compared to PPS:

- Tougher material
- Better flow, lower tendency to flash
- Lower tool wear
- Better weld line strength



Long runners easily accommodated.

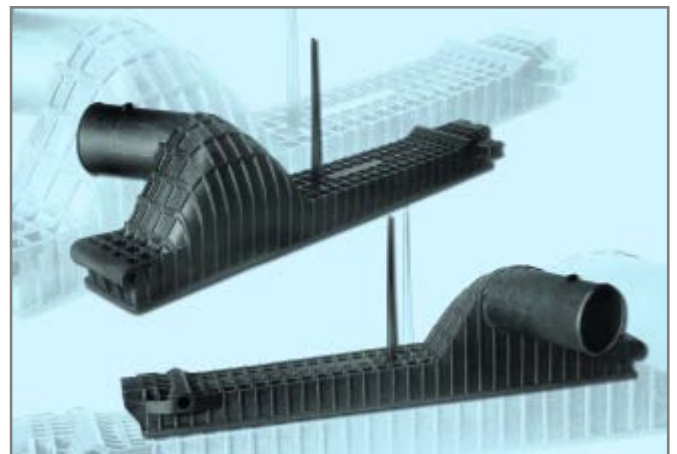
GREATER DESIGN FLEXIBILITY

Stanyl® 46HF4130 requires lower injection pressures to fill molds.

This makes it possible to design large applications with excellent mechanical properties and low warpage. The excellent weld-line strength (Fig 4) of Stanyl® gives greater design freedom and the higher flow of 46HF4130 allows single gates to be used even for large applications like the intercooler in the photo to the right.

Typical applications.

- Automotive connectors
- Complex thin wall "honeycomb" designs
- Large parts with long flow lines
- Replacing sheet metal components with high productivity plastic solutions.
- Motor laminates



A long truck intercooler cap can be molded using only a single gate.

Stanyl[®] 46HF4130

KEY PROPERTIES OF STANYL[®] 46HF4130 AT A GLANCE

Mechanical

Tensile elongation at break	3.0%
Izod Impact @ 23°C	12 kJ/m ²
(ISO 180/1A) @ -30°C	10 kJ/m ²

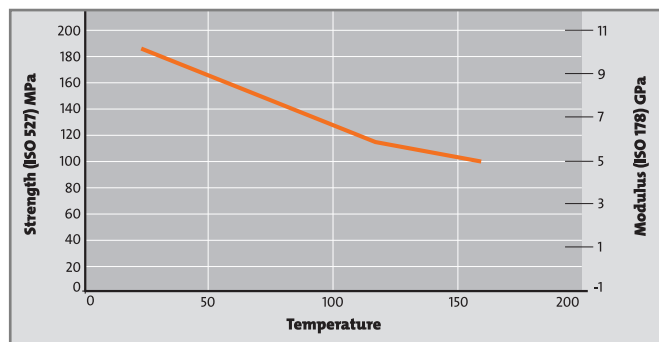
Physical

Density	1.41 g/cm ³
*CLTE, +23°C to +55°C	2 E-05 /°C
Mold Shrinkage	0.5% - 1.3%

Thermal

Melting Point	295°C (565°F)
Heat Deflection Temp.@ 1.81MPa	>290°C (ISO75)
Continuous Use Temp (2500 hrs)	190°C (555°F)

(*CLTE = Coeff. of Linear Thermal Expansion)

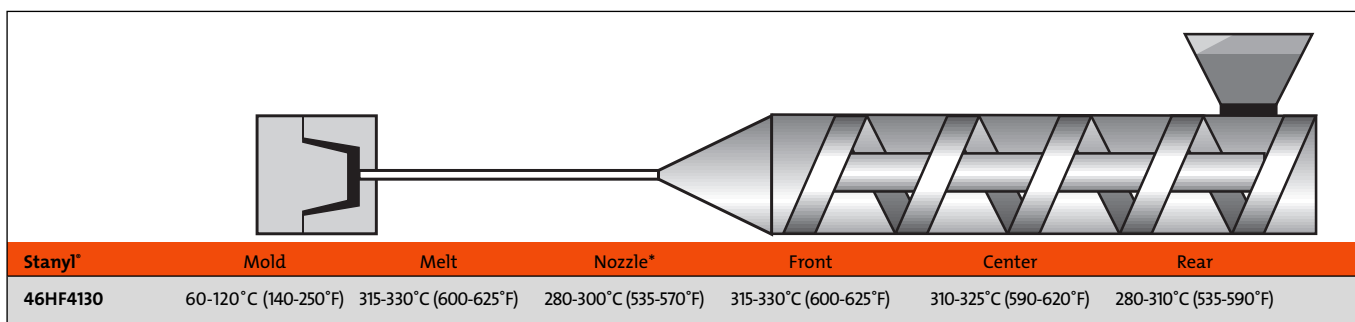


Tensile properties of Stanyl[®] 46HF4130.

PROCESSING OF STANYL[®] 46HF4130

Due to the high flow of Stanyl[®] 46HF4130, there is little shear heating; so machine settings should be adapted as follows:

- For optimal mechanical performance and flow, temperature of the melt should be around 325°C (620°F).
- For optimal dimensional stability, the best mold temperature is 120°C (250°F).
- Use high temperature settings in compression/metering zone and make sure that the actual melt temperature is sufficient.
- Use high dosing speed, high screw speed, high injection speed.
- Low back pressure of approximately 10 bar hydraulic pressure (100 bar effective).
- Check drooling from nozzle; adjust the nozzle temperature if necessary, but not too low to avoid freezing-off. Use reversed tapered polyamide nozzle.



* The correct nozzle temperature should show a neat sprue end and no drooling from the nozzle. This temperature is usually 5 to 20 degrees lower than the actual polymer temperature. Be careful during the start-up for nozzle freeze-off.

STANYL® 46HF4130 MAKES COMPLEX PARTS EASIER, IMPROVES PRODUCTIVITY!

- Fills long thin flow paths better than other resins, greater design freedom.
- Reduces in-built stresses, lowering tendency to warp, improves surface finish; lower production losses, better quality.
- Allows for lower injection pressures and more cavities per tool; raises productivity.

TYPICAL APPLICATIONS FOR WHICH STANYL® 46HF4130 IS SUITED

Where other materials have difficulty meeting processing targets Stanyl® 46HF4130 provides an alternative for parts operating in high temperature environments:

- Large automotive moldings, e.g. truck manifolds or intercoolers.
- Automotive connectors with long flow paths or runner systems.
- Industrial components with intricate designs.
- Encapsulation or over-molding e.g. of sensors.

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