3M Science. Applied to Life.™

▶ 3M™ Dyneon™ Fluoroelastomers

Reducing efforts to accelerate efficiency.

Primer free bonding for innovative lightweight solutions.

New bonds with a familiar basis.

Fluoroelastomers from 3M are the ideal response when faced with the challenge of improving the performance characteristics of heat-resistant elastomers in combination with plastics at the highest level of economic efficiency. They form the foundations of numerous elastomer components required for applications in the automotive, aviation and aerospace industries as well as in chemical processing, mechanical engineering and a range of other fields.

To be able to fulfil the increasingly demanding requirements of these industries in future, we continuously strive to improve our products. Together with the thermoplastics specialist DSM Engineering Plastics, we have developed a two component solution that not only optimises the performance related characteristics of polymer components but also raises design and processing to an entirely new level.

This brochure tells you all about the benefits offered by the material combination of our 3M™ Dyneon™ Fluoroelastomers with DSM Stanyl® Polyamide 46.

The Bonding Proof.

The materials: DSM Stanyl® TW 200 F6 30% glass fiber filled & 3M™ Dyneon™ Fluoroelastomer FPO 3631 peroxide cured.

Moulding technique		Overmoulding 2 Cycles – 2 Machines 150 seconds total*	Overmoulding 1 Cycle – 1 Machine 90 seconds total*
Press cured		✓	✓
Post cured	2 hrs 230 °C	✓	✓
Heat Aging (air)	1000 hrs at 150 °C	✓	✓
Oil Aging (Lubrizol OS)	1000 hrs at 100 °C	✓	✓
Oil Aging (Lubrizol OS)	500 hrs at 150 °C	✓	✓
Fuel Aging (FAM B)	504 hrs 60 °C	✓	✓
Fuel Aging (Biodiesel SME)	504 hrs 80 °C	✓	✓
Salt Spray (5% NaCl)	168 hrs 90 °C	✓	✓

✓ = Rubber Tear

* Rubber moulded over separately prepared Stanyl® part. Heating time of elastomer layer only is 55 seconds at 180 °C. Cycle time in case both machines are side by side: 20 seconds Stanyl® injection moulding + 10 seconds machine transfer + 120 seconds FKM moulding.

Your Benefits.

Weight Reduction

Density of Stanyl® (30% glass) is about 45% less than aluminium and 80% less than steel. Furthermore aluminium and metal inserts are generally overdesigned due to die-casting and stamping constraints.

- ✓ Part weight reductions of 40% to 50% can be achieved (even with a possible design volume increase)
- ✓ Supports the automotive industry's weight reduction requirements

Increased Sustainability

Degreasing, phosphating and chemical primering are hazardous processes. This means:

- Maintaining a safe working environment is complicated
- Chemical waste streams are dangerous
- Treatments consume a lot of energy
- Legislation and permits on the open use of these chemicals are becoming tougher

- ✓ With Stanyl® and 3M Dyneon Fluoroelastomers no surface treatment chemicals are required anymore!
- ✓ Removal of all treatment processes significantly reduces energy consumption

Cost Reduction

Various insert processing steps can be eliminated:

- Steel insert stamping (or)
- Aluminium die-casting (10x tool life time extension with Stanyl®)
- Mechanical and chemical surface treatments (deburring, grinding, drilling, welding, sandblasting, degreasing, phosphating and drying, primering and baking)
- Permission costs for chemical processes and waste streams
- Warehousing and transport from (external) insert supplier and treatment provider

Design Freedom and New Function

Metal stamping and aluminum die-casting processes limit the freedom of design for inserts. Combining 3M Dyneon Fluoroelastomers and Stanyl® opens up new opportunities to:

- Optimise current designs
- Create new design concepts
- Integrate functions
- Use new assembly techniques

Processing Time Saving

Surface treated metal inserts need multi-step batch processes using hazardous chemicals and associated waste streams. Planning, handling and storage of semi-finished goods last several days. The new concept provides the opportunity for:

- ✓ Full continuous production with Stanyl® and 3M Dyneon Fluoro-elastomers, in both 2K and classic overmoulding processes
- ✓ The complete cycle time of 2K parts can become as short as three minutes or just over two hours for the finished post-cured parts

Quality Improvement

Chemical and mechanical surface treatments are complicated to control. This means:

- Processes need to be in a separate facility and need close monitoring
- Every step in the process presents a potential quality risk
- Treated parts need to be securely protected from moisture and foreign particles
- Treated steel parts are still corrosion sensitive

- ✓ Surface treatment-related quality issues will disappear!
- ✓ Corrosion risks are removed

Technical Information and Test Data

Technical information, test data, and advice provided by Dyneon personnel are based on information and tests we believe are reliable and are intended for persons with knowledge and technical skills sufficient to analyse test types and conditions, and to handle and use raw polymers and related compounding ingredients. No license under any Dyneon or third party intellectual rights is granted or implied by virtue of this information.

General recommendations on health and safety in processing, on work hygiene and on measures to be taken in the event of accident are detailed in our material safety data sheets.

You will find further notes on the safe handling of fluoropolymers in the brochure “Guide for the safe handling of Fluoropolymers Resins” by PlasticsEurope, Box 3, B-1160 Brussels, Tel. +32 (2) 676 17 32.

The present edition replaces all previous versions. Please make sure and inquire if in doubt whether you have the latest edition.

Important Notice

All information set forth herein is based on our present state of knowledge and is intended to provide general notes regarding products and their uses. It should not therefore be construed as a guarantee of specific properties of the products described or their suitability for a particular application. Because conditions of product use are outside Dyneon’s control and vary widely, user must evaluate and determine whether a Dyneon product will be suitable for user’s intended application before using it. The quality of our products is warranted under our General Terms and Conditions of Sale as now are or hereafter may be in force.

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