REMFORM® II™: The ideal screw connection into plastic

Innovative thread geometry

Neither nuts nor inserts are required for direct fixing with REMFORM® II™ fasteners, because REMFORM® II™ form their own threads. The screw is simply driven into the cored hole of the moulded plastic part.

REMFORM® II™ fasteners offer the following crucial advantages:
- Asymmetrical thread profile
- Special, rounded flank profile
- Rounded thread crest
- Generates a zero-play thread seating

Saving space and materials alike

The REMFORM® II™ offers excellent results, even in thin wall, shallow insertion depth situations.

That means plastic components can be designed with considerably shorter shot times, making for component cost savings.

Freedom from inserts and ready release of the REMFORM® II™ fasteners make for the ideal solution with an eye to later recycling.

Economic fastening

Considerable savings are available through the use of REMFORM® II™ fasteners over conventional screws and threaded inserts.

Cost savings accrue from:
- Elimination of purchasing, logistics and assembly costs associated with inserts
- Reducing the plastic material weight
- Space-saving design potential
- Reduced injection moulding cycle times
- Lower recycling costs

REMFORM® II™ fasteners meet all the requirements for fault free automated assembly.

The optimum geometry for perfect assembly results

A thread profile offering optimum assembly security

The narrow, asymmetrical thread profile, supported by the rounded thread crest and the rounded flanks, enables optimum and smooth material displacement during thread forming.

This clever design means that the plastic flows primarily towards the load flank; while radial tension is minimised by the rounded tips.

Consequently less plastic material has to be displaced (V1>V2) to achieve the same profile depth t.

This results in:
- Reduced insertion torque for the same or greater failing torque
- Increased assembly security

Influence of the load flank angle on axial and radial loads

The low load flank angle of just 10° reduces the radial component (Fradial) and, together with the large thread supporting area, offers a powerful grip.

Cracking of the plastic is minimised by the low radial deformation. Meanwhile the optimised thread load support counters the stress relaxation, reducing the risk of spontaneous loosening.

Repeated assembly is always an option

The steeper guiding flank finds the previously formed thread in the plastic readily on reinsertion.

Applications for the REMFORM® II™

We offer the optimised REMFORM® II™ thread profile in three different fastener designs suitable for the applications shown in the table opposite.

REMFORM® II™: The ideal screw connection into plastic

REMFORM® II™ “HS”
REMFORM® II™ “F”
REMFORM® II™

Thermoplastics
Reinforced thermoplastics
Highly reinforced thermoplastics
Magnesium die-cast
Zinc die-cast
Aluminium die-cast

Your profit

Plastic component
Purchase inserts
Assembling inserts
Shorter shot cycles
Simplified recycling
Assembly
Fastener

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Thermoplastics
Reinforced thermoplastics
Highly reinforced thermoplastics
Magnesium die-cast
Zinc die-cast
Aluminium die-cast

SFS intec AG, Electrical Industry, electrical-industry@sfsintec.biz
Key features

In comparison to the standard REMFORM® II™ the "HS" version has a larger thread core, a high tensile strength of more than 1'000 N/mm² (class 10.9) and a reduced thread pitch, making it ideal for use with hard glass or glass fibre reinforced plastics.

Even with low insertion depths REMFORM® II™ "HS" offers advantages, because of the shallow pitch.

Differences from REMFORM® II™:

- Increased thread core diameter
- Higher tensile strength of over 1’000 N/mm²
- Reduced pitch
- "HS"-variant available from ∅ ≥ 2 mm

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Tube design guidelines

Calculating core diameter $d_1$:

$\text{Factor} \times \text{nominal thread diameter } d$

<table>
<thead>
<tr>
<th>Material</th>
<th>Factor</th>
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<tbody>
<tr>
<td>PP</td>
<td>0.75</td>
</tr>
<tr>
<td>PE</td>
<td>0.75</td>
</tr>
<tr>
<td>PA 6 / PA 6.6</td>
<td>0.75</td>
</tr>
<tr>
<td>ABS</td>
<td>0.75</td>
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<tr>
<td>POM</td>
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<tr>
<td>PS</td>
<td>0.77</td>
</tr>
<tr>
<td>ASA / SAN</td>
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</tr>
<tr>
<td>PBT</td>
<td>0.78</td>
</tr>
<tr>
<td>PET</td>
<td>0.78</td>
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<tr>
<td>ABS / PC</td>
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<tr>
<td>PMMA</td>
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</tr>
<tr>
<td>PC*</td>
<td>0.82</td>
</tr>
<tr>
<td>PA 6 30% GF</td>
<td>0.83</td>
</tr>
<tr>
<td>PPE*</td>
<td>0.84</td>
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<tr>
<td>PC 30% GF</td>
<td>0.85</td>
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<tr>
<td>PBT 30% GF</td>
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</tr>
<tr>
<td>PET 30% GF</td>
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</tr>
<tr>
<td>PPS</td>
<td>0.88</td>
</tr>
<tr>
<td>PA6T/66</td>
<td>0.89</td>
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These recommendations are valid for REMFORM® II™ fasteners. They are based on our laboratory tests and field experience. With the multiplicity of plastics now in use, with their numerous mechanical properties all dependent on time, temperature and load, it is advisable to carry out individual tests.

The recommended values should be viewed as guidelines.

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The relatively large thread pitch, providing sufficient space for secure anchorage in the plastic material, coupled with the other thread profile advantages discussed above, makes REMFORM® II™ fasteners ideal for all conventional and reinforced plastics.

The advantages at a glance:

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- Special, rounded flank profile
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<td>PC*</td>
<td>0.84</td>
</tr>
<tr>
<td>PA 6 30% GF</td>
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<td>PPE*</td>
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<tr>
<td>PC 30% GF*</td>
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<tr>
<td>PBT 30% GF</td>
<td>0.87</td>
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<tr>
<td>PET 30% GF</td>
<td>0.87</td>
</tr>
<tr>
<td>PPS 40% GF</td>
<td>0.88</td>
</tr>
<tr>
<td>PA6T/66 45% GF</td>
<td>0.89</td>
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Nominal thread diameter: $d = 3 \text{ mm}$

Material being used: PC 30% GF (factor 0.87)

Core diameter $d_1 = 3 \text{ mm} \times 0.87 = 2.61 \text{ mm}$
Influence of the relief bore

Separating the seating stress from radial tension.

A relief bore greatly reduces cracking, particularly in thin walled tubes, and should be used whenever possible. The screw is also guided during insertion, supporting perpendicular entry.

Influence of core diameter

Insertion and failing torque in relation to core diameter $d_1$.

The optimum core diameter $d_1$ is between approximately 80 and 90% thread flank coverage. This generates the maximum separation between insertion $T_I$ and failing torque $T_F$ values.

Influence of insertion depth

Insertion and failing torque in relation to insertion depth $t$.

The optimum insertion depth $t$ lies at approximately $2 \times d$, providing short assembly times and high tear-out values.

Key features

The REMFORM® II™ "F" has a further increased core diameter and a reduced thread pitch in comparison to the "HS" version.

Thanks to the high tensile strength of over 1 000 N/mm² and the thread forming area extending over two turns, these fasteners are optimised for materials with low ductility. They are also waxed for use with metals.

Economical insertion into:
- Light metals (Magnesium and Aluminium)
- Thermosetting plastics
- Highly reinforced thermoplastics
- Applications in plastic with low insertion depths

Remform®II™ "F" (Fine thread)
The ideal fasteners for materials with low ductility

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Application tests

In order to guarantee safe insertion values and fault-free assembly operations, we can carry out tests on your specific application. You can profit from the know-how of our experienced application technicians and the state-of-the-art equipment in our labs.

You will, of course, receive a detailed report on all our tests.

Assembly recommendations

The most important values to be determined are:

- Maximum insertion torque \( T_{\text{Imax}} \)
- Minimum failing torque \( T_{\text{Fmin}} \)
- Optimum tightening torque \( T_T \)
- Failing torque \( T_F \) in repeat insertion
- Loosening torque
- Tear-out force

The tightening torque should be as low as possible, as high pre-tensioning forces can lead to relaxation and cracking issues.

\[
T_i = \text{insertion torque} \\
T_T = \text{tightening torque} \\
T_F = \text{failing torque}
\]

Influence of screwdriver speed

The insertion and failing torque values vary with insertion speed.

The optimum speed for direct insertion into plastics has been found to be approximately 500 min\(^{-1}\) to 700 min\(^{-1}\). Higher speeds can lead to melting issues.

SFS intec also offers REMFORM\textsuperscript{®} II\textsuperscript{™} as miniature screws.

Starting from nominal diameters of just 0.5 mm to meet your special requirements.

Benefits:

- Sealed the application
- Electrical insulation
- Eliminates contact corrosion
- Stopped screws loosening
- Offers long-term fastener security

100 %-attribute control

Increase reliability at reduced costs

Depending on the particular application, the already excellent quality level of SFS intec fasteners can be honed to 0 to 3 ppm levels for defined parameters.

Our sorting processes offer you the following savings potential:

- Reduction of down time and troubleshooting costs on expensive automated lines
- Increased functional efficiency of the finished product
- Increased productivity on your manufacturing lines
The design of the REMFORM® II™ fastener can, of course, be matched to your specific requirements. In this way SFS intec offers you the potential to integrate further functions into the fastener:

- Pressed-on washers to reduce the surface pressure (relaxation)
- Serrated head, ring groove
- Double thread fasteners
- Shoulder screws

Individual power drives, combined power drives and security drives are also available.

Individual cosmetic finishes in a range of colour options, using the best match colouring process:

- Powder coating
- Spray processes
- PVD-process
- Dip spin coating

Fasteners in Aluminium can be anodised in various colours.

SFS intec also offers the REMFORM® II™ fastener family in special materials such as:

- Stainless steels (A2/A4)
- Aluminium alloys
- Non-ferrous metals
- Titanium
- Other materials available on enquiry
Cross location expertise

Flexibility and economy are our bywords at SFS intec, throughout our international network of facilities. We manufacture our products in various plants across three continents.

We maintain a continuous knowledge exchange process beyond company boundaries and national frontiers. It is the merging and ongoing development of technological know-how which creates the critical synergy. That’s why we are always able to communicate and convey a state-of-the-art knowledge base in our technologies.

Discover our comprehensive product portfolio

SFS intec has over 50 years of experience in fastening technology. We will be glad to offer you a solution that meets your demands. See our extensive brochures for further information. You can request them if you need more details.

Feel free to contact us anytime. We will be pleased to assist you.