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# REMINC/CONTI

# REMFORM®II™ SCREWS

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# END-USER SPECIFICATIONS

**PR-182**
**November 2008**
**Revised May 2019**

**Leaders in Lowering the Cost of Assembly**

REMINC/CONTI
REMFORM® II™ SCREWS

END-USER SPECIFICATIONS

## INTRODUCTION

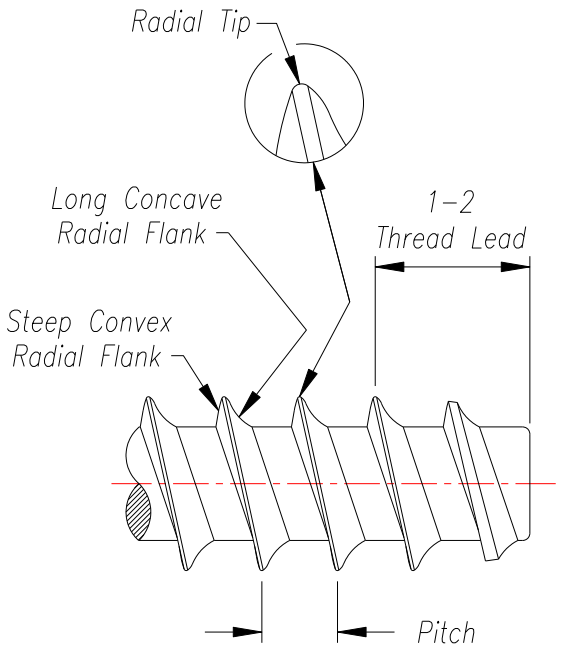
This document provides end-users of REMFORM® II™ screws dimensional and material information to be used as a uniform standard for REMFORM® II™ screws. End-users may use this copyrighted material to create their own in-house REMFORM® II™ standards. This information is intended for use only with REMFORM® II™ products and prior notification to and permission from REMINC/ CONTI is required before incorporating this copyrighted material into any company documents.

## SCOPE

✧ The REMFORM® II™ screw is a thread forming fastener with a unique thread form providing superior performance in today's wide range of plastics. The asymmetrical thread minimizes radial hoop stress to reduce the possibility of boss bursting and the narrow tip angle also reduces stress in the plastic nut member.

✧ REMFORM® II™ fasteners employ a Unique Radius Flank™ asymmetrical thread form shown in the drawing below. The leading thread flank is most influential in forming the mating thread. The intercepting radius form on the lead flank promotes efficient material displacement and material flow. The steep trailing, or pressure, flank which opposes the fastener head, is engineered to resist pull-out forces, whether they be applied by a tensile load or induced by torque. This unique thread and its narrow tip angle efficiently displace material and therefore require minimal energy to form an internal thread. The steep trailing flank, with excellent material contact, results in a high resistance to the internal threads stripping. In applications where the failure mode is fastener fracture, the high torsional strength of REMFORM® II™ fasteners ensures a high failure torque.

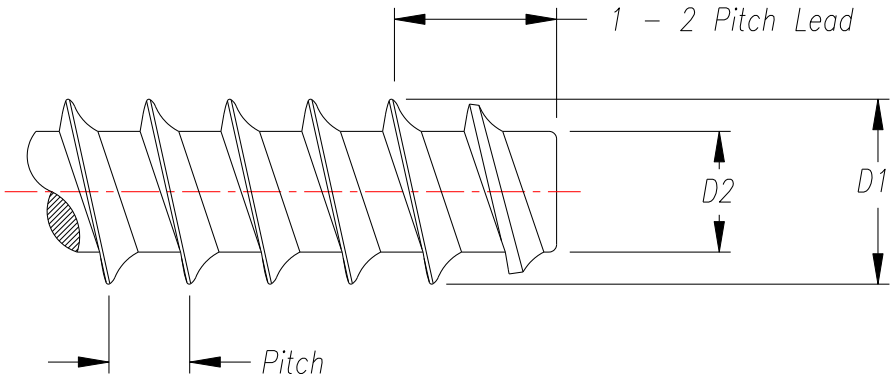
✧




✧ Standard REMFORM® II™ screws are neutral hardened.

✧ All REMFORM® II™ screws can be supplied with standard coatings.

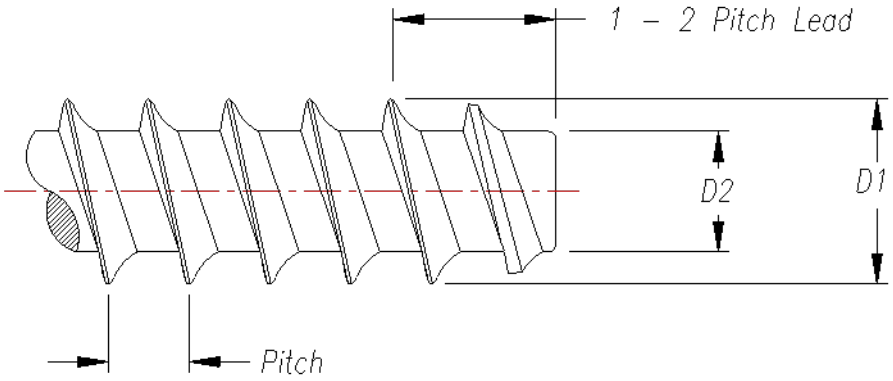
## REMFORM® II™ SCREWS




| SCREW SIZE | PITCH | D1 | | D2 |
|---|---|---|---|---|
| mm | mm | Max. | Min. | Min. |
| 1.0 | 0.55 | 1.07 | 1.00 | 0.64 |
| 1.2 | 0.65 | 1.27 | 1.20 | 0.77 |
| 1.4 | 0.75 | 1.47 | 1.40 | 0.90 |
| 1.6 | 0.85 | 1.70 | 1.60 | 1.03 |
| 1.8 | 0.85 | 1.90 | 1.80 | 1.16 |
| 2.0 | 1.00 | 2.10 | 2.00 | 1.20 |
| 2.2 | 1.05 | 2.30 | 2.20 | 1.32 |
| 2.5 | 1.15 | 2.60 | 2.50 | 1.51 |
| 3.0 | 1.35 | 3.10 | 3.00 | 1.93 |
| 3.5 | 1.55 | 3.60 | 3.50 | 2.25 |
| 4.0 | 1.75 | 4.10 | 4.00 | 2.57 |
| 4.5 | 2.00 | 4.60 | 4.50 | 2.89 |
| 5.0 | 2.25 | 5.15 | 5.00 | 3.20 |
| 6.0 | 2.65 | 6.15 | 6.00 | 3.84 |
| 7.0 | 3.10 | 7.15 | 7.00 | 4.48 |
| 8.0 | 3.50 | 8.15 | 8.00 | 5.11 |
| 9.0 | 4.00 | 9.15 | 9.00 | 5.74 |
| 10.0 | 4.50 | 10.15 | 10.00 | 6.37 |

**ALL DIMENSIONS IN MILLIMETERS**

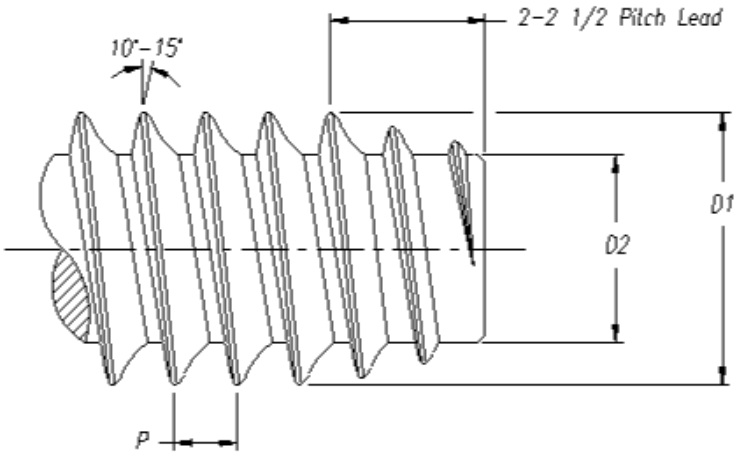
## REMFORM® II™ "HS" SCREWS




| SCREW SIZE | PITCH | D1 | | D2 |
|---|---|---|---|---|
| mm | mm | Max. | Min. | Min. |
| 1.0 | 0.44 | 1.08 | 1.00 | 0.56 |
| 1.2 | 0.51 | 1.28 | 1.20 | 0.7 |
| 1.4 | 0.57 | 1.48 | 1.40 | 0.85 |
| 1.6 | 0.64 | 1.68 | 1.60 | 0.99 |
| 1.8 | 0.71 | 1.88 | 1.80 | 1.14 |
| 2.0 | 0.78 | 2.08 | 2.00 | 1.28 |
| 2.2 | 0.85 | 2.28 | 2.20 | 1.43 |
| 2.5 | 0.95 | 2.60 | 2.50 | 1.64 |
| 3.0 | 1.12 | 3.10 | 3.00 | 2.01 |
| 3.5 | 1.29 | 3.60 | 3.50 | 2.37 |
| 4.0 | 1.46 | 4.10 | 4.00 | 2.73 |
| 4.5 | 1.63 | 4.60 | 4.50 | 3.09 |
| 5.0 | 1.80 | 5.15 | 5.00 | 3.43 |
| 6.0 | 2.14 | 6.15 | 6.00 | 4.16 |
| 7.0 | 2.48 | 7.18 | 7.00 | 4.86 |
| 8.0 | 2.82 | 8.18 | 8.00 | 5.58 |
| 9.0 | 3.16 | 9.25 | 9.00 | 6.28 |
| 10.0 | 3.50 | 10.25 | 10.00 | 7.00 |

**ALL DIMENSIONS IN MILLIMETERS**

## REMFORM® II™ "F" SCREWS




| SCREW SIZE | PITCH | D1 | | D2 |
|---|---|---|---|---|
| mm | mm | Max. | Min. | Min. |
| 1.0 | 0.30 | 1.07 | 1.00 | 0.68 |
| 1.2 | 0.40 | 1.27 | 1.20 | 0.81 |
| 1.4 | 0.45 | 1.47 | 1.40 | 0.95 |
| 1.6 | 0.50 | 1.70 | 1.60 | 1.08 |
| 1.8 | 0.55 | 1.90 | 1.80 | 1.22 |
| 2.0 | 0.60 | 2.10 | 2.00 | 1.33 |
| 2.2 | 0.70 | 2.30 | 2.20 | 1.47 |
| 2.5 | 0.70 | 2.60 | 2.50 | 1.68 |
| 3.0 | 0.80 | 3.10 | 3.00 | 2.02 |
| 3.5 | 0.95 | 3.60 | 3.50 | 2.37 |
| 4.0 | 1.05 | 4.10 | 4.00 | 2.71 |
| 5.0 | 1.25 | 5.15 | 5.00 | 3.40 |
| 6.0 | 1.40 | 6.15 | 6.00 | 4.09 |
| 7.0 | 1.55 | 7.15 | 7.00 | 4.78 |
| 8.0 | 1.75 | 8.15 | 8.00 | 5.46 |
| 10.0 | 2.25 | 10.15 | 10.00 | 6.82 |
| 9.0 | 3.16 | 9.25 | 9.00 | 6.28 |
| 10.0 | 3.50 | 10.25 | 10.00 | 7.00 |

## *Section 1: SCOPE*

This specification covers the materials and heat treatment for REMFORM® II™ fasteners. The material shall be basically a plain carbon steel. Structural grades of alloy steel, stainless steels and non-ferrous metals are optional and not included herein.

## *Section 2: MATERIALS*

***2.01*** Screws shall be made from plain carbon steel aluminum killed fine grain, for which the ladle analysis should fall within the following analysis:

| | |
|---|---|
| Carbon | 0.18 – 0.25 |
| Manganese | 0.70 – 1.65 |
| Sulfur | 0.045 Maximum |
| Phosphorous | 0.035 Maximum |
| Silicon | 0.10 Maximum |
| Boron | 0.0005 – 0.002 (Optional) |

## *Section 3: MECHANICAL PROPERTIES*

***3.01*** Core Hardness

Rockwell "C" 33-39 (HV 327-382) when tested on the cross-sectional core of the shank a distance of one diameter from the point.

***3.02*** Surface Carbon Control

The critical difference in this phase of heat treat is the control of the furnace atmosphere. A balance must be achieved between zero (0) decarburization (true neutral) and a moderate carbon restoration or carbon enrichment.

***3.03*** Surface Hardness

Carbon enrichment allowed, surface should not have any decarburization.
Surface hardness shall not be more than 30 Vickers Points (HRC – 3 points) over core hardness reading.

***3.04*** Minimum Torsional Strength

This is an important and realistic property attribute for inspection purposes, replacing tensile testing. See values on sheet 5.

***3.05*** Ductility

Head of screw shall not separate from the shank after a deformation of 6 degrees (wedge block). For initial control purposes, a deformation of 10 degrees may be used.

## *Section 4: HEAT TREATMENT*

***4.01*** Quenching

Screws shall be quenched directly from the furnace heat into water, oil, or a suitable synthetic with good agitation to achieve uniform quench hardness.

***4.02*** Tempering

Screws shall be tempered suitable to meet ductility, torsional strength as listed below and to achieve core hardness RC 33-39 (HV 327-382)

***4.03*** Torsional Strength Test

**REMFORM® II™ SCREWS**

| Fastener Size | Torque Nm |
|---|---|
| 1.0 | 0.05 |
| 1.2 | 0.086 |
| 1.4 | 0.14 |
| 1.6 | 0.2 |
| 1.8 | 0.29 |
| 2.0 | 0.33 |
| 2.5 | 0.65 |
| 3.0 | 1.35 |
| 3.5 | 2.14 |
| 4.0 | 3.2 |
| 4.5 | 4.53 |
| 5.0 | 6.19 |
| 6.0 | 10.7 |
| 7.0 | 16.9 |
| 8.0 | 25.2 |
| 10.0 | 48.9 |

**REMFORM® II™ "HS" SCREWS**

| Fastener Size | Torque Nm |
|---|---|
| 1.0 | 0.04 |
| 1.2 | 0.075 |
| 1.4 | 0.13 |
| 1.6 | 0.19 |
| 1.8 | 0.29 |
| 2.0 | 0.41 |
| 2.5 | 0.57 |
| 3.0 | 0.85 |
| 3.5 | 1.55 |
| 4.0 | 2.52 |
| 4.5 | 3.83 |
| 5.0 | 5.53 |
| 6.0 | 7.5 |
| 7.0 | 13.3 |
| 8.0 | 21.5 |
| 10.0 | 64.5 |

**REMFORM® II™ "F" SCREWS**

| Fastener Size | Torque Nm |
|---|---|
| 1.0 | 0.060 |
| 1.2 | 0.10 |
| 1.4 | 0.18 |
| 1.6 | 0.27 |
| 1.8 | 0.32 |
| 2.0 | 0.48 |
| 2.2 | 0.72 |
| 2.5 | 0.92 |
| 3.0 | 1.56 |
| 3.5 | 2.45 |
| 4.0 | 3.51 |
| 5.0 | 6.97 |
| 6.0 | 12.6 |
| 7.0 | 23.7 |
| 8.0 | 31.8 |
| 10.0 | 64.4 |

***4.04*** Hydrogen Embrittlement

As standard practice, with or without specification by the customer's order or part print, the following classes of items shall be given a BAKING treatment:

A. Electro Zinc plate.
B. Washer assembly items, ZINC plated, all shapes and designs of washers that are made of spring steel whether the washers are pre heat-treated and assembled with unhardened screws or are heat treated and assembled with the screws.

## *Section 5: TEST METHODS*

***5.01*** Core Hardness

Core hardness shall be determined at the mid-radius of a transverse section through the screw taken at a distance sufficiently behind the point of the screw to be through the full minor diameter. The test shall comply with ISO 6507.

***5.02*** Torsional Strength Test

The screw shall be clamped in place using a threaded or non-threaded clamping device so that clamped threads are not damaged. Three threads as a minimum must protrude beyond the top of the clamping device. Using a torque measuring device, torque shall be applied until the screw fractures. The torque required to cause fracture is the torsional strength. Fracture must occur in the exposed threads and not in the clamped portion.

***5.03*** Ductility Test

The sample screw shall be inserted into a hole in a hardened, 7° angle wedge block, having a hole size 0.5 to 1.0mm larger than the nominal screw size. An axial compressive load shall be applied against the top of the screw until the plane of the underhead bearing surface is bent permanently to 7° with respect to a plane normal to the axis of the screw.

It is acceptable to induce the 7° permanent deformation using a hand held hammer.