

Reduced thread profile and coarse pitch minimizes radial stress and potential hole wall damage. The coarse thread also maximizes the pull-out strength of these Self-Tapping Inserts.

Series 10 Thread Forming



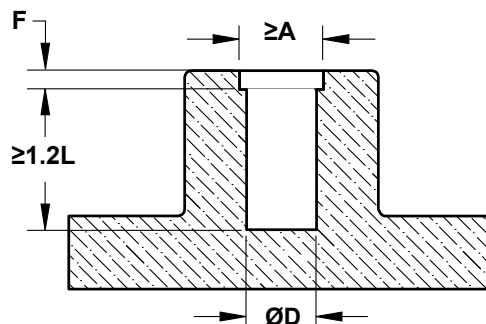
DIMENSIONAL DATA

LEGEND

Inch
Metric Conversion

Thread Size	A Outer Thread Ø		L Length		D* Rec. Hole Ø		F* Counterbore Depth	
	Tolerance ▶	Ref.	±0.10	±0.26	+0.003	+0.08	Ref.	
4-40 M3 x 0.5	.188	4.78	.250	6.35	.169	4.29	.042	1.07
6-32 M3.5 x 0.6	.219	5.56	.281	7.14	.199	5.05	.042	1.07
8-32 M4 x 0.7	.250	6.35	.312	7.92	.228	5.79	.050	1.27
10-24 M5 x 0.8	.281	7.14	.375	9.53	.250	6.35	.063	1.60
10-32 M5 x 0.8	.281	7.14	.375	9.53	.250	6.35	.063	1.60
1/4-20 M6 x 1.0	.344	8.74	.438	11.13	.312	7.92	.071	1.81

Recommended Hole Design*



* See page 5 for more information on recommended hole design

To Order: INS (Series #)/Thread Size / Length, Material, Finish
Example: INS 10/250-20 / .438 EK

SELF-TAPPING INSERT INSTALLATION



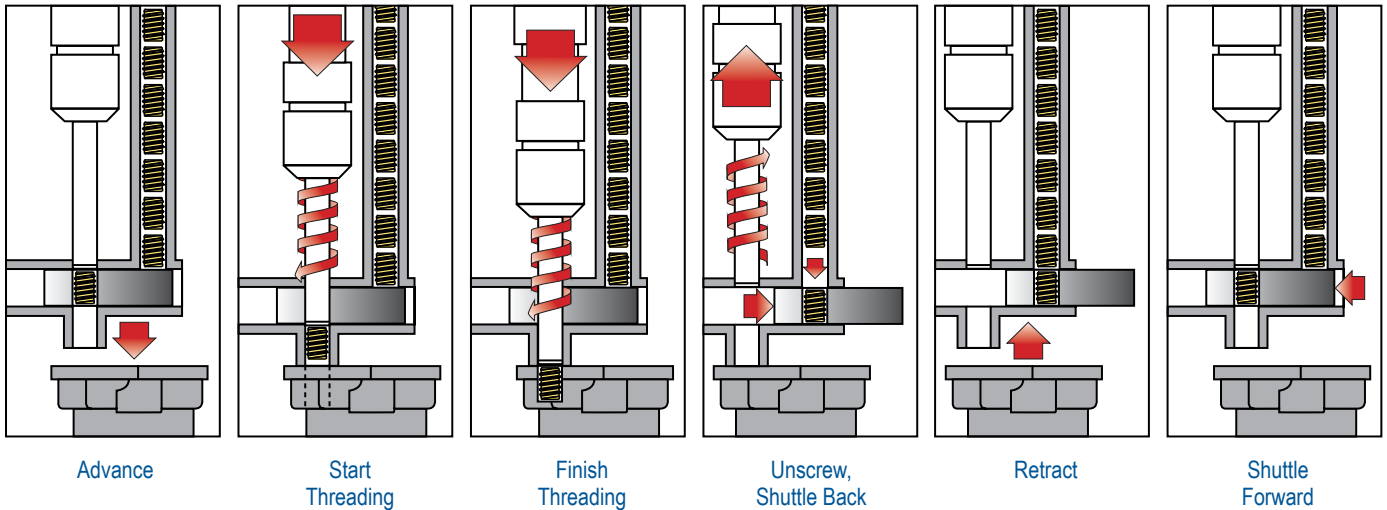
Since the Insert is driven by its internal thread, a different driving stud is required for each Insert size. For applications in recessed areas or close to walls, an extension driver is the solution. The Insert is threaded onto the driver by hand and the manual press is brought down to line the Insert up with the hole. The plastic component should be located against a stop to prevent rotation during installation, or fixtured to prevent rotation as well as to ensure consistent alignment of the hole. After the Insert is seated, releasing the pressure automatically reverses and raises the driver. The Insert should always be installed flush or slightly below the surface.

The **SPIROL Model TA** Automatic Self-Tapping Insert Driver eliminates the need to manually place Inserts. The Inserts are automatically fed to and fixed onto the driving stud while the operator unloads the assembled component and loads a new component. The sequence of this cycle is shown below.

Model TA

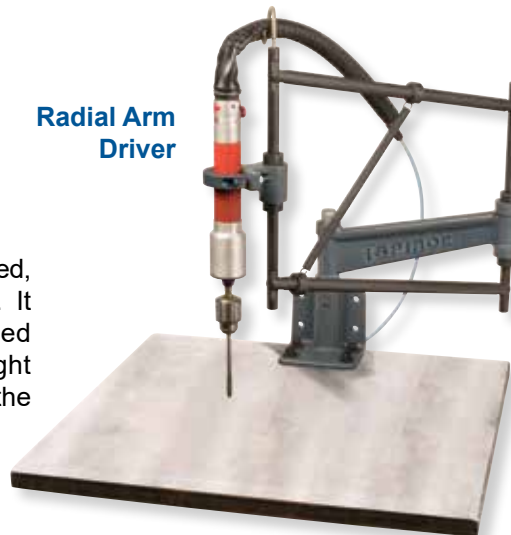


Model TA Insert installation sequence



Radial Arm Driver

If multiple Insert locations are required, a **Radial Arm Driver** can be used. It is important that whatever is used provides rigidity to assure straight axial insertion of the Insert into the hole.



There are four main commercial categories of plastics: thermoset, thermoplastics, foam and elastomers. The latter two have limited suitability for Insert installation and should an Insert be required, an application analysis is suggested. Accordingly, these categories are not covered here.

Thermoset plastics, once formed, undergo an irreversible chemical change and cannot be reformed using heat and pressure. These plastics are tough and heat-resistant. Examples are Bakelite, urea and polyester resins. Heat/Ultrasonic Inserts are not suitable for these plastics. Thermoset plastics require the use of Molded-In, Press-In, or Self-Tapping Inserts.

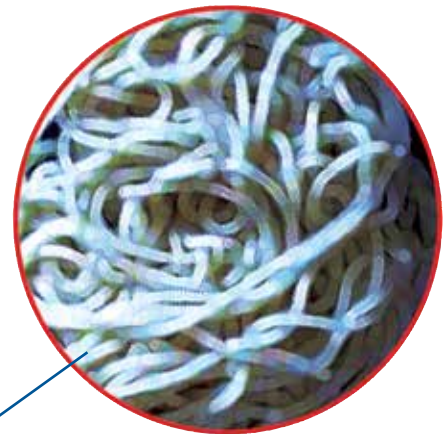
THERMOSET PLASTICS

- Phenolic (Bakelite)
- Epoxies
- Polyimide
- Vulcanized rubber

Thermoplastics are rigid and solid at normal temperatures but at elevated temperatures they soften and melt. Some of the more common plastics in this category are ABS, nylon, PVC and polycarbonate. Heat/Ultrasonic Inserts, as well as other types, are suitable for plastics in this category.

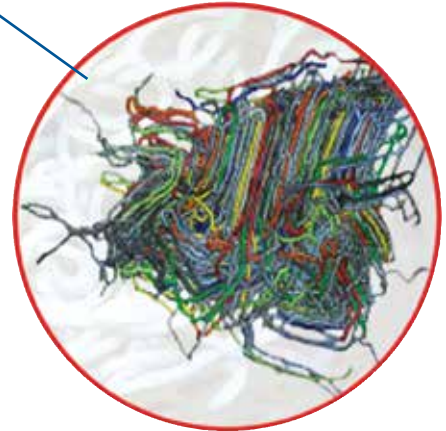
Thermoplastics are further delineated into amorphous and semi-crystalline polymers. **Amorphous polymers** have a random molecular structure that does not have a sharp melting point. Instead, amorphous material softens gradually as temperature rises. Amorphous materials are more sensitive to stress failure due to the presence of hydrocarbons. ABS and PVC are common amorphous thermoplastics. **Semi-crystalline polymers** have a highly ordered molecular structure. These do not soften as the temperature rises, but rather have a defined and narrow melting point. This melting point is generally above that of the upper range of amorphous thermoplastics. PET and PEEK are common semi-crystalline plastics.

Molecular arrangement of polymer chains



Amorphous

Semi-Crystalline



THERMOPLASTICS

Amorphous polymers

- Polymethyl methacrylate (PMMA / Acrylic)
- Polystyrene (PS)
- Polycarbonate (PC)
- Polysulfone (PS)
- PVC
- ABS

Semi-crystalline polymers

- Polyethylene (PE)
- Polypropylene (PP)
- Polybutylene terephthalate (PBT)
- Polyethylene terephthalate (PET)
- Polyetheretherketone (PEEK)

- Polyamide (Nylon)

This can be both amorphous and semi-crystalline based on the blending.

A wide variety of fillers and plasticizers are used to achieve the desired characteristics for the application such as strength, stability, stiffness, conductivity, thermal properties and resistance to creep. Fillers are also used to reduce cost. Fillers and plasticizers increase the stress sensitivity. All fillers generally increase the flow or melt point and therefore, they impact post-mold Insert installation. The impact not only correlates to the type of filler, but also to the percentage used.

SPIROL has a broad range of Inserts for post-mold installation as well as a series of Molded-In Inserts. Installation of Inserts after molding reduces in-place cost by shortening molding time and eliminating secondary cleaning. This method also reduces rejects and mold damage resulting from dislodged Inserts. Molded-In Inserts are placed into the mold cavity prior to plastic injection and offer exceptional torque and pull-out resistance due to unrestricted plastic flow.

HEAT/ULTRASONIC INSERTS are designed for post-mold installation in thermoplastics. Heat and ultrasonic installation yield outstanding performance results. Available in long and short variations, long for maximum torque and pull-out resistance; short for less stringent requirements with the benefits of lower cost and reduced installation time.



Series 19 and 29 are designed for straight holes using standard core pins. The same hole diameter applies to all Inserts within these Series. Seating and installation are facilitated with a pilot and a tapered knurl and groove design. The Series 29 is symmetrical to eliminate the need for orientation.



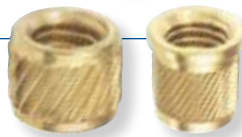
Series 20 and 30 are headed versions using the same body style as Series 19 and 29 respectively.



Series 14 are designed for use in tapered holes. The tapered hole facilitates proper seating and maximizes the surface contact between the Insert and hole wall prior to the application of heat or ultrasonic vibration.



SELF-TAPPING INSERTS are available in **Series 10** which is a Thread Forming Insert for soft, flexible thermoplastics.



PRESS-IN INSERTS are ideal for use in softer plastics to provide a reusable thread which can meet the tightening torque requirements for a threaded joint. Moderate pull-out and good torque requirements are provided by the helical knurl which also facilitates good plastic flow. **Series 50 and 51** Inserts allow for easy and quick installation. The Series 50 is symmetrical with a generous pilot. Series 51 is the headed version which is also suitable for pull-through applications where high pull-out force is a requirement.



MOLDED-IN INSERTS are designed for maximum pull-out and torque performance, and are often the Insert of choice for thermosets and engineered plastics with a high percentage of filler. The minor thread diameter tolerance is controlled to ensure positive positioning and perpendicularity of the Insert on the core pin during the molding process. **Series 63** is symmetrical eliminating orientation and **Series 65** is the same body style in a blind ended version. These Inserts are made from 2024 aluminum, a light-weight, lead-free grade.