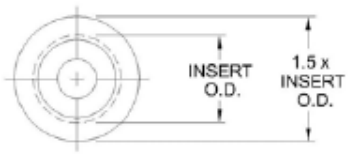
Keenserts® Inserts & Studs
Technical Information

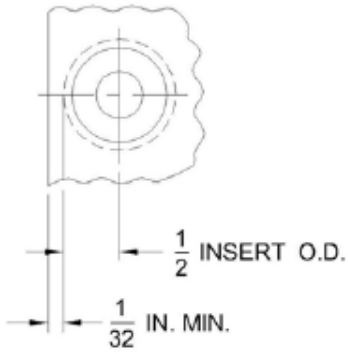
Keenserts® inserts and studs provide strong, permanent, metal threads in virtually any material – ferrous, non-ferrous or non-metallic. We offer the widest available choice of standard sizes, lengths, materials and types. Because of our years of application experience, we are geared to provide solutions to all types of special fastener problems. Please contact our Customer Applications Engineers for other designs to meet your specific needs.

1. Edge Distance

Boss Diameter: 1.5 x O.D. of insert.



Edge distance to a flat side: Can be as little as 1/32" over 1/2 O.D. of the insert. Tap marks may show on flat side and the insert should be positioned with keys 45° to 90° (2 KEES) offset from flat.



2. Broaching

General material harder than HRC 30 may require that the tapped holes be broached for the KEES. Aluminum, anodized after tapping, also may require broaching. Broach blades may not stand up for more than 3 or 4 holes when broaching Inconel and similar alloys.

3. Thickness of Parent Material

In order to achieve the full “Pull-Out” strength, the panel thickness must, at least, contain the threaded length of insert.

4. Internal Thread Lock

Internal thread lock feature is available. Inserts with this feature are designed to securely lock a bolt when it is entered into the insert only a few turns. The locking torque values are consistent and well within the range established by MIL-I-45914, except for Special Lock Inserts.

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4. Internal Thread Lock (Continued)

Even after repeated installations and removals of the bolt, the lock maintains sufficient locking torque to prevent the bolt from vibrating out. Testing is performed with bolts having 3A class threads, and pitch diameter in lower 50% of full tolerance. Class 2A bolts, being smaller, will provide very little to no torque and should not be used. Bolts should have 4 turns after encountering the lock. Less turns may not provide the required torque and more turns will wear out the lock faster. For a metric thread a 4h class bolt is used to test locking feature.

Seating the bolt will affect the locking torque and the number of locking cycles. How it will be affected depends on the material of the bolt and the insert, the finish on bolt and insert, lubrication on the threads and under the head of the bolt, and the seating torque. Seating torque is not required in MIL-I-45914.

5. Standard Minor Diameter Versus Modified Minor

All other things being equal standard minor diameters will provide greater shear engagement areas. This would be desirable where a bolt goes directly into a tapped hole. In the case of inserts where the O.D. of the insert is so much larger than the diameter of the bolt being used, using a larger tap drill, as we do, does not lower the pullout values to any great extent.

6. External thread dimensions

External thread dimensions listed on thread specifications, do not apply to insert O.D. threads and stud end of studs after the assembly of KEES. However, they must accept a ring gage fabricated with minimum installation hole dimension for the corresponding thread size.

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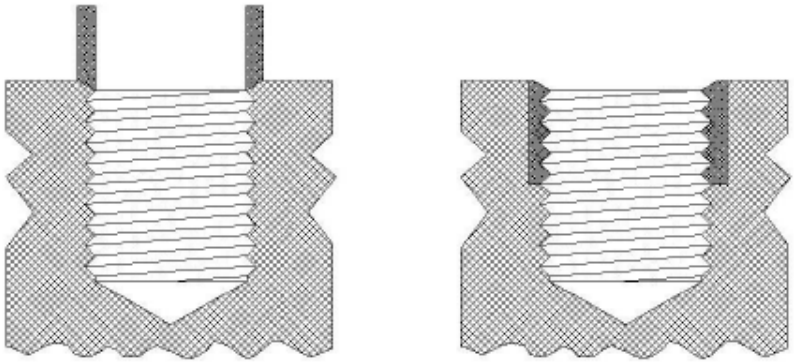
7. Positive Mechanical Lock Against Rotation



KEES are driven down into the tapped threads of the parent material during installation to securely lock the insert against rotation.

Featuring an exclusive external thread design, Keenserts® provide maximum pull-out strength with a minimum outside diameter.

8. Pull-Out Strength *(For Reference Purposes Only)*

To compute the Pull-Out Strength in any parent material, use the following formula:

Calculated Pull-Out Strength = Minimum Shear Engagement Area (in^2) x Minimum Ultimate Shear Strength of the Parent Material (PSI)

9. Shear Engagement Area

Values for Shear Engagement area listed for each part number are for references only.

These values are based on shear failure of material when the parent material is significantly weaker than the insert or stud material.

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9. Shear Engagement Area (Continued)

Such failure occurs in the parent material at or near the major diameter of the insert or stud end external thread. For parent materials of hardness similar to that of the insert or stud, failure occurs by combined shear of both materials simultaneously and will occur along a surface approaching the pitch line. The calculated shear engagement area should be reduced accordingly. For sufficiently hard parent materials, failure may occur by thread shear at the internal thread of the insert or by stud nut end thread failure.

10. Procurement Specification

For MS equivalent inserts: MIL-I-45914.
For MS equivalent studs: NASM45915.

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