ATGL-1802: SPECIAL TOPICS IN DRILL BITS, TAPS, AND FASTENERS

Cuyahoga Community College

Viewing: ATGL-1802 : Special Topics in Drill Bits, Taps, and Fasteners

Board of Trustees:
May 2026

Academic Term:
Fall 2026

Subject Code
ATGL - Appld Indus Tech - Glazing

Course Number:
1802

Title:
Special Topics in Drill Bits, Taps, and Fasteners

Catalog Description:
Course covers the assembly and placement of components used for assembly of window walls and storefronts in the glazing industry. Included will be description of the various drill bits used and taps required for creating correct screw thread of the connectors and miscellaneous fasteners required for assembly, placement and securing of the different components. Proper use of hand and power tools, boring and tapping techniques and layout procedures will be demonstrated and applied.

Credit Hour(s):
1

Lecture Hour(s):
1

Requisites

Prerequisite and Corequisite
Departmental approval: admission to apprenticeship program.

Outcomes

Course Outcome(s):
Discuss the importance of choosing the correct size drill bits and taps for the job performed.

Objective(s):
1. Identify and define the terms related to drill bits, taps, and fasteners
2. List the different type of drill bits, taps, and fasteners
3. Differentiate between high speed drill bits, twist drills and other types of drill bits
4. Explain the different uses for bits, i.e. number 2, number 3, five sixteenths, five eights, and other sizes
5. Recognize the drill bits that should be used for the size taps they are associated with
6. Discuss the types of anchor used in different types of application with different anchor points

---

Course Outcome(s):
Demonstrate the ability to correctly use taps and drills to install fasteners and anchors needed to fabricate window walls and panels in the glazing industry.

Objective(s):
1. Select the different hand and power tools required for installation.
2. Layout hole locations for accurate through-hole locations required for curtain walls and storefront attachments.
3. Select the proper drill size to match the respective screen shank diameter.

4. Properly install drill to drill meter using all three chuck holes.
5. Apply moderate pressure on drill to accurately position bore point on established grid line.
6. Counter sink holes matching fastener head with proper counter bores.
7. Tap existing bore with proper tap size to match the screw thread using cutting oil.

Methods of Evaluation:

1. Lab work
2. Project
3. Tests
4. Quizzes
5. Assignments
6. Participation

Course Content Outline:

1. Bits, taps, and fasteners
    a. Terminology
        i. Shank
        ii. Body
        iii. Drill point
        iv. Flutes
        v. Heel
        vi. WEB
        vii. HSS
        viii. Helix angle
        ix. Drill angle
        x. Tap size
        xi. Pipe tap
        xii. Spiral tap
        xiii. Interrupted tap
        xiv. Combined drill and tap
        xv. Hand tap
        xvi. Spiral tap
        xvii. Number 2 tip
        xviii. Number 3 tip
        xix. One fourth inch nut runner
        xx. Three eighths inch nut runner
        xxi. Five sixteenth inch nut runner
        xxii. Nut runner
        xxiii. Anchor
        xxiv. Plug
        xxv. Fastener
        xxvi. Self- drilling
        xxvii. Expanding anchor
        xxviii. Twist bolt
        xxix. Tapcon—concrete anchor
        xxx. Adhesive bonded anchor
        xxxi. SDS
        xxxii. Hammer drill
        xxxiii. Drill motor
        xxxiv. Screw gun
        xxxv. Counter sink
    b. Discuss the different drill bit types and their uses
        i. HSS
        ii. Cobalt
        iii. Reduced shank

iv. Jobber
v. Aircraft
vi. SDS
vii. Masonry
viii. Wood
ix. Carbide
x. Step drill
xi. Countersink
xii. Auger bit
xiii. Glass and tile
xiv. Diamond
xv. Spear point

c. Bits: High speed versus twist
i. High speed
1. Tip angle
2. Flute angle
3. Durable
4. Performance

1. Twist
a. Versatile
b. Common
c. Economical
2. Miscellaneous
a. Masonry
b. Auger
c. Glass

1. Explain the types of taps and proper drill sizes associated with each
a. Straight flute taps
b. Pipe taps
c. Machine taps
d. Spiral flute tap
e. Extended shank taps
f. Taps and drill sizes
i. 8-32 number 29
ii. 8-36 number 2?
iii. 10-24 number 25
iv. 10-32 number 21
v. 12-24 number 17
vi. One fourth -20 number 7
vii. Five sixteenths- 18 F or seventeen sixty-fourths
viii. Five sixteenths -24 I
ix. Three eighths -16 Five sixteenths
x. Three eighths -24 Q or five sixteenths

1. Anchors: application and anchor joints
a. Different types
i. Concrete anchors
ii. Plugs, hollow wall—toggles
iii. Self-drilling
iv. Mechanically expanded
v. Manually expanded
vi. Adhesively bonded

1. Different uses
a. Concrete
b. Dry wall
c. Aluminum
d. Steel
e. Wood
2. Performance issues/advantages and disadvantages

   a. Concrete
   b. Hollow wall
   c. Self drill
   d. Mechanical drill
   e. Adhesive
3. Anchor point types
   a. Steel
   b. Wood
   c. Brick
   d. Aluminum

1. Drilling and tapping
   a. Hand and power tools
      i. Hand tools
         1. Tape measure
         2. Marker
         3. Square
         4. Screw driver
            a. Number 2
            b. Number 3
         5. Tap wrench
      ii. Power tools
         1. Drill motor
         2. Screw gun
         3. Chop saw
      iii. Accessories
         1. Drill bits
         2. Taps
         3. Counter sinkers
         4. Chuck key

1. Hole lay-out
   a. Hole number
      i. Specifications
      ii. Drawings
   b. Space evenly
2. Drill bit size and shank diameter
   a. Secure attachment
   b. Proper thread depth
3. Bit attachment
   a. Even pressure/drill motor to bit
   b. Chuck hole tightening
      i. Rotational walking
      ii. Even pressure
4. Hole drilling
   a. Pressure
      i. Moderate
      ii. Positioning
   b. Bore
      i. Accuracy
      ii. Perpendicular to substrate
5. Counter- sink
   a. Technique
      i. Alignment
      ii. Depth
   b. Size
      i. Match to fastening head
      ii. Square to surface
   c. Flush mounting
   d. Pressure
6. Tapping

a. Size
b. Screw thread
c. Hand/mechanical
d. Lubrication
    i. Cutting oil
e. Viscosity

Religious Accommodation

Before reviewing the course schedule, students should carefully review the following religious accommodation policy and other required instructional policies:

Religious Accommodation:

Students seeking an accommodation for absences permitted under Ohio's Testing Your Faith Act must provide the instructor with written notice of the specific dates for which the student requires an accommodation and must do so not later than fourteen (14) days after the first day of instruction. Please submit requests for accommodations at this link: https://portal2.tri-c.edu/ReligiousAccommodation/ Religious Accommodation Form. Students with questions about their religious accommodations under Ohio's Testing Your Faith Act may contact the College's Office of General Counsel and Legal Services by phone at 216.987.4856 or via email at legal@tri-c.edu.

Other Required Instructional Policies:

https://www.tri-c.edu/student-resources/curriculum/documents/syllabus-part-b.pdf

Weekly Schedule

	Topics
Week 1	Overview of drill bit types (HSS, cobalt, carbide, step bits, pilot points)
Week 2	Bit geometry: points, flutes, coatings, and cutting angles
Week 3	RPM/feed-rate selection by material (steel, aluminum, masonry, composite
Week 4	Lubrication and heat management
Week 5	Hand tapping vs. power tapping: proper alignment and lubrication
Week 6	Types of taps (taper, plug, bottoming) and dies
Week 7	Thread pitch, thread repair, and extraction
Week 8	Avoiding cross-threading and breakage
Week 9	Overview of fasteners used in glazing: self-tapping, machine screws, structural fasteners
Week 10	Anchors: sleeve, drop-in, wedge, Tapcon, toggle, hollow-wall anchors
Week 11	Load considerations: shear vs. tension, edge distances, embedment depth
Week 12	Corrosion considerations and environment-based selection
Week 13	Common drilling/tapping/fastening failures and root causes
Week 14	Identifying incorrect tool selection, improper torque, and substrate mismatch
Week 15	Troubleshooting real-world examples (stripped threads, cracked material, loose anchors)
Week 16	Course Review and Final Practical Exam

The Course Schedule is subject to change due to pedagogical needs, instructor discretion, parts of term, and unexpected events.

Required/Recommended Readings

Instructor-provided materials

Additional Resources for the Instructor

www.globalspec.com/learnmore/manufacturing_process_equipment/industrialassembly/driverits (https://catalog.tri-c.eduwww.globalspec.com/learnmore/manufacturing_process_equipment/industrialassembly/driverits/)

www.kmstools.com/blog/hand-taps-prope-tapping-techniques (https://catalog.tri-c.eduwww.kmstools.com/blog/hand-taps-prope-tapping-techniques/)

Thomasnet.com (https://catalog.tri-c.eduThomasnet.com)

uni.edu/rao/md-06%20fasteners (https://catalog.tri-c.eduuni.edu/rao/md-06%20fasteners/)

Top of page
Key: 352