

# ATGL-1350: DRILL BITS, TAPS, AND FASTENERS

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## Cuyahoga Community College

**Viewing: ATGL-1350 : Drill Bits, Taps, and Fasteners**

**Board of Trustees:**

March 2020

**Academic Term:**

Spring 2020

**Subject Code**

ATGL - Appld Indus Tech - Glazing

**Course Number:**

1350

**Title:**

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 eighths, 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

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**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.
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**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**
    - ii. **Twist**
      - 1. **Versatile**
      - 2. **Common**
      - 3. **Economical**
    - iii. **Miscellaneous**
      - 1. **Masonry**
      - 2. **Auger**
      - 3. **Glass**
  - d. **Explain the types of taps and proper drill sizes associated with each**
    - i. **Straight flute taps**
    - ii. **Pipe taps**
    - iii. **Machine taps**
    - iv. **Spiral flute tap**
    - v. **Extended shank taps**
    - vi. **Taps and drill sizes**
      - 1. **8-32 number 29**
      - 2. **8-36 number 2?**
      - 3. **10-24 number 25**
      - 4. **10-32 number 21**
      - 5. **12-24 number 17**
      - 6. **One fourth -20 number 7**
      - 7. **Five sixteenths- 18 F or seventeen sixty-fourths**
      - 8. **Five sixteenths -24 I**
      - 9. **Three eighths -16 Five sixteenths**
      - 10. **Three eighths -24 Q or five sixteenths**
  - e. **Anchors: application and anchor joints**
    - i. **Different types**
      - 1. **Concrete anchors**
      - 2. **Plugs, hollow wall—toggles**
      - 3. **Self-drilling**
      - 4. **Mechanically expanded**
      - 5. **Manually expanded**
      - 6. **Adhesively bonded**
    - ii. **Different uses**
      - 1. **Concrete**
      - 2. **Dry wall**
      - 3. **Aluminum**
      - 4. **Steel**
      - 5. **Wood**
    - iii. **Performance issues/advantages and disadvantages**
      - 1. **Concrete**
      - 2. **Hollow wall**
      - 3. **Self drill**
      - 4. **Mechanical drill**
      - 5. **Adhesive**
    - iv. **Anchor point types**
      - 1. **Steel**
      - 2. **Wood**
      - 3. **Brick**
      - 4. **Aluminum**
2. **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**
- b. **Hole lay-out**
  - i. **Hole number**
    - 1. **Specifications**
    - 2. **Drawings**
  - ii. **Space evenly**
- c. **Drill bit size and shank diameter**
  - i. **Secure attachment**
  - ii. **Proper thread depth**
- d. **Bit attachment**
  - i. **Even pressure/drill motor to bit**
  - ii. **Chuck hole tightening**
    - 1. **Rotational walking**
    - 2. **Even pressure**
- e. **Hole drilling**
  - i. **Pressure**
    - 1. **Moderate**
    - 2. **Positioning**
  - ii. **Bore**
    - 1. **Accuracy**
    - 2. **Perpendicular to substrate**
- f. **Counter- sink**
  - i. **Technique**
    - 1. **Alignment**
    - 2. **Depth**
  - ii. **Size**
    - 1. **Match to fastening head**
    - 2. **Square to surface**
  - iii. **Flush mounting**
  - iv. **Pressure**
- g. **Tapping**
  - i. **Size**
  - ii. **Screw thread**
  - iii. **Hand/mechanical**
  - iv. **Lubrication**
    - 1. **Cutting oil**
  - v. **Viscosity**