AQUA Drills EX Oil Hole Micro Coolant Thru Drills
Ø 1.0 - Ø 3.0 Diameter Range
Available in 10D - 15D - 20D Lengths
Drills designed for high efficiency drilling of small diameter deep holes

- Oil-Hole Drills for high efficiency Drilling of small diameter deep holes
- Stable Drilling of small diameter holes with new cutting edge geometry and large Oil Holes more efficient chip evacuation
- Suitable for wide work materials like Carbon Steels, Alloy Steels and Stainless Steels
- Multi-layered Aqua Ex Coating (TiALN+TiAlCr) plus anti-adhesive coating film for added lubrication

Stable & High Efficiency Drilling of small Diameter Holes with AQDEXOH Micro Coolant Thru Drills

- New Oil Hole Design delivers coolant directly to the cutting edges
- New Cutting edge geometry breaks chips effectively
- Extremely smooth Aqua EX coating evacuates chips smoothly

Smooth Drill Flute Surface

Stable Drilling of Deep Holes

Cutting Force Comparison

<table>
<thead>
<tr>
<th>Tool Ø</th>
<th>Cutting Speed</th>
<th>Coolant Type</th>
<th>Hole Depth</th>
<th>Step Feed Interval</th>
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<tbody>
<tr>
<td>AQDEXOH20D</td>
<td>0.18 150 SFM (45/min)</td>
<td>Water Soluble - Coolant Thru</td>
<td>38.1 mm (1.5&quot;) (20D) Blind Hole</td>
<td>0.17&quot; (0.45 mm) / 0.25D</td>
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</table>

Long Tool Life

Cutting Condition

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<tr>
<th>Tool Ø</th>
<th>Cutting Speed</th>
<th>Feed</th>
<th>Hole Depth</th>
<th>Step Feed Interval</th>
<th>Coolant Type</th>
<th>Guide Hole</th>
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<tbody>
<tr>
<td>AQDEXOH20D</td>
<td>0.2 150 SFM (45/min)</td>
<td>0.003 IPR (310mm/min)</td>
<td>38.1 mm (1.5&quot;) (20D) Blind Hole</td>
<td>0.17&quot; (0.45 mm) / 0.25D</td>
<td>Water Soluble - Coolant Thru</td>
<td>AQDEXOHPLT2015 for 2.0 mm hole</td>
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### AQDEXOH10D

**LIST 9612**

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### AQDEXOH15D

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Aqua Drills EX Oil Hole Pilot

**AQDEXOHPLT**

**Precision Guide Hole Drills for Aqua Micro Coolant Thru Drills**

- Coolant Thru guide hole drills for Micro long drills
- Provides high precision holes improving tool life of deep hole drills

Applicable Work Materials: 10D - 15D - 20D - Pilot Drills

| Structural Steels | Carbon Steels | Pre-Hardened Steels | Alloy Steels | Hardened Steels | Mold Steels | Hardened Steels | Stainless Steels | Titanium Alloys | Nickel Alloys | Cast Irons | Aluminum Alloys | Copper Alloys |
|------------------|--------------|---------------------|--------------|----------------|------------|----------------|-----------------|----------------|--------------|------------|-------------|---------------|--------------|
| SS400            | S45C/S50C    | SCR/NAK             | 30~40HRC     | 40~50HRC       | 50~65HRC   | SUS304/SUS316 | SUS420          | FCD/FC         | AC/ADC       | Cu         |              |               |              |

Great | Good
Drills Designed for high efficiency drilling of small diameter deep holes

AQDEXOH

10D 15D 20D PLT

AQDEXOH 10D, 15D, 20D - Standard Drilling Conditions

LIST 9612 AQDEXOH10D / LIST AQDEXOH15D / LIST 9616 AQDEXOH20D

<table>
<thead>
<tr>
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<td>115-150 SFM</td>
<td>65-80 SFM</td>
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<td>80-100 SFM</td>
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<td>Metric/Decimal</td>
<td>RPM</td>
<td>Feed (IPR)</td>
<td>RPM</td>
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</tr>
</tbody>
</table>

Note:
1) Guide hole is required. It is recommended to use AQDEXOHPLT (Guide hole). Hole Depth (1D-2D).
2) It is recommended to use Guide hole drill 0.015mm larger in diameter than deep-hole drill.
3) Utilize the standard drilling conditions shown in catalogs just as general guide, when starting operation.
4) Adjust drilling conditions when unusual vibration or unusual sound occurs when cutting.
5) The above table is for water-soluble cutting fluid. If using non-water soluble cutting fluid, reduce feeds & speeds by 30%.
6) Min. Coolant pressure requirement = 300 psi or 2.0 Mpa.
7) To prevent coolant holes from being blocked use a fine mesh filter. (Recommended filtration efficiency 5µm).
8) Use Step Feed drilling cycle for hole depth over 10D. (Step Feed interval = 0.1D-0.5D).
9) When drilling Stainless Steel always use Step Feed Drilling Cycle.
Drills Designed for high efficiency drilling of small diameter deep holes

**Tip Geometry**

- Oil Hole Dia.: 0.22
  - AQDEXOH20D
- Oil Hole Dia.: 0.15
  - Competitor

**Surface condition**

Smooth coating surface for outstanding chip evacuation

**Coolant delivery**

3 times more

- AQUA EX Oil Hole Long Drill Small Dia.
- Competitor

**Optimized web geometry and balanced design = rigidity, excellent chip evacuation and optimum performance**

**Comparison Cutting Resistance**

**Stable Cutting Resistance**

- AQDEXOH
  - Dia.: φ1.3
  - Speed: 40m/min
  - Feed: 245mm/min (0.025mm/rev)
  - Material: S50C (180HB)

**Large Deviation**

- Competitor
  - Coolant: Water-soluble (Coolant fed)
  - Depth of hole: 26mm (20D) Blind
  - Pocking: 0.325mm (0.25D)
  - Pilot hole: AQDEXOHPLT depth1.3mm
  - Competitor's pilot hole drill depth1.3mm
Drills Designed for high efficiency drilling of small diameter deep holes

AQDEXOH 10D 15D 20D PLT

Small Diameter Deep Hole Drill Cutting Conditions:

1. Use Guide Hole Drill (AQDEXOHPLT)
   - AQDEXOHPLT
   - Drilling at Angles
   - AQDEXZ
   - AQDEXOHPLT
   - We recommend pre-drilling with guide hole drill. Hole depth 1D - 2D
   - We recommend using AQEXOHPLT for guide hole drilling. Select one with a diameter 0.015mm larger than deep hole drill
   - If drilling at an angle use Aqua EX flat drill (AQDEXZ) to create a flat surface and then use Pilot Drill

2. Deep Hole Drilling into guide Hole
   - Penetrate into the guide hole at 50% lower RPM until 0.5-1.0mm (0.02"-0.04") from depth of guide

3. Deep Hole Drilling
   - Start Drilling at recommended feeds & Speeds

4. Thru Hole - Breaking Thru
   - When breaking thru for a thru hole reduce feed rate by 50% to prevent drill from breaking
   - Normal feed
   - Reduce Feed rate by 50%

5. Retracting Drill from the Hole
   - After drilling is complete, decrease RPM and pull the drill back through the hole
   - About RPM = 500, Feed = 2000 mm/min (IPR=0.157 IPM=79)

Precautions for Small Diameter Drills

1. Handling of Cutting Fluid
   - To prevent Coolant holes from being blocked use a fine mesh filter. (Recommended Filtration efficiency 5μm)
   - Water Soluble cutting fluid is recommended

2. Min. Coolant pressure requirement
   - Min. Coolant pressure requirement = 300 psi or 2.0 Mpa
   - Above recommended pressure will enable stable machining
   - If using non-water soluble cutting oils, higher pressure might be required

   Min. Coolant Pressure = 300 psi or 2.0 MPa

3. ATC
   - To reduce shock and vibration reduce ATC feed if required
The Ultimate High Performance Carbide Drill

✓ Ideally suited for flat bottom applications in the oil and gas, automotive and general industries.

✓ One drill does it all - Eliminates the need to use a “center drill” or “end mill” on inclined or curved surfaces.
✓ True 180° flat cutting edges creates minimal exit burr in tubing & thin plates.
✓ “Double Margin” for stable and precision drilling.

AQUA Drill EX Flat
#1 Selling Flat Bottom Drill

ONE STEP DRILLING
with MINIMAL BURR

AQDEXZLS
Extended Length up to 10D Reach

AQDEXZOHS5D
Coolant Thru 5D Flat Drill

AQDEXZR
Non-Coolant Thru Jobber Length Drill

AQDEXZOHS3D
Coolant Thru 3D Flat Drill

AQDEXZ
Non-Coolant Thru Stub Length Drill

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