ALLIED MACHINE & ENGINEERING | WOHLHAUPTER®

Holemaking Solutions for Today's Manufacturing

Drilling

Reaming

Burnishing

Threading

Specials

# Wohlhaupter®

## ▶ *BORING*

Combi-Line Rough and Finish Boring Tools

WOHLHAUPTER®

SECTION

# B10-C

Combi-Line Rough and Finish Boring

# Wohlhaupter® Rough and Finish Boring

Combi-Line

- Diameter Range: 24.50 mm - 201.00 mm

## One tool. Two operations.

The Wohlhaupter Combi-Line combines both rough and finish boring into one operation. The front insert holder is the roughing cutting edge while the shorter holder finishes the hole, saving you time and money.

### Applicable Industries

Aerospace | Agriculture | Automotive | Firearms | General Machining | Oil & Gas | Renewable Energy

Your safety and the safety of others is very important. This catalogue contains important safety messages. Always read and follow all safety precautions.

This triangle is a safety hazard symbol. It alerts you to potential safety hazards that can cause tool failure and serious injury.

When you see this symbol in the catalogue, look for a related safety message that may be near this triangle or referred to in the nearby text.

There are safety signal words also used in the catalogue. Safety messages follow these words.

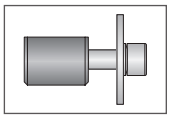
**WARNING** (shown above) means that failure to follow the precautions in this message could result in tool failure and serious injury.

**NOTICE** means that failure to follow the precautions in this message could result in damage to the tool or machine but not result in personal injury.

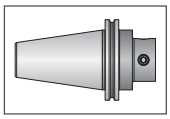
**NOTE** and **IMPORTANT** are also used. These are important that you read and follow but are not safety-related.

**Visit www.alliedmachine.com for the most up-to-date information and procedures.**

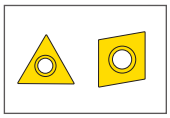
**Reference Icons**
The following icons will appear throughout the catalogue to help you navigate between products.



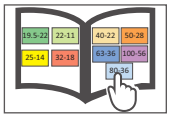
**Clamping Elements**
For use with insert holders and boring heads



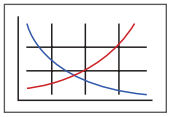
**Shanks**
A variety of shanks for different machines



**Inserts**
For use with insert holder boring heads and boring bars using indexable inserts




**MVS Connection Colour Guide**
Detailed instructions and information regarding the MVS connection(s)



**Recommended Cutting Data**
Speed and feed recommendations for optimum and safe boring

**Through Coolant Option**
Indicates that the product is through coolant

# Combi-Line Rough and Finish Boring Table of Contents

## Combi-Line Introduction



| Series | Diameter Range Metric (mm) |
|---|---|
| **Combi-Line 401** | 24.50 - 201.00 |

# Combi-Line Product Overview

## Combi-Line
## ROUGH & FINISH BORING

### Two Operations. One Tool.

Decrease cycle time and tool changes with the Wohlhaupter Combi-Line. The Combi-Line combines rough and finish boring into one tool with height displaced insert holders.

Reduce your ***cycle time*** with the Combi-Line.

- Diameter range:  24.50 mm - 201.00 mm.
- Reduce cycle and tool changing time.
- Available in semi-standard same level or height displaced insert holders.
- Through coolant.
- 0.002 mm vernier adjustment on finishing insert holder.
- Max spindle speed: 1524 m/min.


**IMPORTANT:** Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
*email:* **engineering.eu@alliedmachine.com**

## Cycle time is crucial. Why not choose the best process?

**Application**: Ductile Cast Iron

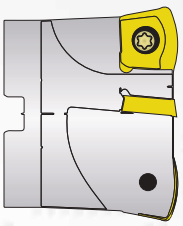
**Finish Diameter**: 50 mm (+/- 0.013 mm)

**Pre-Hole Diameter**: 45 mm

**Boring Depth**: 209 mm

**Hole Finish**: 0.8 Ra

| Measure | 1st Process Option | |
|---|---|---|
| | Step 1 Rough 49 mm<br>Competitor 1.5" High Feed Milling Tool | Step 2 Finish 50 mm<br>Wohlhaupter 310 Boring Head |
| Speed | 2500 RPM | 1165 PRM |
| Feed Rate | 3886.2 mm/min | 11.8 mm/min |
| Total Passes | 77 | 1 |
| Cycle Time (per hole) | 1.93 min | 1.77 min |
| Tool Change Time | 15 sec | |
| Cycle Time (per part) | **3 min 54 sec** | |



1.5" High Feed Milling Tool

Wohlhaupter 310 Boring Head

| Measure | 2nd Process Option | |
|---|---|---|
| | Step 1 Rough 49 mm<br>Wohlhaupter Twin Cutter at 49 mm Ø | Step 2 Finish 50 mm<br>Wohlhaupter 310 Boring Head |
| Speed | 990 RPM | 1165 PRM |
| Feed Rate | 301.88 mm/min | 11.8 mm/min |
| Total Passes | 1 | 1 |
| Cycle Time (per hole) | 0.69 min | 1.77 min |
| Tool Change Time | 15 sec | |
| Cycle Time (per part) | **2 min 46 sec** | |

Wohlhaupter Twin Cutter

Wohlhaupter 310 Boring Head

## OUR ***SOLUTION***

### **Combi-Line** Rough and Finish Boring

| Measure | 3rd Process Option Finish 50 mm<br>Wohlhaupter Combi-Line |
|---|---|
| Speed | 1165 RPM |
| Feed Rate | 11.8 mm/min |
| Total Passes | 1 |
| Cycle Time (per hole) | 1.77 min |
| Tool Change Time | 0 |
| Cycle Time (per part) | **1 min 46 sec** |

60 seconds of
total cycle time saved

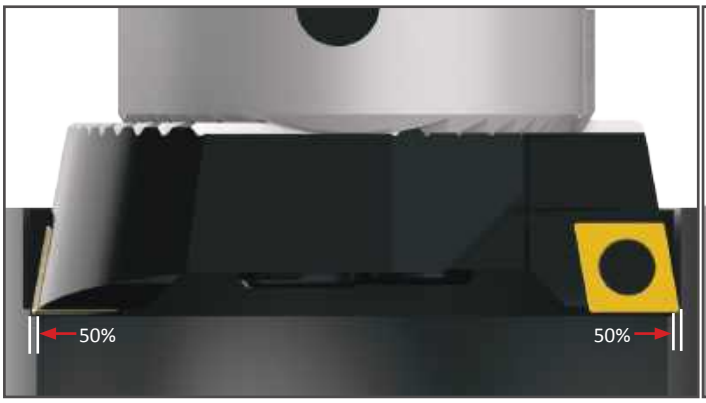
- Combi-Line assembly:
  (1) ***Insert holders (x2): 402021***
  (2) ***Serrated tool body: 404006***
  (3) ***Shank: 353014***

Boring inserts
- ***Item No. 297653WHC19***

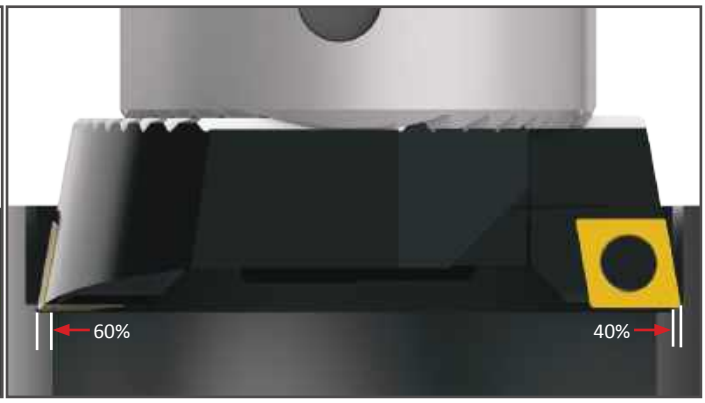
**1 tool vs. 2 tools saves you time and money**

# Material Removal Percentages | Tool Usage

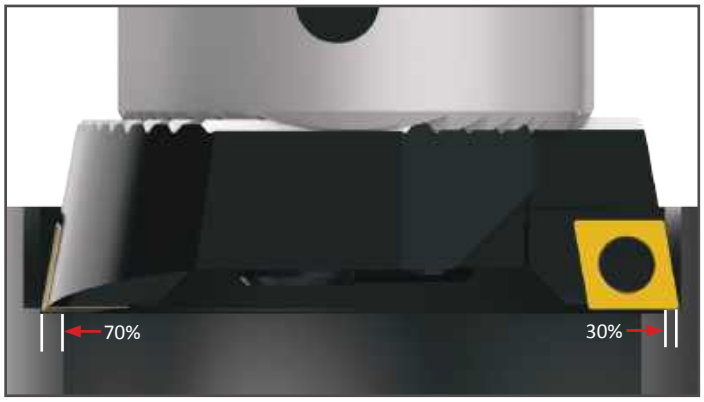
## Material Removal Percentages




Material removal up to 4.00 mm on diameter: **50% roughing 50% finishing**




Material removal up to 4.00 mm - 7.00 mm on diameter: **60% roughing 40% finishing**




Material removal up to 7.00 mm - 10.00 mm on diameter: **70% roughing 30% finishing**

- For tools with a length-to-diameter ratio greater than 4:1, the existing hole diameter should be no more than 4.00 mm smaller than the finish diameter. The 50% roughing and 50% finishing rule should be applied.
- When boring with severe interruptions, the existing hole diameter should be no more than 4.00 mm smaller than the finish diameter. The 50% roughing and 50% finishing rule should be applied.

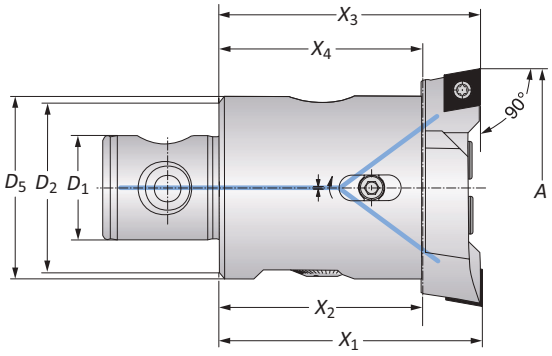
**IMPORTANT:** Consult application engineering for technical support when using Combi-Line tools in holes with interruptions.
*email:* **engineering.eu@alliedmachine.com**

## Tool Usage

- For most applications, the same inserts should be used in both the roughing and finishing insert holders.
- To insure proper chip breaking, the finishing insert holder DOC must be at least 0.50 mm.
- Up to a 4:1 length-to-diameter ratio, standard insert holders with a height displacement of up to 0.30 mm can be used.
- Inserts with wiper geometry are recommended only for special Combi-Line applications.

## Boring Heads and Insert Holders

Diameter Range: 24.50 mm - 201.00 mm


| | Connection | Boring Range | Boring Head | | | | | Weight | Insert Form | Part No. | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | $D_2$ \| $D_1$ | $A$ | $X_1$ | $X_3$ | $X_2$ | $X_4$ | $D_5$ | | | (x2)* Insert Holder** | Boring Head |
| | 22 - 11 | 24.50 - 29.50 | 46.00 | 45.75 | 34.00 | 33.75 | – | 0.10 (kg) | 101 | **402029** | **401003** |
| | 25 - 14 | 29.00 - 37.00 | 56.00 | 55.75 | 41.00 | 40.75 | 26.00 | 0.20 (kg) | 101 | **402009** | **401004** |
| | 25 - 14 | 29.00 - 37.00 | 56.00 | 55.75 | 41.00 | 40.75 | 26.00 | 0.20 (kg) | 103 | **402011** | **401004** |
| | 25 - 14 | 36.00 - 44.00 | 56.00 | 55.75 | 41.00 | 40.75 | 30.00 | 0.30 (kg) | 101 | **402017** | **401005** |
| | 25 - 14 | 36.00 - 44.00 | 56.00 | 55.75 | 41.00 | 40.75 | 30.00 | 0.30 (kg) | 103 | **402019** | **401005** |
| | 32 - 18 | 43.00 - 54.00 | 66.00 | 65.70 | 48.00 | 47.70 | 34.00 | 0.40 (kg) | 103 | **402021** | **401006** |
| Ⓜ | 40 - 22 | 53.00 - 66.00 | 75.00 | 74.70 | 55.00 | 54.70 | – | 0.70 (kg) | 103 | **402005** | **401007** |
| | 50 - 28 | 65.00 - 83.00 | 75.00 | 74.70 | 55.00 | 54.70 | – | 1.10 (kg) | 103 | **402013** | **401008** |
| | 63 - 36 | 82.00 - 103.00 | 90.00 | 89.70 | 70.00 | 69.70 | – | 2.20 (kg) | 103 | **402001** | **401009** |
| | 80 - 36 | 102.00 - 127.00 | 90.00 | 89.70 | 66.00 | 65.70 | 85.00 | 3.00 (kg) | 103 | **402025** | **401010** |
| | 80 - 36 | 127.00 - 152.00 | 90.00 | 89.70 | 66.00 | 65.70 | 85.00 | 3.10 (kg) | 103 | **402026** | **401010** |
| | 80 - 36 | 151.00 - 176.00 | 90.00 | 89.70 | 66.00 | 65.70 | 134.00 | 3.80 (kg) | 103 | **402025** | **401011** |
| | 80 - 36 | 176.00 - 201.00 | 90.00 | 89.70 | 66.00 | 65.70 | 134.00 | 3.90 (kg) | 103 | **402026** | **401011** |

*(2) insert holders are required.
**Insert holders sold individually.

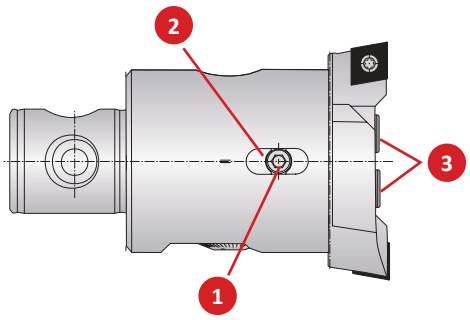
B10-M: 12-13 | B10-C: 6 | B10-F | B10-H | B10: VI-VII
Key on B10-C: 1

Ⓜ = Metric (mm)
Inserts sold separately

**IMPORTANT:** Max spindle speed refers to maximum possible speed for an individual boring head and is not a recommended parameter. Refer to page B10-M: 12 for recommended application-specific parameters. Factory technical assistance is available for your specific applications through our Application Engineering department.
*email:* **engineering.eu@alliedmachine.com**

## Accessories

Screws | Clamping Elements




| Boring Head Part No. | 1. Clamp Screw | | 2. Clamping Piece | 3. Cap Screw | |
|---|---|---|---|---|---|
| | Part No. | Service Key | Part No. | Part No. | Service Key |
| 401003 | **401223** | s2.5 / A | – | **401323** | s3 / B |
| 401004 | **401224** | s2.5 / B | **401204** | **401324** | s4 / B |
| 401005 | **401225** | s2.5 / B | **401205** | **401324** | s4 / B |
| 401006 | **401226** | s3 / B | **401206** | **401324** | s4 / B |
| 401007 | **401227** | s3 / B | **401207** | **401327** | s5 / B |
| 401008 | **115288** | s4 / B | **401208** | **401329** | s6 / B |
| 401009 | **215501** | s4 / B | **401209** | **401329** | s6 / B |
| 401010 | **401230** | s4 / B | **401210** | **019183** | s8 / C |
| 401011 | **401230** | s4 / B | **401210** | **019183** | s8 / C |

B10-M: 12-13
Key on B10-C:1
B10: VI-VII

Ⓜ = Metric (mm)

## Notes

Allied Machine & Engineering

# Guaranteed Test / Demo Application Form

| Distributor PO # | |
|---|---|

**The following must be filled out completely before your test will be considered**

**IMPORTANT:** For processing, send purchase order to your Allied Field Sales Engineer (FSE). Please clearly mark the paperwork as "Test Order."

## Distributor Information

Company Name: _____

Contact: _____

Account Number: _____

Phone: _____

Email: _____

## End User Information

Company Name: _____

Contact: _____

Industry: _____

Phone: _____

Email: _____

## Current Process

List all tooling, coatings, substrates, speeds and feeds, tool life, and any problems you are experiencing

_____

_____

## Test Objective

List what would make this a successful test (i.e. penetration rate, finish, tool life, hole size, etc.)

_____

_____

## Application Information

Hole Diameter: _____ in/mm  Tolerance: _____  Material: _____ (4150, A36, cast iron, etc.)

Pre-existing Diameter: _____ in/mm  Depth of Cut: _____ in/mm  Hardness: _____ (BHN, Rc)

Required Finish: _____ RMS  State: _____ (Casting, hot rolled, forging)

## Machine Information

Machine Type: _____ (Lathe, screw machine, machine center, etc.)  Builder: _____ (Haas, Mori Seiki, etc.)  Model #: _____

Shank Required: _____ (CAT50, Morse taper, etc.)  Power: _____ HP/KW

Rigidity:
- ☐ Excellent
- ☐ Good
- ☐ Poor

Orientation:
- ☐ Vertical
- ☐ Horizontal

Tool Rotating:
- ☐ Yes
- ☐ No

Thrust: _____ lbs/N

## Coolant Information

Coolant Delivery: _____ (Through tool, flood)  Coolant Pressure: _____ PSI / bar

Coolant Type: _____ (Air mist, oil, synthetic, water soluble, etc.)  Coolant Volume: _____ GPM / LPM

## Requested Tooling

| QTY | Item Number |
|---|---|
| | |
| | |
| | |

| QTY | Item Number |
|---|---|
| | |
| | |
| | |

**engineering.eu@alliedmachine.com**

Allied Machine & Engineering Co. (Europe) Ltd
93 Vantage Point, Pensnett Estate,
Kingswinford, DY6 7FR, United Kingdom

**+44 (0)1384 400 900**
**www.alliedmachine.com**

ALLIED MACHINE & ENGINEERING
WOHLHAUPTER®
Holemaking Solutions for Today's Manufacturing

ALLIED MACHINE & ENGINEERING

# Warranty Information

Allied Machine & Engineering ("Allied Machine") warrants to original equipment manufacturers, distributors, industrial and commercial users of its products for one year from the original date of sale that each new product manufactured or supplied by Allied Machine shall be free from defects in material and workmanship.

Allied Machine's sole and exclusive obligation under this warranty is limited to, at its option, without additional charge, replacing or repairing this product or issuing a credit. For this warranty to be applied, the product must be returned freight prepaid to the plant designated by an Allied Machine representative and which, upon inspection, is determined by Allied Machine to be defective in material and workmanship.

Complete information as to operating conditions, machine, setup, and the application of cutting fluid should accompany any product returned for inspection. This warranty shall not apply to any Allied Machine products which have been subjected to misuse, abuse, improper operating conditions, improper machine setup or improper application of cutting fluid or which have been repaired or altered if such repair or alteration, in the judgement of Allied Machine, would adversely affect the performance of the product.

THIS WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Allied Machine shall have no liability or responsibility for any claim, whether in contract, tort or otherwise, for any loss or damage arising out of, connected with, or resulting from the manufacture, sale, delivery or use of any product sold hereunder, in excess of the cost of replacement or repair as provided herein.

Allied Machine shall not be liable in contract or in tort (including, without limitation, negligence, strict liability or otherwise) for economic losses of any kind or for any special, incidental, indirect, consequential, punitive or exemplary damages arising in any way out of the performance of, or failure to perform this agreement.

ALL PRICES, DELIVERIES, DESIGNS, AND MATERIALS ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Allied Machine & Engineering Co. Europe Ltd. is registered to ISO 9001:2015 by bsi.

Allied Machine & Engineering is registered to ISO 9001:2015 by DQS.

Wohlhaupter GmbH is registered to ISO 9001:2015 by QUACERT.

## Europe

**Allied Machine & Engineering Co. (Europe) Ltd.**
93 Vantage Point
Pensnett Estate
Kingswinford
West Midlands
DY6 7FR England

**Phone:**
+44 (0) 1384 400900

**Wohlhaupter® GmbH**
Maybachstrasse 4
Postfach 1264
72636 Frickenhausen
Germany

**Phone:**
+49 (0) 7022 408.0

## United States

**Allied Machine & Engineering**
120 Deeds Drive
Dover OH 44622
United States

**Phone:**
+1.330.343.4283

**Toll Free USA and Canada:**
800.321.5537

**Toll Free USA and Canada:**
800.223.5140

**Allied Machine & Engineering**
485 W Third Street
Dover OH 44622
United States

**Phone:**
+1.330.343.4283

**Toll Free USA and Canada:**
800.321.5537

## Asia

**Wohlhaupter® India Pvt. Ltd.**
B-23, 3rd Floor
B Block Community Centre
Janakpuri, New Delhi - 110058
India

**Phone:**
+91 (0) 11.41827044

Your local Allied Machine representative:

www.alliedmachine.com

Allied Machine & Engineering Co. Europe Ltd. is registered to **ISO 9001:2015** by bsi.

Allied Machine & Engineering is registered to **ISO 9001:2015** by DQS.

Wohlhaupter GmbH is registered to **ISO 9001:2015** by QUACERT.

ALLIED MACHINE & ENGINEERING

WOHLHAUPTER®

Holemaking Solutions for Today's Manufacturing


Available Online Only: B10-C_EU-EN
Publish Date: December 2024