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

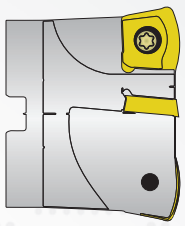
Finish Diameter: 50 mm (+/- 0.013 mm)

Pre-Hole Diameter: 45 mm

Boring Depth: 209 mm

Hole Finish: 0.8 Ra

Measure	1st Process Option	
	Step 1 Rough 49 mm Competitor 1.5" High Feed Milling Tool	Step 2 Finish 50 mm 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 Wohlhaupter Twin Cutter at 49 mm Ø	Step 2 Finish 50 mm 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 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**

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

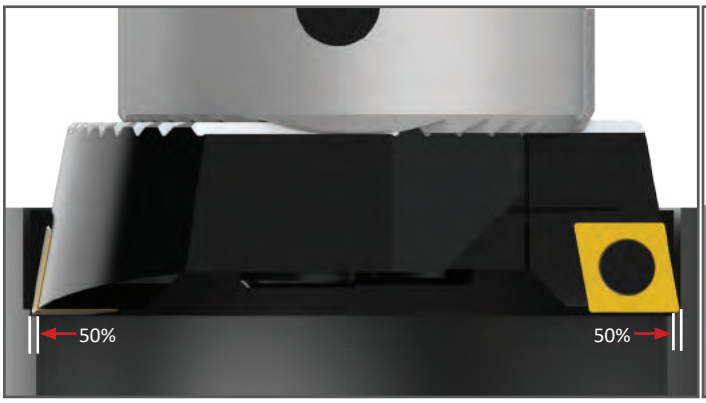
Boring inserts
- ***Item No. 297653WHC19***

60 seconds of
total cycle time saved

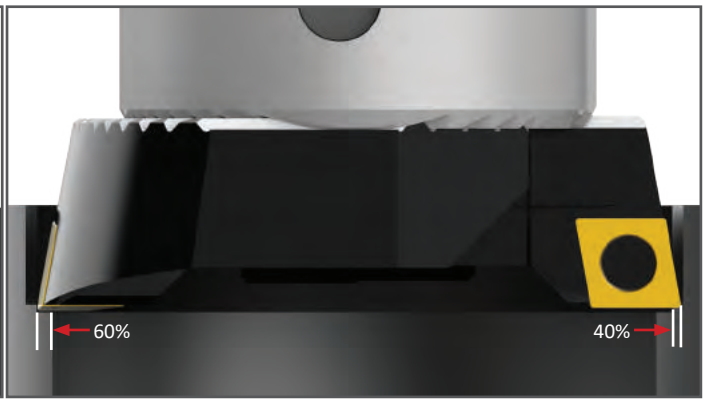
1 tool vs. 2 tools saves you time and money

Material Removal Percentages | Tool Usage | Same-Level Cutting

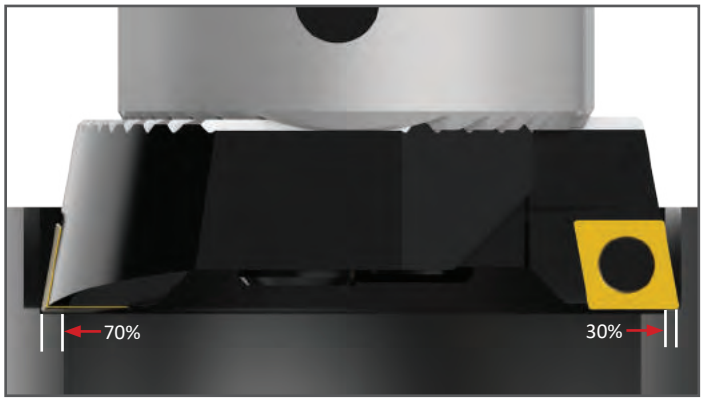
Material Removal Percentages



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.

Same-Level Cutting (0.08 mm Height Displacement)

- With length-to-diameter ratios greater than 4:1, same-level insert holders are recommended to reduce the risk of vibration.
- Same-level cutting inserts will create a 0.08 mm step between the roughing and finishing sides.
- Boring blind holes may require the use of same-level insert holders. (If a true 90° flat bottom is required, a secondary operation to clean up the bottom step may be needed.)
- Combi-Line should be applied as a single-effective cutting tool even when same-level insert holders are used.