

# ***AV ARBOR*** (*Damped Arbor*)

Anti-Vibration Arbor (Damped Arbor)



MOLDINO Tool Engineering, Ltd.

New Product News | No.1225E-4 | 2020-10

# Line Up

## AV Unit

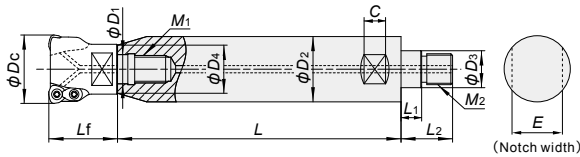


Fig.1 AV Unit for Modular(φ40) type

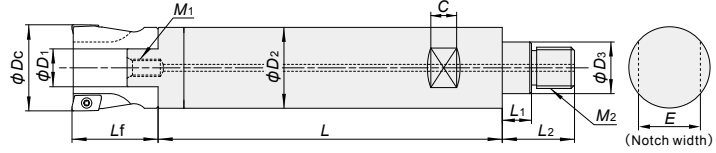


Fig.2 AV Unit for Bore(φ50, φ63) type

Item Code	Stock	Size(mm)														Figure	Arbor body	Weight (kg)
		φDc	φD1	M1	M2	L	L1	L2	Lf	φD2	φD3	φD4	C	E				
D40-17-165-AV	<input type="checkbox"/>	40	17	M16	M18	165	12	30	40	38	21.5	28	12.5	35	Fig.1	BT50-95-38 HSK-A100-95-38	1.6	
D50-22.225-200-AV	<input type="checkbox"/>	50	22.225	M10	M24	200	17	42	50	47	30	-	15	41	Fig.2	BT50-100-47 BT50-150-47 BT50-200-47 HSK-A100-150-47	3.4	
D63-22.225-200-AV	<input type="checkbox"/>	63	22.225	M10	M27	200	23	46	50	60	40	-	20	55	Fig.2	BT50-100-60 BT50-150-60 BT50-240-60 HSK-A100-150-60	5.1	
D50-22-200-AV	<input type="checkbox"/>	50	22	M10	M24	200	17	42	50	47	30	-	15	41	Fig.2	BT50-100-47 BT50-150-47 BT50-200-47 HSK-A100-150-47	3.4	
D63-22-200-AV	<input type="checkbox"/>	63	22	M10	M27	200	23	46	50	60	40	-	20	55	Fig.2	BT50-100-60 BT50-150-60 BT50-240-60 HSK-A100-150-60	5.1	

※Do not disassemble the AV unit. Damping ability may be lost.  
 ※When it will not be used for a long period of time, please store it in an upright position.

## Cutter body list

Item Code	Cutter body	
D40-17-165-AV	ASRM0040-4 ASRTM3040R- ASRM2040R-6	ARM3040R-4 AHUM1040R-6 AHJM40RS
D50-22.225-200-AV	ARB4050R- ASR4050- ASRT4050R- ASRF4050R-	ASR3050R-5 ASR2052R-7*1 AHUB1550R-5
D63-22.225-200-AV	ARB4063R- ARB5063R-3 AR5047R*2 ASR5060- ASR5063-	ASRT5063R-4 ASRF4063R- ASR3063R-6 ASR2066R-8*1 AHUB1563R-6*2

- ※1 ASR2052R-7, ASR5060-, and ASR2066R-8 have different diameters than the applicable tool diameter for each AV unit, but tools can still be mounted.
- ※2 The boss diameters (mounting area diameter) of AHUB1563R-6 and AR5047R are  $\varnothing 47$ , which is smaller than the tube diameter of the  $\varnothing 63$ AV unit. Although this will result in a diameter difference with the bore mounting area, it is recommended that the  $\varnothing 63$ AV unit be used to obtain high damping effect.
- ※3 D50-22-200-AV and D63-22-200-AV are for metric bore bodies.

## Parts

Parts	Arbor screw		Spanner
Shape			
Unit body			
D40-17-165-AV	-	-	SN-35
D50-22.225-200-AV D50-22-200-AV	100-174	100-178	SN-41
D63-22.225-200-AV D63-22-200-AV			SN-55

: Stocked by specified distributor. Contact with our sales department.

## BT50 Arbor

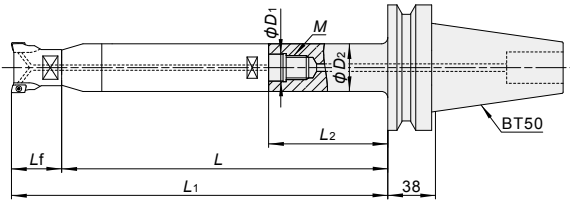


Fig.3 Arbor for Modular(φ40) type

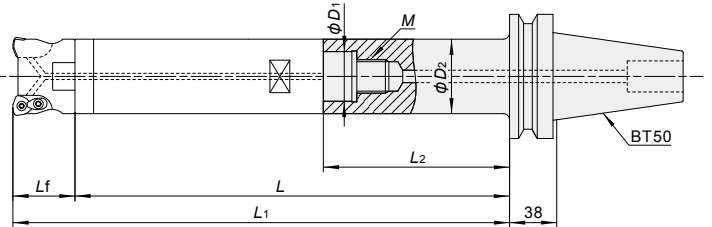


Fig.4 Arbor for Bore(φ50, φ63) type

Item Code	Stock	Size (mm)							Figure	AV Unit body	Weight (kg)
		φD <sub>1</sub>	M	L <sub>1</sub>	L <sub>2</sub>	L	L <sub>f</sub>	φD <sub>2</sub>			
BT50-95-38	<input type="checkbox"/>	21.5	M18	300	95	260	40	38	Fig.3	D40-17-165-AV	4.6
BT50-100-47	<input type="checkbox"/>	30	M24	350	100	300	50	47	Fig.4	D50-22.225-200-AV D50-22-200-AV	4.8
BT50-150-47	<input type="checkbox"/>			400	150	350	50				5.5
BT50-200-47	<input type="checkbox"/>			450	200	400	50				6.1
BT50-100-60	<input type="checkbox"/>	40	M27	350	100	300	50	60	Fig.4	D63-22.225-200-AV D63-22-200-AV	5.5
BT50-150-60	<input type="checkbox"/>			400	150	350	50				6.6
BT50-240-60	<input type="checkbox"/>			490	240	440	50				8.5

## HSK Arbor

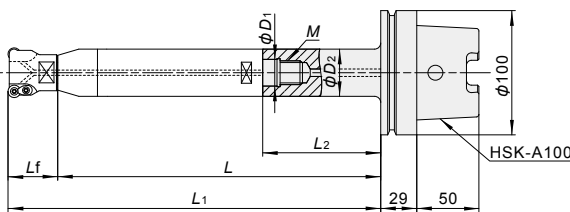


Fig.5 Arbor for Modular(φ40) type

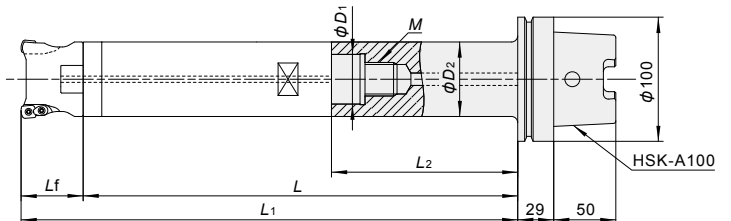


Fig.6 Arbor for Bore(φ50, φ63) type

Item Code	Stock	Size (mm)							Figure	AV Unit body	Weight (kg)
		φD <sub>1</sub>	M	L <sub>1</sub>	L <sub>2</sub>	L	L <sub>f</sub>	φD <sub>2</sub>			
HSK-A100-95-38	<input type="checkbox"/>	21.5	M18	300	95	260	40	38	Fig.5	D40-17-165-AV	3.2
HSK-A100-150-47	<input type="checkbox"/>	30	M24	400	150	350	50	47	Fig.6	D50-22.225-200-AV D50-22-200-AV	4.2
HSK-A100-150-60	<input type="checkbox"/>	40	M27	400	150	350	50	60	Fig.6	D63-22.225-200-AV D63-22-200-AV	5.3

# Recommended Cutting Conditions

※Be sure to use an air blower or coolant when cutting. (to prevent deterioration of internal parts due to generated heat)  
Please check the attached instruction manual for AV Arbor.

Work material	Tool dia. (Applicable AV unit)	φ40 (D40-17-165-AV)		φ50 (D50-22.225-200-AV) (D50-22-200-AV)		
	Cutter body	Round insert cutter High Feed cutter [ AR Type, ASR Type ASRT Type ASRF Type ]	Right angle shoulder cutter [ AHJ Type AHU Type ]	Round insert cutter High Feed cutter [ AR Type, ASR Type ASRT Type, ASRF Type ]		
		Overhang (mm)	300(7.5Dc)	300(7.5Dc)	350(7Dc)	400(8Dc)
Mild Steels (200HB or less)	Vc(m/min)	80~120	70~100	80~120	80~120	80~120
	fz(mm/t)	0.8~1.2	0.06~0.12	0.8~1.2	0.8~1.2	0.8~1.2
	ap(mm)	0.2	1.5	0.5	0.3	0.2
Carbon Steels Alloy Steels (30HRC or less)	Vc(m/min)	80~120	70~100	80~120	80~120	80~120
	fz(mm/t)	0.8~1.2	0.06~0.12	0.8~1.2	0.8~1.2	0.8~1.2
	ap(mm)	0.2	1.5	0.5	0.3	0.2
Carbon Steels Alloy Steels (30~40HRC or less)	Vc(m/min)	70~100	50~80	70~100	70~100	70~100
	fz(mm/t)	0.6~1.0	0.05~0.1	0.6~1.0	0.6~1.0	0.6~1.0
	ap(mm)	0.2	1.5	0.5	0.3	0.2
Stainless Steels SUS	Vc(m/min)	80~120	70~100	80~120	80~120	80~120
	fz(mm/t)	0.6~1.0	0.05~0.1	0.6~1.0	0.6~1.0	0.6~1.0
	ap(mm)	0.2	1.5	0.5	0.3	0.2
Cast Iron FC, FCD	Vc(m/min)	80~120	70~100	80~120	80~120	80~120
	fz(mm/t)	0.8~1.5	0.06~0.12	0.8~1.5	0.8~1.5	0.8~1.5
	ap(mm)	0.2	1.5	0.5	0.3	0.2

- [Note]** ① These conditions are for general guidance, in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.  
 ② The grade shown in each tool's conditions table should be used as a reference for the recommended grades for each tool.  
 ③ Be sure to use this tool with forward rotation (M03). There is a risk of breakage if it is used with reverse rotation (M04).  
 ④ Round insert cutters (AR shape) are recommended for face milling.  
 For die-sinking, use cutters for high-feed machining (ASR shape, ASRT shape, ASRF shape).  
 ⑤ The recommended condition for depth of cut  $a_p$  for round insert cutters and high-feed machining cutters is calculated with the width of cut  $a_e$  being 80% of the tool diameter  $D_c$ .

※Be sure to use this tool with forward rotation (M03). There is a risk of breakage if it is used with reverse rotation (M04).

$\phi 50$ (D50-22.225-200-AV) D50-22-200-AV			$\phi 63$ (D63-22.225-200-AV) D63-22-200-AV					
Right angle shoulder cutter [ AHU Type ]			Round insert cutter High Feed cutter [ AR Type, ASR Type ASRT Type, ASRF Type ]			Right angle shoulder cutter [ AHU Type ]		
350(7Dc)	400(8Dc)	450(9Dc)	350(5.5Dc)	400(6.3Dc)	490(7.7Dc)	350(5.5Dc)	400(6.3Dc)	490(7.7Dc)
70~100	70~100	70~100	80~120	80~120	80~120	70~100	70~100	70~100
0.06~0.12	0.06~0.12	0.06~0.12	0.8~1.2	0.8~1.2	0.8~1.2	0.06~0.12	0.06~0.12	0.06~0.12
1.7	1.1	0.9	0.7	0.5	0.3	3	2.5	1.7
70~100	70~100	70~100	80~120	80~120	80~120	70~100	70~100	70~100
0.06~0.12	0.06~0.12	0.06~0.12	0.8~1.2	0.8~1.2	0.8~1.2	0.06~0.12	0.06~0.12	0.06~0.12
1.7	1.1	0.9	0.7	0.5	0.3	3	2.5	1.7
50~80	50~80	50~80	70~100	70~100	70~100	50~80	50~80	50~80
0.05~0.1	0.05~0.1	0.05~0.1	0.6~1.0	0.6~1.0	0.6~1.0	0.05~0.1	0.05~0.1	0.05~0.1
1.7	1.1	0.9	0.7	0.5	0.3	3	2.5	1.7
70~100	70~100	70~100	80~120	80~120	80~120	70~100	70~100	70~100
0.05~0.1	0.05~0.1	0.05~0.1	0.6~1.0	0.6~1.0	0.6~1.0	0.05~0.1	0.05~0.1	0.05~0.1
1.7	1.1	0.9	0.7	0.5	0.3	3	2.5	1.7
70~100	70~100	70~100	80~120	80~120	80~120	70~100	70~100	70~100
0.06~0.12	0.06~0.12	0.06~0.12	0.8~1.5	0.8~1.5	0.8~1.5	0.06~0.12	0.06~0.12	0.06~0.12
1.7	1.1	0.9	0.7	0.5	0.3	3	2.5	1.7

## ○ Regarding overhaul

Since consumables are used in the internal of this product, the damping effect deteriorates with frequency of use. In order to maintain the damping effect of this product, periodic overhaul is necessary. Under normal usage, overhaul is generally required approximately once per year.

※Do not disassemble the AV unit. Damping ability may be lost.

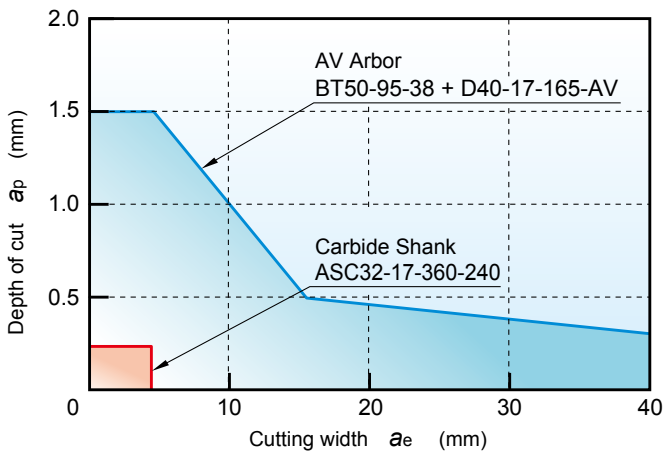
※When it will not be used for a long period of time, please store it in an upright position.

**For details regarding overhaul, please consult your MOLDINO Tool sales office.**

# Cutting performance

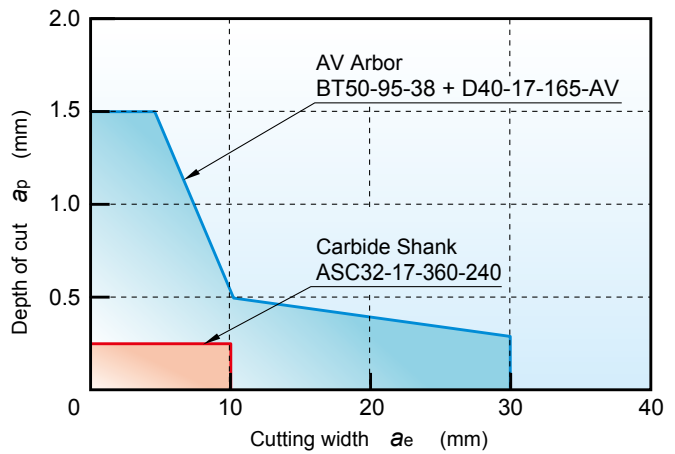
## Comparison of cutting regions for AV arbor and carbide shank when shoulder cutting

φ40 ASRT Type



Tool	ASRTM3040R-4(WDNT09T320)
Cutting Conditions	$V_c = 90 \text{ m/min}$ ( $n = 716 \text{ min}^{-1}$ ) $f_z = 1.0 \text{ mm/t}$ ( $V_f = 2865 \text{ mm/min}$ )
Coolant	Air blow
Work Material	S50C
Machine used	BT50 Machining center
Overhang	300 mm (L/D = 7.5)

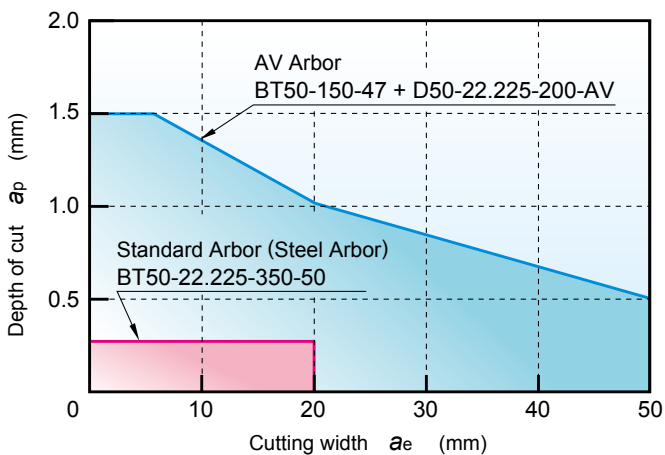
φ40 AHU Type



Tool	AHUM1040R-6(JDMT100308R)
Cutting Conditions	$V_c = 80 \text{ m/min}$ ( $n = 636 \text{ min}^{-1}$ ) $f_z = 0.08 \text{ mm/t}$ ( $V_f = 306 \text{ mm/min}$ )
Coolant	Air blow
Work Material	S50C
Machine used	BT50 Machining center
Overhang	300 mm (L/D = 7.5)

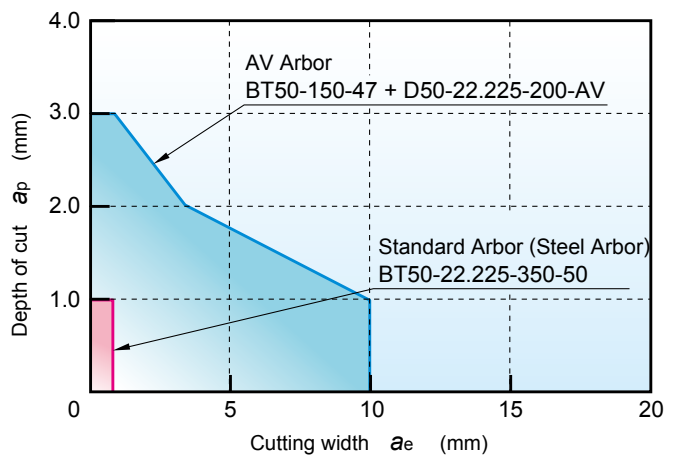
## Comparison of cutting regions for AV arbor and standard arbor (steel arbor) when shoulder cutting

φ50 ASRT Type



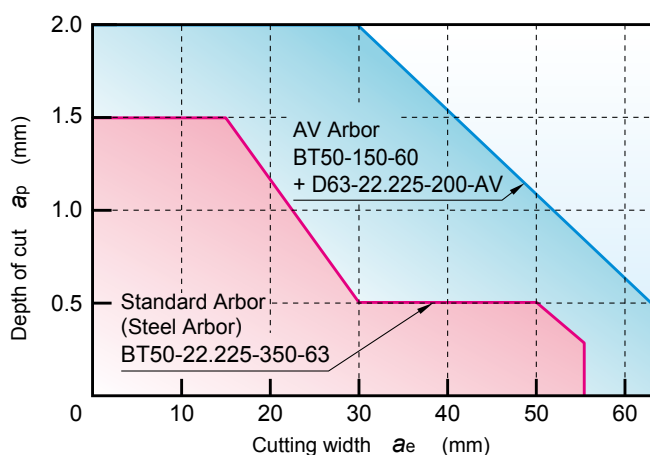
Tool	ASRT4050R-4(WDNT120420)
Cutting Conditions	$V_c = 90 \text{ m/min}$ ( $n = 580 \text{ min}^{-1}$ ) $f_z = 1.0 \text{ mm/t}$ ( $V_f = 2292 \text{ mm/min}$ )
Coolant	Air blow
Work Material	S50C
Machine used	BT50 Machining center
Overhang	400 mm (L/D = 8.0)

φ50 AHU Type



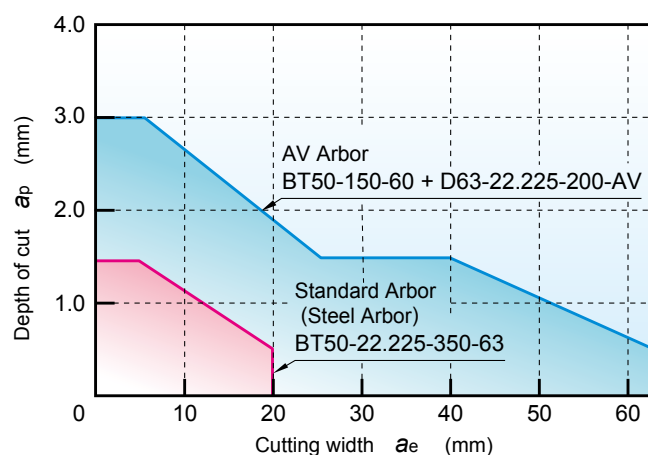
Tool	AHUB1550R-5(JDMT150508R)
Cutting Conditions	$V_c = 80 \text{ m/min}$ ( $n = 509 \text{ min}^{-1}$ ) $f_z = 0.08 \text{ mm/t}$ ( $V_f = 203 \text{ mm/min}$ )
Coolant	Air blow
Work Material	S50C
Machine used	BT50 Machining center
Overhang	400 mm (L/D = 8.0)

### φ63 ASRT Type



Tool	<b>ASRT5063R-4</b> (WDNT140520)
Cutting Conditions	$V_c = 120 \text{ m/min}$ ( $n = 606 \text{ min}^{-1}$ ) $f_z = 1.5 \text{ mm/t}$ ( $V_f = 3638 \text{ mm/min}$ )
Coolant	Air blow
Work Material	S50C
Machine used	BT50 Machining center
Overhang	400 mm (L/D = 6.3)

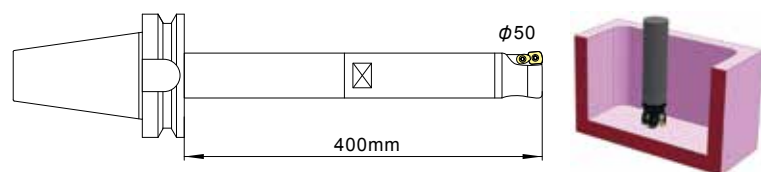
### φ63 AHU Type



Tool	<b>AHUB1563R-6</b> (JDMT150508R)
Cutting Conditions	$V_c = 80 \text{ m/min}$ ( $n = 404 \text{ min}^{-1}$ ) $f_z = 0.08 \text{ mm/t}$ ( $V_f = 194 \text{ mm/min}$ )
Coolant	Air blow
Work Material	S50C
Machine used	BT50 Machining center
Overhang	400 mm (L/D = 6.3)

## Comparison of axial-depth of cut (pocket machining test results)

	$a_p$ Axial cutting depth (mm)				
	0.2	0.3	0.4	0.5	0.6
Standard Arbor (Steel Arbor)	△	×			
AV Arbor	○	○	○	×	



Tool	<b>ASR4050-4</b>
Cutting Conditions	$V_c = 94 \text{ m/min}$ ( $n = 600 \text{ min}^{-1}$ ) $f_z = 1.0 \text{ mm/t}$ ( $V_f = 2400 \text{ mm/min}$ ) $a_e = 30 \text{ mm}$
Work Material	S50C
Overhang	400 mm (L/D = 8.0)

## Field Data

	User	Tools	L/D	Work Material	Cutting Conditions	Result
1	Company A	ASRF4063R-4 D63-22.225-200-AV BT50-150-60	6.4	S50C	$v_c = 118 \text{ m/min}$ , $n = 600 \text{ min}^{-1}$ , $v_f = 3000 \text{ mm/min}$ , $f_z = 1.3 \text{ mm/t}$ , $a_p = 0.5 \text{ mm}$	Electro-discharge machining was used conventionally, but cutting machining is now possible.
2	Company B	ASR4050-4 D50-22.225-200-AV BT50-150-47	8	SNCM Material equivalent to SNCM	$v_c = 102 \text{ m/min}$ , $n = 650 \text{ min}^{-1}$ , $v_f = 1950 \text{ mm/min}$ , $f_z = 0.8 \text{ mm/t}$ , $a_p = 1.0 \text{ mm}$	Stable cutting makes finishing the machined surface unnecessary.
3	Company C	ASR4050-3 D50-22.225-200-AV BT50-150-47	8	SUS420 Material equivalent to SUS420	$v_c = 94 \text{ m/min}$ , $n = 600 \text{ min}^{-1}$ , $v_f = 1800 \text{ mm/min}$ , $f_z = 1.0 \text{ mm/t}$ , $a_p \times a_e = 0.4 \times 30 \text{ mm}$	Compared to a steel arbor, the AV arbor provided stable cutting at 2× the cutting depth and 1.25× the feed rate.
4	Company D	ARB4050R-3 D50-22.225-200-AV BT50-200-47	8	cast steel	$v_c = 120 \text{ m/min}$ , $n = 760 \text{ min}^{-1}$ , $v_f = 910 \text{ mm/min}$ , $f_z = 0.4 \text{ mm/t}$ , $a_p \times a_e = 1.0 \times 35 \text{ mm}$	Stable cutting compared to steel arbor increased efficiency by 57%.



The diagrams and table data are examples of test results, and are not guaranteed values.  
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## Attentions on Safety

### 1. Attentions regarding handling

- (1) When removing the tool from the case (package), be careful not to drop it on your foot or drop it onto the tips of your bare fingers.
- (2) When actually setting the inserts, be careful not to touch the cutting flute directly with your bare hands.

### 2. Attentions regarding mounting

- (1) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (2) If abnormal chattering occurs during use, stop the machine immediately and remove the cause of the chattering.

### 3. Attentions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) The inserts are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be installed and safety equipment such as safety glasses should be worn to create a safe environment for work.
  - Do not use where there is a risk of fire or explosion.
  - Do not use non-water-soluble cutting oils. Such oils may result in fire.
- (4) Do not use the tool for any purpose other than that for which it is intended, and do not modify it.

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