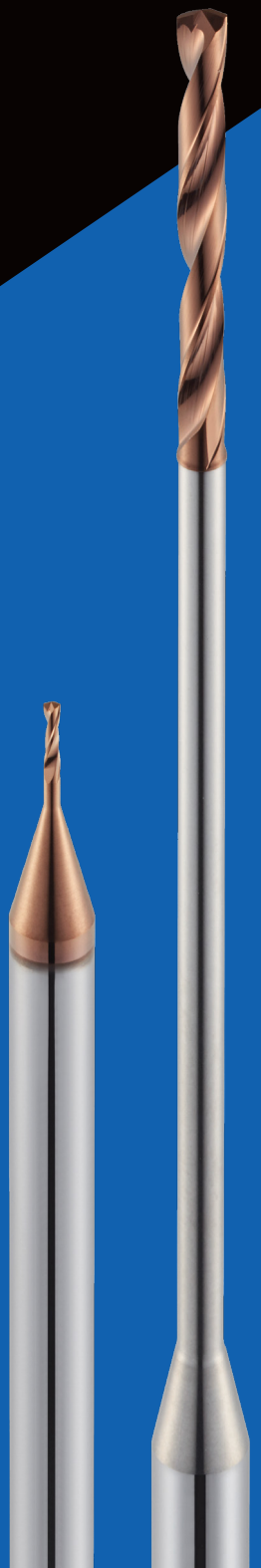
MOLDINO
The Edge To Innovation

Epoch Micro Step Borer Hard Evolution

EMSBHE-ATH

Ultra-deep fine-hole drills for high-hardened steel



MOLDINO Tool Engineering Europe GmbH

EMSBHE-ATH | 2025-06 | Version 1.0 | PDF

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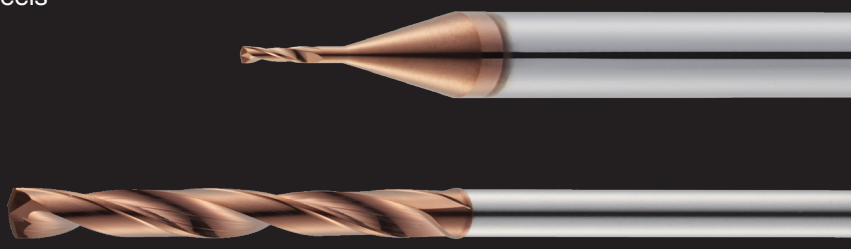
Mirco step borer for deep, high precision drilling of fine holes in high hardness steel.

Features of EMSBHE-ATH

01 Special flute design for high-hardened steels

02 Chip-removal stopper

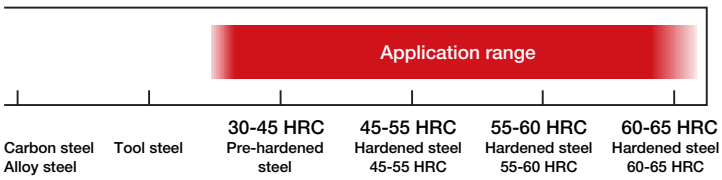
03 ATH coating



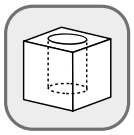
Line-up: 60 items

DC: 0.1-2 mm

Recommended usage

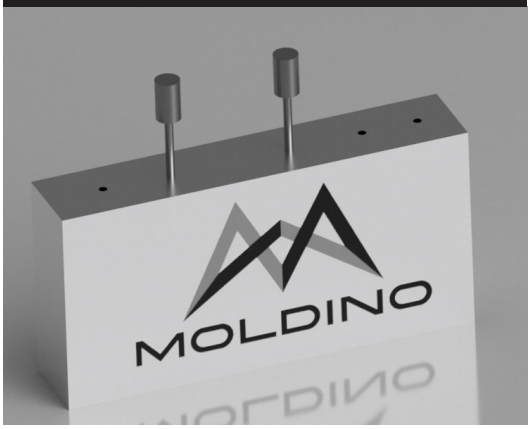


Application



Customer need and product benefit

Example: Ejector Pins



Challenge

Lack of availability and process safety of small-diameter drills for high-hardened steels. Expensive and slow EDM processes.

Solution

Stable micro step drilling process of steels up to 60HRC with EMSBHE-ATH.

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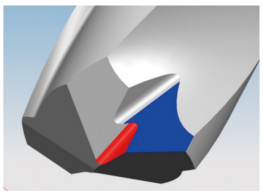
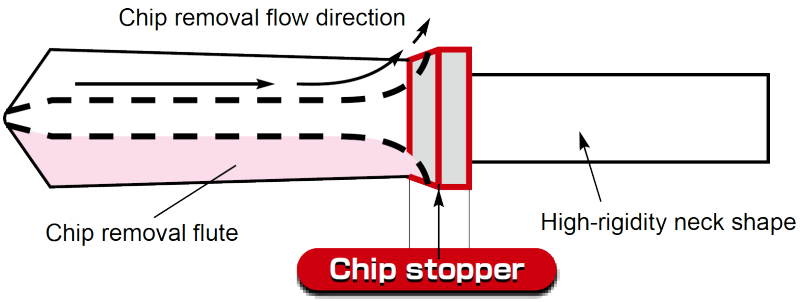
		Errors and alterations excepted	

Feature 01 Special flute design for high-hardened steels



Special flute design for high-hardened steels enables process reliable drilling and chip flow.

Feature 02 Chip-removal stopper



Chip-removal stopper technology and high-rigidity neck shape enables high-accuracy drilling of minute holes.

Feature 03 ATH Coating

Uses proven ATH coating for high hardness steel machining.

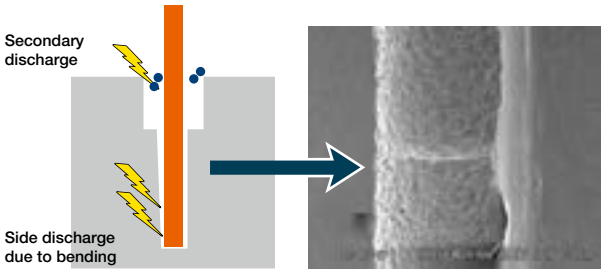
ATHCoating

Production technology comparison

EDM vs. Drilling

Do you have problems with EDM for deep, small-diameter pin holes?

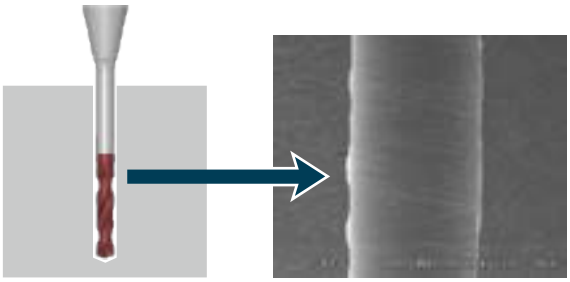
When using small hole EDM on molds



- Requires switching from milling machine to EDM.
- Requires frequent replacement of pipe electrodes.
- Results in lower machining quality due to secondary discharge.
- Results in lower machining efficiency due to side contact of electrodes.

Machine can‘t be left unattended!

Drilling with EMSBHE-ATH



- Eliminates the need to switch from milling machine to EDM.
- Reduces burrs and improves hole accuracy and surface quality.
- Ensures long, consistent tool life and nighttime operation.

Results in significant labor savings and allows unmanned operation.

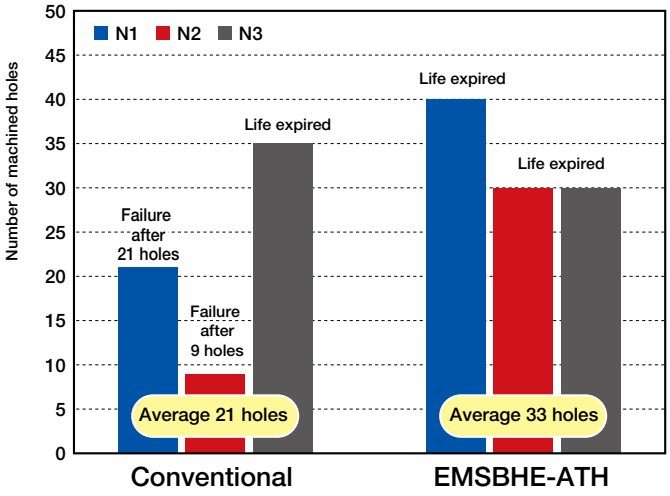
EMSBHE-ATH improvements

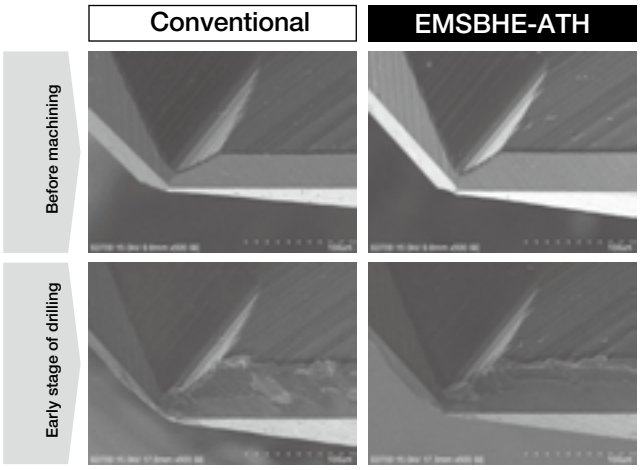
1. **Optimized surface treatment**
   Helps extend and stabilize tool life when machining 60HRC class high hardness steel.

2. **Significantly expanded tool diameter line-up**
   Select the tool diameter to match the wire EDM and reamers to allow adjustment of tolerance for the subsequent process.

EMSBHE-ATH compared to conventional tools

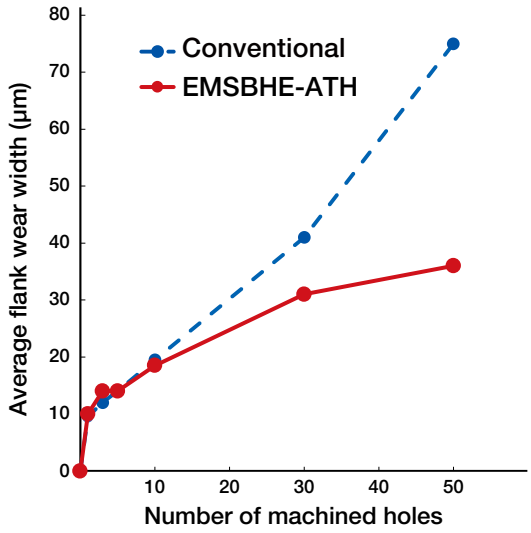
Tool DC: 0.5 mm | Underneck lenght: 15 mm | Machine: MC (HSK-E25) Vertical MC | Work material: SLD (60HRC)
Cutting conditions: n=10,000 min^{-1} | V_c=16 m/min | V_f=50 mm/min | f=0.005 mm/rev | Step feed: 0.05 mm
Coolant: Water-based coolant | Peck drilling cycle: G83

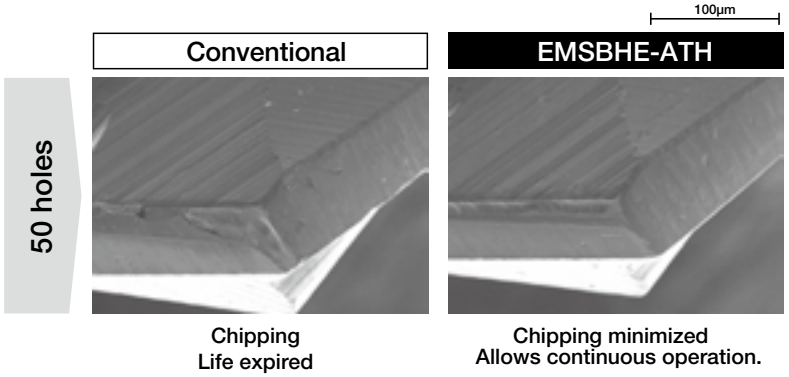




EMSBHE consistently reaches end of life without breakage.
Improved machining stability with 60HRC class high hardness steel.

Tool DC: 0.5 mm | Underneck lenght: 15 mm | Machine: MC (HSK-E25) Vertical MC | Work material: PD613 (58HRC)
Cutting conditions: n=10,000 min^{-1} | V_c=16 m/min | V_f=50 mm/min | f=0.005 mm/rev | Step feed: 0.05 mm
Coolant: Water-based coolant | Peck drilling cycle: G83



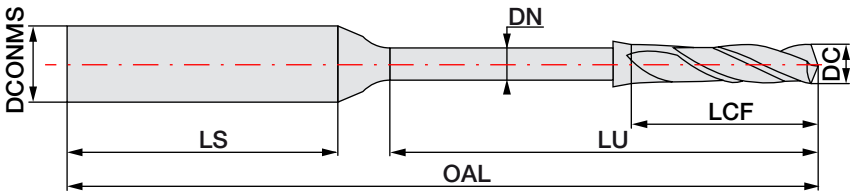


Flank wear reduced to less than half that of conventional tools. Allows continuous cutting—estimated life of at least 100 holes.

EMSBHE-ATH Line-Up

140° | ATH coated | Carbide | h4 | Helix 20° | 60 HRC | NOF 2

P M K
N S H



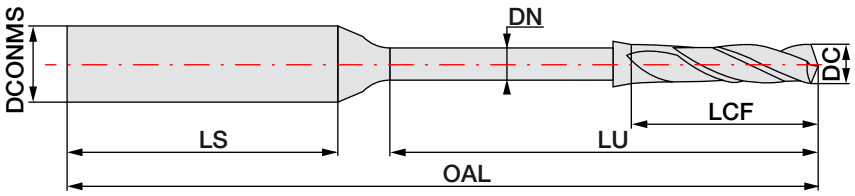
Diameter Tolerance (mm)
+0.001/+0.006

ID Code	Item Code	NOF	Size (mm)						
			DC	LCF	LU	DN	LS	OAL	DCONMS
CD1149	EMSBHE0010-1-ATH	2	0.1	0.518	1.02	0.09	37.2	45.02	3
CD1150	EMSBHE0010-2-ATH	2	0.1	0.518	2.02	0.09	36.2	45.02	3
CD1151	EMSBHE0010-3-ATH	2	0.1	0.518	3.02	0.09	35.2	45.02	3
CD1152	EMSBHE0020-2-ATH	2	0.2	1.036	2.04	0.19	36.4	45.04	3
CD1153	EMSBHE0020-4-ATH	2	0.2	1.036	4.04	0.19	34.4	45.04	3
CD1154	EMSBHE0020-6-ATH	2	0.2	1.036	6.04	0.19	32.4	45.04	3
CD1155	EMSBHE0030-3-ATH	2	0.3	1.555	3.06	0.28	35.7	45.06	3
CD1156	EMSBHE0030-6-ATH	2	0.3	1.555	6.06	0.28	32.7	45.06	3
CD1157	EMSBHE0030-9-ATH	2	0.3	1.555	9.06	0.28	29.7	45.06	3
CD1158	EMSBHE0040-4-ATH	2	0.4	2.073	4.07	0.38	39.9	50.07	3
CD1159	EMSBHE0040-8-ATH	2	0.4	2.073	8.07	0.38	35.9	50.07	3
CD1160	EMSBHE0040-12-ATH	2	0.4	2.073	12.07	0.38	31.9	50.07	3
CD1161	EMSBHE0050-5-ATH	2	0.5	2.591	5.09	0.48	39.1	50.09	3
CD1162	EMSBHE0050-10-ATH	2	0.5	2.591	10.09	0.48	34.1	50.09	3
CD1163	EMSBHE0050-15-ATH	2	0.5	2.591	15.09	0.48	29.1	50.09	3
CD1164	EMSBHE0060-6-ATH	2	0.6	3.109	6.11	0.57	43.3	55.11	3
CD1165	EMSBHE0060-12-ATH	2	0.6	3.109	12.11	0.57	37.3	55.11	3
CD1166	EMSBHE0060-18-ATH	2	0.6	3.109	18.11	0.57	31.3	55.11	3
CD1167	EMSBHE0070-7-ATH	2	0.7	3.627	7.13	0.67	45.2	60.13	4
CD1168	EMSBHE0070-14-ATH	2	0.7	3.627	14.13	0.67	38.2	60.13	4
CD1169	EMSBHE0070-21-ATH	2	0.7	3.627	21.13	0.67	31.2	60.13	4
CD1170	EMSBHE0080-8-ATH	2	0.8	4.146	8.15	0.76	44.4	60.15	4
CD1171	EMSBHE0080-16-ATH	2	0.8	4.146	16.15	0.76	36.4	60.15	4
CD1172	EMSBHE0080-24-ATH	2	0.8	4.146	24.15	0.76	28.4	60.15	4
CD1173	EMSBHE0090-9-ATH	2	0.9	4.664	9.16	0.85	48.6	65.16	4
CD1174	EMSBHE0090-18-ATH	2	0.9	4.664	18.16	0.85	39.6	65.16	4
CD1175	EMSBHE0090-27-ATH	2	0.9	4.664	27.16	0.85	30.6	65.16	4
CD1176	EMSBHE0100-10-ATH	2	1	5.182	10.18	0.95	52.9	70.18	4
CD1177	EMSBHE0100-20-ATH	2	1	5.182	20.18	0.95	42.9	70.18	4
CD1178	EMSBHE0100-30-ATH	2	1	5.182	30.18	0.95	32.9	70.18	4
CD1179	EMSBHE0110-11-ATH	2	1.1	11.2	11.20	-	52.2	70.20	4
CD1180	EMSBHE0110-22-ATH	2	1.1	11.2	22.20	1.06	41.1	70.20	4
CD1181	EMSBHE0110-33-ATH	2	1.1	11.2	33.20	1.06	30.1	70.20	4

EMSBHE-ATH Line-Up

140° | ATH coated | Carbide | h4 | Helix 20° | 60 HRC | NOF 2

P M K
N S H



Diameter Tolerance (mm)
+0.001/+0.006

ID Code	Item Code	NOF	Size (mm)						
			DC	LCF	LU	DN	LS	OAL	DCONMS
CD1182	EMSBHE0120-12-ATH	2	1.2	12.218	12.22	-	51.5	70.22	4
CD1183	EMSBHE0120-24-ATH	2	1.2	12.218	24.22	1.15	39.3	70.22	4
CD1184	EMSBHE0120-36-ATH	2	1.2	12.218	36.22	1.15	57.3	100.22	4
CD1185	EMSBHE0130-13-ATH	2	1.3	13.237	13.24	-	50.7	70.24	4
CD1186	EMSBHE0130-26-ATH	2	1.3	13.237	26.24	1.25	37.6	70.24	4
CD1187	EMSBHE0130-39-ATH	2	1.3	13.237	39.24	1.25	54.6	100.24	4
CD1188	EMSBHE0140-14-ATH	2	1.4	14.255	14.26	-	49.9	70.26	4
CD1189	EMSBHE0140-28-ATH	2	1.4	14.255	28.26	1.34	35.8	70.26	4
CD1190	EMSBHE0140-42-ATH	2	1.4	14.255	42.26	1.34	51.8	100.26	4
CD1191	EMSBHE0150-15-ATH	2	1.5	15.273	15.27	-	49.2	70.27	4
CD1192	EMSBHE0150-30-ATH	2	1.5	15.273	30.27	1.44	34.0	70.27	4
CD1193	EMSBHE0150-45-ATH	2	1.5	15.273	45.27	1.44	49.0	100.27	4
CD1194	EMSBHE0160-16-ATH	2	1.6	16.291	16.29	-	48.4	70.29	4
CD1195	EMSBHE0160-32-ATH	2	1.6	16.291	32.29	1.54	32.3	70.29	4
CD1196	EMSBHE0160-48-ATH	2	1.6	16.291	48.29	1.54	46.3	100.29	4
CD1197	EMSBHE0170-17-ATH	2	1.7	17.309	17.31	-	47.6	70.31	4
CD1198	EMSBHE0170-34-ATH	2	1.7	17.309	34.31	1.63	60.5	100.31	4
CD1199	EMSBHE0170-51-ATH	2	1.7	17.309	51.31	1.63	43.5	100.31	4
CD1200	EMSBHE0180-18-ATH	2	1.8	18.328	18.33	-	46.9	70.33	4
CD1201	EMSBHE0180-36-ATH	2	1.8	18.328	36.33	1.73	58.7	100.33	4
CD1202	EMSBHE0180-54-ATH	2	1.8	18.328	54.33	1.73	40.7	100.33	4
CD1203	EMSBHE0190-19-ATH	2	1.9	19.346	19.35	-	46.1	70.35	4
CD1204	EMSBHE0190-38-ATH	2	1.9	19.346	38.35	1.82	56.9	100.35	4
CD1205	EMSBHE0190-57-ATH	2	1.9	19.346	57.35	1.82	37.9	100.35	4
CD1206	EMSBHE0200-20-ATH	2	2	20.364	20.36	-	45.3	70.36	4
CD1207	EMSBHE0200-40-ATH	2	2	20.364	40.36	1.92	55.2	100.36	4
CD1208	EMSBHE0200-60-ATH	2	2	20.364	60.36	1.92	35.2	100.36	4

Usage Instruction

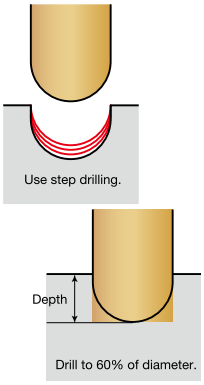
Setting cutting conditions

- Please use EPDBEH-TH3 as a starter for DC=0.1 mm.
- Always perform step drilling using G83 mode (peck drilling cycle).
- Usable length (LU) conforms to through-hole drilling depth.
- When drilling holes, always add 30% of tool diameter to drilling depth (compared to nominal depth of through hole).
  Example: For work thickness T=5mm and tool = DC 0.5x5mm, drilling depth should be 5.15mm (from tip of tool).
- Water-soluble or oil-based coolant should be used to ensure chip removal.

Drilling process and attentions on drilling

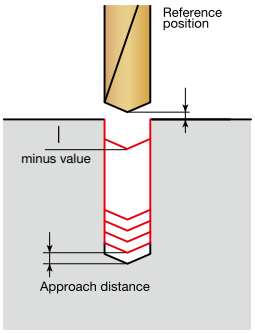
About starter

- Use of EPDBEH-TH3 as starter is recommended
- Perform step drilling for DC 0.1 using a G83 program
- In case of DC>0.1 please use helical (0.5°) milling to create starter hole
- Be sure to machine starter hole to a depth of 60% of tool diameter



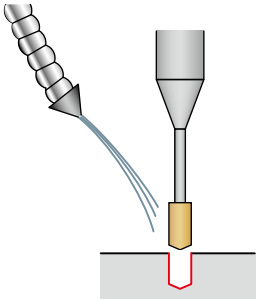
About machining programs

- Always perform drilling using a G83 program (peck drilling cycle)
- Recommended reference positi-on: 0.05 to 0.1 mm
- To remove chips during drilling, retract EMSBHE-ATH repeatedly but stay inside the boring hole (minus value)
- Minus value = tip length + 0.2xDC
- Recommended approach distan-ce: 0.05 mm



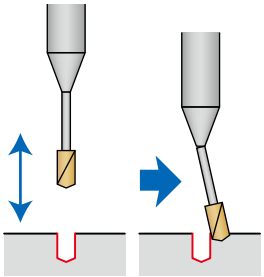
About coolants

- Oil-based or water-soluble coolants are recommended
- When using, set it up so that the coolant hits the flute tip



About fast feed rates

- When the underneck length is long, if the fast feed rate is too fast, bit may be broken
- Recommended: 20m/min or less
- For >30DC, 5m/min or less



Troubleshooting

Phenomenons	Factors	Actions
Breakage	Problems with chip removal	Check the coolant pressure. Ensure to feed coolant to the cutting edge.
		Increase the rotation speed while maintaining feed rate. This increases chip discharge.
		If using an oil-based cutting fluid, change the reference position to 0.2 mm. This will help lifted chips to flow out more smoothly.
Inconsistent tool life	Occurrence of tool runout	Ensure to attach tool with runout accuracy of 0.005 mm or less when chucking. Use clean, undamaged holders and collets to improve tool runout accuracy.

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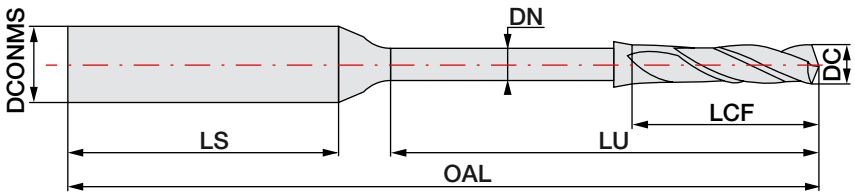
EMSBHE-ATH General technical information

ISO 513 Symbol	Description	Examples
P	Non-alloy steel, low alloy steel, high alloy steel, ferritic/martensitic stainless steel, tool steel	1.2343 / X38CrMoV5-1; 1.2738 / 40CrMnNiMo8; 1.0503 / C45; 1.0570 / ST52-3; 1.1730 / C45W; 1.7131 / 16MnCr5; 1.7225 / 42CrMo4; 1.3343 / HS6-5-2; 1.0511 / C40; 1.2312 / 40CrMnMoS8-6; 1.2311 / 40CrMnMo7; 1.2344 / X40CrMoV5-1; 1.2767 / X45NiCrMo4; 1.2083 / X42Cr13; 1.2085 / X33CrS16; 1.2714 / 55NiCrMoV7; 1.2842 / 90MnCrV8;
M	Austenitic stainless steel	1.4301 / X5CrNi18-9; 1.4401 / X5CrNiMo17-12-2; 1.4404 / X2CrNiMo17-13-2; 1.4828 / X15CrNiSi20 12
K	Grey cast iron (GG), nodular cast iron (GGG), malleable cast iron	0.6025 / GG-25; GGG-40.3; 0.8155 / GTS-55-04
N	Aluminum wrought all, copper alloy, aluminum-cast, alloyed, non-metallic	2.0060 / E-Cu57; 2.0321 / CuZn37; 3.0255 / Al99.5; 3.5103 / MgSE3Zn27r1
S	High temperature alloys, titanium and Ti alloys	1.4864 / X12NiCrSi36 16; 2.4856 / NiCr22Mo9Nb; 1.4977 / X40CoCrNi20 20; 2.4669 / NiCr15Fe7TiAl
H	Hardened steel, chilled cast iron, cast iron	

Recommended: P M K N S H

Suitable: P M K N S H

NOT recommended: P M K N S H



Drawing Nomenclature	
DC	Cutting Diameter
DCONMS	Connection Diameter Machine Side
LF	Functional Length
LU	Usable Length
LS	Shank Length
LCF	Cutting Edge Length
DN	Neck Diameter
OAL	Overall Length

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Attentions on Safety

1. Cautions regarding handling

(1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.

(2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

2. Cautions regarding mounting

(1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.

(2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.

(3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Cautions 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) Cutting tools 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 attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.

(4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.

(5) Do not use the tool for any purpose other than that for which it is intended.

4. Cautions regarding regrinding

(1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.

(2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.

(3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with the local laws and regulations regarding prevention of hazards due to specified chemical substances.

Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification.

The diagrams and table data are examples of test results and are not guaranteed values.

For more details please check our digital tool database

P50 QuickFinder

MOLDINO Tool Engineering Europe GmbH
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EMSBHE-ATH | 2025-02 | Version 1.0 | PDF