

Your technology partner for cost-effective machining

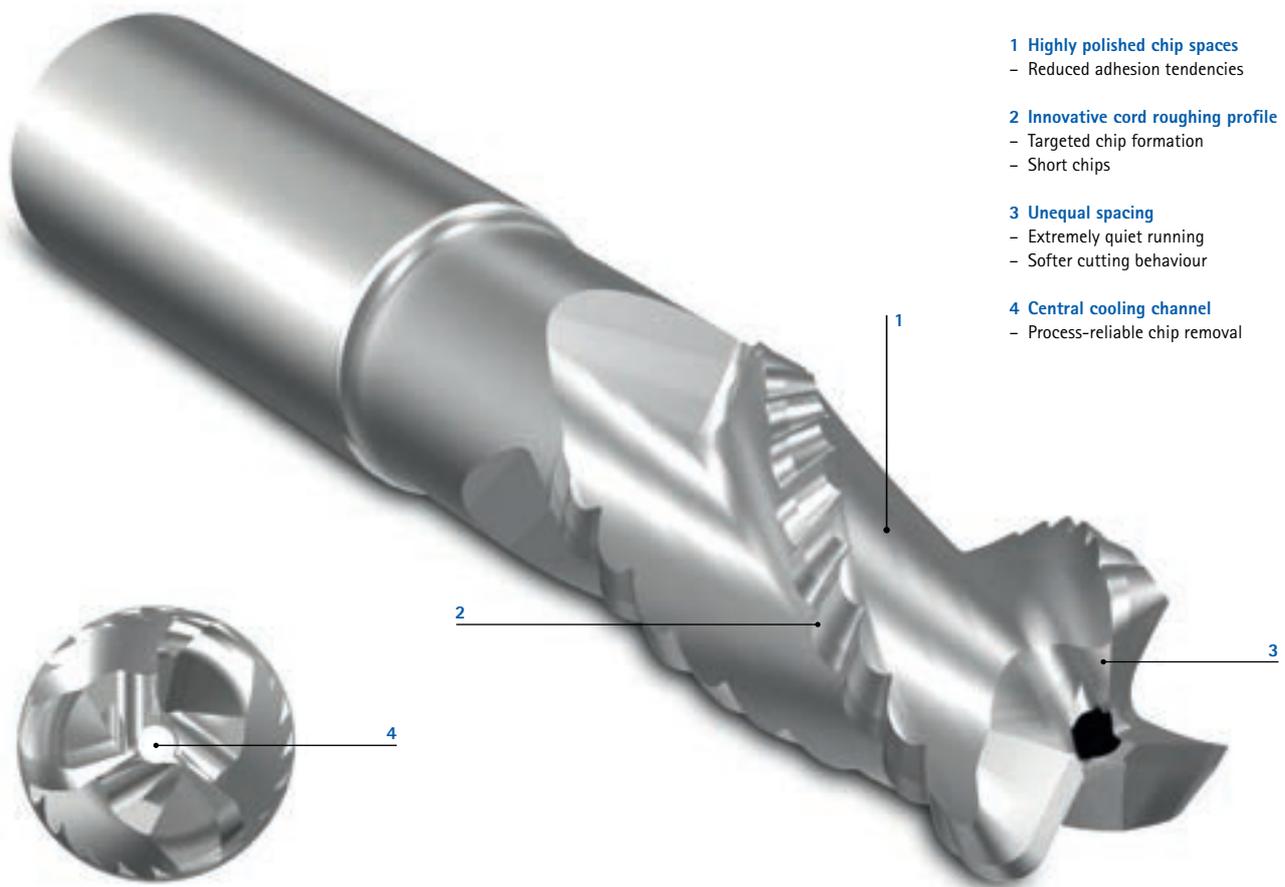
OptiMill[®]-Alu-Wave

OptiMill®-Alu-Wave

A new dimension of high-volume aluminium machining

The OptiMill-Alu-Wave is a newly developed roughing cutter for machining aluminium materials. It produces short chips and ensures smooth cutting behaviour thanks to its unique cord roughing geometry. The milling cutter has a central cooling channel that minimises the formation of built-up edges and safely removes chips. It also offers configurable corner radii for precise near-contour roughing.

Due to its high machining volume, the OptiMill-Alu-Wave allows efficient material removal and, in this way, increases productivity. Available in various lengths, it adapts perfectly to the individual requirements of any roughing task.



1 Highly polished chip spaces
– Reduced adhesion tendencies

2 Innovative cord roughing profile
– Targeted chip formation
– Short chips

3 Unequal spacing
– Extremely quiet running
– Softer cutting behaviour

4 Central cooling channel
– Process-reliable chip removal

Features

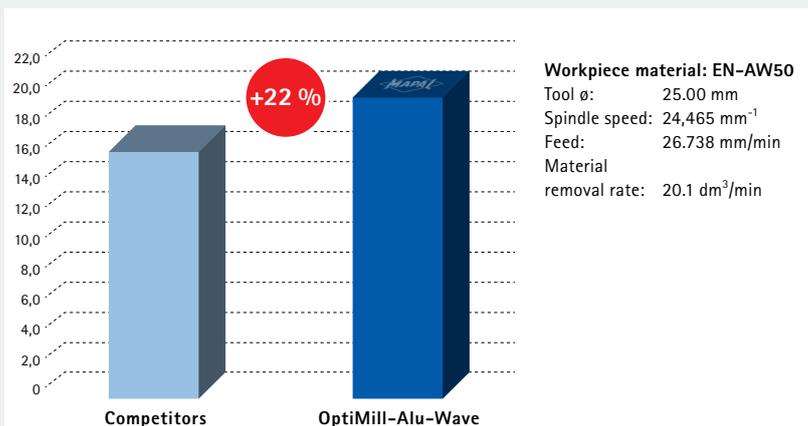
Preferred series available from stock

- Versions: long, overlong, extra long cantilever length with neck
- \varnothing area: 12.00 – 25.00 mm
- Shank form: HA

Configurable features:

- \varnothing area: 12.00 – 25.00 mm
- Shank form: HB | SL (Safe-lock®)
- Cutting edge design: Radius | Chamfer 45° of \varnothing 12.00 – 25.00 mm | 0.40 – 1.00 mm
- Coating: Available as DLC coating with cutting material HP910

MATERIAL REMOVAL RATE [dm³/min]



OptiMill®-Alu-Wave

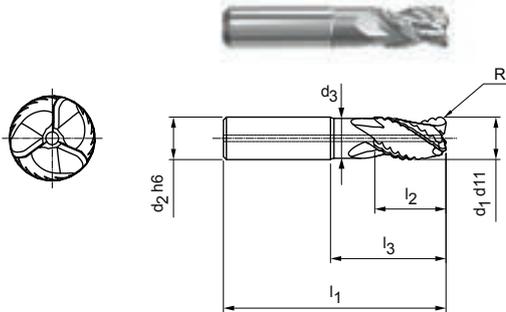
Shoulder milling cutter, long projection length with neck, with internal coolant supply
SCM109

Design:

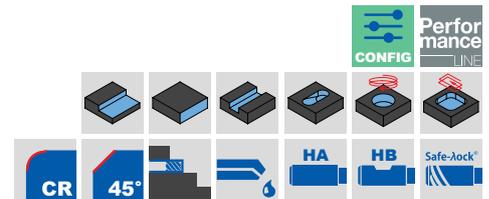
Diameter of milling cutter: 12.00 - 25.00 mm
Cutting material: HU318
Number of cutting edges: 3
Helix angle: 36°

Application:

Before using in the machine, check the cutting data according to machine performance (see cutting data).



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
---	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----



Preferred series available from stock | Long projection length

Dimensions							z	Specification	Order no.
d1 d11	d2 h6	d3	l1	l2	l3	R			
12,00	12	11,2	83	22	36	2,00	3	SCM109-1200Z03R-R0200HA-HU318	31430821
16,00	16	15,1	92	26	42	3,00	3	SCM109-1600Z03R-R0300HA-HU318	31430824
20,00	20	18,8	104	32	54	3,00	3	SCM109-2000Z03R-R0300HA-HU318	31430827
20,00	20	18,8	104	32	54	4,00	3	SCM109-2000Z03R-R0400HA-HU318	31430828
25,00	25	23,5	114	40	58	3,00	3	SCM109-2500Z03R-R0300HA-HU318	31430833
25,00	25	23,5	114	40	58	4,00	3	SCM109-2500Z03R-R0400HA-HU318	31430834

Configurable features

Shank form:
Shank form: HB | SL (Safe-lock®) | MQ (shank HA with MQL*)

Cutting edge design:
Radius R: 0.40 - 6.50 mm
Chamfer Cx45°: 0.40 - 1.00 mm

Coating:
Available as DLC coating with cutting material HP910

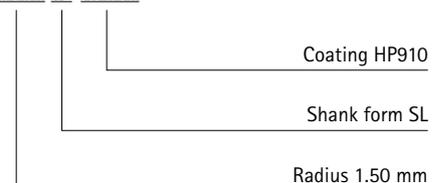
Specification:
SCM109-2500Z03R-[cutting edge design][shank form]-[coating]

Dimensions of configurable radii and corner chamfers

d1	Radius R		Chamfer Cx45°	
	R min.	R max.	Cx45° min.	Cx45° max.
12,00	0,40	3,00	0,40	1,00
16,00	0,50	4,00	0,40	1,00
20,00	0,60	5,20	0,40	1,00
25,00	0,75	6,50	0,40	1,00

Example:

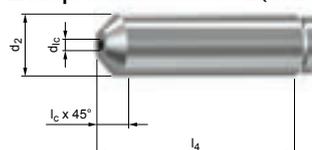
SCM109-2500Z03R-**R0150 SL-HP910**



Safe-lock® by HAIMER

Manufacturer's ID number: 6272

Example: Shank form MQ (shank with MQL)



Dimensions in mm.

MQL-Shank design according to DIN 69090-3.

MQL-Shank design according to DIN69090-3

d2 (h6)	12	16	20	25
l4 (0 / +2)	45	48	50	56
lc (0 / +0,1)	1,7	2,4	3,2	3,7
d1c	2,0	3,0	3,0	4,0

For cutting data recommendation, see pages 6/7.

Special designs and other coatings available upon request.

OptiMill®-Alu-Wave

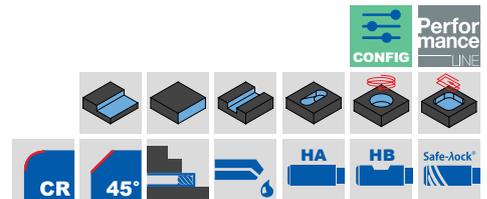
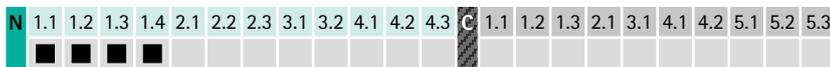
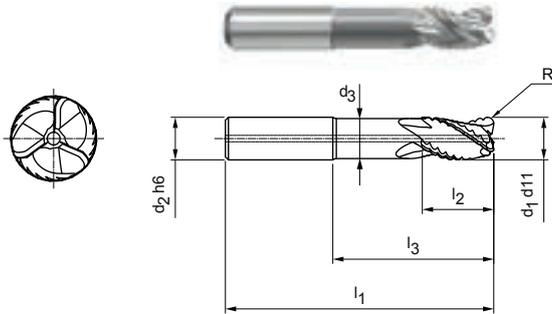
Shoulder milling cutter, overlong projection length with neck, with internal coolant supply SCM109

Design:

Diameter of milling cutter: 12.00 - 25.00 mm
 Cutting material: HU318
 Number of cutting edges: 3
 Helix angle: 36°

Application:

Before using in the machine, check the cutting data according to machine performance (see cutting data).



Preferred series available from stock | Overlong projection length

Dimensions							z	Specification	Order no.
d1 d11	d2 h6	d3	l1	l2	l3	R			
12,00	12	11,2	95	26	50	2,00	3	SCM109-1200Z03R-R0200HA-HU318	31430822
16,00	16	15,1	115	32	65	3,00	3	SCM109-1600Z03R-R0300HA-HU318	31430825
20,00	20	18,8	125	32	75	3,00	3	SCM109-2000Z03R-R0300HA-HU318	31430829
20,00	20	18,8	125	32	75	4,00	3	SCM109-2000Z03R-R0400HA-HU318	31430830
25,00	25	23,5	136	50	80	3,00	3	SCM109-2500Z03R-R0300HA-HU318	31430835
25,00	25	23,5	136	50	80	4,00	3	SCM109-2500Z03R-R0400HA-HU318	31430836

Configurable features

Shank form:
Shank form: HB | SL (Safe-lock®) | MQ (shank HA with MQL*)

Cutting edge design:
Radius R: 0.40 - 6.50 mm
Chamfer Cx45°: 0.40 - 1.00 mm

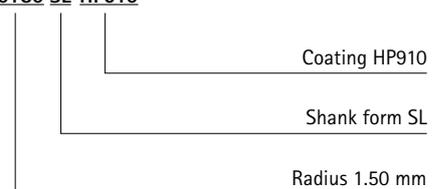
Coating:
Available as DLC coating with cutting material HP910

Specification:
SCM109-2500Z03R-[cutting edge design][shank form]-[coating]

Dimensions of configurable radii and corner chamfers

d1	Radius R		Chamfer Cx45°	
	R min.	R max.	Cx45° min.	Cx45° max.
12,00	0,40	3,00	0,40	1,00
16,00	0,50	4,00	0,40	1,00
20,00	0,60	5,20	0,40	1,00
25,00	0,75	6,50	0,40	1,00

Example:
SCM109-2500Z03R-**R0150 SL-HP910**



Safe-lock® by HAIMER

Manufacturer's ID number: 6272

Example: Shank form MQ (shank with MQL)



Dimensions in mm.
MQL-Shank design according to DIN 69090-3.

MQL-Shank design according to DIN69090-3

d2 (h6)	12	16	20	25
l4 (0 / +2)	45	48	50	56
lc (0 / +0,1)	1,7	2,4	3,2	3,7
d1c	2,0	3,0	3,0	4,0

For cutting data recommendation, see pages 6/7.
Special designs and other coatings available upon request.

OptiMill®-Alu-Wave

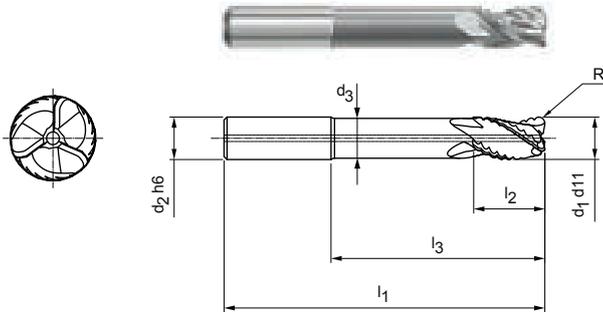
Shoulder milling cutter, extra long projection length with neck, with internal coolant supply
SCM109

Design:

Diameter of milling cutter: 12.00 - 25.00 mm
Cutting material: HU318
Number of cutting edges: 3
Helix angle: 36°

Application:

Before using in the machine, check the cutting data according to machine performance (see cutting data).



N	1.1	1.2	1.3	1.4	2.1	2.2	2.3	3.1	3.2	4.1	4.2	4.3	C	1.1	1.2	1.3	2.1	3.1	4.1	4.2	5.1	5.2	5.3
---	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

CONFIG Performance LINE

Preferred series available from stock | Extra long projection length

Dimensions							z	Specification	Order no.
d1 d11	d2 h6	d3	l1	l2	l3	R			
12,00	12	11,2	106	16	60	2,00	3	SCM109-1200Z03R-R0200HA-HU318	31430823
16,00	16	15,1	129	24	80	3,00	3	SCM109-1600Z03R-R0300HA-HU318	31430826
20,00	20	18,8	150	32	100	3,00	3	SCM109-2000Z03R-R0300HA-HU318	31430831
20,00	20	18,8	150	32	100	4,00	3	SCM109-2000Z03R-R0400HA-HU318	31430832
25,00	25	23,5	163	42	107	3,00	3	SCM109-2500Z03R-R0300HA-HU318	31430837
25,00	25	23,5	163	42	107	4,00	3	SCM109-2500Z03R-R0400HA-HU318	31430838

Configurable features

Shank form:
Shank form: HB | SL (Safe-lock®) | MQ (shank HA with MQL*)

Cutting edge design:
Radius R: 0.40 - 6.50 mm
Chamfer Cx45°: 0.40 - 1.00 mm

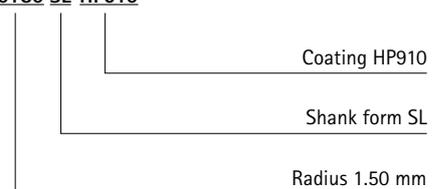
Coating:
Available as DLC coating with cutting material HP910

Specification:
SCM109-2500Z03R-[cutting edge design][shank form]-[coating]

Dimensions of configurable radii and corner chamfers

d1	Radius R		Chamfer Cx45°	
	R min.	R max.	Cx45° min.	Cx45° max.
12,00	0,40	3,00	0,40	1,00
16,00	0,50	4,00	0,40	1,00
20,00	0,60	5,20	0,40	1,00
25,00	0,75	6,50	0,40	1,00

Example:
SCM109-2500Z03R-R0150 SL-HP910



Safe-lock® by HAIMER

Manufacturer's ID number: 6272

Example: Shank form MQ (shank with MQL)



Dimensions in mm.
MQL-Shank design according to DIN 69090-3.

MQL-Shank design according to DIN69090-3

d2 (h6)	12	16	20	25
l4 (0 / +2)	45	48	50	56
lc (0 / +0,1)	1,7	2,4	3,2	3,7
d1c	2,0	3,0	3,0	4,0

For cutting data recommendation, see pages 6/7.
Special designs and other coatings available upon request.

Cutting data recommendations for shoulder milling cutters

Feed and cutting speed

OptiMill-Alu-Wave | SCM109 | Machine performance 25 kW to ≤40 kW

MMG*	Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cooling		
			MQL/Air	Dry	Wet
N N1	N1.1 Aluminium, unalloyed and alloyed < 3% Si				✓
	N1.2 Aluminium, alloyed ≤ 7% Si				✓
	N1.3 Aluminium, alloyed > 7 - 12% Si				✓
	N1.4 Aluminium, alloyed > 12% Si				✓

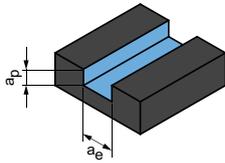
OptiMill-Alu-Wave | SCM109 | Machine performance 40 kW to ≤80 kW

MMG*	Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cooling		
			MQL/Air	Dry	Wet
N N1	N1.1 Aluminium, unalloyed and alloyed < 3% Si				✓
	N1.2 Aluminium, alloyed ≤ 7% Si				✓
	N1.3 Aluminium, alloyed > 7 - 12% Si				✓
	N1.4 Aluminium, alloyed > 12% Si				✓

OptiMill-Alu-Wave | SCM109 | Machine performance >80 kW

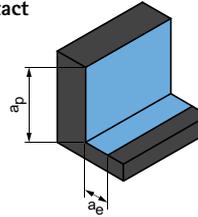
MMG*	Workpiece material	Strength/hardness [N/mm ²] [HRC]	Cooling		
			MQL/Air	Dry	Wet
N N1	N1.1 Aluminium, unalloyed and alloyed < 3% Si				✓
	N1.2 Aluminium, alloyed ≤ 7% Si				✓
	N1.3 Aluminium, alloyed > 7 - 12% Si				✓
	N1.4 Aluminium, alloyed > 12% Si				✓

Full cutting



Long projection length
 $a_p = 1xD \mid a_e = 1xD$
Overlong projection length
 $a_p = 1xD \mid a_e = 1xD$
Extra long projection length
 $a_p = 0.5xD \mid a_e = 1xD$

Part-contact cutting



Long projection length
 $a_p = 1.5xD \mid a_e = 0.6xD$
Overlong projection length
 $a_p = 1.5xD \mid a_e = 0.4xD$
Extra long projection length
 $a_p = 1.5xD \mid a_e = 0.25xD$

	Feed per tooth [f_z] [mm/tooth] for diameter of milling cutter					Feed per tooth [f_z] [mm/tooth] for diameter of milling cutter				
	\emptyset	12.00	16.00	20.00	25.00	\emptyset	12.00	16.00	20.00	25.00
v_c	600 - 900	600 - 900	300 - 600	300 - 600		v_c	600 - 900	600 - 900	400 - 700	300 - 600
Factor v_c						Factor v_c				
1	0.1 - 0.18	0.12 - 0.2	0.15 - 0.2	0.15 - 0.2	1	0.12 - 0.22	0.15 - 0.22	0.15 - 0.22	0.15 - 0.22	0.15 - 0.22
0.95	0.1 - 0.18	0.12 - 0.2	0.15 - 0.2	0.15 - 0.2	0.95	0.12 - 0.22	0.15 - 0.22	0.15 - 0.22	0.15 - 0.22	0.15 - 0.22
0.85	0.1 - 0.18	0.12 - 0.2	0.15 - 0.2	0.15 - 0.2	0.85	0.12 - 0.22	0.15 - 0.22	0.15 - 0.22	0.15 - 0.22	0.15 - 0.22
0.75	0.1 - 0.18	0.12 - 0.2	0.15 - 0.2	0.15 - 0.2	0.75	0.12 - 0.22	0.15 - 0.22	0.15 - 0.22	0.15 - 0.22	0.15 - 0.22

	Feed per tooth [f_z] [mm/tooth] for diameter of milling cutter					Feed per tooth [f_z] [mm/tooth] for diameter of milling cutter				
	\emptyset	12.00	16.00	20.00	25.00	\emptyset	12.00	16.00	20.00	25.00
v_c	900 - 1200	1100 - 1400	1100 - 1400	900 - 1200		v_c	900 - 1200	1100 - 1400	1100 - 1400	900 - 1200
Factor v_c						Factor v_c				
1	0.1 - 0.18	0.12 - 0.2	0.14 - 0.21	0.15 - 0.22	1	0.1 - 0.22	0.15 - 0.25	0.15 - 0.25	0.15 - 0.25	0.15 - 0.25
0.95	0.1 - 0.18	0.12 - 0.2	0.14 - 0.21	0.15 - 0.22	0.95	0.1 - 0.22	0.15 - 0.25	0.15 - 0.25	0.15 - 0.25	0.15 - 0.25
0.85	0.1 - 0.18	0.12 - 0.2	0.14 - 0.21	0.15 - 0.22	0.85	0.1 - 0.22	0.15 - 0.25	0.15 - 0.25	0.15 - 0.25	0.15 - 0.25
0.75	0.1 - 0.18	0.12 - 0.2	0.14 - 0.21	0.15 - 0.22	0.75	0.1 - 0.22	0.15 - 0.25	0.15 - 0.25	0.15 - 0.25	0.15 - 0.25

	Feed per tooth [f_z] [mm/tooth] for diameter of milling cutter					Feed per tooth [f_z] [mm/tooth] for diameter of milling cutter				
	\emptyset	12.00	16.00	20.00	25.00	\emptyset	12.00	16.00	20.00	25.00
v_c	900 - 1200	1100 - 1400	1300 - 1600	1700 - 2500		v_c	900 - 1200	1100 - 1400	1300 - 1600	1700 - 2500
Factor v_c						Factor v_c				
1	0.1 - 0.18	0.12 - 0.2	0.15 - 0.23	0.15 - 0.23	1	0.1 - 0.22	0.13 - 0.25	0.15 - 0.27	0.15 - 0.27	0.15 - 0.27
0.95	0.1 - 0.18	0.12 - 0.2	0.15 - 0.23	0.15 - 0.23	0.95	0.1 - 0.22	0.13 - 0.25	0.15 - 0.27	0.15 - 0.27	0.15 - 0.27
0.85	0.1 - 0.18	0.12 - 0.2	0.15 - 0.23	0.15 - 0.23	0.85	0.1 - 0.22	0.13 - 0.25	0.15 - 0.27	0.15 - 0.27	0.15 - 0.27
0.75	0.1 - 0.18	0.12 - 0.2	0.15 - 0.23	0.15 - 0.23	0.75	0.1 - 0.22	0.13 - 0.25	0.15 - 0.27	0.15 - 0.27	0.15 - 0.27

The specified machining values are guide values.
 The optimum data for the respective machining task should be determined during the test or machining.



Discover tool and service solutions now that give you a lead:

BORE MACHINING

REAMING | FINE BORING

DRILLING FROM SOLID | BORING | COUNTERSINKING

MILLING

CLAMPING

TURNING

ACTUATING

SETTING | MEASURING | DISPENSING

SERVICES

www.mapal.com