

## Mach Long Solid Drill Plus

# MLD Plus



### Mach Long Drill Exclusive for Deep Holes

High precision results when machining deep holes

- ▣ **High Precision Machining**  
Excellent stability thanks to new guide margin added
- ▣ **Longer Tool Life**  
Strong wear resistance thanks to our new PC315G grade



# MLD Plus

## Mach Long Drill Plus Exclusive for Deep Holes

### MLD Plus



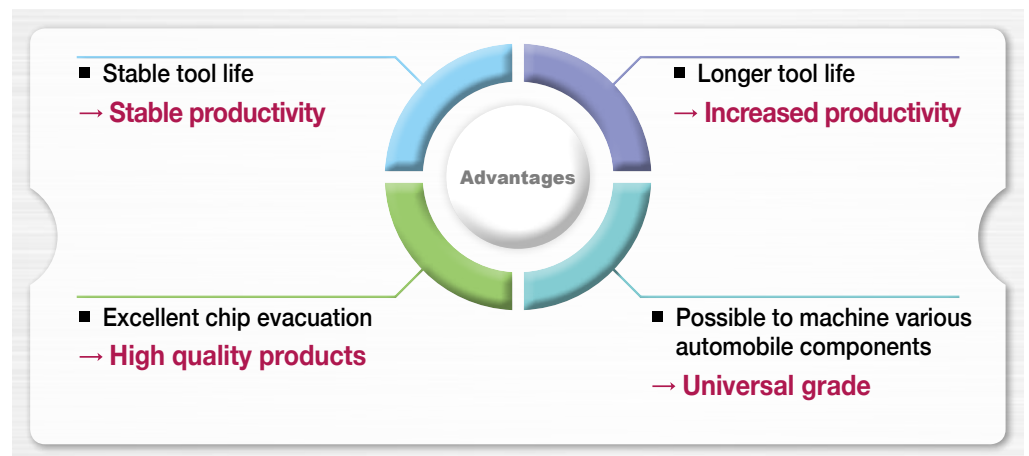
MLD Plus

When machining deep holes more than 20D, tool vibration increases as the drill goes in deeper. This causes poor roundness and straightness of holes and reduces productivity.

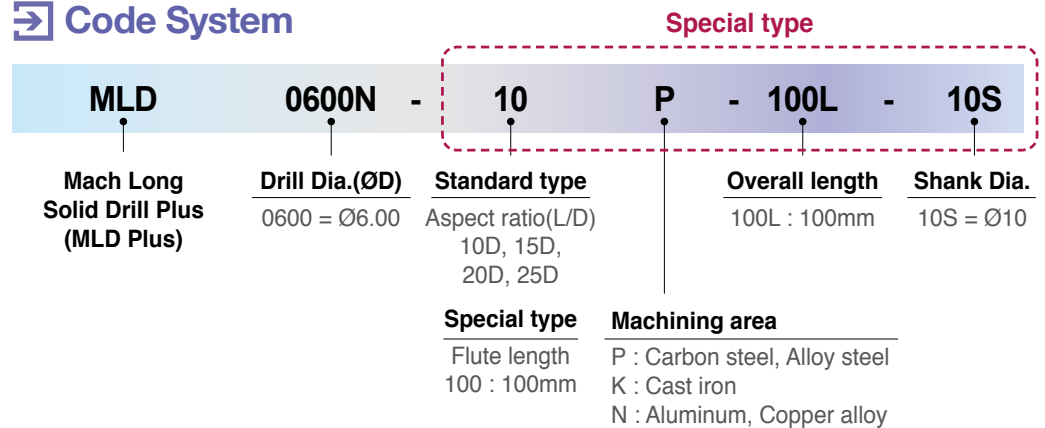
New guide margin was added to **MLD Plus** in order to increase the degree of precision and to enable stable machining. In addition, lubrication on the flute surface was maximized to minimize frictional resistance. Thanks to those innovations, MLD Plus has better chip evacuation.

The new **PC315G** grade has also been applied for stronger wear resistance and better lubrication when it comes to machining steel materials such as carbon steel(SM45C).

All these traits of MLD Plus guarantee maximum cutting efficiency and productivity with a precise cutting performance.



### Code System



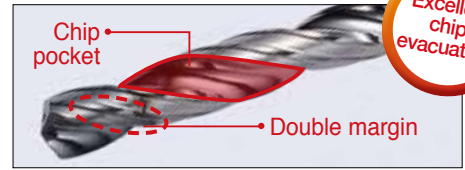
## Features



[Cutting edge shape]

### Cutting edge and flute shape

- Straight cutting edge provides better rigidity.
- Excellent chip evacuation due to wider chip pocket and improved flute surface roughness
- Double margin secures machining stability.

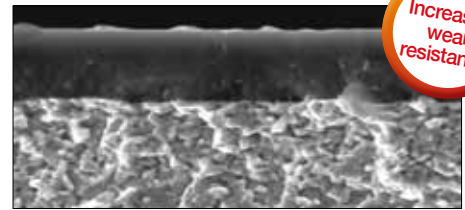


Excellent chip evacuation

[Flute]

### New grade(PC315G)

- Ultra fine substrate and new coating applied
- Lubricative coating layer improves chip evacuation with lower frictional resistance.
- Longer tool life due to higher wear resistance



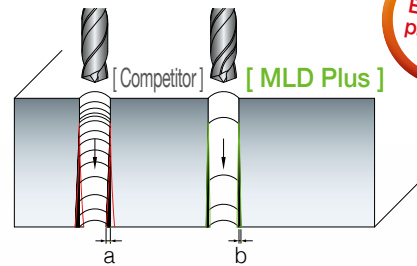
Increased wear resistance

[ PC315G ]

Reduced bent holes compared to competitors (a > b)

### Degree of machining precision

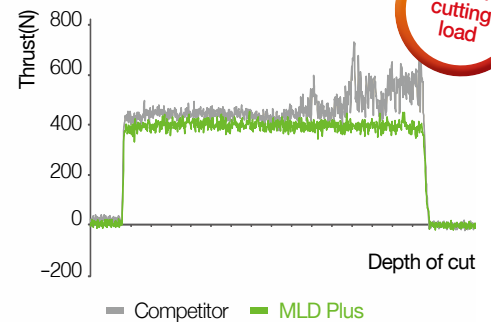
- Improved machining precision
  - Bent holes reduced
  - Inside hole surface roughness improved
  - Hole size uniformity increased
- Improved point shape
  - Precise location secured



Excellent precision

### Cutting load

- Workpiece SM45C
- Cutting conditions
  - Drill Dia.(m) = Ø6.0
  - vc(m/min) = 70
  - fn(mm/rev) = 0.12
  - ap(mm) = 60
  - Wet
- Tools MLD0600N-20P



Lower cutting load



# MLD Plus

## ⇒ Cutting Performance



### Carbon steel (SM45C)

- Cutting conditions  $vc(m/min) = 70$ ,  $fn(mm) = 0.12$ ,  $ap(mm) = 60$ , Through coolant
- Tools MLD0400N-20P (PC315G)

MLD Plus

Cutting length 24m (400 holes)

Competitor

Cutting length 21m (350 holes)

1.2  
times  
more



[ Competitor ]

[ MLD Plus ]

[ Comparison of wear ]

- ➔ New grade PC315G's coating layer has been applied to improve wear resistance when machining carbon steel materials.



### Alloy steel (SM440H)

- Cutting conditions  $vc(m/min) = 70$ ,  $fn(mm) = 0.12$ ,  $ap(mm) = 55$ , Through coolant(MQL)
- Tools MLD0570N-15P (PC315G)

MLD Plus

Cutting length 16.5m (300 holes)

Competitor

Cutting length 8.3m (150 holes)

2 times  
more

- ➔ Double margin has been applied to improve stability and machining precision.

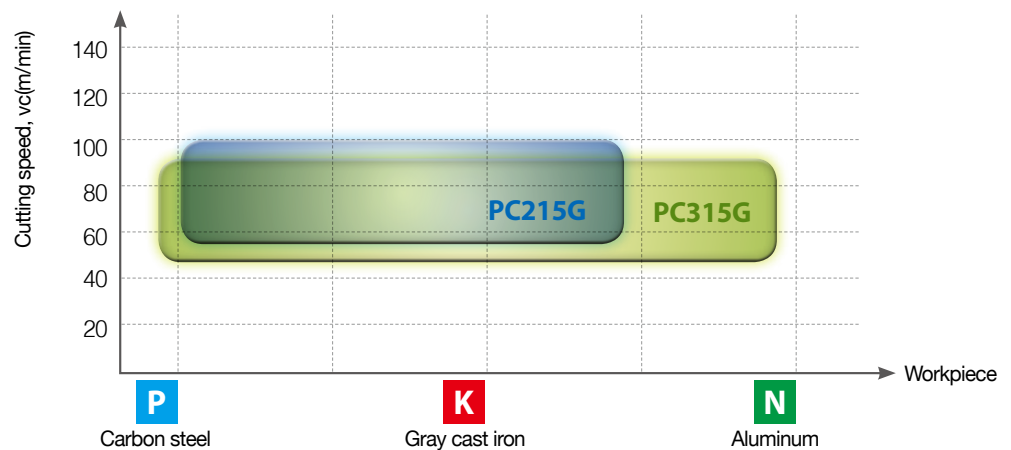
#### PC215G

Excellent performance when machining cast iron and alloy steel at high speed

#### PC315G

Universal grade excellent when machining carbon steel, cast iron, etc. at middle to low cutting speed

## ⇒ Application Area

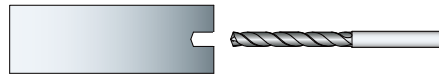


## ➔ Recommended Cutting Condition

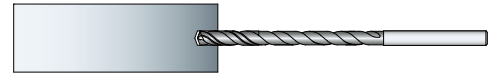
Workpiece			Grade	Cutting speed vc(m/min)	Feed(Depth of cut = 10D ~ 25D)			
ISO	Workpiece materials	Hardness (HB)			Feed rate(mm/rev) per drill dia.(mm)			
			Recommended					
						Ø3.0~Ø5.0	Ø5.1~Ø8.0	Ø8.1~Ø10.0
P	Carbon steel	Low carbon steel	80~120	PC315G	80(60~90)	0.10~0.15	0.15~0.20	0.20~0.25
		High carbon steel	180~280	PC315G	70(60~80)	0.10~0.15	0.15~0.20	0.20~0.25
	Alloy steel	Low alloy steel	140~260	PC215G	80(60~90)	0.10~0.15	0.12~0.17	0.15~0.20
		High alloy steel	50~260	PC215G	70(60~80)	0.08~0.15	0.10~0.15	0.15~0.20
K	Cast iron	Gray cast iron	150~230	PC215G	80(60~100)	0.10~0.20	0.15~0.20	0.15~0.20
		Ductile cast iron	160~260	PC215G	70(60~80)	0.10~0.20	0.15~0.20	0.15~0.20
N	Aluminum	Aluminum alloy	30~150	FG2	120(100~150)	0.12~0.17	0.15~0.20	0.20~0.25
	Copper alloy	Copper alloy	150~160	FG2	120(100~150)	0.12~0.17	0.15~0.20	0.20~0.25

## ➔ Drilling Method

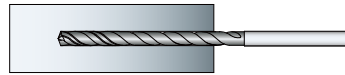
### Flat surface drilling



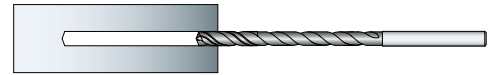
- Center drilling with large point angle
- Depth of drilling : 1~2D of drilling depth
- Size of drilling diameter : center drill > MLD



- Lower the cutting speed and feed as the drill goes inside to the machining area.  
(to 20~30% of recommended cutting conditions)



- Drilling following recommended cutting conditions

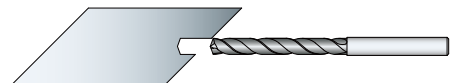


- Lower the cutting speed and feed again as the drill gets out after drilling.

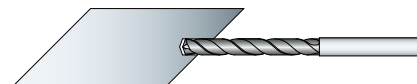
### Inclined surface drilling



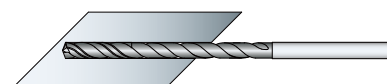
- First, facing with endmills



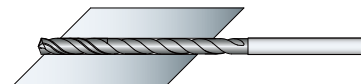
- Center drilling with large point angle
- Depth of drilling : 1~2D of drilling depth
- Size of drilling diameter : center drill > MLD



- Lower the cutting speed and feed as the drill goes inside to the machining area.  
(to 20~30% of recommended cutting conditions)



- Drilling following recommended cutting conditions



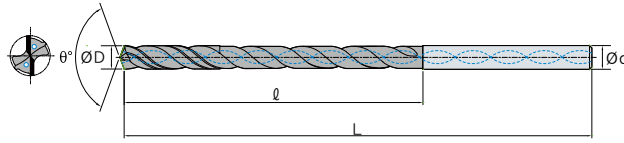
- Lower the feed when penetrating the workpiece.  
(Apply minimum feed rate of recommended cutting conditions)



- Lower the cutting speed and feed again as the drill gets out after drilling.

# MLD Plus

## ⇒ MLD-□ (P/K/N)



Specification	P	K	N
Grade	PC215G PC315G		FG2
Tolerance(drill Dia.)	h7		
Tolerance(shank Dia.)	h6		
Point angle	135°		
Twist angle	30°		
Thinning	X type		
Coolant	Through system		

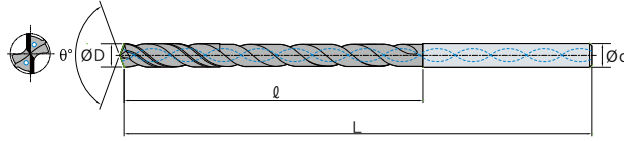
P Steel K Cast iron N Non-ferrous metal

(mm)

Designation	ØD	Ød	10D		15D		20D		25D	
			ℓ	L	ℓ	L	ℓ	L	ℓ	L
<b>MLD</b> 0300N-□□P,K,N	3.0	3.0	40	90	55	105	70	120	-	-
0310N-□□P,K,N	3.1	4.0	45	100	60	125	80	140	-	-
0320N-□□P,K,N	3.2	4.0	45	100	60	125	80	140	-	-
0330N-□□P,K,N	3.3	4.0	45	100	60	125	80	140	-	-
0340N-□□P,K,N	3.4	4.0	50	100	65	125	85	140	-	-
0350N-□□P,K,N	3.5	4.0	50	100	65	125	85	140	-	-
0360N-□□P,K,N	3.6	4.0	50	100	65	125	85	140	-	-
0370N-□□P,K,N	3.7	4.0	50	100	65	125	85	140	-	-
0380N-□□P,K,N	3.8	4.0	50	100	75	125	90	140	-	-
0390N-□□P,K,N	3.9	4.0	50	100	75	125	90	140	-	-
0400N-□□P,K,N	4.0	4.0	50	100	75	125	90	140	115	165
0410N-□□P,K,N	4.1	5.0	55	115	75	140	100	165	120	190
0420N-□□P,K,N	4.2	5.0	55	115	75	140	100	165	120	190
0430N-□□P,K,N	4.3	5.0	60	115	85	140	110	165	135	190
0440N-□□P,K,N	4.4	5.0	60	115	85	140	110	165	135	190
0450N-□□P,K,N	4.5	5.0	60	115	85	140	110	165	135	190
0460N-□□P,K,N	4.6	5.0	60	115	85	140	110	165	135	190
0470N-□□P,K,N	4.7	5.0	60	115	85	140	110	165	135	190
0480N-□□P,K,N	4.8	5.0	65	115	90	140	115	165	140	190
0490N-□□P,K,N	4.9	5.0	65	115	90	140	115	165	140	190

※ Pre-orders can be made in advance for non-stock items.

⇒ MLD-□ (P/K/N)



Specification	P	K	N
Grade	PC215G	PC315G	FG2
Tolerance(drill Dia.)	h7		
Tolerance(shank Dia.)	h6		
Point angle	135°		
Twist angle	30°		
Thinning	X type		
Coolant	Through system		

P Steel K Cast iron N Non-ferrous metal

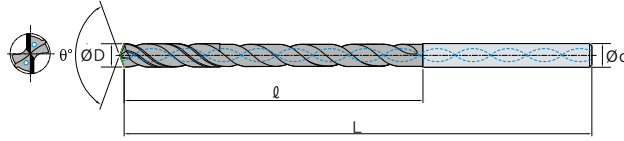
(mm)

Designation	ØD	Ød	10D		15D		20D		25D	
			ℓ	L	ℓ	L	ℓ	L	ℓ	L
<b>MLD</b> 0500N-□□P,K,N	5.0	5.0	65	115	90	140	115	165	140	190
0510N-□□P,K,N	5.1	6.0	70	128	95	160	120	190	150	220
0520N-□□P,K,N	5.2	6.0	70	128	95	160	120	190	150	220
0530N-□□P,K,N	5.3	6.0	70	128	95	160	120	190	150	220
0540N-□□P,K,N	5.4	6.0	78	128	110	160	140	190	170	220
0550N-□□P,K,N	5.5	6.0	78	128	110	160	140	190	170	220
0560N-□□P,K,N	5.6	6.0	78	128	110	160	140	190	170	220
0570N-□□P,K,N	5.7	6.0	78	128	110	160	140	190	170	220
0580N-□□P,K,N	5.8	6.0	78	128	110	160	140	190	170	220
0590N-□□P,K,N	5.9	6.0	78	128	110	160	140	190	170	220
0600N-□□P,K,N	6.0	6.0	78	128	110	160	140	190	170	220
0610N-□□P,K,N	6.1	7.0	87	140	120	175	155	210	190	250
0620N-□□P,K,N	6.2	7.0	87	140	120	175	155	210	190	250
0630N-□□P,K,N	6.3	7.0	87	140	120	175	155	210	190	250
0640N-□□P,K,N	6.4	7.0	87	140	120	175	155	210	190	250
0650N-□□P,K,N	6.5	7.0	87	140	120	175	155	210	190	250
0660N-□□P,K,N	6.6	7.0	87	140	120	175	155	210	190	250
0670N-□□P,K,N	6.7	7.0	87	140	120	175	155	210	190	250
0680N-□□P,K,N	6.8	7.0	90	140	125	175	160	210	200	250
0690N-□□P,K,N	6.9	7.0	90	140	125	175	160	210	200	250

※ Pre-orders can be made in advance for non-stock items.

# MLD Plus

⇒ MLD-□ (P/K/N)



Specification	P	K	N
Grade	PC215G	PC315G	FG2
Tolerance(drill Dia.)	h7		
Tolerance(shank Dia.)	h6		
Point angle	135°		
Twist angle	30°		
Thinning	X type		
Coolant	Through system		

P Steel K Cast iron N Non-ferrous metal

(mm)

Designation	ØD	Ød	10D		15D		20D		25D	
			ℓ	L	ℓ	L	ℓ	L	ℓ	L
<b>MLD</b>										
0700N-□□P,K,N	7.0	7.0	90	140	125	175	160	210	200	250
0710N-□□P,K,N	7.1	8.0	100	155	135	195	170	230	-	-
0720N-□□P,K,N	7.2	8.0	100	155	135	195	170	230	-	-
0730N-□□P,K,N	7.3	8.0	100	155	135	195	170	230	-	-
0740N-□□P,K,N	7.4	8.0	100	155	135	195	170	230	-	-
0750N-□□P,K,N	7.5	8.0	100	155	135	195	170	230	-	-
0760N-□□P,K,N	7.6	8.0	105	155	145	195	180	230	-	-
0770N-□□P,K,N	7.7	8.0	105	155	145	195	180	230	-	-
0780N-□□P,K,N	7.8	8.0	105	155	145	195	180	230	-	-
0790N-□□P,K,N	7.9	8.0	105	155	145	195	180	230	-	-
0800N-□□P,K,N	8.0	8.0	105	155	145	195	180	230	-	-
0810N-□□P,K,N	8.1	9.0	110	165	155	210	195	260	-	-
0820N-□□P,K,N	8.2	9.0	110	165	155	210	195	260	-	-
0830N-□□P,K,N	8.3	9.0	110	165	155	210	195	260	-	-
0840N-□□P,K,N	8.4	9.0	110	165	155	210	195	260	-	-
0850N-□□P,K,N	8.5	9.0	110	165	155	210	195	260	-	-
0860N-□□P,K,N	8.6	9.0	115	165	160	210	210	260	-	-
0870N-□□P,K,N	8.7	9.0	115	165	160	210	210	260	-	-
0880N-□□P,K,N	8.8	9.0	115	165	160	210	210	260	-	-
0890N-□□P,K,N	8.9	9.0	115	165	160	210	210	260	-	-
0900N-□□P,K,N	9.0	9.0	115	165	160	210	210	260	-	-
0910N-□□P,K,N	9.1	10.0	125	190	170	240	-	-	-	-
0920N-□□P,K,N	9.2	10.0	125	190	170	240	-	-	-	-
0930N-□□P,K,N	9.3	10.0	125	190	170	240	-	-	-	-
0940N-□□P,K,N	9.4	10.0	125	190	170	240	-	-	-	-
0950N-□□P,K,N	9.5	10.0	125	190	170	240	-	-	-	-
0960N-□□P,K,N	9.6	10.0	130	190	180	240	-	-	-	-
0970N-□□P,K,N	9.7	10.0	130	190	180	240	-	-	-	-
0980N-□□P,K,N	9.8	10.0	130	190	180	240	-	-	-	-
0990N-□□P,K,N	9.9	10.0	130	190	180	240	-	-	-	-
1000N-□□P,K,N	10.0	10.0	130	190	180	240	-	-	-	-

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