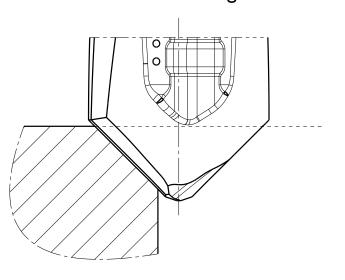
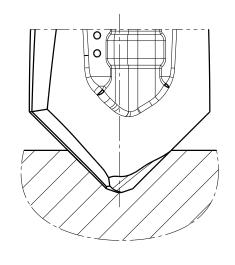
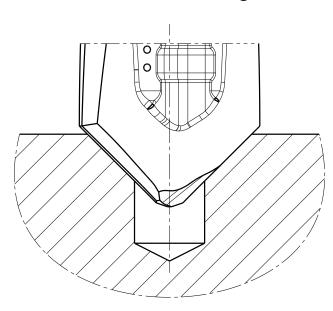
Chamfering

Drilling

Countersinking







MATERIAL GROUPS

According to DIN / ISO 513 and VDI 3323

	MM HCD60° Chamfering							mfering					
0			Tensile Strength	Hardness	Material Group		D= .314389	D= .394 -	.508 D=	.51262	26 D= .629	705 D= .708	3999
OSI	Material	Condition	[Kpsi]	[HB]	No.	V [sfm]			F _z (inch/tootł	h)		
	<0.25% C	annealed	61	125	1	320-				.002 .003			
	≥0.25% C	annealed	94	190	2								
	non-alloy steel and cast <0.55% C steel, free	quenched and tempered	123	250	3		.001 .002	.002			.002	.00. .00	
	cutting steel	annealed	109	220	4		.002	. <mark>003</mark> .004		.005	.003	.00	
	≥0.55% C	quenched and tempered	145	300	5	330- <mark>460</mark> -655							
		annealed	87	200	6	400-000							
Ρ	low alloy and cast steel (less than 5% of	6 of quenched 145	135	275	7								
	alloying elements)		300	8		001	000		000	000			
			174	350	9		.001 .002	.002 .003		.002 . <mark>003</mark>	.002 . <mark>003</mark>	.00. .00	
	high alloyed steel, cast steel and tool steel	annealed	99	200	10	265- <mark>430</mark> -590	.003	.004		.004	.005	.00	
		quenched and tempered	160	325	11								
	stainless steel	ferritic / martensitic	99	200	12		.001	.001		.001	.001	.00	01
	and cast steel	martensitic	119	240	13		.0016	.002		.002	.002	.00	03
М	stainless steel and cast steel	austenitic, duplex	87	180	14		.002	.003		.003	.004	.00)4
	arey east iren (CC)	ferritic / pearlitic		180	15				.001	.001			
	gray cast iron (GG)	pearlitic / martensitic		260	16	330-	.0008	.001			.001	.00	
K	nodular agat iron (CCC)	ferritic		160	17	525-755	.002	.002		.002	.002	.0(
	nodular cast iron (GGG)	pearlitic		250	18		.0024	.003	3	.003	.004	.00	J4
	malleable cast iron	ferritic		130	19								
		pearlitic		230	20								

Recommended cutting data

MATERIAL GROUPS

According to DIN / ISO 513 and VDI 3323

							MM HCD60° Drilling & Countersinking						
~			Tensile Strength	Hardness [HB]	Material Group No.	V [sfm]	D= .314389	D= .394508	D= .512626	D= .629705	D= .708999		
ISO	Material	Condition	[Kpsi]						Frev (inch/rev)				
	<0.25% C	annealed	61	125	1								
	≥0.25% C	annealed	94	190	2	200				.002 .003			
	non-alloy steel and cast <0.55% C steel, free	quenched and tempered	123	250	3	320- 525-720	.001	.002 .003	.002 .003		.002		
	cutting steel	annealed	109	220	4		.002 .003	.003	.003	.003	.004 .007		
	≥0.55% C	quenched and tempered	145	300	5	330-							
		annealed	87	200	6	<mark>460</mark> -655							
Ρ	low alloy and cast steel		135	275	7			000	000	000			
	(less than 5% of alloying elements)	quenched and tempered	145	300	8	-	.001 .002						
		anu tempereu	174	350	9			.002 . <mark>003</mark>	.002 . <mark>003</mark>	.002 . <mark>003</mark>	.002 .004		
		annealed	99	200	10	265- 430-590	.002	.003	.003	.005	.004		
	high alloyed steel, cast steel and tool steel	quenched and tempered	160	325	11								
	stainless steel	ferritic / martensitic	99	200	12		.0008	.001	.001	.001 . <mark>002</mark>	.001		
	and cast steel	martensitic	119	240	13		.0015	.002	.002		.003		
М	stainless steel and cast steel	austenitic, duplex	87	180	14		.002	.003	.003	.004	.004		
	arey east iron (CC)	ferritic / pearlitic		180	15								
	gray cast iron (GG)	pearlitic / martensitic		260	16	330-	.001	.001	.001	.001 .002 .004	.001 .003		
K	nodular and irer (000)	ferritic		160	17	<mark>525</mark> -755	.002	.002	.002				
	nodular cast iron (GGG)	pearlitic		250	18		.0024	.003	.003		.004		
	mallaabla aast iran	ferritic		130	19								
	malleable cast iron	pearlitic		230	20								

Recommended cutting data

MATERIAL GROUPS

According to DIN / ISO 513 and VDI 3323

							MM HCD80° - 90° Chamfering						
			Tensile Strength	Hardness	Material Group		D= .314389	D= .394508	D= .512626	D= .629705	D= .708999		
ISO	Material	Condition	[Kpsi]	[HB]	No.	V [sfm]			Fz (inch/tooth)				
	<0.25% C	annealed	61	125	1	- 330-							
	≥0.25% C	annealed	94	190	2		.0010						
	non-alloy steel and cast <0.55% C steel, free	quenched and tempered	123	250	З	525-720		.002 .0031	.002 . <mark>003</mark> 1	.002	.002 .0047		
	cutting steel	annealed	109	220	4		.0028 .0039	.0031	.0059	.0039	.0047		
	≥0.55% C	quenched and tempered	145	300	5	330- 460-655			.0000				
		annealed	87	200	6	400-000							
	low alloy and cast steel (less than 5% of alloying elements)		135	275	7								
		quenched and tempered	145	300	8	-	.0016 .0024 .0031	000	000	000	000		
			174	350	9			.002 . <mark>003</mark>	.002 . <mark>0031</mark>	.002 . <mark>0031</mark>	.002 .0039		
	high alloyed steel, cast	annealed	99	200	10	265- 430-590		.0039	.0047	.0059	.0071		
	steel and tool steel	quenched and tempered	160	325	11								
	stainless steel	ferritic / martensitic	99	200	12		.001	.0016	.0016	.0016 .0028	.0016 .0031		
	and cast steel	martensitic	119	240	13		.002	.0024	.0028				
IVI	stainless steel and cast steel	austenitic, duplex	87	180	14		.0028	.0031	.0035	.0039	.0047		
	arou cost iron (CC)	ferritic / pearlitic		180	15					.0016			
	gray cast iron (GG)	pearlitic / martensitic		260	16	330-	.001	.0016	.0016		.0016 .0031 .0047		
K	nodular cast iron (CCC)	ferritic		160	17	525 -755	.002	.0024 .0031	.0028 .0035	.0028			
	nodular cast iron (GGG)	pearlitic		250	18		.0028	.0001	.0000	.0039			
	malleable cast iron	ferritic		130	19								
		pearlitic		230	20								

Recommended cutting data

MATERIAL GROUPS

According to DIN / ISO 513 and VDI 3323

	Ŭ						MM HCD80° - 90° Drilling & Countersinking						
			Tensile Strength	Hardness	Material Group		D= .314389	D= .394508	D= .512626	D= .629705	D= .708999		
OSI	Material	Condition	[Kpsi]	[HB]	No.	V [sfm]		· · · · ·	F _{rev} (inch/rev)	· · · · · ·			
	<0.25% C	annealed	61	125	1		.002 .003	.002	.002 .003	.002 .004			
	≥0.25% C	annealed	94	190	2	- 330- <mark>525</mark> -720							
	non-alloy steel and cast <0.55% C steel, free	quenched and tempered	123	250	3						.002 .005		
	cutting steel	annealed	109	220	4		.003	.005	.005	.004	.003		
	≥0.55% C	quenched and tempered	145	300	5	330-		.000					
		annealed	87	200	6	<mark>460</mark> -655							
Ρ	low alloy and cast steel (less than 5% of alloying elements)		135	275	7			000	.002 .003 .005	000			
			145	300	8	265- <u>430</u> -590 _	000						
			174	350	9		.002 .0024	.002 .003		.002 . <mark>003</mark>	.002 . <mark>004</mark>		
	high alloyed steel, east	annealed	99	200	10		.003	.004		.006	.007		
	high alloyed steel, cast steel and tool steel	quenched and tempered	160	325	11								
	stainless steel	ferritic / martensitic	99	200	12		.001	.002	.002 .003	.002 .003	.002		
	and cast steel	martensitic	119	240	13		.002	.002			.003		
М	stainless steel and cast steel	austenitic, duplex	87	180	14		.003	.003	.0035	.004	.005		
	arou cost iron (CC)	ferritic / pearlitic		180	15								
	gray cast iron (GG)	pearlitic / martensitic		260	16	330-	.001	.002	.002	.002	.002		
K	nodular aget iron (CCC)	ferritic		160	17	525 -755	.002	.0024	.003	.003	.003		
	nodular cast iron (GGG)	pearlitic		250	18		.003	.003	.0035	.004	.005		
	malleable cast iron	ferritic		130	19								
		pearlitic		230	20								
	Recommended cutting data	-											

Recommended cutting data

MATERIAL GROUPS

According to DIN / ISO 513 and VDI 3323

							MM HCD100° - 120° Chamfering				
			Tensile Strength	Hardness	Material Group		D= .314389	D= .394508	D= .512626	D= .629705	D= .708999
OSI	Material	Condition	[Kpsi]	[HB]	No.	V [sfm]			Fz (inch/tooth)		
	<0.25% C	annealed	61	125	1	330- 525-720	.002 .0031	.0024	.0024		
	≥0.25% C	annealed	94	190	2					.0024 .0043	
	non-alloy steel and cast <0.55% C steel, free	quenched and tempered	123	250	3						.0024 .0051
	cutting steel	annealed	109	220	4		.0031	.0035 .0051	.0035 .0063	.0045	.0083
	≥0.55% C	quenched and tempered	145	300	5	330- 460-655					
		annealed	87	200	6	400-000					
	low alloy and cast steel (less than 5% of alloying elements)		135	275	7				0004		
		quenched and tempered	145	300	8		000	0004		0004	0004
			174	350	9		.002 .0028	.0024 .0039	.0024 . <mark>0028</mark>	.0024 .0035	.0024 . <mark>0043</mark>
	high alloyed steel, cast	annealed	99	200	10	265- 430-590	.0035	.0043	.0051	.0063	.0075
	steel and tool steel	quenched and tempered	160	325	11						
	stainless steel	ferritic / martensitic	99	200	12	- 400-000	.0016	.002 .0028	.002 . <mark>0031</mark>	.002 . <mark>0031</mark>	.002 .0039
	and cast steel	martensitic	119	240	13		.0024				
	stainless steel and cast steel	austenitic, duplex	87	180	14		.0031	.0035	.0039	.0043	.0051
	arov agat iron (CC)	ferritic / pearlitic		180	15						
	gray cast iron (GG)	pearlitic / martensitic		260	16	330-	.0016	.002	.002	.002	.002 . <mark>0039</mark> .0051
K	nodular agat iron (CCC)	ferritic		160	17	525 -755	.0024	.0028	.0031	.0031	
	nodular cast iron (GGG)	pearlitic		250	18		.0031	.0035	.0039	.0043	
	malleable cast iron	ferritic		130	19						
		pearlitic		230	20						

Recommended cutting data

MATERIAL GROUPS

According to DIN / ISO 513 and VDI 3323

	-						MM	MM HCD100° - 120° Drilling & Countersinking					
			Tensile Strength	Hardness	Material Group		D= .314389 D	= .394508	D= .512626 D	= .629705 D	= .708999		
ISO	Material	Condition	[Kpsi]	[HB]	No.	V [sfm]			F _{rev} (inch/rev)				
	<0.25% C	annealed	61	125	1								
	≥0.25% C	annealed	94	190	2	- 330- <mark>525</mark> -720 -							
	non-alloy steel and cast <0.55% C steel, free	quenched and tempered	123	250	3		.002 .003	.0024 .004	.0024 .004	.0024	.0024 . <mark>005</mark>		
	cutting steel	annealed	109	220	4		.003	.004	.004	.004 .0075	.005		
	≥0.55% C	quenched and tempered	145	300	5	330-							
		annealed	87	200	6	<mark>460</mark> -655							
Ρ	low alloy and cast steel (less than 5% of alloying elements)	 	135	275	7		.002 .002						
		quenched and tempered	145	300	8				.002	.002	.002		
			174	350	9		.003 .0035	. <mark>0032</mark> .0075	.003 .005	.0035 .006	.0075 .008		
	high allowed steel east	annealed	99	200	10	265- 430-590		10010			1000		
	high alloyed steel, cast steel and tool steel	quenched and tempered	160	325	11								
	stainless steel	ferritic / martensitic	99	200	12		.002 .0024	.002 . <mark>0028</mark>	.002 .0031	.002 . <mark>0031</mark> .0043	.002 . <mark>0035</mark>		
	and cast steel	martensitic	119	240	13		.0031	.0035	.0039		.0051		
м	stainless steel and cast steel	austenitic, duplex	87	180	14								
		ferritic / pearlitic		180	15								
	gray cast iron (GG)	pearlitic / martensitic		260	16	330-	.0016	.002	.002	.002	.002		
K	nodular agat iron (000)	ferritic		160	17	525 -755	.0024	.0028	.0031	.0031	.0035		
	nodular cast iron (GGG)	pearlitic		250	18		.0031	.0035	.0039	.0043	.0051		
	malloable cost iron	ferritic		130	19]							
	malleable cast iron	pearlitic		230	20								
	Recommonded outting dat						· · · · · ·		·	4			

Recommended cutting data

When drilling with **MULTI-MASTER** tools that mount MM HCD ... heads, the maximum drilling depth depends on multiple factors such as the material being machined, the tool overhang and coolant supply for which the drilling depth should be adjusted accordingly. In some cases, drilling with peck feed ("pecking") provides an effective alternative solution.

General Drilling Guidelines for MM HCD ... Heads

Machined Materials

Group 1 - Most recommended: steel, ferritic and martensitic stainless steel, cast iron. Group 2 - Secondary application: austenitic and austenitic-ferritic (duplex) stainless steel.

Estimated Maximum Drilling Depth

APMX for material group 1 0.6×APMX for material group 2 where APMX is the catalogue parameter that relates to the head's maximum depth of cut (D.O.C.).