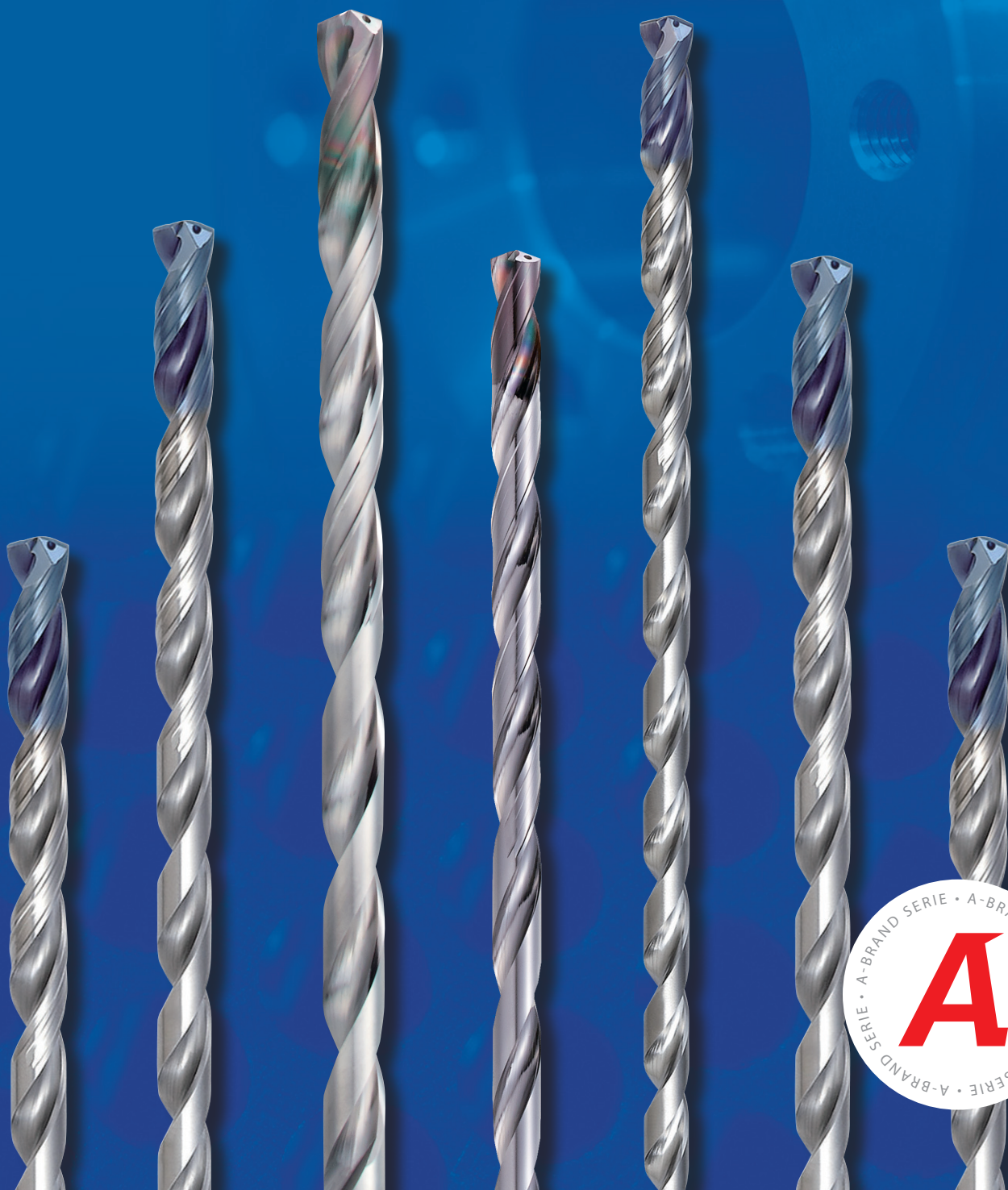




Carbide long drills with oil holes

DEEP HOLE DRILLS

Volume 1.1



INDEX

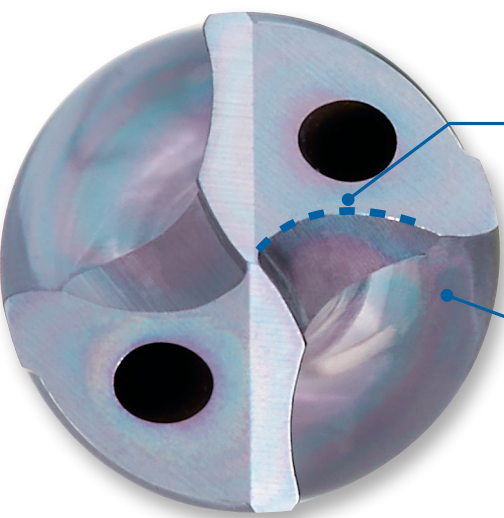
DEEP HOLE DRILLS

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TECHNICAL INFORMATION DEEP HOLE DRILLING

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ENTER THE WORLD OF ULTRA-EFFICIENT DEEP-HOLE 50XD DRILLING



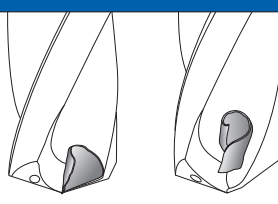
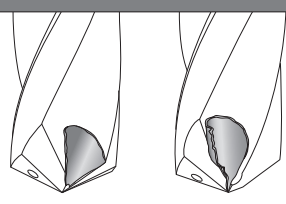
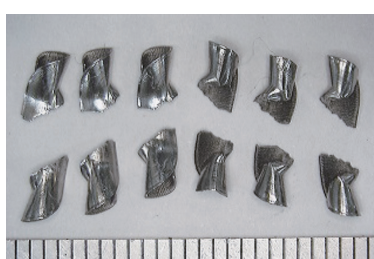
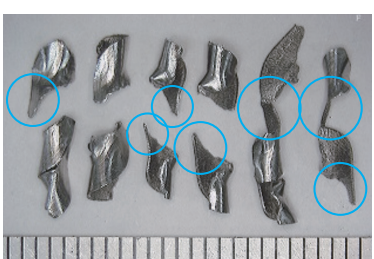
R Gash
Unique R gash geometry enables super low cutting resistance and exceptional chip control

New flute specification
New flute specification with smooth chip evacuation and high tool rigidity qualities ideal for ultra-deep-hole applications

Highly rigid 25°helical flute

R Gash Geometry

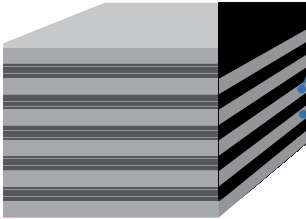
Breaks chips into small and manageable pieces with superior chip evacuation capability

ADO-40D-50D (R Gash)	Competitor (Straight Gash)
 Chips are curled tightly with no elongation	 Chips are loosely curled and are prone to elongation
	

Work Material: SUS304

EgiAs Coating

EgiAs coating with high toughness and wear resistance characteristics
Constructed with extreme toughness, high wear and heat resistance characteristics to ensure stable and consistent tool life.

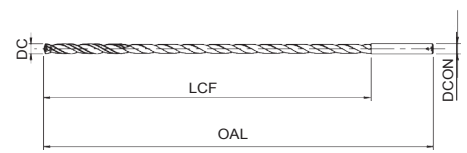
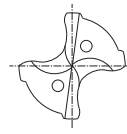
Wear Resistance

Nano Periodical Layer

Coating Color	Coating Structure	Hardness (GPa)	Oxidation Temperature (C°)	Heat Resistance	Adhesion Strength	Surface Roughness	Wear Resistance	Welding Resistance	Toughness
Interference Color	Periodic Nano-layered	40	1.100	☉	☉	○	☉	☉	☉

ADO-10D

Drilling | Solid carbide | 10xD

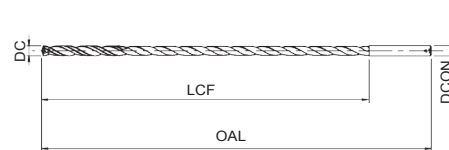


- First choice in quality and performance
- Carbide drill with internal coolant, EgiAs coating
- Double margin, up to 10xD
- For general purpose steels and cast iron
- 102 sizes



EDP	DC	LCF	OAL	DCON	EDP	DC	LCF	OAL	DCON
8696200	2	26	75	3	8710660	6,6	87	140	8
8696210	2,1	33	75	3	8710670	6,7	87	140	8
8696220	2,2	33	75	3	8710680	6,8	90	140	8
8696230	2,3	33	75	3	8710690	6,9	90	140	8
8696240	2,4	33	75	3	8710700	7	90	140	8
8696250	2,5	33	75	3	8710710	7,1	100	155	8
8696260	2,6	40	90	3	8710720	7,2	100	155	8
8696270	2,7	40	90	3	8710730	7,3	100	155	8
8696280	2,8	40	90	3	8710740	7,4	100	155	8
8696290	2,9	40	90	3	8696750	7,5	100	155	8
8696300	3	40	90	3	8710760	7,6	105	155	8
8696310	3,1	45	100	4	8710770	7,7	105	155	8
8696320	3,2	45	100	4	8710780	7,8	105	155	8
8696330	3,3	45	100	4	8710790	7,9	105	155	8
8696340	3,4	50	100	4	8696800	8	105	155	8
8696350	3,5	50	100	4	8710810	8,1	110	165	10
8696360	3,6	50	100	4	8710820	8,2	110	165	10
8696370	3,7	50	100	4	8710830	8,3	110	165	10
8696380	3,8	50	100	4	8710840	8,4	110	165	10
8696390	3,9	50	100	4	8710850	8,5	110	165	10
8696400	4	50	100	4	8710860	8,6	115	165	10
8710410	4,1	55	115	6	8710870	8,7	115	165	10
8710420	4,2	55	115	6	8710880	8,8	115	165	10
8710430	4,3	60	115	6	8710890	8,9	115	165	10
8710440	4,4	60	115	6	8710900	9	115	165	10
8710450	4,5	60	115	6	8710910	9,1	125	190	10
8710460	4,6	60	115	6	8710920	9,2	125	190	10
8710470	4,7	65	115	6	8710930	9,3	125	190	10
8710480	4,8	65	115	6	8710940	9,4	125	190	10
8710490	4,9	65	115	6	8696950	9,5	125	190	10
8710500	5	65	115	6	8710960	9,6	130	190	10
8710510	5,1	70	128	6	8710970	9,7	130	190	10
8710520	5,2	70	128	6	8710980	9,8	130	190	10
8710530	5,3	70	128	6	8710990	9,9	130	190	10
8710540	5,4	78	128	6	8697000	10	130	190	10
8696550	5,5	78	128	6	8711010	10,1	140	205	12
8710560	5,6	78	128	6	8711020	10,2	140	205	12
8710570	5,7	78	128	6	8711030	10,3	140	205	12
8710580	5,8	78	128	6	8711040	10,4	140	205	12
8710590	5,9	78	128	6	8711050	10,5	140	205	12
8696600	6	78	128	6	8711060	10,6	140	205	12
8710610	6,1	87	140	8	8711070	10,7	140	205	12
8710620	6,2	87	140	8	8711080	10,8	145	205	12
8710630	6,3	87	140	8	8711090	10,9	145	205	12
8710640	6,4	87	140	8	8711100	11	145	205	12
8710650	6,5	87	140	8	8711110	11,1	155	215	12

Drilling | Solid carbide | 10xD

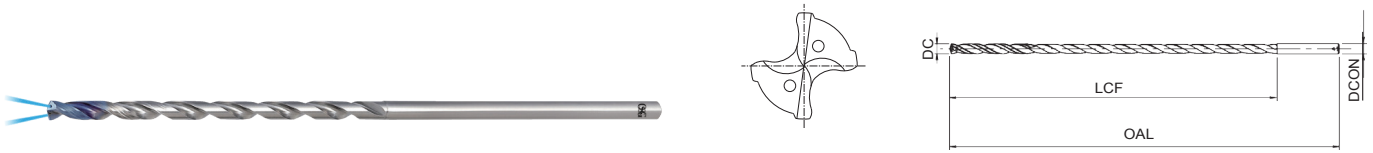


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- PAGE 15**

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ADO-15D NEW SIZES

Drilling | Solid carbide | 15xD



- First choice in quality and performance
- Carbide drill with internal coolant, EgiAs coating
- Double margin, up to 15xD
- For general purpose steels and cast iron
- 102 sizes



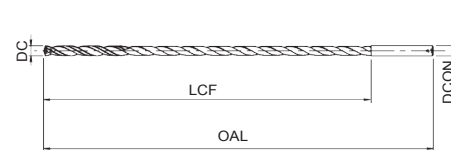
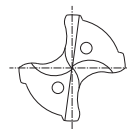
EDP	DC	LCF	OAL	DCON	EDP	DC	LCF	OAL	DCON
48338120	2	36	90	3	8712660	6,6	120	175	8
48338121	2,1	38	90	3	8712670	6,7	120	175	8
48338122	2,2	40	90	3	8712680	6,8	125	175	8
48338123	2,3	42	90	3	8712690	6,9	125	175	8
48338124	2,4	44	90	3	8712700	7	125	175	8
48338125	2,5	45	96	3	8712710	7,1	135	195	8
48338126	2,6	47	96	3	8712720	7,2	135	195	8
48338127	2,7	49	96	3	8712730	7,3	135	195	8
48338128	2,8	51	96	3	8712740	7,4	135	195	8
48338129	2,9	53	96	3	8698750	7,5	135	195	8
8698300	3	55	105	3	8712760	7,6	145	195	8
8698310	3,1	60	125	4	8712770	7,7	145	195	8
8698320	3,2	60	125	4	8712780	7,8	145	195	8
8698330	3,3	60	125	4	8712790	7,9	145	195	8
8698340	3,4	65	125	4	8698800	8	145	195	8
8698350	3,5	65	125	4	8712810	8,1	155	210	10
8698360	3,6	65	125	4	8712820	8,2	155	210	10
8698370	3,7	65	125	4	8712830	8,3	155	210	10
8698380	3,8	75	125	4	8712840	8,4	155	210	10
8698390	3,9	75	125	4	8712850	8,5	155	210	10
8698400	4	75	125	4	8712860	8,6	160	210	10
8712410	4,1	75	140	6	8712870	8,7	160	210	10
8712420	4,2	75	140	6	8712880	8,8	160	210	10
8712430	4,3	85	140	6	8712890	8,9	160	210	10
8712440	4,4	85	140	6	8712900	9	160	210	10
8712450	4,5	85	140	6	8712910	9,1	170	240	10
8712460	4,6	85	140	6	8712920	9,2	170	240	10
8712470	4,7	85	140	6	8712930	9,3	170	240	10
8712480	4,8	90	140	6	8712940	9,4	170	240	10
8712490	4,9	90	140	6	8698950	9,5	170	240	10
8712500	5	90	140	6	8712960	9,6	180	240	10
8712510	5,1	95	160	6	8712970	9,7	180	240	10
8712520	5,2	95	160	6	8712980	9,8	180	240	10
8712530	5,3	95	160	6	8712990	9,9	180	240	10
8712540	5,4	110	160	6	8699000	10	180	240	10
8698550	5,5	110	160	6	8713010	10,1	190	260	12
8712560	5,6	110	160	6	8713020	10,2	190	260	12
8712570	5,7	110	160	6	8713030	10,3	190	260	12
8712580	5,8	110	160	6	8713040	10,4	190	260	12
8712590	5,9	110	160	6	8713050	10,5	190	260	12
8698600	6	110	160	6	8713060	10,6	190	260	12
8712610	6,1	120	175	8	8713070	10,7	200	260	12
8712620	6,2	120	175	8	8713080	10,8	200	260	12
8712630	6,3	120	175	8	8713090	10,9	200	260	12
8712640	6,4	120	175	8	8713100	11	200	260	12
8712650	6,5	120	175	8	8713110	11,1	210	280	12

Solid carbide

Drilling |

15xD

Drilling | Solid carbide | 15xD

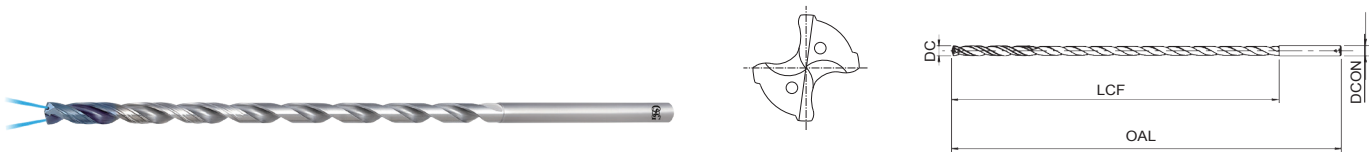


- First choice in quality and performance
- Carbide drill with internal coolant, EgiAs coating
- Double margin, up to 15xD
- For general purpose steels and cast iron
- 102 sizes

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ADO-20D NEW SIZES

Drilling | Solid carbide | 20xD

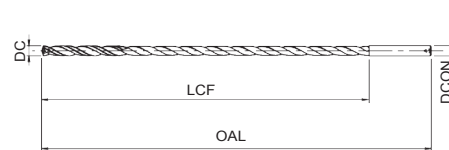


- First choice in quality and performance
- Carbide drill with internal coolant, EgiAs coating
- Double margin, up to 20xD
- For general purpose steels and cast iron
- 102 sizes



EDP	DC	LCF	OAL	DCON	EDP	DC	LCF	OAL	DCON
48338220	2	46	100	3	8714660	6,6	155	210	8
48338221	2,1	49	100	3	8714670	6,7	155	210	8
48338222	2,2	51	100	3	8714680	6,8	160	210	8
48338223	2,3	53	100	3	8714690	6,9	160	210	8
48338224	2,4	56	100	3	8714700	7	160	210	8
48338225	2,5	58	109	3	8714710	7,1	170	230	8
48338226	2,6	60	109	3	8714720	7,2	170	230	8
48338227	2,7	63	109	3	8714730	7,3	170	230	8
48338228	2,8	65	109	3	8714740	7,4	170	230	8
48338229	2,9	67	109	3	8706750	7,5	170	230	8
8706300	3	70	120	3	8714760	7,6	180	230	8
8706310	3,1	80	140	4	8714770	7,7	180	230	8
8706320	3,2	80	140	4	8714780	7,8	180	230	8
8706330	3,3	80	140	4	8714790	7,9	180	230	8
8706340	3,4	85	140	4	8706800	8	180	230	8
8706350	3,5	85	140	4	8714810	8,1	195	260	10
8706360	3,6	85	140	4	8714820	8,2	195	260	10
8706370	3,7	85	140	4	8714830	8,3	195	260	10
8706380	3,8	90	140	4	8714840	8,4	195	260	10
8706390	3,9	90	140	4	8714850	8,5	195	260	10
8706400	4	90	140	4	8714860	8,6	210	260	10
8714410	4,1	100	165	6	8714870	8,7	210	260	10
8714420	4,2	100	165	6	8714880	8,8	210	260	10
8714430	4,3	110	165	6	8714890	8,9	210	260	10
8714440	4,4	110	165	6	8714900	9	210	260	10
8714450	4,5	110	165	6	8714910	9,1	220	290	10
8714460	4,6	110	165	6	8714920	9,2	220	290	10
8714470	4,7	110	165	6	8714930	9,3	220	290	10
8714480	4,8	115	165	6	8714940	9,4	220	290	10
8714490	4,9	115	165	6	8706950	9,5	220	290	10
8714500	5	115	165	6	8714960	9,6	230	290	10
8714510	5,1	120	190	6	8714970	9,7	230	290	10
8714520	5,2	120	190	6	8714980	9,8	230	290	10
8714530	5,3	120	190	6	8714990	9,9	230	290	10
8714540	5,4	140	190	6	8707000	10	230	290	10
8706550	5,5	140	190	6	8715010	10,1	250	310	12
8714560	5,6	140	190	6	8715020	10,2	250	310	12
8714570	5,7	140	190	6	8715030	10,3	250	310	12
8714580	5,8	140	190	6	8715040	10,4	250	310	12
8714590	5,9	140	190	6	8715050	10,5	250	310	12
8706600	6	140	190	6	8715060	10,6	250	310	12
8714610	6,1	155	210	8	8715070	10,7	250	310	12
8714620	6,2	155	210	8	8715080	10,8	250	310	12
8714630	6,3	155	210	8	8715090	10,9	250	310	12
8714640	6,4	155	210	8	8715100	11	250	310	12
8714650	6,5	155	210	8	8715110	11,1	270	330	12

Drilling | Solid carbide | 20xD



- | | | | | | | | |
|--|--|--|--|--|--|--|--|
| P  | P  | P  | P  | M  | K  | K  | H  |
| $C < 0,2\%$ | $0,25 < C < 0,4$ | $C \geq 0,45\%$ | SCM | INOX | GG | GGG | 25-35 HRC |

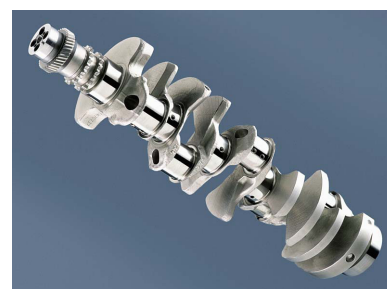
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ADO-25D

Drilling | Solid carbide | 25xD



- First choice in quality and performance
- Carbide drill with internal coolant, EgiAs coating
- Double margin, up to 25xD
- For general purpose steels and cast iron
- 92 sizes



Ideal for drilling oil channels in crankshafts



EDP	DC	LCF	OAL	DCON
48338325	2,5	70	121	3
8726300	3	85	135	3
8724310	3,1	95	165	4
8724320	3,2	95	165	4
8724330	3,3	95	165	4
8724340	3,4	105	165	4
8724350	3,5	105	165	4
8724360	3,6	105	165	4
8724370	3,7	105	165	4
8724380	3,8	115	165	4
8724390	3,9	115	165	4
8724400	4	115	165	4
8724410	4,1	120	190	6
8724420	4,2	120	190	6
8724430	4,3	135	190	6
8724440	4,4	135	190	6
8724450	4,5	135	190	6
8724460	4,6	135	190	6
8724470	4,7	135	190	6
8724480	4,8	140	190	6
8724490	4,9	140	190	6
8724500	5	140	190	6
8724510	5,1	150	220	6
8724520	5,2	150	220	6
8724530	5,3	150	220	6
8724540	5,4	170	220	6
8724550	5,5	170	220	6
8724560	5,6	170	220	6
8724570	5,7	170	220	6
8724580	5,8	170	220	6
8724590	5,9	170	220	6
8724600	6	170	220	6
8724610	6,1	190	250	8
8724620	6,2	190	250	8
8724630	6,3	190	250	8
8724640	6,4	190	250	8
8724650	6,5	190	250	8
8724660	6,6	190	250	8
8724670	6,7	190	250	8
8724680	6,8	200	250	8
8724690	6,9	200	250	8
8724700	7	200	250	8
8724710	7,1	210	275	8
8724720	7,2	210	275	8
8724730	7,3	210	275	8
8724740	7,4	210	275	8

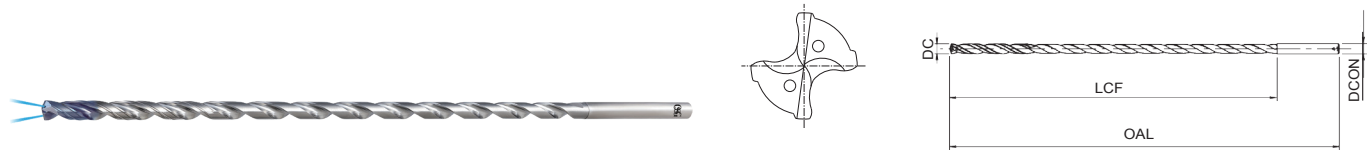
EDP	DC	LCF	OAL	DCON
8724750	7,5	210	275	8
8724760	7,6	225	275	8
8724770	7,7	225	275	8
8724780	7,8	225	275	8
8724790	7,9	225	275	8
8724800	8	225	275	8
8724810	8,1	240	305	10
8724820	8,2	240	305	10
8724830	8,3	240	305	10
8724840	8,4	240	305	10
8724850	8,5	240	305	10
8724860	8,6	255	305	10
8724870	8,7	255	305	10
8724880	8,8	255	305	10
8724890	8,9	255	305	10
8724900	9	255	305	10
8724910	9,1	270	340	10
8724920	9,2	270	340	10
8724930	9,3	270	340	10
8724940	9,4	270	340	10
8724950	9,5	270	340	10
8724960	9,6	280	340	10
8724970	9,7	280	340	10
8724980	9,8	280	340	10
8724990	9,9	280	340	10
8725000	10	280	340	10
8725010	10,1	310	370	12
8725020	10,2	310	370	12
8725030	10,3	310	370	12
8725040	10,4	310	370	12
8725050	10,5	310	370	12
8725060	10,6	310	370	12
8725070	10,7	310	370	12
8725080	10,8	310	370	12
8725090	10,9	310	370	12
8725100	11	310	370	12
8725110	11,1	340	400	12
8725120	11,2	340	400	12
8725130	11,3	340	400	12
8725140	11,4	340	400	12
8725150	11,5	340	400	12
8725160	11,6	340	400	12
8725170	11,7	340	400	12
8725180	11,8	340	400	12
8725190	11,9	340	400	12
8725200	12	340	400	12

Drilling | Solid carbide

25xD

ADO-30D NEW SIZES

Drilling | Solid carbide | 30xD



- First choice in quality and performance
- Carbide drill with internal coolant, EgiAs coating
- Double margin, up to 30xD
- For general purpose steels and cast iron
- 81 sizes

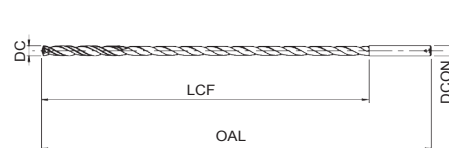
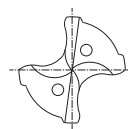


EDP	DC	LCF	OAL	DCON	EDP	DC	LCF	OAL	DCON
48338420	2	66	120	3	8716660	6,6	215	280	8
48338421	2,1	70	120	3	8716670	6,7	215	280	8
48338422	2,2	73	120	3	8716680	6,8	230	280	8
48338423	2,3	76	120	3	8716690	6,9	230	280	8
48338424	2,4	80	120	3	8716700	7	230	280	8
48338425	2,5	83	134	3	8716710	7,1	250	315	8
48338426	2,6	86	134	3	8716720	7,2	250	315	8
48338427	2,7	90	134	3	8716730	7,3	250	315	8
48338428	2,8	93	134	3	8716740	7,4	250	315	8
48338429	2,9	96	134	3	8708750	7,5	250	315	8
8708300	3	100	150	3	8716760	7,6	265	315	8
8708310	3,1	102	185	4	8716770	7,7	265	315	8
8708320	3,2	105	185	4	8716780	7,8	265	315	8
8708330	3,3	109	185	4	8716790	7,9	265	315	8
8708340	3,4	112	185	4	8708800	8	265	315	8
8708350	3,5	116	185	4	8716810	8,1	280	350	10
8708360	3,6	116	185	4	8716820	8,2	280	350	10
8708370	3,7	116	185	4	8716830	8,3	280	350	10
8708380	3,8	132	185	4	8716840	8,4	280	350	10
8708390	3,9	132	185	4	8716850	8,5	280	350	10
8708400	4	132	185	4	8716860	8,6	300	350	10
8716410	4,1	140	215	6	8716870	8,7	300	350	10
8716420	4,2	140	215	6	8716880	8,8	300	350	10
8716430	4,3	150	215	6	8716890	8,9	300	350	10
8716440	4,4	150	215	6	8716900	9	300	350	10
8716450	4,5	150	215	6	8716910	9,1	315	390	10
8716460	4,6	150	215	6	8716920	9,2	315	390	10
8716470	4,7	150	215	6	8716930	9,3	315	390	10
8716480	4,8	165	215	6	8716940	9,4	315	390	10
8716490	4,9	165	215	6	8708950	9,5	315	390	10
8716500	5	165	215	6	8716960	9,6	330	390	10
8716510	5,1	180	250	6	8716970	9,7	330	390	10
8716520	5,2	180	250	6	8716980	9,8	330	390	10
8716530	5,3	180	250	6	8716990	9,9	330	390	10
8716540	5,4	200	250	6	8709000	10	330	390	10
8708550	5,5	200	250	6					
8716560	5,6	200	250	6					
8716570	5,7	200	250	6					
8716580	5,8	200	250	6					
8716590	5,9	200	250	6					
8708600	6	200	250	6					
8716610	6,1	215	280	8					
8716620	6,2	215	280	8					
8716630	6,3	215	280	8					
8716640	6,4	215	280	8					
8716650	6,5	215	280	8					

- 
- PAGE 15**

[illegible]

Drilling | Solid carbide | 50xD



- | | | | | | | | |
|--|--|--|--|--|--|--|--|
| P  | P  | P  | P  | M  | K  | K  | H  |
| C < 0,2% | 0,25 < C < 0,4 | C ≥ 0,45% | SCM | INOX | GG | GGG | 25-35 HRC |



CARBIDE



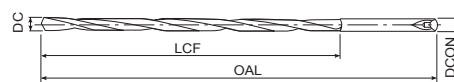
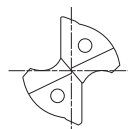
25°



EDP	DC	LCF	OAL	DCON
8718300	3	159	209	3
8718301	NEW 3,175	169	220	4
8718320	NEW 3,2	170	220	4
8718350	NEW 3,5	186	247	4
8718400	4	212	262	4
8718450	NEW 4,5	239	303	6
8718500	5	265	315	5
8718501	NEW 5	265	315	6
8718540	NEW 5,4	287	337	6
8718550	NEW 5,5	292	353	6
8718570	NEW 5,7	303	353	6
8718600	6	318	368	6
8718620	NEW 6,2	329	382	8
8718630	NEW 6,3	334	393	8
8718635	NEW 6,35	337	393	8
8718640	NEW 6,4	340	393	8
8718650	NEW 6,5	345	409	8
8718680	NEW 6,8	361	421	8
8718700	NEW 7	371	421	8
8718750	NEW 7,5	398	459	8
8718770	NEW 7,7	409	459	8
8718800	8	424	474	8
8718820	NEW 8,2	435	490	10
8718830	NEW 8,3	440	500	10
8718840	NEW 8,4	446	500	10
8718850	NEW 8,5	450	500	10

[illegible]

Drilling | Solid carbide | 15xD / 20xD / 30xD



- | | | |
|---|----------------------------------|---------|
| N | ☐ | AI |
| N | ☒ | AC, ADC |

[illegible][illegible]

CUTTING CONDITIONS

Drilling | Solid | Cutting conditions

ADO-10D/15D/20D/25D/30D

	Mild Steel - Low Carbon Steel SS400 • S10C ~150HB ~500 N/mm ²		Carbon Steel S35C • S50C ~210HB ~710 N/mm ²		Alloys Steel SCM • SCr • SNCM 16~28HRC 710~900 N/mm ²		Cast Iron FC250 ~350 N/mm ²		Ductile Cast Iron FCD450 • FCD600 400~600 N/mm ²		Stainless Steel SUS400 400 ~ 800 N/mm ²	
Vc	60 ~ 125 m/min		60 ~ 125 m/min		60 ~ 125 m/min		60 ~ 125 m/min		50 ~ 80 m/min		40 ~ 80 m/min	
Ø	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)
2	11.000	0,04 ~ 0,08	11.000	0,04 ~ 0,08	11.000	0,04 ~ 0,08	11.000	0,04 ~ 0,08	11.000	0,04 ~ 0,08	8.000	0,04 ~ 0,08
3	7.500	0,06 ~ 0,12	7.500	0,06 ~ 0,12	7.500	0,06 ~ 0,12	7.500	0,06 ~ 0,12	7.500	0,06 ~ 0,12	5.300	0,06 ~ 0,12
4	6.400	0,08 ~ 0,16	6.400	0,08 ~ 0,16	6.400	0,08 ~ 0,16	6.400	0,08 ~ 0,16	5.600	0,08 ~ 0,16	5.000	0,08 ~ 0,16
5	5.800	0,10 ~ 0,20	5.800	0,10 ~ 0,20	5.800	0,10 ~ 0,20	5.800	0,10 ~ 0,20	4.500	0,10 ~ 0,20	4.500	0,10 ~ 0,20
6	4.800	0,12 ~ 0,24	4.800	0,12 ~ 0,24	4.800	0,12 ~ 0,24	4.800	0,12 ~ 0,24	3.800	0,12 ~ 0,24	3.800	0,12 ~ 0,24
8	3.600	0,16 ~ 0,28	3.600	0,16 ~ 0,28	3.600	0,16 ~ 0,28	3.600	0,16 ~ 0,28	2.800	0,16 ~ 0,28	2.800	0,16 ~ 0,28
10	2.900	0,20 ~ 0,35	2.900	0,20 ~ 0,35	2.900	0,20 ~ 0,35	2.900	0,20 ~ 0,35	2.300	0,20 ~ 0,35	2.300	0,20 ~ 0,35
12	2.400	0,24 ~ 0,42	2.400	0,24 ~ 0,42	2.400	0,24 ~ 0,42	2.400	0,24 ~ 0,42	1.900	0,24 ~ 0,42	1.900	0,24 ~ 0,42

ADO-40D/50D

	Mild Steel - Low Carbon Steel SS400 • S10C ~150HB ~500 N/mm ²		Carbon Steel S35C • S50C ~210HB ~710 N/mm ²		Alloy Steel SCM • SCr • sncm 16~28HRC 710 ~ 900 N/mm ²		Alloy Steel (C ≥ 0,3%) SCM440 28~35HRC 900~1,060N/mm ²	
Vc	60~90m/min		60~90m/min		50~80m/min		40~70m/min	
Ø	S (min ⁻¹)	f (mm/rev.)	S (min ⁻¹)	f (mm/rev.)	S (min ⁻¹)	f (mm/rev.)	S (min ⁻¹)	f (mm/rev.)
3	7.500	0,06 ~ 0,12	7.500	0,06 ~ 0,12	6.400	0,06 ~ 0,12	5.300	0,06 ~ 0,11
4	5.600	0,08 ~ 0,16	5.600	0,08 ~ 0,16	4.800	0,08 ~ 0,16	4.000	0,08 ~ 0,14
5	4.500	0,1 ~ 0,2	4.500	0,1 ~ 0,2	3.800	0,1 ~ 0,2	3.200	0,1 ~ 0,17
6	3.700	0,12 ~ 0,24	3.700	0,12 ~ 0,24	3.200	0,12 ~ 0,24	2.700	0,12 ~ 0,21
8	2.800	0,16 ~ 0,28	2.800	0,16 ~ 0,28	2.400	0,16 ~ 0,28	2.000	0,16 ~ 0,24
10	2.300	0,2 ~ 0,35	2.300	0,2 ~ 0,35	1.900	0,2 ~ 0,35	1.600	0,2 ~ 0,3

	Cast Iron FC250 ~350N/mm ²		Ductile Cast Iron FCD450 - FCD600 400 ~ 600 N/mm ²		Stainless Steel SUS300/400 480 ~ 800 N/mm ²	
Vc	60~90m/min		50~80m/min		40~60m/min	
Ø	S (min ⁻¹)	f (mm/rev.)	S (min ⁻¹)	f (mm/rev.)	S (min ⁻¹)	f (mm/rev.)
3	7.500	0,06 ~ 0,12	6.400	0,06 ~ 0,12	5.300	0,06 ~ 0,12
4	5.600	0,08 ~ 0,16	4.800	0,08 ~ 0,16	4.000	0,08 ~ 0,16
5	4.500	0,1 ~ 0,2	3.800	0,1 ~ 0,2	3.200	0,1 ~ 0,2
6	3.700	0,12 ~ 0,24	3.200	0,12 ~ 0,24	2.700	0,12 ~ 0,24
8	2.800	0,16 ~ 0,28	2.400	0,16 ~ 0,28	2.000	0,16 ~ 0,28
10	2.300	0,2 ~ 0,35	1.900	0,2 ~ 0,35	1.600	0,2 ~ 0,35

1. The indicated speeds and feeds are for drilling with water-soluble coolant or MQL (mist drilling in stainless steels is not recommended).
2. Water-soluble high density coolant (20-30 times dilution) is recommended.
3. When using non-water-soluble coolant, set the cutting speed between 70-100% of the lowest limit.
4. Make a pilot hole before using in accordance with the recommended operation.
5. A clogged oil hole can lead to breakage. Make sure that a filter is attached to the oil feeder.
6. Peck drilling of 1D - 2D is strongly recommended.

*If it is difficult to process or if the straightness of the hole needed to be improved, use the coolant-through carbide drill ADO-20/30D after drilling a pilot hole, then process with the ADO-40/50D. When processing with 3 tools, the ADO-40/50D may be used at a more aggressive cutting condition than those listed above.

CAO-GDXL

Standard drilling

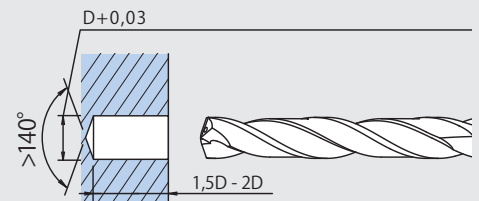
	AC ADC • AC		AI A20... • A70...		AI A50... • A60...		Cu C1020 • C1100		Cu CrCu	
Vc	80 ~ 200 m/min		60 ~ 120 m/min		80 ~ 200 m/min		80 ~ 200 m/min		60 ~ 120 m/min	
Ø	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)	S (min ⁻¹)	F (mm/rev.)
3	12.800	0,09~0,15	10.700	0,09~0,15	12.800	0,06~0,12	12.800	0,06~0,12	10.700	0,05~0,09
4	9.600	0,12~0,20	8.000	0,12~0,20	9.600	0,08~0,16	9.600	0,08~0,16	8.000	0,06~0,10
5	7.700	0,15~0,25	6.400	0,15~0,25	7.700	0,10~0,20	7.700	0,10~0,20	6.400	0,06~0,10
6	6.400	0,18~0,30	5.400	0,18~0,30	6.400	0,12~0,20	6.400	0,12~0,20	5.400	0,06~0,10
8	4.800	0,20~0,40	4.000	0,20~0,40	4.800	0,12~0,25	4.800	0,12~0,25	4.000	0,08~0,15
10	3.900	0,25~0,50	3.200	0,25~0,50	3.900	0,15~0,25	3.900	0,15~0,25	3.200	0,08~0,15

Strategy

10xD / 30xD applications

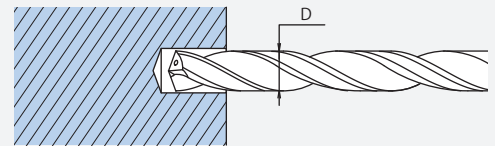
Drill pilot hole

- $\varnothing +0,03$ mm
- Point angle $>140^\circ$

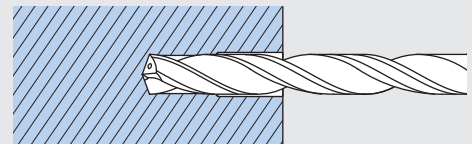


Insert ADO deep hole drill until 0,2 mm above hole bottom

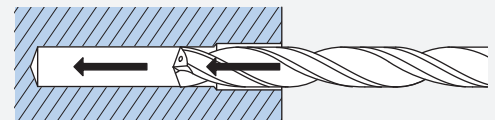
- $S = 500$ rev/min-1
- $V_f = 500$ mm/min
- Without coolant pressure



Launch coolant and machining RPM

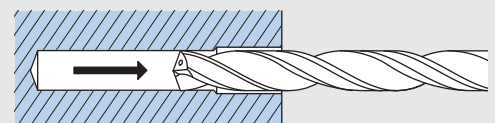


Feed rate 100% until final drilling depth



When reaching final drilling depth, lower the RPM to 500 rev/min. Reverse drill out of the hole with high feed (e.g. $V_f = 6.000$ mm/min).

Do not reverse with max. feed!



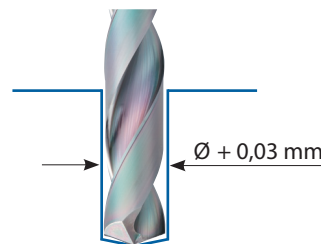
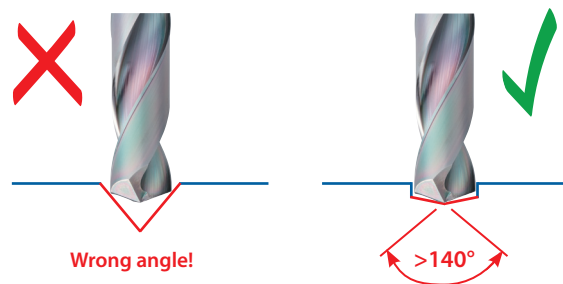
Drilling pilot hole

The point angle is important. It must always be larger than that of the following tool so that the point of the deep hole drill hits the center of the of the pilot hole exactly!

- Position accuracy
- Runout

The diameter should be slightly larger than that of the following tool!

- Friction
- Wear

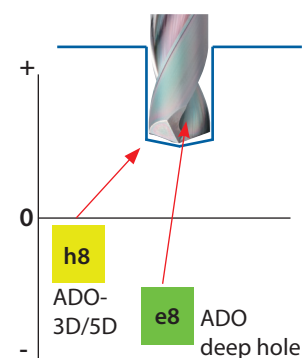
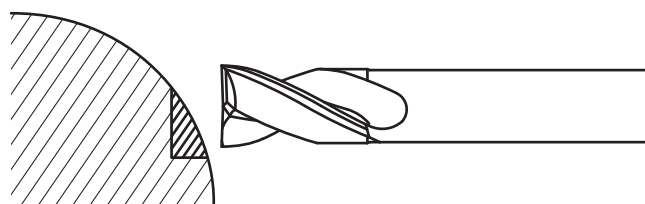
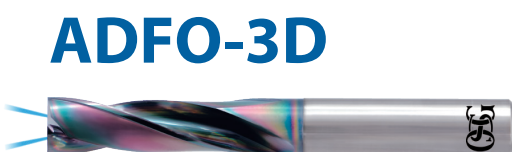


Possible pilot drills for ADO-10D to 50D

- ADO-3D/5D are manufactured with outer diameter tolerance h8 and point angle $>140^\circ$.
- ADO deep hole drills are manufactured with outer diameter tolerance e8 and point angle $<140^\circ$.
- ADO-PLT, point angle 160° , outer diameter $+ 0,03 \text{ mm}$

Pilot drilling on round / inclined surfaces

- The ADF(O) series drills are suitable for pilot drilling on round / inclined surfaces.



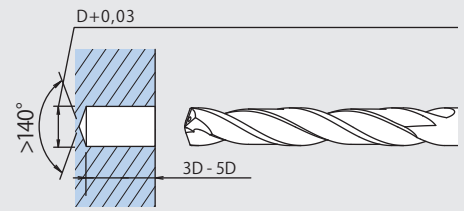
Dimensional tolerance for shafts, frequently used fits																	
Reference dimension (mm)		Tolerance limit class															
		b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7	h8
-	3	-140 -165	-60 -85	-20 -34	-20 -45	-14 -24	-14 -28	-14 -39	-6 -12	-6 -16	-6 -20	-2 -6	-2 -8	0 -4	0 -6	0 -10	0 -14
3	6	-140 -170	-70 -100	-30 -48	-30 -60	-20 -32	-20 -38	-20 -50	-10 -18	-10 -22	-10 -28	-4 -9	-4 -12	0 -5	0 -8	0 -12	0 -18
6	10	-150 -186	-80 -116	-40 -62	-40 -76	-25 -40	-25 -47	-25 -61	-13 -22	-13 -28	-13 -35	-5 -11	-5 -14	0 -6	0 -9	0 -15	0 -22
10	14	-150 -193	-95 -138	-50 -77	-50 -93	-32 -50	-32 -59	-32 -75	-16 -27	-16 -34	-16 -43	-6 -14	-6 -17	0 -8	0 -11	0 -18	0 -27
14	18																

Optimizing 40D / 50D drilling depths

The following measures are helpful for reliable implementation of drilling depths of up to 50xD!

Set deeper pilot hole (e.g. ADO-5D)

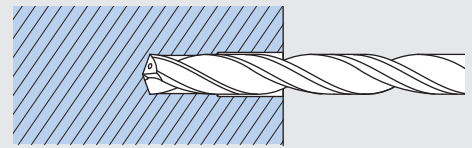
- Better guidance



Optional (recommended)

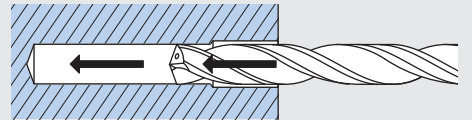
Use additional deep hole drill
(e.g. ADO-20D, ADO-30D)

- Less runout
- Possibly faster and therefore more economical



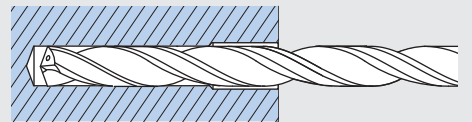
Insert ADO-40D/50D into pre-drilled hole
(keep approx. 0,2mm safety distance from hole bottom)

- Rotation **left**
- $S = 300-500$ rev/min
- Without coolant pressure



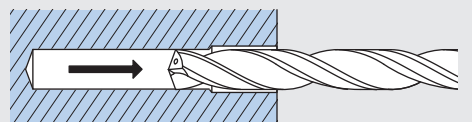
Finishing the deep hole with ADO-40D/50D

- Turn on coolant and machining rotation
- Feed rate 100% until final drilling depth



When reaching final drilling depth, lower the RPM
to 300-500 rev/min. Reverse drill out of the hole with
high feed (e.g. $V_f = 6.000$ mm/min).

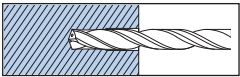
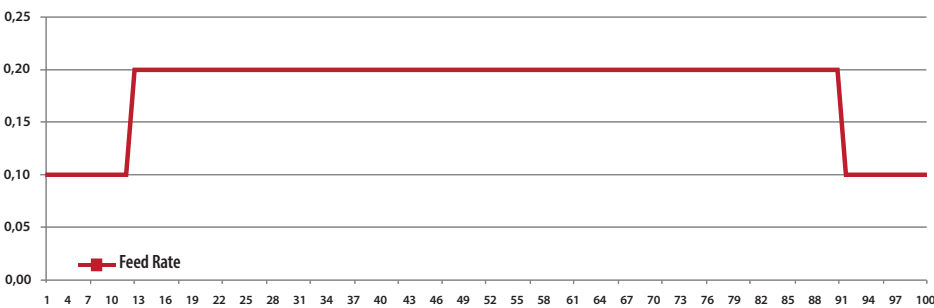
Do not reverse with max. feed!



Optimizing tool life

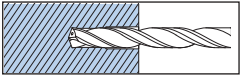
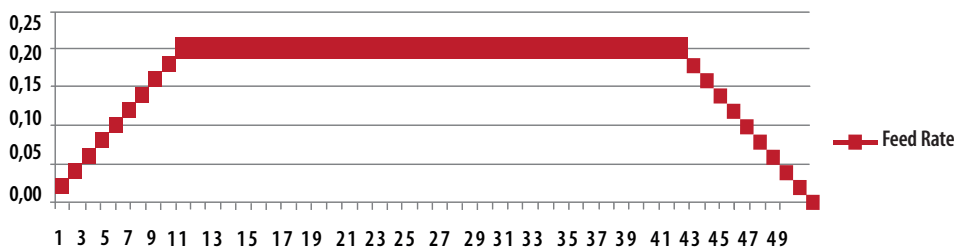
Strategies for optimizing the tool life

Pre-drilling with reduced feed rate



- Reduce feed rate to 50% until drill has reached 1xD drilling depth
- Reduce feed rate to 50% before drill exits hole

Pre-drilling with „FLIN“ (Siemens - Sinumerik)



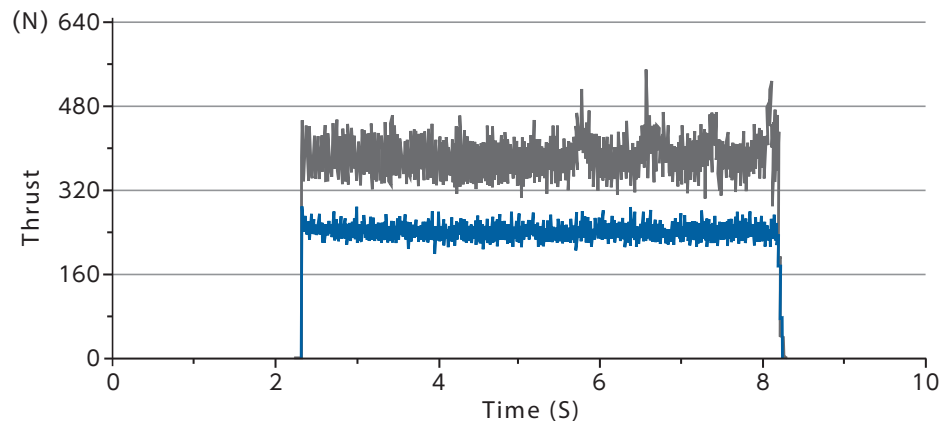
- Linear increase of feed rate from 50% to 100% until drill reaches 1xD depth
- Linear decrease of feed rate to 50% before drill exits the hole

Manufacturable range as special items

Ø	Max. OAL	Max. flute length	Max. drilling depth									"Unit (mm)"	
			50	100	150	200	250	300	350	400	450		
3	209	159			150								
~4	262	212				200							
~5	315	265					250						
~6	428	378							360				
~7	456	406								380			
~8	500	450									430		
~9	500	450									420		
~10	500	450									420		
~11	500	450									420		
~12	500	450									420		
~13	500	450									410		
~14	500	450									410		
~15	500	450									410		
~16	500	450								400			

Manufacturable range

Low Cutting Force



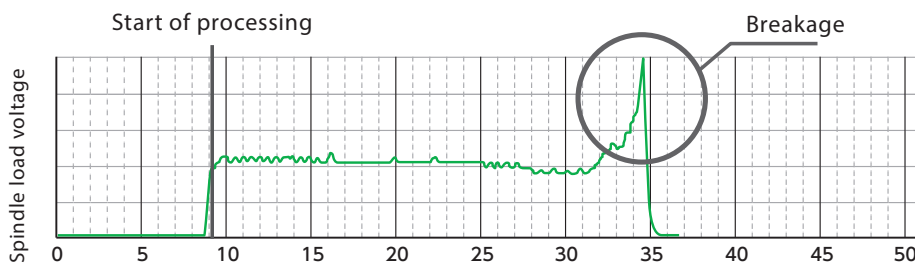
Size: Ø 3

Work Material: SCM440 (82~90HRB)

Cutting speed: 80m/min (8493min⁻¹)

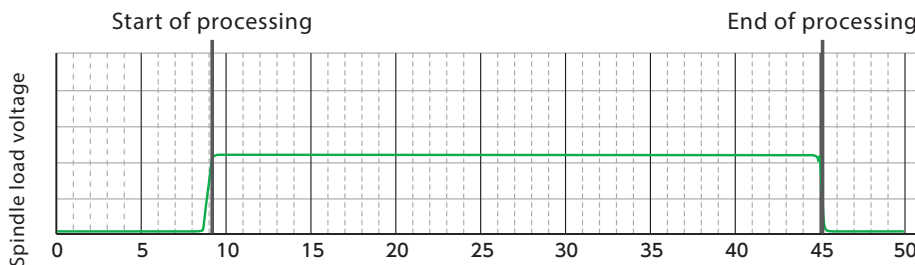
Feed: 1.188mm/min (0,14mm/rev)

25° Helix Angle Optimal for Ultra-Deep-Hole Drilling



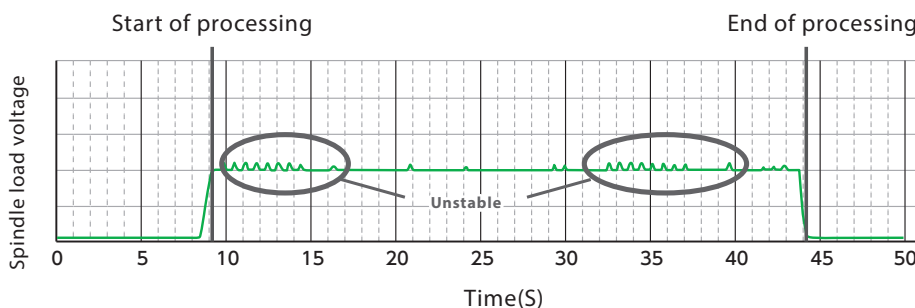
Helix Angle 20°

Insufficient helix angle causes clogging of chips and tool breakage



Helix Angle 25°

Stable performance



Helix Angle 30°

Low rigidity leads to unstable processing

Size: Ø 6x50D Work Material: SCM440 (82~90HRB) Depth of Hole: 300mm

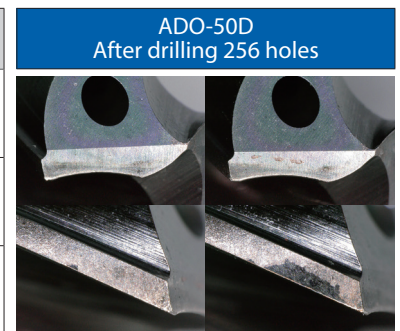
Long tool life even in ultra-deep-hole drilling applications

Size	Ø8
Work Material	SCM440 (Raw material)
Depth of Cut	391mm
Coolant	Water Soluble
Machine	Horizontal machining center

Tool	Second Step		
	1	2	3
	ADO-50D	Competitor	Gun Drill
Cutting Speed	62.8m/min (2,500min ⁻¹)	70m/min (2,787min ⁻¹)	60m/min (2,389min ⁻¹)
Feed	750mm/min (0.3mm/rev)	418mm/min (0.15mm/rev)	143mm/min (0.06mm/rev)

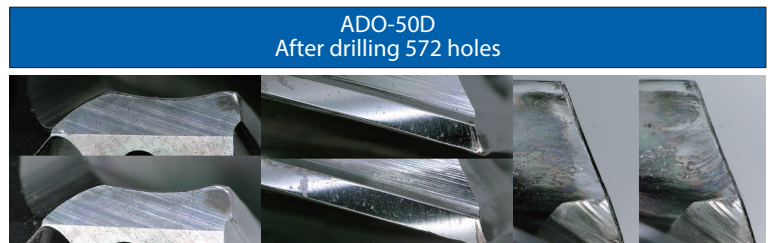
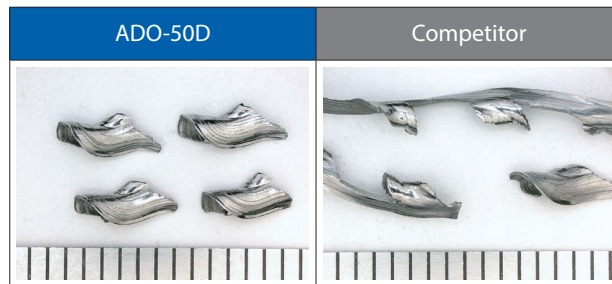
First Step: pilot hole at depth of 40mm

		Number of Holes		Cutting Time
		100	200	
1	ADO-50D	265 Holes Still Running		1'4"
2	Competitor	60 Holes	Breakage	1'29"
3	Gun Drill	65 Holes	Wear and replacement	3'17"



Effectively breaks chips into small and manageable pieces even in sticky work material

Tool	ADO-50D	Competitor 50D
Size	Ø5	
Work Material	SCM420H	
Cutting Speed	60m/min (3.822 min ⁻¹)	50m/min (3.185 min ⁻¹)
Feed	955m/min (0,25 mm/rev)	636m/min (0,2 mm/rev)
Depth of Hole	250mm (Blind)	
Coolant	Water-Soluble	
Machine	Multifunction Lathe	



	Number of Holes					
	100	200	300	400	500	600
ADO-50D	572 Holes Wear and replacement					
Competitor	360 Holes Breakage					

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