HSS non-step extra long drills 10D, 15D and 20D

TDXL

VOL. 4

Features: Four newly developed technologies including three patents pending

1. Newly developped flat flute (Pat. P)
2. Low-resistace thinning (Pat. P)
3. WXL coating for drills
4. Compound flute lead construction (Pat. P)

HSS Extra-long Drill

New flute shape (Pat. P.) dramatically improves chip evacuation

It is capable of non-step drilling from 10D up to 20D.

- Flute form

Highly rigid, wide flutes with smooth curves

Newly developed flat flute (Pat. P.)

- Chip shape when drilling S50C

The newly developed thinning (Pat. P.) exhibited half the thrust resistance (in-house comparison)

- Thinning Form

Sharp and low-thrust new thinning form

- Thrust Resistance

TDXL was tested at a depth of 20xD

The competitor's product with a shorter flute was tested at a depth of 15xD

HSS Extra-long Drill

Newly developed compound flute lead construction (Pat. P.)

The newly conceived flute design widens in the middle, significantly improving chip evacuation. Thanks to this, it is capable of non-step drilling of up to 20xD.

- Stable drilling power (spindle amperage)

New coating improves durability !

The newly developed WXL makes drills sparkle !

Processing Examples

Lower CO2 output than competitors

Tool	TDXL 10 X 10 D
Work Material	S50C (DIN CK50 AISI 1050)
Drilling Speed	25 m/min (796 min^{-1})
Feed	176 mm/min (0,22mm/rev) NON STEP
Depth of holes	100 mm (10D) (Blind)
Coolant	Water Soluble
Machine	Vertical Machining Center

Compared to the competitor's product, cut CO2 by 0,96 kg or 5,4% per 1000 holes !!

Compared to the competitor's product, the maximum thrust value is stable. Durability is 1,8 to 3 times greater!

Tool	TDXL 7 X 15 D
Work Material	S50C (DIN CK50 AISI 1050)
Drilling Speed	20 ~ 40 m/min (910 ~ 1.820min^{-1})
Feed	127 ~ 255 mm/min (0,14mm/rev) NON STEP
Depth of holes	99 mm (14 D) (Blind)
Coolant	Water Soluble
Machine	Horizontal Machining Center

Tool runhout under 2µm

- Drill for pilot hole

Tool	EX-GDS Ø 7,1
Depth of Holes	14 mm

Processing Examples

	Thrust		Torque	
TDXL				
Competitor A		High thrust		Torque increased at about 20xD
Competitor B		Thrust fluctuations		Torque increased at about 12xD
Competitor C				Despite its stable thrust, torque increased at the middle of the hole.
Competitor D				Torque fluctuations began at about 8xD

Compared to the competitor's product, the maximum thrust value is stable. Durability is 1,8 to 3 times greater!

Tool	TDXL 6×20D
Work Material	SCM420H (Simillar DIN 15CrMo5)
Drilling Speed	24m/min (1,273min^{-1})
Feed	190mm/min (0.15mm/rev) (Up to 112 holes) Non-step
	229mm/min (0.18mm/rev) (Until tool life) Non-Step
Depth of holes	120mm (20D) (Through)
Coolant	Water Soluble
Machine	Horizontal Machining Center

- Drill for pilot hole

Tool	EX-GDS Ø 6,1
Depth of Holes	15 mm

- Wear Condition

Processing Examples

Compared to the competitor's product, our drill was capable of drilling an overwhelming number of holes!

Tool	TDXL 1,6×20D	
Work Material	S50C (DIN CK50 AISI 1050)	
Drilling Speed	20 m/min (3.980 min^{-1})	
Feed	64 mm/min (0,016mm/rev) Non-step Up to 8 mm from beginning of hole	
	92 mm/min (0,023mm/rev) Non-step After 8 mm	
Depth of holes	32 mm (20 D)	Blind
Coolant	Water Soluble	
Machine	Vertical Machining Center	

- Drill for pilot hole

Tool	EX-GDS Ø 1,65
Depth of Holes	4,8 mm

Stable non-step drilling is possible even for material with 30 HRC

Tool	TDXL 10×10D	
Work Material	SCM 440 (30 HRC)	
Drilling Speed	16 m/min (509 min^{-1})	
Feed	112 mm/min (0,22mm/rev) Non-step	
Depth of holes	100 mm (10 D)	Blind
Coolant	Water Soluble	
Machine	Vertical Machining Center	

- Drill for pilot hole

Tool	EX-GDS Ø 10,1
Depth of Holes	20 mm

Competitor		Competitor after 8 holes
TDXL		TDXL after 93 holes

TDXL

HSS-Co | WXL | 40° | h7 | 120° | h8 | min⁻¹ P.10

Drills

- High performance
- HSS extra long drill
- Non step drilling 10 D, 15 D, 20 D
- Without internal coolant

- High performance
- HSS extra lange Bohrer
- Ohne Step 10 D, 15 D, 20 D
- Ohne innerer Kühlmittelzufuhr

- Alta prestazione
- HSS extra lunga
- Foratura continua 10 D, 15 D, 20 D
- senza fori di lubrificazione

- Haute performance
- Foret HSSE revêtu extra long.
- Forage en continu 10 D, 15 D, 20 D
- Sans arrosage central

- Yüksek performans
- HSS ekstra uzun matkap
- Ekstra uzun 10 D, 15 D, 20 D kesintisiz delme
- İçten soğutma yok

- High performance
- HSS ekstra lang
- Uden udspåning i 10 D, 15 D, 20 D
- Uden kølekanaler

- High performance
- HSS extra långa borr
- Step fri borrning 10D, 15D, 20D
- Utan Kylkanaler

- Altas prestaciones
- Broca HSS extra larga.
- Taladrado ininterrumpido 10 D, 15 D, 20 D
- Sin agujeros de refrigeración

- Высокая производительность
- Сверхдлинное сверло из быстрорежущей стали
- Непрерывное сверление глубиной
- Без внутреннего охлаждения

- Wysoka wydajność
- Wiertło HSS extra długie
- wiercenie bez odwiórowywania - non step 10 D, 15 D, 20 D
- Bez wewnętrznego chłodzenia

10 XD

EDP	D	L	l	d	Price
8622816	1,6	75	26	1,6	
8622818	1,8	75	26	1,8	
8622820	2	75	26	2	
8622821	2,1	75	33	2,1	
8622822	2,2	75	33	2,2	
8622823	2,3	75	33	2,3	
8622824	2,4	75	33	2,4	
8622825	2,5	75	33	2,5	
8622826	2,6	90	40	2,6	
8622827	2,7	90	40	2,7	
8622828	2,8	90	40	2,8	
8622829	2,9	90	40	2,9	
8622830	3	90	40	3	
8622831	3,1	100	45	3,1	
8622832	3,2	100	45	3,2	
8622833	3,3	100	45	3,3	
8622834	3,4	100	50	3,4	
8622835	3,5	100	50	3,5	
8622836	3,6	100	50	3,6	
8622837	3,7	100	50	3,7	
8622838	3,8	100	50	3,8	
8622839	3,9	100	50	3,9	
8622840	4	100	50	4	
8622841	4,1	115	55	4,1	
8622842	4,2	115	55	4,2	
8622843	4,3	115	60	4,3	
8622844	4,4	115	60	4,4	
8622845	4,5	115	60	4,5	
8622846	4,6	115	60	4,6	
8622847	4,7	115	60	4,7	
8622848	4,8	115	65	4,8	
8622849	4,9	115	65	4,9	
8622850	5	115	65	5	
8622851	5,1	128	70	5,1	
8622852	5,2	128	70	5,2	
8622853	5,3	128	70	5,3	
8622854	5,4	128	78	5,4	
8622855	5,5	128	78	5,5	
8622856	5,6	128	78	5,6	
8622857	5,7	128	78	5,7	
8622858	5,8	128	78	5,8	
8622859	5,9	128	78	5,9	
8622860	6	128	78	6	
8622861	6,1	140	78	6,1	
8622862	6,2	140	87	6,2	
8622863	6,3	140	87	6,3	
8622864	6,4	140	87	6,4	
8622865	6,5	140	87	6,5	
8622866	6,6	140	87	6,6	
8622867	6,7	140	87	6,7	
8622868	6,8	140	90	6,8	
8622869	6,9	140	90	6,9	

10 XD

EDP	D	L	l	d	Price
8622870	7	140	90	7	
8622871	7,1	155	100	7,1	
8622872	7,2	155	100	7,2	
8622873	7,3	155	100	7,3	
8622874	7,4	155	100	7,4	
8622875	7,5	155	100	7,5	
8622876	7,6	155	105	7,6	
8622877	7,7	155	105	7,7	
8622878	7,8	155	105	7,8	
8622879	7,9	155	105	7,9	
8622880	8	155	105	8	
8622881	8,1	165	110	8,1	
8622882	8,2	165	110	8,2	
8622883	8,3	165	110	8,3	
8622884	8,4	165	110	8,4	
8622885	8,5	165	110	8,5	
8622886	8,6	165	115	8,6	
8622887	8,7	165	115	8,7	
8622888	8,8	165	115	8,8	
8622889	8,9	165	115	8,9	
8622890	9	165	115	9	
8622891	9,1	190	125	9,1	
8622892	9,2	190	125	9,2	
8622893	9,3	190	125	9,3	
8622894	9,4	190	125	9,4	
8622895	9,5	190	125	9,5	
8622896	9,6	190	130	9,6	
8622897	9,7	190	130	9,7	
8622898	9,8	190	130	9,8	
8622899	9,9	190	130	9,9	
8622900	10	190	130	10	
8622901	10,1	205	140	10,1	
8622902	10,2	205	140	10,2	
8622903	10,3	205	140	10,3	
8622904	10,4	205	140	10,4	
8622905	10,5	205	140	10,5	
8622906	10,6	205	145	10,6	
8622907	10,7	205	145	10,7	
8622908	10,8	205	145	10,8	
8622909	10,9	205	145	10,9	
8622910	11	205	145	11	
8622911	11,1	215	155	11,1	
8622912	11,2	215	155	11,2	
8622913	11,3	215	155	11,3	
8622914	11,4	215	155	11,4	
8622915	11,5	215	155	11,5	
8622916	11,6	215	155	11,6	
8622917	11,7	215	155	11,7	
8622918	11,8	215	155	11,8	
8622919	11,9	215	155	11,9	
8622920	12	215	155	12	

Applications - Anwendungen - Applicazioni - Applications - Applikation - Applikation - Aplicaciones - Применение - Uygulama - Zastosowania								
C≤0.2%	0.25<C≤0.4%	C≥0.45%	SCM	~35 HRC	35~45 HRC	45~50 HRC	50~70 HRC	SUS
○	◎	◎	◎					
SKD	GG	GGG	Cu	Al	AC	Ti	Tiall	Inc
	◎	◎			◎			

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15 XD

EDP	D	L	l	d	Price
8623016	1,6	70	30	1,6	
8623018	1,8	75	34	1,8	
8623020	2	80	36	2	
8623021	2,1	80	38	2,1	
8623022	2,2	80	40	2,2	
8623023	2,3	85	42	2,3	
8623024	2,4	85	44	2,4	
8623025	2,5	85	46	2,5	
8623026	2,6	100	48	2,6	
8623027	2,7	100	50	2,7	
8623028	2,8	100	50	2,8	
8623029	2,9	105	54	2,9	
8623030	3	105	54	3	
8623031	3,1	110	56	3,1	
8623032	3,2	110	58	3,2	
8623033	3,3	110	60	3,3	
8623034	3,4	115	62	3,4	
8623035	3,5	115	64	3,5	
8623036	3,6	115	66	3,6	
8623037	3,7	120	68	3,7	
8623038	3,8	120	70	3,8	
8623039	3,9	120	70	3,9	
8623040	4	120	72	4	
8623041	4,1	135	74	4,1	
8623042	4,2	135	76	4,2	
8623043	4,3	140	78	4,3	
8623044	4,4	140	80	4,4	
8623045	4,5	140	82	4,5	
8623046	4,6	145	84	4,6	
8623047	4,7	145	86	4,7	
8623048	4,8	145	86	4,8	
8623049	4,9	150	88	4,9	
8623050	5	150	90	5	
8623051	5,1	150	92	5,1	

15 XD

EDP	D	L	l	d	Price
8623052	5,2	155	94	5,2	
8623053	5,3	155	96	5,3	
8623054	5,4	155	98	5,4	
8623055	5,5	155	100	5,5	
8623056	5,6	160	102	5,6	
8623057	5,7	165	104	5,7	
8623058	5,8	165	106	5,8	
8623060	6	170	108	6	
8623062	6,2	170	112	6,2	
8623063	6,3	175	114	6,3	
8623065	6,5	200	118	6,5	
8623066	6,6	200	120	6,6	
8623068	6,8	200	124	6,8	
8623069	6,9	200	126	6,9	
8623070	7	200	126	7	
8623071	7,1	200	128	7,1	
8623075	7,5	205	136	7,5	
8623080	8	215	144	8	
8623081	8,1	215	146	8,1	
8623082	8,2	220	148	8,2	
8623085	8,5	225	154	8,5	
8623086	8,6	225	156	8,6	
8623088	8,8	230	160	8,8	
8623090	9	230	162	9	
8623093	9,3	240	168	9,3	
8623095	9,5	240	172	9,5	
8623097	9,7	245	176	9,7	
8623098	9,8	245	178	9,8	
8623100	10	250	180	10	
8623105	10,5	270	190	10,5	
8623110	11	280	200	11	
8623115	11,5	290	208	11,5	
8623118	11,8	295	214	11,8	
8623120	12	300	216	12	

20 XD

EDP	D	L	l	d	Price
8623216	1,6	85	38	1,6	
8623218	1,8	85	42	1,8	
8623220	2	85	46	2	
8623221	2,1	90	50	2,1	
8623222	2,2	90	52	2,2	
8623223	2,3	95	54	2,3	
8623224	2,4	95	56	2,4	
8623225	2,5	100	58	2,5	
8623226	2,6	110	60	2,6	
8623227	2,7	115	64	2,7	
8623228	2,8	115	66	2,8	
8623229	2,9	120	68	2,9	
8623230	3	120	70	3	
8623231	3,1	125	72	3,1	
8623232	3,2	125	74	3,2	
8623233	3,3	125	76	3,3	
8623234	3,4	130	80	3,4	
8623235	3,5	130	82	3,5	
8623237	3,7	135	86	3,7	
8623238	3,8	140	88	3,8	
8623240	4	140	92	4	
8623241	4,1	155	96	4,1	
8623242	4,2	155	98	4,2	
8623243	4,3	160	100	4,3	

20 XD

EDP	D	L	l	d	Price
8623245	4,5	165	104	4,5	
8623246	4,6	165	106	4,6	
8623248	4,8	170	112	4,8	
8623250	5	175	116	5	
8623251	5,1	180	118	5,1	
8623252	5,2	180	120	5,2	
8623255	5,5	185	128	5,5	
8623257	5,7	190	132	5,7	
8623258	5,8	200	134	5,8	
8623260	6	200	138	6	
8623263	6,3	200	146	6,3	
8623265	6,5	225	150	6,5	
8623268	6,8	225	158	6,8	
8623269	6,9	230	160	6,9	
8623270	7	230	162	7	
8623275	7,5	245	174	7,5	
8623280	8	255	184	8	
8623281	8,1	255	188	8,1	
8623282	8,2	260	190	8,2	
8623285	8,5	265	196	8,5	
8623290	9	275	208	9	
8623300	10	300	230	10	
8623310	11	350	254	11	
8623320	12	350	276	12	

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○	◎	◎	◎					
SKD	GG	GGG	Cu	Al	AC	Ti	Tiall	Inc
	◎	◎			◎			

Coolant Application Key Point

Vertical Machine

Allow the coolant to move along the drill if the discharge flow rate is low or the number of nozzles is too few

Horizontal Machine

If there are too few coolant nozzles is small, increase the amount of coolant and its discharge pressure and allow the coolant to move along the drill so that it is applied constantly to the entrance.

If there are too few coolant nozzles is small, the coolant that is applied to the hole entrance will stray from the hole along the way

1. Make a pilot hole

Recommended drill : EX-SUS-GDS

- For a pilot hole, select 0.05mm to 0.1mm larger size drill than TDXL. For deep hole, we recommend to drill deeper pilot hole.
- For a vertical machining center. When drilling many holes in a small area with vertical machining center. We recommend only centering by 130 degree point angle LDS to avoid chips building up in pilot holes, which can cause drill chipping or breakage. When drilling the pilot hole it is recommended to make the hole 3xD in depth, at a feed rate equal to (Drill φx 0.01) per revolution. Straightness will be less accurate than a comparable operation in a horizontal machining center.
- We recommended to use point angle from 120 degree and over.

2. Insert the TDXL into a pilot hole with low revolution (~500 min^{-1})

3. Start supplying the coolant.

4. Increase the revolution to the designated speed and start drilling. At the start of drilling, set the feed rate to 1% of the drill dia. and increase the feed rate when the depth reaches between 3xD and 5xD.

Increase feed rate to between 1 and 2%. Set it to 1%D between 3xD and 5xD.

5. After drilling, move the drill away from the bottom of the hole; then reduce its speed while pulling it out of the hole..

Conditions

TDXL

	C≤0,2% S50C ■ S35C 500 ~ 710 N/mm²		SCM SCr ■ SNCM 710 ~ 900 N/mm²		SKD Die Steels SKD ■ SK ■ DH31 ■ DAC 710 ~ 900 N/mm²		GGG FCD400 ■ FCD500 ~ 500 N/mm²		GG FC200 ■ FC300 ~ 300 N/mm²	
Vc	20 ~ 24 m/min		18 ~ 22 m/min		12 ~ 16 m/min		16 ~ 20 m/min		18 ~ 24 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.)
1,6	4.000	0,016~0,03	4.000	0,016~0,03	2.700	0,016~0,03	3.600	0,01~0,03	4.150	0,03~0,05
2	3.200	0,02~0,05	3.200	0,02~0,04	2.200	0,02~0,04	2.850	0,01~0,04	3.350	0,04~0,06
3	2.200	0,03~0,08	2.200	0,03~0,08	1.500	0,03~0,07	1.900	0,02~0,08	2.250	0,06~0,10
4	1.600	0,04~0,10	1.600	0,04~0,10	1.150	0,04~0,09	1.460	0,02~0,10	1.650	0,08~0,13
5	1.300	0,05~0,13	1.300	0,05~0,13	900	0,05~0,12	1.150	0,03~0,13	1.350	0,10~0,16
6	1.100	0,06~0,15	1.100	0,06~0,15	750	0,06~0,14	955	0,04~0,15	1.100	0,12~0,19
8	800	0,08~0,20	800	0,08~0,20	550	0,08~0,18	715	0,05~0,20	835	0,16~0,26
10	650	0,10~0,25	650	0,10~0,25	450	0,10~0,23	575	0,06~0,25	670	0,20~0,32
12	550	0,13~0,30	550	0,12~0,30	380	0,12~0,28	475	0,07~0,30	555	0,24~0,38

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