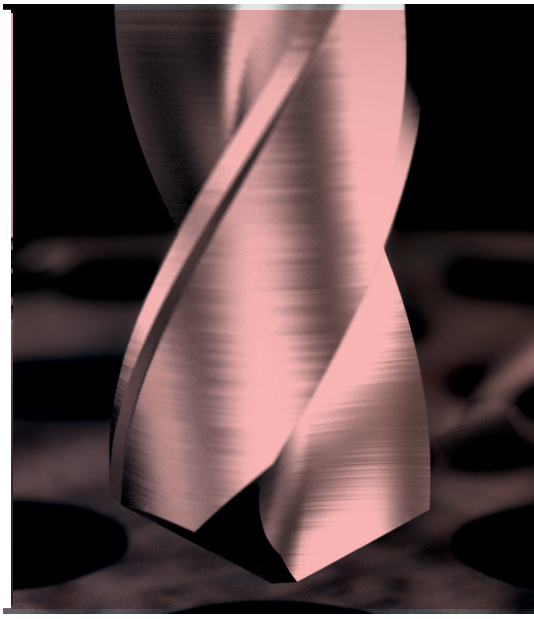
Sangeo
cutting tools

2021

TAPS&DRILLS&MORE

NEW PRODUCTS

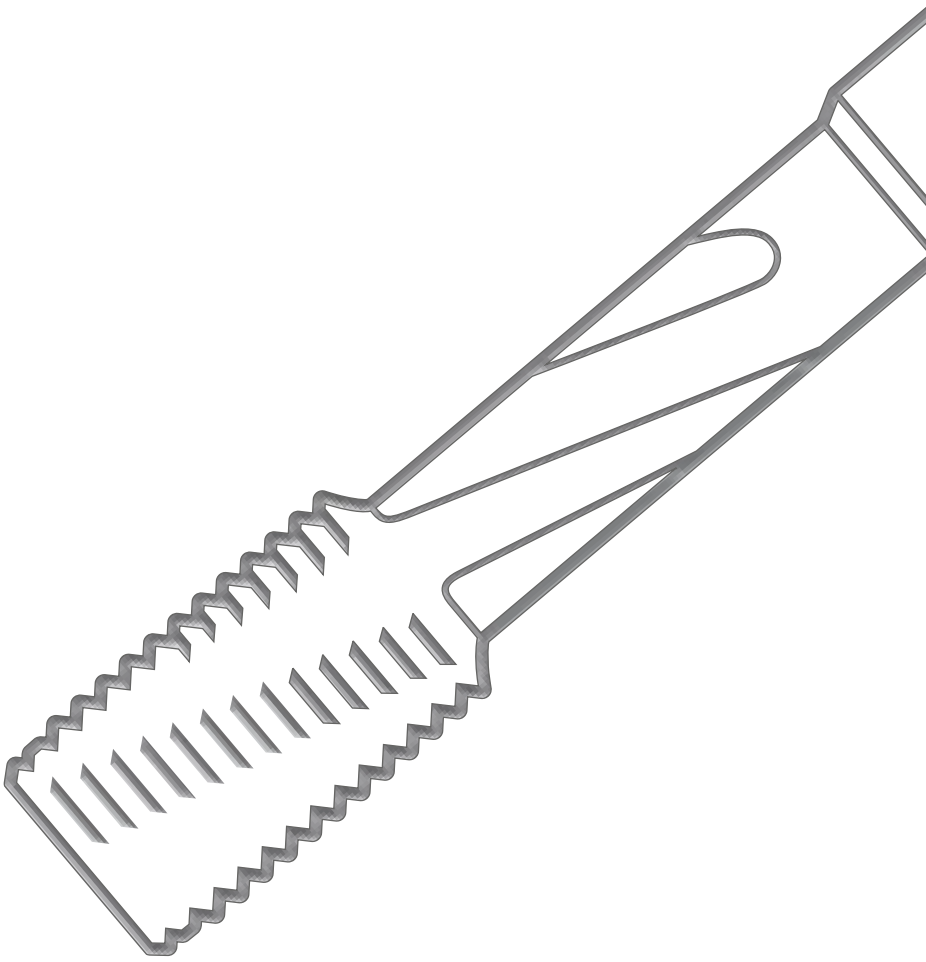


TAPS

DRILLS

OTHERS

sangeo cutting tools



TAPS/

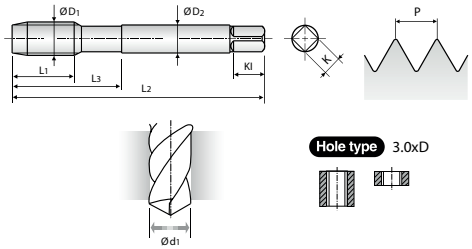
Metric /4

Metric Fine /8

UNC /12

UNF /14

M SPIRAL POINT TAPS for Stainless Steels
ISO Metric coarse threads DIN 13



Working Material M Stainless Steel

HSS-PM up to M12 | HSS-E over M12 | DIN 371/376 | 6H | 60° | B | VAP

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
M2	0.4	IZ0428I0001	8	45	13	2.8	2.1	5	3	1.6
M2.2	0.45	IZ0428I0002	8	45	13	2.8	2.1	5	3	1.75
M2.3	0.4	IZ0428I0003	8	45	13	2.8	2.1	5	3	1.9
M2.5	0.45	IZ0428I0004	9	50	15	2.8	2.1	5	3	2.05
M2.6	0.45	IZ0428I0005	9	50	15	2.8	2.1	5	3	2.1
M3	0.5	IZ0428I0006	11	56	18	3.5	2.7	6	3	2.5
M3.5	0.6	IZ0428I0007	12	56	20	4	3	6	3	2.9
M4	0.7	IZ0428I0008	13	63	21	4.5	3.4	6	3	3.3
M4.5	0.75	IZ0428I0009	14	70	25	6	4.9	8	3	3.7
M5	0.8	IZ0428I0010	15	70	25	6	4.9	8	3	4.2
M6	1.0	IZ0428I0011	17	80	30	6	4.9	8	3	5
M7	1.0	IZ0428I0012	17	80	30	7	5.5	8	3	6
M8	1.25	IZ0428I0013	20	90	35	8	6.2	9	3	6.8
M9	1.25	IZ0428I0014	20	90	35	9	7	10	3	7.8
M10	1.5	IZ0428I0015	22	100	39	10	8	11	3	8.5
M11	1.5	IZ0428I0016	22	100	40	8	6.2	9	3	9.5
M12	1.75	IZ0428I0017	24	110	44	9	7	10	3	10.2
M14	2.0	IZ1428I0001	26	110	44	11	9	12	3	12
M16	2.0	IZ1428I0002	27	110	44	12	9	12	3	14
M18	2.5	IZ1428I0003	30	125	50	14	11	14	4	15.5
M20	2.5	IZ1428I0004	32	140	54	16	12	15	4	17.5
M22	2.5	IZ1428I0005	32	140	54	18	14.5	17	4	19.5
M24	3.0	IZ1428I0006	34	160	60	18	14.5	17	4	21
M27	3.0	IZ1428I0007	36	160	60	20	16	19	4	24
M30	3.5	**IZ1428I0008**	40	180	70	22	18	21	4	26.5

Unit : N/mm²

◎ : Excellent ○ : Good

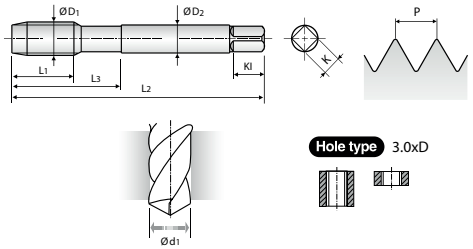
Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
	○		○			◎	◎							

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
				○										

Sangeo cutting tools

HSS-PM / HSS-E TAPS

M SPIRAL POINT TAPS for Multi-Purpose
ISO Metric coarse threads DIN 13



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 371/376** | **6H** | **60°** | **B** | **BRIGHT**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
M2	0.4	IZ0814I0001	8	45	13	2.8	2.1	5	3	1.6
M2.2	0.45	IZ0814I0002	8	45	13	2.8	2.1	5	3	1.75
M2.3	0.4	IZ0814I0003	8	45	13	2.8	2.1	5	3	1.9
M2.5	0.45	IZ0814I0004	9	50	15	2.8	2.1	5	3	2.05
M2.6	0.45	IZ0814I0005	9	50	15	2.8	2.1	5	3	2.1
M3	0.5	IZ0814I0006	6	56	18	3.5	2.7	6	3	2.5
M3.5	0.6	IZ0814I0007	7	56	20	4	3	6	3	2.9
M4	0.7	IZ0814I0008	7	63	21	4.5	3.4	6	3	3.3
M4.5	0.75	IZ0814I0009	8	70	25	6	4.9	8	3	3.7
M5	0.8	IZ0814I0010	8	70	25	6	4.9	8	3	4.2
M6	1.0	IZ0814I0011	10	80	30	6	4.9	8	3	5
M7	1.0	IZ0814I0012	10	80	30	7	5.5	8	3	6
M8	1.25	IZ0814I0013	13	90	35	8	6.2	9	3	6.8
M9	1.25	IZ0814I0014	13	90	35	9	7	10	3	7.8
M10	1.5	IZ0814I0015	15	100	39	10	8	11	3	8.5
M11	1.5	IZ0814I0016	17	100	40	8	6.2	9	3	9.5
M12	1.75	IZ0814I0017	18	110	44	9	7	10	3	10.2
M14	2.0	IZ0814I0018	20	110	44	11	9	12	3	12
M16	2.0	IZ0814I0019	20	110	44	12	9	12	3	14
M18	2.5	IZ0814I0020	25	125	50	14	11	14	4	15.5
M20	2.5	IZ0814I0021	25	140	54	16	12	15	4	17.5
M22	2.5	IZ0814I0022	25	140	54	18	14.5	17	4	19.5
M24	3.0	IZ0814I0023	30	160	60	18	14.5	17	4	21
M27	3.0	IZ0814I0024	30	160	60	20	16	19	4	24
M30	3.5	IZ0814I0025	35	180	70	22	18	21	4	26.5

Unit : N/mm²

◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
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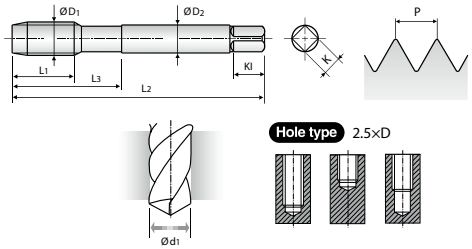
Sangeo cutting tools

M SPIRAL FLUTE TAPS for Stainless Steels
ISO Metric coarse threads DIN 13



Working Material **M** Stainless Steel

HSS-PM up to M12 | HSS-E over M12 | DIN 371/376 | 6H | 60° | C | VAP | R45

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
M2	0.4	IZ1744I0001	8	45	13	2.8	2.1	5	2	1.6
M2.2	0.45	IZ1744I0002	8	45	13	2.8	2.1	5	2	1.75
M2.3	0.4	IZ1744I0003	8	45	13	2.8	2.1	5	2	1.9
M2.5	0.45	IZ1744I0004	9	50	15	2.8	2.1	5	2	2.05
M2.6	0.45	IZ1744I0005	9	50	15	2.8	2.1	5	2	2.1
M3	0.5	IZ1744I0006	6	56	18	3.5	2.7	6	3	2.5
M3.5	0.6	IZ1744I0007	7	56	20	4	3	6	3	2.9
M4	0.7	IZ1744I0008	7	63	21	4.5	3.4	6	3	3.3
M4.5	0.75	IZ1744I0009	8	70	25	6	4.9	8	3	3.7
M5	0.8	IZ1744I0010	8	70	25	6	4.9	8	3	4.2
M6	1.0	IZ1744I0011	10	80	30	6	4.9	8	3	5
M7	1.0	IZ1744I0012	10	80	30	7	5.5	8	3	6
M8	1.25	IZ1744I0013	13	90	35	8	6.2	9	3	6.8
M9	1.25	IZ1744I0014	13	90	35	9	7	10	3	7.8
M10	1.5	IZ1744I0015	15	100	39	10	8	11	3	8.5
M11	1.5	IZ1744I0016	17	100	40	8	6.2	9	3	9.5
M12	1.75	IZ1744I0017	18	110	44	9	7	10	3	10.2
M14	2.0	IZ0744I0001	20	110	44	11	9	12	3	12
M16	2.0	IZ0744I0002	20	110	44	12	9	12	3	14
M18	2.5	IZ0744I0003	25	125	50	14	11	14	4	15.5
M20	2.5	IZ0744I0004	25	140	54	16	12	15	4	17.5
M22	2.5	IZ0744I0005	25	140	54	18	14.5	17	4	19.5
M24	3.0	IZ0744I0006	30	160	60	18	14.5	17	4	21
M27	3.0	IZ0744I0007	30	160	60	20	16	19	4	24
M30	3.5	IZ0744I0008	35	180	70	22	18	21	4	26.5

Unit : N/mm²

◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
	○		○			◎	◎							

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
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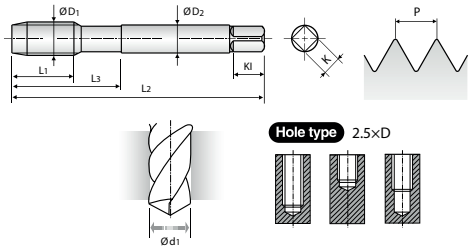
Sangeo cutting tools

HSS-PM / HSS-E TAPS

M SPIRAL FLUTE TAPS for Multi-Purpose
ISO Metric coarse threads DIN 13



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 371/376** | **6H** | **60°** | **C** | **BRIGHT** | **R40**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
M2	0.4	IZ0804I0001	8	45	13	2.8	2.1	5	3	1.6
M2.2	0.45	IZ0804I0002	8	45	13	2.8	2.1	5	3	1.75
M2.3	0.4	IZ0804I0003	8	45	13	2.8	2.1	5	3	1.9
M2.5	0.45	IZ0804I0004	9	50	15	2.8	2.1	5	3	2.05
M2.6	0.45	IZ0804I0005	9	50	15	2.8	2.1	5	3	2.1
M3	0.5	IZ0804I0006	6	56	18	3.5	2.7	6	3	2.5
M3.5	0.6	IZ0804I0007	7	56	20	4	3	6	3	2.9
M4	0.7	IZ0804I0008	7	63	21	4.5	3.4	6	3	3.3
M4.5	0.75	IZ0804I0009	8	70	25	6	4.9	8	3	3.7
M5	0.8	IZ0804I0010	8	70	25	6	4.9	8	3	4.2
M6	1.0	IZ0804I0011	10	80	30	6	4.9	8	3	5
M7	1.0	IZ0804I0012	10	80	30	7	5.5	8	3	6
M8	1.25	IZ0804I0013	13	90	35	8	6.2	9	3	6.8
M9	1.25	IZ0804I0014	13	90	35	9	7	10	3	7.8
M10	1.5	IZ0804I0015	15	100	39	10	8	11	3	8.5
M11	1.5	IZ0804I0016	17	100	40	8	6.2	9	3	9.5
M12	1.75	IZ0804I0017	18	110	44	9	7	10	3	10.2
M14	2.0	IZ0804I0018	20	110	44	11	9	12	3	12
M16	2.0	IZ0804I0019	20	110	44	12	9	12	3	14
M18	2.5	IZ0804I0020	25	125	50	14	11	14	4	15.5
M20	2.5	IZ0804I0021	25	140	54	16	12	15	4	17.5
M22	2.5	IZ0804I0022	25	140	54	18	14.5	17	4	19.5
M24	3.0	IZ0804I0023	30	160	60	18	14.5	17	4	21
M27	3.0	IZ0804I0024	30	160	60	20	16	19	4	24
M30	3.5	IZ0804I0025	35	180	70	22	18	21	4	26.5

Unit : N/mm²

◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
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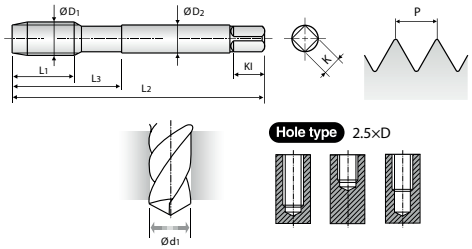
Sangeo cutting tools

MF SPIRAL POINT TAPS for Multi-Purpose ISO Metric fine threads DIN 13



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 374** | **6H** | **60°** | **B** | **BRIGHT**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
M4	0.5	IZ0854I0001	10	63	21	2.8	2.1	5	3	3.5
M5	0.5	IZ0854I0002	11	70	25	3.5	2.7	6	3	4.5
M6	0.75	IZ0854I0004	13	80	30	4.5	3.4	6	3	5.2
M6	0.5	IZ0854I0003	13	80	30	4.5	3.4	6	3	5.5
M7	0.75	IZ0854I0005	14	80	30	5.5	4.3	7	3	6.2
M8	1.0	IZ0854I0007	17	90	36	6	4.9	8	3	7
M8	0.75	IZ0854I0006	14	80	36	6	4.9	8	3	7.2
M10	1.25	IZ0854I0010	22	100	40	7	5.5	8	3	8.8
M10	1.0	IZ0854I0009	18	90	40	7	5.5	8	3	9
M10	0.75	IZ0854I0008	18	90	40	7	5.5	8	3	9.2
M12	1.5	IZ0854I0013	22	100	40	9	7	10	3	10.5
M12	1.25	IZ0854I0012	22	100	40	9	7	10	3	10.8
M12	1.0	IZ0854I0011	18	100	40	9	7	10	3	11
M14	1.5	IZ0854I0016	22	100	40	11	9	12	3	12.5
M14	1.25	IZ0854I0015	22	100	40	11	9	12	3	12.8
M14	1.0	IZ0854I0014	22	100	40	11	9	12	3	13
M16	1.5	IZ0854I0018	22	100	40	12	9	12	3	14.5
M16	1.0	IZ0854I0017	18	100	40	12	9	12	3	15
M18	1.5	IZ0854I0020	25	110	44	14	11	14	4	16.5
M18	1.0	IZ0854I0019	20	110	44	14	11	14	4	17
M20	1.5	IZ0854I0022	25	125	50	16	12	15	4	18.5
M20	1.0	IZ0854I0021	20	125	50	16	12	15	4	19
M22	1.5	IZ0854I0024	25	125	50	18	14.5	17	4	20.5
M22	1.0	IZ0854I0023	20	125	50	18	14.5	17	4	21

Unit : N/mm²

◎ : Excellent ○ : Good

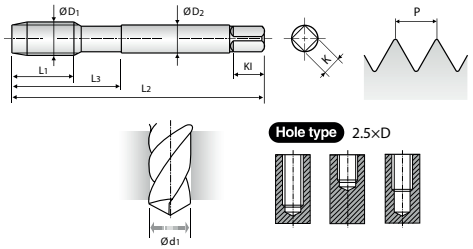
Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
				◎	◎	◎			◎	◎	◎			

Sangeo cutting tools

HSS-PM / HSS-E TAPS

MF SPIRAL POINT TAPS for Multi-Purpose
ISO Metric fine threads DIN 13



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 374** | **6H** | **60°** | **B** | **BRIGHT**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
M24	2.0	IZ0854I0026	27	140	54	18	14.5	17	4	22
M24	1.5	IZ0854I0025	27	140	54	18	14.5	17	4	22.5
M26	1.5	IZ0854I0027	28	140	54	18	14.5	17	4	24.5
M27	2.0	IZ0854I0029	28	140	54	20	16	19	4	25
M27	1.5	IZ0854I0028	28	140	54	20	16	19	4	25.5
M28	1.5	IZ0854I0030	28	140	54	20	16	19	4	26.5
M30	2.0	IZ0854I0032	30	150	57	22	18	21	4	28
M30	1.5	IZ0854I0031	30	150	57	22	18	21	4	28.5

Unit : N/mm²

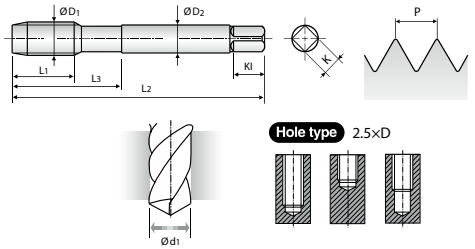
◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
				◎	◎	◎			◎	◎	◎			

Sangeo cutting tools

MF SPIRAL FLUTE TAPS for Multi-Purpose ISO Metric fine threads DIN 13



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 371/376** | **6H** | **60°** | **C** | **BRIGHT** | **R40**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
M4	0.5	IZ0844I0001	5	63	21	2.8	2.1	5	3	3.5
M5	0.5	IZ0844I0002	5	70	25	3.5	2.7	6	3	4.5
M6	0.75	IZ0844I0004	8	80	30	4.5	3.4	6	3	5.2
M6	0.5	IZ0844I0003	5	80	30	4.5	3.4	6	3	5.5
M7	0.75	IZ0844I0005	10	80	30	5.5	4.3	7	3	6.2
M8	1.0	IZ0844I0007	10	90	36	6	4.9	8	3	7
M8	0.75	IZ0844I0006	8	80	30	6	4.9	8	3	7.2
M10	1.25	IZ0844I0010	16	100	40	7	5.5	8	3	8.8
M10	1.0	IZ0844I0009	10	90	36	7	5.5	8	3	9
M10	0.75	IZ0844I0008	10	90	36	7	5.5	8	3	9.2
M12	1.5	IZ0844I0013	15	100	40	9	7	10	3	10.5
M12	1.25	IZ0844I0012	15	100	40	9	7	10	3	10.8
M12	1.0	IZ0844I0011	11	100	40	9	7	10	3	11
M14	1.5	IZ0844I0016	15	100	40	11	9	12	3	12.5
M14	1.25	IZ0844I0015	15	100	40	11	9	12	3	12.8
M14	1.0	IZ0844I0014	11	100	40	11	9	12	3	13
M16	1.5	IZ0844I0018	15	100	40	12	9	12	3	14.5
M16	1.0	IZ0844I0017	12	100	40	12	9	12	3	15
M18	1.5	IZ0844I0020	17	110	44	14	11	14	4	16.5
M18	1.0	IZ0844I0019	13	110	44	14	11	14	4	17
M20	1.5	IZ0844I0022	17	125	50	16	12	15	4	18.5
M20	1.0	IZ0844I0021	14	125	50	16	12	15	4	19
M22	1.5	IZ0844I0024	17	125	50	18	14.5	17	4	20.5
M22	1.0	IZ0844I0023	14	125	50	18	14.5	17	4	21

Unit : N/mm²

◎ : Excellent ○ : Good

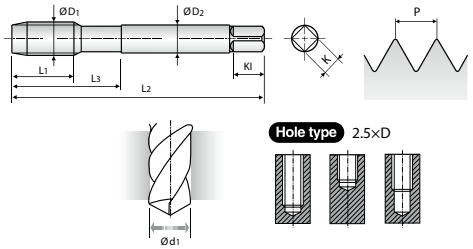
Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
				◎	◎	◎			◎	◎	◎			

Sangeo cutting tools

HSS-PM / HSS-E TAPS

MF SPIRAL FLUTE TAPS for Multi-Purpose ISO Metric fine threads DIN 13



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 371/376** | **6H** | **60°** | **C** | **BRIGHT** | **R40**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
M24	2.0	IZ0844I0026	20	140	54	18	14.5	17	4	22
M24	1.5	IZ0844I0025	20	140	54	18	14.5	17	4	22.5
M26	1.5	IZ0844I0027	20	140	54	18	14.5	17	4	24.5
M27	2.0	IZ0844I0029	20	140	54	20	16	19	4	25
M27	1.5	IZ0844I0028	20	140	54	20	16	19	4	25.5
M28	1.5	IZ0844I0030	20	140	54	20	16	19	4	26.5
M30	2.0	IZ0844I0032	22	150	57	22	18	21	4	28
M30	1.5	IZ0844I0031	22	150	57	22	18	21	4	28.5

Unit : N/mm²

◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
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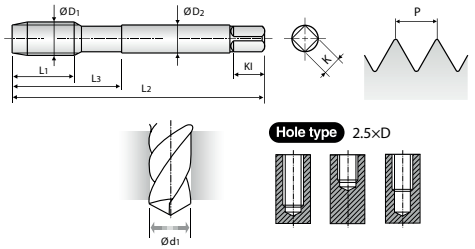
Sangeo cutting tools

UNC SPIRAL FLUTE TAPS for Multi-Purpose
Unified coarse threads



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 371/376** | **2B** | **60°** | **C** | **BRIGHT** | **R40**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
#4	40 UNC	IZ0824I0001	6	56	18	3.5	2.7	6	3	2.3
#5	40 UNC	IZ0824I0002	7	56	18	3.5	2.7	6	3	2.6
#6	32 UNC	IZ0824I0003	7	56	20	4	3	6	3	2.85
#8	32 UNC	IZ0824I0004	8	63	21	4.5	3.4	6	3	3.5
#10	24 UNC	IZ0824I0005	10	70	25	6	4.9	8	3	3.9
#12	24 UNC	IZ0824I0006	10	80	30	6	4.9	8	3	4.5
1/4	20 UNC	IZ0824I0007	13	80	30	7	5.5	8	3	5.2
5/16	18 UNC	IZ0824I0008	14	90	35	8	6.2	9	3	6.6
3/8	16 UNC	IZ0824I0009	16	100	39	9	7	10	3	8
7/16	14 UNC	IZ0824I0010	17	100	40	8	6.2	9	3	9.4
1/2	13 UNC	IZ0824I0011	20	110	44	9	7	10	3	10.75
9/16	12 UNC	IZ0824I0012	20	110	44	11	9	12	3	12.25
5/8	11 UNC	IZ0824I0013	22	110	44	12	9	12	3	13.5
3/4	10 UNC	IZ0824I0014	25	125	50	14	11	14	4	16.5
7/8	9 UNC	IZ0824I0015	27	140	54	18	14.5	17	4	19.5
1	8 UNC	IZ0824I0016	30	160	60	20	16	19	4	22.25

Unit : N/mm²

◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
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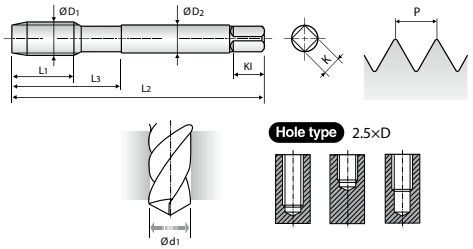
UNC SPIRAL POINT TAPS for Multi-Purpose
Unified coarse threads



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 371/376** | **2B** | **60°** | **B** | **BRIGHT**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
#4	40 UNC	IZ0834I0001	11	56	18	3.5	2.7	6	3	2.3
#5	40 UNC	IZ0834I0002	11	56	18	3.5	2.7	6	3	2.6
#6	32 UNC	IZ0834I0003	12	56	20	4	3	6	3	2.85
#8	32 UNC	IZ0834I0004	13	63	21	4.5	3.4	6	3	3.5
#10	24 UNC	IZ0834I0005	15	70	25	6	4.9	8	3	3.9
#12	24 UNC	IZ0834I0006	16	80	30	6	4.9	8	3	4.5
1/4	20 UNC	IZ0834I0007	17	80	30	7	5.5	8	3	5.2
5/16	18 UNC	IZ0834I0008	20	90	35	8	6.2	9	3	6.6
3/8	16 UNC	IZ0834I0009	22	100	39	9	7	10	3	8
7/16	14 UNC	IZ0834I0010	22	100	40	8	6.2	9	3	9.4
1/2	13 UNC	IZ0834I0011	25	110	44	9	7	10	3	10.75
9/16	12 UNC	IZ0834I0012	26	110	44	11	9	12	3	12.25
5/8	11 UNC	IZ0834I0013	27	110	44	12	9	12	3	13.5
3/4	10 UNC	IZ0834I0014	30	125	50	14	11	14	4	16.5
7/8	9 UNC	IZ0834I0015	32	140	54	18	14.5	17	4	19.5
1	8 UNC	IZ0834I0016	36	160	60	20	16	19	4	22.25

Unit : N/mm²

◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
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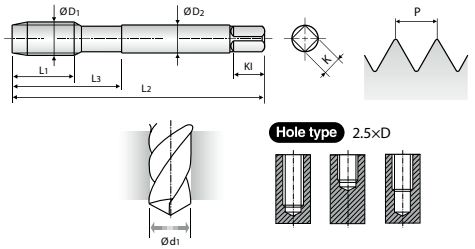
Sangeo cutting tools

UNF SPIRAL FLUTE TAPS for Multi-Purpose
Unified coarse threads



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 371/374** | **2B** | **60°** | **C** | **BRIGHT** | **R40**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
#4	48 UNF	IZ0864I0001	6	56	18	3.5	2.7	6	3	2.4
#5	44 UNF	IZ0864I0002	7	56	18	3.5	2.7	6	3	2.7
#6	40 UNF	IZ0864I0003	7	56	20	4	3	6	3	3
#8	36 UNF	IZ0864I0004	8	63	21	4.5	3.4	6	3	3.5
#10	32 UNF	IZ0864I0005	10	70	25	6	4.9	8	3	4.1
#12	28 UNF	IZ0864I0006	10	80	30	6	4.9	8	3	4.7
1/4	28 UNF	IZ0864I0007	10	80	30	7	5.5	8	3	5.5
5/16	24 UNF	IZ0864I0008	10	90	35	8	6.2	9	3	6.9
3/8	24 UNF	IZ0864I0009	10	100	39	9	7	10	3	8.5
7/16	20 UNF	IZ0864I0010	13	100	40	8	6.2	9	3	9.9
1/2	20 UNF	IZ0864I0011	13	100	40	9	7	10	3	11.5
9/16	18 UNF	IZ0864I0012	15	100	40	11	9	12	3	12.9
5/8	18 UNF	IZ0864I0013	15	100	40	12	9	12	3	14.5
3/4	16 UNF	IZ0864I0014	17	110	44	14	11	14	4	17.5
7/8	14 UNF	IZ0864I0015	17	125	50	18	14.5	17	4	20.5
1	12 UNF	IZ0864I0016	20	140	54	20	16	19	4	23.25

Unit : N/mm²

◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
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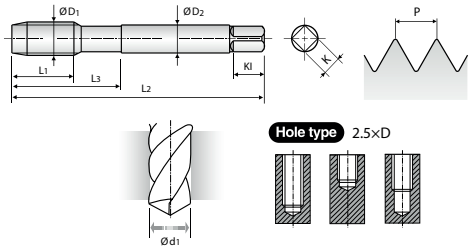
HSS-PM / HSS-E TAPS

UNF SPIRAL POINT TAPS for Multi-Purpose
Unified coarse threads



Working Material **UNI** Multi Purpose | **HSS-E** | **DIN 371/374** | **2B** | **60°** | **B** | **BRIGHT**

Unit : mm

Size	Pitch	SDC No.	Thread Length	Overall Length	Neck Length	Shank Diameter	Square Size	Square Length	No. of Flute	Tapping Drill Diameter
ØD1	P	Vap	L1	L2	L3	ØD2	K	Kl	Z	Ød1
#4	48 UNF	IZ0874I0001	11	56	18	3.5	2.7	6	3	2.4
#5	44 UNF	IZ0874I0002	11	56	18	3.5	2.7	6	3	2.7
#6	40 UNF	IZ0874I0003	12	56	20	4	3	6	3	3
#8	36 UNF	IZ0874I0004	13	63	21	4.5	3.4	6	3	3.5
#10	32 UNF	IZ0874I0005	15	70	25	6	4.9	8	3	4.1
#12	28 UNF	IZ0874I0006	16	80	30	6	4.9	8	3	4.7
1/4	28 UNF	IZ0874I0007	17	80	30	7	5.5	8	3	5.5
5/16	24 UNF	IZ0874I0008	17	90	35	8	6.2	9	3	6.9
3/8	24 UNF	IZ0874I0009	18	100	39	9	7	10	3	8.5
7/16	20 UNF	IZ0874I0010	22	100	40	8	6.2	9	3	9.9
1/2	20 UNF	IZ0874I0011	22	100	40	9	7	10	3	11.5
9/16	18 UNF	IZ0874I0012	22	100	40	11	9	12	3	12.9
5/8	18 UNF	IZ0874I0013	22	100	40	12	9	12	3	14.5
3/4	16 UNF	IZ0874I0014	25	110	44	14	11	14	4	17.5
7/8	14 UNF	IZ0874I0015	26	125	50	18	14.5	17	4	20.5
1	12 UNF	IZ0874I0016	28	140	54	20	16	19	4	23.25

Unit : N/mm²

◎ : Excellent ○ : Good

Steel < 400	Steel < 700	Steel < 850	St. Alloy < 850	St. Alloy ≤1200	St. Alloy > 1200	INOX Free < 850	INOX Aust. < 850	INOX < 1000	GG Cast < 500	GG Cast < 1000	GGG Cast < 700	GGG Cast < 1000	Ti < 700	Ti Alloy < 900
◎	◎	◎	◎	◎		◎	◎	◎	◎	◎	◎	◎		

Ti Alloy ≤ 1300	Ni < 500	Ni Alloy < 900	Ni Alloy ≤1400	Cu < 350	Cu Alloy Short	Cu Alloy Long	Cu-Al-Fe < 1500	Al / Mg < 350	Al Wrought	Al Si≤10%	Al Si>10%	Plastic Thermosoft	Plastic Thermoset	Plastic FRP
				◎	◎	◎			◎	◎	◎			

Sangeo cutting tools

TROUBLE SHOOTING GUIDE

Specific Problem	Cause	Solution
Oversize Pitch Diameter	Incorrect Tap	1. Use proper limits of taps 2. Use longer chamfered taps
	Chip Packing	1. Use spiral point or spiral fluted taps 2. Reduce number of flutes to provide extra chip room 3. Use larger hole size 4. If tapping a hole, allow deeper hole where applicable or shorten the thread length of the parts 5. Use proper lubricant
	Galling	1. Apply proper surface treatment such as Hardslick or chrome 2. Use proper cutting lubricant 3. Reduce tapping speed 4. Use proper cutting angle in accordance with material being tapped 5. Use large hole size
	Operating Conditions	1. Apply proper tapping speed 2. Correct alignment of tap and drill hole 3. Free cutting either tap or workpiece 4. Use proper tapping speed to avoid torn or rough threads 5. Use lead screw tapper 6. Use proper tapping machine with suitable power 7. Avoid misalignment of the tap and drill hole from loose spindle or worn holder
	Tool Condition	1. Obtain proper indexing angle for the flutes at the cutting edge 2. Grind proper cutting angle and chamfer angle 3. Avoid too narrow a land width 4. Remove burrs from regrinding
Oversize Internal Diameter	Hole Size	"1. Use minimum hole size 2. Avoid tapered hole 3. Use proper chamfered taps"
	Galling	1. Galling solutions 1 through 4 above can be applied to this specific problem
Undersize Pitch Diameter	Incorrect Tap	1. Use oversize taps 2. Apply proper chamfer angle 3. Increase cutting angle
	Damaged Thread	1. Use proper reversing speed to avoid damaging tapped thread on the way out of the hole
	Left-over Chips	1. Increase cutting performance to avoid any left over chips in the hole 2. Remove left over chips from the hole for gage checking
Undersize Internal Diameter	Hole Size	1. Use maximum drill size
Breakage	Incorrect Tap Selection	1. Avoid chip packing in the flutes or on the bottom of the hole Use spiral pointed or spiral fluted taps or fluteless taps 2. Apply correct surface treatment such as Hardslick or bright
	Excessive Tapping Torque	1. Use larger drill size 2. Try to shorten thread length 3. Increase cutting angle 4. Apply a tap with more thread relief and reduced land width 5. Apply correct surface treatment such as Hardslick

TROUBLE SHOOTING GUIDE

Specific Problem	Cause	Solution
Breakage	Operating Conditions	1. Reduce tapping speed 2. Avoid misalignment between tap and the hole and tapered hole 3. Use floating type of tapping holder 4. Use tapping holder with torque adjustment 5. Avoid hitting bottom of the hole with tap
	Tool Condition	1. Do not grind the bottom of the flute 2. Avoid too narrow a land width 3. Remove all worn sections when regrinding the flutes 4. Regrind tool more frequently
Chipping	Incorrect Tap Selection	1. Reduce cutting angle 2. Use a different kind of high-speed steel tap 3. Reduce hardness of the tap 4. Increase chamfer length 5. Avoid chip packing in the flutes or in the bottom of the hole by using spiral fluted or spiral pointed taps
	Operating Conditions	1. Reduce tapping speed 2. Avoid misalignment between tap and hole 3. Avoid sudden return of reverse in blind hole tapping 4. Avoid galling 5. Use larger hole size
Wear	Incorrect Tap Selection	1. Apply specially designed tap for tapping heat treated material 2. Change to a type of high-speed steel tap that contains vanadium 3. Apply special surface treatment such as TiCN, TiAlN or Hardslick 4. Increase chamfer length
	Operating Conditions	1. Reduce tapping speed 2. Apply proper cutting lubricants 3. Avoid work hardened hole 4. Use larger hole size
	Tool Condition	1. Grind proper cutting angle 2. Avoid hardness reduction from grinding process
Torn or Rough Thread	Chamfer Too Short	1. Increase chamfer length
	Wrong Cutting Angle	1. Apply proper cutting angle
	Galling	1. Use thread relieved taps 2. Reduce land width 3. Apply surface treatment such as Hardslick or chrome 4. Use proper cutting lubricant 5. Reduce tapping speed 6. Use larger hole size 7. Obtain proper alignment between tap and work
	Chip Packing	1. Use spiral pointed or spiral fluted taps 2. Use larger drill size
Chattering on Tapped Thread	Tool Free Cutting	1. Reduce cutting angle 2. Reduce amount of thread relief
	Tool Condition	1. Avoid too narrow land width 2. Do not grind the bottom of the flute

CUTTING SPEED TABLE

Cutting Speeds m/min. into revolutions per minute

Tool Dia.	Cutting Speed (m/min.)															
	1	2	3	4	5	6	8	10	12	15	20	25	30	40	50	60
1	318	637	955	1274	1592	1910	2548	3185	3822	4777	6366	7962	9554	12739	15924	19108
2	159	318	478	637	796	955	1274	1592	1911	2388	3185	3981	4777	6369	7962	9554
3	106	212	318	425	531	637	849	1062	1274	1592	2123	2654	3185	4246	5308	6369
4	80	159	239	318	398	478	637	796	955	1194	1592	1990	2389	3185	3981	4777
5	64	127	191	255	318	382	510	637	764	955	1274	1592	1911	2548	3185	3822
6	53	106	159	212	265	318	425	531	637	796	1062	1327	1592	2123	2653	3185
8	40	80	119	159	199	239	318	398	478	597	796	955	1194	1592	1990	2388
10	31	64	96	127	159	191	255	318	382	478	637	796	955	1274	1592	1911
12	26	53	80	106	133	159	212	265	318	398	531	663	796	1062	1327	1592
14	23	45	68	91	114	136	182	227	273	341	455	569	682	910	1137	1365
16	20	40	60	80	100	119	159	199	239	299	398	498	597	796	995	1194
18	18	35	53	71	88	106	142	177	212	265	354	442	531	708	885	1062
20	16	32	48	64	80	96	127	159	191	239	318	398	478	637	796	955
25	13	25	38	51	64	76	102	127	153	191	255	318	382	510	637	764
30	11	21	32	42	53	64	85	106	127	159	212	265	318	425	531	637
35	9	18	27	36	45	55	73	91	109	136	182	227	273	364	455	546
40	8	16	24	32	40	48	64	80	96	119	159	199	239	318	398	478

RECOMMENDED TAP DRILL SIZE (M / MF)

Metric-ISO threads coarse pitch			
M	Pitch	Maximum Core Dia.	Drill Size
1	0.25	0.785	0.75
1.1	0.25	0.885	0.85
1.2	0.25	0.985	0.95
1.4	0.30	1.160	1.10
1.6	0.35	1.321	1.25
1.7	0.35	1.346	1.30
1.8	0.35	1.521	1.45
2	0.40	1.679	1.60
2.2	0.45	1.838	1.75
2.3	0.40	1.920	1.90
2.5	0.45	2.138	2.05
2.6	0.45	2.176	2.10
3	0.50	2.599	2.50
3.5	0.60	3.010	2.90
4	0.70	3.422	3.30
4.5	0.75	3.878	3.70
5	0.80	4.334	4.20
6	1.00	5.153	5.00
7	1.00	6.153	6.00
8	1.25	6.912	6.80
9	1.25	7.912	7.80
10	1.50	8.676	8.50
11	1.50	9.676	9.50
12	1.75	10.441	10.20
14	2.00	12.210	12.00
16	2.00	14.210	14.00
18	2.50	15.744	15.50
20	2.50	17.744	17.50
22	2.50	19.744	19.50
24	3.00	21.252	21.00
27	3.00	24.252	24.00
30	3.50	26.771	26.50
33	3.50	29.771	29.50
36	4.00	32.270	32.00
39	4.00	35.270	35.00
42	4.50	37.799	37.50
45	4.50	40.799	40.50
48	5.00	43.297	43.00
52	5.00	47.297	47.00
56	5.50	50.796	50.50

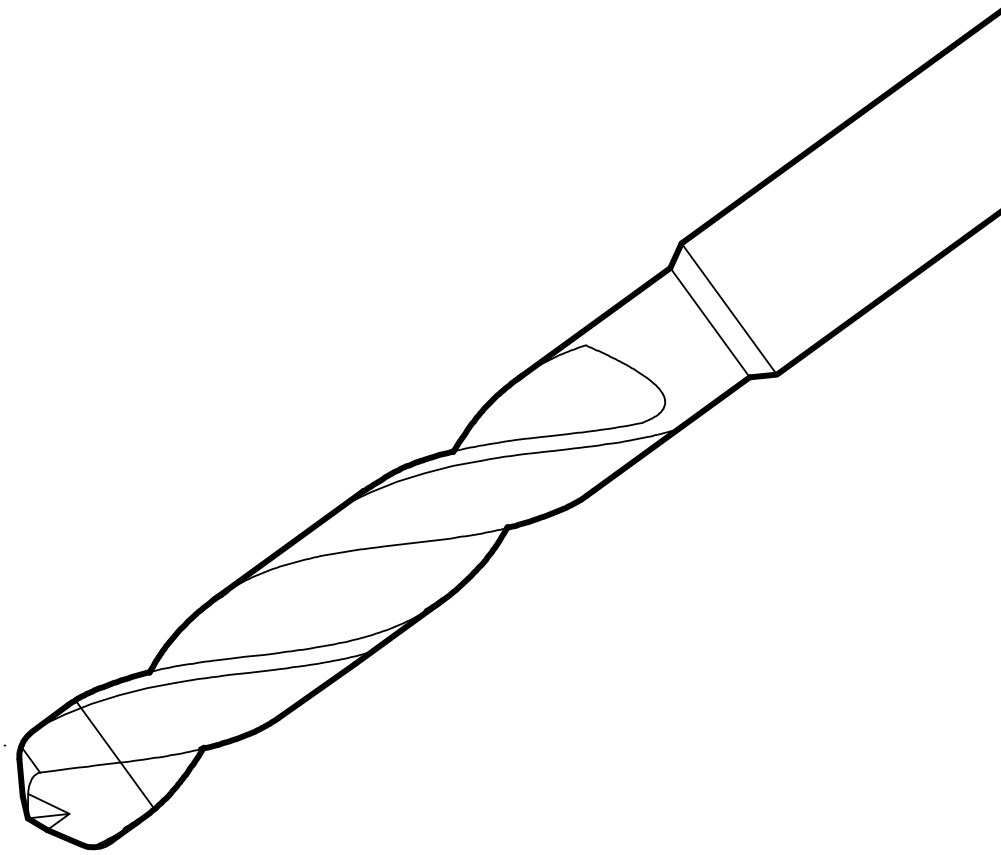
Metric-ISO threads fine pitch			
MF	Pitch	Maximum Core Dia.	Drill Size
2.5	0.35	2.221	2.15
3	0.35	2.271	2.65
3.5	0.35	3.221	3.15
4	0.50	3.599	3.50
4.5	0.50	4.099	4.00
5	0.50	4.599	4.50
5.5	0.50	5.099	5.00
6	0.75	5.378	5.20
7	0.75	6.378	6.20
8	0.75	7.378	7.20
8	1.00	7.153	7.00
9	0.75	8.378	8.20
9	1.00	8.153	8.00
10	0.75	9.378	9.20
10	1.00	9.153	9.00
10	1.25	8.912	8.80
11	0.75	10.378	10.20
11	1.00	10.153	10.00
12	1.00	11.153	11.00
12	1.25	10.912	10.80
12	1.50	10.676	10.50
14	1.00	13.153	13.00
14	1.25	12.912	12.80
14	1.50	12.676	12.50
15	1.00	14.153	14.00
15	1.50	13.676	13.50
16	1.00	15.153	15.00
16	1.50	14.676	14.50
17	1.00	16.153	16.00
17	1.50	15.676	15.50
18	1.00	17.153	17.00
18	1.50	16.676	16.50
18	2.00	16.210	16.00
20	1.00	19.153	19.00
20	2.00	18.210	18.00
22	1.00	21.153	21.00
22	1.50	20.676	20.50
22	2.00	20.210	20.00
24	1.00	23.153	23.00
25	1.00	24.153	24.00

Metric-ISO threads fine pitch			
MF	Pitch	Maximum Core Dia.	Drill Size
25	2.00	23.210	23.00
26	1.50	24.676	24.50
27	1.00	26.153	26.00
27	1.50	25.676	25.50
27	2.00	25.210	25.00
28	1.00	27.153	27.00
28	1.50	26.676	26.50
28	2.00	26.210	26.00
30	1.00	29.153	29.00
30	1.50	28.676	28.50
30	2.00	28.210	28.00
30	3.00	27.252	27.00
32	1.50	30.675	30.50
32	2.00	30.210	30.00
33	1.50	31.676	31.50
33	2.00	31.210	31.00
33	3.00	30.252	30.00
35	1.50	33.676	33.50
36	1.50	34.676	34.50
36	2.00	34.210	34.00
36	3.00	33.252	33.00
38	1.50	36.676	36.50
39	1.50	37.676	37.50
39	2.00	37.210	37.00
39	3.00	36.252	36.00
40	1.50	38.676	38.50
40	2.00	38.210	38.00
40	3.00	37.252	37.00
42	1.50	40.676	40.50
42	2.00	40.210	40.00
42	3.00	39.252	39.00
45	1.50	43.676	43.50
45	2.00	43.210	43.00
45	3.00	42.252	42.00
48	1.50	46.676	46.50
48	2.00	46.210	46.00
48	3.00	45.252	45.00
50	1.50	48.676	48.50
50	2.00	48.210	48.00
50	3.00	47.252	47.00

RECOMMENDED TAP DRILL SIZE (UNC / UNF)

American Unified coarse threads			
UNC	TPI	Maximum Core Dia.	Drill Size
#1	64	1.585	1.50
#2	56	1.872	1.80
#3	48	2.146	2.10
#4	40	2.385	2.30
#5	40	2.697	2.60
#6	32	2.896	2.85
#8	32	3.528	3.50
#10	24	3.950	3.90
#12	24	4.590	4.50
1/4	20	5.250	5.20
5/16	18	6.680	6.60
3/8	16	8.082	8.00
7/16	14	9.441	9.40
1/2	13	10.881	10.75
9/16	12	12.301	12.25
5/8	11	13.693	13.50
3/4	10	16.624	16.50
7/8	9	19.520	19.50
1	8	22.344	22.25
1-1/8	7	25.082	25.00
1-1/4	7	28.258	28.25
1-3/8	6	30.851	30.75
1-1/2	6	34.026	34.00
1-3/4	5	39.560	39.50
2	4.5	45.367	45.25

American Unified coarse threads			
UNF	TPI	Maximum Core Dia.	Drill Size
#0	80	1.306	1.30
#1	72	1.613	1.60
#2	64	1.913	1.90
#3	56	2.197	2.10
#4	48	2.459	2.40
#5	44	2.741	2.70
#6	40	3.012	3.00
#8	36	3.597	3.50
#10	32	4.168	4.10
#12	28	4.717	4.70
1/4	28	5.563	5.50
5/16	24	6.995	6.90
3/8	24	8.565	8.50
7/16	20	9.947	9.90
1/2	20	11.524	11.50
9/16	18	12.969	12.90
5/8	18	14.554	14.50
3/4	16	17.546	17.50
7/8	14	20.493	20.50
1	12	23.363	23.25
1-1/8	12	26.538	26.50
1-1/4	12	29.713	29.50
1-3/8	12	32.888	32.70
1-1/2	12	36.063	36.00

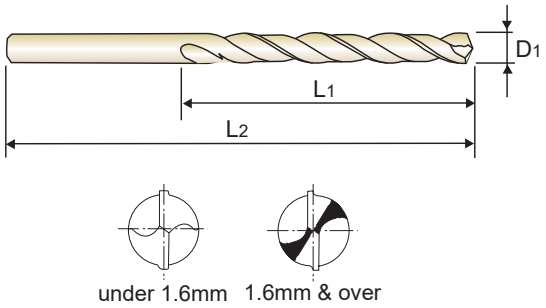


DRILLS/

HSS-E TiN /24

HSSCo5 STRAIGHT SHANK

►Flute Geometry : Right hand helix
►Point Angle : 135°
►Surface Treatment : TiN-tip coating
►Application : Drilling in Steels, Cast Steels Alloyed and Non-Alloyed, Stainless Steels, Aluminum and Titanium



HSS -Co5 | DIN 338 | h8 | 33° | 135°

Unit : mm

SDC No.	Drill Diameter	Flute Length	Overall Length
Vap	D1	L1	L2
IZ0195I0010	1.0	12	34
IZ0195I0011	1.1	14	36
IZ0195I0012	1.2	16	38
IZ0195I0013	1.3	16	38
IZ0195I0014	1.4	18	40
IZ0195I0015	1.5	18	40
IZ0195I0016	1.6	20	43
IZ0195I0017	1.7	20	43
IZ0195I0018	1.8	22	46
IZ0195I0019	1.9	22	46
IZ0195I0020	2.0	24	49
IZ0195I0021	2.1	24	49
IZ0195I0022	2.2	27	53
IZ0195I0023	2.3	27	53
IZ0195I0024	2.4	30	57
IZ0195I0025	2.5	30	57
IZ0195I0026	2.6	30	57
IZ0195I0027	2.7	33	61
IZ0195I0028	2.8	33	61
IZ0195I0029	2.9	33	61
IZ0195I0030	3.0	33	61

SDC No.	Drill Diameter	Flute Length	Overall Length
Vap	D1	L1	L2
IZ0195I0031	3.1	36	65
IZ0195I0032	3.2	36	65
IZ0195I0033	3.3	36	65
IZ0195I0034	3.4	39	70
IZ0195I0035	3.5	39	70
IZ0195I0036	3.6	39	70
IZ0195I0037	3.7	39	70
IZ0195I0038	3.8	43	75
IZ0195I0039	3.9	43	75
IZ0195I0040	4.0	43	75
IZ0195I0041	4.1	43	75
IZ0195I0042	4.2	43	75
IZ0195I0043	4.3	47	80
IZ0195I0044	4.4	47	80
IZ0195I0045	4.5	47	80
IZ0195I0046	4.6	47	80
IZ0195I0047	4.7	47	80
IZ0195I0048	4.8	52	86
IZ0195I0049	4.9	52	86
IZ0195I0050	5.0	52	86
IZ0195I0051	5.1	52	86

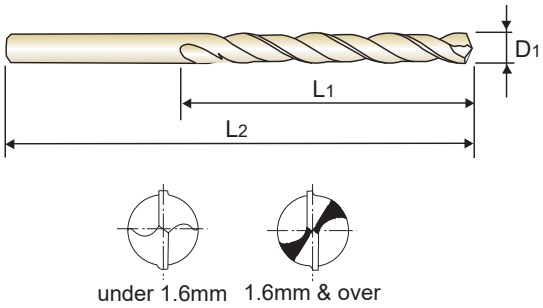
◎ : Excellent ○ : Good

P			H		M	K	N				S
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		Stainless Steels	Cast Iron	Aluminum	Copper	Bronze	CFRP	Titanium
~HB225	HB225~325	HRc20~40	HRc45~55	HRc55~							
◎	◎				○		○				○

ECO COATED DRILLS (DIN)

HSSCo5 STRAIGHT SHANK

- ►Flute Geometry : Right hand helix
- ►Point Angle : 135°
- ►Surface Treatment : TiN-tip coating
- ►Application : Drilling in Steels, Cast Steels Alloyed and Non-Alloyed, Stainless Steels, Aluminum and Titanium



HSS -Co5 | DIN 338 | h8 | 33° | 135°

Unit : mm

SDC No.	Drill Diameter	Flute Length	Overall Length
Vap	D1	L1	L2
IZ0195I0052	5.2	52	86
IZ0195I0053	5.3	52	86
IZ0195I0054	5.4	57	93
IZ0195I0055	5.5	57	93
IZ0195I0056	5.6	57	93
IZ0195I0057	5.7	57	93
IZ0195I0058	5.8	57	93
IZ0195I0059	5.9	57	93
IZ0195I0060	6.0	57	93
IZ0195I0061	6.1	63	101
IZ0195I0062	6.2	63	101
IZ0195I0063	6.3	63	101
IZ0195I0064	6.4	63	101
IZ0195I0065	6.5	63	101
IZ0195I0066	6.6	63	101
IZ0195I0067	6.7	63	101
IZ0195I0068	6.8	69	109
IZ0195I0069	6.9	69	109
IZ0195I0070	7.0	69	109
IZ0195I0071	7.1	69	109
IZ0195I0072	7.2	69	109

SDC No.	Drill Diameter	Flute Length	Overall Length
Vap	D1	L1	L2
IZ0195I0073	7.3	69	109
IZ0195I0074	7.4	69	109
IZ0195I0075	7.5	69	109
IZ0195I0076	7.6	75	117
IZ0195I0077	7.7	75	117
IZ0195I0078	7.8	75	117
IZ0195I0079	7.9	75	117
IZ0195I0080	8.0	75	117
IZ0195I0081	8.1	75	117
IZ0195I0082	8.2	75	117
IZ0195I0083	8.3	75	117
IZ0195I0084	8.4	75	117
IZ0195I0085	8.5	75	117
IZ0195I0086	8.6	81	125
IZ0195I0087	8.7	81	125
IZ0195I0088	8.8	81	125
IZ0195I0089	8.9	81	125
IZ0195I0090	9.0	81	125
IZ0195I0091	9.1	81	125
IZ0195I0092	9.2	81	125
IZ0195I0093	9.3	81	125

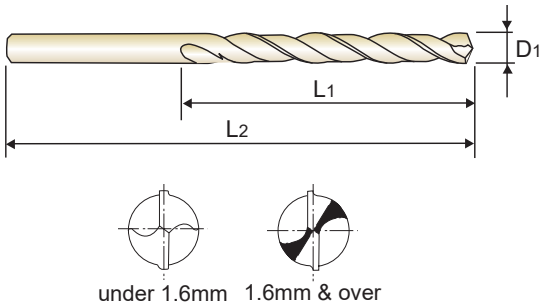
◎ : Excellent ○ : Good

P				H	M	K	N				S
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		Stainless Steels	Cast Iron	Aluminum	Copper	Bronze	CFRP	Titanium
~HB225	HB225~325	HRc20~40	HRc45~55	HRc55~							
◎	◎				○		○				○

Sangeo cutting tools

HSSCo5 STRAIGHT SHANK

- ►Flute Geometry : Right hand helix
- ►Point Angle : 135°
- ►Surface Treatment : TiN-tip coating
- ►Application : Drilling in Steels, Cast Steels Alloyed and Non-Alloyed, Stainless Steels, Aluminum and Titanium



HSS -Co5 | DIN 338 | h8 | 33° | 135°

Unit : mm

SDC No.	Drill Diameter	Flute Length	Overall Length
Vap	D1	L1	L2
IZ0195I0094	9.4	81	125
IZ0195I0095	9.5	81	125
IZ0195I0096	9.6	87	133
IZ0195I0097	9.7	87	133
IZ0195I0098	9.8	87	133
IZ0195I0099	9.9	87	133
IZ0195I0100	10.0	87	133
IZ0195I0101	10.1	87	133
IZ0195I0102	10.2	87	133
IZ0195I0103	10.3	87	133
IZ0195I0104	10.4	87	133
IZ0195I0105	10.5	87	133
IZ0195I0106	10.6	87	133
IZ0195I0107	10.7	94	142
IZ0195I0108	10.8	94	142
IZ0195I0109	10.9	94	142
IZ0195I0110	11.0	94	142
IZ0195I0111	11.1	94	142
IZ0195I0112	11.2	94	142
IZ0195I0113	11.3	94	142
IZ0195I0114	11.4	94	142

SDC No.	Drill Diameter	Flute Length	Overall Length
Vap	D1	L1	L2
IZ0195I0115	11.5	94	142
IZ0195I0116	11.6	94	142
IZ0195I0117	11.7	94	142
IZ0195I0118	11.8	94	142
IZ0195I0119	11.9	101	151
IZ0195I0120	12.0	101	151
IZ0195I0121	12.1	101	151
IZ0195I0122	12.2	101	151
IZ0195I0123	12.3	101	151
IZ0195I0124	12.4	101	151
IZ0195I0125	12.5	101	151
IZ0195I0126	12.6	101	151
IZ0195I0127	12.7	101	151
IZ0195I0128	12.8	101	151
IZ0195I0129	12.9	101	151
IZ0195I0130	13.0	101	151

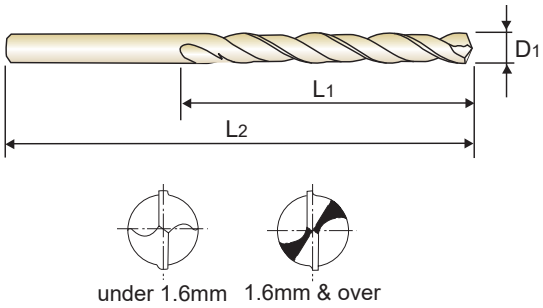
◎ : Excellent ○ : Good

P			H		M	K	N				S
Carbon Steels	Alloy Steels	Prehardened Steels	Hardened Steels		Stainless Steels	Cast Iron	Aluminum	Copper	Bronze	CFRP	Titanium
~HB225	HB225~325	HRc20~40	HRc45~55	HRc55~							
◎	◎				○		○				○

ECO TWIST DRILL

HSS-E STRAIGHT SHANK

- ►Flute Geometry : Right hand helix
- ►Point Angle : 135°
- ►Surface Treatment : Coloring (Gold color)
- ►Drilling stainless steels and difficult - to - cut materials such as titanium and inconel.



HSS-E | DIN 338 | h8 | 33° | 135°

Unit : mm

SDC No.	Drill Diameter	Flute Length	Overall Length
Vap	D1	L1	L2
IZ0105I0001	9.7	87	133
IZ0105I0002	9.75	87	133
IZ0105I0003	9.8	87	133
IZ0105I0004	9.9	87	133
IZ0105I0005	10.0	87	133
IZ0105I0006	10.2	87	133
IZ0105I0007	10.5	87	133
IZ0105I0008	11.0	94	142
IZ0105I0009	11.5	94	142
IZ0105I0010	12.0	101	151
IZ0105I0011	12.5	101	151
IZ0105I0012	13.0	101	151
IZ0105I0013	13.5	108	160

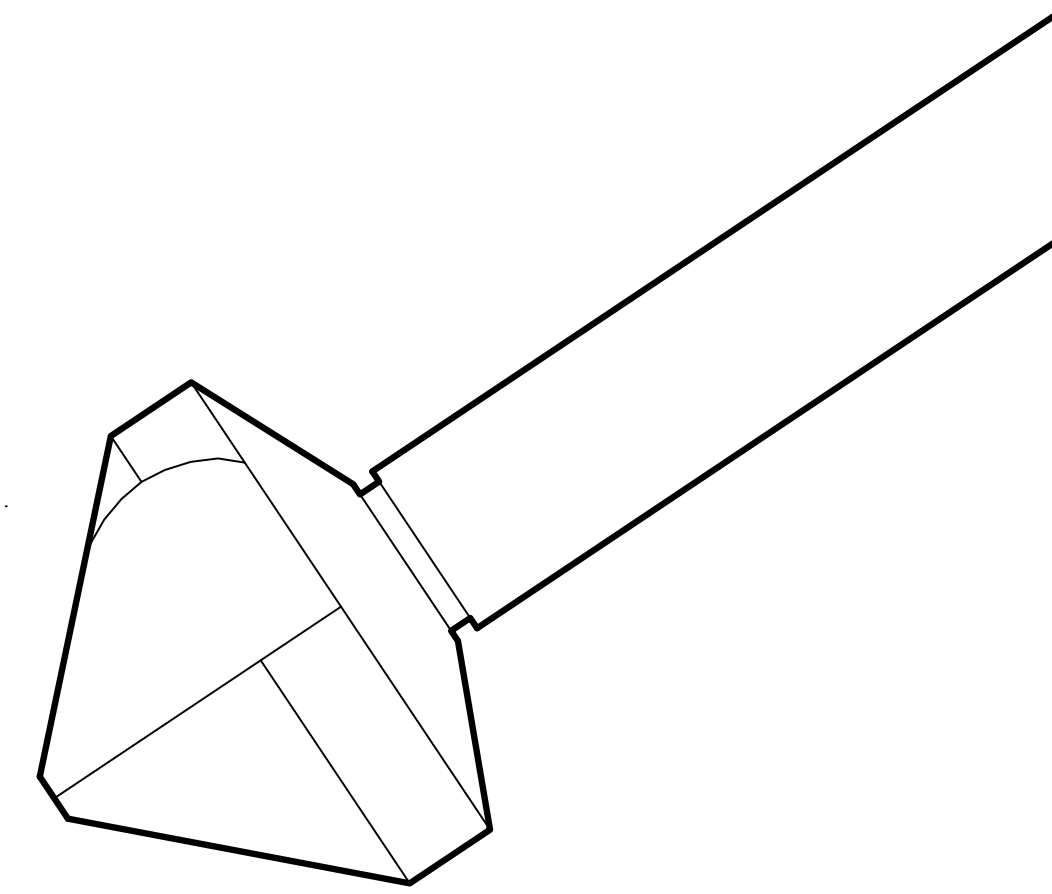
SDC No.	Drill Diameter	Flute Length	Overall Length
Vap	D1	L1	L2
IZ0105I0014	14.0	108	160
IZ0105I0015	14.5	114	169
IZ0105I0016	15.0	114	169
IZ0105I0017	15.5	120	178
IZ0105I0018	16.0	120	178
IZ0105I0019	16.5	125	184
IZ0105I0020	17.0	125	184
IZ0105I0021	17.5	130	191
IZ0105I0022	18.0	130	191
IZ0105I0023	18.5	135	198
IZ0105I0024	19.0	135	198
IZ0105I0025	19.5	140	205
IZ0105I0026	20.0	140	205

◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	◎	○		◎	○	○		○		◎	○	○	○	○	○		○	

ISO	N										S							H			
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommended	○	○	○						○							○					

Sangeo cutting tools

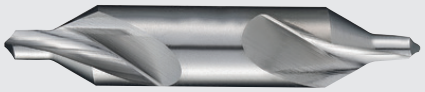


OTHERS/

Centerdrill /30

Countersink /31

HSS CENTER DRILLS



Type A
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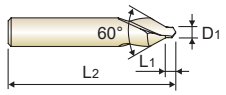

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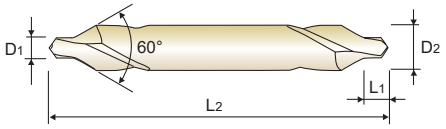


HSS | DIN 333 | k12 | 120° | h8

Unit : mm

SDC No.	Drill Diameter	Shank Diameter	Flute Length	Overall Length
Vap	D1	D2	L1	L2
IZ1303I0001	1.0	3.15	1.3	31.5
IZ1303I0002	1.25	3.15	1.6	31.5
IZ1303I0003	1.6	4	2	35.5
IZ1303I0004	2.0	5	2.5	40
IZ1303I0005	2.5	6.3	3.1	45
IZ1303I0006	3.15	8	3.9	50
IZ1303I0007	4.0	10	5	56
IZ1303I0008	5.0	12.5	6.3	63
IZ1303I0009	6.3	16	8	71

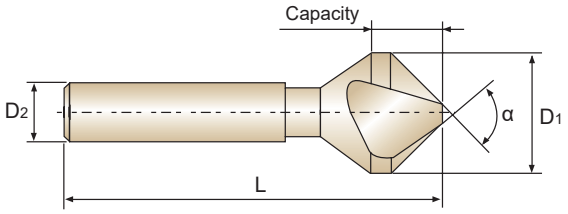
◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	◎	○		◎	○	○		○		◎	○	○	○	○	○		○	

ISO	N										S							H			
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommended	○	○	○						○							○					

THREE FLUTE COUNTERSINKS

HSS COUNTERSINK



HSS | DIN 335C

Unit : mm

SDC No.	Point Angle	Cutter Diameter	Shank Diameter	Overall Length	Capacity
Vap	α	D1	D2	L(±1)	min/max
IZ3139I0001	90°	4.3	4	40	1.3 - 4.3
IZ3139I0002	90°	5.0	4	40	1.5 - 5.0
IZ3139I0003	90°	6.0	5	45	1.5 - 6.0
IZ3139I0004	90°	6.3	5	45	1.5 - 6.3
IZ3139I0005	90°	7.0	6	50	1.8 - 7.0
IZ3139I0006	90°	8.0	6	50	2.0 - 8.0
IZ3139I0007	90°	8.3	6	50	2.0 - 8.3
IZ3139I0008	90°	10.0	6	50	2.5 - 10.0
IZ3139I0009	90°	10.4	6	50	2.5 - 10.4
IZ3139I0010	90°	11.5	8	56	2.8 - 11.5
IZ3139I0011	90°	12.4	8	56	2.8 - 12.4
IZ3139I0012	90°	15.0	10	60	3.2 - 15.0
IZ3139I0013	90°	16.5	10	60	3.2 - 16.5
IZ3139I0014	90°	19.0	10	63	3.5 - 19.0
IZ3139I0015	90°	20.5	10	63	3.5 - 20.5
IZ3139I0016	90°	23.0	10	67	3.8 - 23.0
IZ3139I0017	90°	25.0	10	67	3.8 - 25.0
IZ3139I0018	90°	30.0	12	71	4.2 - 30.0
IZ3139I0019	90°	31.0	12	71	4.2 - 31.0

◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommended	◎	◎	◎	○		◎	○	○		○		◎	○	○	○	○	○		○	

ISO	N										S					H					
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommended	○	○	○						○							○					

Sangeo cutting tools

Sangeo
cutting tools

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