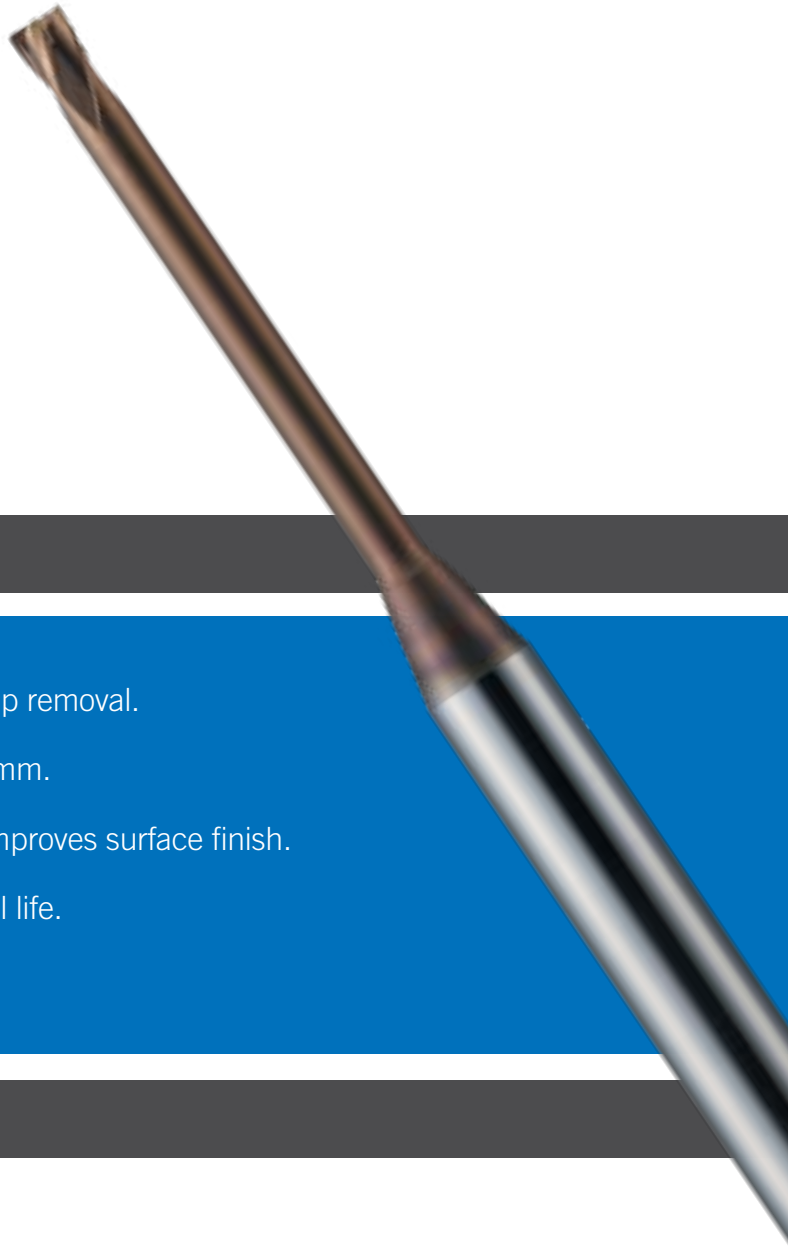
EPDRF

High-Precision Four Flute Corner Radius End Mills for Deep Machining



FEATURES

Flute shape provides both rigidity and excellent chip removal.

Unprecedented corner radius accuracy of ±0.005mm.

Bottom flute wiper effect reduces chattering and improves surface finish.

TH Coating provides cutting efficiency and long tool life.

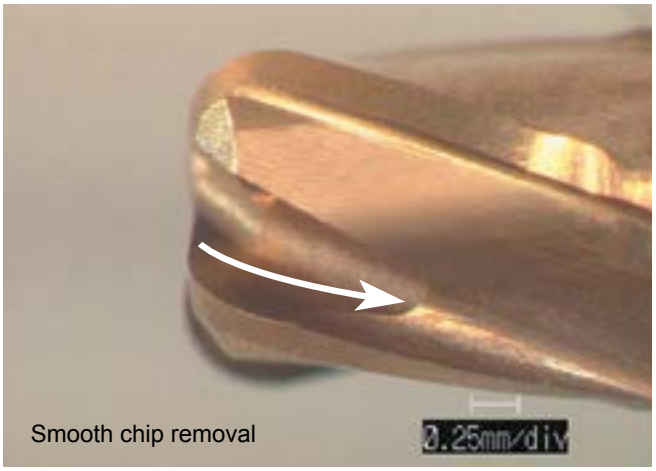
EPDRF

INTRODUCTION

Our EPDRF Corner Radius Deep End Mills are designed to deep machine flat surfaces in hardened steels while providing excellent surface finish. The new flute geometry is designed for excellent chip removal and high rigidity, while the bottom flute wiper blade improves the surface roughness of the finished part. MOLDINO's own PVD nano-technology TH Coating leads to unprecedented heat resistance and longer tool life.

FEATURES

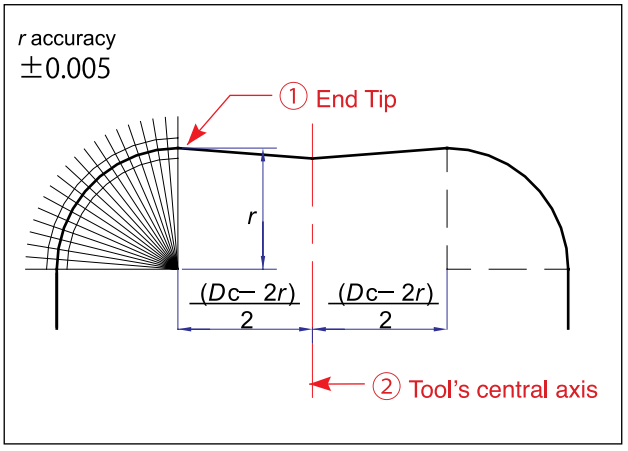
1. New Flute Geometry Provides Excellent Chip Removal And High Rigidity



By using a flute shape with both good chip removal characteristics and rigidity, highly efficient deep machining can be performed. Chip jamming is prevented and chattering is suppressed, contributing to a smooth machined surface.

2. Unprecedented High Corner Radius Accuracy

Corner R accuracy guaranteed with tool center as reference point. Enables more accurate finishing when finishing molds.

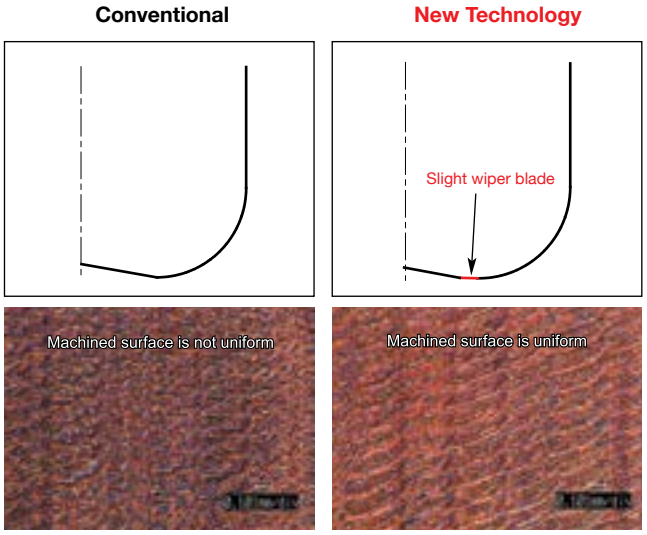


Accuracy basis

① End Tip ② Tool's central axis

Like ball end mills, corner radius accuracy is kept to within ±0.005mm relative to the tool's central axis, achieving a high corner radius accuracy. This enables high-accuracy finish machining to be performed, something which has been difficult to do with previous corner radius end mills.

3. Bottom Flute Wiper Effect



By designing the bottom blade to have a slight wiper blade, it's possible to machine an excellent surface finish of the bottom surface even during high-efficiency machining. Particularly for tools with long below-the-neck lengths (for which chattering is likely to occur), good surface roughness can be achieved for bottom finish machining, such as for deep rib grooves, etc.

Cutting data

Tool size: ϕ2×r 0.5×20 (under neck length)
Work piece: Pre-harden steel (38HRC)
n=12,700min^{-1} vf=1778mm/min fz=0.035mm/tooth
ap=0.05mm ae=0.5mm Wet

4. Backdraft Shape

Reliable backdraft shape

Note: Mill diameter: 3mm or less

By employing the backdraft shape that has provided good results for Epoch Deep series, chattering vibrations are suppressed even when machining deep areas, so that a good machined surface can be achieved.

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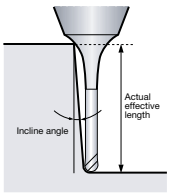

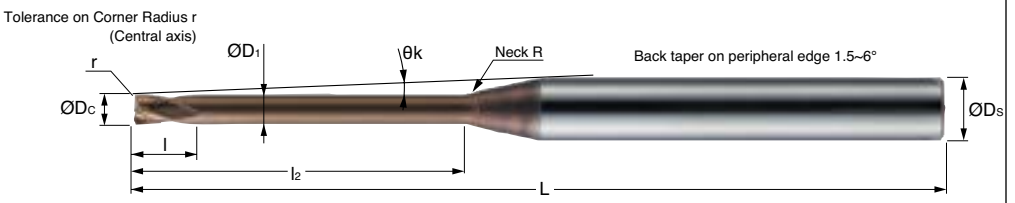

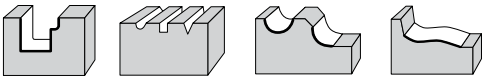

Helix Angle	20°	d	h5
r	±0.005	Dc	0/-0.1

Part No.	Stock	Size (mm) D_c	r	l_2	l	D_1	L	D_s	Neck R	θk	Actual Effective Length in Incline Angles 0.5°	1°	1.5°	2°	3°
EPDRF4010-4-005-TH	●	1.0	0.05	4	0.8	0.94	50	4	4	7.67	4.75	4.95	5.13	5.28	5.56
EPDRF4010-6-005-TH	●	1.0	0.05	6	0.8	0.94	50	4	4	6.51	6.84	7.09	7.30	7.49	8.13
EPDRF4010-8-005-TH	□	1.0	0.05	8	0.8	0.94	50	4	4	5.66	8.92	9.21	9.46	9.73	10.78
EPDRF4010-10-005-TH	□	1.0	0.05	10	0.8	0.94	50	4	4	5	10.99	11.32	11.59	12.12	13.44
EPDRF4010-12-005-TH	□	1.0	0.05	12	0.8	0.94	60	4	4	4.48	13.06	13.42	13.84	14.51	16.09
EPDRF4010-16-005-TH	□	1.0	0.05	16	0.8	0.94	60	4	4	3.71	17.18	17.60	18.40	19.30	21.40
EPDRF4010-20-005-TH	□	1.0	0.05	20	0.8	0.94	60	4	4	3.17	21.29	21.93	22.96	24.09	26.71
EPDRF4010-4-01-TH	●	1.0	0.10	4	0.8	0.94	50	4	4	7.7	4.74	4.95	5.12	5.28	5.55
EPDRF4010-6-01-TH	●	1.0	0.10	6	0.8	0.94	50	4	4	6.54	6.83	7.09	7.30	7.49	8.11
EPDRF4010-8-01-TH	□	1.0	0.10	8	0.8	0.94	50	4	4	5.68	8.91	9.21	9.45	9.72	10.77
EPDRF4010-10-01-TH	□	1.0	0.10	10	0.8	0.94	50	4	4	5.02	10.99	11.32	11.59	12.11	13.42
EPDRF4010-12-01-TH	□	1.0	0.10	12	0.8	0.94	60	4	4	4.5	13.06	13.42	13.83	14.50	16.08
EPDRF4010-16-01-TH	□	1.0	0.10	16	0.8	0.94	60	4	4	3.72	17.18	17.60	18.39	19.29	21.39
EPDRF4010-20-01-TH	□	1.0	0.10	20	0.8	0.94	60	4	4	3.17	21.29	21.93	22.95	24.08	26.70
EPDRF4015-4-005-TH	●	1.5	0.05	4	1.35	1.42	50	4	4	7.12	4.80	4.99	5.16	5.31	5.59
EPDRF4015-8-005-TH	●	1.5	0.05	8	1.35	1.42	50	4	4	5.1	8.96	9.25	9.48	9.78	10.85
EPDRF4015-12-005-TH	□	1.5	0.05	12	1.35	1.42	60	4	4	3.97	13.09	13.45	13.89	14.57	16.16
EPDRF4015-15-005-TH	□	1.5	0.05	15	1.35	1.42	60	4	4	3.41	16.18	16.58	17.31	18.16	20.14
EPDRF4015-20-005-TH	□	1.5	0.05	20	1.35	1.42	60	4	4	2.76	21.32	21.98	23.01	24.14	–
EPDRF4015-4-01-TH	●	1.5	0.10	4	1.35	1.42	50	4	4	7.15	4.80	4.99	5.16	5.31	5.58
EPDRF4015-8-01-TH	●	1.5	0.10	8	1.35	1.42	50	4	4	5.12	8.96	9.24	9.48	9.77	10.83
EPDRF4015-12-01-TH	□	1.5	0.10	12	1.35	1.42	60	4	4	3.98	13.09	13.45	13.88	14.56	16.14
EPDRF4015-15-01-TH	□	1.5	0.10	15	1.35	1.42	60	4	4	3.42	16.18	16.58	17.30	18.15	20.12
EPDRF4015-20-01-TH	□	1.5	0.10	20	1.35	1.42	60	4	4	2.76	21.32	21.98	23.01	24.13	–
EPDRF4020-4-005-TH	●	2.0	0.05	4	1.7	1.92	50	4	4	6.46	4.80	4.99	5.16	5.31	5.59
EPDRF4020-6-005-TH	●	2.0	0.05	6	1.7	1.92	50	4	4	5.27	6.88	7.13	7.33	7.52	8.19
EPDRF4020-8-005-TH	●	2.0	0.05	8	1.7	1.92	50	4	4	4.46	8.96	9.25	9.48	9.78	10.85
EPDRF4020-12-005-TH	●	2.0	0.05	12	1.7	1.92	60	4	4	3.4	13.09	13.45	13.89	14.57	16.16
EPDRF4020-16-005-TH	●	2.0	0.05	16	1.7	1.92	60	4	4	2.75	17.21	17.63	18.45	19.36	–
EPDRF4020-20-005-TH	□	2.0	0.05	20	1.7	1.92	60	4	4	2.31	21.32	21.98	23.01	24.14	–

□ = Stocked items in Japan

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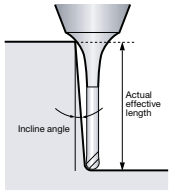

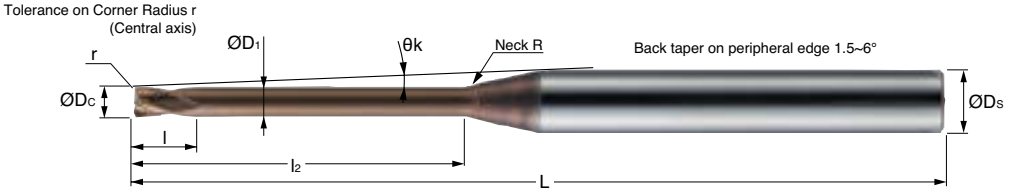

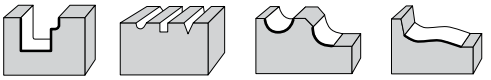

Helix Angle	20°	d	h5
r	±0.005	Dc	0/-0.1

Part No.	Stock	Size (mm)							Neck		Actual Effective Length in Incline Angles				
		D_c	r	l_2	l	D_1	L	D_s	R	θk	0.5°	1°	1.5°	2°	3°
EPDRF4020-4-01-TH	●	2.0	0.1	4	1.7	1.92	50	4	4	6.49	4.80	4.99	5.16	5.31	5.58
EPDRF4020-6-01-TH	●	2.0	0.1	6	1.7	1.92	50	4	4	5.3	6.88	7.12	7.33	7.51	8.18
EPDRF4020-8-01-TH	●	2.0	0.1	8	1.7	1.92	50	4	4	4.47	8.96	9.24	9.48	9.77	10.83
EPDRF4020-12-01-TH	●	2.0	0.1	12	1.7	1.92	60	4	4	3.41	13.09	13.45	13.88	14.56	16.14
EPDRF4020-16-01-TH	●	2.0	0.1	16	1.7	1.92	60	4	4	2.76	17.21	17.62	18.44	19.35	–
EPDRF4020-20-01-TH	□	2.0	0.1	20	1.7	1.92	60	4	4	2.31	21.32	21.98	23.01	24.13	–
EPDRF4020-4-02-TH	●	2.0	0.2	4	1.7	1.92	50	4	4	6.57	4.79	4.98	5.15	5.30	5.57
EPDRF4020-6-02-TH	●	2.0	0.2	6	1.7	1.92	50	4	4	5.35	6.88	7.12	7.32	7.50	8.14
EPDRF4020-8-02-TH	●	2.0	0.2	8	1.7	1.92	50	4	4	4.51	8.95	9.24	9.47	9.75	10.8
EPDRF4020-12-02-TH	●	2.0	0.2	12	1.7	1.92	60	4	4	3.43	13.09	13.44	13.87	14.54	16.11
EPDRF4020-16-02-TH	●	2.0	0.2	16	1.7	1.92	60	4	4	2.77	17.21	17.62	18.43	19.33	–
EPDRF4020-20-02-TH	□	2.0	0.2	20	1.7	1.92	60	4	4	2.32	21.32	21.97	22.99	24.11	–
EPDRF4020-25-02-TH	●	2.0	0.2	25	1.7	1.92	70	4	4	1.93	26.44	27.42	28.69	–	–
EPDRF4020-30-02-TH	□	2.0	0.2	30	1.7	1.92	70	4	4	1.66	31.55	32.87	34.40	–	–
EPDRF4020-4-03-TH	□	2.0	0.2	4	1.7	1.92	50	4	4	6.64	4.79	4.97	5.14	5.29	5.55
EPDRF4020-8-03-TH	□	2.0	0.3	8	1.7	1.92	50	4	4	4.55	8.95	9.23	9.47	9.73	10.77
EPDRF4020-12-03-TH	□	2.0	0.3	12	1.7	1.92	60	4	4	3.45	13.09	13.44	13.85	14.52	16.08
EPDRF4020-16-03-TH	□	2.0	0.3	16	1.7	1.92	60	4	4	2.79	17.21	17.61	18.42	19.31	–
EPDRF4020-20-03-TH	□	2.0	0.3	20	1.7	1.92	60	4	4	2.33	21.31	21.96	22.98	24.09	–
EPDRF4020-4-05-TH	□	2.0	0.5	4	1.7	1.92	50	4	4	6.80	4.78	4.96	5.12	5.26	5.53
EPDRF4020-6-05-TH	□	2.0	0.5	6	1.7	1.92	50	4	4	5.50	6.86	7.10	7.30	7.48	8.05
EPDRF4020-8-05-TH	●	2.0	0.5	8	1.7	1.92	50	4	4	4.62	8.94	9.22	9.45	9.70	10.70
EPDRF4020-12-05-TH	□	2.0	0.5	12	1.7	1.92	60	4	4	3.50	13.08	13.43	13.83	14.48	16.01
EPDRF4020-16-05-TH	●	2.0	0.5	16	1.7	1.92	60	4	4	2.81	17.2	17.61	18.39	19.27	–
EPDRF4020-20-05-TH	●	2.0	0.5	20	1.7	1.92	60	4	4	2.35	21.31	21.95	22.95	24.06	–
EPDRF4020-25-05-TH	●	2.0	0.5	25	1.7	1.92	70	4	4	1.95	26.43	27.39	28.65	–	–
EPDRF4020-30-05-TH	●	2.0	0.5	30	1.7	1.92	70	4	4	1.67	31.54	32.84	34.36	–	–
EPDRF4025-8-01-TH	●	2.5	0.1	8	2	2.4	50	4	4	3.68	9.00	9.27	9.51	9.83	10.89
EPDRF4025-16-01-TH	●	2.5	0.1	16	2	2.4	60	4	4	2.19	17.24	17.67	18.50	19.40	–
EPDRF4025-20-01-TH	●	2.5	0.1	20	2	2.4	60	4	4	1.82	21.35	22.03	23.06	–	–

□ = Stocked items in Japan

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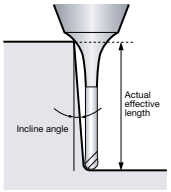

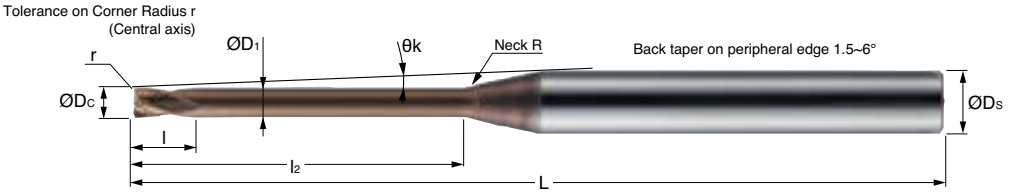

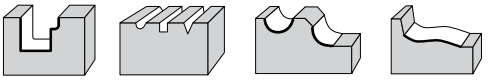

Helix Angle	20°	d	h5
r	±0.005	Dc	0/-0.1

Part No.	Stock	Size (mm) D_c	r	l_2	l	D_1	L	D_s	Neck R	θk	Actual Effective Length in Incline Angles 0.5°	1°	1.5°	2°	3°
EPDRF4025-8-02-TH	●	2.5	0.2	8	2	2.4	50	4	4	3.72	8.99	9.27	9.50	9.81	10.86
EPDRF4025-16-02-TH	●	2.5	0.2	16	2	2.4	60	4	4	2.2	17.24	17.67	18.48	19.38	–
EPDRF4025-20-02-TH	●	2.5	0.2	20	2	2.4	60	4	4	1.83	21.34	22.02	23.05	–	–
EPDRF4025-12-03-TH	□	2.5	0.3	12	2	2.4	60	4	4	2.78	13.12	13.47	13.91	14.58	–
EPDRF4025-20-03-TH	□	2.5	0.3	20	2	2.4	60	4	4	1.84	21.34	22.01	23.03	–	–
EPDRF4025-12-05-TH	□	2.5	0.5	12	2	2.4	60	4	4	2.82	13.12	13.46	13.88	14.54	–
EPDRF4025-20-05-TH	□	2.5	0.5	20	2	2.4	60	4	4	1.85	21.34	22.00	23.00	–	–
EPDRF4030-8-01-TH	●	3.0	0.1	8	2.5	2.86	60	6	4	5.61	9.07	9.34	9.56	9.94	11.02
EPDRF4030-16-01-TH	●	3.0	0.1	16	2.5	2.86	60	6	4	3.69	17.30	17.78	18.60	19.52	21.64
EPDRF4030-25-01-TH	□	3.0	0.1	25	2.5	2.86	70	6	4	2.67	26.52	27.58	28.87	30.28	–
EPDRF4030-30-01-TH	□	3.0	0.1	30	2.5	2.86	80	6	4	2.31	31.62	33.03	34.57	36.27	–
EPDRF4030-8-02-TH	●	3.0	0.2	8	2.5	2.86	60	6	4	5.65	9.07	9.33	9.55	9.92	10.99
EPDRF4030-12-02-TH	●	3.0	0.2	12	2.5	2.86	60	6	4	4.48	13.19	13.52	14.03	14.71	16.30
EPDRF4030-16-02-TH	●	3.0	0.2	16	2.5	2.86	60	6	4	3.71	17.30	17.77	18.59	19.50	21.60
EPDRF4030-20-02-TH	●	3.0	0.2	20	2.5	2.86	70	6	4	3.16	21.40	22.13	23.15	24.28	26.91
EPDRF4030-25-02-TH	□	3.0	0.2	25	2.5	2.86	70	6	4	2.67	26.51	27.57	28.86	30.27	–
EPDRF4030-30-02-TH	□	3.0	0.2	30	2.5	2.86	80	6	4	2.31	31.62	33.02	34.56	36.25	–
EPDRF4030-8-03-TH	●	3.0	0.3	8	2.5	2.86	60	6	4	5.68	9.07	9.33	9.54	9.90	10.95
EPDRF4030-16-03-TH	●	3.0	0.3	16	2.5	2.86	60	6	4	3.72	17.30	17.76	18.58	19.48	21.57
EPDRF4030-20-03-TH	●	3.0	0.3	20	2.5	2.86	70	6	4	3.17	21.40	22.12	23.14	24.26	26.88
EPDRF4030-25-03-TH	□	3.0	0.3	25	2.5	2.86	70	6	4	2.68	26.51	27.56	28.84	30.25	–
EPDRF4030-30-03-TH	□	3.0	0.3	30	2.5	2.86	80	6	4	2.32	31.62	33.01	34.54	36.23	–
EPDRF4030-8-05-TH	●	3.0	0.5	8	2.5	2.86	60	6	4	5.76	9.06	9.31	9.53	9.87	10.89
EPDRF4030-12-05-TH	●	3.0	0.5	12	2.5	2.86	60	6	4	4.55	13.18	13.51	13.99	14.65	16.20
EPDRF4030-16-05-TH	●	3.0	0.5	16	2.5	2.86	60	6	4	3.75	17.29	17.74	18.55	19.44	21.51
EPDRF4030-20-05-TH	●	3.0	0.5	20	2.5	2.86	70	6	4	3.2	21.39	22.1	23.11	24.22	26.82
EPDRF4030-25-05-TH	●	3.0	0.5	25	2.5	2.86	70	6	4	2.7	26.51	27.55	28.81	30.21	–
EPDRF4030-30-05-TH	●	3.0	0.5	30	2.5	2.86	80	6	4	2.33	31.61	32.99	34.52	36.19	–
EPDRF4030-35-05-TH	□	3.0	0.5	35	2.5	2.86	80	6	4	2.06	36.82	38.44	40.22	42.17	–
EPDRF4040-12-01-TH	□	4.0	0.1	12	4	3.9	60	6	4	3.4	13.13	13.47	13.94	14.62	16.20

□ = Stocked items in Japan

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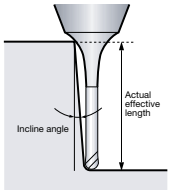

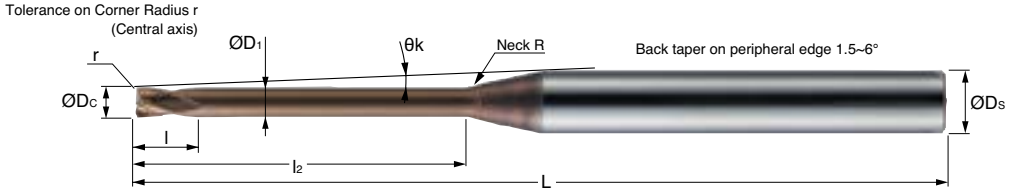

Helix Angle	20°	d	h5
r	±0.005	Dc	0/-0.1

Part No.	Stock	Size (mm) Dc	r	l2	l	D1	L	Ds	Neck R	θk	Actual Effective Length in Incline Angles 0.5°	1°	1.5°	2°	3°
EPDRF4040-20-01-TH	●	4.0	0.1	20	4	3.9	60	6	4	2.31	21.35	22.03	23.06	24.19	–
EPDRF4040-30-01-TH	□	4.0	0.1	30	4	3.9	80	6	4	1.65	31.57	32.93	34.46	–	–
EPDRF4040-40-01-TH	□	4.0	0.1	40	4	3.9	80	6	4	1.28	41.95	43.82	–	–	–
EPDRF4040-12-02-TH	●	4.0	0.2	12	4	3.9	60	6	4	3.42	13.12	13.47	13.92	14.6	16.17
EPDRF4040-20-02-TH	●	4.0	0.2	20	4	3.9	60	6	4	2.32	21.34	22.02	23.05	24.17	–
EPDRF4040-30-02-TH	●	4.0	0.2	30	4	3.9	80	6	4	1.65	31.57	32.92	34.45	–	–
EPDRF4040-40-02-TH	□	4.0	0.2	40	4	3.9	80	6	4	1.29	41.94	43.81	–	–	–
EPDRF4040-12-03-TH	●	4.0	0.3	12	4	3.9	60	6	4	3.44	13.12	13.47	13.91	14.58	16.14
EPDRF4040-20-03-TH	●	4.0	0.3	20	4	3.9	60	6	4	2.33	21.34	22.01	23.03	24.15	–
EPDRF4040-30-03-TH	□	4.0	0.3	30	4	3.9	80	6	4	1.66	31.57	32.91	34.44	–	–
EPDRF4040-40-03-TH	□	4.0	0.3	40	4	3.9	80	6	4	1.29	41.94	43.80	–	–	–
EPDRF4040-12-05-TH	●	4.0	0.5	12	4	3.9	60	6	4	3.49	13.12	13.46	13.88	14.54	16.07
EPDRF4040-20-05-TH	●	4.0	0.5	20	4	3.9	60	6	4	2.35	21.34	22.00	23	24.11	–
EPDRF4040-30-05-TH	●	4.0	0.5	30	4	3.9	80	6	4	1.67	31.57	32.89	34.41	–	–
EPDRF4040-40-05-TH	●	4.0	0.5	40	4	3.9	80	6	4	1.29	41.93	43.79	–	–	–
EPDRF4050-20-01-TH	●	5.0	0.1	20	5	4.9	70	6	4	1.28	21.35	22.03	–	–	–
EPDRF4050-40-01-TH	□	5.0	0.1	40	5	4.9	90	6	4	0.68	41.95	–	–	–	–
EPDRF4050-20-02-TH	●	5.0	0.2	20	5	4.9	70	6	4	1.28	21.34	22.02	–	–	–
EPDRF4050-40-02-TH	●	5.0	0.2	40	5	4.9	90	6	4	0.68	41.94	–	–	–	–
EPDRF4050-20-03-TH	□	5.0	0.3	20	5	4.9	70	6	4	1.29	21.34	22.01	–	–	–
EPDRF4050-40-03-TH	□	5.0	0.3	40	5	4.9	90	6	4	0.68	41.94	–	–	–	–
EPDRF4050-20-05-TH	●	5.0	0.5	20	5	4.9	70	6	4	1.3	21.34	22.00	–	–	–
EPDRF4050-40-05-TH	□	5.0	0.5	40	5	4.9	90	6	4	0.69	41.93	–	–	–	–
EPDRF4050-20-10-TH	□	5.0	1	20	5	4.9	70	6	4	1.33	21.32	21.95	–	–	–
EPDRF4050-40-10-TH	□	5.0	1	40	5	4.9	90	6	4	0.69	41.91	–	–	–	–
EPDRF4060-30-02-TH	●	6.0	0.2	30	6	5.9	80	6	4	0	–	–	–	–	–
EPDRF4060-54-02-TH	□	6.0	0.2	54	6	5.9	100	6	4	0	–	–	–	–	–
EPDRF4060-72-02-TH	□	6.0	0.2	72	6	5.9	120	6	4	0	–	–	–	–	–
EPDRF4060-30-03-TH	●	6.0	0.3	30	6	5.9	80	6	4	0	–	–	–	–	–
EPDRF4060-54-03-TH	□	6.0	0.3	54	6	5.9	100	6	4	0	–	–	–	–	–

□ = Stocked items in Japan

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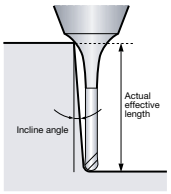

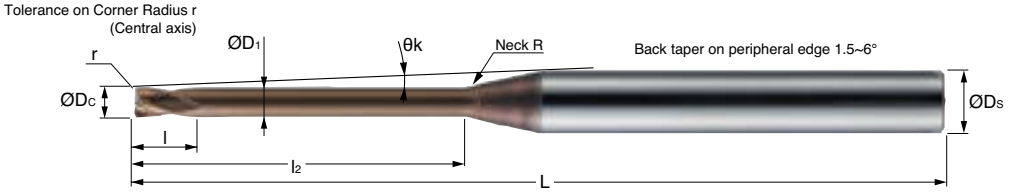

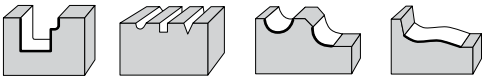

Helix Angle	20°	d	h5
r	±0.005	Dc	0/-0.1

Part No.	Stock	Size (mm) D_c	r	l_2	l	D_1	L	D_s	Neck R	θk	Actual Effective Length in Incline Angles 0.5°	1°	1.5°	2°	3°
EPDRF4060-72-03-TH	□	6.0	0.3	72	6	5.9	120	6	4	0	–	–	–	–	–
EPDRF4060-30-05-TH	●	6.0	0.5	30	6	5.9	80	6	4	0	–	–	–	–	–
EPDRF4060-54-05-TH	□	6.0	0.5	54	6	5.9	100	6	4	0	–	–	–	–	–
EPDRF4060-72-05-TH	□	6.0	0.5	72	6	5.9	120	6	4	0	–	–	–	–	–
EPDRF4060-30-10-TH	●	6.0	1	30	6	5.9	80	6	4	0	–	–	–	–	–
EPDRF4060-54-10-TH	□	6.0	1	54	6	5.9	100	6	4	0	–	–	–	–	–
EPDRF4060-72-10-TH	□	6.0	1	72	6	5.9	120	6	4	0	–	–	–	–	–

□ = Stocked items in Japan

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Cutting Conditions
(Metric)

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Work Material				Copper (Cu)		Carbon steels Alloy steel (180 - 250HB)		Stainless steels Tool steels (25 - 35HRC)		Pre-harden steels (35 - 45HRC)		Hardened steel (45 - 55HRC)		Hardened steel (55 - 65HRC)	
Ratio to standard depth of cut				120%		100%		90%		80%		65%		60%	
Mill dia.	r	Under neck length	Standard depth of cut	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)
1	0.05	4	0.012	38,900	2,440	31,120	1,952	28,008	1,757	26,608	1,669	23,947	1,230	22,749	1,000
1	0.05	6	0.01	31,500	1,780	25,200	1,424	22,680	1,282	21,546	1,218	19,391	990	18,422	810
1	0.05	8	0.008	28,000	1,580	22,400	1,264	20,160	1,138	19,152	1,081	17,237	880	16,375	720
1	0.05	10	0.005	24,500	1,390	19,600	1,112	17,640	1,001	16,758	951	15,082	770	14,328	630
1	0.05	12	0.004	21,800	1,100	17,440	880	15,696	792	14,911	752	13,420	600	12,749	480
1	0.05	16	0.003	21,800	960	17,440	768	15,696	691	14,911	657	13,420	510	12,749	400
1	0.05	20	0.002	16,300	720	13,040	576	11,736	518	11,149	492	10,034	385	9,533	300
1	0.1	4	0.02	38,900	2,440	31,120	1,952	28,008	1,757	26,608	1,669	23,947	1,230	22,749	1,000
1	0.1	6	0.018	31,500	1,780	25,200	1,424	22,680	1,282	21,546	1,218	19,391	990	18,422	810
1	0.1	8	0.014	28,000	1,580	22,400	1,264	20,160	1,138	19,152	1,081	17,237	880	16,375	720
1	0.1	10	0.01	24,500	1,390	19,600	1,112	17,640	1,001	16,758	951	15,082	770	14,328	630
1	0.1	12	0.008	21,800	1,100	17,440	880	15,696	792	14,911	752	13,420	600	12,749	480
1	0.1	16	0.006	21,800	960	17,440	768	15,696	691	14,911	657	13,420	510	12,749	400
1	0.1	20	0.004	16,300	720	13,040	576	11,736	518	11,149	492	10,034	385	9,533	300
1.5	0.05	4	0.02	29,900	2,030	23,920	1,624	21,528	1,462	20,452	1,389	18,406	1,020	17,486	830
1.5	0.05	8	0.014	27,200	1,850	21,760	1,480	19,584	1,332	18,605	1,265	16,744	1,030	15,907	840
1.5	0.05	12	0.007	21,800	1,480	17,440	1,184	15,696	1,066	14,911	1,012	13,420	820	12,749	670
1.5	0.05	15	0.006	16,900	1,020	13,520	816	12,168	734	11,560	698	10,404	560	9,883	450
1.5	0.05	20	0.004	16,900	1,020	13,520	816	12,168	734	11,560	698	10,404	560	9,883	450
1.5	0.1	4	0.027	29,900	2,030	23,920	1,624	21,528	1,462	20,452	1,389	18,406	1,020	17,486	830
1.5	0.1	8	0.02	27,200	1,850	21,760	1,480	19,584	1,332	18,605	1,265	16,744	1,030	15,907	840
1.5	0.1	12	0.017	21,800	1,480	17,440	1,184	15,696	1,066	14,911	1,012	13,420	820	12,749	670
1.5	0.1	15	0.014	16,900	1,020	13,520	816	12,168	734	11,560	698	10,404	560	9,883	450
1.5	0.1	20	0.01	16,900	1,020	13,520	816	12,168	734	11,560	698	10,404	560	9,883	450
2	0.05	4	0.035	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	0.05	6	0.03	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	0.05	8	0.025	22,700	2,670	18,900	2,230	17,000	2,010	16,100	1,890	14,200	1,340	13,200	1,090
2	0.05	12	0.02	18,400	1,950	15,300	1,620	13,800	1,460	13,000	1,380	11,500	1,080	10,700	890
2	0.05	16	0.015	16,300	1,730	13,600	1,440	12,200	1,300	11,600	1,230	10,200	960	9,500	790
2	0.05	20	0.01	14,300	1,520	11,900	1,260	10,700	1,140	10,100	1,070	8,900	840	8,300	690
2	0.1	4	0.042	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	0.1	6	0.042	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	0.1	8	0.036	22,700	2,670	18,900	2,230	17,000	2,010	16,100	1,890	14,200	1,340	13,200	1,090
2	0.1	12	0.036	18,400	1,950	15,300	1,620	13,800	1,460	13,000	1,380	11,500	1,080	10,700	890
2	0.1	16	0.023	16,300	1,730	13,600	1,440	12,200	1,300	11,600	1,230	10,200	960	9,500	790
2	0.1	20	0.018	14,300	1,520	11,900	1,260	10,700	1,140	10,100	1,070	8,900	840	8,300	690
2	0.2	4	0.08	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	0.2	6	0.08	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	0.2	8	0.07	22,700	2,670	18,900	2,230	17,000	2,010	16,100	1,890	14,200	1,340	13,200	1,090
2	0.2	12	0.04	18,400	1,950	15,300	1,620	13,800	1,460	13,000	1,380	11,500	1,080	10,700	890
2	0.2	16	0.04	16,300	1,730	13,600	1,440	12,200	1,300	11,600	1,230	10,200	960	9,500	790
2	0.2	20	0.035	14,300	1,520	11,900	1,260	10,700	1,140	10,100	1,070	8,900	840	8,300	690
2	0.2	25	0.025	14,300	1,520	11,900	1,260	10,700	1,140	10,100	1,070	8,900	840	8,300	690
2	0.2	30	0.017	13,600	1,440	11,300	1,200	10,200	1,080	9,600	1,020	8,500	800	7,900	650

EPDRF

EPDRF
Cutting Conditions (Metric)

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Work Material				Copper (Cu)		Carbon steels Alloy steel (180 - 250HB)		Stainless steels Tool steels (25 - 35HRC)		Pre-harden steels (35 - 45HRC)		Hardened steel (45 - 55HRC)		Hardened steel (55 - 65HRC)	
Ratio to standard depth of cut				120%		100%		90%		80%		65%		60%	
Mill dia.	r	Under neck length	Standard depth of cut	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)
2	**0.3**	4	0.11	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	**0.3**	8	0.09	22,700	2,850	18,900	2,350	17,000	2,100	16,100	1,950	14,200	1,490	13,200	1,210
2	**0.3**	12	0.06	18,400	2,170	15,300	1,810	13,800	1,620	13,000	1,530	11,500	1,200	10,700	980
2	**0.3**	16	0.06	16,300	1,930	13,600	1,610	12,200	1,440	11,600	1,360	10,200	1,070	9,500	870
2	**0.3**	20	0.037	14,300	1,680	11,900	1,400	10,700	1,260	10,100	1,190	8,900	940	8,300	770
2	**0.5**	4	0.17	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	**0.5**	6	0.17	24,900	2,940	20,800	2,450	18,700	2,210	17,700	2,080	15,600	1,470	14,600	1,200
2	**0.5**	8	0.14	22,700	2,850	18,900	2,350	17,000	2,100	16,100	1,950	14,200	1,490	13,200	1,210
2	**0.5**	12	0.08	18,400	2,170	15,300	1,810	13,800	1,620	13,000	1,530	11,500	1,200	10,700	980
2	**0.5**	16	0.08	16,300	1,930	13,600	1,610	12,200	1,440	11,600	1,360	10,200	1,070	9,500	870
2	**0.5**	20	0.05	14,300	1,680	11,900	1,400	10,700	1,260	10,100	1,190	8,900	940	8,300	770
2	**0.5**	25	0.05	14,300	1,680	11,900	1,400	10,700	1,260	10,100	1,190	8,900	940	8,300	770
2	**0.5**	30	0.03	13,600	1,600	11,300	1,330	10,200	1,200	9,600	1,130	8,500	850	7,900	730
2.5	**0.1**	8	0.047	22,700	2,970	18,900	2,480	17,000	2,230	16,100	2,100	14,200	1,490	13,200	1,210
2.5	**0.1**	16	0.037	16,300	1,930	13,600	1,610	12,200	1,440	11,600	1,360	10,200	1,070	9,500	870
2.5	**0.1**	20	0.025	14,300	1,680	11,900	1,400	10,700	1,260	10,100	1,190	8,900	940	8,300	770
2.5	**0.2**	8	0.08	19,400	2,570	16,200	2,140	14,600	1,920	13,800	1,820	12,200	1,280	11,300	1,100
2.5	**0.2**	16	0.045	16,900	2,130	14,100	1,770	12,700	1,600	12,000	1,510	10,600	1,110	9,900	960
2.5	**0.2**	20	0.042	14,100	1,750	11,800	1,410	10,600	1,270	10,000	1,200	8,800	930	8,200	790
2.5	**0.3**	12	0.09	17,700	2,350	14,800	1,960	13,300	1,760	12,500	1,660	11,100	1,230	10,300	1,010
2.5	**0.3**	20	0.052	14,100	1,870	11,800	1,560	10,600	1,400	10,000	1,330	8,800	1,040	8,200	850
2.5	**0.5**	12	0.1	17,700	2,350	14,800	1,960	13,300	1,760	12,500	1,660	11,100	1,230	10,300	1,010
2.5	**0.5**	20	0.07	14,100	1,870	11,800	1,560	10,600	1,400	10,000	1,330	8,800	1,040	8,200	850
3	**0.1**	8	0.055	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
3	**0.1**	16	0.035	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
3	**0.1**	25	0.022	14,000	2,060	11,700	1,720	10,500	1,550	9,900	1,460	8,700	1,150	8,200	940
3	**0.1**	30	0.014	10,900	2,060	9,100	1,720	8,200	1,550	7,700	1,460	6,800	1,150	6,400	940
3	**0.2**	8	0.09	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
3	**0.2**	12	0.07	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
3	**0.2**	16	0.05	17,300	2,550	14,400	2,120	13,000	1,910	12,200	1,800	10,800	1,270	10,100	1,040
3	**0.2**	20	0.05	14,000	2,060	11,700	1,720	10,500	1,550	9,900	1,460	8,700	1,150	8,200	940
3	**0.2**	25	0.045	14,000	2,060	11,700	1,720	10,500	1,550	9,900	1,460	8,700	1,150	8,200	940
3	**0.2**	30	0.04	10,900	2,060	9,100	1,720	8,200	1,550	7,700	1,460	6,800	1,150	6,400	940
3	**0.3**	8	0.13	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
3	**0.3**	16	0.075	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
3	**0.3**	20	0.075	14,000	2,290	11,700	1,910	10,500	1,720	9,900	1,620	8,700	1,270	8,200	1,040
3	**0.3**	25	0.067	14,000	2,290	11,700	1,910	10,500	1,720	9,900	1,620	8,700	1,270	8,200	1,040
3	**0.3**	30	0.06	10,900	2,290	9,100	1,910	8,200	1,720	7,700	1,620	6,800	1,270	6,400	1,040
3	**0.5**	8	0.18	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
3	**0.5**	12	0.13	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
3	**0.5**	16	0.1	17,300	2,830	14,400	2,360	13,000	2,120	12,200	2,010	10,800	1,410	10,100	1,160
3	**0.5**	20	0.1	14,000	2,290	11,700	1,910	10,500	1,720	9,900	1,620	8,700	1,270	8,200	1,040
3	**0.5**	25	0.09	14,000	2,290	11,700	1,910	10,500	1,720	9,900	1,620	8,700	1,270	8,200	1,040
3	**0.5**	30	0.08	10,900	2,290	9,100	1,910	8,200	1,720	7,700	1,620	6,800	1,270	6,400	1,040
3	**0.5**	35	0.065	10,900	2,290	9,100	1,910	8,200	1,720	7,700	1,620	6,800	1,270	6,400	1,040

EPDRF
Cutting Conditions (Metric)

MOLDINO
The Edge To Innovation

Work Material				Copper (Cu)		Carbon steels Alloy steel (180 - 250HB)		Stainless steels Tool steels (25 - 35HRC)		Pre-harden steels (35 - 45HRC)		Hardened steel (45 - 55HRC)		Hardened steel (55 - 65HRC)	
Ratio to standard depth of cut				120%		100%		90%		80%		65%		60%	
Mill dia.	r	Under neck length	Standard depth of cut	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)	n (RPM)	vf (mm/min)
4	**0.1**	12	0.065	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,240	7,800	1,750	7,200	1,300
4	**0.1**	20	0.055	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,240	7,800	1,750	7,200	1,300
4	**0.1**	30	0.045	11,200	3,020	9,300	2,520	8,400	2,010	7,900	1,830	7,000	1,470	6,500	1,170
4	**0.1**	40	0.03	11,200	3,020	9,300	2,520	8,400	2,010	7,900	1,830	7,000	1,470	6,500	1,170
4	**0.2**	12	0.13	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,240	7,800	1,750	7,200	1,300
4	**0.2**	20	0.1	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,240	7,800	1,750	7,200	1,300
4	**0.2**	30	0.08	11,200	3,020	9,300	2,520	8,400	2,010	7,900	1,830	7,000	1,470	6,500	1,170
4	**0.2**	40	0.06	11,200	3,020	9,300	2,520	8,400	2,010	7,900	1,830	7,000	1,470	6,500	1,170
4	**0.3**	12	0.17	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,380	7,800	1,860	7,200	1,410
4	**0.3**	20	0.13	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,380	7,800	1,860	7,200	1,410
4	**0.3**	30	0.1	11,200	3,020	9,300	2,520	8,400	2,260	7,900	1,900	7,000	1,570	6,500	1,170
4	**0.3**	40	0.08	11,200	3,020	9,300	2,520	8,400	2,260	7,900	1,900	7,000	1,570	6,500	1,170
4	**0.5**	12	0.24	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,380	7,800	1,860	7,200	1,410
4	**0.5**	20	0.2	12,400	3,350	10,400	2,790	9,300	2,520	8,800	2,380	7,800	1,860	7,200	1,410
4	**0.5**	30	0.17	11,200	3,020	9,300	2,520	8,400	2,260	7,900	1,900	7,000	1,570	6,500	1,170
4	**0.5**	40	0.1	11,200	3,020	9,300	2,520	8,400	2,260	7,900	1,900	7,000	1,570	6,500	1,170
5	**0.1**	20	0.07	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,760	6,100	1,370	5,700	1,020
5	**0.1**	40	0.035	8,700	2,360	7,300	1,970	6,600	1,570	6,200	1,430	5,500	1,150	5,100	920
5	**0.2**	20	0.15	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,760	6,100	1,370	5,700	1,020
5	**0.2**	40	0.08	8,700	2,360	7,300	1,970	6,600	1,570	6,200	1,430	5,500	1,150	5,100	920
5	**0.3**	20	0.21	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,860	6,100	1,460	5,700	1,110
5	**0.3**	40	0.1	8,700	2,360	7,300	1,970	6,600	1,770	6,200	1,490	5,500	1,230	5,100	920
5	**0.5**	20	0.28	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,860	6,100	1,460	5,700	1,110
5	**0.5**	40	0.14	8,700	2,360	7,300	1,970	6,600	1,770	6,200	1,490	5,500	1,230	5,100	920
5	**1**	20	0.35	9,700	2,620	8,100	2,190	7,300	1,970	6,900	1,860	6,100	1,460	5,700	1,110
5	**1**	40	0.18	8,700	2,360	7,300	1,970	6,600	1,770	6,200	1,490	5,500	1,230	5,100	920
6	**0.2**	30	0.15	8,600	2,330	7,200	1,940	6,500	1,750	6,100	1,560	5,400	1,220	5,000	910
6	**0.2**	54	0.1	7,800	2,100	6,500	1,750	5,800	1,400	5,500	1,270	4,900	1,020	4,500	820
6	**0.2**	72	0.07	7,800	2,100	6,500	1,750	5,800	1,400	5,500	1,270	4,900	1,020	4,500	820
6	**0.3**	30	0.25	8,600	2,330	7,200	1,940	6,500	1,750	6,100	1,560	5,400	1,300	5,000	980
6	**0.3**	54	0.18	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,270	4,900	1,090	4,500	820
6	**0.3**	72	0.1	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,270	4,900	1,090	4,500	820
6	**0.5**	30	0.35	8,600	2,330	7,200	1,940	6,500	1,750	6,100	1,650	5,400	1,300	5,000	980
6	**0.5**	54	0.25	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,320	4,900	1,090	4,500	820
6	**0.5**	72	0.15	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,320	4,900	1,090	4,500	820
6	**1**	30	0.55	8,600	2,330	7,200	1,940	6,500	1,750	6,100	1,650	5,400	1,300	5,000	980
6	**1**	54	0.4	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,320	4,900	1,090	4,500	820
6	**1**	72	0.22	7,800	2,100	6,500	1,750	5,800	1,570	5,500	1,320	4,900	1,090	4,500	820