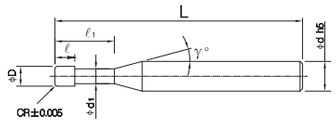
HSXR2L 2-Flute Long Neck Corner Radius End Mill



UMG AHX 2 30° Spiral Angle Arc Back Angle R <65 HRC

Ø D	D Tol. [mm]
D<3	0~-0.010
3<D<6	0~-0.012

Unit : mm

Type No.	Dia.	Corner Radius	Length of Cut	Under Neck Length	Neck Dia.	Neck Taper Angle	Overall Length	Shank Dia.
	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2002R0.05L0.5 0450	0.2	R0.05	0.15	0.5	0.18	12	50	4
HSXR2002R0.05L1 0450	0.2	R0.05	0.15	1	0.18	12	50	4
HSXR2002R0.05L1.5 0450	0.2	R0.05	0.15	1.5	0.18	12	50	4
HSXR2002R0.05L2 0450	0.2	R0.05	0.15	2	0.18	12	50	4
HSXR2003R0.05L1 0450	0.3	R0.05	0.2	1	0.28	12	50	4
HSXR2003R0.05L1.5 0450	0.3	R0.05	0.2	1.5	0.28	12	50	4
HSXR2003R0.05L2 0450	0.3	R0.05	0.2	2	0.28	12	50	4
HSXR2003R0.05L2.5 0450	0.3	R0.05	0.2	2.5	0.28	12	50	4
HSXR2003R0.05L3 0450	0.3	R0.05	0.2	3	0.28	12	50	4
HSXR2004R0.05L1 0450	0.4	R0.05	0.3	1	0.37	12	50	4
HSXR2004R0.05L1.5 0450	0.4	R0.05	0.3	1.5	0.37	12	50	4
HSXR2004R0.05L2 0450	0.4	R0.05	0.3	2	0.37	12	50	4
HSXR2004R0.05L2.5 0450	0.4	R0.05	0.3	2.5	0.37	12	50	4
HSXR2004R0.05L3 0450	0.4	R0.05	0.3	3	0.37	12	50	4
HSXR2004R0.05L4 0450	0.4	R0.05	0.3	4	0.37	12	50	4
HSXR2004R0.1L1 0450	0.4	R0.1	0.3	1	0.37	12	50	4
HSXR2004R0.1L1.5 0450	0.4	R0.1	0.3	1.5	0.37	12	50	4
HSXR2004R0.1L2 0450	0.4	R0.1	0.3	2	0.37	12	50	4
HSXR2004R0.1L2.5 0450	0.4	R0.1	0.3	2.5	0.37	12	50	4
HSXR2004R0.1L3 0450	0.4	R0.1	0.3	3	0.37	12	50	4
HSXR2004R0.1L4 0450	0.4	R0.1	0.3	4	0.37	12	50	4
HSXR2005R0.05L1 0450	0.5	R0.05	0.35	1	0.46	12	50	4
HSXR2005R0.05L1.5 0450	0.5	R0.05	0.35	1.5	0.46	12	50	4
HSXR2005R0.05L2 0450	0.5	R0.05	0.35	2	0.46	12	50	4
HSXR2005R0.05L2.5 0450	0.5	R0.05	0.35	2.5	0.46	12	50	4
HSXR2005R0.05L3 0450	0.5	R0.05	0.35	3	0.46	12	50	4

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Type No.	Dia.	Corner Radius	Length of Cut	Under Neck Length	Neck Dia.	Neck Taper Angle	Overall Length	Shank Dia.
	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2005R0.05L4 0450	0.5	R0.05	0.35	4	0.46	12	50	4
HSXR2005R0.05L5 0450	0.5	R0.05	0.35	5	0.46	12	50	4
HSXR2005R0.05L6 0450	0.5	R0.05	0.35	6	0.46	12	50	4
HSXR2005R0.1L1 0450	0.5	R0.1	0.35	1	0.46	12	50	4
HSXR2005R0.1L1.5 0450	0.5	R0.1	0.35	1.5	0.46	12	50	4
HSXR2005R0.1L2 0450	0.5	R0.1	0.35	2	0.46	12	50	4
HSXR2005R0.1L2.5 0450	0.5	R0.1	0.35	2.5	0.46	12	50	4
HSXR2005R0.1L3 0450	0.5	R0.1	0.35	3	0.46	12	50	4
HSXR2005R0.1L4 0450	0.5	R0.1	0.35	4	0.46	12	50	4
HSXR2005R0.1L5 0450	0.5	R0.1	0.35	5	0.46	12	50	4
HSXR2005R0.1L6 0450	0.5	R0.1	0.35	6	0.46	12	50	4
HSXR2006R0.05L2 0450	0.6	R0.05	0.45	2	0.56	12	50	4
HSXR2006R0.05L3 0450	0.6	R0.05	0.45	3	0.56	12	50	4
HSXR2006R0.05L4 0450	0.6	R0.05	0.45	4	0.56	12	50	4
HSXR2006R0.05L6 0450	0.6	R0.05	0.45	6	0.56	12	50	4
HSXR2006R0.05L8 0450	0.6	R0.05	0.45	8	0.56	12	50	4
HSXR2006R0.05L10 0450	0.6	R0.05	0.45	10	0.56	12	50	4
HSXR2006R0.1L2 0450	0.6	R0.1	0.45	2	0.56	12	50	4
HSXR2006R0.1L3 0450	0.6	R0.1	0.45	3	0.56	12	50	4
HSXR2006R0.1L4 0450	0.6	R0.1	0.45	4	0.56	12	50	4
HSXR2006R0.1L6 0450	0.6	R0.1	0.45	6	0.56	12	50	4
HSXR2006R0.1L8 0450	0.6	R0.1	0.45	8	0.56	12	50	4
HSXR2006R0.1L10 0450	0.6	R0.1	0.45	10	0.56	12	50	4
HSXR2007R0.05L2 0450	0.7	R0.05	0.5	2	0.66	12	50	4
HSXR2007R0.05L3 0450	0.7	R0.05	0.5	3	0.66	12	50	4
HSXR2007R0.05L4 0450	0.7	R0.05	0.5	4	0.66	12	50	4
HSXR2007R0.05L6 0450	0.7	R0.05	0.5	6	0.66	12	50	4
HSXR2007R0.05L8 0450	0.7	R0.05	0.5	8	0.66	12	50	4
HSXR2007R0.05L10 0450	0.7	R0.05	0.5	10	0.66	12	50	4
HSXR2007R0.1L2 0450	0.7	R0.1	0.5	2	0.66	12	50	4
HSXR2007R0.1L3 0450	0.7	R0.1	0.5	3	0.66	12	50	4
HSXR2007R0.1L4 0450	0.7	R0.1	0.5	4	0.66	12	50	4
HSXR2007R0.1L6 0450	0.7	R0.1	0.5	6	0.66	12	50	4
HSXR2007R0.1L8 0450	0.7	R0.1	0.5	8	0.66	12	50	4

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Unit : mm

Type No.	Dia.	Corner Radius	Length of Cut	Under Neck Length	Neck Dia.	Neck Taper Angle	Overall Length	Shank Dia.
	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2007R0.1L10 0450	0.7	R0.1	0.5	10	0.66	12	50	4
HSXR2008R0.05L2 0450	0.8	R0.05	0.6	2	0.76	12	50	4
HSXR2008R0.05L3 0450	0.8	R0.05	0.6	3	0.76	12	50	4
HSXR2008R0.05L4 0450	0.8	R0.05	0.6	4	0.76	12	50	4
HSXR2008R0.05L6 0450	0.8	R0.05	0.6	6	0.76	12	50	4
HSXR2008R0.05L8 0450	0.8	R0.05	0.6	8	0.76	12	50	4
HSXR2008R0.05L10 0450	0.8	R0.05	0.6	10	0.76	12	50	4
HSXR2008R0.05L12 0450	0.8	R0.05	0.6	12	0.76	12	50	4
HSXR2008R0.1L2 0450	0.8	R0.1	0.6	2	0.76	12	50	4
HSXR2008R0.1L3 0450	0.8	R0.1	0.6	3	0.76	12	50	4
HSXR2008R0.1L4 0450	0.8	R0.1	0.6	4	0.76	12	50	4
HSXR2008R0.1L6 0450	0.8	R0.1	0.6	6	0.76	12	50	4
HSXR2008R0.1L8 0450	0.8	R0.1	0.6	8	0.76	12	50	4
HSXR2008R0.1L10 0450	0.8	R0.1	0.6	10	0.76	12	50	4
HSXR2008R0.1L12 0450	0.8	R0.1	0.6	12	0.76	12	50	4
HSXR2008R0.2L2 0450	0.8	R0.2	0.6	2	0.76	12	50	4
HSXR2008R0.2L3 0450	0.8	R0.2	0.6	3	0.76	12	50	4
HSXR2008R0.2L4 0450	0.8	R0.2	0.6	4	0.76	12	50	4
HSXR2008R0.2L6 0450	0.8	R0.2	0.6	6	0.76	12	50	4
HSXR2008R0.2L8 0450	0.8	R0.2	0.6	8	0.76	12	50	4
HSXR2008R0.2L10 0450	0.8	R0.2	0.6	10	0.76	12	50	4
HSXR2008R0.2L12 0450	0.8	R0.2	0.6	12	0.76	12	50	4
HSXR2009R0.1L4 0450	0.9	R0.1	0.65	4	0.86	12	50	4
HSXR2009R0.1L8 0450	0.9	R0.1	0.65	8	0.86	12	50	4
HSXR2009R0.2L4 0450	0.9	R0.2	0.65	4	0.86	12	50	4
HSXR2009R0.2L8 0450	0.9	R0.2	0.65	8	0.86	12	50	4
HSXR2010R0.05L3 0450	1	R0.05	0.75	3	0.95	12	50	4
HSXR2010R0.05L4 0450	1	R0.05	0.75	4	0.95	12	50	4
HSXR2010R0.05L5 0450	1	R0.05	0.75	5	0.95	12	50	4
HSXR2010R0.05L6 0450	1	R0.05	0.75	6	0.95	12	50	4
HSXR2010R0.05L8 0450	1	R0.05	0.75	8	0.95	12	50	4
HSXR2010R0.05L10 0450	1	R0.05	0.75	10	0.95	12	50	4
HSXR2010R0.05L12 0450	1	R0.05	0.75	12	0.95	12	50	4
HSXR2010R0.05L16 0450	1	R0.05	0.75	16	0.95	12	50	4

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Type No.	Dia.	Corner Radius	Length of Cut	Under Neck Length	Neck Dia.	Neck Taper Angle	Overall Length	Shank Dia.
	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2010R0.05L20 0460	1	R0.05	0.75	20	0.95	12	60	4
HSXR2010R0.1L2 0450	1	R0.1	0.75	2	0.95	12	50	4
HSXR2010R0.1L3 0450	1	R0.1	0.75	3	0.95	12	50	4
HSXR2010R0.1L4 0450	1	R0.1	0.75	4	0.95	12	50	4
HSXR2010R0.1L5 0450	1	R0.1	0.75	5	0.95	12	50	4
HSXR2010R0.1L6 0450	1	R0.1	0.75	6	0.95	12	50	4
HSXR2010R0.1L8 0450	1	R0.1	0.75	8	0.95	12	50	4
HSXR2010R0.1L10 0450	1	R0.1	0.75	10	0.95	12	50	4
HSXR2010R0.1L12 0450	1	R0.1	0.75	12	0.95	12	50	4
HSXR2010R0.1L16 0450	1	R0.1	0.75	16	0.95	12	50	4
HSXR2010R0.1L20 0460	1	R0.1	0.75	20	0.95	12	60	4
HSXR2010R0.2L2 0450	1	R0.2	0.75	2	0.95	12	50	4
HSXR2010R0.2L3 0450	1	R0.2	0.75	3	0.95	12	50	4
HSXR2010R0.2L4 0450	1	R0.2	0.75	4	0.95	12	50	4
HSXR2010R0.2L5 0450	1	R0.2	0.75	5	0.95	12	50	4
HSXR2010R0.2L6 0450	1	R0.2	0.75	6	0.95	12	50	4
HSXR2010R0.2L8 0450	1	R0.2	0.75	8	0.95	12	50	4
HSXR2010R0.2L10 0450	1	R0.2	0.75	10	0.95	12	50	4
HSXR2010R0.2L12 0450	1	R0.2	0.75	12	0.95	12	50	4
HSXR2010R0.2L16 0450	1	R0.2	0.75	16	0.95	12	50	4
HSXR2010R0.2L20 0460	1	R0.2	0.75	20	0.95	12	60	4
HSXR2010R0.3L3 0450	1	R0.3	0.75	3	0.95	12	50	4
HSXR2010R0.3L4 0450	1	R0.3	0.75	4	0.95	12	50	4
HSXR2010R0.3L5 0450	1	R0.3	0.75	5	0.95	12	50	4
HSXR2010R0.3L6 0450	1	R0.3	0.75	6	0.95	12	50	4
HSXR2010R0.3L8 0450	1	R0.3	0.75	8	0.95	12	50	4
HSXR2010R0.3L10 0450	1	R0.3	0.75	10	0.95	12	50	4
HSXR2010R0.3L12 0450	1	R0.3	0.75	12	0.95	12	50	4
HSXR2010R0.3L16 0450	1	R0.3	0.75	16	0.95	12	50	4
HSXR2010R0.3L20 0460	1	R0.3	0.75	20	0.95	12	60	4
HSXR2015R0.05L4 0450	1.5	R0.05	1.2	4	1.42	11	50	4
HSXR2015R0.05L6 0450	1.5	R0.05	1.2	6	1.42	11	50	4
HSXR2015R0.05L8 0450	1.5	R0.05	1.2	8	1.42	11	50	4
HSXR2015R0.05L10 0450	1.5	R0.05	1.2	10	1.42	11	50	4

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Unit : mm

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	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2015R0.05L12 0450	1.5	R0.05	1.2	12	1.42	11	50	4
HSXR2015R0.05L16 0450	1.5	R0.05	1.2	16	1.42	11	50	4
HSXR2015R0.05L20 0460	1.5	R0.05	1.2	20	1.42	11	60	4
HSXR2015R0.1L4 0450	1.5	R0.1	1.2	4	1.42	11	50	4
HSXR2015R0.1L6 0450	1.5	R0.1	1.2	6	1.42	11	50	4
HSXR2015R0.1L8 0450	1.5	R0.1	1.2	8	1.42	11	50	4
HSXR2015R0.1L10 0450	1.5	R0.1	1.2	10	1.42	11	50	4
HSXR2015R0.1L12 0450	1.5	R0.1	1.2	12	1.42	11	50	4
HSXR2015R0.1L16 0450	1.5	R0.1	1.2	16	1.42	11	50	4
HSXR2015R0.1L20 0460	1.5	R0.1	1.2	20	1.42	11	60	4
HSXR2015R0.2L4 0450	1.5	R0.2	1.2	4	1.42	11	50	4
HSXR2015R0.2L6 0450	1.5	R0.2	1.2	6	1.42	11	50	4
HSXR2015R0.2L8 0450	1.5	R0.2	1.2	8	1.42	11	50	4
HSXR2015R0.2L10 0450	1.5	R0.2	1.2	10	1.42	11	50	4
HSXR2015R0.2L12 0450	1.5	R0.2	1.2	12	1.42	11	50	4
HSXR2015R0.2L15 0450	1.5	R0.2	1.2	15	1.42	11	50	4
HSXR2015R0.2L16 0450	1.5	R0.2	1.2	16	1.42	11	50	4
HSXR2015R0.2L20 0460	1.5	R0.2	1.2	20	1.42	11	60	4
HSXR2015R0.3L4 0450	1.5	R0.3	1.2	4	1.42	11	50	4
HSXR2015R0.3L6 0450	1.5	R0.3	1.2	6	1.42	11	50	4
HSXR2015R0.3L8 0450	1.5	R0.3	1.2	8	1.42	11	50	4
HSXR2015R0.3L10 0450	1.5	R0.3	1.2	10	1.42	11	50	4
HSXR2015R0.3L12 0450	1.5	R0.3	1.2	12	1.42	11	50	4
HSXR2015R0.3L16 0450	1.5	R0.3	1.2	16	1.42	11	50	4
HSXR2015R0.3L20 0460	1.5	R0.3	1.2	20	1.42	11	60	4
HSXR2015R0.5L4 0450	1.5	R0.5	1.2	4	1.42	11	50	4
HSXR2015R0.5L6 0450	1.5	R0.5	1.2	6	1.42	11	50	4
HSXR2015R0.5L8 0450	1.5	R0.5	1.2	8	1.42	11	50	4
HSXR2015R0.5L10 0450	1.5	R0.5	1.2	10	1.42	11	50	4
HSXR2015R0.5L12 0450	1.5	R0.5	1.2	12	1.42	11	50	4
HSXR2015R0.5L16 0450	1.5	R0.5	1.2	16	1.42	11	50	4
HSXR2015R0.5L20 0460	1.5	R0.5	1.2	20	1.42	11	60	4
HSXR20175R0.2L5 0450	1.75	R0.2	1.4	5	1.67	11	50	4
HSXR20175R0.2L10 0450	1.75	R0.2	1.4	10	1.67	11	50	4

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	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR20175R0.2L15 0450	1.75	R0.2	1.4	15	1.67	11	50	4
HSXR2020R0.05L6 0450	2	R0.05	1.6	6	1.9	11	50	4
HSXR2020R0.05L8 0450	2	R0.05	1.6	8	1.9	11	50	4
HSXR2020R0.05L10 0450	2	R0.05	1.6	10	1.9	11	50	4
HSXR2020R0.05L12 0450	2	R0.05	1.6	12	1.9	11	50	4
HSXR2020R0.05L16 0450	2	R0.05	1.6	16	1.9	11	50	4
HSXR2020R0.05L20 0460	2	R0.05	1.6	20	1.9	11	60	4
HSXR2020R0.05L25 0460	2	R0.05	1.6	25	1.9	11	60	4
HSXR2020R0.05L30 0475	2	R0.05	1.6	30	1.9	11	75	4
HSXR2020R0.1L6 0450	2	R0.1	1.6	6	1.9	11	50	4
HSXR2020R0.1L8 0450	2	R0.1	1.6	8	1.9	11	50	4
HSXR2020R0.1L10 0450	2	R0.1	1.6	10	1.9	11	50	4
HSXR2020R0.1L12 0450	2	R0.1	1.6	12	1.9	11	50	4
HSXR2020R0.1L16 0450	2	R0.1	1.6	16	1.9	11	50	4
HSXR2020R0.1L20 0460	2	R0.1	1.6	20	1.9	11	60	4
HSXR2020R0.1L25 0460	2	R0.1	1.6	25	1.9	11	60	4
HSXR2020R0.1L30 0475	2	R0.1	1.6	30	1.9	11	75	4
HSXR2020R0.2L4 0450	2	R0.2	1.6	4	1.9	11	50	4
HSXR2020R0.2L6 0450	2	R0.2	1.6	6	1.9	11	50	4
HSXR2020R0.2L8 0450	2	R0.2	1.6	8	1.9	11	50	4
HSXR2020R0.2L10 0450	2	R0.2	1.6	10	1.9	11	50	4
HSXR2020R0.2L12 0450	2	R0.2	1.6	12	1.9	11	50	4
HSXR2020R0.2L16 0450	2	R0.2	1.6	16	1.9	11	50	4
HSXR2020R0.2L20 0450	2	R0.2	1.6	20	1.9	11	50	4
HSXR2020R0.2L20 0460	2	R0.2	1.6	20	1.9	11	60	4
HSXR2020R0.2L25 0460	2	R0.2	1.6	25	1.9	11	60	4
HSXR2020R0.2L30 0475	2	R0.2	1.6	30	1.9	11	75	4
HSXR2020R0.3L6 0450	2	R0.3	1.6	6	1.9	11	50	4
HSXR2020R0.3L8 0450	2	R0.3	1.6	8	1.9	11	50	4
HSXR2020R0.3L10 0450	2	R0.3	1.6	10	1.9	11	50	4
HSXR2020R0.3L12 0450	2	R0.3	1.6	12	1.9	11	50	4
HSXR2020R0.3L16 0450	2	R0.3	1.6	16	1.9	11	50	4
HSXR2020R0.3L20 0460	2	R0.3	1.6	20	1.9	11	60	4
HSXR2020R0.3L25 0460	2	R0.3	1.6	25	1.9	11	60	4

HSXR2L 2-Flute Long Neck Corner Radius End Mill

Unit : mm

Type No.	Dia.	Corner Radius	Length of Cut	Under Neck Length	Neck Dia.	Neck Taper Angle	Overall Length	Shank Dia.
	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2020R0.3L30 0475	2	R0.3	1.6	30	1.9	11	75	4
HSXR2020R0.5L6 0450	2	R0.5	1.6	6	1.9	11	50	4
HSXR2020R0.5L8 0450	2	R0.5	1.6	8	1.9	11	50	4
HSXR2020R0.5L10 0450	2	R0.5	1.6	10	1.9	11	50	4
HSXR2020R0.5L12 0450	2	R0.5	1.6	12	1.9	11	50	4
HSXR2020R0.5L16 0450	2	R0.5	1.6	16	1.9	11	50	4
HSXR2020R0.5L20 0460	2	R0.5	1.6	20	1.9	11	60	4
HSXR2020R0.5L25 0460	2	R0.5	1.6	25	1.9	11	60	4
HSXR2020R0.5L30 0475	2	R0.5	1.6	30	1.9	11	75	4
HSXR2025R0.2L10 0450	2.5	R0.2	2	10	2.4	11	50	4
HSXR2025R0.2L20 0460	2.5	R0.2	2	20	2.4	11	60	4
HSXR2025R0.2L30 0475	2.5	R0.2	2	30	2.4	11	75	4
HSXR2025R0.5L10 0450	2.5	R0.5	2	10	2.4	11	50	4
HSXR2025R0.5L20 0460	2.5	R0.5	2	20	2.4	11	60	4
HSXR2025R0.5L30 0475	2.5	R0.5	2	30	2.4	11	75	4
HSXR2030R0.1L8 0660	3	R0.1	2.4	8	2.9	11	60	6
HSXR2030R0.1L10 0660	3	R0.1	2.4	10	2.9	11	60	6
HSXR2030R0.1L12 0660	3	R0.1	2.4	12	2.9	11	60	6
HSXR2030R0.1L16 0660	3	R0.1	2.4	16	2.9	11	60	6
HSXR2030R0.1L20 0660	3	R0.1	2.4	20	2.9	11	60	6
HSXR2030R0.1L25 0675	3	R0.1	2.4	25	2.9	11	75	6
HSXR2030R0.1L30 0675	3	R0.1	2.4	30	2.9	11	75	6
HSXR2030R0.1L35 0675	3	R0.1	2.4	35	2.9	11	75	6
HSXR2030R0.1L40 06100	3	R0.1	2.4	40	2.9	11	100	6
HSXR2030R0.2L8 0660	3	R0.2	2.4	8	2.9	11	60	6
HSXR2030R0.2L10 0660	3	R0.2	2.4	10	2.9	11	60	6
HSXR2030R0.2L12 0660	3	R0.2	2.4	12	2.9	11	60	6
HSXR2030R0.2L16 0660	3	R0.2	2.4	16	2.9	11	60	6
HSXR2030R0.2L20 0660	3	R0.2	2.4	20	2.9	11	60	6
HSXR2030R0.2L25 0675	3	R0.2	2.4	25	2.9	11	75	6
HSXR2030R0.2L30 0675	3	R0.2	2.4	30	2.9	11	75	6
HSXR2030R0.2L35 0675	3	R0.2	2.4	35	2.9	11	75	6
HSXR2030R0.2L40 06100	3	R0.2	2.4	40	2.9	11	100	6
HSXR2030R0.3L8 0660	3	R0.3	2.4	8	2.9	11	60	6

HSXR2L 2-Flute Long Neck Corner Radius End Mill

Unit : mm

Type No.	Dia.	Corner Radius	Length of Cut	Under Neck Length	Neck Dia.	Neck Taper Angle	Overall Length	Shank Dia.
	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2030R0.3L10 0660	3	R0.3	2.4	10	2.9	11	60	6
HSXR2030R0.3L12 0660	3	R0.3	2.4	12	2.9	11	60	6
HSXR2030R0.3L16 0660	3	R0.3	2.4	16	2.9	11	60	6
HSXR2030R0.3L20 0660	3	R0.3	2.4	20	2.9	11	60	6
HSXR2030R0.3L25 0675	3	R0.3	2.4	25	2.9	11	75	6
HSXR2030R0.3L30 0675	3	R0.3	2.4	30	2.9	11	75	6
HSXR2030R0.3L35 0675	3	R0.3	2.4	35	2.9	11	75	6
HSXR2030R0.3L40 06100	3	R0.3	2.4	40	2.9	11	100	6
HSXR2030R0.5L8 0660	3	R0.5	2.4	8	2.9	11	60	6
HSXR2030R0.5L10 0660	3	R0.5	2.4	10	2.9	11	60	6
HSXR2030R0.5L12 0660	3	R0.5	2.4	12	2.9	11	60	6
HSXR2030R0.5L16 0660	3	R0.5	2.4	16	2.9	11	60	6
HSXR2030R0.5L20 0660	3	R0.5	2.4	20	2.9	11	60	6
HSXR2030R0.5L25 0675	3	R0.5	2.4	25	2.9	11	75	6
HSXR2030R0.5L30 0675	3	R0.5	2.4	30	2.9	11	75	6
HSXR2030R0.5L35 0675	3	R0.5	2.4	35	2.9	11	75	6
HSXR2030R0.5L40 06100	3	R0.5	2.4	40	2.9	11	100	6
HSXR2040R0.1L10 0660	4	R0.1	3.2	10	3.9	11	60	6
HSXR2040R0.1L12 0660	4	R0.1	3.2	12	3.9	11	60	6
HSXR2040R0.1L16 0660	4	R0.1	3.2	16	3.9	11	60	6
HSXR2040R0.1L20 0660	4	R0.1	3.2	20	3.9	11	60	6
HSXR2040R0.1L25 0675	4	R0.1	3.2	25	3.9	11	75	6
HSXR2040R0.1L30 0675	4	R0.1	3.2	30	3.9	11	75	6
HSXR2040R0.1L35 0675	4	R0.1	3.2	35	3.9	11	75	6
HSXR2040R0.1L40 06100	4	R0.1	3.2	40	3.9	11	100	6
HSXR2040R0.1L45 06100	4	R0.1	3.2	45	3.9	11	100	6
HSXR2040R0.1L50 06100	4	R0.1	3.2	50	3.9	11	100	6
HSXR2040R0.2L10 0660	4	R0.2	3.2	10	3.9	11	60	6
HSXR2040R0.2L12 0660	4	R0.2	3.2	12	3.9	11	60	6
HSXR2040R0.2L16 0660	4	R0.2	3.2	16	3.9	11	60	6
HSXR2040R0.2L20 0660	4	R0.2	3.2	20	3.9	11	60	6
HSXR2040R0.2L25 0675	4	R0.2	3.2	25	3.9	11	75	6
HSXR2040R0.2L30 0675	4	R0.2	3.2	30	3.9	11	75	6
HSXR2040R0.2L35 0675	4	R0.2	3.2	35	3.9	11	75	6

HSXR2L 2-Flute Long Neck Corner Radius End Mill

Unit : mm

Type No.	Dia.	Corner Radius	Length of Cut	Under Neck Length	Neck Dia.	Neck Taper Angle	Overall Length	Shank Dia.
	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2040R0.2L40 06100	4	R0.2	3.2	40	3.9	11	100	6
HSXR2040R0.2L45 06100	4	R0.2	3.2	45	3.9	11	100	6
HSXR2040R0.2L50 06100	4	R0.2	3.2	50	3.9	11	100	6
HSXR2040R0.3L10 0660	4	R0.3	3.2	10	3.9	11	60	6
HSXR2040R0.3L12 0660	4	R0.3	3.2	12	3.9	11	60	6
HSXR2040R0.3L16 0660	4	R0.3	3.2	16	3.9	11	60	6
HSXR2040R0.3L20 0660	4	R0.3	3.2	20	3.9	11	60	6
HSXR2040R0.3L25 0675	4	R0.3	3.2	25	3.9	11	75	6
HSXR2040R0.3L30 0675	4	R0.3	3.2	30	3.9	11	75	6
HSXR2040R0.3L35 0675	4	R0.3	3.2	35	3.9	11	75	6
HSXR2040R0.3L40 06100	4	R0.3	3.2	40	3.9	11	100	6
HSXR2040R0.3L45 06100	4	R0.3	3.2	45	3.9	11	100	6
HSXR2040R0.3L50 06100	4	R0.3	3.2	50	3.9	11	100	6
HSXR2040R0.5L10 0660	4	R0.5	3.2	10	3.9	11	60	6
HSXR2040R0.5L12 0660	4	R0.5	3.2	12	3.9	11	60	6
HSXR2040R0.5L16 0660	4	R0.5	3.2	16	3.9	11	60	6
HSXR2040R0.5L20 0660	4	R0.5	3.2	20	3.9	11	60	6
HSXR2040R0.5L25 0675	4	R0.5	3.2	25	3.9	11	75	6
HSXR2040R0.5L30 0675	4	R0.5	3.2	30	3.9	11	75	6
HSXR2040R0.5L35 0675	4	R0.5	3.2	35	3.9	11	75	6
HSXR2040R0.5L40 06100	4	R0.5	3.2	40	3.9	11	100	6
HSXR2040R0.5L45 06100	4	R0.5	3.2	45	3.9	11	100	6
HSXR2040R0.5L50 06100	4	R0.5	3.2	50	3.9	11	100	6
HSXR2040R1.0L10 0660	4	R1	3.2	10	3.9	11	60	6
HSXR2040R1.0L12 0660	4	R1	3.2	12	3.9	11	60	6
HSXR2040R1.0L16 0660	4	R1	3.2	16	3.9	11	60	6
HSXR2040R1.0L20 0660	4	R1	3.2	20	3.9	11	60	6
HSXR2040R1.0L25 0675	4	R1	3.2	25	3.9	11	75	6
HSXR2040R1.0L30 0675	4	R1	3.2	30	3.9	11	75	6
HSXR2040R1.0L35 0675	4	R1	3.2	35	3.9	11	75	6
HSXR2040R1.0L40 06100	4	R1	3.2	40	3.9	11	100	6
HSXR2040R1.0L45 06100	4	R1	3.2	45	3.9	11	100	6
HSXR2040R1.0L50 06100	4	R1	3.2	50	3.9	11	100	6

RADIUS END MILL
HSX SERIES

HSXR2L 2-Flute Long Neck Corner Radius End Mill

Unit : mm

Type No.	Dia.	Corner Radius	Length of Cut	Under Neck Length	Neck Dia.	Neck Taper Angle	Overall Length	Shank Dia.
	ϕD	CR	ℓ	ℓ1	ϕd1	γ/°	L	ϕd
HSXR2060R0.5L18 0660	6	R0.5	4.8	18	5.85	–	60	6
HSXR2060R0.5L24 0675	6	R0.5	4.8	24	5.85	–	75	6
HSXR2060R0.5L36 0675	6	R0.5	4.8	36	5.85	–	75	6

TABLE OF RECOMMENDED MILLING MATERIALS

◎ Very suitable ○ Suitable

CARBON STEELS ALLOY STEELS PREHARDENED STEELS TOOL STEELS	PREHARDENED STEELS、HARDENED STEELS				STAINLESS STEELS	CAST IRON DUCTILE CAST IRON	COPPER ALLOYS	ALUMINUM ALLOY	GRAPHITE	TITANIUM ALLOY	HEAT RESISTANT ALLOYS	PLASTIC
~40HRC	~45HRC	~55HRC	~60HRC	~65HRC	~35HRC	~350HB						
○	○	◎	◎	○	○	○	○			○	○	

Cutting Parameter

HSXR2L 2-Flute Long Neck Corner Radius End Mill Z-Level Milling

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Diameter mm	Radius mm	Underneck mm	n min^{-1}	Vf mm/min	ap mm	ae mm	n min^{-1}	Vf mm/min	ap mm	ae mm	n min^{-1}	Vf mm/min	ap mm	ae mm
0.2	R0.02	0.5	36000	360	0.006	0.12	30000	300	0.005	0.12	24000	200	0.003	0.1
		1	36000	300	0.006	0.12	30000	240	0.005	0.12	24000	150	0.003	0.1
		1.5	36000	240	0.004	0.12	30000	180	0.003	0.12	24000	100	0.002	0.1
		2	36000	180	0.004	0.12	30000	120	0.003	0.12	24000	50	0.002	0.1
	R0.05	0.5	36000	440	0.006	0.12	30000	400	0.005	0.12	24000	300	0.003	0.1
		1	36000	360	0.006	0.12	30000	300	0.005	0.12	24000	200	0.003	0.1
		1.5	36000	240	0.004	0.12	30000	200	0.003	0.12	24000	150	0.002	0.1
		2	36000	200	0.004	0.12	30000	150	0.003	0.12	24000	100	0.002	0.1
0.3	R0.02	1	36000	350	0.006	0.18	30000	350	0.006	0.18	24000	300	0.003	0.15
		1.5	36000	260	0.006	0.18	30000	260	0.006	0.18	24000	200	0.003	0.15
		2	36000	180	0.004	0.18	30000	180	0.004	0.18	24000	150	0.003	0.15
		2.5	36000	150	0.004	0.18	30000	150	0.004	0.18	24000	100	0.002	0.15
		3	36000	70	0.004	0.18	30000	70	0.004	0.18	24000	50	0.002	0.15
	R0.05	1	36000	450	0.008	0.18	30000	400	0.007	0.18	24000	350	0.003	0.15
		1.5	36000	330	0.008	0.18	30000	300	0.007	0.18	24000	250	0.003	0.15
		2	36000	280	0.006	0.18	30000	250	0.005	0.18	24000	200	0.003	0.15
		2.5	36000	250	0.005	0.18	30000	200	0.004	0.18	24000	150	0.002	0.15
		3	36000	150	0.005	0.18	30000	100	0.004	0.18	24000	80	0.002	0.15
0.4	R0.02	1	36000	500	0.006	0.28	30000	450	0.006	0.24	24000	400	0.005	0.2
		1.5	36000	440	0.006	0.28	30000	400	0.006	0.24	24000	360	0.005	0.2
		2	36000	400	0.004	0.28	30000	360	0.004	0.24	24000	320	0.004	0.2
		2.5	36000	370	0.004	0.28	30000	340	0.004	0.24	24000	280	0.004	0.2
		3	36000	350	0.004	0.28	30000	320	0.004	0.24	24000	260	0.004	0.2
		4	36000	275	0.004	0.28	30000	250	0.004	0.24	24000	200	0.003	0.2
	R0.05	1	36000	600	0.012	0.28	30000	500	0.01	0.24	24000	400	0.005	0.2
		1.5	36000	540	0.012	0.28	30000	450	0.01	0.24	24000	360	0.005	0.2
		2	36000	490	0.012	0.28	30000	410	0.01	0.24	24000	328	0.005	0.2
		2.5	36000	450	0.01	0.28	30000	380	0.008	0.24	24000	304	0.005	0.2
		3	36000	430	0.01	0.28	30000	360	0.008	0.24	24000	288	0.004	0.2
		4	36000	360	0.008	0.28	30000	300	0.006	0.24	24000	240	0.003	0.2
	R0.1	1	36000	660	0.012	0.28	30000	550	0.01	0.24	24000	440	0.005	0.2
		1.5	36000	600	0.012	0.28	30000	500	0.01	0.24	24000	400	0.005	0.2

Cutting Parameter

HSXR2L 2-Flute Long Neck Corner Radius End Mill Z-Level Milling

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Diameter mm	Radius mm	Underneck mm	n min^{-1}	Vf mm/min	ap mm	ae mm	n min^{-1}	Vf mm/min	ap mm	ae mm	n min^{-1}	Vf mm/min	ap mm	ae mm
0.4	R0.1	2	36000	550	0.012	0.28	30000	460	0.01	0.24	24000	360	0.005	0.2
		2.5	36000	500	0.01	0.28	30000	420	0.008	0.24	24000	340	0.005	0.2
		3	36000	450	0.01	0.28	30000	380	0.008	0.24	24000	300	0.004	0.2
		4	36000	420	0.008	0.28	30000	350	0.006	0.24	24000	280	0.003	0.2
0.5	R0.02	1	30000	600	0.006	0.14	25000	500	0.006	0.15	23000	400	0.006	0.1
		1.5	30000	550	0.006	0.14	25000	460	0.006	0.15	23000	370	0.006	0.1
		2	30000	500	0.005	0.14	25000	420	0.005	0.15	23000	340	0.005	0.1
		2.5	30000	450	0.005	0.14	25000	380	0.005	0.15	23000	300	0.005	0.1
		3	30000	420	0.004	0.14	25000	350	0.004	0.15	23000	280	0.004	0.1
		4	25000	360	0.003	0.14	25000	300	0.003	0.15	23000	240	0.002	0.1
		5	25000	240	0.003	0.14	20000	200	0.003	0.15	18000	160	0.002	0.1
		6	25000	190	0.003	0.14	20000	160	0.003	0.15	18000	130	0.001	0.1
	R0.05 R0.1	1	30000	720	0.03	0.14	25000	600	0.01	0.15	23000	480	0.007	0.1
		1.5	30000	660	0.03	0.14	25000	550	0.01	0.15	23000	440	0.007	0.1
		2	30000	576	0.025	0.14	25000	480	0.01	0.15	23000	384	0.007	0.1
		2.5	30000	540	0.025	0.14	25000	450	0.01	0.15	23000	360	0.007	0.1
		3	30000	480	0.02	0.14	25000	400	0.008	0.15	23000	320	0.005	0.1
		4	25000	420	0.015	0.14	25000	350	0.005	0.15	23000	280	0.003	0.1
		5	25000	300	0.01	0.14	20000	250	0.004	0.15	18000	200	0.003	0.1
		6	25000	240	0.008	0.14	20000	200	0.003	0.15	18000	160	0.002	0.1
0.6	R0.02	2	30000	600	0.006	0.2	25000	500	0.006	0.2	23000	400	0.006	0.15
		3	28000	540	0.006	0.2	24000	450	0.006	0.2	21000	360	0.005	0.15
		4	25000	480	0.005	0.2	23000	400	0.005	0.2	20000	320	0.004	0.15
		6	23000	240	0.005	0.2	20000	200	0.004	0.2	18000	160	0.003	0.15
		8	18000	180	0.004	0.2	16000	150	0.004	0.2	14000	120	0.001	0.15
		10	16000	120	0.004	0.2	14000	100	0.003	0.2	12000	80	0.001	0.15
	R0.05 R0.1	2	30000	720	0.035	0.2	25000	600	0.02	0.2	23000	480	0.01	0.15
		3	28000	600	0.03	0.2	24000	500	0.02	0.2	21000	400	0.008	0.15
		4	25000	480	0.025	0.2	23000	400	0.015	0.2	20000	320	0.007	0.15
		6	23000	264	0.015	0.2	20000	220	0.008	0.2	18000	180	0.005	0.15
		8	18000	216	0.01	0.2	16000	180	0.005	0.2	14000	140	0.002	0.15
		10	16000	144	0.005	0.2	14000	120	0.002	0.2	12000	100	0.001	0.15

RADIUS END MILL
HSX SERIES

Cutting Parameter

HSXR2L 2-Flute Long Neck Corner Radius End Mill Z-Level Milling

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Diameter mm	Radius mm	Underneck mm	n min⁻¹	Vf mm/min	ap mm	ae mm	n min⁻¹	Vf mm/min	ap mm	ae mm	n min⁻¹	Vf mm/min	ap mm	ae mm
0.7	R0.02	2	30000	840	0.006	0.25	25000	700	0.006	0.25	23000	560	0.006	0.15
		3	30000	840	0.006	0.25	25000	700	0.006	0.25	23000	560	0.006	0.15
		4	28000	720	0.005	0.25	25000	600	0.005	0.25	23000	480	0.005	0.15
		6	25000	480	0.005	0.25	20000	400	0.005	0.25	18000	320	0.005	0.15
		8	18000	240	0.004	0.2	16000	200	0.004	0.2	14000	160	0.004	0.15
		10	16000	216	0.003	0.2	14000	180	0.003	0.2	12000	140	0.003	0.15
	R0.05 R0.1	2	30000	840	0.05	0.25	25000	700	0.03	0.25	23000	560	0.02	0.15
		3	30000	780	0.04	0.25	25000	650	0.03	0.25	23000	520	0.015	0.15
		4	28000	720	0.03	0.25	25000	600	0.02	0.25	23000	480	0.01	0.15
		6	25000	480	0.02	0.25	20000	400	0.01	0.25	18000	320	0.01	0.15
		8	18000	360	0.02	0.25	16000	300	0.01	0.25	14000	240	0.008	0.15
		10	16000	240	0.015	0.25	14000	200	0.01	0.25	12000	160	0.006	0.15
0.8	R0.02	2	28000	1020	0.006	0.3	25000	850	0.006	0.25	23000	680	0.006	0.16
		3	28000	960	0.006	0.3	25000	800	0.006	0.25	23000	640	0.006	0.16
		4	28000	840	0.005	0.3	25000	700	0.005	0.25	23000	560	0.005	0.16
		6	23000	660	0.005	0.3	20000	550	0.005	0.25	18000	440	0.005	0.15
		8	18000	480	0.004	0.3	16000	400	0.004	0.25	14000	320	0.004	0.15
		10	16000	360	0.004	0.25	15000	300	0.004	0.20	13500	240	0.004	0.12
		12	14000	240	0.003	0.2	13000	200	0.003	0.15	12000	160	0.003	0.12
	R0.05 R0.1	2	28000	1200	0.02	0.3	25000	1000	0.014	0.25	23000	800	0.012	0.16
		3	28000	1080	0.02	0.3	25000	900	0.014	0.25	23000	720	0.012	0.16
		4	28000	960	0.015	0.3	25000	800	0.012	0.25	23000	640	0.01	0.16
		6	23000	720	0.012	0.3	20000	600	0.01	0.25	18000	480	0.01	0.15
		8	18000	600	0.012	0.3	16000	500	0.01	0.25	14000	400	0.008	0.15
		10	16000	480	0.01	0.25	15000	400	0.008	0.20	13500	320	0.006	0.12
		12	14000	360	0.01	0.2	13000	300	0.008	0.15	12000	240	0.006	0.12
0.9	R0.1	4	25000	1200	0.05	0.3	25000	900	0.03	0.3	20000	800	0.02	0.2
		8	18000	800	0.03	0.3	16000	500	0.01	0.3	14000	400	0.008	0.2
1	R0.05	3	30000	1450	0.04	0.35	25000	1300	0.03	0.3	22000	1000	0.025	0.3
		4	30000	1440	0.03	0.35	25000	1200	0.025	0.3	21000	960	0.02	0.25
		5	28000	1200	0.03	0.35	23000	1000	0.025	0.3	20000	800	0.02	0.25
		6	25000	1080	0.02	0.35	21000	900	0.02	0.3	18000	720	0.015	0.25

Cutting Parameter

HSXR2L 2-Flute Long Neck Corner Radius End Mill Z-Level Milling

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Diameter mm	Radius mm	Underneck mm	n min⁻¹	Vf mm/min	ap mm	ae mm	n min⁻¹	Vf mm/min	ap mm	ae mm	n min⁻¹	Vf mm/min	ap mm	ae mm
1	R0.05	8	23000	960	0.02	0.35	19000	800	0.02	0.3	16000	640	0.015	0.25
		10	20000	840	0.02	0.35	16000	700	0.015	0.3	14000	560	0.010	0.25
		12	18000	720	0.015	0.35	15000	600	0.015	0.3	13000	480	0.010	0.25
		16	16000	480	0.015	0.35	13000	400	0.01	0.3	11000	320	0.008	0.25
		20	14000	400	0.015	0.35	13000	300	0.01	0.3	11000	240	0.008	0.25
	R0.1 R0.2 R0.3	3	30000	1500	0.04	0.35	25000	1350	0.03	0.3	22000	1080	0.025	0.3
		4	30000	1440	0.07	0.35	25000	1200	0.05	0.3	21000	960	0.04	0.25
		5	28000	1200	0.06	0.35	23000	1000	0.05	0.3	20000	800	0.04	0.25
		6	25000	1080	0.055	0.35	21000	900	0.04	0.3	18000	720	0.03	0.25
		8	23000	960	0.05	0.35	19000	800	0.03	0.3	16000	640	0.02	0.25
		10	20000	840	0.045	0.35	16000	700	0.02	0.3	14000	560	0.01	0.25
		12	18000	720	0.035	0.35	15000	600	0.015	0.3	13000	480	0.008	0.25
		16	18000	480	0.035	0.35	15000	400	0.015	0.3	13000	320	0.008	0.25
		20	14000	450	0.015	0.35	13000	350	0.01	0.3	11000	280	0.008	0.25
1.5	R0.05 R0.1 R0.2 R0.3	4	28000	1500	0.1	0.55	24000	1250	0.05	0.5	22000	1000	0.04	0.4
		6	28000	1440	0.1	0.55	23000	1200	0.05	0.5	20000	960	0.04	0.4
		8	25000	1200	0.08	0.55	21000	1000	0.05	0.5	18000	800	0.04	0.4
		10	23000	1080	0.08	0.55	19000	900	0.045	0.5	16000	720	0.03	0.4
		12	20000	960	0.06	0.55	16000	800	0.04	0.5	14000	640	0.025	0.4
		16	16000	720	0.06	0.55	13000	600	0.03	0.5	11000	480	0.02	0.4
		20	12000	480	0.03	0.55	11000	400	0.02	0.5	9000	320	0.007	0.4
2	R0.05 R0.1 R0.2 R0.3 R0.5	6	24000	1320	0.13	0.7	20000	1100	0.06	0.6	17000	880	0.05	0.5
		8	24000	1320	0.13	0.7	20000	1100	0.06	0.6	17000	880	0.05	0.5
		10	22000	1200	0.12	0.7	18000	1000	0.06	0.6	15000	800	0.05	0.5
		12	20000	1080	0.11	0.7	16000	900	0.05	0.6	14000	720	0.04	0.5
		16	16000	840	0.09	0.7	13000	700	0.04	0.6	11000	560	0.03	0.5
		20	14000	720	0.07	0.7	11000	600	0.03	0.6	9500	480	0.02	0.5
		25	12000	600	0.06	0.7	9000	500	0.03	0.6	8000	400	0.02	0.5
		30	10000	480	0.05	0.7	8000	400	0.02	0.6	7000	320	0.01	0.5
3	R0.1 R0.2 R0.3 R0.5	8	18000	1440	0.18	1	15000	1200	0.1	0.8	13000	960	0.07	0.7
		10	18000	1440	0.18	1	15000	1200	0.1	0.8	13000	960	0.07	0.7
		12	16000	1320	0.17	1	13000	1100	0.1	0.8	11000	880	0.07	0.7

Cutting Parameter

HSXR2L 2-Flute Long Neck Corner Radius End Mill Z-Level Milling

Workpiece			Pre-Hardened Steels (30-45HRC)				Hardened Steels (45-55HRC)				Hardened Steels (55-65HRC)			
Diameter mm	Radius mm	Underneck mm	n min^{-1}	Vf mm/min	ap mm	ae mm	n min^{-1}	Vf mm/min	ap mm	ae mm	n min^{-1}	Vf mm/min	ap mm	ae mm
3	R0.1 R0.2 R0.3 R0.5	16	14000	1200	0.16	1	11000	1000	0.1	0.8	9500	800	0.07	0.7
		20	13500	1080	0.16	1	11000	900	0.08	0.8	9500	720	0.06	0.7
		25	12000	900	0.14	1	10000	750	0.07	0.8	8500	600	0.05	0.7
		30	10000	780	0.12	1	8000	650	0.05	0.8	7000	520	0.04	0.7
		35	9000	600	0.08	1	7500	500	0.04	0.8	6500	400	0.02	0.7
		40	8000	480	0.06	1	6500	400	0.03	0.8	5500	320	0.02	0.7
4	R0.1 R0.2 R0.3 R0.5 R1	10	14000	1800	0.3	2.5	13000	1500	0.15	2	12000	1200	0.12	1.5
		12	13000	1500	0.3	2.5	12000	1300	0.15	2	10000	1000	0.12	1.5
		16	12000	1300	0.25	1.4	10000	1100	0.15	1.2	8500	900	0.1	1
		20	12000	1300	0.25	1.4	10000	1000	0.15	1.2	8500	900	0.1	1
		25	10000	1100	0.17	1.4	8000	900	0.1	1.2	7000	800	0.08	1
		30	8000	800	0.14	1.4	6500	800	0.08	1.2	5500	660	0.08	1
		35	6500	700	0.08	1.4	5500	700	0.06	1.2	4500	540	0.05	1
		40	5800	660	0.06	1.2	5200	600	0.05	1	4000	480	0.05	0.8
		45	5200	550	0.05	1.2	4800	500	0.04	1	3800	420	0.04	0.8
		50	4800	450	0.04	1.2	4500	400	0.03	1	3200	360	0.04	0.8