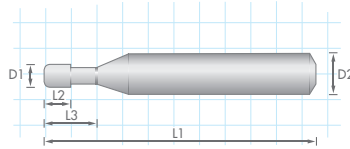
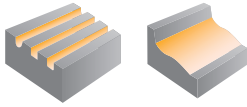


Tool Series 342: HSC Miniature Hard Milling Carbide End Mills- Long Reach



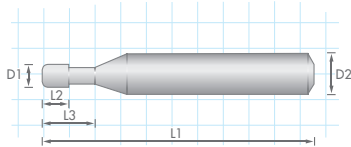
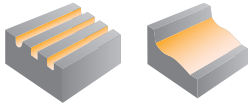
Tolerance	(Uncoated*)	(Coated):
D1:	-0.007 -0.018	h8
D2:	h5	h5

* Tools are recommended to be operated in "coated condition" only. Uncoated tolerances allow for custom coatings by third parties.

Uncoated Tool Number	Coated Tool Number	D1	D2	D3	L1	L2	L3	CR	Z
342-2002-05	342-2002-05-R	0.2	4	0.17	45	0.15	0.5	0.05	2
342-2002-1	342-2002-1-R	0.2	4	0.17	45	0.15	1	0.05	2
342-2003-1	342-2003-1-R	0.3	4	0.27	45	0.24	1	0.05	2
342-2003-2	342-2003-2-R	0.3	4	0.27	45	0.24	2	0.05	2
342-2004-2	342-2004-2-R	0.4	4	0.37	45	0.3	2	0.1	2
342-2004-3	342-2004-3-R	0.4	4	0.37	45	0.3	3	0.1	2
342-2004-4	342-2004-4-R	0.4	4	0.37	45	0.3	4	0.1	2
342-2005-3	342-2005-3-R	0.5	4	0.47	45	0.35	3	0.1	2
342-2005-4	342-2005-4-R	0.5	4	0.47	45	0.35	4	0.1	2
342-2005-5	342-2005-5-R	0.5	4	0.47	45	0.35	5	0.1	2
342-2005-6	342-2005-6-R	0.5	4	0.47	45	0.35	6	0.1	2
342-2005-8	342-2005-8-R	0.5	4	0.47	45	0.35	8	0.1	2
342-2005-10	342-2005-10-R	0.5	4	0.47	45	0.35	10	0.1	2
342-2006-4	342-2006-4-R	0.6	4	0.57	45	0.4	4	0.1	2
342-2006-6	342-2006-6-R	0.6	4	0.57	45	0.4	6	0.1	2
342-2006-8	342-2006-8-R	0.6	4	0.57	45	0.4	8	0.1	2
342-2006-10	342-2006-10-R	0.6	4	0.57	45	0.4	10	0.1	2
342-2006-12	342-2006-12-R	0.6	4	0.57	53	0.4	12	0.1	2
342-2008-4	342-2008-4-R	0.8	4	0.77	45	0.5	4	0.2	2
342-2008-6	342-2008-6-R	0.8	4	0.77	45	0.5	6	0.2	2
342-2008-8	342-2008-8-R	0.8	4	0.77	45	0.5	8	0.2	2
342-2008-10	342-2008-10-R	0.8	4	0.77	45	0.5	10	0.2	2
342-2008-12	342-2008-12-R	0.8	4	0.77	53	0.5	12	0.2	2
342-2008-16	342-2008-16-R	0.8	4	0.77	53	0.5	16	0.2	2
342-2010-4	342-2010-4-R	1	4	0.94	45	0.8	4	0.2	2
342-2010-6	342-2010-6-R	1	4	0.94	45	0.8	6	0.2	2
342-2010-8	342-2010-8-R	1	4	0.94	45	0.8	8	0.2	2
342-2010-10	342-2010-10-R	1	4	0.94	45	0.8	10	0.2	2
342-2010-12	342-2010-12-R	1	4	0.94	53	0.8	12	0.2	2
342-2010-16	342-2010-16-R	1	4	0.94	53	0.8	16	0.2	2
342-2010-20	342-2010-20-R	1	4	0.94	63	0.8	20	0.2	2



Tool Series 342: HSC Miniature Hard Milling Carbide End Mills- Long Reach



Tolerance	(Uncoated*)	(Coated):
D1:	-0.007 -0.018	h8
D2:	h5	h5

* Tools are recommended to be operated in "coated condition" only. Uncoated tolerances allow for custom coatings by third parties.

Uncoated Tool Number	Coated Tool Number	D1	D2	D3	L1	L2	L3	CR	Z
342-2012-6	342-2012-6-R	1.2	4	1.14	45	1	6	0.2	2
342-2012-8	342-2012-8-R	1.2	4	1.14	45	1	8	0.2	2
342-2012-10	342-2012-10-R	1.2	4	1.14	45	1	10	0.2	2
342-2012-12	342-2012-12-R	1.2	4	1.14	53	1	12	0.2	2
342-2012-16	342-2012-16-R	1.2	4	1.14	53	1	16	0.2	2
342-2012-20	342-2012-20-R	1.2	4	1.14	63	1	20	0.2	2
342-2015-8	342-2015-8-R	1.5	4	1.42	45	1.2	8	0.2	2
342-2015-12	342-2015-12-R	1.5	4	1.42	53	1.2	12	0.2	2
342-2015-16	342-2015-16-R	1.5	4	1.42	53	1.2	16	0.2	2
342-2015-20	342-2015-20-R	1.5	4	1.42	63	1.2	20	0.2	2
342-2015-25	342-2015-25-R	1.5	4	1.42	63	1.2	25	0.2	2
342-2020-8-02	342-2020-8-02-R	2	4	1.92	45	1.35	8	0.2	2
342-2020-8-05	342-2020-8-05-R	2	4	1.92	45	1.6	8	0.5	2
342-2020-12-02	342-2020-12-02-R	2	4	1.92	53	1.6	12	0.2	2
342-2020-12-05	342-2020-12-05-R	2	4	1.92	53	1.6	12	0.5	2
342-2020-16-02	342-2020-16-02-R	2	4	1.92	53	1.6	16	0.2	2
342-2020-16-05	342-2020-16-05-R	2	4	1.92	53	1.6	16	0.5	2
342-2020-20-02	342-2020-20-02-R	2	4	1.92	63	1.6	20	0.2	2
342-2020-20-05	342-2020-20-05-R	2	4	1.92	63	1.6	20	0.5	2
342-2020-25-02	342-2020-25-02-R	2	4	1.92	63	1.6	25	0.2	2
342-2020-25-05	342-2020-25-05-R	2	4	1.92	63	1.6	25	0.5	2
342-2020-30-02	342-2020-30-02-R	2	4	1.92	75	1.6	30	0.2	2
342-2020-30-05	342-2020-30-05-R	2	4	1.92	75	1.6	30	0.5	2
342-2030-8-02	342-2030-8-02-R	3	6	2.86	50	2.4	8	0.2	2
342-2030-8-05	342-2030-8-05-R	3	6	2.86	50	2.4	8	0.5	2
342-2030-12-02	342-2030-12-02-R	3	6	2.86	63	2.4	12	0.2	2
342-2030-12-05	342-2030-12-05-R	3	6	2.86	63	2.4	12	0.5	2
342-2030-16-02	342-2030-16-02-R	3	6	2.86	63	2.4	16	0.2	2
342-2030-16-05	342-2030-16-05-R	3	6	2.86	63	2.4	16	0.5	2
342-2030-20-02	342-2030-20-02-R	3	6	2.86	63	2.4	20	0.2	2
342-2030-20-05	342-2030-20-05-R	3	6	2.86	63	2.4	20	0.5	2
342-2030-25-02	342-2030-25-02-R	3	6	2.86	63	2.4	25	0.2	2
342-2030-25-05	342-2030-25-05-R	3	6	2.86	63	2.4	25	0.5	2
342-2030-30-02	342-2030-30-02-R	3	6	2.86	75	2.4	30	0.2	2
342-2030-30-05	342-2030-30-05-R	3	6	2.86	75	2.4	30	0.5	2



Tool Series 342: Technical Support – HSC Conditions

Material			Copper			Carbon Steels (180-250 HB)			Stainless Steels (25-35HRC)		
DI mm	L3 mm	CR mm	ap mm	n min.	Vf mm/min.	ap mm	n min.	Vf mm/min.	ap mm	n min.	Vf mm/min.
0.2	0.5	0.05	0.024	50,100	1,443	0.02	50,100	1,443	0.018	45,090	1,299
0.2	1	0.05	0.017	50,100	1,443	0.014	50,100	1,443	0.013	45,090	1,299
0.3	1	0.05	0.025	50,100	1,891	0.021	48,096	1,818	0.019	43,286	1,636
0.3	2	0.05	0.014	50,100	1,735	0.012	43,286	1,496	0.011	38,958	1,347
0.4	2	0.1	0.034	48,096	1,847	0.028	40,080	1,539	0.025	36,072	1,385
0.4	3	0.1	0.019	43,286	1,496	0.016	36,072	1,246	0.014	32,465	1,122
0.4	4	0.1	0.012	43,286	1,496	0.01	36,072	1,246	0.009	32,465	1,122
0.5	3	0.1	0.024	41,555	1,915	0.02	34,629	1,596	0.018	31,166	1,436
0.5	4	0.1	0.024	41,555	1,915	0.02	34,629	1,596	0.018	31,166	1,436
0.5	5	0.1	0.016	41,555	1,915	0.013	34,629	1,596	0.012	31,166	1,436
0.5	6	0.1	0.016	36,938	1,489	0.013	30,781	1,241	0.012	27,703	1,117
0.5	8	0.1	0.015	36,938	1,489	0.013	30,781	1,241	0.012	27,703	1,117
0.5	10	0.1	0.012	27,620	997	0.011	28,056	1,012	0.01	24,860	902
0.6	4	0.1	0.029	41,555	2,394	0.024	34,629	1,995	0.022	31,166	1,796
0.6	6	0.1	0.018	41,555	2,394	0.015	34,629	1,995	0.014	31,166	1,796
0.6	8	0.1	0.018	41,555	2,394	0.015	34,629	1,995	0.014	31,166	1,796
0.6	10	0.1	0.016	41,501	2,241	0.012	31,869	1,723	0.011	28,682	1,548
0.6	12	0.1	0.016	41,501	2,241	0.012	31,869	1,723	0.011	28,682	1,548
0.8	4	0.2	0.067	48,096	2,309	0.056	40,080	1,924	0.05	36,072	1,731
0.8	6	0.2	0.038	43,286	1,870	0.032	36,072	1,558	0.029	32,465	1,403
0.8	8	0.2	0.038	43,286	1,870	0.032	36,072	1,558	0.029	32,465	1,403
0.8	10	0.2	0.036	41,828	1,844	0.03	34,669	1,528	0.027	31,072	1,368
0.8	12	0.2	0.032	40,636	1,628	0.026	33,467	1,343	0.024	29,880	1,197
0.8	16	0.2	0.028	40,636	1,463	0.022	33,467	1,207	0.02	29,880	1,077
1	4	0.2	0.084	43,286	3,116	0.07	36,072	2,597	0.063	32,465	2,338
1	6	0.2	0.048	38,958	2,524	0.04	32,465	2,104	0.036	29,218	1,894
1	8	0.2	0.048	38,958	2,524	0.04	32,465	2,104	0.036	29,218	1,894
1	10	0.2	0.03	38,958	2,524	0.025	32,465	2,104	0.023	29,218	1,894
1	12	0.2	0.03	34,629	1,995	0.025	28,858	1,662	0.023	25,972	1,496
1	16	0.2	0.018	34,629	1,745	0.015	28,858	1,455	0.014	25,972	1,309
1	20	0.2	0.012	25,972	1,309	0.01	21,643	1,091	0.009	19,479	982
1.2	6	0.2	0.078	39,840	2,710	0.064	33,727	2,295	0.057	31,062	2,114
1.2	8	0.2	0.078	39,840	2,390	0.064	33,727	2,024	0.057	31,062	1,864
1.2	10	0.2	0.038	36,388	2,184	0.024	30,275	1,819	0.017	27,625	1,658
1.2	12	0.2	0.038	36,388	2,184	0.024	30,275	1,819	0.017	27,625	1,658
1.2	16	0.2	0.025	32,665	1,703	0.019	26,558	1,383	0.014	23,908	1,242
1.2	20	0.2	0.019	25,496	1,328	0.014	20,716	1,077	0.012	18,061	942
1.5	8	0.2	0.072	30,300	1,964	0.06	25,250	1,636	0.054	22,725	1,473
1.5	12	0.2	0.072	30,300	1,964	0.06	25,250	1,636	0.054	22,725	1,473
1.5	15	0.2	0.046	26,934	1,551	0.038	22,445	1,293	0.034	20,200	1,163
1.5	20	0.2	0.046	26,934	1,551	0.038	22,445	1,293	0.034	20,200	1,163
1.5	25	0.2	0.032	22,310	1,160	0.024	18,061	942	0.02	15,932	832
2	8	0.2	0.168	25,250	3,409	0.14	21,042	2,841	0.126	18,938	2,557
2	8	0.5	0.168	25,250	3,788	0.14	21,042	3,156	0.126	18,938	2,841
2	12	0.2	0.096	22,725	2,762	0.08	18,938	2,301	0.072	17,044	2,071
2	12	0.5	0.096	22,725	3,068	0.08	18,938	2,557	0.072	17,044	2,301
2	16	0.2	0.096	22,725	2,762	0.08	18,938	2,301	0.072	17,044	2,071
2	16	0.5	0.096	22,725	3,068	0.08	18,938	2,557	0.072	17,044	2,301
2	20	0.2	0.06	22,725	2,762	0.05	18,938	2,301	0.045	17,044	2,071
2	20	0.5	0.06	22,725	3,068	0.05	18,938	2,557	0.045	17,044	2,301
2	25	0.2	0.04	19,759	2,295	0.03	15,932	1,849	0.025	14,183	1,648
2	25	0.5	0.04	19,759	2,570	0.03	15,932	2,074	0.025	14,183	1,844
2	30	0.2	0.03	19,759	2,295	0.02	15,932	1,849	0.015	14,183	1,648
2	30	0.5	0.03	19,759	2,570	0.02	15,932	2,074	0.015	14,183	1,844
3	8	0.2	0.361	19,238	2,597	0.301	16,032	2,164	0.271	14,429	1,948
3	8	0.5	0.361	19,238	2,886	0.301	16,032	2,405	0.271	14,429	2,164
3	12	0.2	0.253	19,238	2,597	0.21	16,032	2,164	0.189	14,429	1,948
3	12	0.5	0.253	19,238	2,886	0.21	16,032	2,405	0.189	14,429	2,164
3	16	0.2	0.144	19,238	2,597	0.12	16,032	2,164	0.108	14,429	1,948
3	16	0.5	0.144	19,238	2,886	0.12	16,032	2,405	0.108	14,429	2,164
3	20	0.2	0.144	17,315	2,104	0.12	14,429	1,754	0.108	12,986	1,578
3	20	0.5	0.144	17,315	2,338	0.12	14,429	1,948	0.108	12,986	1,754
3	30	0.2	0.096	17,315	2,104	0.08	14,429	1,754	0.072	12,986	1,578
3	30	0.5	0.096	17,315	2,338	0.08	14,429	1,948	0.072	12,986	1,754
3	30	0.2	0.096	17,315	2,104	0.08	14,429	1,754	0.072	12,986	1,578
3	30	0.5	0.096	17,315	2,338	0.08	14,429	1,948	0.072	12,986	1,754

This data recommendation applies to highly accurate and rigid machining conditions associated with HSC. It may serve as a general guidance only. The actual cutting parameters may vary with each application. A proportional feed rate adjustment is necessary when the actual RPM is lower than the stated recommendation.

Material			Steels (35-45 HRC)			Hardened Steels (45-55 HRC)			Hardened Steels (55-70 HRC)		
DI mm	L3 mm	CR mm	ap mm	n min.	Vf mm/min.	ap mm	n min.	Vf mm/min.	ap mm	n min.	Vf mm/min.
0.2	0.5	0.05	0.016	42,585	1,104	0.013	37,575	866	0.012	35,070	707
0.2	1	0.05	0.011	42,585	1,104	0.009	37,575	866	0.008	35,070	707
0.3	1	0.05	0.017	40,882	1,148	0.014	36,072	857	0.013	33,667	690
0.3	2	0.05	0.01	36,793	1,033	0.008	32,465	772	0.007	30,300	622
0.4	2	0.1	0.022	34,068	1,177	0.018	30,060	924	0.017	28,056	755
0.4	3	0.1	0.013	30,661	1,060	0.01	27,054	831	0.01	25,250	678
0.4	4	0.1	0.008	30,661	1,060	0.007	27,054	831	0.006	25,250	678
0.5	3	0.1	0.016	29,435	1,102	0.013	25,972	823	0.012	24,240	663
0.5	4	0.1	0.016	29,435	1,102	0.013	25,972	823	0.012	24,240	663
0.5	5	0.1	0.01	29,435	1,102	0.008	25,972	823	0.008	24,240	663
0.5	6	0.1	0.01	26,164	715	0.008	23,086	631	0.008	21,547	496
0.5	8	0.1	0.004	26,164	715	0.002	23,086	631	0.002	21,547	496
0.5	10	0.1	0.004	24,860	596	0.002	21,042	506	0.002	19,123	396
0.6	4	0.1	0.019	29,435	1,378	0.016	25,972	1,028	0.014	24,240	829
0.6	6	0.1	0.012	29,435	1,378	0.01	25,972	1,028	0.009	24,240	829
0.6	8	0.1	0.006	26,558	957	0.005	22,846	777	0.005	21,247	595
0.6	10	0.1	0.006	23,903	765	0.005	20,190	606	0.005	18,592	446
0.6	12	0.1	0.004	21,247	595	0.002	17,535	455	0.002	15,937	321
0.8	4	0.2	0.045	34,068	1,472	0.036	30,060	1,154	0.034	28,056	943
0.8	6	0.2	0.026	30,661	1,325	0.021	27,054	1,039	0.019	25,250	849
0.8	8	0.2	0.041	23,467	1,503	0.038	21,778	1,263	0.037	20,451	1,022
0.8	10	0.2	0.036	23,467	1,503	0.034	21,778	1,263	0.033	20,451	1,022
0.8	12	0.2	0.03	23,467	1,503	0.028	21,778	1,263	0.027	20,451	1,022
0.8	16	0.2	0.028	22,575	1,132	0.024	18,858	942	0.023	17,535	772
1	4	0.2	0.056	30,661	1,987	0.046	27,054	1,558	0.042	25,250	1,273
1	6	0.2	0.032	27,595	1,789	0.026	24,349	1,403	0.024	22,725	1,145
1	8	0.2	0.032	27,595	1,789	0.026	24,349	1,403	0.024	22,725	1,145
1	10	0.2	0.02	27,595	1,789	0.016	24,349	1,403	0.015	22,725	1,145
1	12	0.2	0.02	24,529	1,236	0.016	21,643	1,091	0.015	20,200	873
1	16	0.2	0.012	24,529	1,148	0.01	21,643	935	0.009	20,200	727
1	20	0.2	0.008	18,397	861	0.007	16,232	701	0.006	15,150	545
1.2	6	0.2	0.041	23,467	1,503	0.038	21,778	1,263	0.037	20,451	1,022
1.2	8	0.2	0.036	23,467	1,503	0.034	21,778	1,263	0.033	20,451	1,022
1.2	10	0.2	0.03	23,467	1,503	0.028	21,778	1,263	0.027	20,451	1,022
1.2	12	0.2	0.028	22,575	1,132	0.024	18,858	942	0.023	17,535	772
1.2	16	0.2	0.02	22,575	1,132	0.018	18,858	832	0.017	17,535	631
1.2	20	0.2	0.018	21,242	977	0.014	17,535	772	0.013	16,202	586
1.5	8	0.2	0.048	21,463	1,391	0.039	18,938	1,091	0.036	17,675	891
1.5	12	0.2	0.048	21,463	1,391	0.039	18,938	1,091	0.036	17,675	891
1.5	15	0.2	0.03	19,078	962	0.025	16,834	849	0.023	15,711	678
1.5	20	0.2	0.03	19,078	962	0.025	16,834	849	0.023	15,711	678
1.5	25	0.2	0.02	15,308	581	0.015	13,181	501	0.013	12,118	388
2	8	0.2	0.112	17,886	2,415	0.091	15,782	1,704	0.084	14,729	1,392
2	8	0.5	0.112	17,886	2,683	0.091	15,782	1,894	0.084	14,729	1,547
2	12	0.2	0.064	16,097	1,956	0.052	14,203	1,534	0.048	13,256	1,253
2	12	0.5	0.064	16,097	2,173	0.052	14,203	1,704	0.048	13,256	1,392
2	16	0.2	0.064	16,097	1,956	0.052	14,203	1,534	0.048	13,256	1,253
2	16	0.5	0.064	16,097	2,173	0.052	14,203	1,704	0.048	13,256	1,392
2	20	0.2	0.04	16,097	1,956	0.033	14,203	1,534	0.03	13,256	1,253
2	20	0.5	0.04	16,097	2,173	0.033	14,203	1,704	0.03	13,256	1,392
2	25	0.2	0.02	13,873	1,526	0.018	12,118	1,163	0.017	11,161	915
2	25	0.5	0.02	13,873	1,720	0.018	12,118	1,309	0.017	11,161	1,049
2	30	0.2	0.015	13,873	1,526	0.01	12,118	1,163	0.008	11,161	915
2	30	0.5	0.015	13,873	1,720	0.01	12,118	1,309	0.008	11,161	1,049
3	8	0.2	0.24	13,627	1,840	0.195	12,024	1,299	0.18	11,222	1,060
3	8	0.5	0.24	13,627	2,044	0.195	12,024	1,443	0.18	11,222	1,178
3	12	0.2	0.168	13,627	1,840	0.137	12,024	1,299	0.126	11,222	1,060
3	12	0.5	0.168	13,627	2,044	0.137	12,024	1,443	0.126	11,222	1,178
3	16	0.2	0.096	13,627	1,840	0.078	12,024	1,299	0.072	11,222	1,060
3	16	0.5	0.096	13,627	2,044	0.078	12,024	1,443	0.072	11,222	1,178
3	20	0.2	0.096	12,264	1,490	0.078	10,822	1,168	0.072	10,100	955
3	20	0.5	0.096	12,264	1,655	0.078	10,822	1,299	0.072	10,100	1,060
3	30	0.2	0.064	12,264	1,490	0.052	10,822	1,168	0.048	10,100	955
3	30	0.5	0.064	12,264	1,655	0.052	10,822	1,299	0.048	10,100	1,060
3	30	0.2	0.064	12,264	1,490	0.052	10,822	1,168	0.048	10,100	955
3	30	0.5	0.064	12,264	1,655	0.052	10,822	1,299	0.048	10,100	1,060

This data recommendation applies to highly accurate and rigid machining conditions associated with HSC. It may serve as a general guidance only. The actual cutting parameters may vary with each application. A proportional feed rate adjustment is necessary when the actual RPM is lower than the stated recommendation.

