GALLEA GP1T | Recommended Cutting Conditions

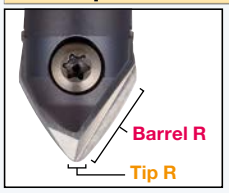
Workpiece material	Recommended grade & target hardness (HRC) 30 40 50 60		Tool Dia.	D12			D16			D20			D25			D30		
		Parameter		Corner milling	Semi	Finishing	Corner milling	Semi	Finishing	Corner milling	Semi	Finishing	Corner milling	Semi	Finishing	Corner milling	Semi	Finishing
		Cutting Edge (R)		Tip (R1.2)	Barrel (R30)		Tip (R1.6)	Barrel (R40)		Tip (R2)	Barrel (R50)		Tip (R2.5)	Barrel (R62.5)		Tip (R3)	Barrel (R75)	
Carbon-Steel Alloy-Steel <30 HRC	PN215	V_c	m/min	150	400	500	210	400	500	250	400	500	310	400	500	370	400	500
		n	min^{-1}	19894	10610	13263	19660	7958	9947	19894	6366	7958	19735	5093	6366	19629	4244	5305
		f_z	mm/t	0.040	0.237	0.158	0.050	0.274	0.183	0.060	0.306	0.204	0.070	0.342	0.228	0.080	0.375	0.250
		V_f	mm/min	1590	5030	4190	1970	4360	3630	2390	3900	3250	2760	3490	2910	3140	3180	2650
		a_p	mm	0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table	
		a_e	mm	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100
Pre-Hard-ened Steel 30 – 45 HRC	PN215 TH308	V_c	m/min	150	360	450	210	360	450	250	360	450	310	360	450	370	360	450
		n	min^{-1}	19894	9549	11937	19660	7162	8952	19894	5730	7162	19735	4584	5730	19629	3820	4775
		f_z	mm/t	0.040	0.237	0.158	0.050	0.274	0.183	0.060	0.306	0.204	0.070	0.342	0.228	0.080	0.375	0.250
		V_f	mm/min	1590	4530	3770	1970	3920	3270	2390	3510	2920	2760	3140	2620	3140	2860	2390
		a_p	mm	0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table	
		a_e	mm	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100
Hardened steels (45 ~ 55 HRC)	TH308	V_c	m/min	150	256	320	210	256	320	250	256	320	310	256	320	370	256	320
		n	min^{-1}	19894	6791	8488	19660	5093	6366	19894	4074	5093	19735	3259	4074	19629	2716	3395
		f_z	mm/t	0.040	0.190	0.126	0.050	0.219	0.146	0.060	0.245	0.163	0.070	0.274	0.183	0.080	0.300	0.200
		V_f	mm/min	1590	2580	2150	1970	2230	1860	2390	2000	1660	2760	1790	1490	3140	1630	1360
		a_p	mm	0.080	optimum value in table		0.080	optimum value in table		0.080	optimum value in table		0.080	optimum value in table		0.080	optimum value in table	
		a_e	mm	value in table	0.280	0.080	value in table	0.280	0.080	value in table	0.280	0.080	value in table	0.280	0.080	value in table	0.280	0.080
Hardened steels (55 ~ 62 HRC)	TH308	V_c	m/min	150	224	280	210	224	280	250	224	280	310	224	280	370	224	280
		n	min^{-1}	19894	5942	7427	19660	4456	5570	19894	3565	4456	19735	2852	3565	19629	2377	2971
		f_z	mm/t	0.040	0.190	0.126	0.050	0.219	0.146	0.060	0.245	0.163	0.070	0.274	0.183	0.080	0.300	0.200
		V_f	mm/min	1590	2250	1880	1970	1950	1630	2390	1750	1460	2760	1560	1300	3140	1430	1190
		a_p	mm	0.050	optimum value in table		0.050	optimum value in table		0.050	optimum value in table		0.050	optimum value in table		0.050	optimum value in table	
		a_e	mm	value in table	0.175	0.050	value in table	0.175	0.050	value in table	0.175	0.050	value in table	0.175	0.050	value in table	0.175	0.050
Cast-Iron GG/GGG	PN215 TH308	V_c	m/min	150	400	500	210	400	500	250	400	500	310	400	500	370	400	500
		n	min^{-1}	19894	10610	13263	19660	7958	9947	19894	6366	7958	19735	5093	6366	19629	4244	5305
		f_z	mm/t	0.040	0.285	0.190	0.050	0.329	0.219	0.060	0.367	0.245	0.070	0.411	0.274	0.080	0.450	0.300
		V_f	mm/min	1590	6040	5030	1970	5230	4360	2390	4680	3900	2760	4180	3490	3140	3820	3180
		a_p	mm	0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table		0.100	optimum value in table	
		a_e	mm	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100	value in table	0.350	0.100

Overhang ratio L/D	V_c (m/min)	V_f (mm/min)
3D ~ 5D	70%	70%
5D ~ 6D	60%	60%
6D ~ 7D	50%	50%
>7D	45%	45%

- In the same material group, please reduce V_c by 30% when using PN coating insert.
- RPM are based on the Nominal Diameter! Please calculate RPM according to real contact point and effective cutting diameter.
- These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and workpiece conditions.

※ please make adjustment based on the below table in the case of L/D >3

Correspondence table – a_p / a_e & cusp height:

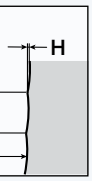


Barrel edge a_p (mm)

	Insert		Cusp height (mm)						
	Item code	Barrel R	0.0005	0.001	0.002	0.003	0.004	0.005	0.01
a_p for	ZDHW-120-T43R1.2-30	30	0.35	0.49	0.69	0.85	0.98	1.1	1.55
	ZDHW-160-T43R1.6-40	40	0.4	0.57	0.8	0.98	1.13	1.26	1.79
	ZDHW-200-T43R2-50	50	0.45	0.63	0.89	1.1	1.26	1.41	2
	ZDHW-250-T43R2.5-62.5	62.5	0.5	0.71	1	1.22	1.41	1.58	2.24
	ZDHW-300-T43R3-75	75	0.55	0.77	1.1	1.34	1.55	1.73	2.45

$$a_p = 2\sqrt{R^2-(R-H)^2}\ (a_e)$$

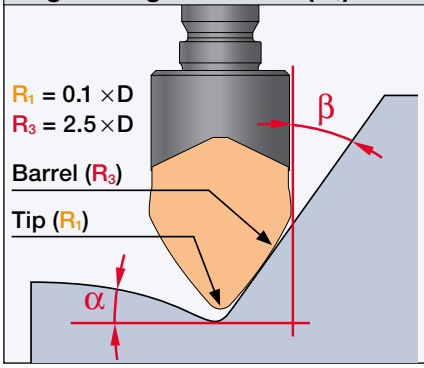
R: R-Sizes of insert
H: Cusp height



Tip edge a_e (mm)

	Insert		Cusp height (mm)						
	Item code	Tip R	0.0005	0.001	0.002	0.003	0.004	0.005	0.01
a_e for	ZDHW-120-T43R1.2-30	1.2	0.07	0.1	0.14	0.17	0.2	0.22	0.31
	ZDHW-160-T43R1.6-40	1.6	0.08	0.11	0.16	0.2	0.23	0.25	0.36
	ZDHW-200-T43R2-50	2	0.09	0.13	0.18	0.22	0.25	0.28	0.4
	ZDHW-250-T43R2.5-62.5	2.5	0.1	0.14	0.2	0.24	0.28	0.32	0.45
	ZDHW-300-T43R3-75	3	0.11	0.15	0.22	0.27	0.31	0.35	0.49

Angle Range of Barrel (R_3) and Tip (R_1)



GP1T	
	
	D12 – D30
β_{min}	26°
β_{max}	43°
α	47°

β ≙ min/max wall inclination angle nominal to tool / z-axis for Barrel (R_3)

α ≙ maximum bottom inclination angle for Tip (R_1)