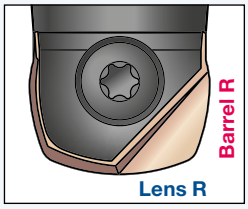
GALLEA GP1LB | Recommended Cutting Conditions

Workpiece material	Recommended grade & target hardness (HRC)				Tool Dia. (R)		D16 (R16)				D20 (R20)				D25 (R25)				D30 (R30)			
					Parameter		Semi		Finishing		Semi		Finishing		Semi		Finishing		Semi		Finishing	
	30	40	50	60	Cutting Edge		Lens	Barrel	Lens	Barrel	Lens	Barrel	Lens	Barrel	Lens	Barrel	Lens	Barrel	Lens	Barrel	Lens	Barrel
Carbon-Steel Alloy-Steel <30 HRC	PN215				V_c	m/min	480	400	600	500	480	400	600	500	480	400	600	500	480	400	600	500
					n	min^{-1}	9549	7958	11937	9947	7639	6366	9549	7958	6112	5093	7639	6366	5093	4244	6366	5305
					f_z	mm/t	0.274	0.274	0.183	0.183	0.306	0.306	0.204	0.204	0.342	0.342	0.228	0.228	0.375	0.375	0.250	0.250
					V_f	mm/min	5230	4360	4360	3630	4680	3900	3900	3250	4180	3490	3490	2910	3820	3180	3180	2650
					a_p	mm	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table
					a_e	mm	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100
Pre-Hardened Steel 30 – 45 HRC	PN215	TH308			V_c	m/min	440	360	550	450	440	360	550	450	440	360	550	450	440	360	550	450
					n	min^{-1}	8754	7162	10942	8952	7003	5730	8754	7162	5602	4584	7003	5730	4669	3820	5836	4775
					f_z	mm/t	0.274	0.274	0.183	0.183	0.306	0.306	0.204	0.204	0.342	0.342	0.228	0.228	0.375	0.375	0.250	0.250
					V_f	mm/min	4790	3920	4000	3270	4290	3510	3570	2920	3840	3140	3200	2620	3500	2860	2920	2390
					a_p	mm	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table
					a_e	mm	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100
Hardened steels (45 ~ 55 HRC)		TH308			V_c	m/min	336	256	420	320	336	256	420	320	336	256	420	320	336	256	420	320
					n	min^{-1}	6685	5093	8356	6366	5348	4074	6685	5093	4278	3259	5348	4074	3565	2716	4456	3395
					f_z	mm/t	0.219	0.219	0.146	0.146	0.245	0.245	0.163	0.163	0.274	0.274	0.183	0.183	0.300	0.300	0.200	0.200
					V_f	mm/min	2930	2230	2440	1860	2620	2000	2180	1660	2340	1790	1950	1490	2140	1630	1780	1360
					a_p	mm	0.280	value in table	0.080	value in table	0.280	value in table	0.080	value in table	0.280	value in table	0.080	value in table	0.280	value in table	0.080	value in table
					a_e	mm	value in table	0.280	value in table	0.080	value in table	0.280	value in table	0.080	value in table	0.280	value in table	0.080	value in table	0.280	value in table	0.080
Hardened steels (55 ~ 62 HRC)			TH308		V_c	m/min	304	224	380	280	304	224	380	280	304	224	380	280	304	224	380	280
					n	min^{-1}	6048	4456	7560	5570	4838	3565	6048	4456	3871	2852	4838	3565	3226	2377	4032	2971
					f_z	mm/t	0.219	0.219	0.146	0.146	0.245	0.245	0.163	0.163	0.274	0.274	0.183	0.183	0.300	0.300	0.200	0.200
					V_f	mm/min	2650	1950	2210	1630	2370	1750	1980	1460	2120	1560	1770	1300	1940	1430	1610	1190
					a_p	mm	0.175	value in table	0.050	value in table	0.175	value in table	0.050	value in table	0.175	value in table	0.050	value in table	0.175	value in table	0.050	value in table
					a_e	mm	value in table	0.175	value in table	0.050	value in table	0.175	value in table	0.050	value in table	0.175	value in table	0.050	value in table	0.175	value in table	0.050
Cast-Iron GG/GGG	PN215	TH308			V_c	m/min	480	400	600	500	480	400	600	500	480	400	600	500	480	400	600	500
					n	min^{-1}	9549	7958	11937	9947	7639	6366	9549	7958	6112	5093	7639	6366	5093	4244	6366	5305
					f_z	mm/t	0.329	0.329	0.219	0.219	0.367	0.367	0.245	0.245	0.411	0.411	0.274	0.274	0.450	0.450	0.300	0.300
					V_f	mm/min	6280	5230	5230	4360	5610	4680	4680	3900	5020	4180	4180	3490	4580	3820	3820	3180
					a_p	mm	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table
					a_e	mm	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100	value in table	0.350	value in table	0.100

- 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.



- For machining shapes that make heavy use of **Lens R**, refer to the **Lens edges** cutting conditions in the above table.
- For machining shapes that make heavy use of **Barrel R**, refer to the **Barrel edges** cutting conditions
- For machining shapes that use both **Lens R** & **Barrel R** equally, refer to the **Lens edges** cutting conditions in the table at left

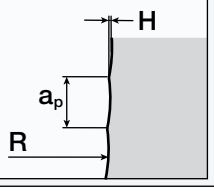
※ please make adjustment based on the below table in the case of L/D >3

Overhang ratio L/D	V_c (m/min)	V_f (mm/min)
<3D	100%	100%
3D ~ 5D	70%	70%
5D ~ 6D	60%	60%
6D ~ 7D	50%	50%
>7D	45%	45%

Correspondence table – a_p / a_e & cusp height:

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

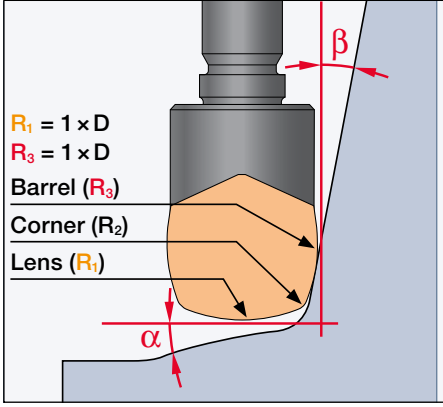
R: R-Sizes of insert
H: Cusp height



Barrel edge a_p (mm) or Lens edge a_e (mm)

	Insert		Cusp height (mm)					
	Item code	R	0.001	0.002	0.003	0.004	0.005	0.01
a_p for	ZPHW-160-LB16	16	0.36	0.51	0.62	0.72	0.8	1.13
	ZPHW-200-LB20	20	0.40	0.57	0.69	0.8	0.89	1.26
	ZPHW-250-LB25	25	0.45	0.63	0.77	0.89	1	1.41
	ZPHW-300-LB30	30	0.49	0.69	0.85	0.98	1.1	1.55

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



$R_1 = 1 \times D$
$R_3 = 1 \times D$
Barrel (R_3)
Corner (R_2)
Lens (R_1)

GP1LB				
	 Standard Corner (R_2) (ZPHWxxx-LBxx)	 Bigger Corner (R_2) (ZPHWxxx-LBxx-Rxx)		
	D16 – D30	D16	D20	D25	D30
β	22°	17.78°	20.08°	16.21°	12.85°
α	22°	13°	13°	13°	13°

β ≙ maximum wall inclination angle nominal to tool / z-axis for Barrel (R_3)
α ≙ maximum bottom inclination angle for Lens (R_1)
Note: Machining with Corner (R_2) in case of bigger inclination as shown above