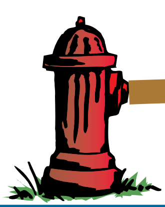
FINISH BALL™
Back Draft Insert

- Can be used with standard Finish Ball Bodies or Back Draft Bodies
- **For finishing, Semi-Finishing and Roughing**
- **Precision Machining, Mold & Die, Aerospace**



Finish•Ball Bodies

Series
12W9F-03017S4R01

Straight Shank
Finish Ball Body, Steel

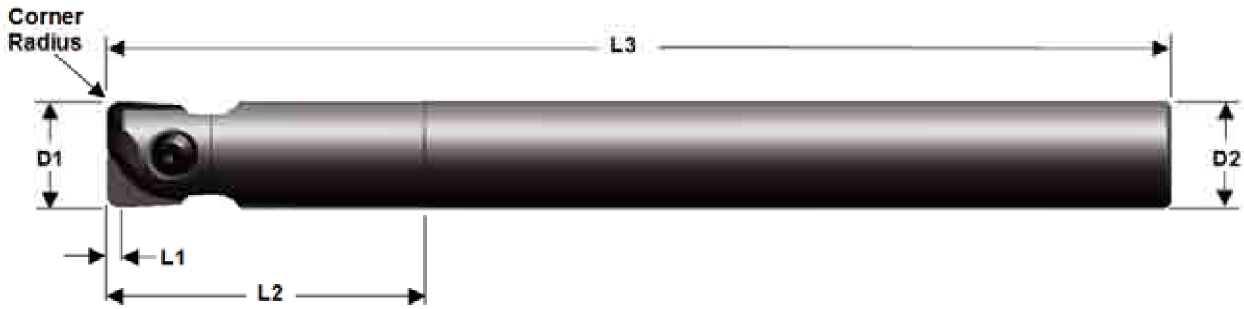
Series
12W9F-03011X5R01

Top-On
Finish Ball Body, Steel

Series
12W503015R8R01

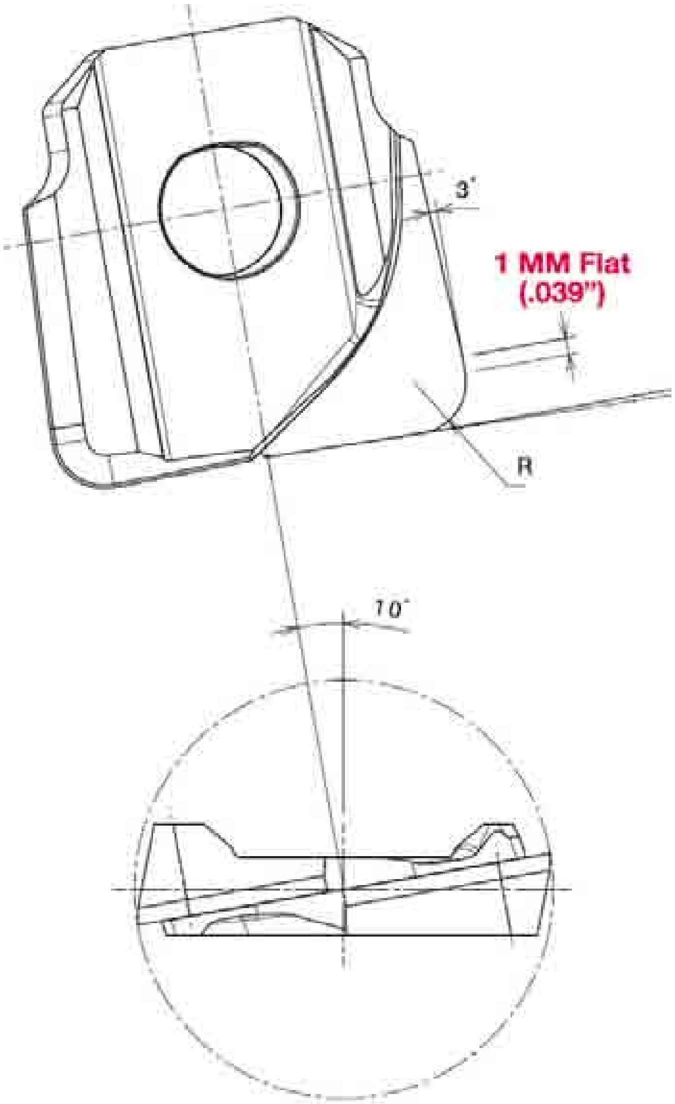
Finish Ball Solid Carbide Body
Brazed Head

BACK DRAFT BODIES (Available in straight shank only)



Part Number	D1 Effective Diameter	D2 Shank Size/Style	L1 Max DOC	L2 Extension	L3 Overall Length	Effective Cutting Edges
12V6F-03012S4R01	.375	.500 cylindrical / steel	Corner Radius	1.250	5.25	2
12V9H-05015S4R01	.500	.500 cylindrical / steel	Corner Radius	1.500	6.000	2
12V5H-05015S4R01	.500	.500 cylindrical / carbide	Corner Radius	1.500	6.000	2
12V9K-06018S6R01	.625	.625 cylindrical / steel	Corner Radius	1.875	7.000	2
12V9M-07022S7R01	.750	.750 cylindrical / steel	Corner Radius	2.250	9.000	2
12V5M-07022S7R01	.750	.750 cylindrical / carbide	Corner Radius	2.250	9.000	2
12V9R-10030S1R01	1.000	1.000 cylindrical / steel	Corner Radius	3.000	10.000	2
12V5R-10030S1R01	1.000	1.000 cylindrical / carbide	Corner Radius	3.000	10.000	2

- Stable - Unique prismatic clamping system ensures an extremely strong & uniform clamping condition
- Free cutting – Precision geometry, back drafted 3 degrees
- Accurate - Unparalleled repeatability (+/-.0004 runout , +/-.001 corner radius)



BACK DRAFT INSERTS

D1 Insert Dia.	Part Number	Index per Insert	Corner Radius	Grades
0.375	GPHG091208R01	1	0.031	IN2005
0.500	GPHG121708R01	1	0.031	IN2005
0.500	GPHG121716R01	1	0.062	IN2005
0.500	GPHG121732R01	1	0.125	IN2005
0.625	GPHG152208R01	1	0.031	IN2005
0.625	GPHG152216R01	1	0.063	IN2005
0.625	GPHG152232R01	1	0.125	IN2005
0.750	GPHG192508R01	1	0.031	IN2005
0.750	GPHG192516R01	1	0.062	IN2005
0.750	GPHG192532R01	1	0.125	IN2005
1.000	GPHG252608R01	1	0.031	IN2005
1.000	GPHG252616R01	1	0.062	IN2005
1.000	GPHG252632R01	1	0.125	IN2005

OPERATING GUIDELINES

SERIES GPHG BACK DRAFT INSERT

	Material	Brinell Hardness	SFM	Feed per Insert	IN2005	Coolant
Aluminum	6061-T6, 7075-T6	-	1000 - 3000	.003 - .016	1	YES
Cast Iron	Gray	150-250	500 - 1200	.002 - .016	1	NO
	Nodular	150-250	400 - 800	.002 - .016	1	
Steel	Low Carbon 1018-8620	150-250	600-1200	.002 - .016	1	NO
	High Carbon F-6180	250 - 400	400 - 600	.002 - .015	2	
	Alloyed Steel 4140	150 - 300	400 - 800	.002 - .015	1	
	Tool Steel P20-H13	Up to 460	400 - 800	.002 - .015	2	
Stainless Steel	300 Series, 304, 316	-	400 - 800	.002 - .010	1	NO
	400 Series, 15-5 PH, 17-4 PH	Up to 320	500 - 1000	.002 - .010	1	
	13-8 PH	-	200 - 400	.002 - .010	1	YES
Nickel Alloys	Inconel 600, 706, 718, 903, Hastelloy	75 - 120	75 - 120	.002 - .010	1	YES
Titanium	6AL-4V	-	80 - 150	002 - .008	1	YES

FEEDS & SPEED

Note: Feed and speed recommendations are starting operating parameters. They are only guidelines from which further optimization should take place. Operating parameters are influenced by many machining variables. These variables may cause for reductions in feeds and speed or dramatic increases. Additionally, DOC and WOC may need to be revised to optimize the tools performance.

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