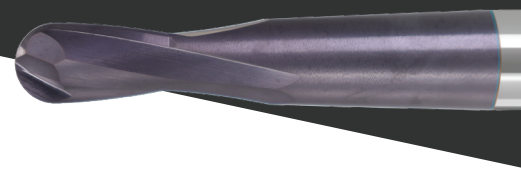
CASTELAR TOOL

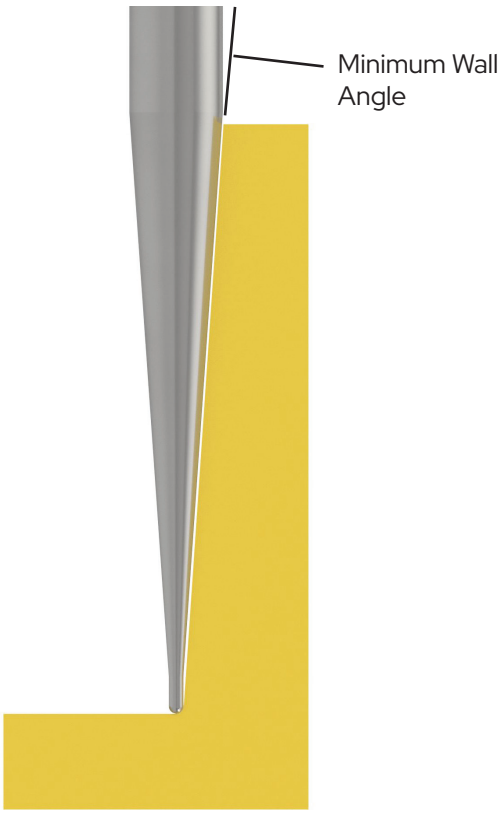
271

SPEEDS AND FEEDS



WORK MATERIAL	TYPE OFCUT	AXIAL DOC	RADIAL DOC	SFM	IPT				
					1/16"Ø	1/8"Ø	1/4"Ø	3/8"Ø	1/2"Ø
STEEL 25- 48 Rc	Roughing	.06xD	.3 x D	140-185	0.0005-0.0010	0.0010-0.0022	0.0039-0.0043	0.0059-0.0065	0.0078-0.0086
	Finishing	.05xD	.15 x D	170-220	0.0005-0.0017	0.0010-0.0034	0.0059-0.0064	0.0089-0.0096	0.0118-0.0127
STEEL <48 Rc	Roughing	.06xD	.3 x D	140-185	0.0005-0.0012	0.0010-0.0022	0.0039-0.0043	0.0059-0.0065	0.0078-0.0086
	Finishing	.07xD	.15 x D	170-220	0.0005-0.0017	0.0010-0.0034	0.0059-0.0064	0.0089-0.0096	0.0118-0.0127
STEEL 48- 57 Rc	Roughing	.05xD	.3 x D	110-140	0.0005-0.0010	0.0010-0.0022	0.0039-0.0043	0.0059-0.0065	0.0078-0.0086
	Finishing	.06xD	.15 x D	115-150	0.0005-0.0017	0.0020-0.0034	0.0059-0.0064	0.0089-0.0096	0.0118-0.0127
STEEL <65 Rc	Roughing	.04xD	.20 x D	90-120	0.0005-0.0010	0.0010-0.0022	0.0039-0.0043	0.0059-0.0065	0.0078-0.0086
	Finishing	.03xD	.10 x D	115-150	0.0005-0.0012	0.0010-0.0024	0.0039-0.0044	0.0059-0.0066	0.0078-0.0087
STEEL >65 Rc	Roughing	.025xD	.20 x D	55-75	0.0005-0.0010	0.0010-0.0012	0.0019-0.0023	0.0029-0.0035	0.0038-0.0046
	Finishing	.02xD	.10 x D	100-130	0.0005-0.0012	0.0010-0.0024	0.0039-0.0044	0.0059-0.0066	0.0078-0.0087

Part Number	Cutting Ø	Minimum Wall Angle
271-0020A	0.020	4.3°
271-0031A	1/32	4.2°
271-0040A	0.040	4.0°
271-0062A	1/16	3.8°
271-0093A	3/32	3.3°
271-0125A	1/8	2.8°
271-0156A	5/32	3.0°
271-0187A	3/16	2.4°
271-0250A	1/4	2.0°
271-0312A	5/16	2.2°
271-0375A	3/8	2.4°
271-0437A	7/16	1.2°
271-0500A	1/2	0°



CASTELAR TOOL

BALLNOSE

EFFECTIVE DIAMETERS

Ballnose Effective Diameter (No Tilt)

Cutting Diameter	Axial Depth of Cut														
	0.002	0.005	0.010	0.020	0.030	0.040	0.050	0.070	0.080	0.100	0.120	0.150	0.220	0.300	0.350
0.02	0.012	0.017													
1/32"Ø	0.015	0.023	0.029												
1/16"Ø	0.022	0.034	0.046	0.058	0.062										
3/32"Ø	0.027	0.042	0.058	0.076	0.087	0.092									
1/8"Ø	0.031	0.049	0.068	0.092	0.107	0.117	0.122								
5/32"Ø	0.035	0.055	0.076	0.104	0.123	0.136	0.146	0.155							
3/16"Ø	0.039	0.06	0.084	0.116	0.137	0.154	0.166	0.181	0.185						
1/4"Ø	0.045	0.07	0.098	0.136	0.162	0.183	0.2	0.224	0.233	0.245	0.25				
5/16"Ø	0.05	0.078	0.11	0.153	0.184	0.209	0.229	0.261	0.273	0.292	0.304	0.312			
3/8"Ø	0.055	0.086	0.121	0.169	0.203	0.232	0.255	0.292	0.307	0.332	0.35	0.367			
7/16"Ø	0.059	0.093	0.131	0.183	0.221	0.252	0.278	0.321	0.338	0.367	0.39	0.415			
0.5"Ø	0.063	0.099	0.14	0.196	0.237	0.271	0.3	0.347	0.367	0.4	0.427	0.458	0.496		
0.625"Ø	0.071	0.111	0.157	0.22	0.267	0.306	0.339	0.394	0.418	0.458	0.492	0.534	0.597	0.624	
0.75"Ø	0.077	0.122	0.172	0.242	0.294	0.337	0.374	0.436	0.463	0.51	0.55	0.6	0.683	0.735	0.748

Ballnose Effective Diameter (With 15° Tilt)

Cutting Diameter	Axial Depth of Cut												
	0.002	0.005	0.010	0.020	0.030	0.040	0.050	0.070	0.080	0.100	0.120	0.220	0.260
0.02	0.016	0.019											
1/32"Ø	0.022	0.028	0.031										
1/16"Ø	0.036	0.046	0.055	0.062									
3/32"Ø	0.049	0.062	0.075	0.088	0.093								
1/8"Ø	0.062	0.077	0.093	0.111	0.12	0.124							
5/32"Ø	0.073	0.091	0.109	0.131	0.144	0.151	0.155						
3/16"Ø	0.085	0.104	0.125	0.15	0.166	0.176	0.183						
1/4"Ø	0.107	0.13	0.154	0.185	0.206	0.221	0.232	0.245	0.249				
5/16"Ø	0.128	0.154	0.182	0.218	0.243	0.262	0.276	0.296	0.303	0.311			
3/8"Ø	0.149	0.178	0.209	0.249	0.278	0.3	0.317	0.343	0.352	0.366	0.373		
7/16"Ø	0.169	0.2	0.234	0.279	0.311	0.336	0.356	0.387	0.399	0.416	0.428		
0.5"Ø	0.189	0.223	0.259	0.308	0.343	0.371	0.393	0.428	0.442	0.464	0.48		
0.625"Ø	0.229	0.267	0.308	0.364	0.404	0.437	0.463	0.506	0.524	0.553	0.575	0.625	
0.75"Ø	0.268	0.309	0.355	0.417	0.463	0.499	0.53	0.579	0.6	0.635	0.663	0.74	0.749

Calculate Effective Diameter based on a specific tilt angle:

$$D \times \sin\left[\textit{Tilt Angle} + \arccos\left(\frac{D-2 \times ADOC}{}\right)\right]$$

Calculate your compensated RPM:

$$\frac{SFM \times 3.82}{\text{Effective Diameter}}$$

Example: 1/8" ballnose has a recommended SFM of 200. At 15° of tilt and an ADOC of 0.01", the effective cutting diameter is 0.093"Ø
Using the effective diameter, the RPM is increased from 6112, to 8215.

Please note, this is only to compensate for RPM. It is still recommended to use the nominal diameter IPT recommendations.