



TOOLING CATALOG

CARBIDE FOR METAL CUTTING, MINING AND WEAR

REV 2-21

HEADQUARTERS | OAK HILL, WV | 304-469-4721 | WWW.XCALINDUSTRIES.COM

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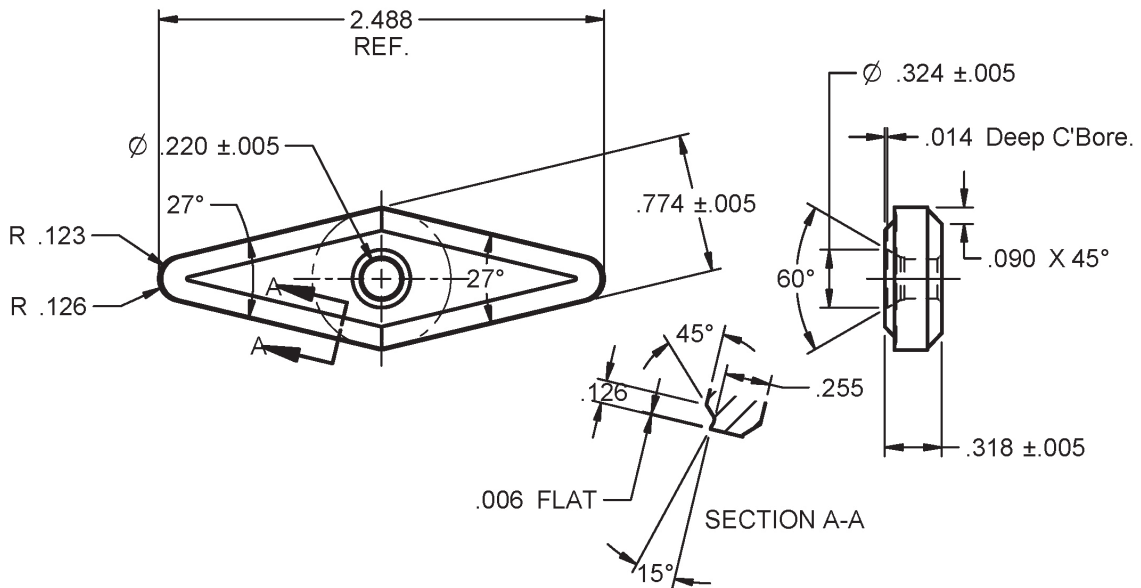
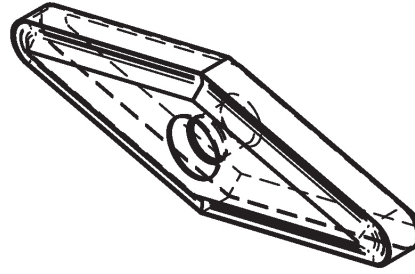
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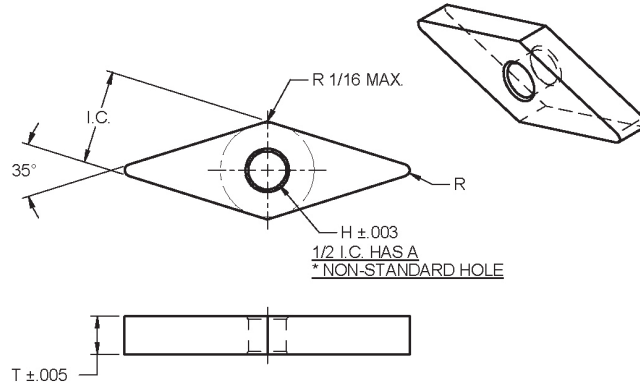
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LX-1291-2 (MA-69025)

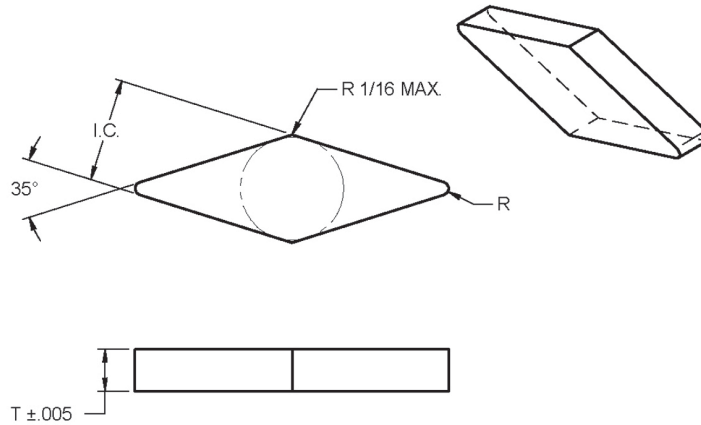


VNSA



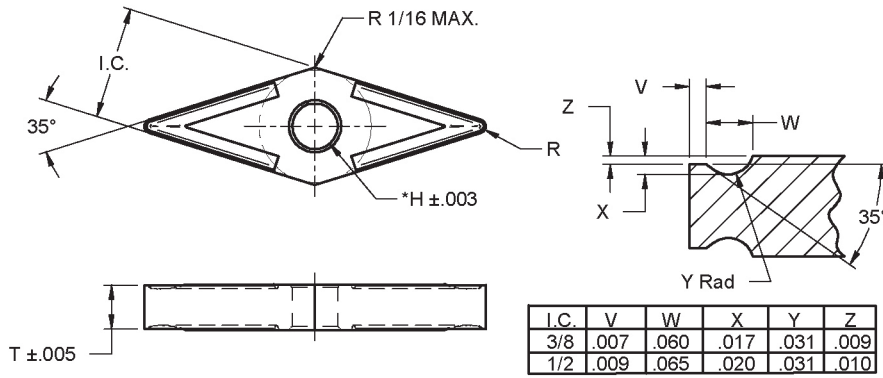
Insert	I.C.	T	R	H	Notes
VNSA332	.375 ±.002	.203	1/32	.150	
VNSA333	.375 ±.002	.203	3/64	.150	
*VNSA432	.500 ±.003	.265	1/32	.231	*Non-Standard
*VNSA442	.500 ±.003	.265	1/32	.231	*Non-Standard
*VNSA443	.500 ±.003	.265	3/64	.231	*Non-Standard

VNR



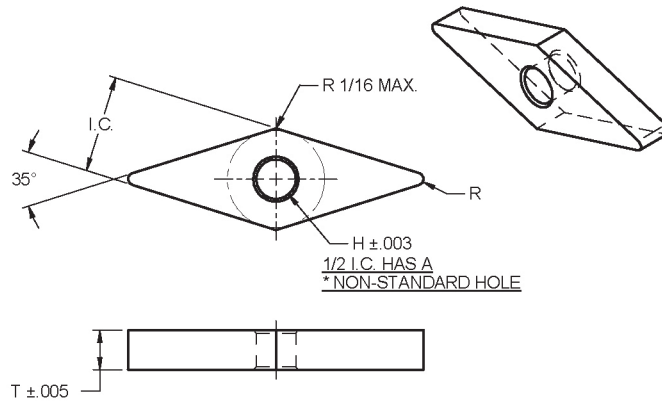
Insert	I.C.	T	R
VNR331	.395 ±.005	.203	1/64
VNR332	.395 ±.005	.203	1/32
VNR441	.520 ±.005	.265	1/64
VNR442	.520 ±.005	.265	1/32

VNSG



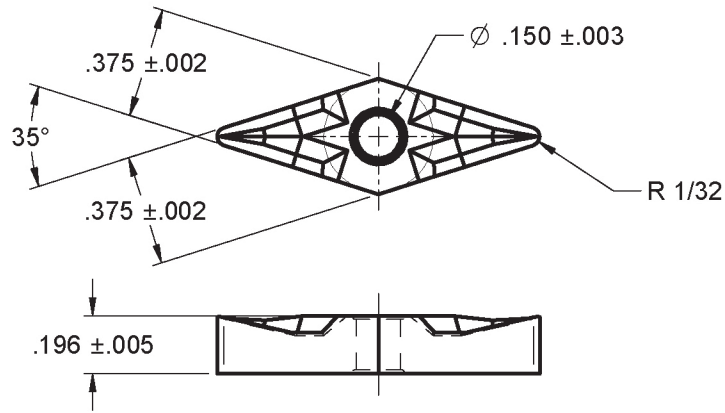
Insert	I.C.	T	R	H		Notes
VNSG322	.375 ±.002	.143	1/32	.150		
VNSG332	.375 ±.002	.205	1/32	.150		
VNSG432	.500 ±.003	.203	1/32	.203		
*VNSG433.231H	.500 ±.003	.206	3/64	*.231	*Non-	Standard
*VNSG434.231H	.500 ±.003	.206	1/16	*.231	*Non-	Standard

VNRA



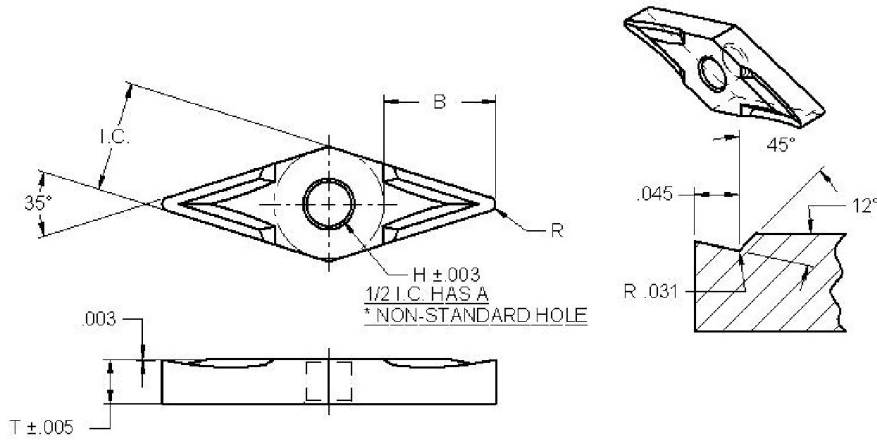
Insert	I.C.	T	R	H		Notes
VNRA331	.395 ±.005	.203	1/64	.150		
VNRA332	.395 ±.005	.203	1/32	.150		
VNRA333	.395 ±.005	.203	3/64	.150		
VNRA431	.520 ±.005	.203	1/64	.203		
*VNRA432.231H	.520 ±.005	.203	1/32	.231	*Non-	Standard
VNRA441	.520 ±.005	.265	1/64	.203		
*VNRA442.231H	.520 ±.005	.265	1/32	.231	*Non-	Standard

VNSS



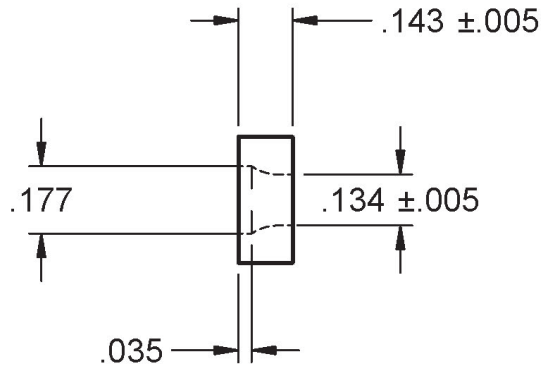
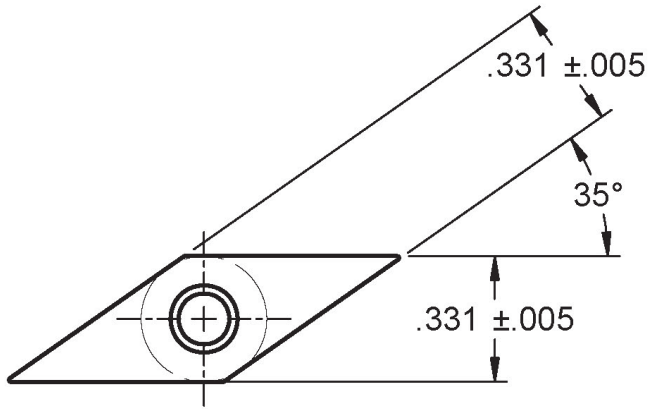
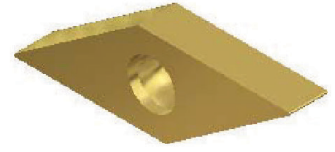
Insert	I.C.	B	T	R	H
VNMS322	.375 ±.002	.363	.134	1/32	.150
VNMS332	.375 ±.002	.363	.196	1/32	.150

VNSP (VNRP)

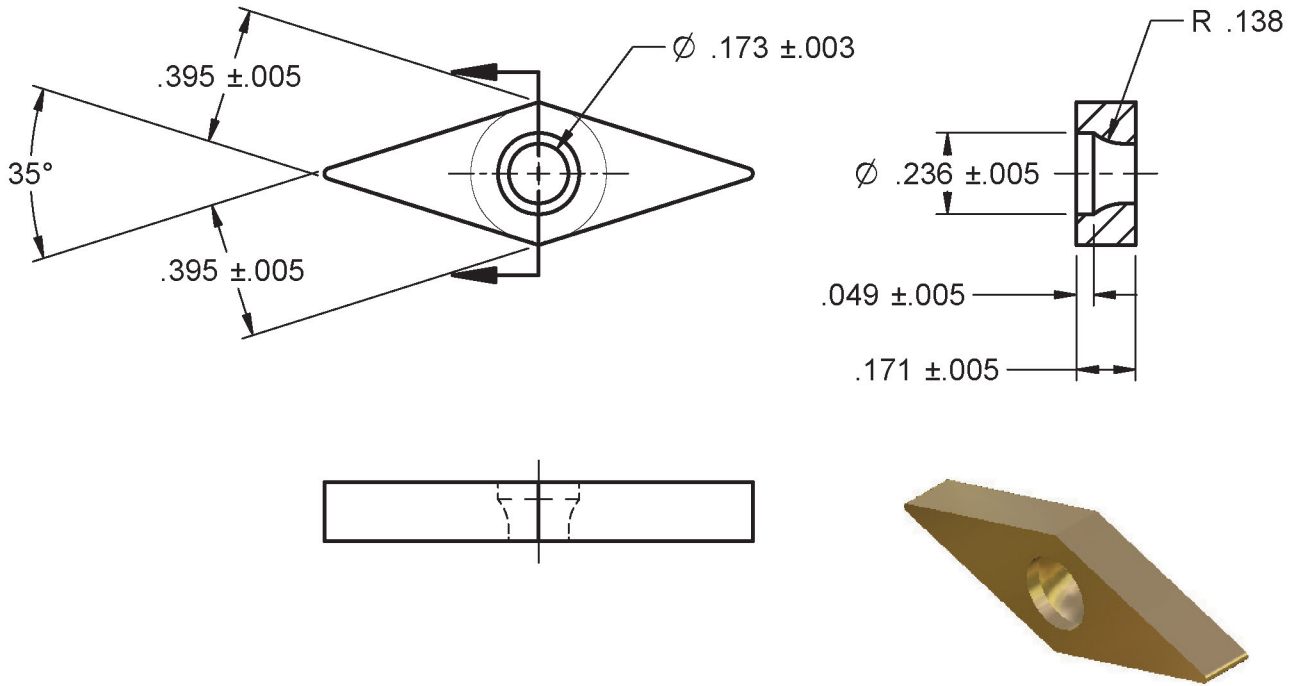


Insert	I.C.	B	T	R	H	Notes
VNRP321	.395 ±.005	.399	.138	.026	.150	
VNSP322	.375 ±.002	.363	.134	1/32	.150	
VNRP331	.395 ±.005	.399	.201	.026	.150	
VNSP332	.375 ±.002	.363	.196	1/32	.150	
*VNSP433	.500 ±.003	.472	.196	3/64	.231	*Non-Standard

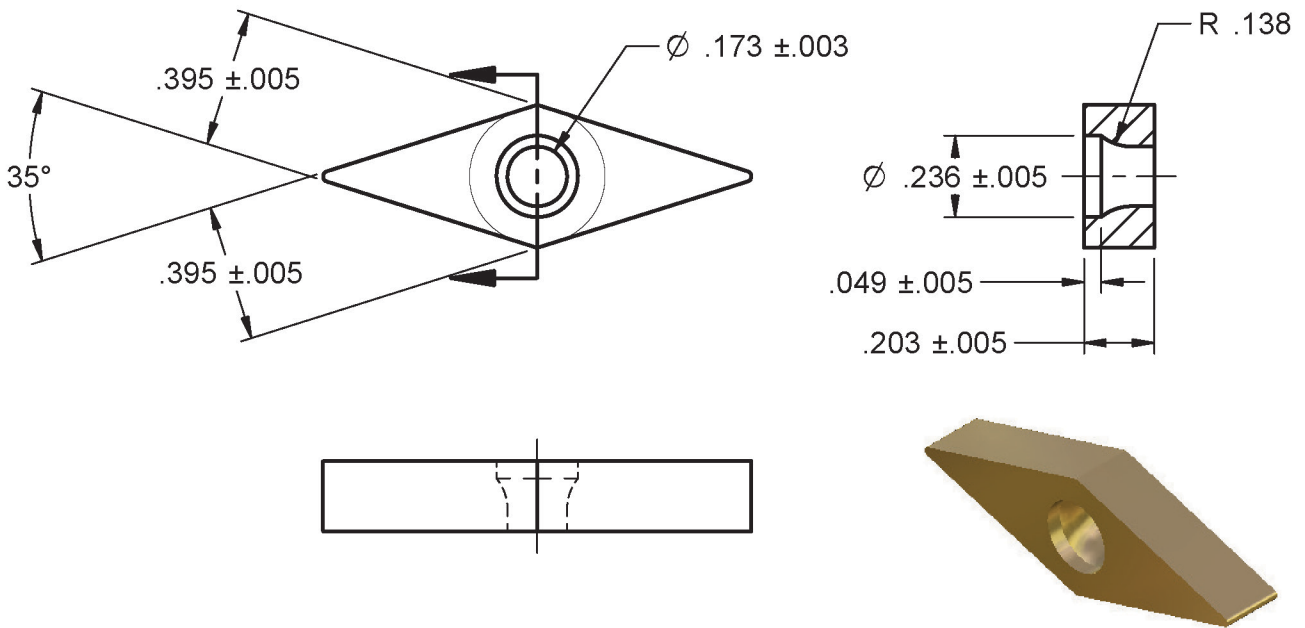
VNRW2.520



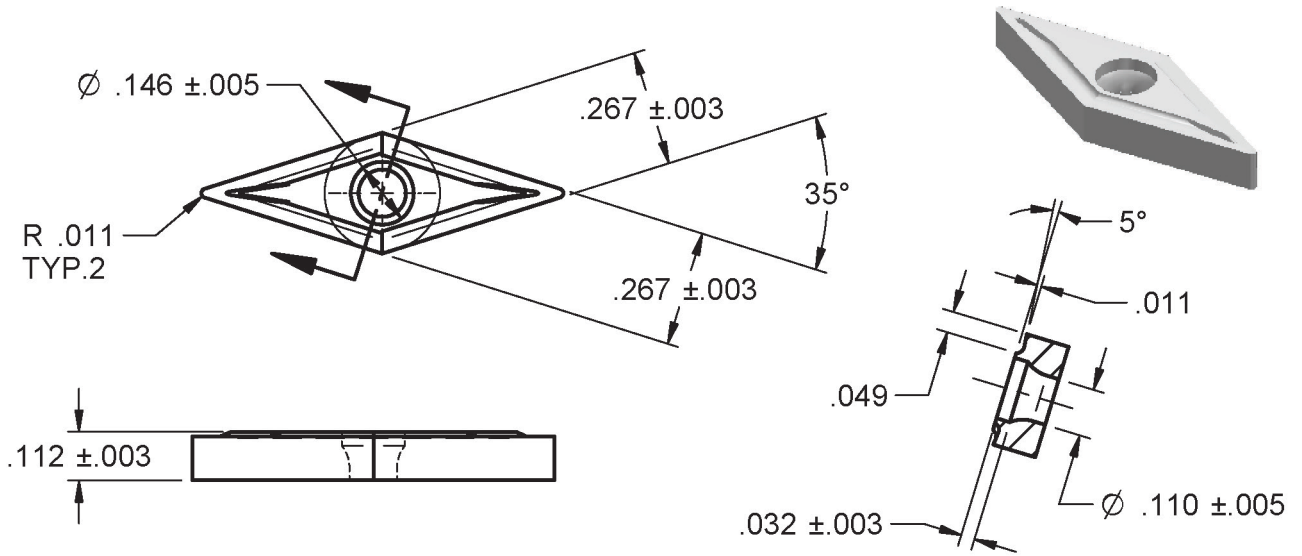
VNRW32.51



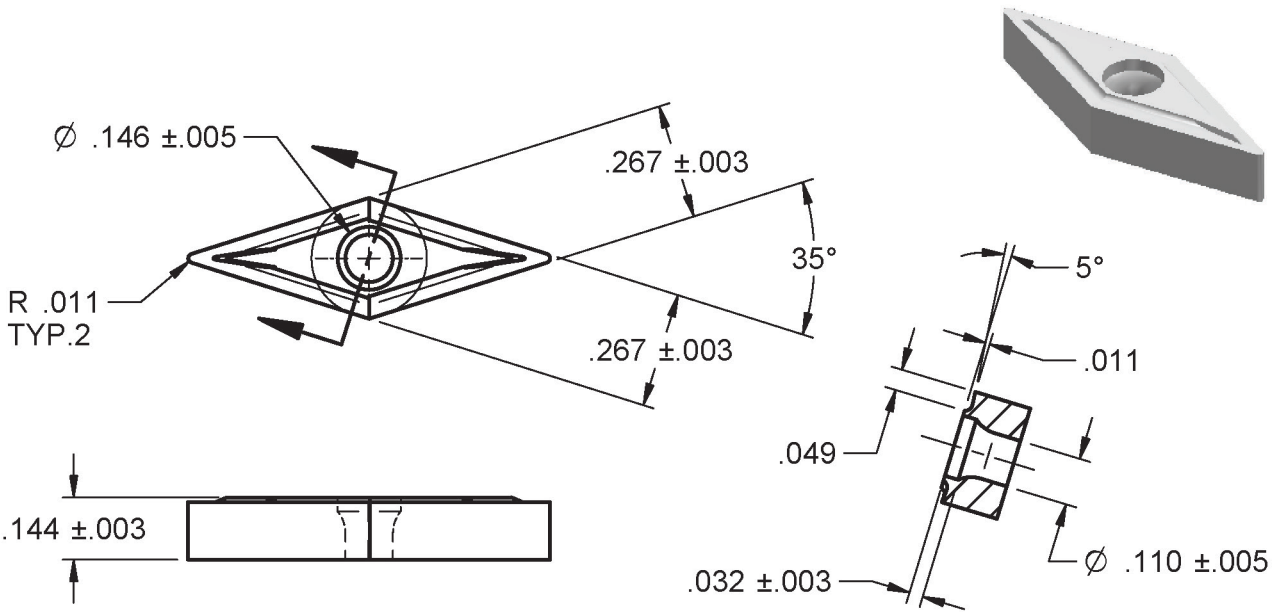
VNRW331



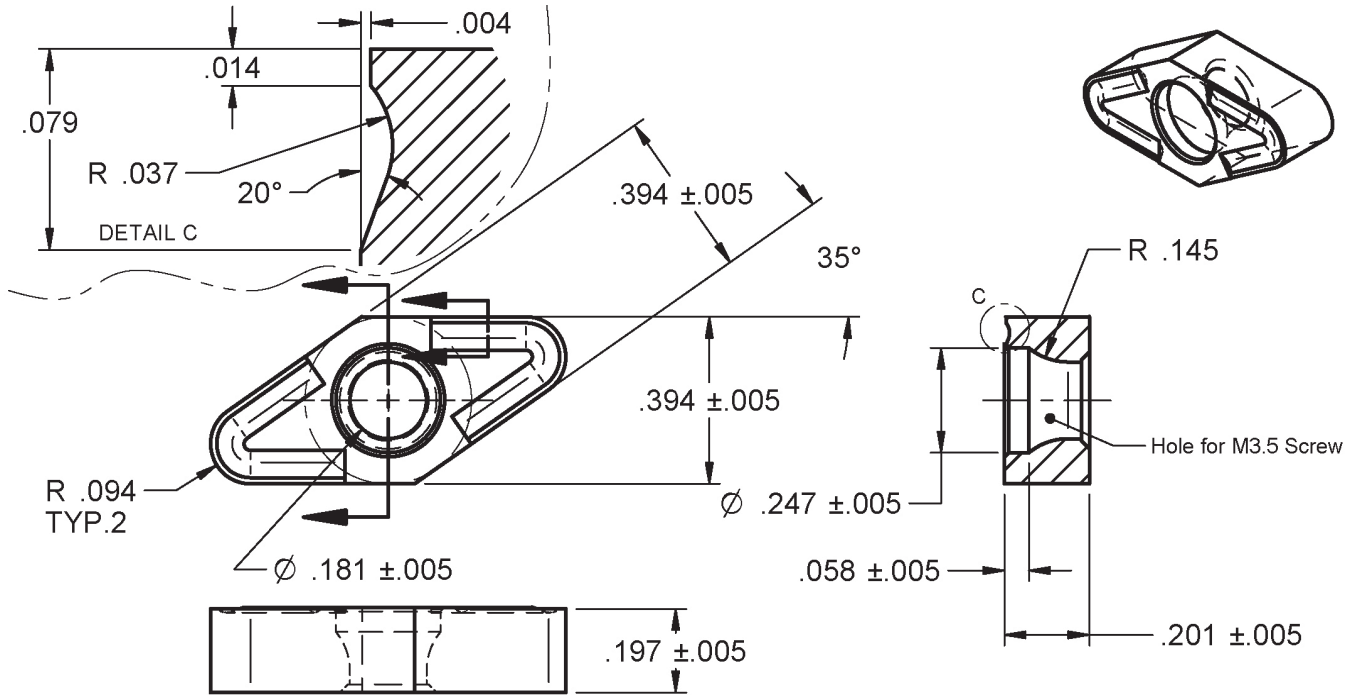
VNRT21.51-TM



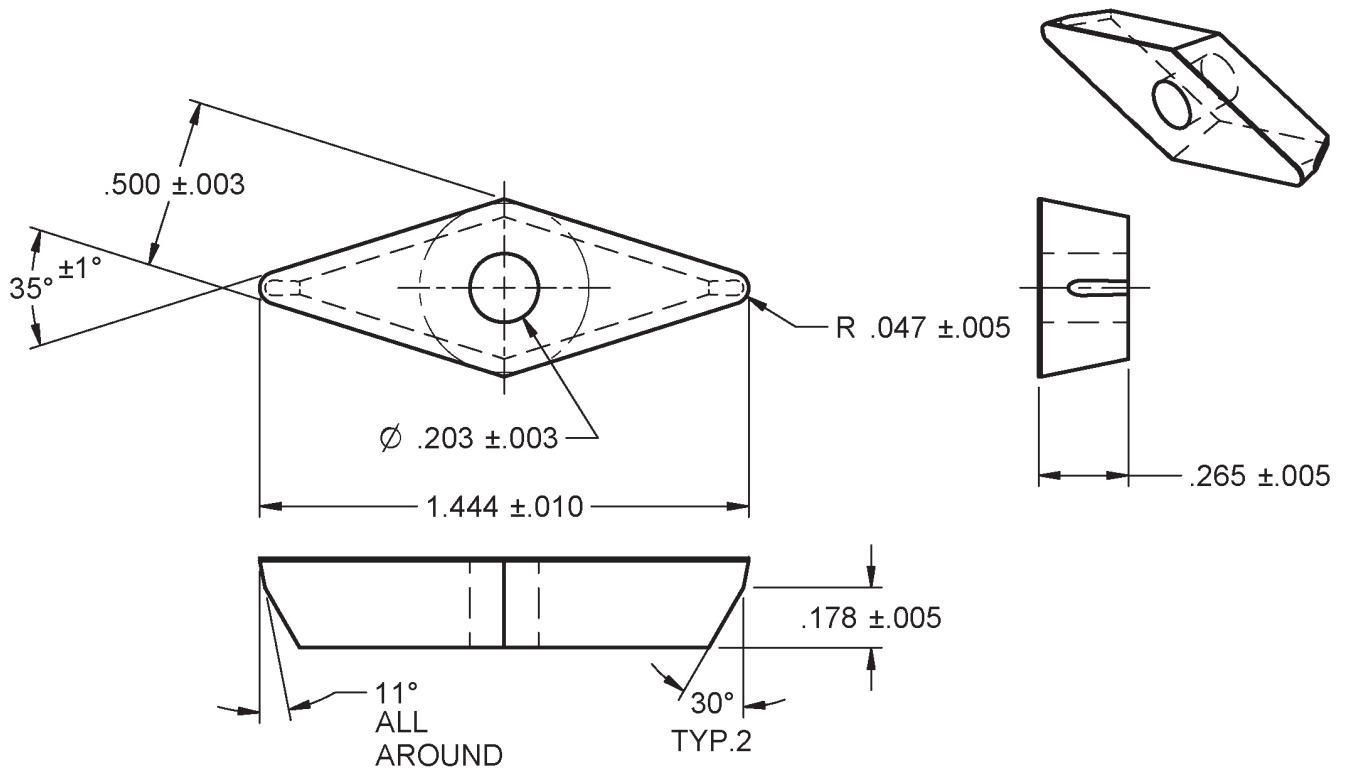
VNRT221-TM



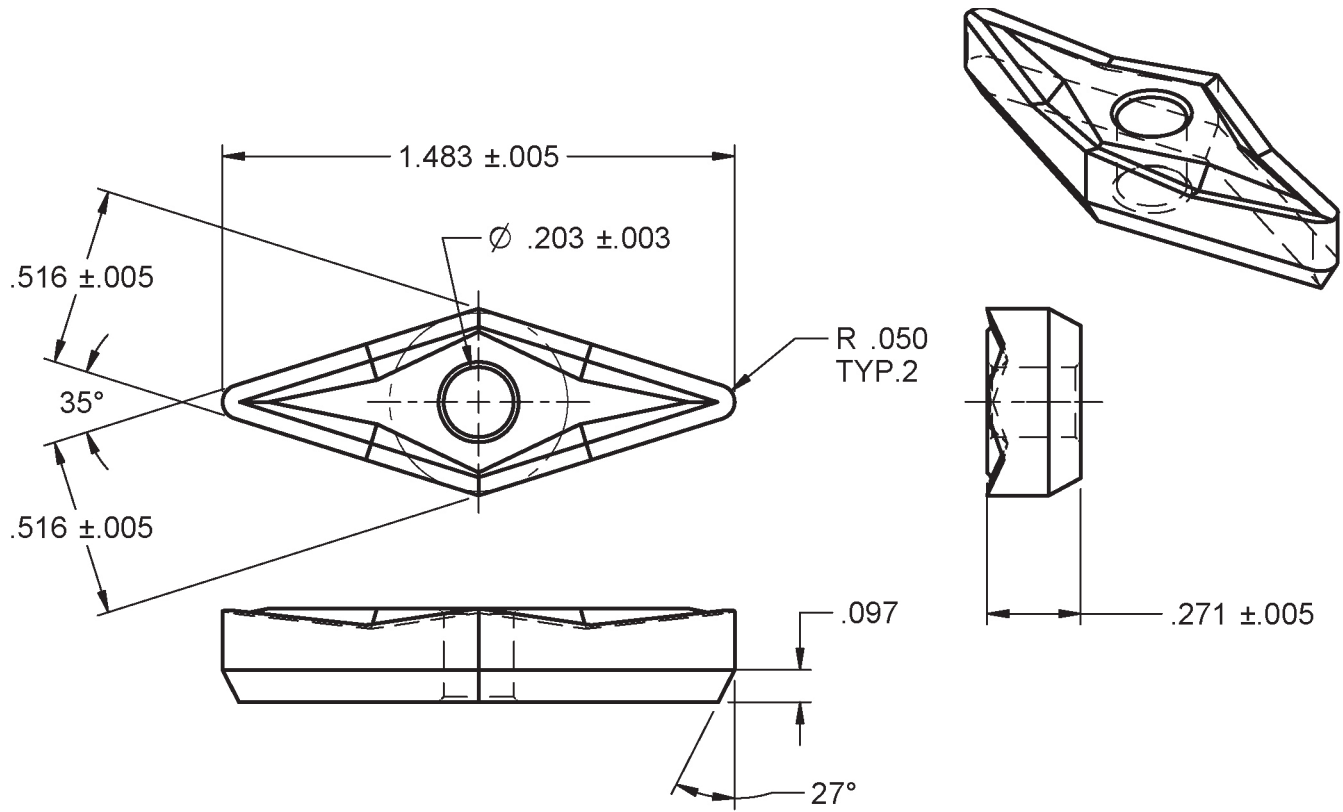
LX-0985-5 (VNRT336)



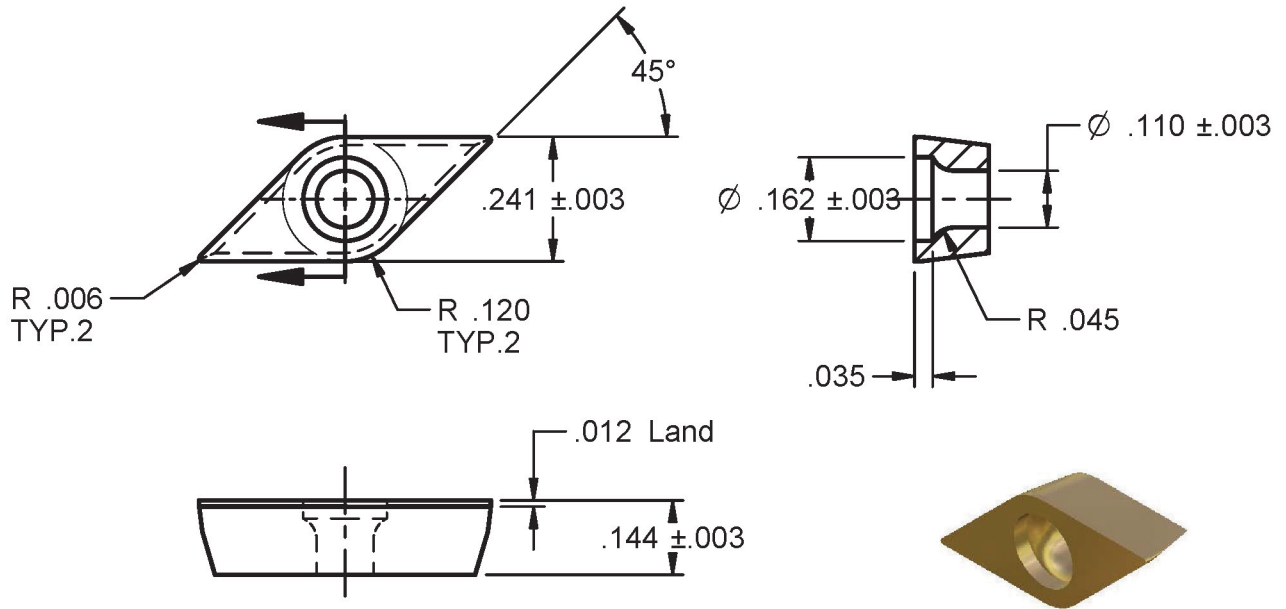
A-2496-A (VPSA443)



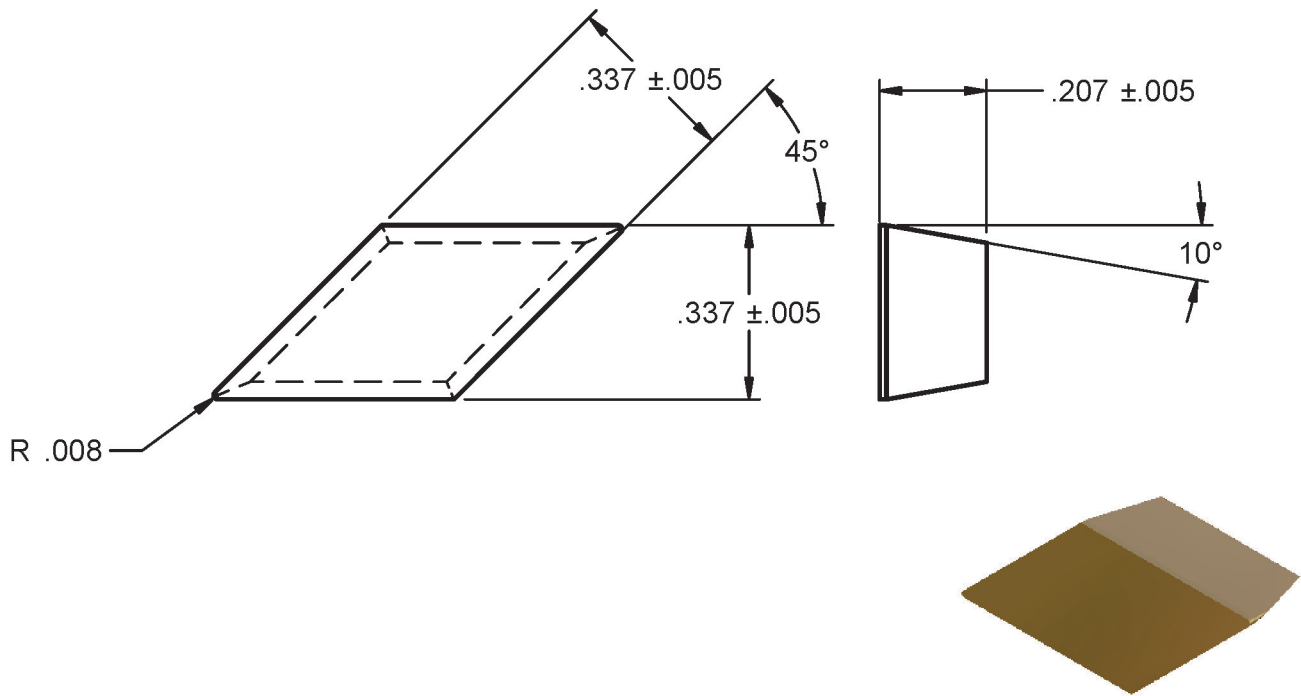
MA-71452 (VNRP443)



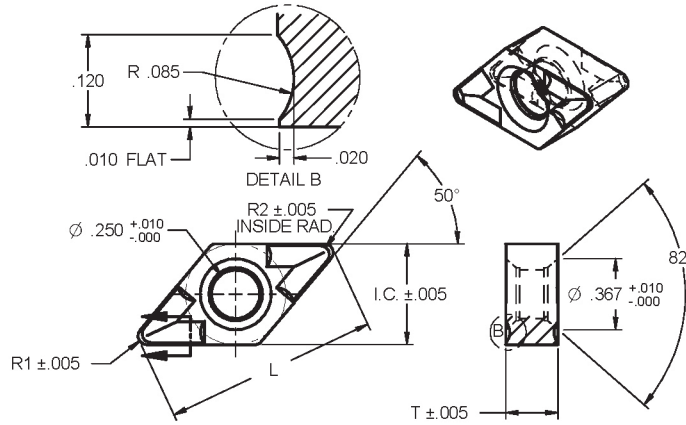
LX-1113-6 (MA-72285)



T-16241-B-8 (MA-1863)

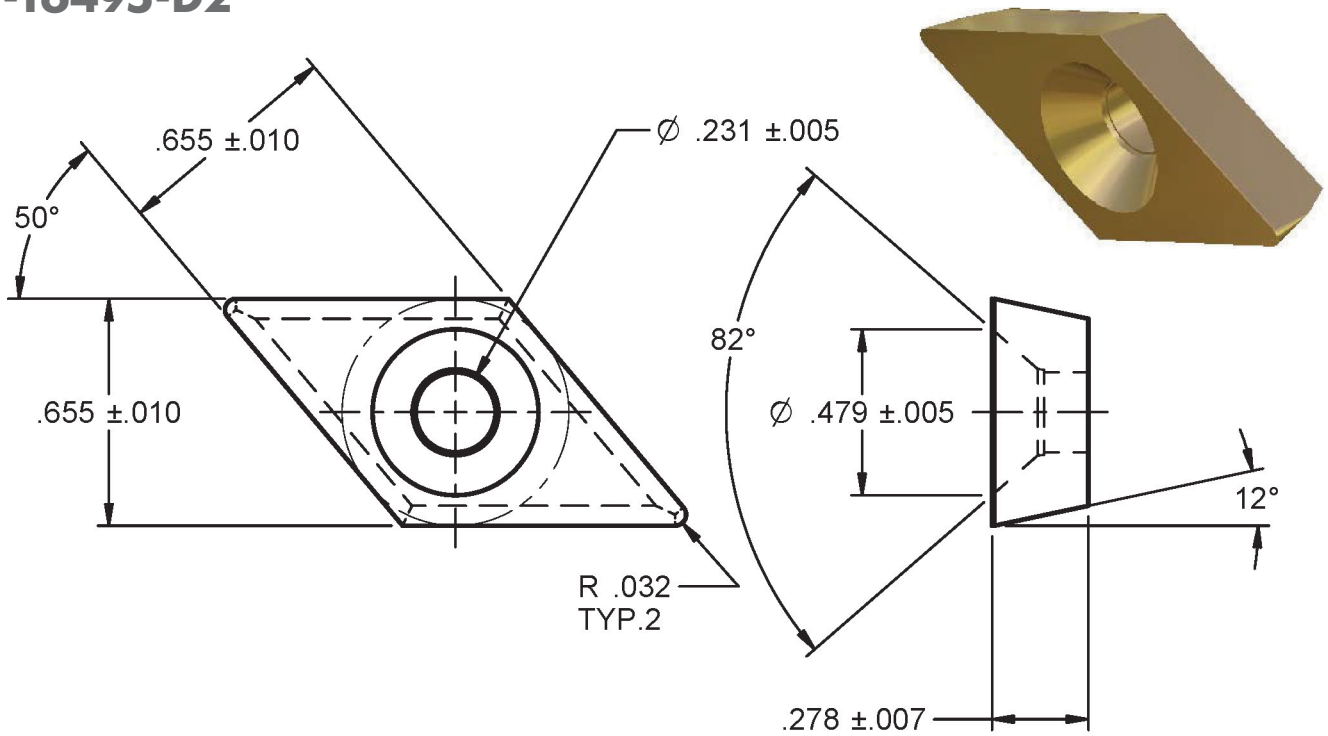


50° DIAMOND "J" STYLE

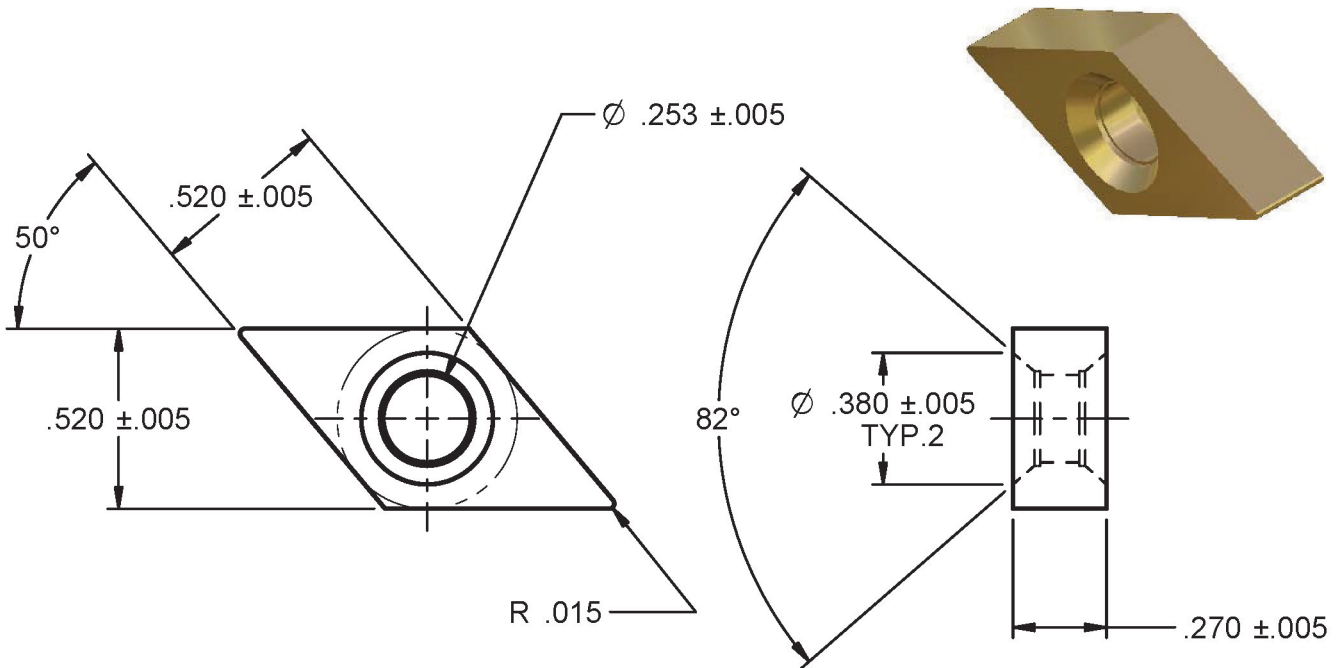


Insert	I.C.	T	R1	R2	L
A-1506-G	.520	.270	.015	.036	1.189
A-1678-C	.520	.270	.046	.051	1.105

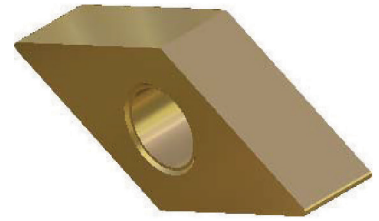
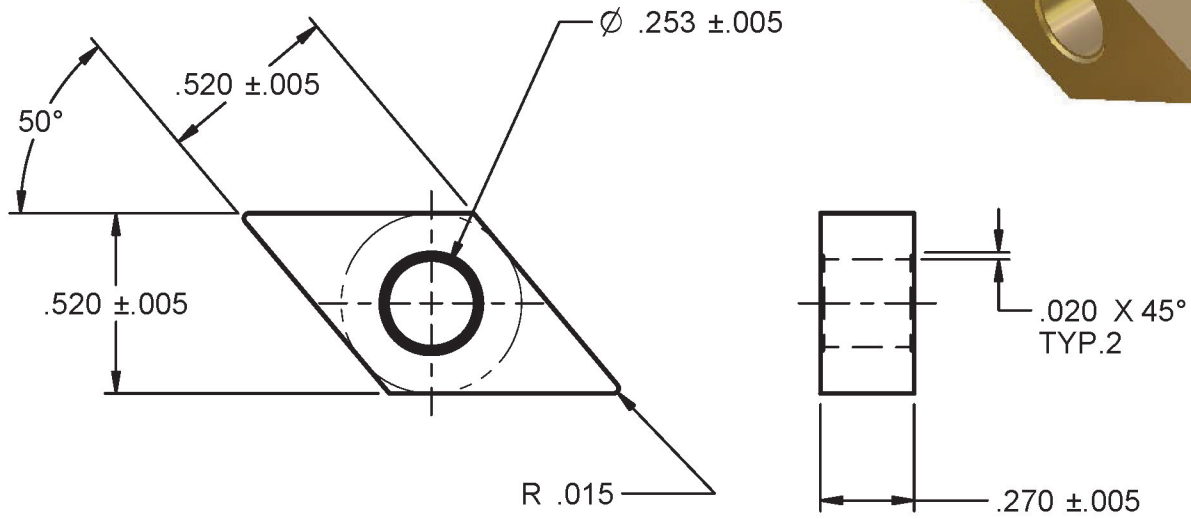
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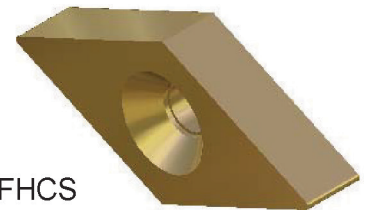
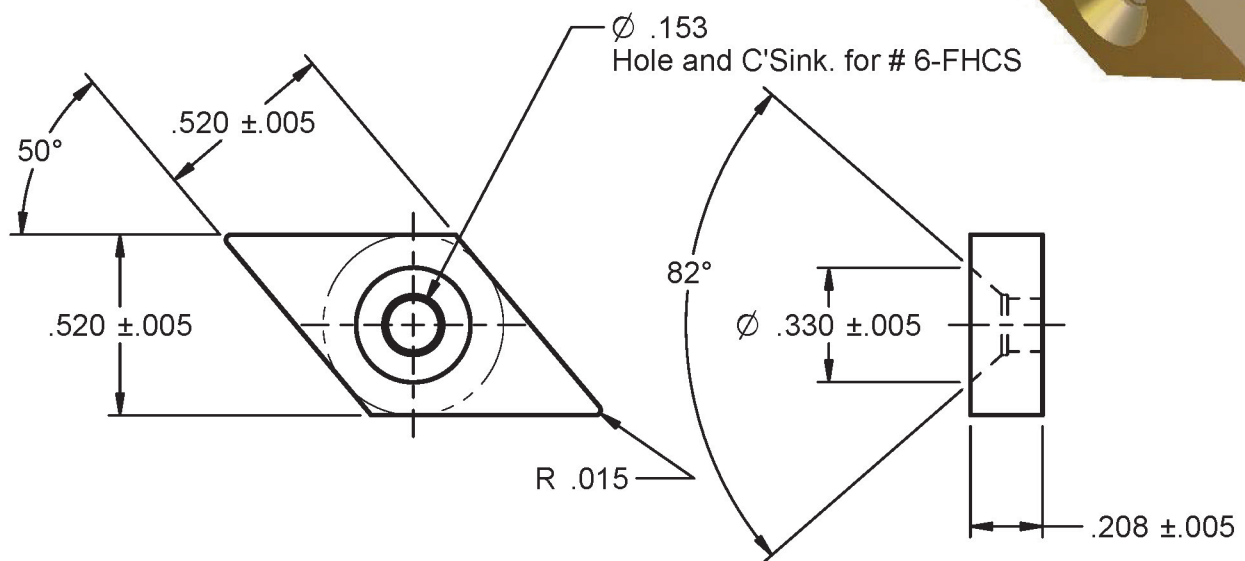
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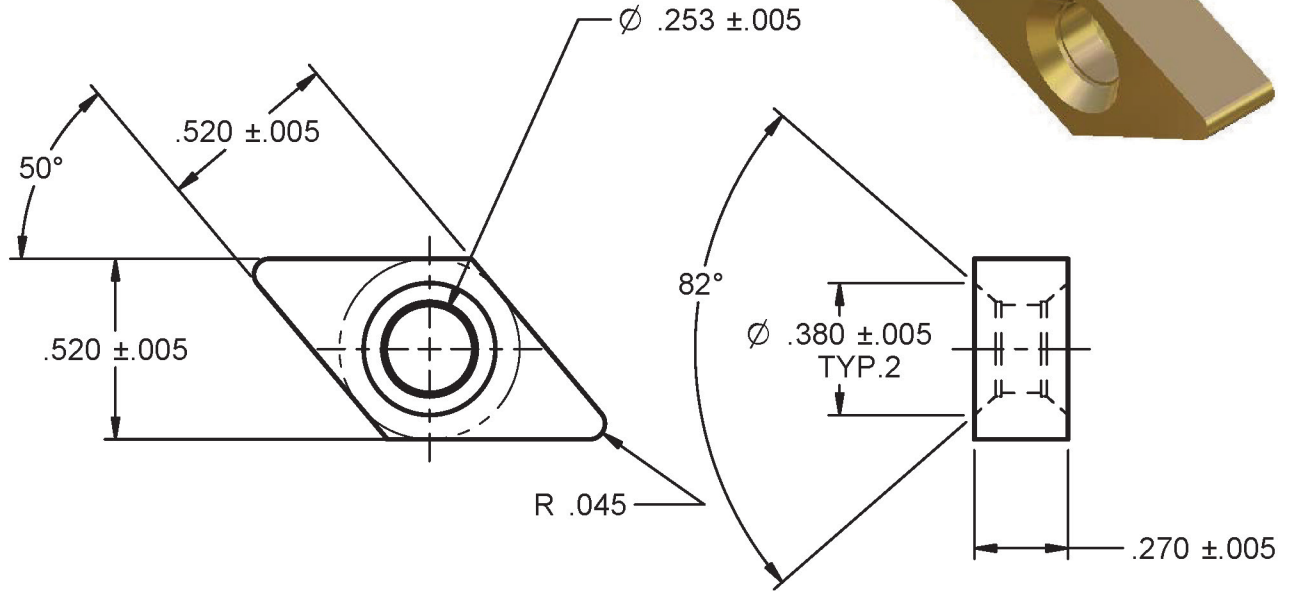
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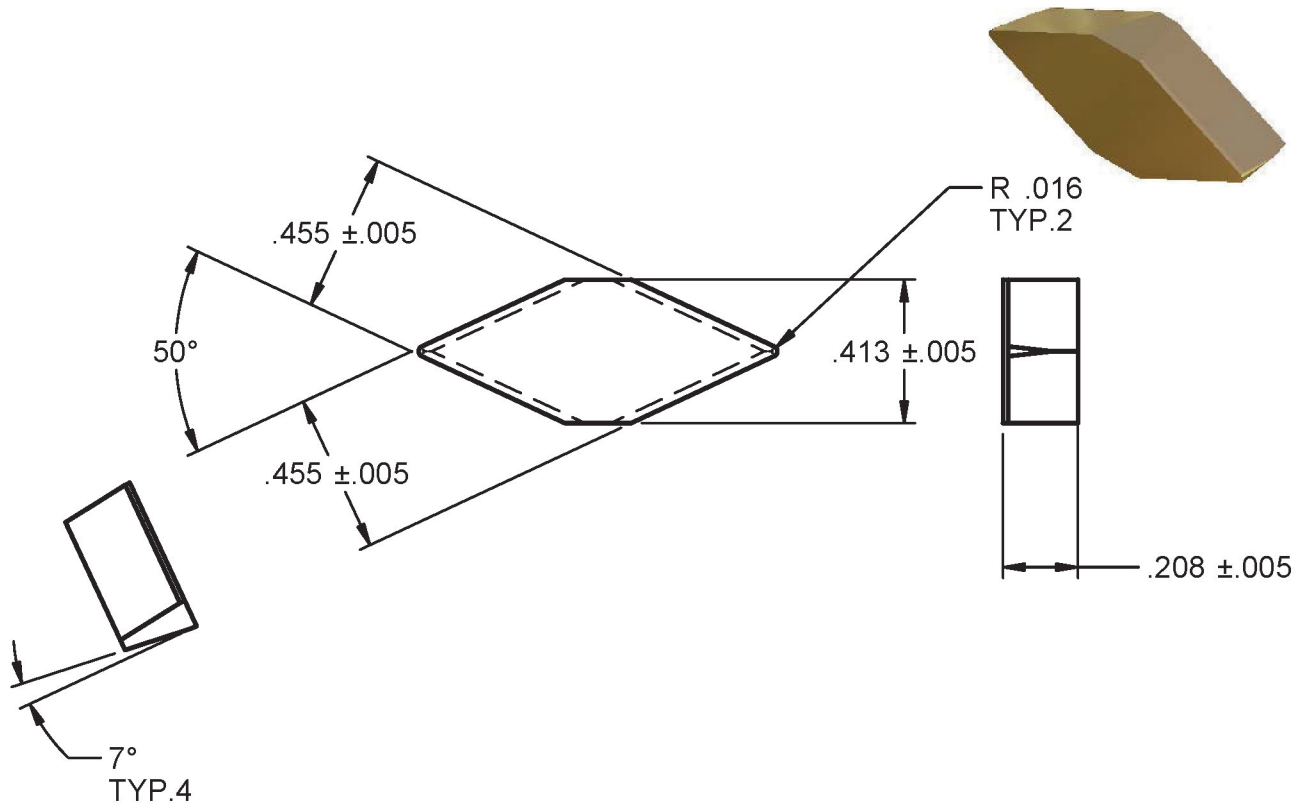
A-2171-B



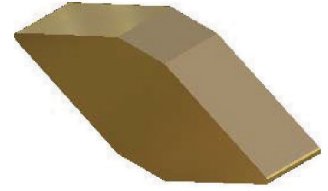
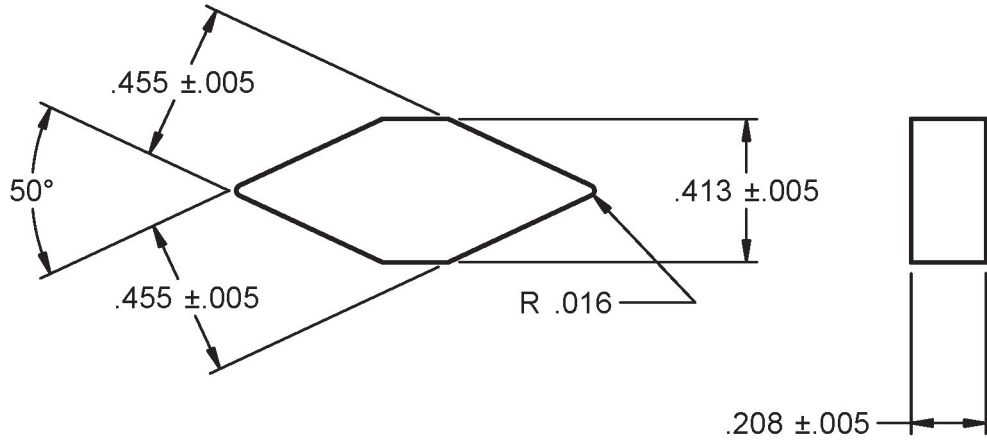
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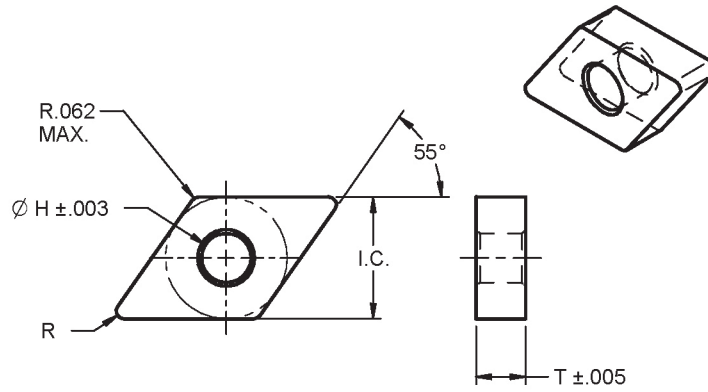
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T-16241-B-3

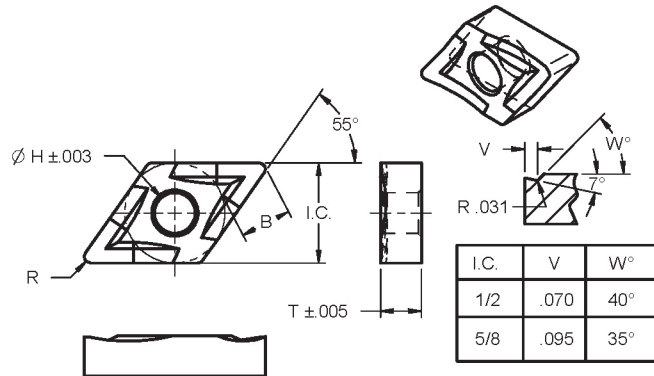


DNSA



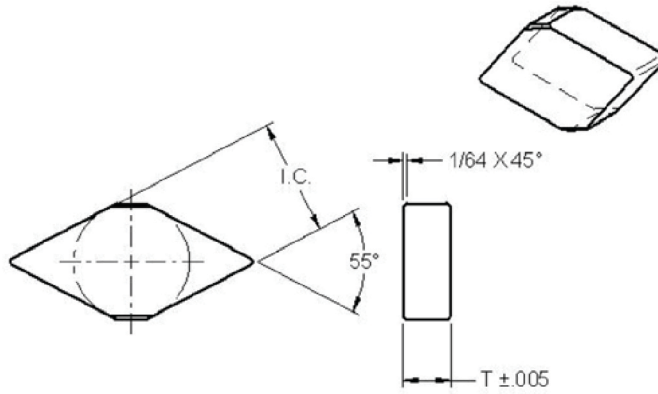
Insert	I.C.	T	R	H
DNSA431	.500 ±.003	.203	1/64	.203
DNSA432	.500 ±.003	.203	1/32	.203
DNSA441	.500 ±.003	.265	1/64	.203
DNSA442	.500 ±.003	.265	1/32	.203

DNSP



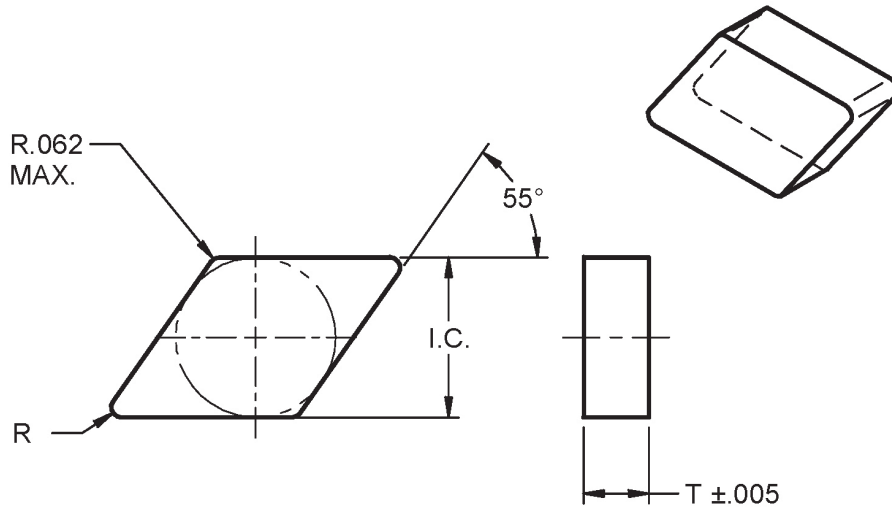
Insert	I.C.	B	T	R	H
DNSP431	.500 ±.003	.273	.196	1/64	.203
DNSP432	.500 ±.003	.255	.196	1/32	.203
DNSP434	.500 ±.003	.219	.196	1/16	.203
DNSP542	.625 ±.003	.328	.260	1/32	.253
DNSP543	.625 ±.003	.310	.260	3/64	.253

DTF533



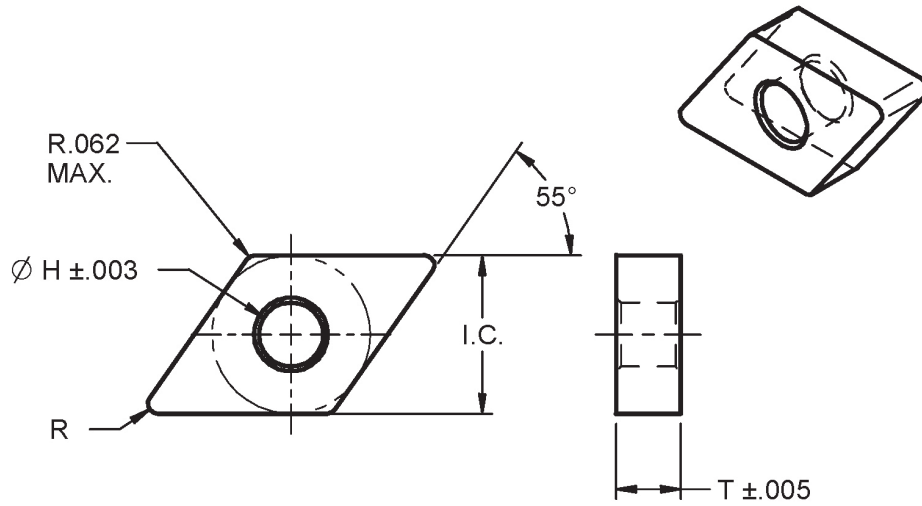
Insert	I.C.	T	R
DTF553P1	.482 ±.005	.203	1/64
DTF553P2	.482 ±.005	.203	1/32
DTF553P3	.482 ±.005	.203	3/64
DTF553P4	.482 ±.005	.203	1/16

DNR



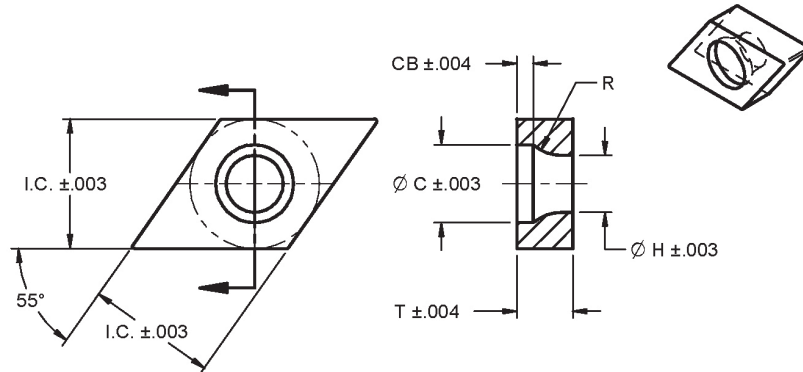
Insert	I.C.	T	R
DNR421	.518 ±.005	.140	.012
DNR422	.518 ±.005	.140	1/32
DNR423	.518 ±.005	.203	3/64
DNR431	.518 ±.005	.203	1/64
DNR432	.518 ±.005	.203	1/32
DNR433	.515 ±.005	.203	3/64
DNR531	.642 ±.005	.203	1/64
DNR532	.642 ±.005	.203	1/32
DNR533	.642 ±.005	.203	3/64

DNRA



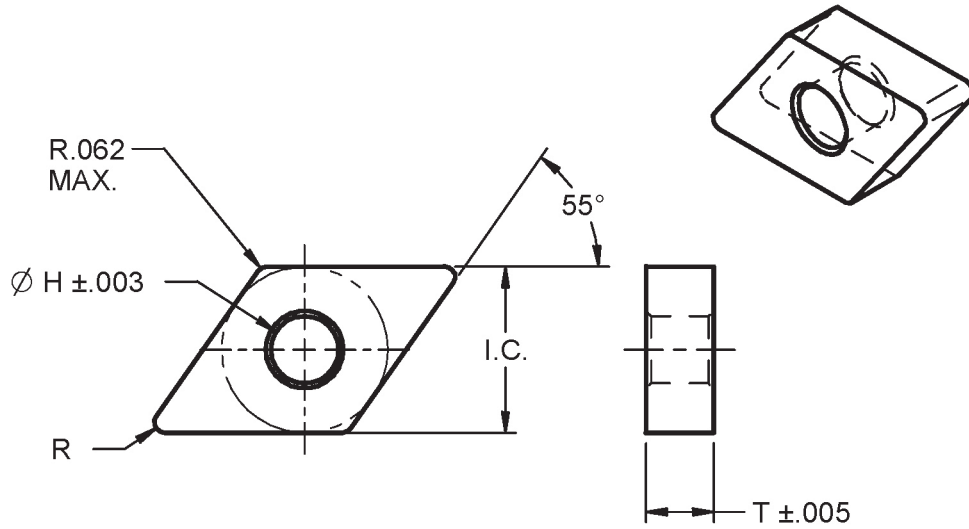
Insert	I.C.	T	R	H
DNRA2.522	.328 ±.005	.140	1/32	.150
DNRA320	.390 ±.005	.140	0	.150
DNRA330	.390 ±.005	.203	0	.150
DNRA324	.390 ±.005	.140	1/16	.150
DNRA334	.390 ±.005	.203	1/16	.150
DNRA326	.390 ±.005	.140	3/32	.150
DNRA336	.390 ±.005	.203	3/32	.150
DNRA431	.517 ±.005	.203	1/64	.203
DNRA432	.517 ±.005	.203	1/32	.203
DNRA433	.517 ±.005	.203	3/64	.203
DNRA532	.642 ±.007	.203	1/32	.253
DNRA533	.642 ±.007	.203	3/64	.253
DNRA540	.642 ±.007	.250	1/64	.253
DNRA542	.642 ±.007	.250	1/32	.253
DNRA543	.642 ±.007	.250	3/64	.253

DNRW



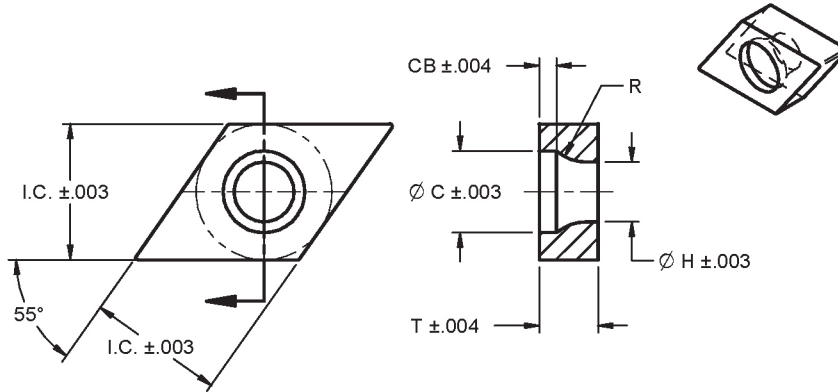
Insert	I.C.	T	H	C	CB	R	Notes
DNRW320	.392	.139	.173	.236	.049	.138	M3.5
DNRW32.50	.392	.170	.173	.236	.049	.138	M3.5
DNRW330	.392	.202	.173	.236	.049	.138	M3.5
DNRW431	.517	.202	.216	.295	.060	.177	M4.5 - M5
DNRW441	.517	.268	.216	.295	.060	.177	M4.5 - M5

DNRA



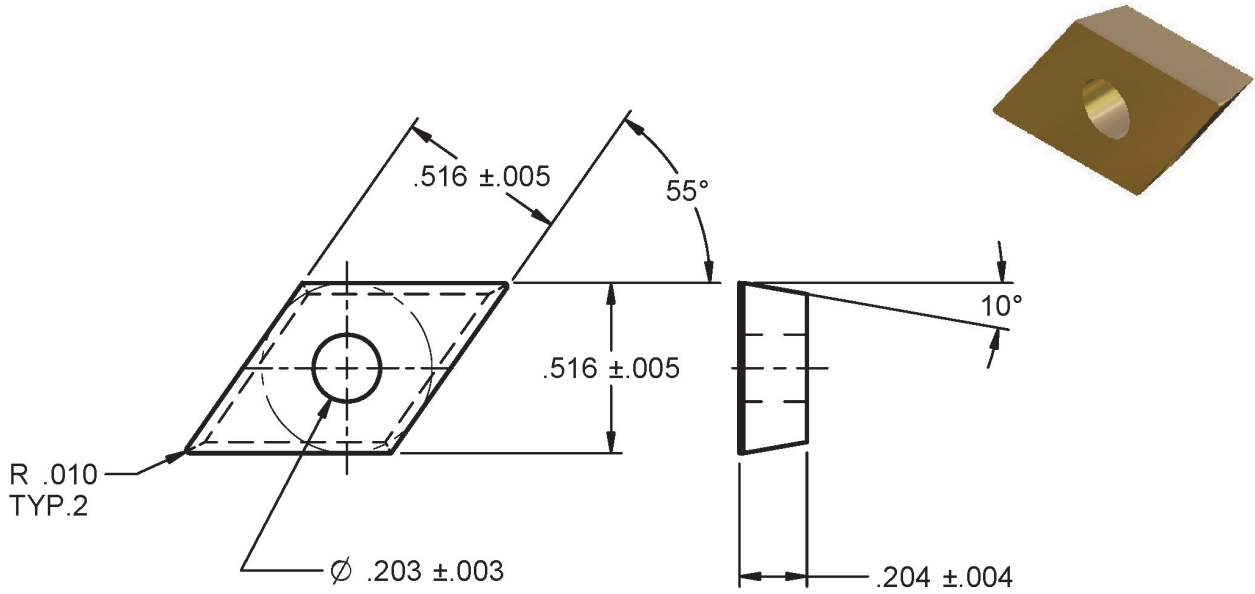
Insert	I.C.	T	R	H
DNRA2.522	.328 ±.005	.140	1/32	.150
DNRA320	.390 ±.005	.140	0	.150
DNRA330	.390 ±.005	.203	0	.150
DNRA324	.390 ±.005	.140	1/16	.150
DNRA334	.390 ±.005	.203	1/16	.150
DNRA326	.390 ±.005	.140	3/32	.150
DNRA336	.390 ±.005	.203	3/32	.150
DNRA431	.517 ±.005	.203	1/64	.203
DNRA432	.517 ±.005	.203	1/32	.203
DNRA433	.517 ±.005	.203	3/64	.203
DNRA532	.642 ±.007	.203	1/32	.253
DNRA533	.642 ±.007	.203	3/64	.253
DNRA540	.642 ±.007	.250	1/64	.253
DNRA542	.642 ±.007	.250	1/32	.253
DNRA543	.642 ±.007	.250	3/64	.253

DNRW

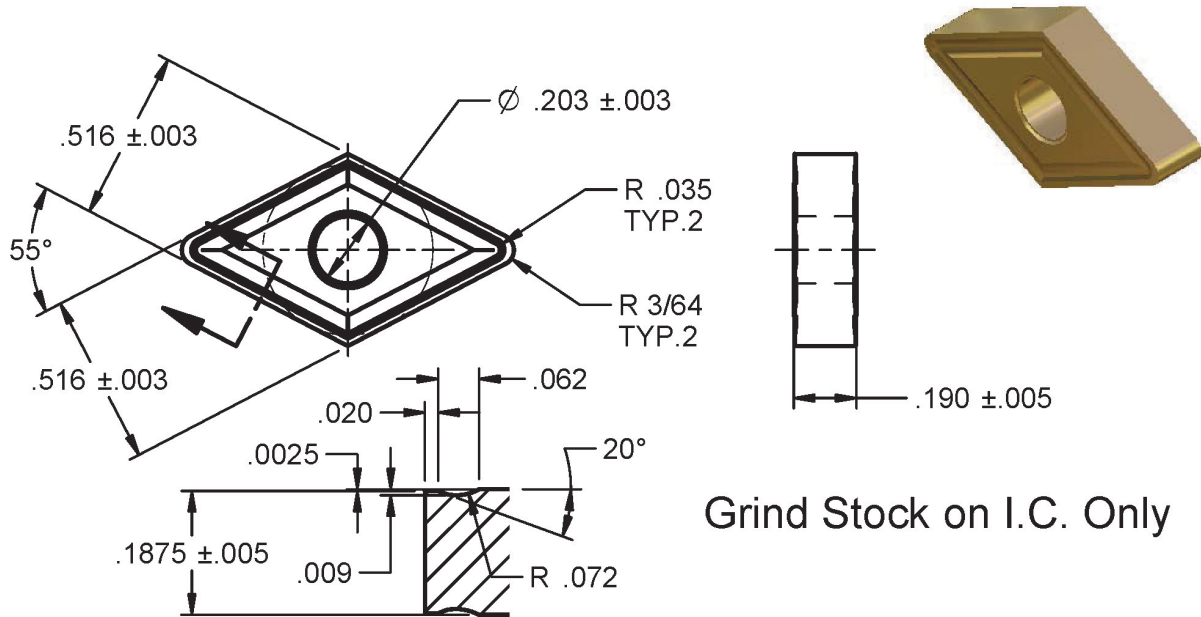


Insert	I.C.	T	H	C	CB	R	Notes
DNRW320	.392	.139	.173	.236	.049	.138	M3.5
DNRW32.50	.392	.170	.173	.236	.049	.138	M3.5
DNRW330	.392	.202	.173	.236	.049	.138	M3.5
DNRW431	.517	.202	.216	.295	.060	.177	M4.5 - M5
DNRW441	.517	.268	.216	.295	.060	.177	M4.5 - M5

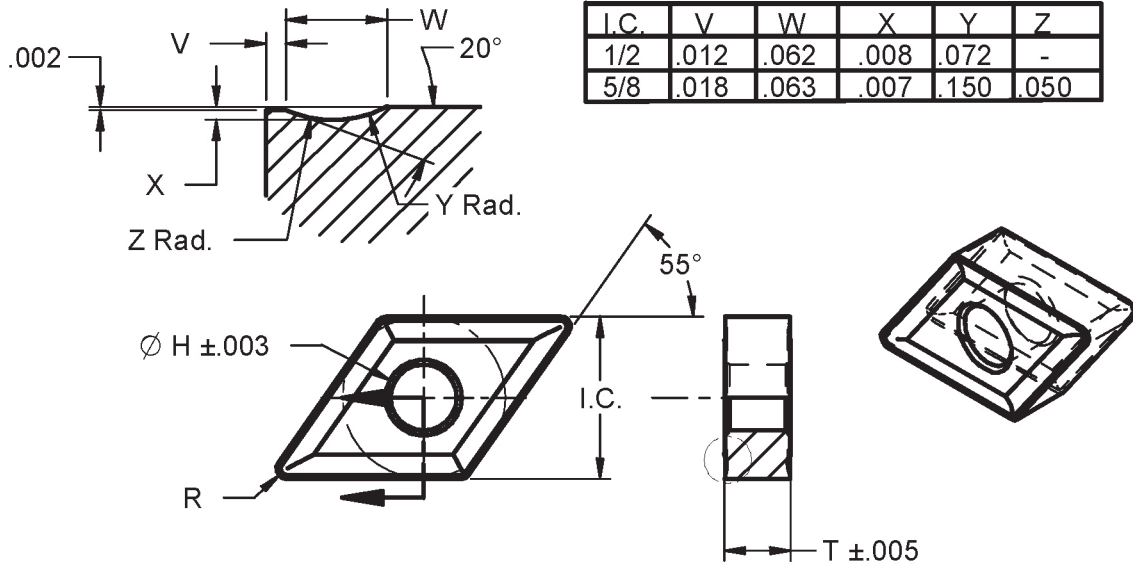
DPRA430



DNRG433

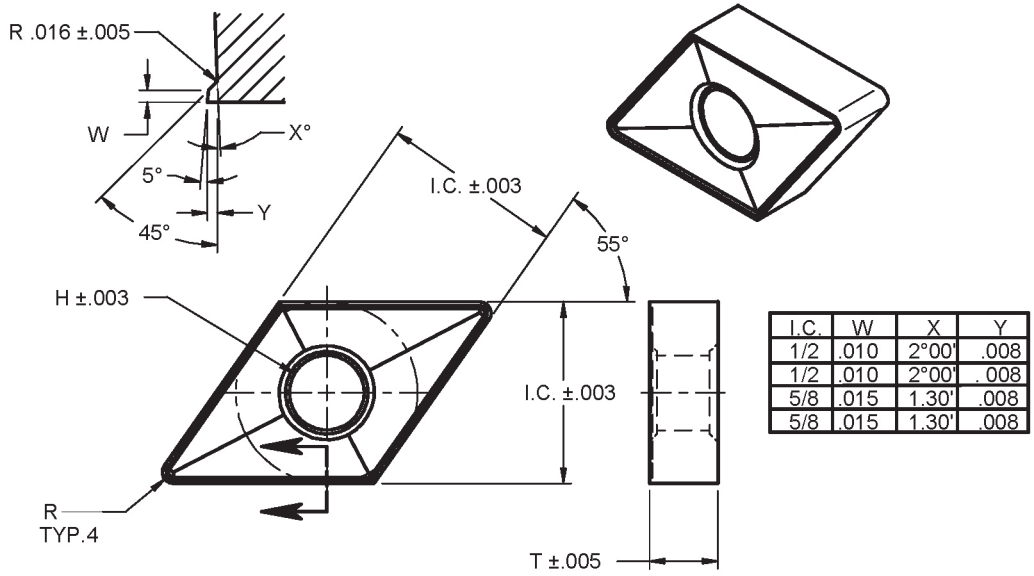


DNMG



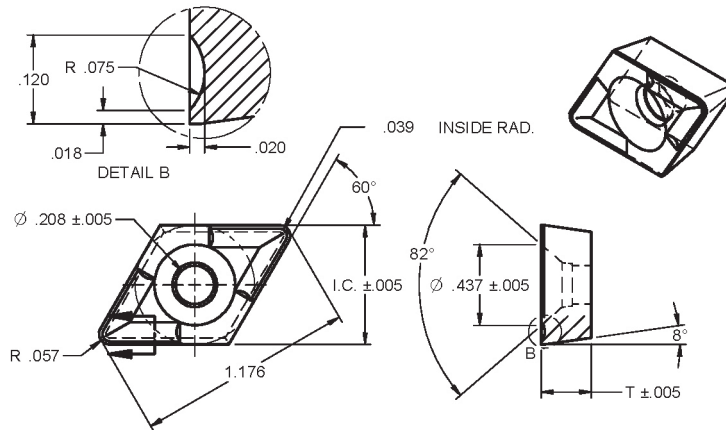
Insert	I.C.	T	R	H
DNMG431	.500 ±.003	.188	1/64	.203
DNMG432	.500 ±.003	.188	1/32	.203
DNMG423	.500 ±.003	.125	3/32	.203
DNMG433	.500 ±.003	.188	3/32	.203
DNMG441	.500 ±.003	.250	1/64	.203
DNMG442	.500 ±.003	.250	1/32	.203
DNMG443	.500 ±.003	.250	3/32	.203
DNMG532	.625 ±.003	.188	1/32	.253
DNMG533	.625 ±.003	.188	3/32	.253
DNMG542	.625 ±.003	.250	1/32	.253
DNMG543	.625 ±.003	.250	3/32	.253

DNSM



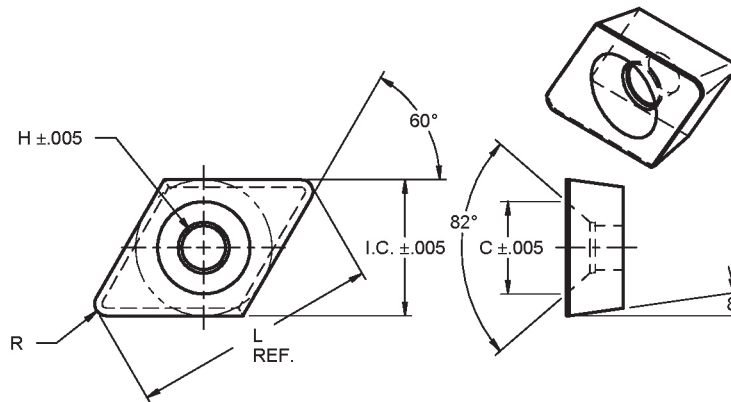
Insert	I.C.	T	R	H
DNSM432	.500	.196	1/32	.203
DNSM442	.500	.258	1/32	.203
DNSM433	.500	.196	3/64	.203
DNSM443	.500	.258	3/64	.203
DNSM542	.625	.258	1/32	.253
DNSM543	.625	.258	3/64	.253

60° Diamond "H" Style



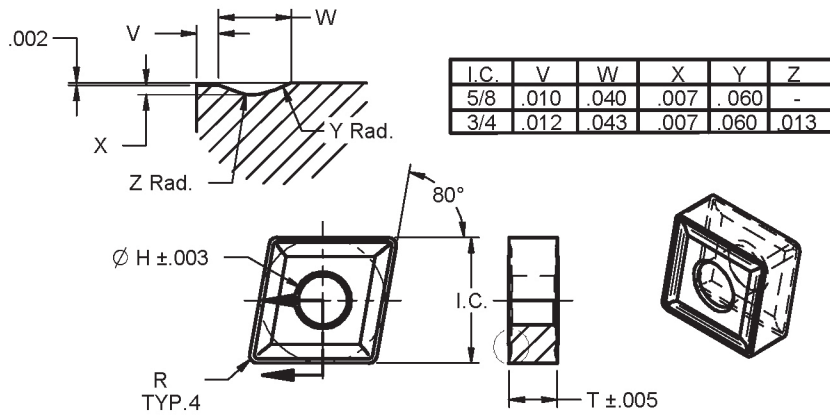
Insert	I.C.	T
A-2199-A	.645	.270

60° Diamond "B" Style



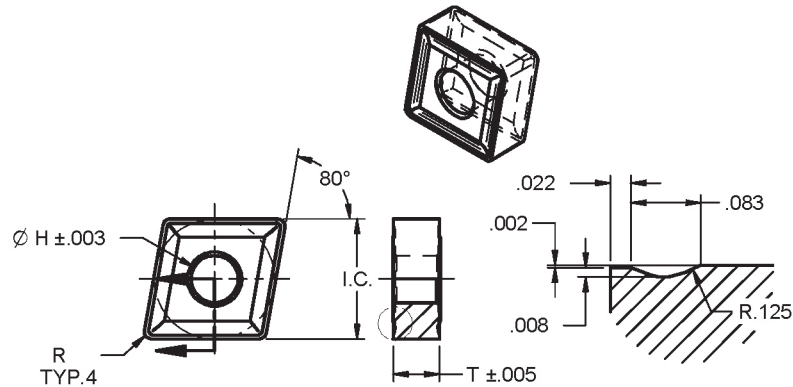
Insert	I.C.	T	R	L	H	C
T-17065-E-1	.525	.210	3/64	.956	.150	.348
T-17065-E-3	.643	.268	3/64	1.192	.205	.431

CNSG-N



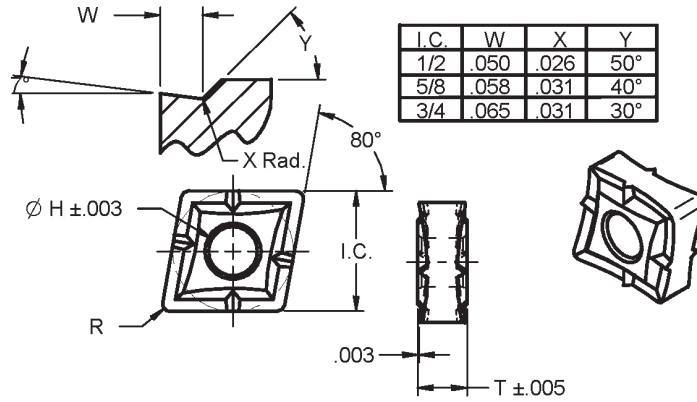
Insert	I.C	T	R	H	Notes
CNSG543N	.625 ±.003	.250	3/64	.253	Nar. Chip
CNSG544N	.625 ±.003	.250	1/16	.253	Nar. Chip
CNSG642N	.750 ±.003	.250	1/32	.313	Nar. Chip
CNSG643N	.750 ±.003	.250	3/64	.313	Nar. Chip

CNSG-W



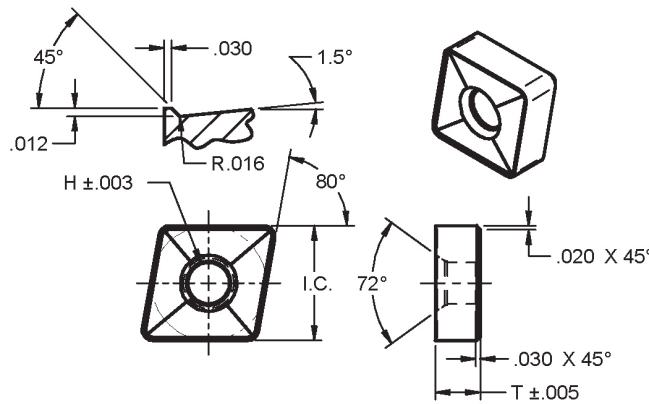
Insert	I.C.	T	R	H	Notes
CNSG643W	.750 ±.003	.250	3/64	.313	Wide
CNSG644W	.750 ±.003	.250	1/16	.313	Wide

CNSP



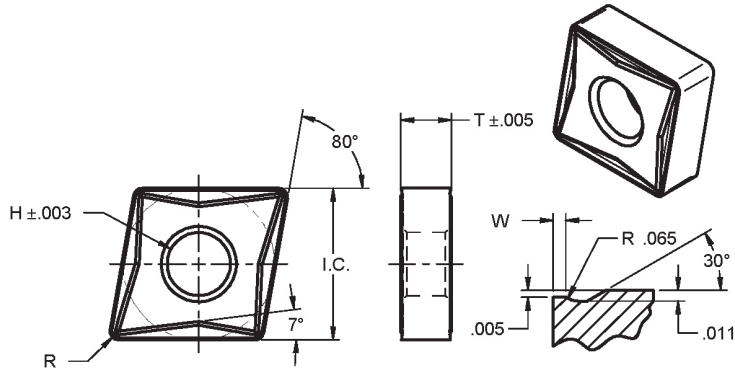
Insert	I.C.	T	R	H
CNSP432	.500 ±.003	.188	1/32	.203
CNSP543	.625 ±.003	.250	3/32	.253
CNSP642	.750 ±.003	.250	1/32	.313
CNSP643	.750 ±.003	.250	3/64	.313
CNSP644	.750 ±.003	.250	1/16	.313

CNSH



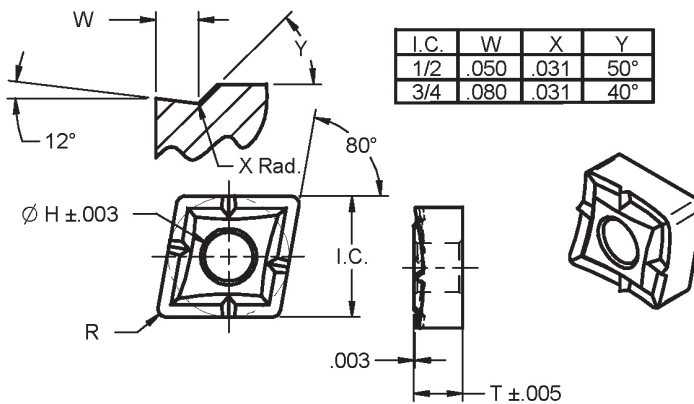
Insert	I.C.	T	R	H
CNSH864	1.000 ±.004	.390	1/16	.362
CNSH866	1.000 ±.004	.390	3/32	.362

CNMX



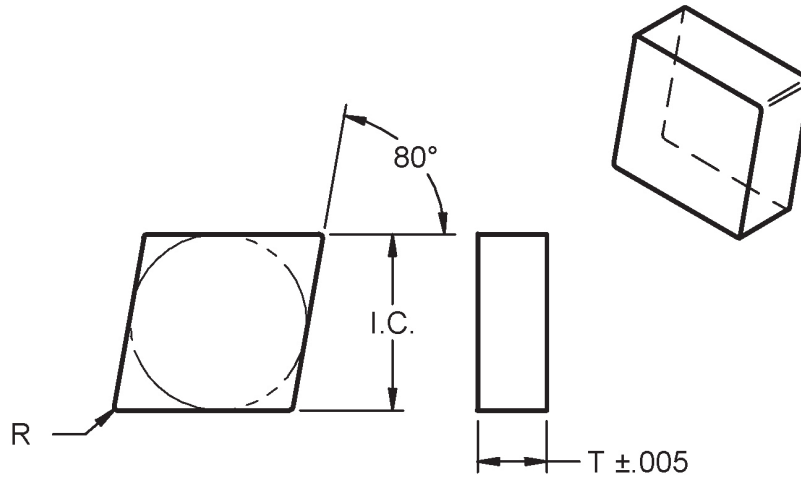
Insert	I.C.	T	R	H	W
CNMX432C	.500 ±.003	.194	1/32	.203	.012
CNMX633C	.750 ±.003	.188	3/64	.313	.017
CNMX643C	.750 ±.003	.250	3/64	.313	.017

CNSS



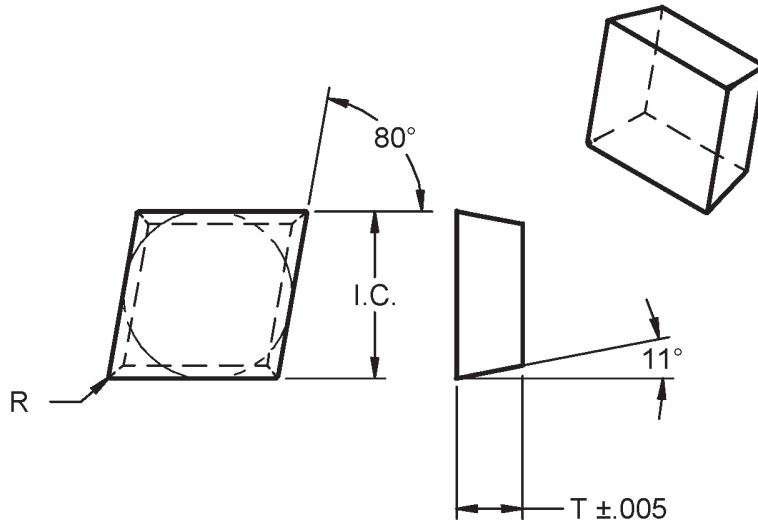
Insert	I.C.	T	R	H
CNSS432	.500±.003	.197	1/32	.203
CNSS642	.750±.003	.260	1/32	.313
CNSS643	.750±.003	.260	3/64	.313

CNR



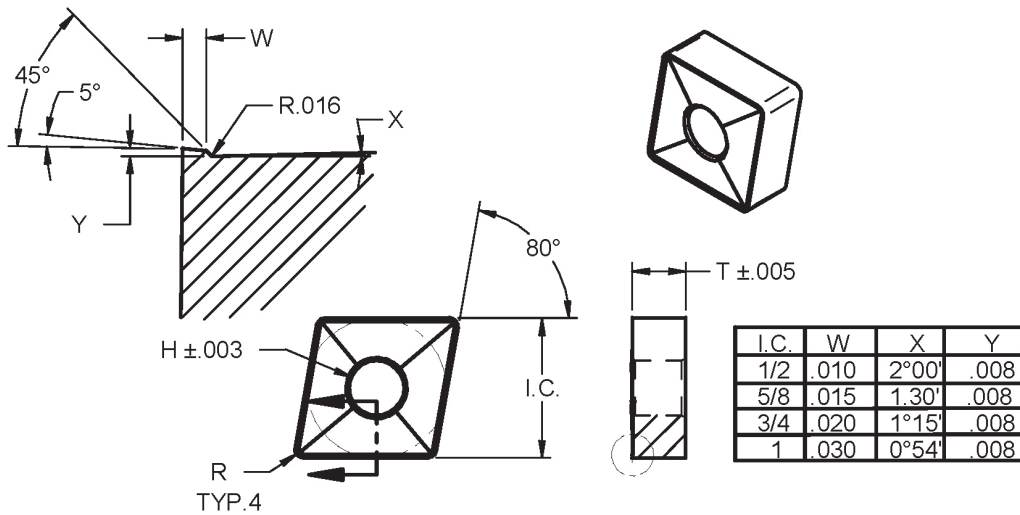
Insert	I.C.	T	R
CNR320	.390 ±.005	.139	.012
CNR322	.390 ±.005	.139	1/32
CNR330	.390 ±.005	.201	.012
CNR332	.390 ±.005	.201	1/32
CNR4620	.482 ±.005	.139	.012
CNR4630	.482 ±.005	.201	.012
CNR420	.518 ±.005	.139	.012
CNR422	.518 ±.005	.139	1/32
CNR430	.518 ±.005	.201	.012
CNR432	.518 ±.005	.201	1/32
CNR630	.770 ±.005	.201	.012
CNR633	.770 ±.005	.201	3/64

CPR



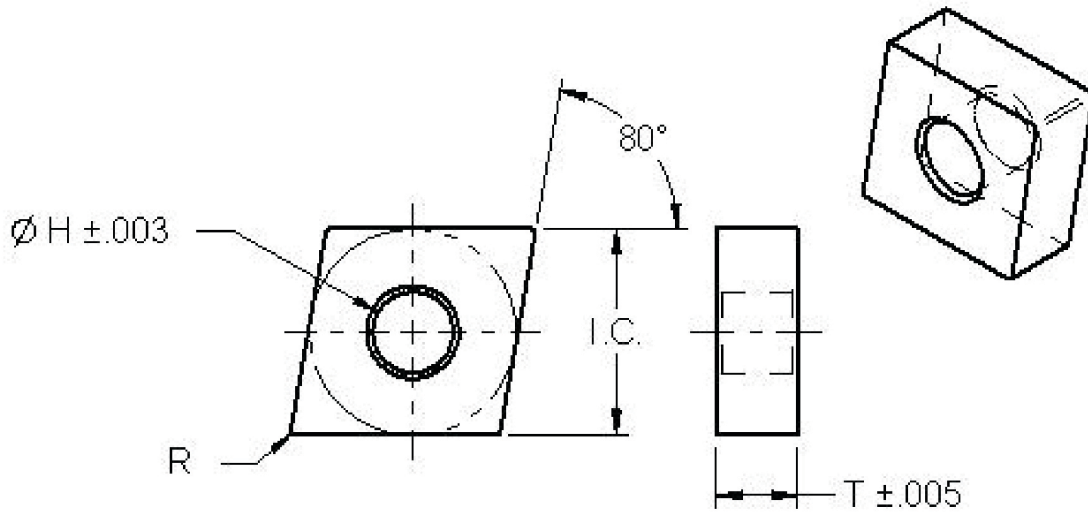
Insert	I.C.	T	R
CPR320	.389 ±.006	.140	.005
CPR321	.389 ±.006	.140	1/64
CPR420	.518 ±.006	.140	1/64
CPR421	.518 ±.006	.140	1/64
CPR531	.642 ±.006	.202	1/32
CPR532	.642 ±.006	.202	1/32
CPR533	.642 ±.006	.202	3/64
CPR631	.769 ±.006	.202	1/64
CPR632	.769 ±.006	.202	1/32
CPR633	.769 ±.006	.202	3/64
CPR6312	.769 ±.006	.202	3/16

CNSM



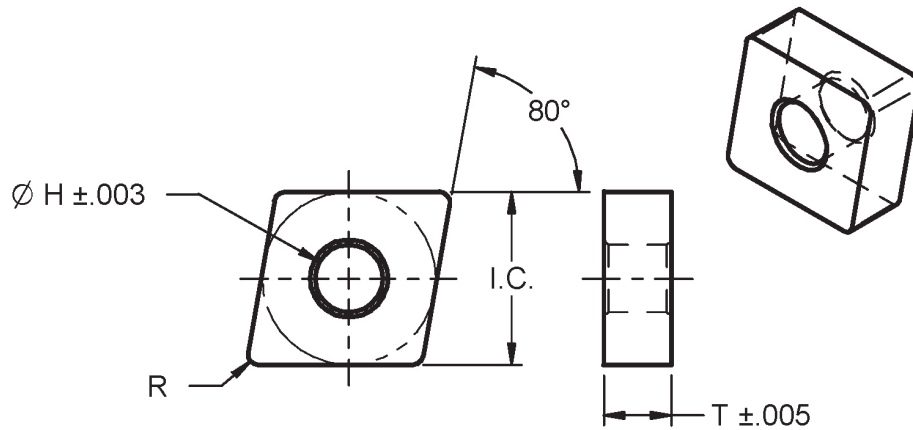
Insert	I.C.	T	R	H
CNSM432	.500 ±.003	.196	1/32	.203
CNSM433	.500 ±.003	.196	3/64	.203
CNSM434	.500 ±.003	.196	1/16	.203
CNSM542	.625 ±.003	.258	1/32	.253
CNSM543	.625 ±.003	.258	3/64	.253
CNSM544	.625 ±.003	.258	1/16	.253
CNSM642	.750 ±.003	.258	1/32	.313
CNSM643	.750 ±.003	.258	3/64	.313
CNSM644	.750 ±.003	.258	1/16	.313
CNSM866	1.000 ±.004	.385	3/32	.362

CNRA



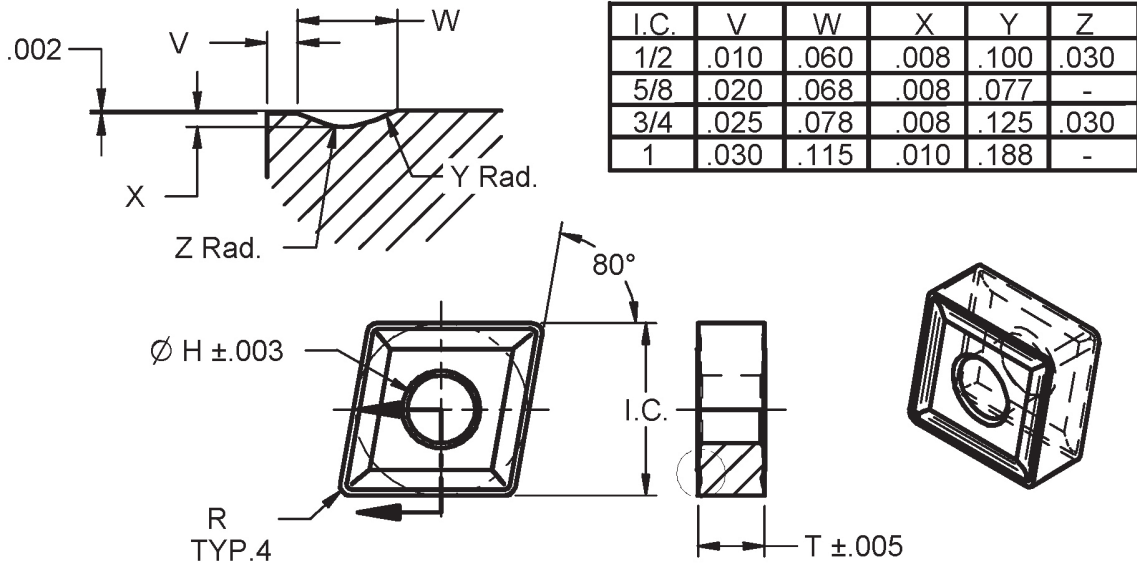
Insert	I.C.	T	R	H
CNRA320	.390 ±.005	.139	.012	.150
CNRA322	.390 ±.005	.139	1/32	.150
CNRA330	.390 ±.005	.201	.012	.150
CNRA332	.390 ±.005	.201	1/32	.150
CNRA420	.518 ±.005	.139	.012	.203
CNRA422	.518 ±.005	.139	1/32	.203
CNRA430	.518 ±.005	.201	.012	.203
CNRA432	.518 ±.005	.201	1/32	.203
CNRA530	.643 ±.005	.203	.010	.253
CNRA540	.643 ±.005	.265	.010	.253
CNRA630	.770 ±.005	.201	.012	.313
CNRA632	.770 ±.005	.201	1/32	.313
CNRA633	.770 ±.005	.201	3/64	.313
CNRA640	.770 ±.005	.265	.012	.313
CNRA642	.770 ±.005	.265	1/32	.313
CNRA643	.770 ±.005	.265	3/64	.313

CNSA



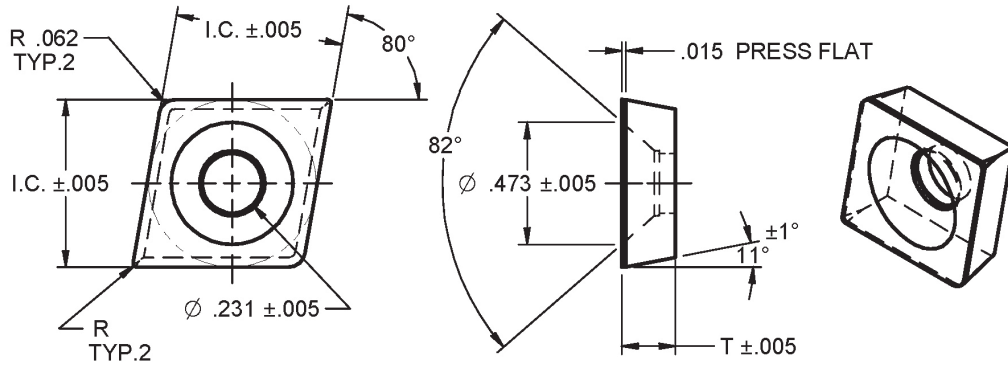
Insert	I.C.	T	R	H
CNSA420	.500 ±.003	.139	.008	.203
CNSA422	.500 ±.003	.139	1/32	.203
CNSA423	.500 ±.003	.139	3/64	.203
CNSA424	.500 ±.003	.139	1/16	.203
CNSA430	.500 ±.003	.201	.008	.203
CNSA432	.500 ±.003	.201	1/32	.203
CNSA433	.500 ±.003	.201	3/64	.203
CNSA434	.500 ±.003	.201	1/16	.203
CNSA532	.625 ±.003	.201	1/32	.253
CNSA533	.625 ±.003	.201	3/64	.253
CNSA538	.625 ±.003	.201	1/8	.253
CNSA543	.625 ±.003	.265	3/64	.253
CNSA548	.625 ±.003	.265	1/8	.253
CNSA632	.750 ±.003	.201	1/32	.313
CNSA633	.750 ±.003	.201	3/64	.313
CNSA634	.750 ±.003	.201	1/16	.313
CNSA638	.750 ±.003	.201	1/8	.313
CNSA642	.750 ±.003	.265	1/32	.313
CNSA643	.750 ±.003	.265	3/64	.313
CNSA644	.750 ±.003	.265	1/16	.313
CNSA648	.750 ±.003	.265	1/8	.313
CNSA866	1.000 ±.004	.394	3/32	.362

CNMG



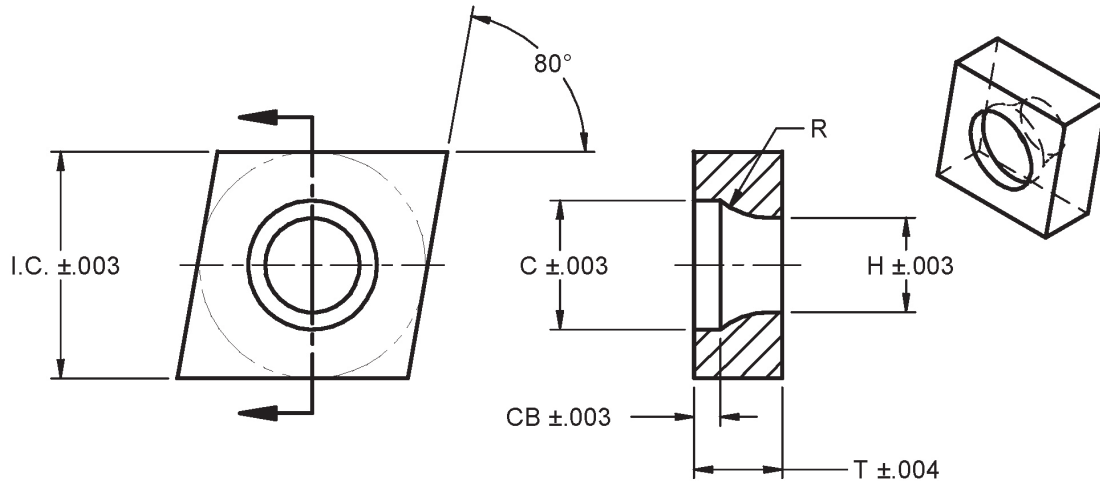
Insert	I.C.	T	R	H
CNMG421	.500 ±.003	.125	1/64	.203
CNMG422	.500 ±.003	.125	1/32	.203
CNMG423	.500 ±.003	.125	3/64	.203
CNMG424	.500 ±.003	.125	1/16	.203
CNMG431	.500 ±.003	.188	1/64	.203
CNMG432	.500 ±.003	.188	1/32	.203
CNMG433	.500 ±.003	.188	3/64	.203
CNMG434	.500 ±.003	.188	1/16	.203
CNMG532	.625 ±.003	.188	1/32	.253
CNMG533	.625 ±.003	.188	3/64	.253
CNMG534	.625 ±.003	.188	1/16	.253
CNMG542	.625 ±.003	.250	1/32	.253
CNMG543	.625 ±.003	.250	3/64	.253
CNMG544	.625 ±.003	.250	1/16	.253
CNMG632	.750 ±.003	.188	1/32	.313
CNMG633	.750 ±.003	.188	3/64	.313
CNMG634	.750 ±.003	.188	1/16	.313
CNMG642	.750 ±.003	.250	1/32	.313
CNMG643	.750 ±.003	.250	3/64	.313
CNMG644	.750 ±.003	.250	1/16	.313
CNMG866	1.000 ±.004	.375	3/32	.362

CPRB



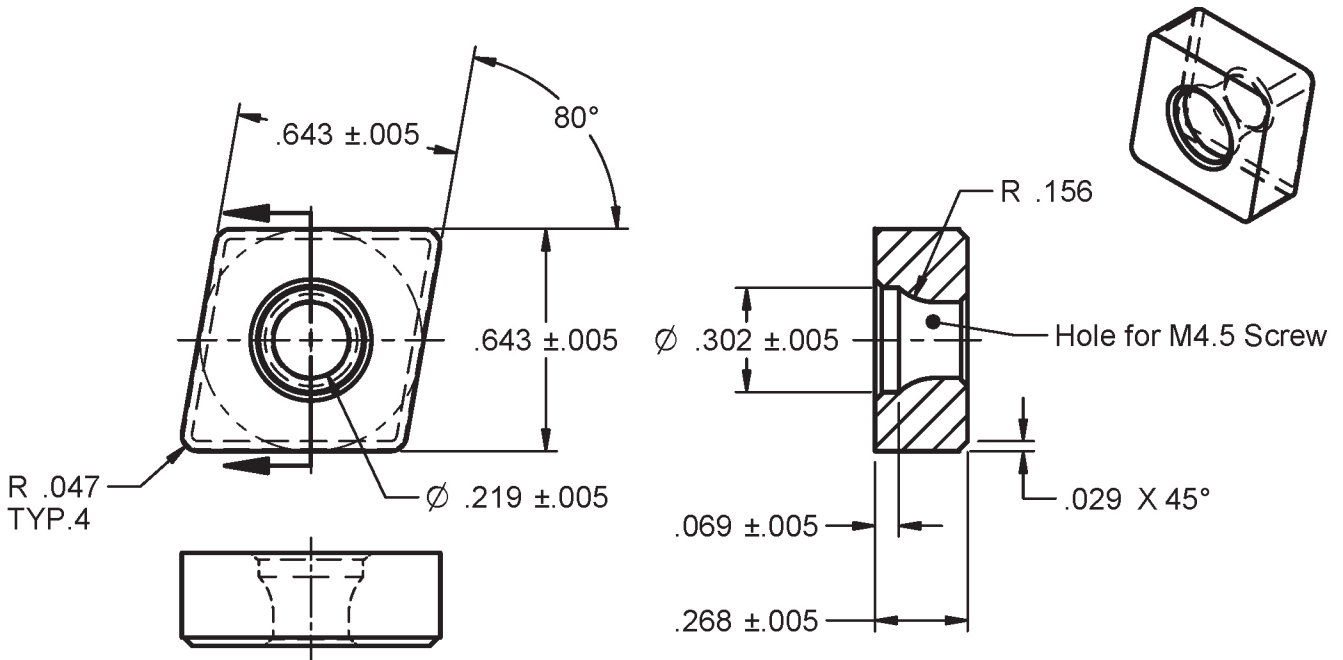
Insert	I.C.	T	R
CPRB530	.650	.207	.010
CPRB533	.650	.207	.046
CPRB538	.650	.207	.125

CNRW

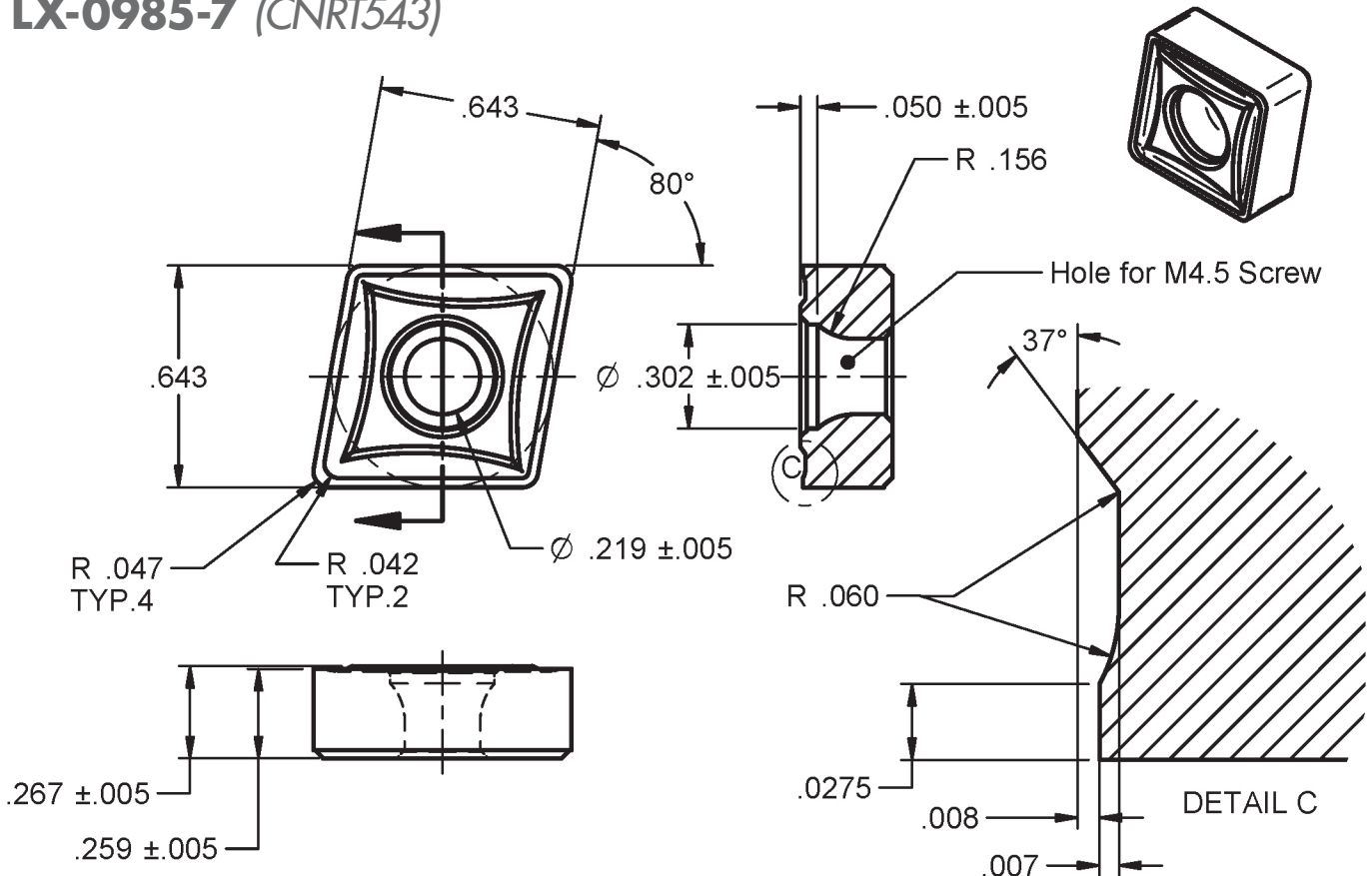


Insert	I.C.	T	H	C	CB	R
CNRW1.81.50	.236	.107	.098	.130	.039	.079
CNRW21.50	.267	.108	.110	.146	.039	.079
CNRW220	.267	.139	.110	.146	.039	.079
CNRW2.520	.330	.139	.134	.177	.031	.097
CNRW32.50	.389	.170	.173	.236	.046	.138
CNRW430	.518	.202	.216	.295	.060	.177
CNRW450	.518	.331	.216	.295	.060	.177

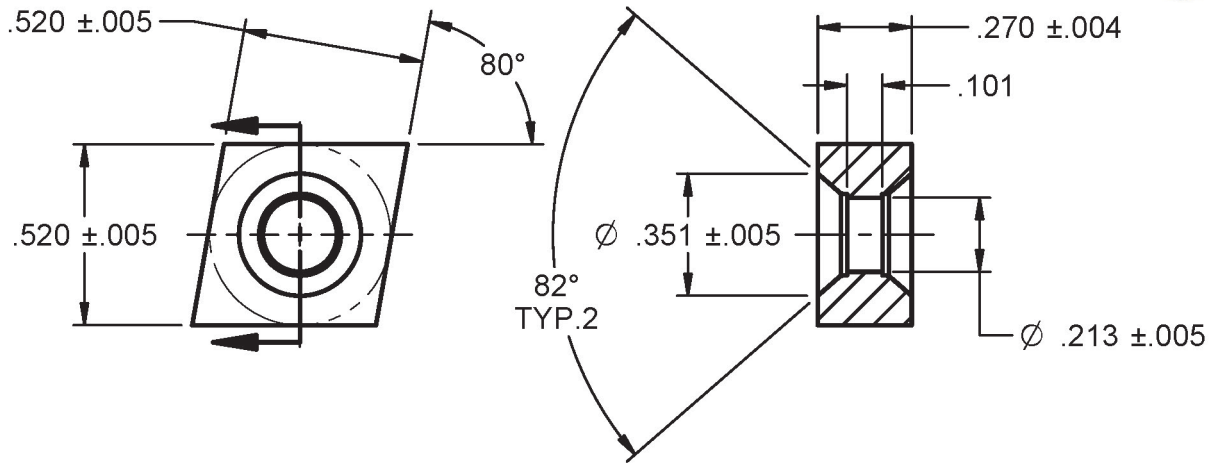
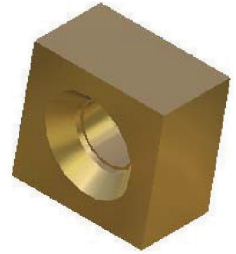
LX-0985-8 (CNRW543)



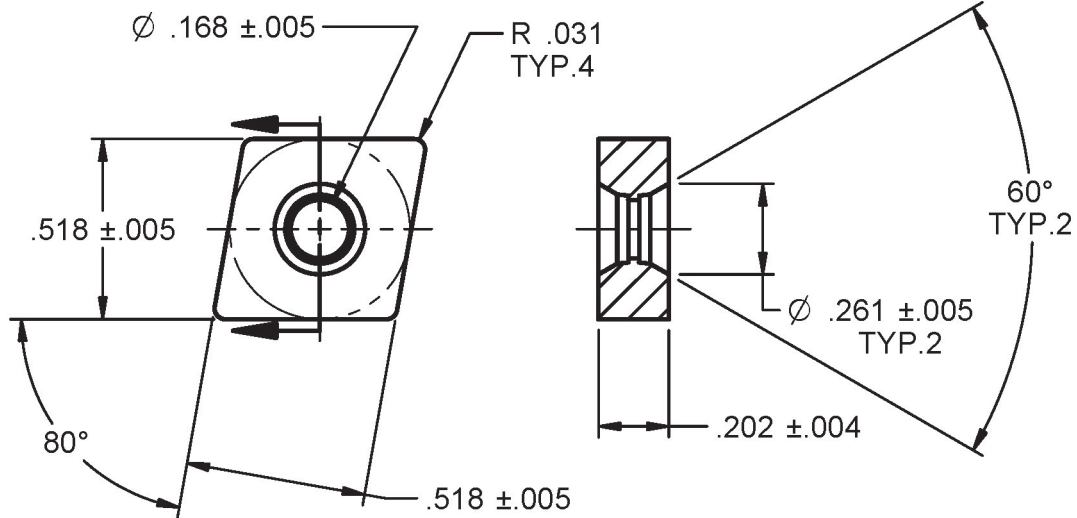
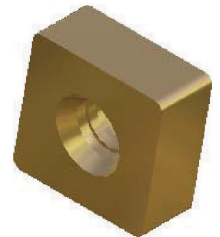
LX-0985-7 (CNRT543)



CNRC440 (MA65610)

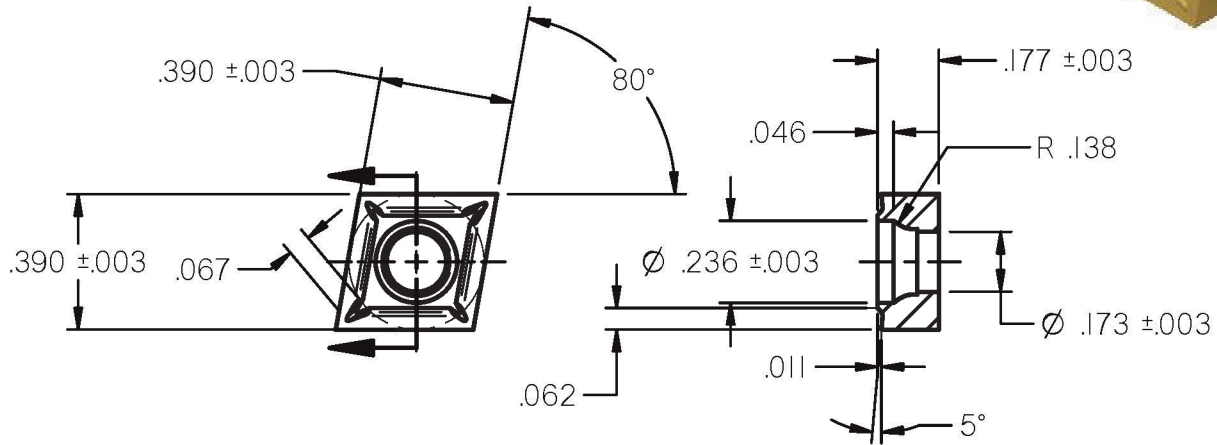
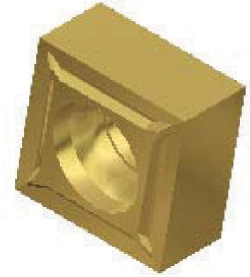


CNRQ432

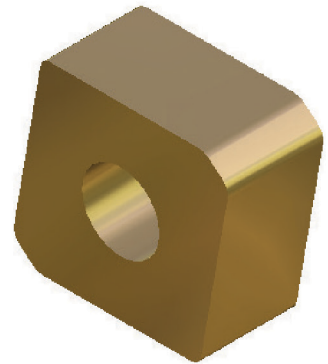
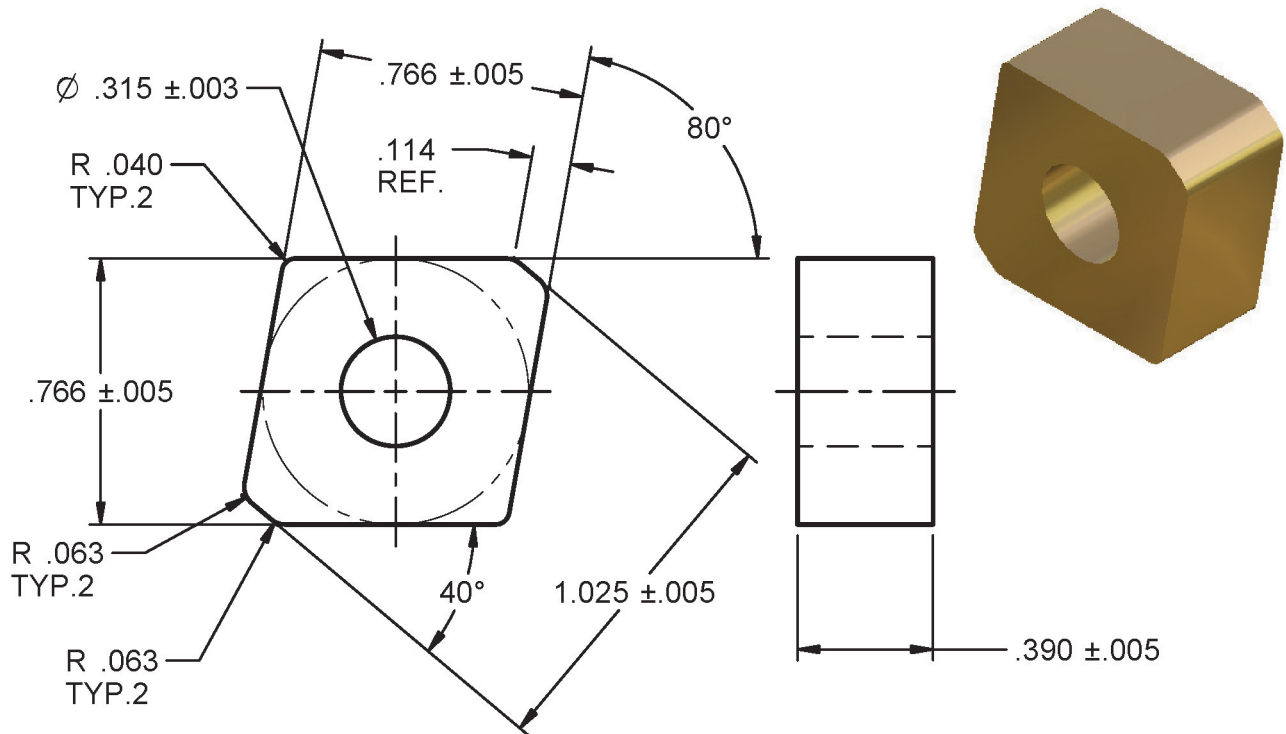


CNRT32.50TM

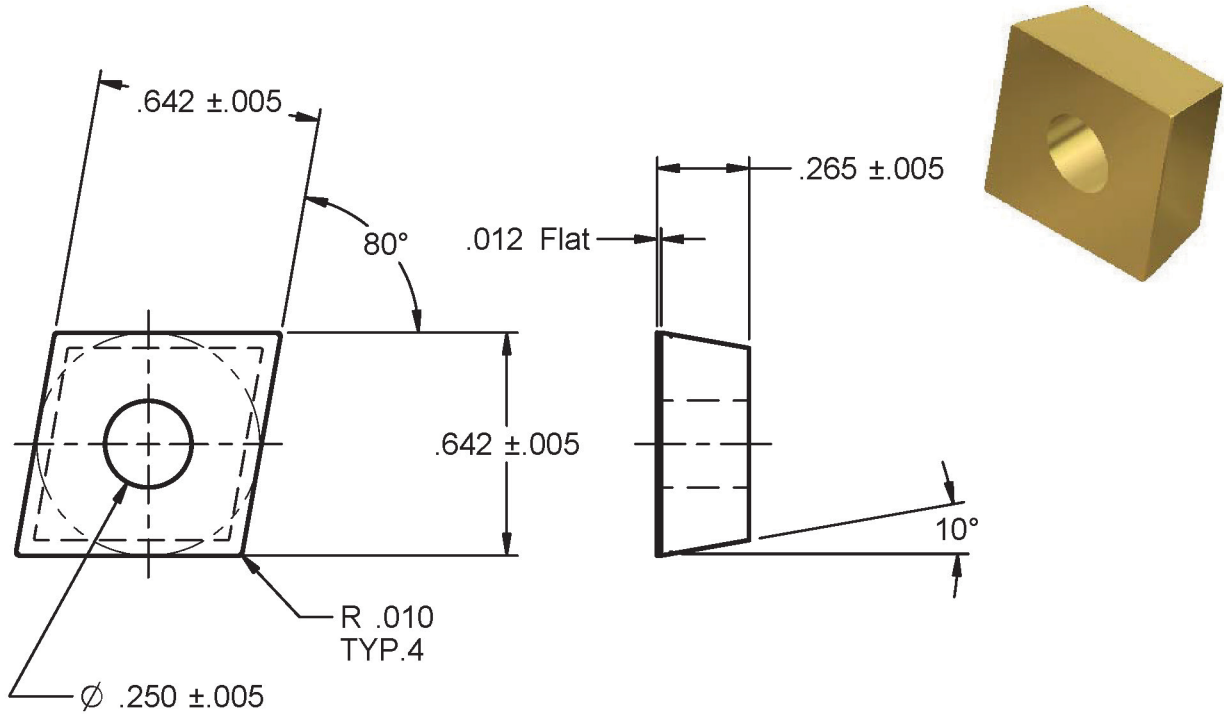
NOTE: This Insert can be ground from a 0 up to 3/64 Radii.



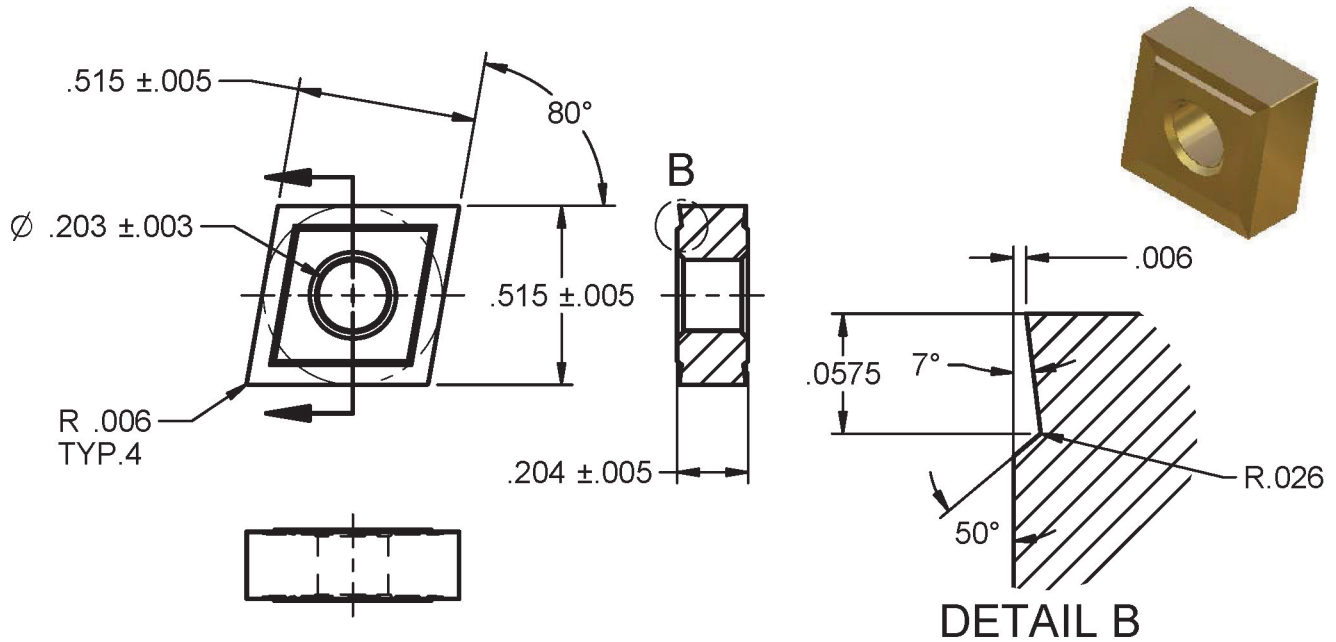
A-1322-A



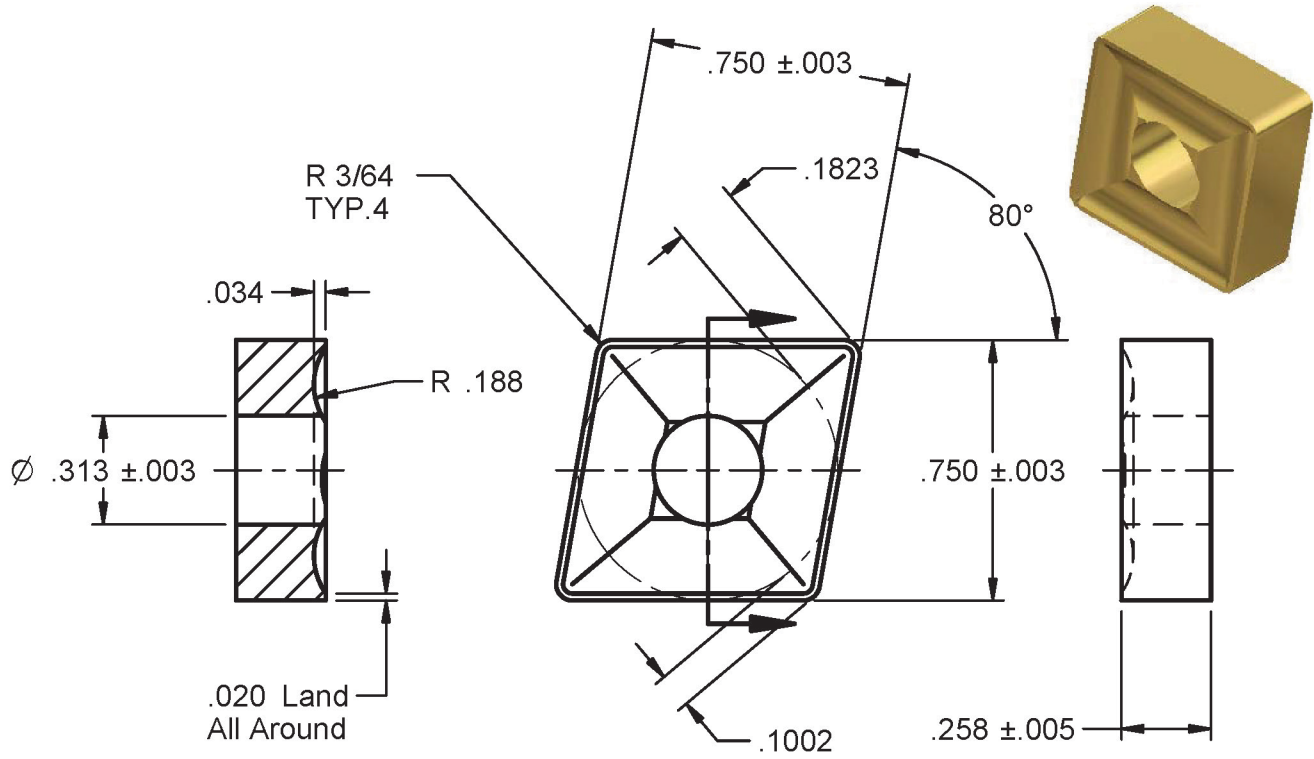
CPRA540 (MA-71204)



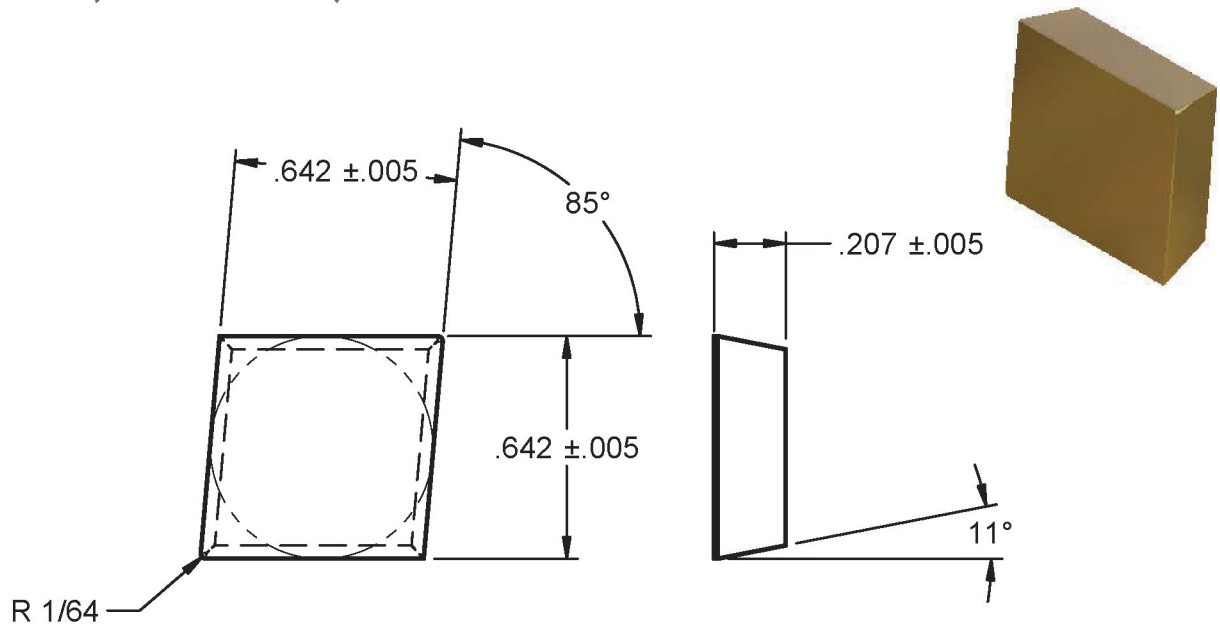
LX-1093-1/CNRP430 (MA-67815)



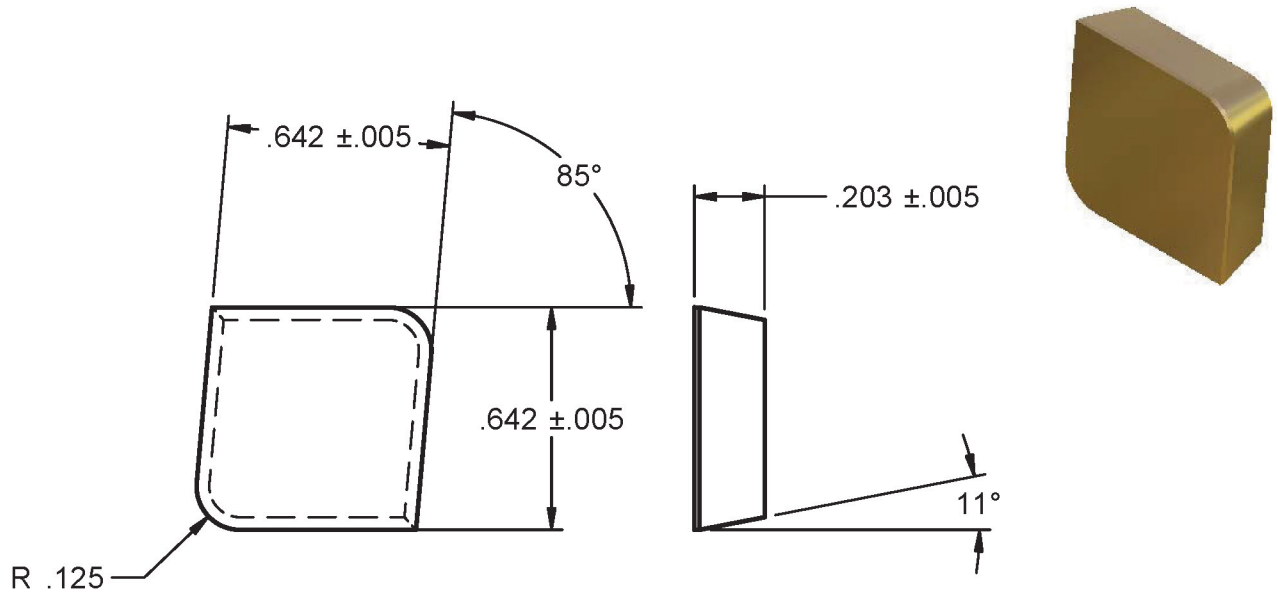
R-16113-A (D-16915-P1 N28)



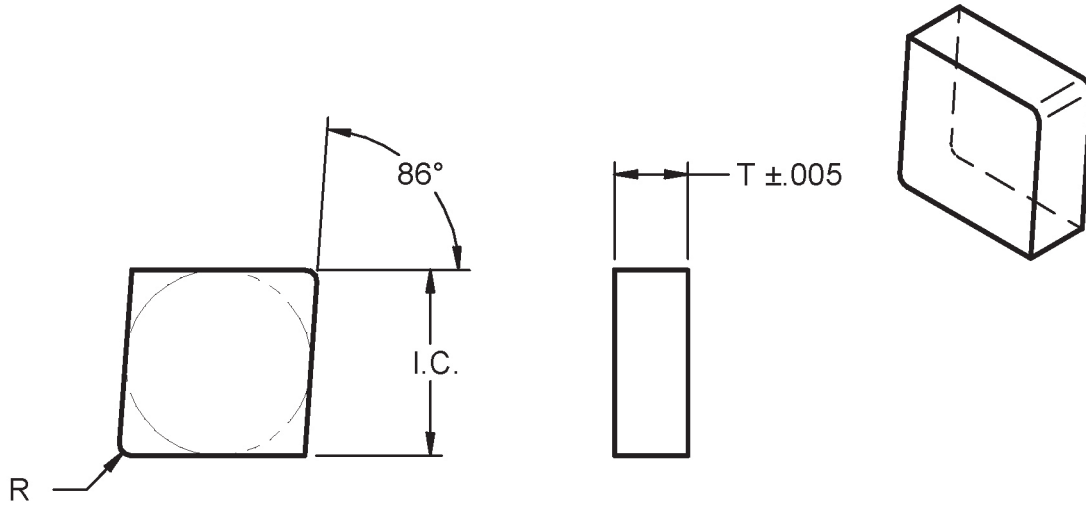
R-16227 (85° Diamond)



A-2838-B-11 (85° Diamond)

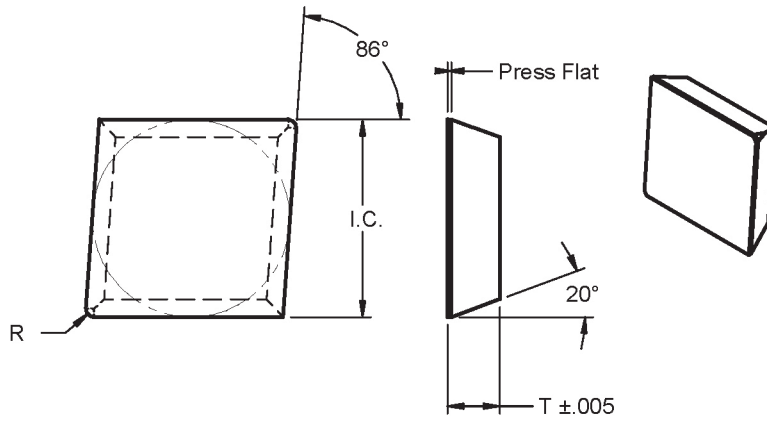


MNR



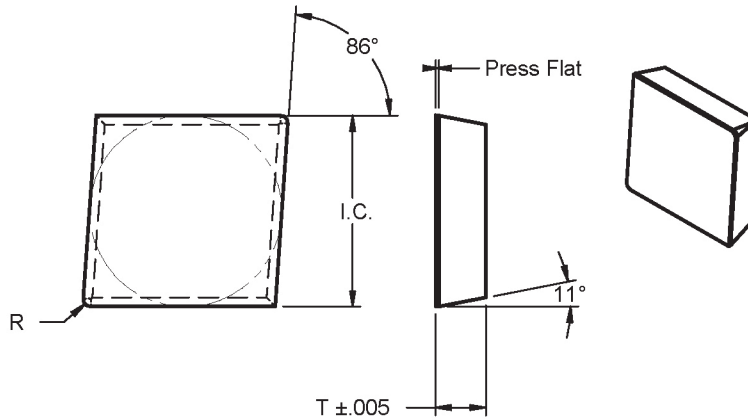
Insert	I.C.	T	R
MNR422	.518 ±.005	.143	1/32
MNR52.50	.642 ±.007	.171	.008
MNR52.52	.642 ±.007	.171	1/32
MNR52.58	.642 ±.007	.171	1/8
MNR530	.642 ±.007	.202	.008
MNR532	.642 ±.007	.202	1/32
MNR630	.769 ±.007	.202	.008
MNR632	.769 ±.007	.202	1/32
MNR640	.769 ±.007	.265	.008
MNR642	.769 ±.007	.265	1/32

MER



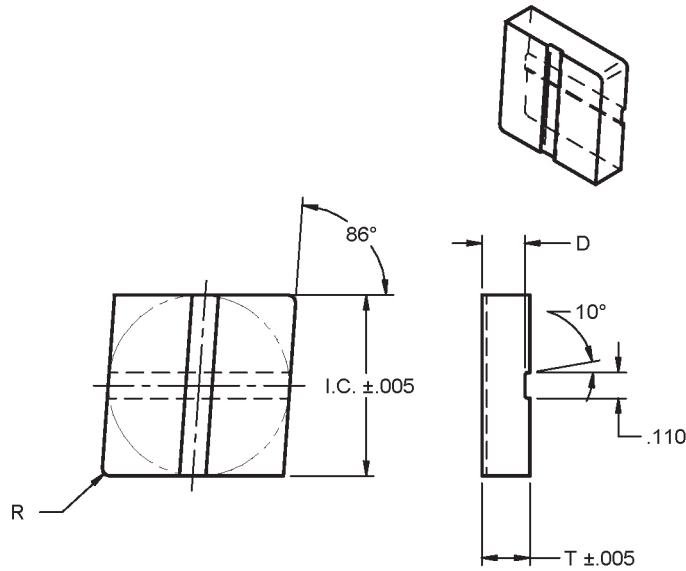
Insert	I.C.	T	R
MER323	.390 ±.005	.140	3/64
MER534	.642 ±.007	.203	1/16
MER630	.769 ±.007	.203	.008
MER632	.769 ±.007	.203	1/32

MPR



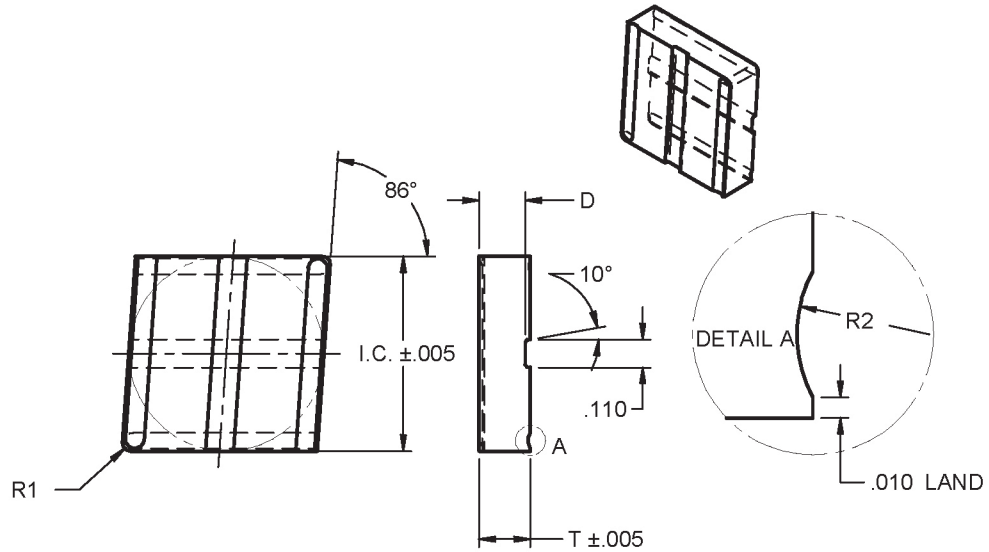
Insert	I.C.	T	R
MPR52.51	.642 ±.007	.174	1/64
MPR531	.642 ±.007	.203	1/64
MPR630	.763 ±.007	.203	.008
MPR831	1.020 ±.007	.203	1/64
MPR834	1.020 ±.007	.212	1/16
MPR8424	1.020 ±.007	.265	3/8

LX-1322-3



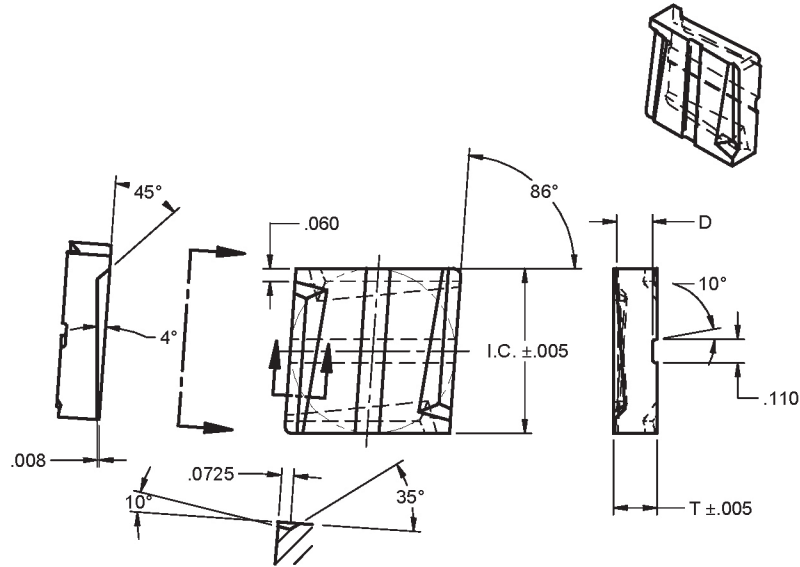
Insert	I.C.	T	D	R
LX1322-3-1	.515	.138	.118	1/32
LX-1322-3-2	.640	.201	.181	1/32
LX-1322-3-3	.765	.201	.181	1/32
LX-1322-3-4	.515	.138	.118	0
LX-1322-3-6	.640	.201	.181	0
LX-1322-3-7	.765	.201	.181	0

LX-1355-1



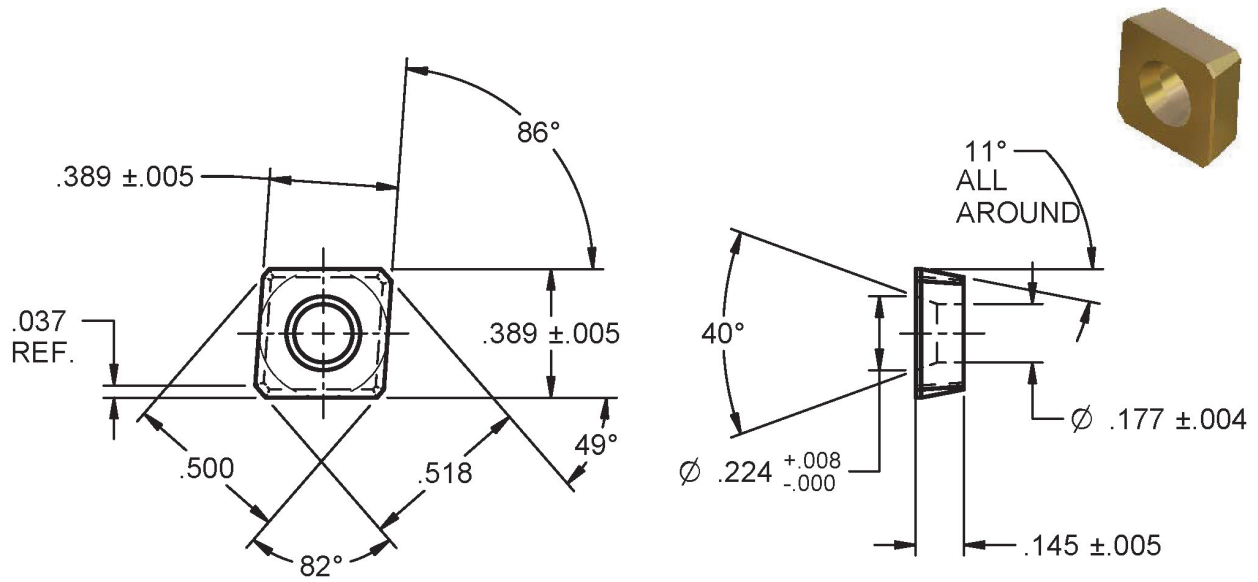
Insert	I.C.	T	D	R1	R2
LX-1355-1-1	.515	.138	.118	1/32	.065
LX-1355-1-2	.640	.201	.181	1/32	.065
LX-1355-1-3	.765	.201	.181	1/32	.065
LX-1355-1-4	.515	.138	.118	.005	.065
LX-1355-1-6	.640	.201	.181	.005	.065

LX-1322-1

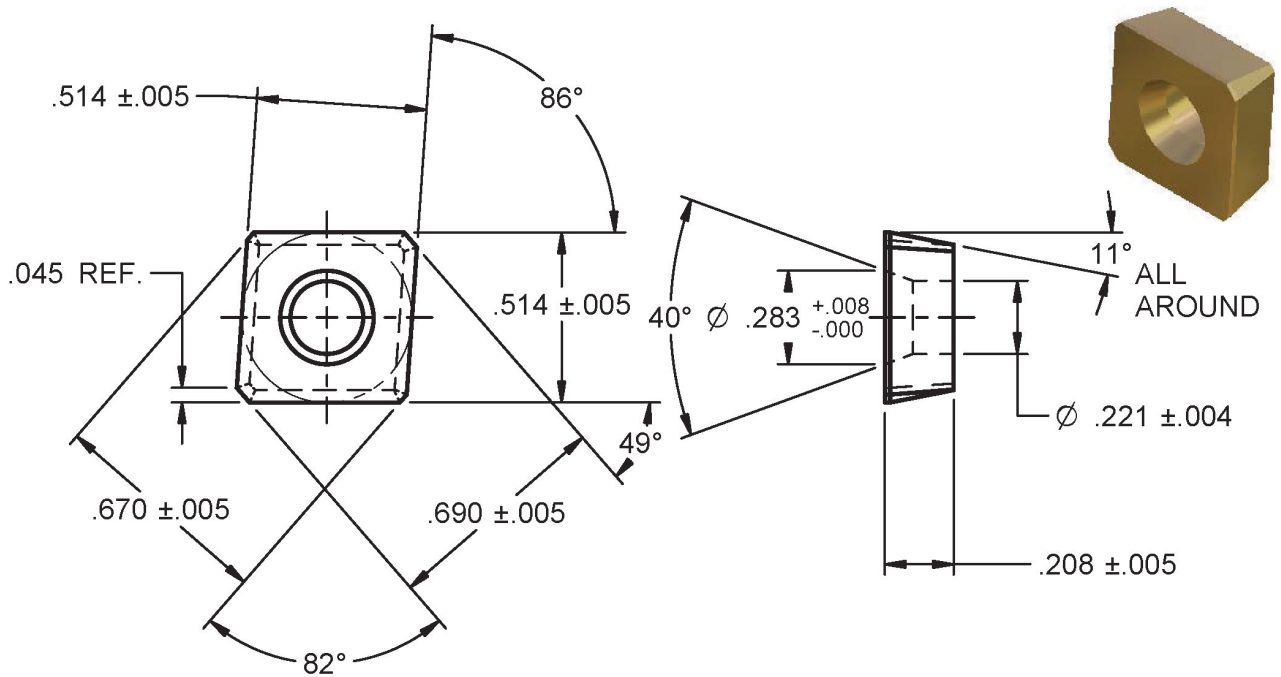


Insert	I.C.	T	D	R
LX-1321-1-1	.515	.138	.118	1/32
LX-1321-1-2	.640	.201	.181	1/32
LX-1321-1-3	.765	.201	.181	1/32
LX-1321-1-4	.515	.138	.118	.005
LX-1321-1-5	.640	.201	.181	.005
LX-1321-1-6	.765	.201	.181	.005

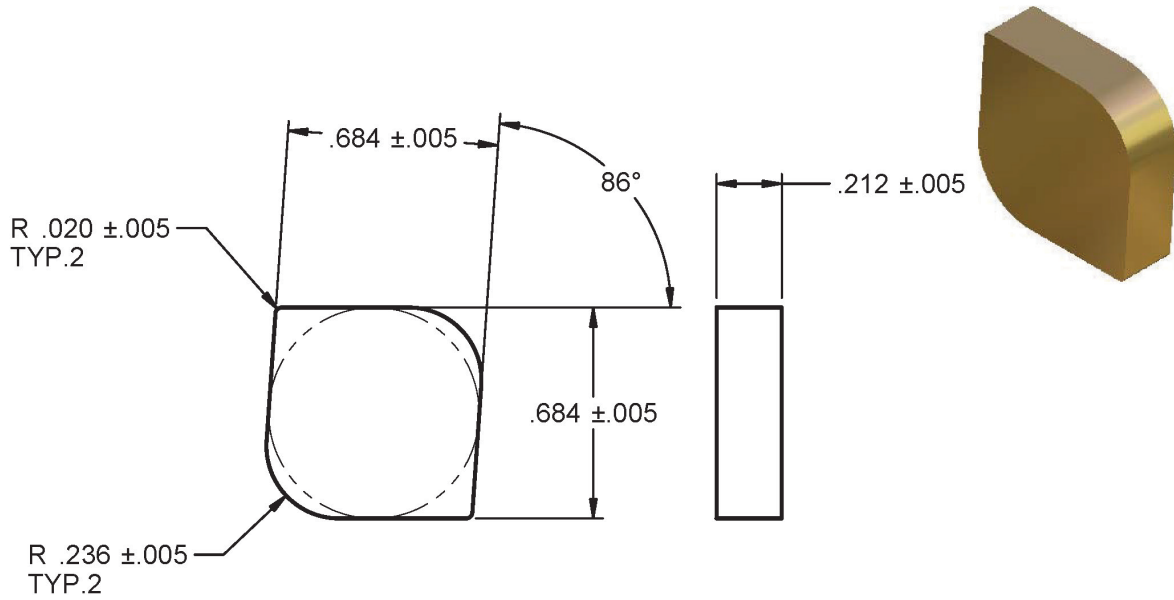
A-1728-C-1



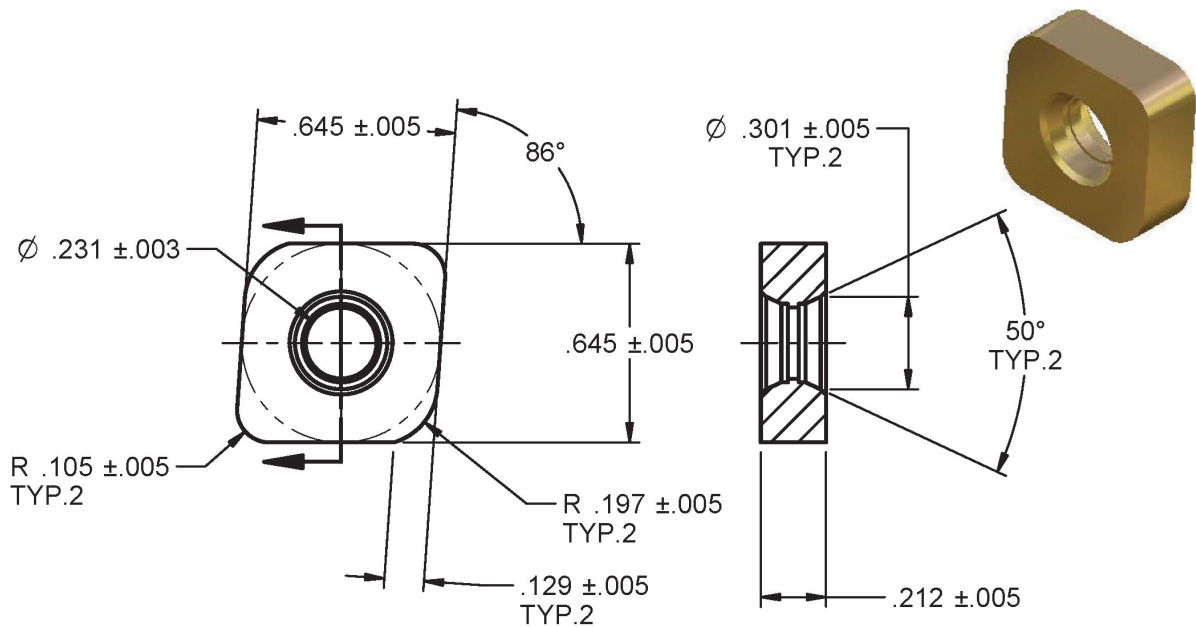
A-1728-C-2



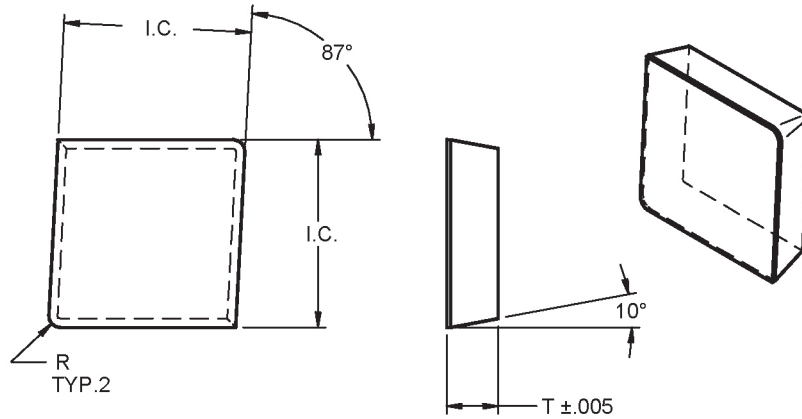
A-2838-B-7



A-1659-C

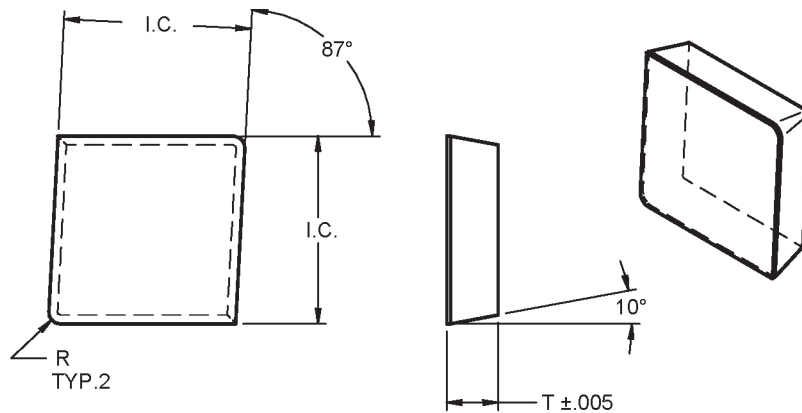


MPR-87°



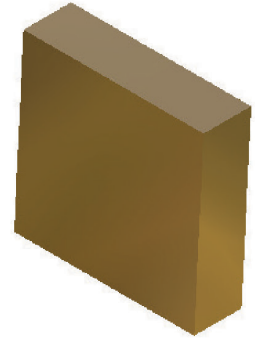
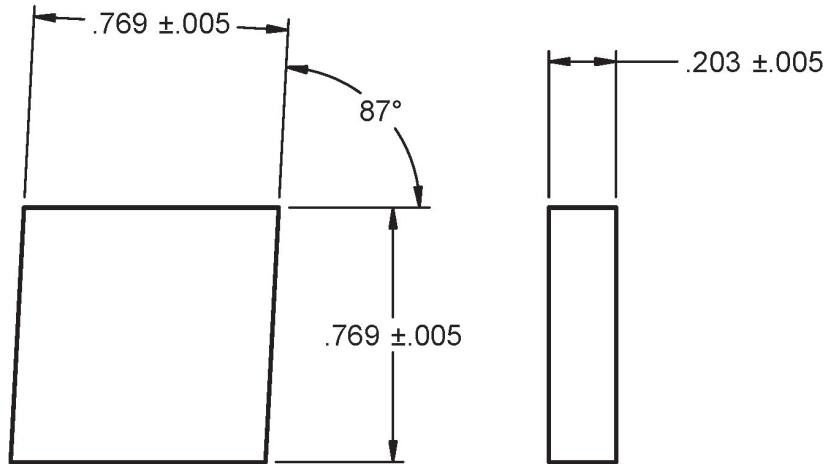
Insert	I.C.	T	R
MPR534-87°	.640 ±.005	.203	1/16
MPR633-87°	.774 ±.006	.212	3/64
MPR636-87°	.765 ±.005	.212	3/32
MPR637-87°	.765 ±.005	.212	7/64

UP53

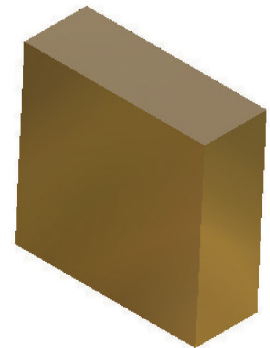
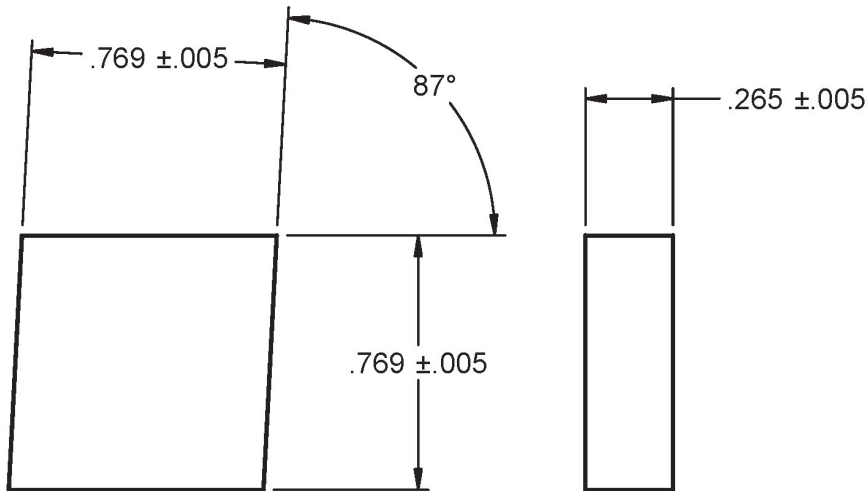


Insert	I.C.	T	R
UP53	.717±.005	.210	0

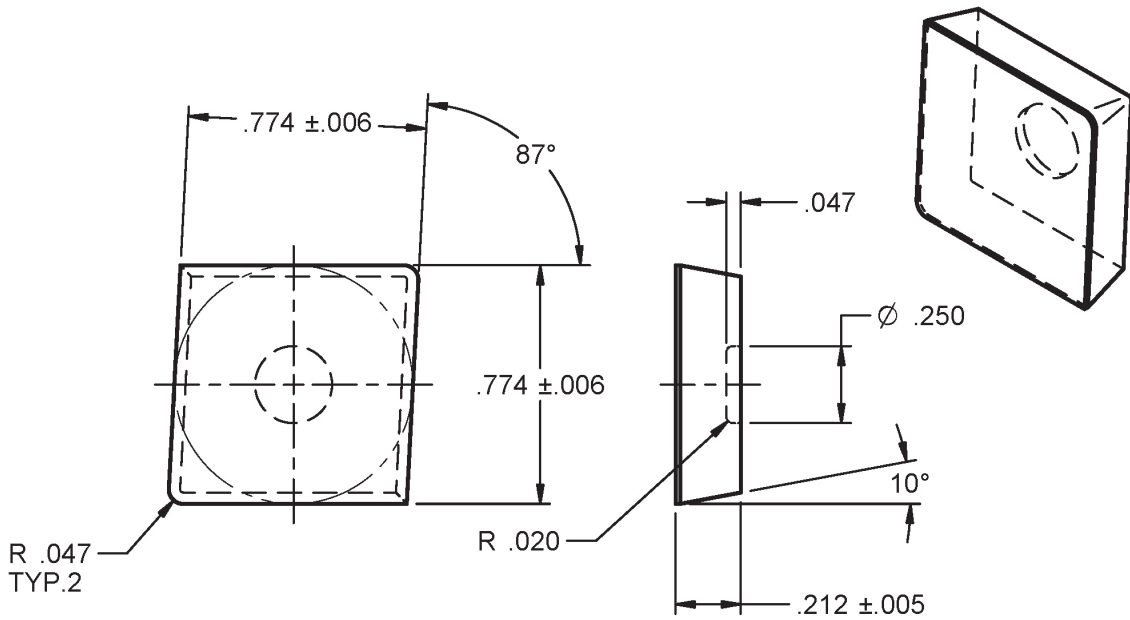
A-2838-B-17 (MNR630-87° - UP66N)



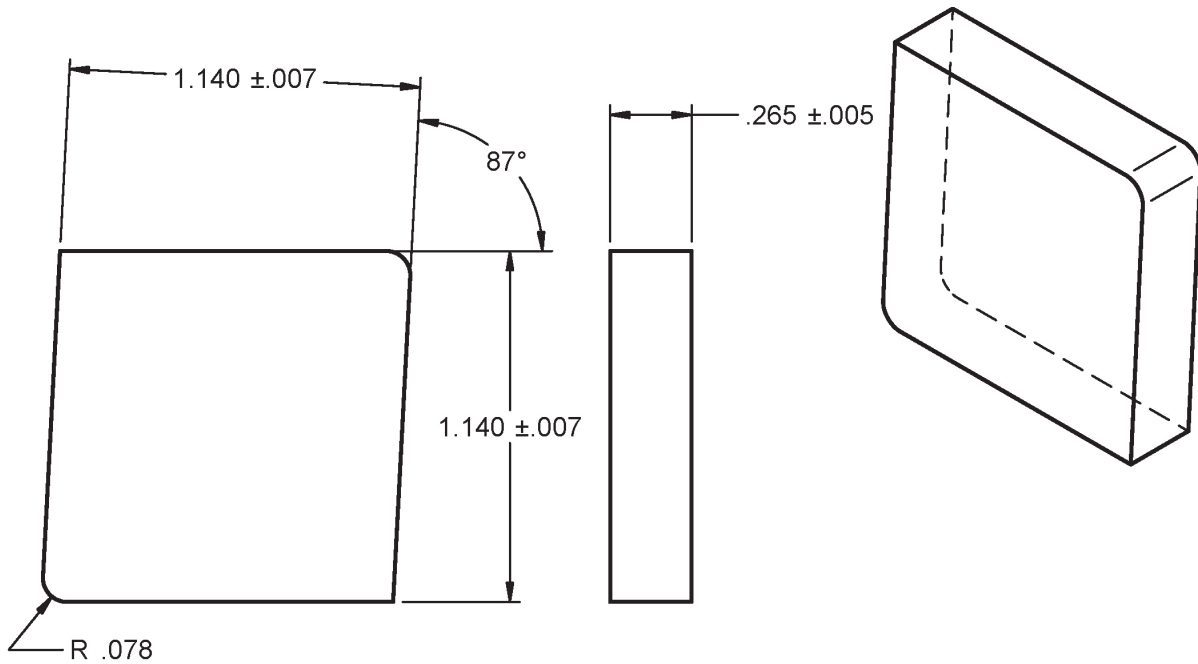
A-2838-B-6 (MNR640-87°)



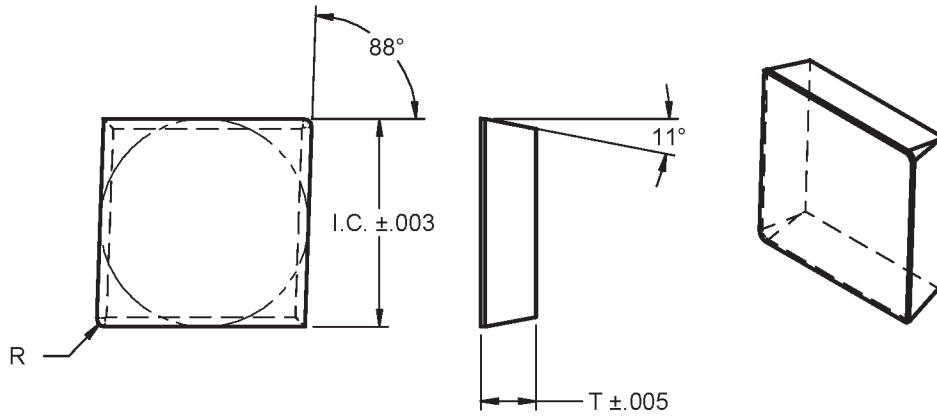
MA707-82



A-2838-B-12 (MNR945-87°)

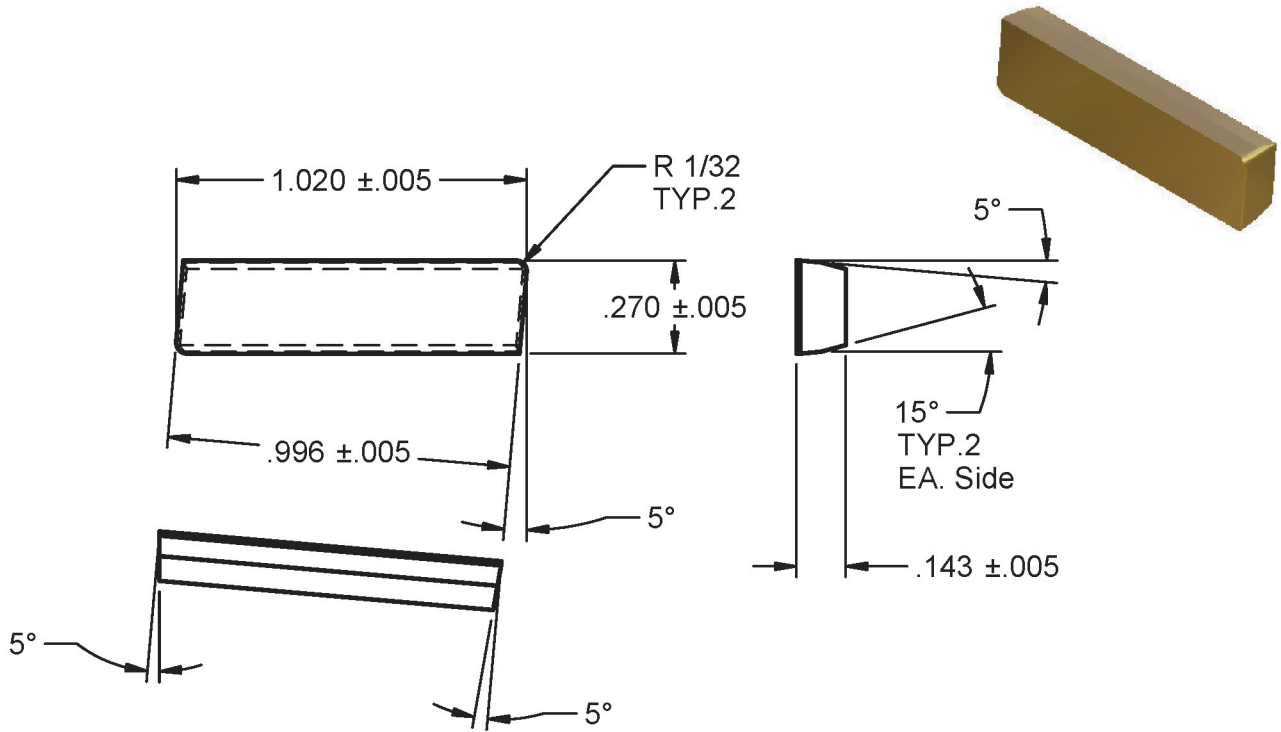


FPR

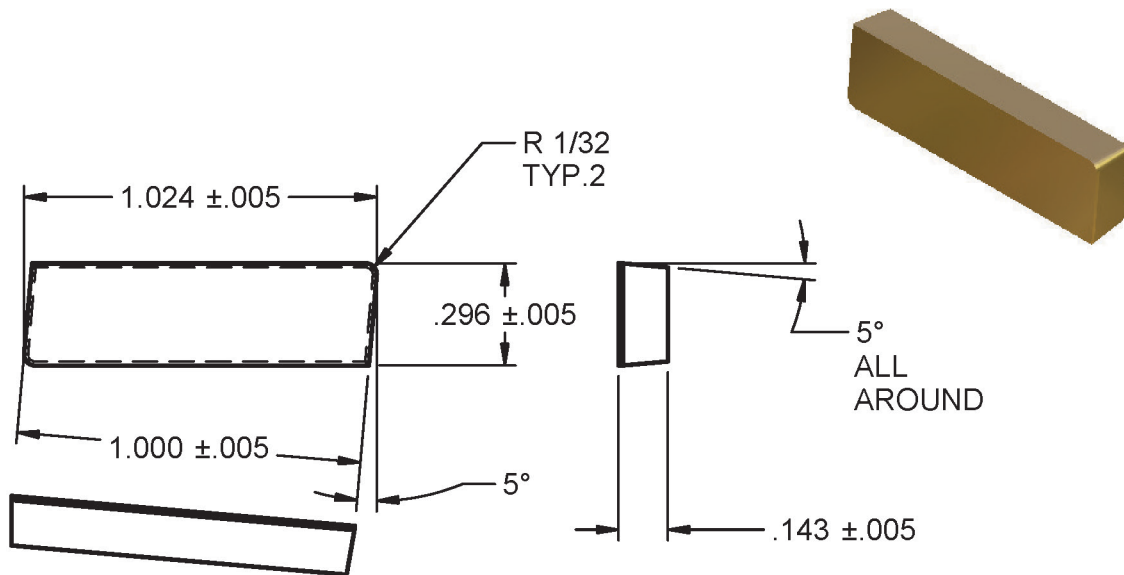


Insert	I.C.	T	R
FPR631	.765	.203	1/64
FPR634	.765	.203	1/16

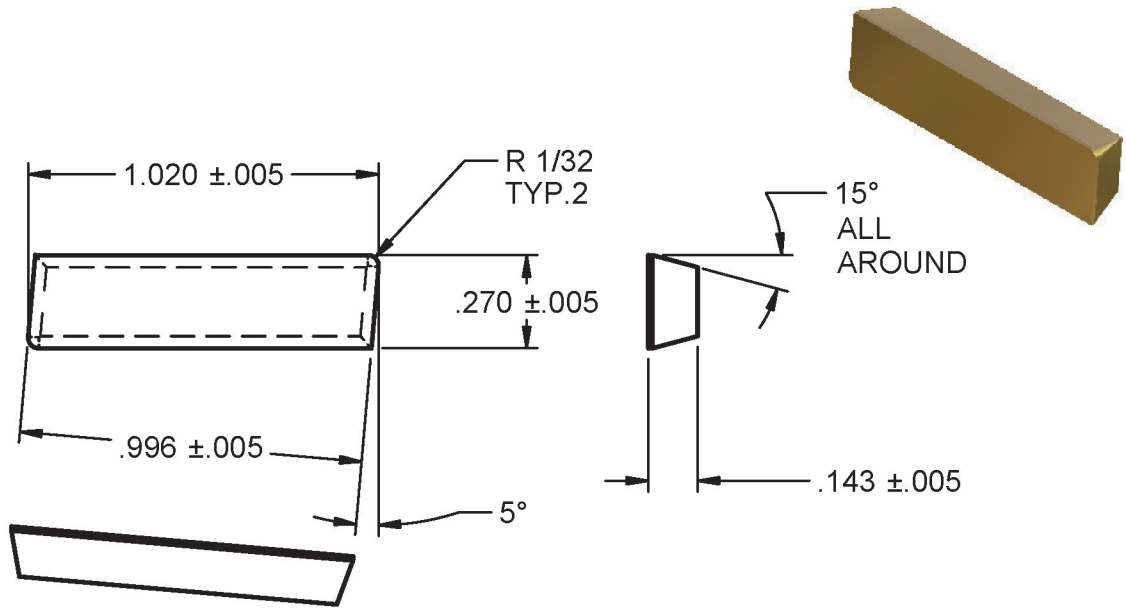
ABR-2422R



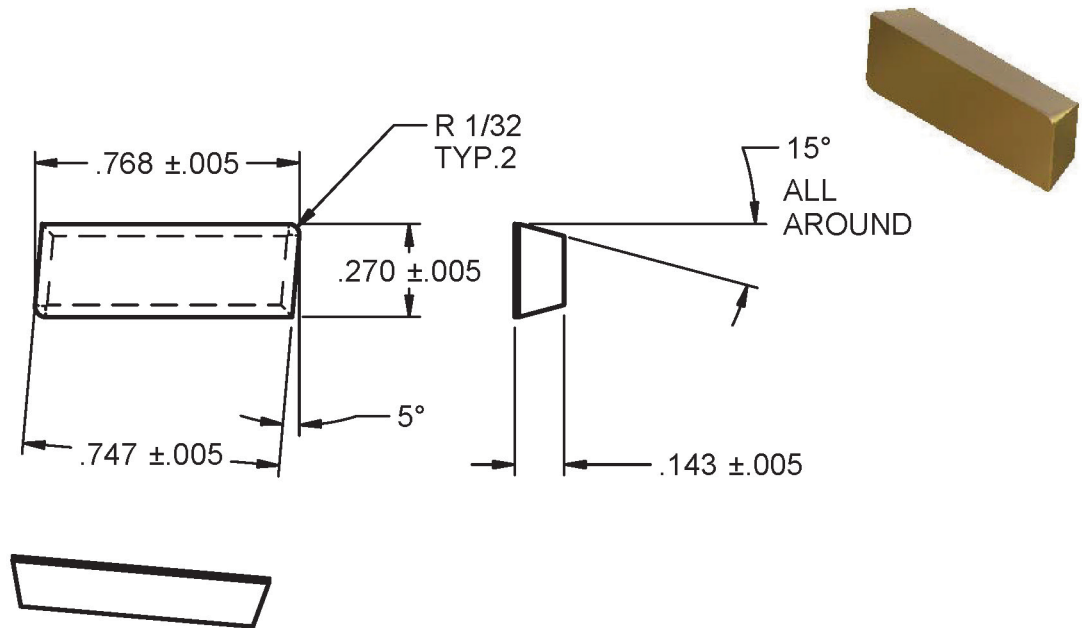
ABR-2.25422R



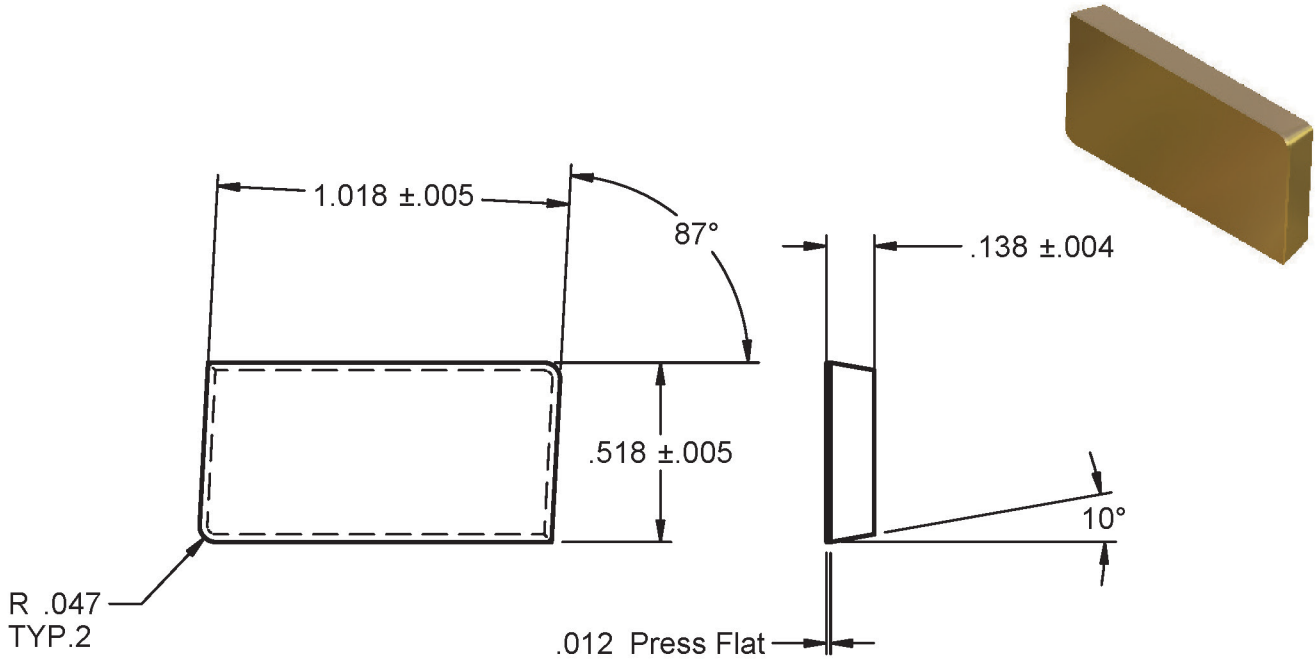
ADR-2422R



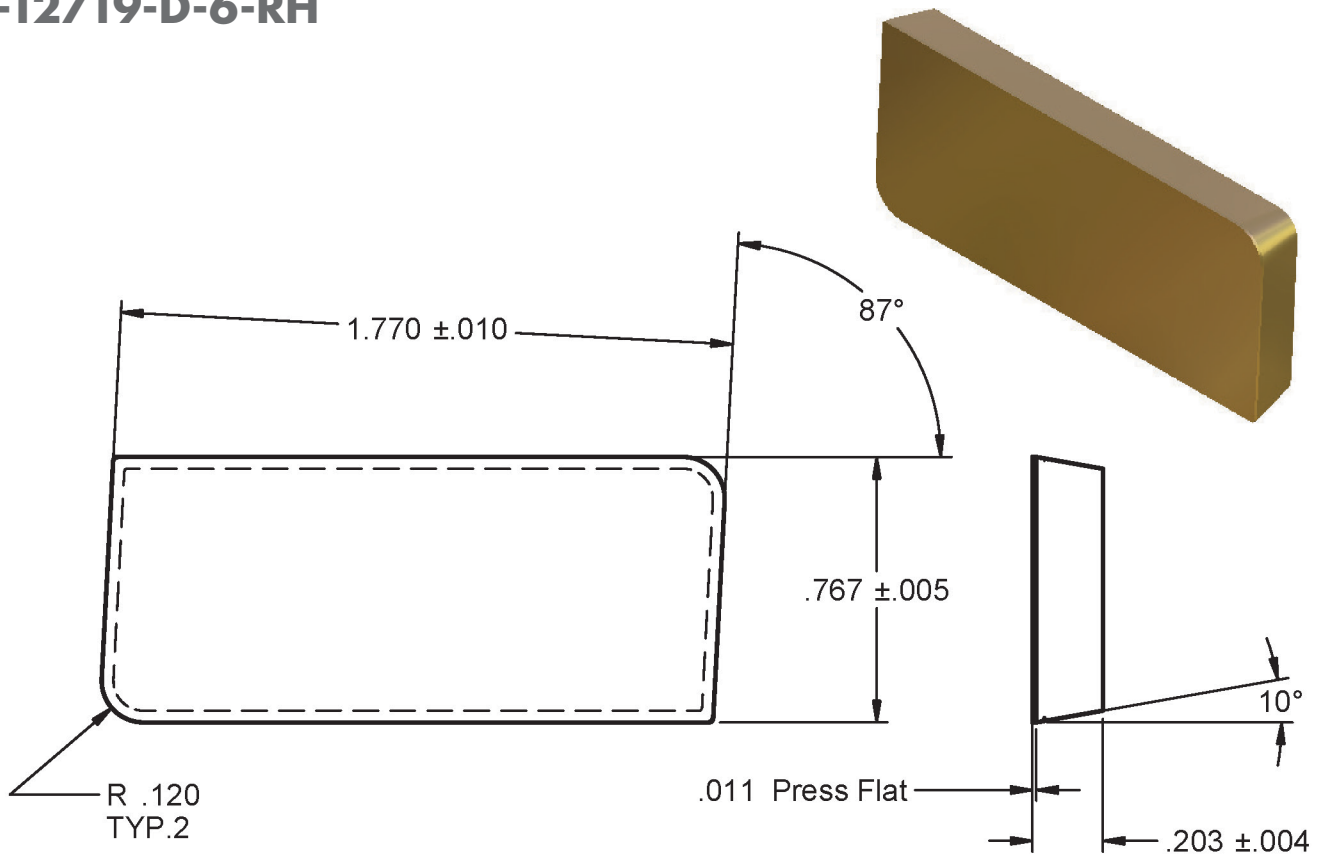
ADR-2322R



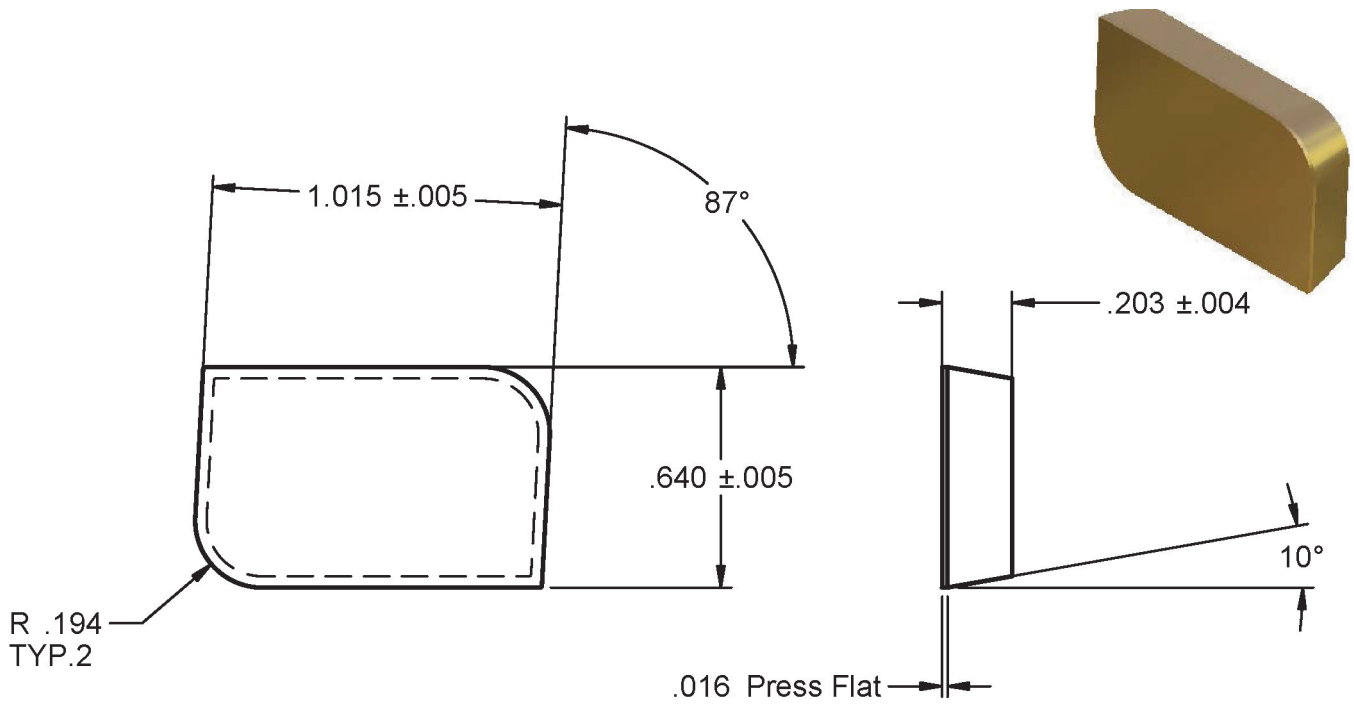
BCBP-15RH



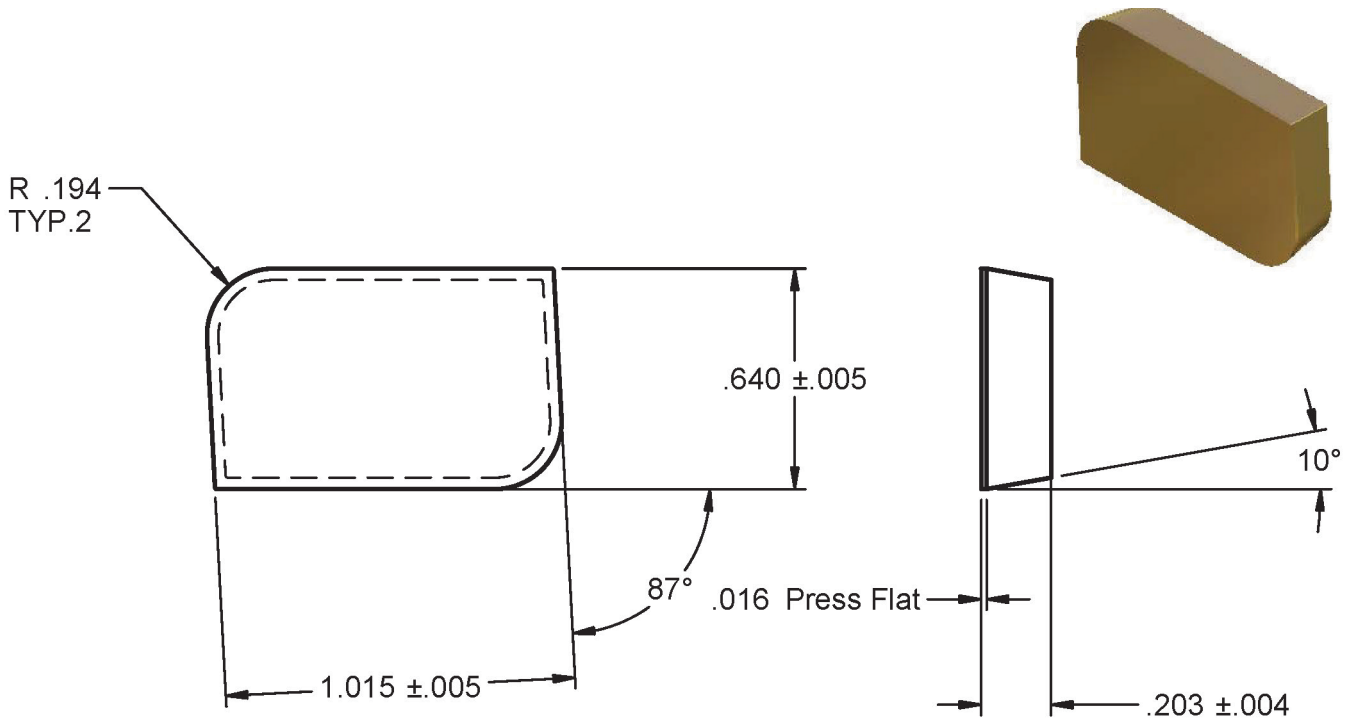
R-12719-D-6-RH



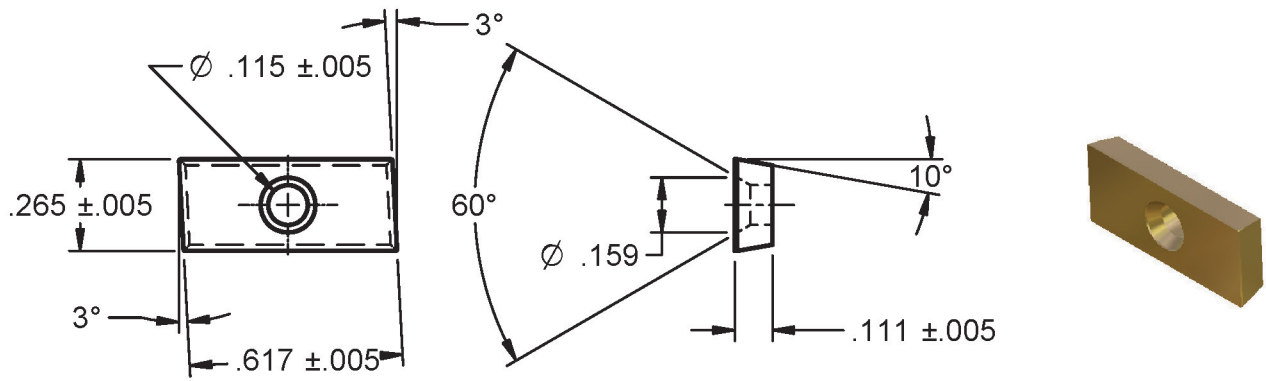
A-2309A-RH



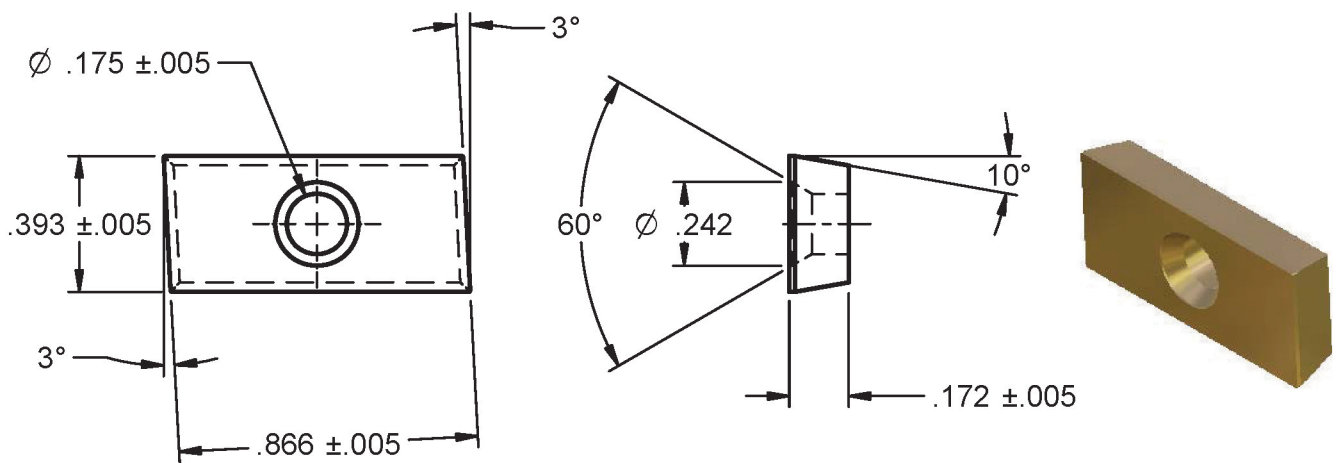
A-2310A-LH



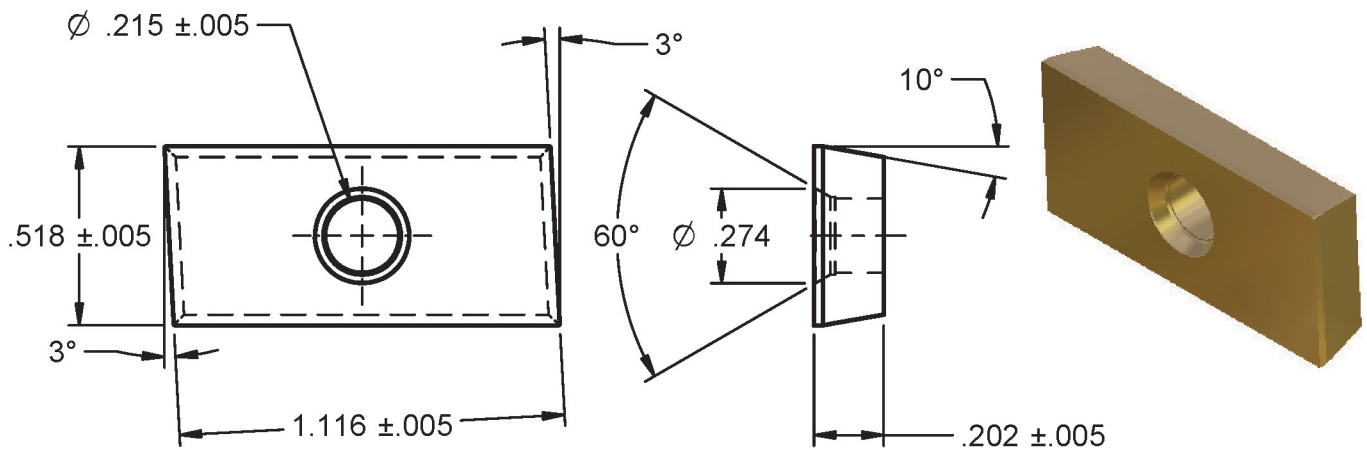
LX-1274-2-8



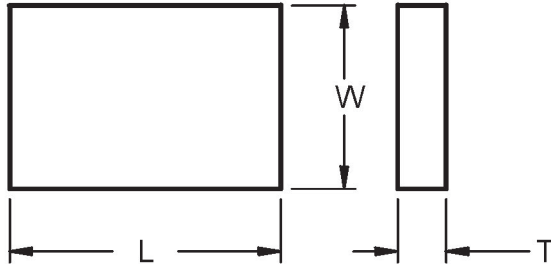
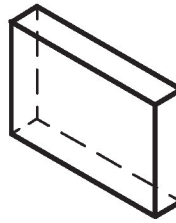
LX-1274-3-7



LX-1274-4-5



1000

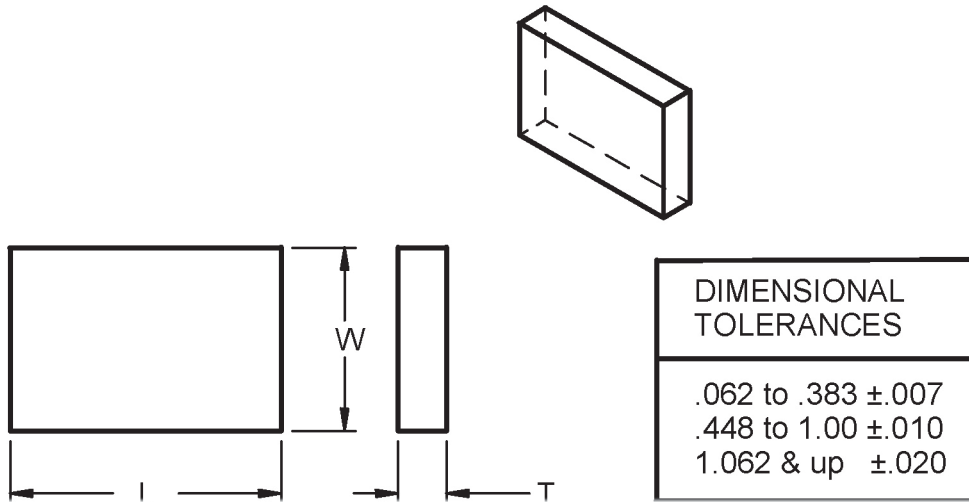


DIMENSIONAL TOLERANCES

.062 to .383 ±.007
 .448 to 1.00 ±.010
 1.062 & up ±.020

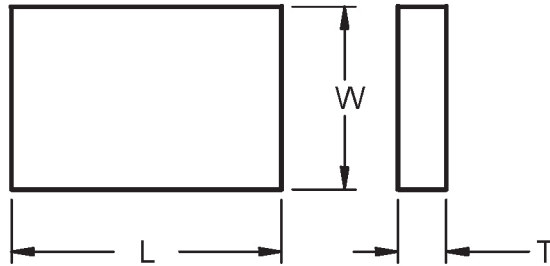
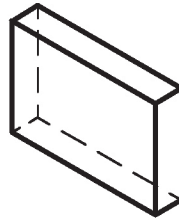
Insert	L	W	T	L	W	T
1010	5/8	1/8	1/16	.635	.133	.070
1015	1/4	5/32	1/16	.258	.164	.070
1020	1/4	3/16	1/16	.258	.196	.070
1024	1/2	3/16	1/16	.510	.196	.075
1025	1/4	1/4	1/16	.258	.258	.070
1030	5/16	1/4	1/16	.320	.258	.070
1035	3/4	1/8	3/32	.760	.133	.102
1040	5/16	3/16	3/32	.320	.196	.102
1045	5/16	1/4	3/32	.320	.258	.102
1050	1/2	3/16	3/32	.510	.196	.102
1060	3/8	1/4	3/32	.383	.258	.102
1070	1/2	1/4	3/32	.510	.258	.102
1080	3/8	5/16	3/32	.383	.320	.102
1090	3/8	3/8	3/32	.383	.383	.102
1100	1/2	3/8	3/32	.510	.383	.102
1105	1/2	7/16	3/32	.510	.448	.102
1107	1/2	3/16	1/8	.510	.196	.133
1109	5/8	3/16	1/8	.635	.196	.133
1110	3/4	3/16	1/8	.760	.196	.133
1120	1/2	1/4	1/8	.510	.258	.133
1130	5/8	1/4	1/8	.635	.258	.133
1140	3/4	1/4	1/8	.760	.258	.133
1150	7/16	5/16	1/8	.448	.320	.133
1160	1/2	5/16	1/8	.510	.320	.133
1170	5/8	5/16	1/8	.635	.320	.133

1000



Insert	L	W	T	L	W	T
1180	1/2	3/8	1/8	.510	.383	.133
1190	3/4	3/8	1/8	.760	.383	.133
1200	1/2	1/2	1/8	.510	.510	.133
1210	3/4	1/2	1/8	.760	.510	.133
1215	3/4	3/4	1/8	.760	.760	.133
1220	9/16	3/8	5/32	.572	.383	.164
1230	3/4	3/4	5/32	.760	.383	.164
1240	5/8	5/8	5/32	.635	.635	.164
1244	1/2	1/2	3/16	.510	.258	.196
1250	7/16	5/16	3/16	.448	.320	.196
1260	5/8	5/16	3/16	.635	.320	.196
1270	1/2	3/8	3/16	.510	.383	.196
1280	5/8	3/8	3/16	.635	.383	.196
1290	3/4	3/8	3/16	.760	.383	.196
1291	7/8	3/8	3/16	.885	.383	.196
1300	5/8	7/16	3/16	.635	.448	.196
1310	13/16	7/16	3/16	.822	.448	.196
1320	1/2	1/2	3/16	.510	.510	.196
1330	3/4	1/2	3/16	.760	.510	.196
1340	3/4	3/4	3/16	.760	.760	.196
1350	9/16	3/8	1/4	.572	.383	.258
1360	3/4	3/8	1/4	.760	.383	.258
1370	5/8	7/16	1/4	.635	.448	.258
1380	3/4	1/2	1/4	.760	.510	.258
1390	1	9/16	1/4	1.010	.572	.258

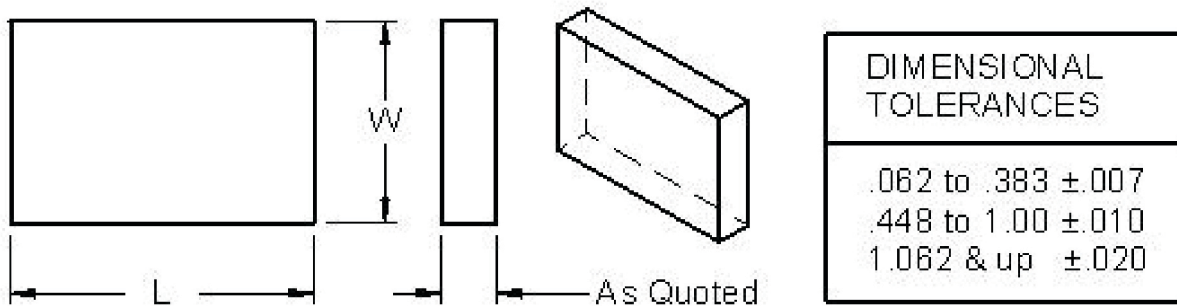
1000



DIMENSIONAL TOLERANCES
.062 to .383 ±.007
.448 to 1.00 ±.010
1.062 & up ±.020

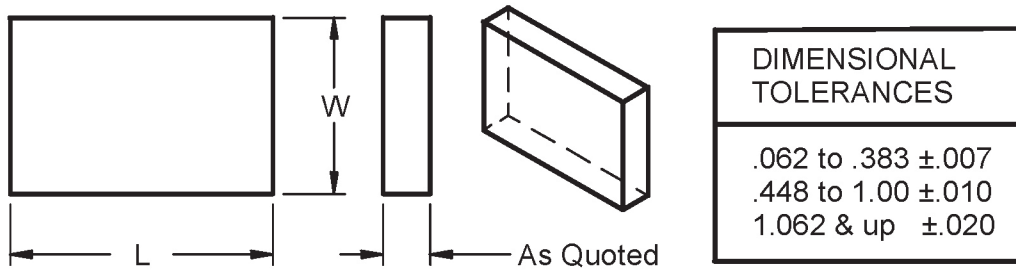
Insert	L	W	T	L	W	T
1400	5/8	5/8	1/4	.635	.635	.258
1405	3/4	3/4	1/4	.760	.760	.258
1410	1	3/4	1/4	1.010	.760	.258
1415	1	1	1/4	1.010	1.010	.258
1420	5/8	5/8	5/16	.635	.448	.320
1430	15/16	7/16	5/16	.948	.448	.320
1440	3/4	1/2	5/16	.760	.510	.320
1450	1	1/2	5/16	1.010	.510	.320
1460	1	5/8	5/16	1.010	.635	.320
1470	3/4	3/4	5/16	.760	.760	.320
1475	1	3/4	5/16	1.010	.760	.320
1480	1-1/4	3/4	5/16	1.270	.760	.320
1490	3/4	1/2	3/8	.760	.510	.383
1500	1	1/2	3/8	1.010	.510	.383
1510	1	5/8	3/8	1.010	.635	.383
1515	1-1/4	5/8	3/8	1.270	.635	.383
1520	1-1/4	3/4	3/8	1.270	.760	.383
1525	1-1/2	3/4	3/8	1.520	.760	.383
1530	1	3/4	1/2	1.010	.760	.510
1540	1-1/4	3/4	1/2	1.270	.760	.510
1550	1-1/2	3/4	1/2	1.520	.760	.510

NON-STANDARD RECTANGLES



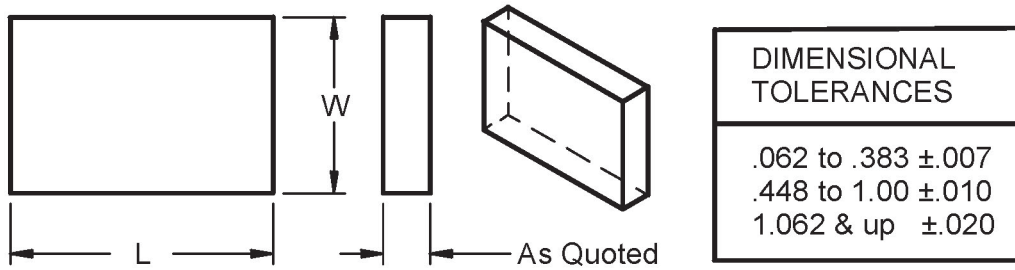
Insert	W	L
1/16 X 1/4	.068	.257
1/16 X 3/4	.069	.765
1/16 X 1-1/4	.066	1.270
1/16 X 1-1/2	.075	1.523
3/32 X 13/64	.112	.221
3/32 X 1/4	.100	.260
3/32 X 5/16	.100	.322
3/32 X 1/2	.099	.510
3/32 X 3/4	.114	.777
3/32 X 13/16	.099	.824
3/32 X 1	.100	1.010
3/32 X 1-1/16	.098	1.078
3/32 X 1-1/4	.098	1.270
3/32 X 1-3/8	.102	1.375
3/32 X 2	.114	2.030
3/32 X 2-1/2	.119	2.520
1/8 X 3/16	.133	.192
1/8 X 5/16	.151	.330
1/8 X 3/8	.132	.385
1/8 X 1/2	.135	.510
1/8 X 5/8	.142	.638
1/8 X 11/16	.135	.700
1/8 X 3/4	.144	.765
1/8 X 7/8	.138	.887
1/8 X 1	.135	1.020

NON-STANDARD RECTANGLES



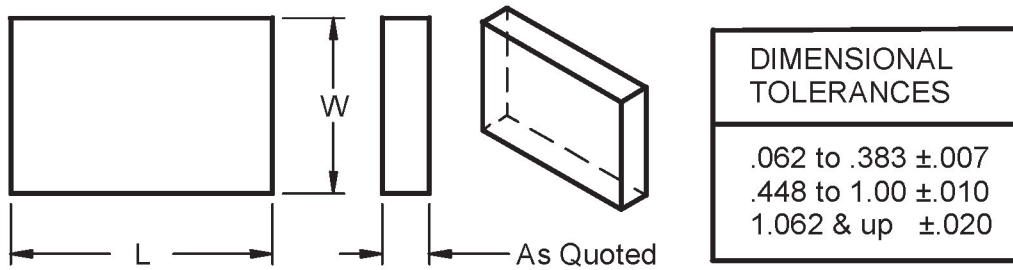
Insert	W	L
1/8 X 1-1/16	.140	1.075
1/8 X 1-1/8	.151	1.145
1/8 X 1-1/4	.138	1.285
1/8 X 1-1/2	.143	1.520
1/8 X 2	.146	2.046
9/64 X 3-7/32	.162	3.227
9/64 X 3-11/32	.152	3.415
5/32 X 3/16	.163	.194
5/32 X 5/16	.151	.330
5/32 X 3/8	.168	.390
5/32 X 1/2	.163	.510
5/32 X 5/8	.165	.635
5/32 X 3/4	.166	.780
5/32 X 7/8	.164	.890
5/32 X 1	.171	1.020
11/64 X 25/32	.181	.797
11/64 X 1	.183	1.020
3/16 X 3/16	.200	.200
3/16 X 3/8	.195	.385
3/16 X 7/16	.194	.448
3/16 X 17/32	.198	.540
3/16 X 5/8	.197	.635
3/16 X 3/4	.210	.760
3/16 X 13/16	.194	.824
3/16 X 7/8	.194	.889

NON-STANDARD RECTANGLES



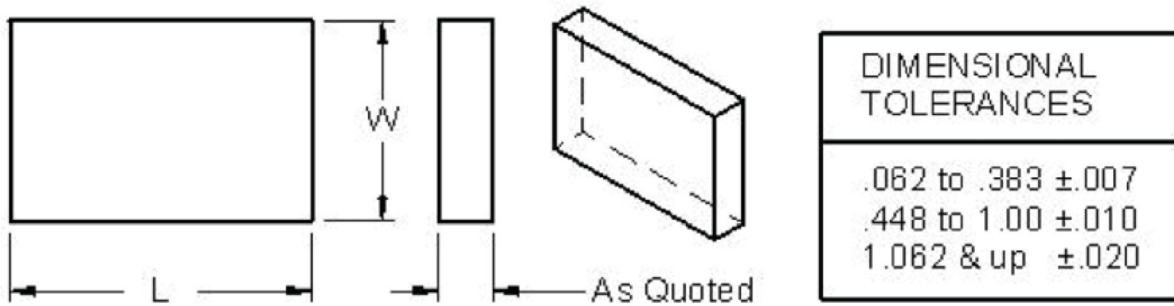
Insert	W	L
3/16 X 1	.194	1.010
3/16 X 1-1/8	.202	1.158
3/16 X 1-1/4	.203	1.267
3/16 X 1-5/16	.194	1.328
3/16 X 1-3/8	.197	1.395
3/16 X 1-1/2	.199	1.518
3/16 X 2	.204	2.035
13/64 X 3/4	.223	.770
7/32 X 7/32	.230	.230
7/32 X 5/16	.233	.327
7/32 X 3/8	.228	.385
7/32 X 1/2	.229	.514
1/4 X 7/16	.258	.448
1/4 X 9/16	.272	.588
1/4 X 11/16	.273	.713
1/4 X 25/32	.267	.789
1/4 X 13/16	.260	.828
1/4 X 7/8	.258	.885
1/4 X 31/32	.268	.977
1/4 X 1	.265	1.020
1/4 X 1-1/4	.272	1.286
1/4 X 1-5/16	.292	1.318
1/4 X 1-1/2	.271	1.520
1/4 X 1-9/16	.267	1.568
1/4 X 1-5/8	.275	1.645

NON-STANDARD RECTANGLES



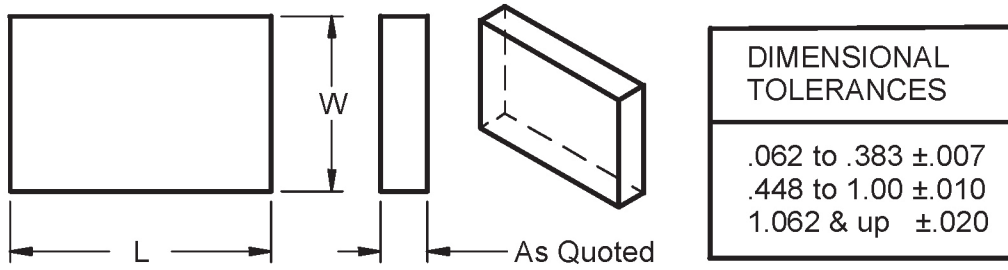
Insert	W	L
1/4 X 1-3/4	.265	1.780
1/4 X 2	.260	2.020
1/4 X 2-1/4	.275	2.273
1/4 X 2-1/2	.260	2.530
1/4 X 3	.268	3.025
9/32 X 3/8	.292	.395
5/16 X 5/16	.319	.319
5/16 X 17/32	.330	.554
5/16 X 21/32	.328	.682
5/16 X 3/4	.325	.765
5/16 X 25/32	.321	.790
5/16 X 7/8	.320	.888
5/16 X 1	.320	1.020
5/16 X 1-1/4	.327	1.272
5/16 X 1-5/16	.326	1.328
5/16 X 1-1/2	.329	1.517
5/16 X 1-9/16	.338	1.568
5/16 X 1-3/4	.319	1.765
5/16 X 2	.322	2.020
5/16 X 2-1/16	.331	2.081
3/8 X 3/8	.392	.392
3/8 X 7/16	.385	.447
3/8 X 11/16	.385	.705
3/8 X 25/32	.398	.784
3/8 X 57/64	.397	.903

NON-STANDARD RECTANGLES



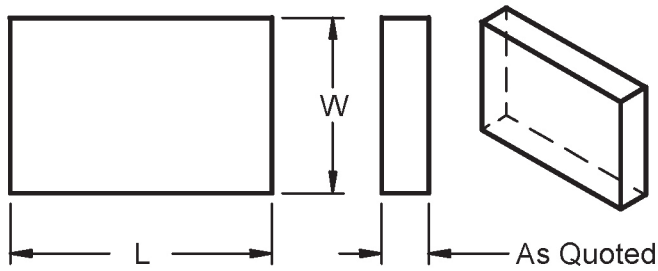
Insert	W	L
3/8 X 1	.400	1.040
3/8 X 1-1/8	.389	1.152
3/8 X 1-1/4	.393	1.279
3/8 X 1-3/8	.384	1.390
3/8 X 1-1/2	.392	1.540
3/8 X 1-3/4	.392	1.770
3/8 X 2	.392	2.025
3/8 X 2-1/4	.390	2.280
3/8 X 2-1/2	.390	2.530
13/32 X 1/2	.417	.513
13/32 X 1-9/16	.420	1.563
7/16 X 3/4	.450	.765
7/16 X 7/8	.452	.890
7/16 X 1	.452	1.038
7/16 X 1-3/4	.447	1.780
15/32 X 1-1/2	.482	1.520
31/64 X 51/64	.483	.798
1/2 X 5/8	.512	.635
1/2 X 25/32	.520	.781
1/2 X 13/16	.517	.830
1/2 X 7/8	.513	.892
1/2 X 1-1/32	.528	1.056
1/2 X 1-1/16	.520	1.092
1/2 X 1-1/4	.515	1.267
1/2 X 1-5/16	.528	1.312

NON-STANDARD RECTANGLES



Insert	W	L
1/2 X 1-3/8	.510	1.395
1/2 X 1-1/2	.518	1.535
1/2 X 1-9/16	.531	1.577
1/2 X 1-3/4	.530	1.765
1/2 X 1-7/8	.525	1.910
1/2 X 2	.530	2.015
1/2 X 2-1/4	.525	2.285
1/2 X 2-1/2	.535	2.520
35/64 X 7/8	.553	.900
9/16 X 9/16	.577	.577
9/16 X 3/4	.572	.760
9/16 X 2-1/2	.582	2.540
5/8 X 23/32	.648	.721
5/8 X 3/4	.635	.762
5/8 X 7/8	.637	.898
5/8 X 1-1/8	.633	1.145
5/8 X 1-1/2	.635	1.521
5/8 X 1-3/4	.642	1.780
5/8 X 1-7/8	.640	1.905
5/8 X 2	.645	2.020
5/8 X 2-13/32	.642	2.425
3/4 X 7/8	.765	.890
3/4 X 57/64	.775	.905
3/4 X 1-5/32	.768	1.176
3/4 X 1-3/4	.760	1.780

NON-STANDARD RECTANGLES

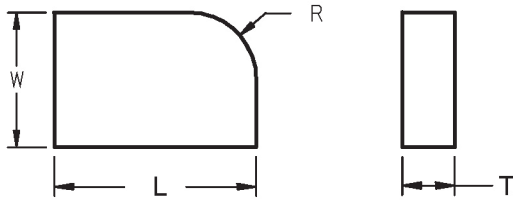
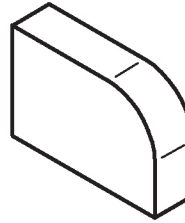


DIMENSIONAL TOLERANCES	
.062 to .383	±.007
.448 to 1.00	±.010
1.062 & up	±.020

Insert	W	L
3/4 X 1-7/8	.775	1.990
3/4 X 1-9/16	.784	1.568
25/32 X 25/32	.784	.784
25/32 X 2-1/32	.798	2.053
7/8 X 1	.900	1.033
7/8 X 1-3/4	.892	1.772
57/64 X 57/64	.904	.904
31/32 X 1-15/64	.998	1.248
1 X 1	1.018	1.018
1 X 1-1/4	1.017	1.267
1 X 1-1/2	1.010	1.515
1-1/32 X 1-1/32	1.065	1.065
1-1/4 X 1-1/4	1.270	1.270

2000

W (Width)	R (Rad.)
1/8 Thru 1/4	1/8
9/32 Thru 3/8	3/16
Over 3/8	1/4

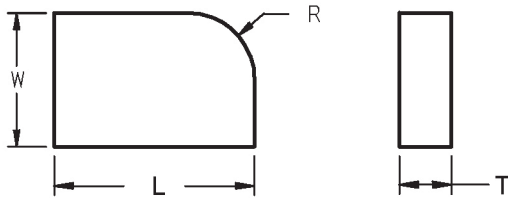
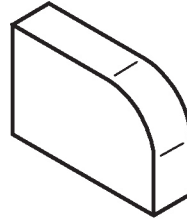


DIMENSIONAL TOLERANCES
UP to 3/8 +.015-.000
3/8 - 1 +.020-.000
1 and up +.040-.000

Insert	L	W	T	L	W	T
2000	1	1/2	1/8	1.012	.510	.133
2010	5/8	1/8	1/16	.635	.133	.070
2015	1/4	5/32	1/13	.258	.164	.070
2020	1/4	3/16	1/16	.258	.196	.070
2030	5/16	1/4	1/16	.320	.258	.070
2040	5/16	3/16	3/32	.320	.196	.102
2050	1/2	3/16	3/32	.510	.196	.102
2060	3/8	1/4	3/32	.383	.258	.102
2070	1/2	1/4	3/32	.510	.258	.102
2080	3/8	5/16	3/32	.383	.320	.102
2090	3/8	3/8	3/32	.383	.383	.102
2100	1/2	3/8	3/32	.510	.383	.102
2105	1/2	7/16	3/32	.510	.448	.102
2110	3/4	3/16	1/8	.760	.196	.133
2118	7/16	1/4	1/8	.448	.258	.133
2120	1/2	1/4	1/8	.510	.258	.133
2130	5/8	1/4	1/8	.635	.258	.133

2000

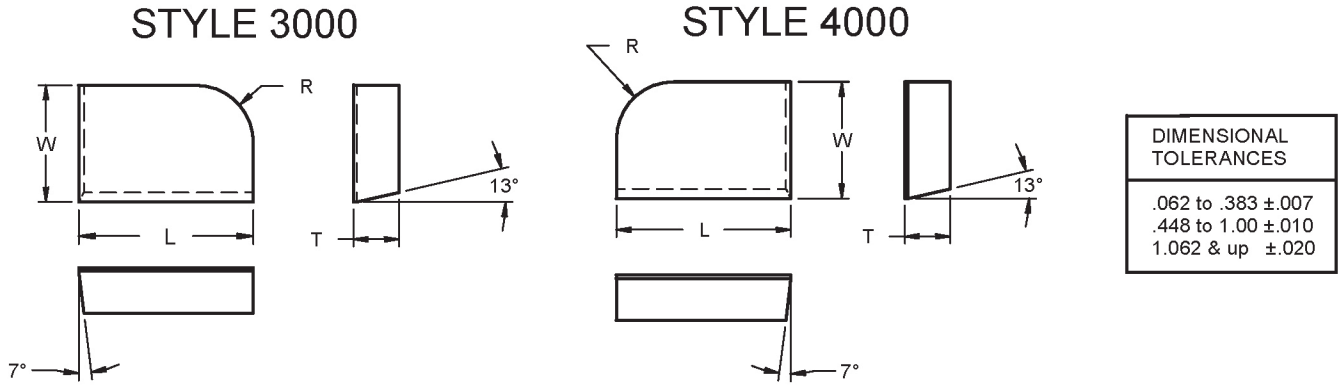
W (Width)	R (Rad.)
1/8 Thru 1/4	1/8
9/32 Thru 3/8	3/16
Over 3/8	1/4



DIMENSIONAL TOLERANCES
UP to 3/8 +.015-.000
3/8 - 1 +.020-.000
1 and up +.040-.000

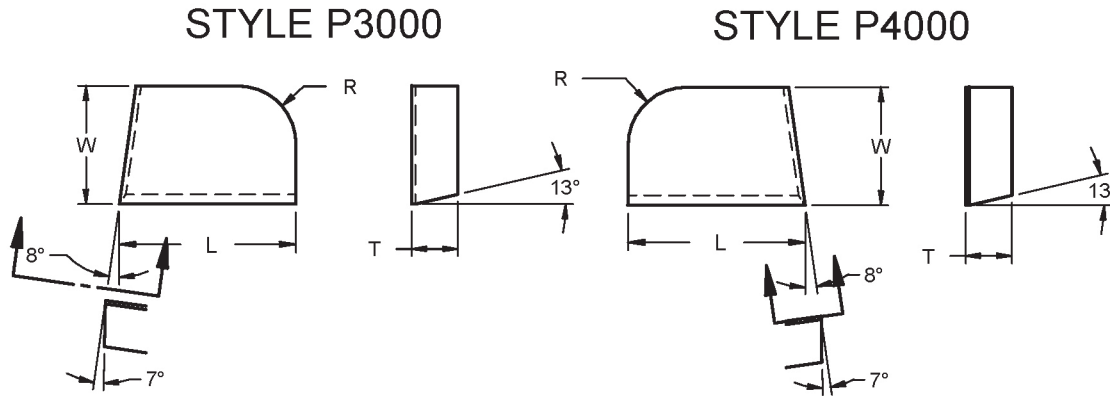
Insert	L	W	T	L	W	T
2215	3/4	3/4	1/8	.760	.760	.133
2220	9/16	3/8	5/32	.572	.383	.164
2230	3/4	3/8	5/32	.760	.383	.164
2240	5/8	5/8	5/32	.635	.635	.164
2250	7/16	5/16	3/16	.448	.320	.196
2260	5/8	5/16	3/16	.635	.320	.196
2270	1/2	3/8	3/16	.510	.383	.196
2280	5/8	3/8	3/16	.635	.383	.196
2290	3/4	3/8	3/16	.760	.383	.196
2300	5/8	7/16	3/16	.635	.448	.196
2310	13/16	7/16	3/16	.822	.448	.196
2320	1/2	1/2	3/16	.510	.510	.196
2330	3/4	1/2	3/16	.760	.510	.196
2340	3/4	3/4	3/16	.760	.760	.196
2350	9/16	3/8	1/4	.572	.383	.258
2360	3/4	3/8	1/4	.760	.383	.258
2390	1	9/16	1/4	1.010	.572	.258
2410	1	3/4	1/4	1.010	.760	.258
2430	15/16	7/16	5/16	.948	.448	.320
2440	3/4	1/2	5/16	.760	.510	.320
2450	1	1/2	5/16	1.010	.510	.320
2460	1	5/8	5/16	1.010	.635	.320
2480	1-1/4	3/4	5/16	1.270	.760	.320
2550	1-1/2	3/4	1/2	1.520	.760	.510

3000-4000



Insert	L	W	T	L	W	T
3070	1/2	1/4	3/32	.508	.258	.102
3170	5/8	5/16	1/8	.635	.321	.136
3230	3/4	3/8	5/32	.765	.385	.164
3310	13/16	7/16	3/16	.827	.447	.192
3360	3/4	3/8	1/4	.760	.383	.258
3380	3/4	1/2	1/4	.760	.510	.258
3390	1	9/16	1/4	1.010	.572	.258
3460	1	5/8	5/16	1.010	.635	.320
4070	1/2	1/4	3/32	.508	.258	.110
4170	5/8	5/16	1/8	.635	.321	.136
4230	3/4	3/8	5/32	.765	.385	.164
4310	13/16	7/16	3/16	.827	.447	.192
4380	3/4	1/2	1/4	.760	.510	.258
4390	1	9/16	1/4	1.010	.572	.258
4460	1	5/8	5/16	1.010	.635	.320

P3000-P4000

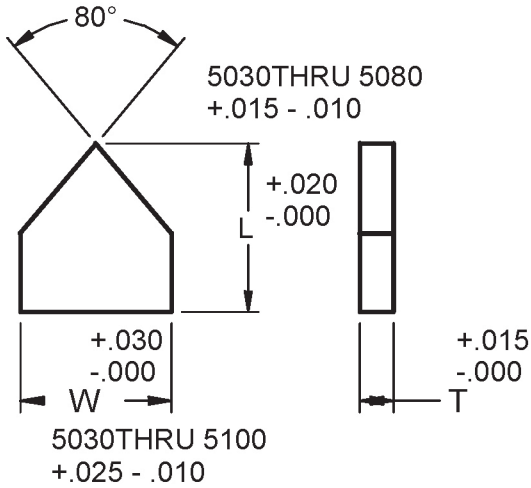


DIMENSIONAL TOLERANCES	
.062 to .383	±.007
.448 to 1.00	±.010
1.062 & up	±.020

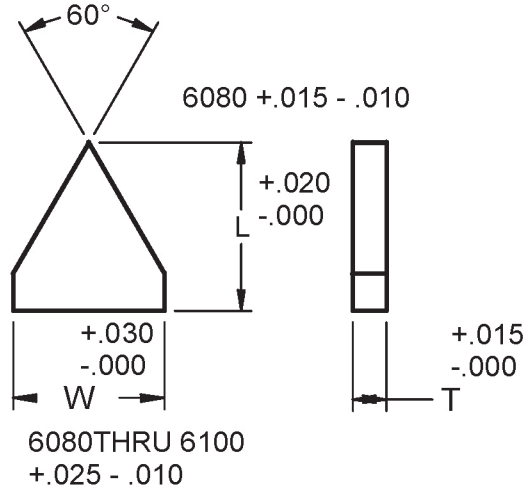
Insert	L	W	T	R
P3040	.313	.188	.094	.125
P3070	.500	.250	.094	.125
P3170	.625	.313	.125	.188
P3230	.750	.375	.156	.188
P3310	.813	.438	.188	.250
P3360	.750	.375	.250	.188
P3380	.750	.500	.250	.250
P3390	1.000	.563	.250	.250
P4040	.313	.188	.094	.125
P4070	.500	.250	.094	.125
P4170	.625	.313	.125	.188
P4230	.750	.375	.156	.188
P4310	.813	.438	.188	.250
P4390	1.000	.563	.250	.250

5000-6000

STYLE 5000

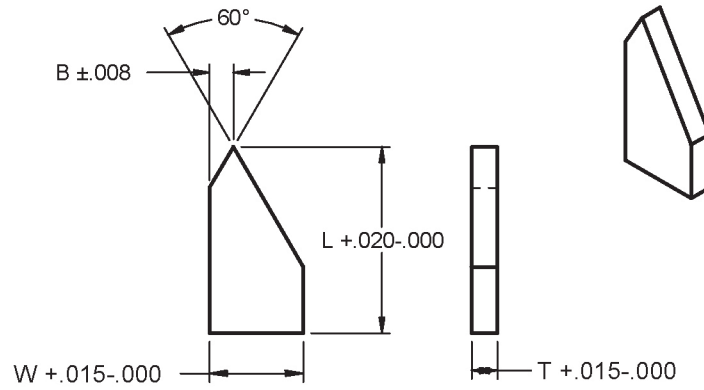


STYLE 6000



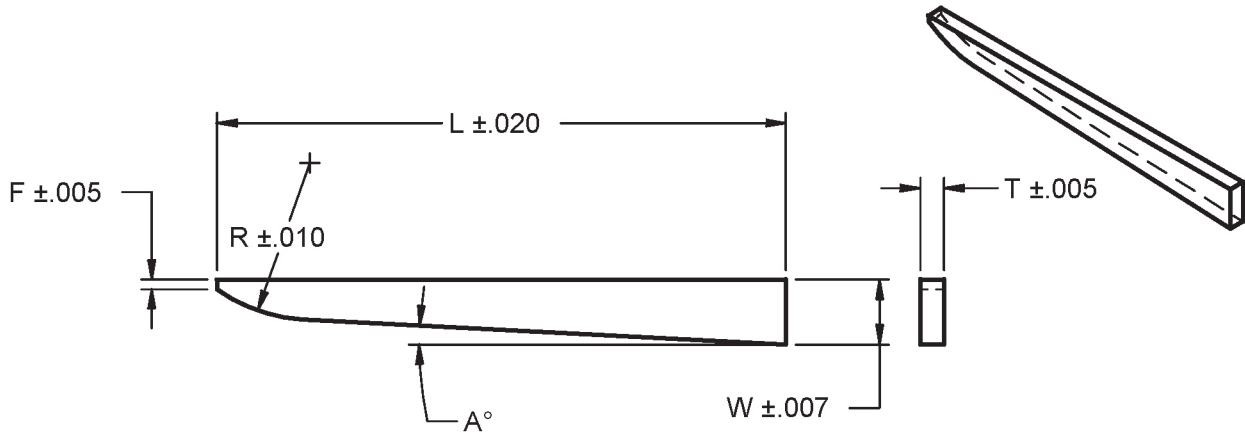
Insert	T	W	L
5030	.063	.250	.313
5080	.094	.313	.375
5100	.094	.375	.500
5105	.094	.438	.500
5200	.125	.500	.500
5240	.156	.625	.625
5340	.188	.750	.750
5410	.250	1.000	.750
6080	.094	.313	.375
6100	.094	.375	.500
6105	.094	.438	.500
6200	.125	.500	.500
6205	.125	.500	.563
6240	.156	.625	.625
6340	.188	.750	.750

7000



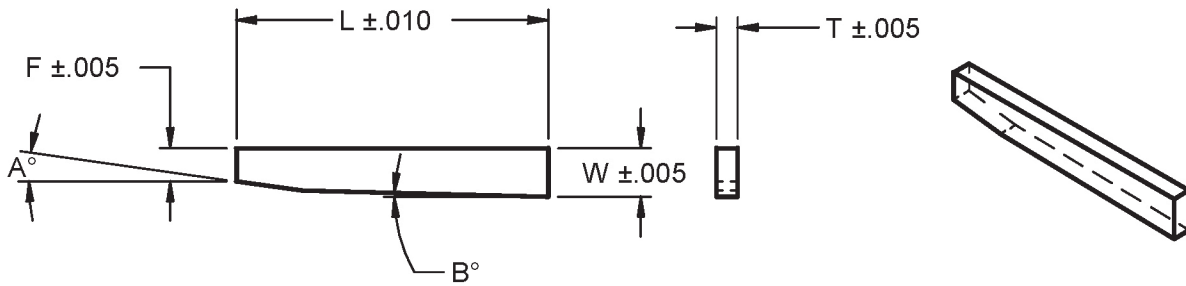
Insert	T	W	L	B
7060	.094	.250	.375	.063
7170	.125	.313	.625	.094
7230	.156	.375	.750	.125

MISC. ROUTER/REAMERS



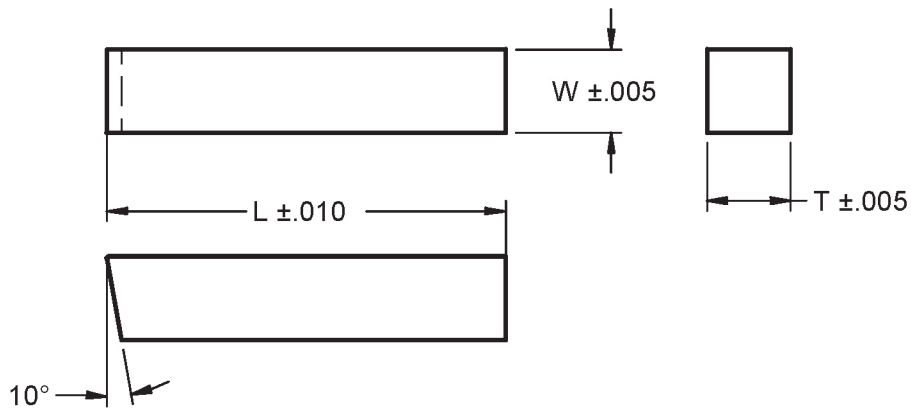
Insert	T	W	L	R	A°	F
T-16634	.072	.200	1.832	.500	3°	.037
R-15379	.077	.215	2.030	.368	2°	.025
T-16713-A	.072	.198	1.520	1.313	2°	.040
T-14619-A	.078	.250	1.031	1.250	---	.190
A-2598-A-1	.055	.187	1.295	1.500	2°	.097
A-2598-A-3	.066	.158	1.270	1.500	2°	.086
A-1769-A-1	.065	.218	1.520	1.312	1.5°	.086
A-2691-A-4	.066	.158	1.020	1.500	2°	.086
A-2691-A-8	.082	.232	1.280	1.500	2°	.147
T-16630-C-1	.065	.185	2.031	.500	2°	.031

MISC. ROUTER/REAMERS



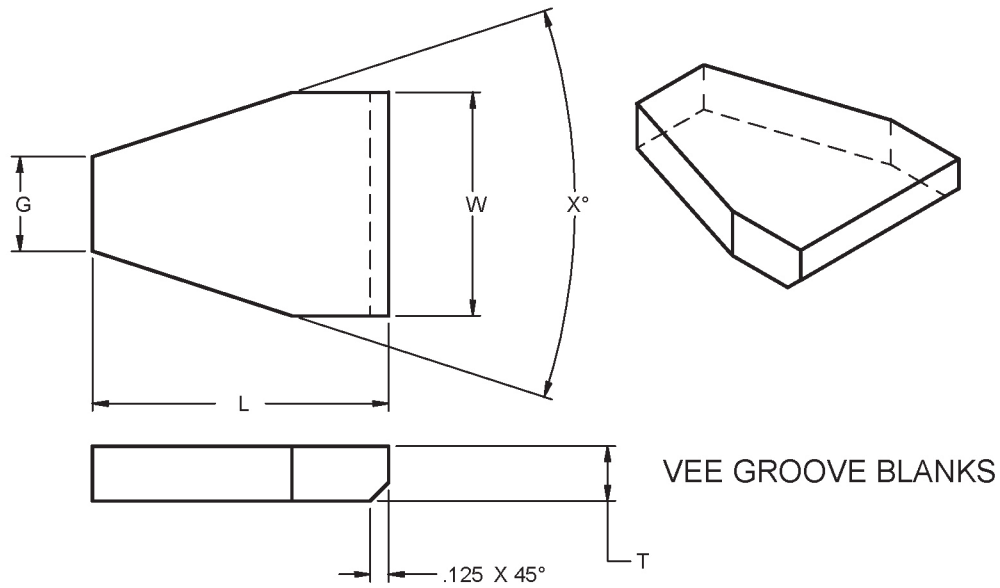
Insert	T	W	L	A°	B°	F
T-17208-G-1	.083	.195	1.545	12°	1.5°	.098
T-17208-G-2	.048	.103	.655	8°	1.5°	.070
T-17208-G-3	.045	.125	.780	10°	----	.075
T-17208-G-4	.083	.195	1.295	12°	1.5°	.098
T-17208-G-6	.078	.195	2.040	12°	1°	.098
T-17208-G-10	.066	.158	1.020	10°	2°	.086
T-17208-G-13	.067	.181	1.030	12°	2°	.101

SS-810



Insert	T	W	L
SS-810	.262	.262	1.250

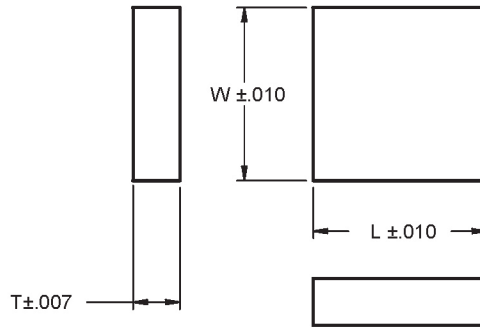
VGB



Insert	T	W	L	G	X°
VGB-21	5/16	5/8	1"	.195	34°
VGB-22	5/16	5/8	1"	.167	38°
VGB-23	5/16	3/4	1-1/8	.283	34°
VGB-24	5/16	3/4	1-1/8	.251	38°
VGB-25	5/16	1"	1-1/2	.403	34°
VGB-26	5/16	1"	1-1/2	.381	36°
VGB-27	5/16	1"	1-1/2	.358	38°

C-TOOL BLANK

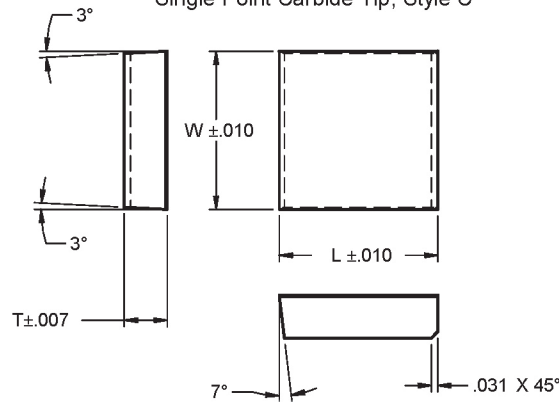
Single Point Carbide Tip, Style C



Insert	T	W	L	Notes
C-4	.064	.258	.320	Style 1030
C-5	.102	.320	.383	Style 1080
C-6	.102	.383	.383	Style 1090
C-7	.102	.448	.510	Style 1105
C-64	.268	.757	.757	Style 1405
C-66	.320	.757	.757	Style 1470
C-86	.320	1.010	.760	Style 1475

C-TOOL BLANK

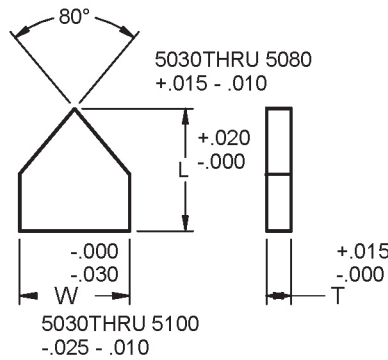
Single Point Carbide Tip, Style C



Insert	T	W	L
C-8	.143	.508	.508
C-10	.164	.632	.632
C-12	.206	.762	.762
C-16	.268	1.015	.762
C-44	.206	.508	.508
C-54	.268	.632	.632
C-55	.268	.632	.632

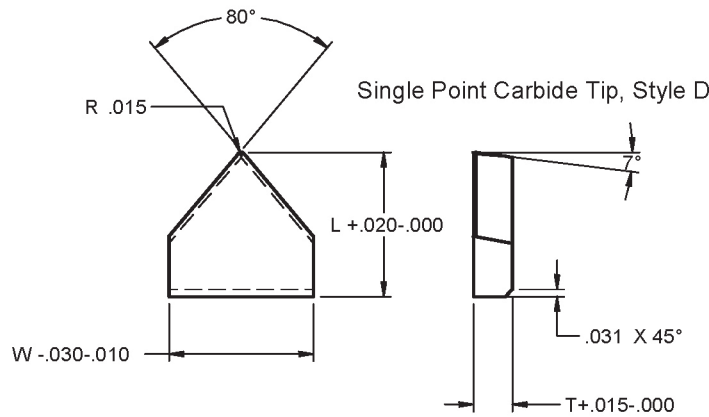
D-TOOL BLANK

Single Point Carbide Tip, Style D



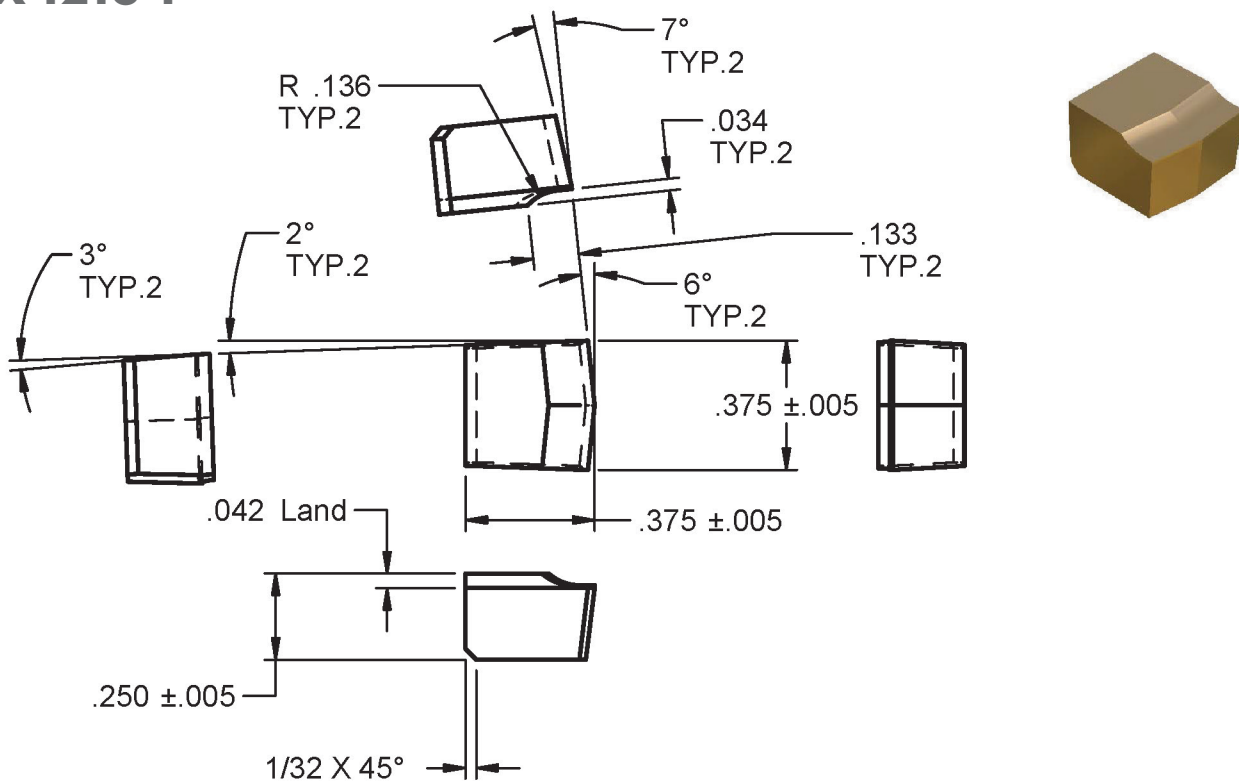
Insert	T	W	L	Notes
D-4	.063	.250	.313	Style 5030
D-5	.094	.313	.375	Style 5080
D-6	.094	.375	.500	Style 5100
D-7	.094	.438	.500	Style 5105

D-TOOL BLANK

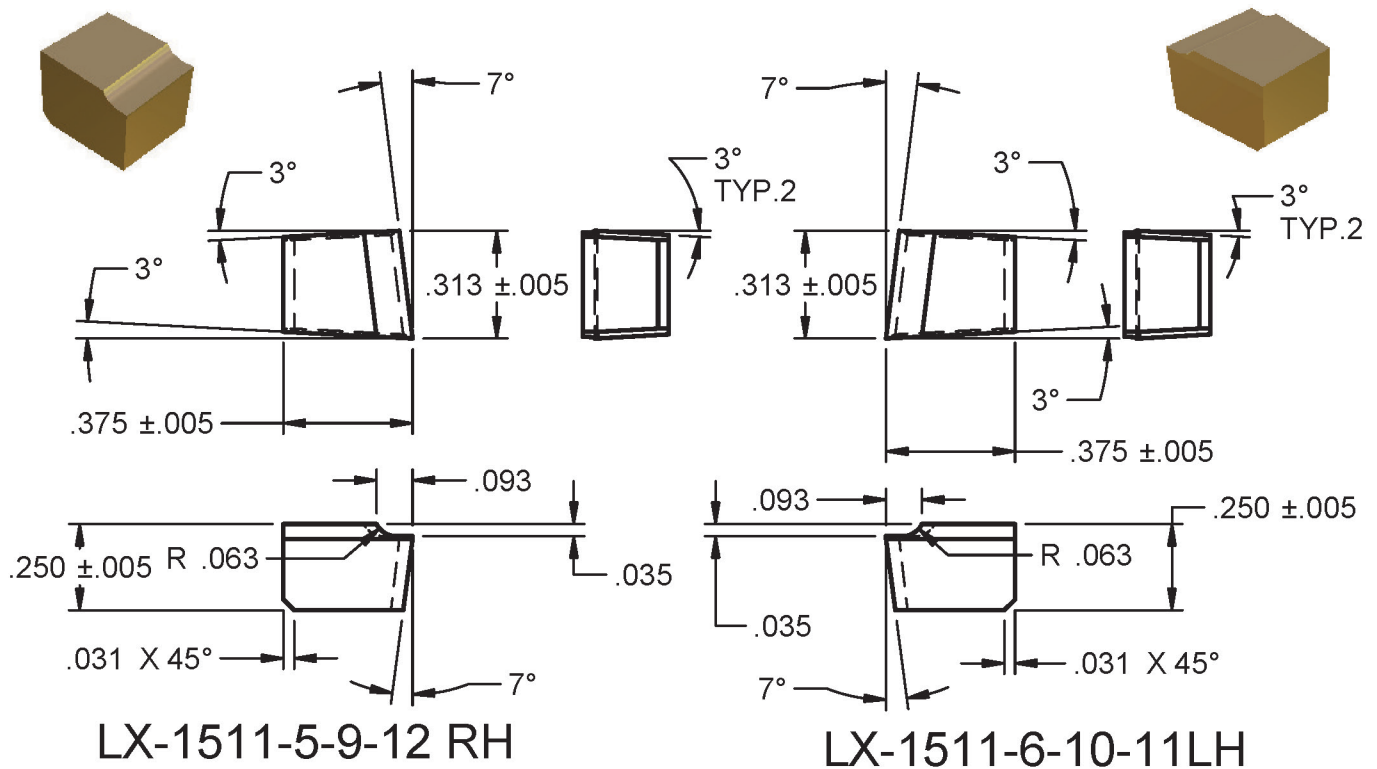


Insert	T	W	L
D-8	.125	.500	.500
D-10	.156	.625	.625
D-12	.188	.750	.750
D-16	.250	1.000	.750

EX-1218-1



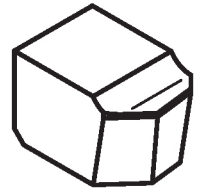
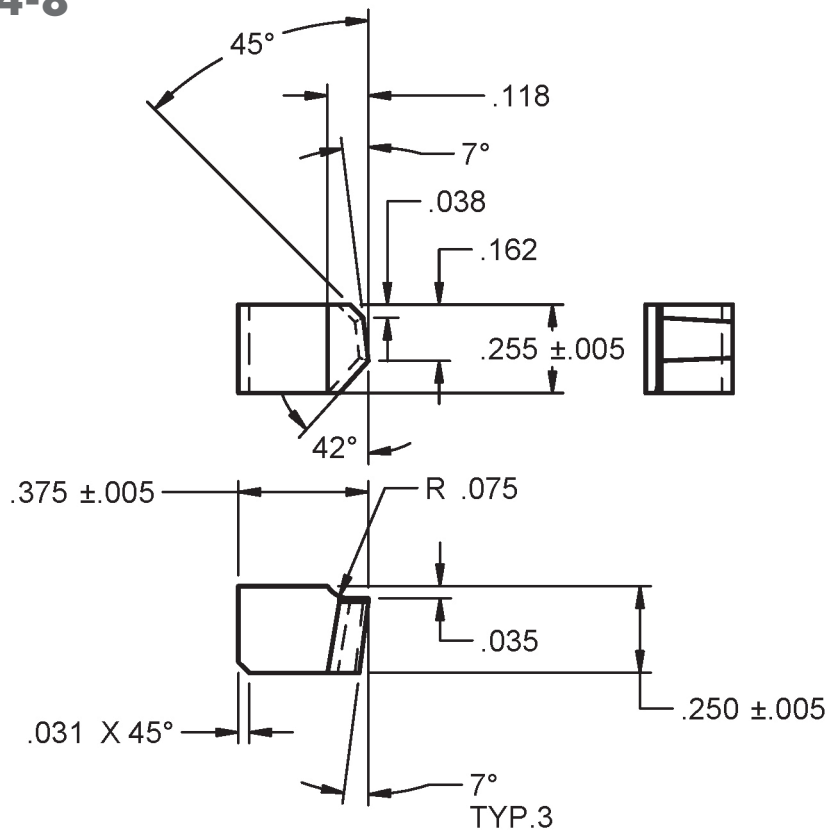
LX-1511-5-9-12 & LX-1511-6-10-11



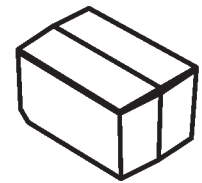
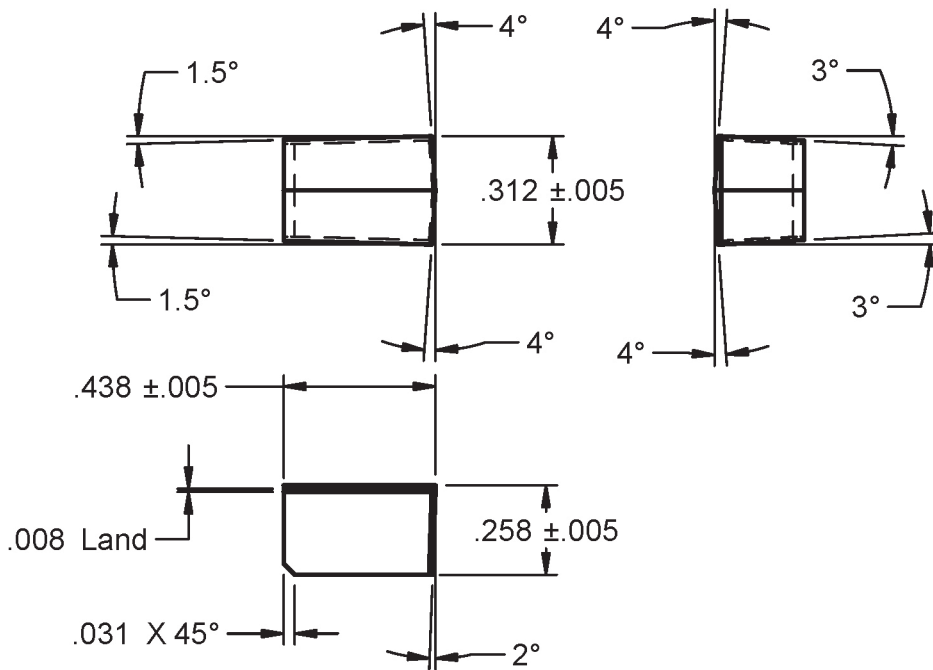
LX-1511-5-9-12 RH

LX-1511-6-10-11 LH

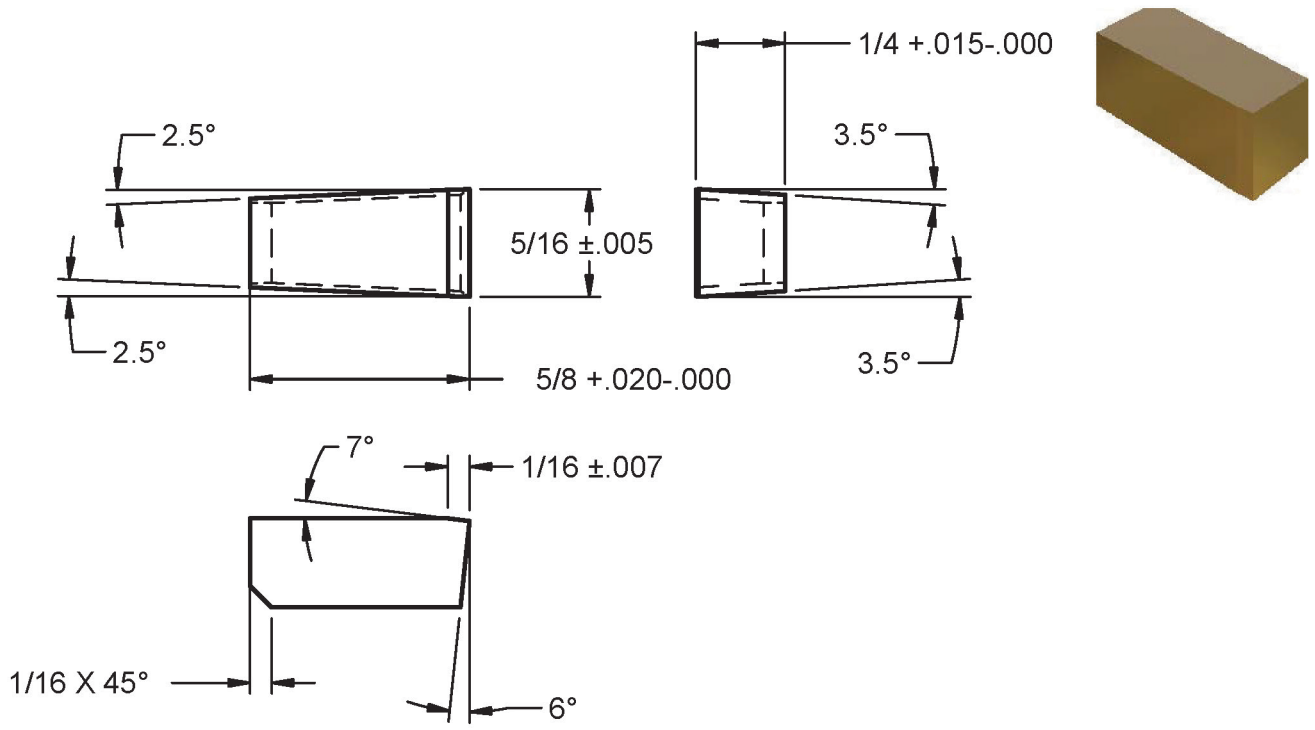
LX-1511-4-8



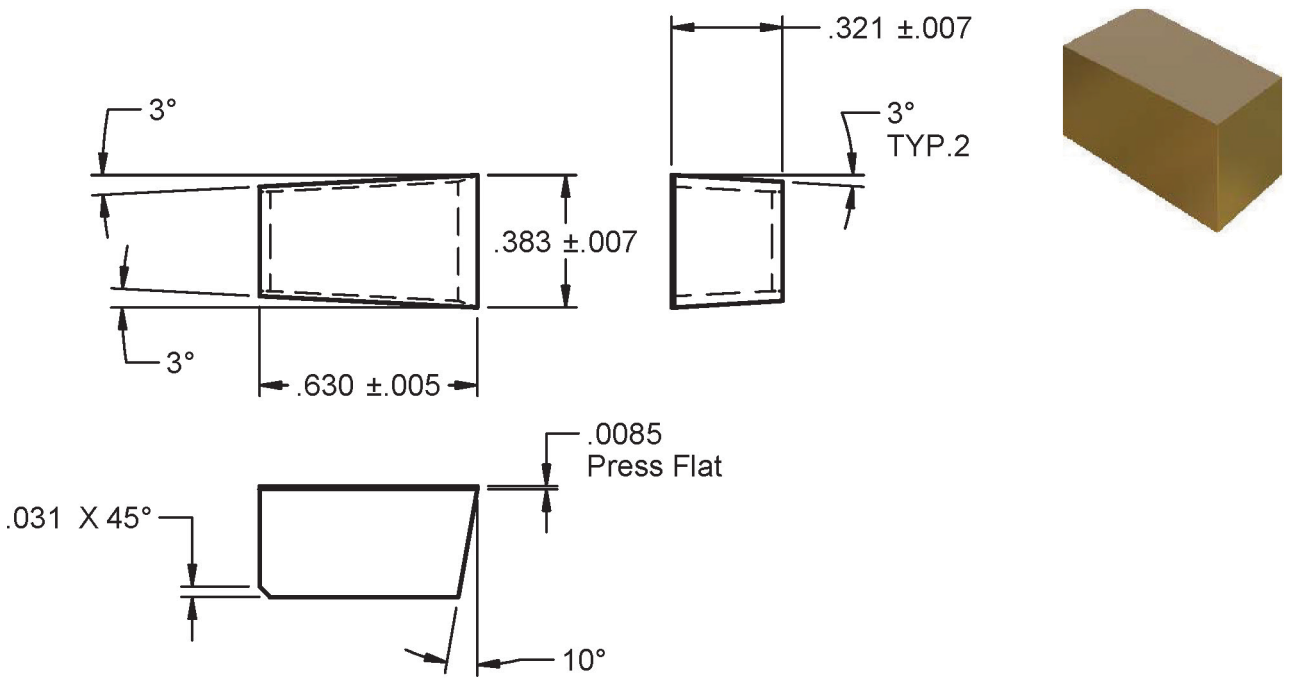
LX-0467-2



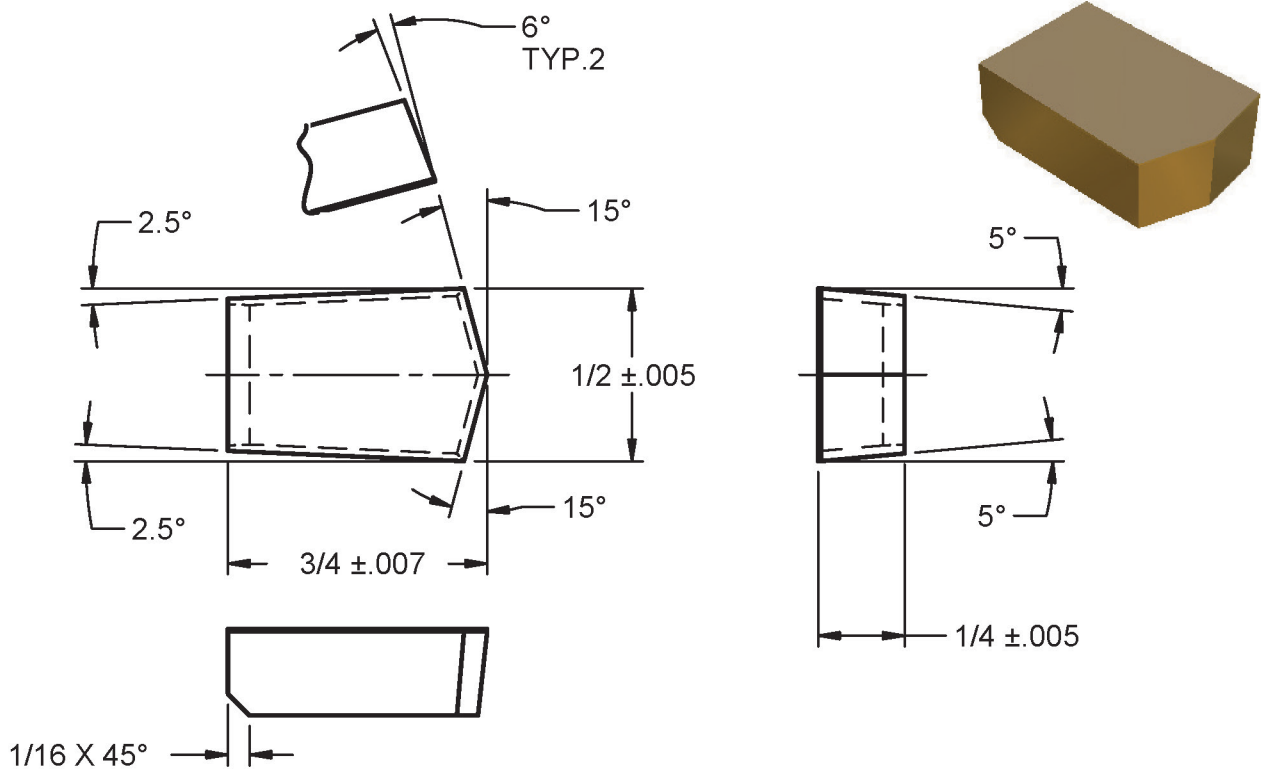
LX-0322



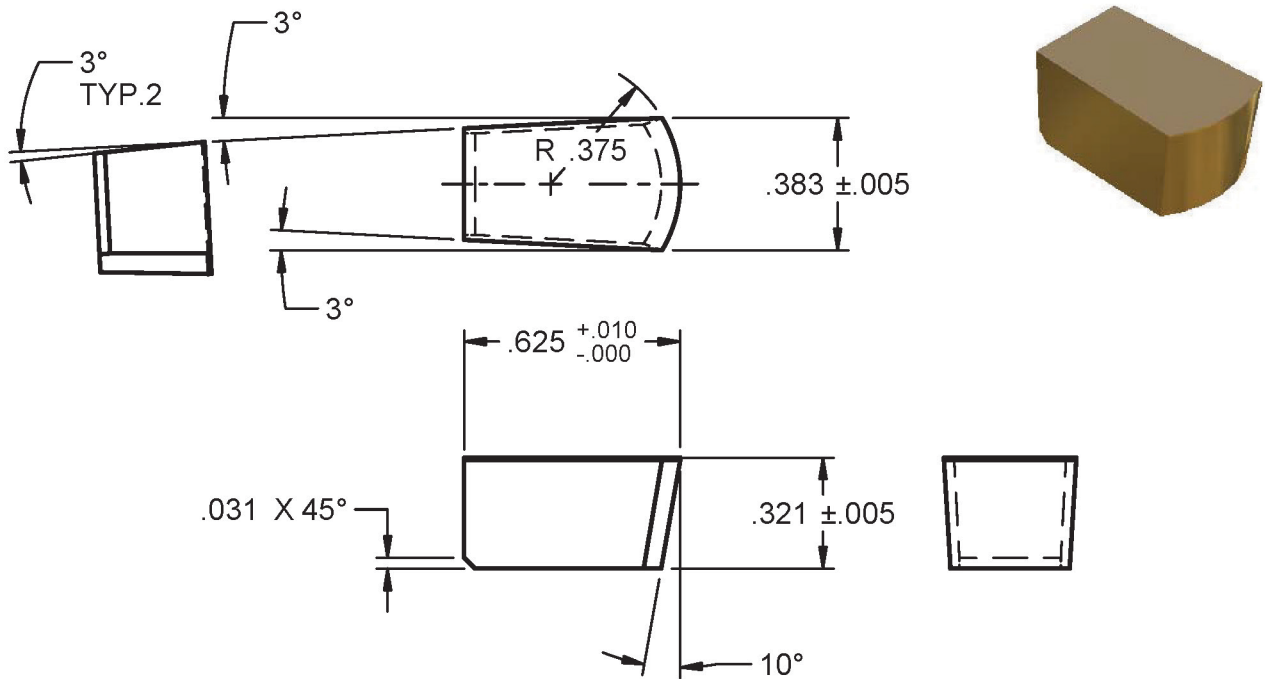
A-1799-A-1



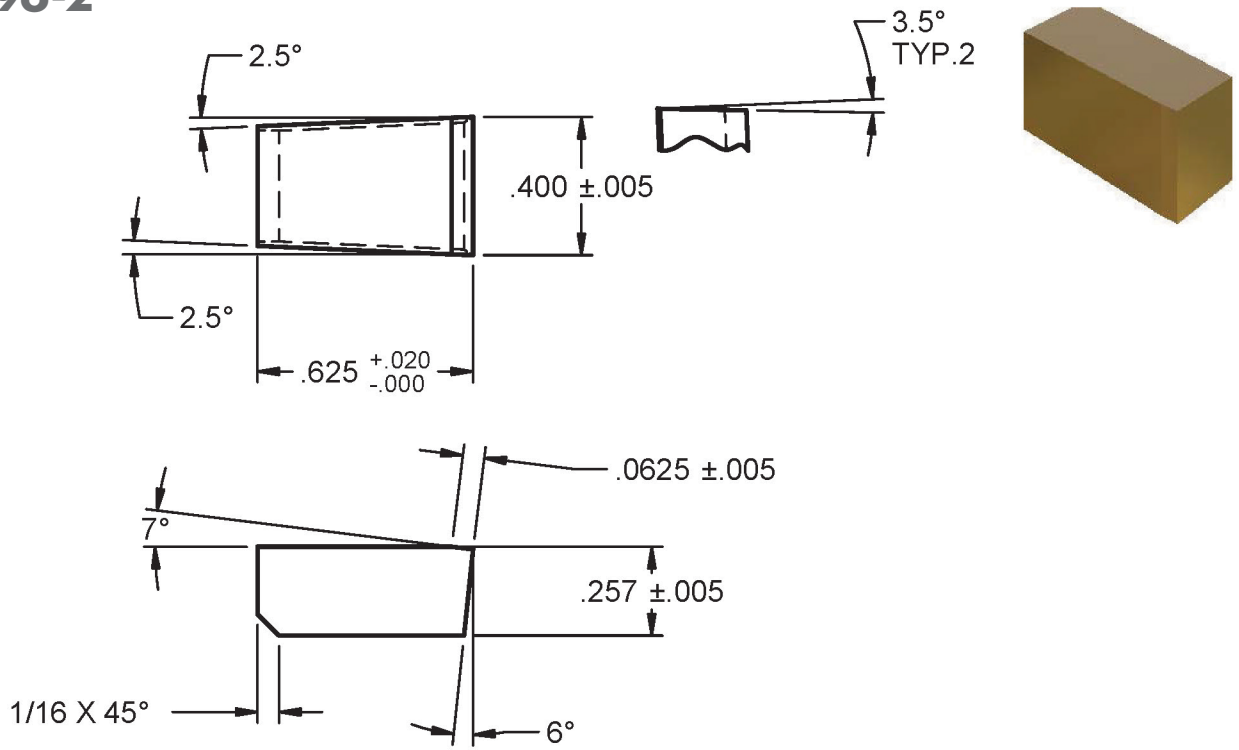
T-14497 (D&T-225)



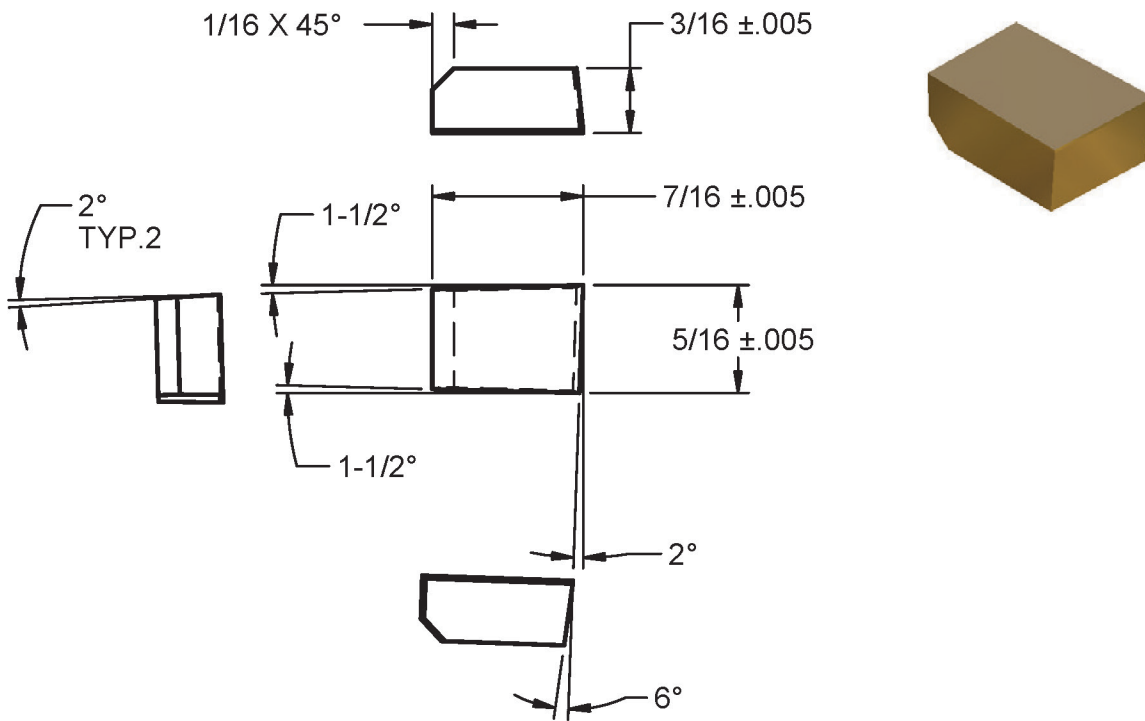
A-1722-A



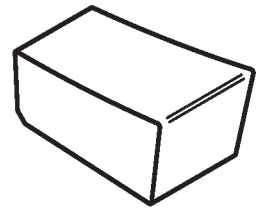
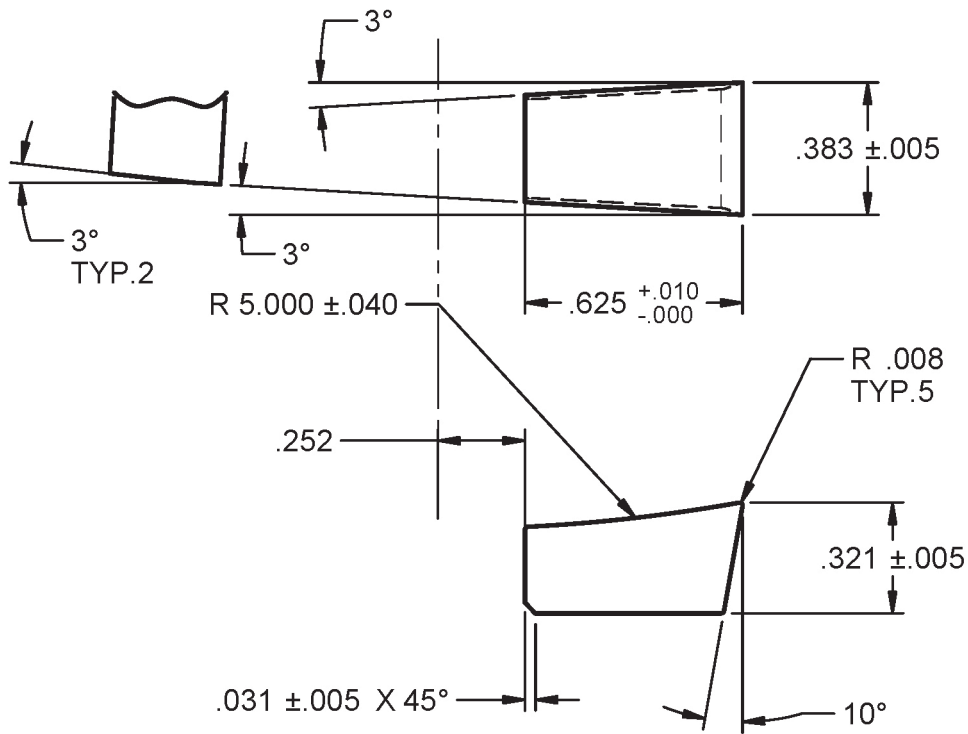
LX-1196-2



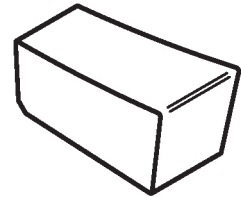
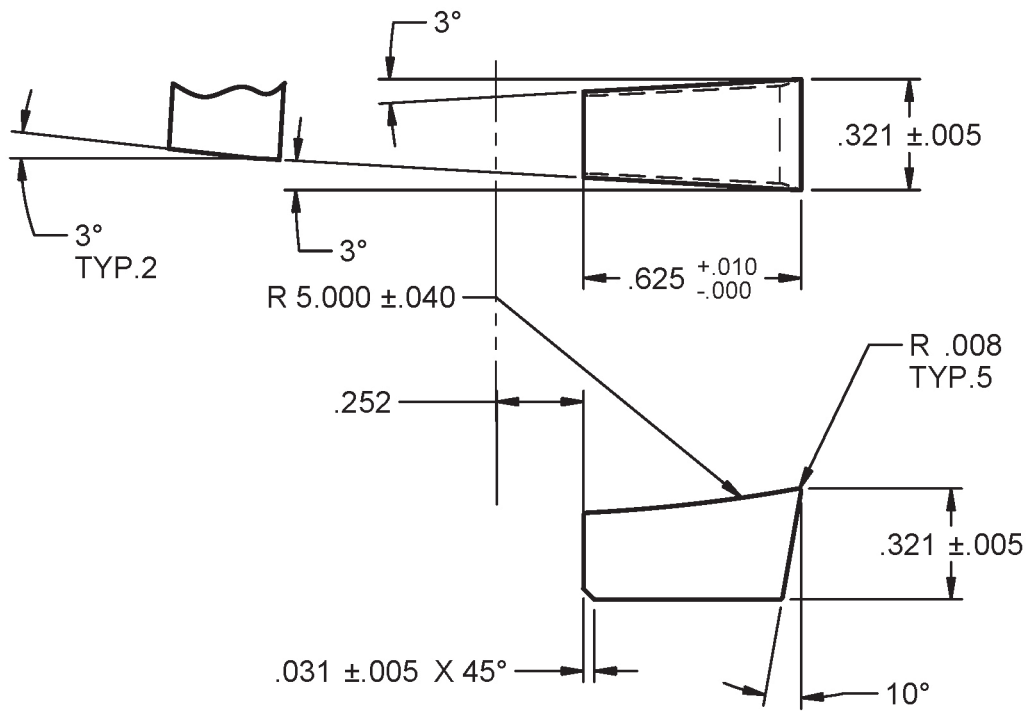
T-14740



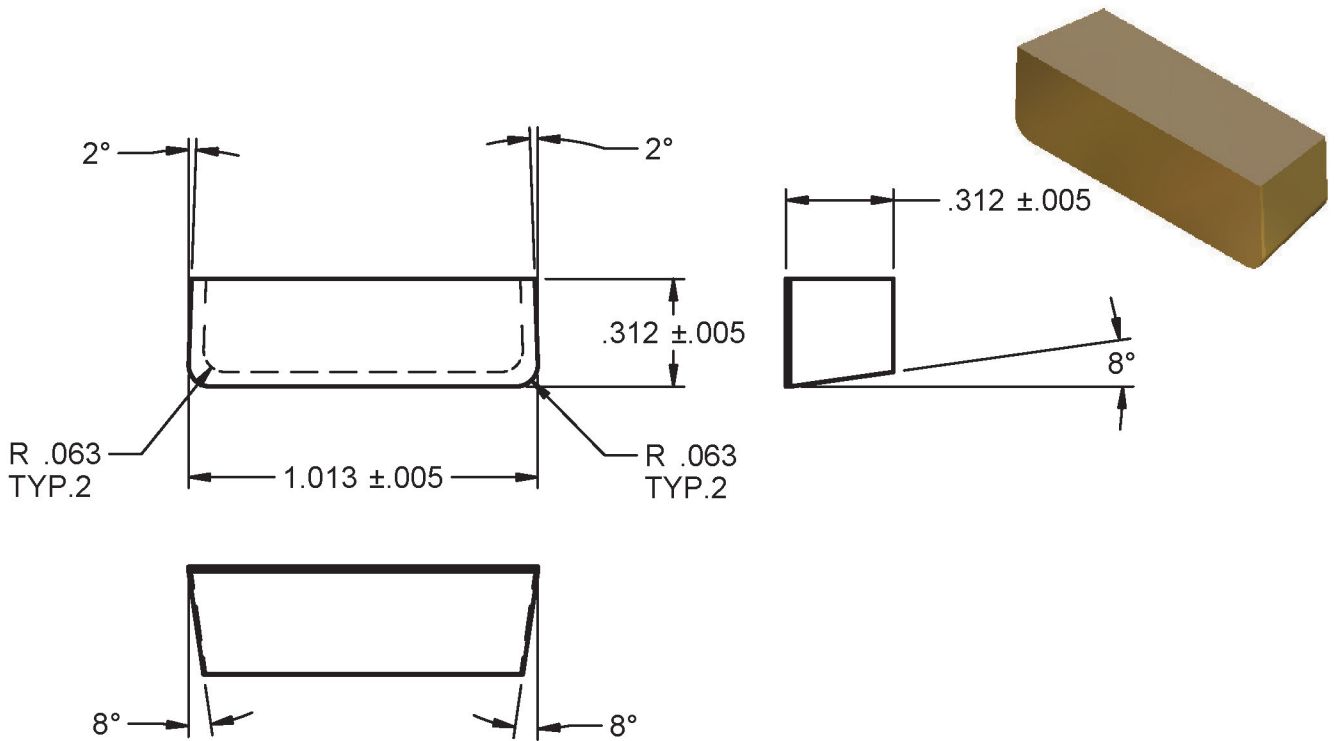
A-1858-A-1



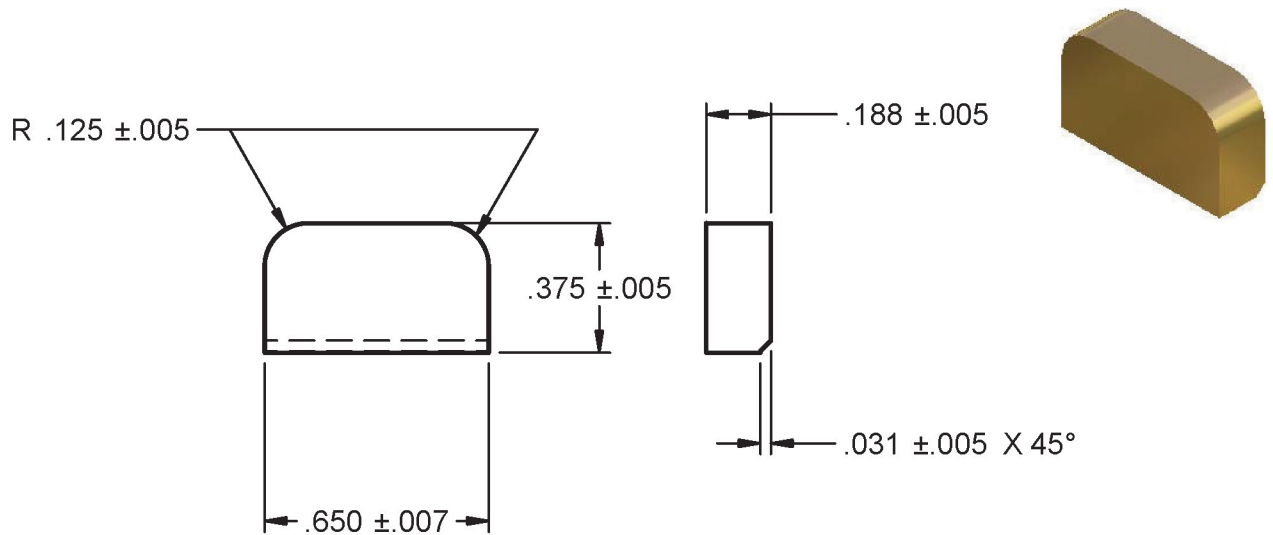
A-1858-A-2



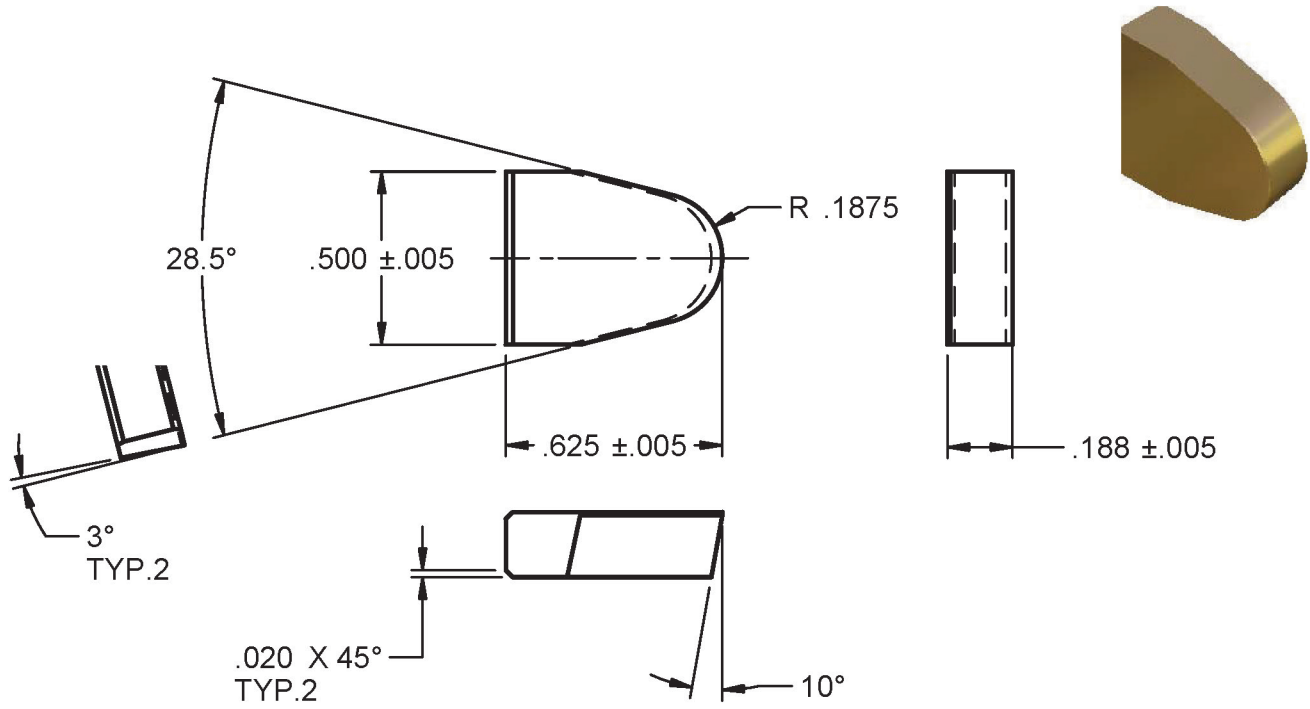
A-2956-A



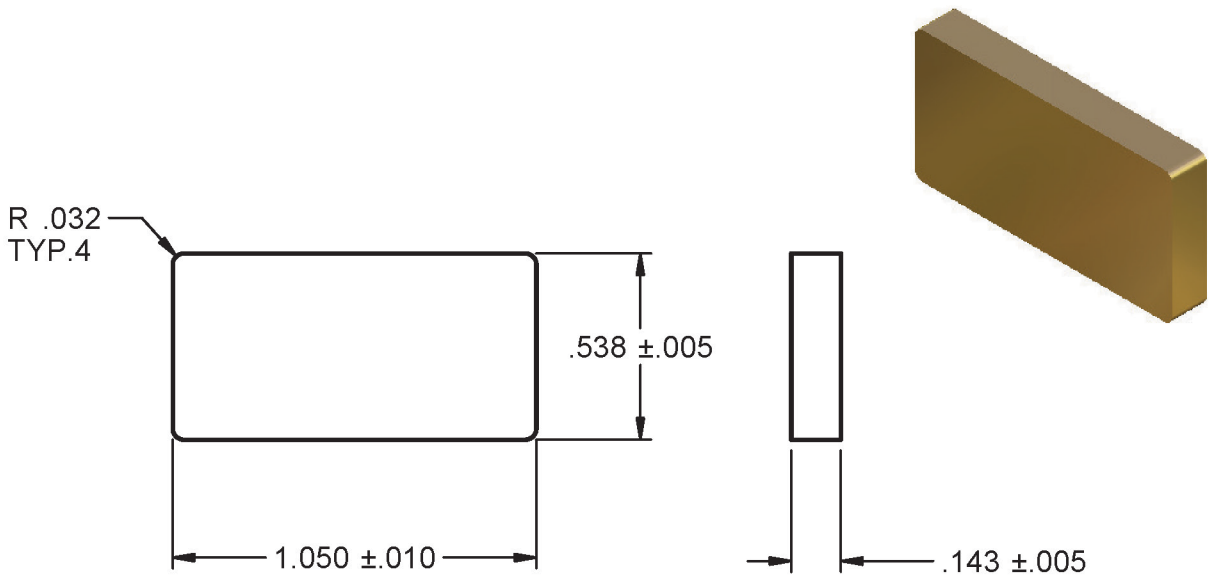
T-14740



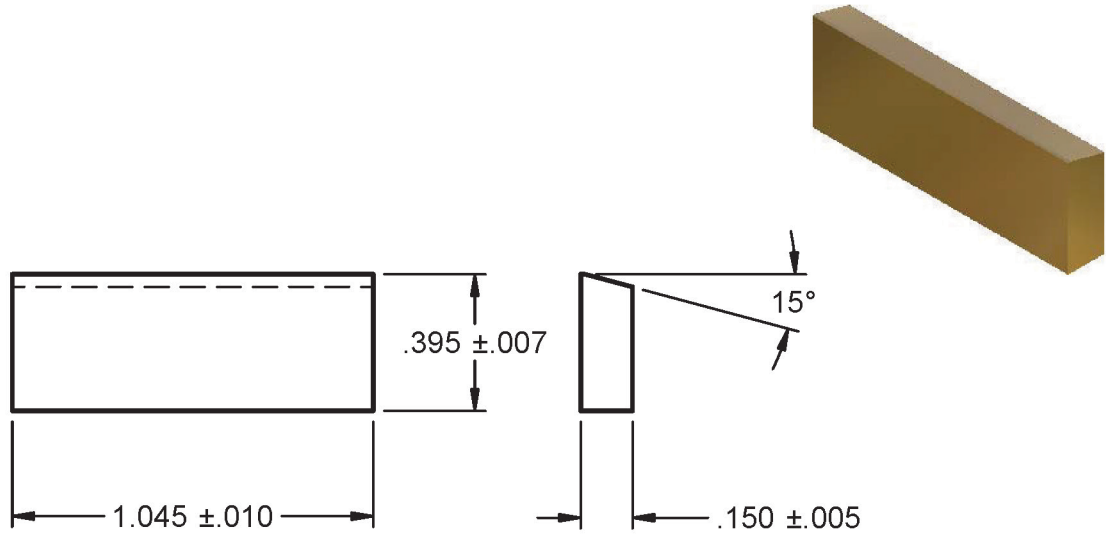
R-10753



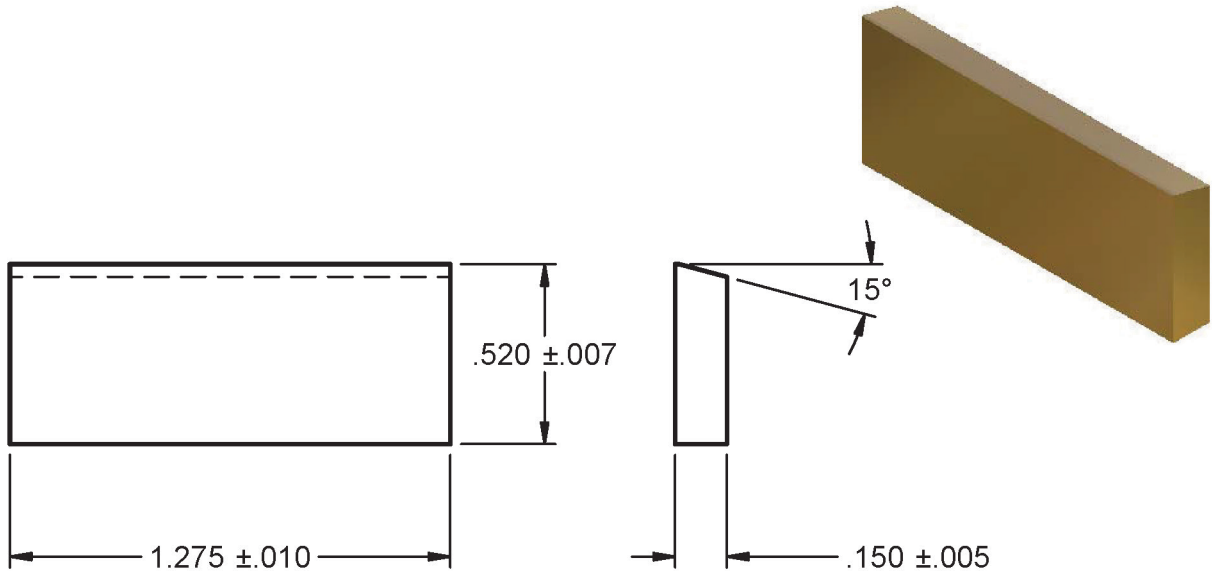
LX-1203-5



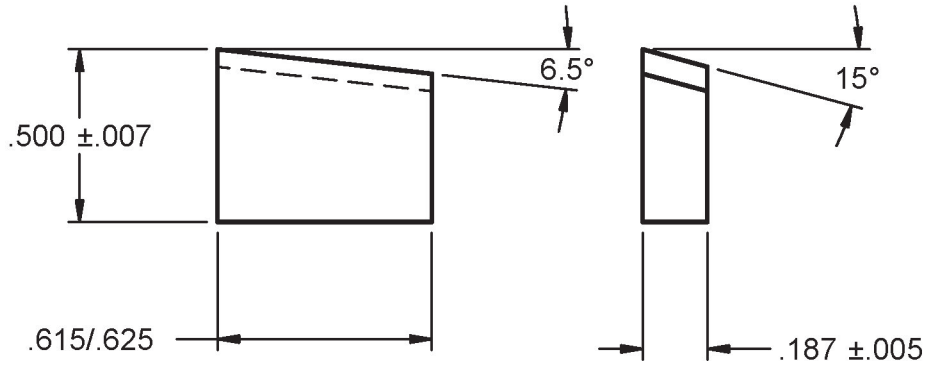
T-23781-A-51



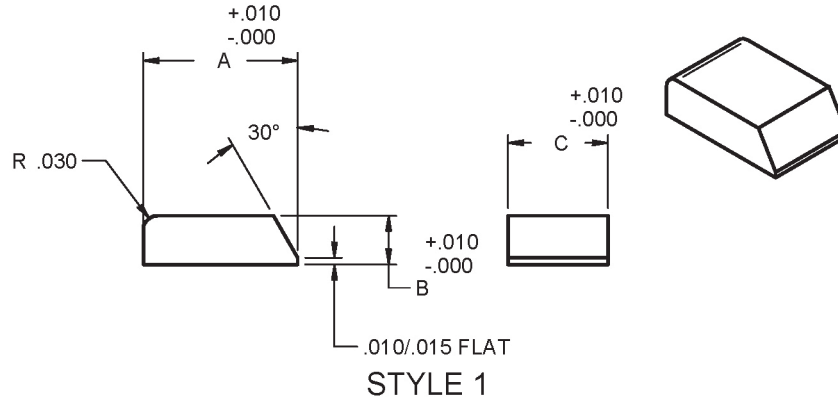
T-T-23781-A-55



LX-0526-1

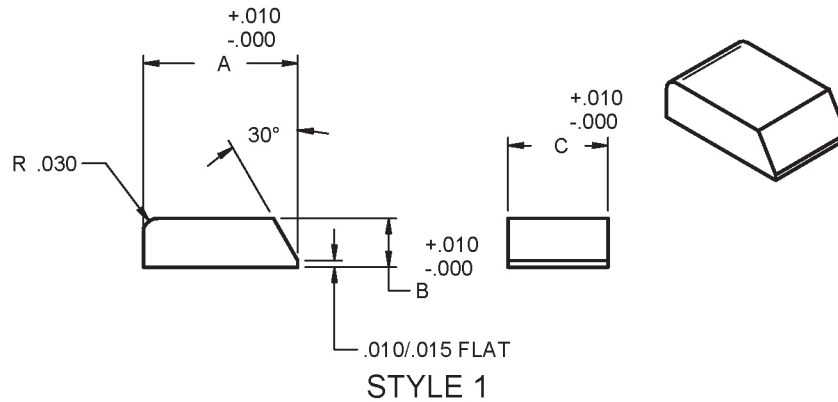


WA- CIRCULAR SAW TIP BLANK



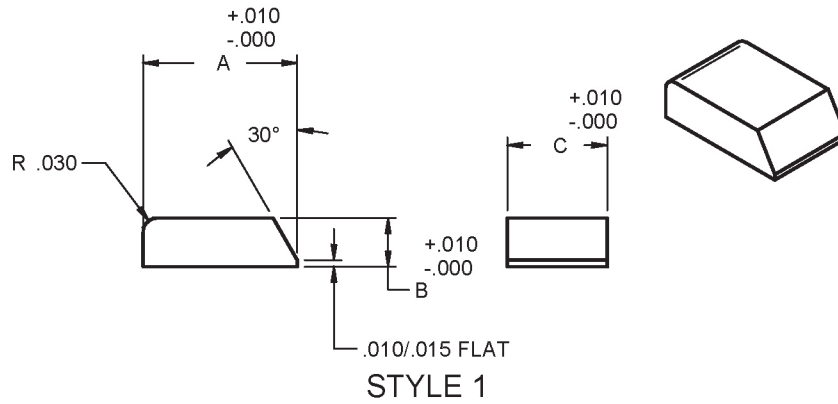
Insert	A	B	C
WA-7100	.250	.062	.100
WA-7110	.250	.062	.110
WA-7125	.250	.062	.125
WA-7130	.250	.062	.130
WA-7140	.250	.062	.140
WA-7145	.250	.062	.145
WA-7160	.250	.062	.160

WB - CIRCULAR SAW TIP BLANK



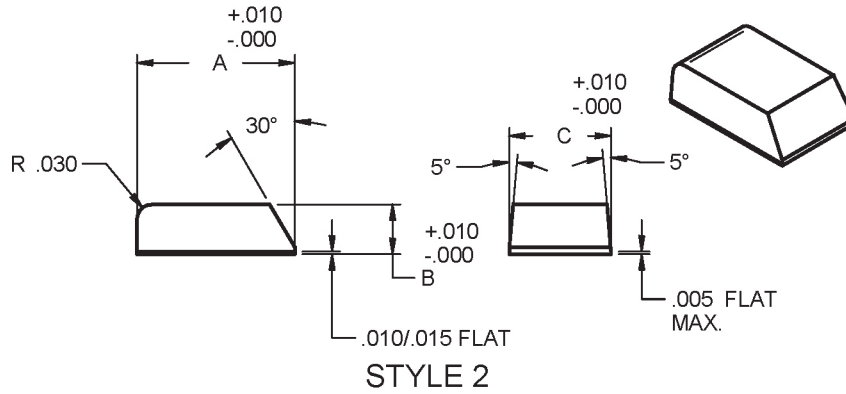
Insert	A	B	C
WB-7100	.281	.078	.100
WB-7115	.281	.078	.115
WB-7125	.281	.078	.125
WB-7130	.281	.078	.130
WB-7150	.281	.078	.150
WB-7160	.281	.078	.160
WB-7195	.281	.078	.195

WD - CIRCULAR SAW TIP BLANK



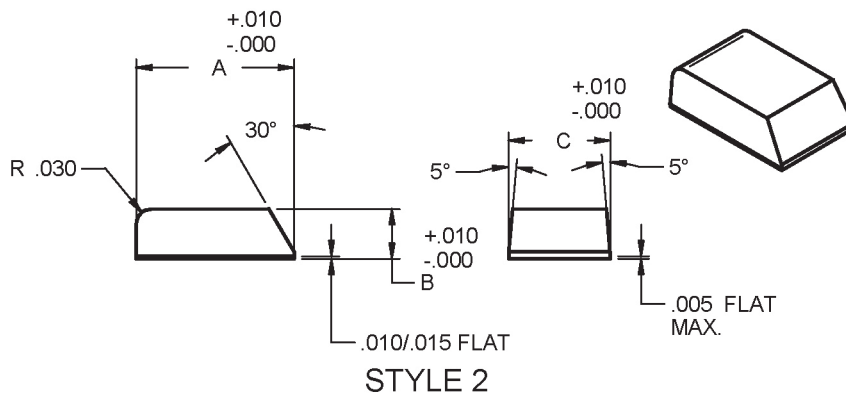
Insert	A	B	C
WD-7150	.312	.095	.150
WD-7165	.312	.095	.165
WD-7180	.312	.095	.180
WD-7200	.312	.095	.200
WD-7215	.312	.095	.215
WD-7230	.312	.095	.230
WD-7250	.312	.095	.250

WA - CIRCULAR SAW TIP BLANK



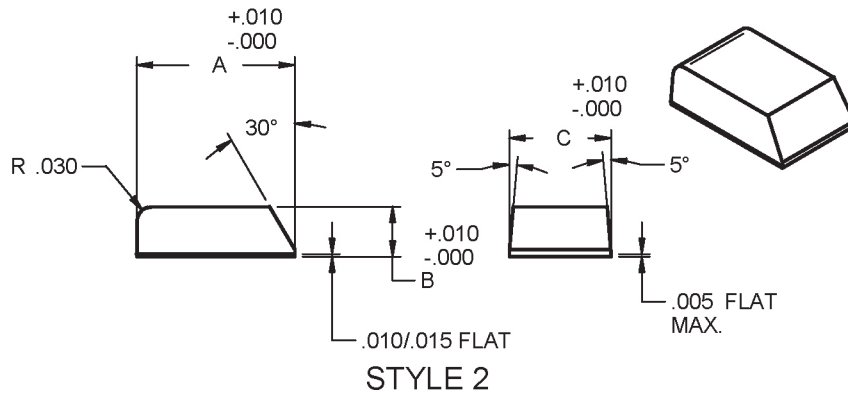
Insert	A	B	C
WA-8100	.250	.062	.100
WA-8110	.250	.062	.110
WA-8125	.250	.062	.125
WA-8130	.250	.062	.130
WA-8140	.250	.062	.140
WA-8145	.250	.062	.145
WA-8160	.250	.062	.160

WB - CIRCULAR SAW TIP BLANK



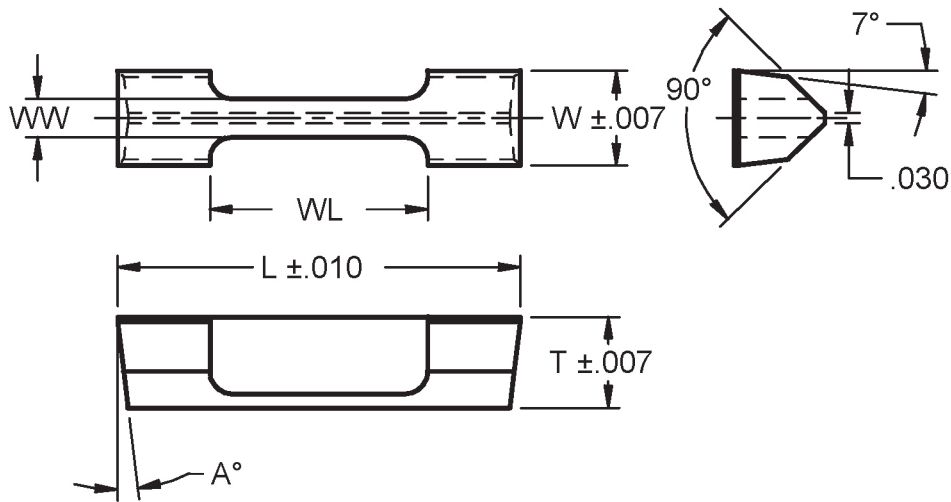
Insert	A	B	C
WB-8100	.281	.078	.100
WB-8115	.281	.078	.115
WB-8125	.281	.078	.125
WB-8130	.281	.078	.130
WB-8150	.281	.078	.150
WB-8160	.281	.078	.160
WB-8195	.281	.078	.195

WD - CIRCULAR SAW TIP BLANK



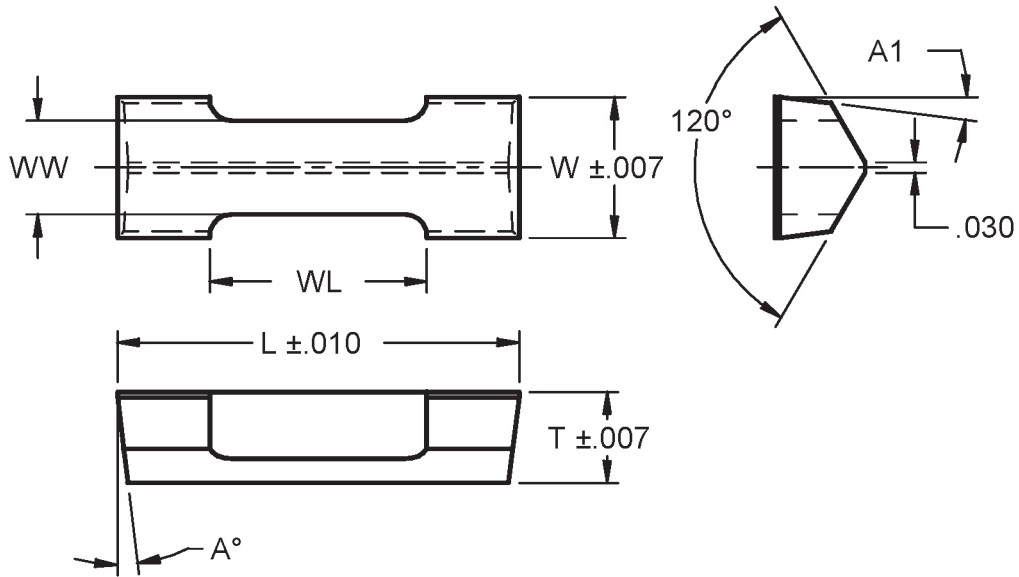
Insert	A	B	C
WD-8150	.312	.095	.150
WD-8165	.312	.095	.165
WD-8180	.312	.095	.180
WD-8200	.312	.095	.200
WD-8215	.312	.095	.215
WD-8230	.312	.095	.230
WD-8250	.312	.095	.250

DB DOGBONE



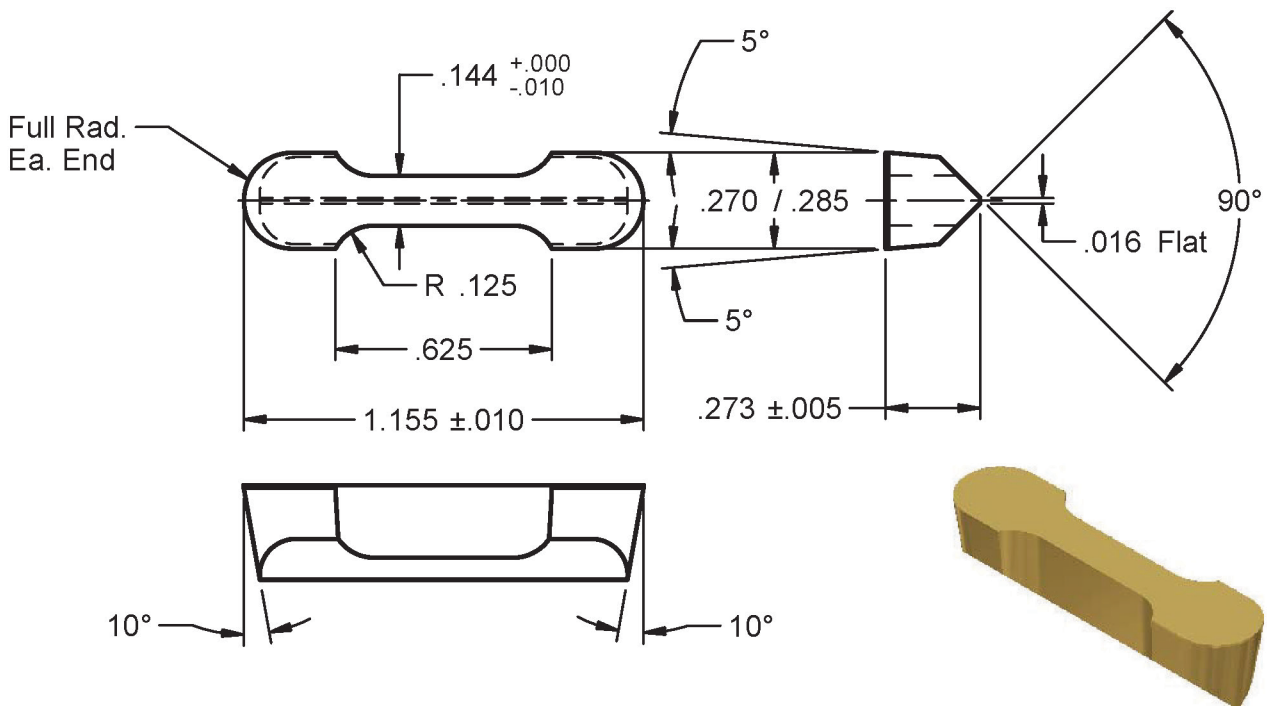
Insert	T	W	L	WL	A	WW
DB125	.260	.145	1.155	.625	7°	.106
DB156	.260	.175	1.155	.625	7°	.106
DB188	.276	.223	1.155	.625	7°	.139
DB250A	.261	.273	1.155	.625	7°	.139
DB250B	.347	.268	1.155	.625	7°	.139
A-2634-C-28	.213	.278	1.155	.625	7°	.139
A-2634-C-22	.365	.303	1.155	.625	7°	.139
A-2634-C-21	.360	.360	1.155	.625	7°	.202
A-2634-C-23	.365	.462	1.155	.625	7°	.271
DB375	.352	.413	1.155	.625	7°	.271
DB500	.352	.525	1.155	.625	7°	.271
A-2634-C-20	.211	.164	1.344	.937	7°	.101
DB156-1.312L	.203	.175	1.342	.937	7°	.101
DB218-1.312L	.203	.245	1.342	.812	7°	.139
A-2634-C-3	.272	.334	1.342	.812	5°	.202
A-2634-C-62	.269	.358	1.342	.562	7°	.271
DB218-1.500L	.196	.233	1.530	1.000	10°	.101
DB281-1.500L	.258	.307	1.530	1.000	10°	.139
DB344-1.500L	.345	.370	1.530	1.000	10°	.197
DB375-1.500L	.345	.406	1.530	.875	10°	.271
DB500-1.500L	.345	.530	1.530	.875	10°	.370
DB562-1.500L	.354	.577	1.530	.875	10°	.373

DB DOGBONE

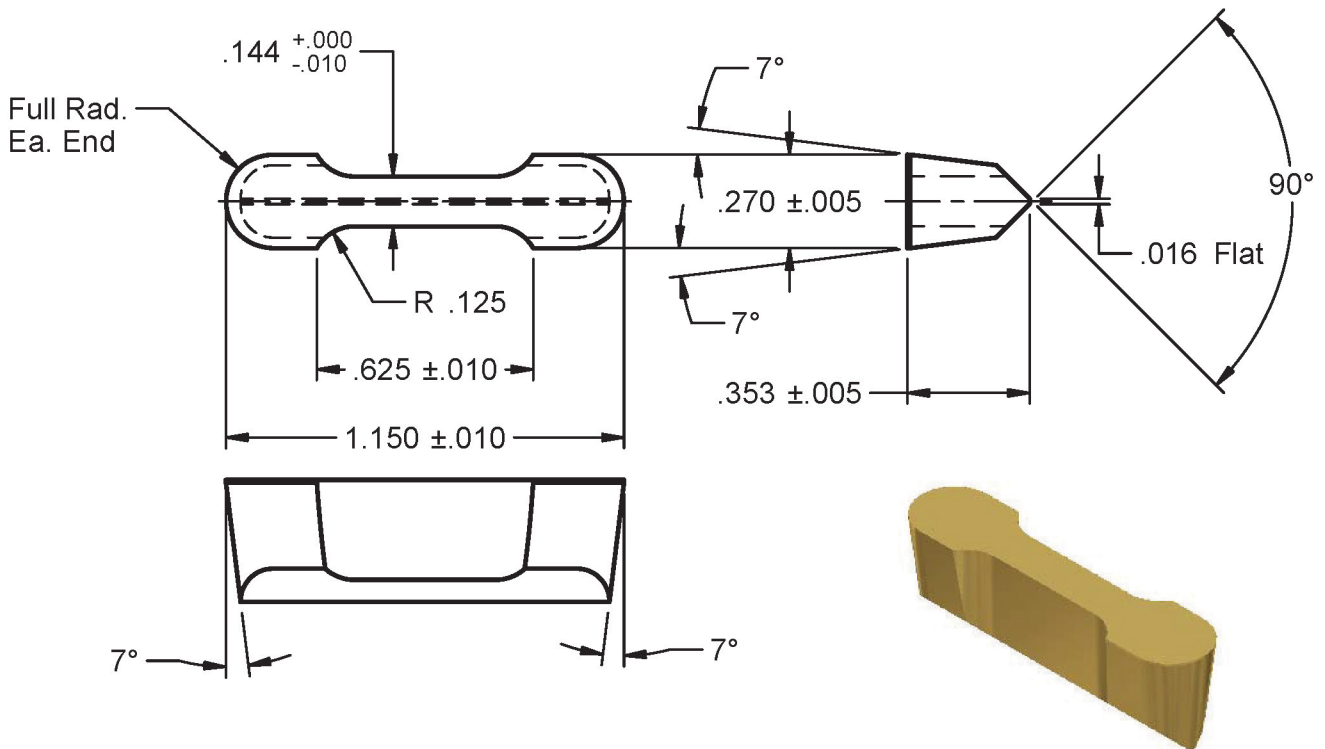


Insert	T	W	L	WL	A	WW	A-1
A-2634-C-44	.240	.406	1.530	.875	10°	.271	7°
A-2634-C-59	.282	.535	1.347	.625	7°	.375	7°
A-2634-C-4	.271	.521	1.352	.812	5°	.375	5°

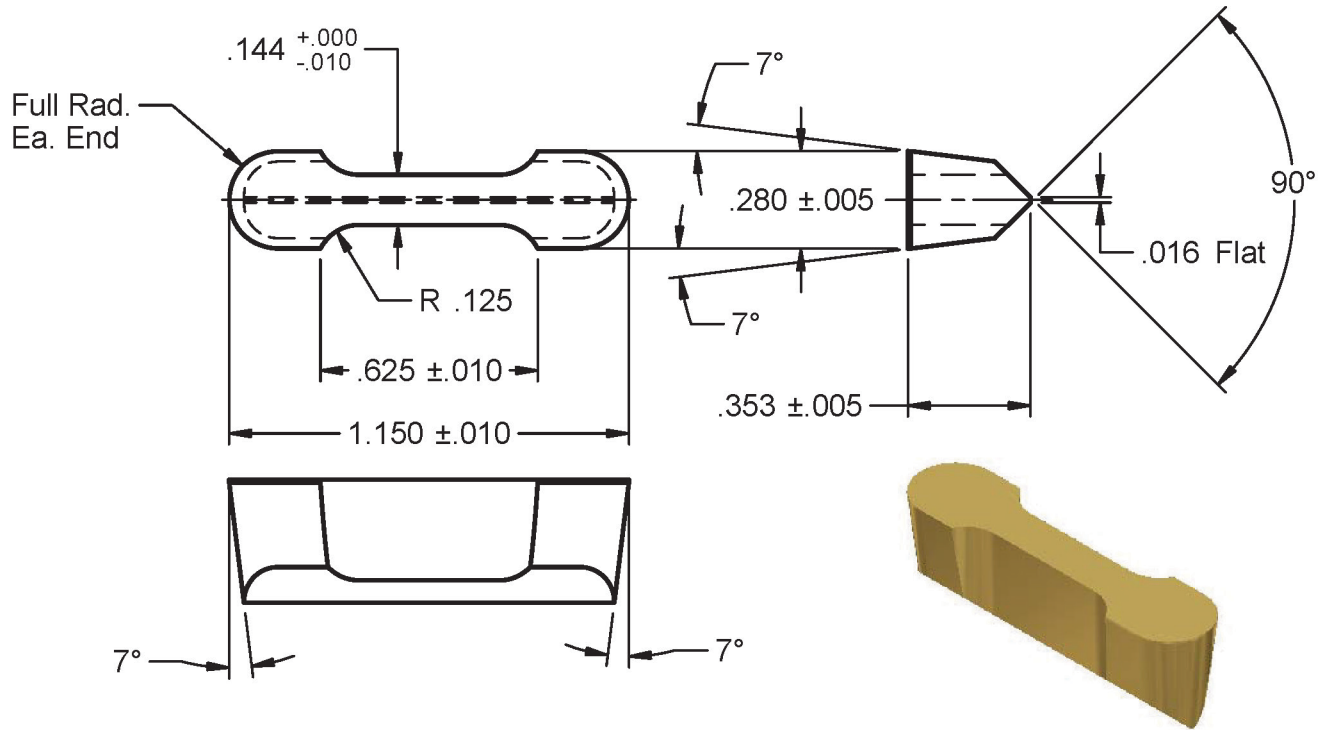
MA6999 (DB-250A-FR)



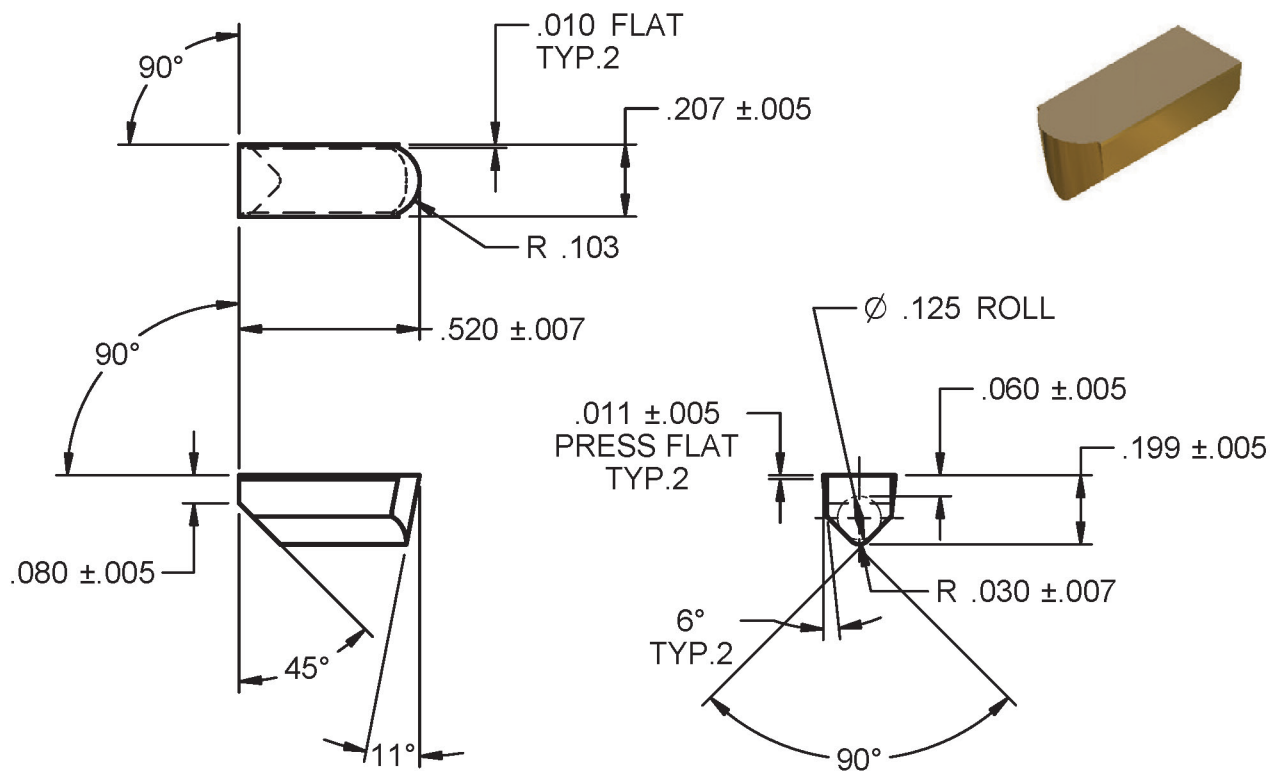
MA5954-55 (DB-250B-FR)



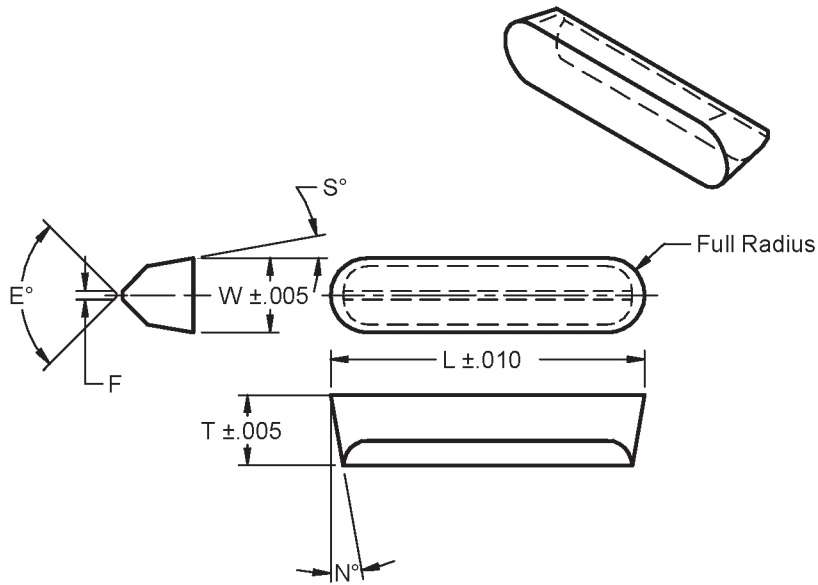
T-18045-5



MA68711

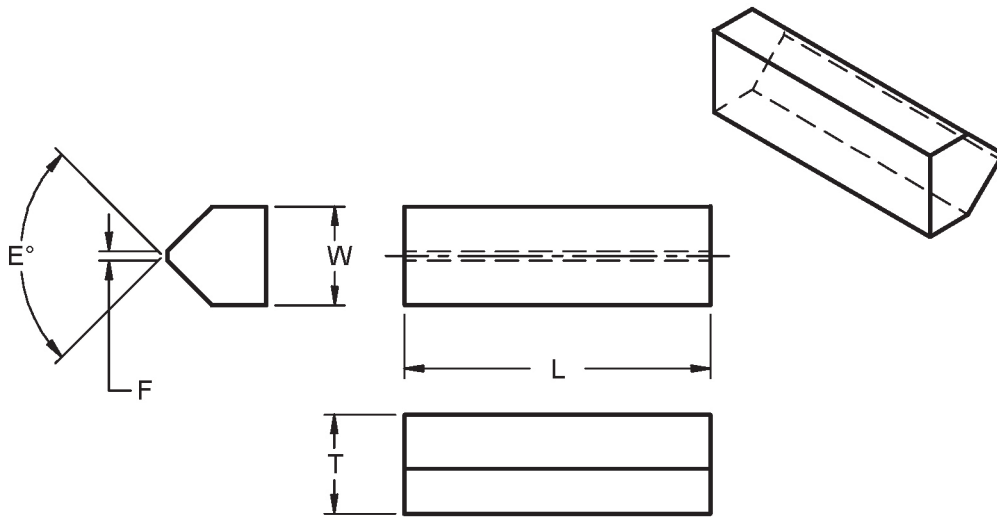


Hot Dog



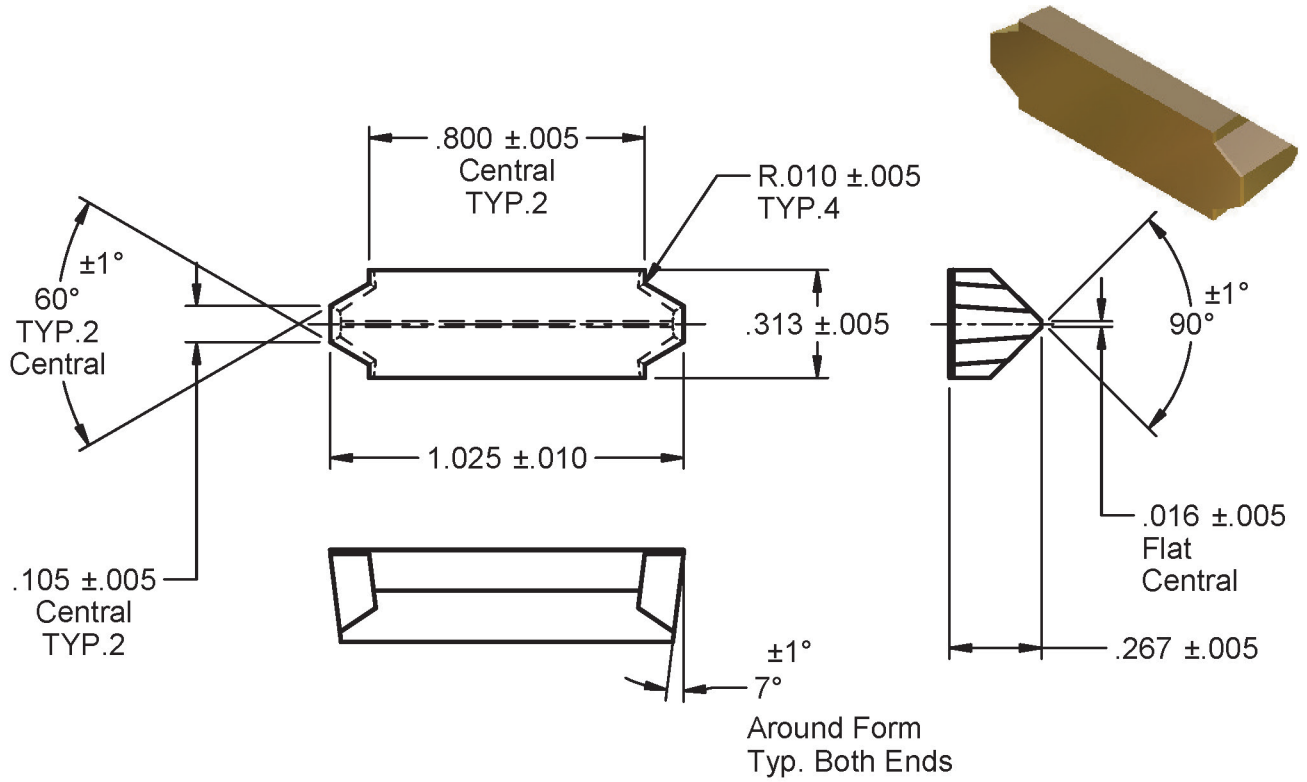
Insert	T	W	L	E°	S°	N°	Notes
A-3092-A-1	.275	.273	1.020	90	7	7	F .016
A-3092-A-7	.266	.273	1.020	90	7	7	F .050
A-3092-A-8	.266	.273	1.150	90	10	10	F .016
A-3092-A-9	.349	.525	1.530	90	10	10	F .016
A-3092-A-12	.258	.274	1.155	90	11	11	F .032
A-3092-A-13	.262	.324	1.279	90	10	10	F .023
A-3092-A-15	.262	.210	1.020	90	7	7	F .023
A-3092-A-16	.266	.409	1.530	120	10	10	F .040
A-3092-A-24	.218	.172	.895	90	5	5	F .023
A-3092-A-25	.268	.397	.770	90	6	6	F .046
A-3092-A-26	.311	.522	1.020	90	6	6	F .030
A-3092-A-28	.242	.250	1.500	90	10	10	F .016
T-17276	.328	.324	1.022	90	10	10	F = 3/64 RAD.
T-18033-E-19	.275	.525	1.530	120	10	10	F .016

Rectangular V-Bottom

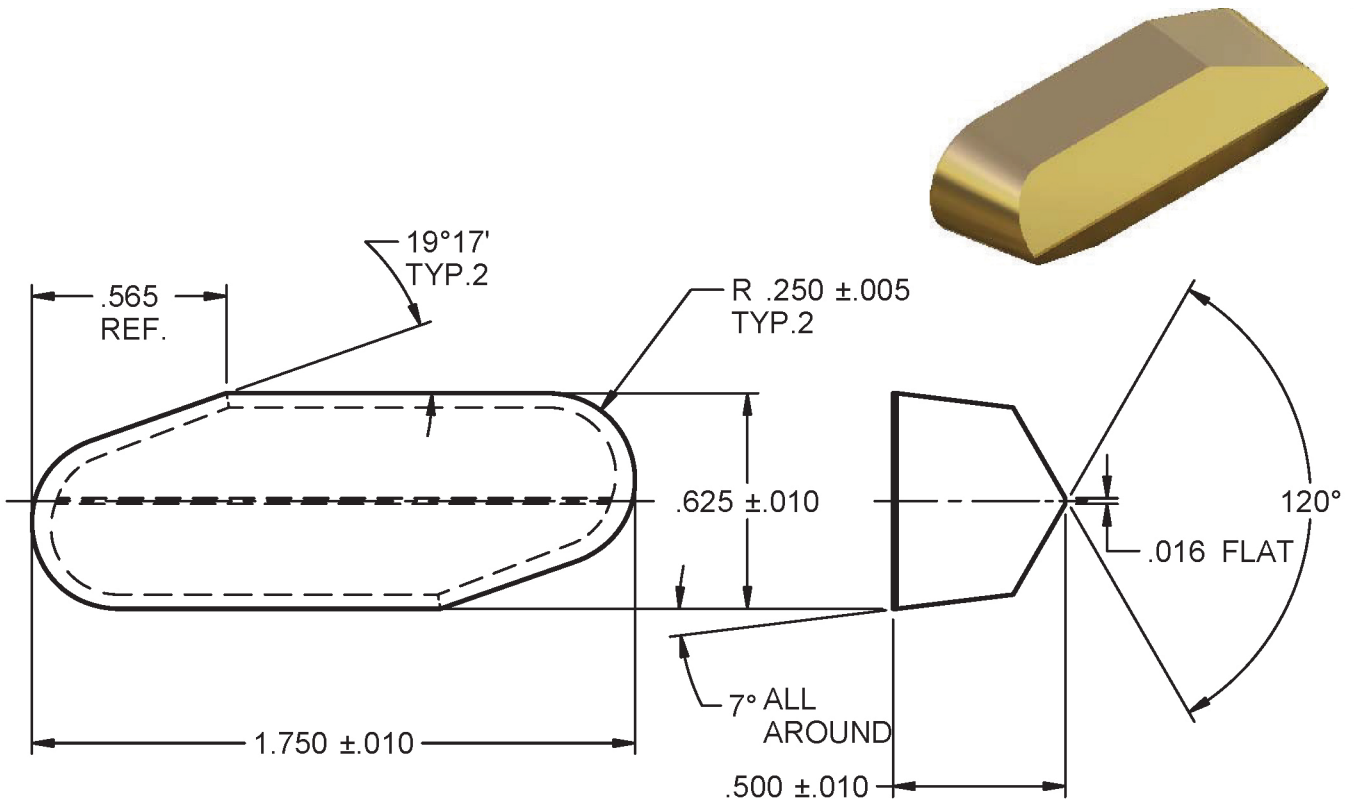


Insert	T	W	L	E°	F
A-0901-5-2	.268	.270	1.282	90	0
A-0901-5-6	.208	.145	1.155	90	0
A-0901-5-7	.165	.150	1.035	90	0
A-0901-5-8	.185	.150	1.035	90	0
LX-0933-1	.252	.275	1.293	90	.030
LX-1132-1-1	.351	.333	1.029	90	.030
LX-1132-1-2	.263	.333	1.029	90	.030
LX-1132-1-3	.208	.333	1.029	90	.030
LX-1132-1-4	.333	.333	1.029	90	.030
MA68763	.347	.418	.775	120	.083

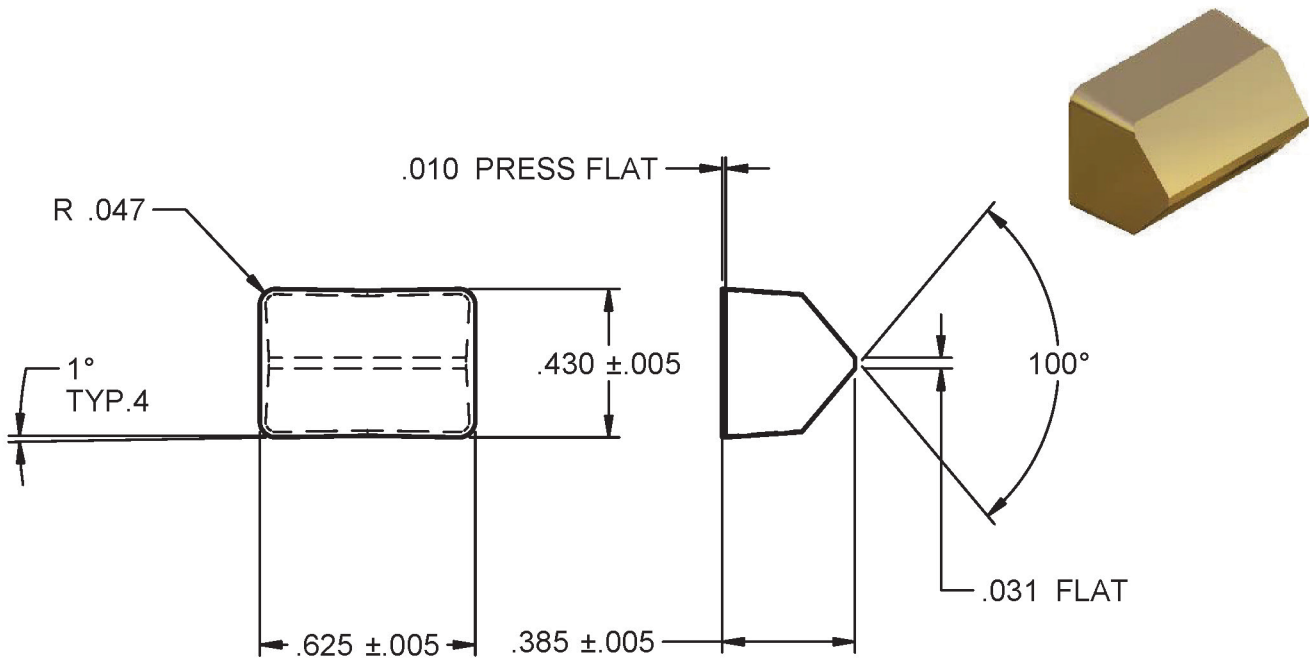
A-1693-A



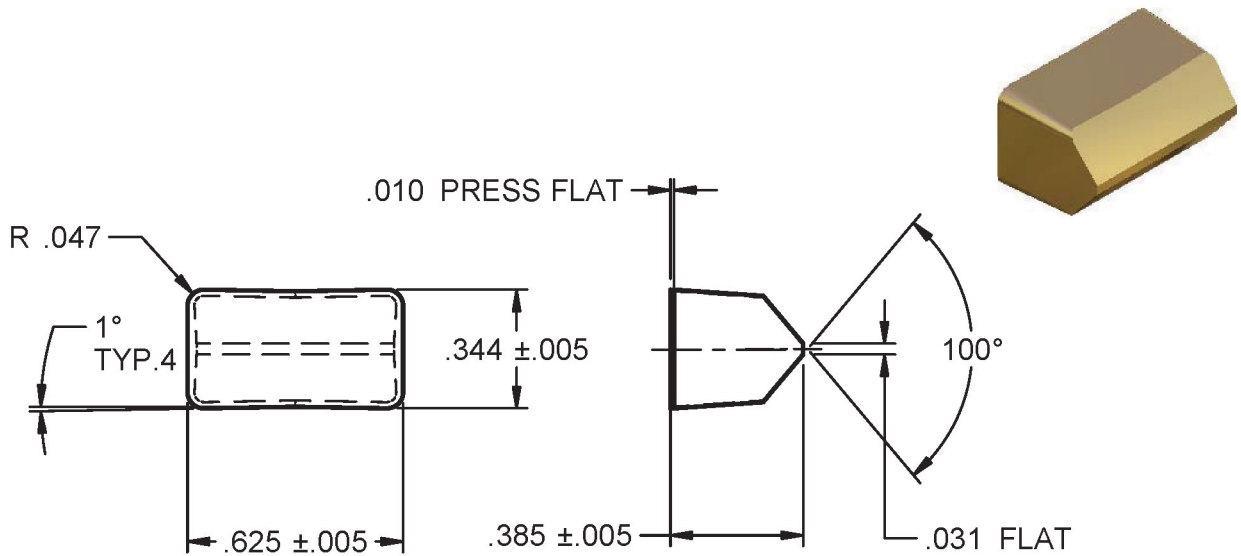
A-0249-B (MA-52270)



A-0167-A-1

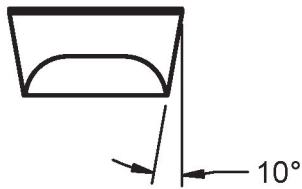
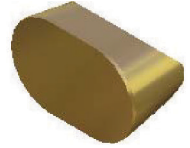
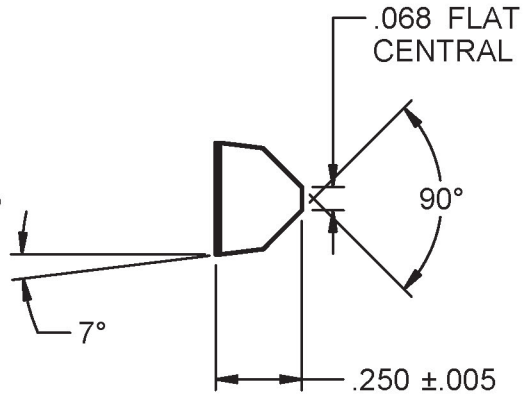
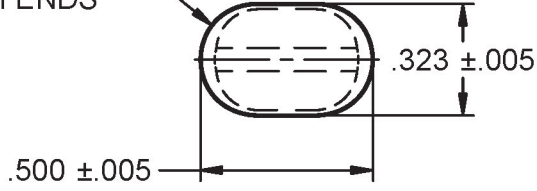


A-0167-A-2



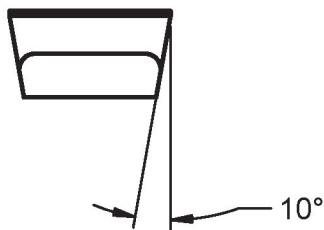
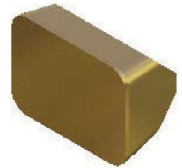
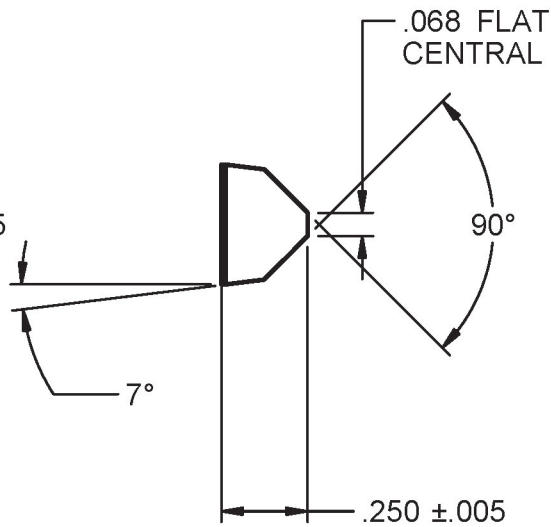
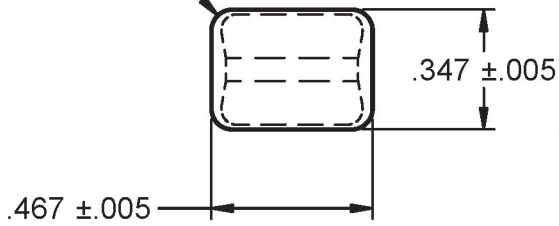
MA-66294

FULL RAD.
BOTH ENDS

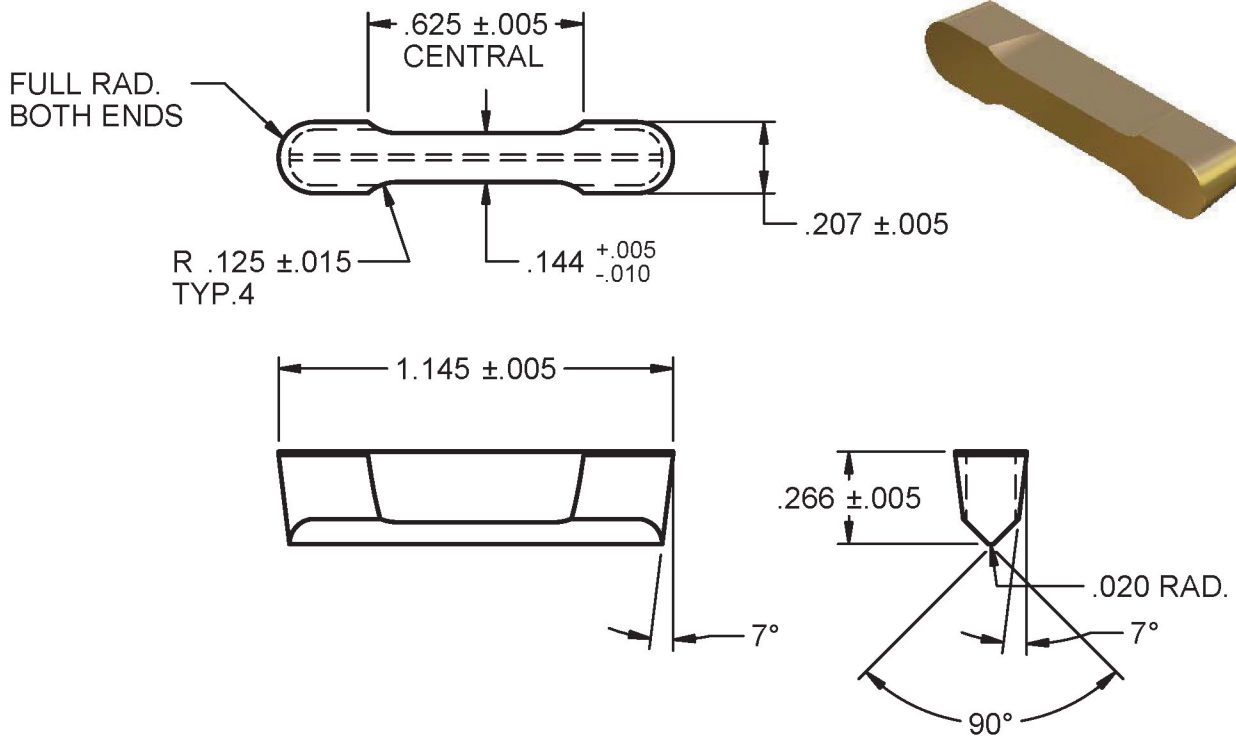


MA-66293

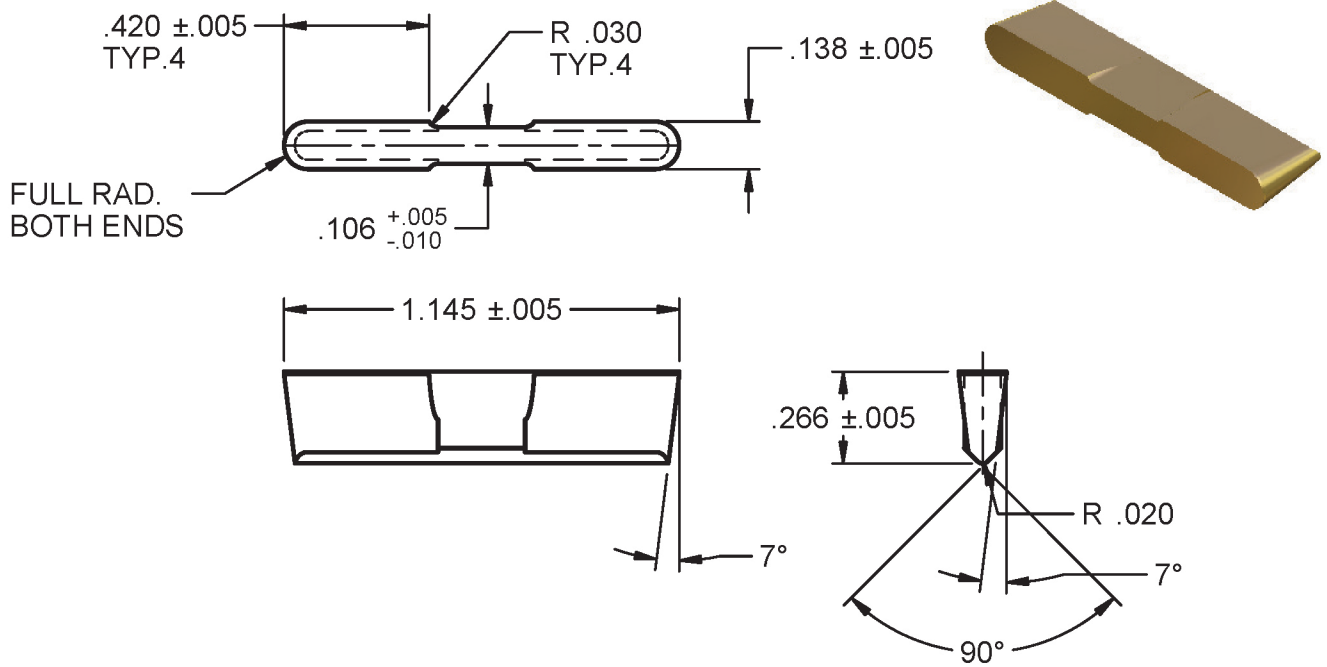
R .060
TYP.4



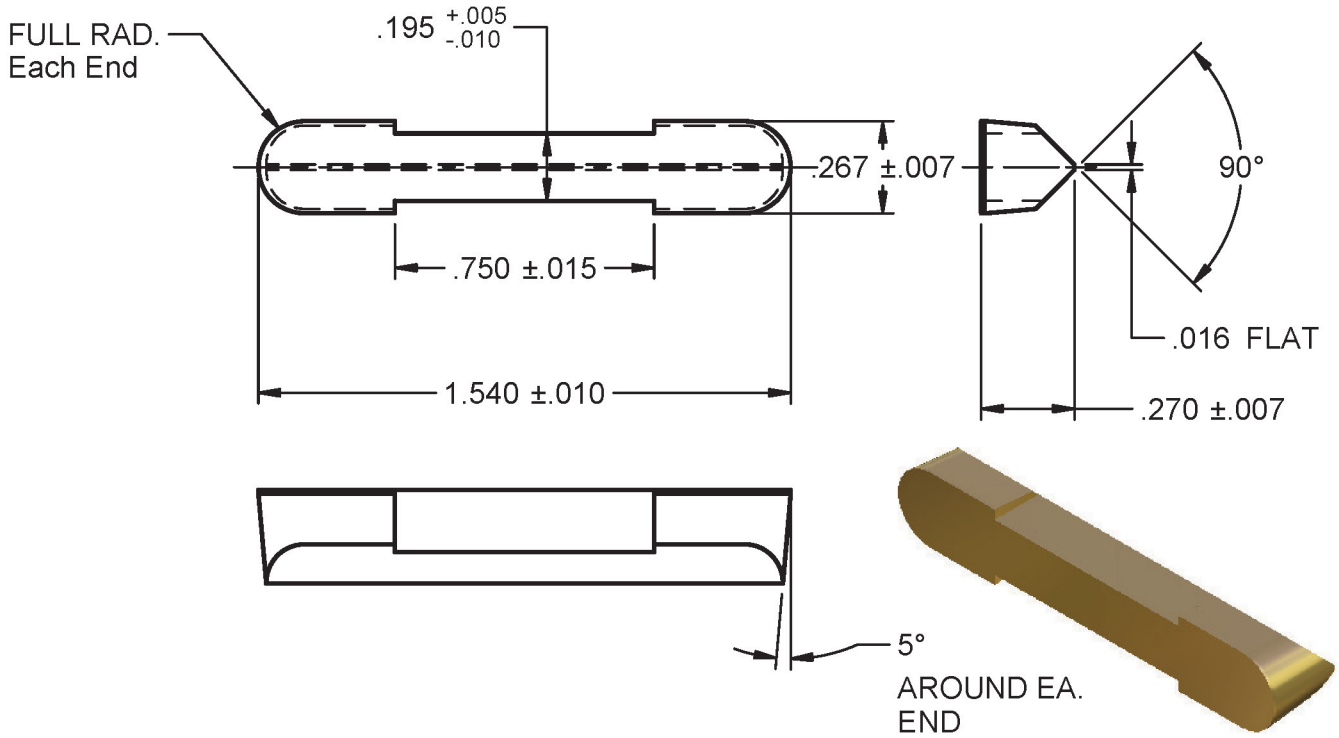
MA-71259



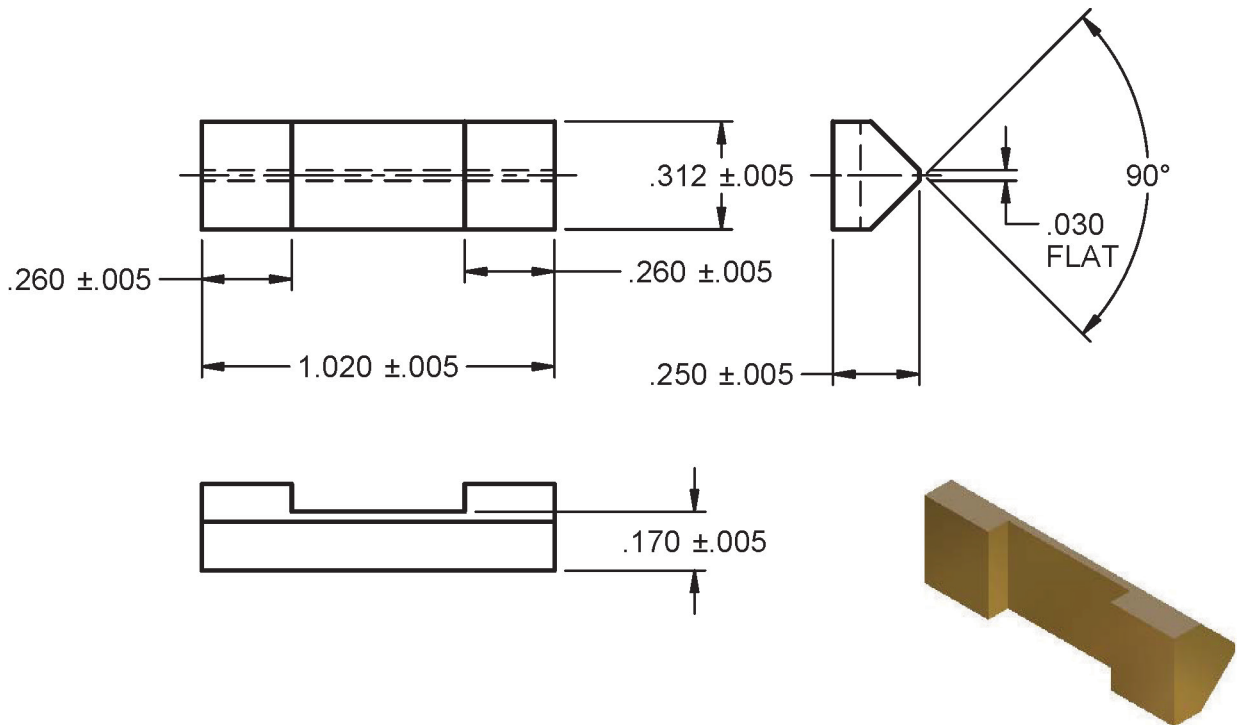
MA-71257



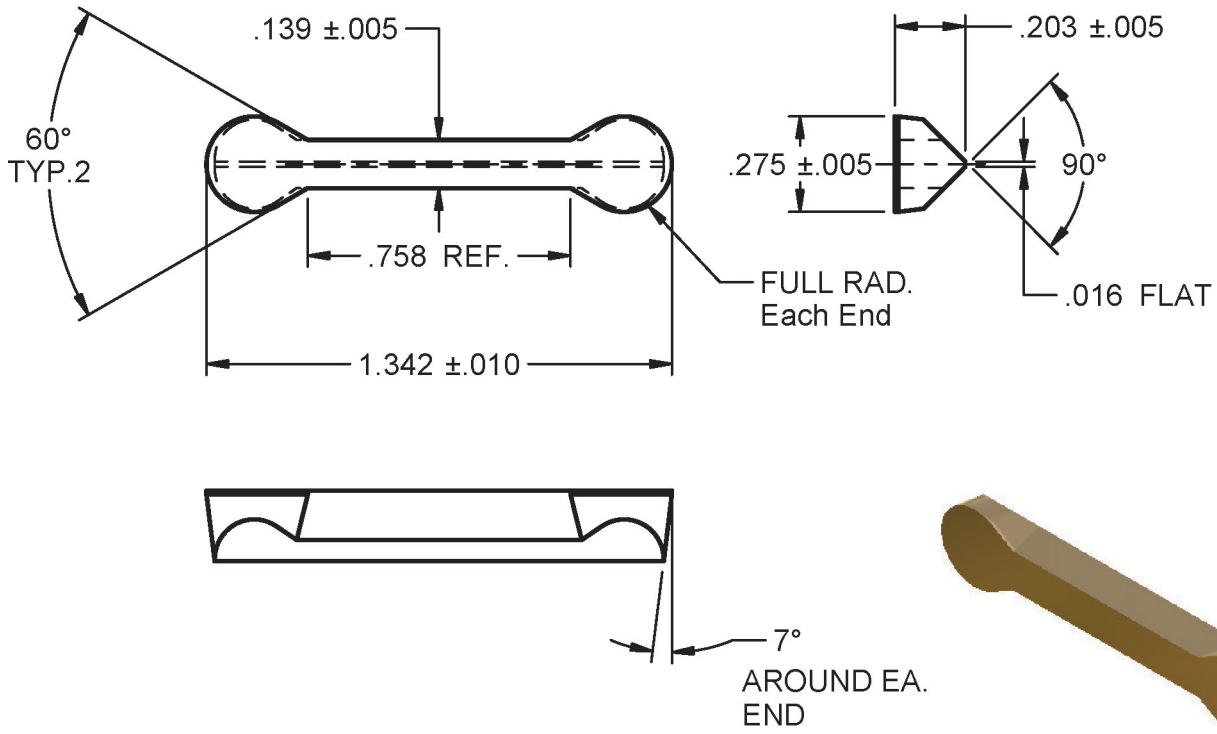
T-16220-A (MA-4228, MA-4154)



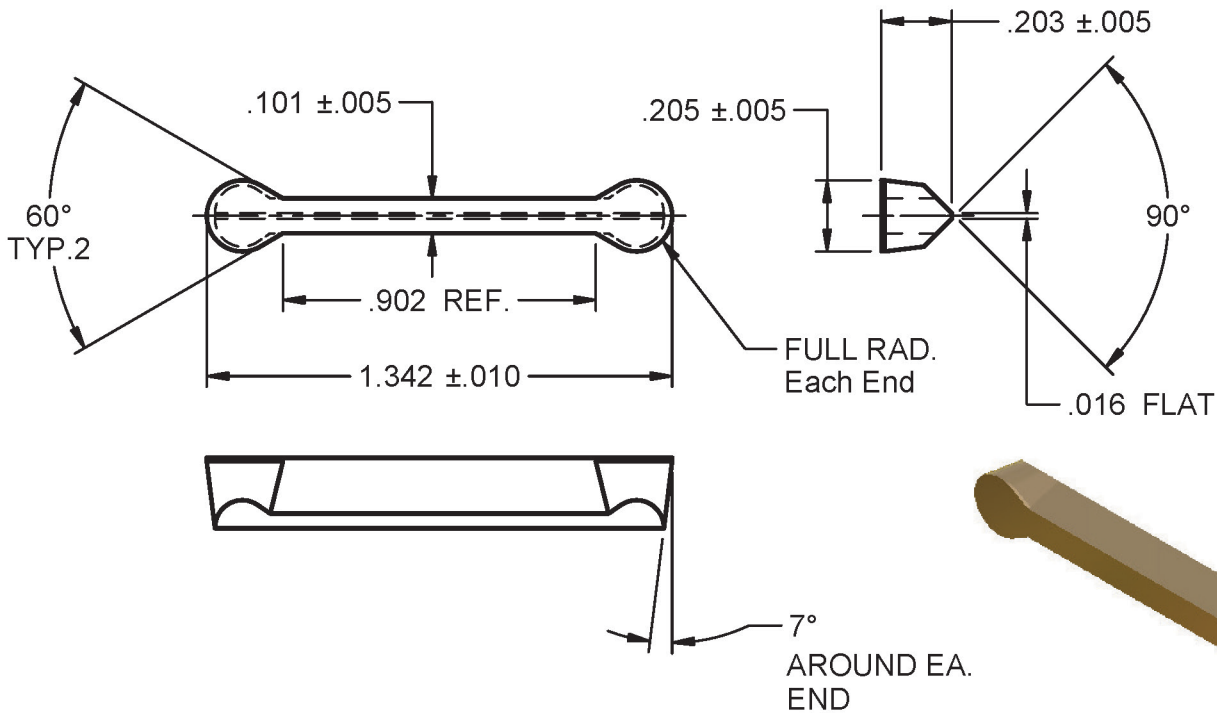
A-1048-C-1



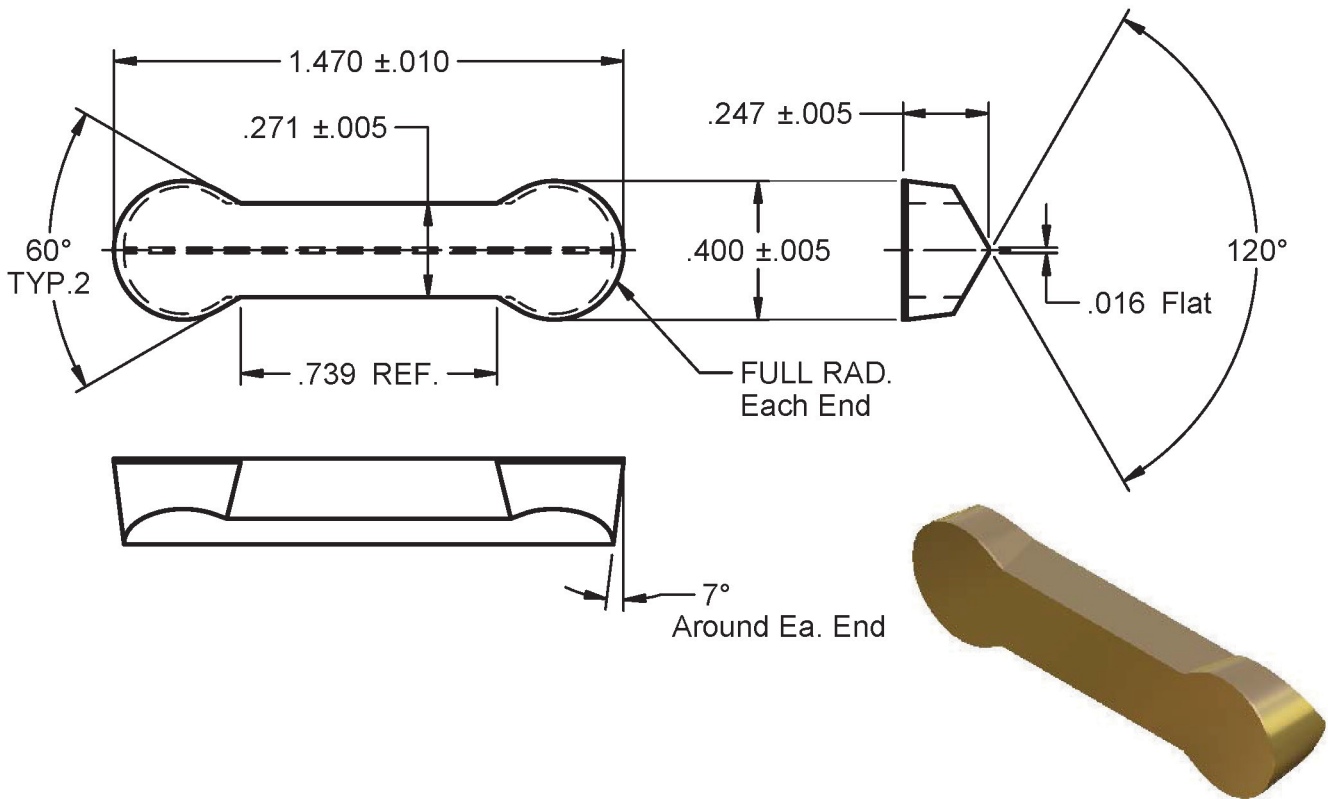
T-18052-A-1 (MA-42584, MA-48457)



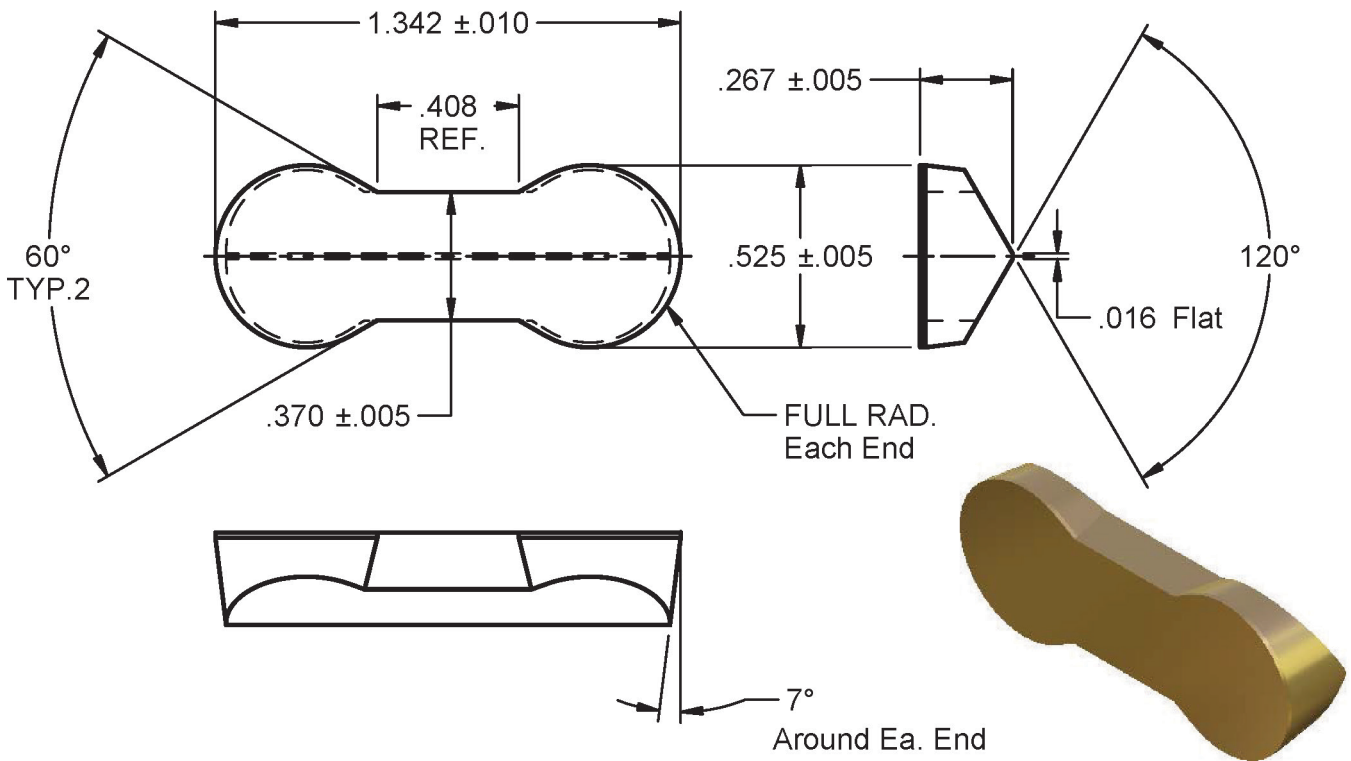
T-18052-A-3 (MA-52644, MA-441561)



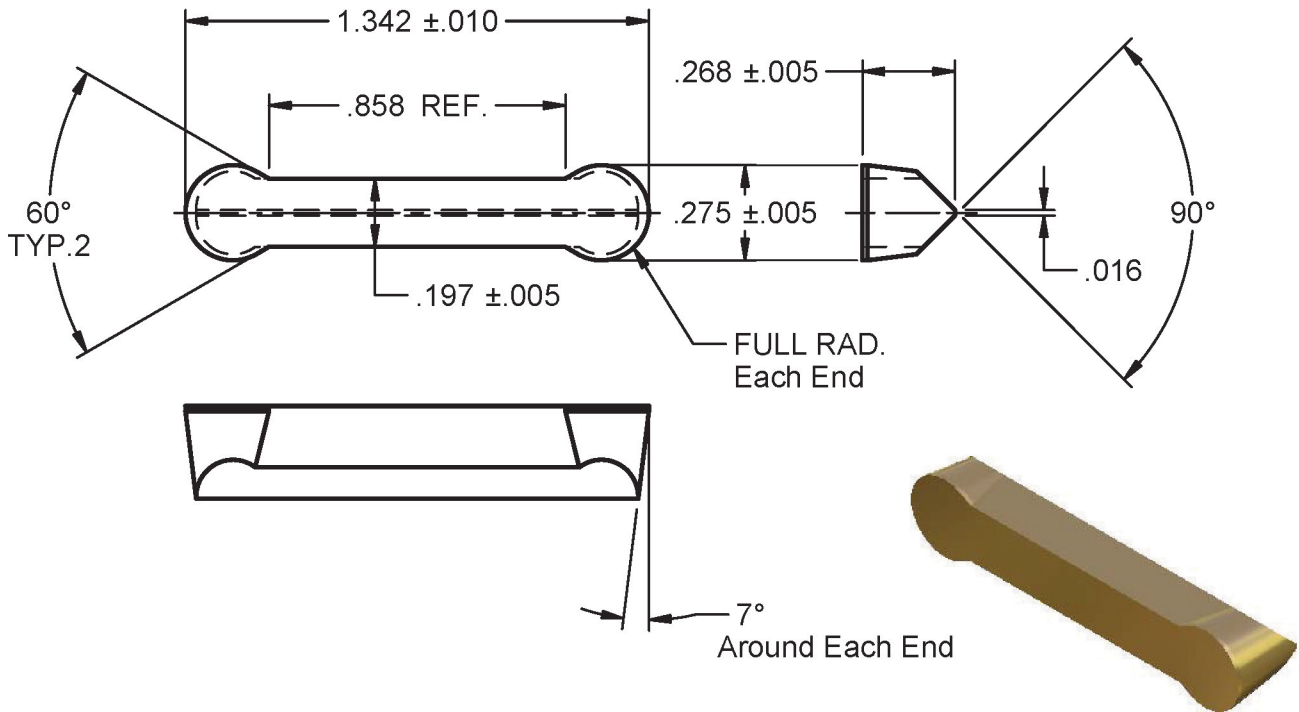
T-18052-A-4 (MA-41565, MA-43630)



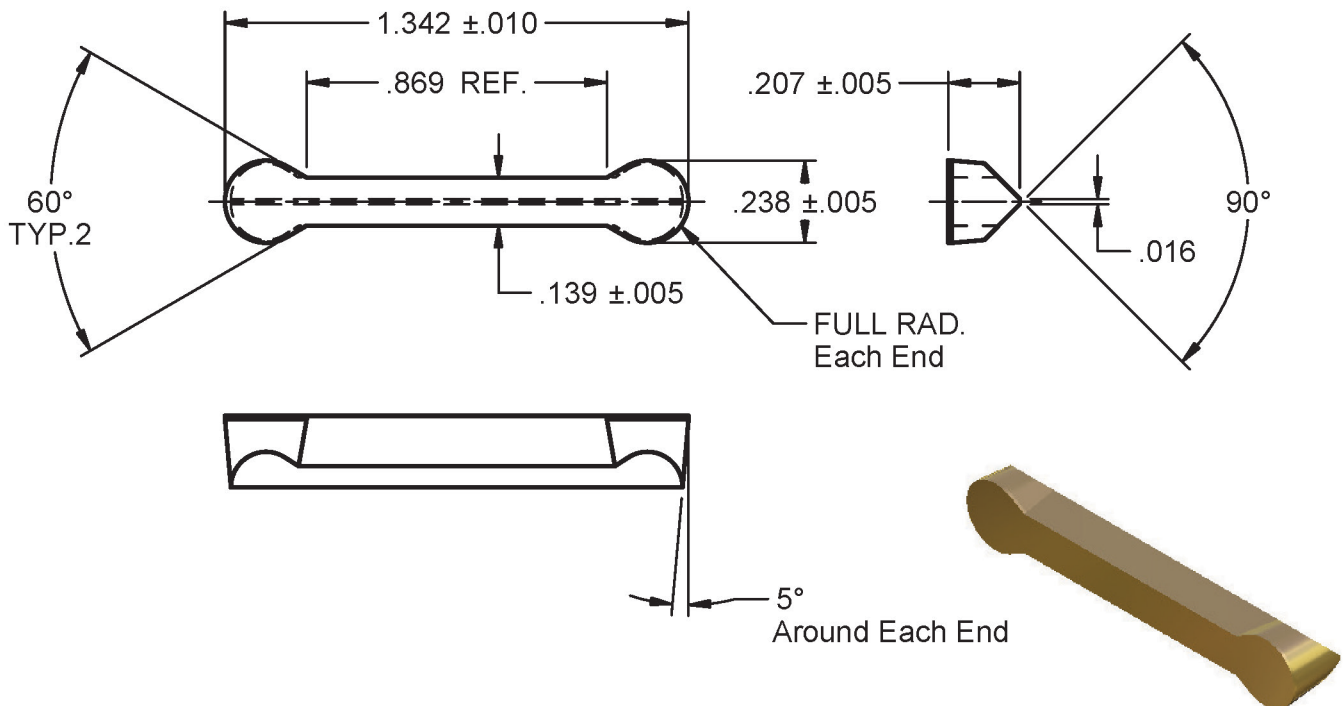
T-18052-A-5 (MA-41566)



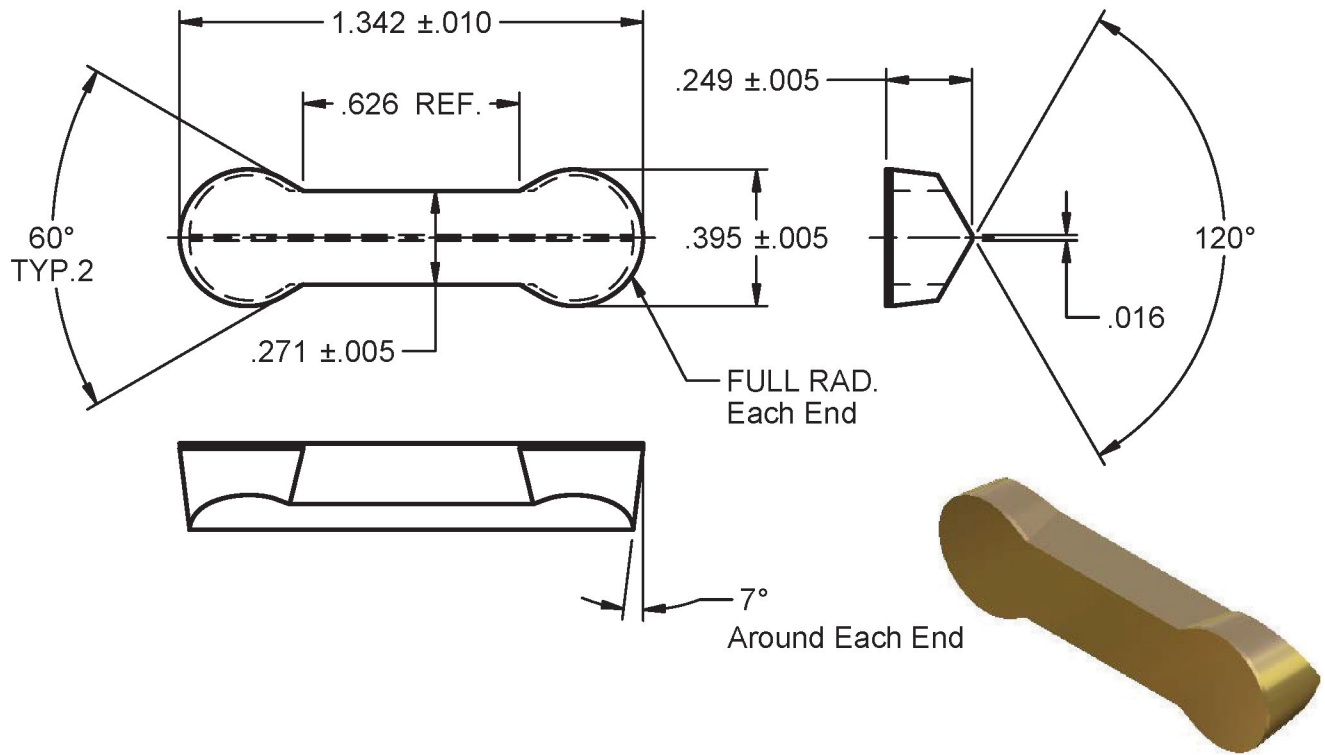
T-18052-A-6 (MA-46296)



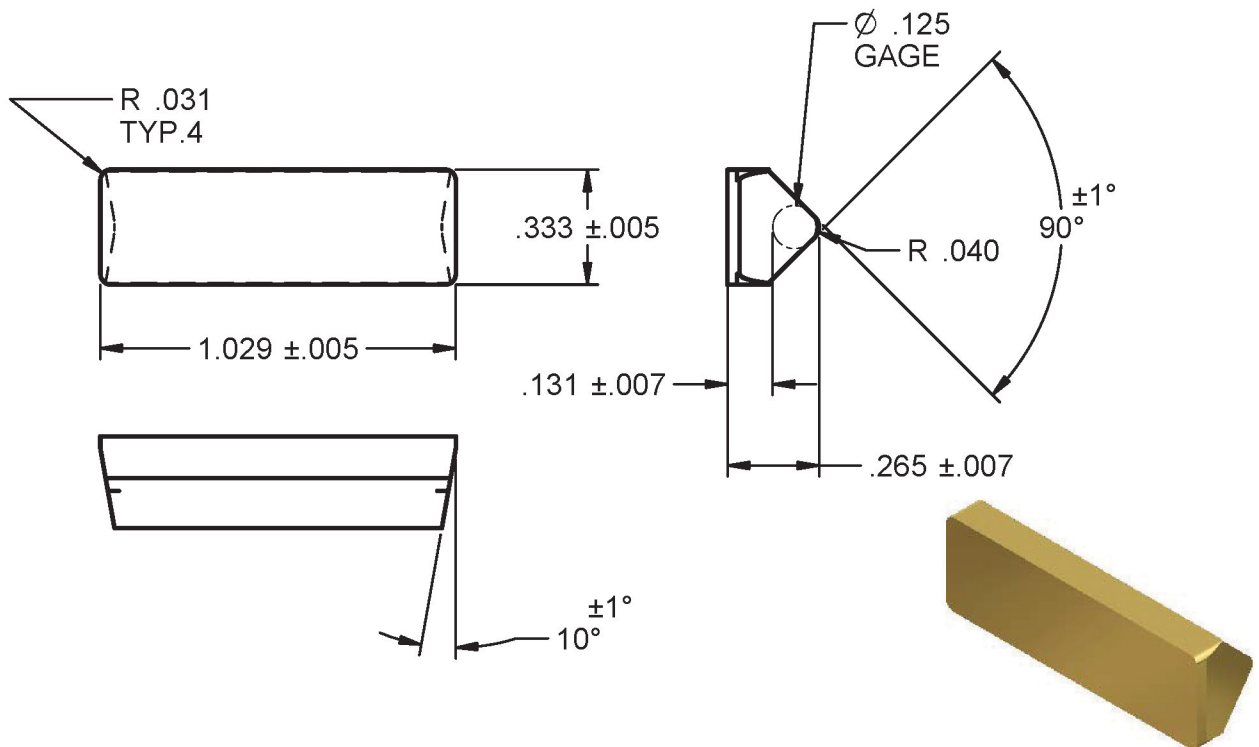
T-18052-A-7 (MA-57820)



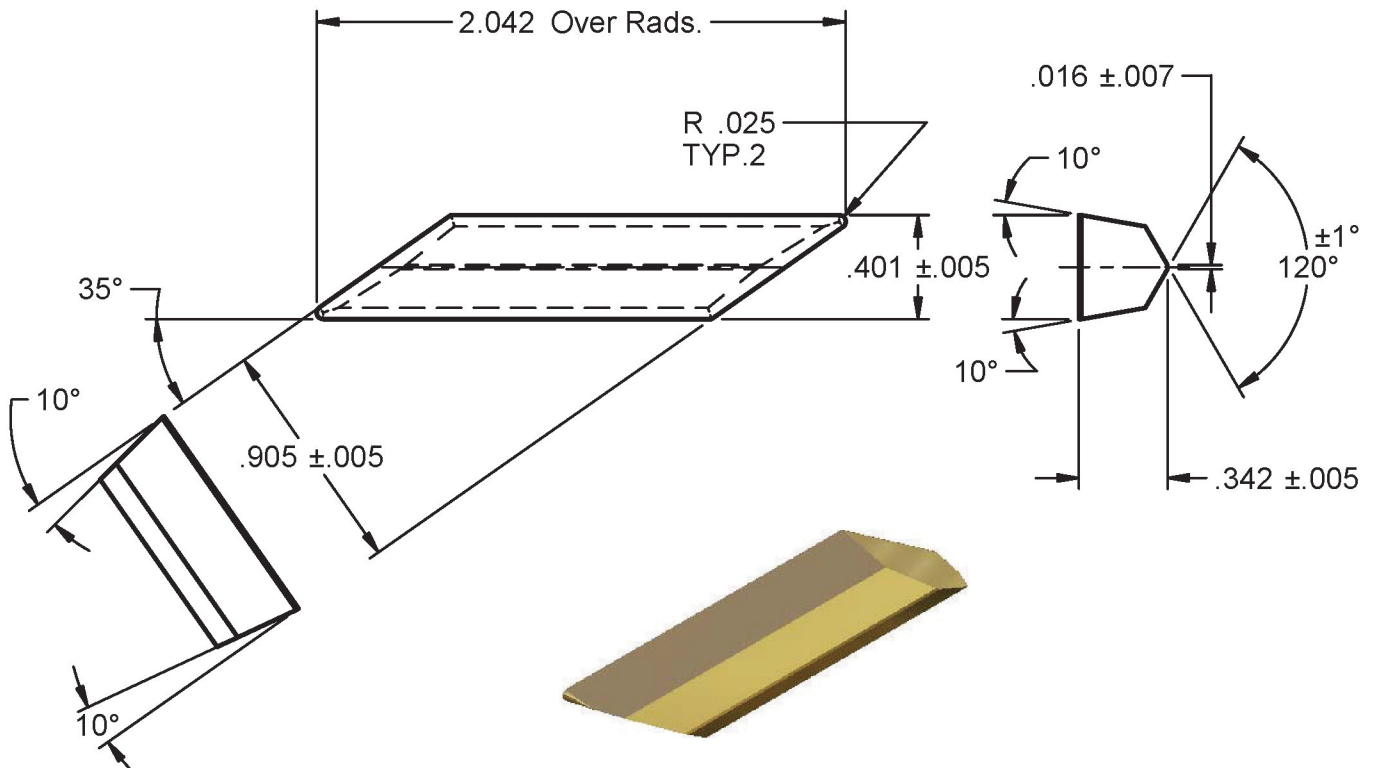
T-18052-A-8 (MA-57871)



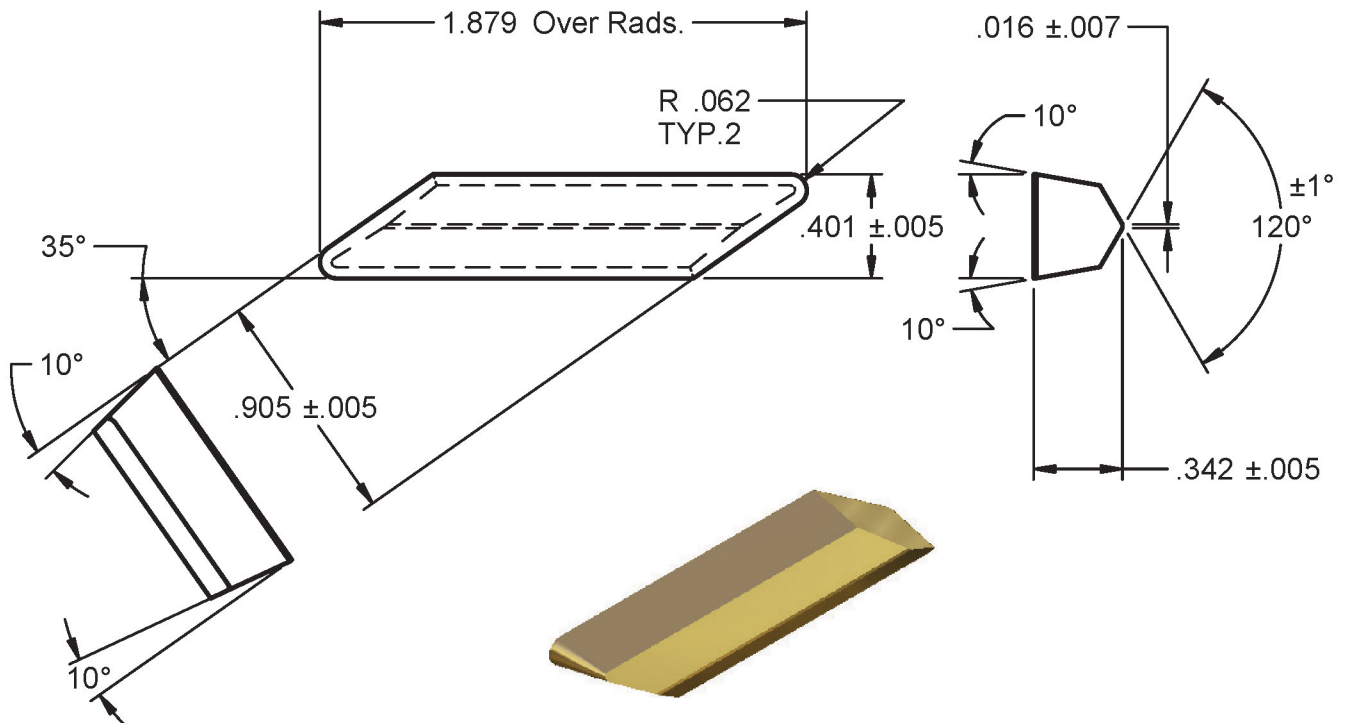
MA-69280



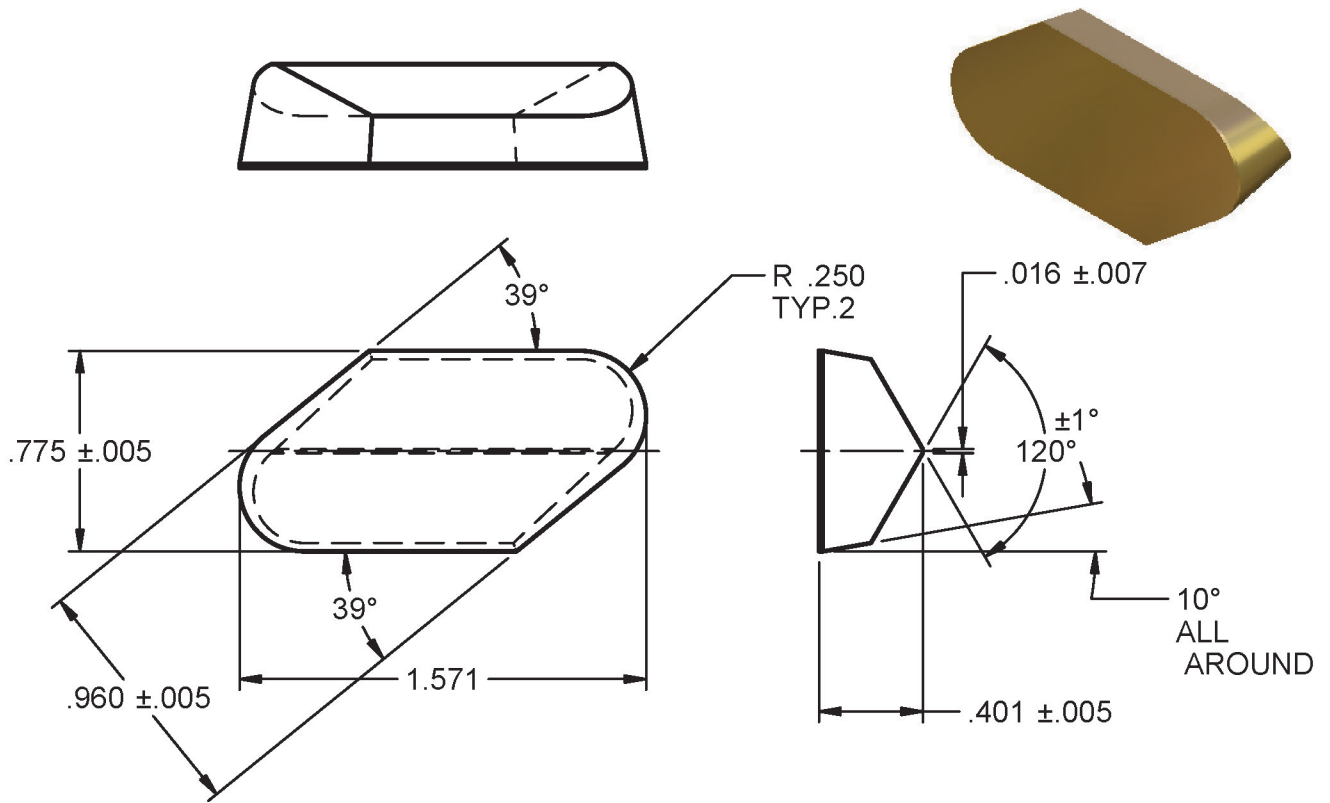
LX-1618-3-1 (MA-1847, MA-48195)



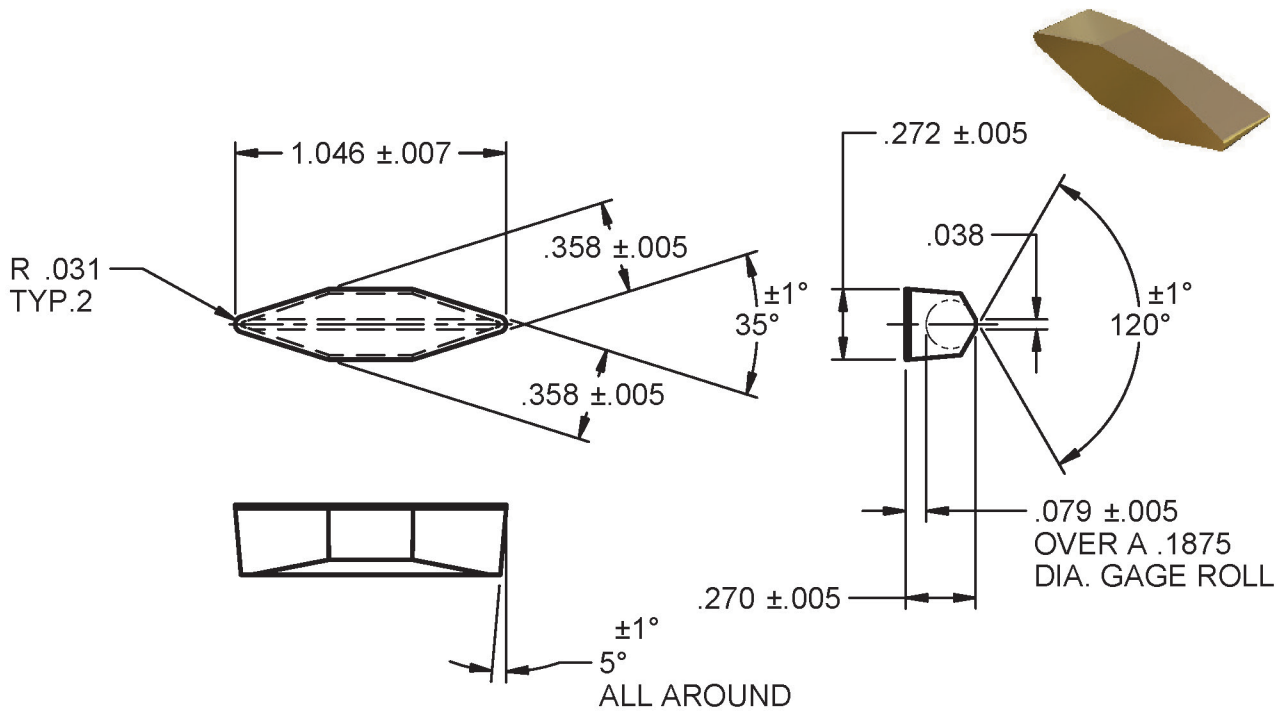
LX-1618-3-2 (MA-1549)



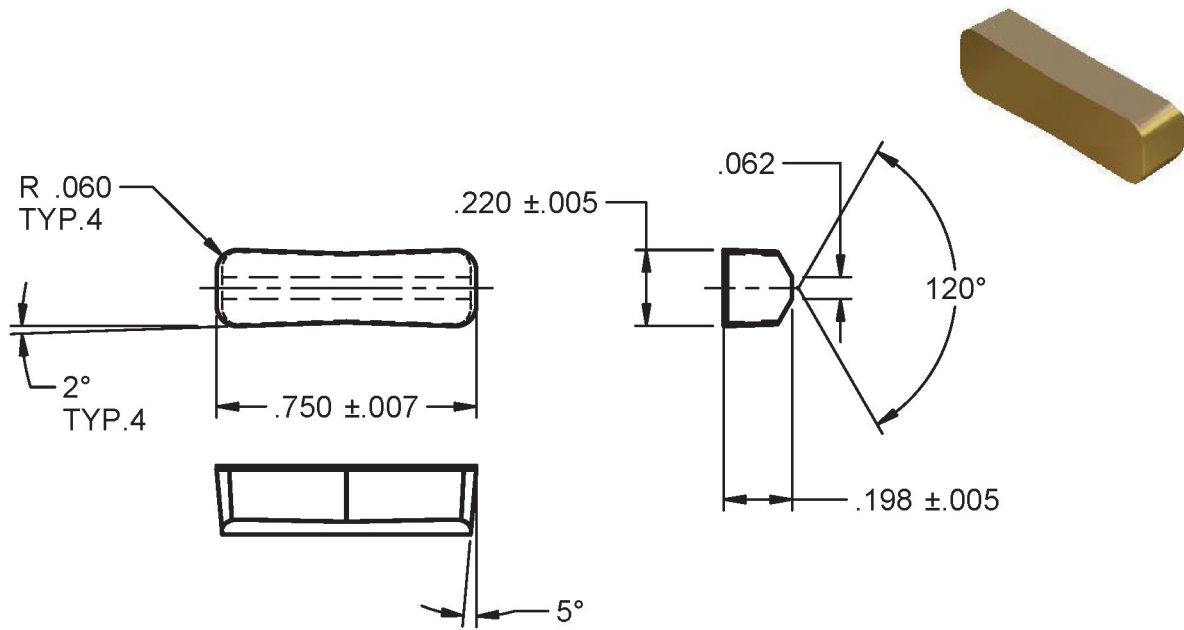
T-18034-5 (MA-3733)



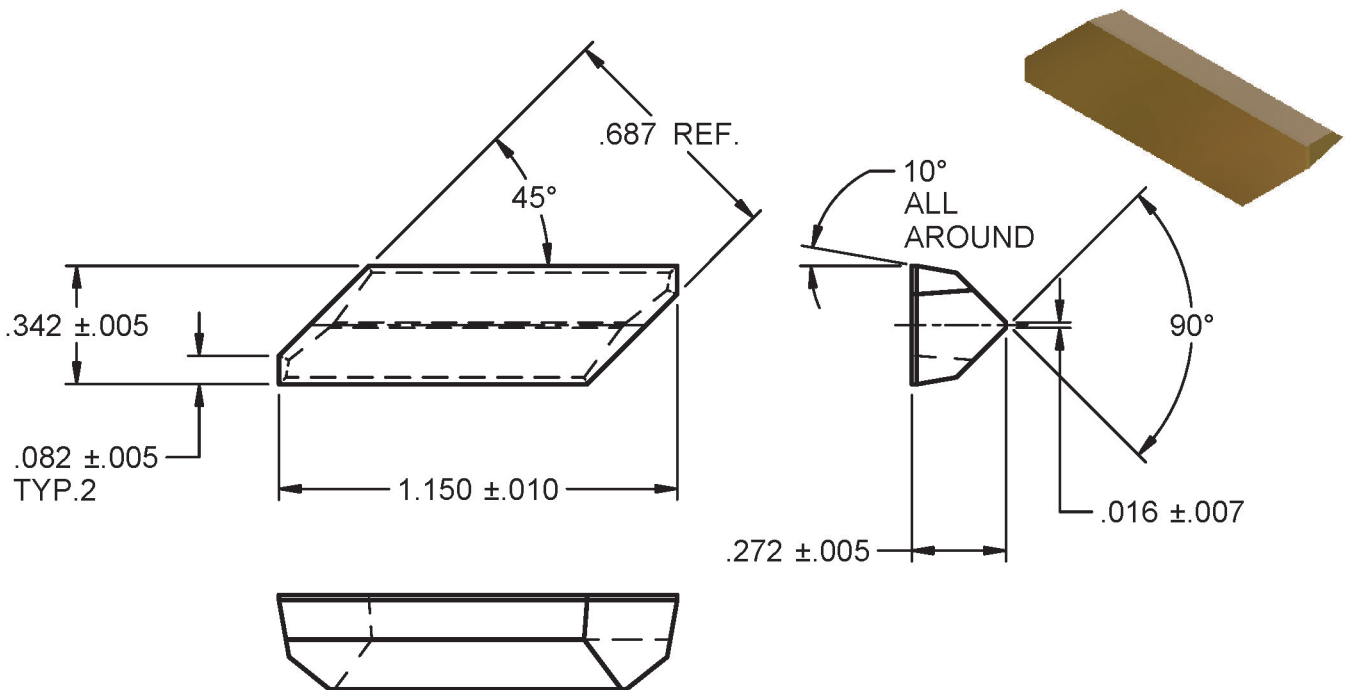
A-2873-A (MA-70223)



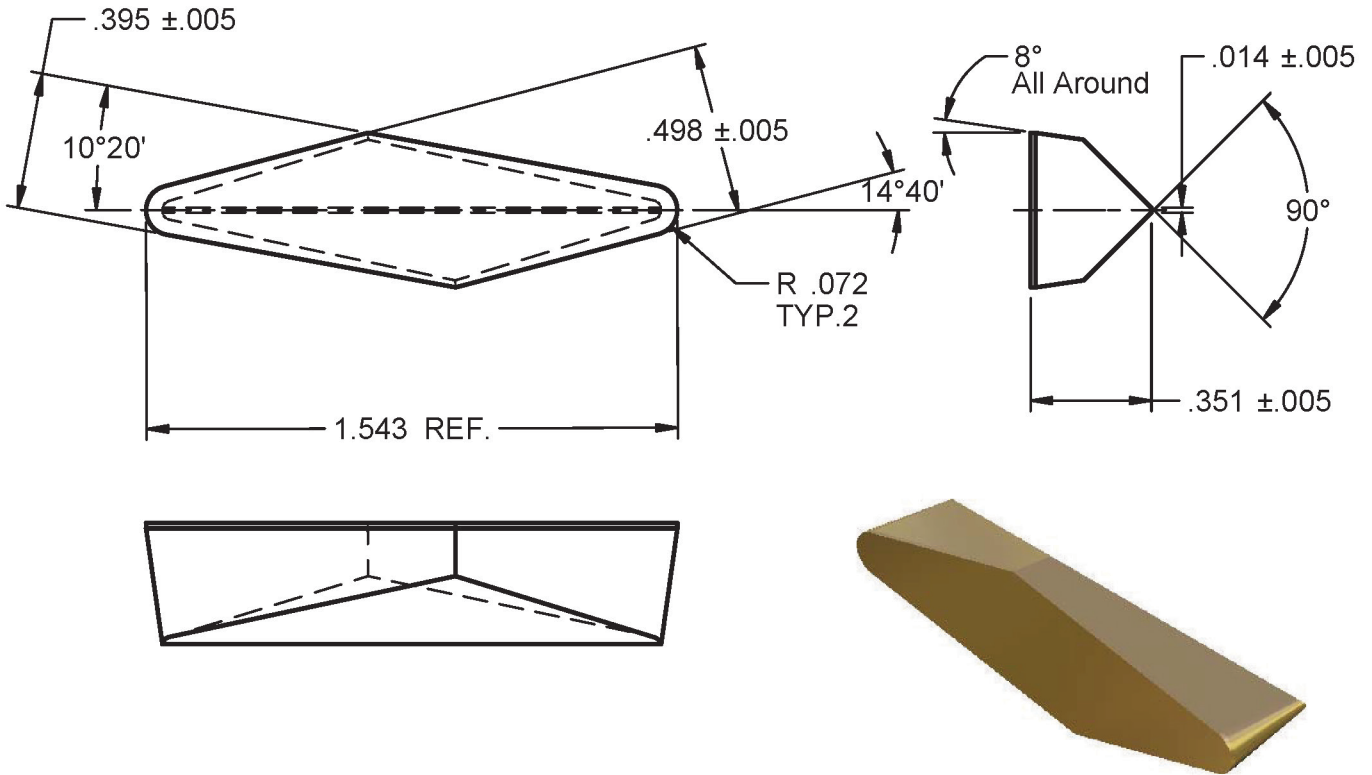
T-16719



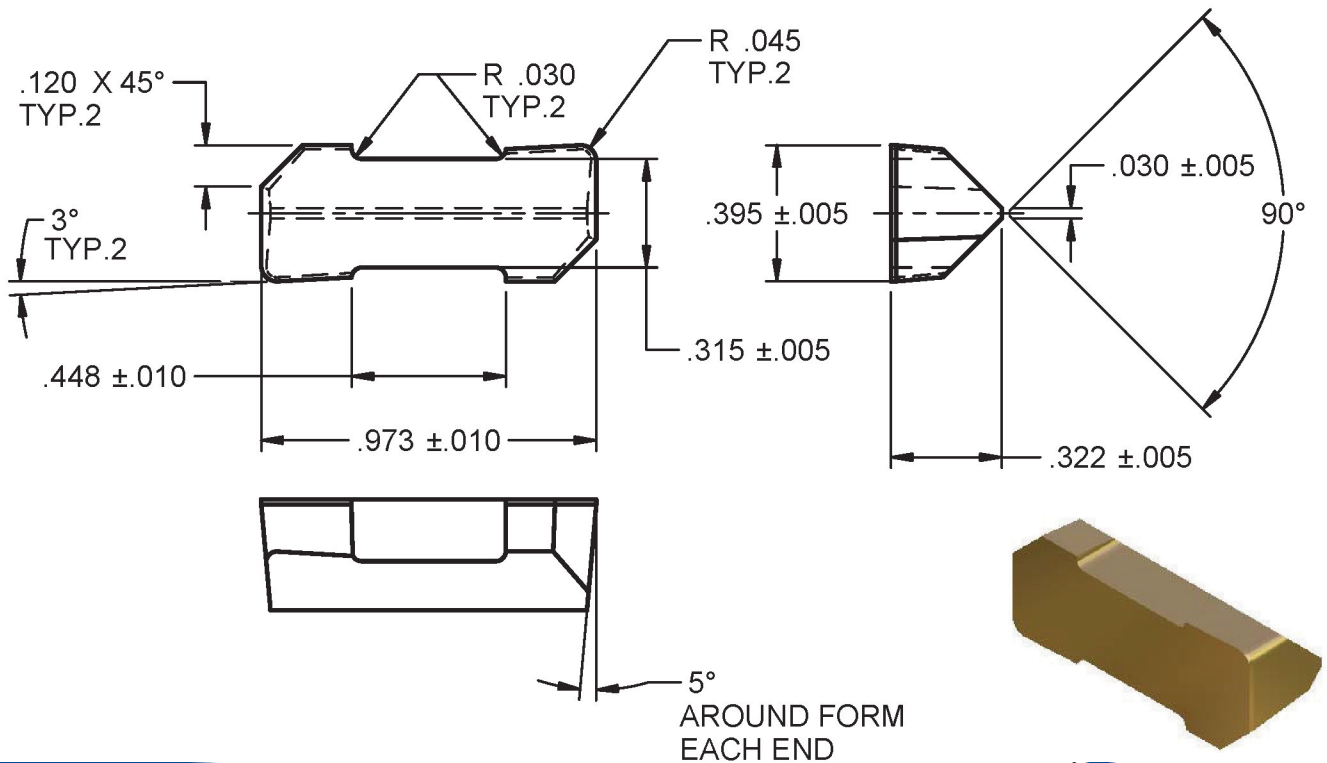
A-0267-A



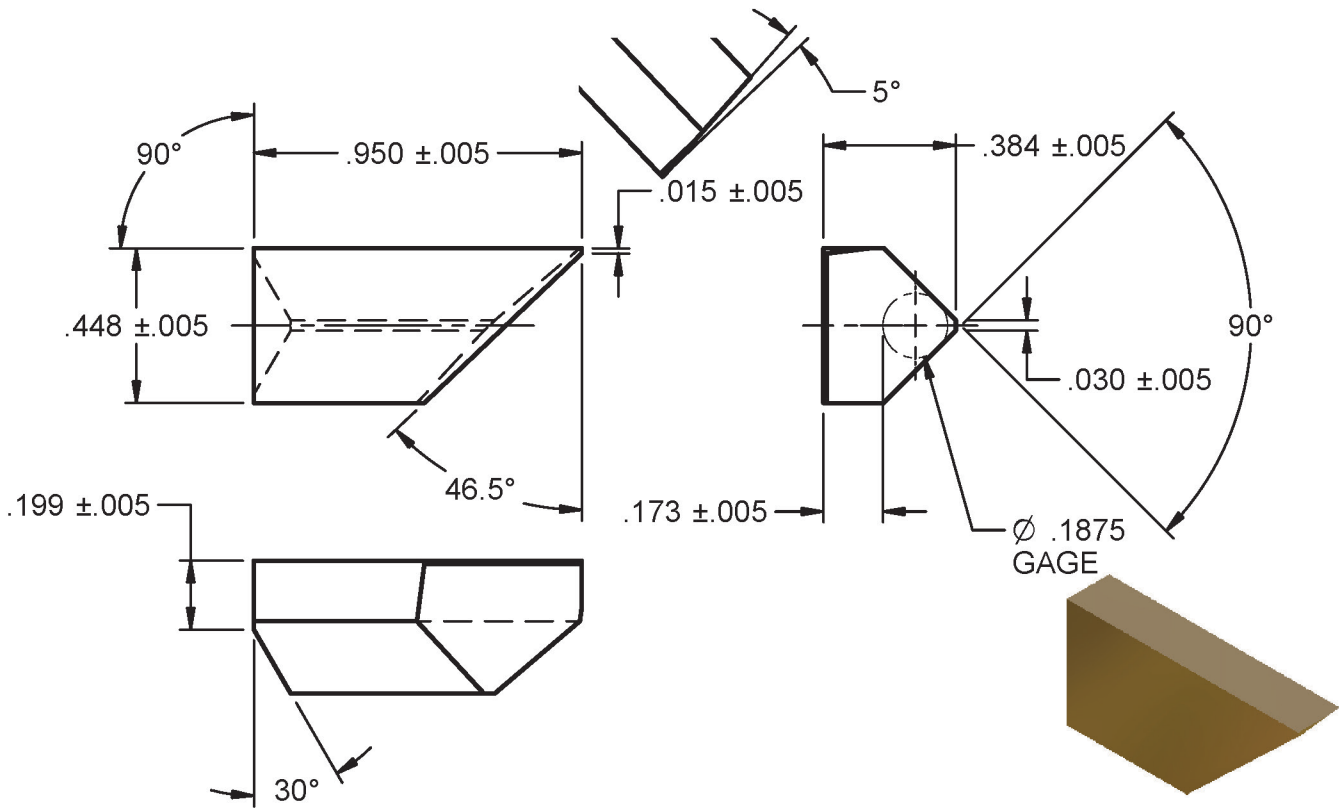
A-0503-A



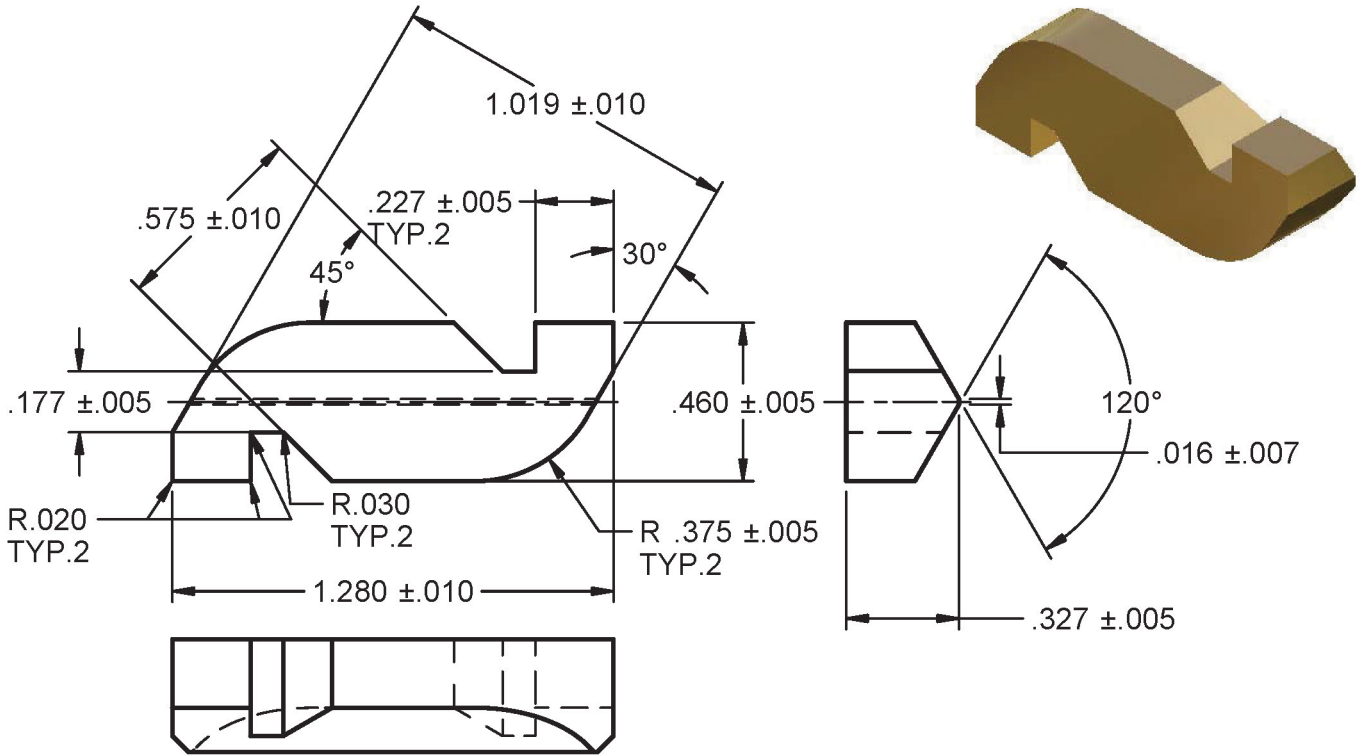
A-1591-A



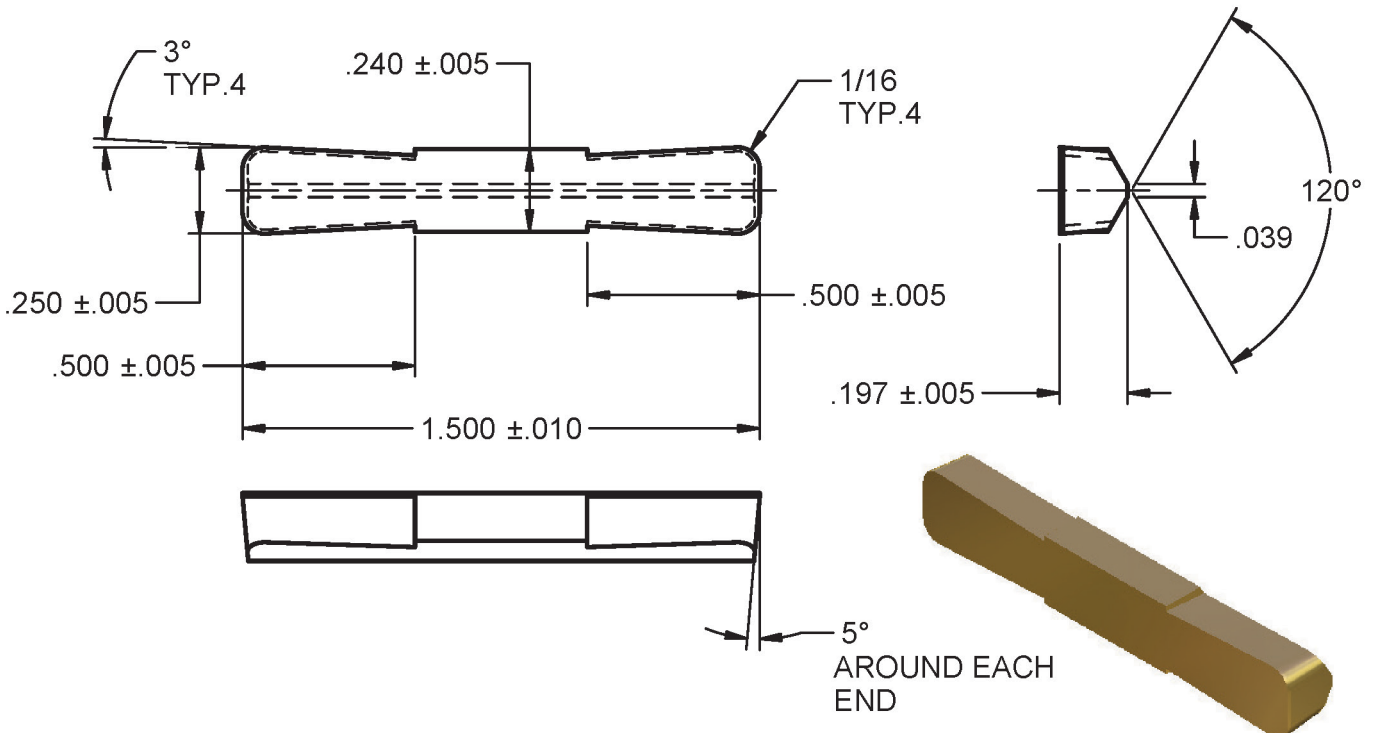
MA-69327



MA-70307 (A-1503-D)



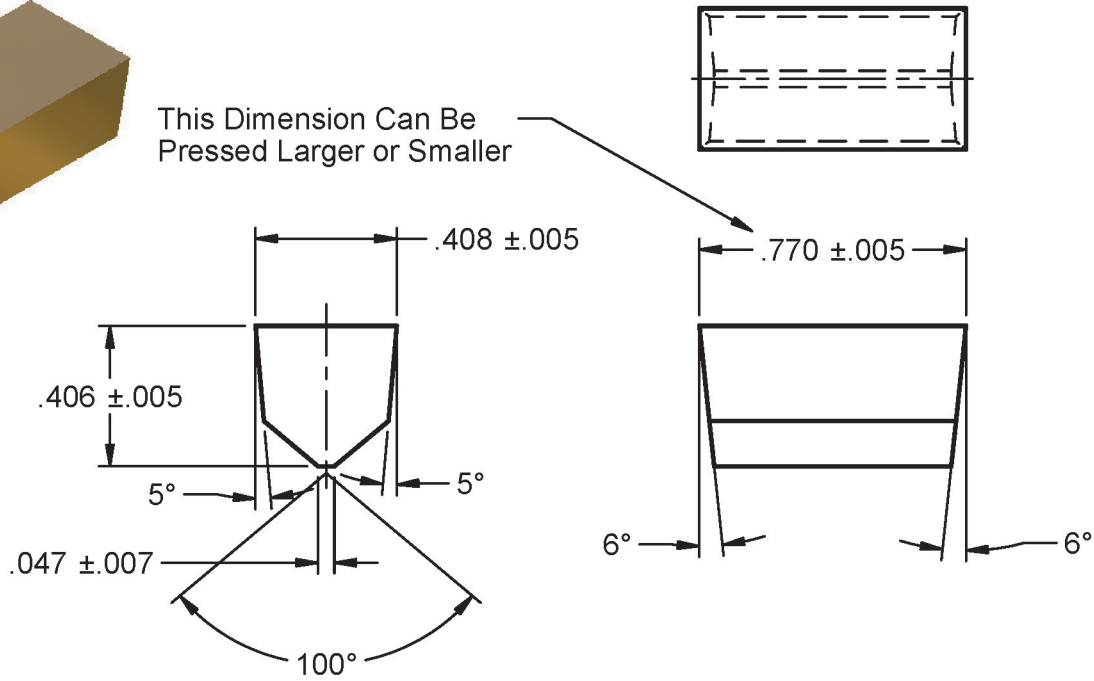
R-15282



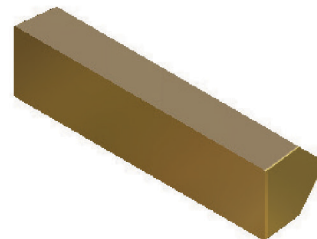
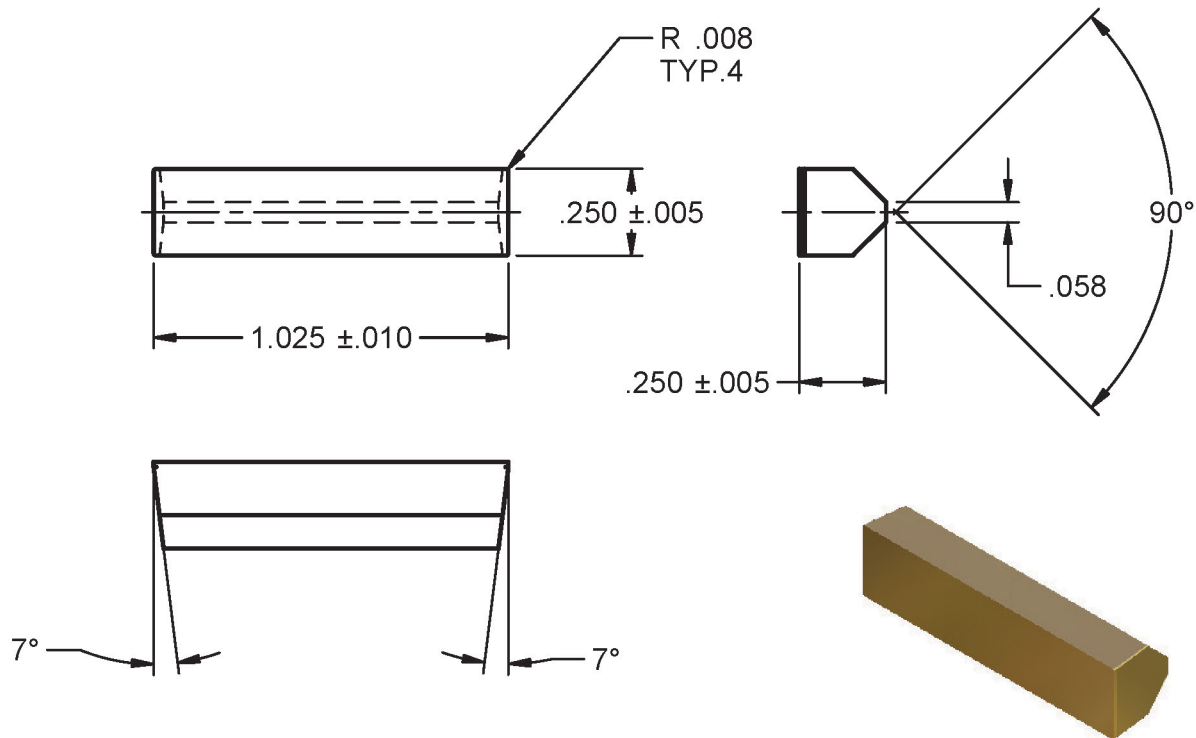
T-17773



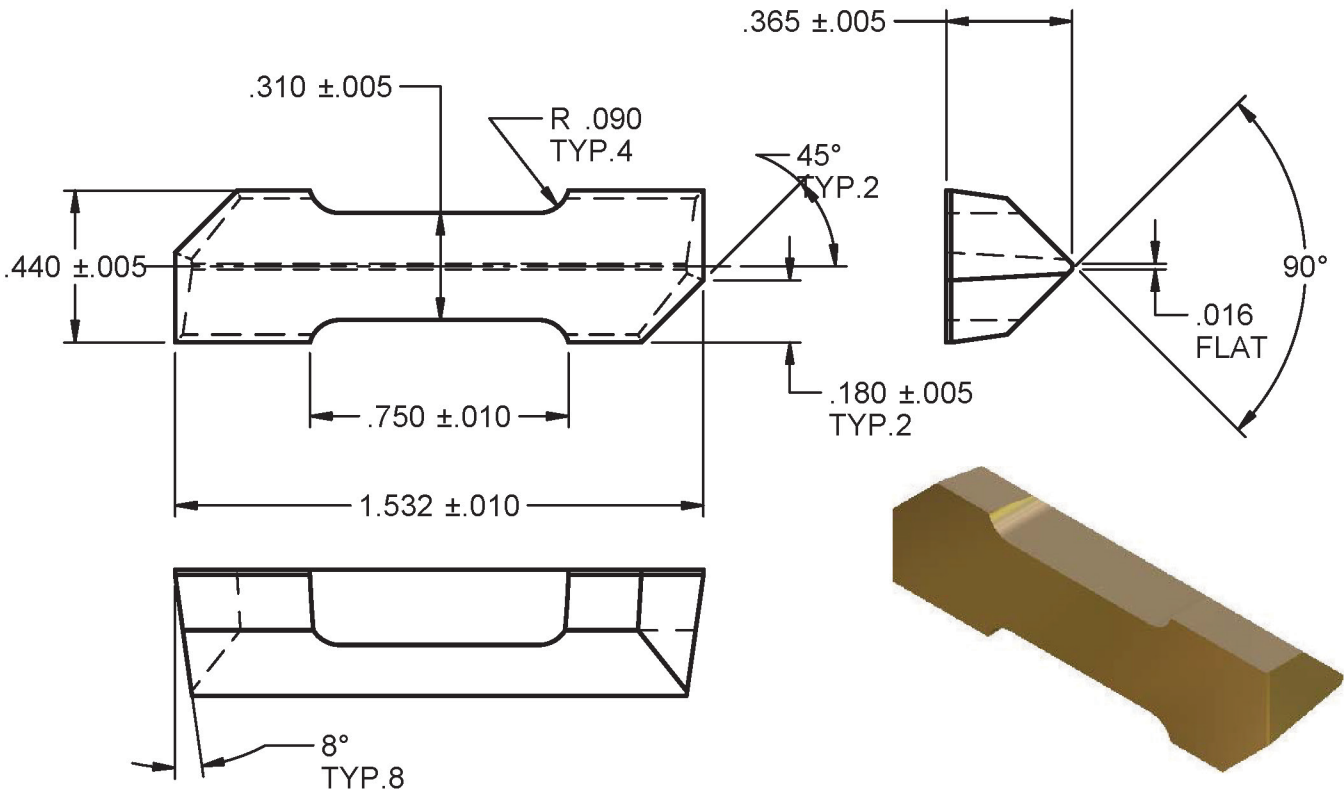
This Dimension Can Be Pressed Larger or Smaller



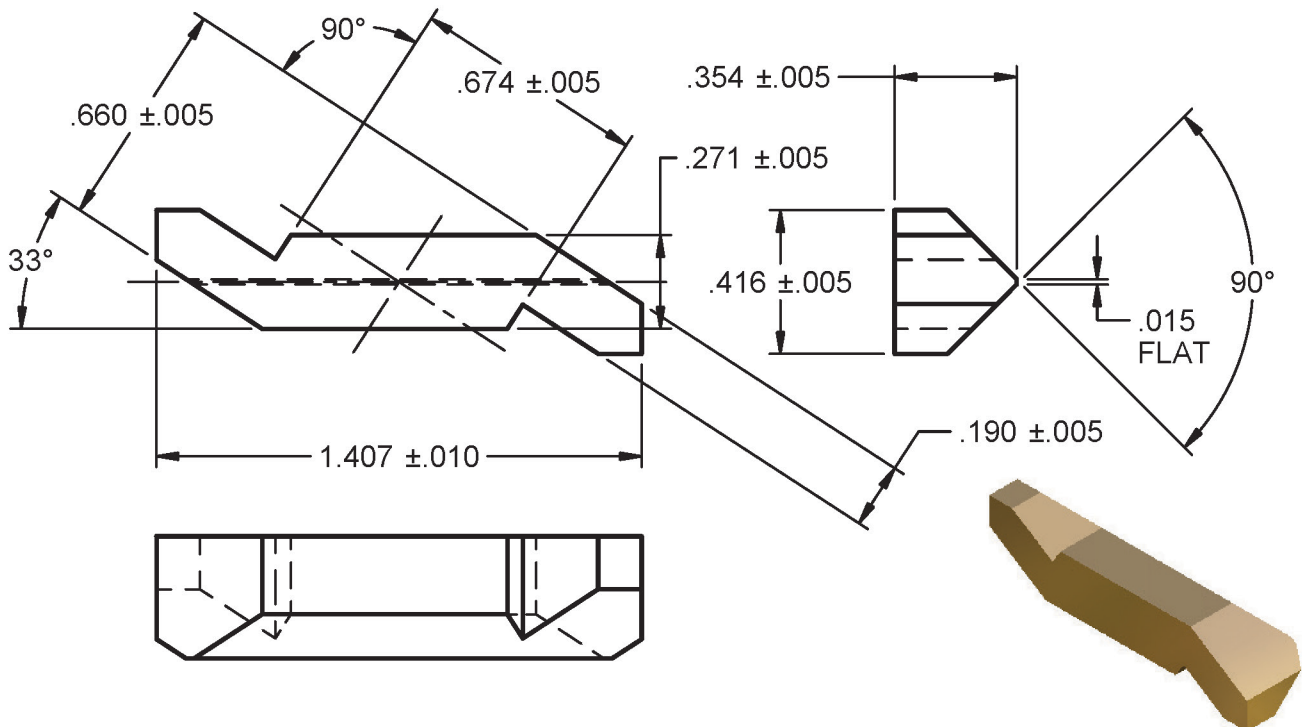
A-2163-A



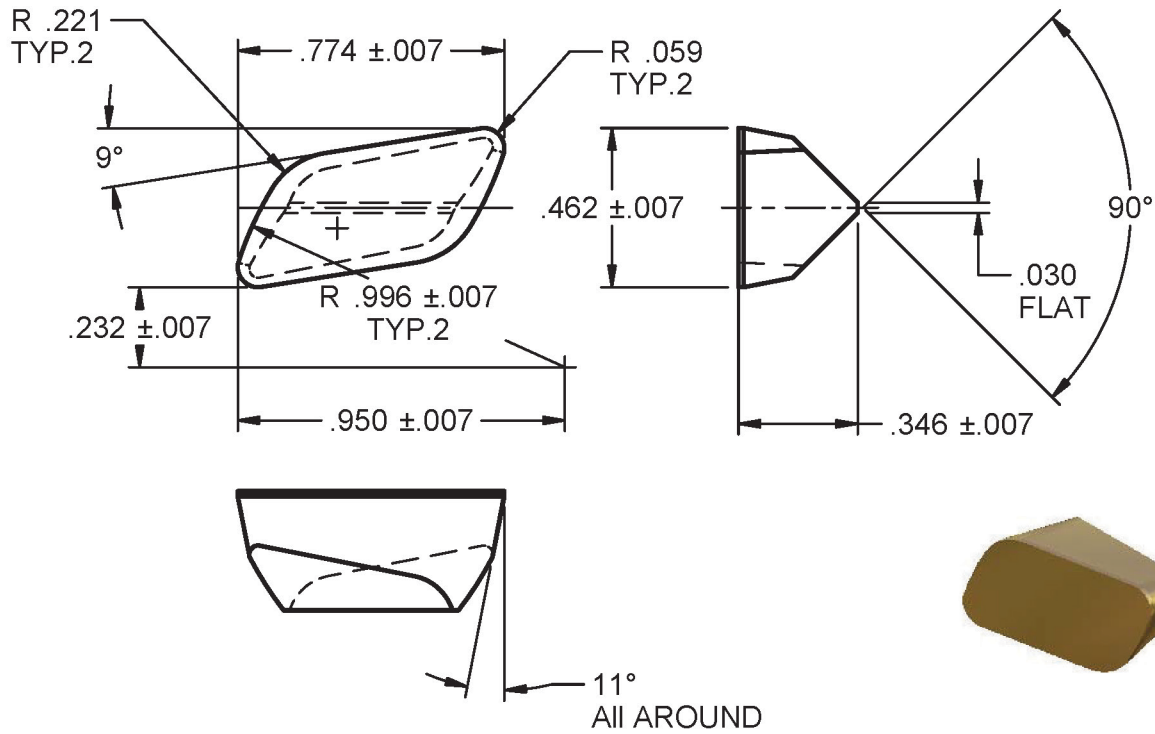
A-2346-B



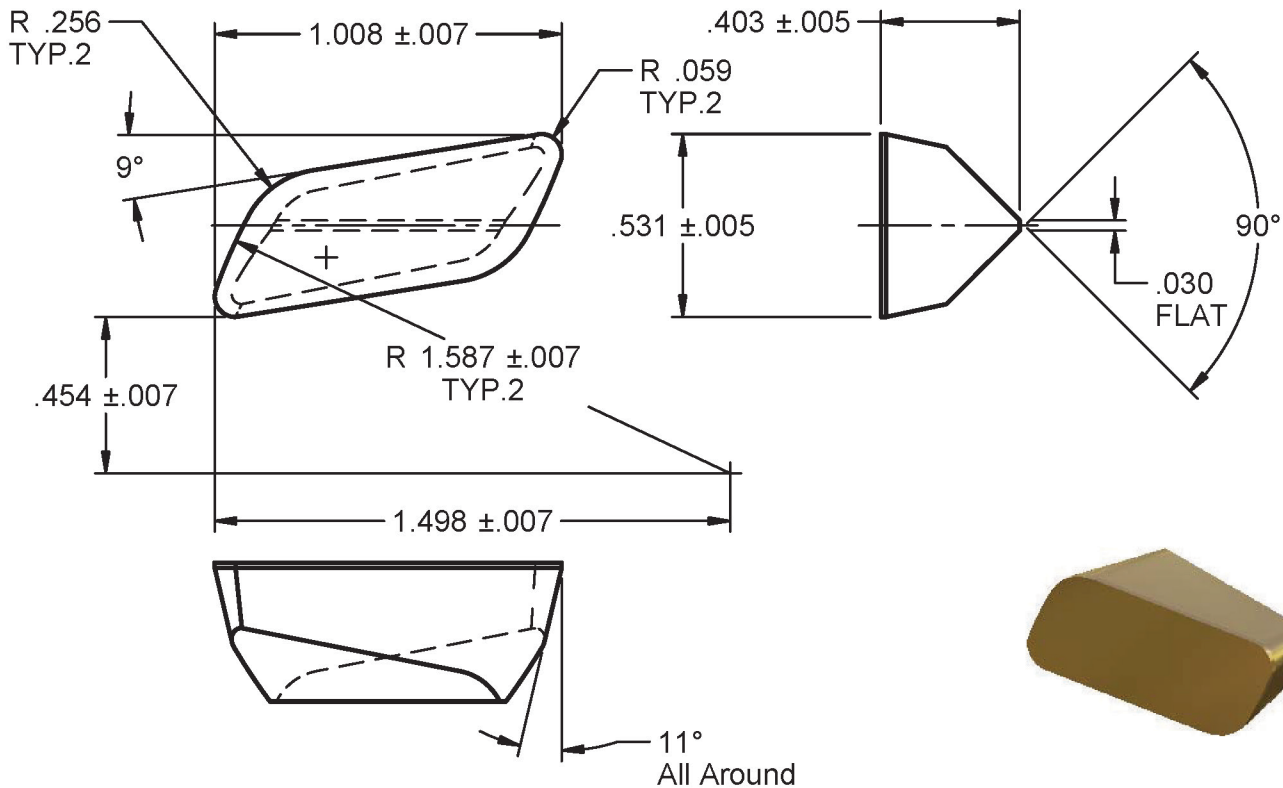
A-2382-B



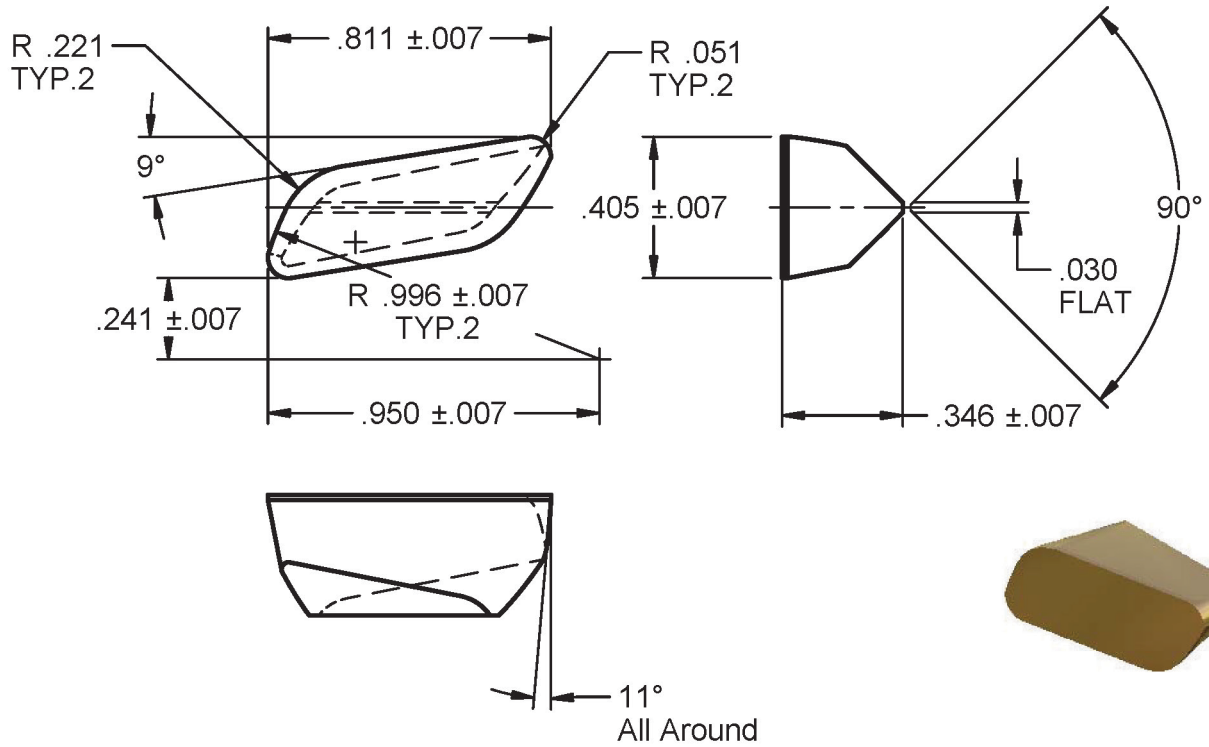
A-2276-B-1



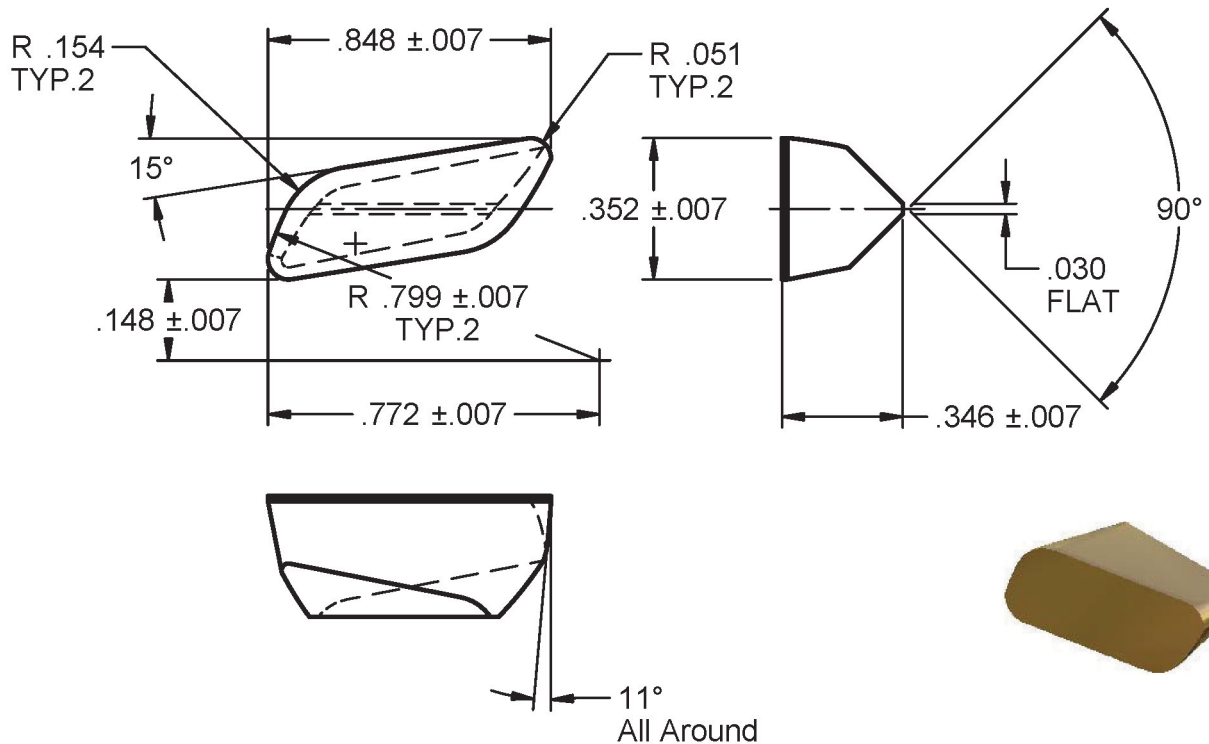
A-2276-B-2



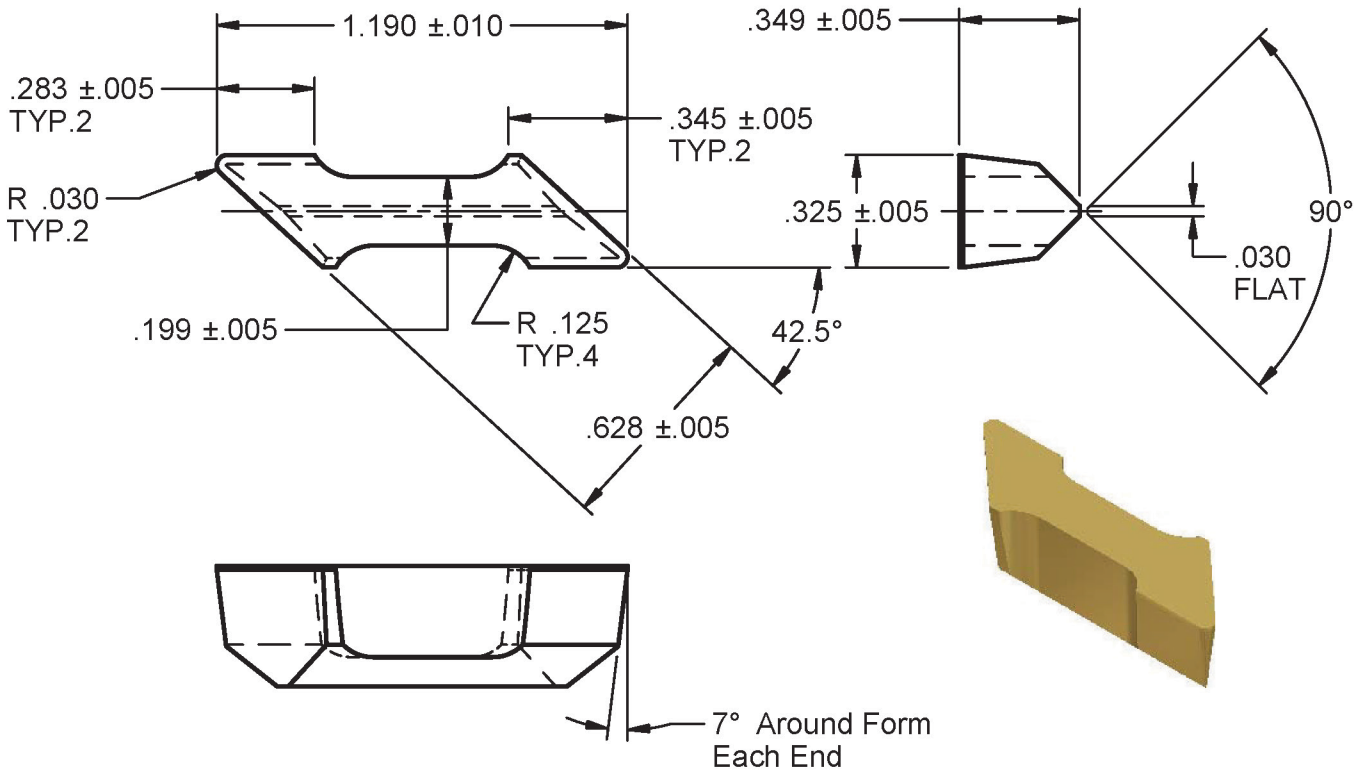
A-2276-B-3



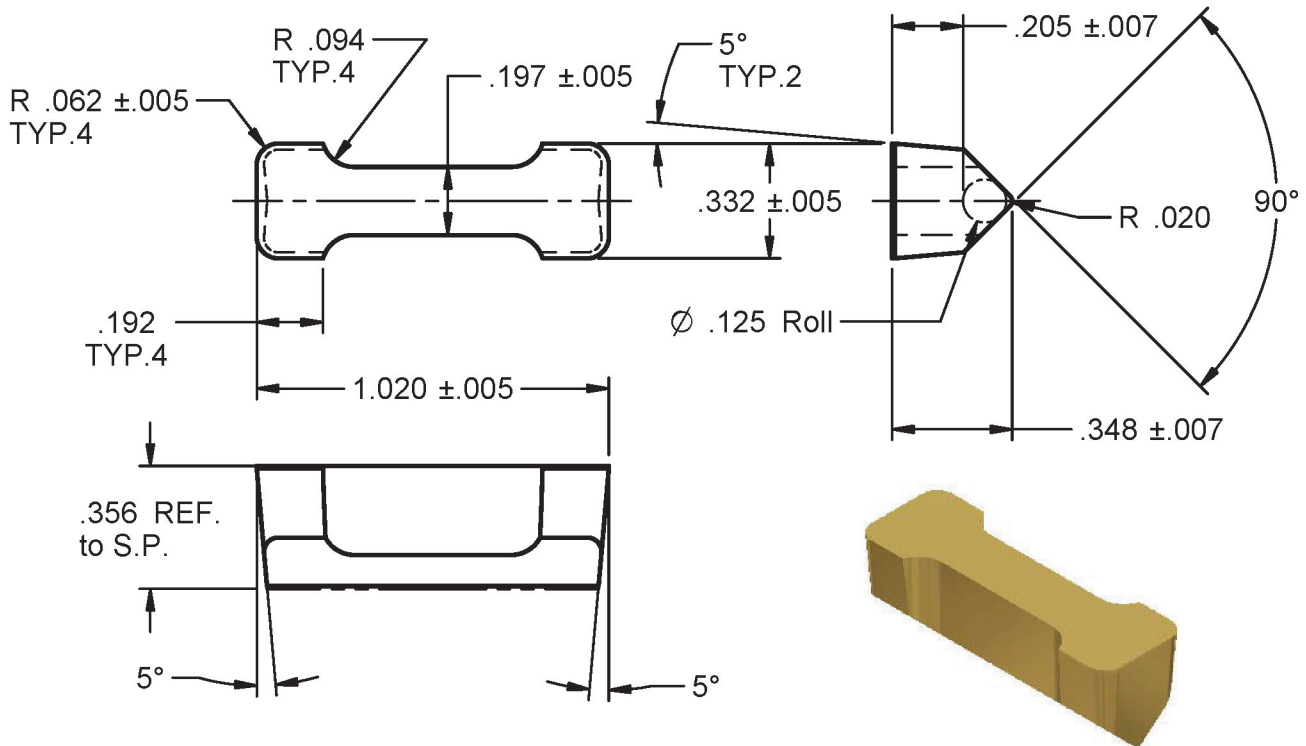
A-2276-B-4



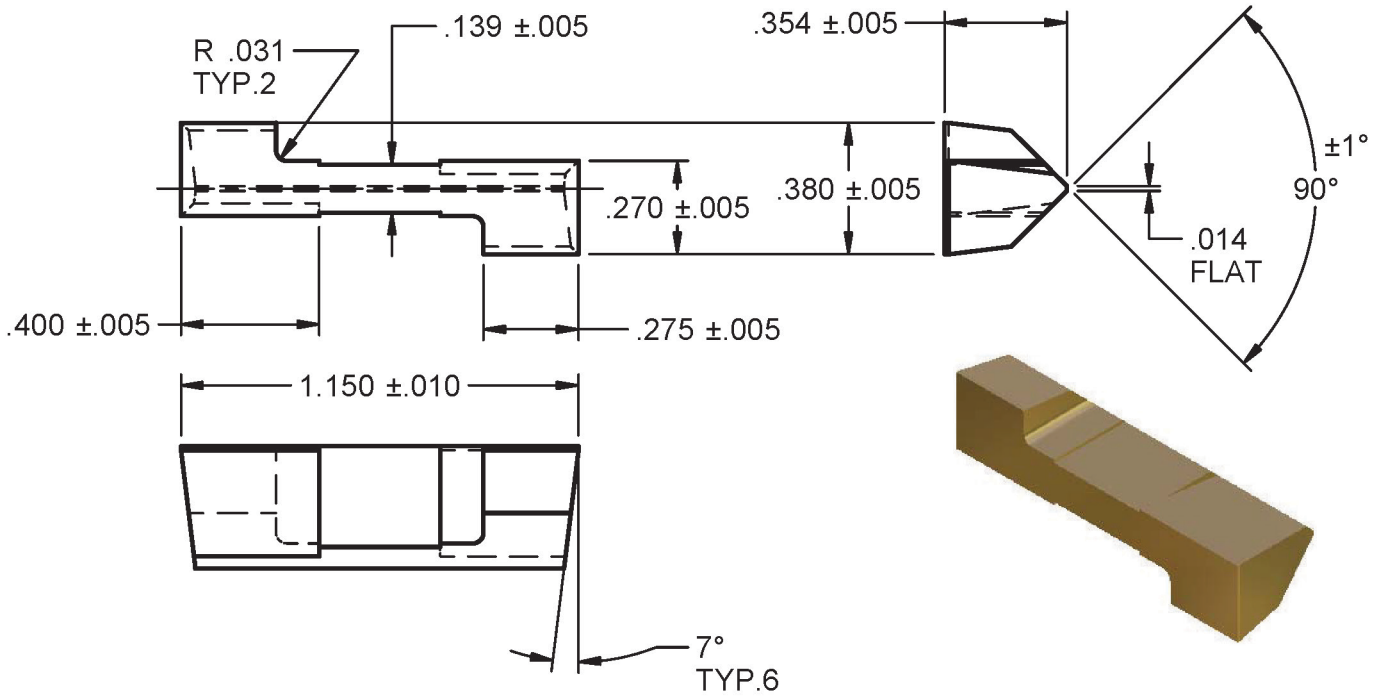
A-2341-B



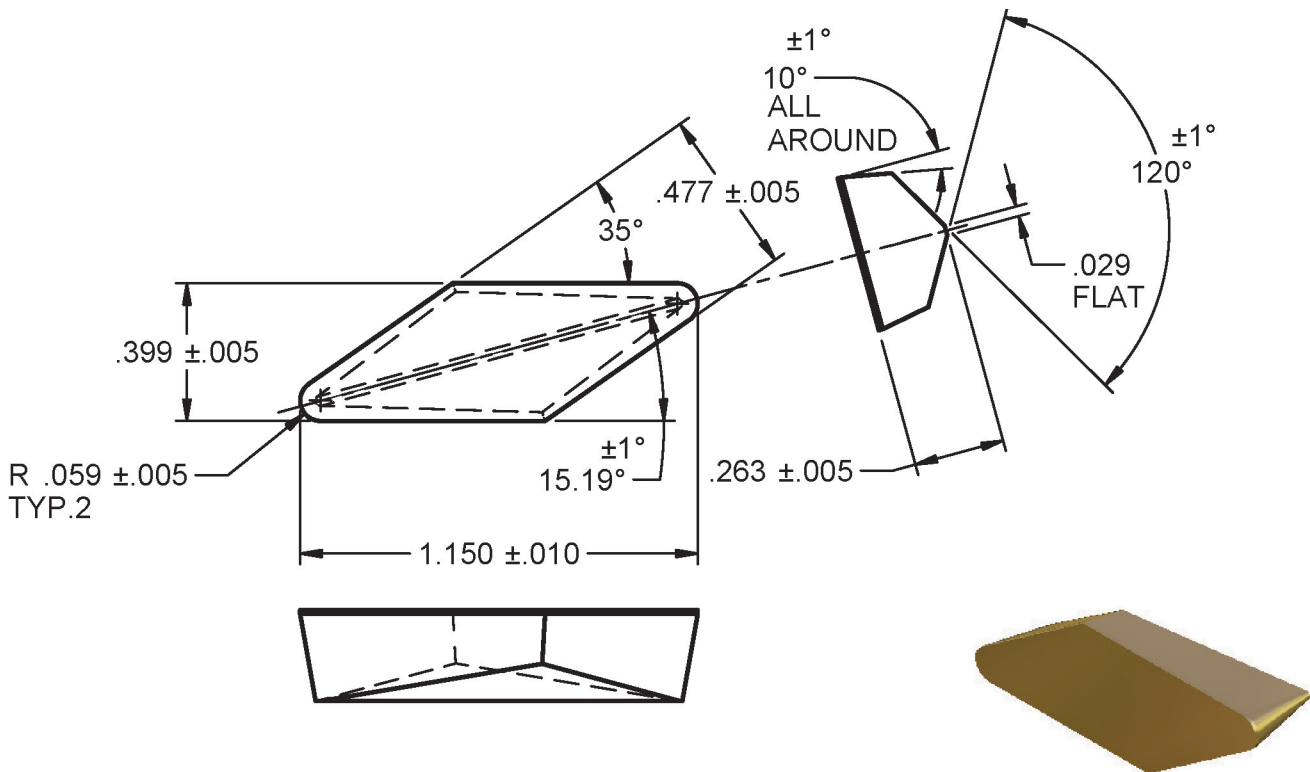
MA-69579 (D-07789-P1 C175)



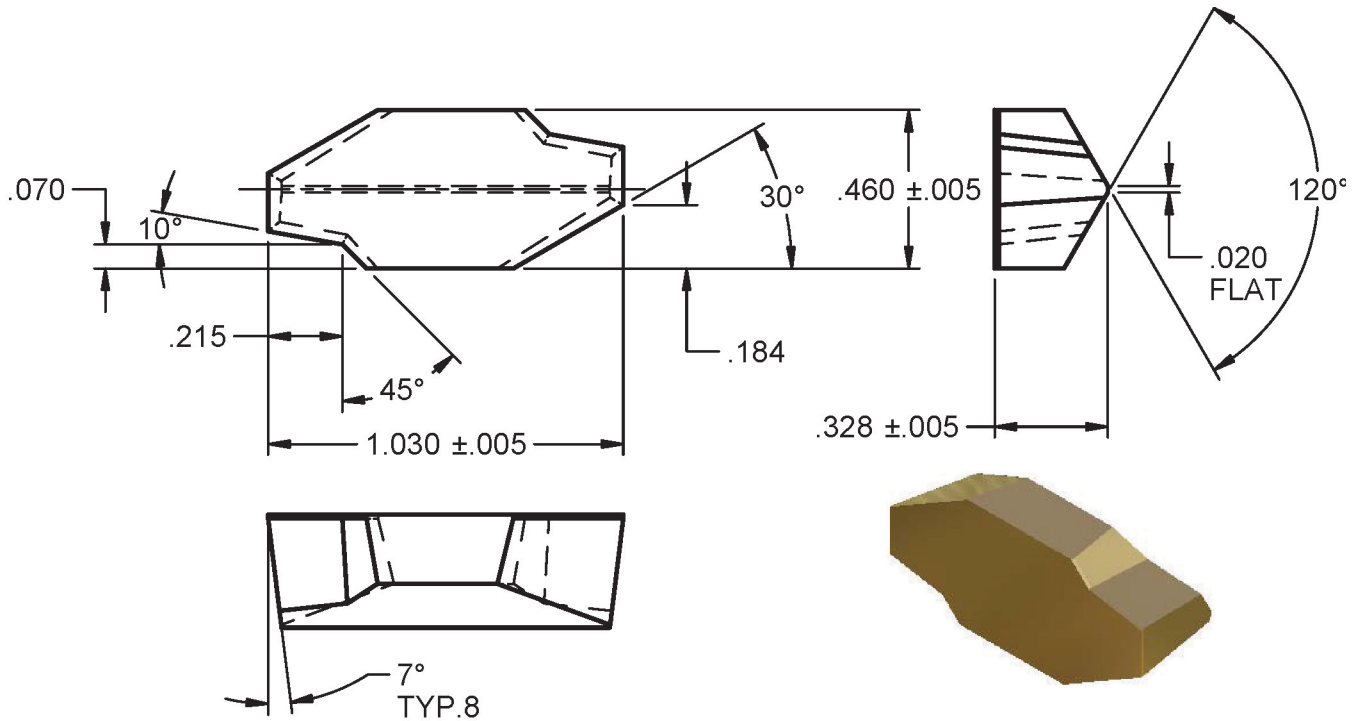
A-0461-A



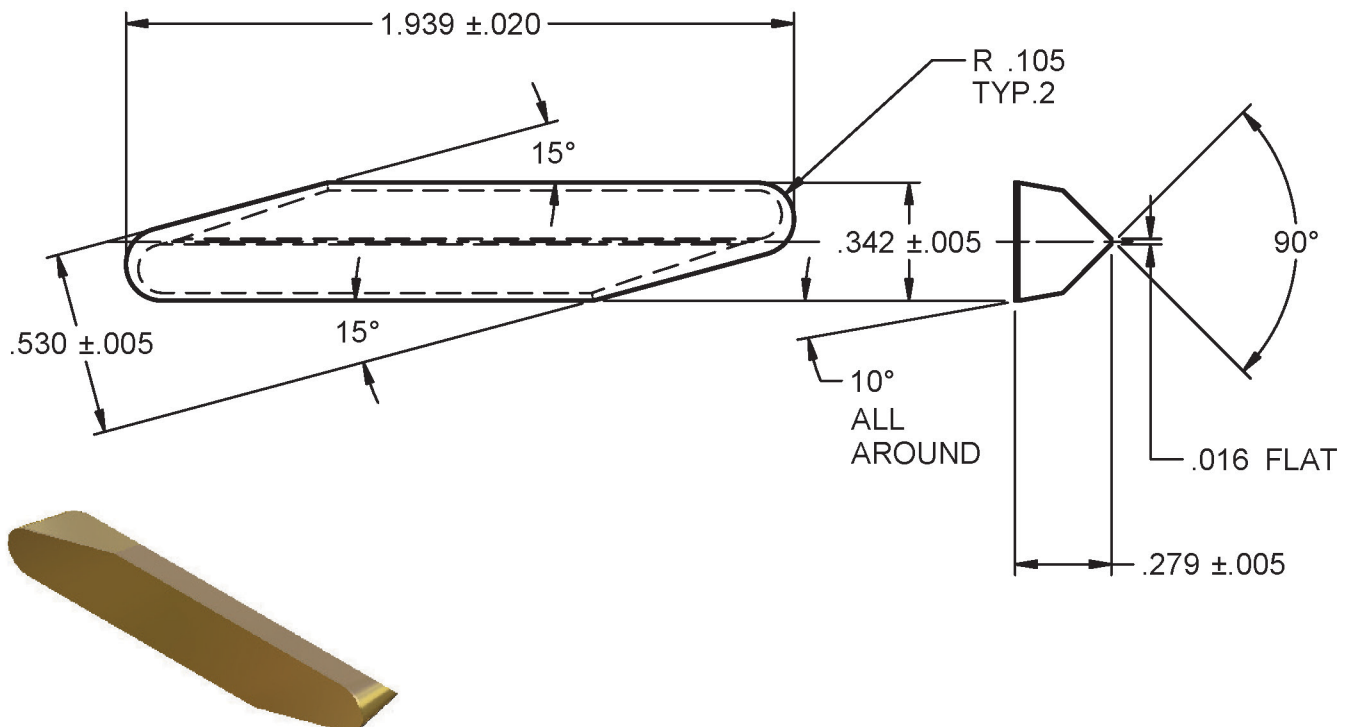
A-2523-B



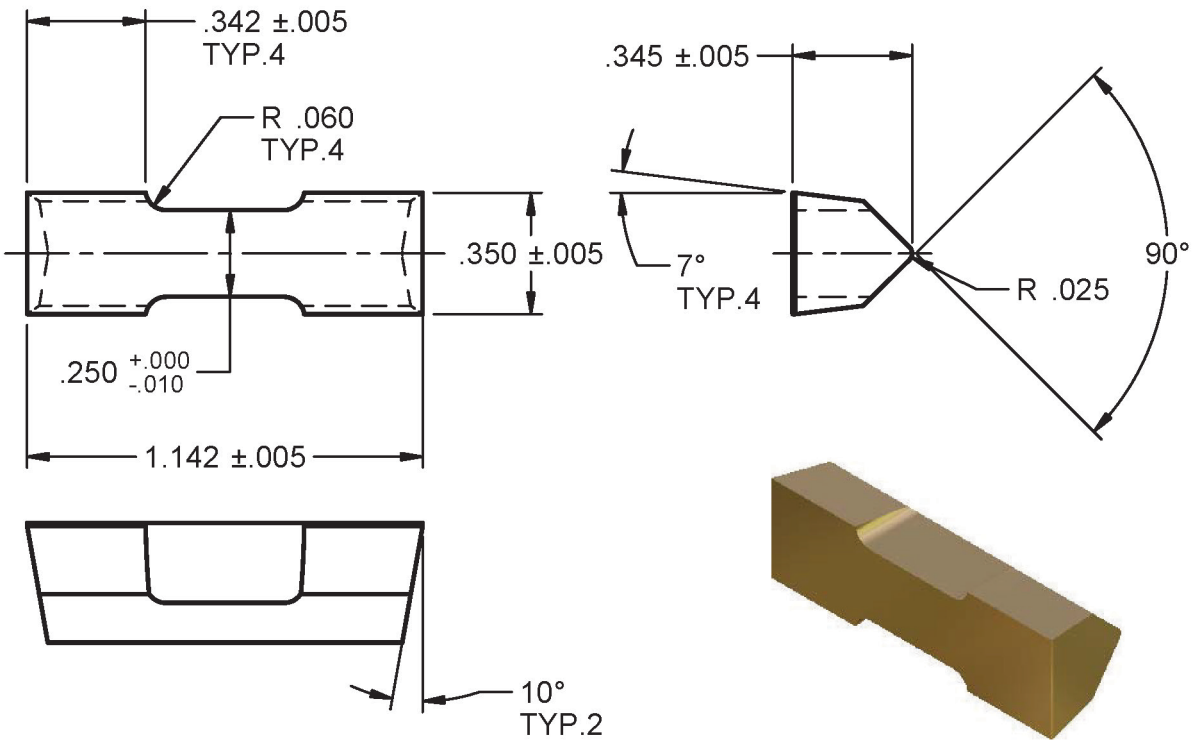
A-0543-A



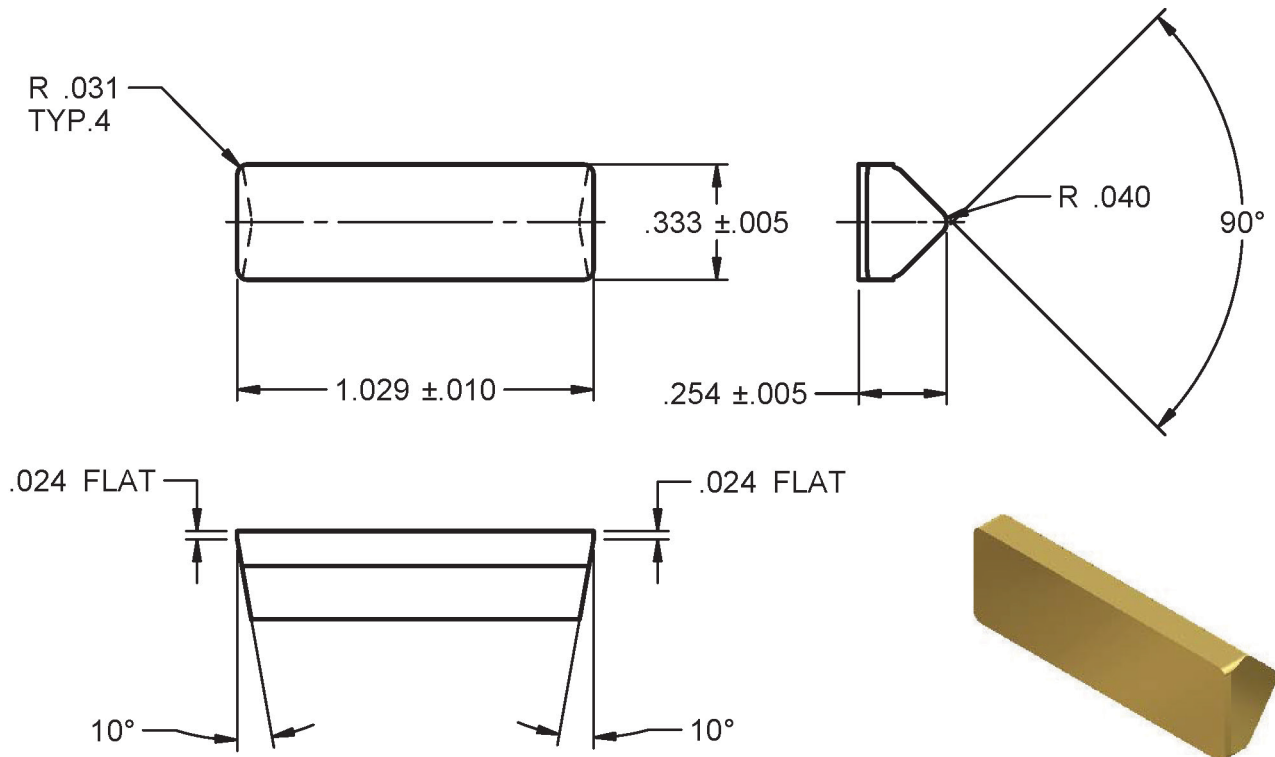
T-15913 (MA-3169)



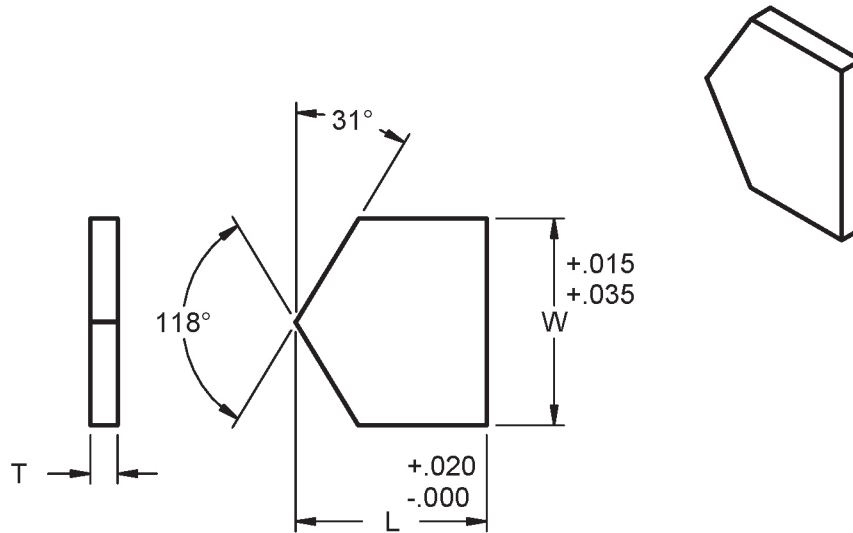
LX-1225-1 (MA-69471)



V85

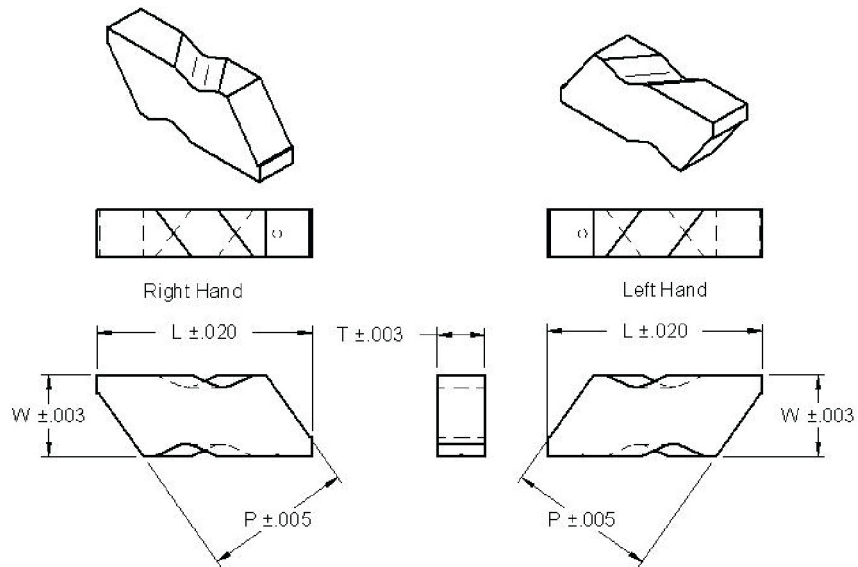


MD DRILL BLANK



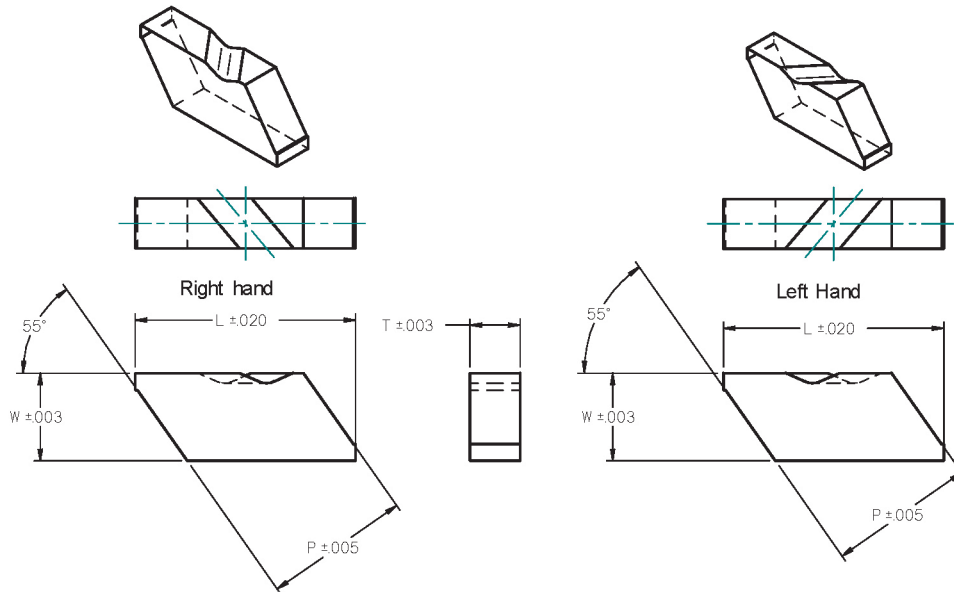
Insert	DRILL Ø	T	W	L
MD6	3/8	.075/.078	.398	.368
MD7	7/16	.075/.078	.468	.468
MD8	1/2	.087/.091	.530	.472
MD9	9/16	.087/.091	.592	.472
MD10	5/8	.087/.091	.660	.598
MD12	3/4	.087/.091	.787	.598
MD14	7/8	.087/.091	.915	.728
MD16	1	.117/.122	1.040	.728
MD18	1-1/8	.117/.122	1.170	.858
MD-20	1-1/4	.117/.122	1.295	.858

ERL/ERR



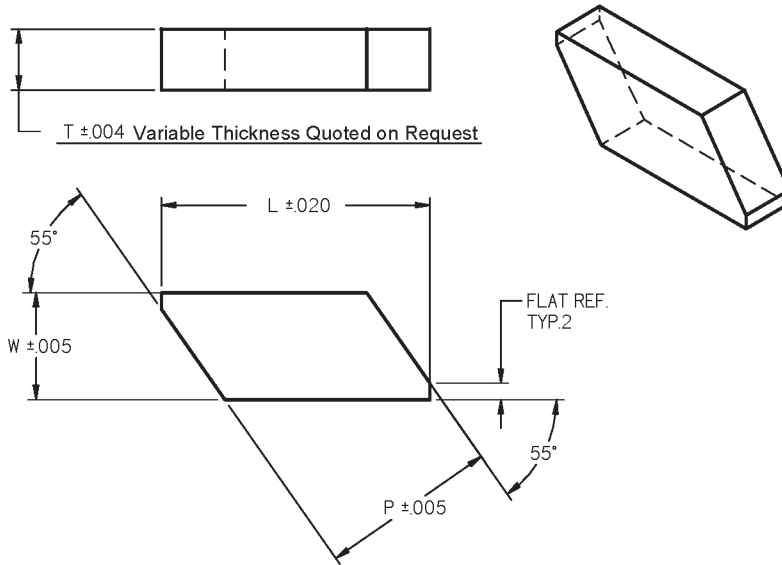
Insert	T	W	L	P
ERL2	.165	.234	.572	.364
ERR2	.165	.234	.572	.364
ERL3	.210	.362	.955	.654
ERR3	.210	.362	.955	.654
ERL4	.270	.475	1.187	.785
ERR4	.270	.475	1.187	.785
ERL6	.400	.475	1.187	.785
ERR6	.400	.475	1.187	.785
ERL5	.400	.708	1.647	1.100
ERR5	.400	.708	1.647	1.100

ERL/ERR-SS



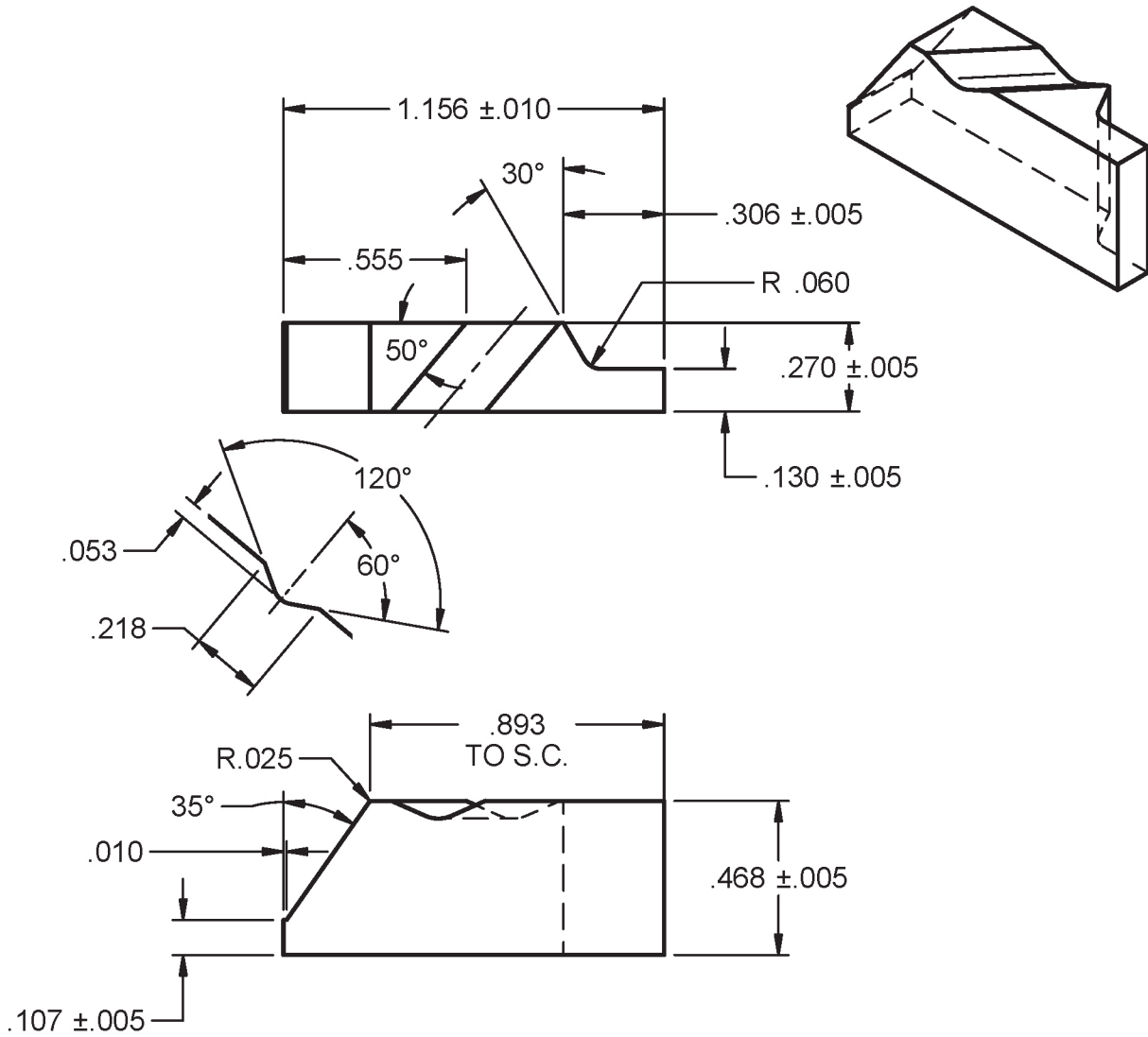
Insert	T	W	L	P
ERL3-SS	.210	.362	.955	.654
ERR3-SS	.210	.362	.955	.654
ERL4-SS	.270	.475	1.187	.785
ERR4-SS	.270	.475	1.187	.785

ER

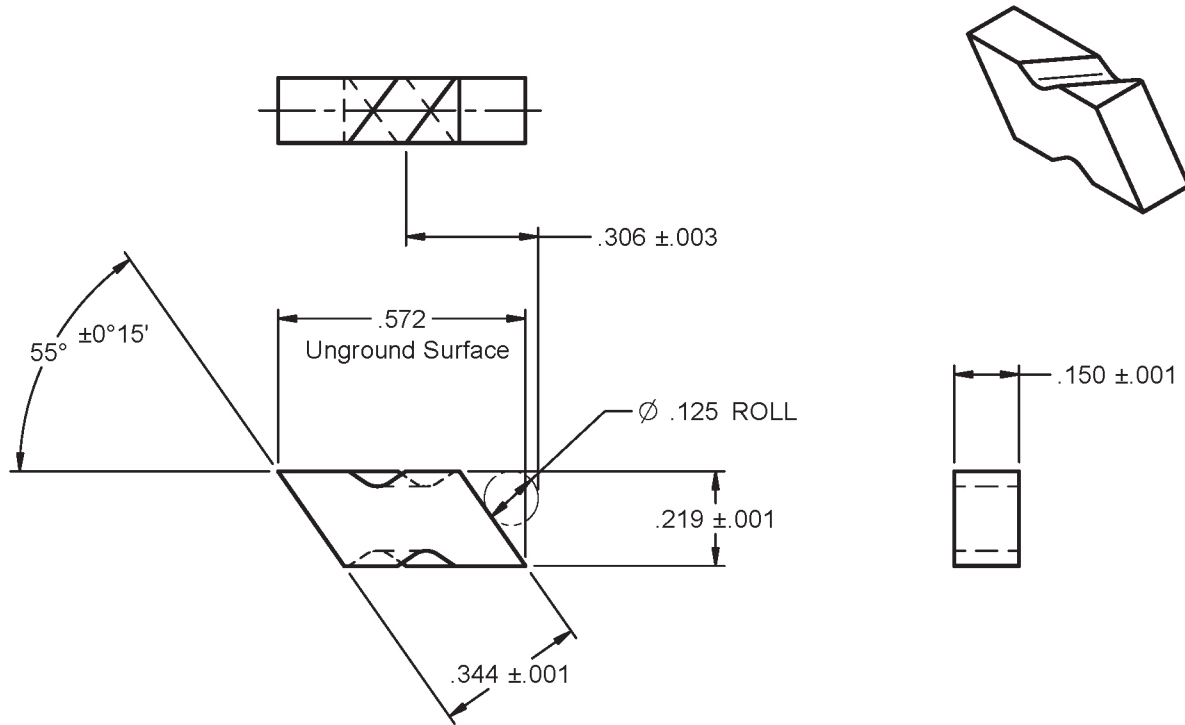


Insert	T	W	L	P	FLAT
ER3	.210	.362	.955	.654	.070
ER3.187THK	.202	.362	.955	.654	.070
ER3.219THK	.234	.362	.955	.654	.070
ER3.222THK	.237	.362	.955	.654	.070
ER3.250THK	.265	.362	.955	.654	.070
ER4	.270	.473	1.187	.785	.073
ER4.187THK	.202	.473	1.187	.785	.073
ER4.250THK	.265	.473	1.187	.785	.073
ER4.312THK	.327	.473	1.187	.785	.073
ER4.375THK	.390	.473	1.187	.785	.073
ER6	.400	.473	1.187	.785	.073
ER6.375THK	.395	.473	1.187	.785	.073
ER6.425THK	.445	.473	1.187	.785	.073
ER6.436THK	.456	.473	1.187	.785	.073

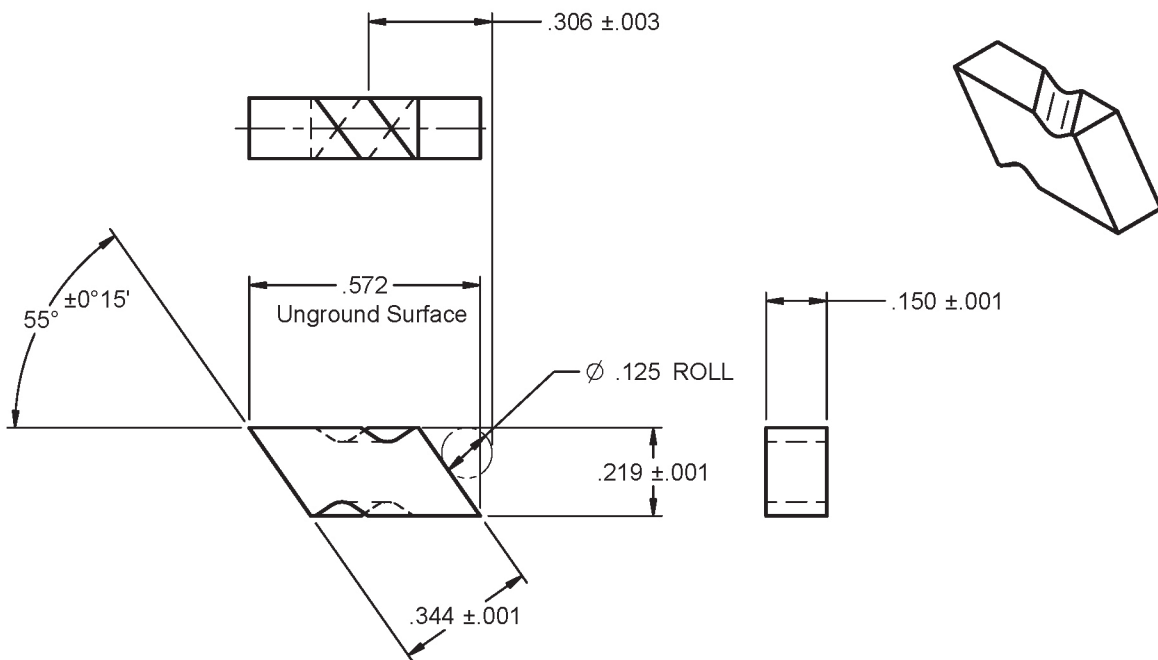
LX-1699-1 (MA-70533)



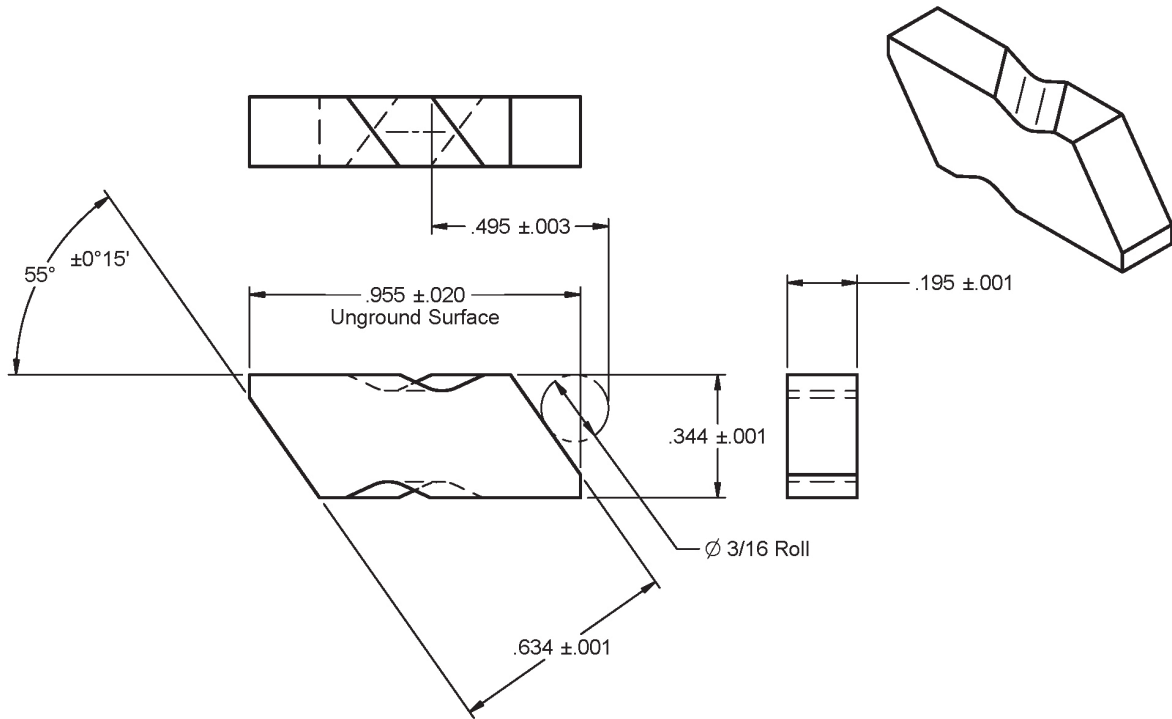
ERL2-SF



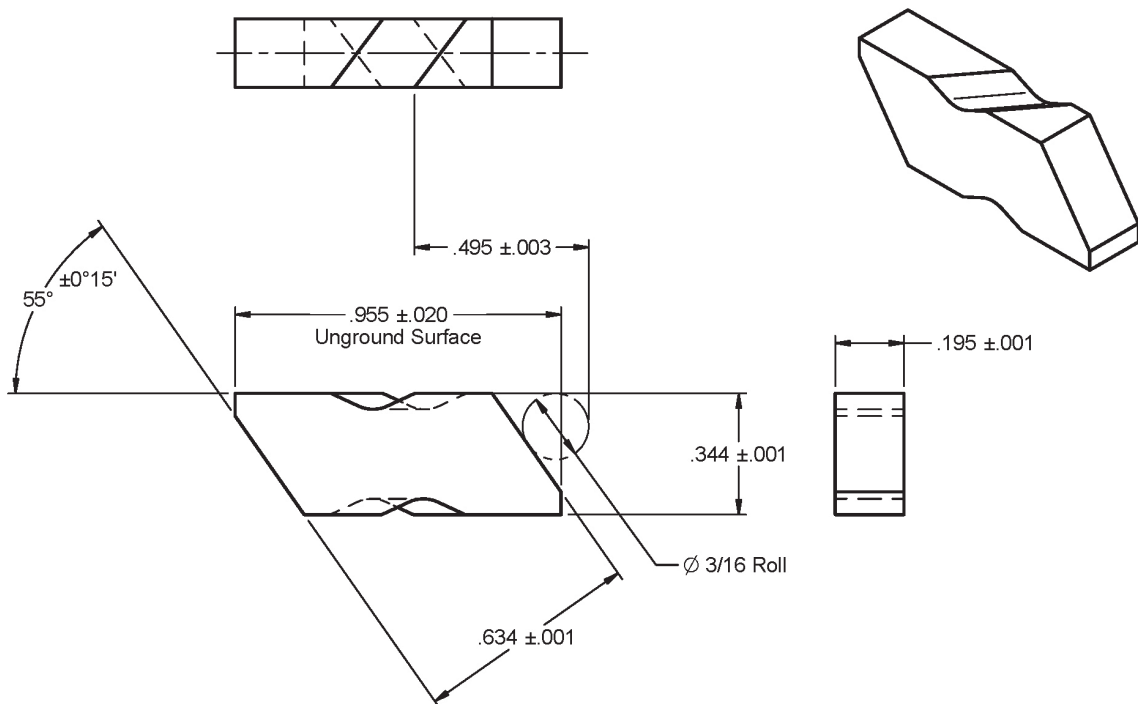
ERR2-SF



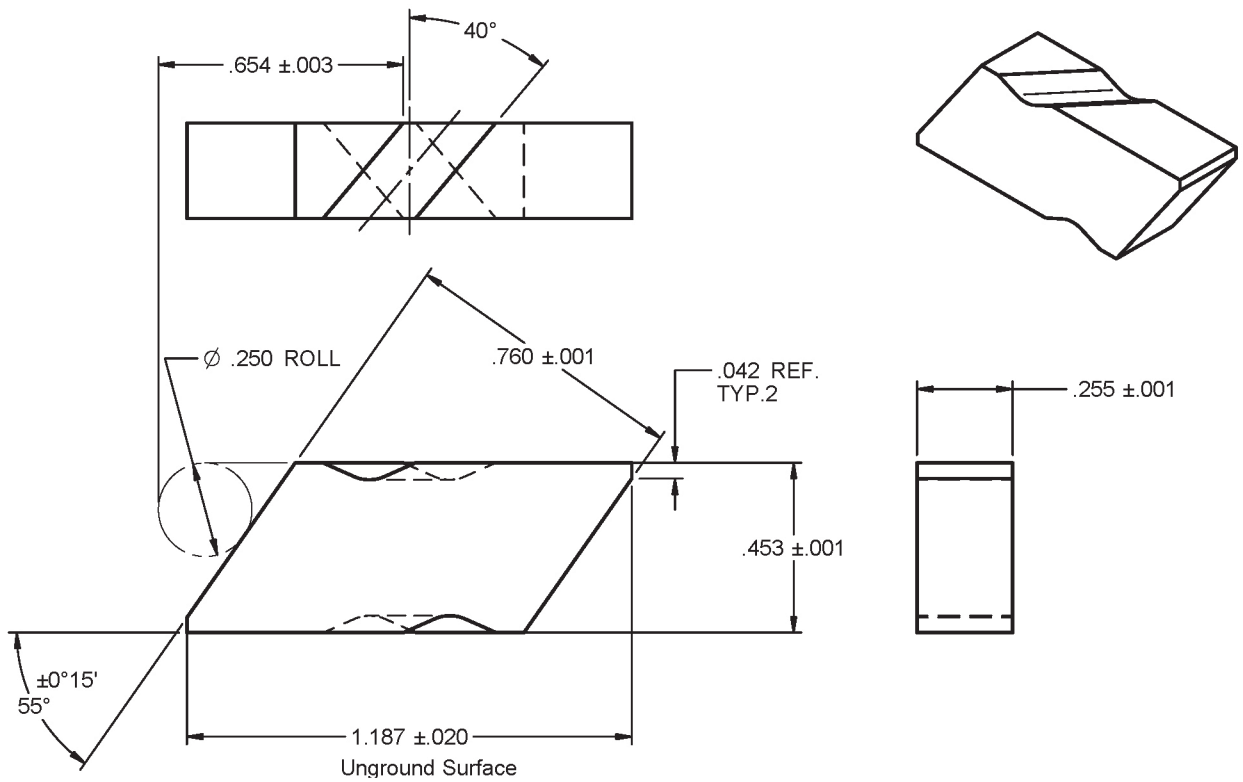
ERR3-SF



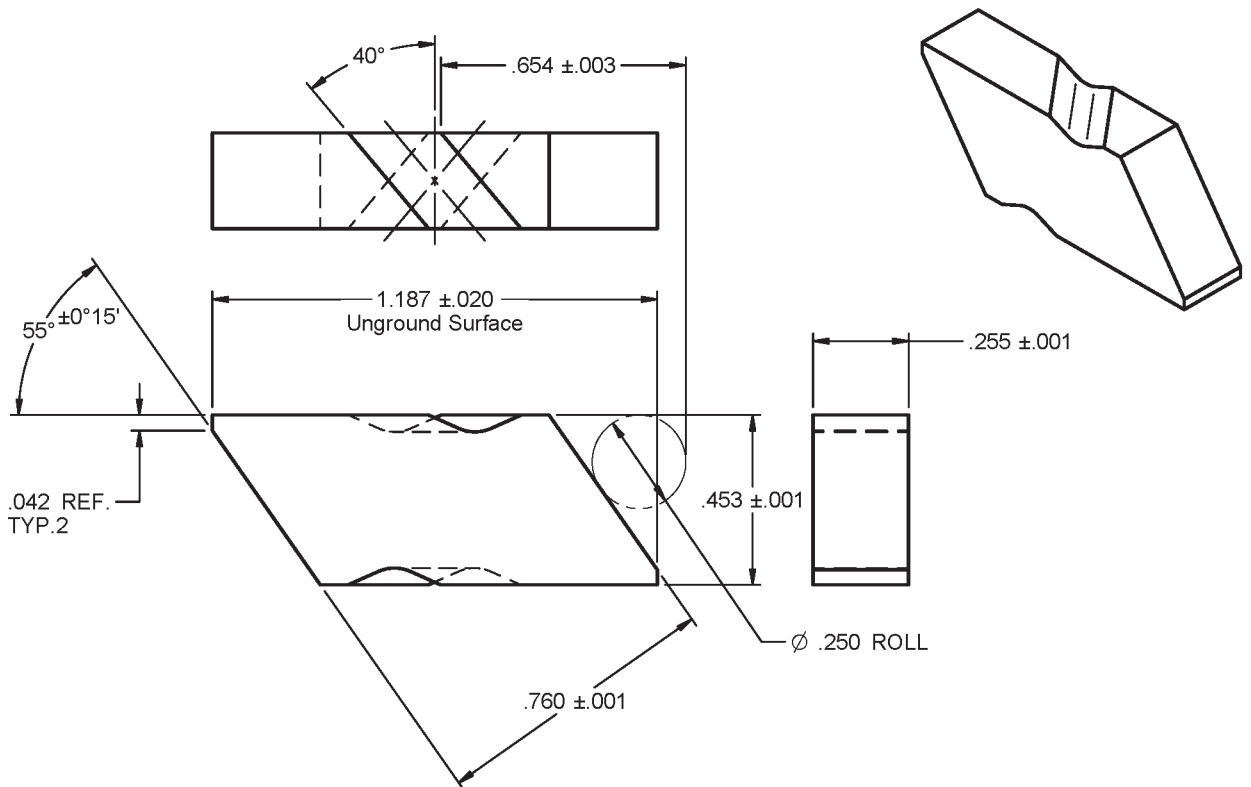
ERL3-SF



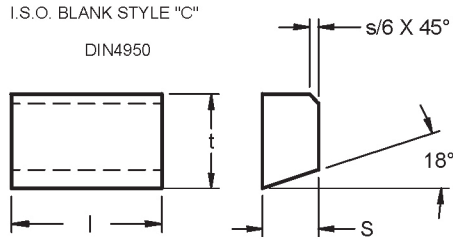
ERL4-SF



ERR4-SF



ISO TIP "C"

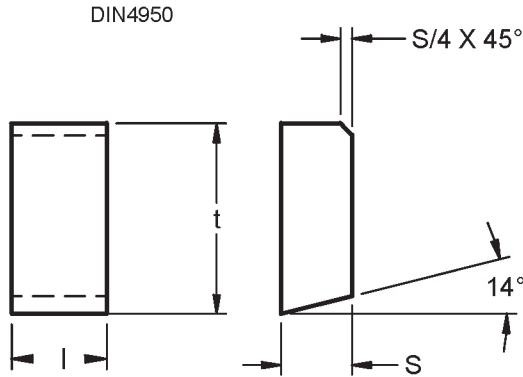


No.	S	t	l
C5 ISO	+0.012 -0.000	+0.012 -0.000	+0.012 -0.000
C6 ISO	+0.012 -0.000	+0.012 -0.000	+0.012 -0.000
C8 ISO	+0.012 -0.000	+0.012 -0.000	+0.016 -0.000
C10 ISO	+0.012 -0.000	+0.012 -0.000	+0.016 -0.000
C12 ISO	+0.012 -0.000	+0.016 -0.000	+0.024 -0.000
C16 ISO	+0.012 -0.000	+0.016 -0.000	+0.024 -0.000
C20 ISO	+0.016 -0.000	+0.016 -0.000	+0.024 -0.000
C25 ISO	+0.016 -0.000	+0.024 -0.000	+0.024 -0.000
C32 ISO	+0.016 -0.000	+0.024 -0.000	+0.039 -0.000

Insert	s (mm)	t (mm)	l (mm)	s (in)	t (in)	l (in)
C5 ISO	2	3	5	.079	.118	.197
C6 ISO	2.5	4	6	.098	.158	.236
C8 ISO	3	5	8	.118	.200	.315
C10 ISO	4	6	10	.158	.236	.394
C12 ISO	5	8	12	.200	.315	.472
C16 ISO	6	10	16	.236	.394	.630
C20 ISO	7	12	20	.276	.472	.787
C25 ISO	8	14	25	.315	.551	.984
C32 ISO	10	18	32	.394	.709	1.260

ISO TIP "D"

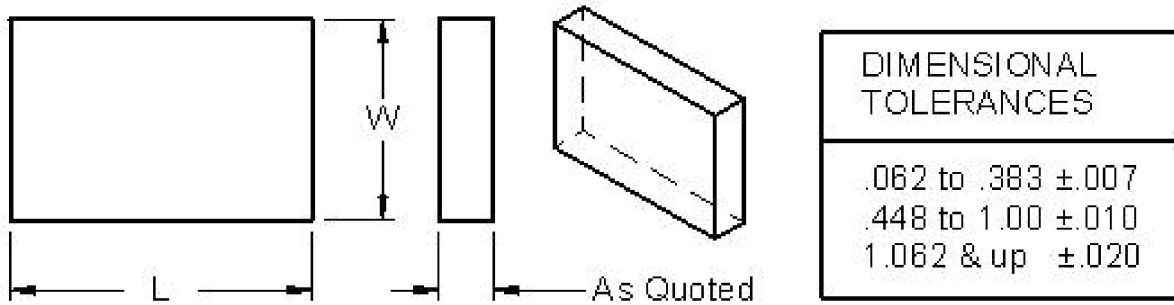
I.S.O. BLANK STYLE "D"



No.	S	t	l
D3 ISO	+0.012 -.000	+0.016 -.000	+0.012 -.000
D4 ISO	+0.012 -.000	+0.016 -.000	+0.012 -.000
D5 ISO	+0.012 -.000	+0.016 -.000	+0.012 -.000
D6 ISO	+0.012 -.000	+0.024 -.000	+0.012 -.000
D8 ISO	+0.016 -.000	+0.024 -.000	+0.016 -.000
D10 ISO	+0.016 -.000	+0.024 -.000	+0.016 -.000
D12 ISO	+0.016 -.000	+0.024 -.000	+0.016 -.000

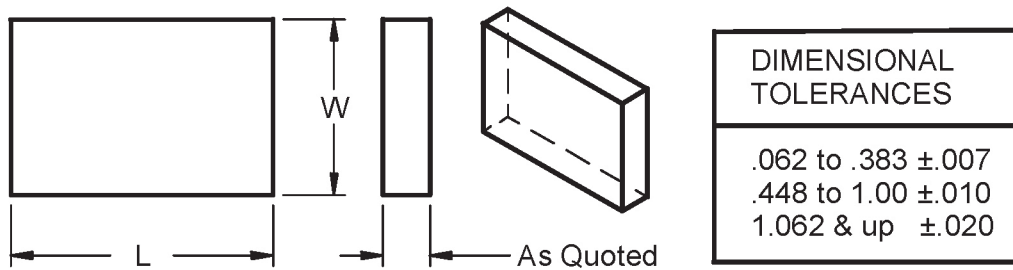
Insert	s (mm)	t (mm)	l (mm)	s (in)	t (in)	l (in)
D3 ISO	3	8	3	.118	.315	.118
D4 ISO	4	10	4	.158	.394	.158
D5 ISO	5	12	5	.197	.472	.197
D6 ISO	6	14	6	.236	.551	.236
D8 ISO	8	16	8	.315	.630	.315
D10 ISO	10	18	10	.394	.709	.394
D12 ISO	12	20	12	.472	.787	.472

NON-STANDARD RECTANGLES



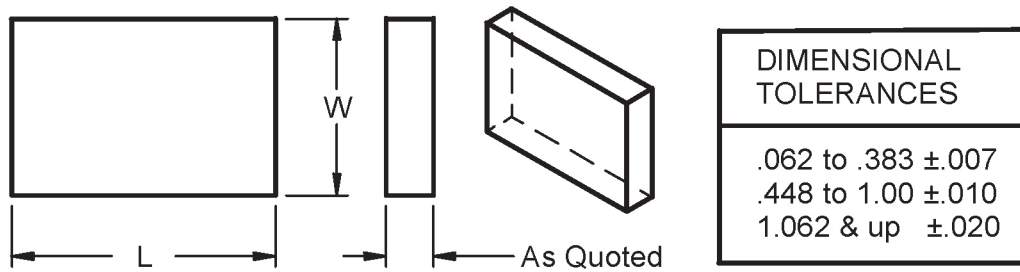
Insert	W	L
1/16 X 1/4	.068	.257
1/16 X 3/4	.069	.765
1/16 X 1-1/4	.066	1.270
1/16 X 1-1/2	.075	1.523
3/32 X 13/64	.112	.221
3/32 X 1/4	.100	.260
3/32 X 5/16	.100	.322
3/32 X 1/2	.099	.510
3/32 X 3/4	.114	.777
3/32 X 13/16	.099	.824
3/32 X 1	.100	1.010
3/32 X 1-1/16	.098	1.078
3/32 X 1-1/4	.098	1.270
3/32 X 1-3/8	.102	1.375
3/32 X 2	.114	2.030
3/32 X 2-1/2	.119	2.520
1/8 X 3/16	.133	.192
1/8 X 5/16	.151	.330
1/8 X 3/8	.132	.385
1/8 X 1/2	.135	.510
1/8 X 5/8	.142	.638
1/8 X 11/16	.135	.700
1/8 X 3/4	.144	.765
1/8 X 7/8	.138	.887
1/8 X 1	.135	1.020

NON-STANDARD RECTANGLES



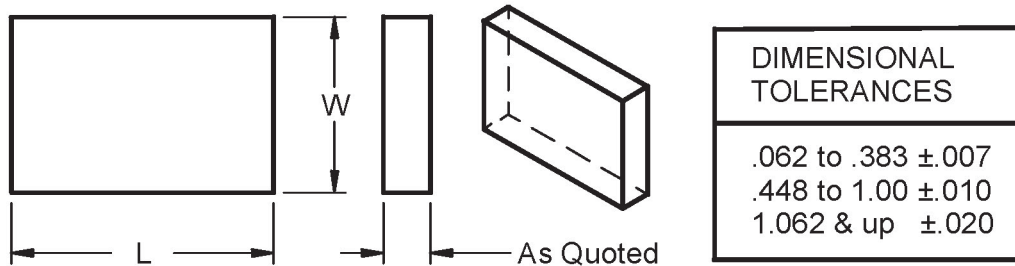
Insert	W	L
1/8 X 1-1/16	.140	1.075
1/8 X 1-1/8	.151	1.145
1/8 X 1-1/4	.138	1.285
1/8 X 1-1/2	.143	1.520
1/8 X 2	.146	2.046
9/64 X 3-7/32	.162	3.227
9/64 X 3-11/32	.152	3.415
5/32 X 3/16	.163	.194
5/32 X 5/16	.151	.330
5/32 X 3/8	.168	.390
5/32 X 1/2	.163	.510
5/32 X 5/8	.165	.635
5/32 X 3/4	.166	.780
5/32 X 7/8	.164	.890
5/32 X 1	.171	1.020
11/64 X 25/32	.181	.797
11/64 X 1	.183	1.020
3/16 X 3/16	.200	.200
3/16 X 3/8	.195	.385
3/16 X 7/16	.194	.448
3/16 X 17/32	.198	.540
3/16 X 5/8	.197	.635
3/16 X 3/4	.210	.760
3/16 X 13/16	.194	.824
3/16 X 7/8	.194	.889

NON-STANDARD RECTANGLES



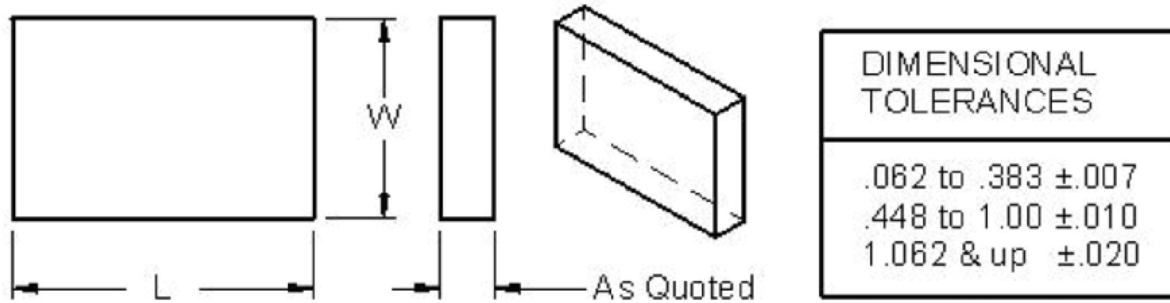
Insert	W	L
3/16 X 1	.194	1.010
3/16 X 1-1/8	.202	1.158
3/16 X 1-1/4	.203	1.267
3/16 X 1-5/16	.194	1.328
3/16 X 1-3/8	.197	1.395
3/16 X 1-1/2	.199	1.518
3/16 X 2	.204	2.035
13/64 X 3/4	.223	.770
7/32 X 7/32	.230	.230
7/32 X 5/16	.233	.327
7/32 X 3/8	.228	.385
7/32 X 1/2	.229	.514
1/4 X 7/16	.258	.448
1/4 X 9/16	.272	.588
1/4 X 11/16	.273	.713
1/4 X 25/32	.267	.789
1/4 X 13/16	.260	.828
1/4 X 7/8	.258	.885
1/4 X 31/32	.268	.977
1/4 X 1	.265	1.020
1/4 X 1-1/4	.272	1.286
1/4 X 1-5/16	.292	1.318
1/4 X 1-1/2	.271	1.520
1/4 X 1-9/16	.267	1.568
1/4 X 1-5/8	.275	1.645

NON-STANDARD RECTANGLES



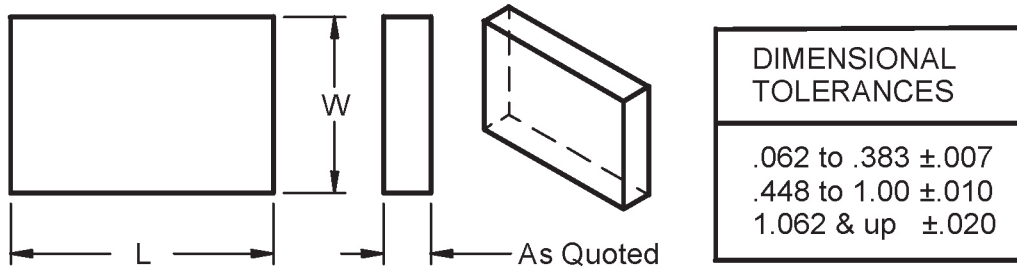
Insert	W	L
1/4 X 1-3/4	.265	1.780
1/4 X 2	.260	2.020
1/4 X 2-1/4	.275	2.273
1/4 X 2-1/2	.260	2.530
1/4 X 3	.268	3.025
9/32 X 3/8	.292	.395
5/16 X 5/16	.319	.319
5/16 X 17/32	.330	.554
5/16 X 21/32	.328	.682
5/16 X 3/4	.325	.765
5/16 X 25/32	.321	.790
5/16 X 7/8	.320	.888
5/16 X 1	.320	1.020
5/16 X 1-1/4	.327	1.272
5/16 X 1-5/16	.326	1.328
5/16 X 1-1/2	.329	1.517
5/16 X 1-9/16	.338	1.568
5/16 X 1-3/4	.319	1.765
5/16 X 2	.322	2.020
5/16 X 2-1/16	.331	2.081
3/8 X 3/8	.392	.392
3/8 X 7/16	.385	.447
3/8 X 11/16	.385	.705
3/8 X 25/32	.398	.784
3/8 X 57/64	.397	.903

NON-STANDARD RECTANGLES



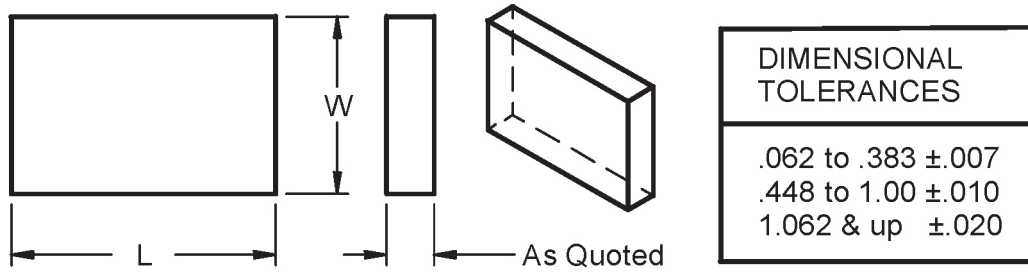
Insert	W	L
3/8 X 1	.400	1.040
3/8 X 1-1/8	.389	1.152
3/8 X 1-1/4	.393	1.279
3/8 X 1-3/8	.384	1.390
3/8 X 1-1/2	.392	1.540
3/8 X 1-3/4	.392	1.770
3/8 X 2	.392	2.025
3/8 X 2-1/4	.390	2.280
3/8 X 2-1/2	.390	2.530
13/32 X 1/2	.417	.513
13/32 X 1-9/16	.420	1.563
7/16 X 3/4	.450	.765
7/16 X 7/8	.452	.890
7/16 X 1	.452	1.038
7/16 X 1-3/4	.447	1.780
15/32 X 1-1/2	.482	1.520
31/64 X 51/64	.483	.798
1/2 X 5/8	.512	.635
1/2 X 25/32	.520	.781
1/2 X 13/16	.517	.830
1/2 X 7/8	.513	.892
1/2 X 1-1/32	.528	1.056
1/2 X 1-1/16	.520	1.092
1/2 X 1-1/4	.515	1.267
1/2 X 1-5/16	.528	1.312

NON-STANDARD RECTANGLES



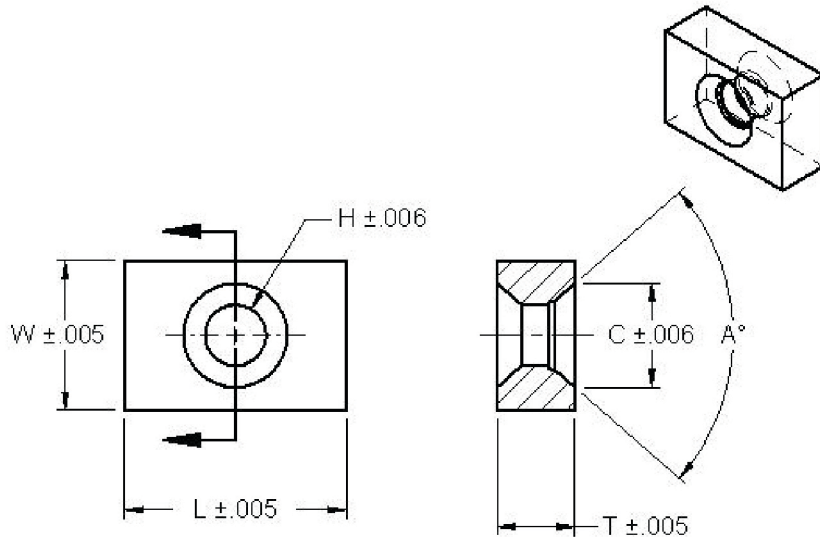
Insert	W	L
1/2 X 1-3/8	.510	1.395
1/2 X 1-1/2	.518	1.535
1/2 X 1-9/16	.531	1.577
1/2 X 1-3/4	.530	1.765
1/2 X 1-7/8	.525	1.910
1/2 X 2	.530	2.015
1/2 X 2-1/4	.525	2.285
1/2 X 2-1/2	.535	2.520
35/64 X 7/8	.553	.900
9/16 X 9/16	.577	.577
9/16 X 3/4	.572	.760
9/16 X 2-1/2	.582	2.540
5/8 X 23/32	.648	.721
5/8 X 3/4	.635	.762
5/8 X 7/8	.637	.898
5/8 X 1-1/8	.633	1.145
5/8 X 1-1/2	.635	1.521
5/8 X 1-3/4	.642	1.780
5/8 X 1-7/8	.640	1.905
5/8 X 2	.645	2.020
5/8 X 2-13/32	.642	2.425
3/4 X 7/8	.765	.890
3/4 X 57/64	.775	.905
3/4 X 1-5/32	.768	1.176
3/4 X 1-3/4	.760	1.780

NON-STANDARD RECTANGLES



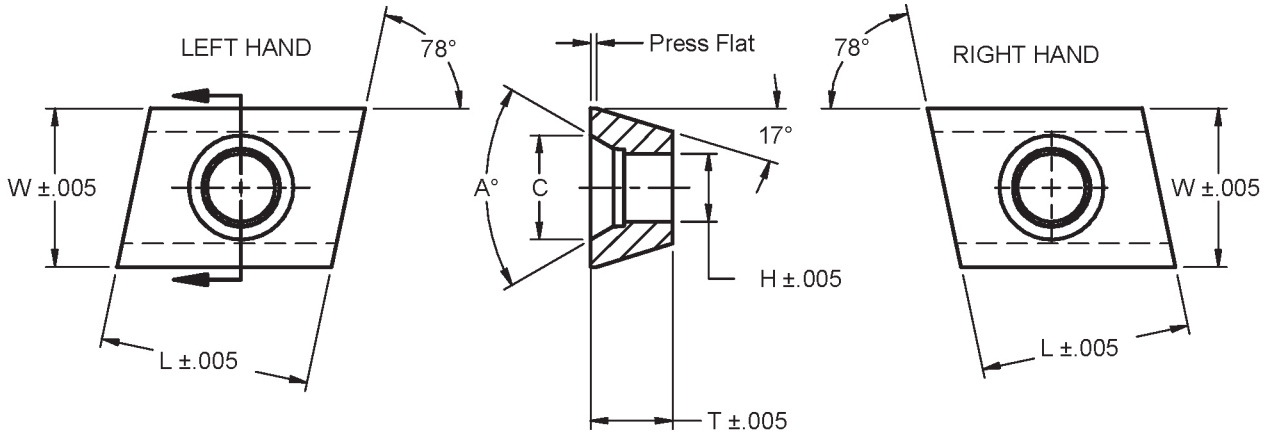
Insert	W	L
3/4 X 1-7/8	.775	1.990
3/4 X 1-9/16	.784	1.568
25/32 X 25/32	.784	.784
25/32 X 2-1/32	.798	2.053
7/8 X 1	.900	1.033
7/8 X 1-3/4	.892	1.772
57/64 X 57/64	.904	.904
31/32 X 1-15/64	.998	1.248
1 X 1	1.018	1.018
1 X 1-1/4	1.017	1.267
1 X 1-1/2	1.010	1.515
1-1/32 X 1-1/32	1.065	1.065
1-1/4 X 1-1/4	1.270	1.270

LNR



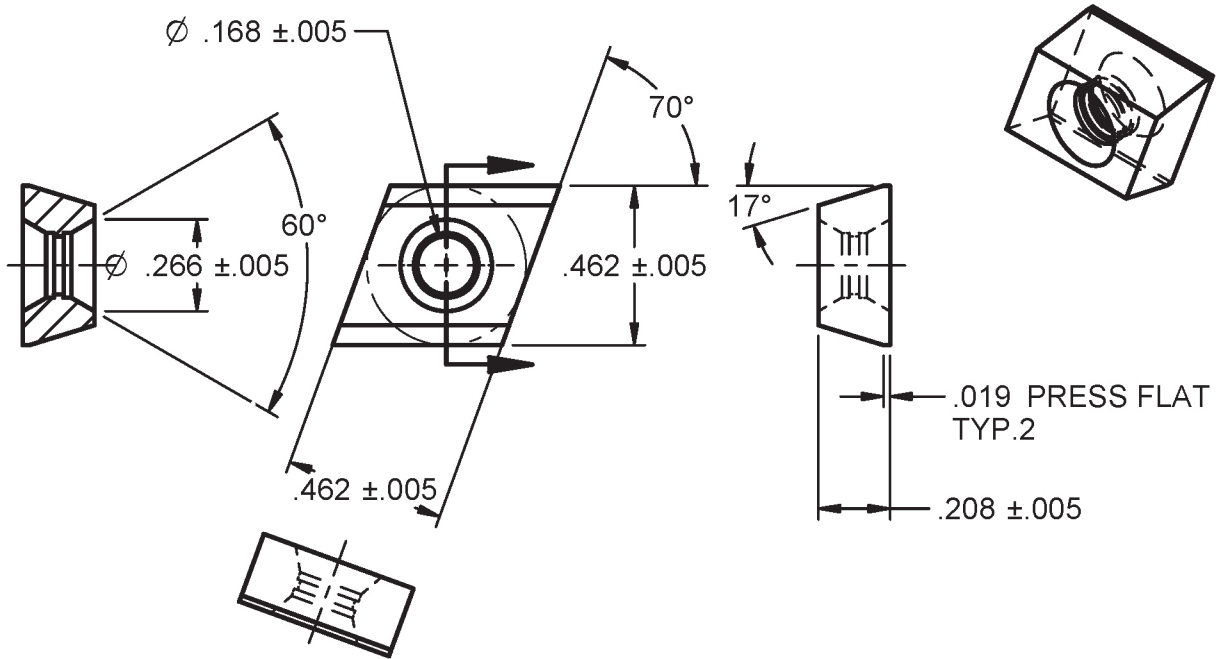
Insert	L	W	T	H	C	A
LNR313	.522	.392	.203	.168	.267	60°
LNR314	.522	.392	.265	.168	.267	60°
LNR323	.640	.390	.202	.168	.267	60°
LNR324	.640	.390	.265	.168	.267	60°
LNR325	.640	.390	.328	.168	.267	60°
LNR414-08	.582	.455	.265	.168	.267	60°
LNR423-20	.645	.515	.202	.213	.342	82°
LNR424-20	.645	.515	.265	.213	.342	82°
LNR425-20	.645	.515	.327	.213	.342	82°
LNR433-20	.768	.518	.202	.213	.342	82°
LNR434-20	.768	.518	.265	.213	.342	82°
LNR435-04	.768	.518	.328	.213	.342	82°
LNR434-02 or 05	.770	.577	.265	.213	.342	82°
LNR436	.770	.577	.390	.213	.342	82°
LNR443-20	1.020	.515	.202	.213	.342	82°
LNR444-20	1.020	.515	.265	.213	.342	82°
LNR443-01	1.020	.577	.202	.213	.342	82°

CDR

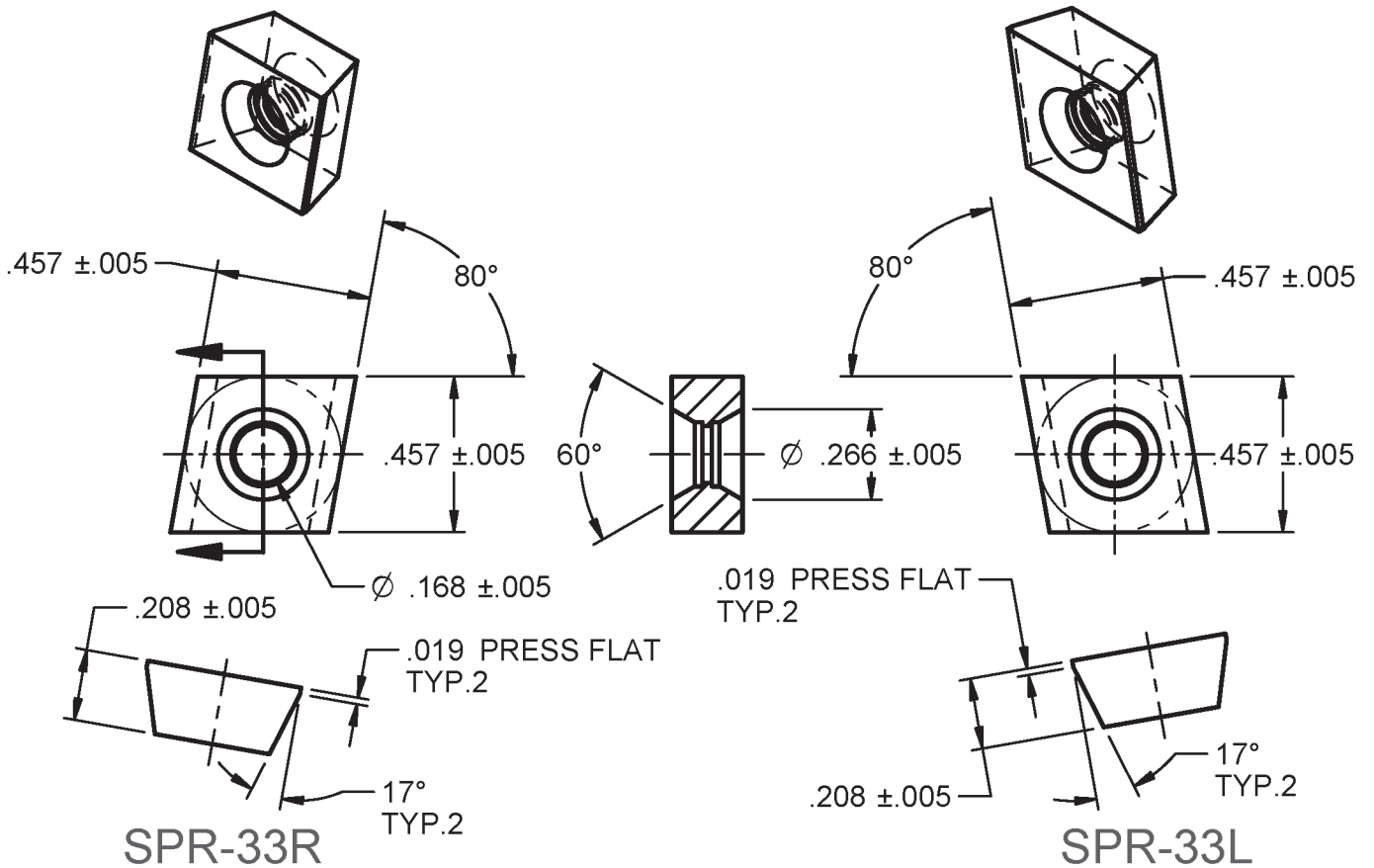


Insert	T	W	L	A	H	C
CDR212L02	.165	.327	.390	60°	.168	.257
CDR313L30	.202	.390	.390	60°	.168	.257
CDR322L	.165	.390	.517	60°	.168	.255
CDR322R	.170	.390	.515	60°	.168	.265
CDR323L01	.202	.390	.517	60°	.168	.257
CDR323R01	.202	.390	.517	60°	.168	.257
CDR324L20	.265	.390	.517	60°	.168	.257
CDR324R20	.265	.390	.517	60°	.168	.257
CDR424R01	.265	.580	.517	82°	.213	.341
CDR424L30	.270	.582	.707	82°	.213	.367
CDR424R30	.270	.582	.707	82°	.213	.367
CDR434R01	.270	.580	.917	82°	.213	.351
CDR434L01	.270	.582	.920	82°	.213	.351
CDR434R25	.270	.602	.938	82°	.213	.348

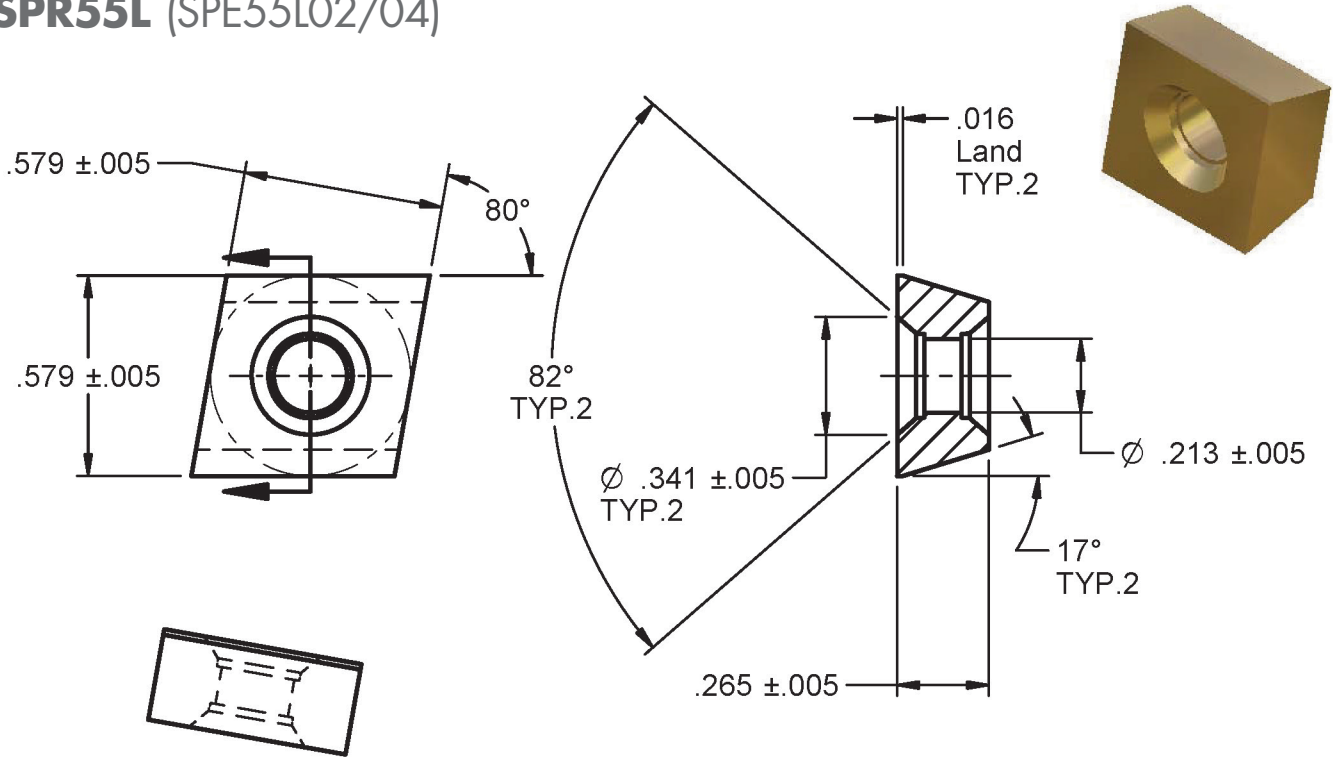
JPR-33R



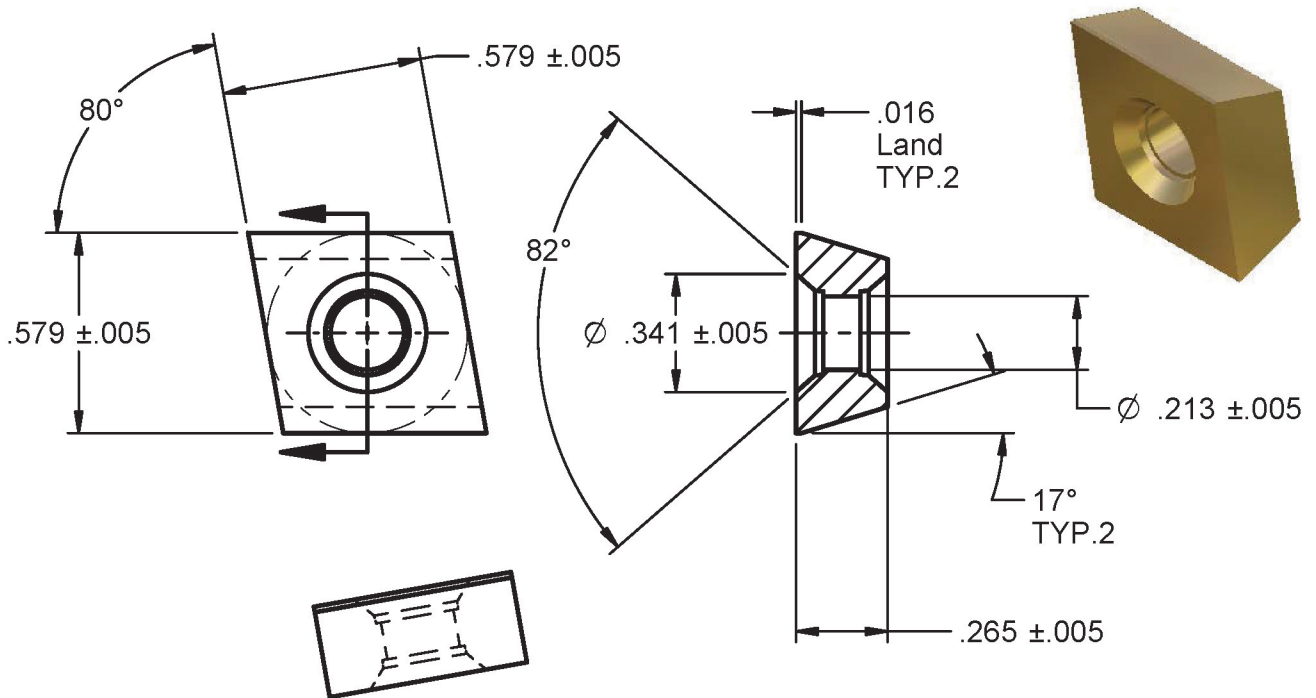
SPR-33L-R



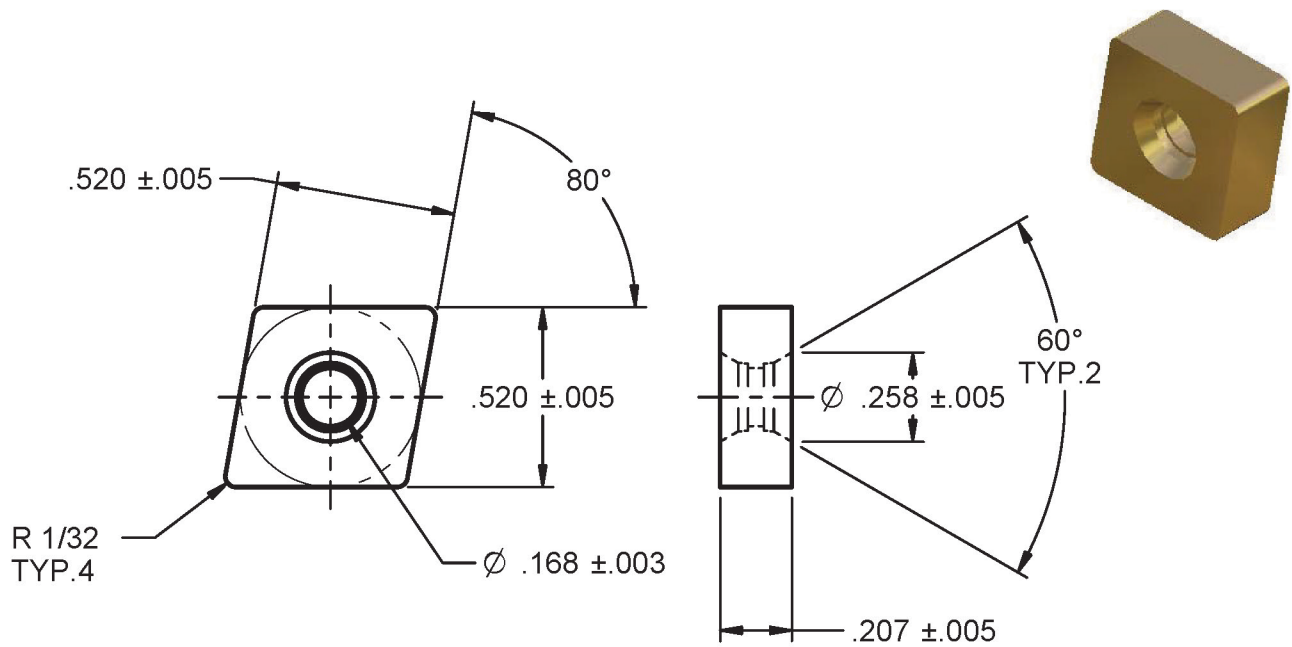
SPR55L (SPE55L02/04)



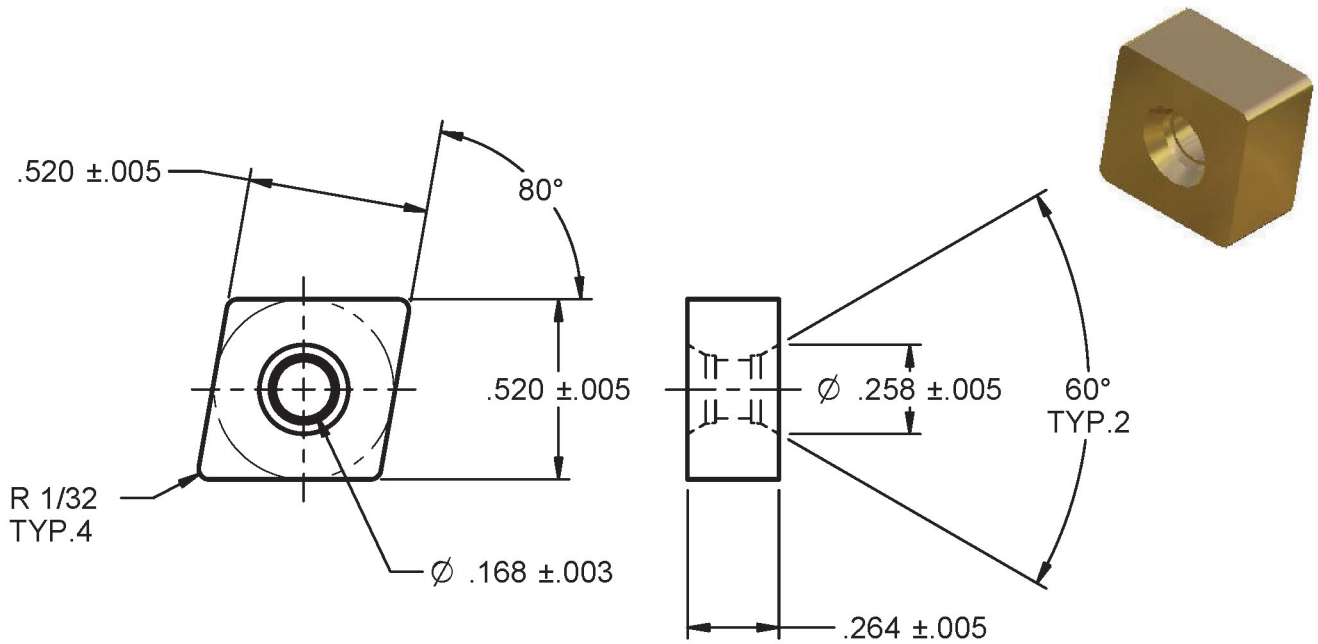
SPR55R (SPE55R02/04)



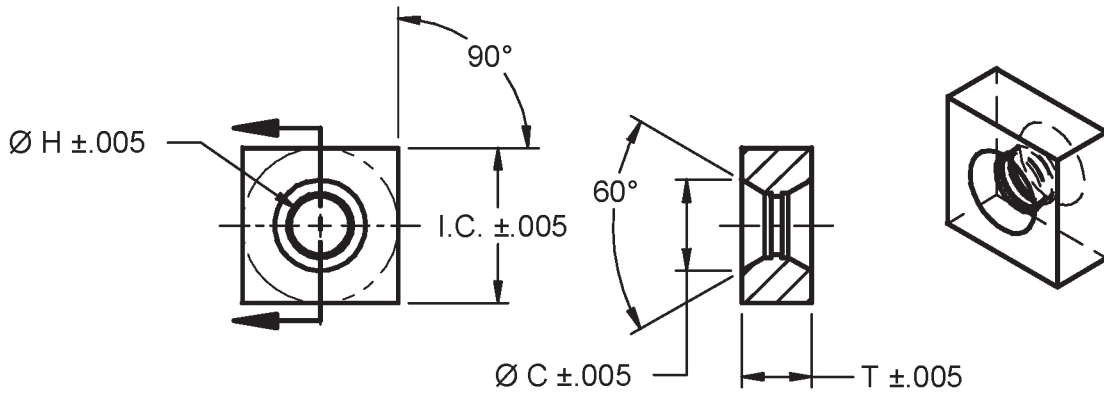
LX-0583-1 (MA-67538)



CNRQ442-SE02

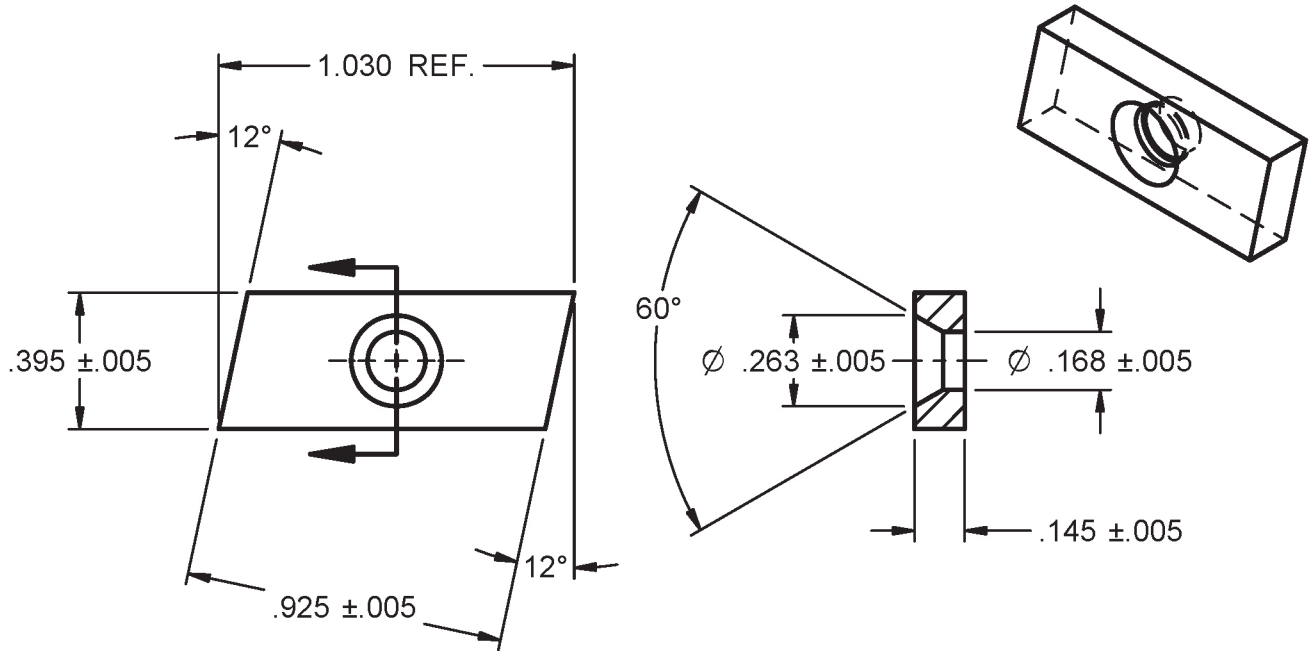


SNRQ

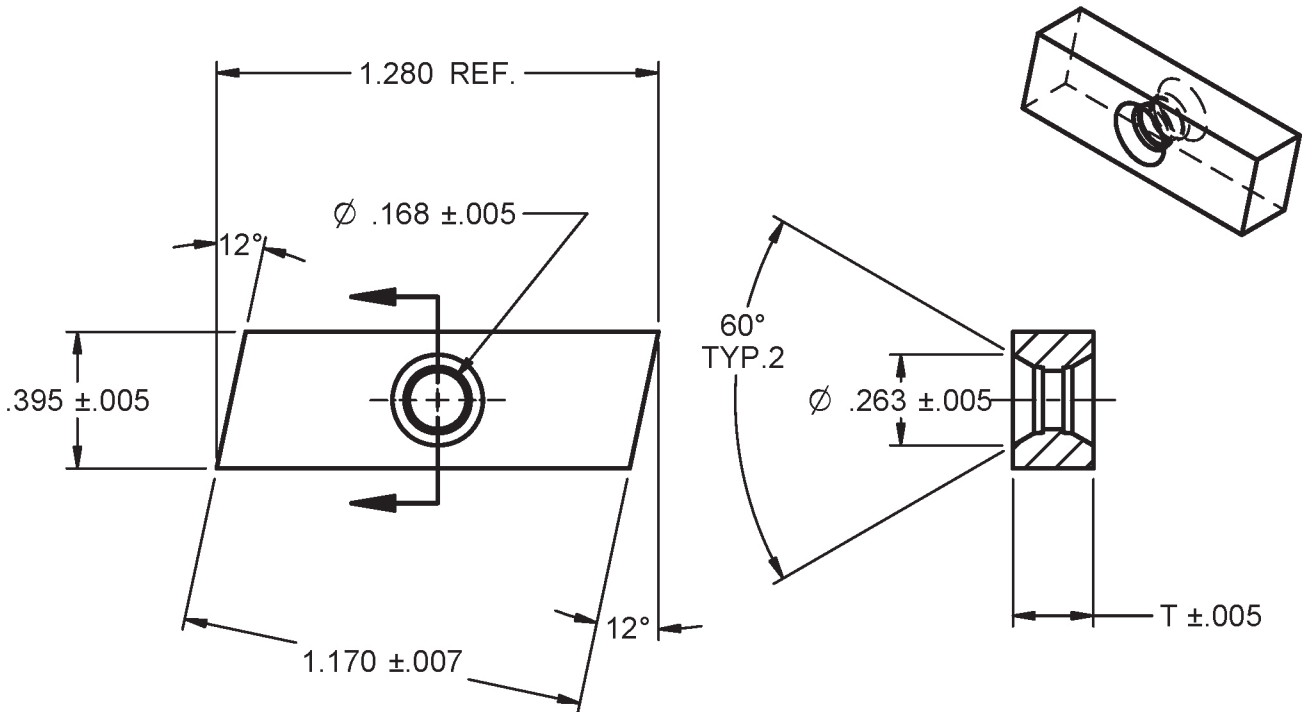


Insert	I.C.	T	H	C
SNRQ330	.392	.203	.168	.254
SNRQ3.530	.452	.203	.172	.265
SNRQ3.540	.452	.268	.172	.265

LX-1200-2 (MA-66123)

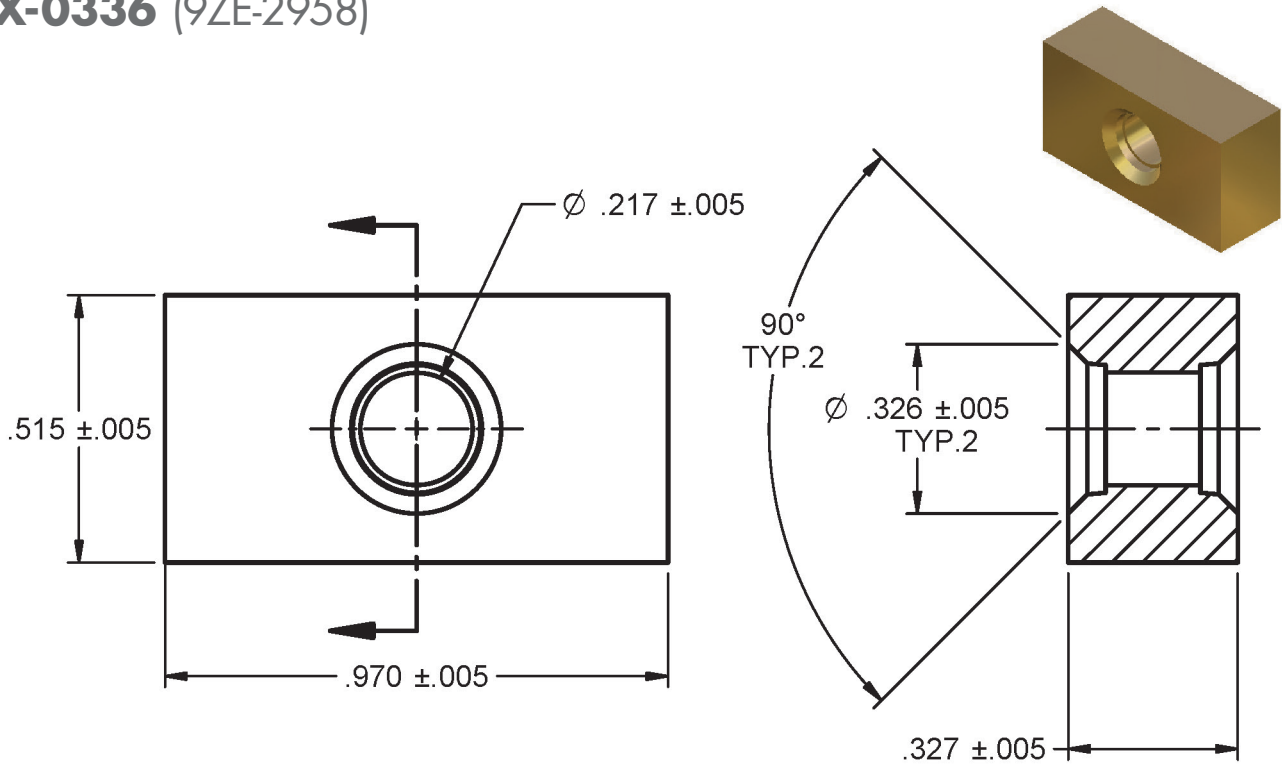


LX-03545-1

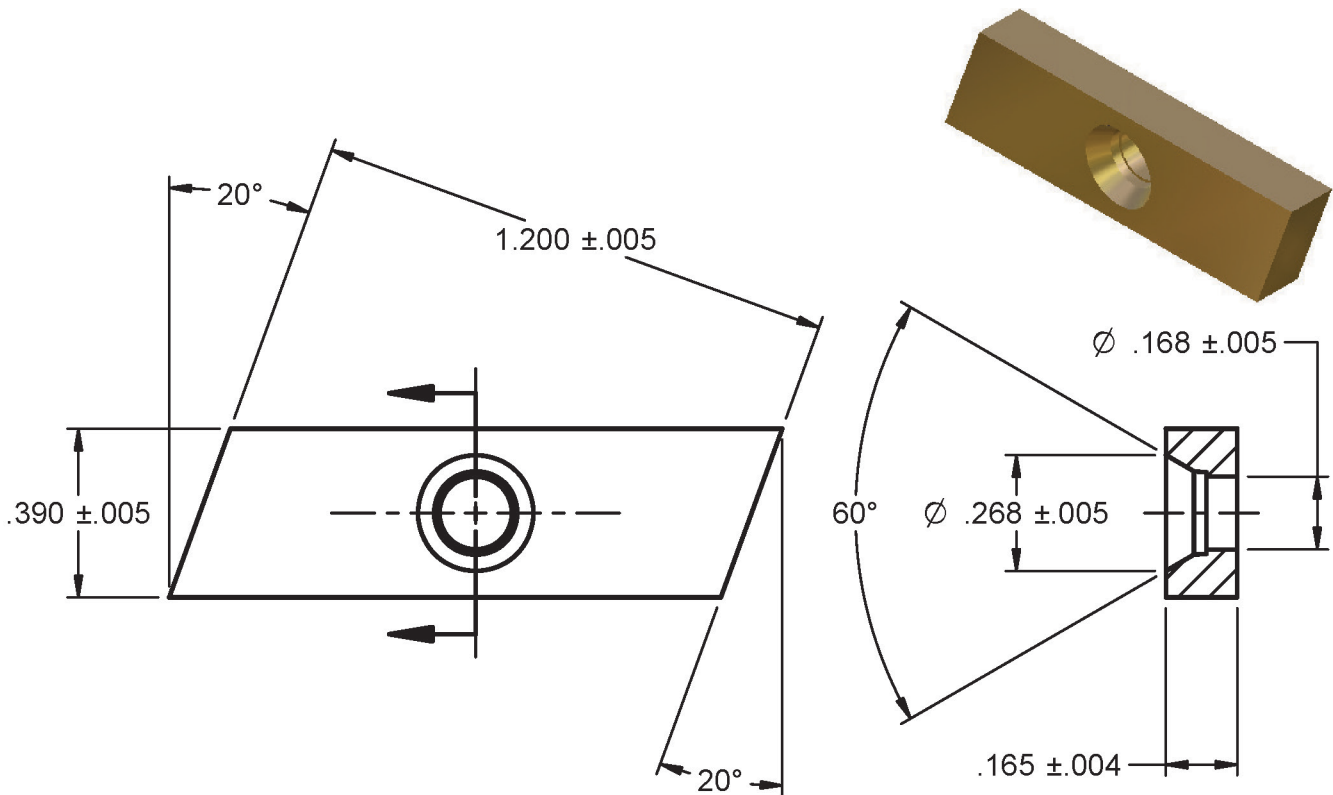


DET.	T
1	.233
2	.199

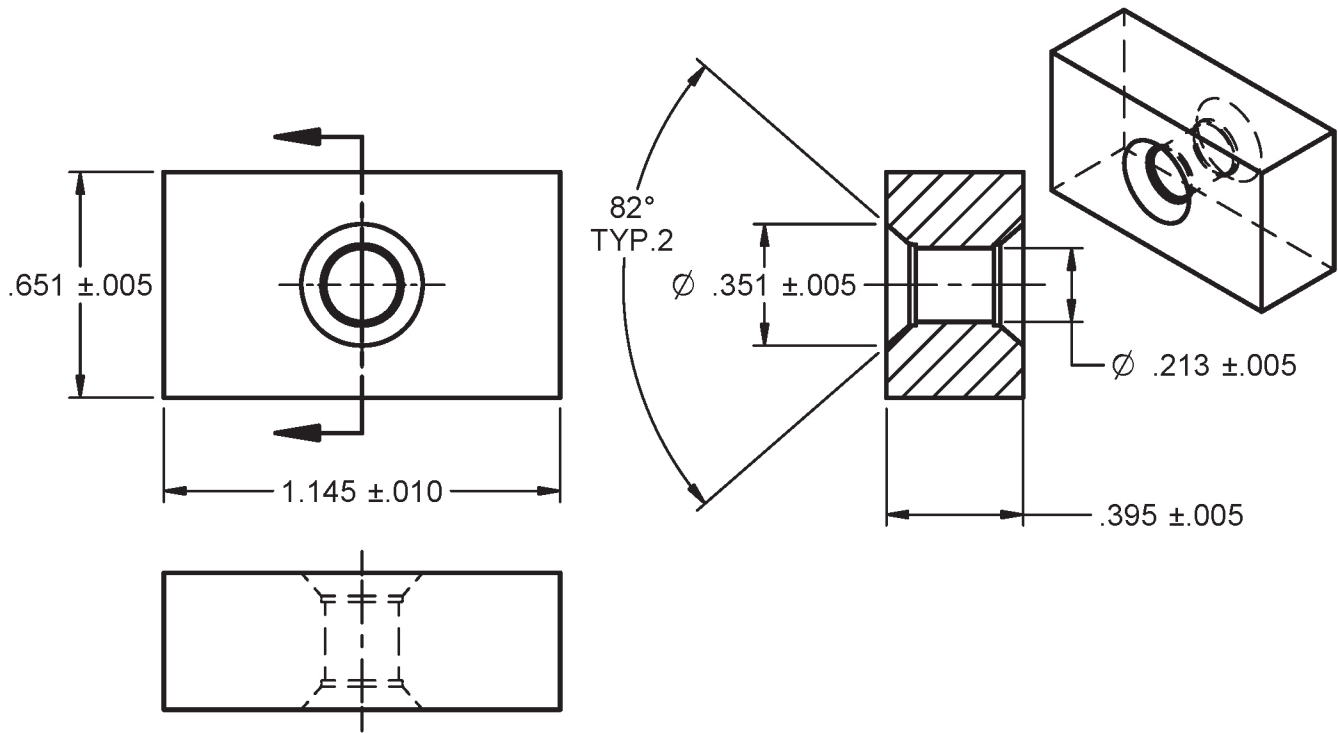
LX-0336 (9ZE-2958)



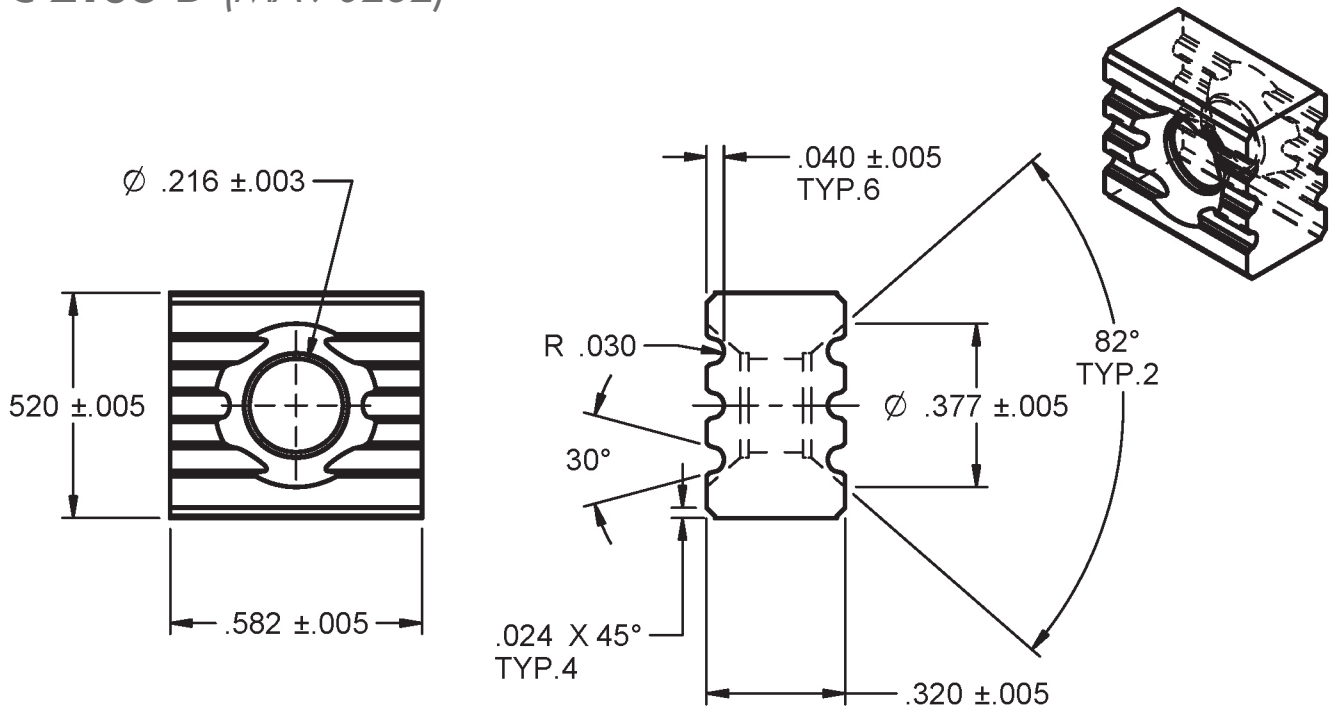
LX-0831-3



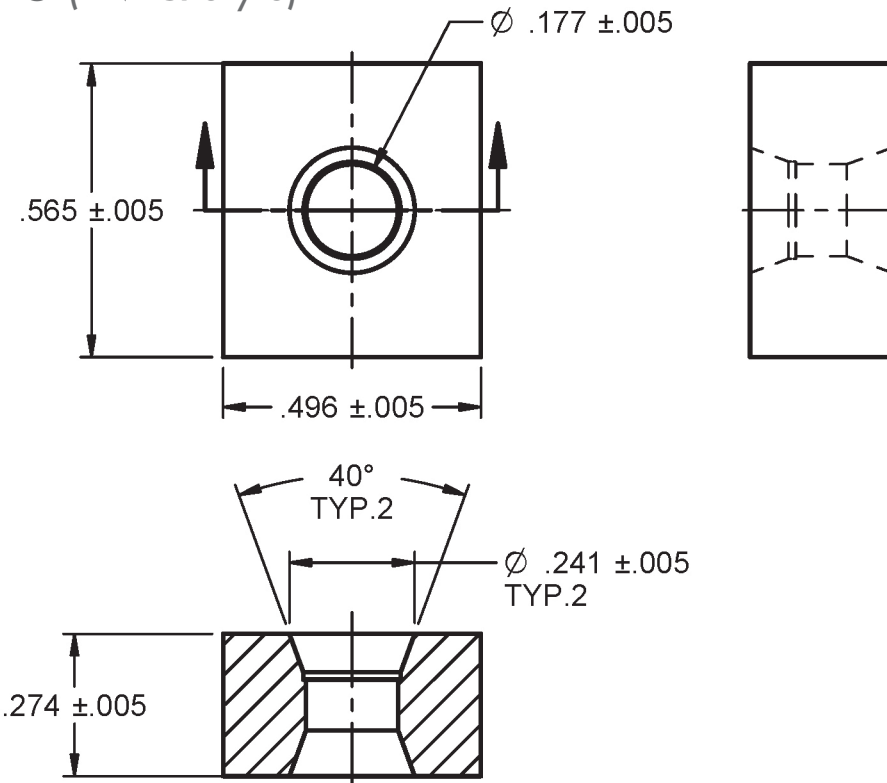
LX-0354-8



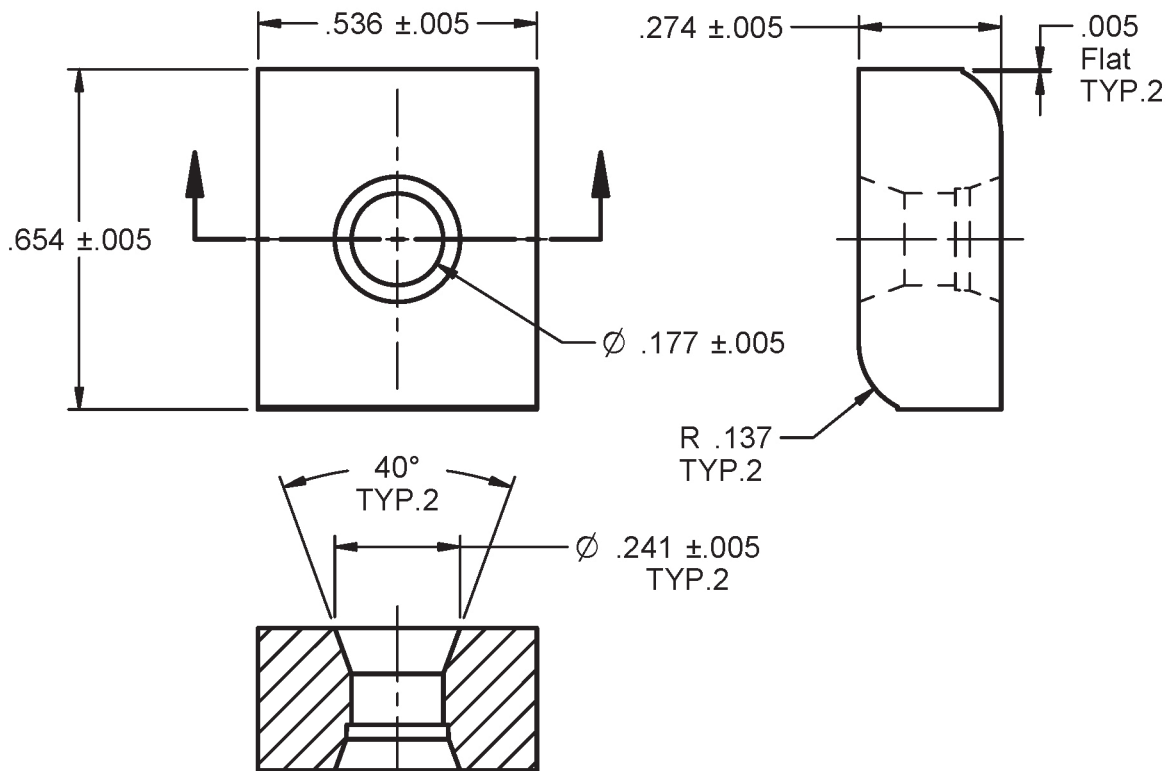
C-2108-D (MA-70232)



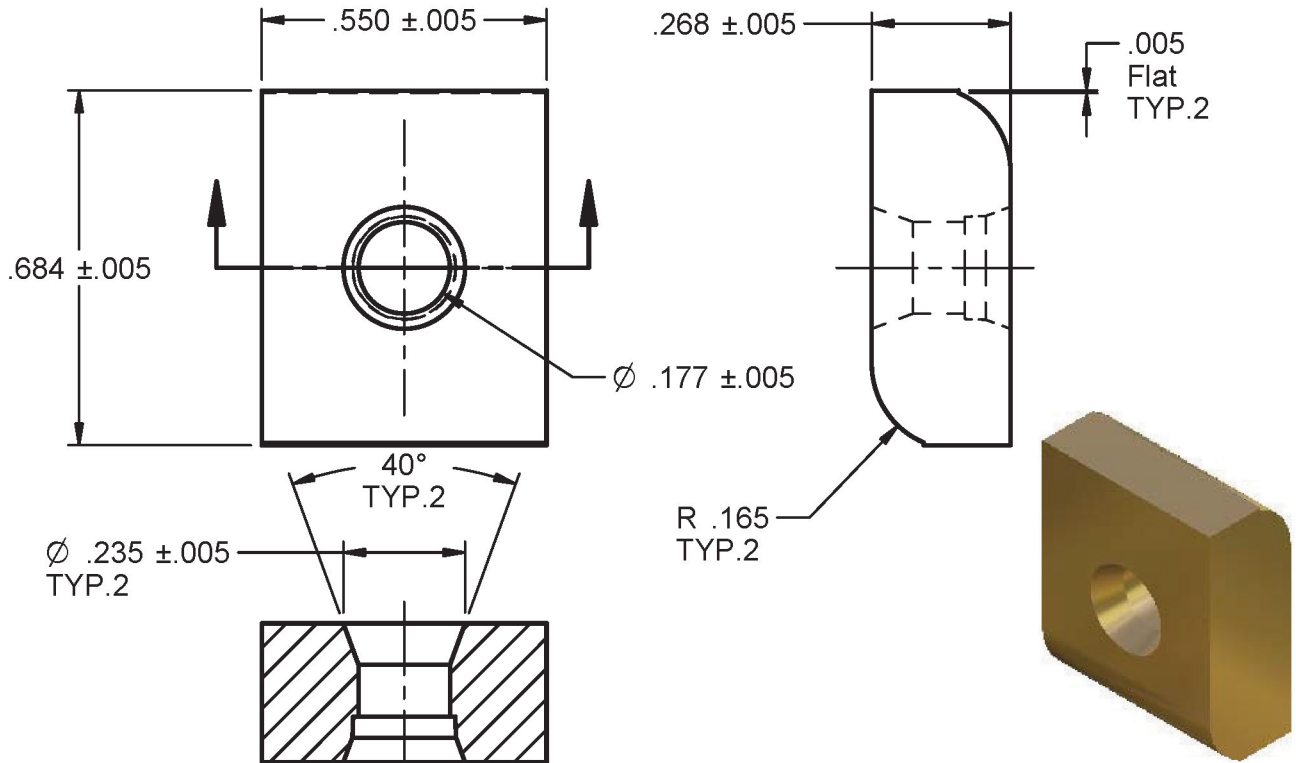
LX-1203-3 (LNRQ-Style)



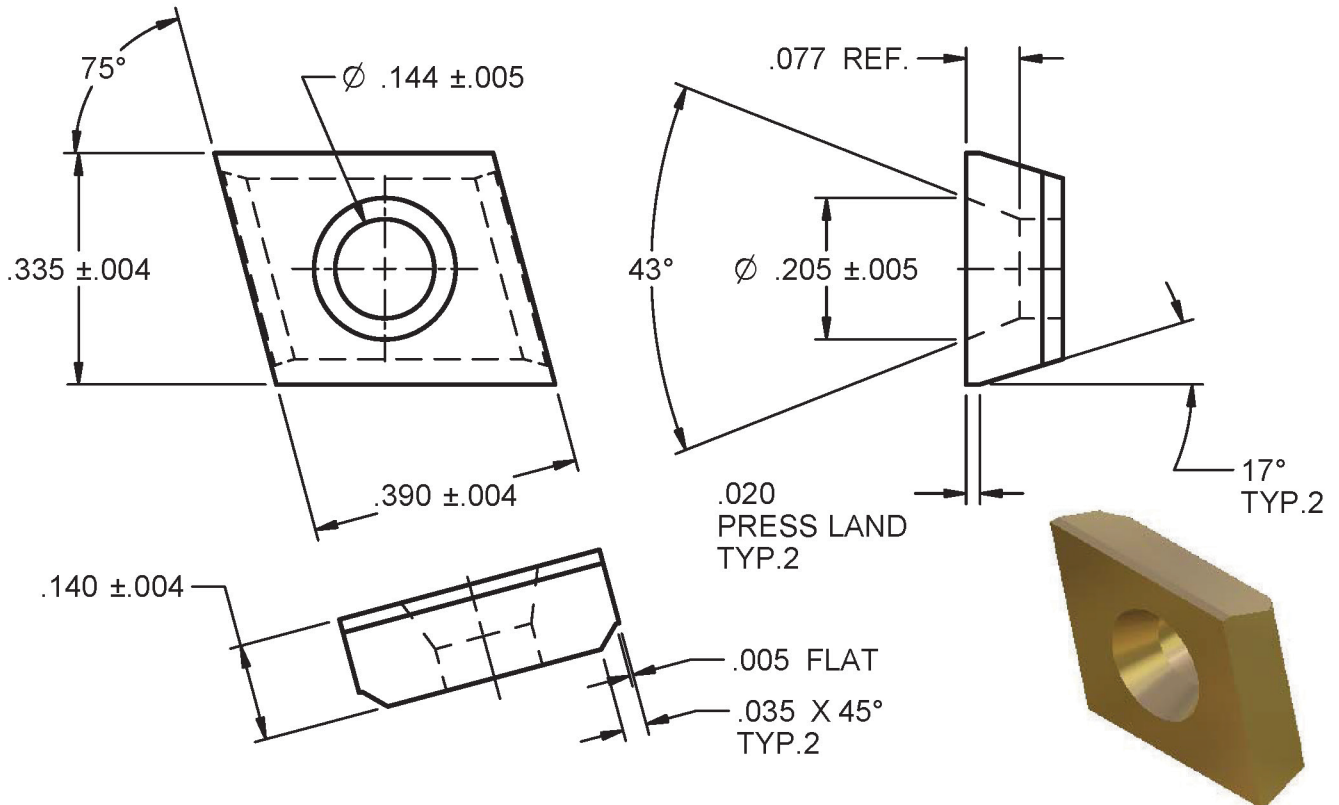
LX-1203-4 (LNRQ-Style)



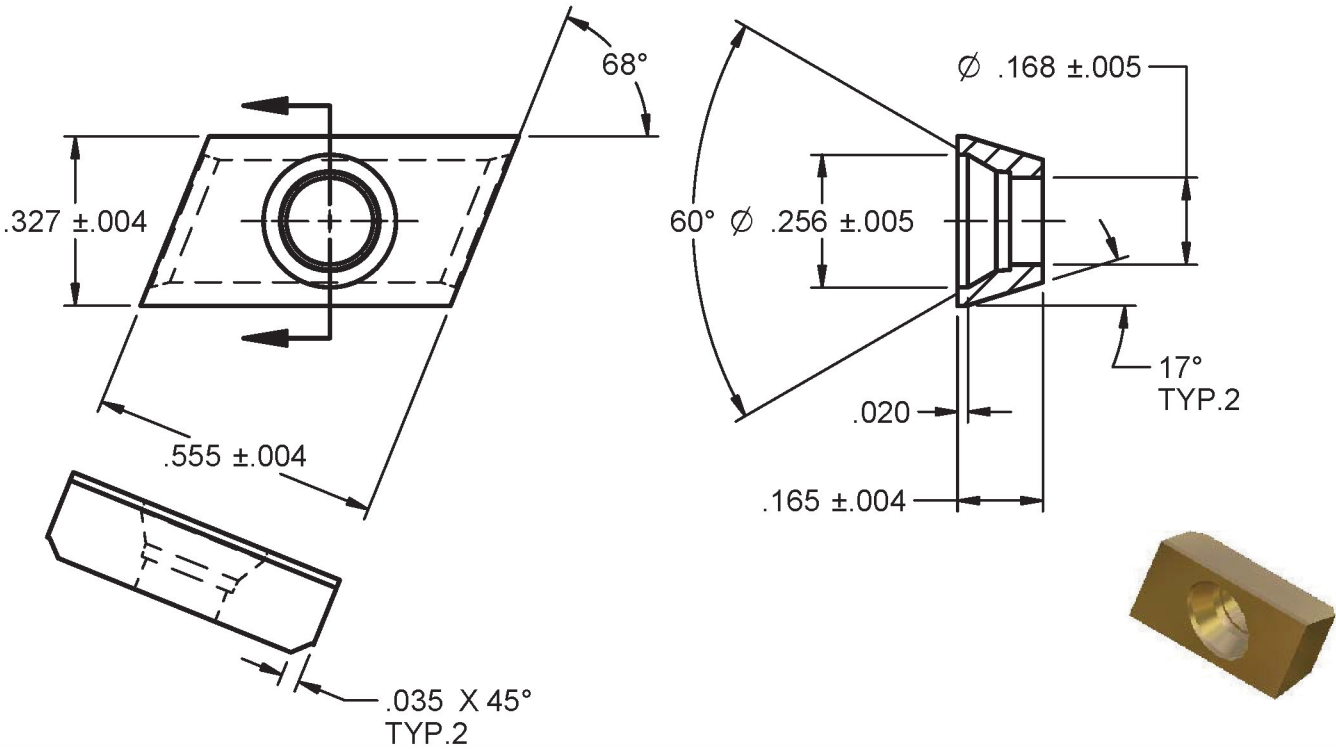
LX-1552-1 (MA-71211, LNRQ-Style)



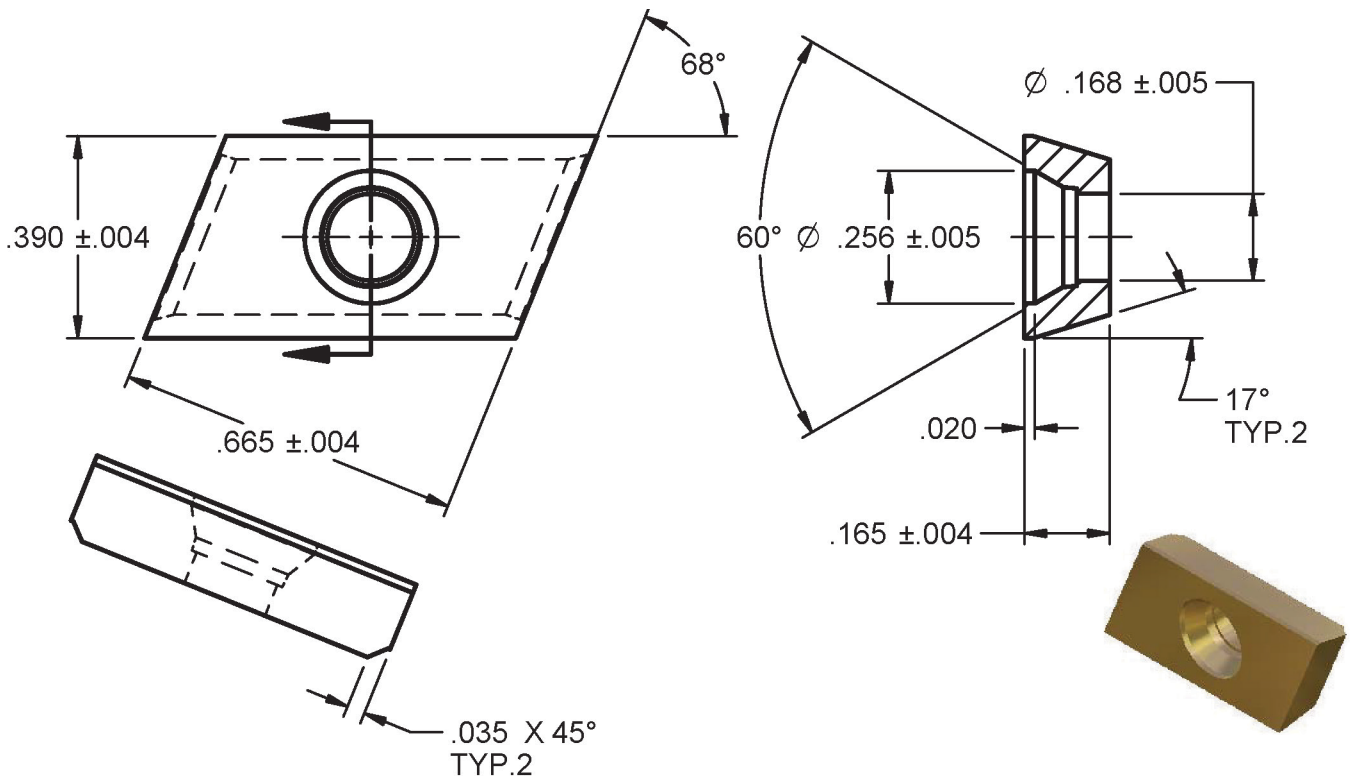
A-3037-B



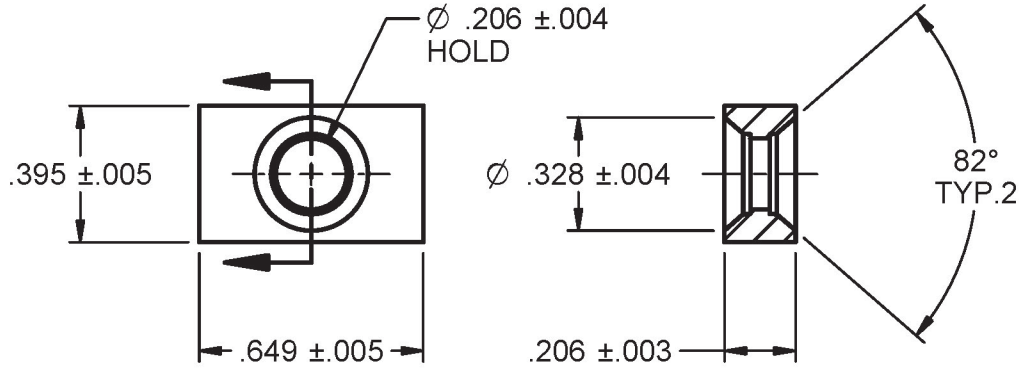
A-3039-A-1



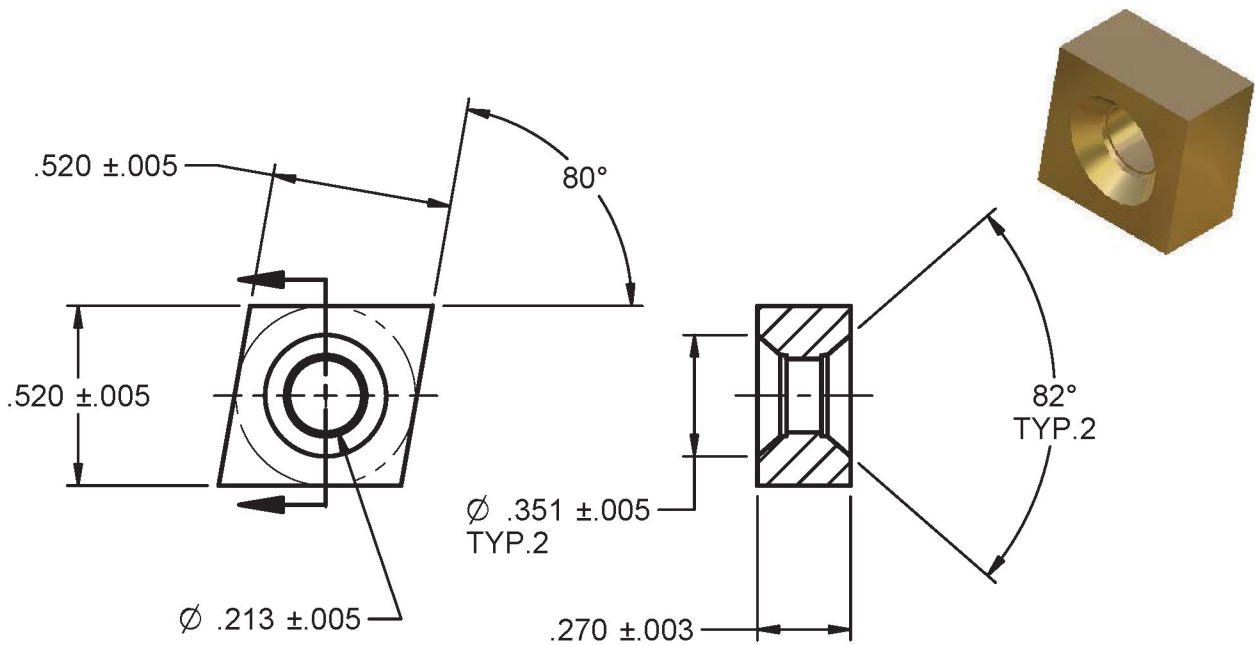
A-3039-A-2



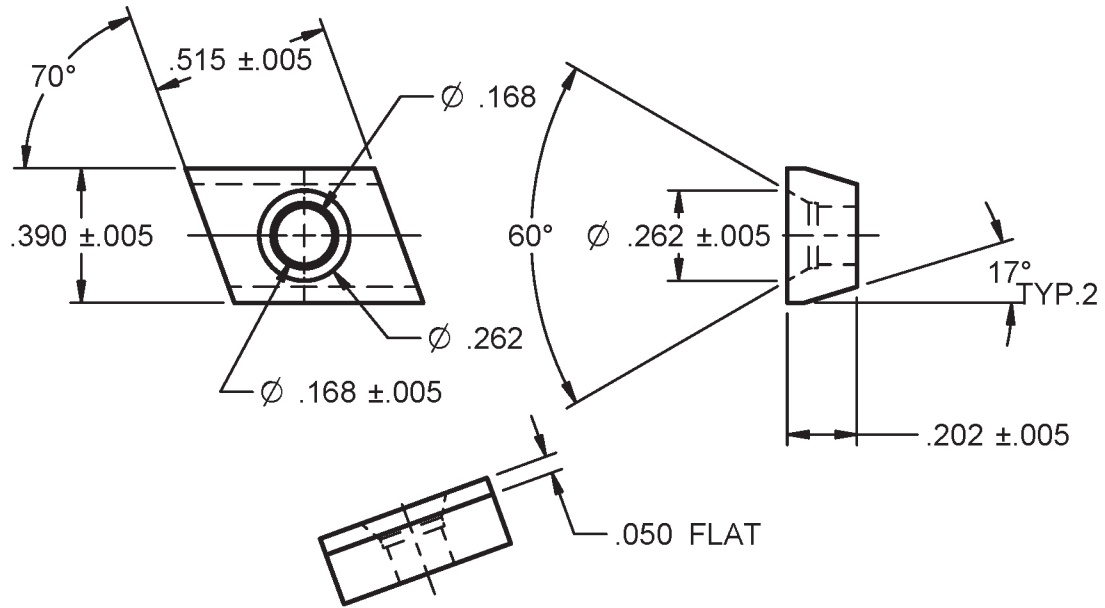
SCB1353A (D-16693-P3)



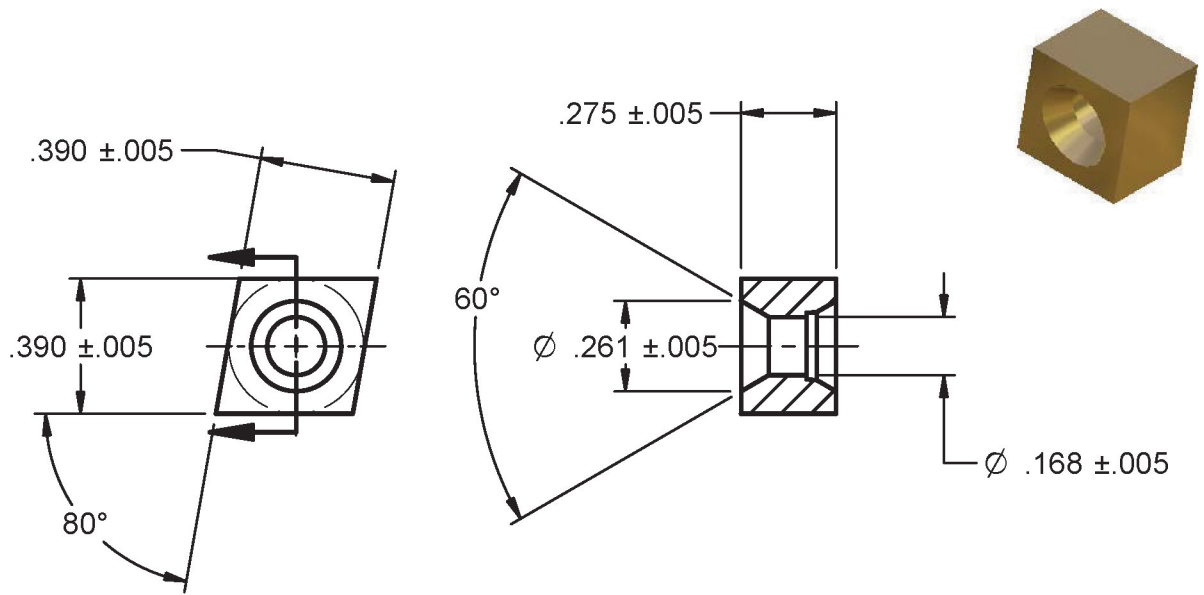
MA65610



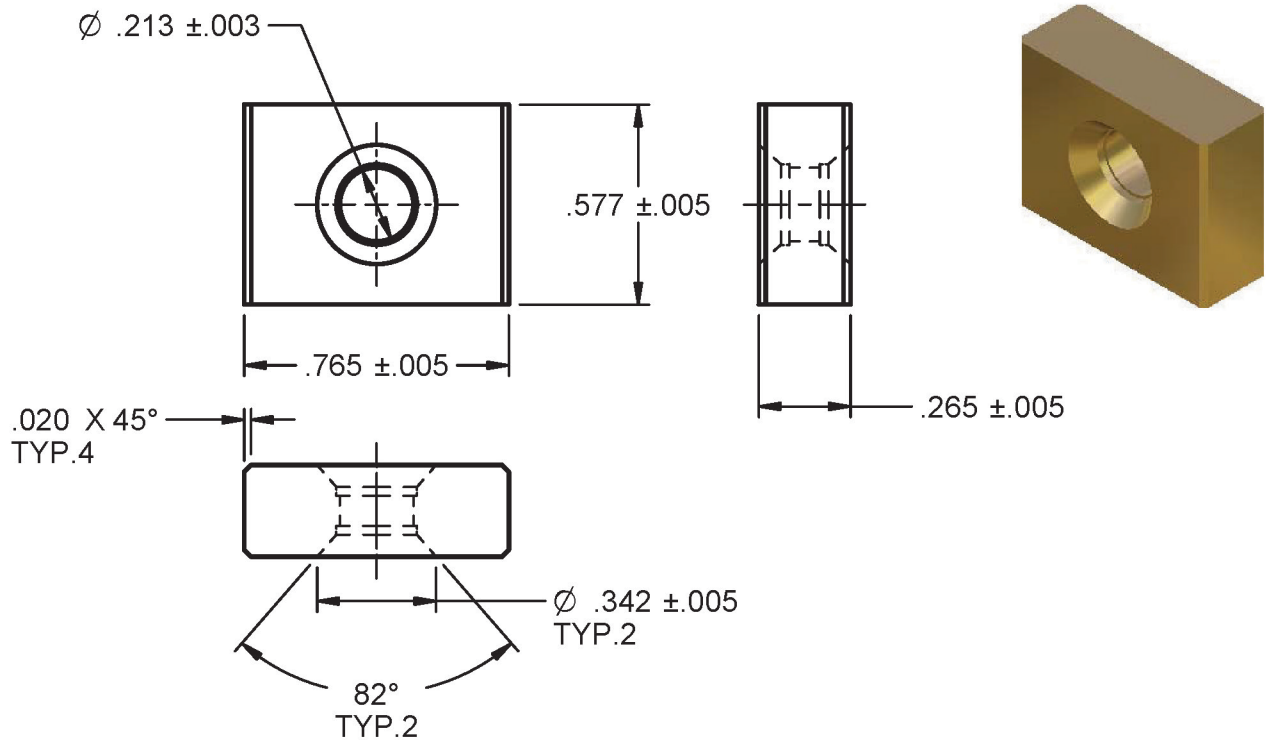
GDR323R (LX-0668-3)



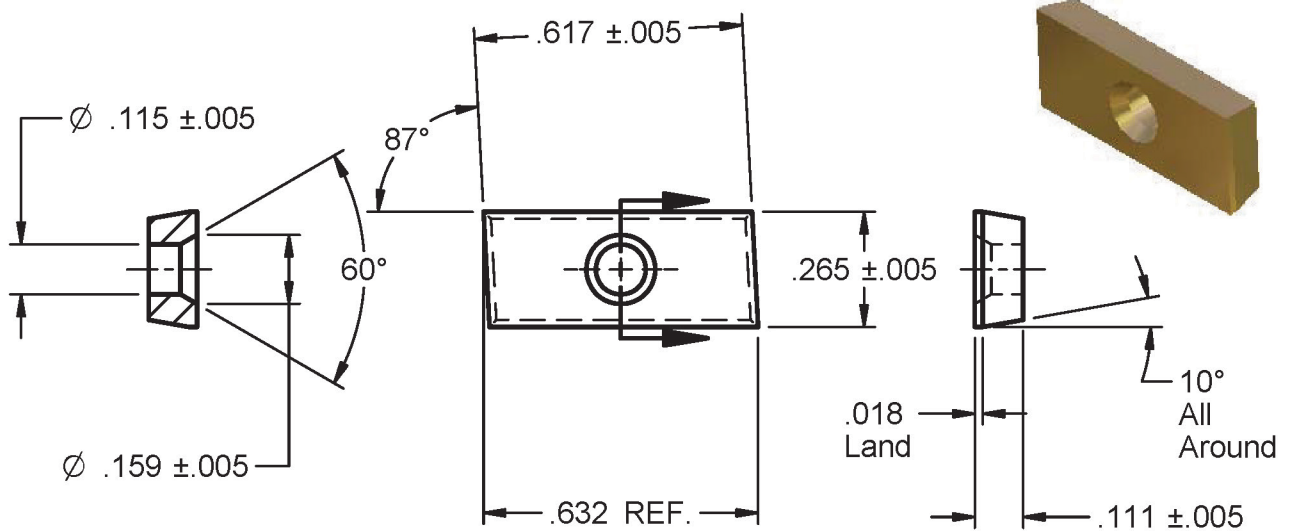
LX-1106-1 (MA-68666, CNRQ340)



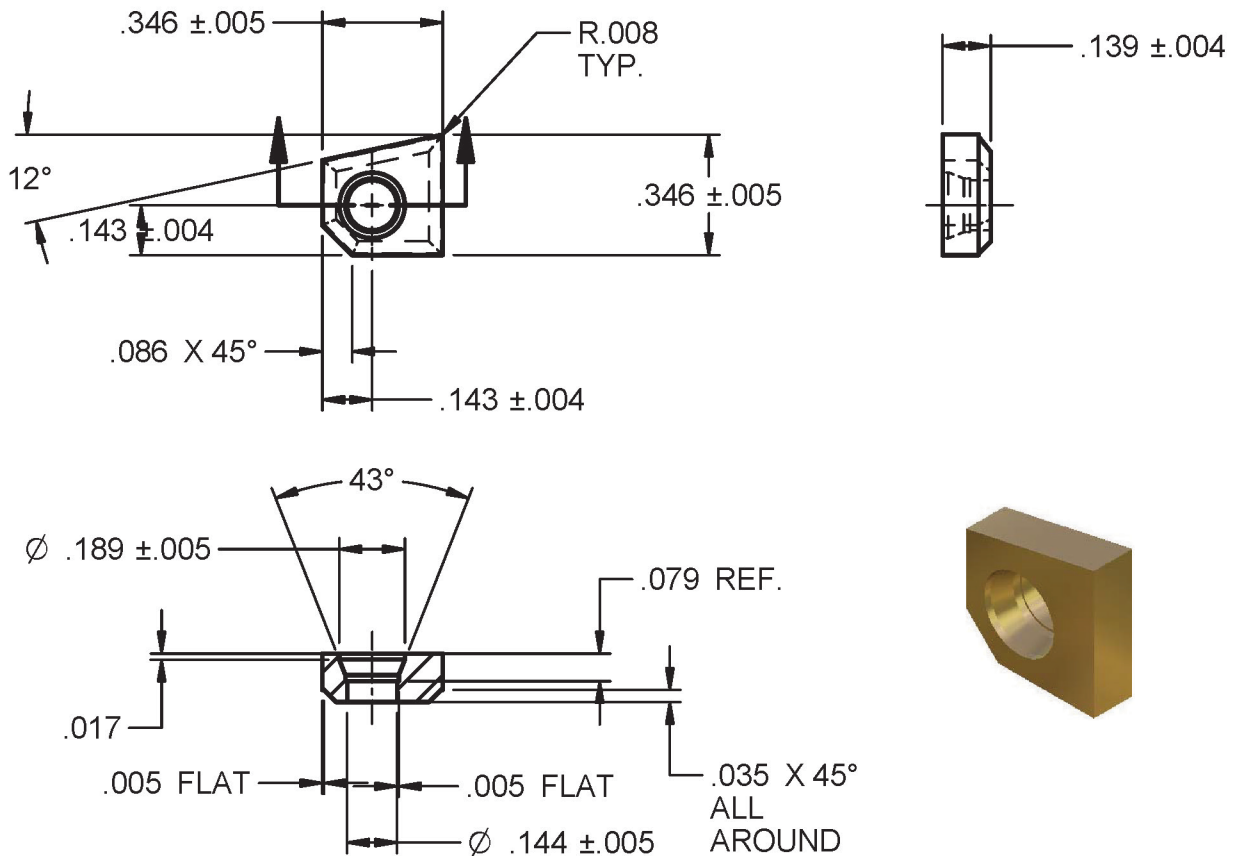
A-1833-A



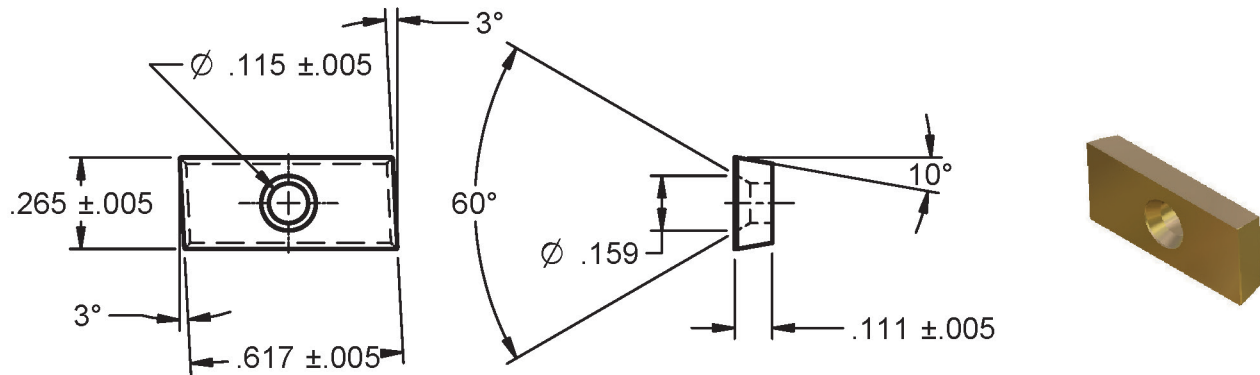
MA-70039-12



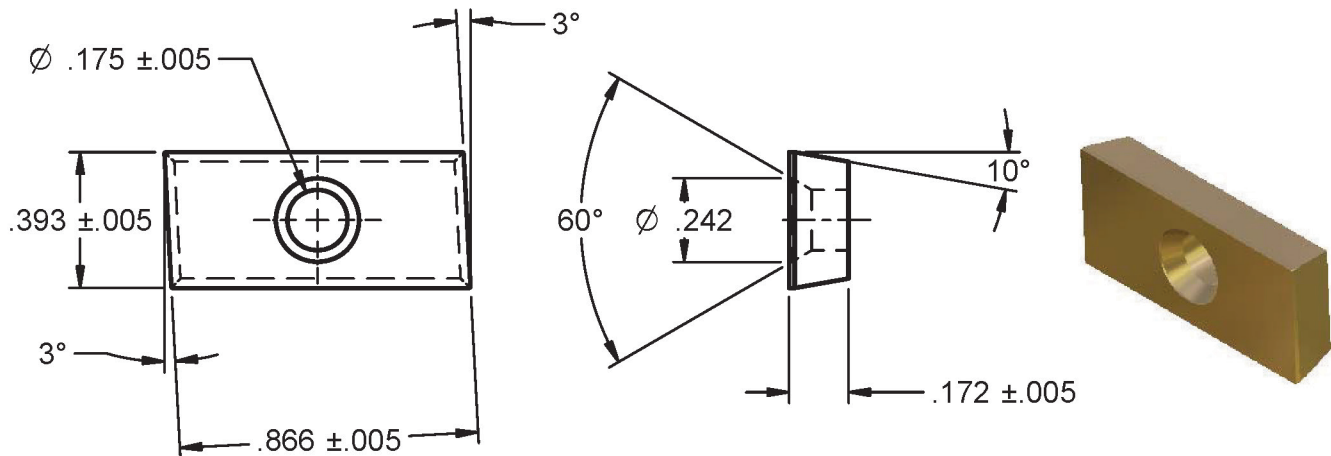
A-2806-A



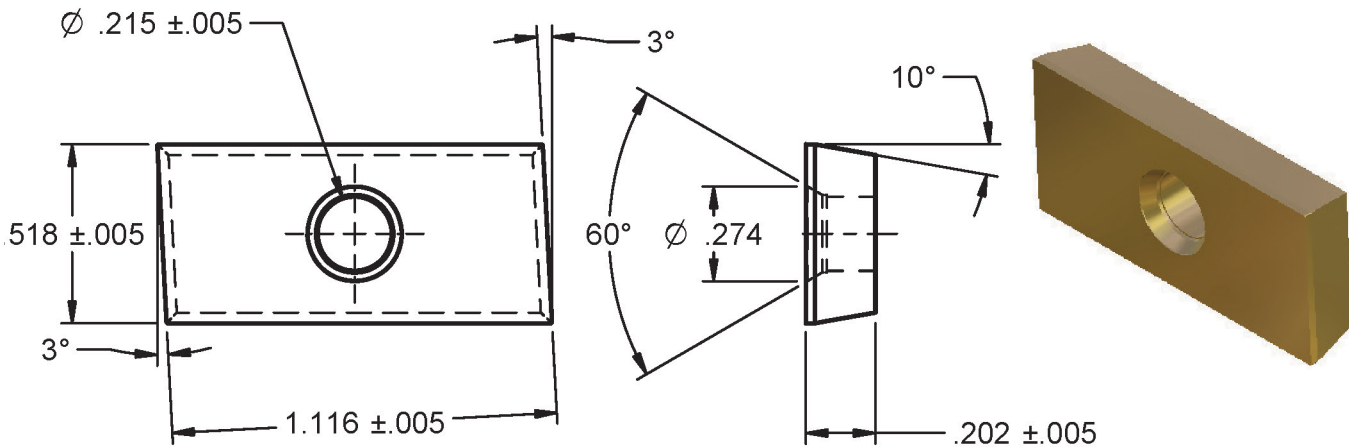
LX-1274-2-8



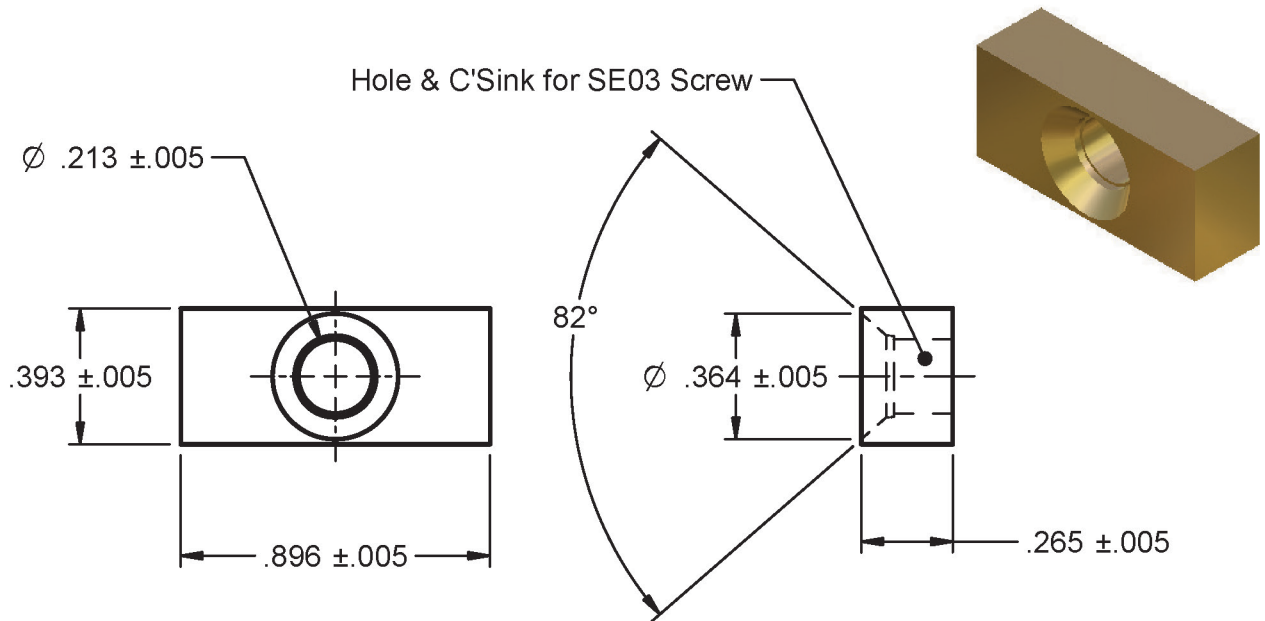
LX-1274-3-7



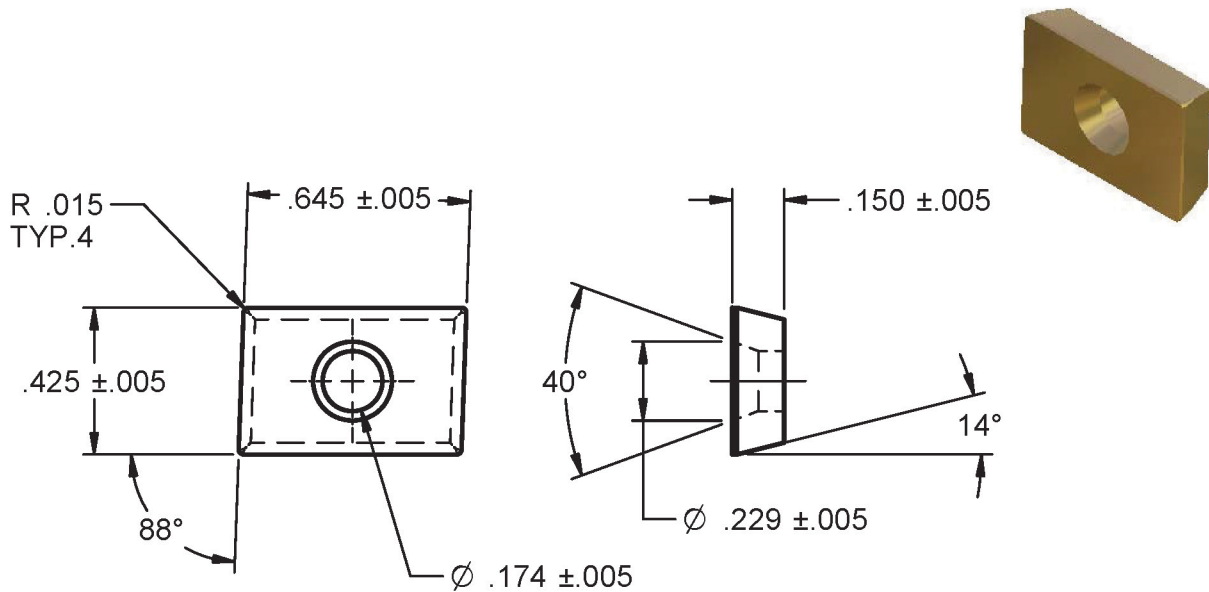
LX-1274-4-5



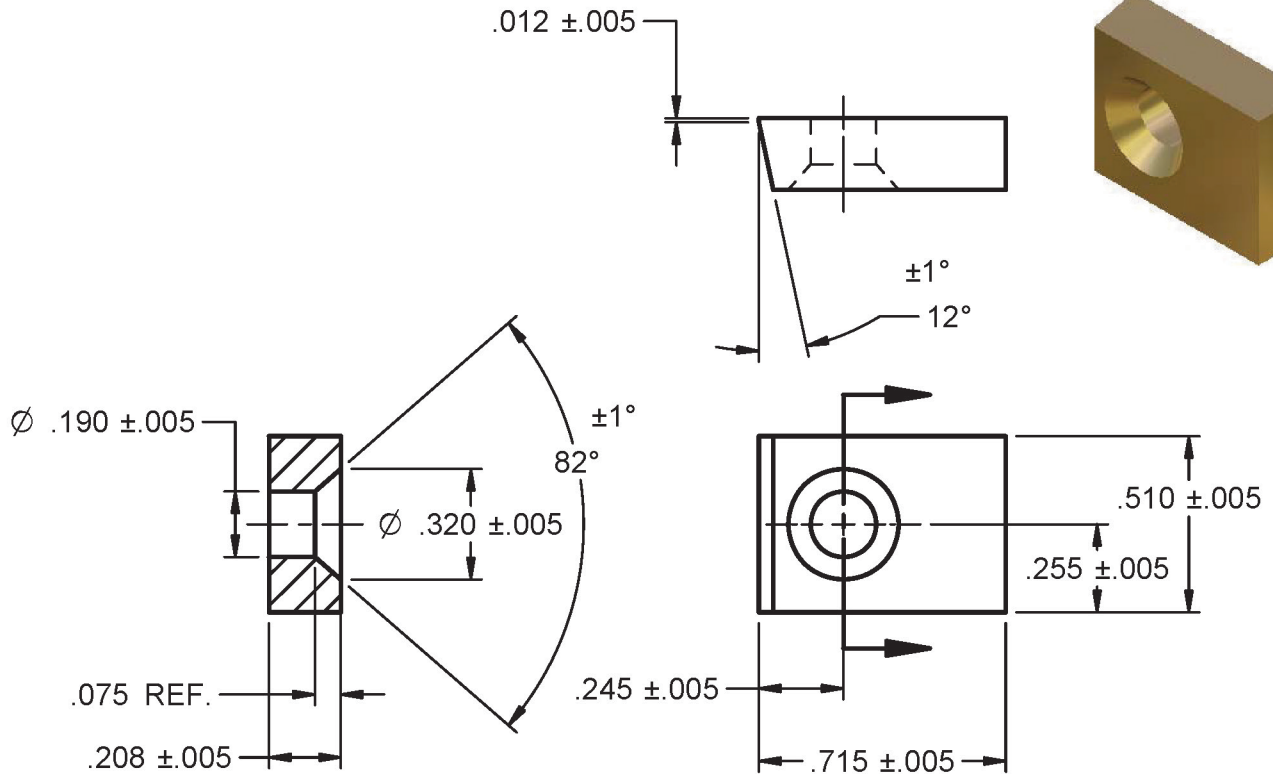
LNRB33.540



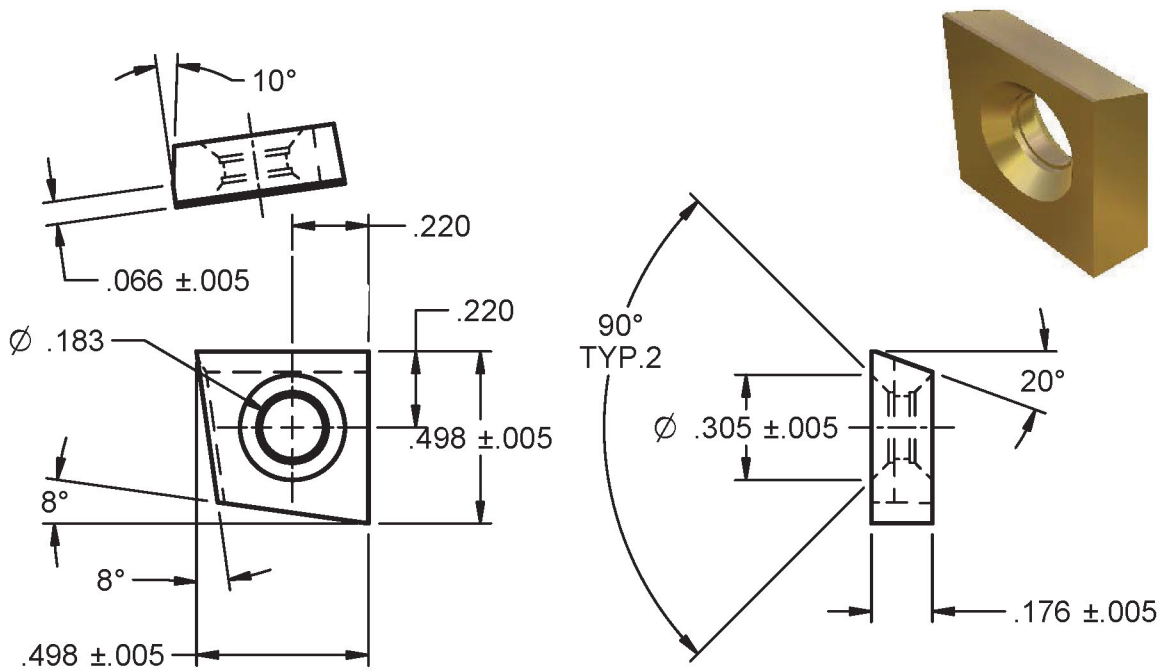
MA-69244



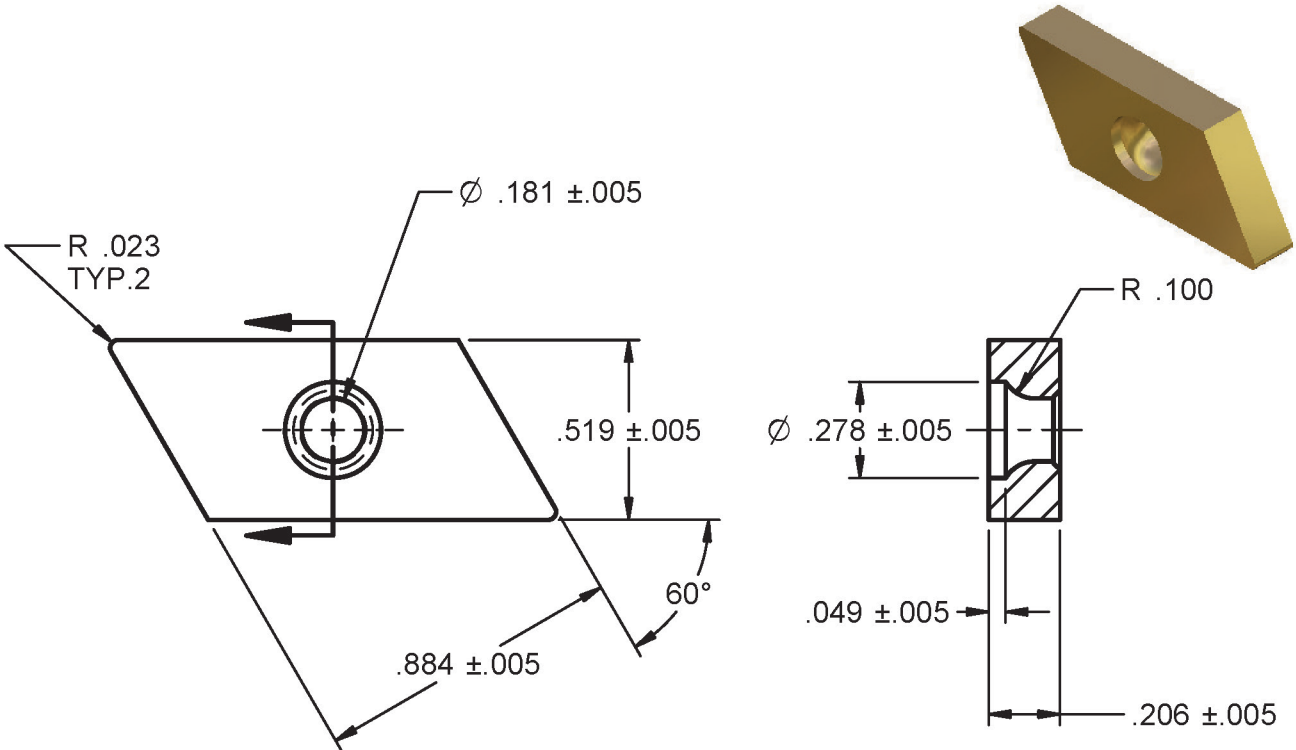
MA-68183 (LX-0967-1)



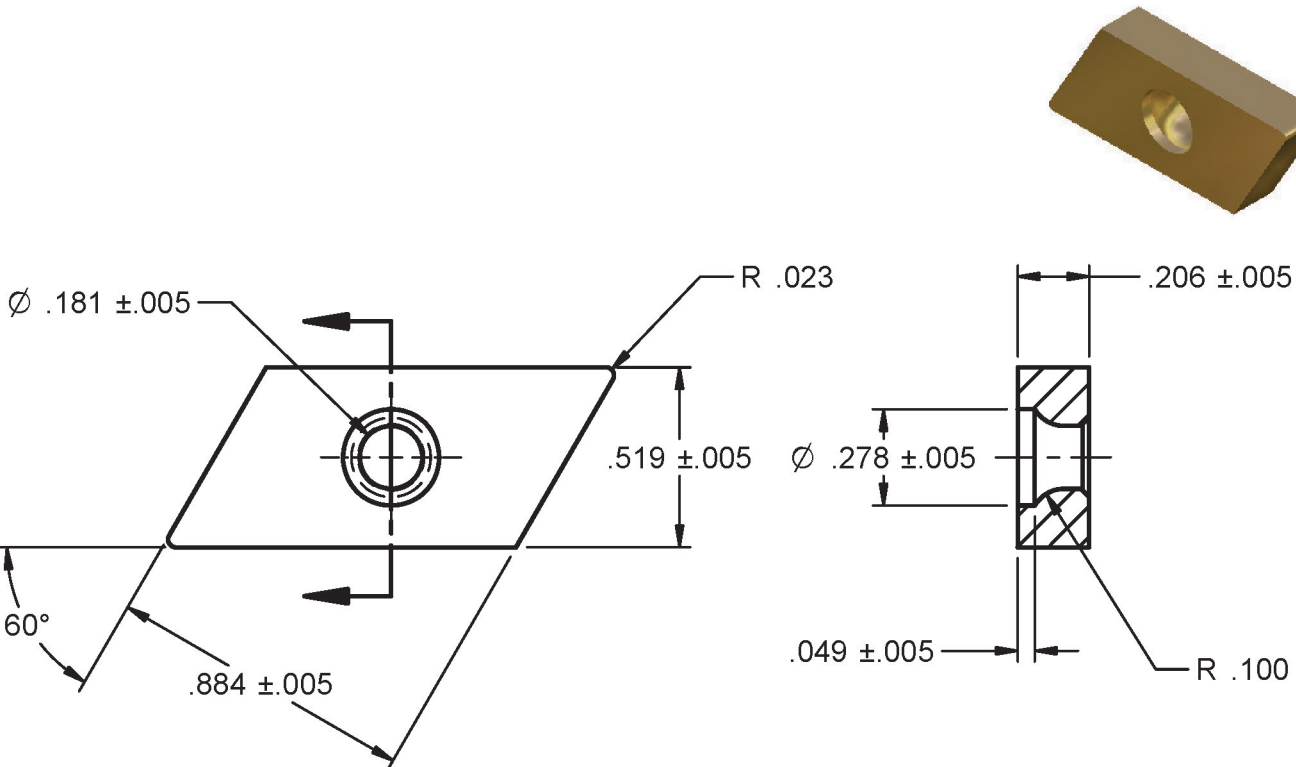
VR-0090-A



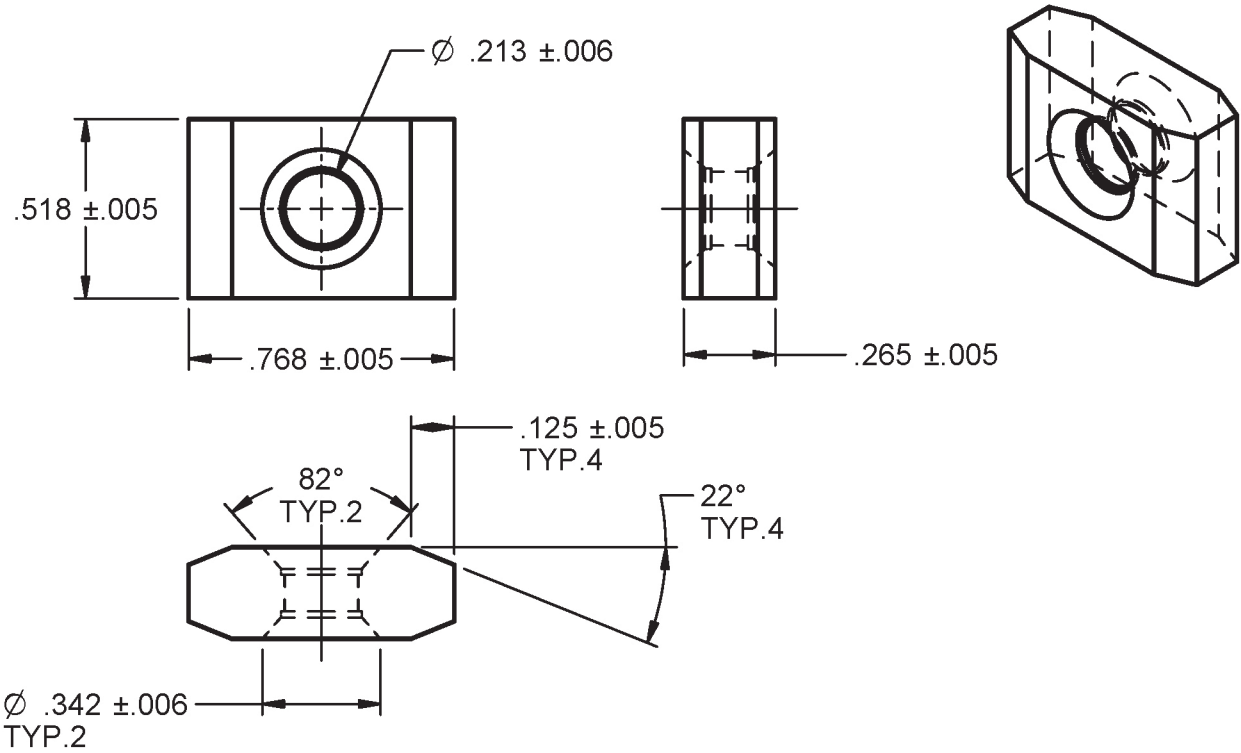
LX-0985-3



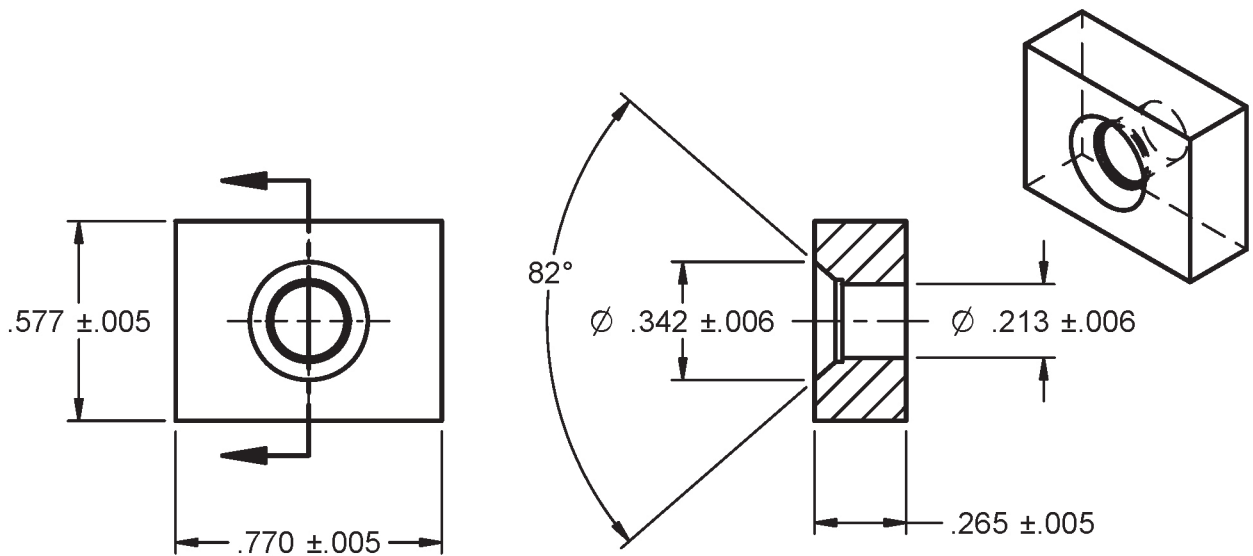
LX-0985-4



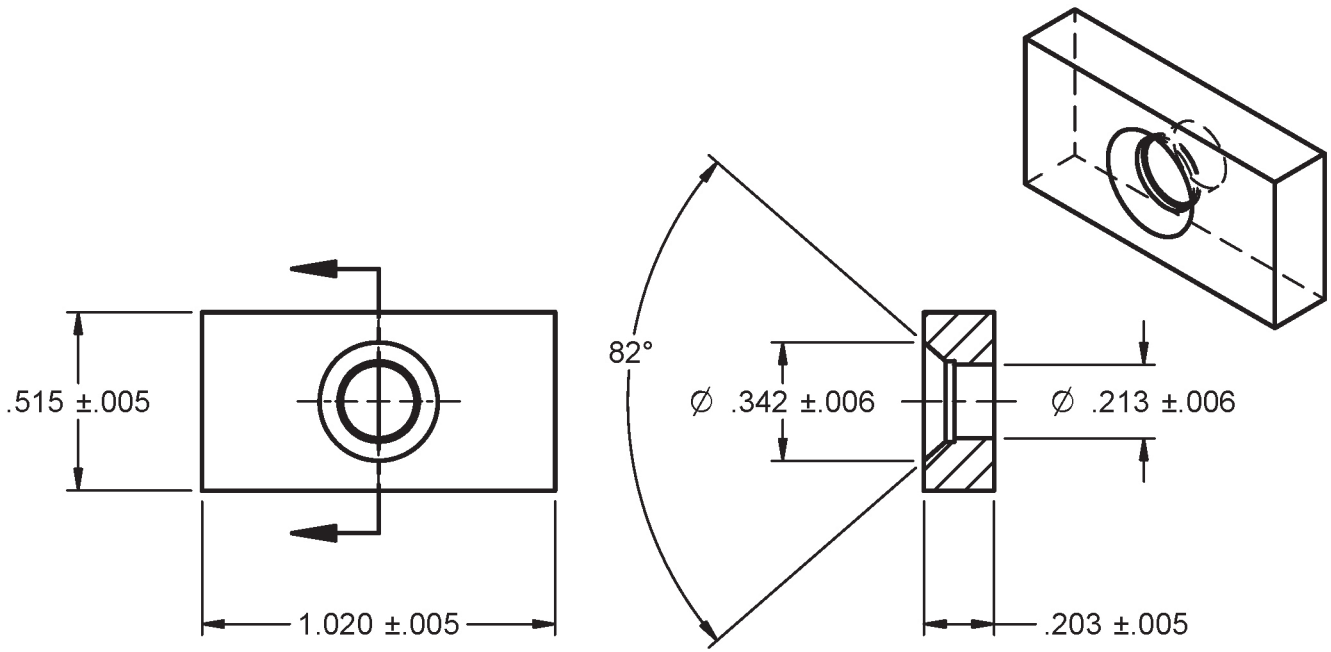
A-2013-B (LNR434-20-MOD)



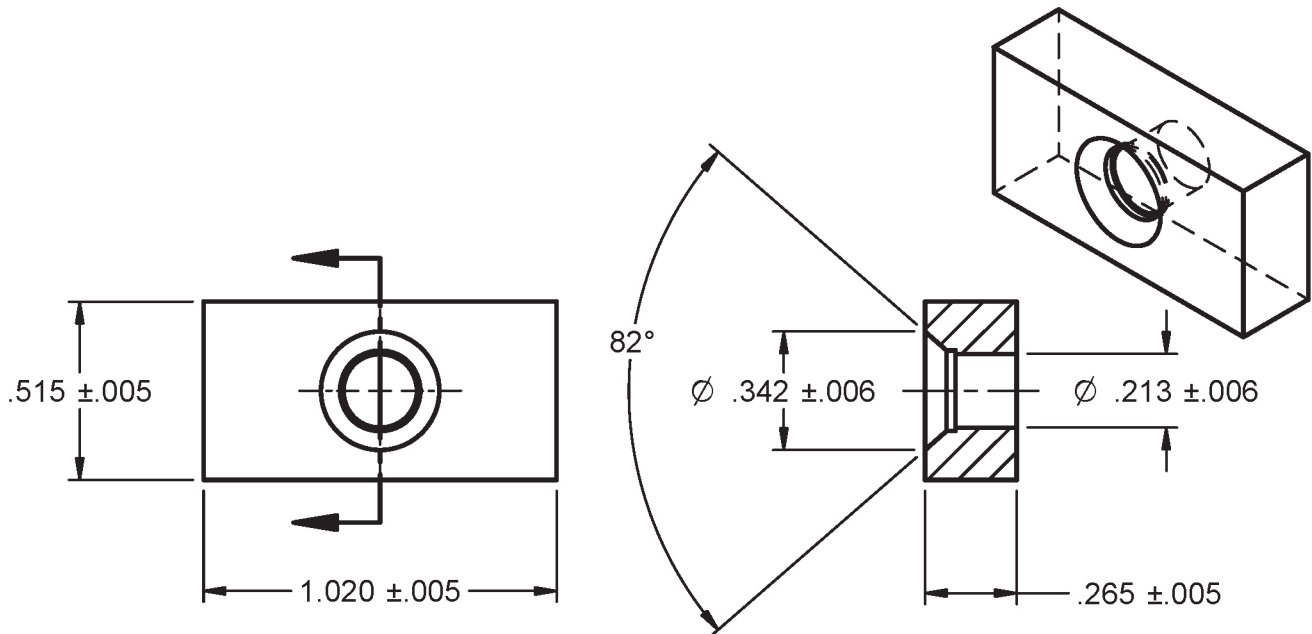
LNRB4.5340-SE03



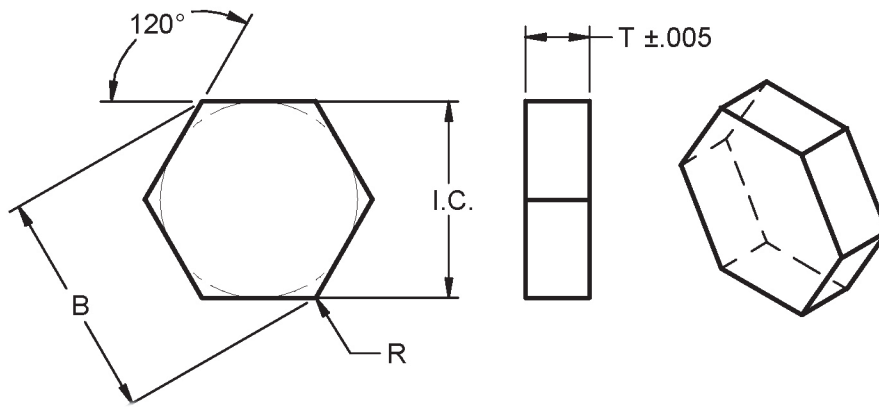
LRRB4430-SE03



LNRB4440-SE03

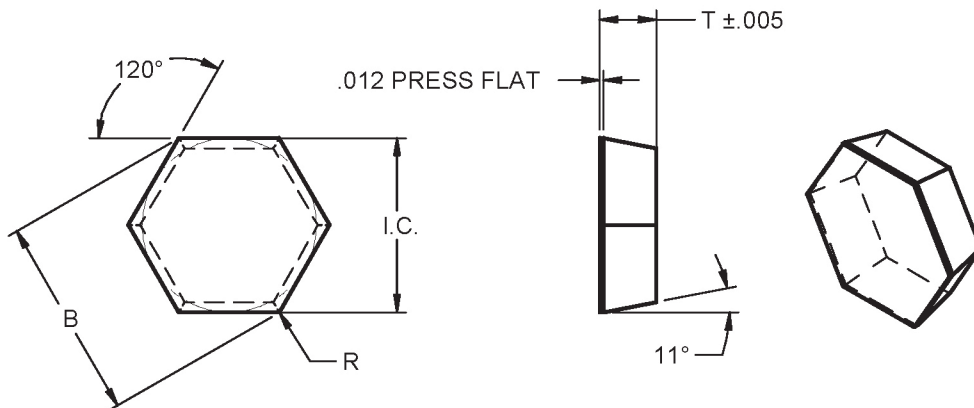


HNR



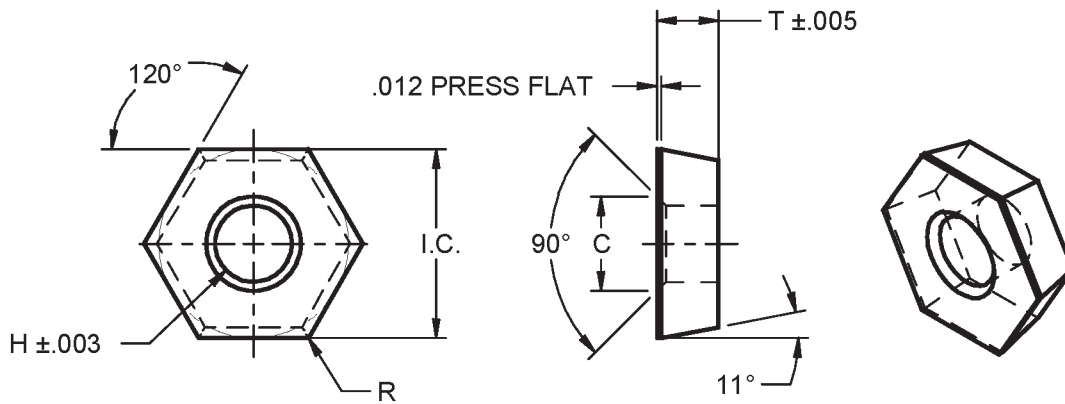
Insert	I.C.	B	T	R
HNR531	.639 ±.005	.739	.203	.010
HNR630	.769 ±.005	.883	.203	.010
HNR631	.769 ±.005	.885	.203	1/64
HNR633	.769 ±.005	.909	.203	3/64
HNR634	.769 ±.005	.883	.203	1/16
HNR638	.769 ±.005	.883	.203	1/8
HNR1.51.50	.206 ±.005	.236	.104	0

HPR



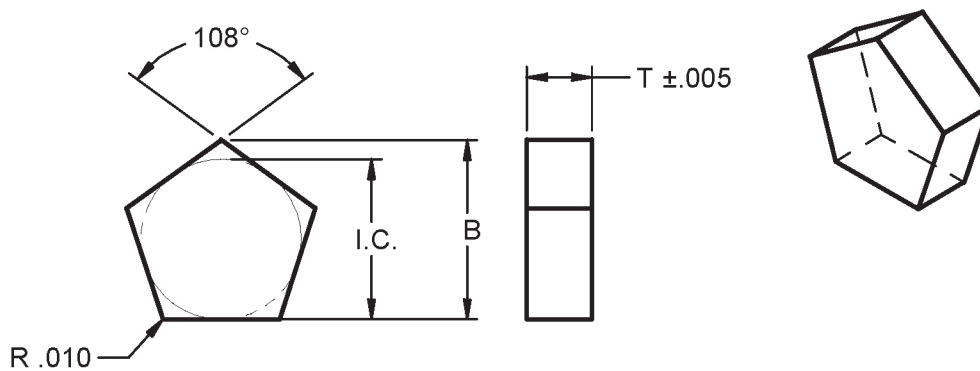
Insert	I.C.	T	R
HPR531	.639 ±.005	.203	.010
HPR532	.639 ±.005	.203	1/32
HPR632	.769 ±.005	.203	1/32

HPRB



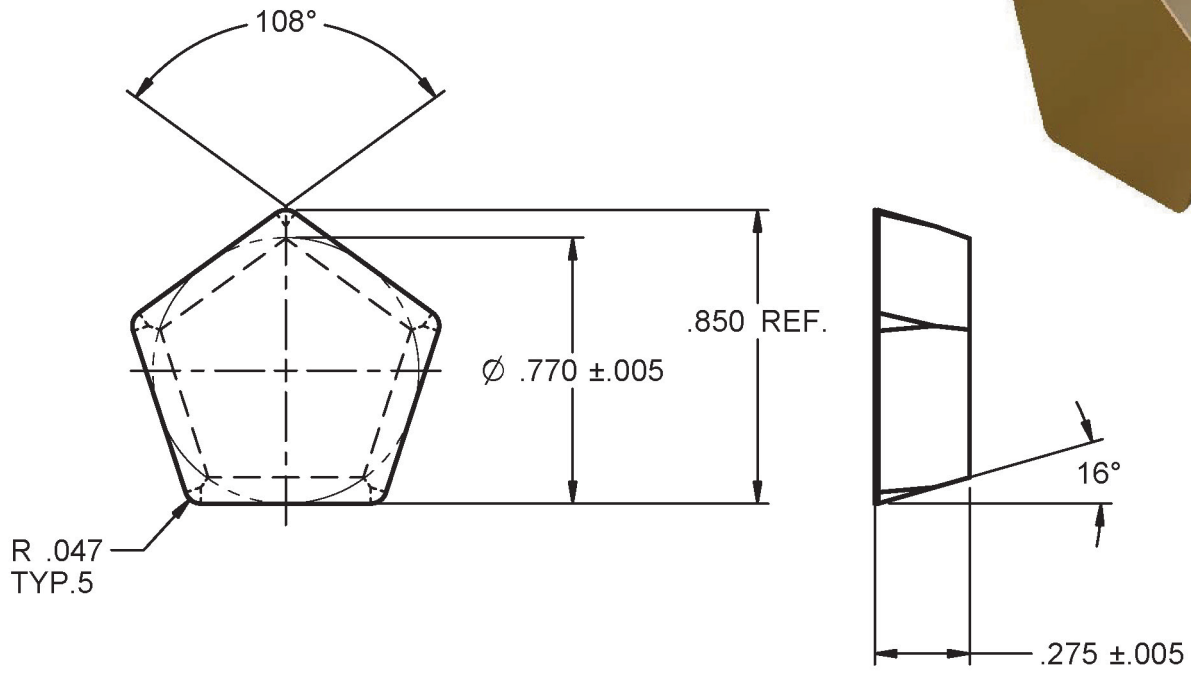
Insert	I.C.	T	R	H	C
HPRB433	.519 ±.005	.203	3/64	.253	.313
HPRB533	.644 ±.005	.203	3/64	.313	.384
HPRB633	.769 ±.005	.203	3/64	.313	.384

PNR

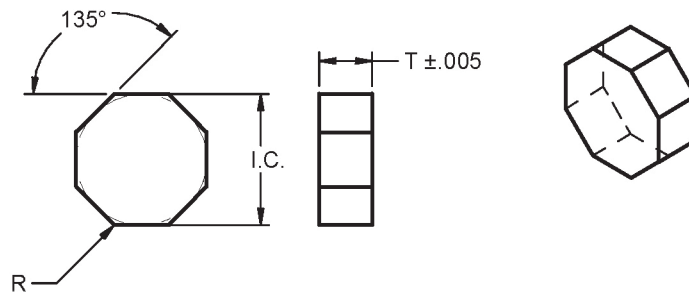


Insert	I.C.	B	T	R
PNR320	.390 ±.005	.436	.140	.010
PNR420	.515 ±.005	.576	.140	.010
PNR430	.515 ±.005	.576	.201	.010
PNR21.5	.265 ±.005	-	.104	-

PDR643

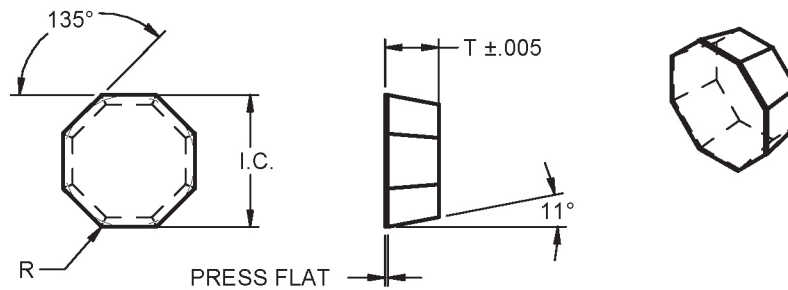


ONR



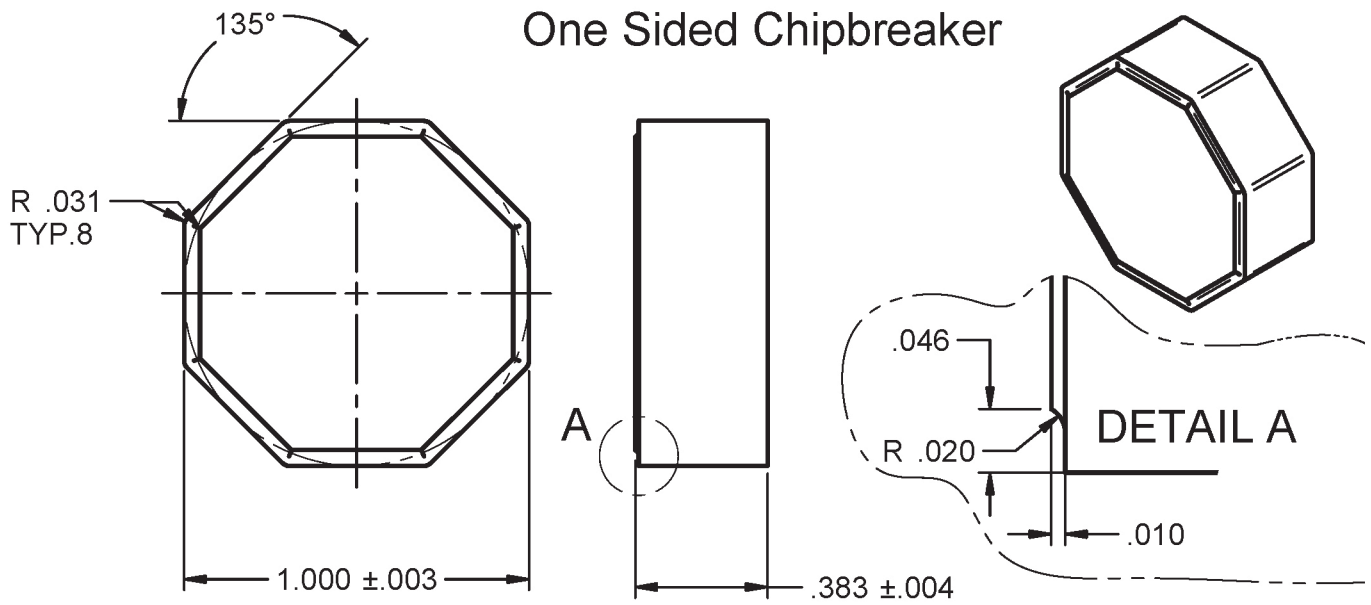
Insert	I.C.	T	R
ONR320	.393 ±.005	.140	.008
ONR330	.393 ±.005	.203	.008
ONR430	.520 ±.005	.203	.008
ONR530	.639 ±.005	.203	.008
ONR540	.639 ±.005	.265	.008
ONR630	.769 ±.005	.203	.008
ONR640	.769 ±.005	.265	.008

OPR

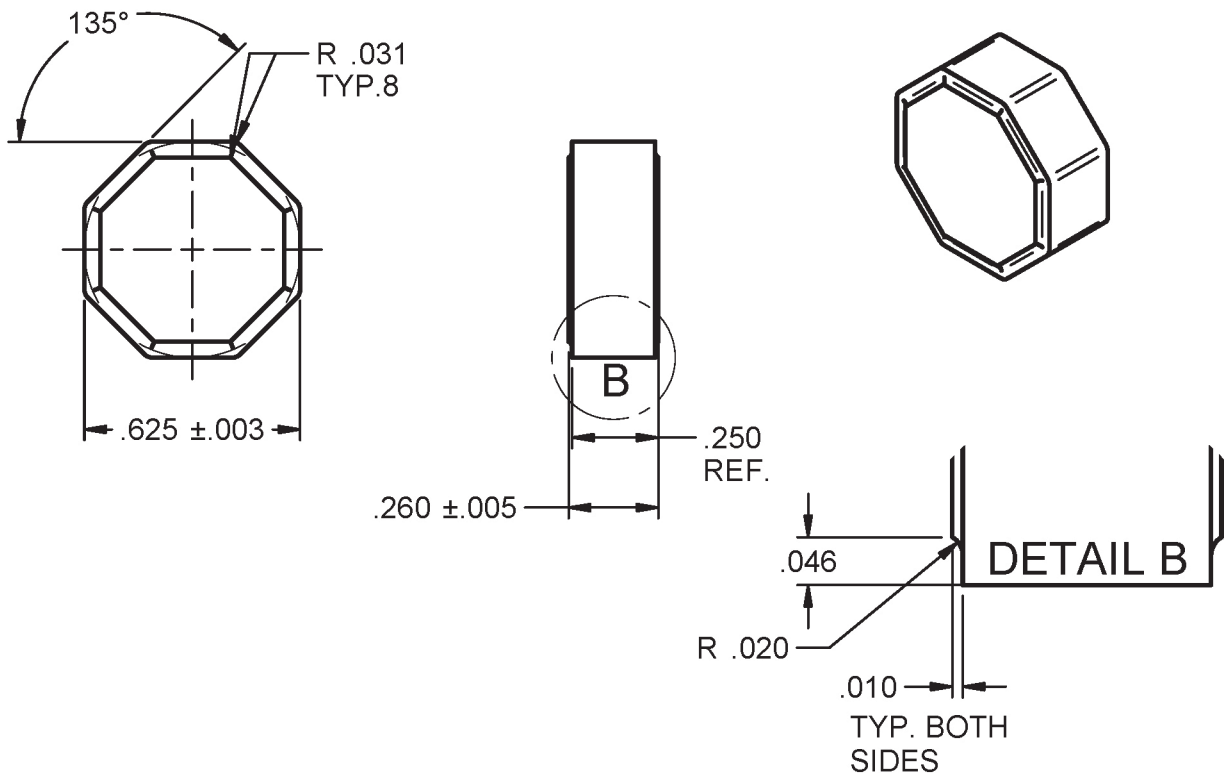


Insert	I.C.	T	R
OPR320	.393 ±.005	.140	.008
OPR520	.639 ±.005	.140	.008
OPR630	.769 ±.005	.203	.008
OPR640	.769 ±.005	.265	.008

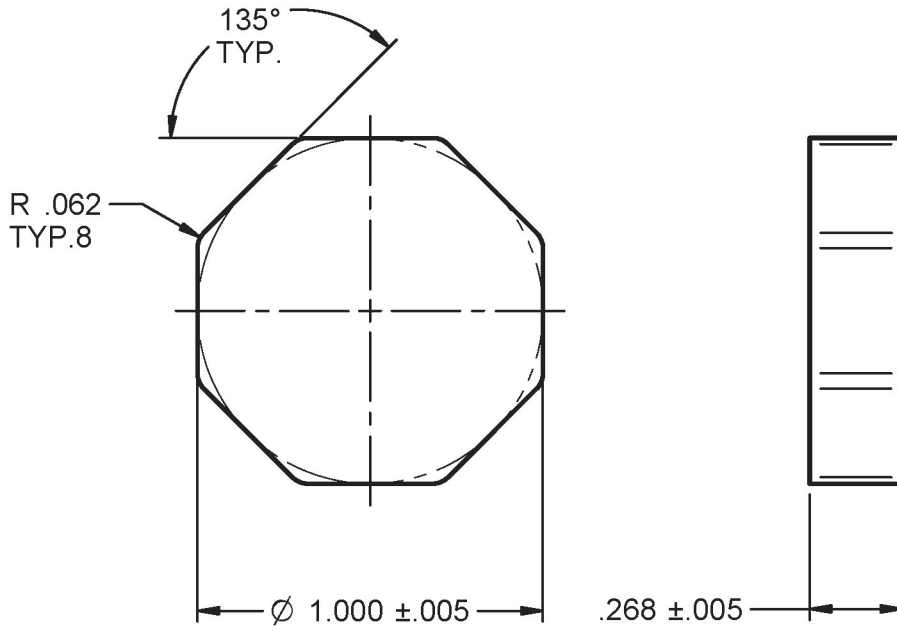
LX-0468-3 (ONSF862-1CB)



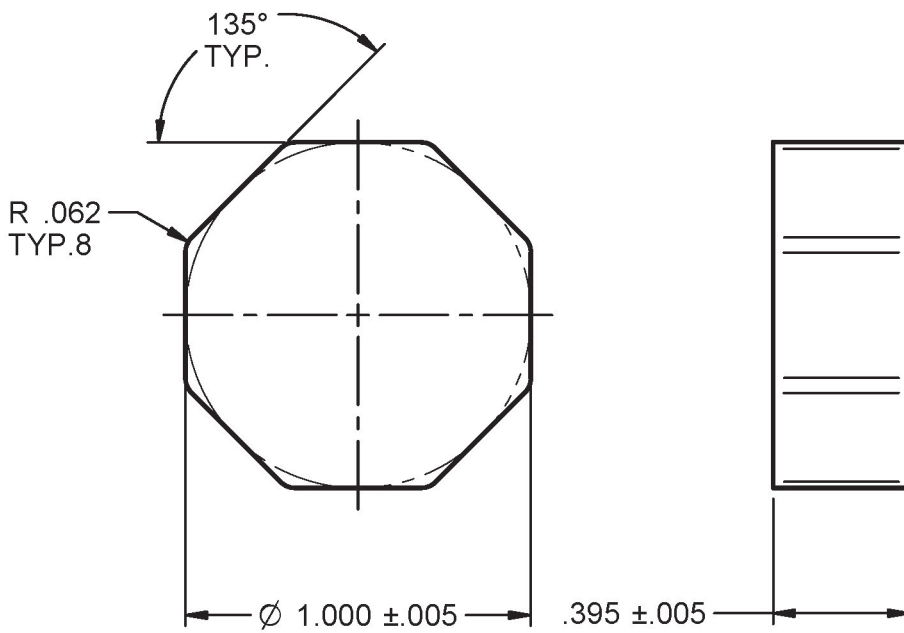
LX-0468-2 (ONMF542)



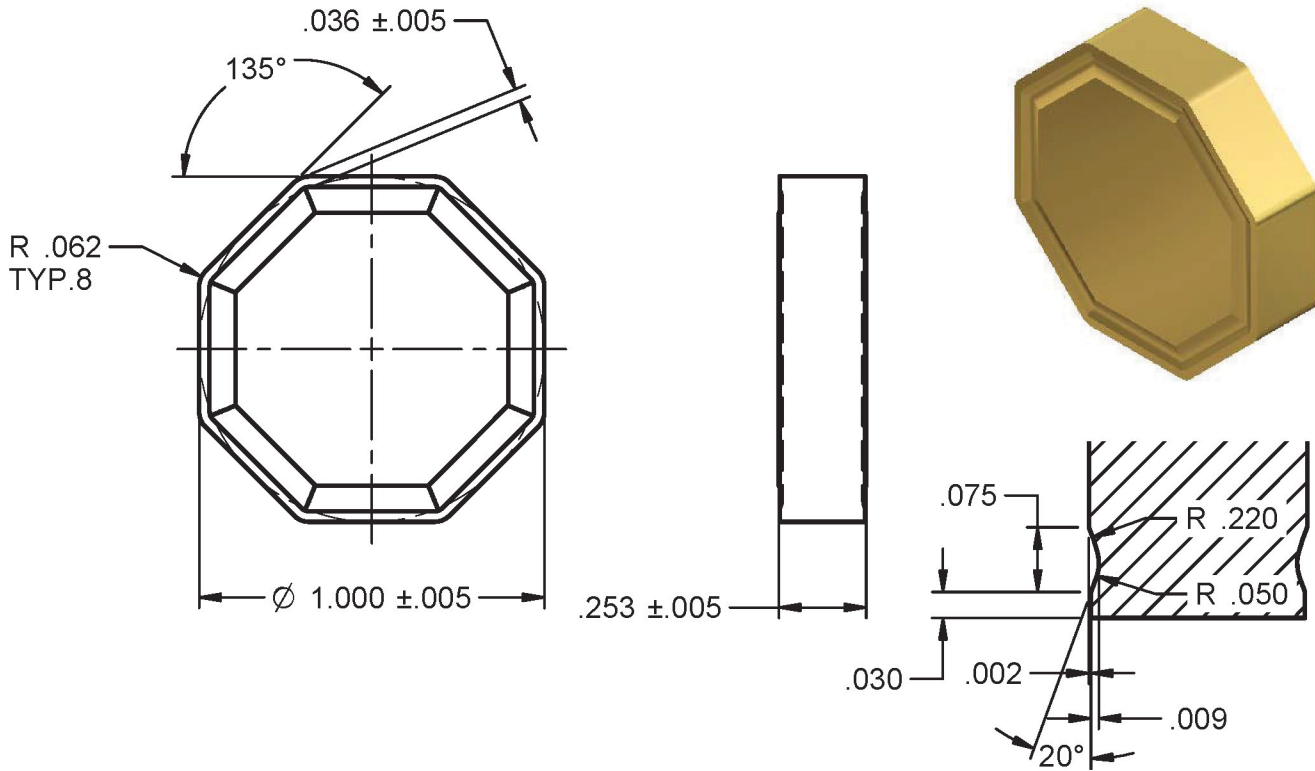
ONS844 (D-16948-P1 N18)



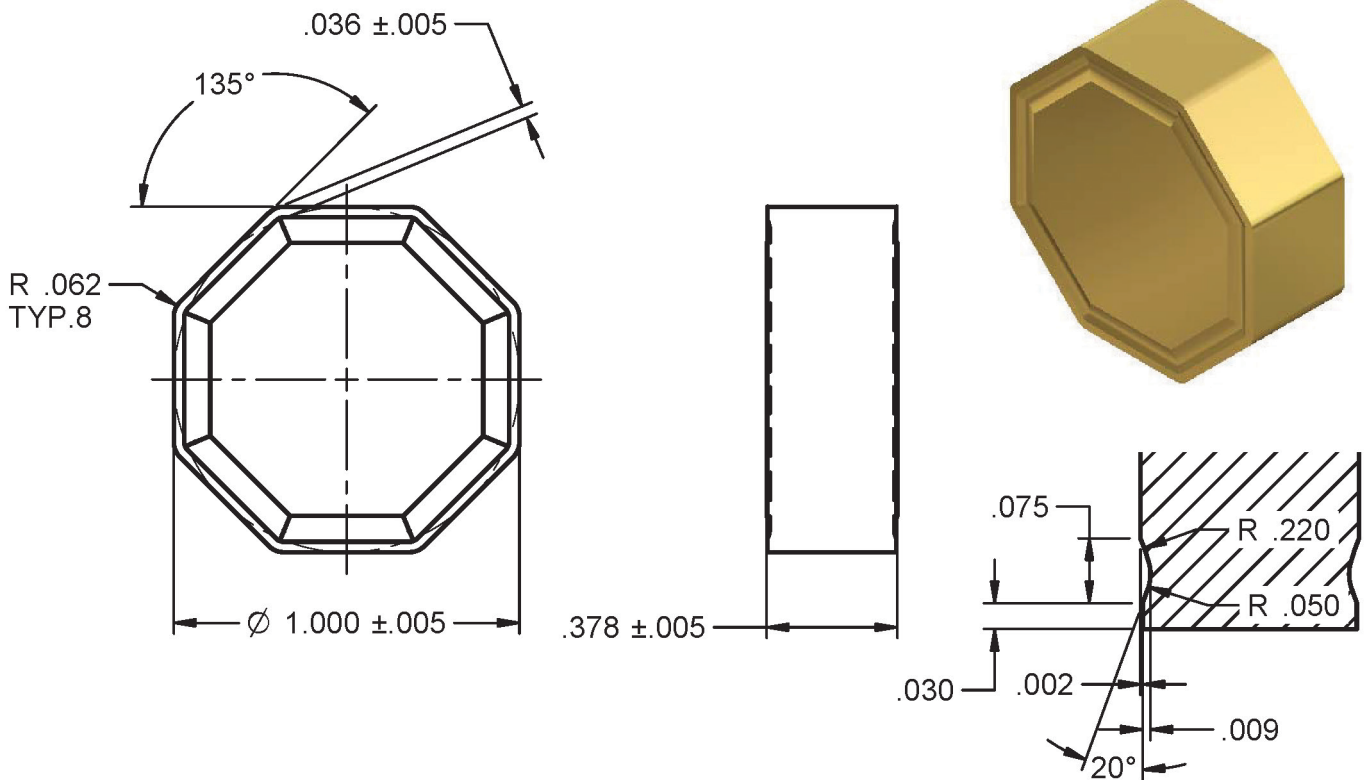
ONS864 (D-16948-P1 N18)



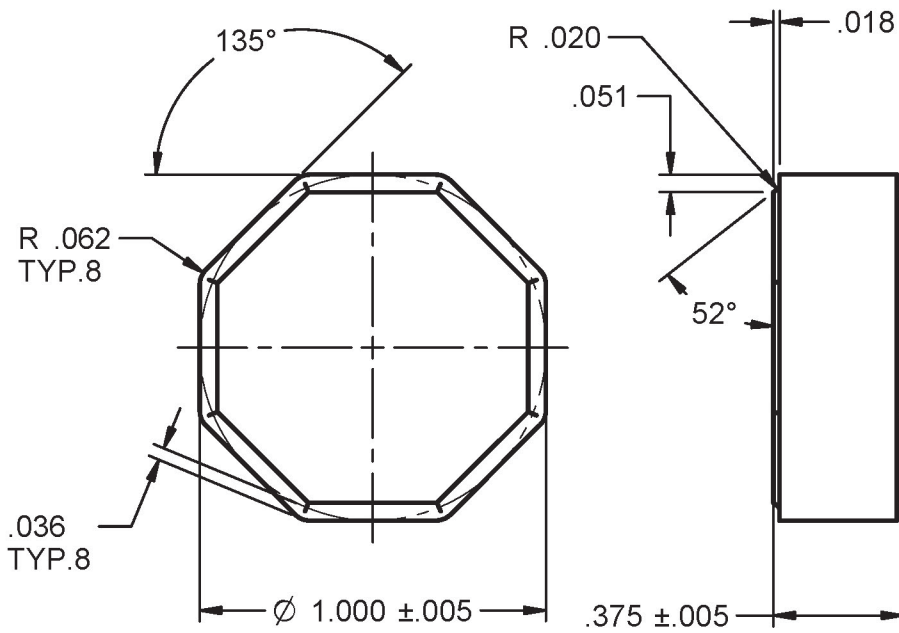
ONMF844 (D-16948-P2 N18)



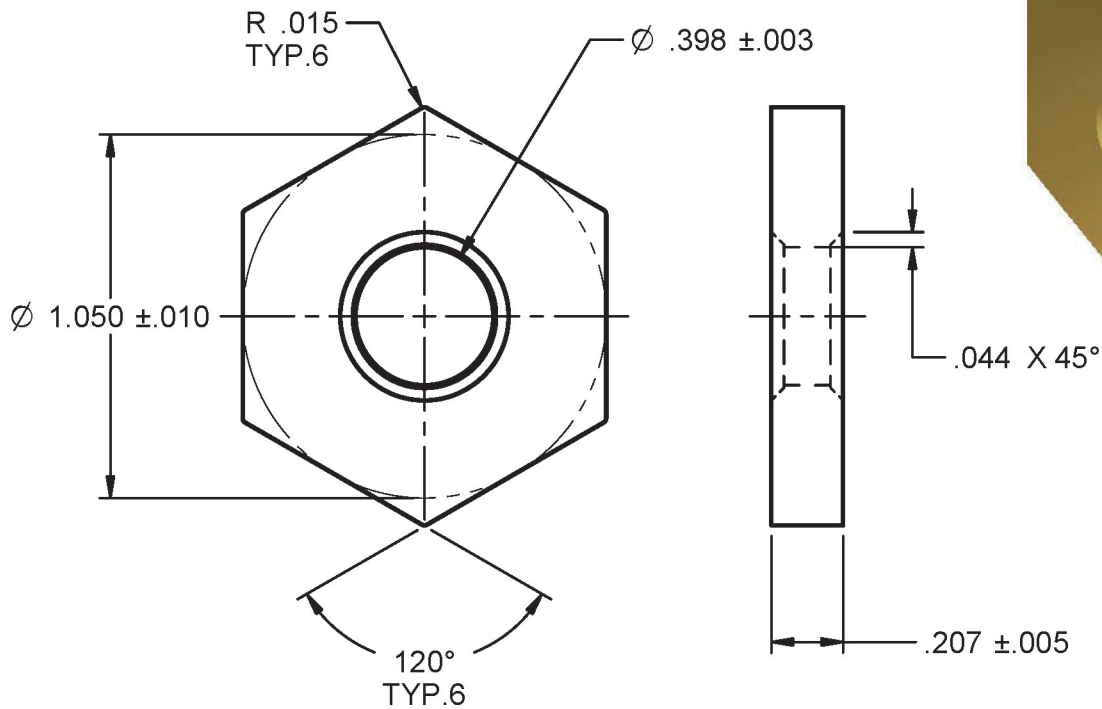
ONMF864 (D-16948-P2 N18)



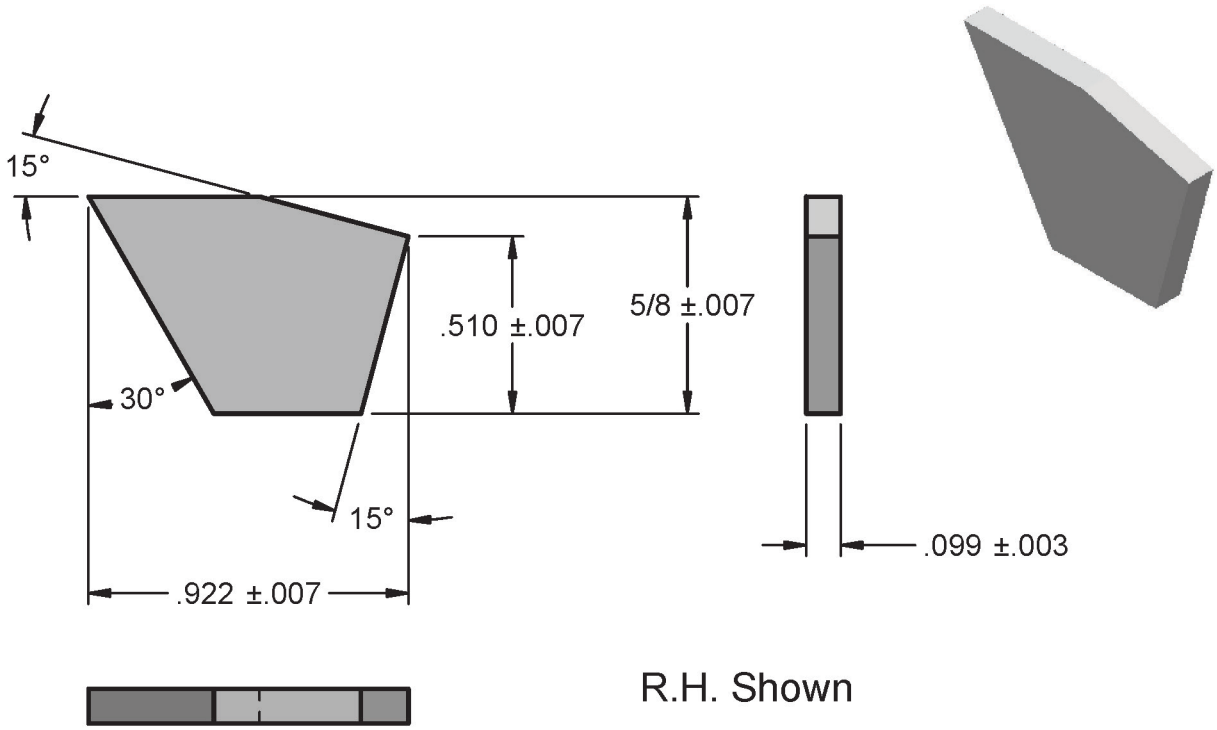
ONMX864 (D-16948-P2 N18)



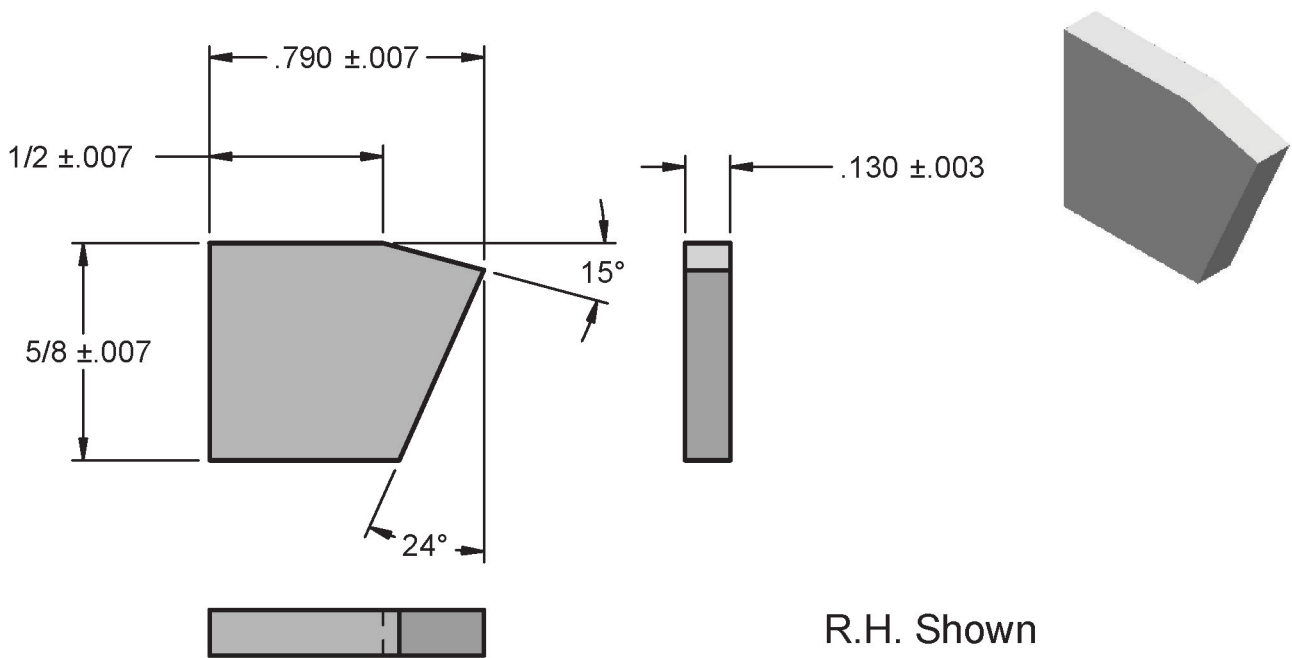
A-2059-A (D-19272-P1)



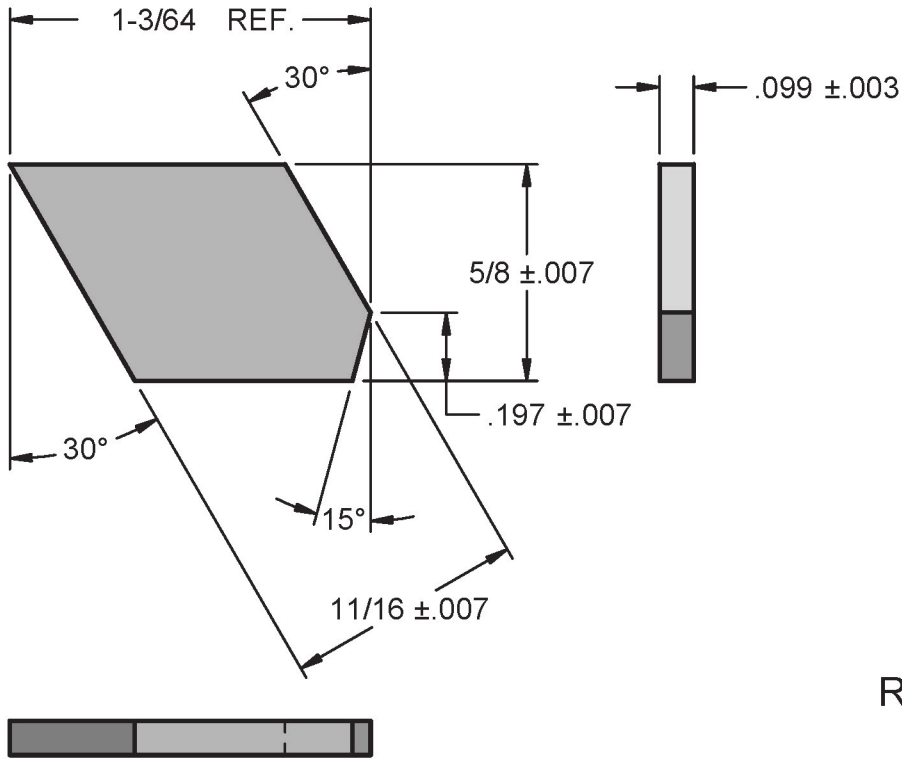
580 R/L (BLANK FOR RIGIDCUT CUTTER)



7888 R/L (BLANK FOR RIGIDCUT CUTTER)

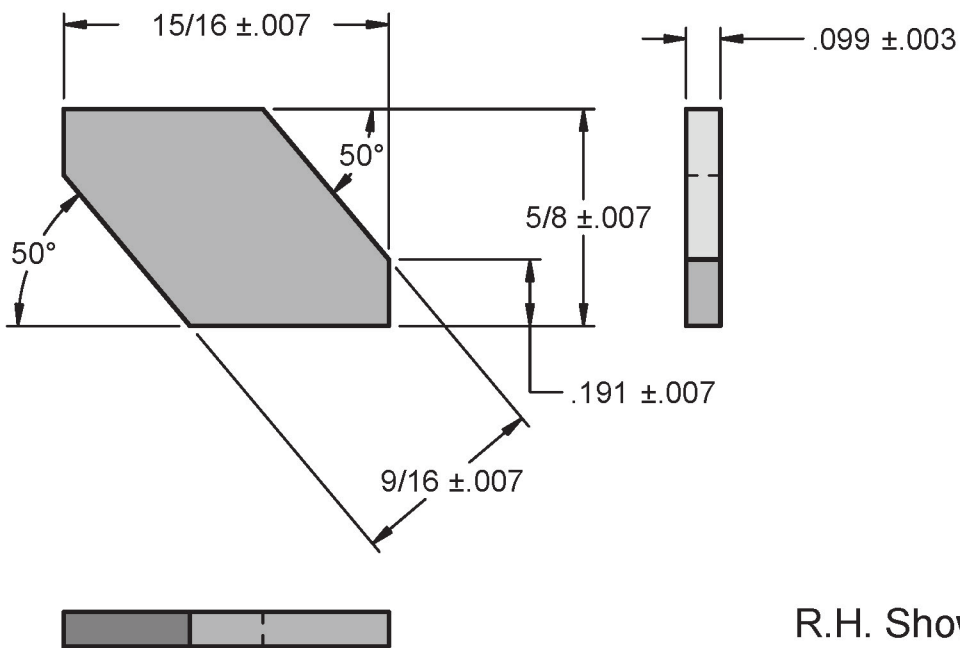


500 R/L (BLANK FOR RIGIDCUT CUTTER)



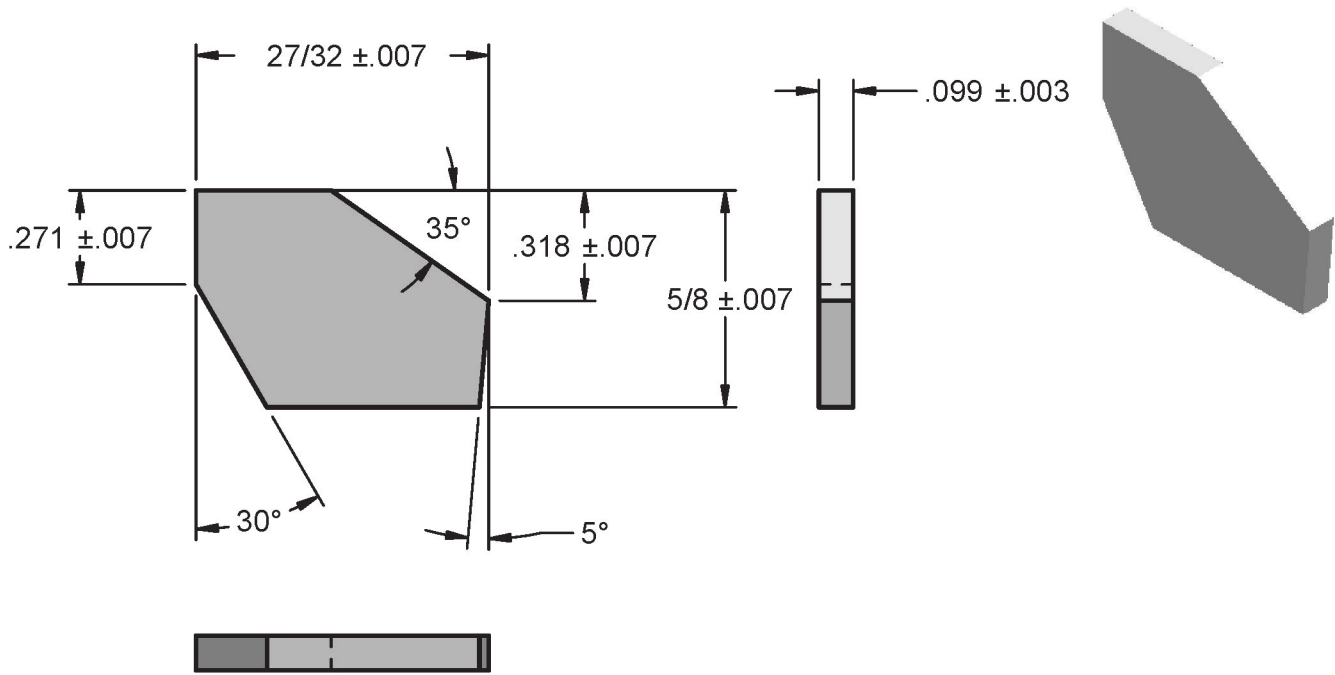
R.H. Shown

505 R/L (BLANK FOR RIGIDCUT CUTTER)



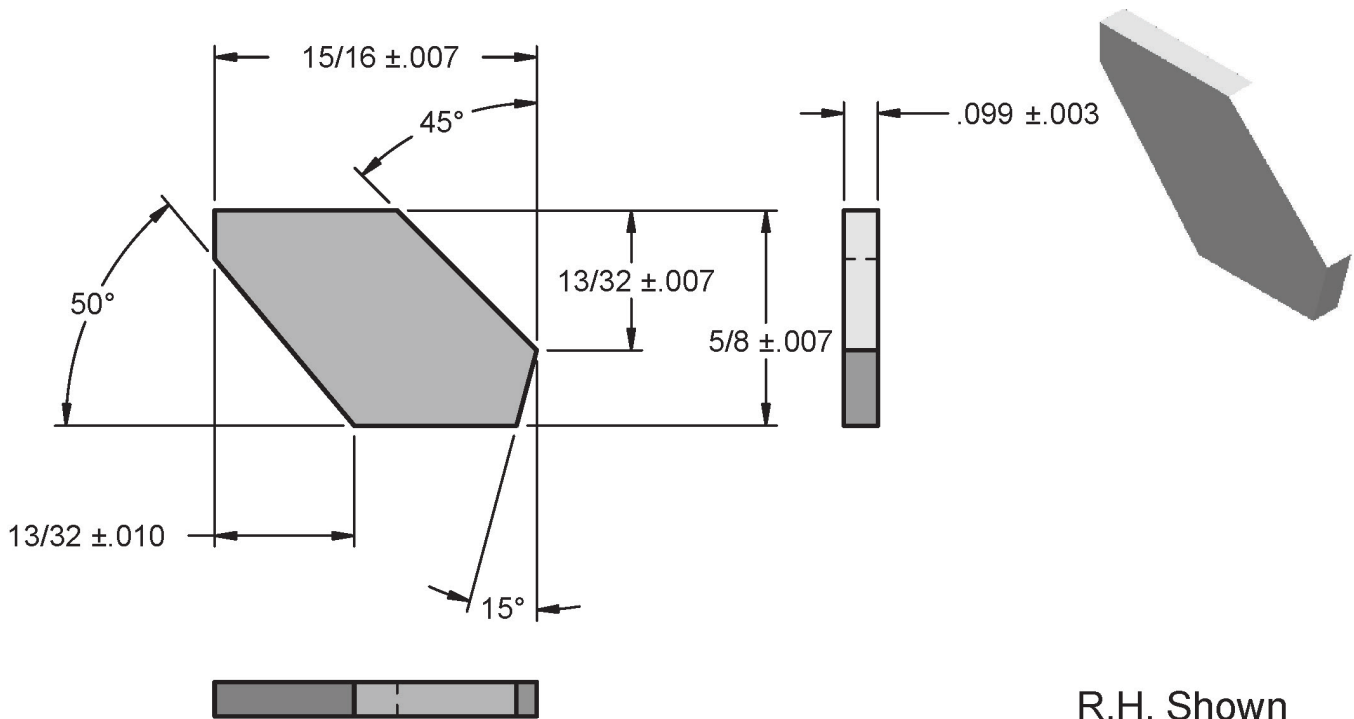
R.H. Shown

530 R/L (BLANK FOR RIGIDCUT CUTTER)



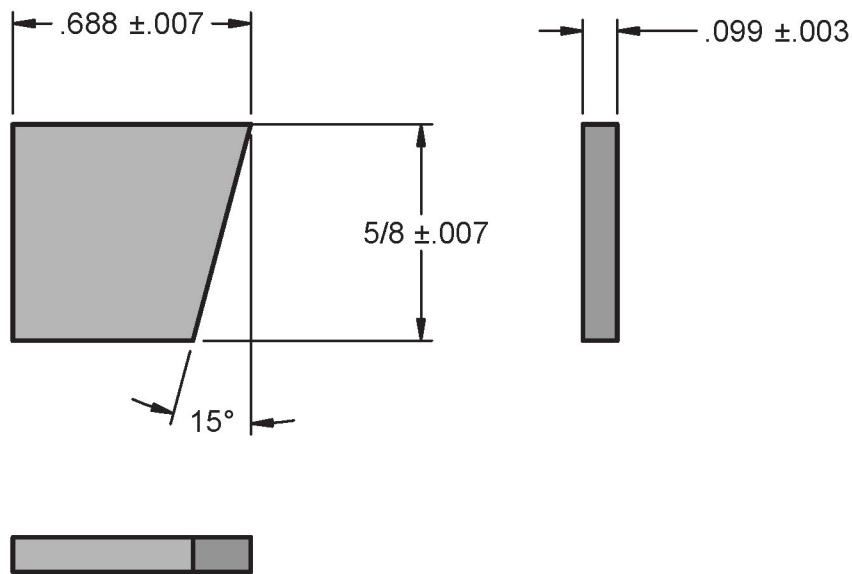
R.H. Shown

535 R/L (BLANK FOR RIGIDCUT CUTTER)



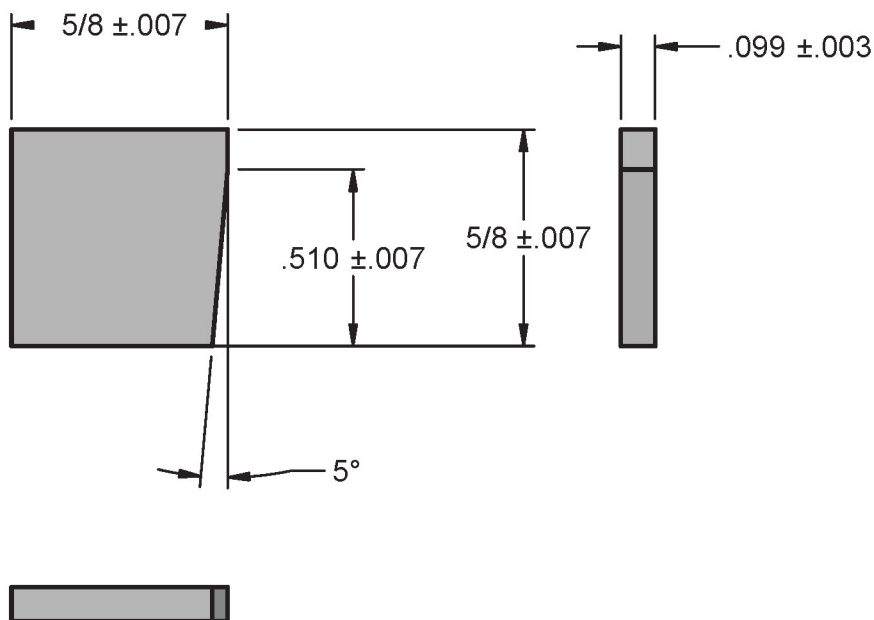
R.H. Shown

550 R/L (BLANK FOR RIGIDCUT CUTTER)



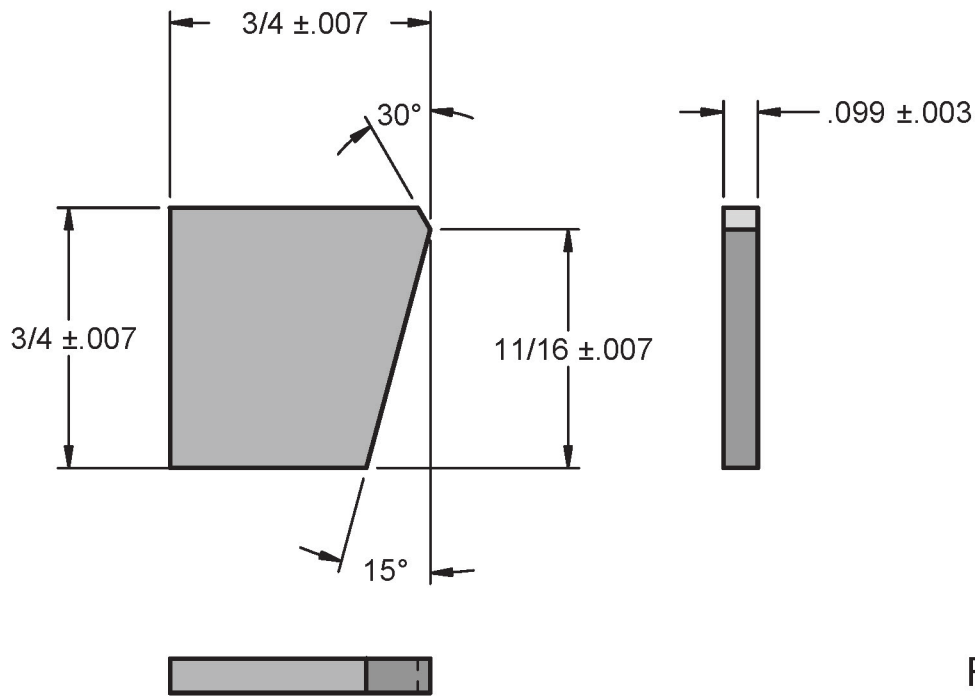
R.H. Shown

555 R/L (BLANK FOR RIGIDCUT CUTTER)



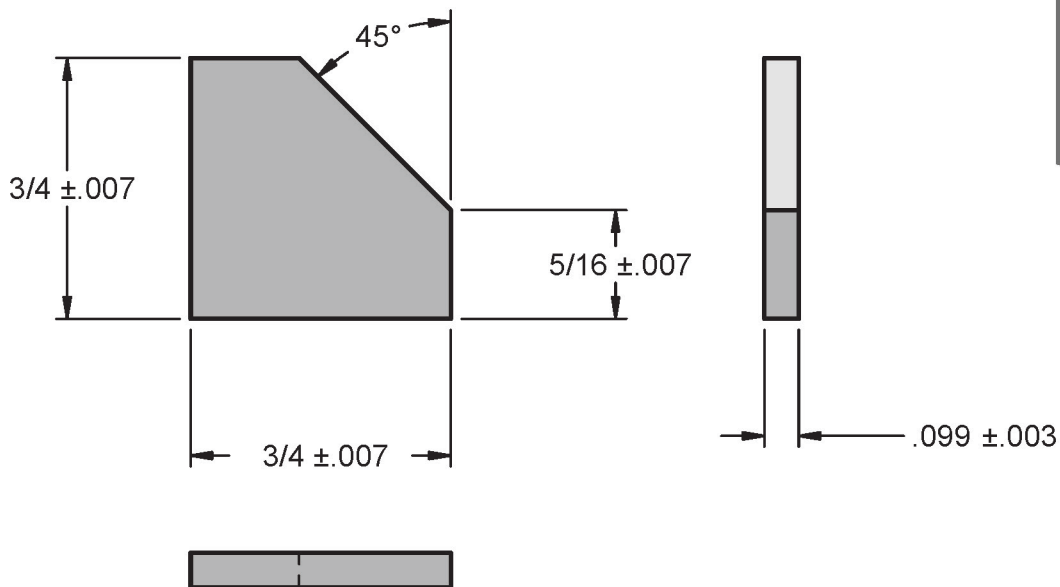
R.H. Shown

560 R/L (BLANK FOR RIGIDCUT CUTTER)



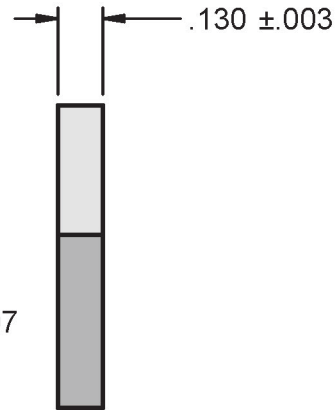
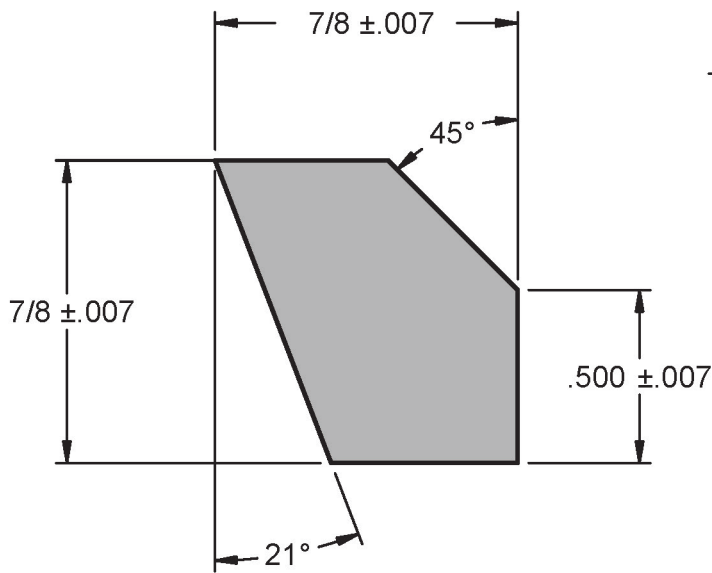
R.H. Shown

560-A R/L (BLANK FOR RIGIDCUT CUTTER)



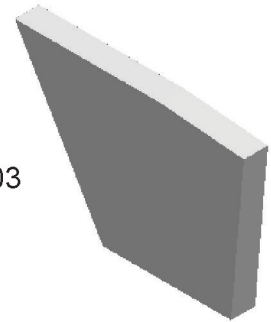
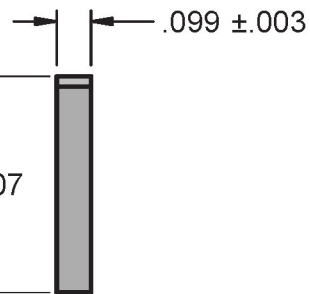
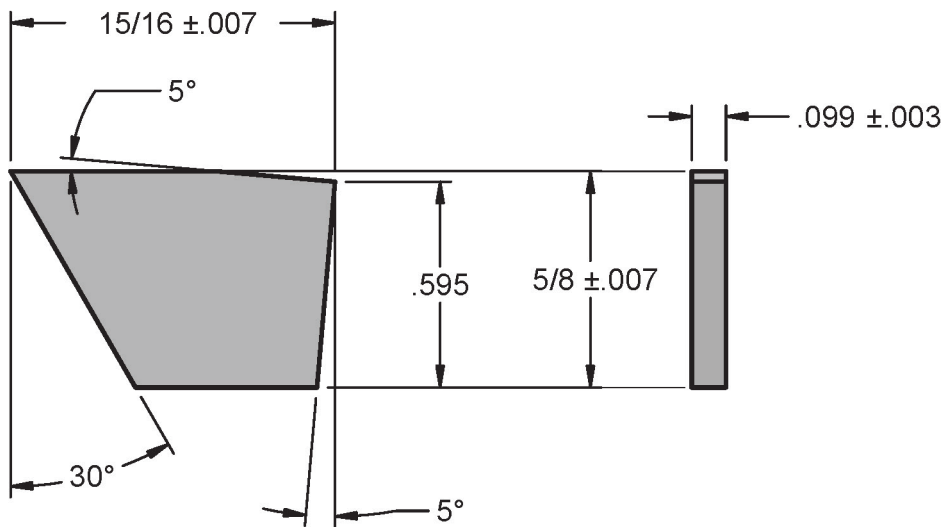
R.H. Shown

595 R/L (BLANK FOR RIGIDCUT CUTTER)



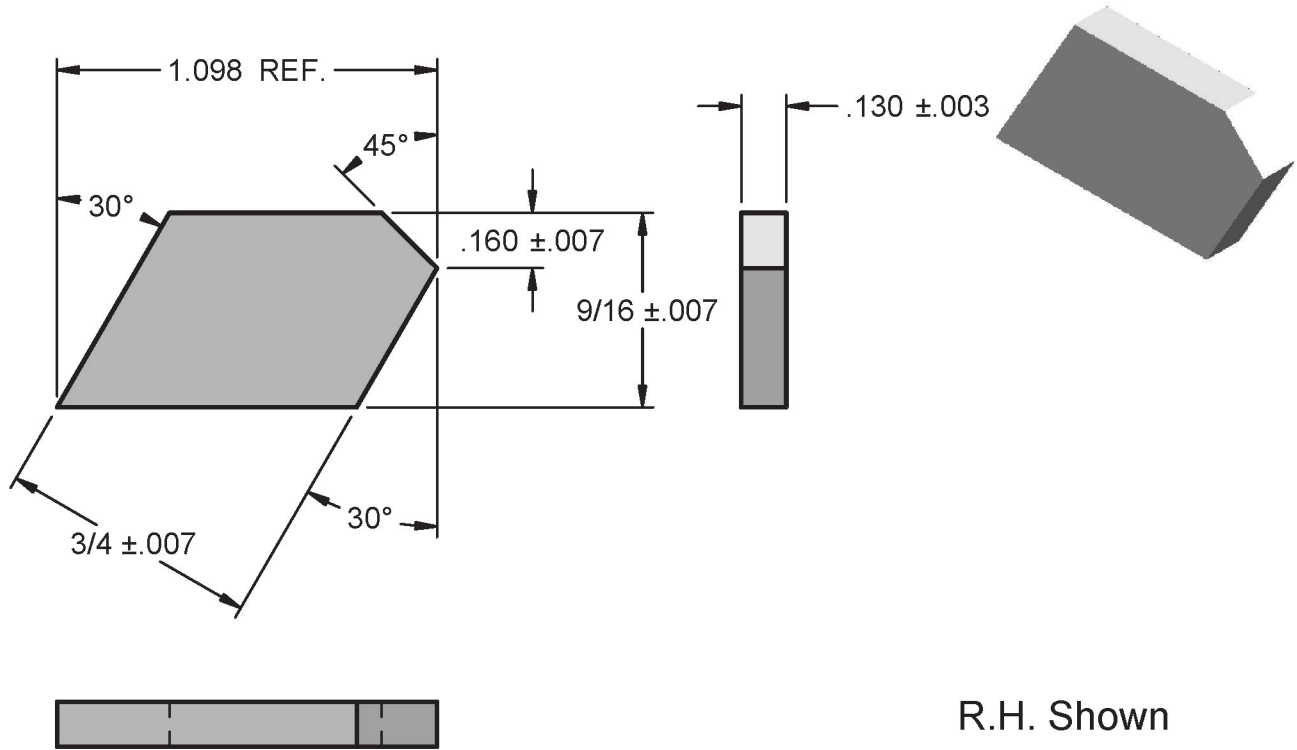
R.H. Shown

585 R/L (BLANK FOR RIGIDCUT CUTTER)

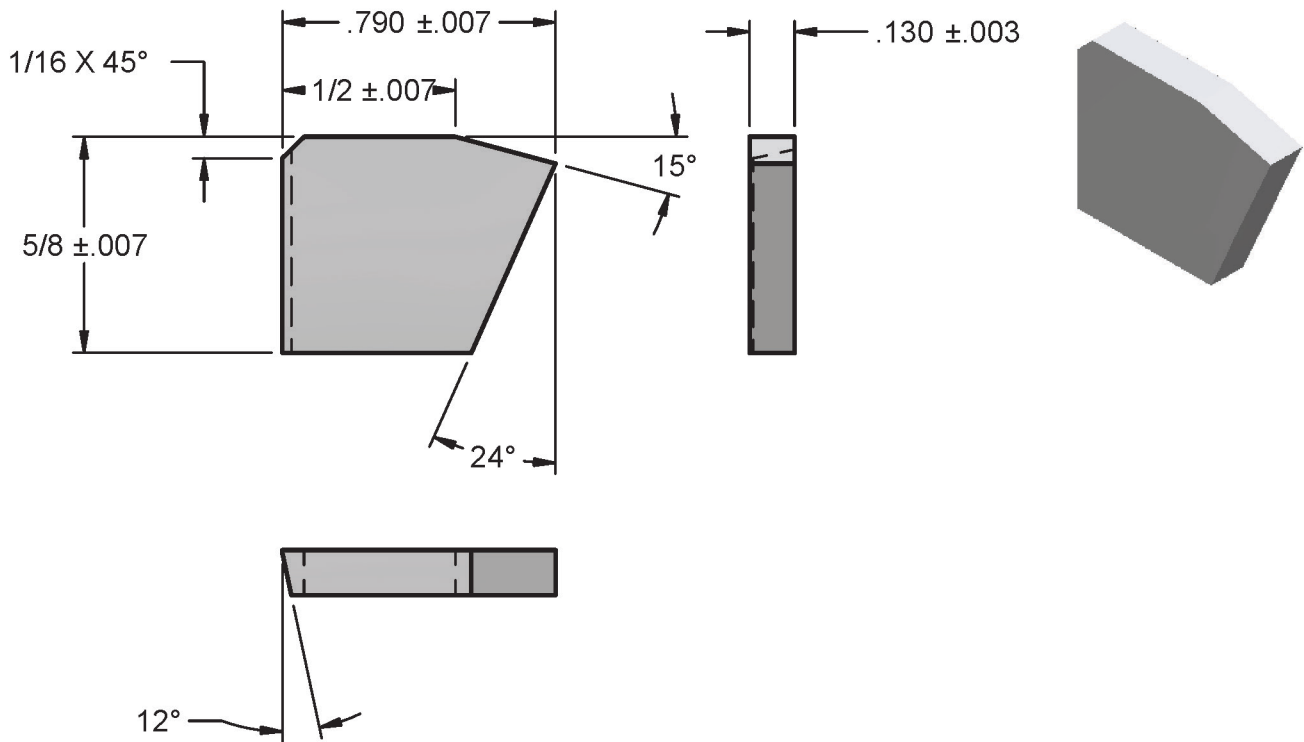


R.H. Shown

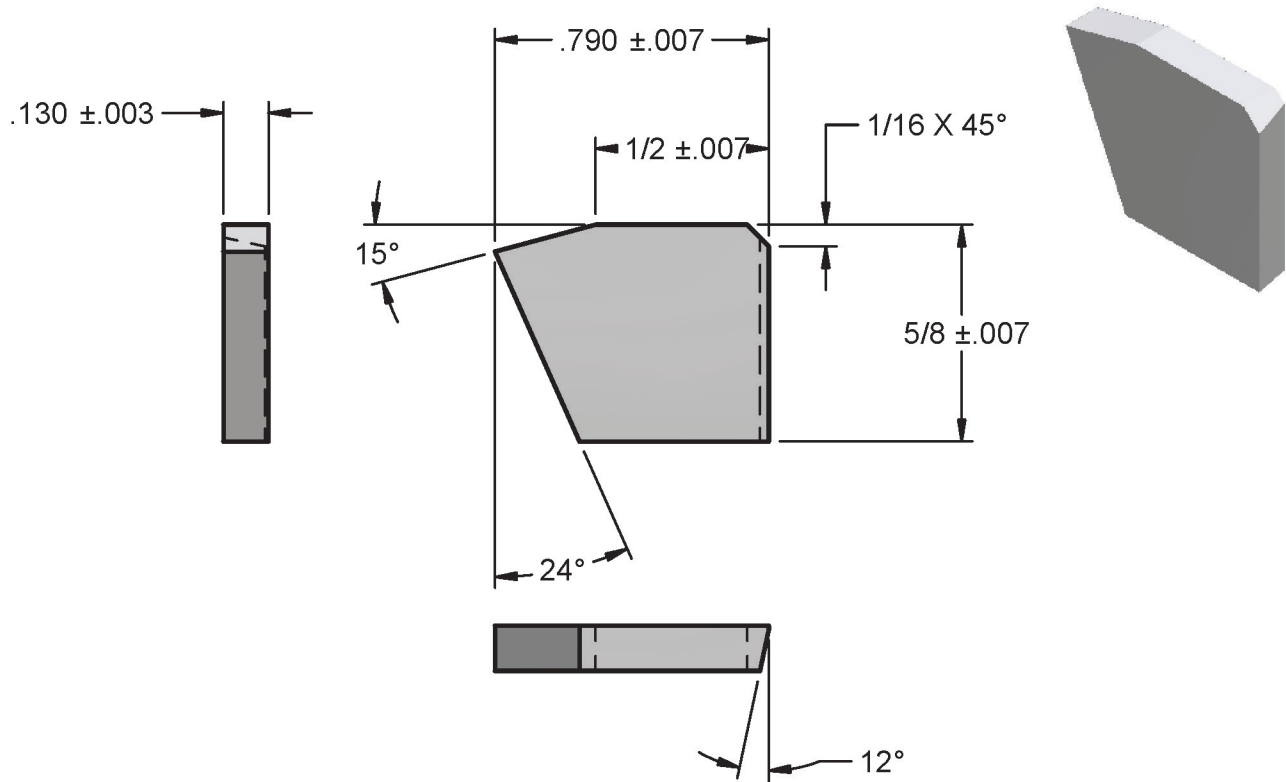
7881 & 7883 R/L (BLANK FOR RIGIDCUT CUTTER)



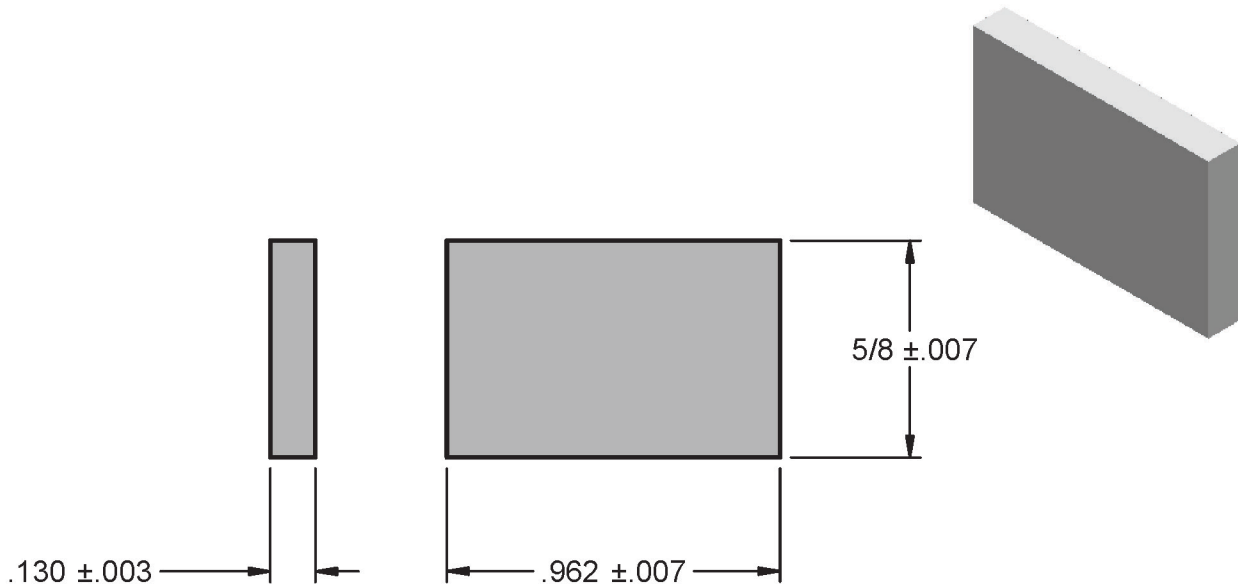
7888L-C (BLANK FOR RIGIDCUT CUTTER)



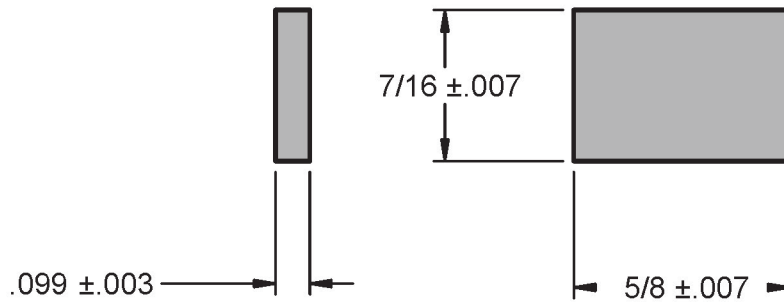
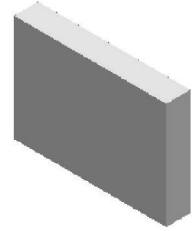
7888R-C (BLANK FOR RIGIDCUT CUTTER)



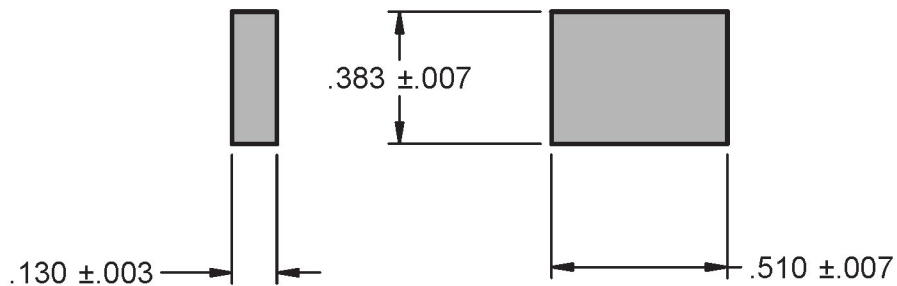
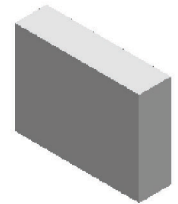
590 R/L (BLANK FOR RIGIDCUT CUTTER)



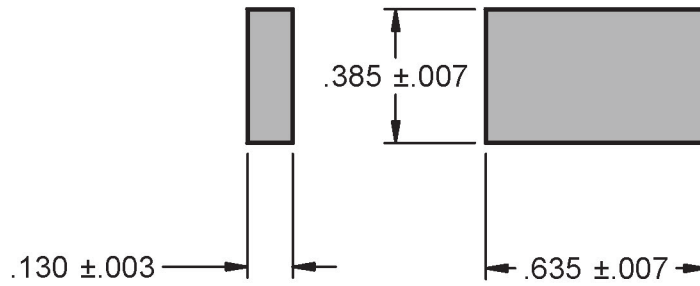
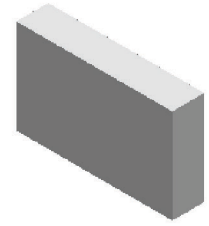
600 R/L (BLANK FOR RIGIDCUT CUTTER)



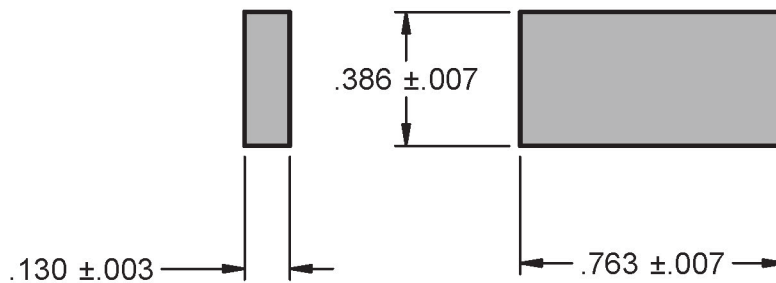
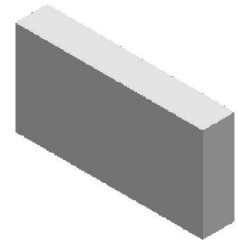
909 R/L (BLANK FOR RIGIDCUT CUTTER)



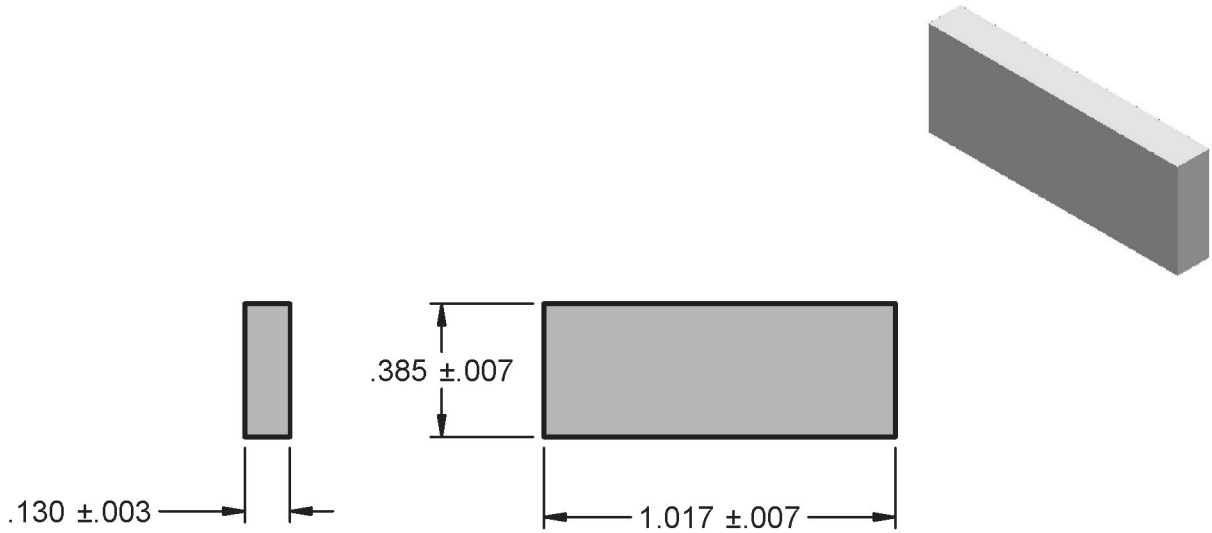
910 R/L (BLANK FOR RIGIDCUT CUTTER)



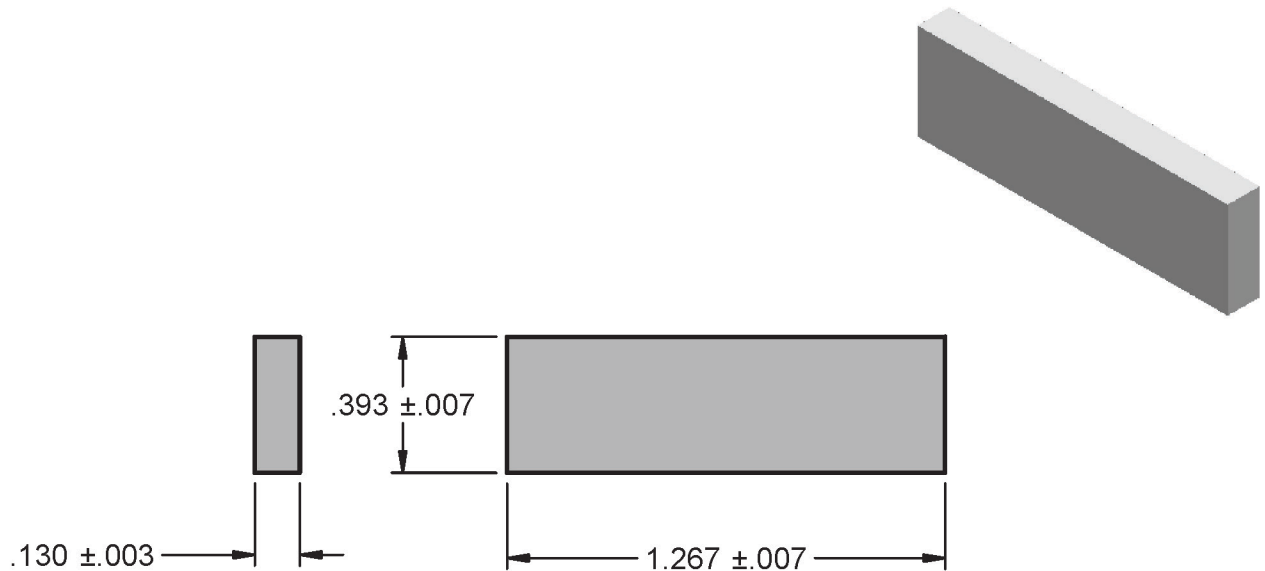
911 R/L (BLANK FOR RIGIDCUT CUTTER)



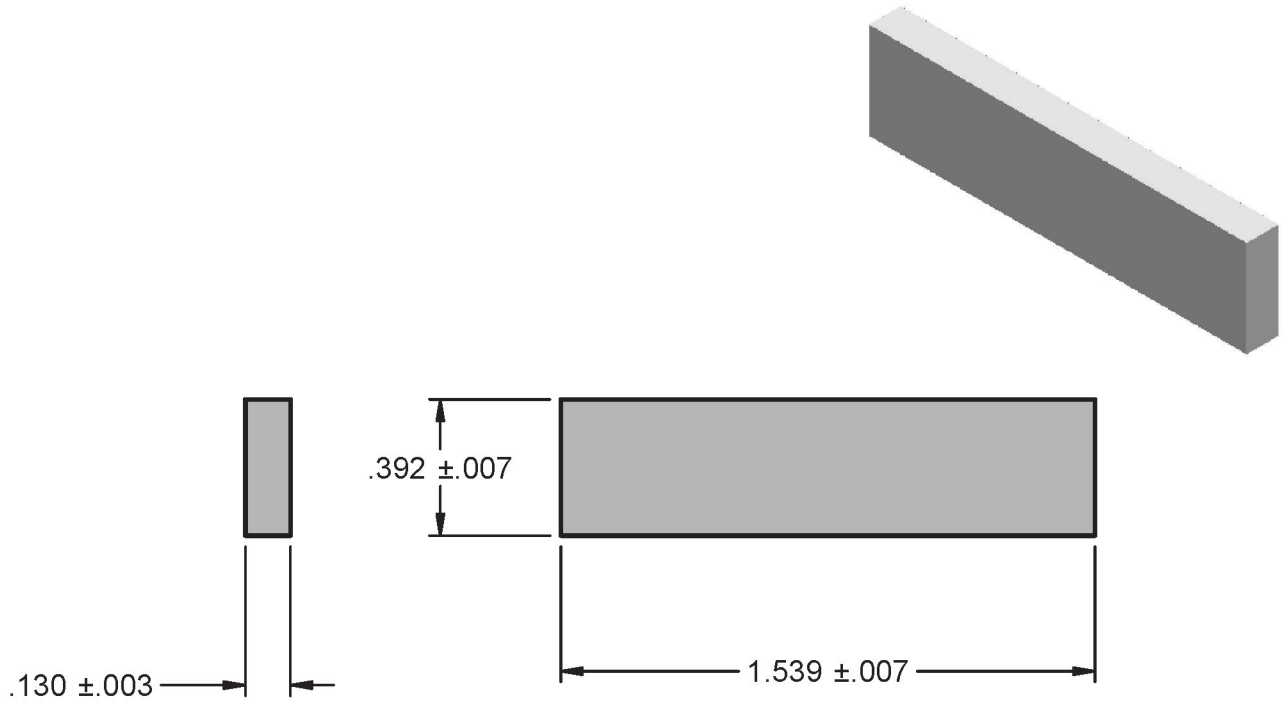
912 R/L (BLANK FOR RIGIDCUT CUTTER)



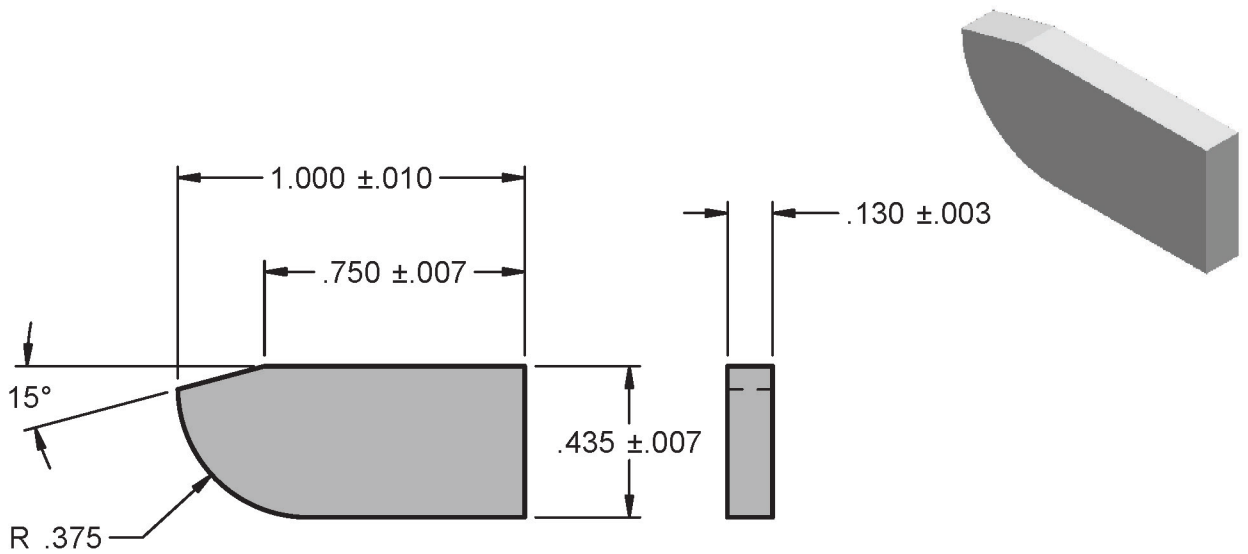
915 R/L (BLANK FOR RIGIDCUT CUTTER)



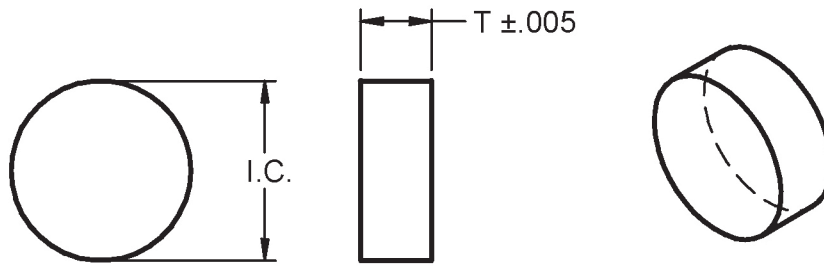
919 R/L (BLANK FOR RIGIDCUT CUTTER)



7892 (BLANK FOR RIGIDCUT CUTTER)

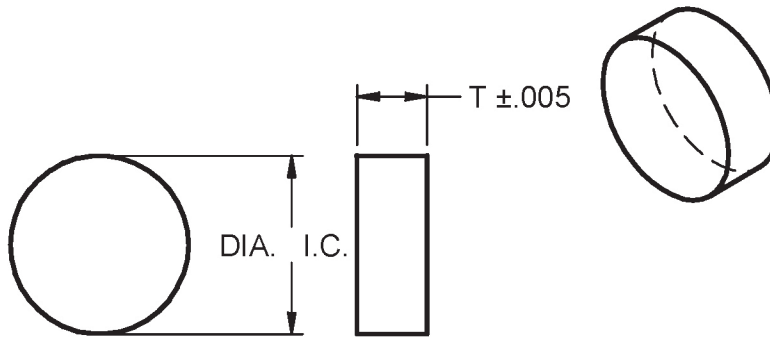


RNR



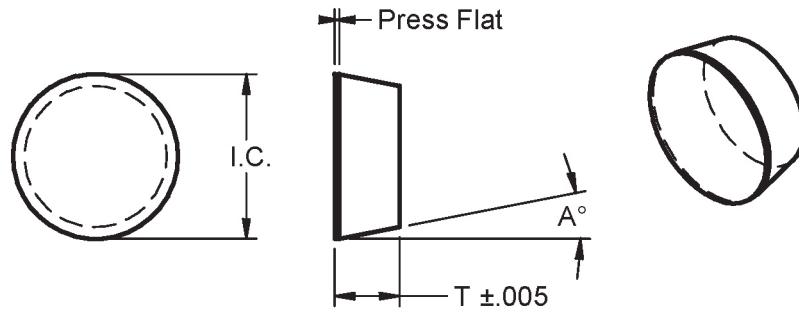
Insert	I.C.	T
RNR22	.268 ±.005	.139
RNR23	.268 ±.005	.203
RNR24	.268 ±.005	.265
RNR32	.391 ±.005	.139
RNR33	.391 ±.005	.203
RNR34	.391 ±.005	.265
RNR35	.391 ±.005	.328
RNR36	.391 ±.005	.390
RNR42	.516 ±.005	.139
RNR43	.516 ±.005	.203
RNR44	.516 ±.005	.265
RNR45	.516 ±.005	.328
RNR52	.643 ±.006	.139
RNR53	.643 ±.006	.203
RNR54	.643 ±.006	.265
RNR55	.643 ±.006	.328
RNR62	.770 ±.006	.139
RNR63	.770 ±.006	.203
RNR64	.770 ±.006	.265
RNR73	.895 ±.006	.203
RNR83	1.020 ±.006	.203
RNR84	1.020 ±.006	.265
RNR86	1.020 ±.006	.390
RNR94	1.050 ±.006	.265
RNR104	1.275±.010	.270

RNS



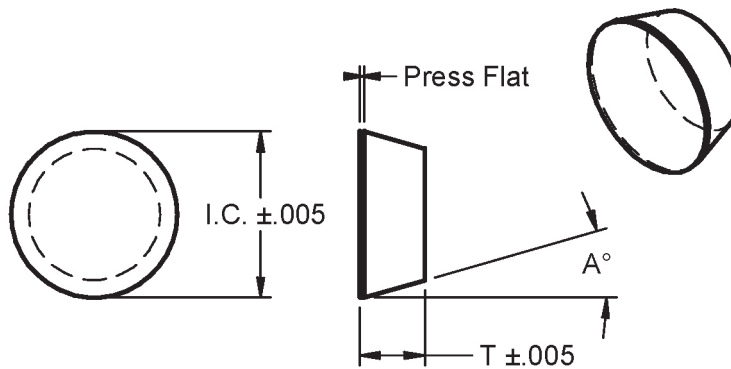
Insert	I.C.	T
RNS32	.375 ±.005	.140
RNS42	.500 ±.005	.140
RNS43	.500 ±.005	.203
RNS45	.500 ±.005	.327
RNS52	.625 ±.005	.140
RNS53	.625 ±.005	.203
RNS54	.625 ±.005	.265
RNS55	.625 ±.005	.327
RNS56	.625 ±.005	.390
RNS63	.750 ±.005	.203
RNS64	.750 ±.005	.265
RNS65	.750 ±.005	.327
RNS66	.750 ±.005	.390
RNS83	1.000 ±.005	.203
RNS84	1.000 ±.005	.265
RNS85	1.000 ±.005	.327
RNS86	1.000 ±.005	.390

RPR/RCR



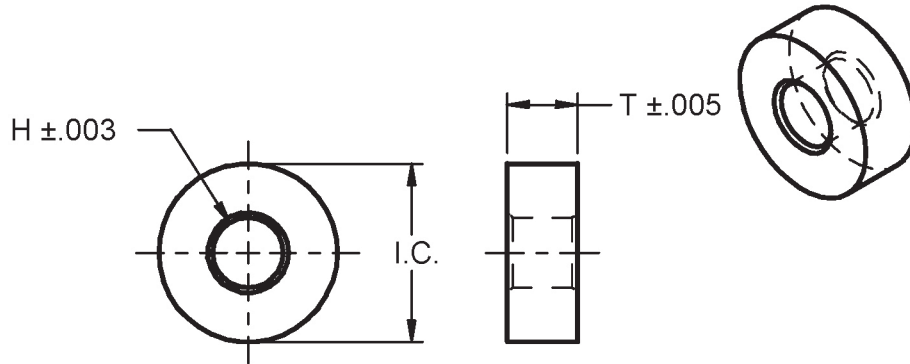
Insert	I.C.	T	A°
RPR42	.525	.146	11°
RPR53	.640	.203	11°
RPR63	.767	.203	10°
RPR83	1.019	.207	11°
RPR84	1.019	.265	11°
RCR43	.517	.205	8°

RDR/RER



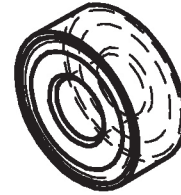
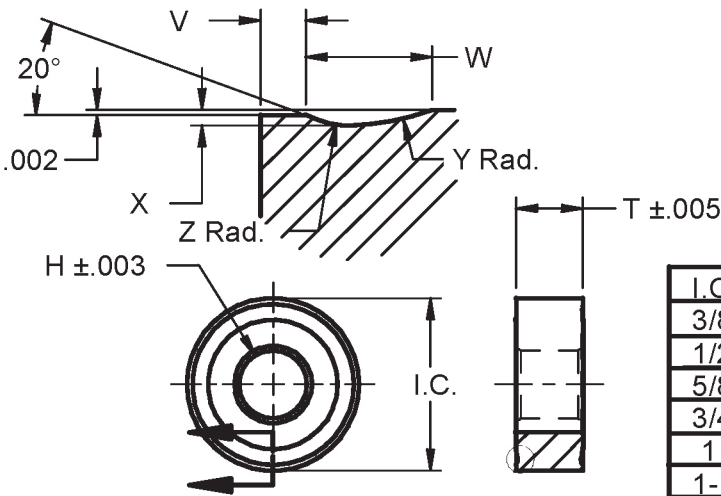
Insert	I.C.	T	A°
RDR84	1.015	.265	16°
RER63	.764	.208	20°

RNSA



Insert	I.C.	T	H
RNSA32	.375 ±.002	.139	.150
RNSA33	.375 ±.002	.203	.150
RNSA42	.500 ±.003	.139	.203
RNSA43	.500 ±.003	.203	.203
RNSA44	.500 ±.003	.265	.203
RNSA53	.625 ±.003	.203	.253
RNSA54	.625 ±.003	.265	.253
RNSA63	.750 ±.003	.203	.313
RNSA64	.750 ±.003	.265	.313
RNSA83	1.000 ±.004	.203	.362
RNSA84	1.000 ±.004	.265	.362
RNSA85	1.000 ±.004	.330	.362
RNSA86	1.000 ±.004	.393	.362
RNSA106	1.250 ±.005	.393	.503

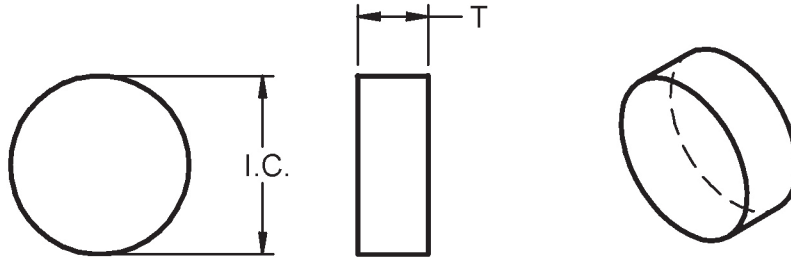
RNMG



I.C.	V	W	X	Y	Z
3/8	.007	.042	.007	.040	.030
1/2	.010	.047	.007	.100	.030
5/8	.010	.055	.007	.100	.030
3/4	.018	.055	.007	.100	.030
1	.018	.055	.007	.100	.050
1-1/4	.028	.065	.008	.125	.050

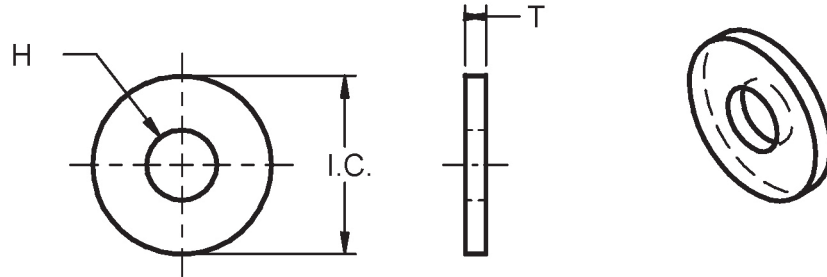
Insert	I.C.	T	H
RNMG32	.375 ±.003	.125	.150
RNMG33	.375 ±.003	.188	.150
RNMG43	.500 ±.003	.188	.203
RNMG44	.500 ±.003	.250	.203
RNMG53	.625 ±.003	.188	.253
RNMG54	.625 ±.003	.250	.253
RNMG63	.750 ±.003	.188	.313
RNMG64	.750 ±.003	.250	.313
RNMG84	.750 ±.003	.250	.362
RNMG86	1.000 ±.004	.375	.362
RNMG106	1.250 ±.004	.375	.503

DS-P



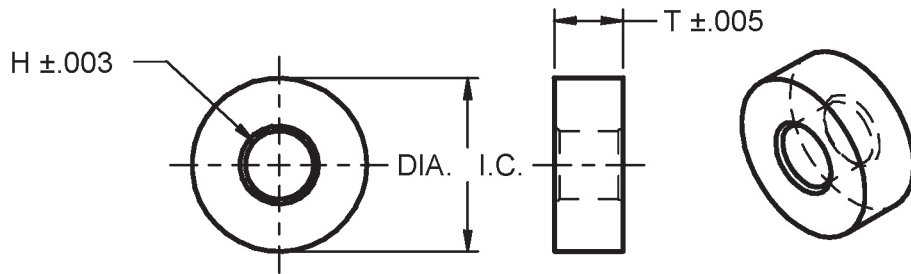
Insert	I.C.	T
DS-P42	.125/.140	.063/.078
DS-P62	.188/.203	.063/.078
DS-P83	.250/.265	.094/.109
DS-P103	.312/.327	.094/.109
DS-P124	.375/.390	.125/.140
DS-P164	.500/.520	.125/.140
DS-P204	.625/.645	.125/.140
DS-P245	.750/.770	.156/.171
DS-P285	.875/.895	.156/.171
DS-P326	1.000/1.020	.188/.203

DS-H



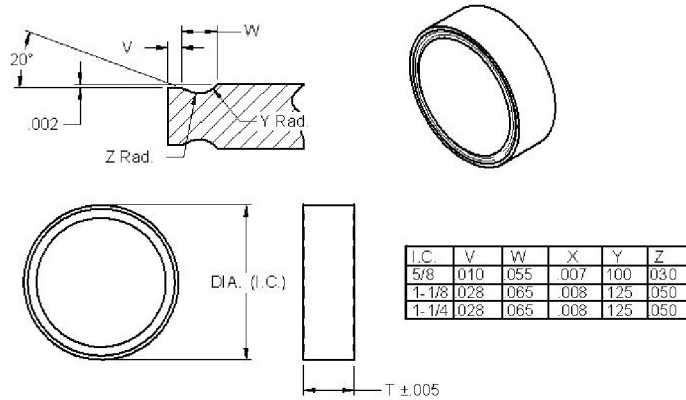
Insert	I.C.	T	H
DS-H124	.375/.390	.040/.055	.105/.120
DS-H146	.438/.450	.040/.055	.168/.183
DS-H166	.500/.520	.040/.055	.168/.183
DS-H186	.563/.583	.040/.055	.168/.183
DS-H208	.625/.645	.060/.075	.230/.245
DS-H248	.750/.770	.060/.075	.230/.245
DS-H2810	.875/.895	.060/.075	.293/.308
DS-H4010	1.270 ±.020	.060/.075	.293/.308
DS-H329	1.010 ±.020	.266/.280	.265/.271

RNRA



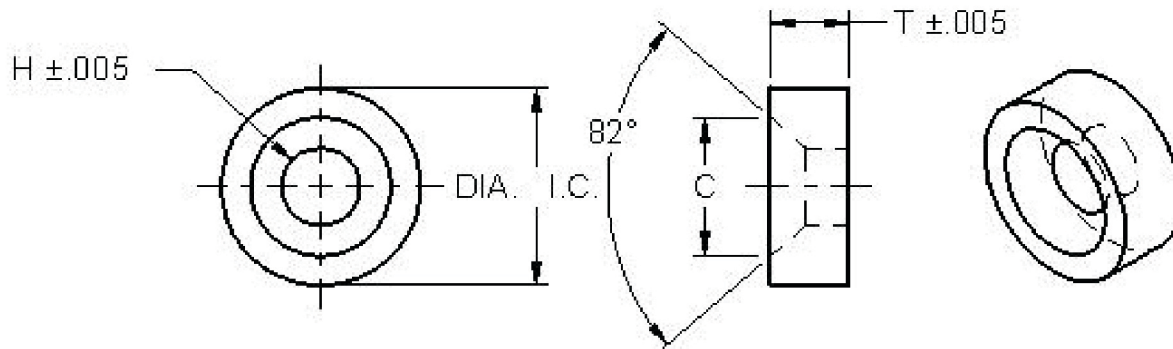
Insert	DIA	T	H
RNRA32	.397 ±.007	.143	.150
RNRA33	.397 ±.007	.203	.150
RNRA54	.640 ±.007	.268	.253
RNRA56	.640 ±.007	.393	.253
RNRA84	1.025 ±.010	.268	.362
RNRA85	1.025 ±.010	.330	.362
RNRA86	1.025 ±.010	.393	.362

RNSF



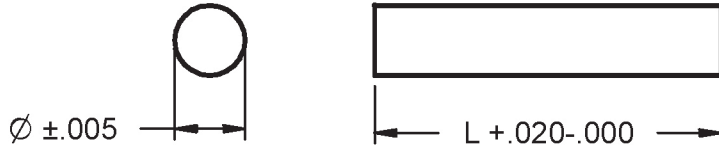
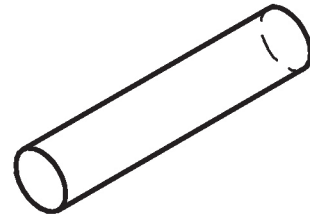
Insert	DIA	T
RNSF55	.625 ±.003	.313
RNSF96	1.125 ±.004	.375

RD-P



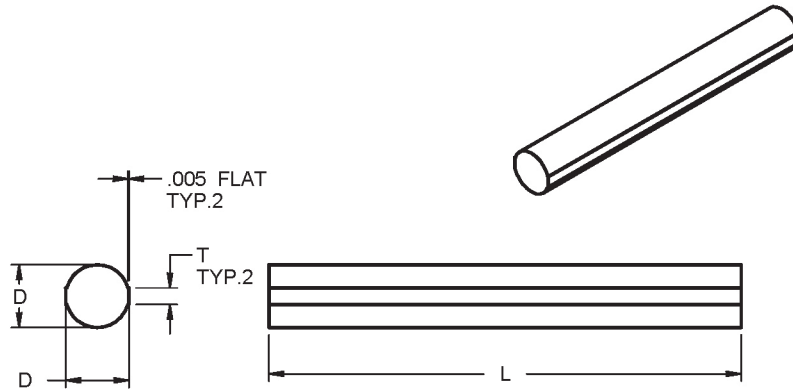
Insert	DIA	T	H	C
RD8P	.516 ±.005	.140	.125	.260
RD10P	.640 ±.005	.140	.203	.364
RD12P	.768 ±.005	.203	.203	.416
RD16P	1.020 ±.005	.265	.263	.536

SR



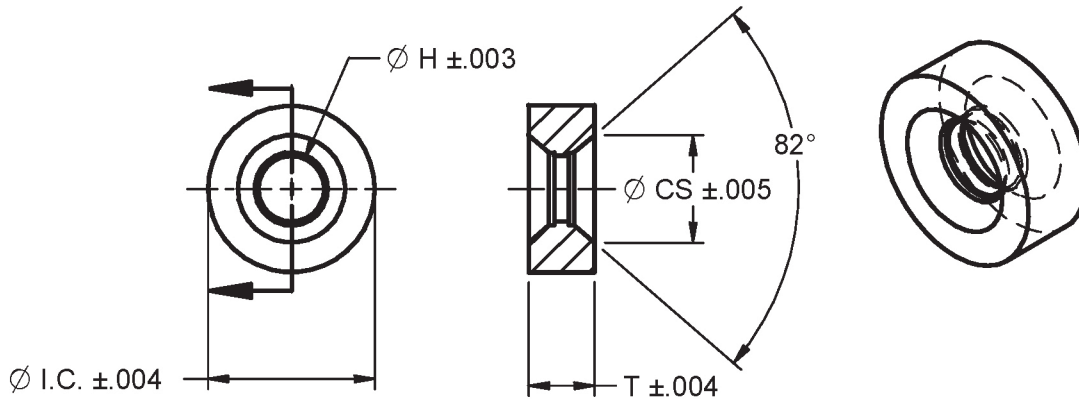
Insert	\varnothing	L	\varnothing	L
SR33	.100	.375	3/32	3/8
SR34	.100	.500	3/32	1/2
SR44	.137	.500	1/8	1/2
SR46	.137	.750	1/8	3/4
SR48	.137	1.000	1/8	1"
SR55	.168	.625	5/32	5/8
SR64	.201	.500	3/16	1/2
SR66	.201	.750	3/16	3/4

ROUND RODS WITH BELLY BAND



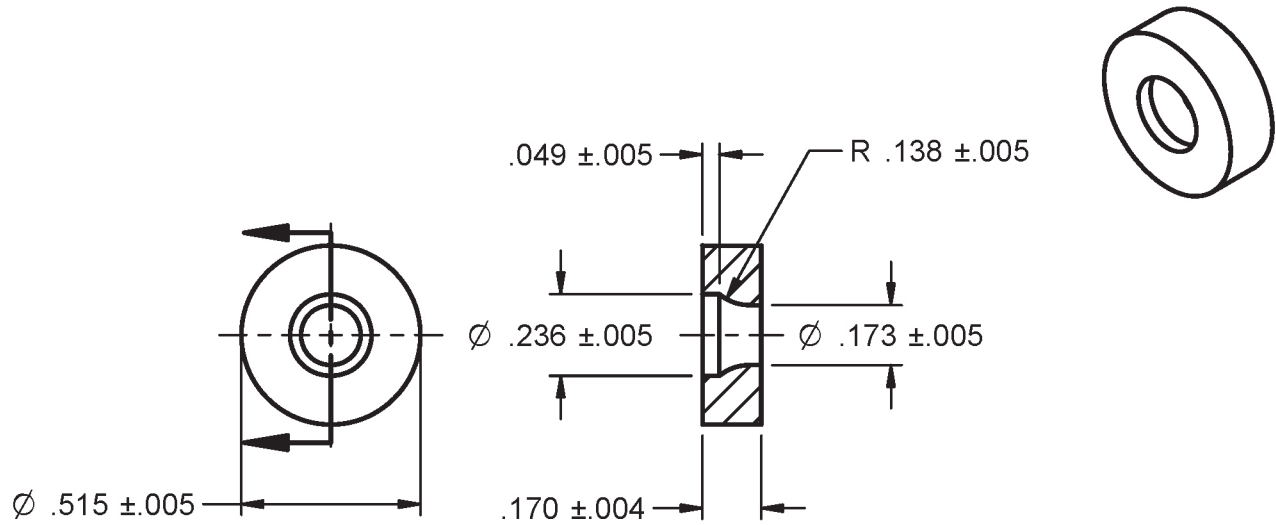
Insert	D	L	T
1/8DIA X 1-15/32LG	.136	1.496	.045
1/8DIA X 1-1/2LG	.147	1.515	.049
5/32DIA X 1-1/2LG	.179	1.523	.054
1/4DIA X 2.000LG	.270	2.015	.070

RNRC

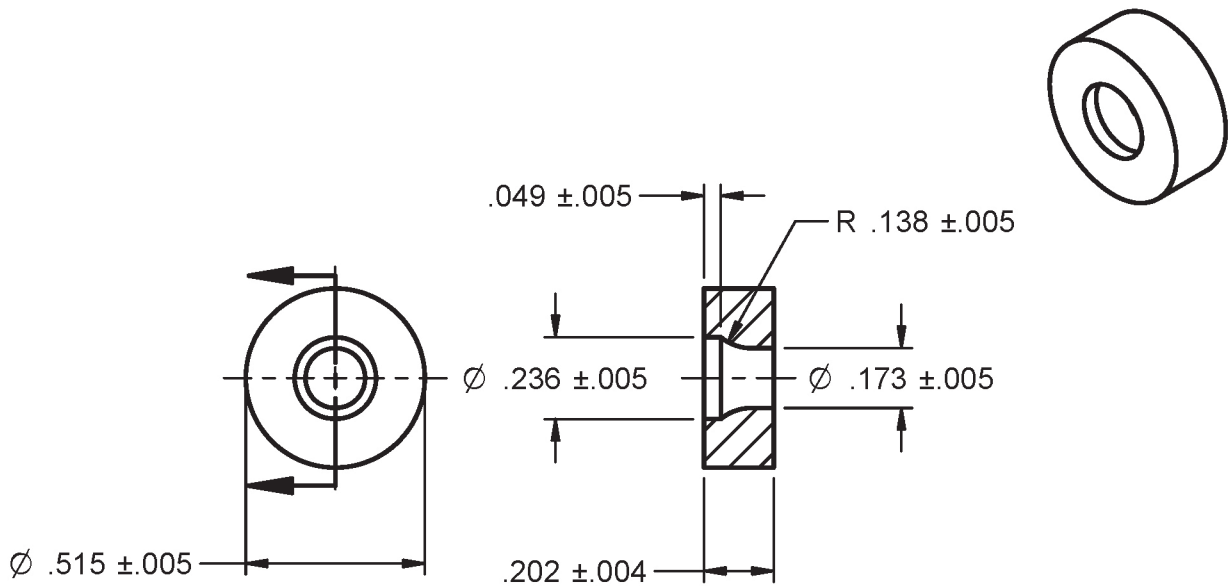


Insert	Ø I.C.	T	Ø H	Ø CS
RNRC43	.515	.203	.203	.332
RNRC44	.515	.265	.203	.332

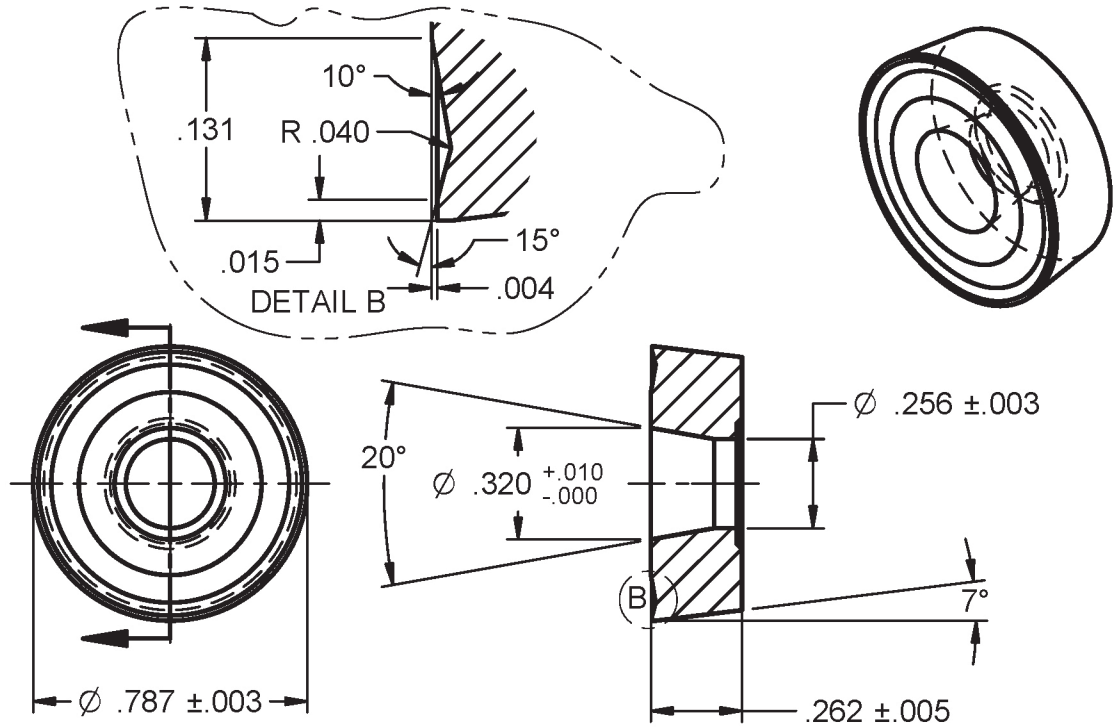
RNRW42.5-M3.5



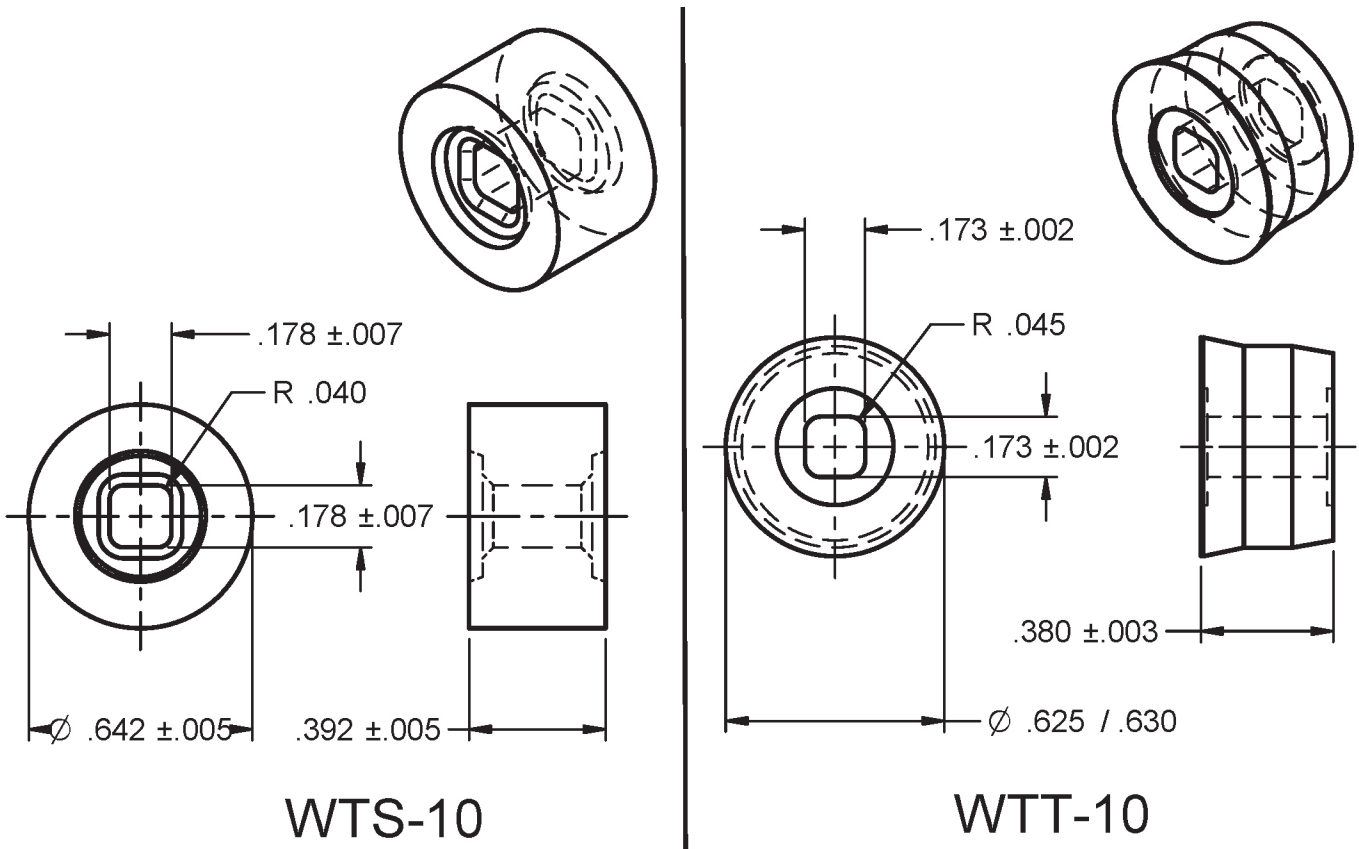
RNRW43-M3.5



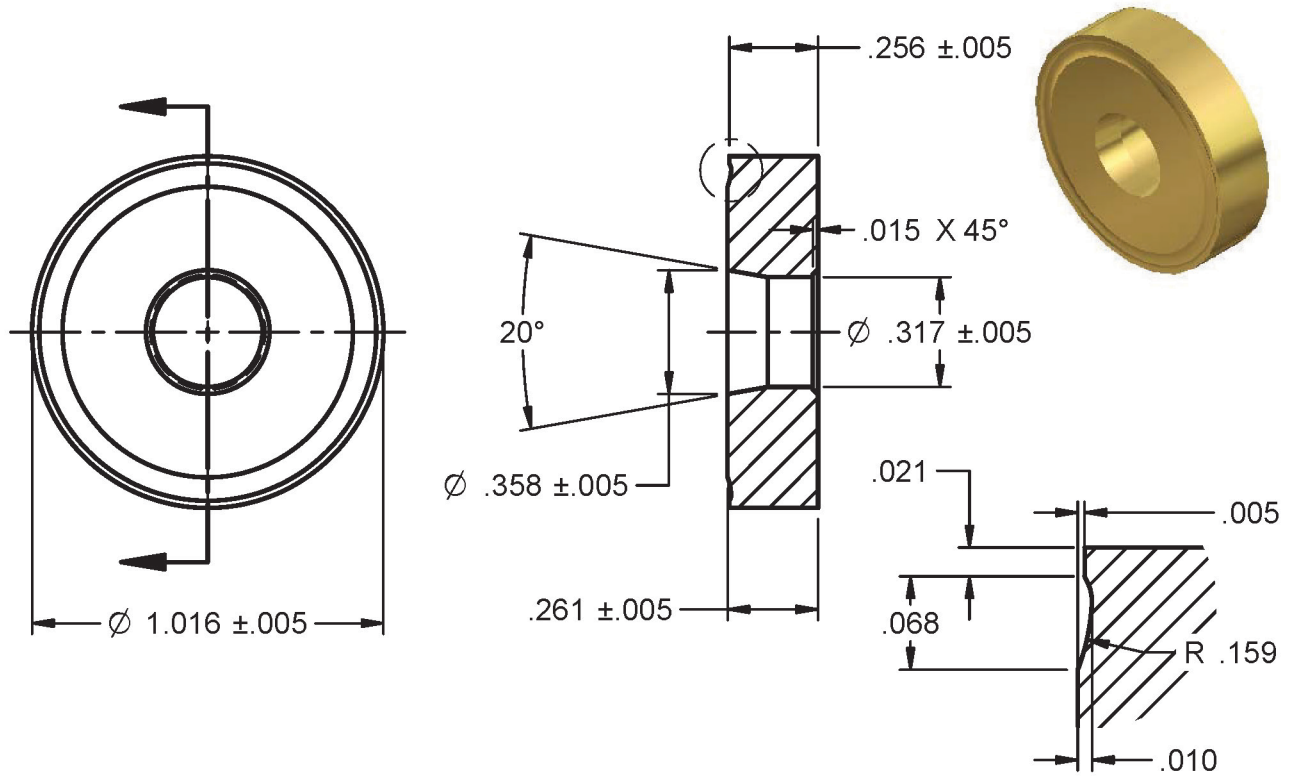
RCMX2006MO (A-2023-A)



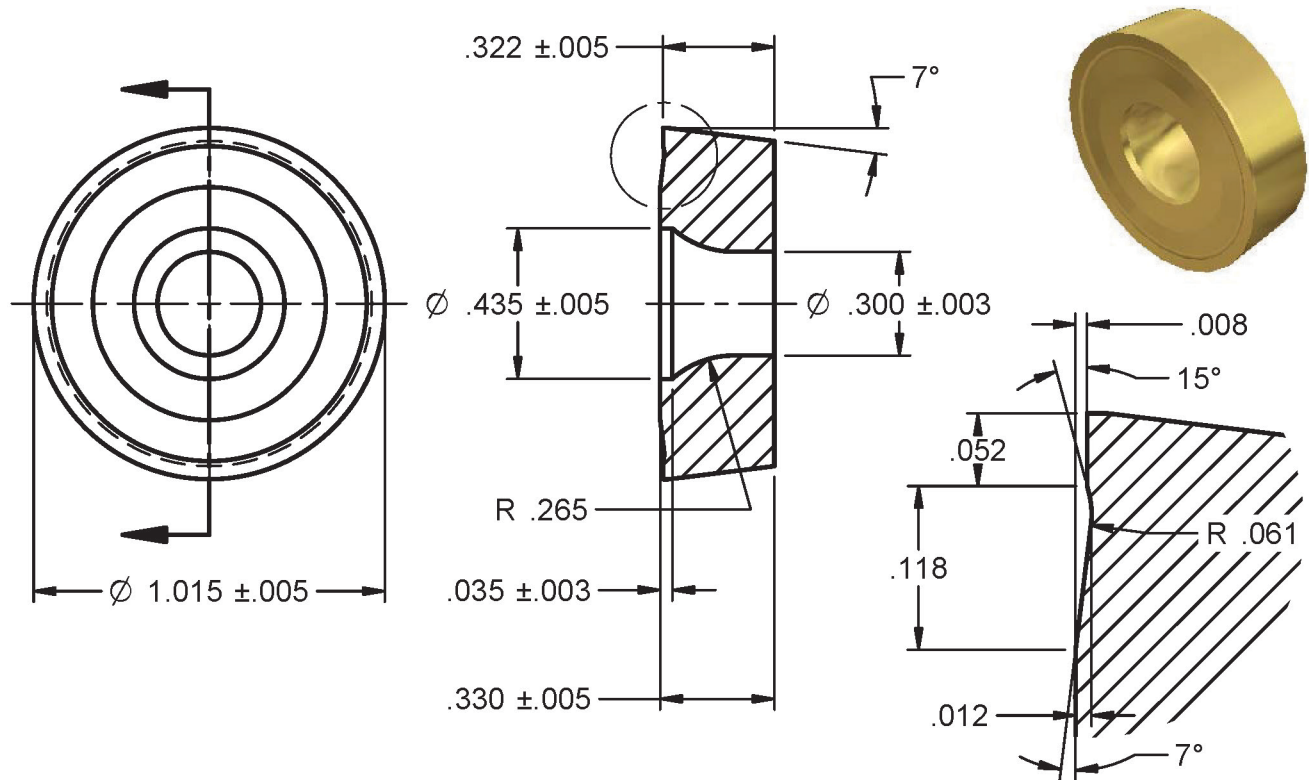
WTS-10/WTT-10



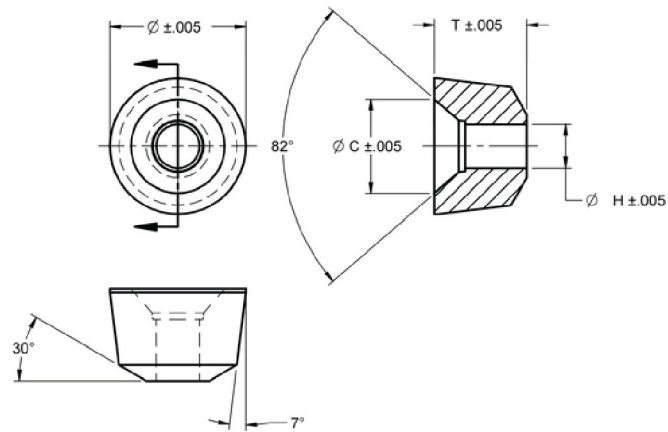
RCMM84, MA70111 (D-16433-P5)



RRT85 (D-07640-P1)

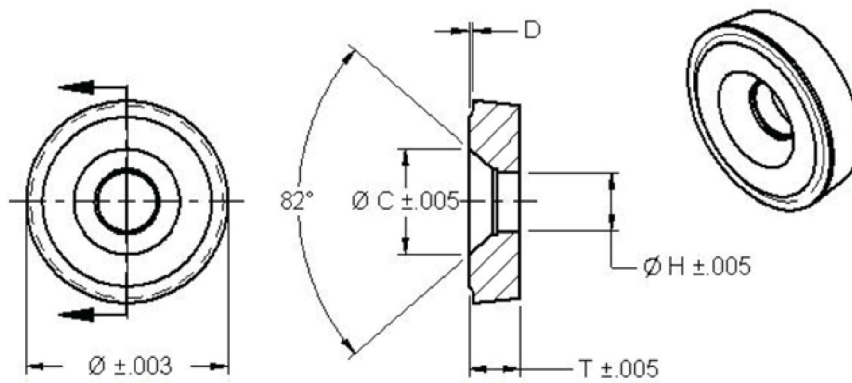


RD-C



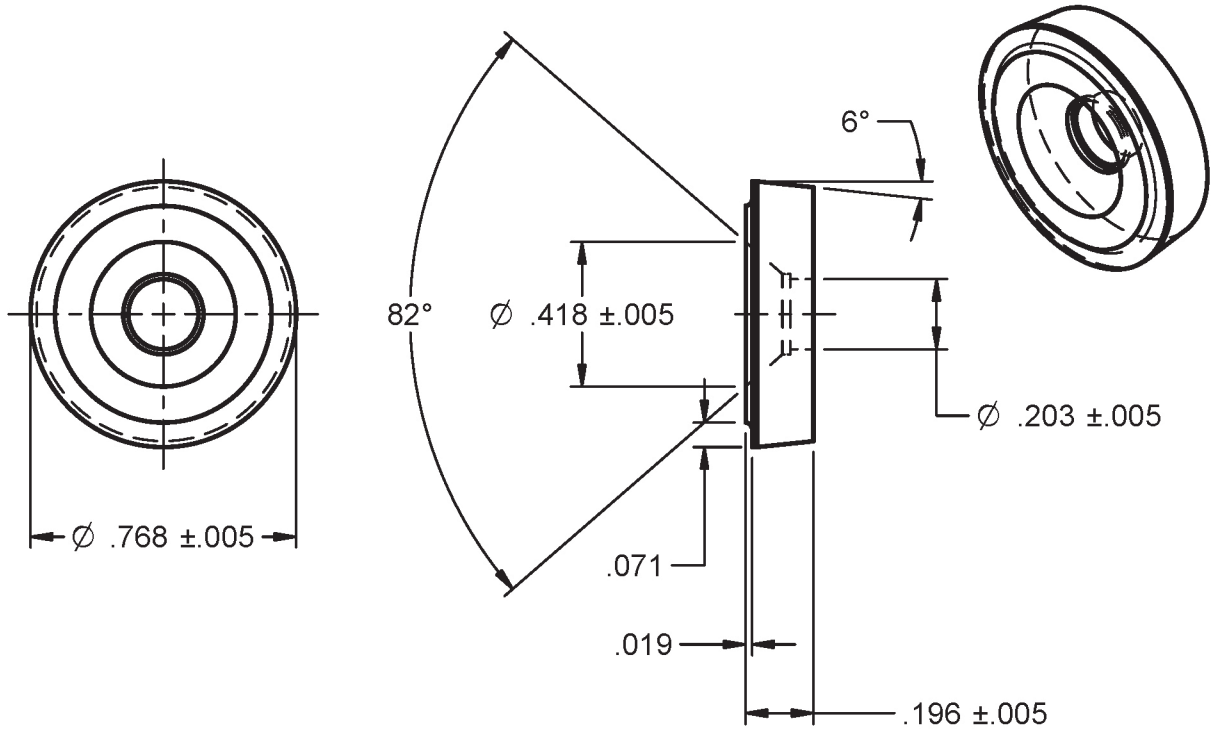
Insert	Ø	T	H	C
RD-6C	.395	.268	.125	.273
RD-8C	.520	.288	.177	.353

RBRH

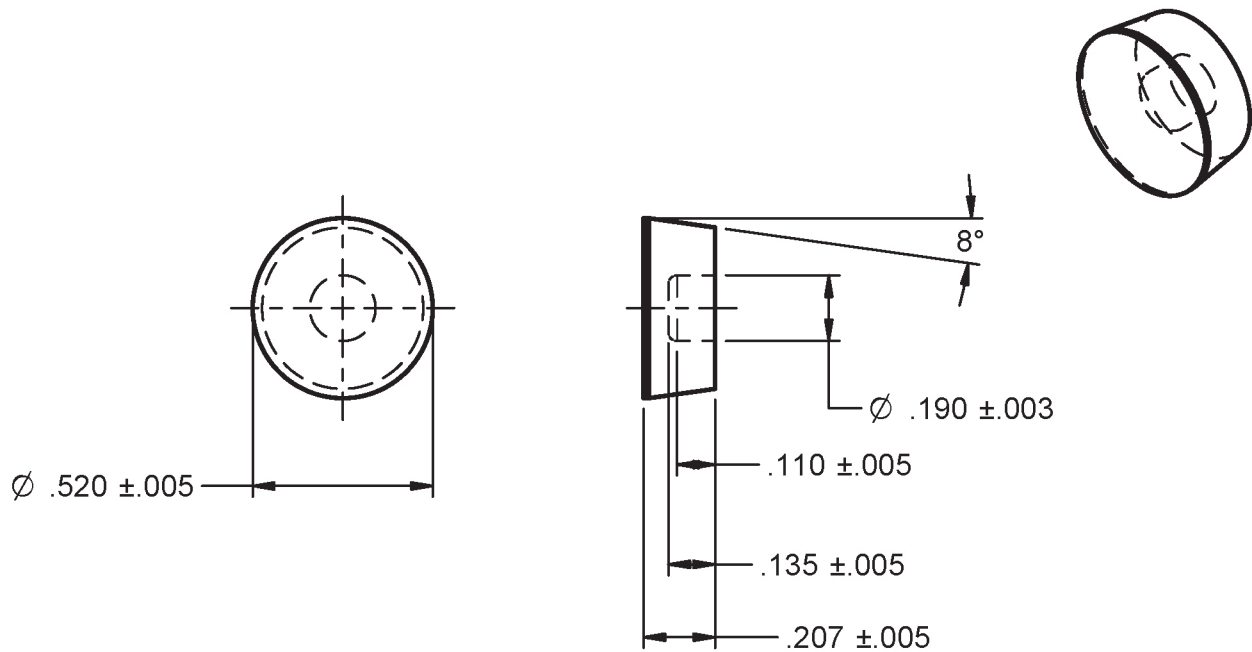


Insert	Ø	T	H	C	D
RBRH52	.628	.146	.180	.344	.013
RBRH63	.753	.211	.219	.391	.015
RBRH84	1.003	.275	.281	.507	.016

RCRH63

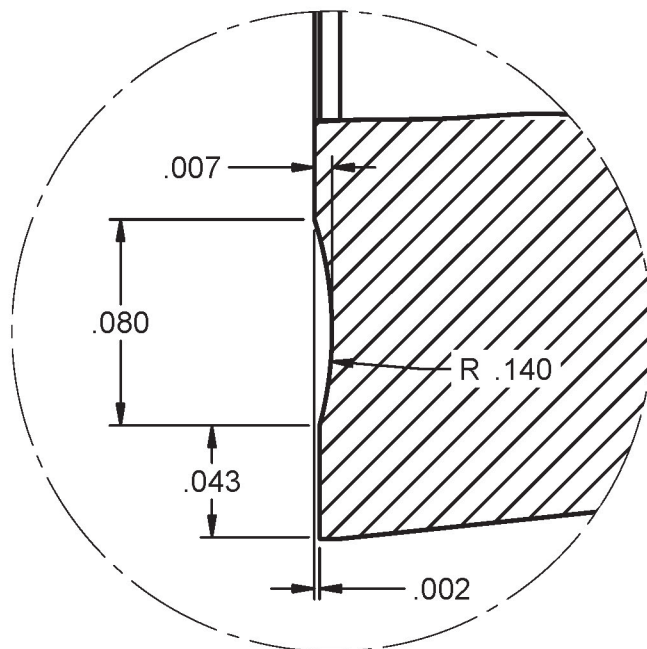
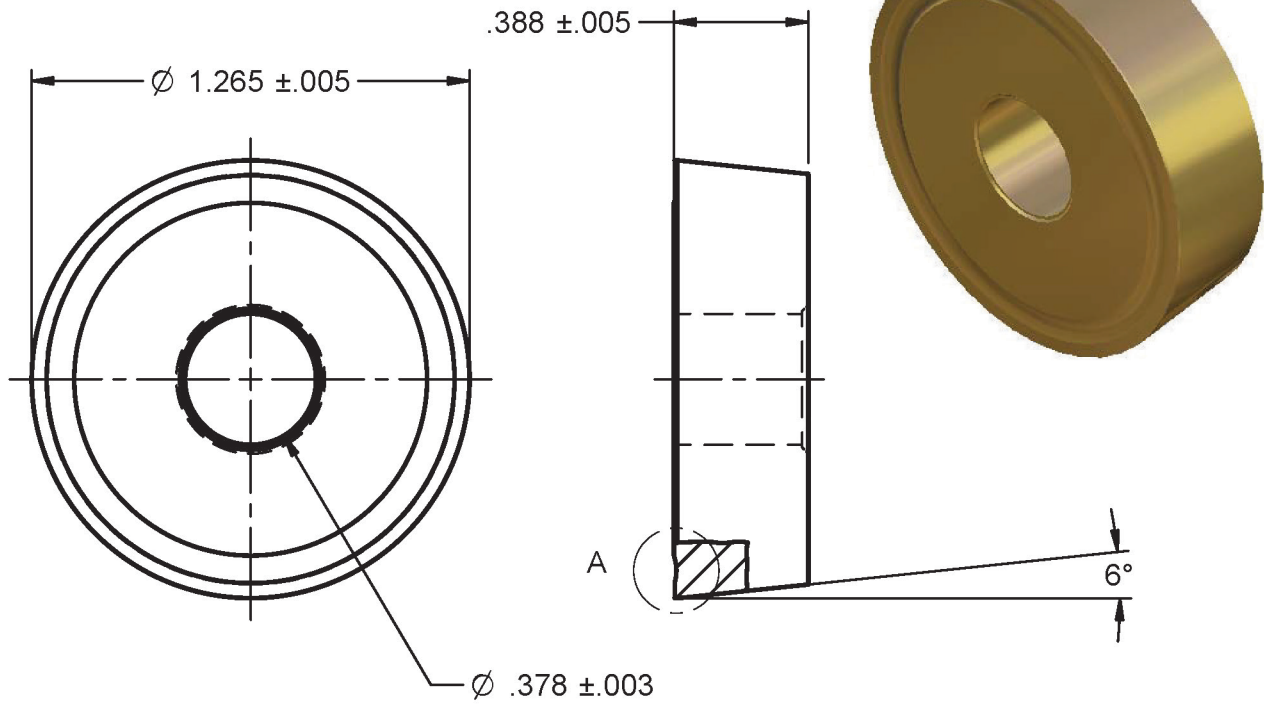


MA-70332



A-1922-A (RCRM106)

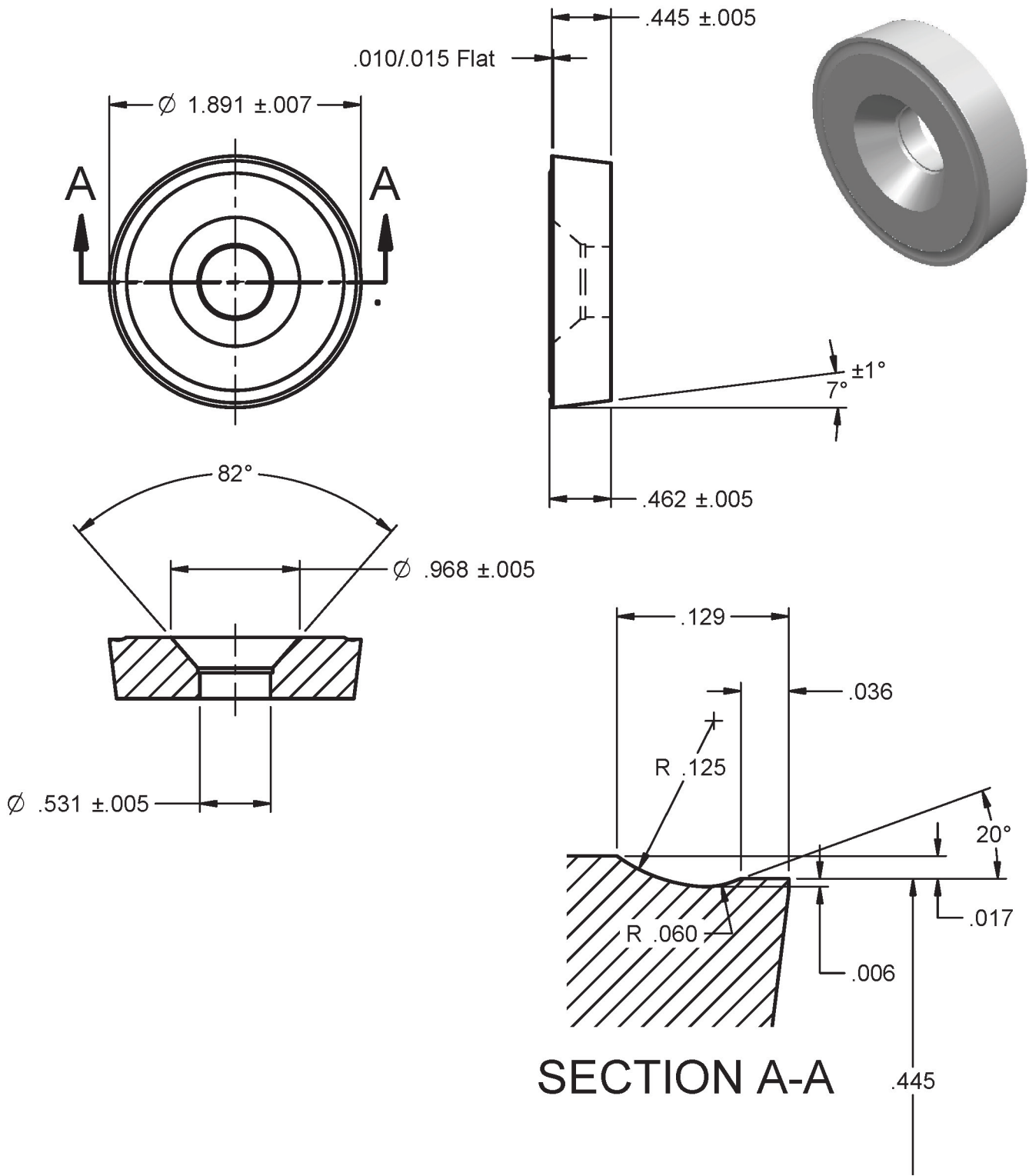
Note: Grind Stock on O.D. and Bottom Only.



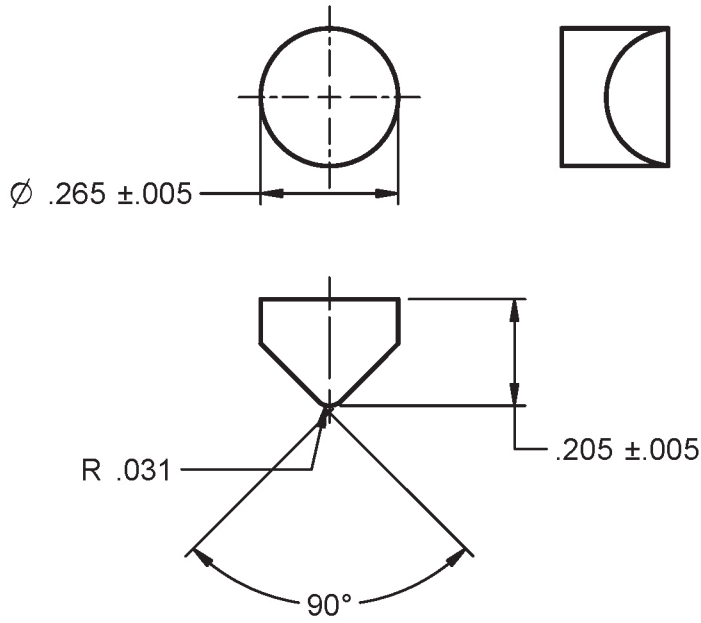
DETAIL A

MA-71871 (RCRH157)

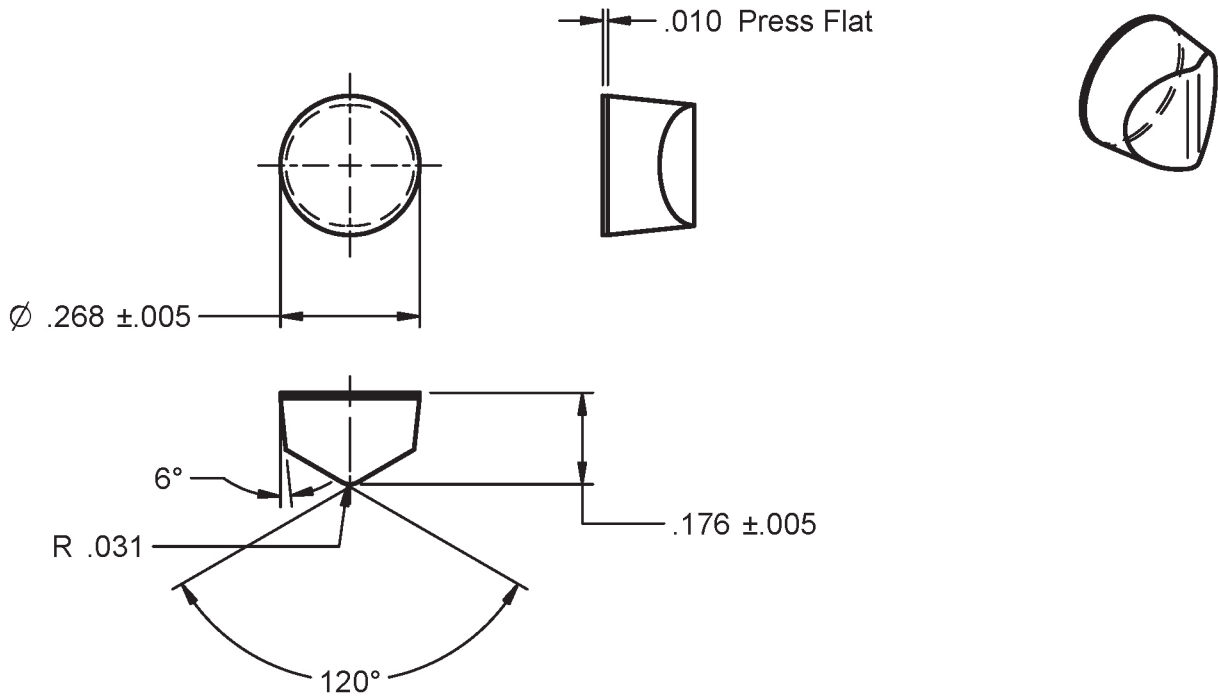
Note: Grind Stock on O.D. and Bottom Only.



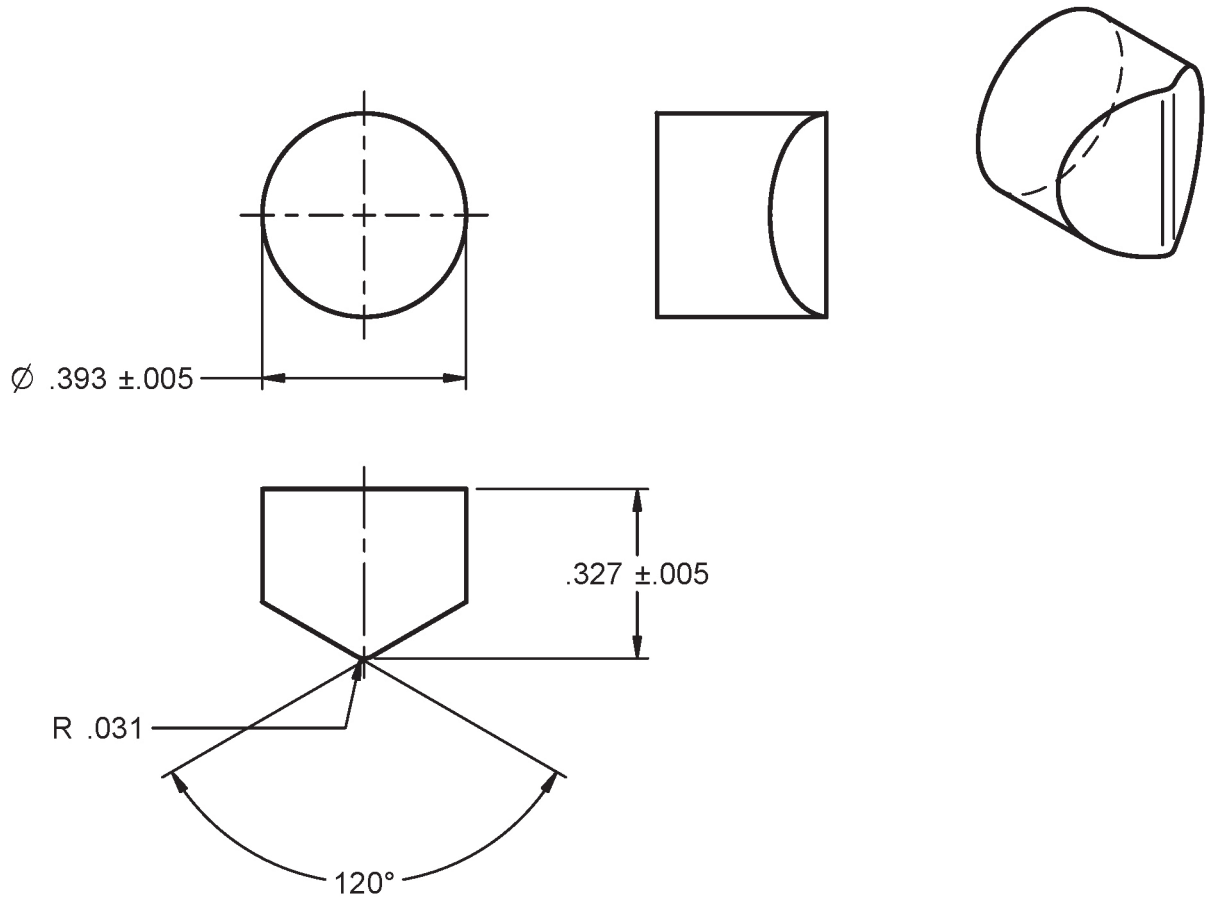
LX-0645-2 (RNRX2-90)



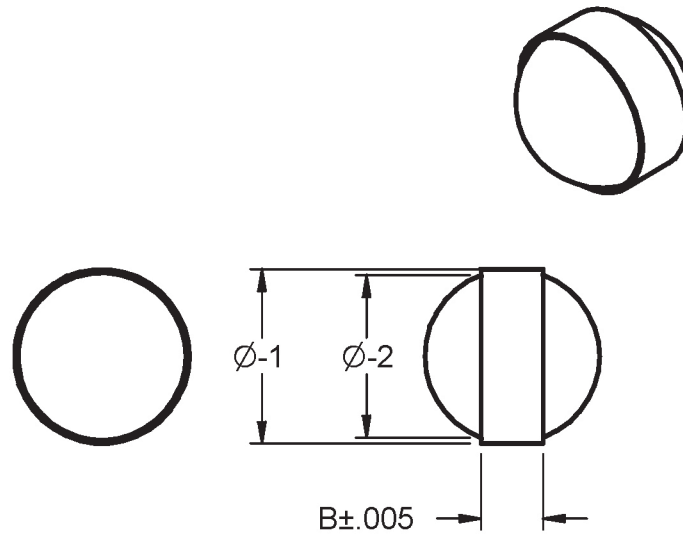
RCRX2-120°



LX-0645-1 (RNRX3-120°)

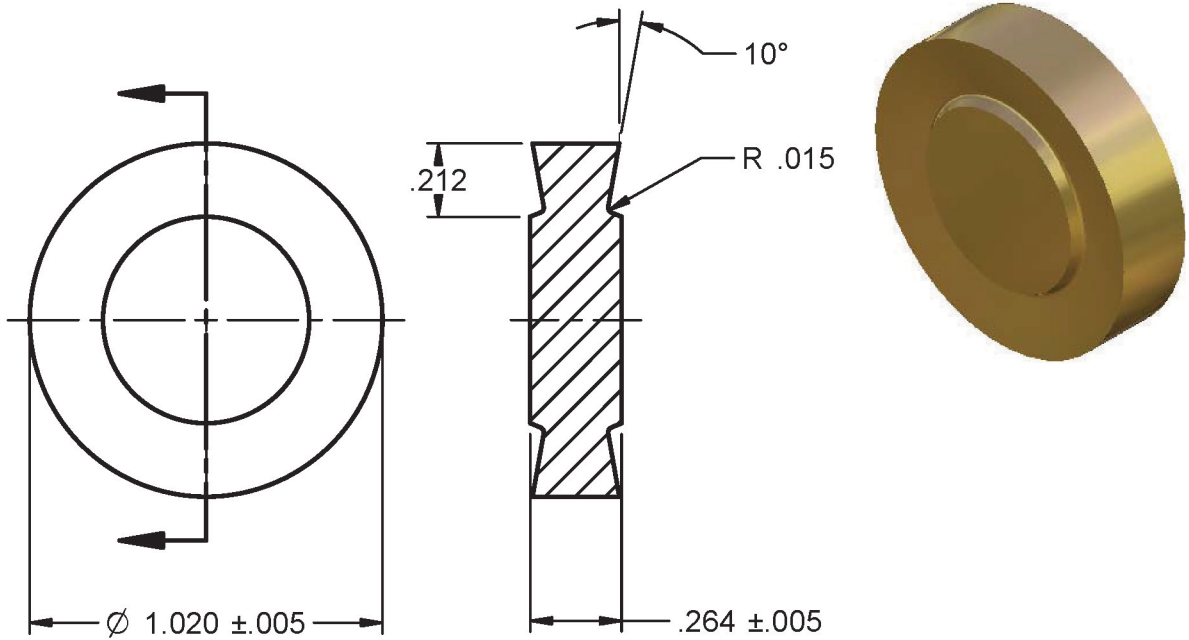


SPHERE

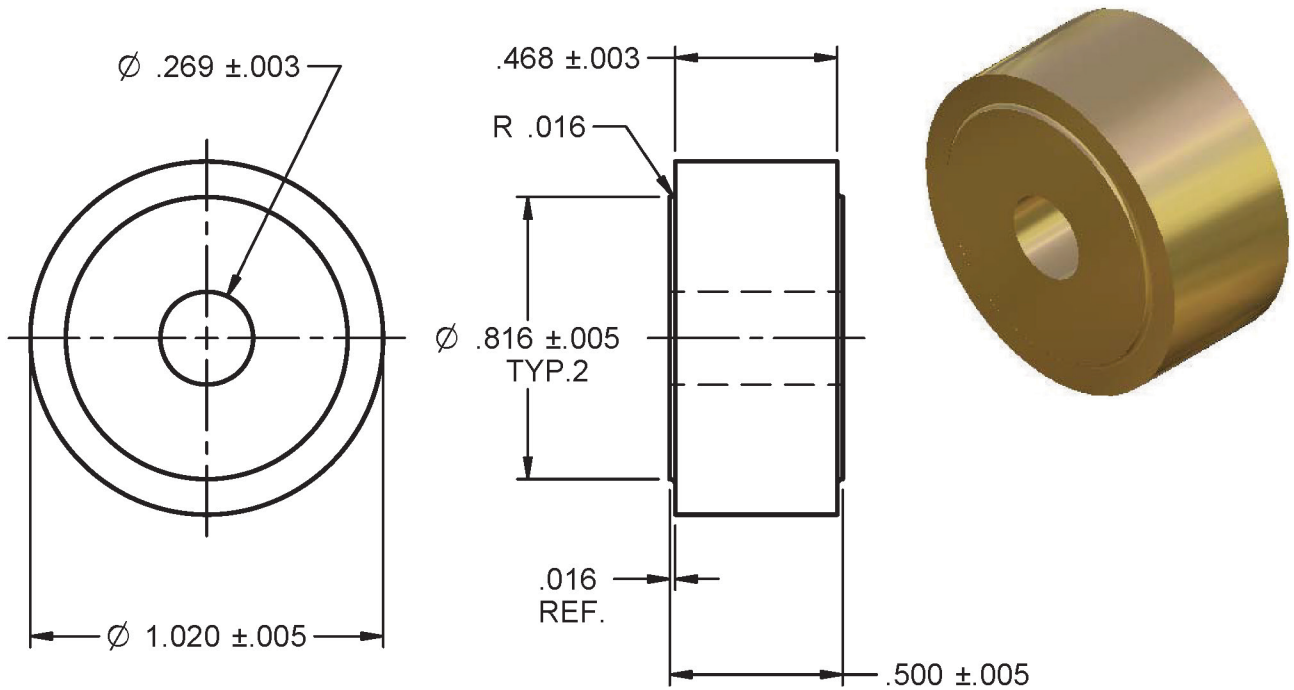


Insert	Ø-1 inch	Ø-1 mm	Ø-2 inch	Ø-2 mm	B inch	B mm
1/8 Ø Ball	.145 ±.007	3.68	.137	3.48	.048	1.22
5/32 Ø Ball	.176 ±.007	4.47	.166	4.22	.059	1.50
3/16 Ø Ball	.208 ±.007	5.28	.196	4.98	.069	1.75
1/4 Ø Ball	.270 ±.007	6.86	.255	6.48	.090	2.28
5/16 Ø Ball	.344 ±.007	8.74	.324	8.23	.115	2.92
3/8 Ø Ball	.375 ±.007	9.53	.354	8.99	.125	3.18
13/32 Ø Ball	.425 ±.007	10.80	.401	10.19	.142	3.61
7/16 Ø Ball	.437 ±.007	11.10	.412	10.46	.146	3.71
15/32 Ø Ball	.469 ±.010	11.91	.442	11.23	.156	3.96
1/2 Ø Ball	.531 ±.010	13.49	.510	12.73	.177	4.50
21/32 Ø Ball	.718 ±.010	18.24	.677	17.19	.239	6.07
3/4 Ø Ball	.781 ±.010	19.84	.736	18.69	.260	6.60

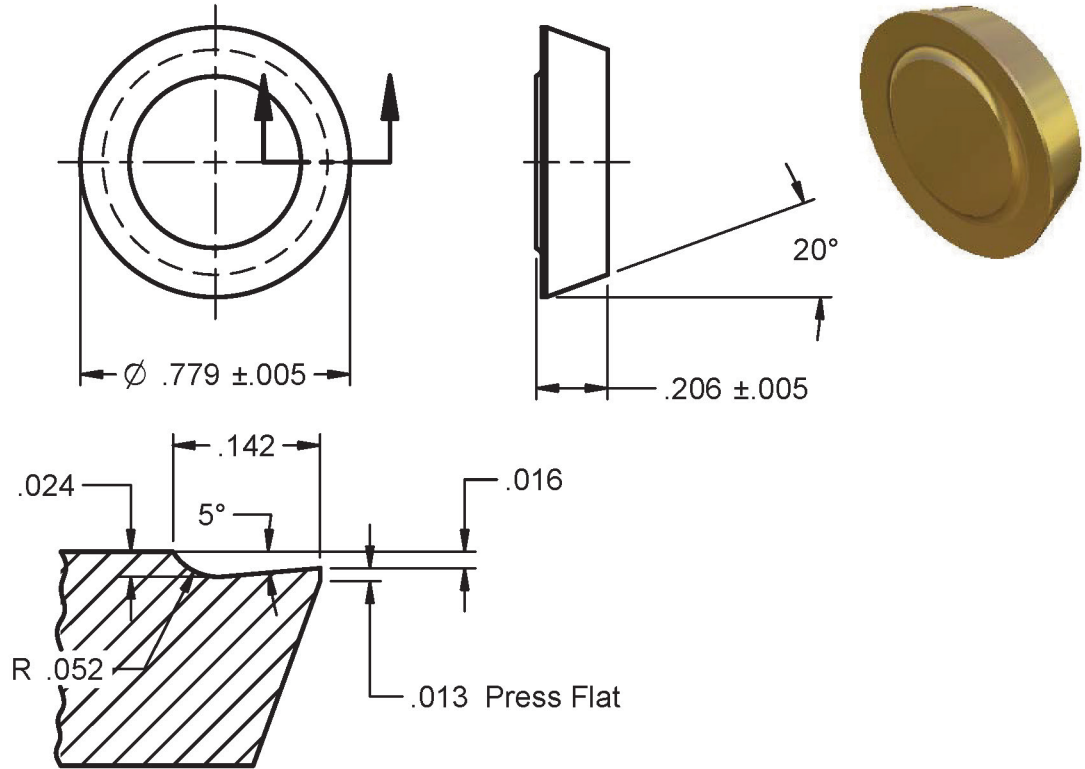
A-0098-B



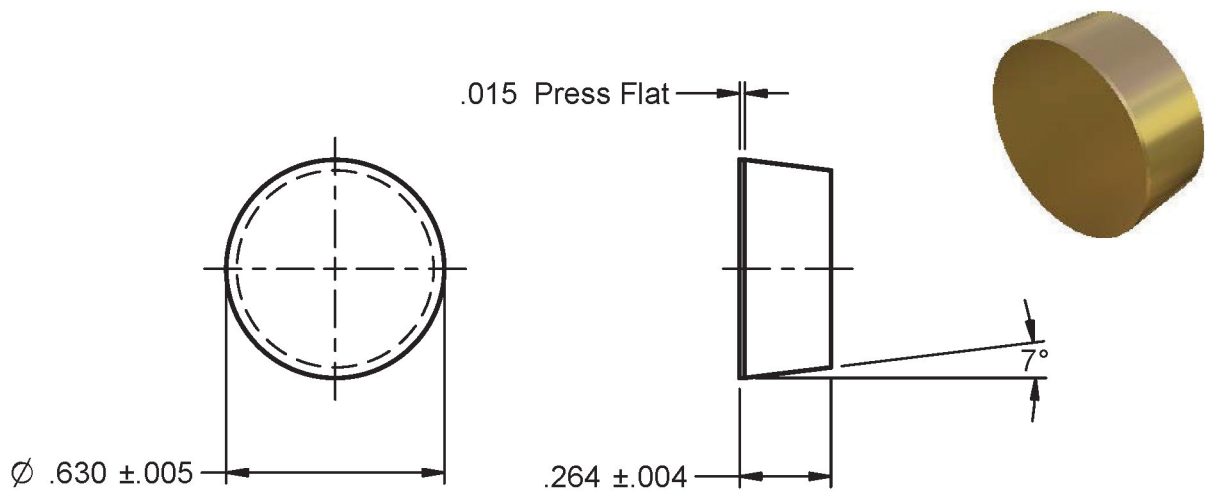
A-0844-D



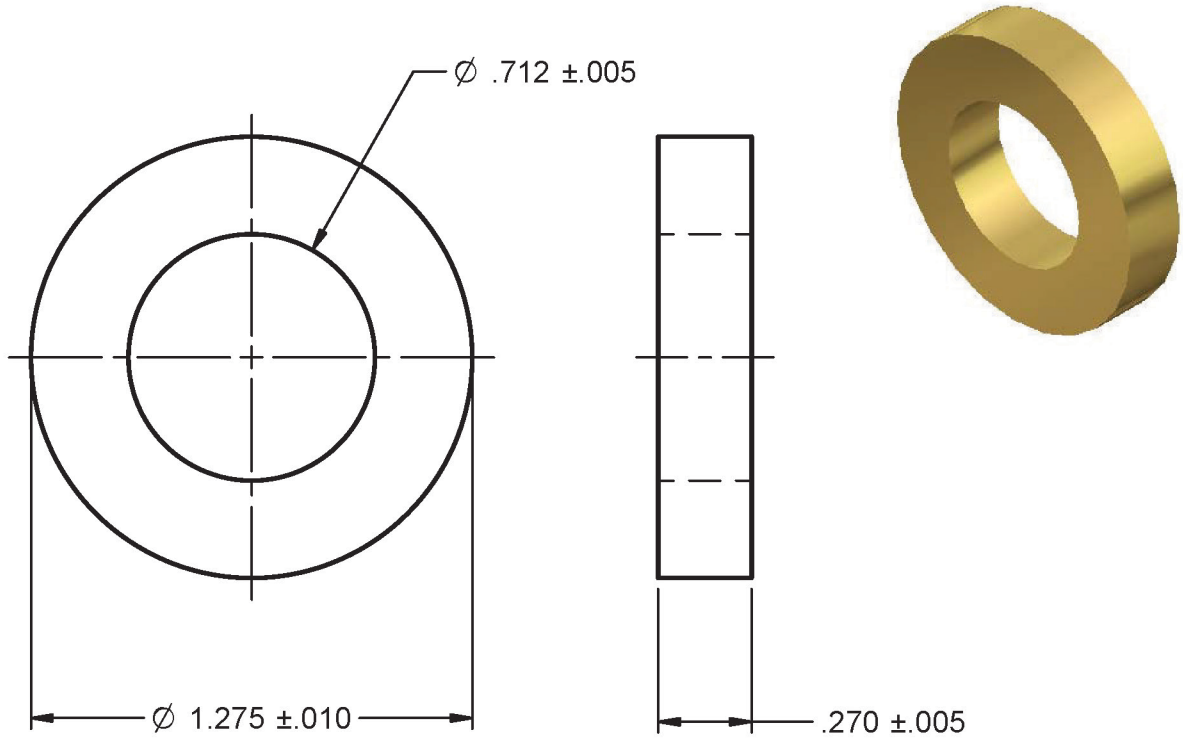
A-2074-A



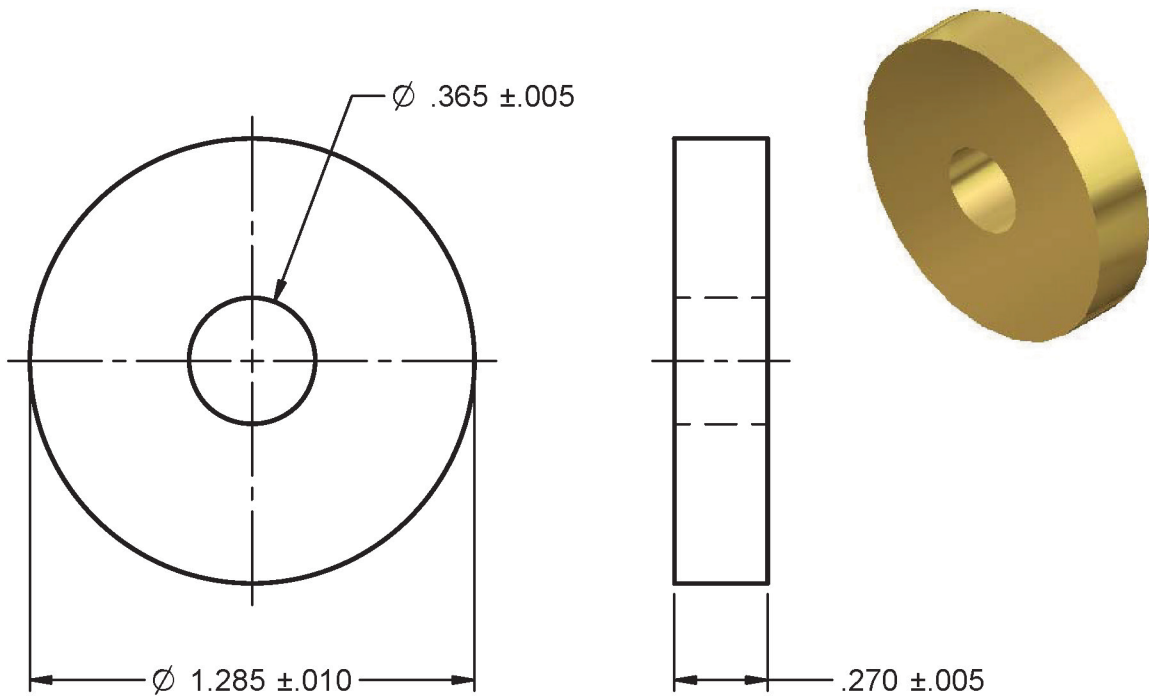
R-15744E-36 (RCR-STYLE)



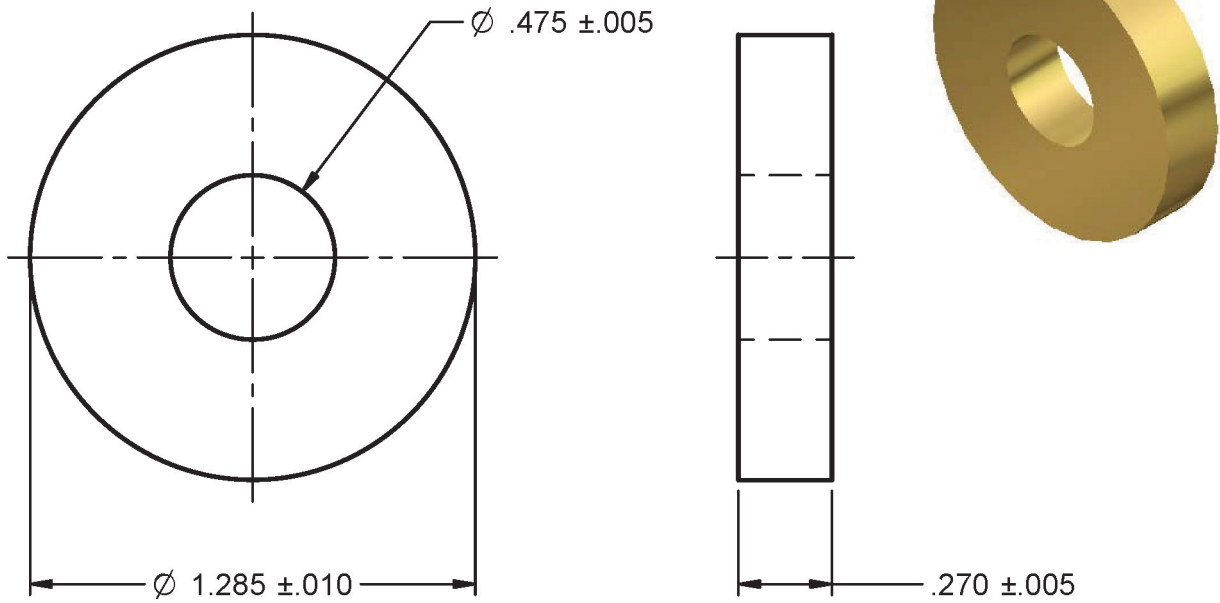
RNRA104.712HOLE



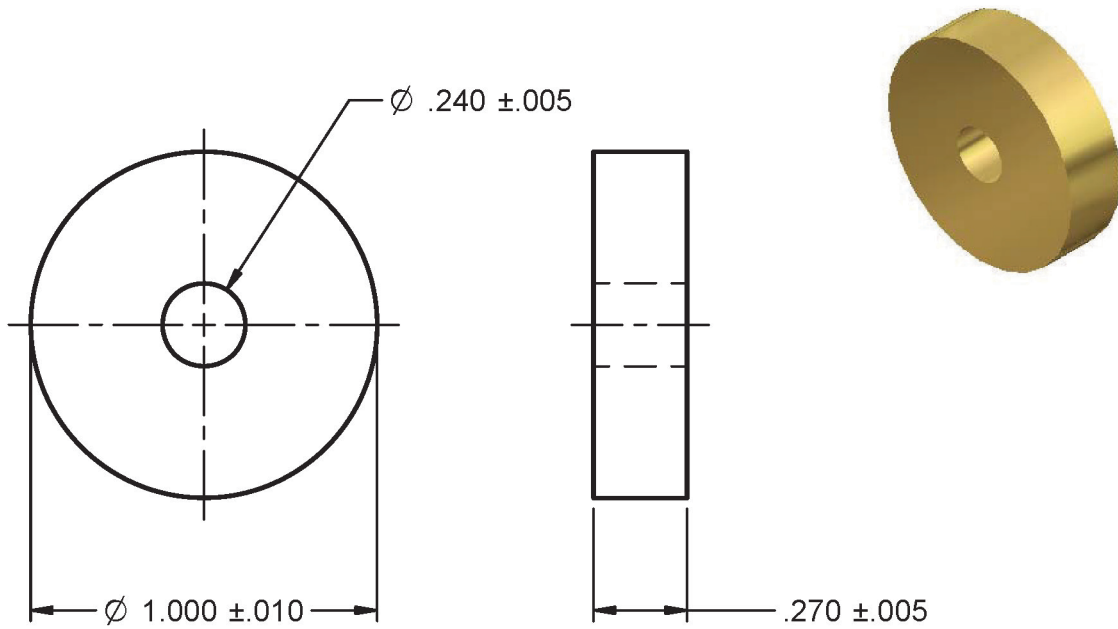
RNRA104.365HOLE



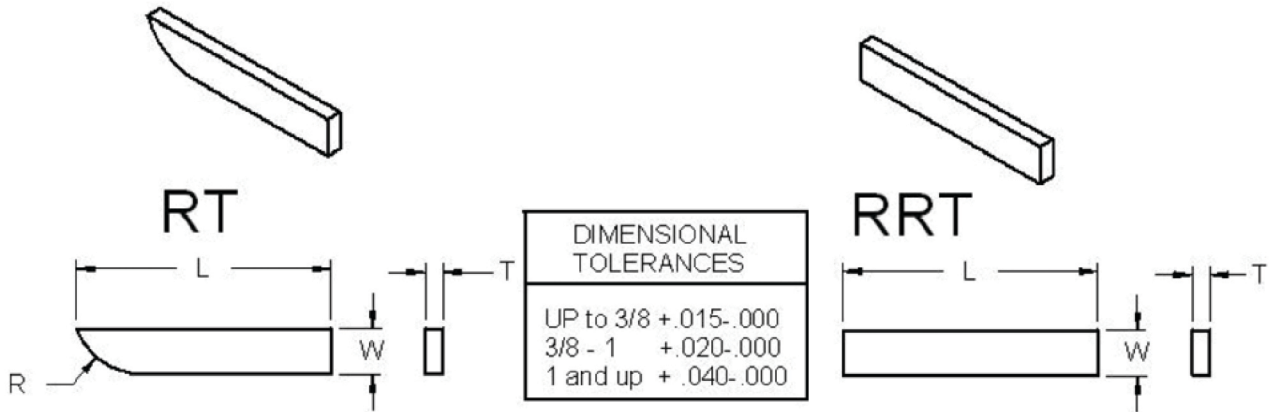
RNRA104.475HOLE



RNSA84.240HOLE

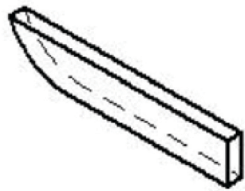


RT & RRT

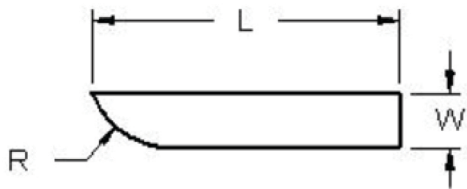


Insert	T	W	L	R
RT0	.026	3/64	1/2	1/4
RT1 - RRT1	1/32	1/16	1/2	1/4
RT2 - RRT2	3/64	3/32	1/2	1/4
RT3- RRT3	3/64	3/32	5/8	1/4
RT4- RRT4	1/16	1/8	3/4	1/4
RT5- RRT5	5/64	5/32	7/8	1/4
RT6- RRT6	3/32	3/16	7/8	5/16
RT7- RRT7	1/16	13/64	3/4	5/16
RT8- RRT8	1/16	17/64	3/4	3/8
RT9- RRT9	1/16	5/16	3/4	3/8
RT10- RRT10	1/16	3/8	3/4	3/8
RT11- RRT11	3/64	3/32	7/8	1/4
RT12 - RRT12	1/16	1/8	1	1/4
RT18 - RRT18	3/32	3/16	1-1/4	5/16
RT20- RRT20	1/8	1/4	1-1/4	3/8
RT21- RRT21	1/8	1/4	1-1/2	3/8
RT22 - RRT22	3/64	3/32	1	1/4
RRT30	1/32	1/16	1	1/4
RRT40	1/32	1/16	1-1/2	1/4
RRT50	1/16	1/8	1-1/2	3/8

RT & RRT (NON-STANDARD STYLE 200 RT)



DIMENSIONAL TOLERANCES	
UP to 3/8	+ .015 - .000
3/8 - 1	+ .020 - .000
1 and up	+ .040 - .000



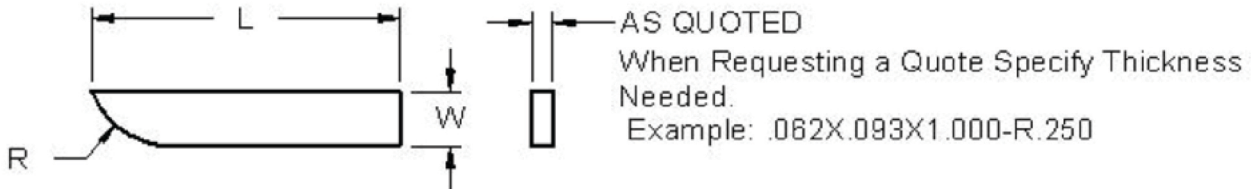
AS QUOTED
When Requesting a Quote Specify Thickness Needed.
Example: .062X.093X1.000-R.250

Insert	W	L	R	W (mm)	L(mm)	R(mm)
.234X.375-R.234	.236	.394	.236	6	10	6
.265X.453-R.265	.276	.472	.276	7	12	7
.375X.390-R.125	.375	.490	.125	9.52	12.45	3.18
.312X.500-R.312	.315	.500	.315	8	12.7	8
.375X.578-R.375	.375	.578	.375	9.52	14.68	9.52
.125X.750-R.125	.125	.750	.125	3.18	19.05	3.18
.188X.750-R.188	.188	.750	.188	4.76	19.05	4.76
.218X.750-R.500	.218	.750	.500	5.56	19.05	12.7
.250X.750-R.250	.250	.750	.250	6.35	19.05	6.35
.375X.750-R.500	.375	.750	.500	9.52	19.05	12.7
.438X.750-R.500	.438	.750	.500	11.11	19.05	12.7
.500X.750-R.438	.500	.750	.438	12.7	19.05	11.11
.156X.766-R.156	.156	.766	.156	3.97	19.46	3.97
.125X.766-R.118	.125	.766	.118	3.18	19.46	3
.156X.781-R.156	.156	.781	.156	3.97	19.84	3.97
.118X.787-R.157	.118	.787	.157	3	20	4
.126X.787-R.118	.125	.787	.118	3.18	20	3
.125X.787-R.141	.125	.787	.141	3.18	20	3.58
.125X.787-R.157	.125	.787	.157	3.18	20	4
.146X.787-R.138	.146	.787	.138	3.71	20	3.5
.157X.787-R.157	.157	.787	.157	4	20	4
.165X.787-R.157	.165	.787	.157	4.19	20	4
.188X.787-R.188	.188	.787	.203	4.76	20	5.16
.197X.787-R.157	.197	.787	.157	5	20	4
.236X.787-R.157	.236	.787	.157	6	20	4

RT & RRT (NON-STANDARD STYLE 200 RT)

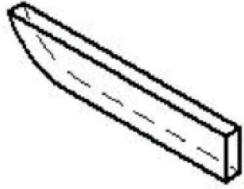


DIMENSIONAL TOLERANCES	
UP to 3/8	+ .015-.000
3/8 - 1	+ .020-.000
1 and up	+ .040-.000

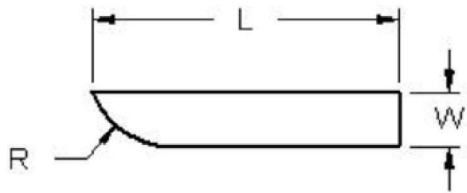


Insert	W	L	R	W (mm)	L(mm)	R(mm)
.125X.790-R.118	.125	.790	.118	3.18	20.07	3
.205X.795-R.157	.205	.795	.157	5.21	20.19	4
.093X.812-R.250	.093	.812	.250	2.38	20.64	6.35
.156X.812-R.156	.156	.812	.156	3.97	20.64	3.97
.250X.875-R.375	.250	.875	.375	6.35	22.23	9.53
.281X.875-R.500	.281	.875	.500	7.14	22.23	12.7
.313X.875-R.438	.313	.875	.438	7.94	22.23	11.11
.375X.875-R.375	.375	.875	.375	9.52	22.23	9.52
.244X.984-R.236	.244	.984	.236	6.20	25	6
.125X.968-R.118	.125	.968	.118	3.18	24.59	3
.093X1.000-R.250	.093	1.000	.250	2.38	25.4	6.35
.125X1.000-R.250	.125	1.000	.250	3.18	25.4	6.35
.250X1.000-R.188	.250	1.000	.188	6.35	25.4	4.76
.250X1.000-R.375	.250	1.000	.375	6.35	25.4	9.52
.375X1.000-R.500	.375	1.000	.500	9.52	25.4	12.7
.125X1.032-R.125	.125	1.032	.125	3.18	26.19	3.18
.156X1.156-R.156	.156	1.156	.156	3.97	29.36	3.97
.125X1.250-R.188	.125	1.250	.188	3.18	31.75	4.76
.188X1.250-R.313	.188	1.250	.313	4.76	31.75	7.94
.250X1.250-R.375	.250	1.250	.375	6.35	31.75	9.52
.250X1.500-R.375	.250	1.500	.375	6.35	38.1	9.52
.500X1.750-R.250	.500	1.750	.250	12.7	44.45	6.35
.093X.750-R.250	.093	.750	.250	2.38	19.05	6.35
.394X.591-R.394	.394	.591	.394	10	15.01	10
.141X1.063-R.138	.141	1.063	.138	3.58	27.0	3.5

RT & RRT (NON-STANDARD STYLE 200 RT)



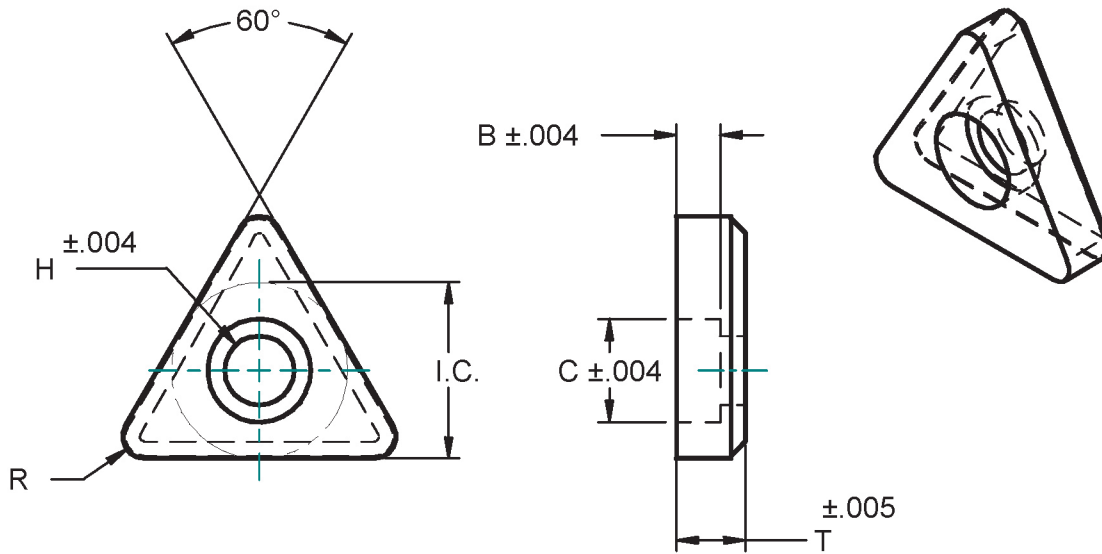
DIMENSIONAL TOLERANCES	
UP to 3/8	+ .015 - .000
3/8 - 1	+ .020 - .000
1 and up	+ .040 - .000



AS QUOTED
 When Requesting a Quote Specify Thickness Needed.
 Example: .062X.093X1.000-R.250

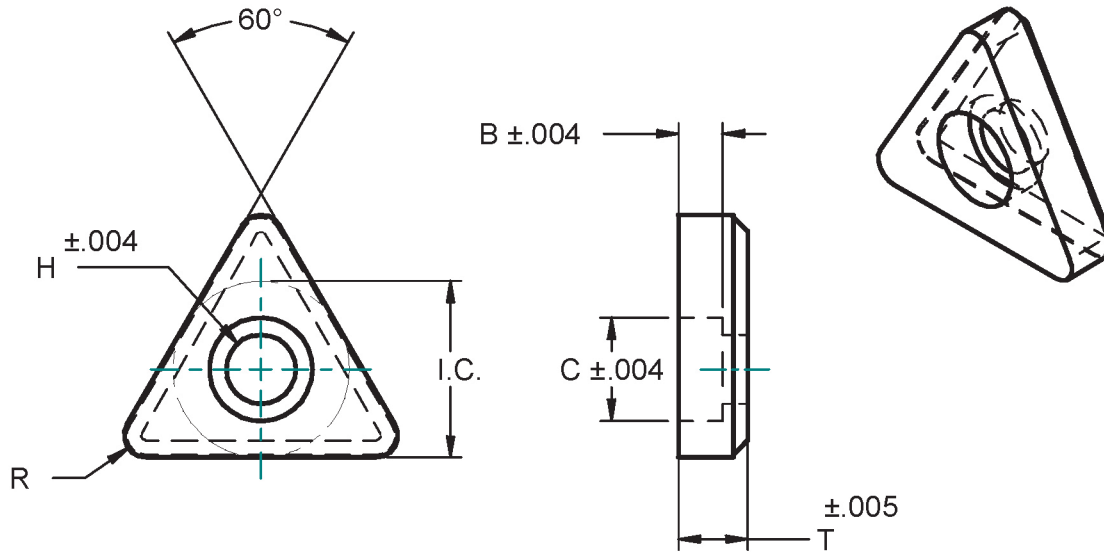
Insert	W	L	R	W (mm)	L(mm)	R(mm)
.093X.875-R.250	.093	.875	.250	2.38	22.23	6.35
.125X1.250-R.375	.125	1.250	.375	3.18	31.75	9.52

ITSN SHIM



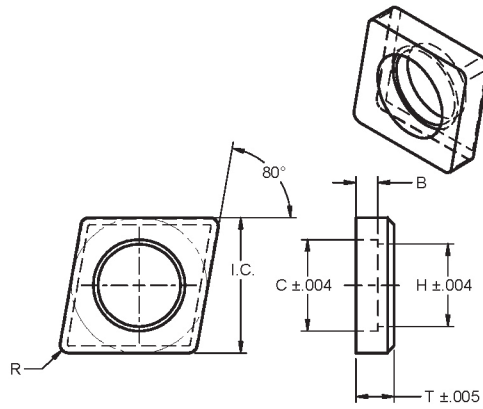
Insert	I.C.	T	H	C	B	R
ITSN323	.365 ±.004	.140	.226	.250	.093	3/64
ITSN333	.365 ±.004	.205	.226	.250	.158	3/64
ITSN432	.490 ±.004	.205	.290	.325	.128	1/32
ITSN432T	.455 ±.004	.205	.255	.325	.110	1/32
ITSN433	.490 ±.004	.205	.290	.325	.128	3/64
ITSN424	.490 ±.004	.140	.290	.325	.093	1/16
ITSN434	.490 ±.004	.205	.290	.325	.128	1/16
ITSN532T	.570 ±.005	.205	.380	.450	.110	1/32
ITSN533	.615 ±.005	.205	.380	.425	.128	3/64
ITSN534	.615 ±.005	.205	.380	.450	.158	1/16
ITSN636	.739 ±.005	.205	.443	.513	.110	3/32
ITSN637	.739 ±.005	.205	.443	.513	.110	7/64
SM293	.608 ±.004	.207	.315	.412	.109	1/16

TSN SHIM



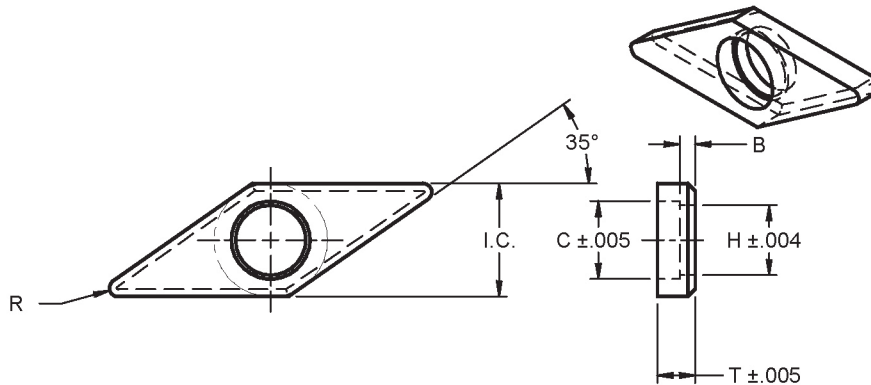
Insert	I.C.	T	H	C	B	R
TSN322	.368 ±.004	.138	.208	.262	.079	1/32
TSN323T	.345 ±.004	.138	.208	.262	.079	3/64
TSN324	.368 ±.004	.138	.208	.262	.079	1/16
TSN431	.493 ±.004	.202	.255	.325	.109	1/64
TSN432T	.455 ±.004	.202	.255	.325	.109	1/32
TSN434	.493 ±.004	.202	.255	.325	.109	1/16
TSN435	.439 ±.004	.202	.255	.325	.109	5/64
TSN439	.439 ±.004	.202	.255	.325	.109	9/64
TSN532T	.570 ±.004	.202	.380	.450	.109	1/32
TSN534	.618 ±.004	.202	.380	.450	.109	1/16
TSN535	.618 ±.004	.202	.380	.450	.109	5/64
TSN637	.743 ±.007	.202	.443	.513	.109	7/64

ICSN SHIM



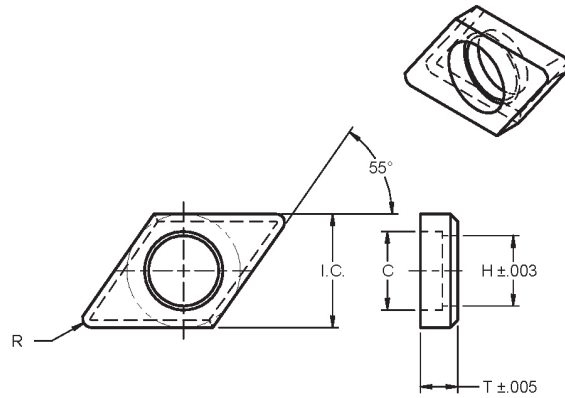
Insert	I.C.	T	H	C	B	R	Notes
ICSN433	.490 ±.004	.207	.290	.325	*.120	3/64	*ground
ICSN454	.491 ±.004	.355	.289	.317	*.090	1/16	
ICSN533	.615 ±.004	.207	.380	.425	*.120	3/64	
ICSN633	.740 ±.005	.207	.450	.500	*.120	3/64	
SM303	.491 ±.004	.207	.263	.355	*.092	1/32	
SM390	.625 ±.005	.207	.313	.425	*.084	3/64	

IVSN SHIM



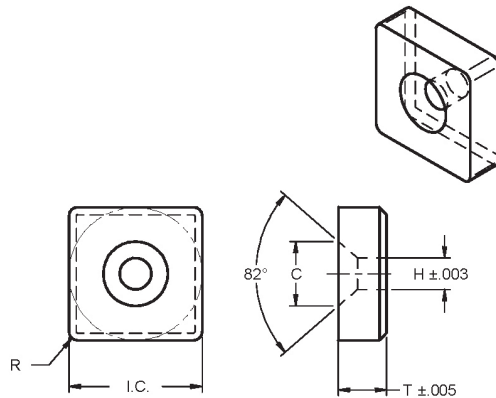
Insert	I.C.	T	H	C	B	R
IVSN322	.369 ±.004	.142	.227	.255	.059	1/32
IVSN432	.491 ±.004	.207	.290	.325	.080	1/32
IVSN433	.491 ±.004	.207	.290	.325	.095	3/64

IDSN SHIM



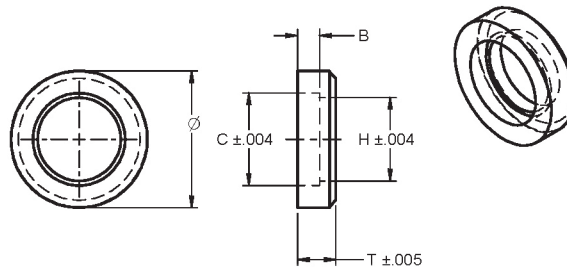
Insert	I.C.	T	H	C	B	R	Notes
IDSN322	.367 ±.003	.141	.227	.255	.067*	1/32	*ground
IDSN433	.490 ±.004	.203	.290	.325	.120*	3/64	
IDSN443	.490 ±.004	.268	.290	.325	.120*	3/64	
IDSN533	.615 ±.004	.203	.380	.425	.120*	3/64	

YSN SHIM



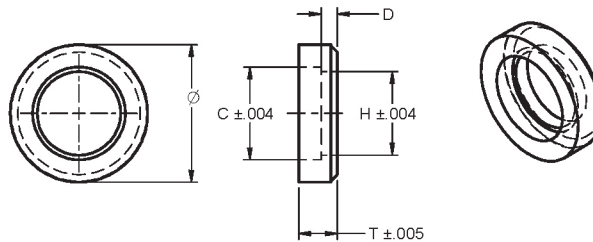
Insert	I.C.	T	H	C	R
YSN422	.490 ±.004	.142	.125	.282	1/32
YSN432	.490 ±.004	.203	.125	.282	1/32
YSN623	.740 ±.004	.142	.176	.360	3/64
YSN633	.740 ±.004	.203	.176	.360	3/64
YSN643	.740 ±.004	.268	.176	.360	3/64

IRSN SHIM



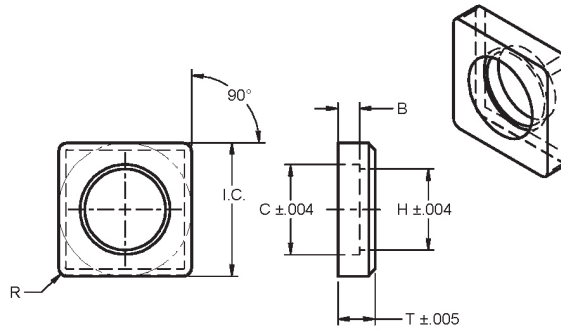
Insert	Ø	T	H	C	B	Notes
IRSN43	.485 ±.004	.207	.290	.325	*.120	*ground
IRSN44	.485 ±.004	.267	.290	.325	*.120	
IRSN53	.615 ±.005	.207	.380	.425	*.120	
IRSN63	.730 ±.007	.207	.443	.495	*.120	
IRSN84	.980 ±.008	.267	.568	.639	*.120	

RSN SHIM



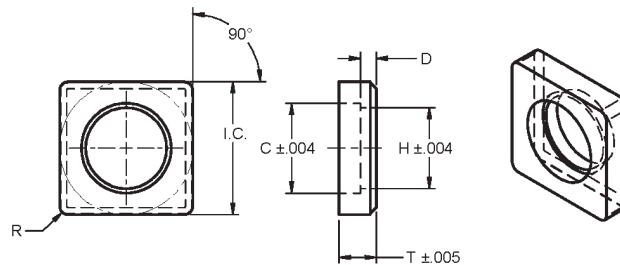
Insert	Ø	T	H	C	B	Notes
RSN32	.350 ±.004	.142	.208	.262	*.055	*ground
RSN43	.468 ±.005	.207	.255	.325	*.088	
RSN63	.712 ±.007	.207	.443	.513	*.088	
RSN84	.960 ±.008	.267	.568	.639	*.115	
RSN104	1.200 ±.010	.267	.692	.764	*.115	

ISSN SHIM



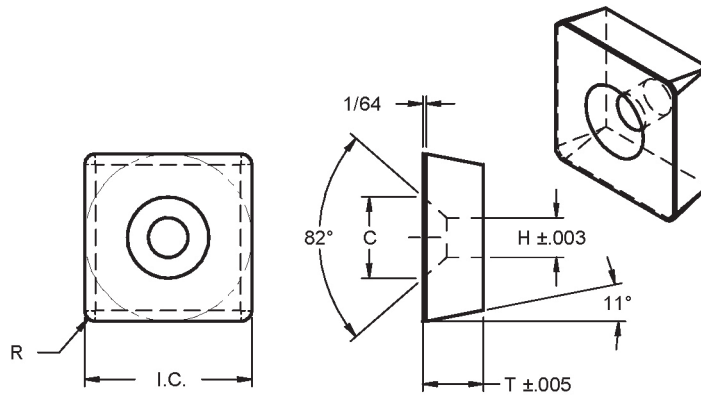
Insert	I.C.	T	H	C	B	R	Notes
ISSN322	.365 ±.004	.140	.230	.262	*.088	1/32	*ground
ISSN433	.490 ±.004	.207	.290	.325	*.120	3/64	
ISSN443	.490 ±.004	.267	.290	.325	*.120	3/64	
ISSN533	.615 ±.004	.207	.380	.435	*.120	3/64	
ISSN543	.615 ±.004	.267	.380	.435	*.120	3/64	
ISSN633	.740 ±.005	.207	.450	.500	*.120	3/64	
ISSN643	.740 ±.005	.267	.450	.500	*.120	3/64	

SSN SHIM



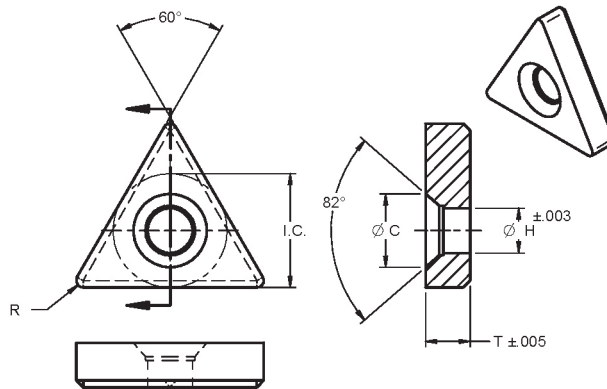
Insert	I.C.	T	H	C	B	R	Notes
SSN322	.365 ±.004	.140	.208	.262	*.055	1/32	*ground
SSN432	.490 ±.005	.207	.255	.325	*.088	1/32	
SSN532	.615 ±.006	.207	.380	.450	*.088	1/32	
SSN632	.740 ±.007	.207	.443	.513	*.088	1/32	
SSN844	.990 ±.008	.267	.568	.639	*.115	1/16	

PSQ SHIM



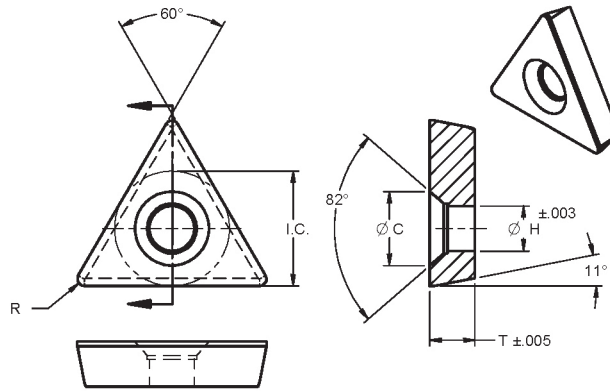
Insert	I.C.	T	H	C	R
PSQ 3	.450 ±.005	.142	.140	.282	1/64
PSQ 4	.695 ±.005	.142	.185	.350	3/64

YTN SHIM



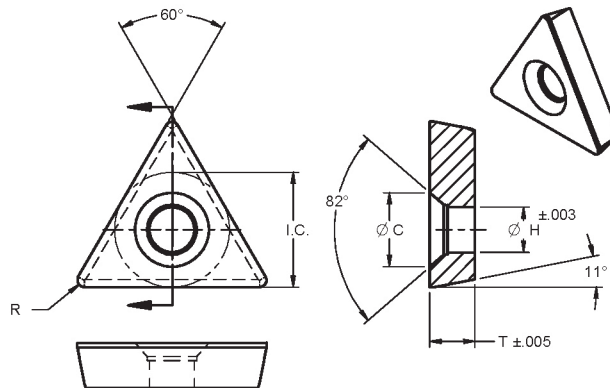
Insert	I.C.	T	H	C	R
YTN322	.364 ±.005	.142	.125	.282	1/32
YTN332	.364 ±.005	.203	.125	.282	1/32
YTN423	.490 ±.005	.142	.176	.360	3/64
YTN534	.614 ±.005	.203	.202	.438	1/16

PTP SHIM



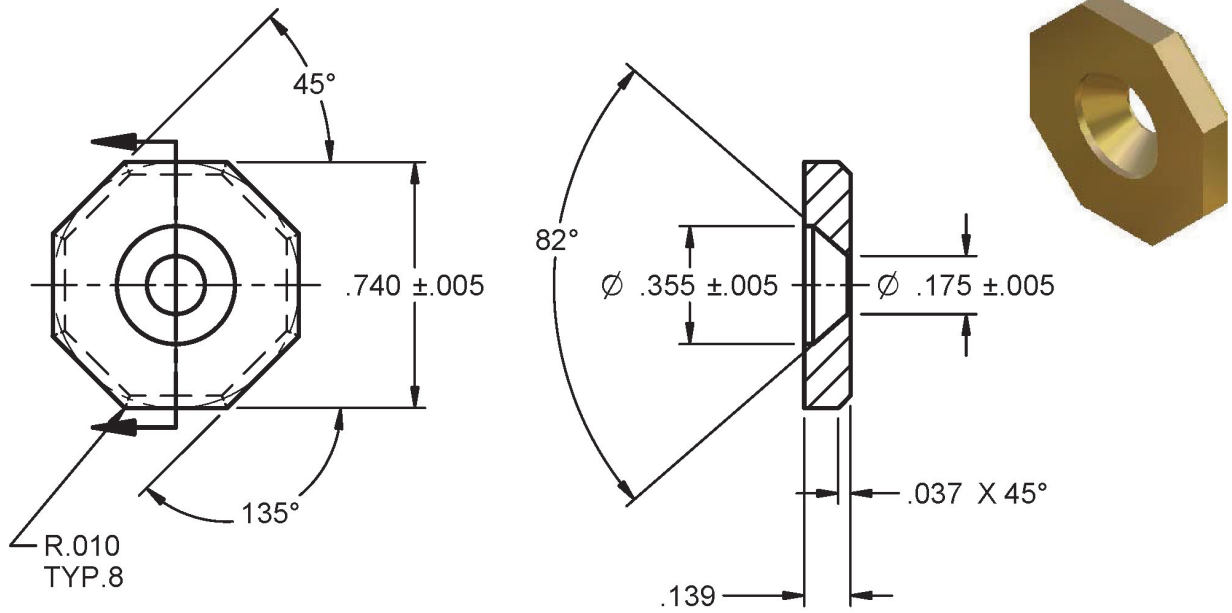
Insert	I.C.	T	H	C	R
PTP 3	.328 ±.005	.142	.140	.282	1/64
PTP 4	.450 ±.005	.142	.185	.350	3/64
PTP 5	.542 ±.005	.203	.220	.432	1/32

YTP SHIM

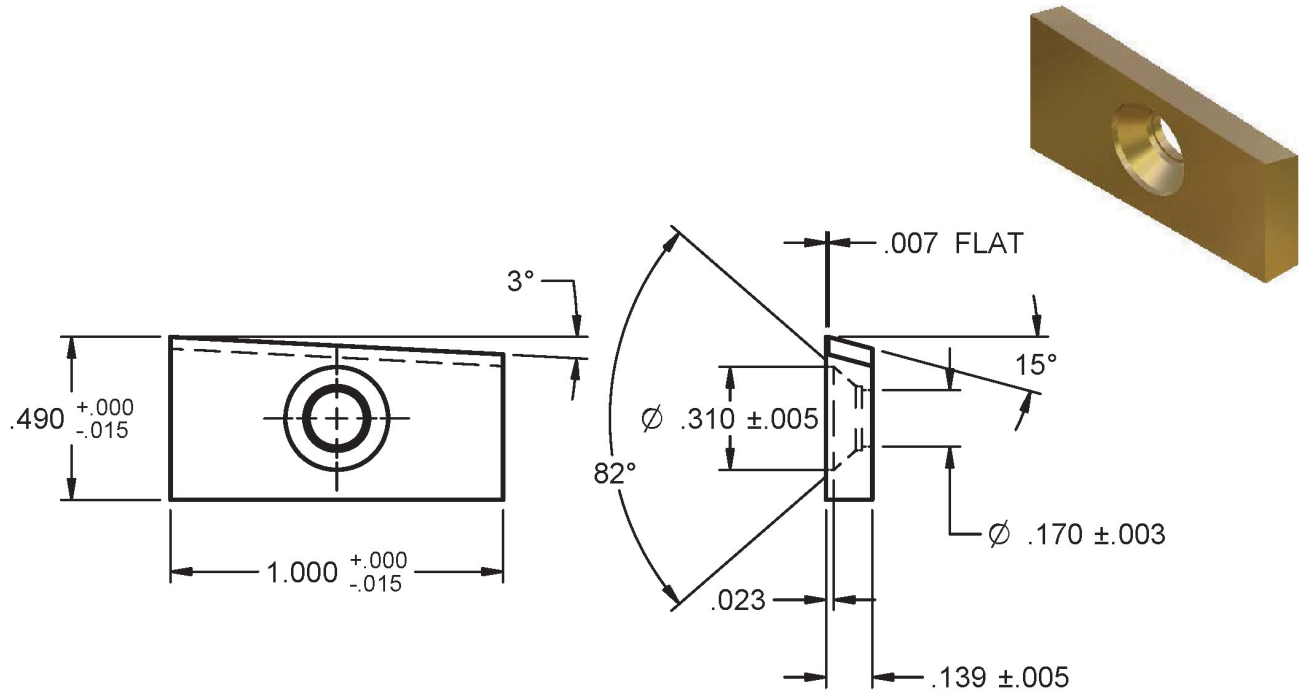


Insert	I.C.	T	H	C	R
YTP321	.328 ±.005	.142	.125	.282	1/64
YTP423	.445 ±.005	.142	.176	.360	3/64
SM41	.332 ±.005	.142	.124	.271	1/64

A-2105-A

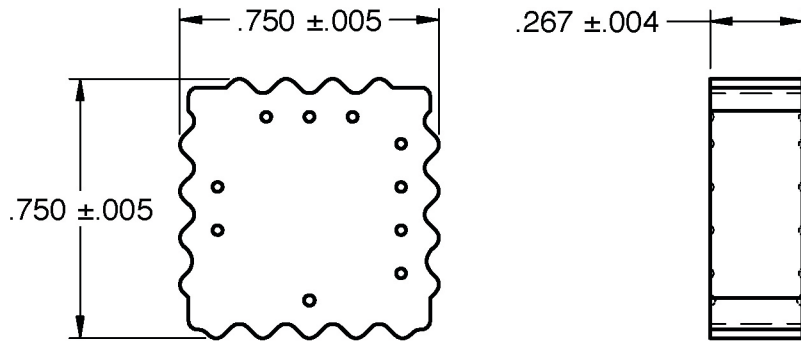


A-1878-A

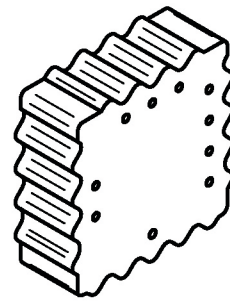


4T75Q (D-19577-P1 G58)

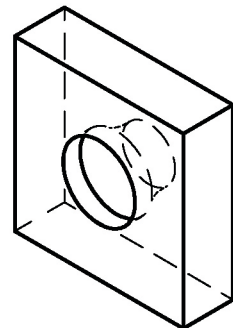
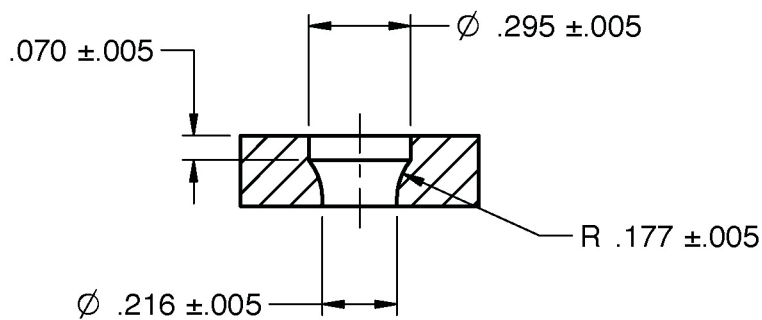
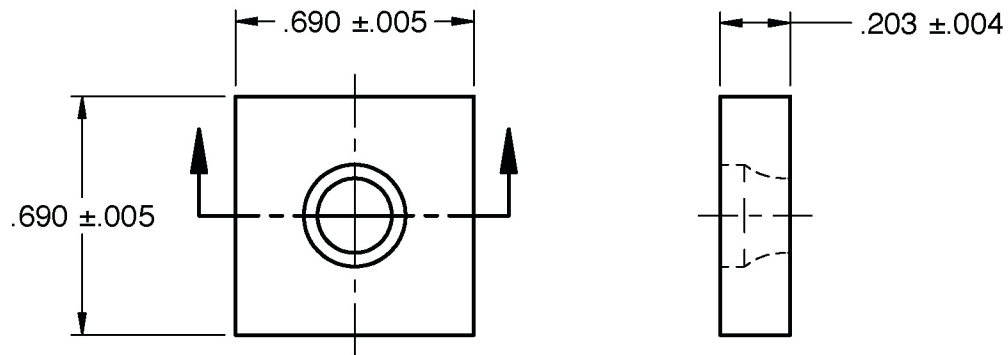
NEGATIVE RAKE MILLING for top clamping systems



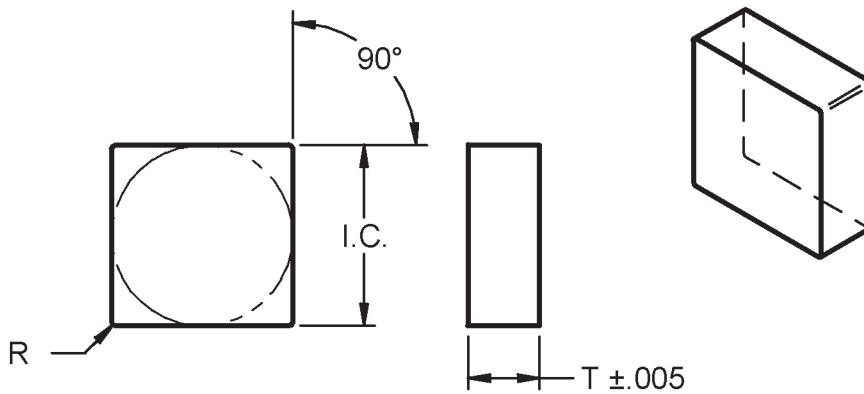
Rough Milling



SNRW.670DQX.188THK (D-0778-P1 D289)



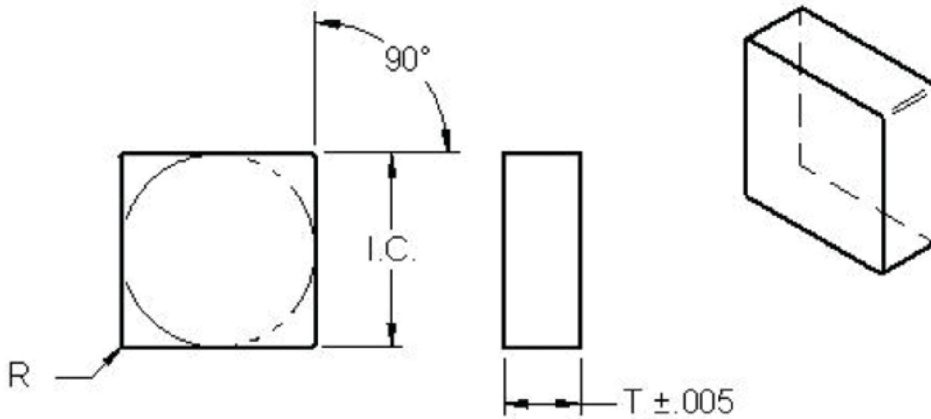
SNR



Variable Thickness Quoted on Request

Insert	I.C.	T	R
SNR211	.264 ±.004	.080	1/64
SNR220	.264 ±.004	.139	.008
SNR221	.264 ±.004	.139	1/64
SNR320	.391 ±.005	.139	.008
SNR321	.391 ±.005	.139	1/64
SNR322	.391 ±.005	.201	1/32
SNR330	.391 ±.005	.201	.008
SNR331	.391 ±.005	.201	1/64
SNR332	.391 ±.005	.201	1/32
SNR420	.516 ±.005	.139	.008
SNR422	.516 ±.005	.139	1/32
SNR423	.516 ±.005	.139	3/64
SNR424	.516 ±.005	.139	1/16
SNR430	.516 ±.005	.201	.008
SNR431	.516 ±.005	.201	1/64
SNR432	.516 ±.005	.201	1/32
SNR433	.516 ±.005	.201	3/64
SNR434	.516 ±.005	.201	1/16
SNR436	.516 ±.005	.201	3/32
SNR438	.516 ±.005	.201	1/8
SNR520	.642 ±.007	.139	.008
SNR530	.642 ±.007	.202	.008
SNR531	.642 ±.007	.202	1/64
SNR534	.642 ±.007	.202	1/16
SNR536	.642 ±.007	.202	3/32

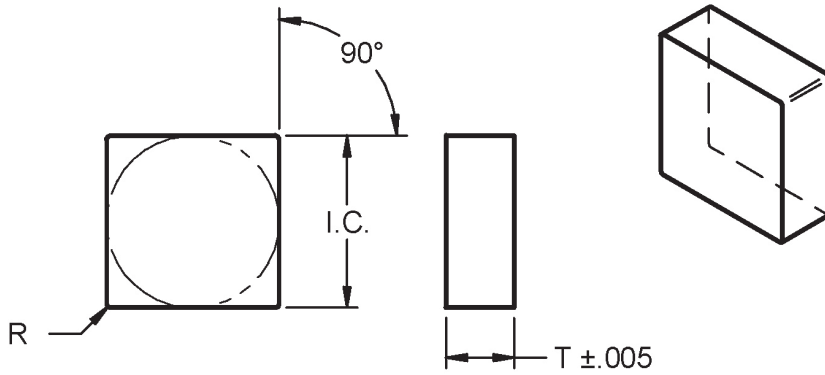
SNR



Variable Thickness Quoted on Request

Insert	I.C.	T	R
SNR540	.642 ±.007	.265	.008
SNR550	.642 ±.007	.323	.008
SNR554	.642 ±.007	.323	1/16
SNR620	.770 ±.007	.139	.008
SNR630	.770 ±.007	.201	.008
SNR631	.770 ±.007	.201	.008
SNR632	.770 ±.007	.201	1/32
SNR633	.770 ±.007	.201	3/64
SNR634	.770 ±.007	.201	1/32
SNR638	.770 ±.007	.201	1/8
SNR640	.770 ±.007	.265	.008
SNR643	.770 ±.007	.265	3/64
SNR644	.770 ±.007	.265	1/16
SNR646	.770 ±.007	.265	3/32
SNR650	.770 ±.007	.323	.008
SNR6416	.770 ±.007	.265	1/4
SNR730	.894 ±.007	.203	.008
SNR820	1.019 ±.007	.139	.008
SNR830	1.019 ±.007	.203	.008
SNR840	1.019 ±.007	.260	.008
SNR850	1.019 ±.007	.323	.008
SNR860	1.019 ±.007	.388	.008
SNR1040	1.270±.007	.265	.008

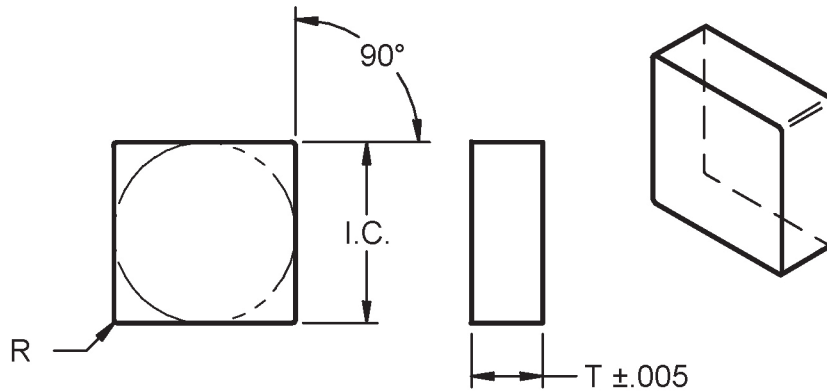
SNR



Variable Thickness Quoted on Request

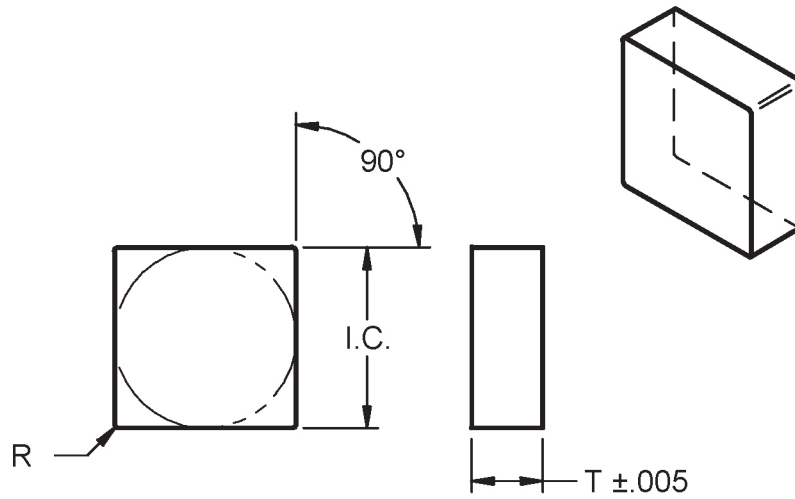
Insert	I.C.	T	R
SNR2.520	.326 ±.004	.140	0
SNR3.520	.454 ±.005	.140	0
SNR3.530	.454 ±.005	.203	0
SNR3.540	.454 ±.005	.265	0
SNR4.520	.577±.005	.140	0
SNR4.530	.577±.005	.203	0
SNR4.540	.577±.005	.265	0

SNS



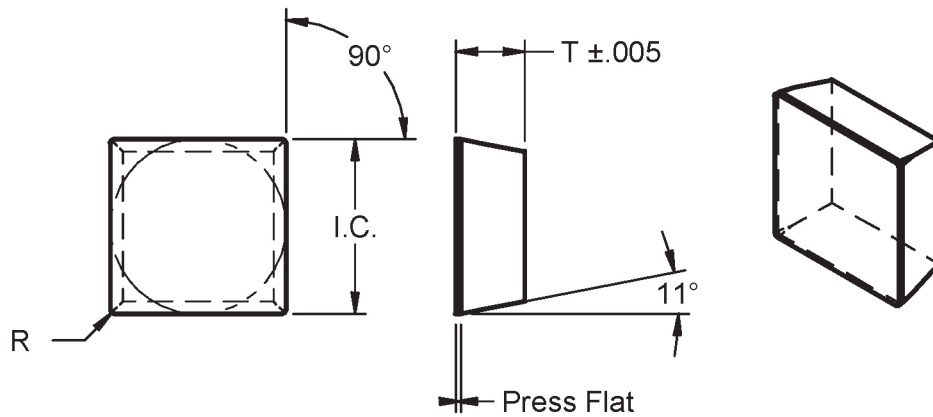
Insert	I.C.	T	R
SNS321	.375 ±.005	.139	1/64
SNS322	.375 ±.005	.139	1/32
SNS324	.375 ±.005	.139	1/16
SNS331	.375 ±.005	.201	1/64
SNS332	.375 ±.005	.201	1/32
SNS334	.375 ±.005	.201	1/16
SNS421	.500 ±.005	.139	1/64
SNS422	.500 ±.005	.139	1/32
SNS424	.500 ±.005	.139	1/16
SNS431	.500 ±.005	.201	1/64
SNS432	.500 ±.005	.201	1/32
SNS433	.500 ±.005	.201	3/64
SNS434	.500 ±.005	.201	1/16
SNS438	.500 ±.005	.201	1/8
SNS443	.500 ±.005	.265	3/64
SNS530	.625 ±.007	.201	.008
SNS533	.625 ±.007	.201	3/64
SNS538	.625 ±.007	.265	1/8
SNS543	.625 ±.007	.265	3/64
SNS544	.625 ±.007	.265	1/16
SNS548	.625 ±.007	.265	1/8
SNS632	.750 ±.007	.201	1/32
SNS633	.750 ±.007	.201	3/64
SNS634	.750 ±.007	.201	1/16
SNS636	.750 ±.007	.201	3/32

SNS



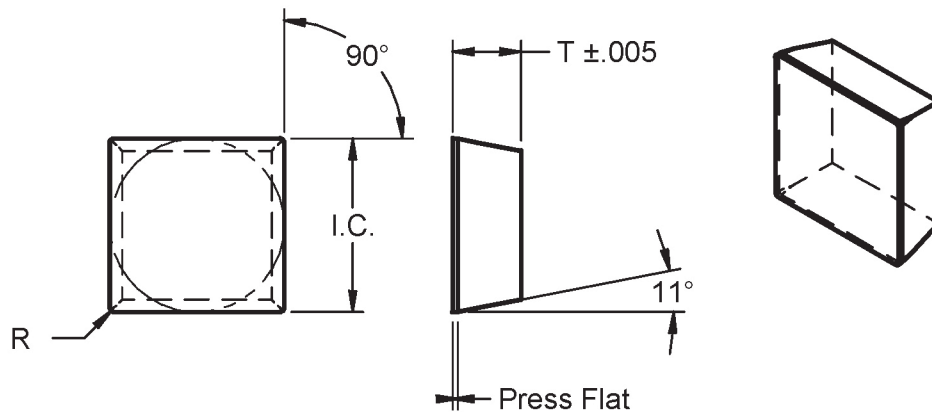
Insert	I.C.	T	R
SNS638	.750 ±.007	.201	1/8
SNS642	.750 ±.007	.265	1/32
SNS644	.750 ±.007	.265	1/16
SNS833	1.000 ±.010	.201	3/64
SNS834	1.000 ±.010	.201	1/16
SNS844	1.000 ±.010	.265	1/16
SNS854	1.000 ±.010	.323	1/16
SNS856	1.000 ±.010	.323	3/32
SNS866	1.000 ±.010	.392	3/32

SPR



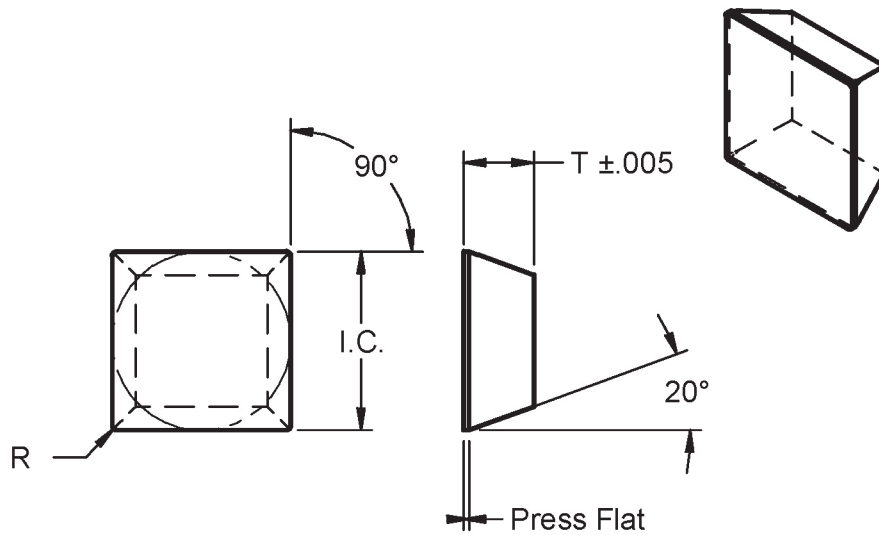
Insert	I.C.	T	R	Notes
SPR221	.264 ±.004	.139	1/64	
SPR2.51.52	.327 ±.005	.107	1/32	
SPR32.52	.391 ±.005	.171	1/32	.042 Press Flat
SPR320	.392 ±.005	.139	1/64	
SPR321	.392 ±.005	.139	1/64	
SPR322	.392 ±.005	.139	1/32	
SPR324	.392 ±.005	.139	1/16	
SPR420	.516 ±.005	.139	1/64	
SPR421	.516 ±.005	.139	1/64	
SPR422	.516 ±.005	.139	1/32	
SPR423	.516 ±.005	.139	3/64	
SPR424	.516 ±.005	.139	1/16	
SPR426	.516 ±.005	.139	3/32	
SPR430	.516 ±.005	.201	1/64	
SPR431	.516 ±.005	.201	1/64	
SPR432	.516 ±.005	.201	1/32	
SPR433	.516 ±.005	.201	3/64	
SPR530	.643 ±.005	.201	1/64	
SPR531	.643 ±.005	.201	1/64	
SPR533	.643 ±.005	.201	3/64	
SPR630	.770 ±.005	.201	1/64	
SPR631	.770 ±.005	.201	1/64	
SPR632	.770 ±.005	.201	1/32	
SPR633	.770 ±.005	.201	3/64	
SPR634	.770 ±.005	.201	1/16	

SPR



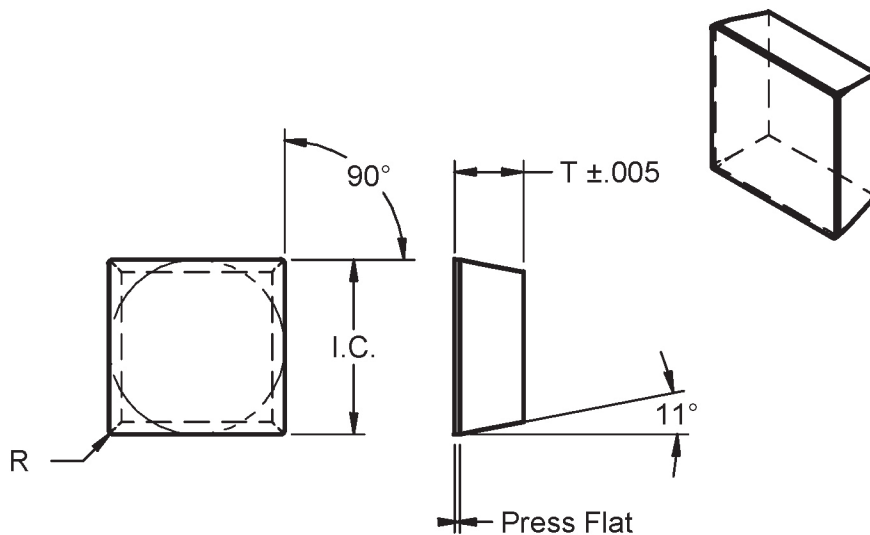
Insert	I.C.	T	R	Notes
SPR636	.770 ±.005	.201	3/32	
SPR638	.770 ±.005	.201	1/8	
SPR6312	.770 ±.005	.201	3/16	
SPR6316	.770 ±.005	.201	1/4	
SPR6328	.770 ±.005	.201	7/16	
SPR643	.770 ±.005	.265	3/64	
SPR644	.770 ±.005	.265	1/16	
SPR833	1.023 ±.007	.201	3/64	
SPR838	1.023 ±.007	.201	1/8	
SPR843	1.023 ±.007	.265	3/64	
SPR844	1.023 ±.007	.265	1/16	
SPR846	1.023 ±.007	.270	3/32	
SPR1034	1.273 ±.007	.201	1/16	
SPR1.81.50	.234 ±.004	.110	0	7/32 SQ.X 3/32T
SPR12mmX.156T	.486 ±.005	.184	1/32	12mm SQ.
SPR(4.25)38	.551 ±.005	.204	1/8	SPR17/32X3/16T
SPR(4.75)38	.624 ±.005	.204	1/8	SPR19/32X3/16T
SPR(5.5)38	.707 ±.005	.204	1/8	SPR11/16X3/16T
SPR(6.25)30	.807 ±.005	.209	.010	SPR25/32X3/16T
SPR(6.5)38	.832 ±.005	.204	1/8	SPR13/16X3/16T

SER



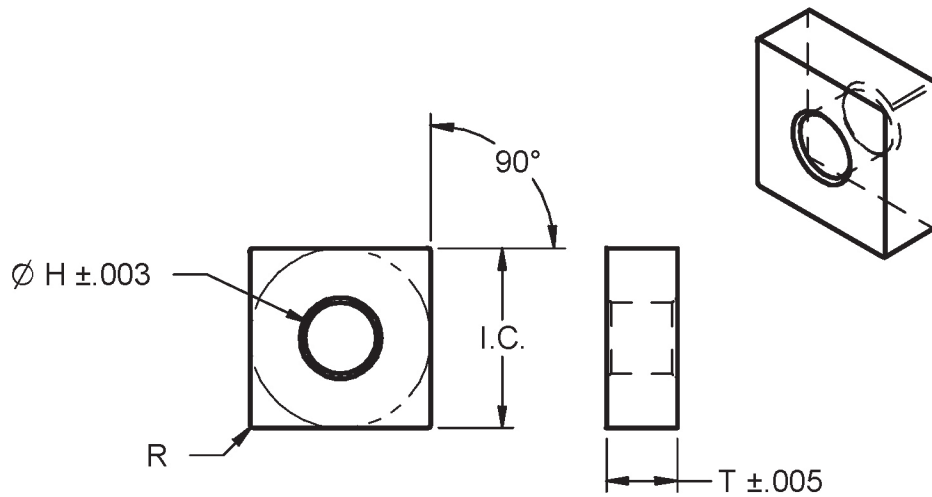
Insert	I.C.	T	R
SER421	.517 ±.007	.140	1/64
SER422	.517 ±.007	.140	1/32
SER433	.517 ±.007	.204	3/64
SER522	.640±.007	.140	1/32
SER634	.769 ±.007	.204	1/16

SPS



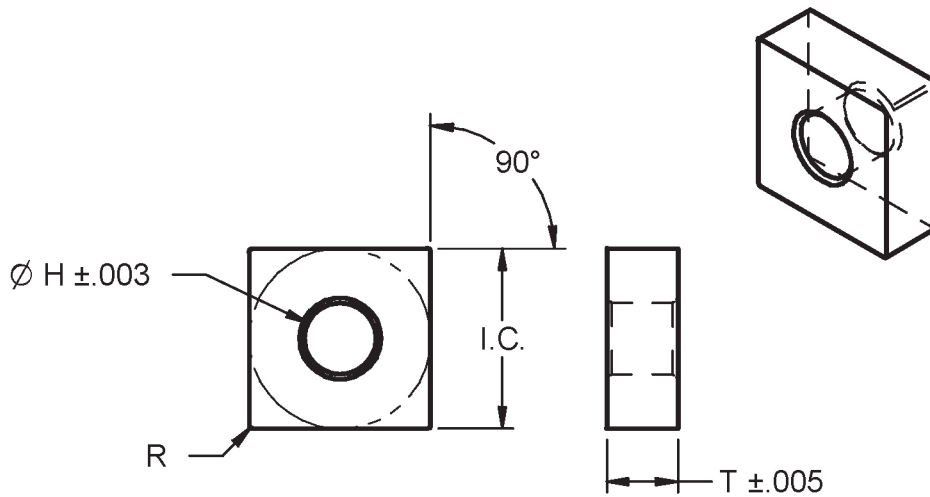
Insert	I.C.	T	R
SPS321	.375 ±.005	.139	1/64
SPS322	.375 ±.005	.139	1/32
SPS323	.375 ±.005	.139	3/64
SPS324	.375 ±.005	.139	1/16
SPS421	.500 ±.005	.139	1/64
SPS422	.500 ±.005	.139	1/32
SPS423	.500 ±.005	.139	3/64
SPS431	.500 ±.005	.201	1/64
SPS432	.500 ±.005	.201	1/32
SPS433	.500 ±.005	.201	3/64
SPS531	.625 ±.007	.201	1/64
SPS532	.625 ±.007	.201	1/32
SPS533	.625 ±.007	.201	3/64
SPS631	.750 ±.007	.201	1/64
SPS633	.750 ±.007	.201	3/64
SPS634	.750 ±.007	.201	1/16
SPS844	1.000 ±.007	.265	1/16
SPS864	1.000 ±.007	.395	1/16

SNRA



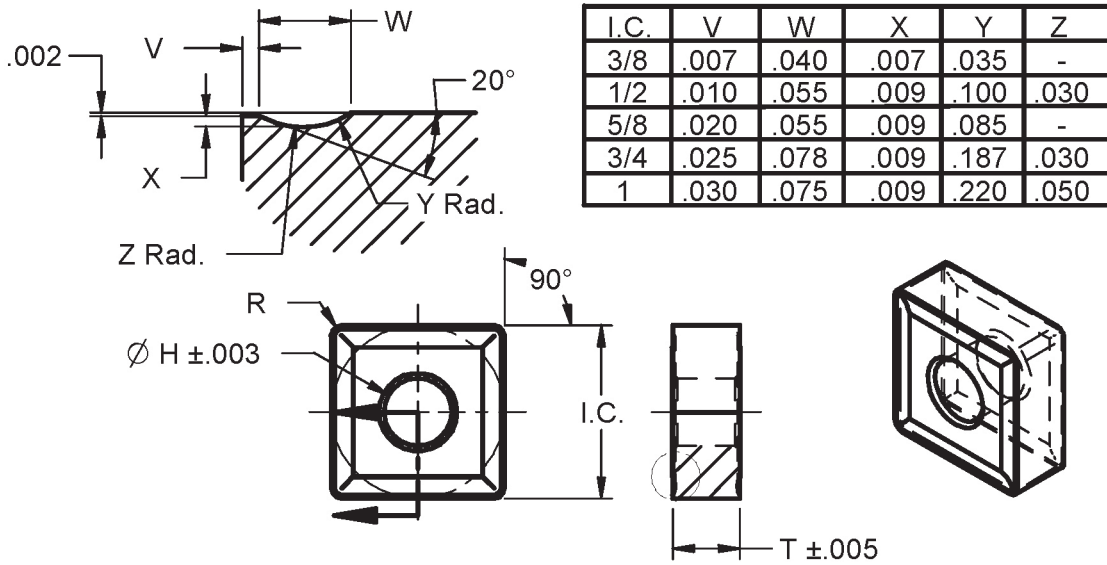
Insert	I.C.	T	R	H
SNRA320	.391 ±.005	.139	.012	.150
SNRA330	.391 ±.005	.201	.012	.150
SNRA420	.517 ±.005	.139	.012	.203
SNRA430	.517 ±.005	.201	.012	.203
SNRA540	.650 ±.005	.268	0	.250
SNRA543	.642 ±.007	.265	.048	.253
SNRA544	.642 ±.007	.265	.070	.253
SNRA630	.770 ±.007	.201	0	.313
SNRA640	.770 ±.007	.264	0	.313
SNRA830	1.025±.007	.207	0	.362
SNRA840	1.025±.007	.269	0	.362
SNRA850	1.025±.007	.332	0	.362
SNRA860	1.025±.007	.394	0	.362

SNSA



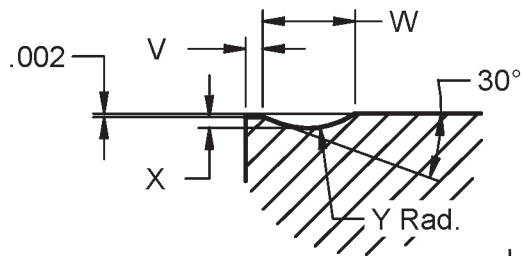
Insert	I.C.	T	R	H
SNSA322	.375 ±.002	.139	1/32	.150
SNSA323	.375 ±.002	.139	3/64	.150
SNSA332	.375 ±.002	.201	1/32	.150
SNSA333	.375 ±.002	.201	3/64	.150
SNSA422	.500 ±.003	.139	1/32	.203
SNSA423	.500 ±.003	.139	3/64	.203
SNSA424	.500 ±.003	.139	1/16	.203
SNSA432	.500 ±.003	.201	1/32	.203
SNSA433	.500 ±.003	.201	3/64	.203
SNSA434	.500 ±.003	.201	1/16	.203
SNSA523	.625 ±.003	.139	3/64	.253
SNSA533	.625 ±.003	.201	3/64	.253
SNSA543	.625 ±.003	.265	3/64	.253
SNSA544	.625 ±.003	.265	1/16	.253
SNSA548	.625 ±.003	.265	1/8	.253
SNSA632	.750 ±.003	.201	1/32	.313
SNSA633	.750 ±.003	.201	3/64	.313
SNSA634	.750 ±.003	.201	1/16	.313
SNSA642	.750 ±.003	.265	1/32	.313
SNSA643	.750 ±.003	.265	3/64	.313
SNSA644	.750 ±.003	.265	1/16	.313
SNSA648	.750 ±.003	.265	1/8	.313
SNSA866	1.000 ±.004	.393	3/32	.362

SNMG

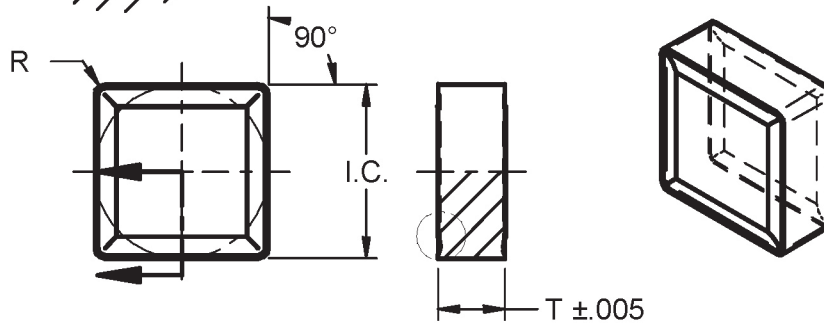


Insert	I.C.	T	R	H
SNMG321	.375 ±.002	.125	1/64	.150
SNMG322	.375 ±.002	.125	1/32	.150
SNMG323	.375 ±.002	.125	3/64	.150
SNMG333	.375 ±.002	.188	3/64	.150
SNMG422	.500 ±.003	.125	1/32	.203
SNMG423	.500 ±.003	.125	3/64	.203
SNMG424	.500 ±.003	.125	1/16	.203
SNMG432	.500 ±.003	.188	1/32	.203
SNMG433	.500 ±.003	.188	3/64	.203
SNMG434	.500 ±.003	.188	1/16	.203
SNMG438	.500 ±.003	.188	1/8	.203
SNMG443	.500 ±.003	.250	3/64	.203
SNMG453	.562 ±.003	.250	3/64	.203
SNMG533	.625 ±.003	.188	3/64	.253
SNMG542	.625 ±.003	.250	1/32	.253
SNMG543	.625 ±.003	.250	3/64	.253
SNMG544	.625 ±.003	.250	1/16	.253
SNMG632	.750 ±.003	.188	1/32	.313
SNMG633	.750 ±.003	.188	3/64	.313
SNMG634	.750 ±.003	.188	1/16	.313
SNMG642	.750 ±.003	.250	1/32	.313
SNMG643	.750 ±.003	.250	3/64	.313
SNMG644	.750 ±.003	.250	1/16	.313
SNMG866	1.000 ±.004	.375	3/32	.362

SNMF

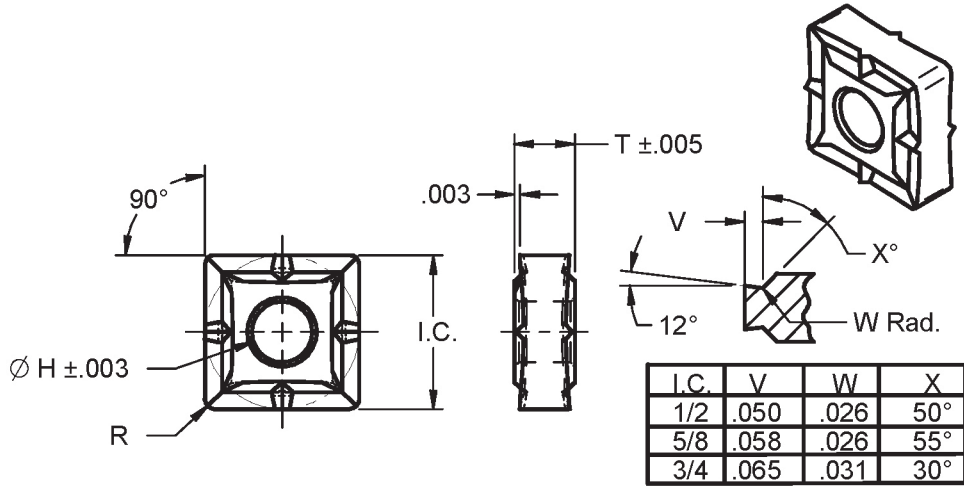


I.C.	V	W	X	Y
3/8	.015	.050	.012	.042
1/2	.018	.055	.013	.042
5/8	.022	.055	.013	.042
3/4	.027	.062	.013	.060
1	.030	.070	.013	.075



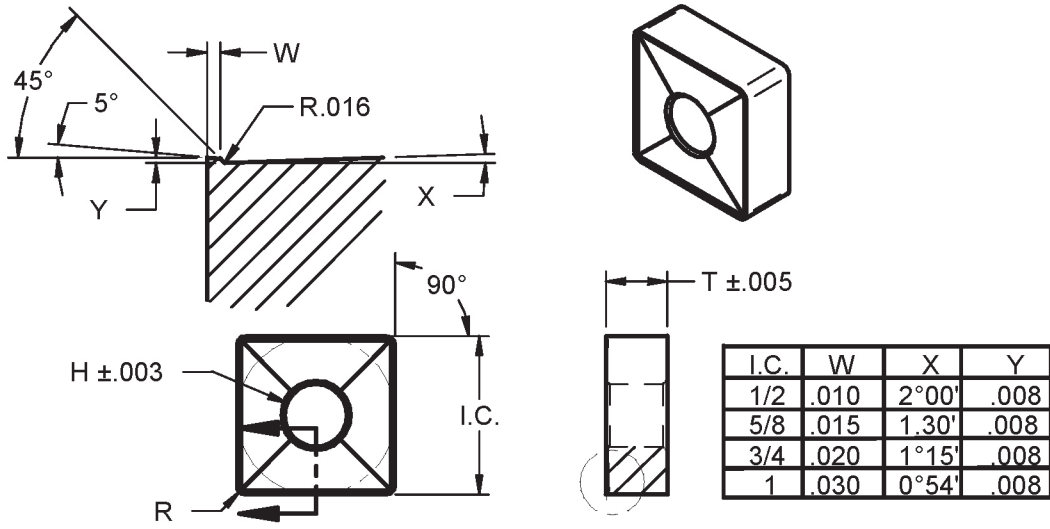
Insert	I.C.	T	R
SNMF322	.375 ±.002	.125	1/32
SNMF422	.500 ±.003	.125	1/32
SNMF423	.500 ±.003	.125	3/64
SNMF424	.500 ±.003	.125	1/16
SNMF432	.500 ±.003	.188	1/32
SNMF433	.500 ±.003	.188	3/64
SNMF434	.500 ±.003	.188	1/32
SNMF543	.625 ±.005	.250	3/64
SNMF632	.750 ±.003	.188	1/32
SNMF633	.750 ±.003	.188	3/64
SNMF634	.750 ±.003	.188	1/16
SNMF642	.750 ±.003	.250	1/32
SNMF643	.750 ±.003	.250	3/64
SNMF644	.750 ±.003	.250	1/16
SNMF866	1.000 ±.004	.375	3/32

SNSP



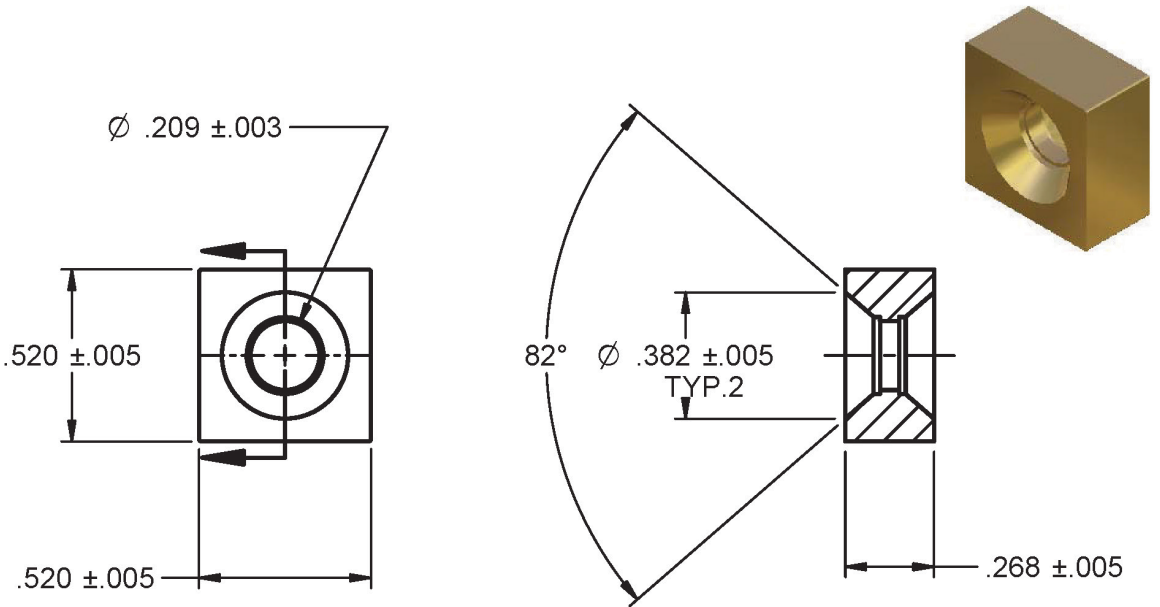
Insert	I.C.	T	R	H
SNSP431	.500 ±.003	.188	1/64	.203
SNSP432	.500 ±.003	.188	1/32	.203
SNSP433	.500 ±.003	.188	3/64	.203
SNSP434	.500 ±.003	.188	1/16	.203
SNSP436	.500 ±.003	.188	3/32	.203
SNSP533	.625 ±.003	.188	3/64	.253
SNSP543	.625 ±.003	.250	3/64	.253
SNSP632	.750 ±.003	.188	1/32	.313
SNSP633	.750 ±.003	.188	3/64	.313
SNSP634	.750 ±.003	.188	1/16	.313
SNSP642	.750 ±.003	.250	1/32	.313
SNSP643	.750 ±.003	.250	3/64	.313
SNSP644	.750 ±.003	.250	1/16	.313

SNSM

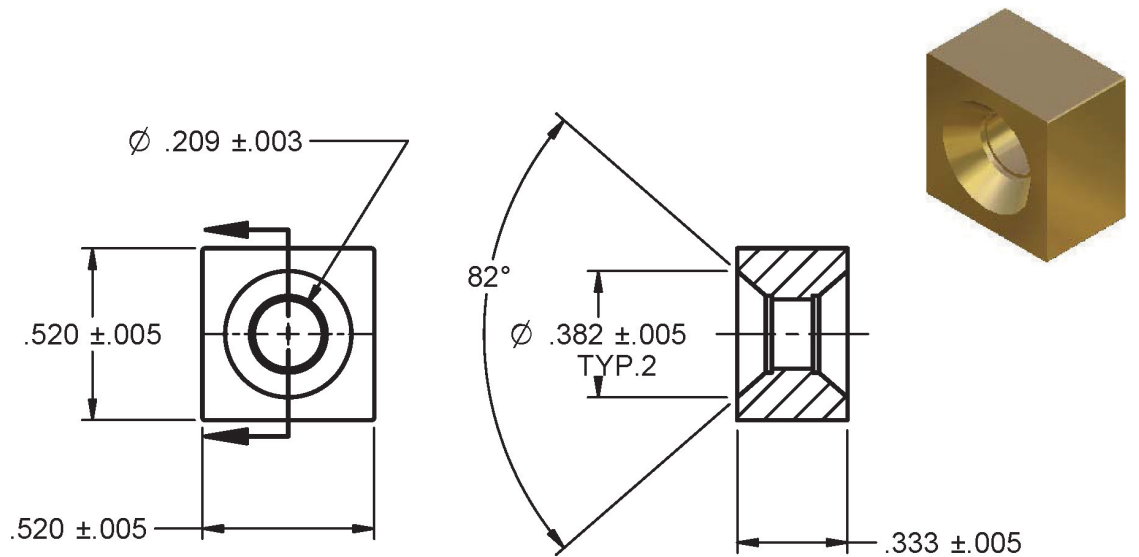


Insert	I.C.	T	R	H
SNSM432	.500 ±.003	.196	1/32	.203
SNSM433	.500 ±.003	.196	3/64	.203
SNSM434	.500 ±.003	.196	1/16	.203
SNSM543	.625 ±.003	.260	3/64	.253
SNSM544	.625 ±.003	.260	1/16	.253
SNSM643	.750 ±.003	.260	3/64	.313
SNSM644	.750 ±.003	.260	1/16	.313
SNSM646	.750 ±.003	.260	3/32	.313
SNSM854	1.000 ±.004	.325	1/16	.362
SNSM856	1.000 ±.004	.325	3/32	.362
SNSM866	1.000 ±.004	.378	3/32	.362

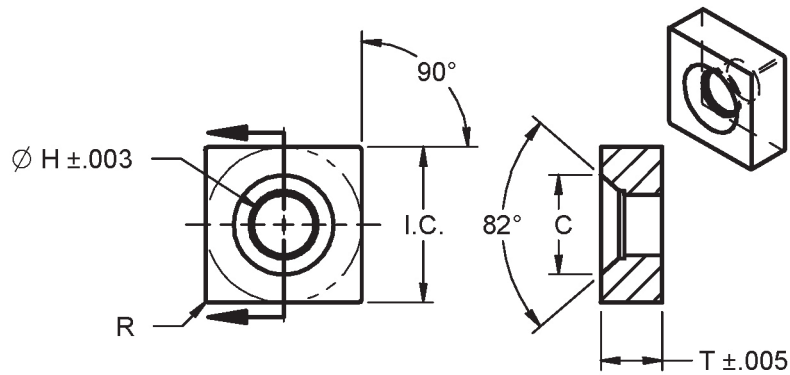
SNRC440



SNRC450

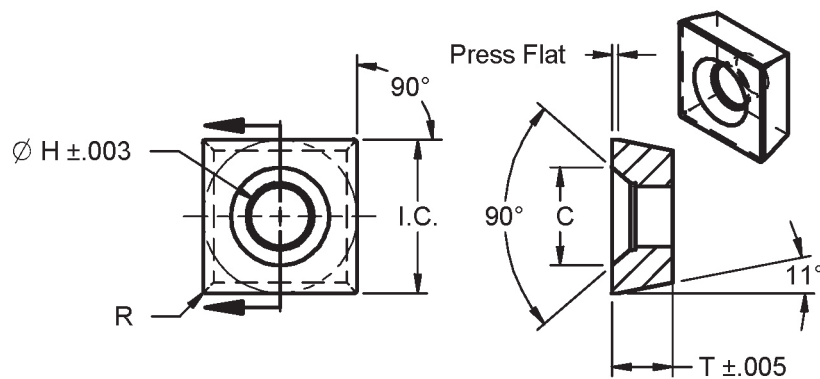


SD (NEG)



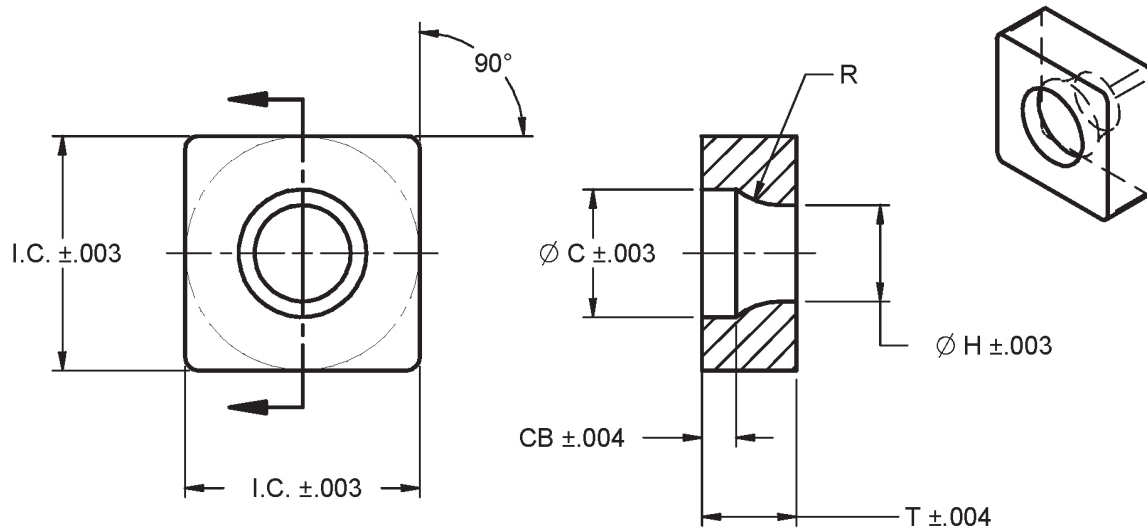
Insert	I.C.	T	R	H	C
SD7P	.452 ±.005	.140	1/32	.125	.275
SD8P	.514 ±.005	.140	.008	.203	.379
SD9P	.577 ±.005	.140	1/32	.203	.379
SD12P	.775 ±.005	.202	1/32	.203	.431

SPRB/USD



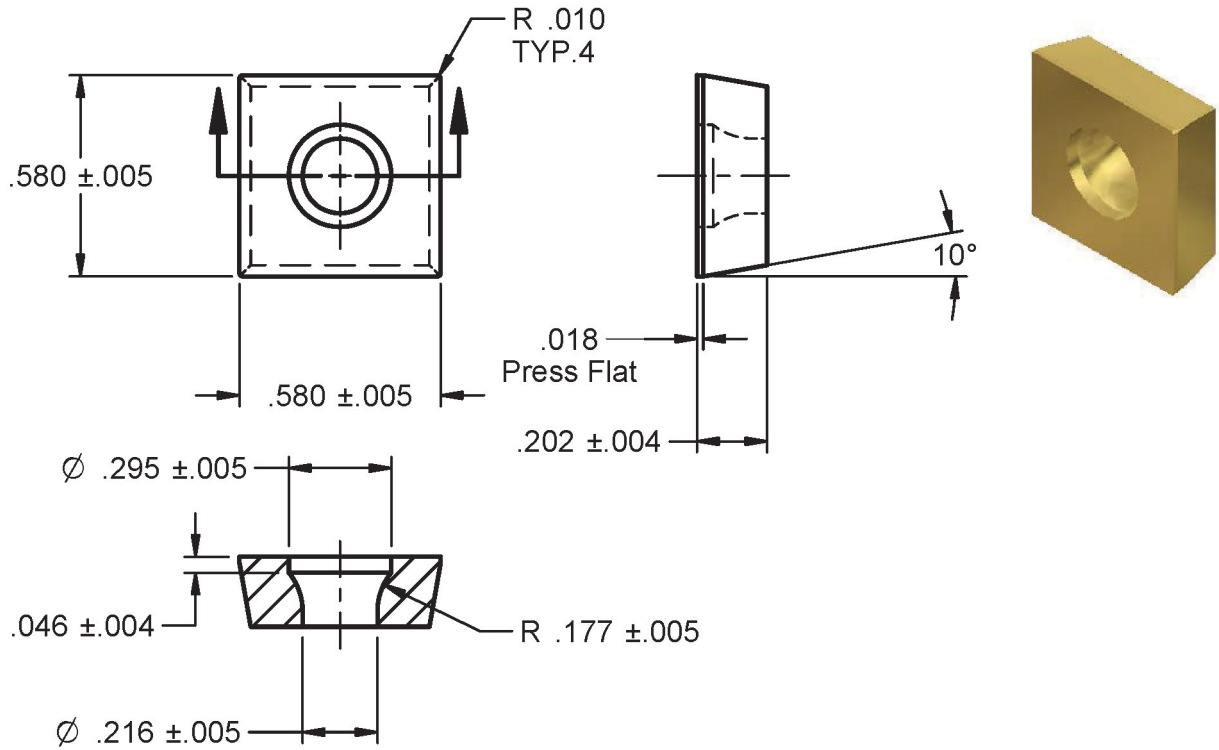
Insert	I.C.	T	R	H	C
SPRB424 - #4	.520 ±.005	.145	1/16	.126	.270
SPRB533	.642 ±.005	.201	3/64	.253	.331
SPRB633	.769 ±.005	.201	3/64	.313	.402
SPRB843	1.025 ±.005	.265	3/64	.313	.402
USD422P	.518±.005	.148	1/32	.180	.307

SNRW

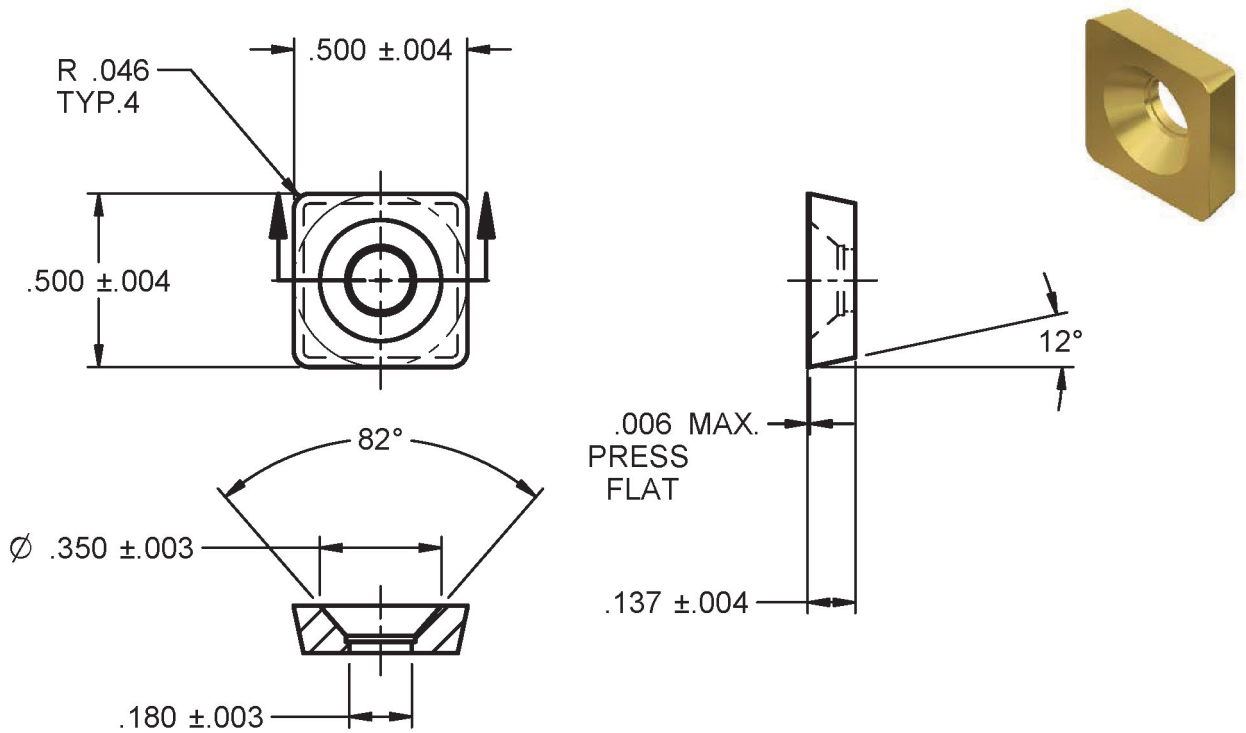


Insert	I.C.	T	H	C	CB	R	Notes
SNRW21.51	.268	.108	.110	.146	.039	.079	
SNRW2.52.50	.331	.171	.134	.177	.031	.098	
SNRW320	.392	.139	.173	.236	.039	.138	
SNRW32.50	.392	.170	.173	.236	.039	.138	
SNRW330	.392	.202	.173	.236	.039	.138	
SNRW42.50-M3.5	.520	.171	.173	.236	.046	.138	Non-standard Hole
SNRW430-M3.5	.520	.202	.173	.236	.046	.138	Non-standard Hole
SNRW440-M3.5	.520	.268	.173	.236	.046	.138	Non-standard Hole
SNRW430	.520	.202	.216	.295	.060	.177	
SNRW440	.520	.264	.216	.295	.060	.177	
SNRW450	.520	.331	.216	.295	.060	.177	

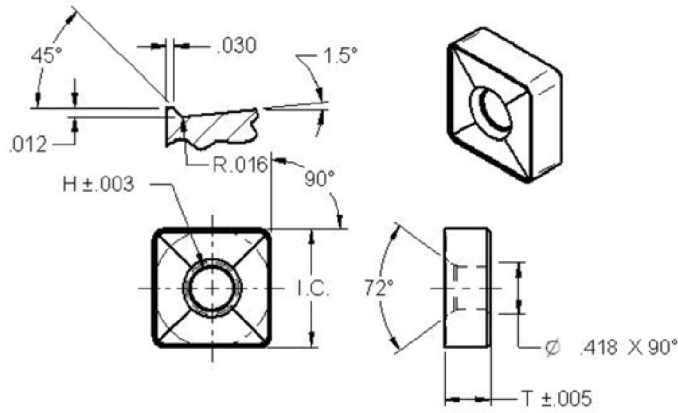
SPRW4.530



A-1099-B-4

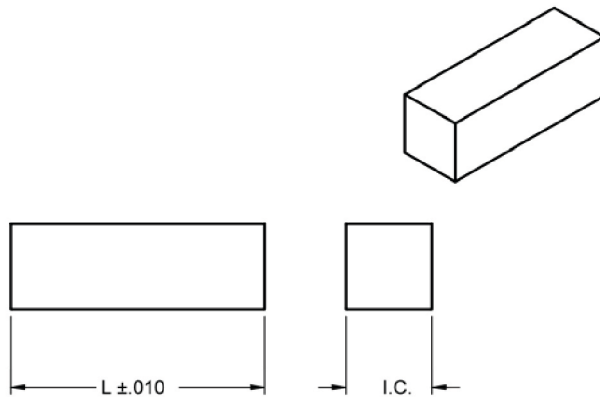


SNSH



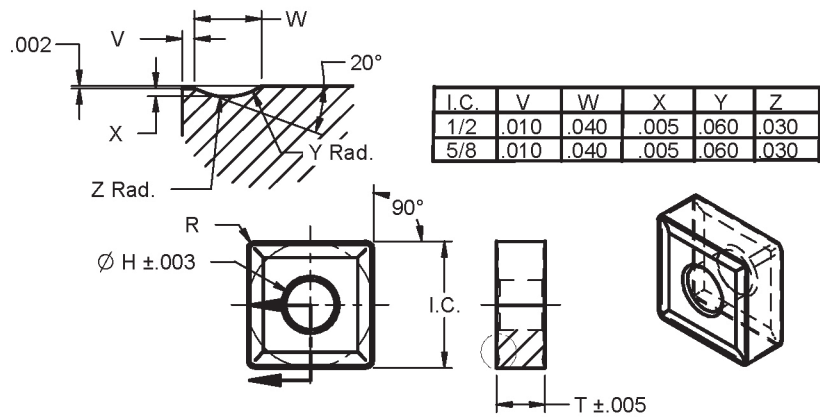
Insert	I.C.	T	R	H
SNSH864	1.000 ±.004	.375	1/16	.362
SNSH866	1.000 ±.004	.375	3/32	.362

SQ



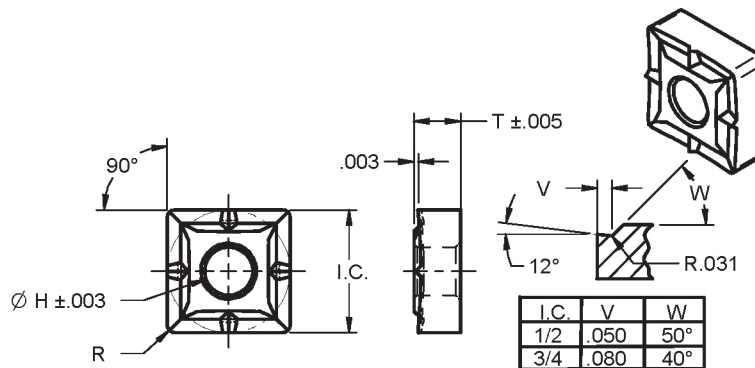
Insert	I.C.	L	Notes
SQ120	.392 ±.005	1.540	D-16103
SQ160	.520 ±.005	1.540	D-0668

SNSG-EN



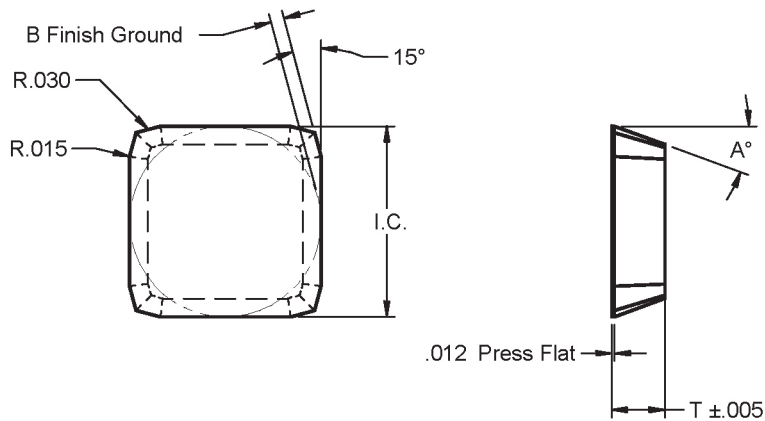
Insert	I.C.	T	R	H	Notes
SNSG434EN	.500 ±.003	.188	1/16	.203	Narrow
SNSG543EN	.625 ±.003	.250	3/64	.253	Narrow

SNSS



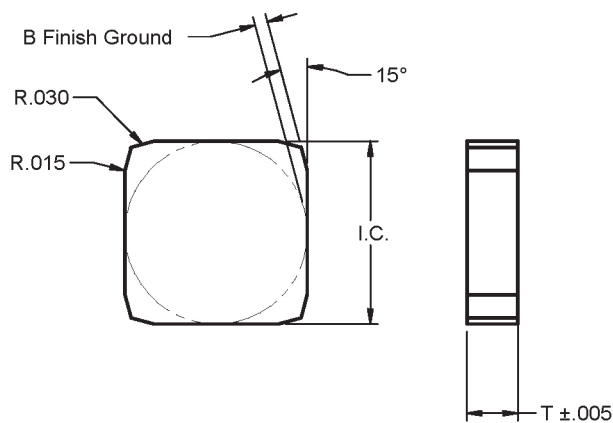
Insert	I.C.	T	R	H
SNSS432	.500 ±.003	.188	1/32	.203
SNSS643	.750 ±.003	.250	.3250	.313

SER-L/SPR-L



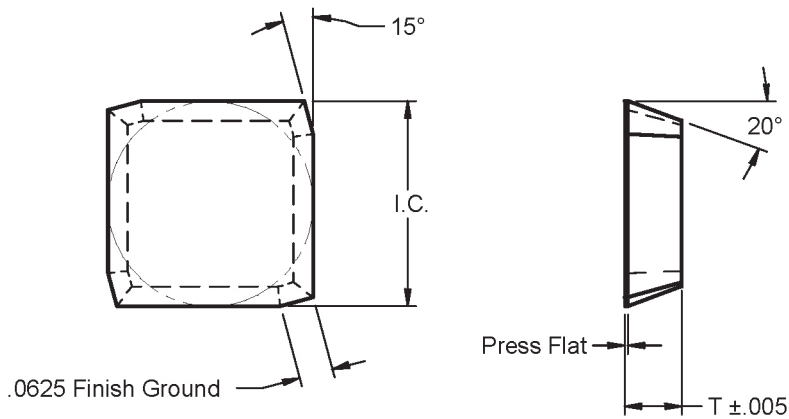
Insert	I.C.	B	T	A°
SER43L4	.516 ±.005	.0365	.213	20°
SER53L4	.640 ±.005	.0506	.213	20°
SER63L8	.769 ±.005	.0447	.198	20°
SPR63L8	.765 ±.005	.0447	.213	10°
SPR64L8	.765 ±.005	.0447	.262	10°

SNR-L



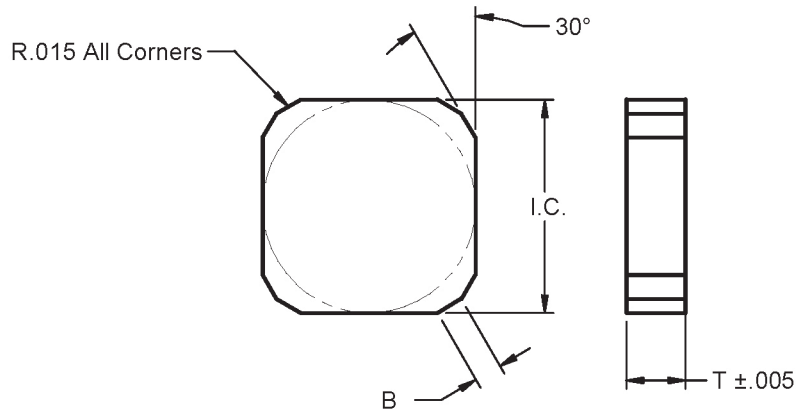
Insert	I.C.	B	T
SNR43L4	.516 ±.005	.0365	.213
SNR43L6	.516 ±.005	.0264	.213
SNR63L8	.769 ±.005	.0447	.213

SER-R



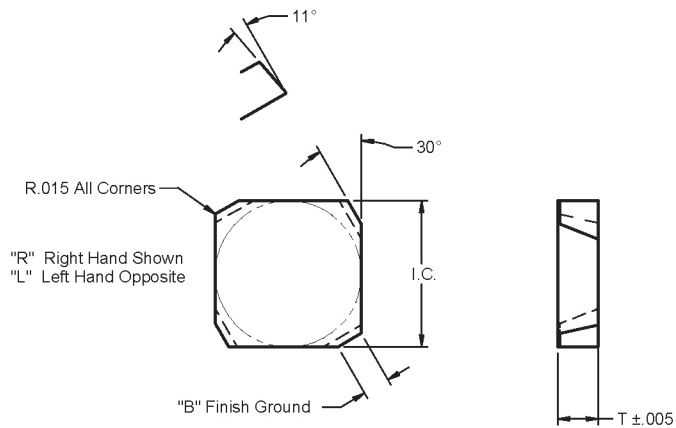
Insert	I.C.	B	T
SER42E4R	.516 ±.005	.0625	.143

SNR-K



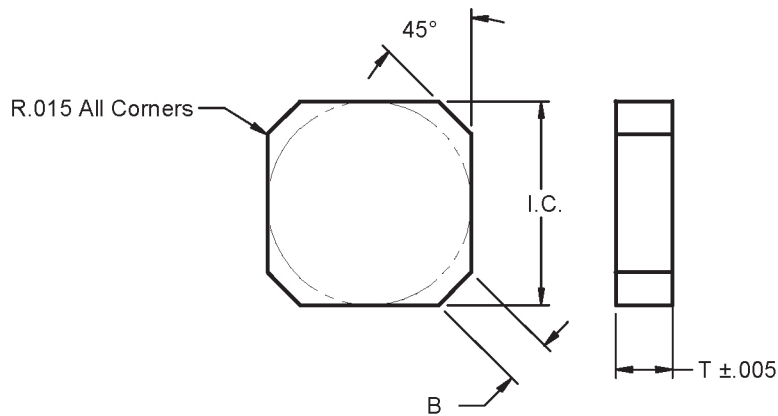
Insert	I.C.	B	T
SNR63K8	.769 ±.005	.172	.201

SHR



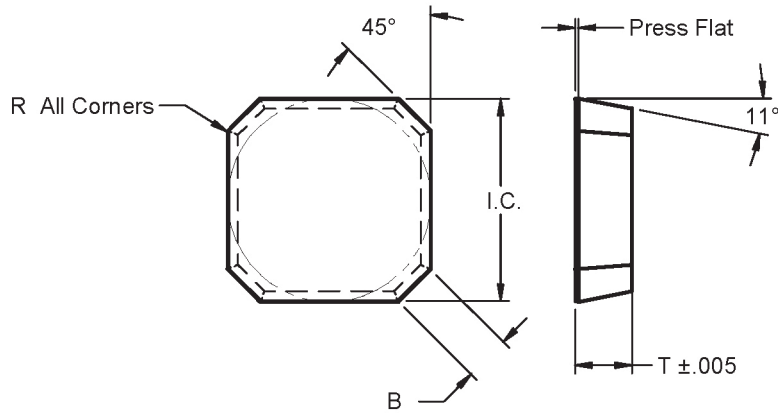
Insert	I.C.	B	T
SHR63D8R	.769 ±.005	.125	.201
SHR63D8L	.769 ±.005	.125	.201
SHR63D9R	.769 ±.005	.1476	.201
SHR63D9L	.769 ±.005	.1476	.201
SHR84D5R	1.017 ±.003	.078	.265

SNR-A



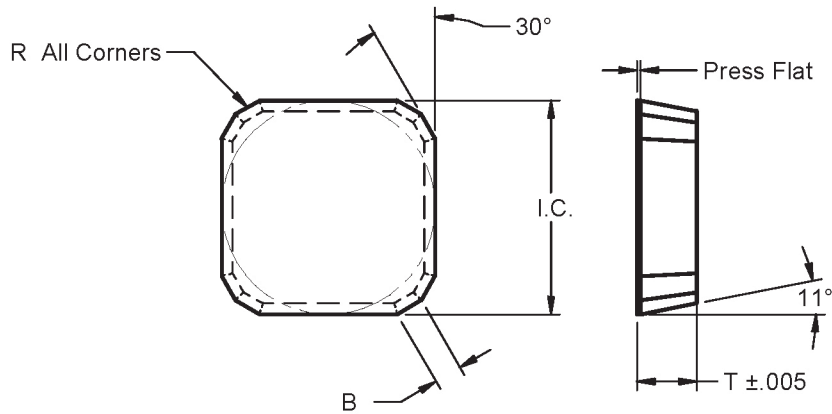
Insert	I.C.	B	T
SNR63A8	.769 ±.005	.125	.201

SPR-A



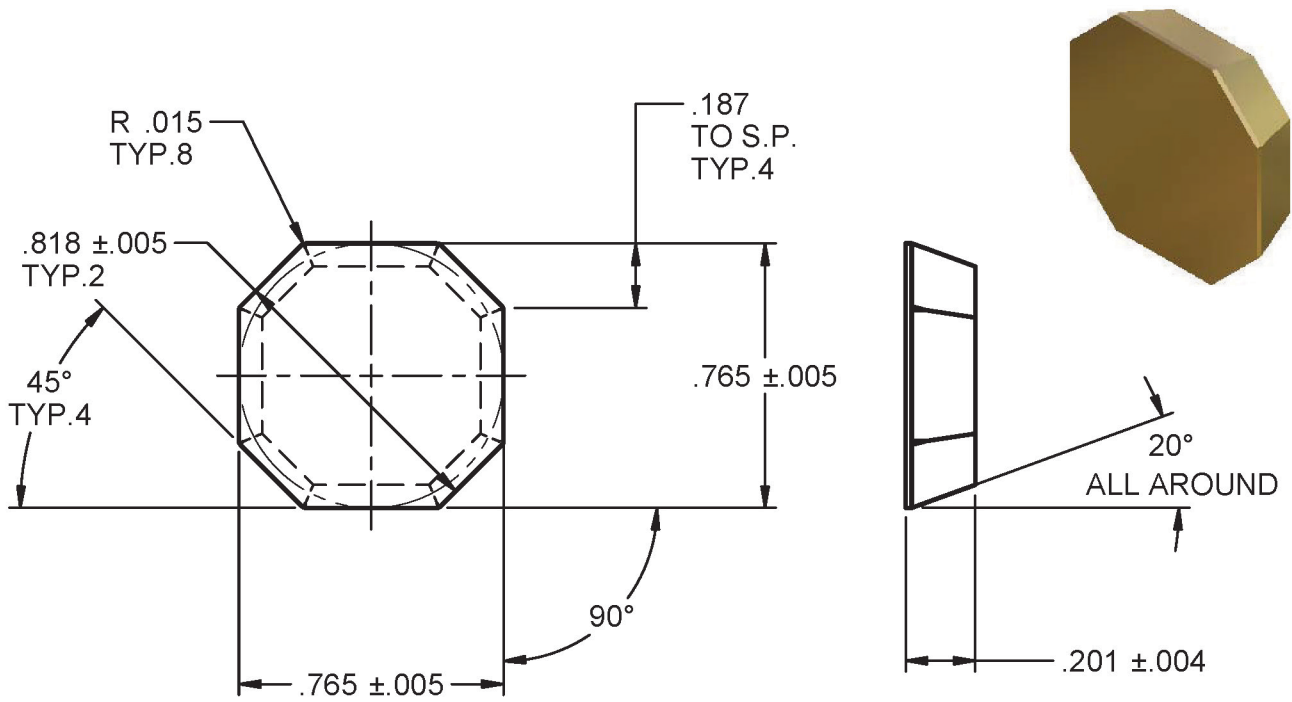
Insert	I.C.	B	T	R
SPR63A8	.769 ±.005	.125	.203	.015

SPR-K

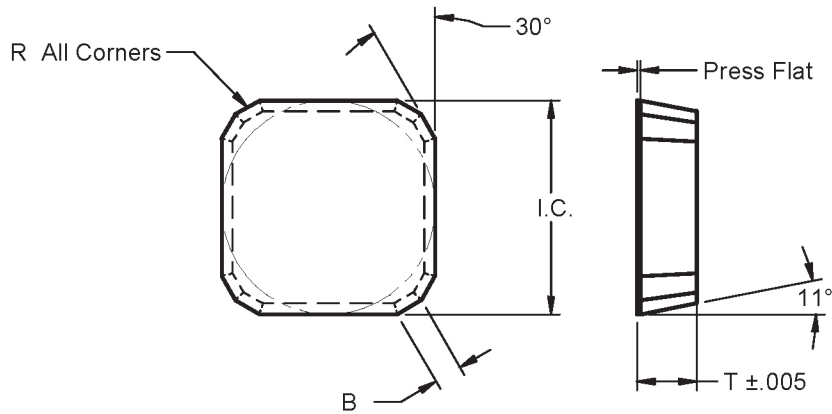


Insert	I.C.	B	T	R
SPR63K8	.769 ±.005	.125	.203	.015

SER63A8

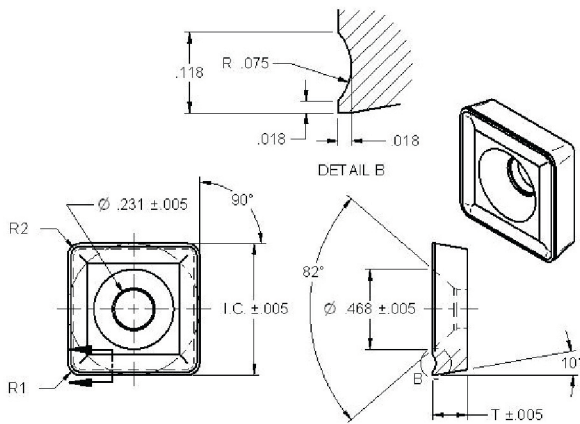


SER63K8



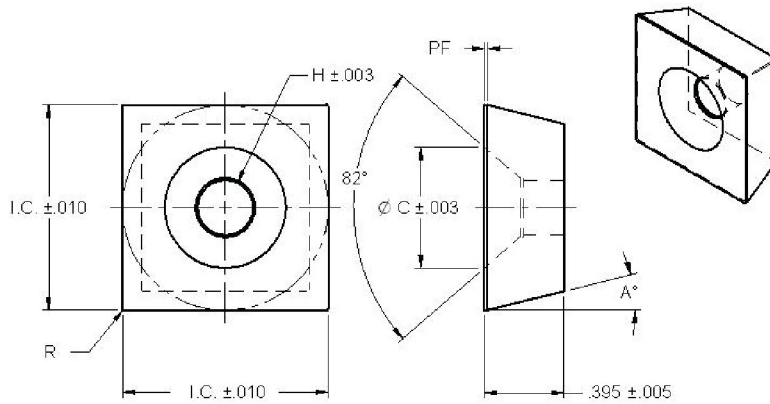
Insert	I.C.	B	T	R
SPR63K8	.769 ±.005	.125	.203	.015

SPRH



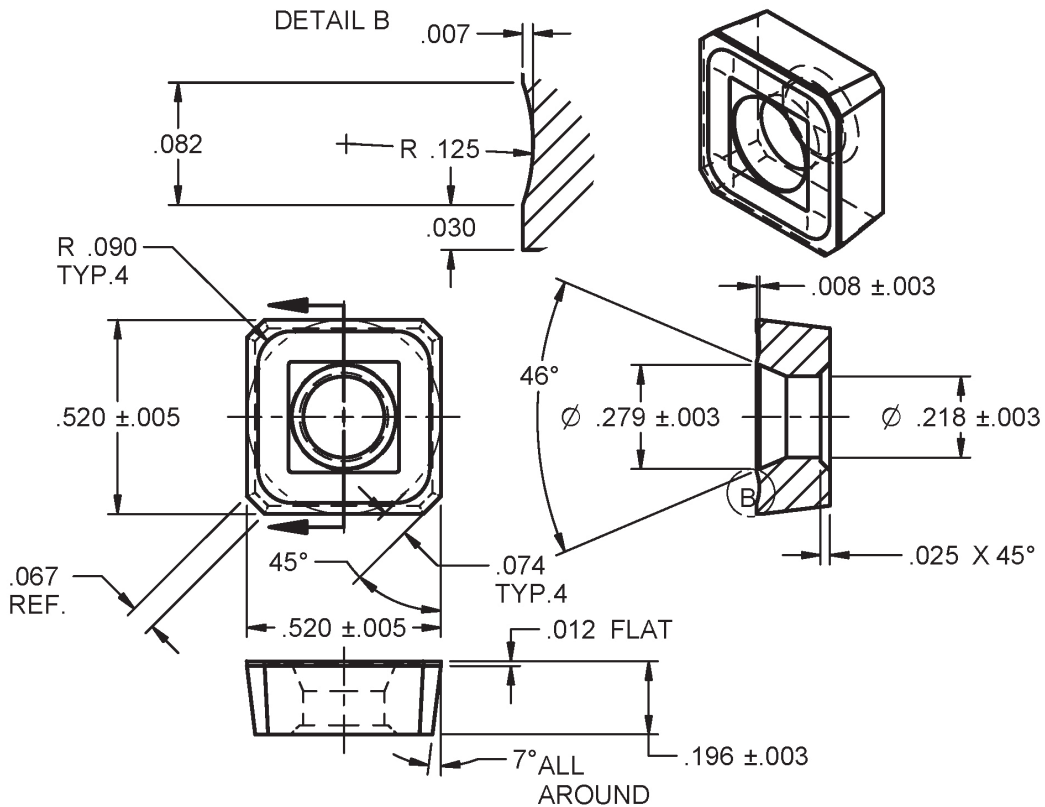
Insert	IC	T	R1	R2
SPRH631	.770	.203	.015	.073
SPRH634	.770	.203	.072	.073
SPRH638	.770	.203	.135	.136

SDRB/SDSB

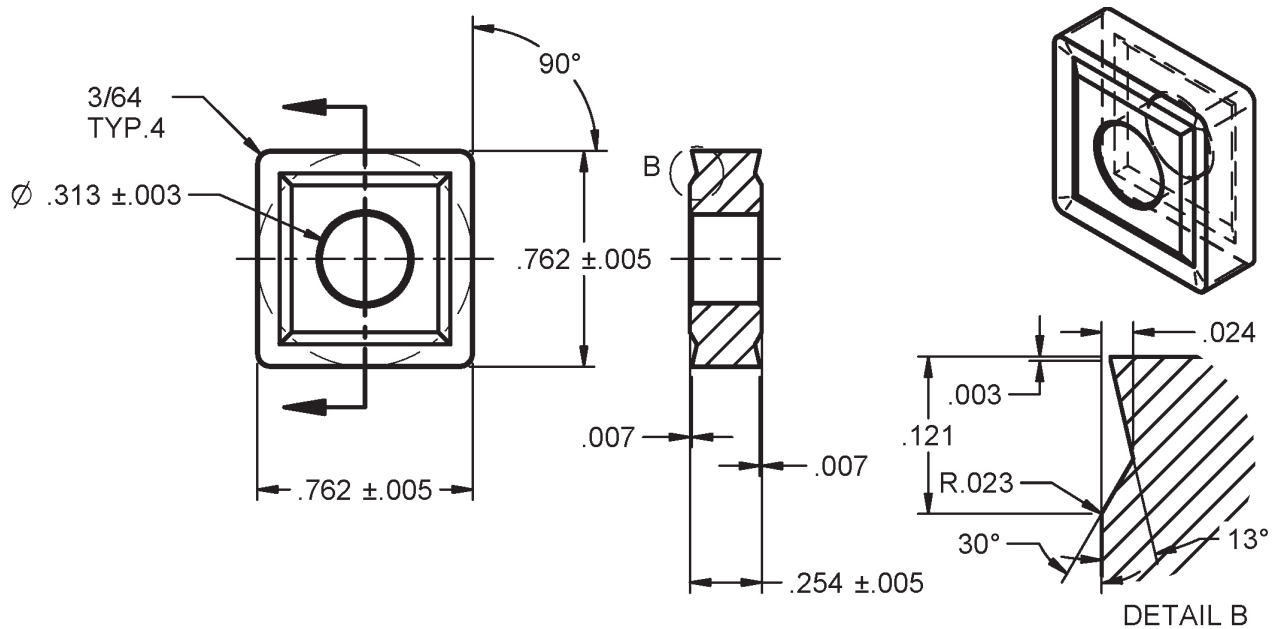


Insert	I.C.	R	H	C	PF	A
SDRB633	.767	3/64	.231	.467	.052	14°
SDRB860	1.025	.008	.273	.573	.015	14°
SDSB860	1.000	.008	.268	.564	.0125	15°
SDSB1264	1.500	1/16	.265	.600	.016	15°

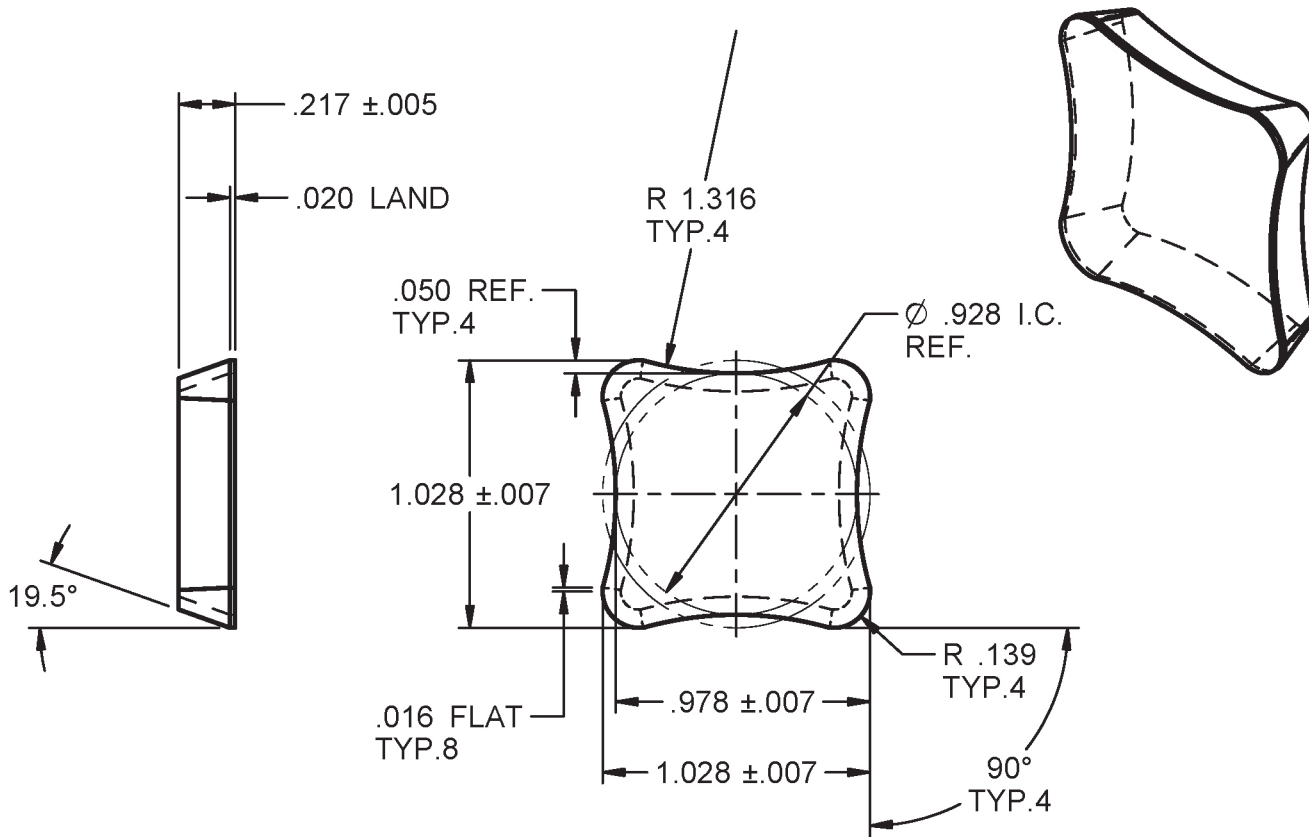
SCRT43A (LX-0350/MA-65752)



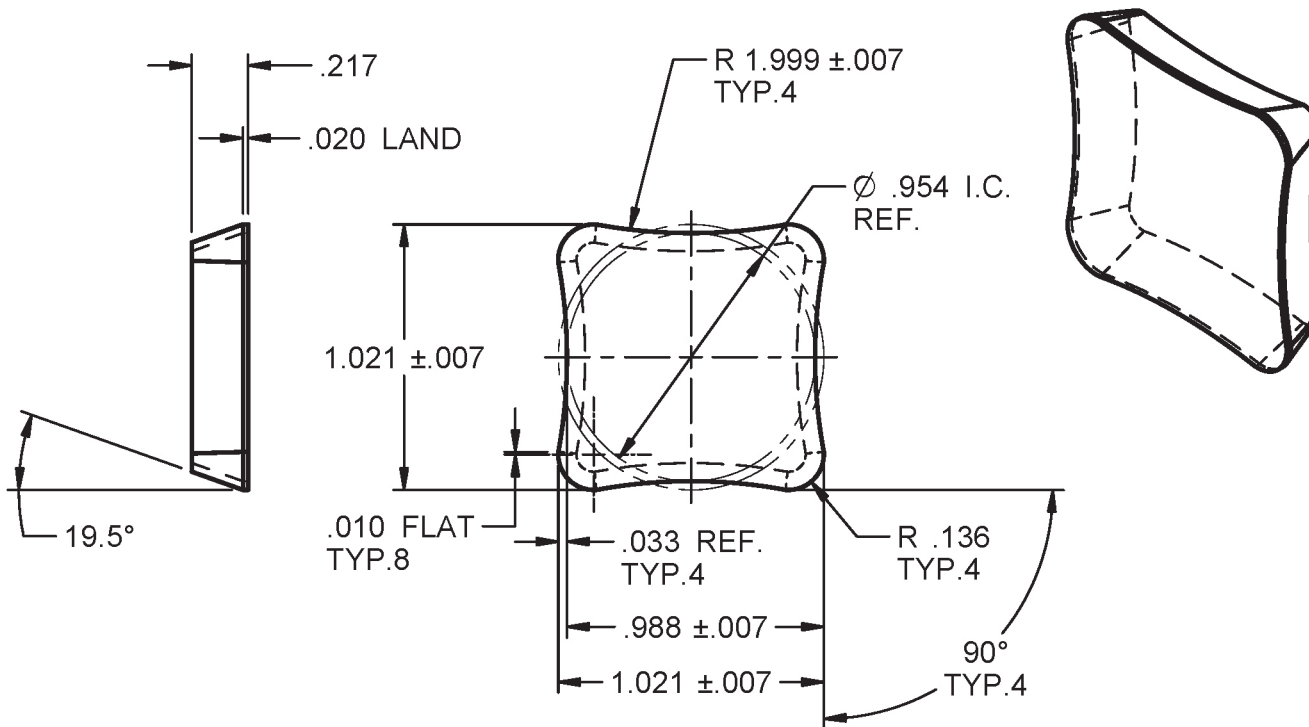
SNRP643 (LX-1708-1/MA 72271)



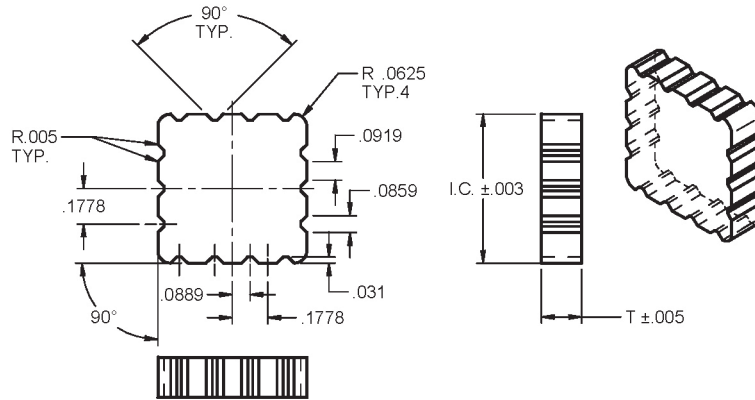
MA-70086-6 (LX-1646-3)



MA-70086-3 (LX-1646-2)

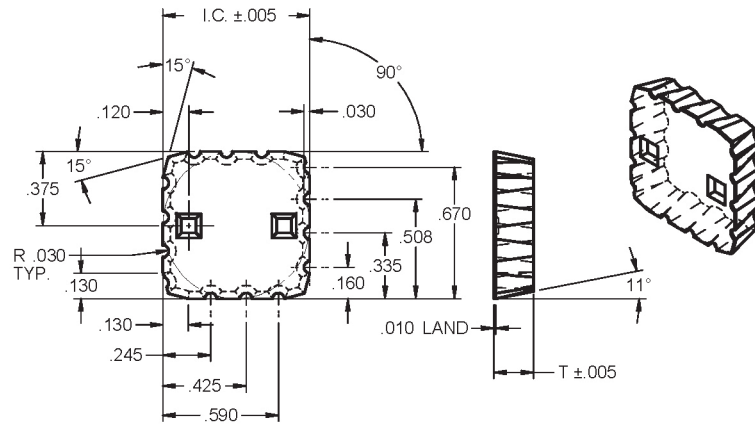


A-1544-C



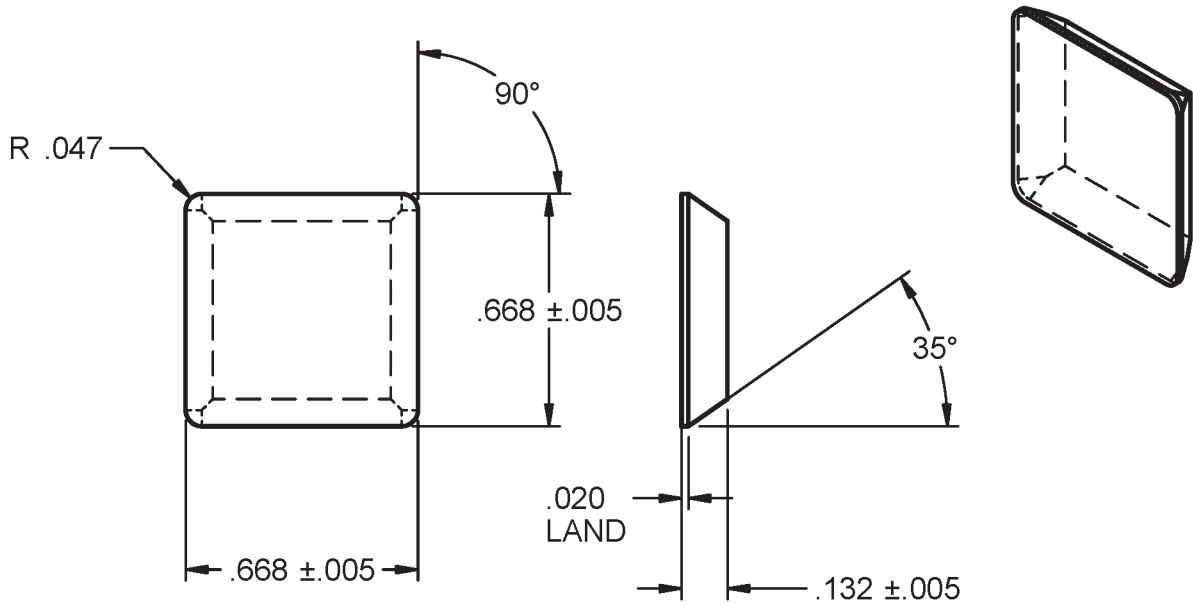
Insert	I.C.	T
A-1544-C-1	.747	.201
A-1544-C-2	.747	.265
A-1544-C-3	.750	.201
A-1544-C-4	.750	.265

A-2860-C

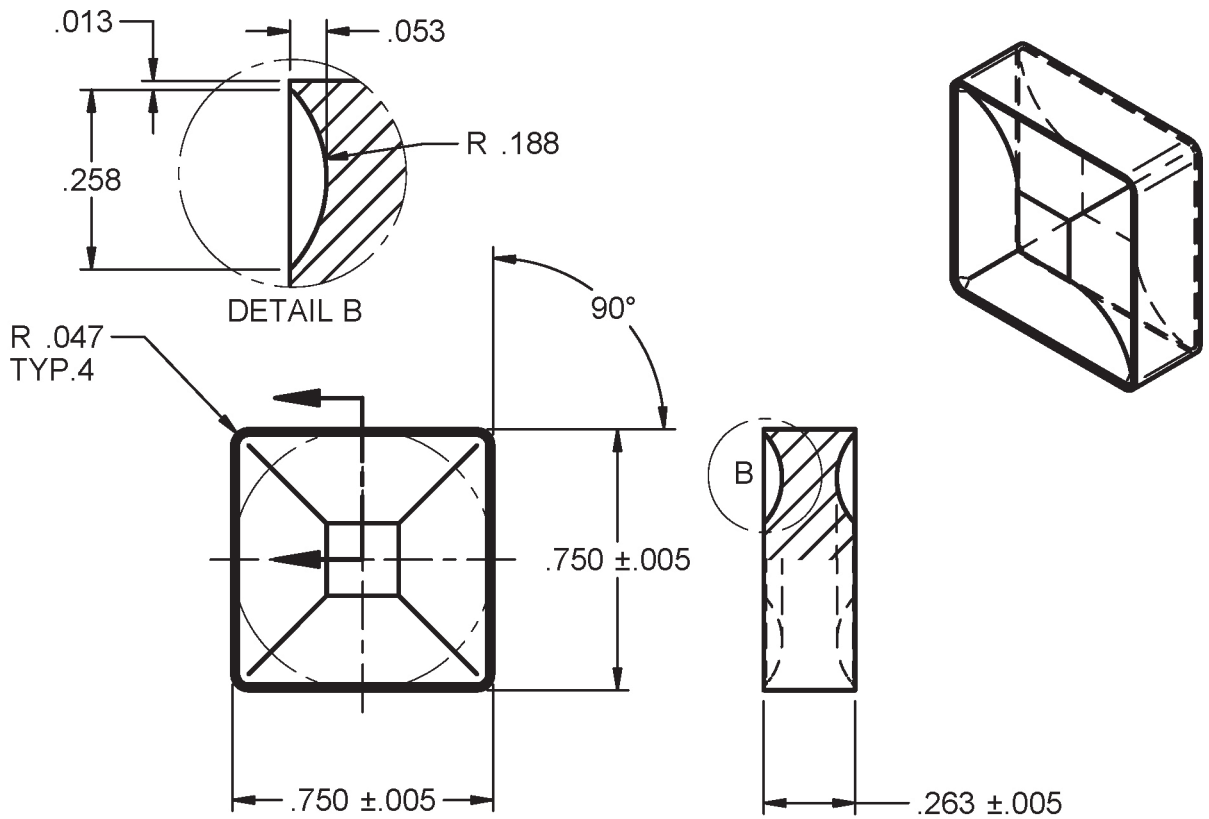


Insert	I.C.	T
A-2860-C	.750	.203

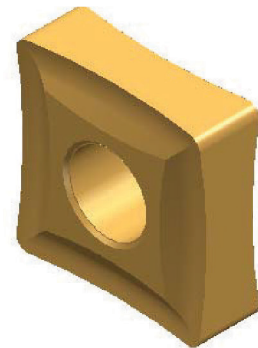
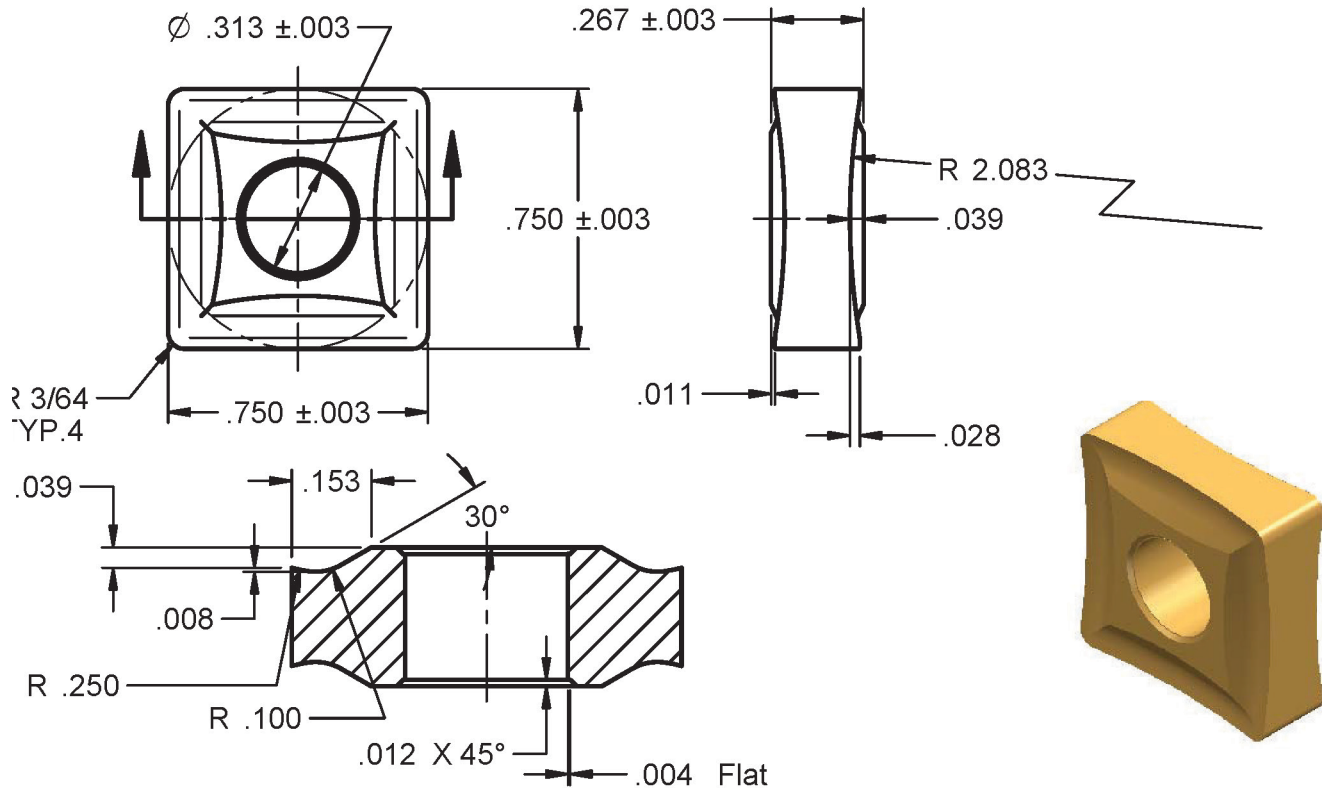
MA-71569



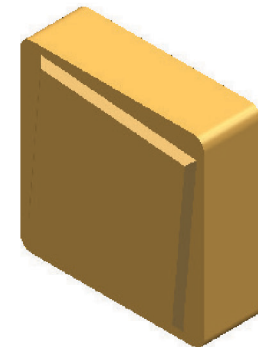
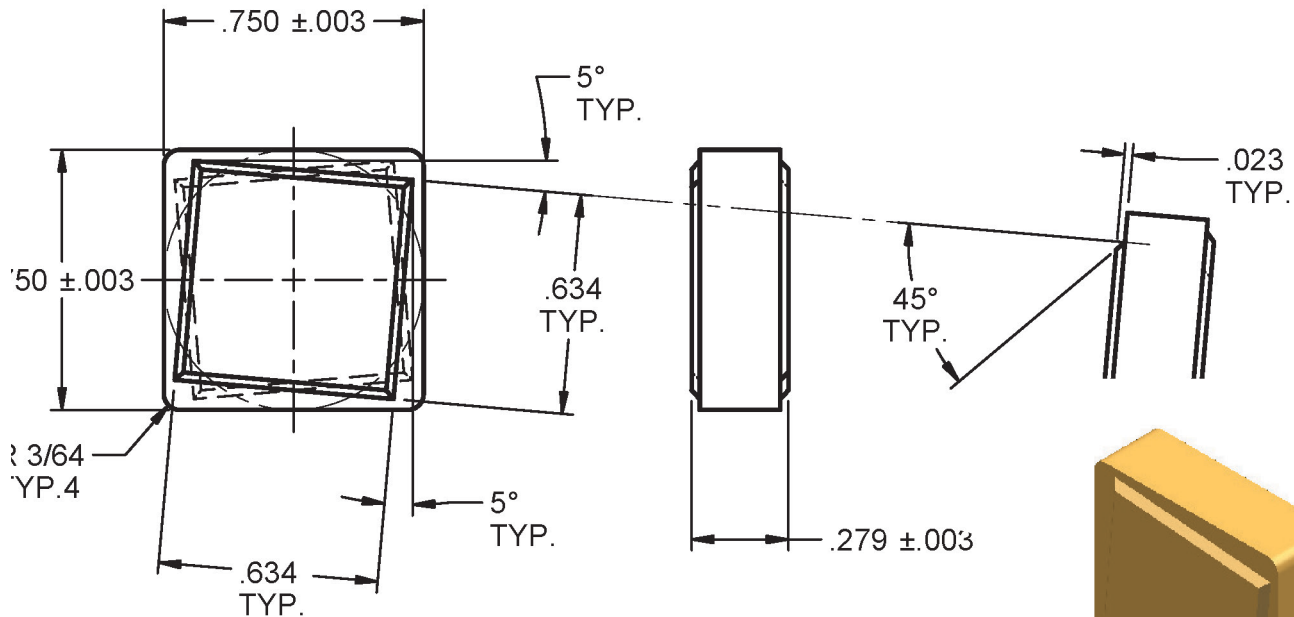
MA-70275



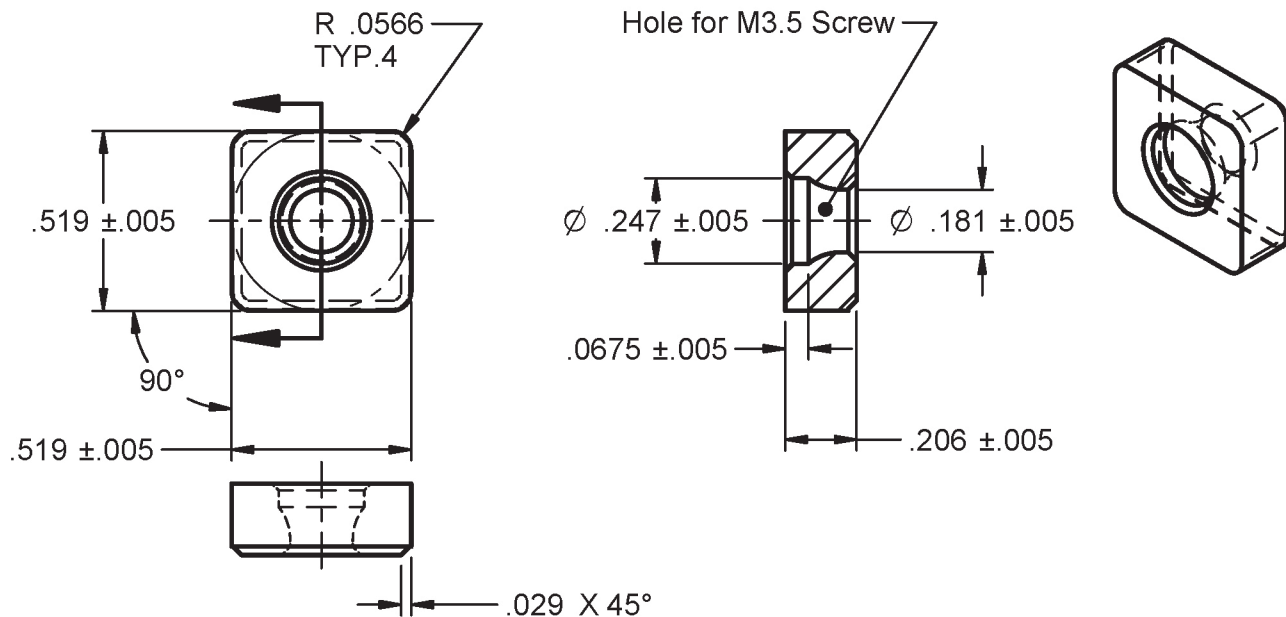
SNSX643-P3 (D-16663-P3 L20)



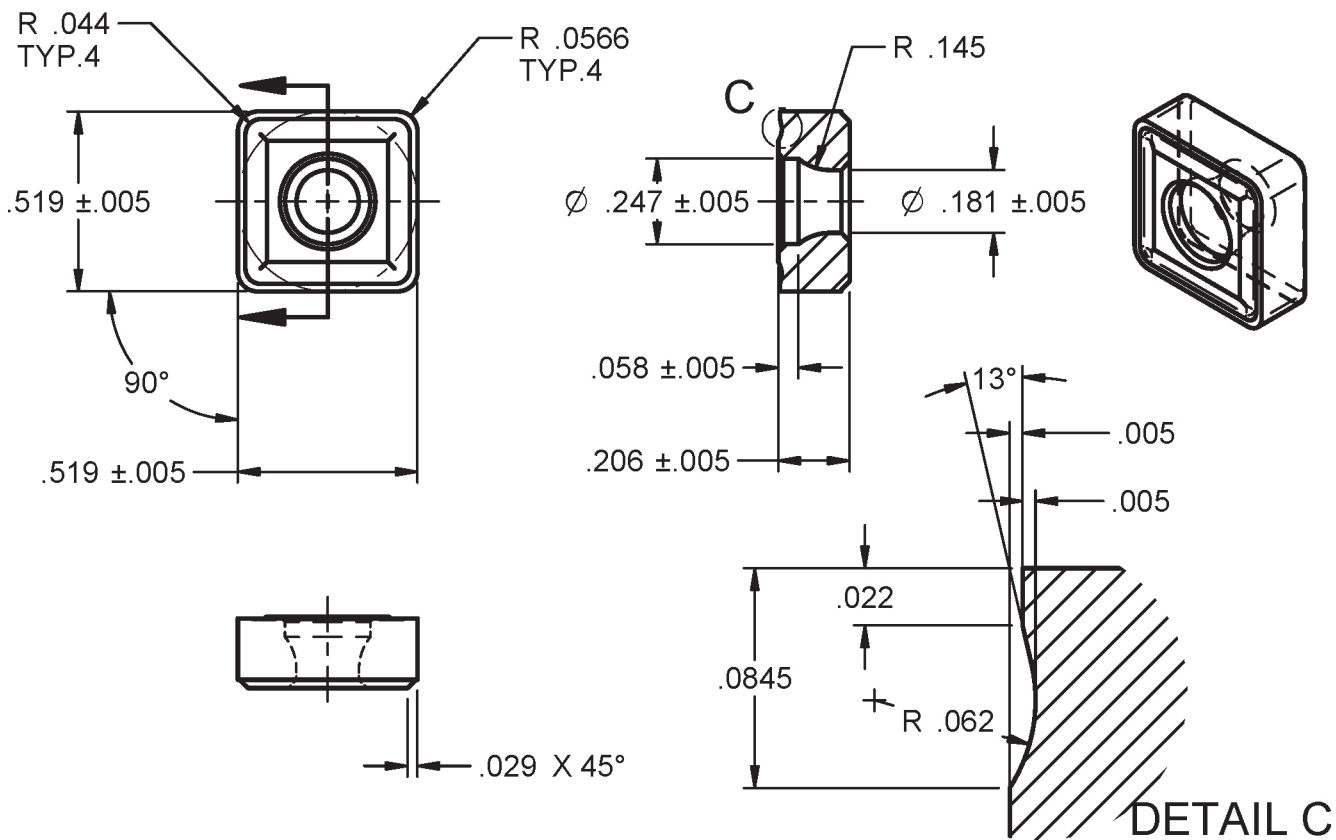
MA-SNSX643-X426 (D-16663-P5 L20)



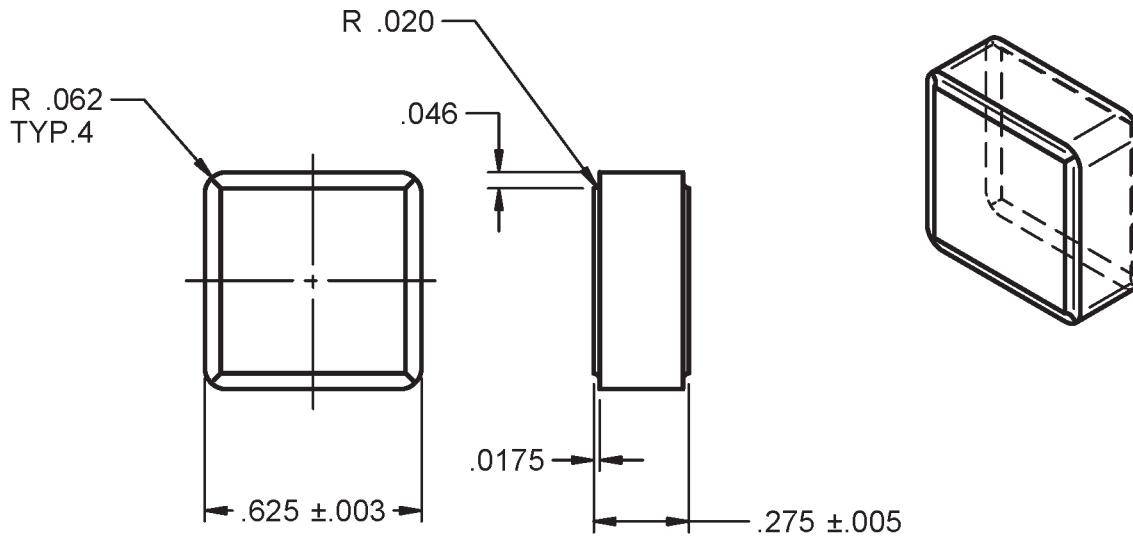
LX-0985-2 (MAI-68465, SNRW433-M3.5)



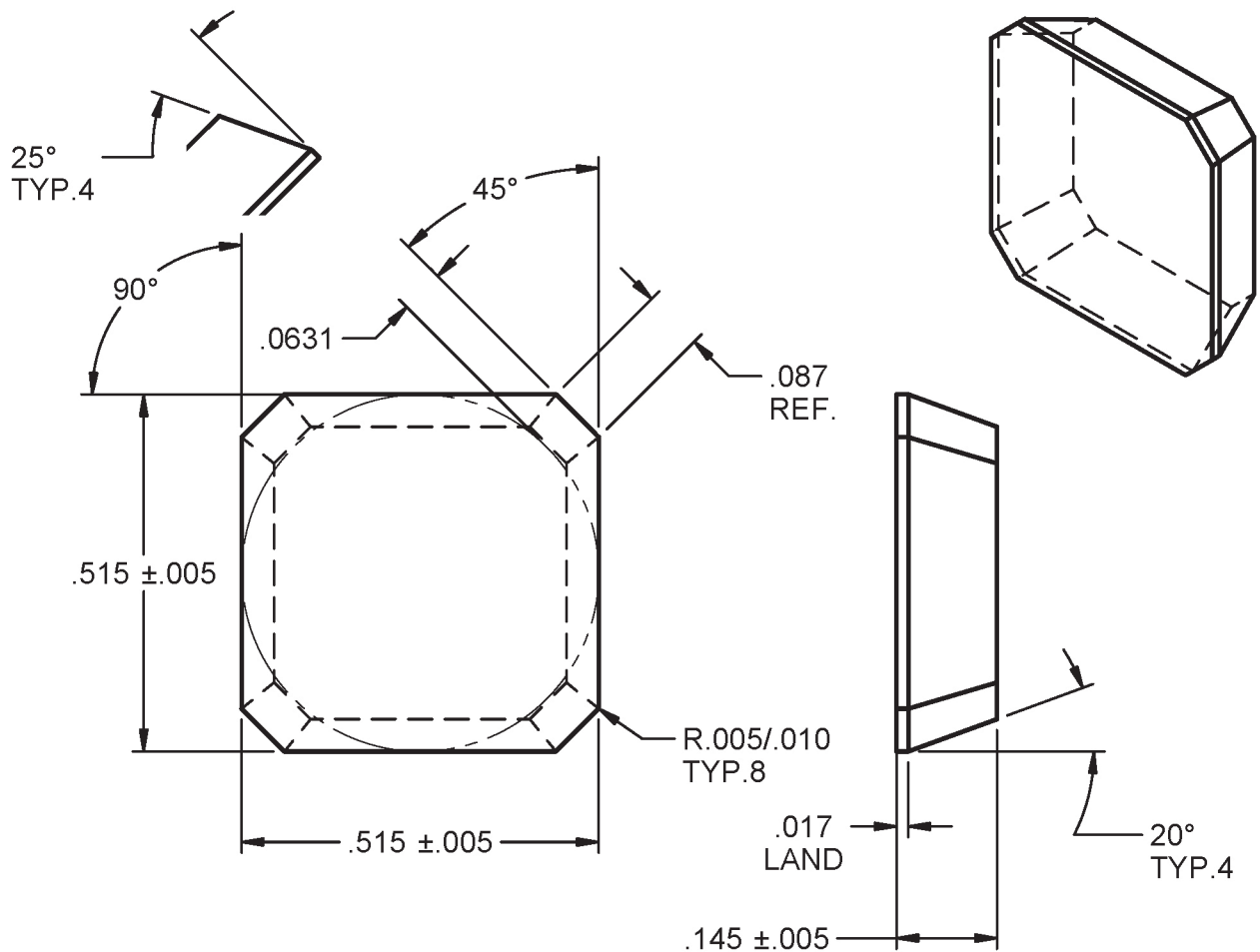
MA-SNSX643-X426 (D-16663-P5 L20)



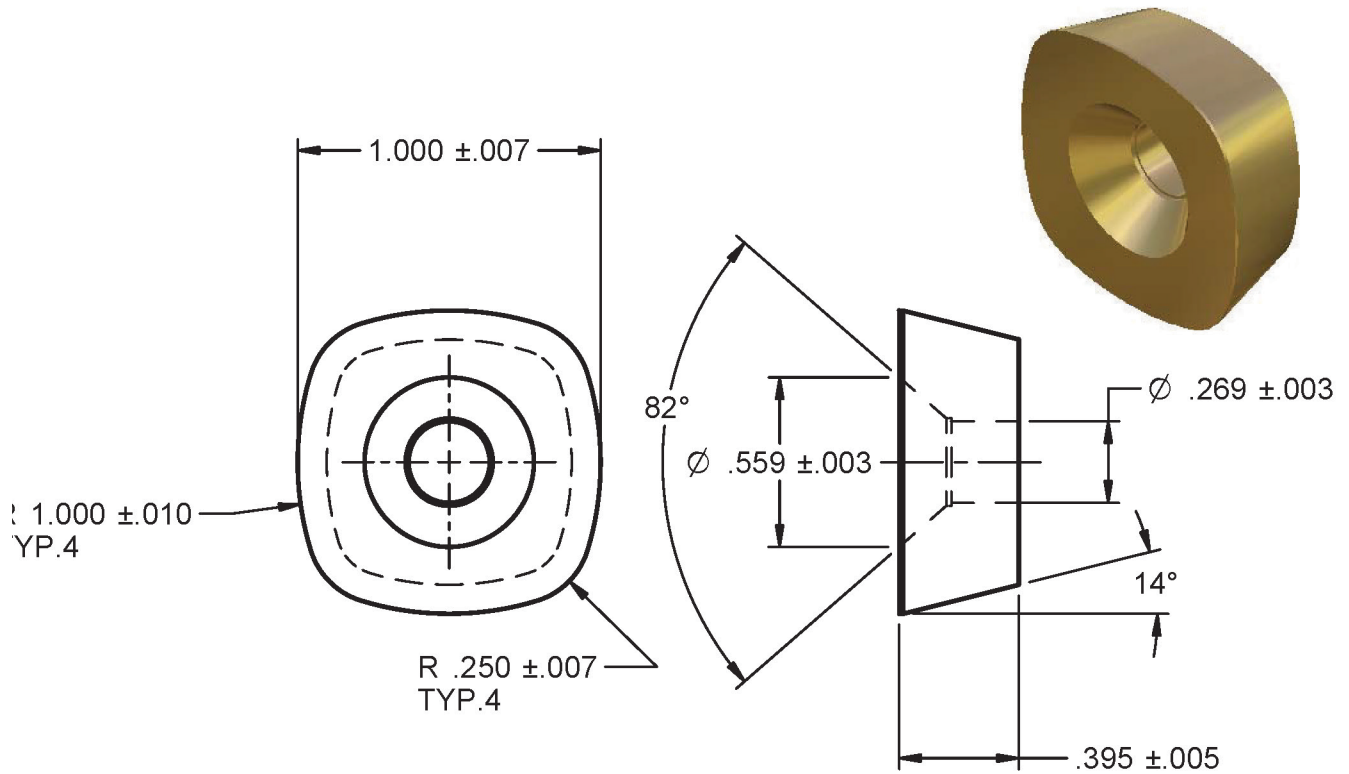
LX-0468-1 (MA-70975, SNSF544)



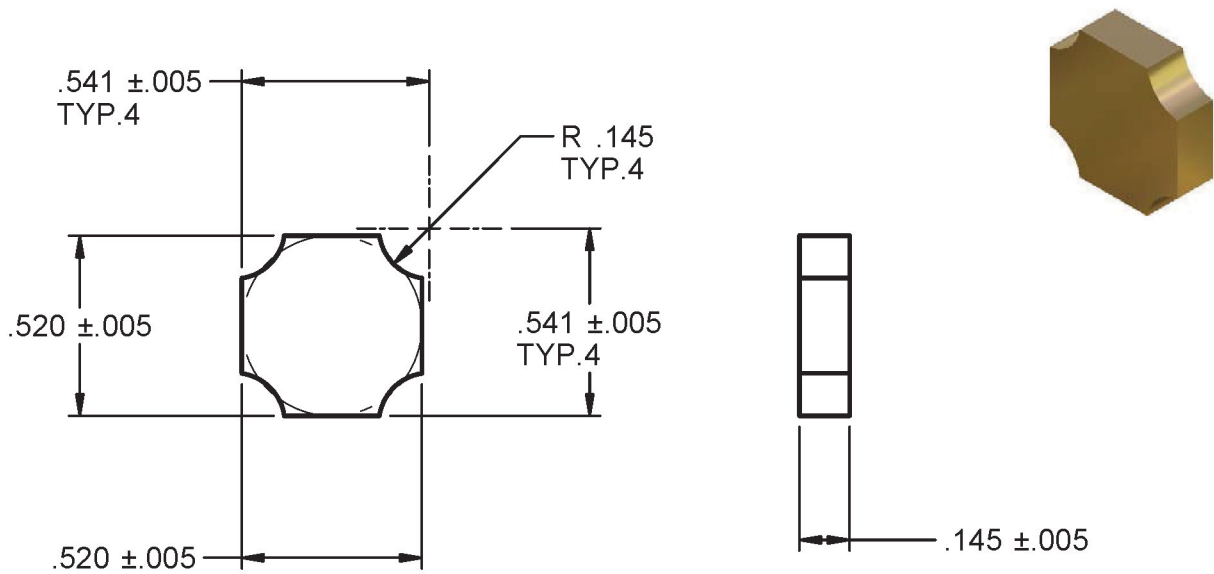
LX-0372-2 (SERN42A)



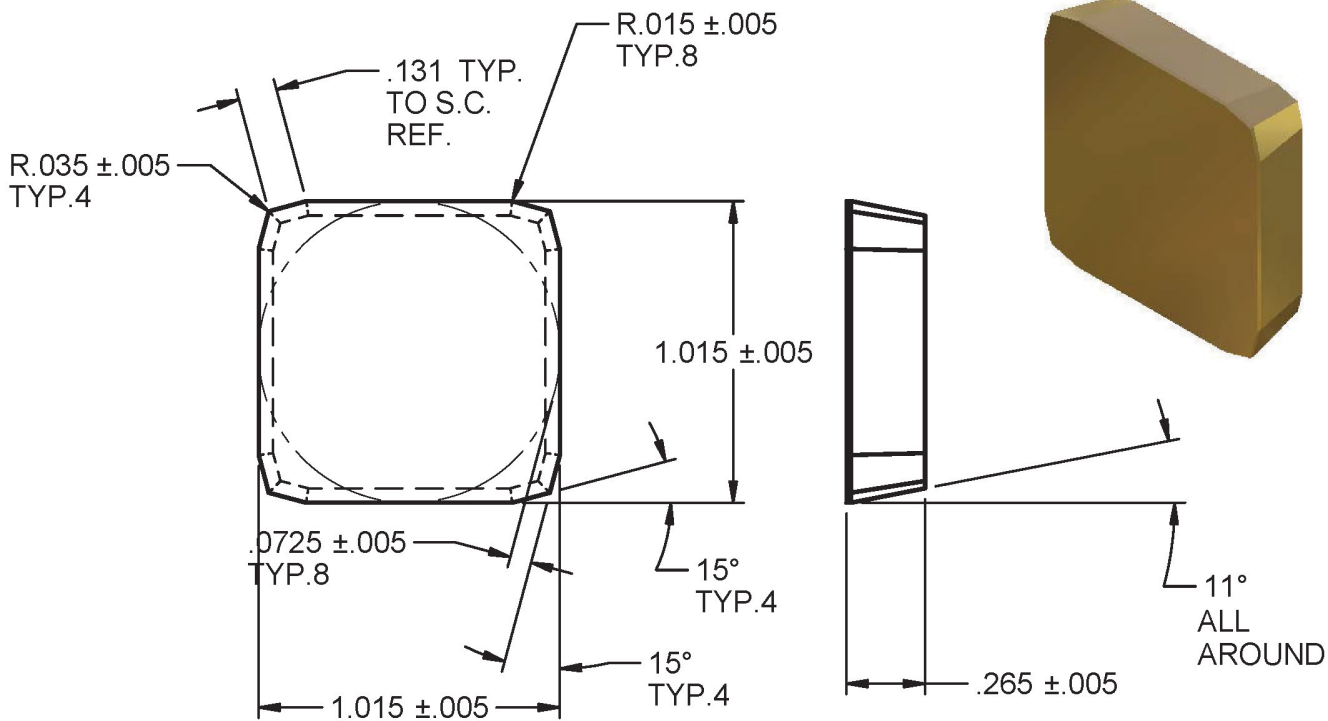
R-13790



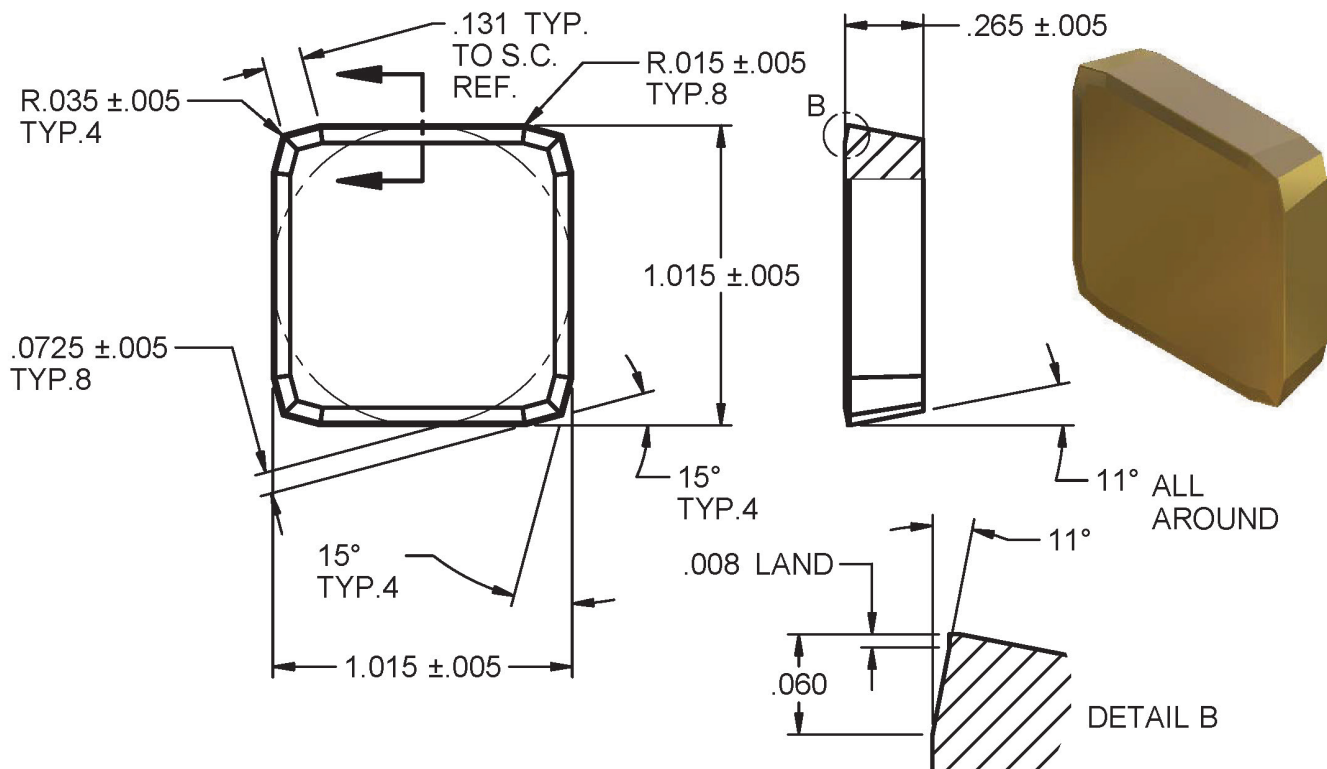
A-2485-A



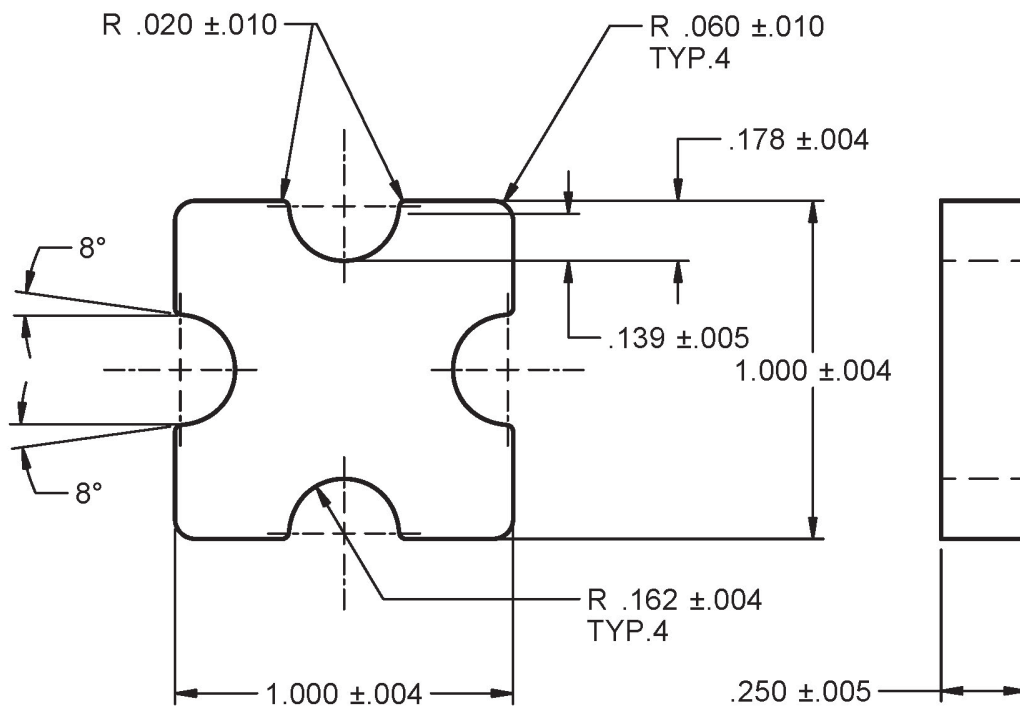
A-1507-B (SPR84L8)



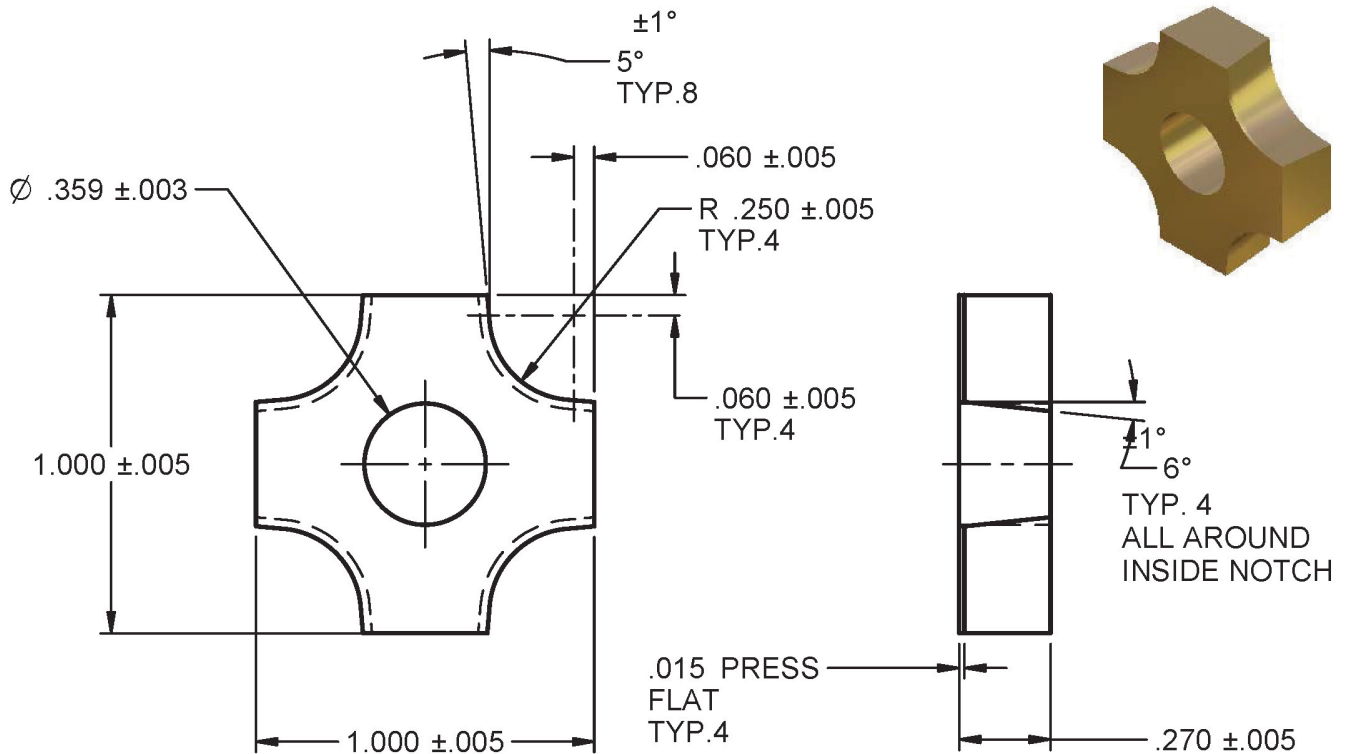
A-1507-D (SPR84L8T)



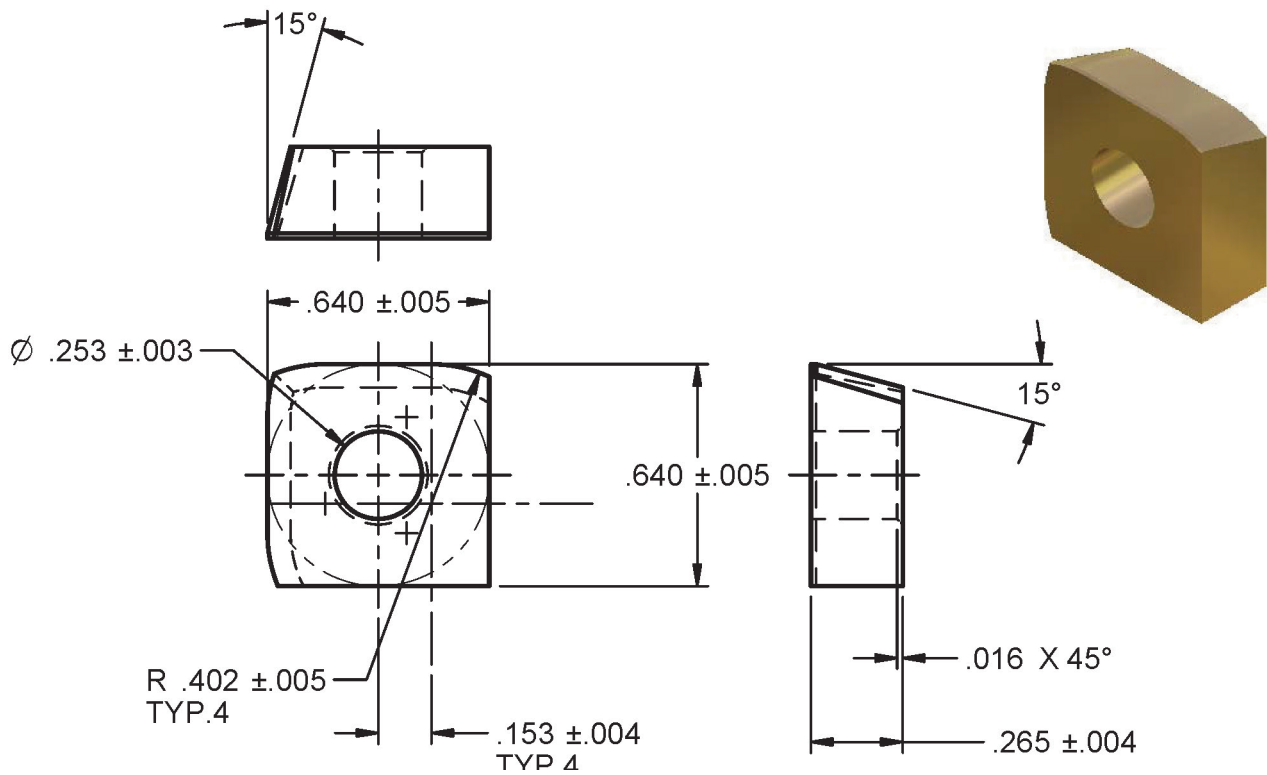
A-2089B



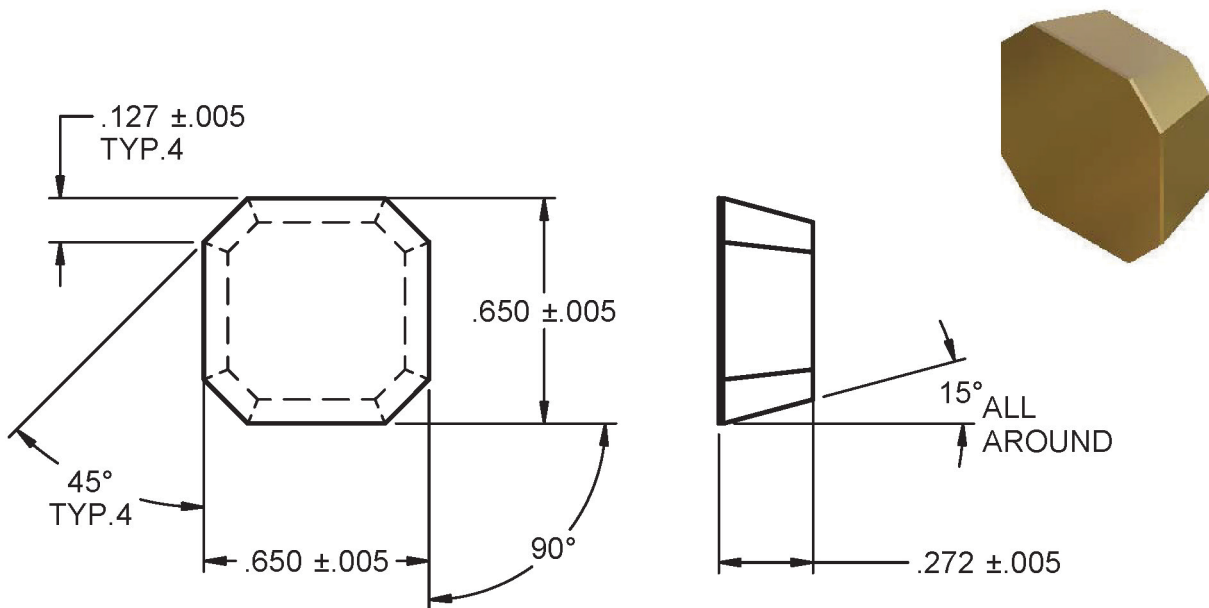
A-2442A



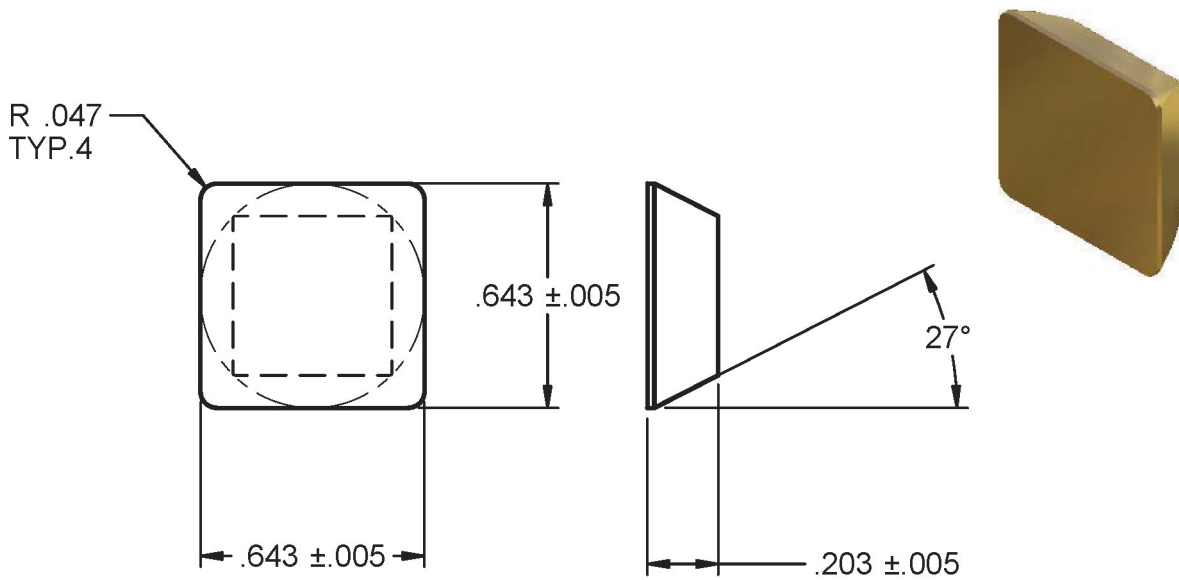
A-1923-D



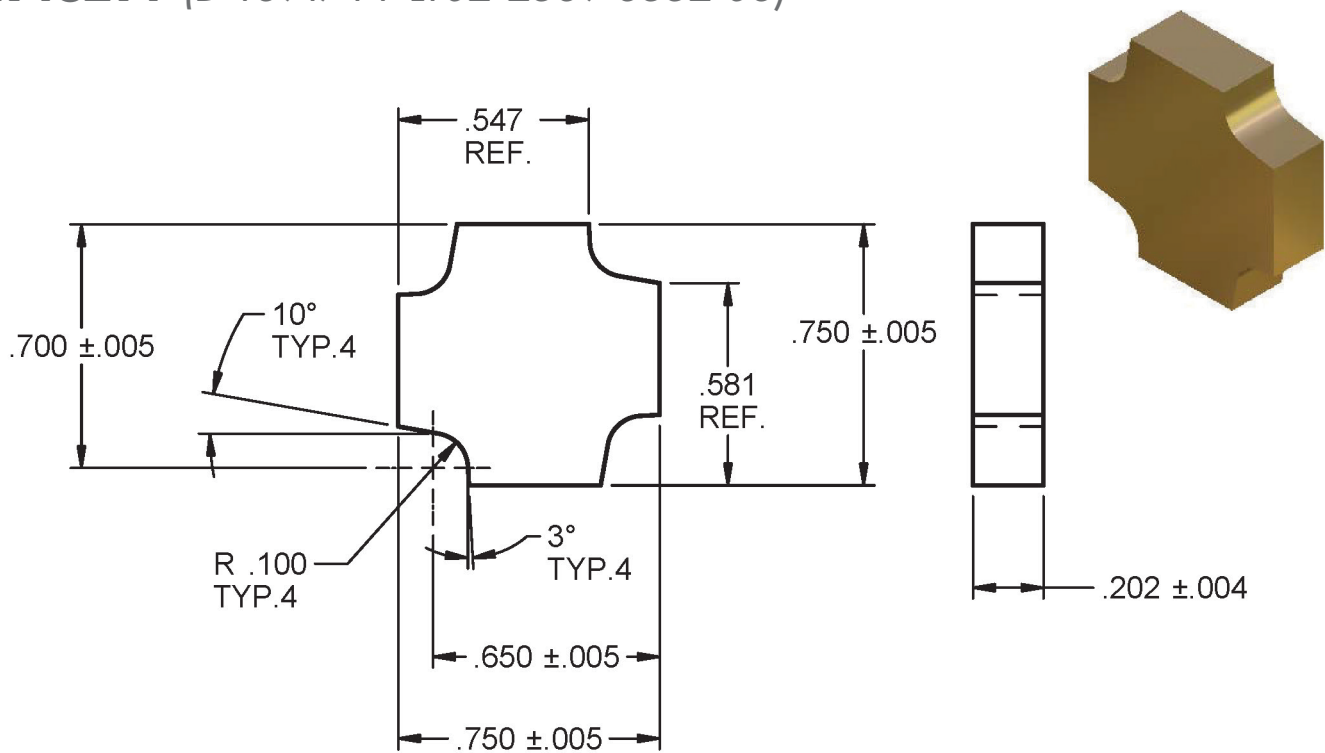
A-2430-A



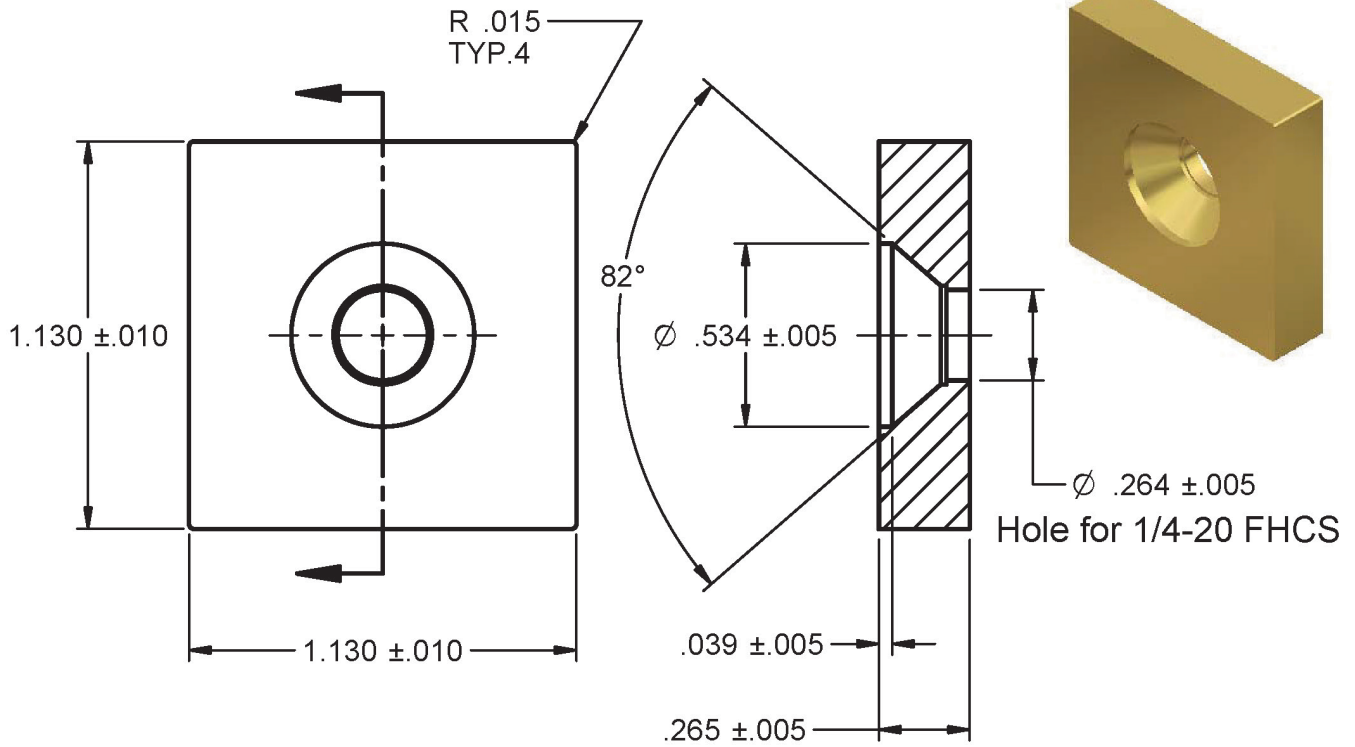
SXR533



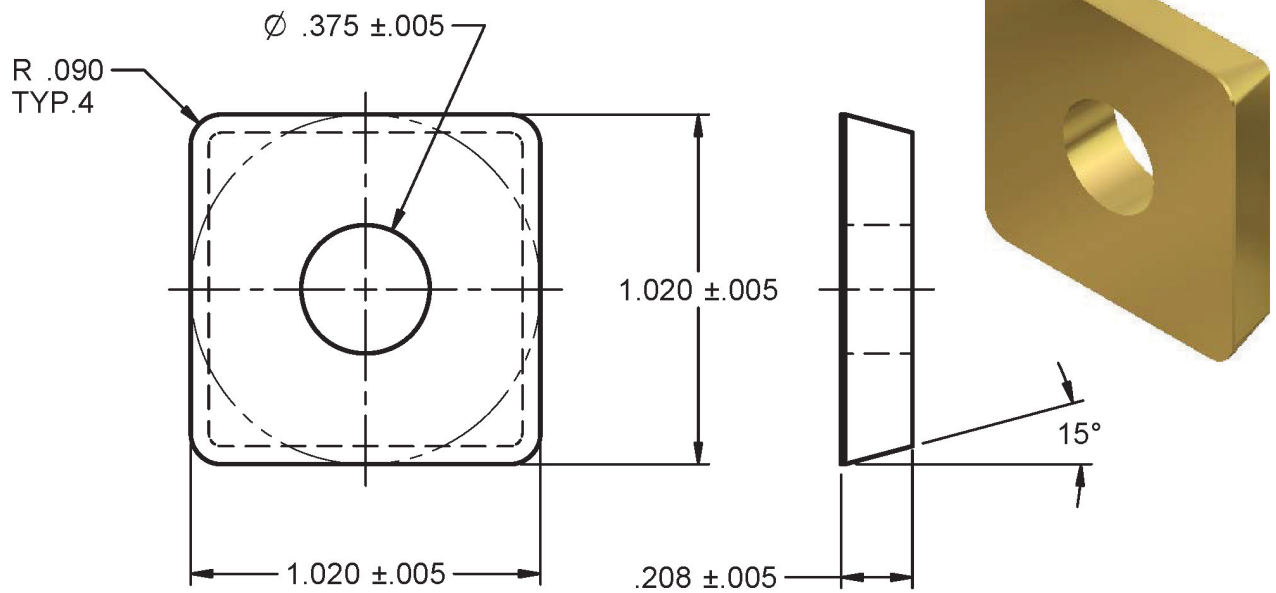
R-16291 (D-16917-P1 L102 2539-3552-03)



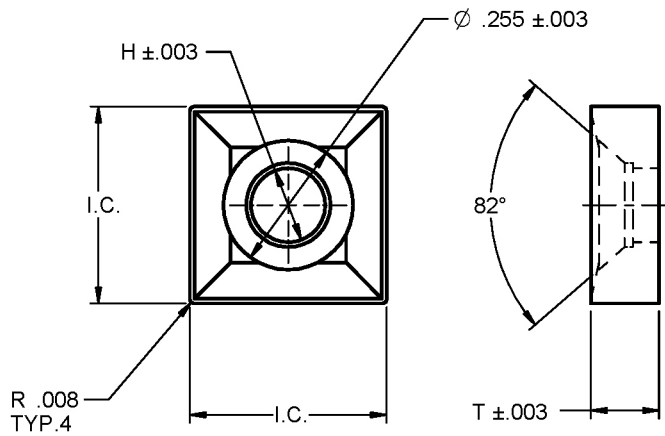
A-1788-B (D-19224-P1)



R-15381-2-3 (D-19071-P1)

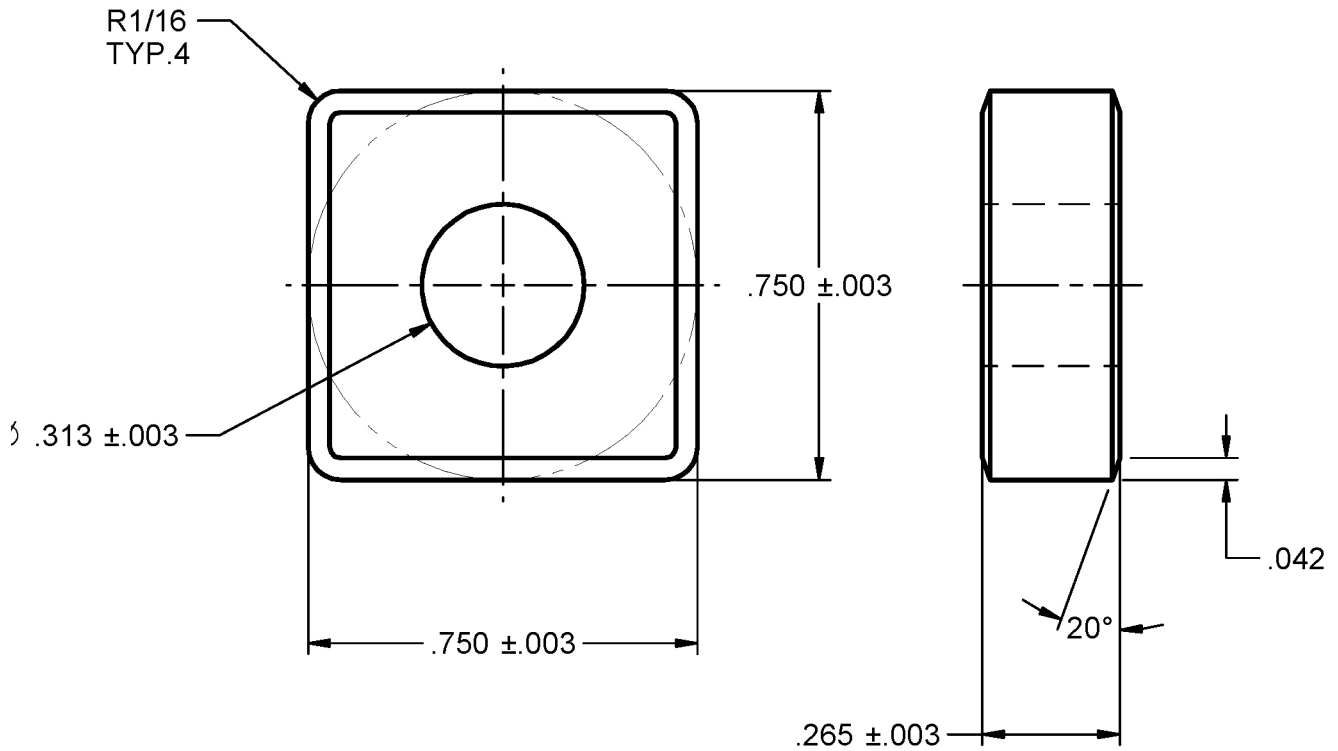


SNRX

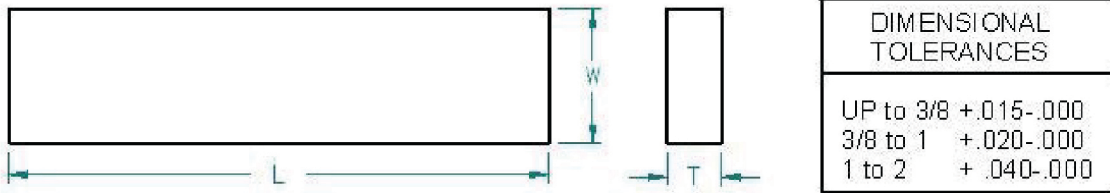


Insert	I.C.	T	R	H
SNRX320	$.388 \pm .003$	.133	.008	.144
SNRX32.50	$.388 \pm .003$	.176	.008	.144
SNRX330	$.388 \pm .003$	.198	.008	.144

SNSA644T0220-20

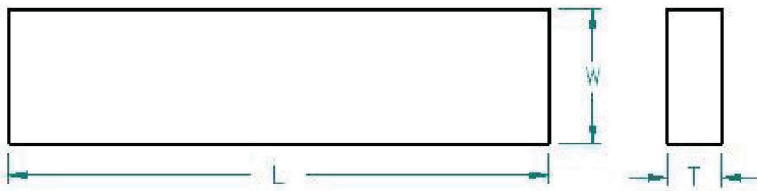


STB



Insert	T	W	L	T	W	L
STB410A	1/8	5/16	1-1/2	.145	.329	1.517
STB410C	1/8	5/16	2-1/2	.145	.323	2.517
STB412D	1/8	3/8	1	.145	.385	1.017
STB412A	1/8	3/8	2	.145	.392	2.020
STB416A	1/8	1/2	1	.145	.525	1.045
STB416B	1/8	1/2	1-1/2	.145	.515	1.537
STB416D	1/8	1/2	2-1/2	.145	.530	2.515
STB416C	1/8	1/2	3	.145	.525	3.040
STB420B	1/8	5/8	2	.145	.645	2.020
STB420A	1/8	5/8	3	.145	.637	3.040
STB6161	3/16	1/2	1	.207	.511	1.012
STB68A	3/16	1/4	3	.207	.268	3.025
STB616C	3/16	1/2	1-1/4	.207	.510	1.267
STB616B	3/16	1/2	2-1/2	.207	.530	2.515
STB616A	3/16	1/2	3	.207	.525	3.040
STB341	3/32	1/8	1	.114	.135	1.020
STB343	3/32	1/8	3	.114	.145	3.045
STB3101	3/32	5/16	1	.114	.330	1.020
STB3121	3/32	3/8	1	.114	.385	1.017
STB3161	3/32	1/2	1	.114	.511	1.012
STB3164	3/32	1/2	4	.114	.525	4.015
STB4101	1/8	5/16	1	.145	.330	1.020
STB4201	1/8	5/8	1	.145	.635	1.010
STB4241	1/8	3/4	1	.145	.760	1.010
STB681	3/16	1/4	1	.207	.263	1.018

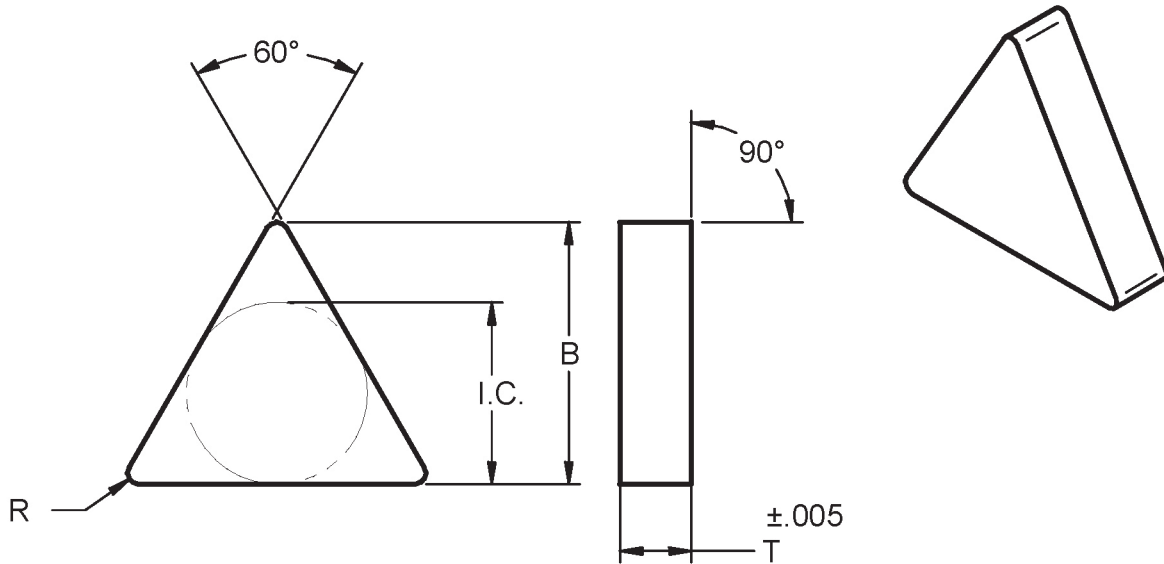
STB



DIMENSIONAL TOLERANCES	
UP to 3/8	+ .015- .000
3/8 to 1	+ .020- .000
1 to 2	+ .040- .000

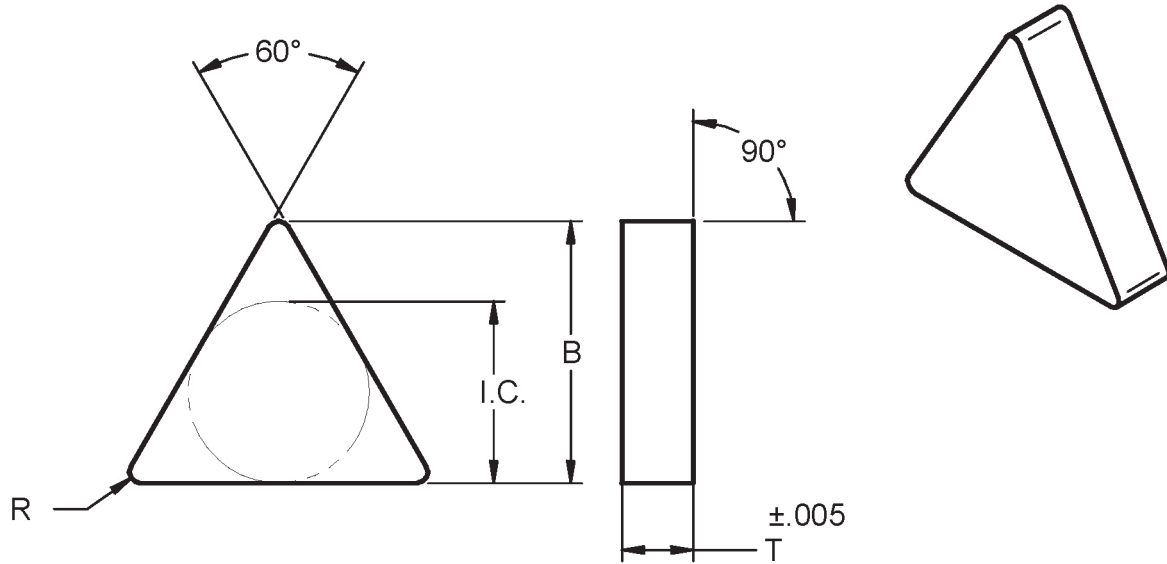
Insert	T	W	L	T	W	L
STB68A	3/16	1/4	3	.207	.268	3.025
STB6101	3/16	5/16	1	.207	.330	1.020
STB6121	3/16	3/8	1	.207	.385	1.017
STB6161	3/16	1/2	1	.207	.511	1.012
STB616A	3/16	1/2	3	.207	.525	3.040
STB6201	3/16	5/8	1	.207	.635	1.010
STB6241	3/16	3/4	1	.207	.760	1.010
STB8121	1/4	3/8	1	.270	.385	1.017
STB812X	1/4	3/8	1-1/4	.270	.390	1.269
STB8161	1/4	1/2	1	.270	.511	1.012
STB816A	1/4	1/2	3	.270	.525	3.040
STB8201	1/4	5/8	1	.270	.635	1.010
STB24B	1/16	1/8	3	.082	.145	3.045
STB24D	1/16	1/8	1-1/2	.082	.135	1.535
STB28D	1/16	1/4	3	.082	.268	3.025

TNR



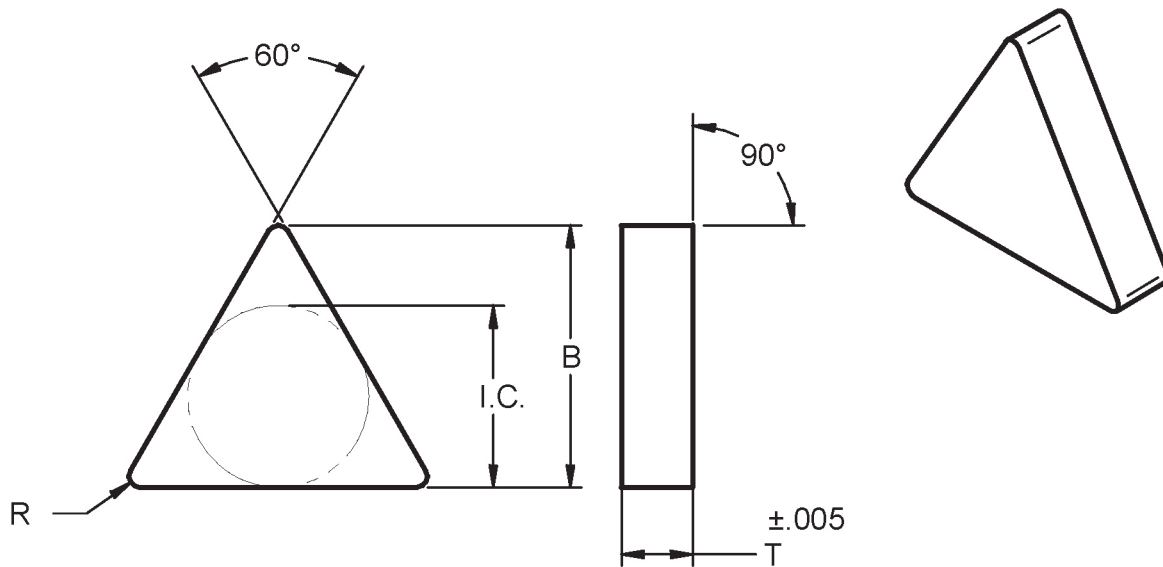
Insert	I.C.	B	T	R
TNR211	.264 ±.004	.381	.080	1/64
TNR220	.264 ±.004	.384	.139	.012
TNR221	.264 ±.004	.380	.139	1/64
TNR222	.264 ±.004	.365	.139	1/32
TNR2.521	.317 ±.005	.483	.139	1/64
TNR320	.391 ±.005	.574	.139	.012
TNR321	.391 ±.005	.570	.139	1/64
TNR322	.391 ±.005	.555	.139	1/32
TNR323	.391 ±.005	.539	.139	3/64
TNR330	.391 ±.005	.574	.201	.012
TNR331	.391 ±.005	.570	.201	1/64
TNR332	.391 ±.005	.555	.201	1/32
TNR333	.391 ±.005	.539	.201	3/64
TNR340	.391 ±.005	.574	.265	.012
TNR360	.391 ±.005	.601	.390	.008
TNR420	.516 ±.005	.773	.139	.008
TNR430	.516 ±.005	.769	.201	.012
TNR432	.516 ±.005	.742	.201	1/32
TNR433	.516 ±.005	.726	.201	3/64
TNR434	.516 ±.005	.711	.201	1/16
TNR440	.516 ±.005	.761	.265	.012
TNR442	.516 ±.005	.742	.265	1/32
TNR444	.516 ±.005	.711	.265	1/16

TNR



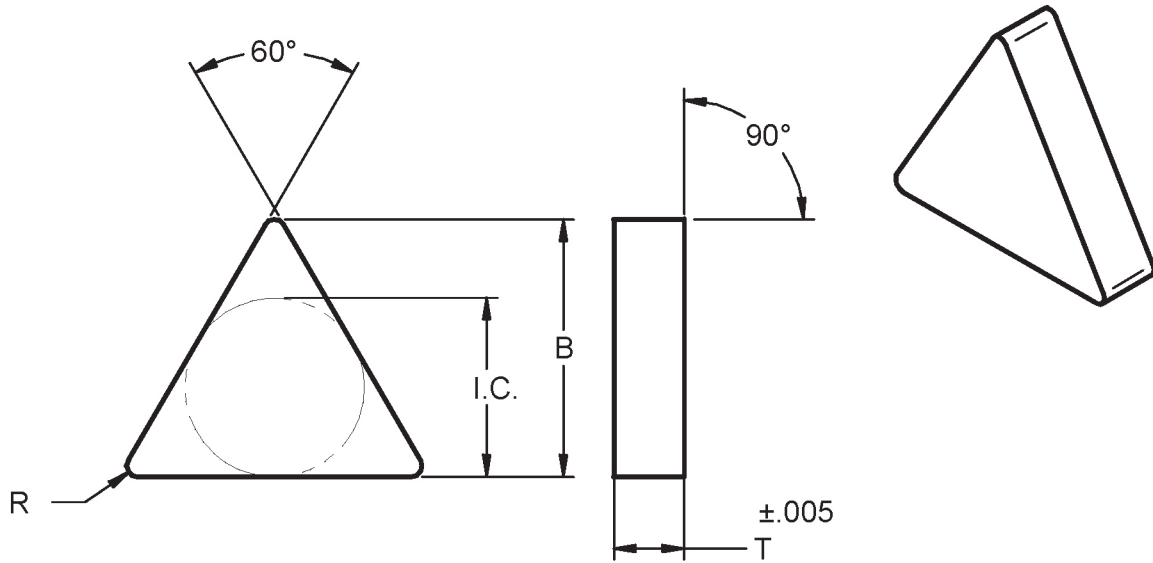
Insert	I.C.	B	T	R
TNR450	.516 ±.005	.761	.327	.012
TNR460	.516 ±.005	.761	.390	.012
TNR462	.516 ±.005	.742	.390	1/32
TNR490	.516 ±.005	.775	.593	.006
TNR520	.641 ±.005	.951	.139	.008
TNR530	.641 ±.005	.951	.201	.008
TNR540	.641 ±.005	.951	.265	.008
TNR543	.641 ±.005	.916	.265	3/64
TNR544	.641 ±.005	.901	.265	1/16
TNR546	.641 ±.005	.869	.265	3/32
TNR560	.641 ±.005	.951	.390	.008
TNR570	.641 ±.005	.951	.443	.008
TNR620	.771 ±.006	1.156	.140	0
TNR630	.771 ±.006	1.156	.203	0
TNR640	.771 ±.006	1.156	.265	0
TNR650	.771 ±.006	1.156	.327	0
TNR660	.771 ±.006	1.156	.390	0
TNR621	.771 ±.006	1.140	.140	1/64
TNR631	.771 ±.006	1.140	.203	1/64
TNR641	.771 ±.006	1.140	.265	1/64
TNR651	.771 ±.006	1.140	.327	1/64
TNR661	.771 ±.006	1.140	.390	1/64
TNR644	.771 ±.006	1.094	.265	1/16
TNR664	.771 ±.006	1.094	.390	1/16

TNR



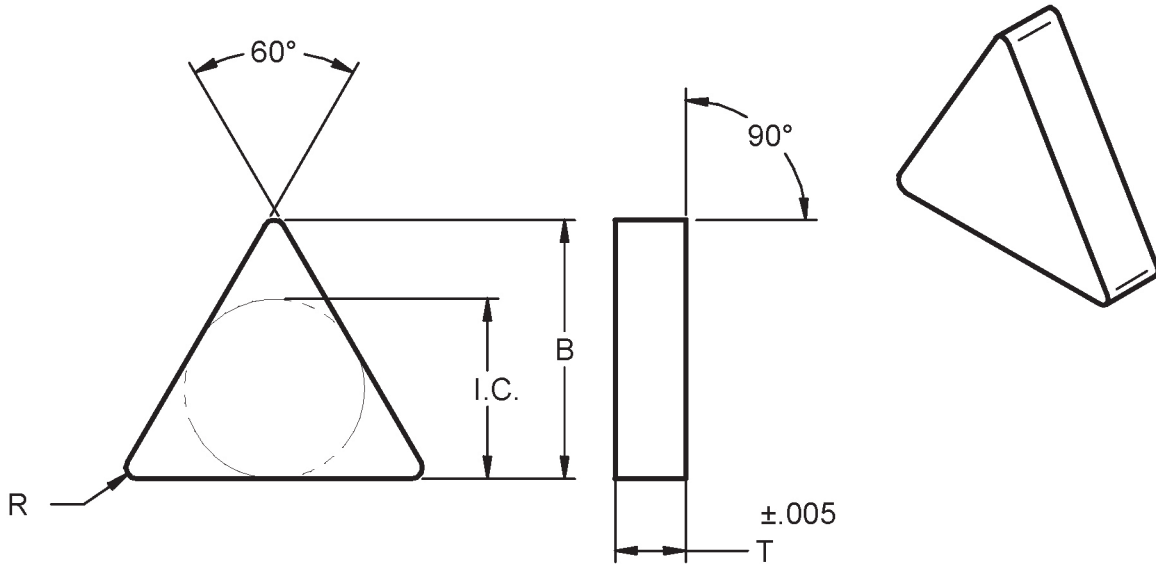
Insert	I.C.	B	T	R
TNR831	1.026 ±.006	1.536	.203	1/64
TNR841	1.026 ±.006	1.536	.265	1/64
TNR851	1.026 ±.006	1.536	.327	1/64
TNR861	1.026 ±.006	1.536	.395	1/64
TNR871	1.026 ±.006	1.536	.460	1/64
TNR866	1.026 ±.006	1.445	.395	3/32

TNS



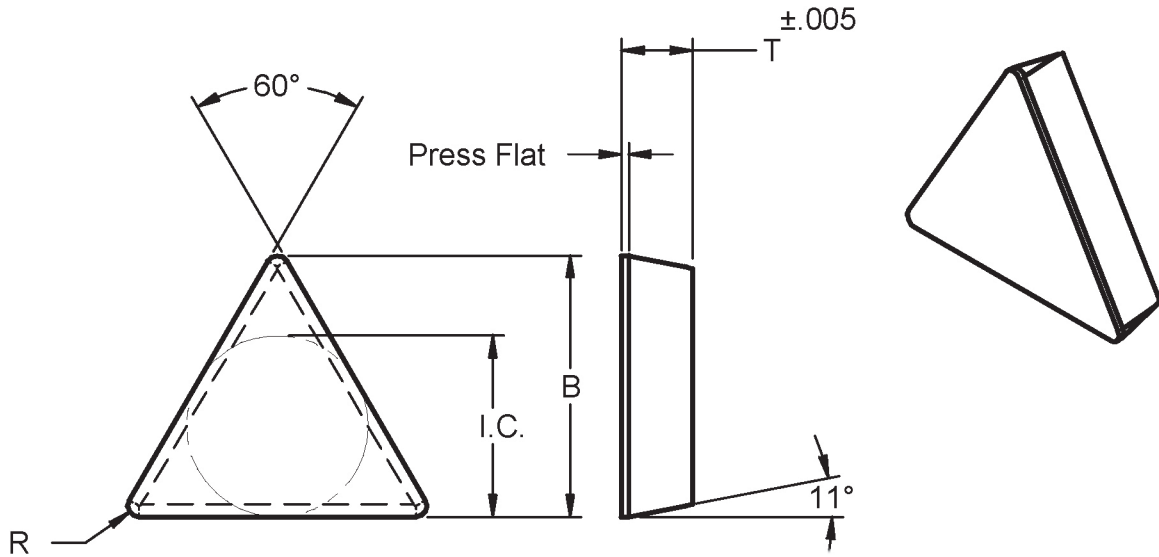
Insert	I.C.	B	T	R
TNS221	.250 ±.005	.359	.139	1/64
TNS222	.250 ±.005	.344	.139	1/32
TNS321	.375 ±.005	.563	.139	1/64
TNS322	.375 ±.005	.563	.139	1/32
TNS323	.375 ±.005	.563	.139	3/64
TNS331	.375 ±.005	.563	.201	1/64
TNS332	.375 ±.005	.563	.201	1/32
TNS333	.375 ±.005	.563	.201	3/64
TNS334	.375 ±.005	.563	.201	1/16
TNS336	.375 ±.005	.563	.201	3/32
TNS338	.500 ±.005	.563	.201	1/8
TNS431	.500 ±.005	.734	.201	1/64
TNS432	.500 ±.005	.719	.201	1/32
TNS433	.500 ±.005	.703	.201	3/64
TNS434	.500 ±.005	.688	.201	1/16
TNS438	.500 ±.005	.625	.201	1/8
TNS441	.500 ±.005	.735	.265	1/64
TNS442	.500 ±.005	.719	.265	1/32
TNS443	.500 ±.005	.703	.265	3/64
TNS444	.500 ±.005	.688	.265	1/16

TNS



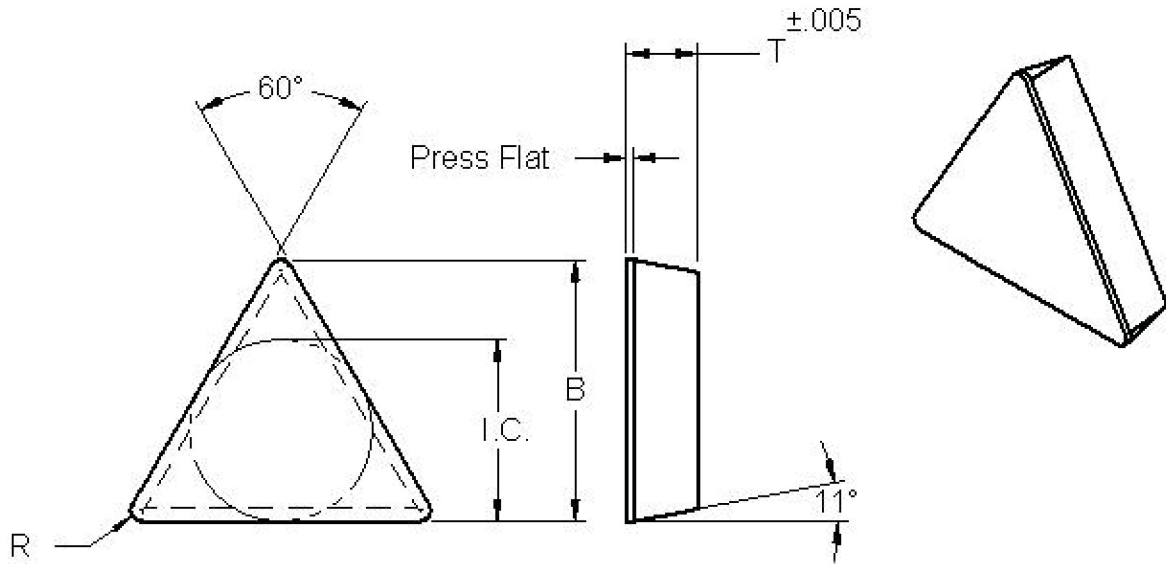
Insert	I.C.	B	T	R
TNS532	.625 ±.007	.906	.201	1/32
TNS542	.625 ±.007	.906	.265	1/32
TNS544	.625 ±.007	.875	.265	1/16
TNS546	.625 ±.007	.844	.265	3/32
TNS548	.625 ±.007	.812	.265	1/8
TNS5416	.625 ±.007	.688	.265	1/4
TNS654	.750 ±.007	1.062	.330	1/16
TNS656	.750 ±.007	1.031	.330	3/32
TNS666	.750 ±.007	1.031	.393	3/32
TNS778	.875 ±.007	1.188	.456	1/8
TNS868	1.000 ±.010	1.375	.393	1/8
TNS878	1.000 ±.010	1.375	.456	1/8

TPR



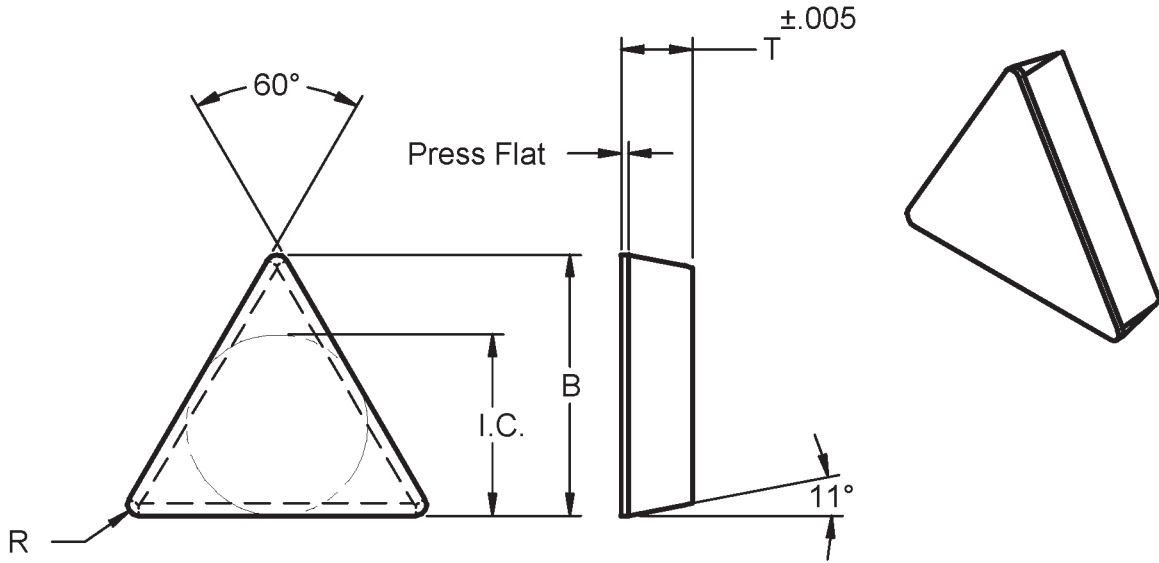
Insert	I.C.	B	T	R	Notes
TPR220	.264 ±.004	.381	.139	1/64	
TPR221	.264 ±.004	.381	.139	1/64	
TPR222	.264 ±.004	.365	.139	1/32	
TPR223	.264 ±.004	.353	.139	3/64	
TPR320	.391 ±.005	.570	.139	1/64	
TPR321	.391 ±.005	.570	.139	1/64	
TPR322	.391 ±.005	.550	.139	1/32	
TPR323	.391 ±.005	.550	.139	1/32	
TPR324	.391 ±.005	.524	.139	1/16	
TPR326	.391 ±.005	.492	.139	3/32	
TPR330	.391 ±.005	.570	.201	1/64	.090 Press Flat
TPR331	.391 ±.005	.570	.201	1/64	.090 Press Flat
TPR332	.391 ±.005	.550	.201	1/32	.090 Press Flat
TPR333	.391 ±.005	.550	.201	1/32	.090 Press Flat
TPR420	.516 ±.005	.758	.139	1/64	
TPR421	.516 ±.005	.758	.139	1/64	
TPR430	.516 ±.005	.758	.201	1/64	
TPR431	.516 ±.005	.758	.201	1/64	
TPR432	.516 ±.005	.742	.201	1/32	.079 Press Flat
TPR433	.516 ±.005	.727	.201	3/64	
TPR434	.516 ±.005	.727	.201	3/64	
TPR436	.516 ±.005	.680	.201	3/32	
TPR436	.516 ±.005	.649	.201	1/8	
TPR441	.516 ±.005	.742	.265	1/32	
TPR442	.516 ±.005	.742	.265	1/32	

TPR



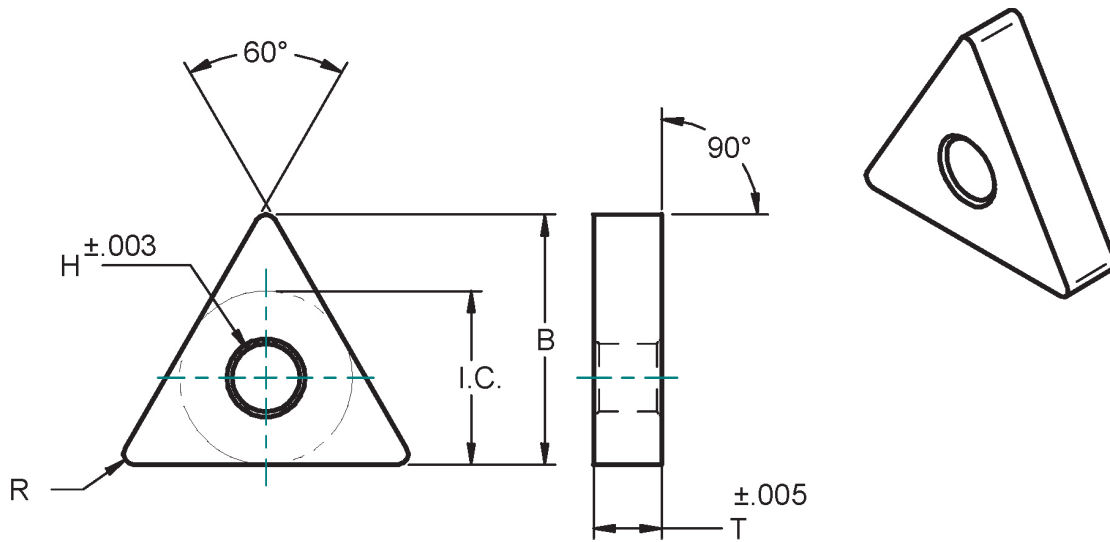
Insert	I.C.	B	T	R	Notes
TPR530	.645 ±.005	.958	.203	.010	
TPR540	.642 ±.005	.946	.268	.015	
TPR541	.642 ±.005	.946	.268	.015	
TPR542	.642 ±.005	.946	.268	.015	
TPR543	.642 ±.005	.915	.268	3/64	
TPR544	.642 ±.005	.915	.268	3/64	
TPR546	.642 ±.005	.915	.268	3/64	
TPR632	.770 ±.006	1.125	.201	1/32	
TPR640	.770 ±.006	1.150	.268	0	
TPR642	.770 ±.006	1.125	.268	1/32	.074 Press Flat
TPR2.521	.331±.004	.481	.143	1/64	

TPS



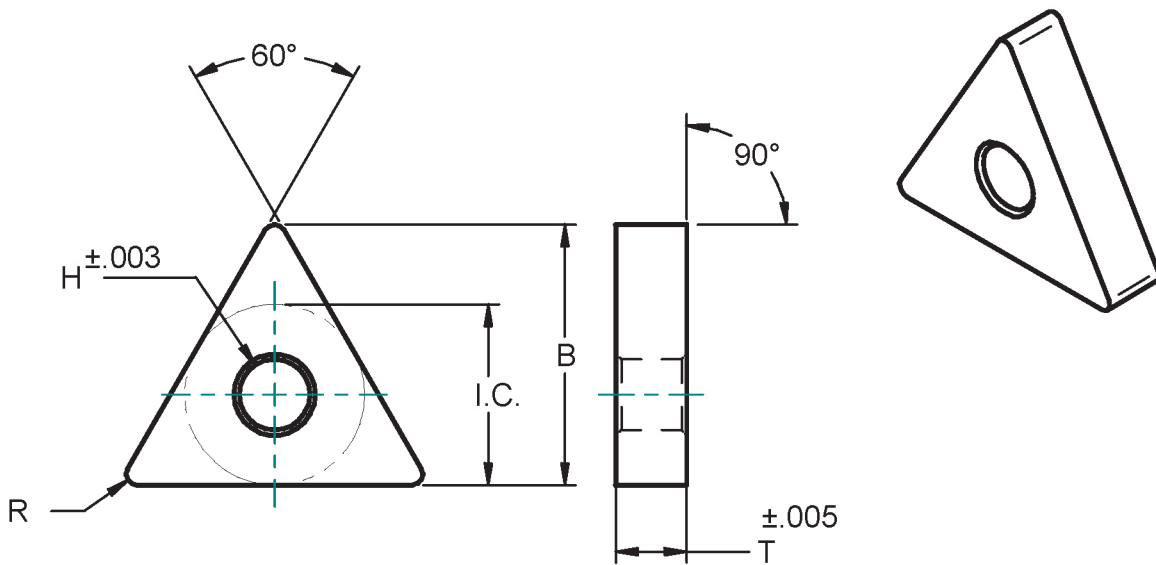
Insert	I.C.	B	T	R
TPS221	.250 ±.005	.351	.142	1/64
TPS222	.250 ±.005	.344	.142	1/32
TPS223	.250 ±.005	.328	.142	3/64
TPS321	.375 ±.005	.547	.142	1/64
TPS322	.375 ±.005	.531	.142	1/32
TPS323	.375 ±.005	.513	.142	3/64
TPS431	.500 ±.005	.734	.205	1/64
TPS432	.500 ±.005	.719	.205	1/32
TPS433	.500 ±.005	.703	.205	3/64
TPS434	.500 ±.005	.688	.205	1/16
TPS438	.500 ±.005	.625	.205	1/8
TPS542	.625 ±.007	.906	.270	1/32
TPS543	.625 ±.007	.891	.270	3/64
TPS544	.625 ±.007	.875	.270	1/16

TNRA



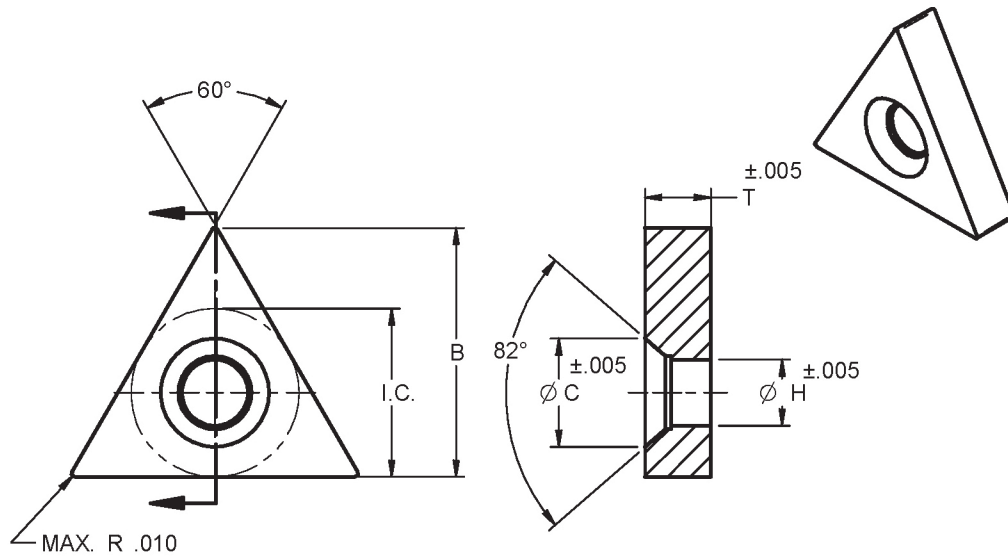
Insert	I.C.	B	T	R	H
TNRA220	.270 ±.005	.389	.078	1/64	.093
TNRA221	.263 ±.005	.379	.143	1/64	.140
TNRA21.50	.270 ±.005	.389	.108	1/64	.132
TNRA2.525	.327 ±.007	.412	.143	5/64	.150
TNRA2.521	.327 ±.007	.412	.143	1/64	.125
TNRA320	.393 ±.007	.590	.143	.010	.150
TNRA330	.393 ±.007	.590	.206	.010	.150
TNRA333	.393 ±.007	.543	.206	.010	.150
TNRA335	.393 ±.007	.511	.206	5/64	.150
TNRA420	.520 ±.007	.780	.143	.010	.203
TNRA430	.520 ±.007	.780	.206	.010	.203
TNRA440	.520 ±.007	.780	.268	.010	.203
TNRA445	.520 ±.007	.702	.268	5/64	.203
TNRA450	.520 ±.007	.780	.330	.010	.203
TNRA460	.520 ±.007	.780	.293	.010	.203
TNRA520	.645 ±.007	.968	.143	.010	.253
TNRA530	.645 ±.007	.968	.206	.010	.253
TNRA540	.645 ±.007	.968	.268	.010	.253
TNRA550	.645 ±.007	.968	.330	.010	.253
TNRA630	.770 ±.007	1.155	.206	.010	.313
TNRA631	.770 ±.007	1.133	.206	.010	.253
TNRA640	.770 ±.007	1.155	.268	.010	.313
TNRA650	.770 ±.007	1.155	.330	.010	.313
TNRA660	.770 ±.007	1.155	.393	.010	.313
TNRA670	.770 ±.007	1.155	.456	.010	.313

TNSA



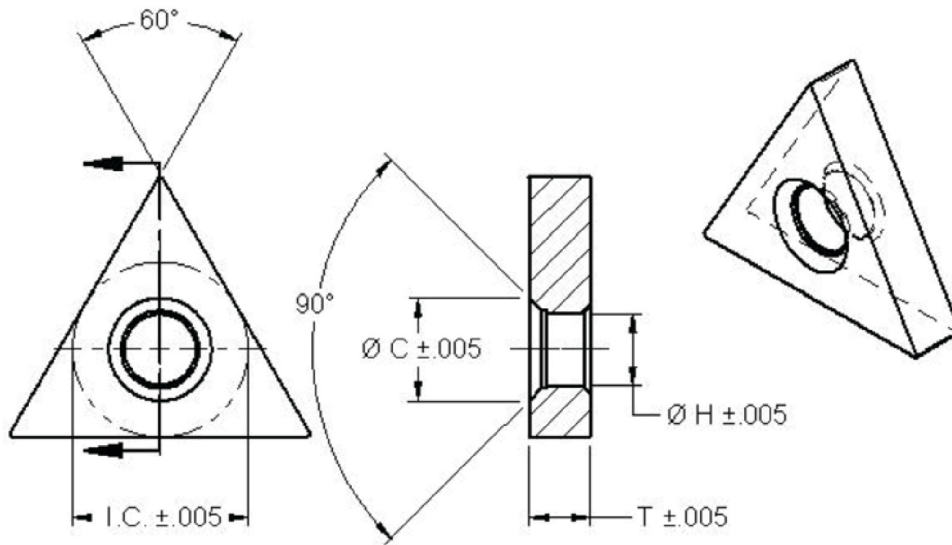
Insert	I.C.	B	T	R	H
TNSA222	.250 ±.002	.344	.139	1/32	.090
TNSA321	.375 ±.002	.547	.139	1/64	.150
TNSA322	.375 ±.002	.531	.139	1/32	.150
TNSA323	.375 ±.002	.516	.139	3/64	.150
TNSA324	.375 ±.002	.500	.139	1/16	.150
TNSA331	.375 ±.002	.547	.201	1/64	.150
TNSA332	.375 ±.002	.531	.201	1/32	.150
TNSA333	.375 ±.002	.516	.201	3/64	.150
TNSA334	.375 ±.002	.500	.201	1/16	.150
TNSA431	.500 ±.003	.734	.201	1/64	.203
TNSA432	.500 ±.003	.719	.201	1/32	.203
TNSA433	.500 ±.003	.703	.201	3/64	.203
TNSA434	.500 ±.003	.688	.201	1/16	.203
TNSA438	.500 ±.003	.625	.201	1/8	.203
TNSA444	.500 ±.003	.688	.263	1/16	.203
TNSA542	.625 ±.003	.906	.263	1/32	.253
TNSA543	.625 ±.003	.891	.263	3/64	.253
TNSA544	.625 ±.003	.875	.263	1/16	.253
TNSA548	.625 ±.003	.812	.263	1/8	.253
TNSA666	.750 ±.005	1031	.393	3/32	.313

TNRB (LX-0555-3)



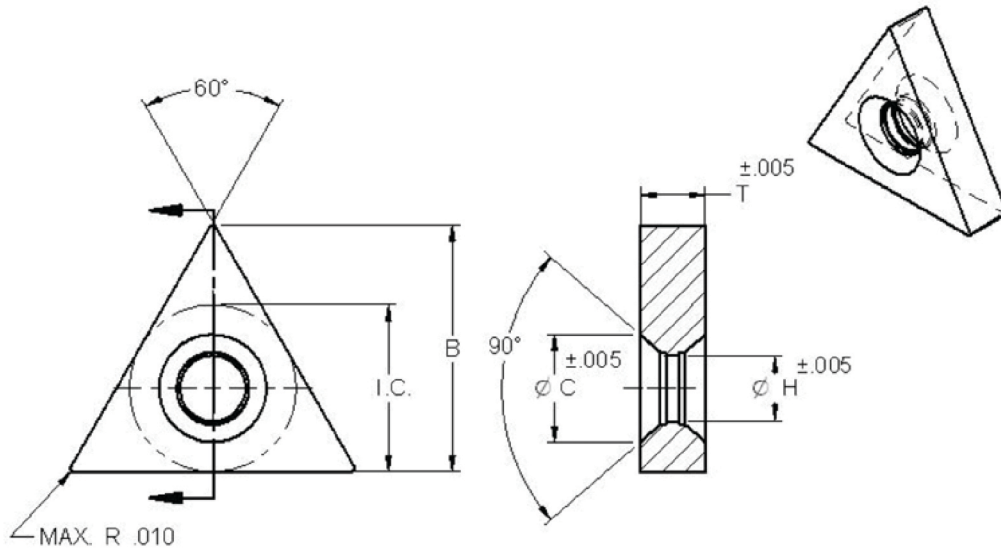
Insert	I.C.	B	T	R	H	C
TNRB320-#5	.395 ±.005	.583	.143	-	.148	.310
TNRB330	.395 ±.005	.583	.203	-	.144	.308
TNRB420	.525 ±.005	.797	.143	-	.211	.421
TNRB430	.525 ±.005	.797	.203	-	.211	.421
TNRB440	.525 ±.005	.797	.268	-	.211	.421
TNRB450	.525 ±.005	.797	.338	-	.211	.421
TNRB520	.650 ±.010	.967	.143	-	.250	.461
TNRB530	.650 ±.010	.967	.203	-	.250	.461
TNRB540	.650 ±.010	.967	.268	-	.250	.461
LX-0555-3-.125T	.650 ±.010	.967	.140	-	.250	.338
LX-0555-3-.188T	.650 ±.010	.967	.203	-	.250	.338
LX-0555-3-.250T	.650 ±.010	.967	.268	-	.250	.338

TNRB-VAL



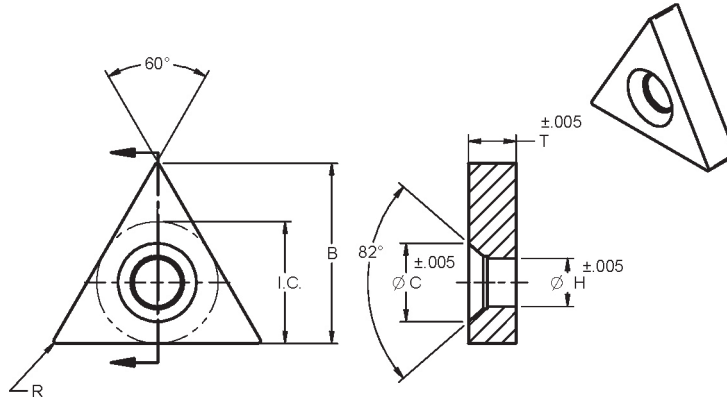
Insert	I.C.	T	H	C
TNRB320-VAL	.393	.143	.150	.250
TNRB330-VAL	.393	.206	.150	.250
TNRB340-VAL	.393	.268	.150	.250
TNRB420-VAL	.520	.143	.203	.355
TNRB430-VAL	.520	.206	.203	.355
TNRB440-VAL	.520	.268	.203	.355
TNRB450-VAL	.520	.331	.203	.355
TNRB460-VAL	.520	.393	.203	.355
TNRB520-VAL	.645	.143	.253	.418
TNRB530-VAL	.645	.206	.253	.418
TNRB540-VAL	.645	.268	.253	.418
TNRB550-VAL	.645	.331	.253	.418
TNRB630-VAL	.770	.206	.313	.504
TNRB640-VAL	.770	.268	.313	.504
TNRB650-VAL	.770	.331	.313	.504
TNRB660-VAL	.770	.393	.313	.504

TNRC



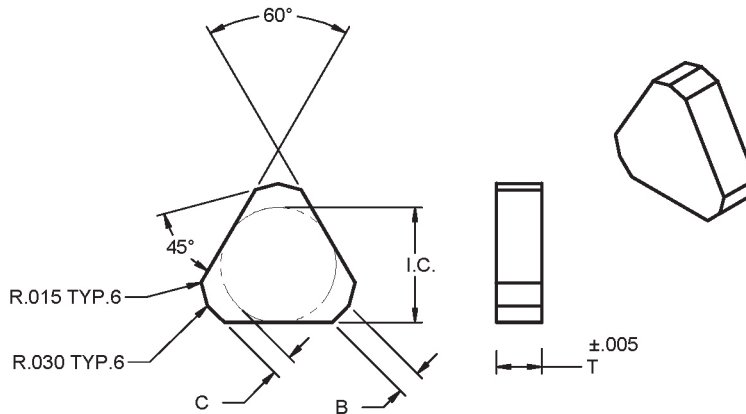
Insert	I.C.	B	T	R	H	C
TNRC320	.393 ±.007	.590	.143	-	.150	.250
TNRC330	.393 ±.007	.590	.206	-	.150	.250
TNRC340	.393 ±.007	.590	.268	-	.150	.250
TNRC360	.393 ±.007	.590	.393	-	.150	.250
TNRC430	.520 ±.010	.780	.203	-	.203	.355
TNRC440	.520 ±.010	.780	.268	-	.203	.355
TNRC450	.520 ±.010	.780	.330	-	.203	.355
TNRC460	.520 ±.010	.780	.393	-	.203	.355
TNRC480	.520 ±.010	.780	.518	-	.203	.355
TNRC520	.645 ±.010	.968	.143	-	.253	.418
TNRC530	.645 ±.010	.968	.206	-	.253	.418
TNRC540	.645 ±.010	.968	.268	-	.253	.418
TNRC550	.645 ±.010	.968	.330	-	.253	.418
TNRC560	.645 ±.010	.968	.393	-	.253	.418
TNRC630	.770 ±.010	1.155	.206	-	.313	.504
TNRC640	.770 ±.010	1.155	.268	-	.313	.504
TNRC660	.770 ±.010	1.155	.393	-	.313	.504
TNRC670	.770 ±.010	1.155	.456	-	.313	.504
TNRC680	.770 ±.010	1.155	.518	-	.313	.504

UTD



Insert	I.C.	B	T	R	H	C
UTD6P (11° Pos)	.390 ±.005	.554	.140	1/32	.125	.280
UTD7P (Neg)	.460 ±.005	.643	.140	3/64	.125	.280
UTD8P (11° Pos)	.516 ±.005	.743	.204	1/32	.177	.380
UTD9P (Neg)	.587 ±.005	.817	.204	1/16	.177	.380
UTD10P (Neg)	.650 ±.005	.897	.204	5/64	.203	.430
UTD6P-0 RAD (9° Pos)	.390 ±.005	.588	.140	.005	.131	.270

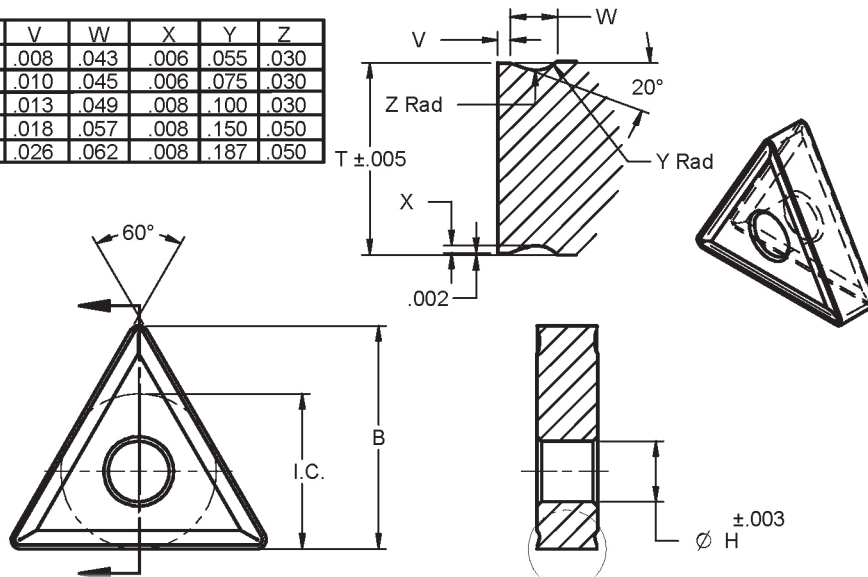
TNC



Insert	I.C.	B	T	C
TNC43X6.5	.518 ±.005	.107	.203	.095

TNMG

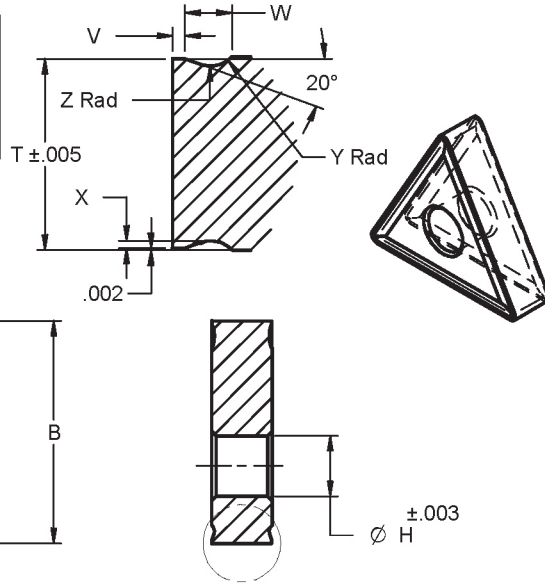
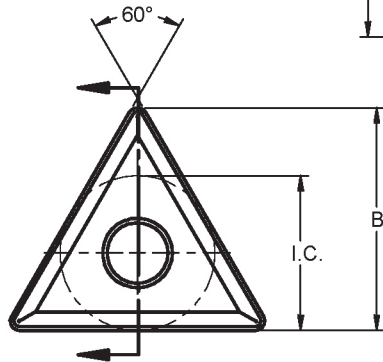
I.C.	V	W	X	Y	Z
1/4	.008	.043	.006	.055	.030
3/8	.010	.045	.006	.075	.030
1/2	.013	.049	.008	.100	.030
5/8	.018	.057	.008	.150	.050
3/4	.026	.062	.008	.187	.050



Insert	I.C.	B	T	R	H
TNMG221	.250 ±.002	.359	.125	1/64	.090
TNMG222	.250 ±.002	.344	.125	1/32	.090
TNMG321	.375 ±.002	.547	.125	1/64	.150
TNMG322	.375 ±.002	.531	.125	1/32	.150
TNMG323	.375 ±.002	.516	.125	3/64	.150
TNMG324	.375 ±.002	.500	.125	1/64	.150
TNMG326	.375 ±.002	.469	.125	3/32	.150
TNMG331	.375 ±.002	.547	.188	1/64	.150
TNMG332	.375 ±.002	.531	.188	1/32	.150
TNMG333	.375 ±.002	.516	.188	3/64	.150
TNMG334	.375 ±.002	.500	.188	1/16	.150
TNMG336	.375 ±.002	.469	.188	3/32	.150
TNMG431	.500 ±.003	.734	.188	1/64	.203
TNMG432	.500 ±.003	.719	.188	1/32	.203
TNMG433	.500 ±.003	.703	.188	3/64	.203
TNMG434	.500 ±.003	.688	.188	1/16	.203
TNMG436	.500 ±.003	.656	.188	3/32	.203
TNMG438	.500 ±.003	.625	.188	1/8	.203
TNMG442	.500 ±.003	.719	.250	1/32	.203
TNMG443	.500 ±.003	.703	.250	3/64	.203
TNMG444	.500 ±.003	.688	.250	1/16	.203
TNMG454	.500 ±.003	.688	.313	1/16	.203
TNMG534	.625±.003	.875	.188	1/16	.253
TNMG542	.625±.003	.906	.250	1/32	.253
TNMG543	.625±.003	.491	.250	3/64	.253

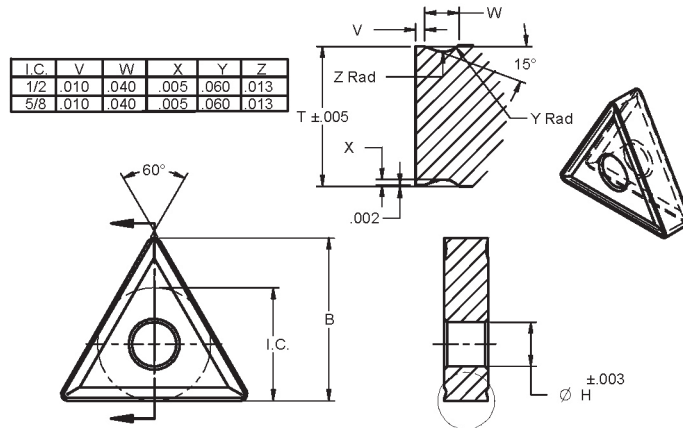
TNMG

I.C.	V	W	X	Y	Z
1/4	.008	.043	.006	.055	.030
3/8	.010	.045	.006	.075	.030
1/2	.013	.049	.008	.100	.030
5/8	.018	.057	.008	.150	.050
3/4	.026	.062	.008	.187	.050



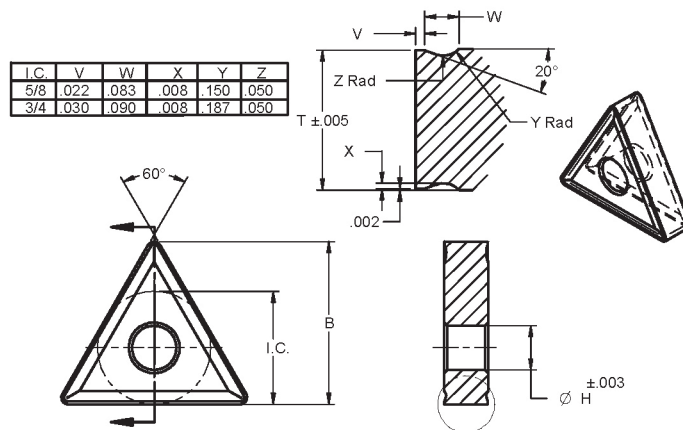
Insert	I.C.	B	T	R	H
TNMG544	.625 ±.003	.875	.250	1/16	.253
TNMG546	.625 ±.003	.844	.250	3/32	.253
TNMG548	.625 ±.003	.812	.250	1/8	.253
TNSG554	.625 ±.003	.875	.313	1/16	.253
TNMG564	.625 ±.003	.875	.375	1/16	.253
TNMG644	.750 ±.003	1.063	.250	1/16	.313
TNMG664	.750 ±.003	1.063	.375	1/16	.313
TNMG666	.750 ±.003	1.031	.375	3/32	.313
TNMG6612	.750 ±.003	.938	.375	3/16	.313
TNMG6616	.750 ±.003	.875	.375	1/4	.313

TNSG-N



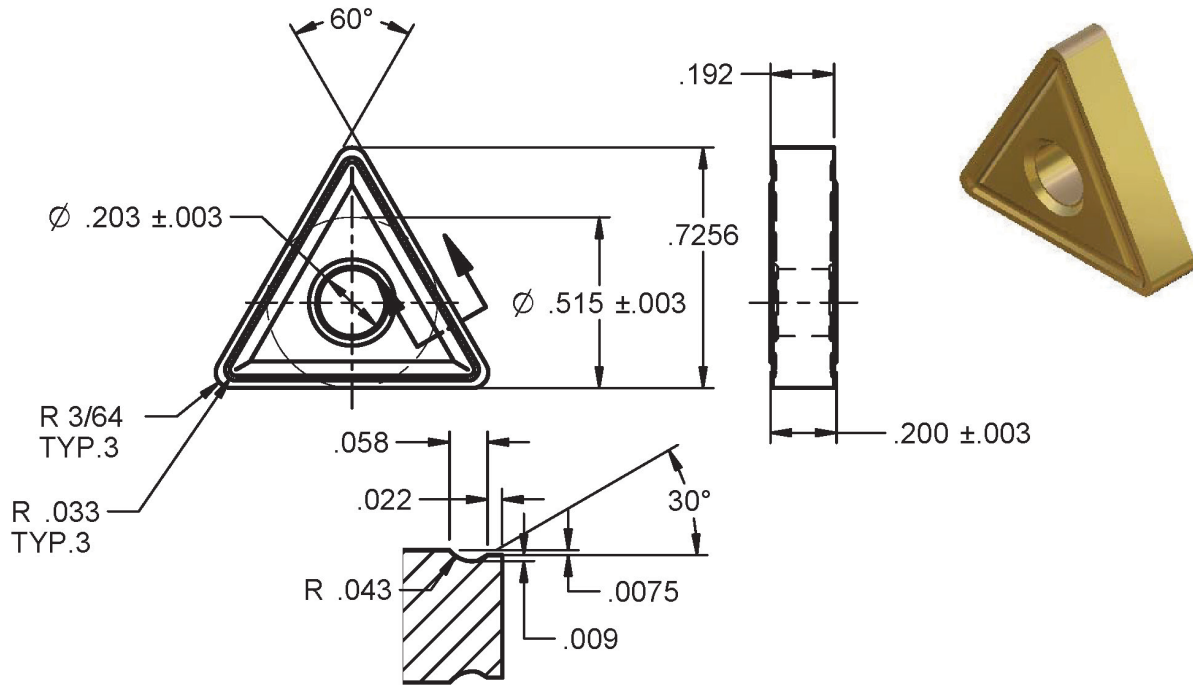
Insert	I.C.	B	T	R	H
TNSG432N	.500 ±.003	.719	.188	1/32	.203
TNSG433N	.500 ±.003	.703	.188	3/64	.203
TNSG543N	.625 ±.003	.891	.250	3/64	.253

TNSG-W



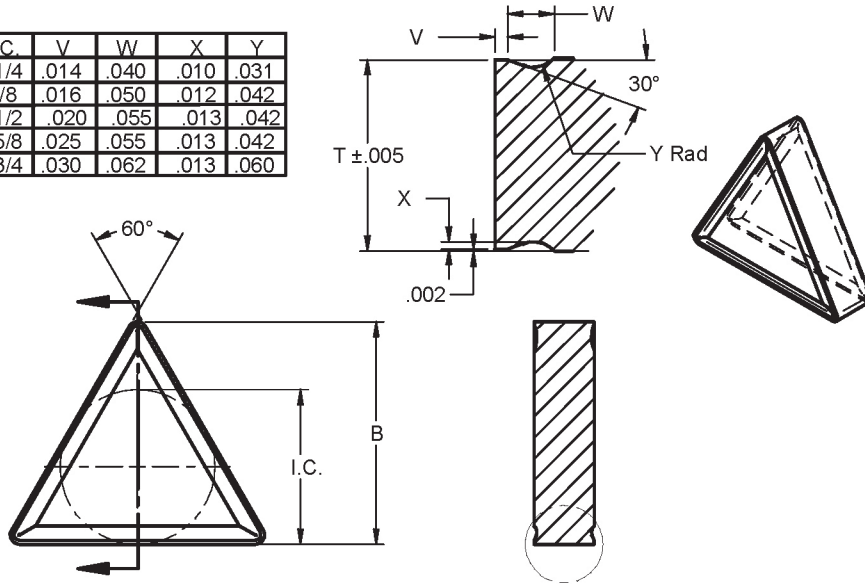
Insert	I.C.	B	T	R	H
TNSG543W	.625 ±.003	.891	.250	3/64	.253
TNSG544W	.625 ±.003	.875	.250	1/16	.253
TNSG548W	.625 ±.003	.812	.250	1/8	.253
TNSG564W	.625 ±.003	.875	.375	1/16	.253
TNSG666W	.750 ±.004	1.031	.375	3/32	.313

TNRG433



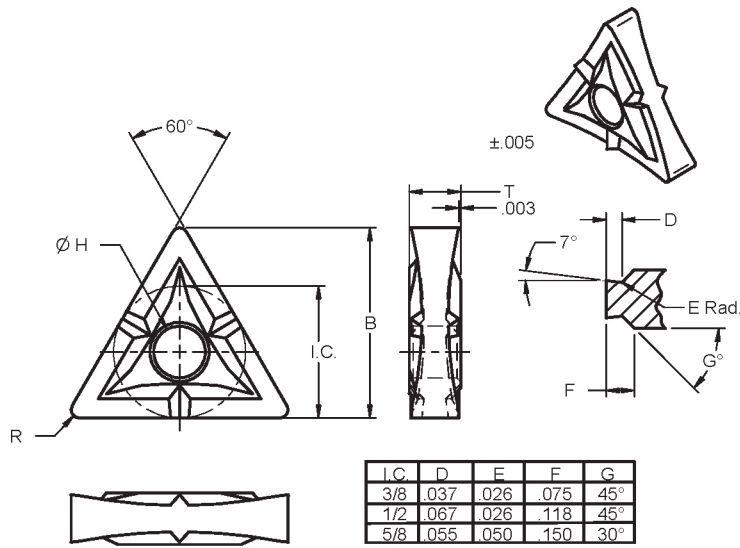
TNMF

I.C.	V	W	X	Y
1/4	.014	.040	.010	.031
3/8	.016	.050	.012	.042
1/2	.020	.055	.013	.042
5/8	.025	.055	.013	.042
3/4	.030	.062	.013	.060



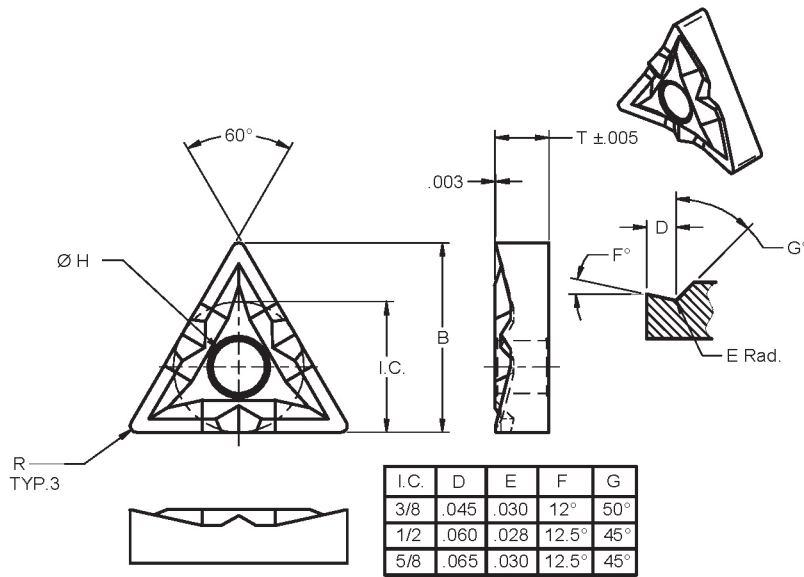
Insert	I.C.	B	T	R
TNMF222	.250 ±.002	.344	.125	1/32
TNMF322	.375 ±.002	.531	.125	1/32
TNMF323	.375 ±.002	.516	.125	3/64
TNMF332	.375 ±.002	.531	.188	1/32
TNMF333	.375 ±.002	.516	.188	3/64
TNMF432	.500 ±.003	.719	.188	1/32
TNMF433	.500 ±.003	.703	.188	3/64
TNMF434	.500 ±.003	.688	.188	1/16
TNMF438	.500 ±.003	.625	.188	1/8
TNMF542	.625 ±.003	.906	.250	1/32
TNMF543	.625 ±.003	.891	.250	3/64
TNMF544	.625 ±.003	.875	.250	1/16
TNMF546	.625 ±.003	.844	.250	3/32
TNMF666	.750 ±.004	1.031	.375	3/16

TNMP



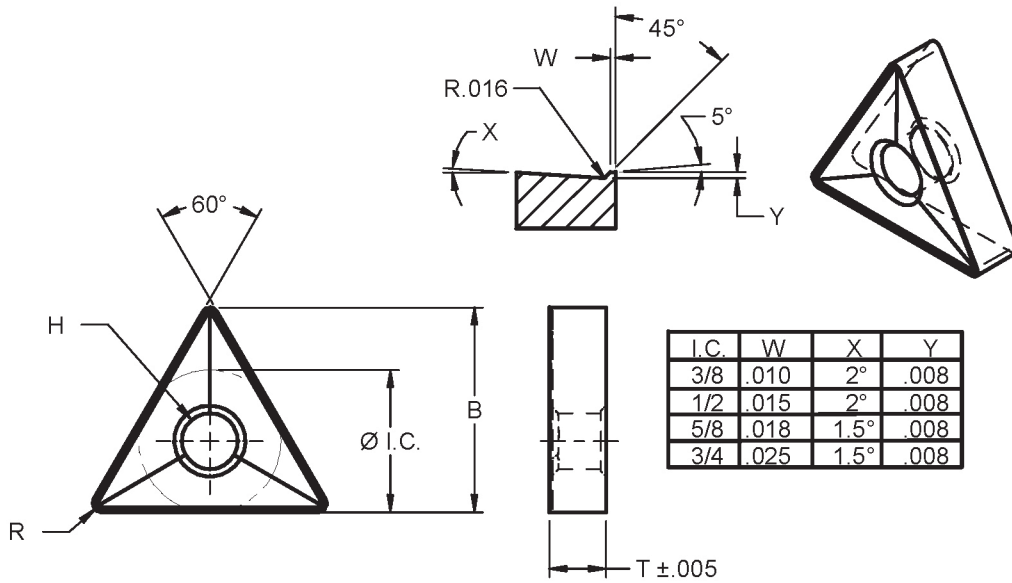
Insert	I.C.	B	T	R	H
TNMP321	.375 ±.002	.547	.125	1/64	.150
TNMP322	.375 ±.002	.531	.125	1/32	.150
TNMP331	.375 ±.002	.547	.188	1/64	.150
TNMP332	.375 ±.002	.531	.188	1/32	.150
TNMP333	.375 ±.002	.516	.188	3/64	.150
TNMP334	.375 ±.002	.500	.188	1/16	.150
TNMP431	.500 ±.003	.734	.188	1/64	.203
TNMP432	.500 ±.003	.719	.188	1/32	.203
TNMP433	.500 ±.003	.703	.188	3/64	.203
TNMP434	.500 ±.003	.688	.188	1/16	.203
TNMP542	.625 ±.003	.906	.250	1/32	.253
TNMP543	.625 ±.003	.819	.250	3/64	.253
TNMP544	.625 ±.003	.875	.250	1/16	.253

TNSS



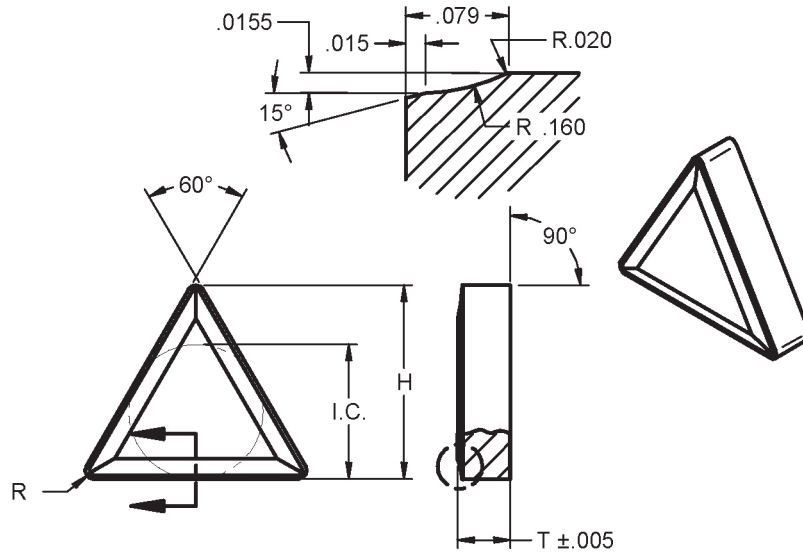
Insert	I.C.	B	T	R	H
TNSS331	.375 ±.002	.547	.133	1/64	.150
TNSS332	.375 ±.002	.531	.133	1/32	.150
TNSS333	.375 ±.002	.516	.196	3/64	.150
TNSS431	.500 ±.003	.734	.196	1/64	.203
TNSS432	.500 ±.003	.719	.196	1/32	.203
TNSS433	.500 ±.003	.703	.196	3/64	.203
TNSS434	.500 ±.003	.688	.196	1/16	.203
TNSS542	.625 ±.003	.906	.258	1/32	.253
TNSS543	.625 ±.003	.891	.258	3/64	.253
TNSS544	.625 ±.003	.875	.258	1/16	.253

TNSM



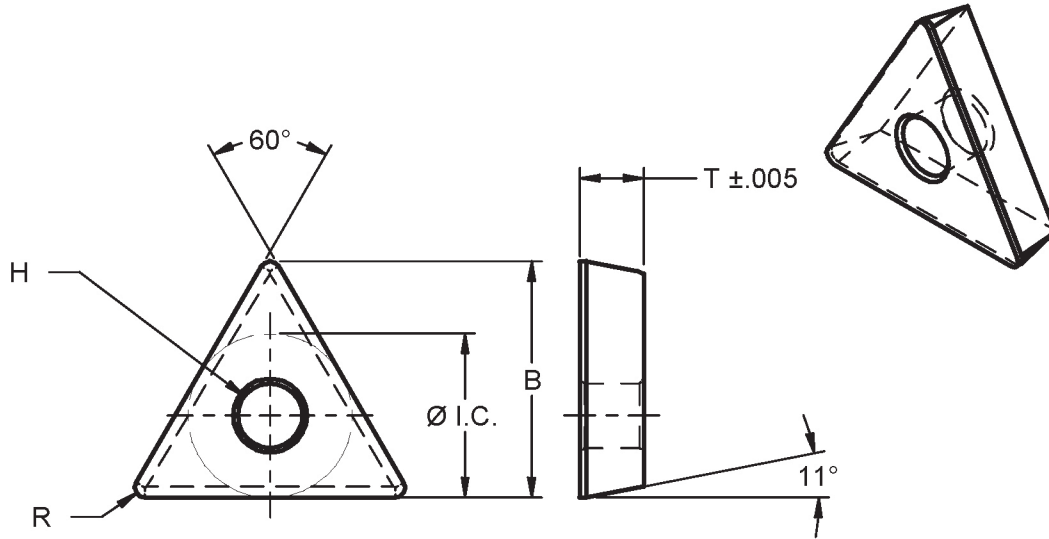
Insert	I.C.	B	T	R	H
TNSM322	.375 ±.002	.534	.133	1/32	.150
TNSM332	.375 ±.002	.534	.133	1/32	.150
TNSM333	.375 ±.002	.516	.196	3/64	.150
TNSM431	.500 ±.003	.734	.196	1/64	.150
TNSM432	.500 ±.003	.719	.196	1/32	.203
TNSM433	.500 ±.003	.703	.196	3/64	.203
TNSM434	.500 ±.003	.688	.188	1/16	.203
TNSM542	.625 ±.003	.906	.256	1/32	.203
TNSM543	.625 ±.003	.891	.256	3/64	.203
TNSM544	.625 ±.003	.875	.256	1/16	.203
TNSM664	.750 ±.003	1.063	.381	1/16	.313
TNSM666	.750 ±.003	1.031	.381	3/32	.313

TPMR



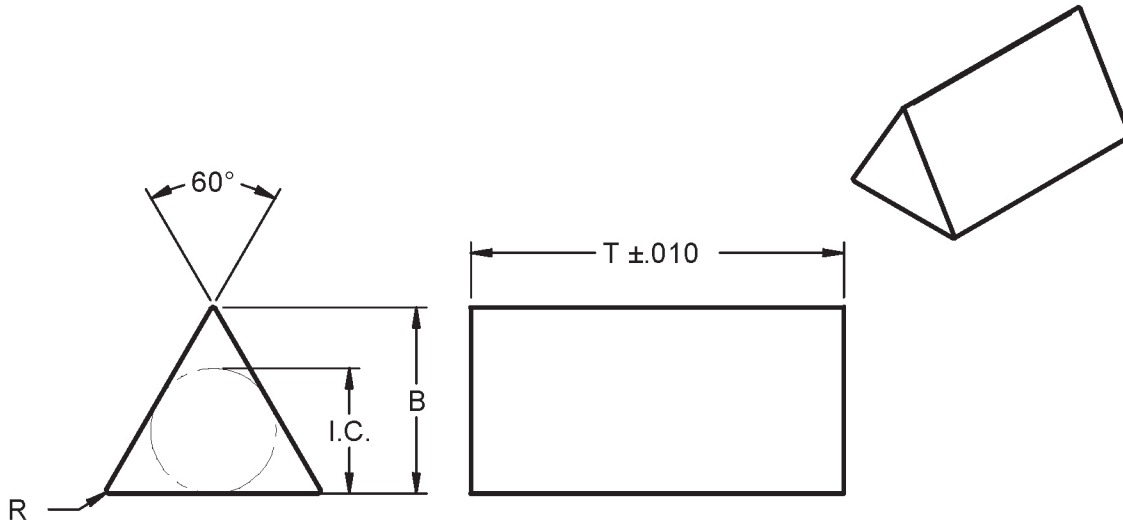
Insert	I.C.	B	T	R
TPMR321	.388 ±.004	.568	.148	1/64
TPMR322	.388 ±.004	.553	.148	1/32
TPMR331	.388 ±.004	.568	.210	1/64
TPMR332	.388 ±.004	.551	.210	1/32
TPMR432	.514 ±.005	.739	.210	1/32

TNMP



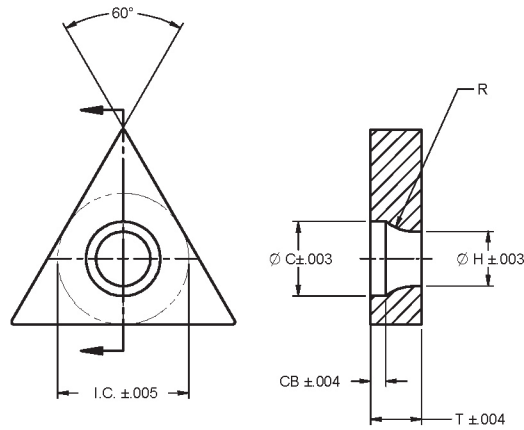
Insert	I.C.	B	T	R	H
TP21	.169 ±.005	.239	.073	1/64	.101
TP40	.263 ±.005	.380	.106	1/64	.135
TP41	.263 ±.005	.380	.106	1/64	.135
TP42	.263 ±.005	.380	.106	1/64	.135
TP60	.398 ±.005	.582	.138	1/64	.161
TP61	.398 ±.005	.582	.138	1/64	.161
TP62	.388 ±.005	.551	.138	1/32	.161

TB



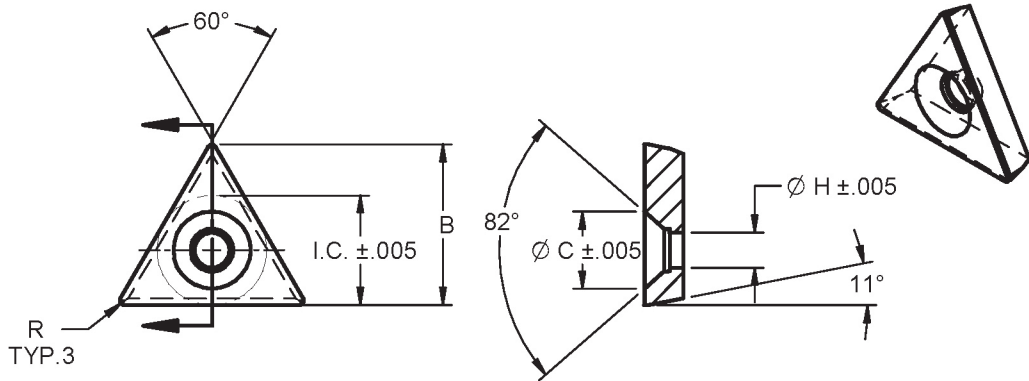
Insert	I.C.	B	T	R
TB80	.273 ±.007	.384	1.520	1/64
TB81	.273 ±.007	.384	1.520	1/64
TB82	.273 ±.007	.384	1.520	1/64
TB84	.273 ±.007	.384	1.520	1/64
TB120	.400 ±.007	.575	1.520	.025
TB121	.400 ±.007	.570	1.520	1/64
TB122	.400 ±.007	.575	1.520	.025
TB125	.400 ±.007	.508	1.520	.025
TB160	.530 ±.007	.782	1.520	.006
TB161	.530 ±.007	.782	1.520	.006
TB162	.530 ±.007	.771	1.520	.021
TB202	.647 ±.007	.947	1.520	.021
TB242	.772 ±.007	1.134	1.520	.021

TNRW



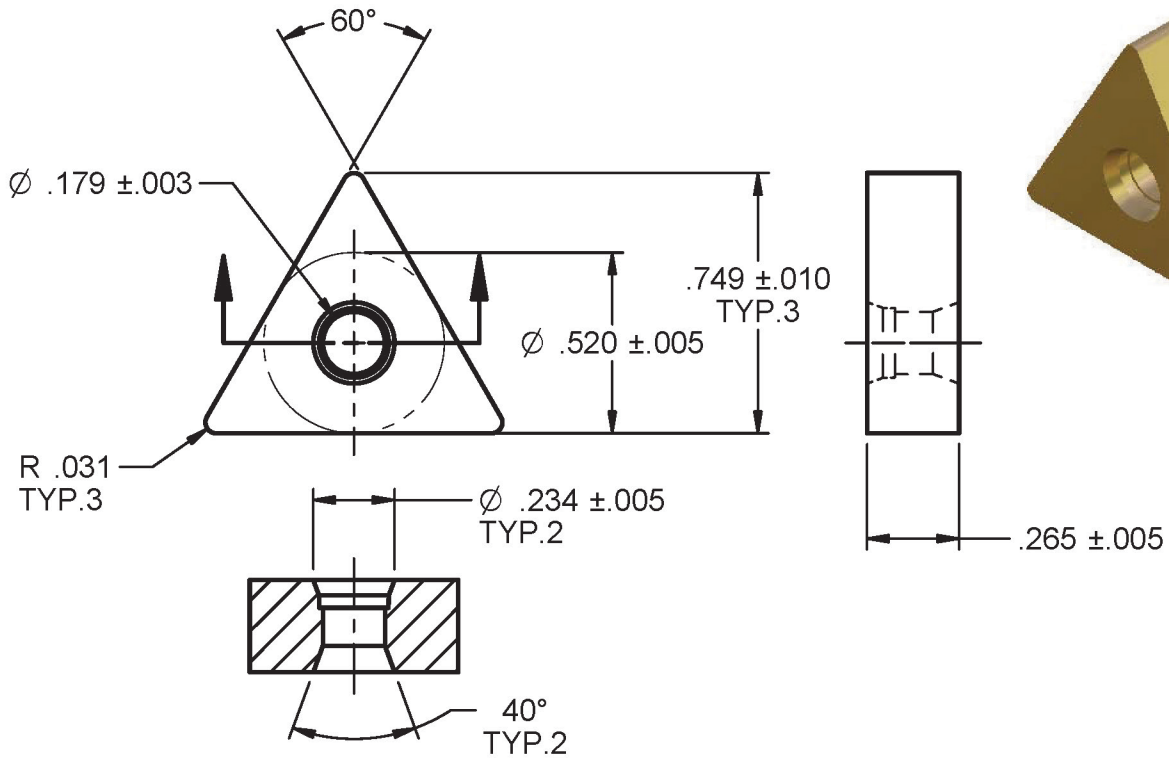
Insert	I.C.	T	Ø H	Ø C	CB	R
TNRW21.50	.270	.108	.110	.146	.039	.079
TNRW220	.270	.139	.110	.146	.039	.079
TNRW2.520	.330	.139	.134	.177	.031	.098
TNRW32.50	.393	.170	.173	.236	.046	.138
TNRW330	.393	.202	.173	.236	.046	.138
TNRW430	.520	.202	.216	.295	.060	.177
TNRW440	.520	.264	.216	.295	.060	.177

TPRB

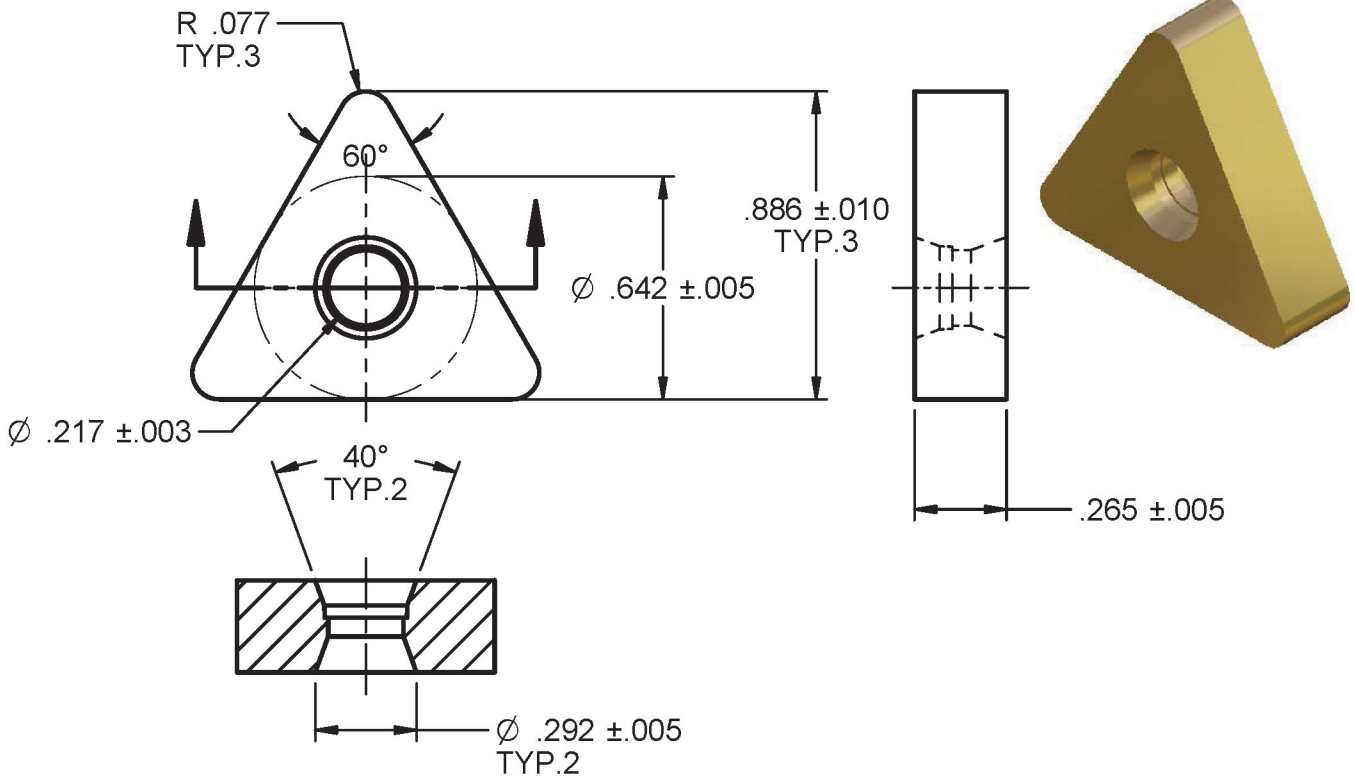


Insert	I.C.	T	Ø H	Ø C	B	R	Notes
TPRB221	.263	.140	.139	.212	.380	1/64	
TPRB321-#4	.398	.140	.127	.280	.582	1/64	#4 Screw

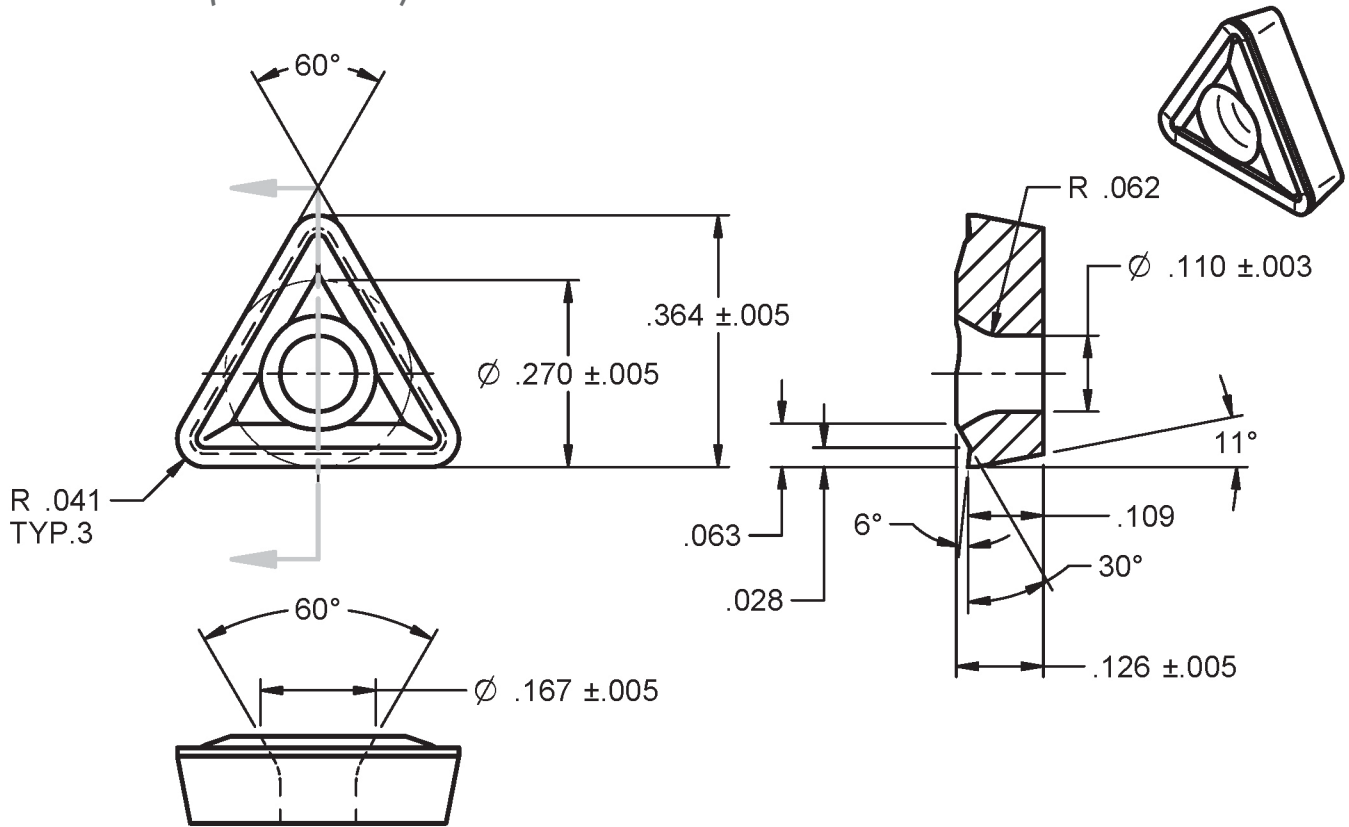
LX-1171-4 (TNRQ442)



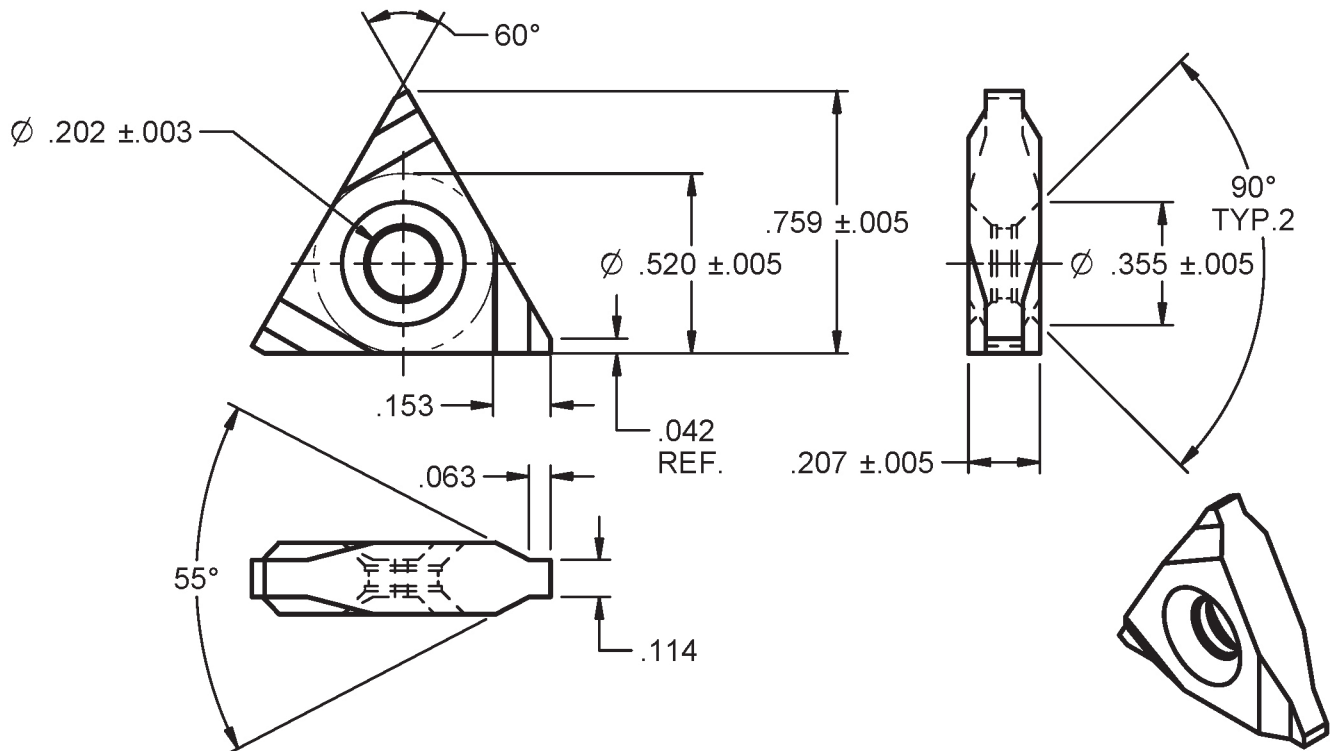
LX-1171-2 (TNRQ545)



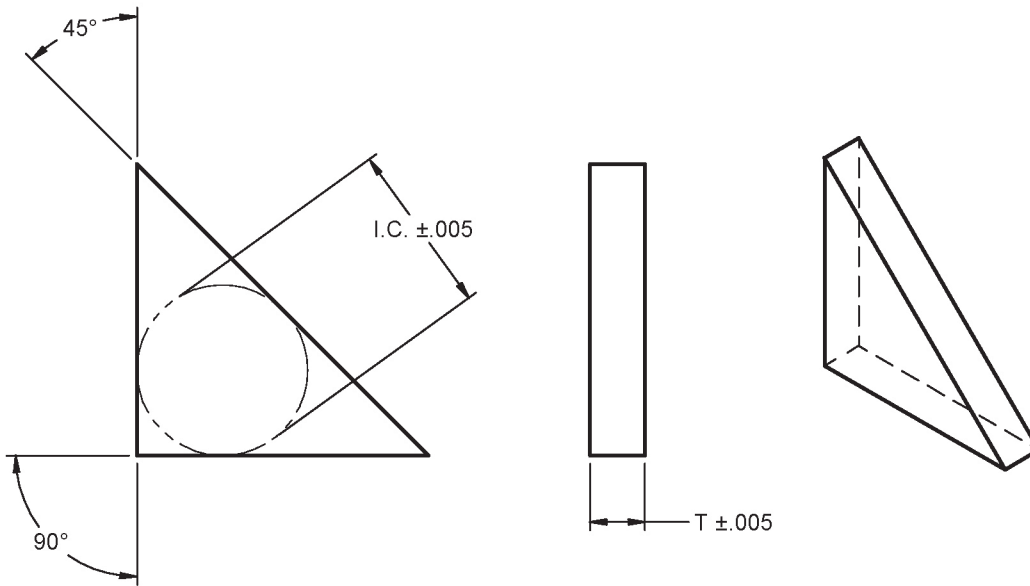
A-2125-B (TPRT21.52)



A-1161-C (TNRC43)

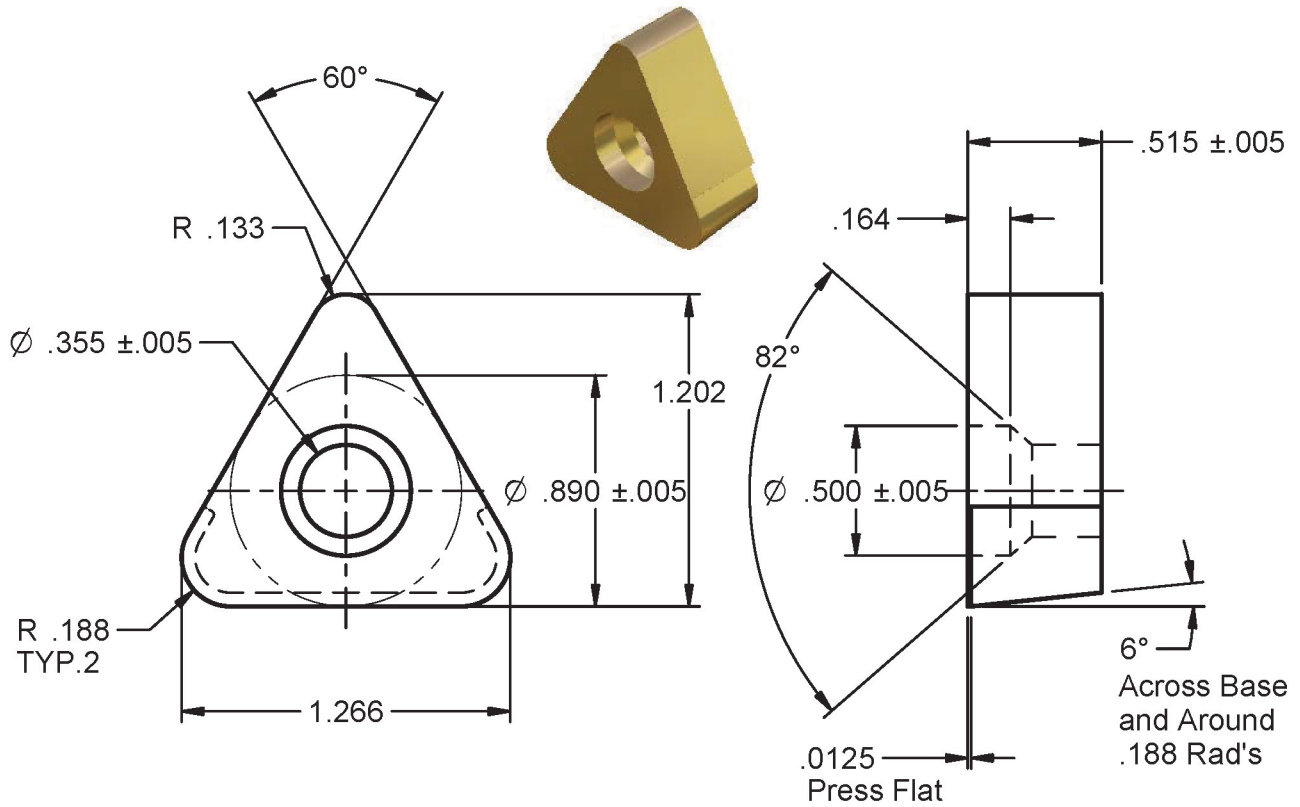


XTNR

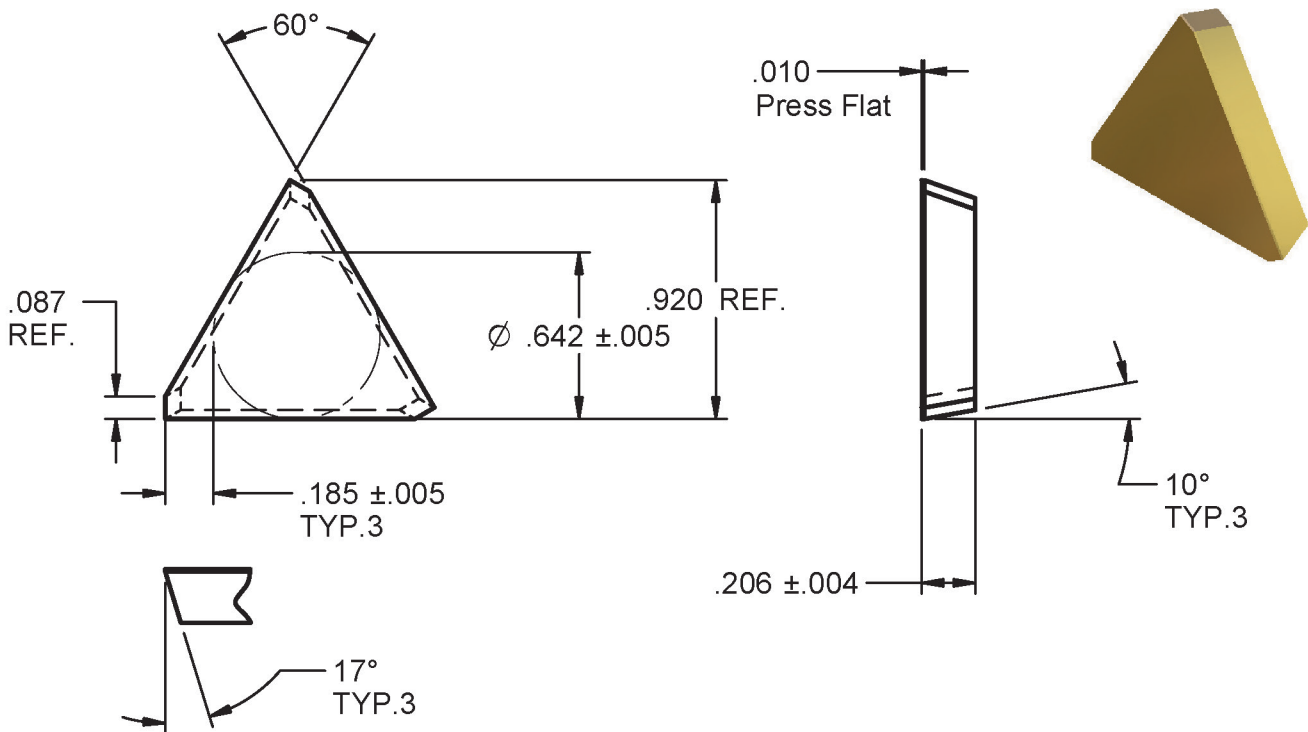


Insert	I.C.	T	Notes
XTNR41.50	.520	.113	
XTNR420	.520	.145	
XTNR430	.520	.208	
XTNR440	.520	.270	Max. 1/4 Thk.
XTNR51.50	.645	.113	
XTNR520	.645	.145	
XTNR530	.645	.208	
XTNR540	.645	.270	
XTNR550	.645	.333	
XTNR560	.645	.395	Max. 3/8 Thk.

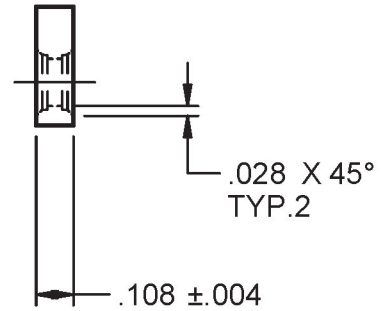
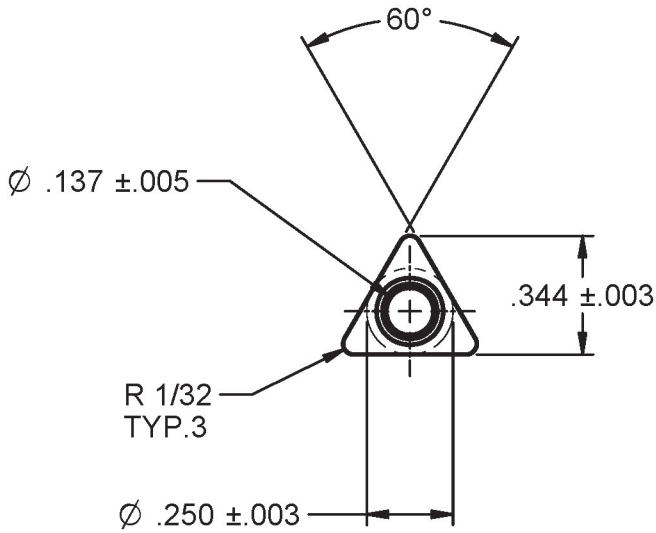
MA72208 (LX-0466-4X)



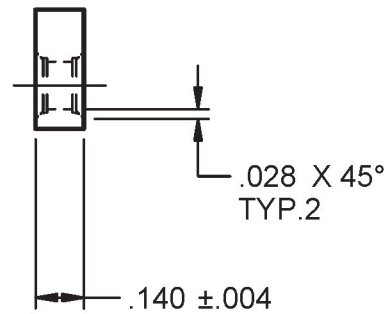
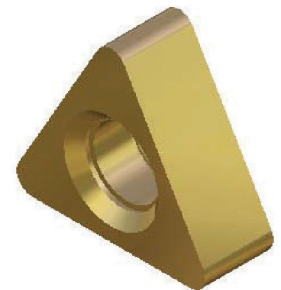
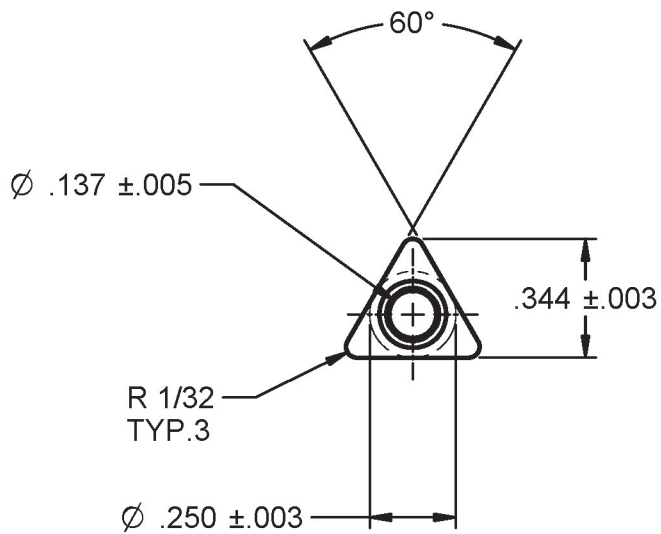
T56P-Y4



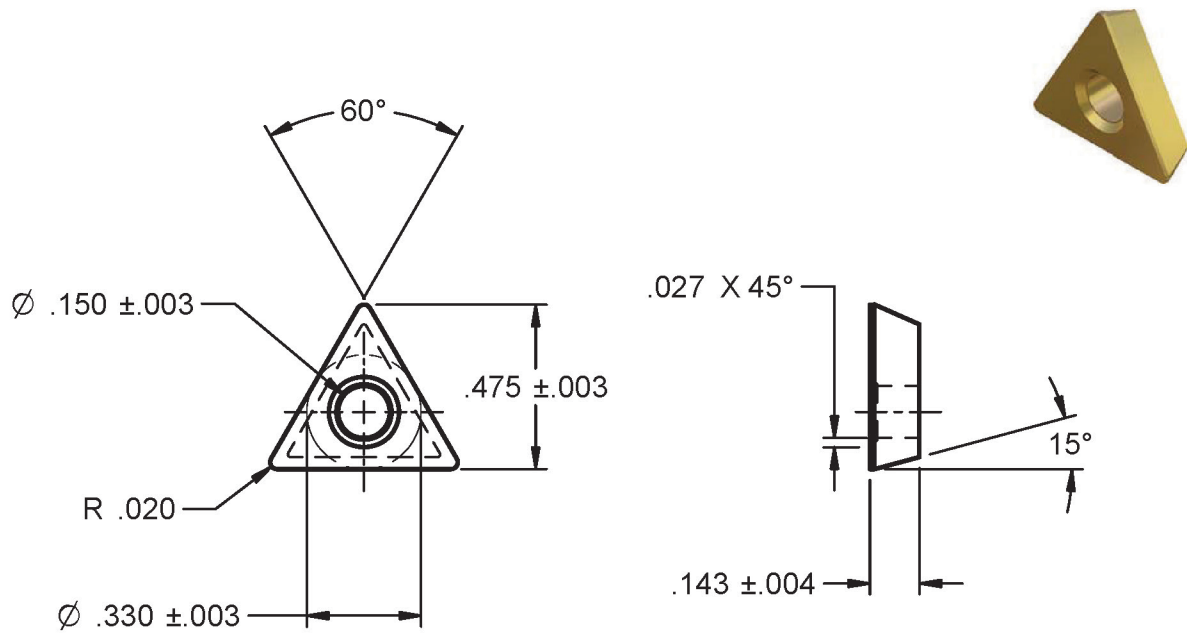
TNSC21.52 (BRAKE DRUM INSERT)



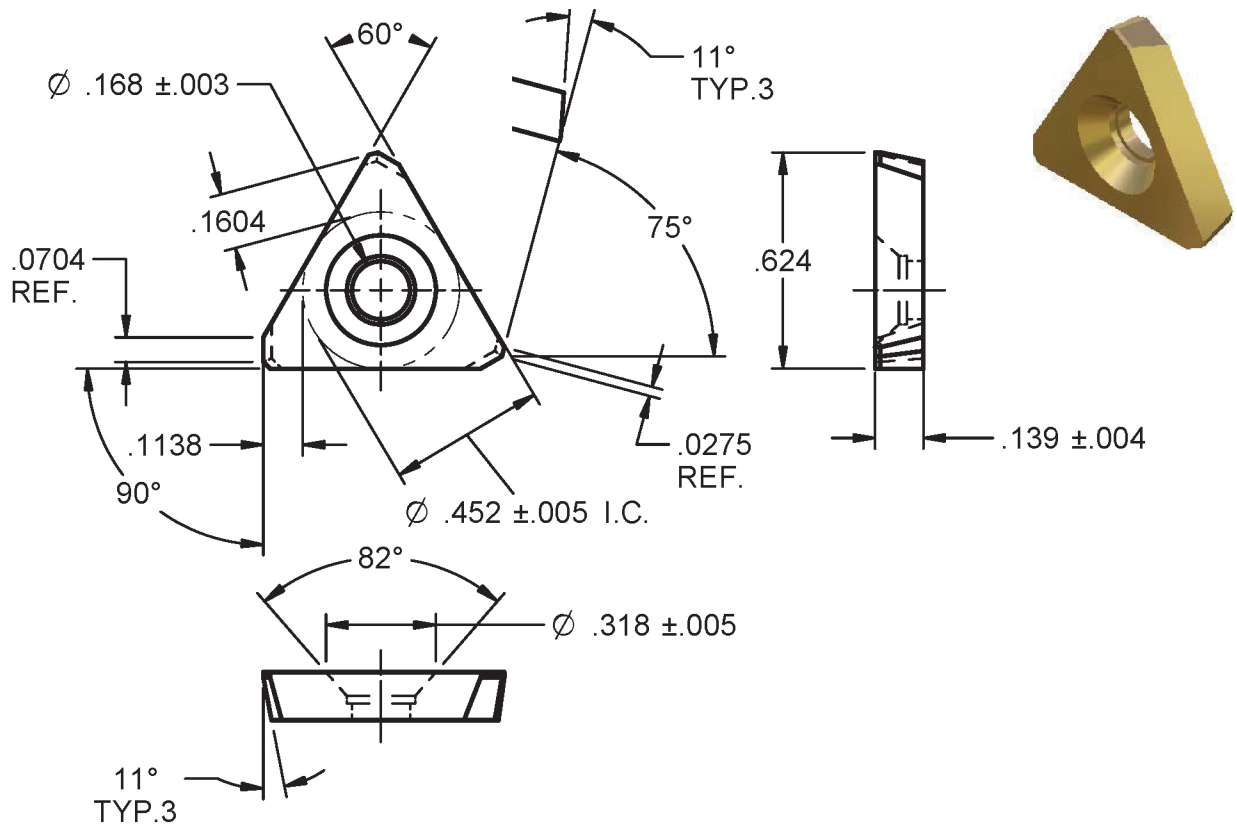
TNSC222 (BRAKE DRUM INSERT)



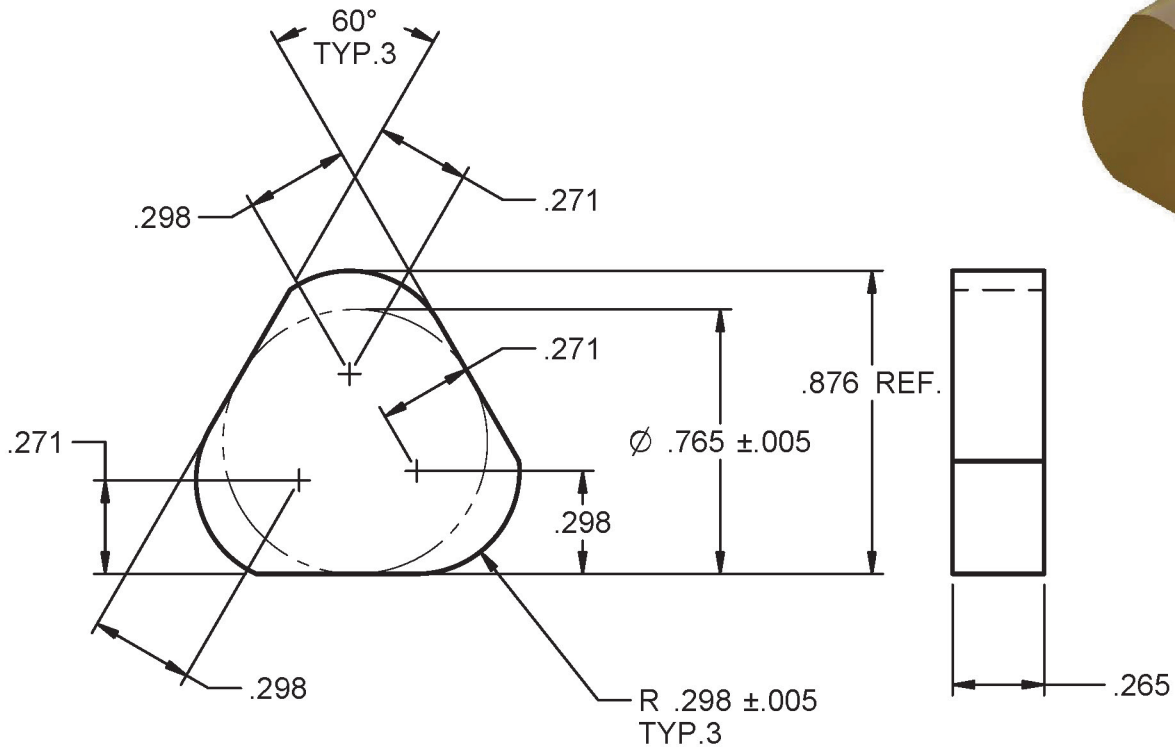
TDRA2.52020 (BRAKE DRUM INSERT)



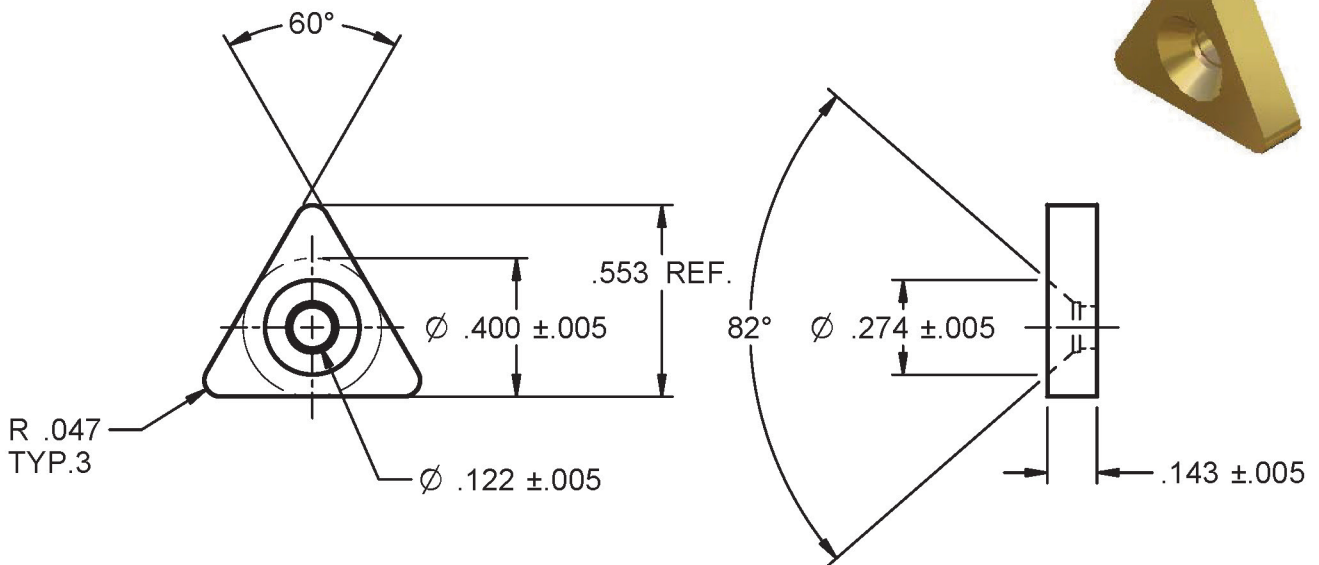
A-2911A



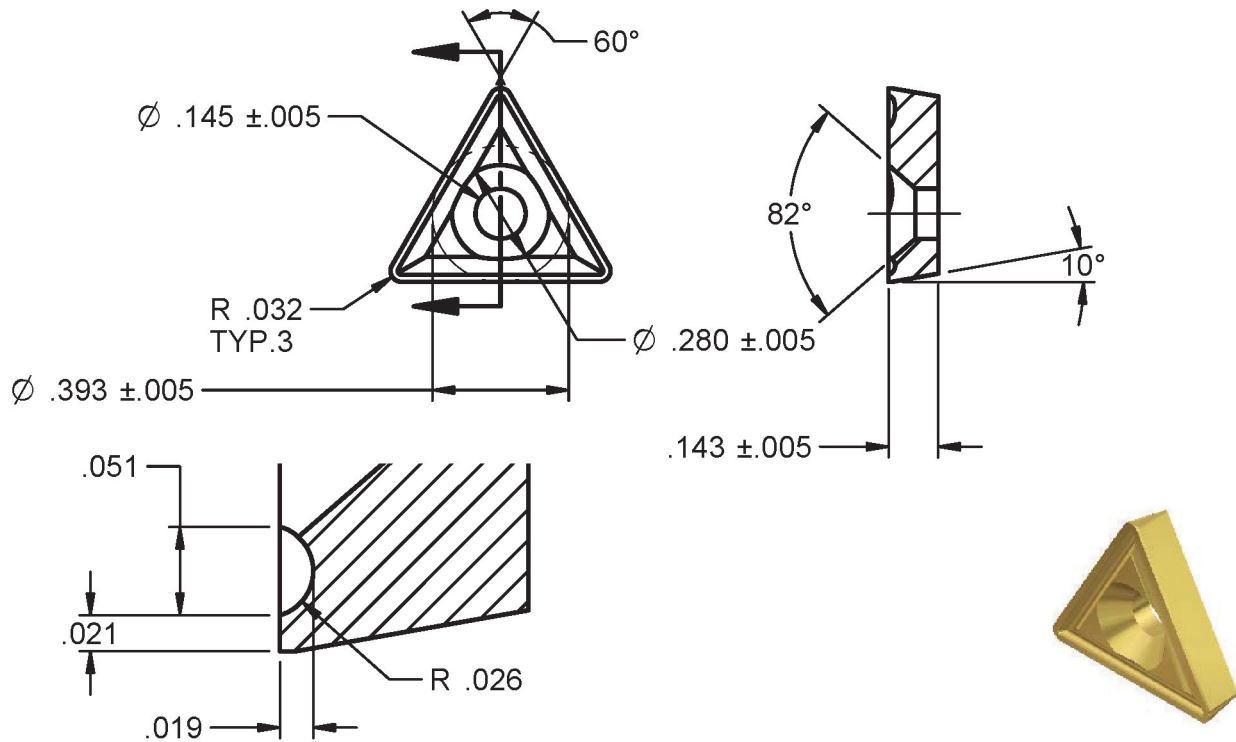
LX-1347-2



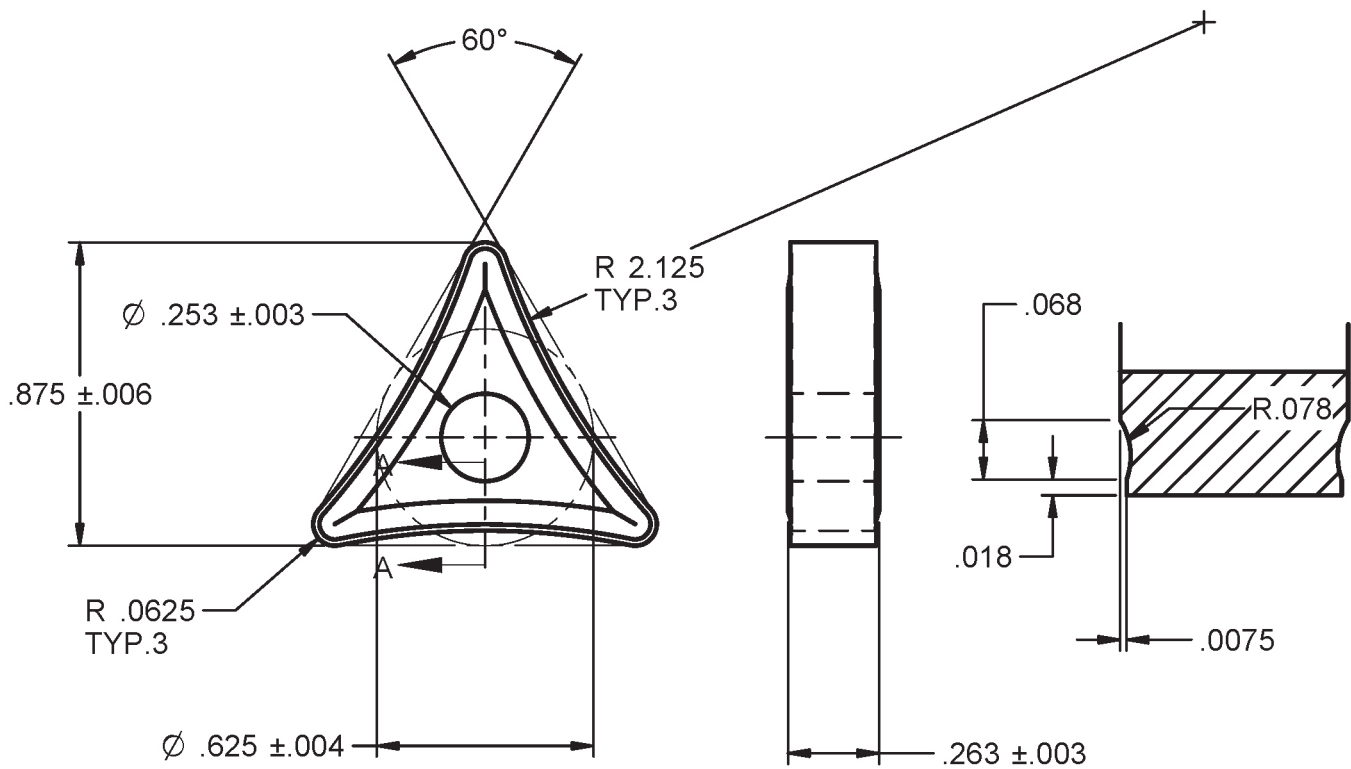
TNRB323-#4



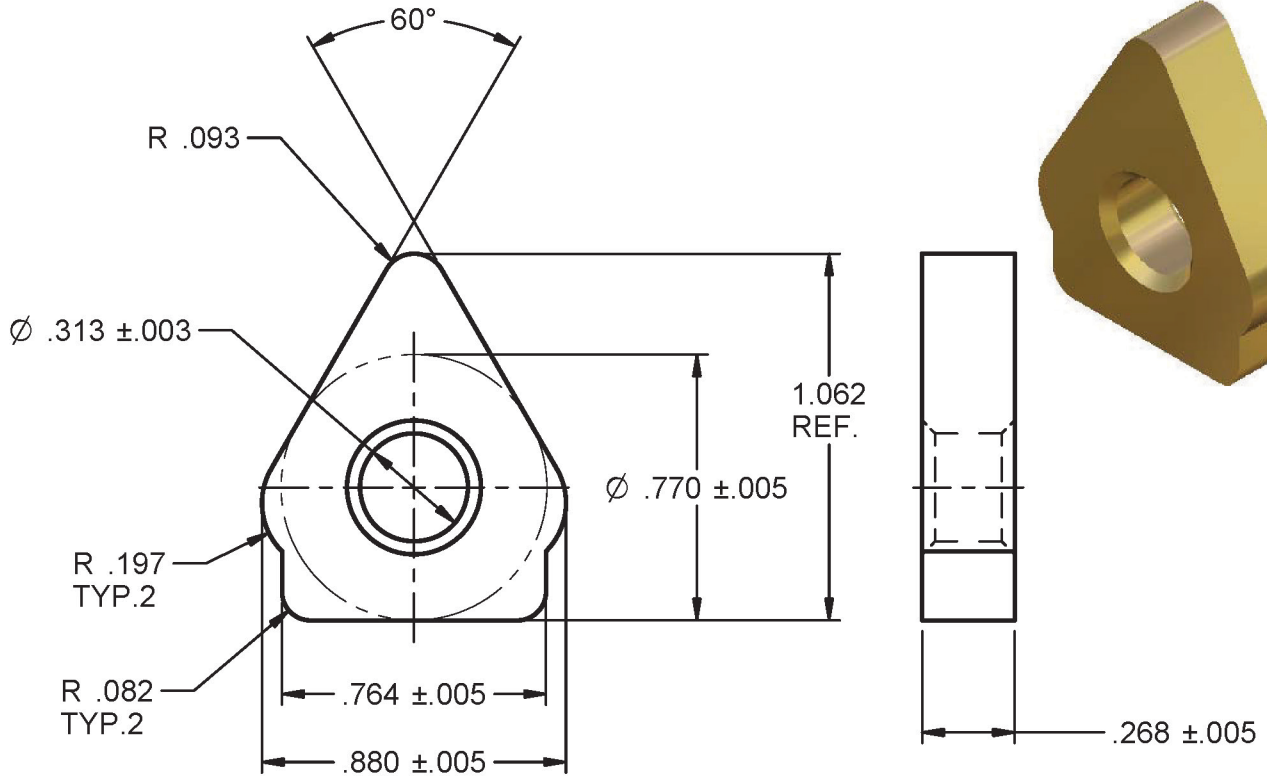
A-0948-C



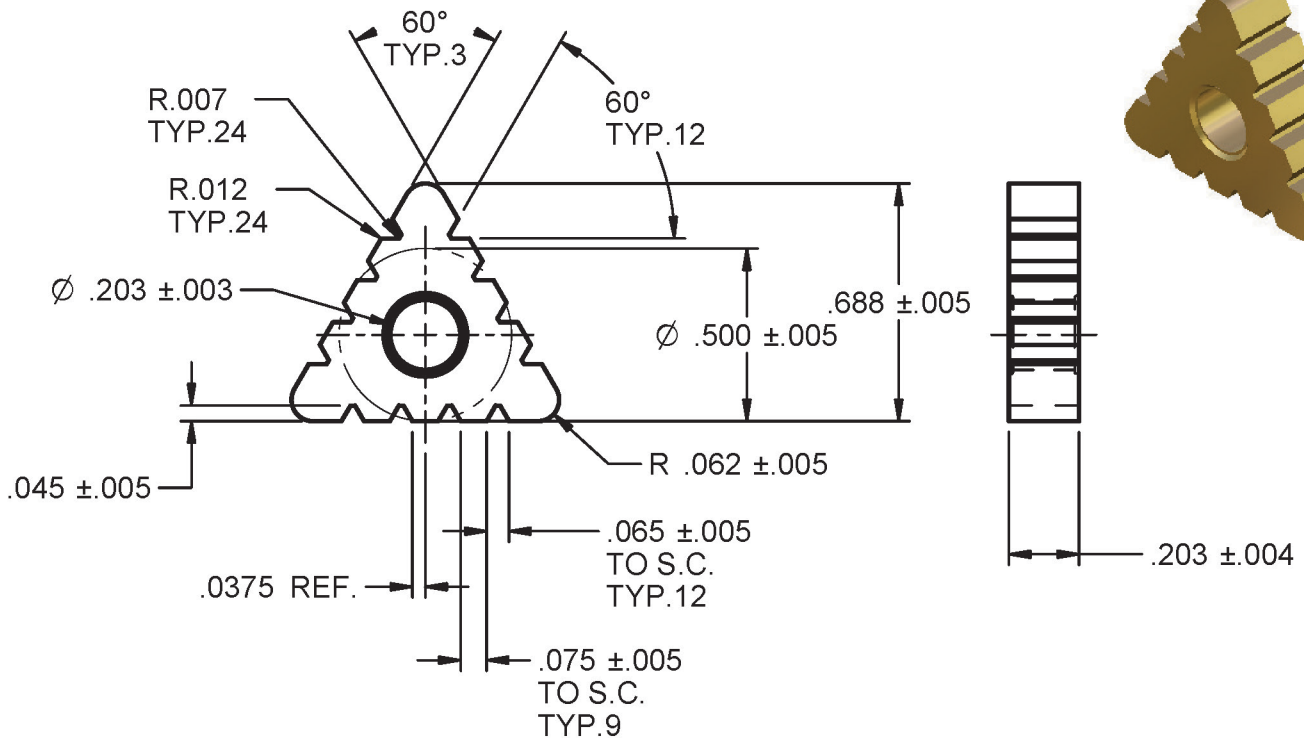
TNSX544-R2.125



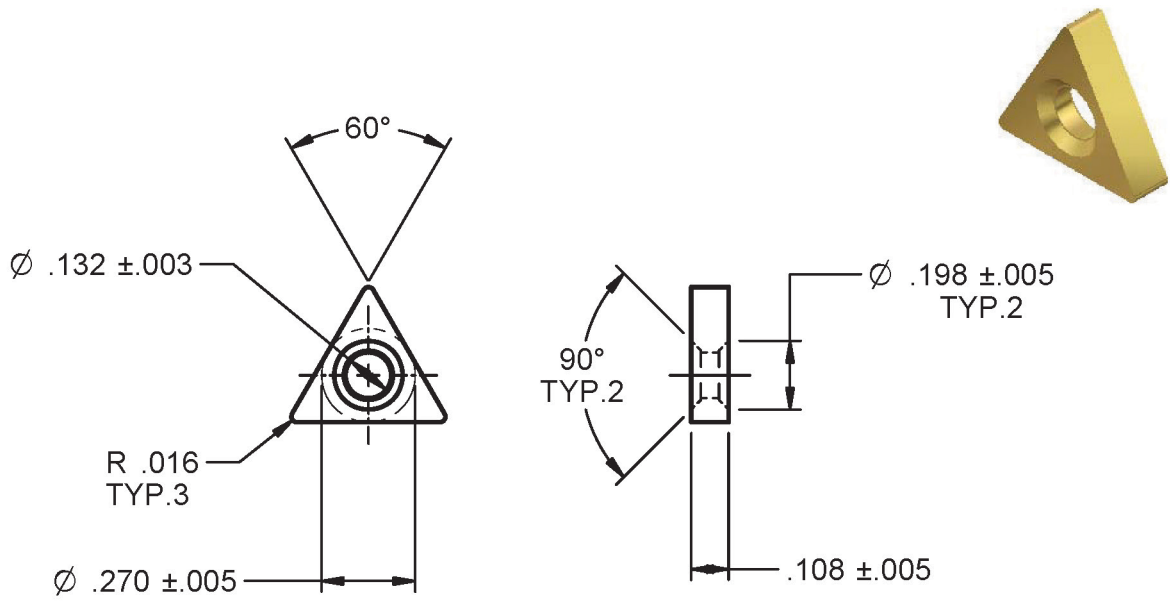
TNRA646-X400



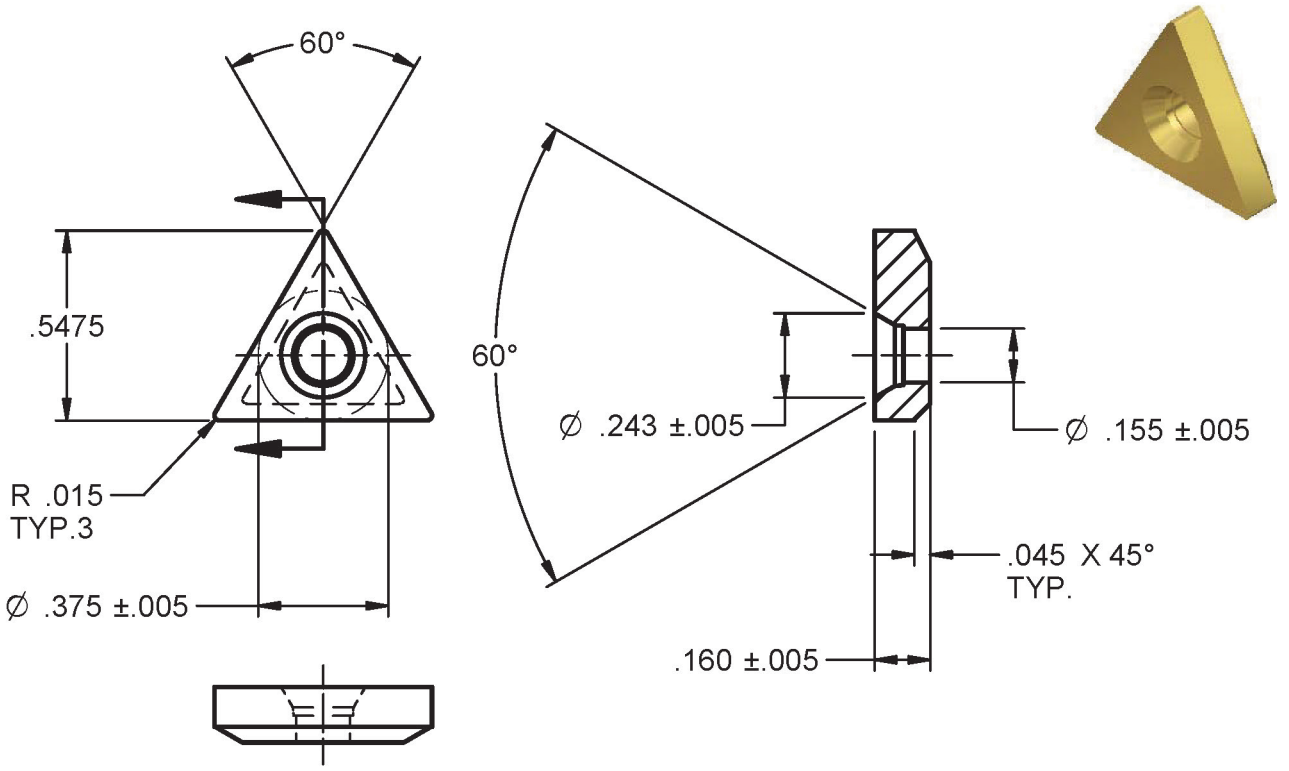
A-2915-B



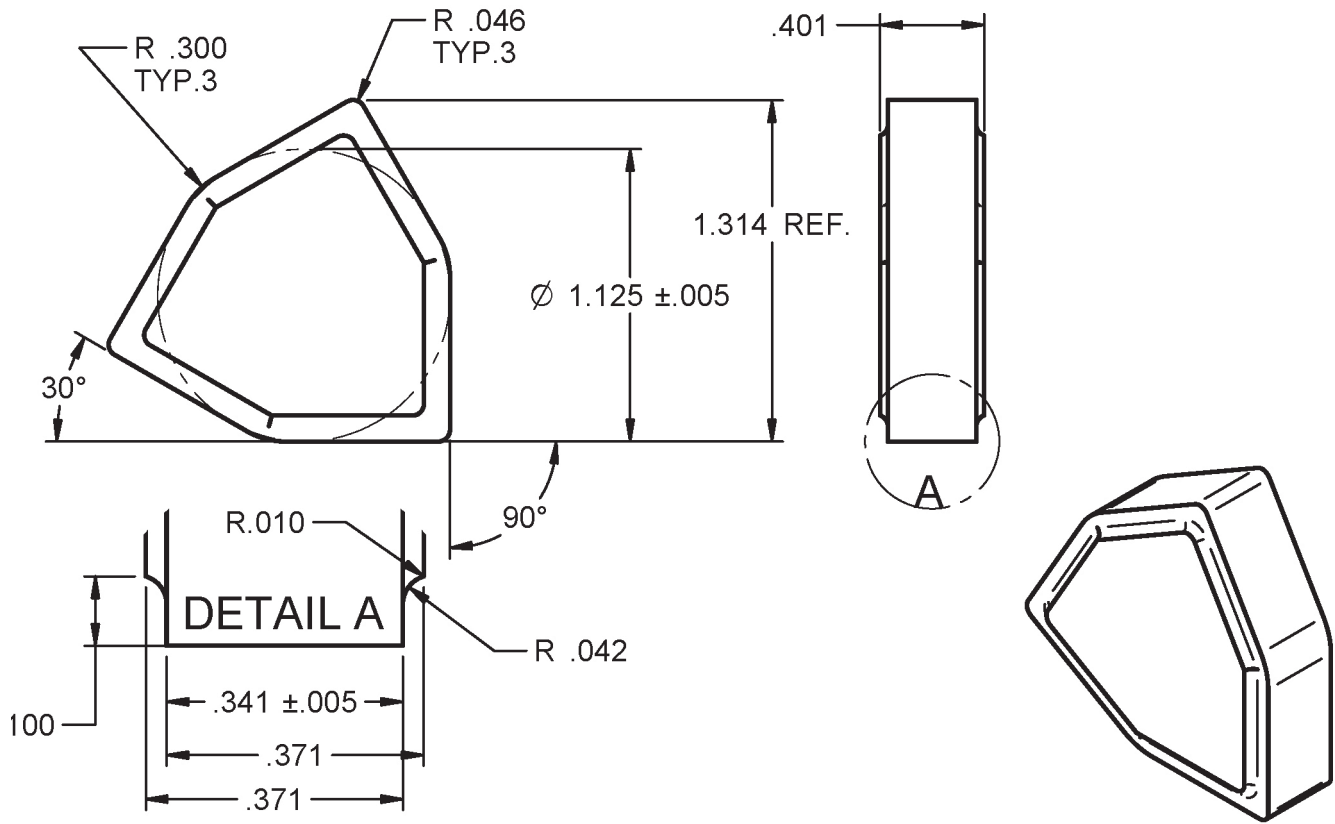
TNRC21.50 (BRAKE DRUM INSERT)



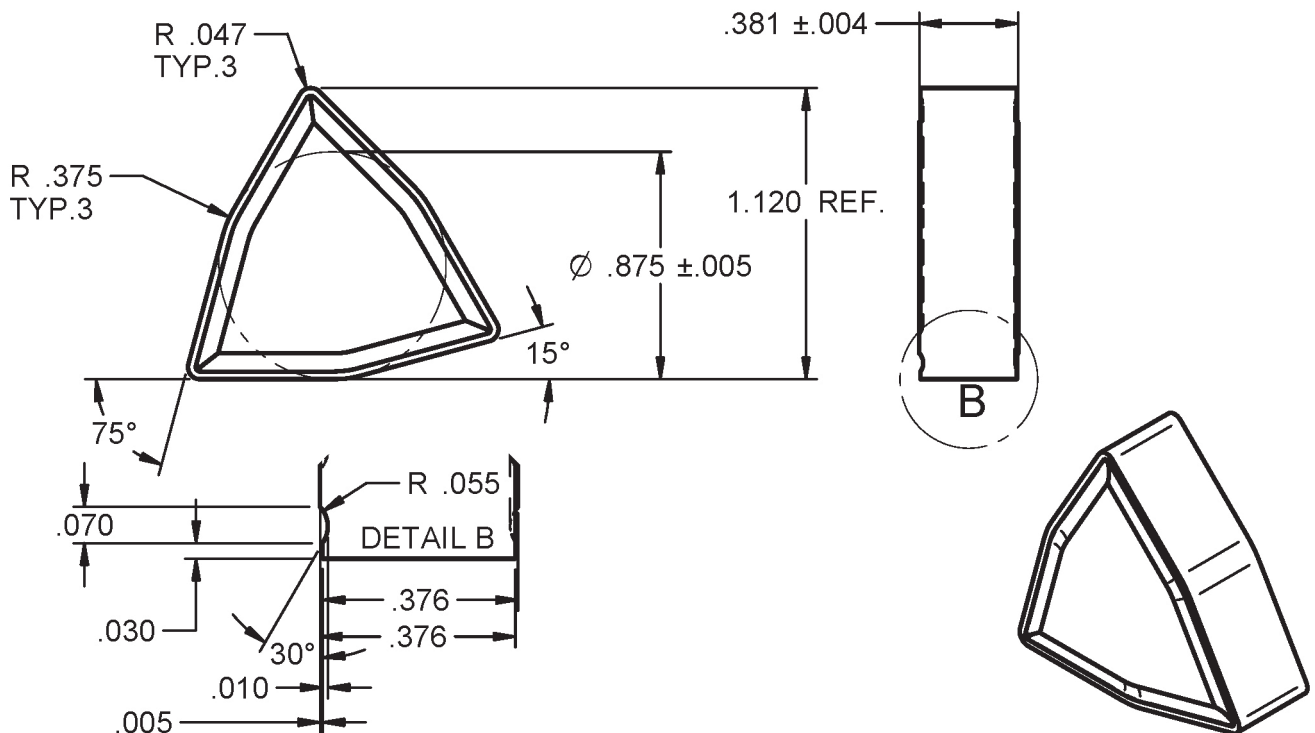
LX-0375



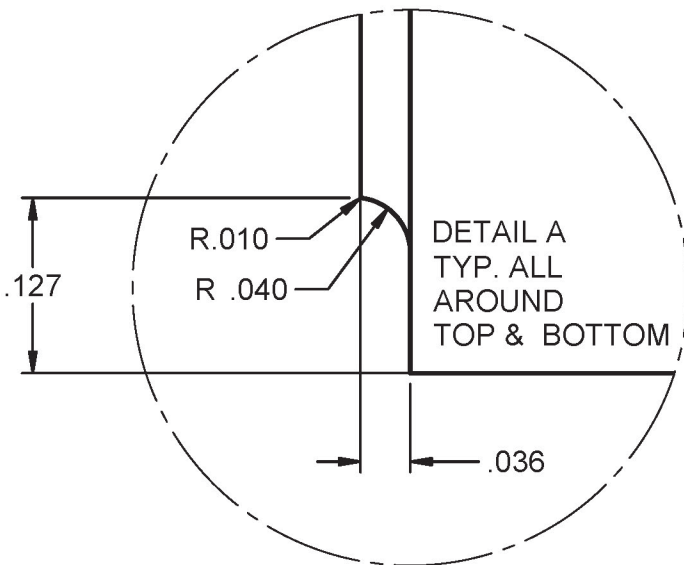
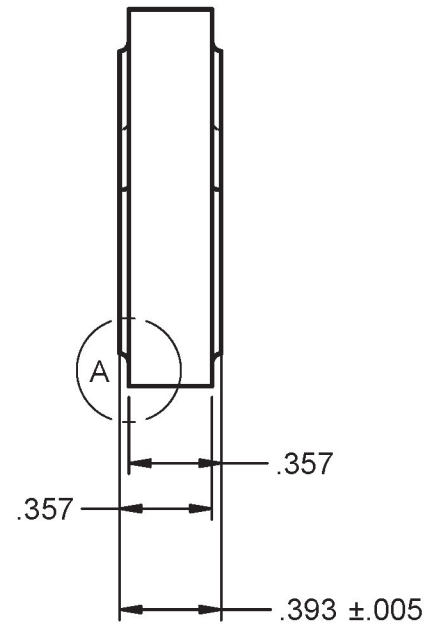
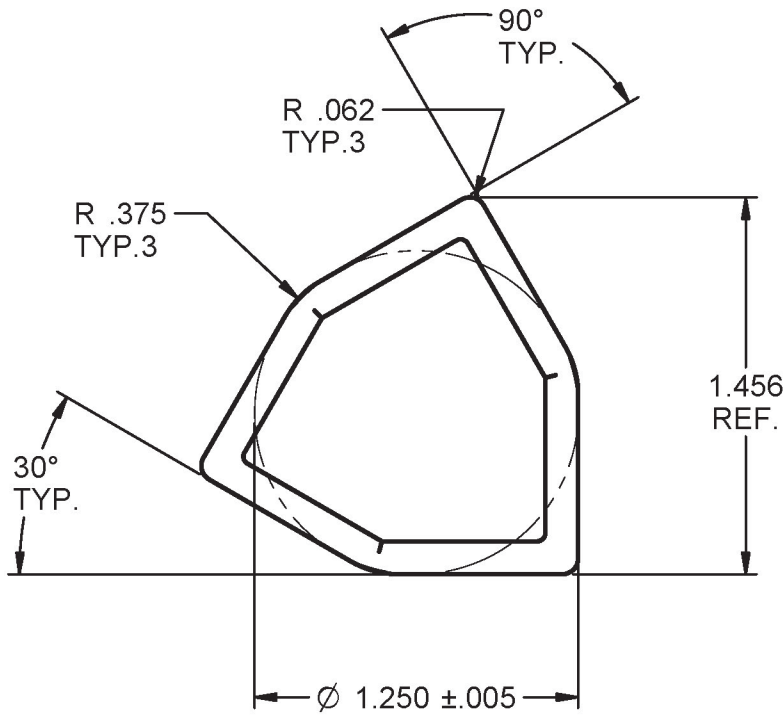
LX-0457-1 (MA-69622-B, WNSF96)



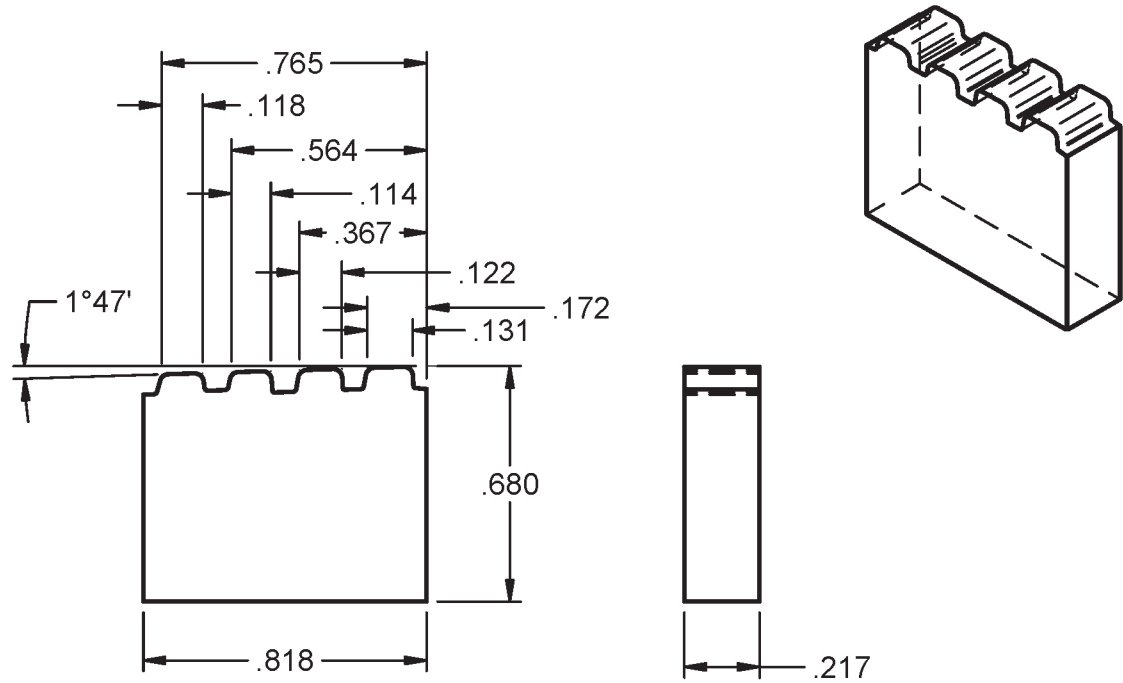
LX-0525-1 (MA-70337, WNSF76)



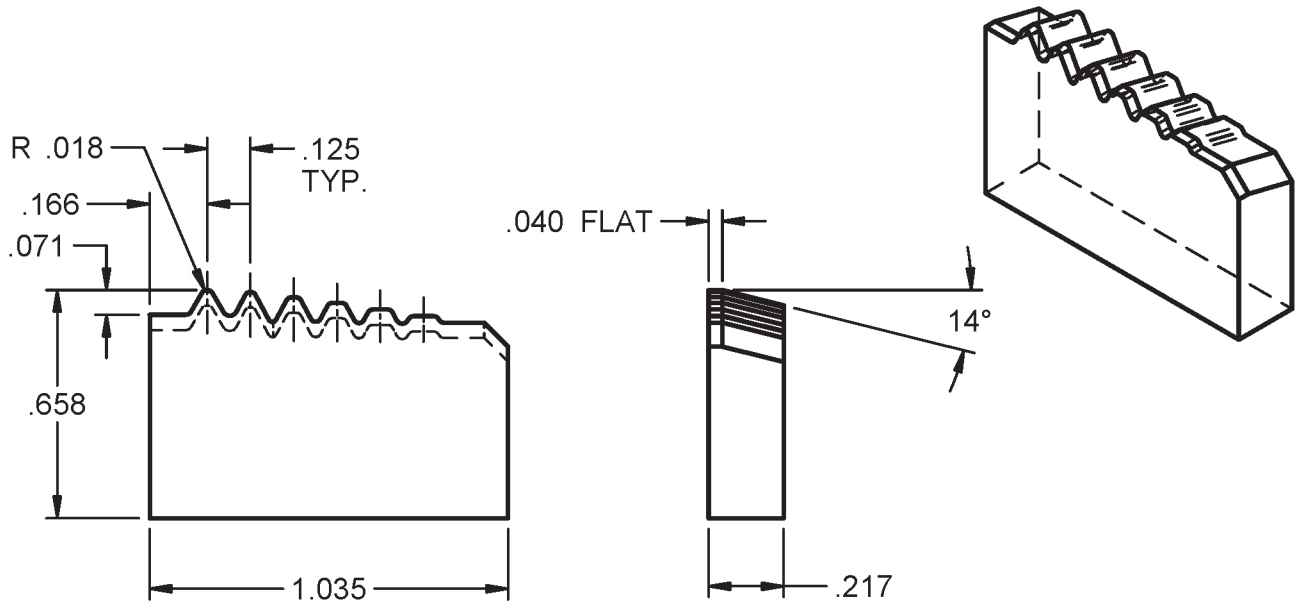
LX-0466-2 (WNSF106)



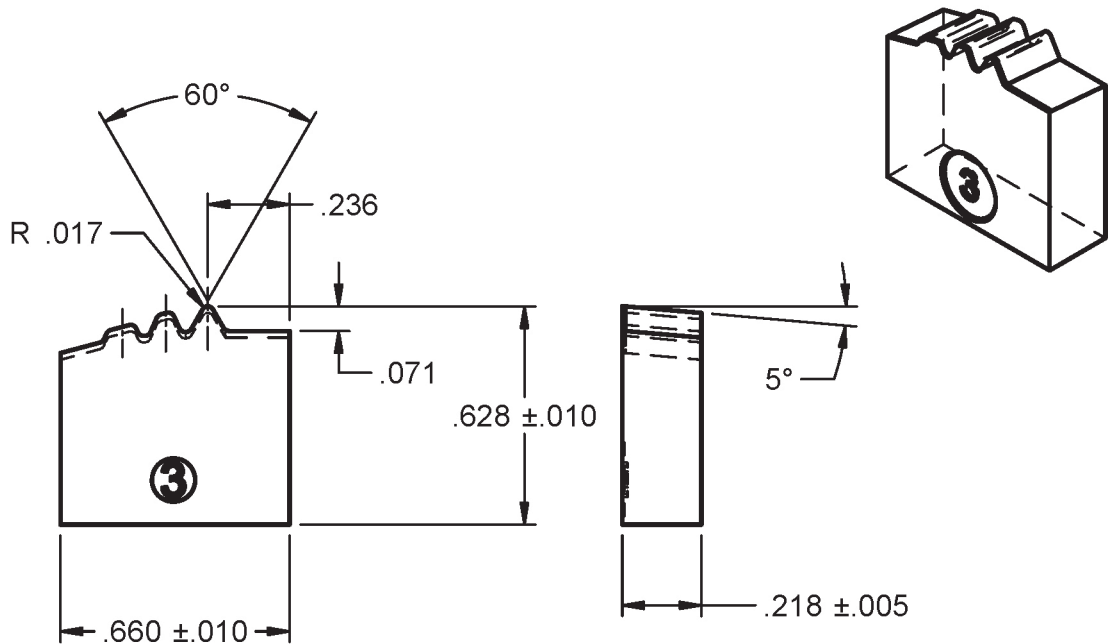
LX-1101-15-OD5BBUT2.5



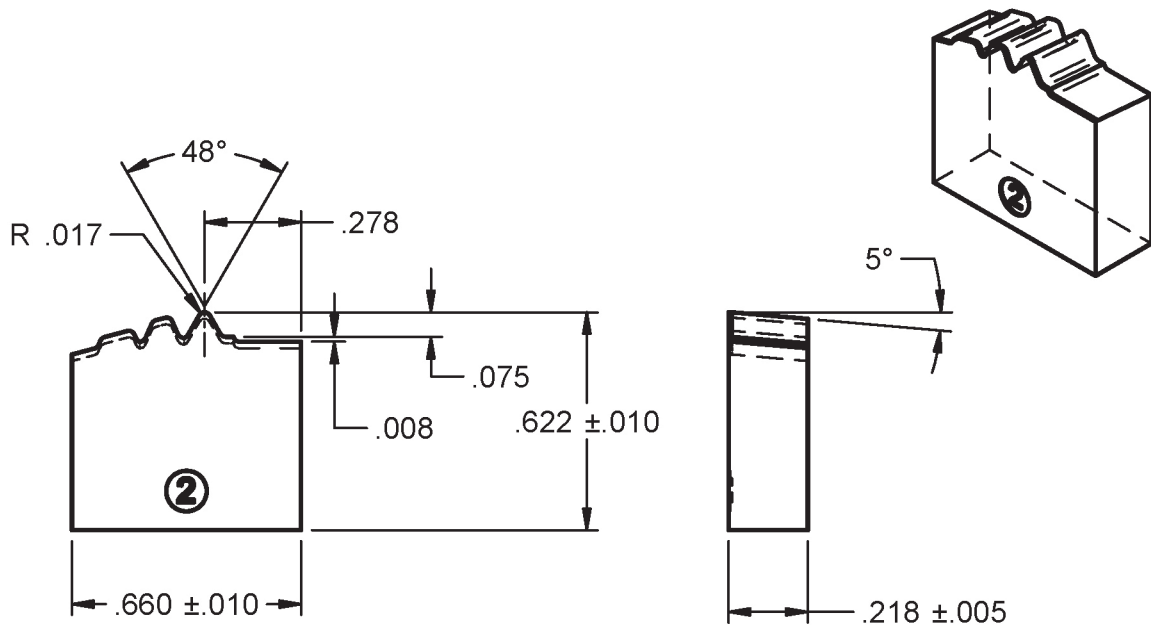
A-1727-B-8RD-INT



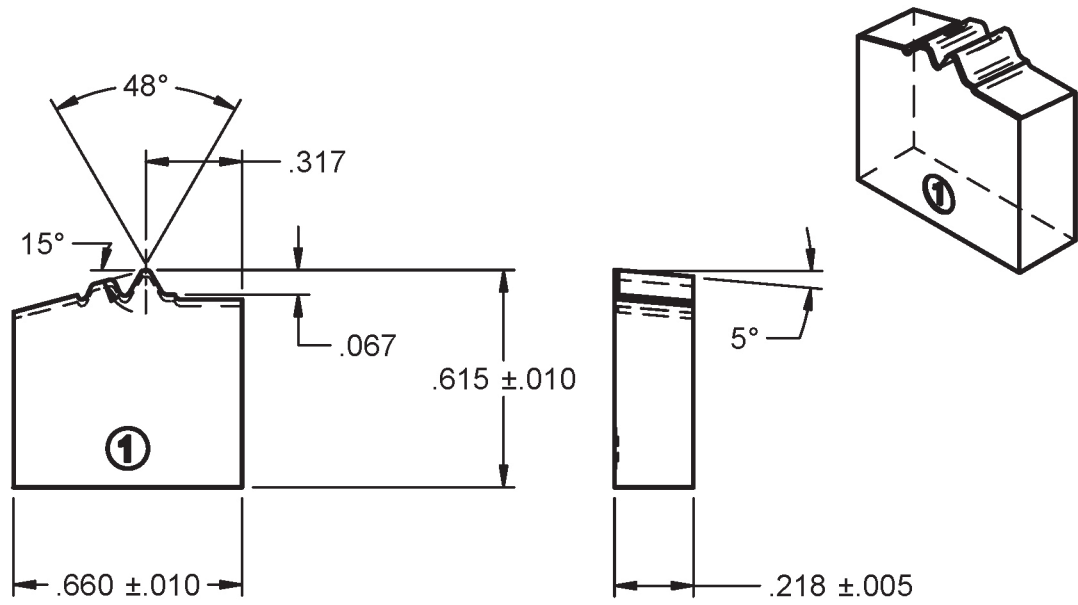
A-1931-B #3 THREAD CHASER



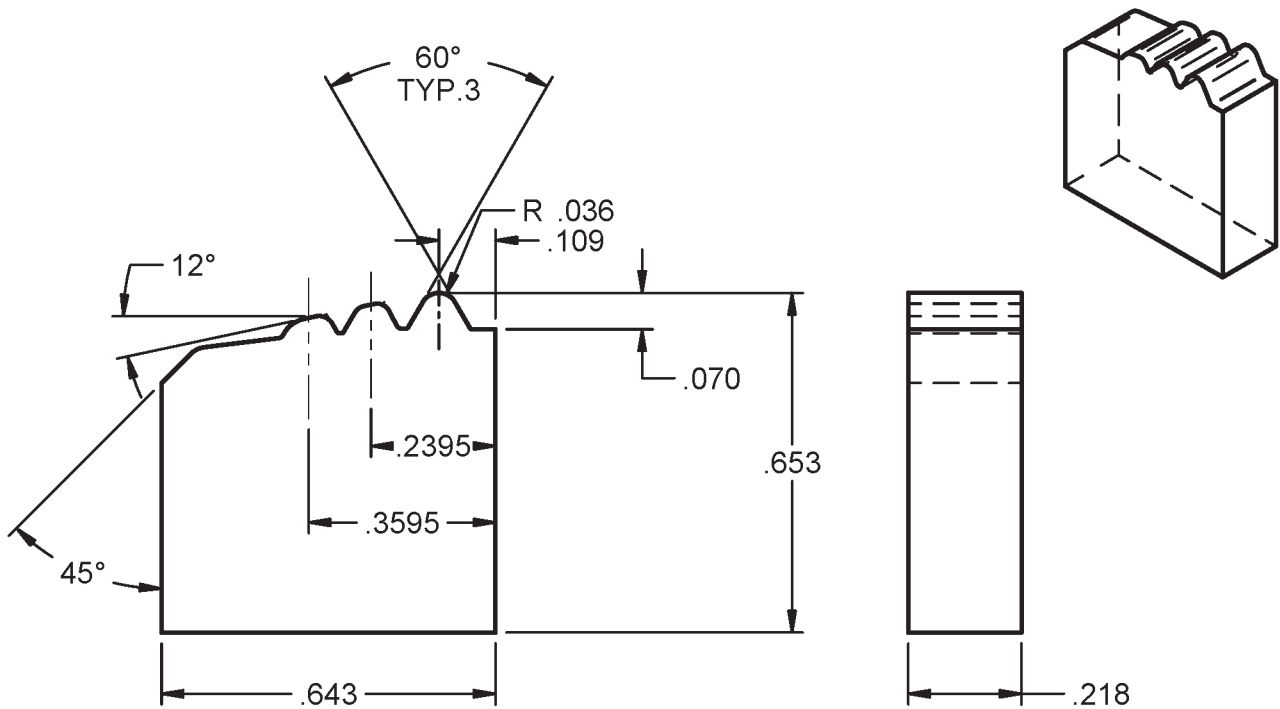
A-1930-B #2 THREAD CHASER



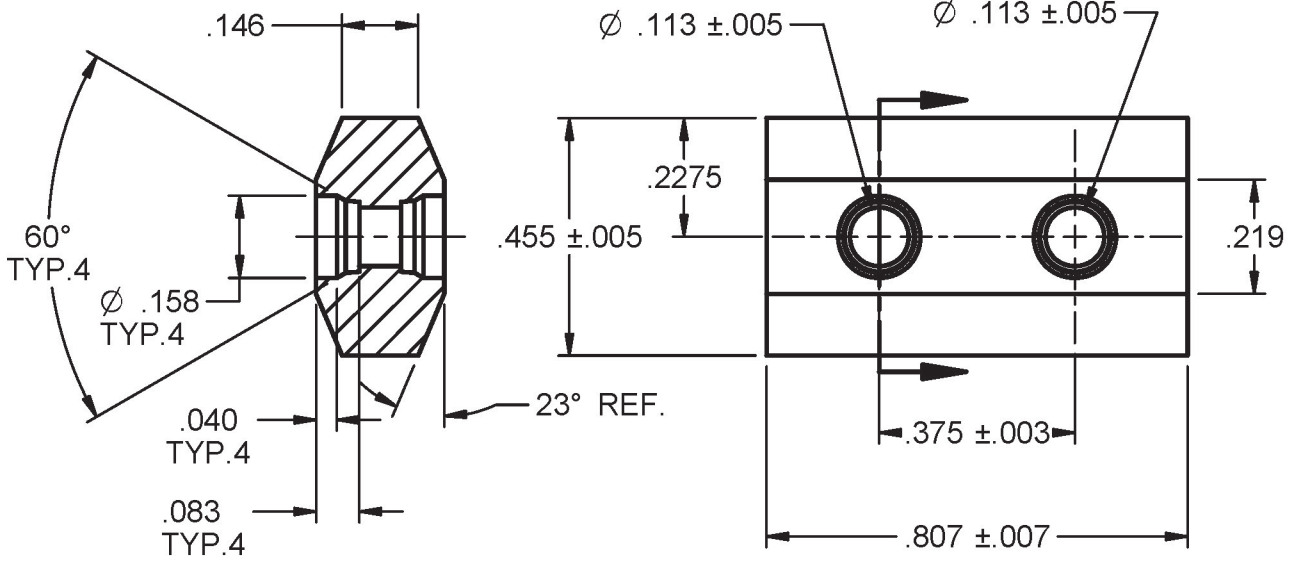
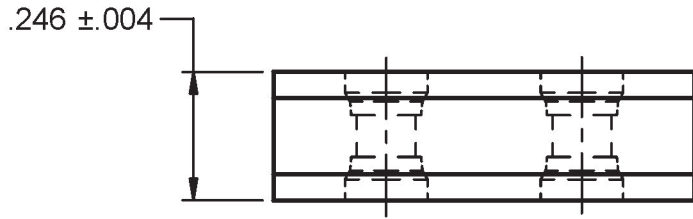
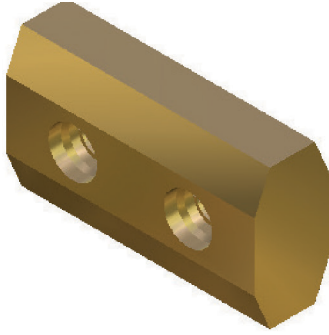
A-1929-B-1 THREAD CHASER



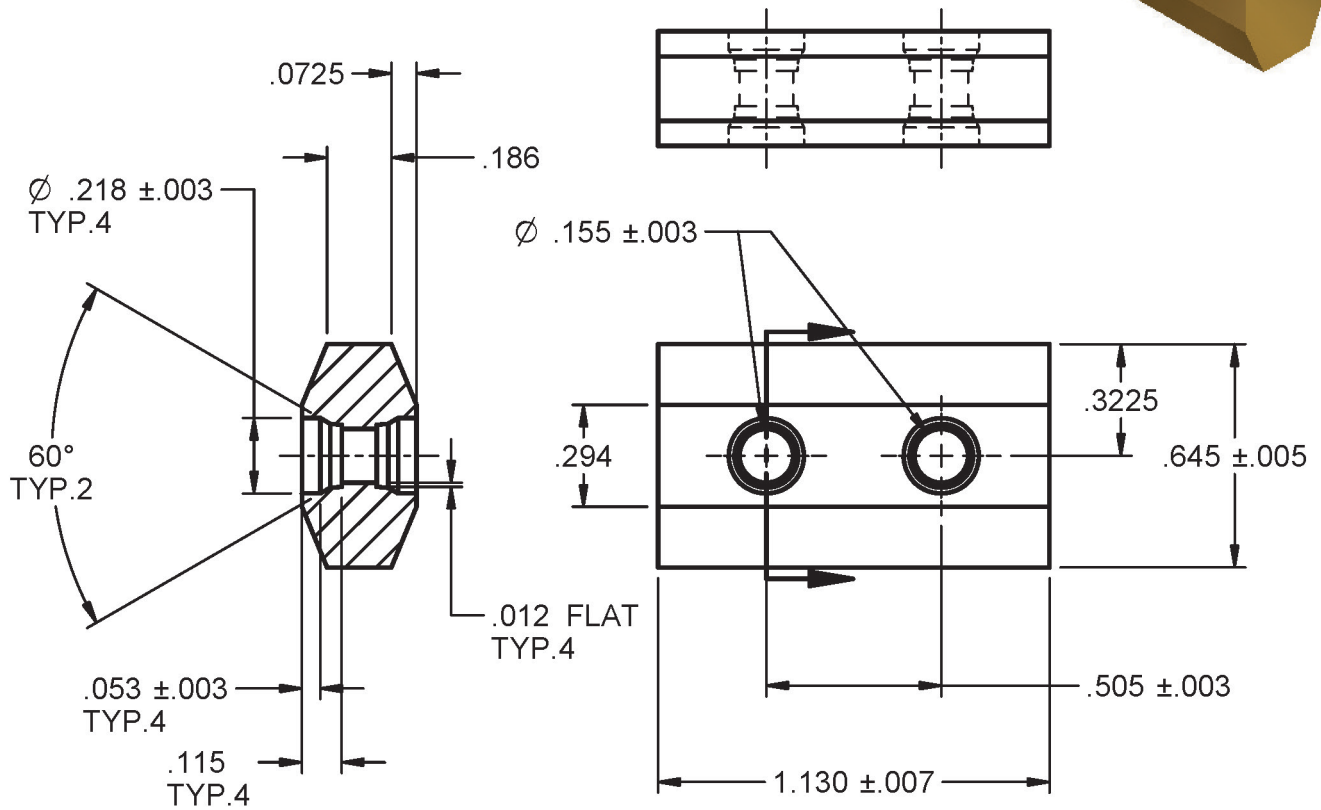
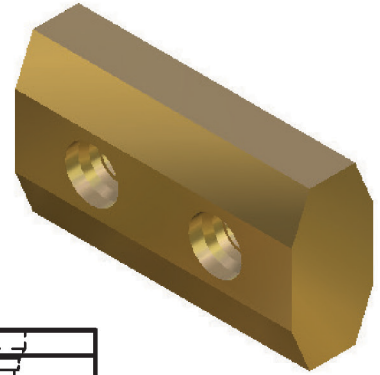
LX-1101-14-OD8APIRD3T



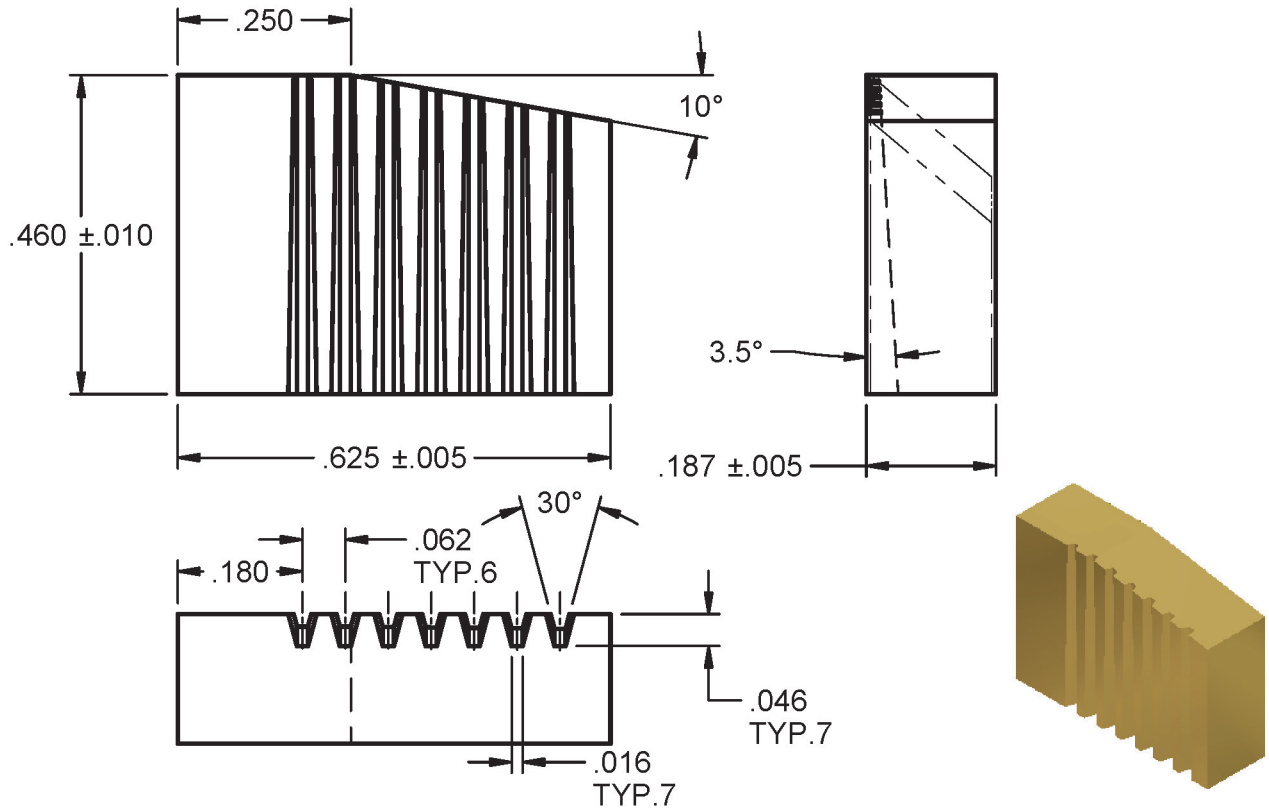
LX-0549-3 (TMB19/20MM - THD. MILL BLANK 19 & 20MM)



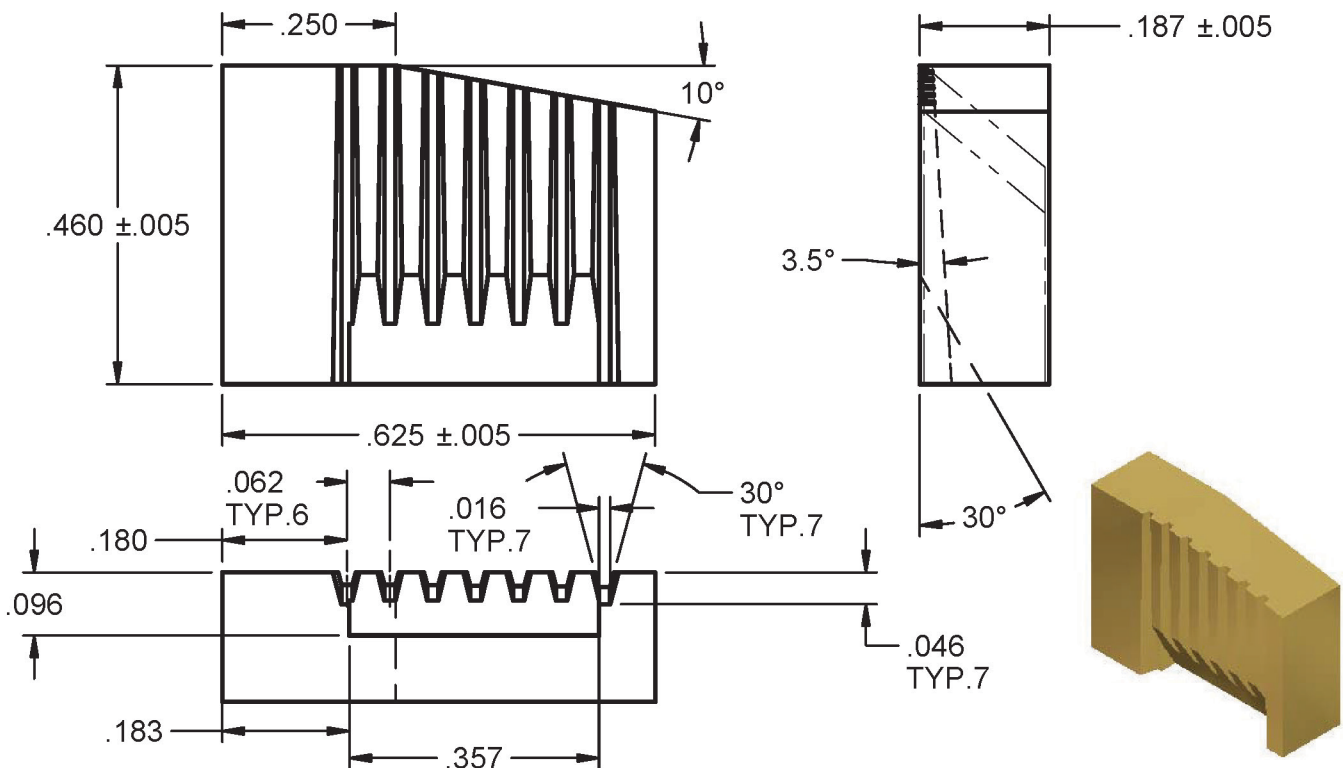
LX-0549-4 (TMB28MM - THD. MILL BLANK 28MM)



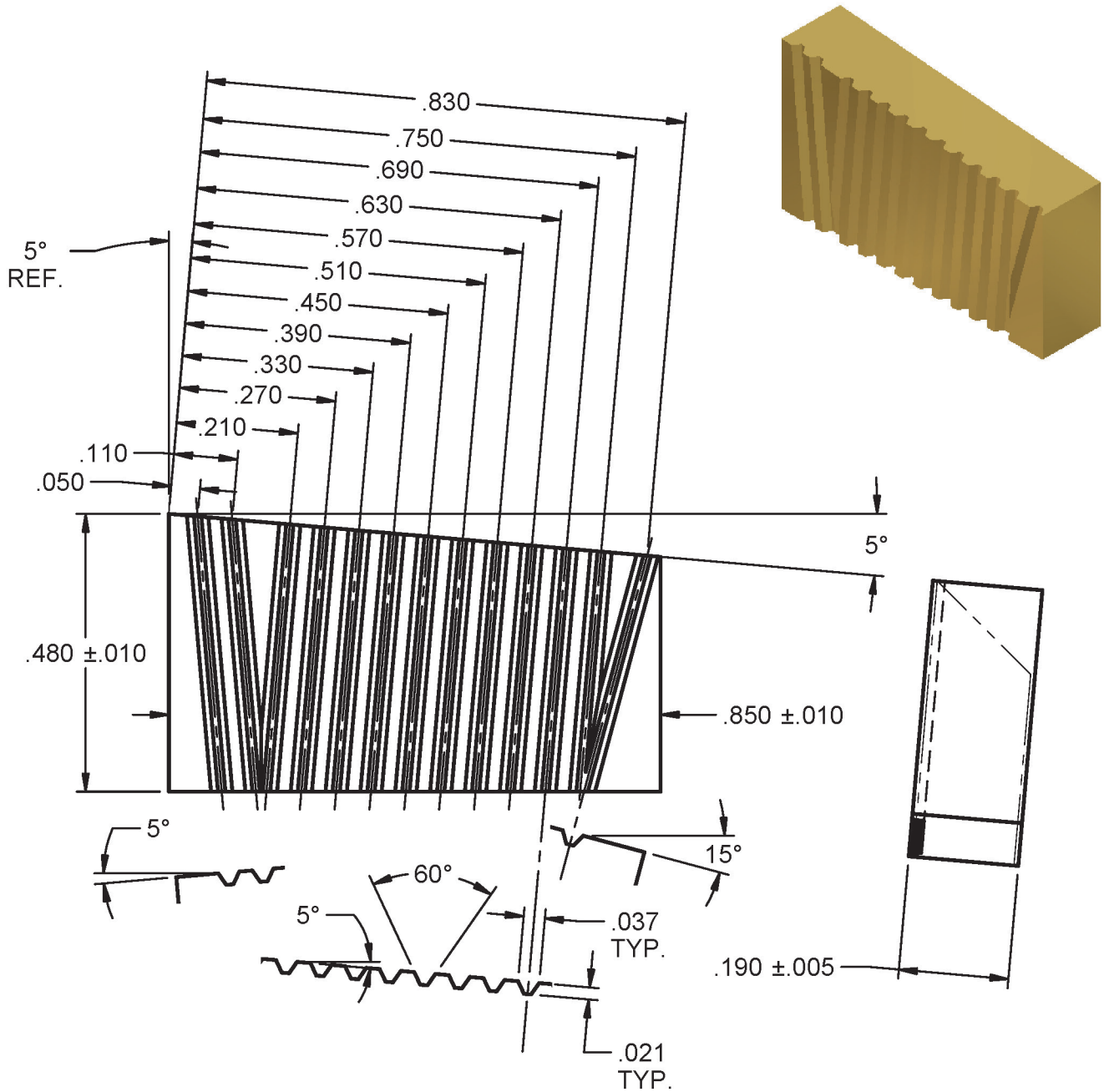
MA-67943 (D-19252-P1 CHIPBREAKER)



LX-1348-1 (D-19252-P2 CHIPBREAKER)



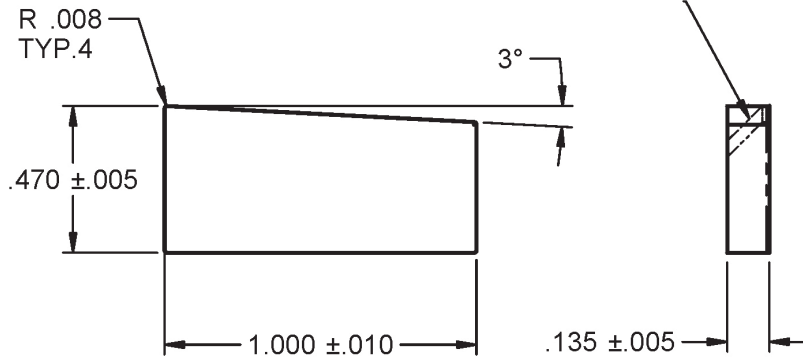
A-2030-A (D-19269-P1)



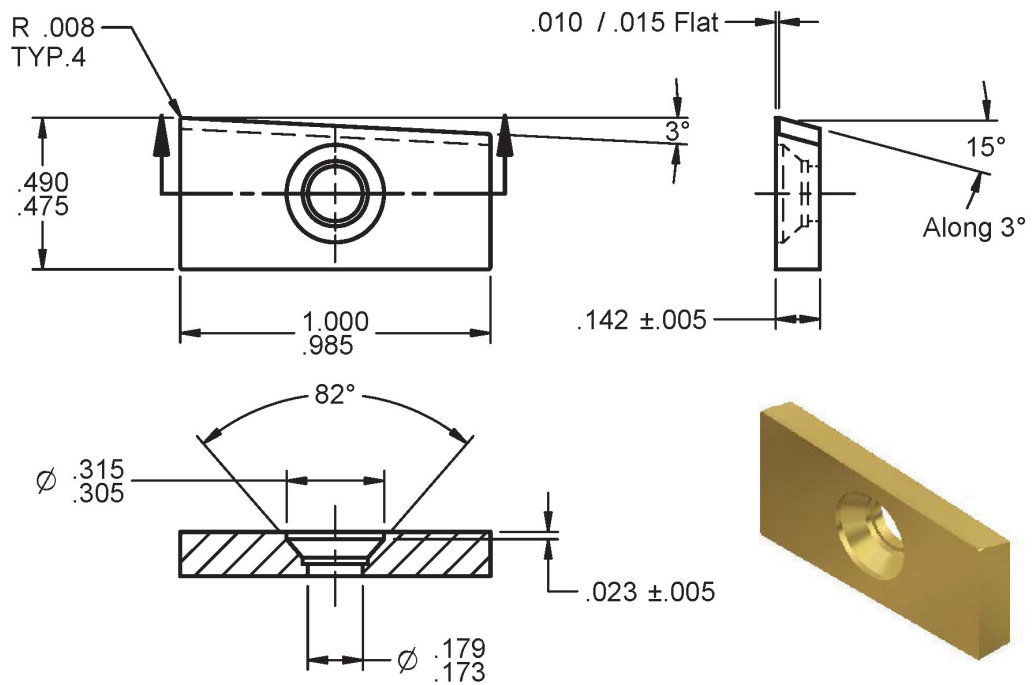
A-1877-A (D-19241 CHIPBREAKER)

Grind Stock Thickness

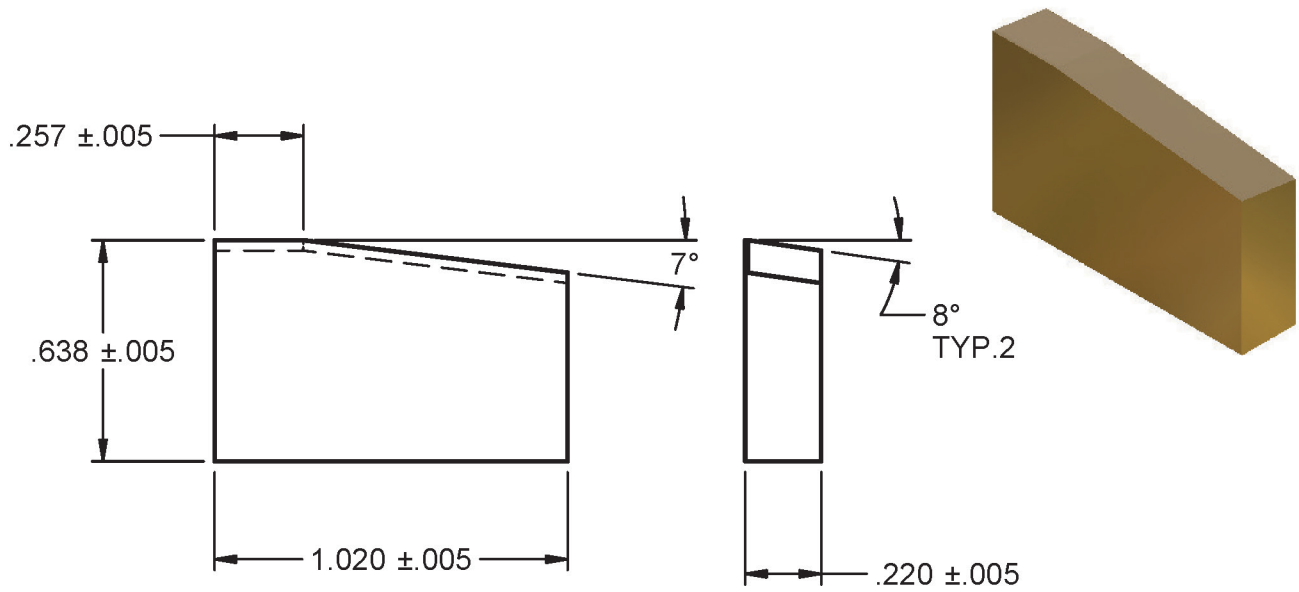
45° Clear. would need to be Ground on.



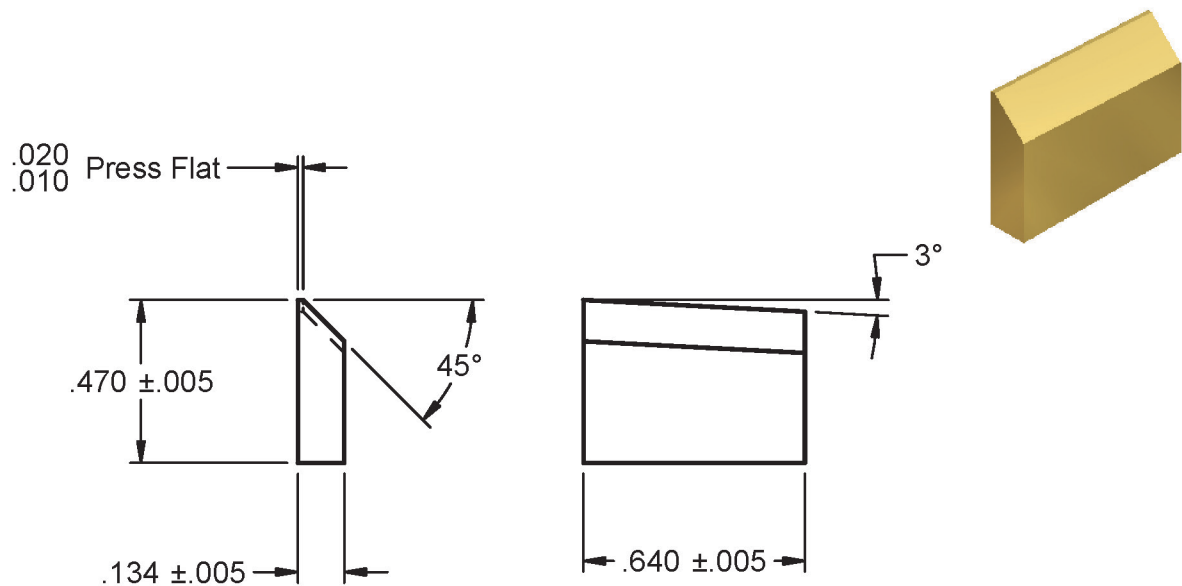
A-1878-A (D-07559-P1 SHIM SEAT)



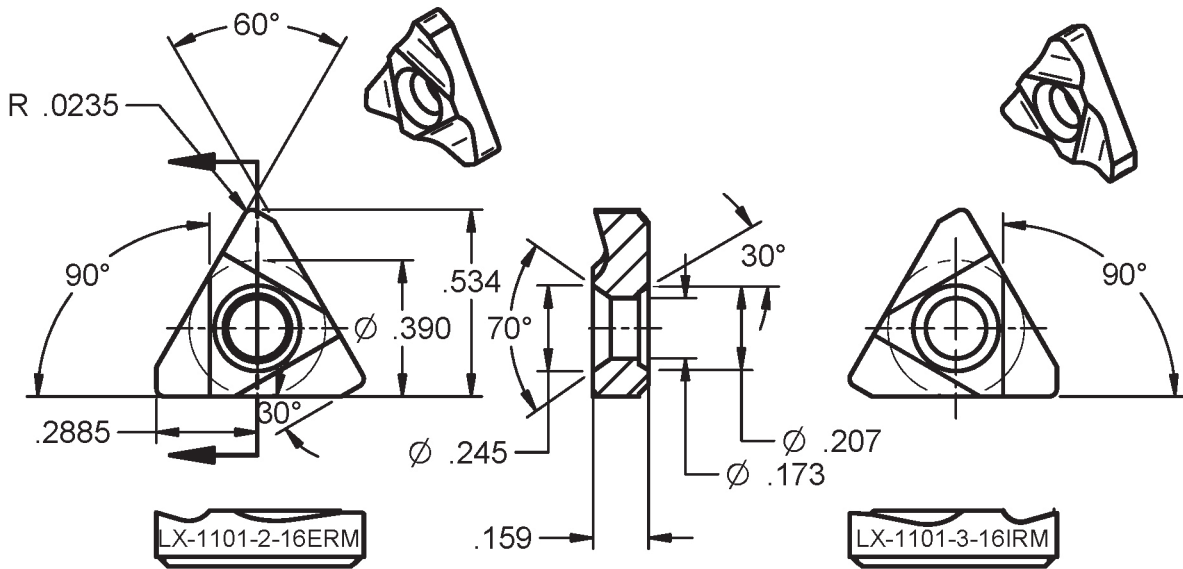
A-1010-B (D-07522 CHIPBREAKER)



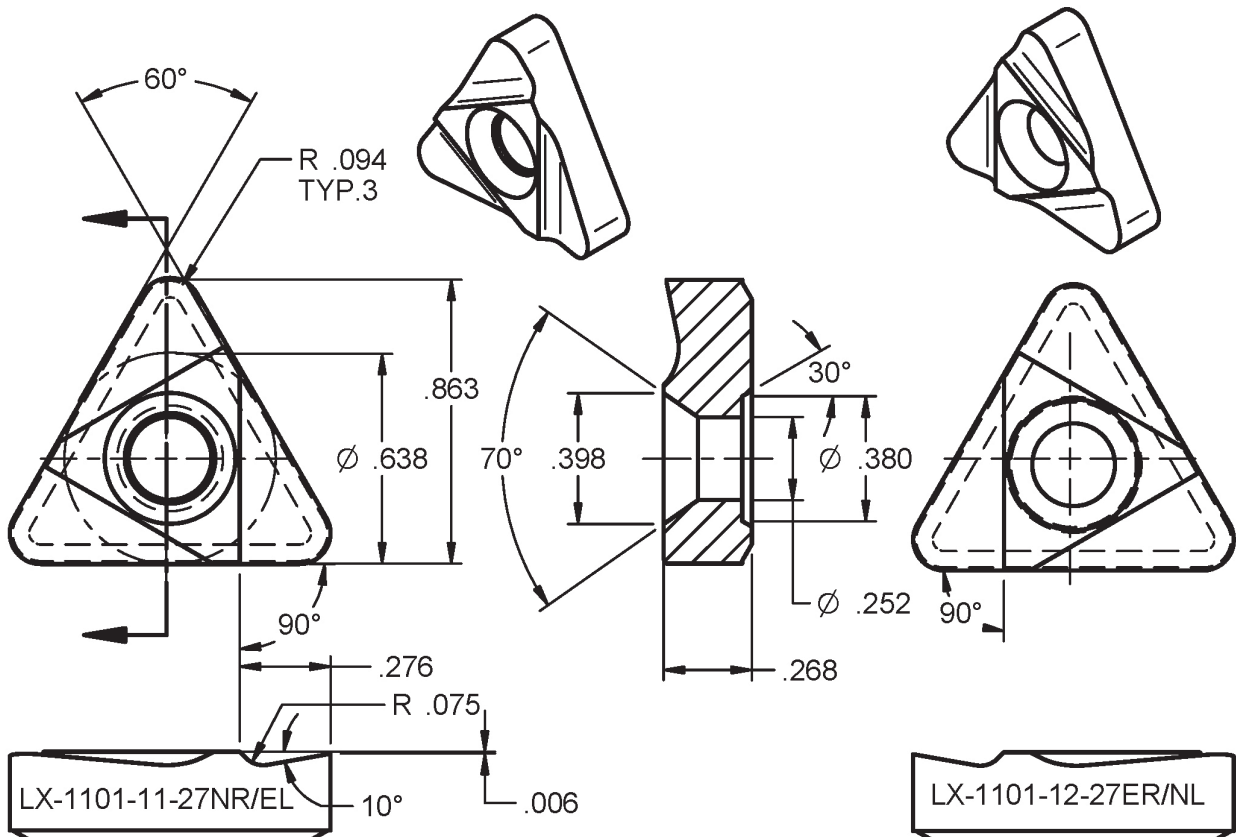
4T8RD INT (D-16670-P1 CHIPBREAKER)



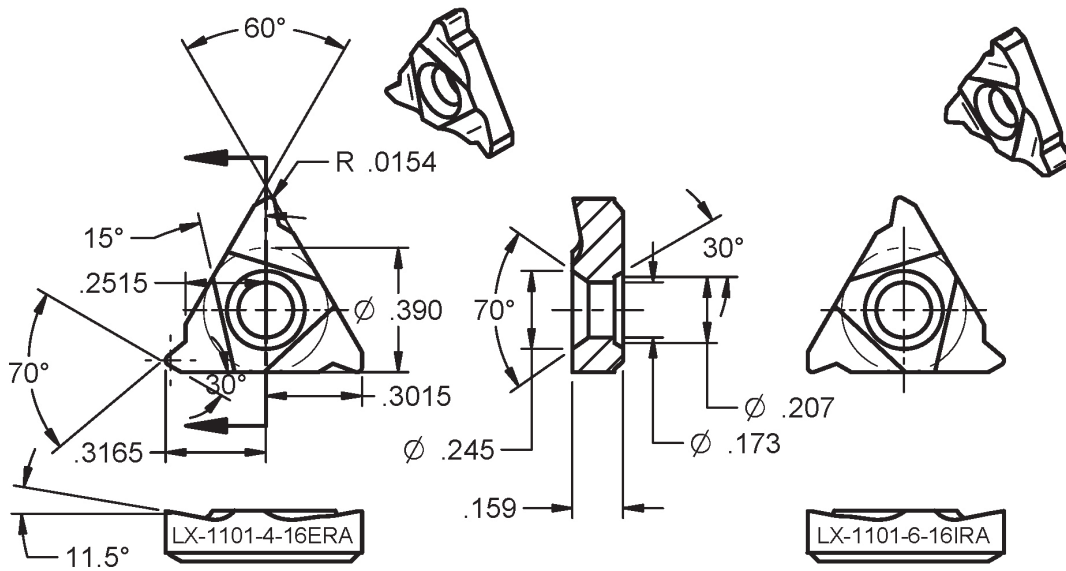
LX-1101 ERM/IRM



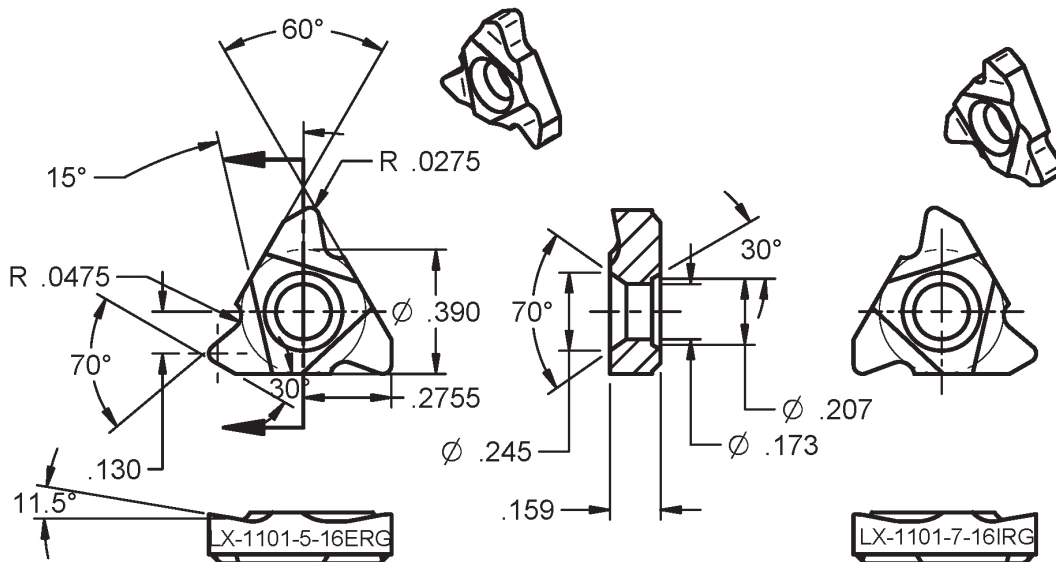
LX-1101-NR-EL/ER-NL



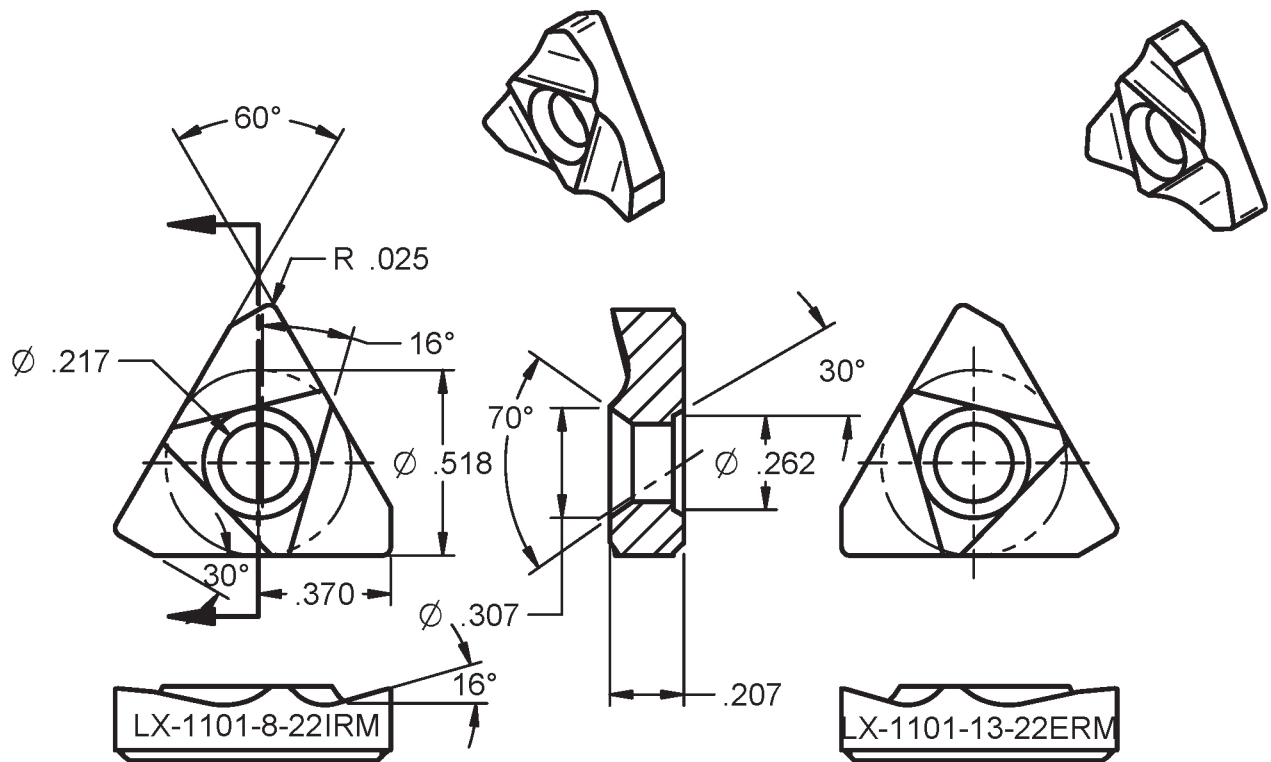
LX-1101 ERA/IRA



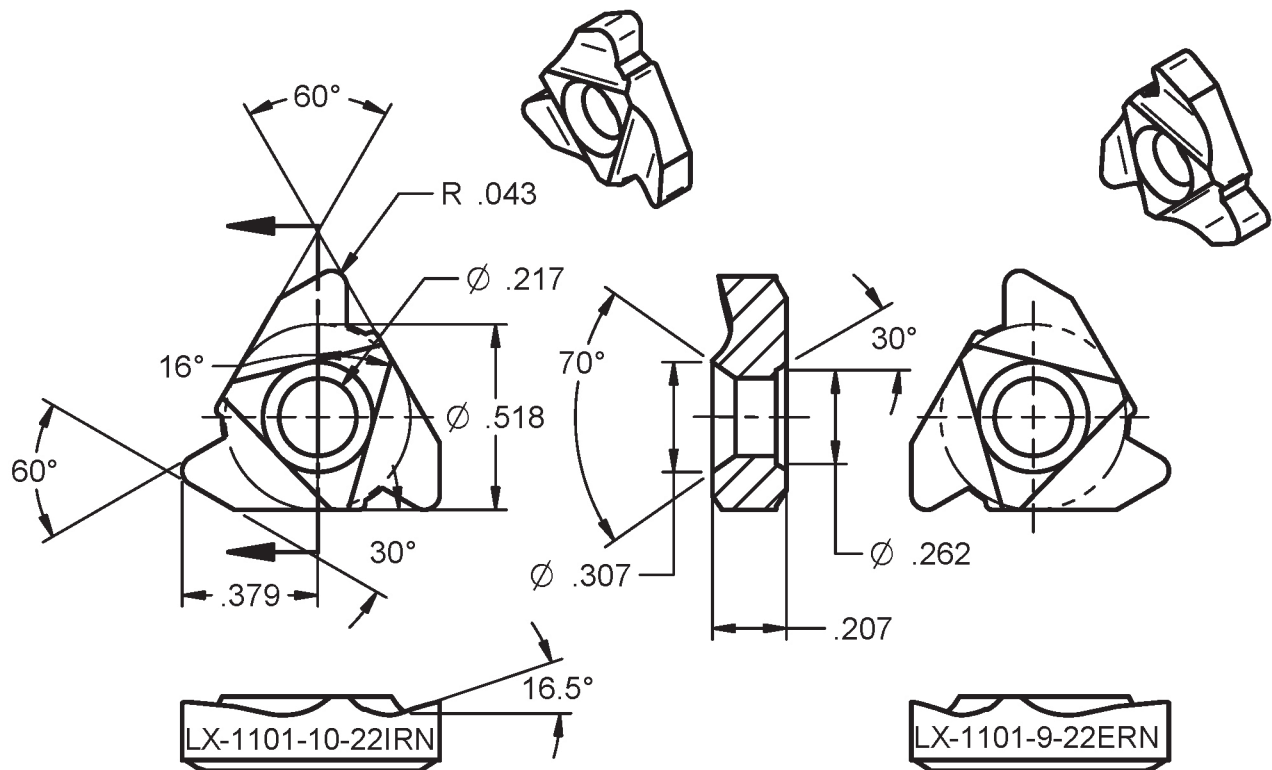
LX-1101-ERG/IRG



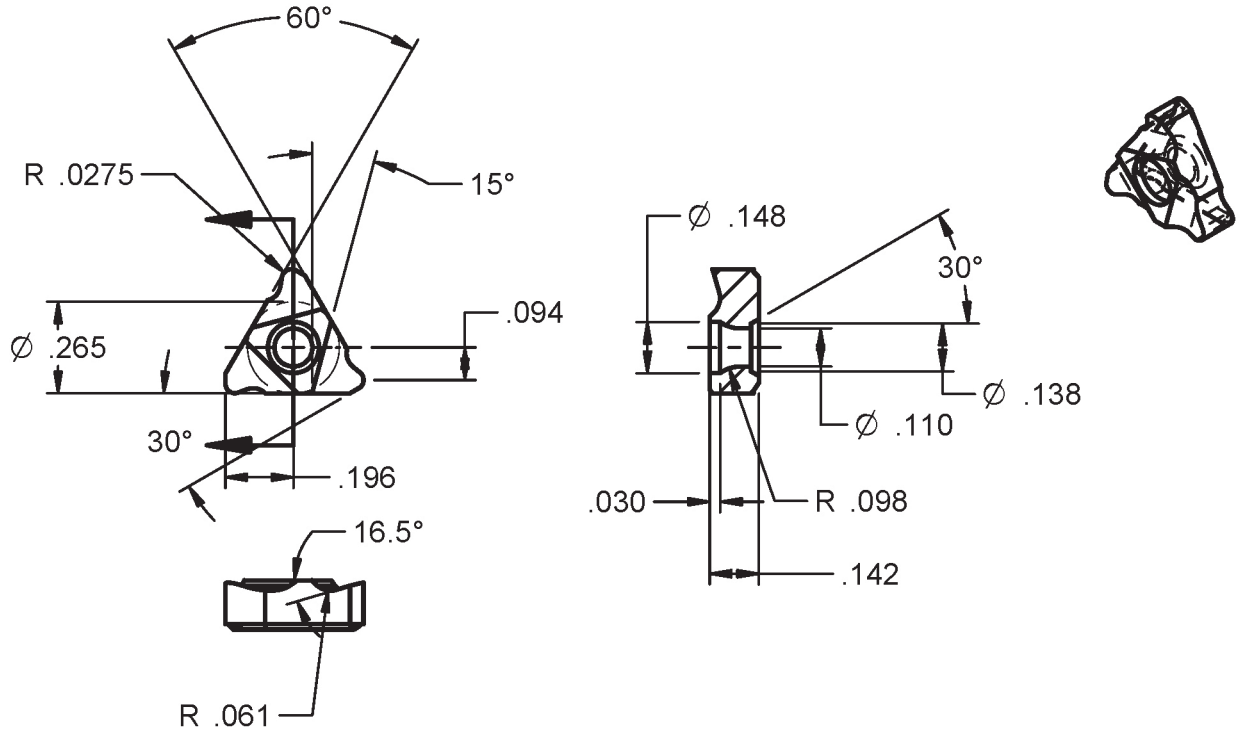
LX-1101 IRM/ERM



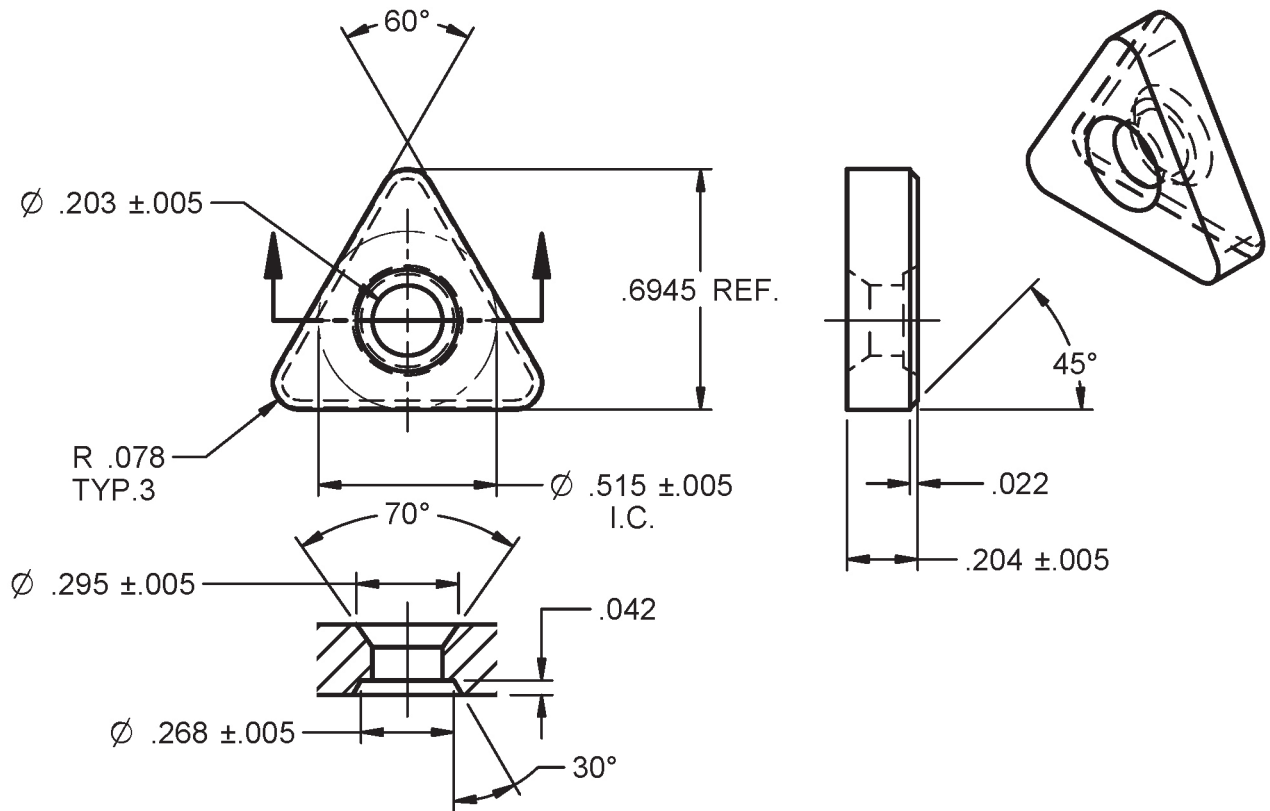
LX-1101-IRN/ERN



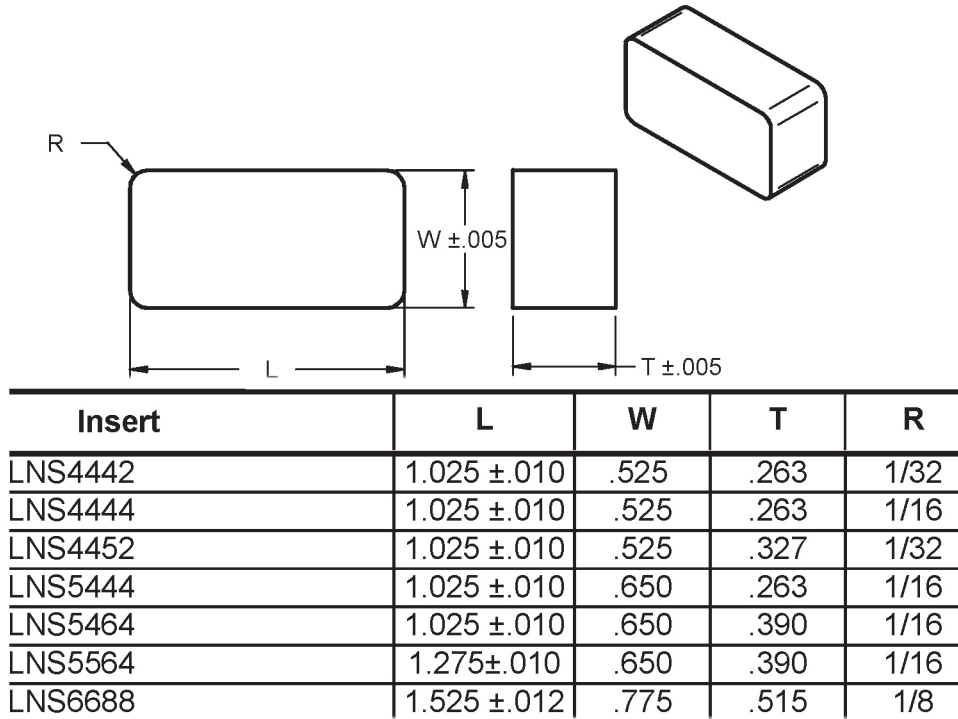
LX-1101-1-11IGR



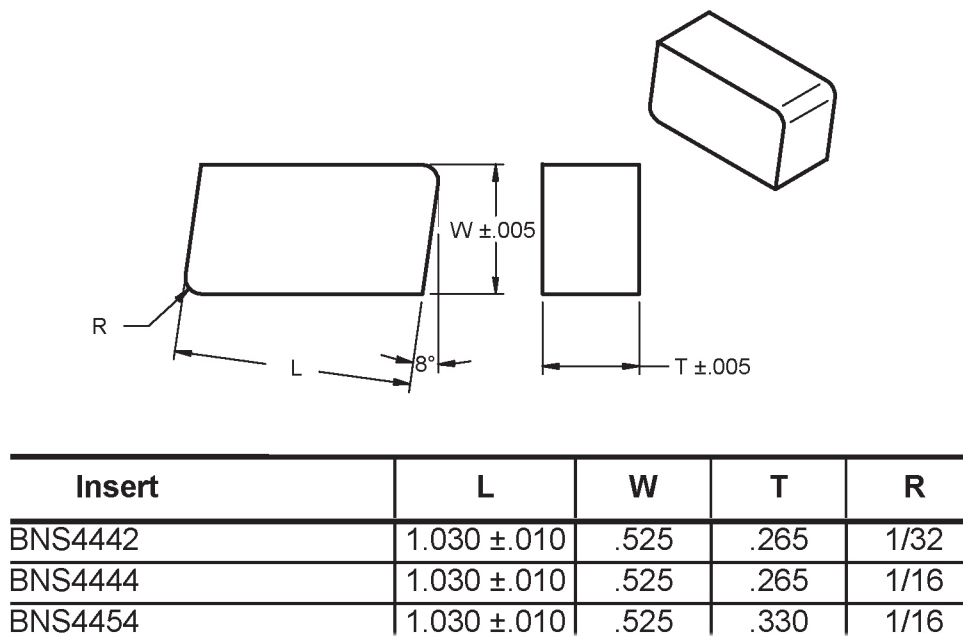
LX-0505-3-LD-22XX



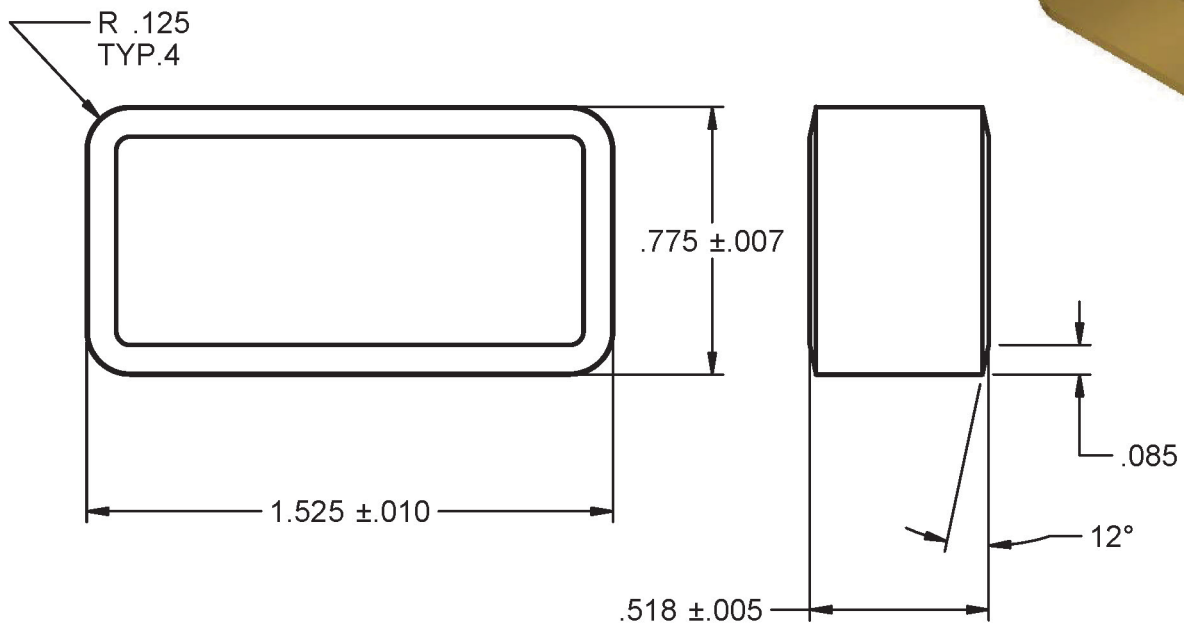
LNS



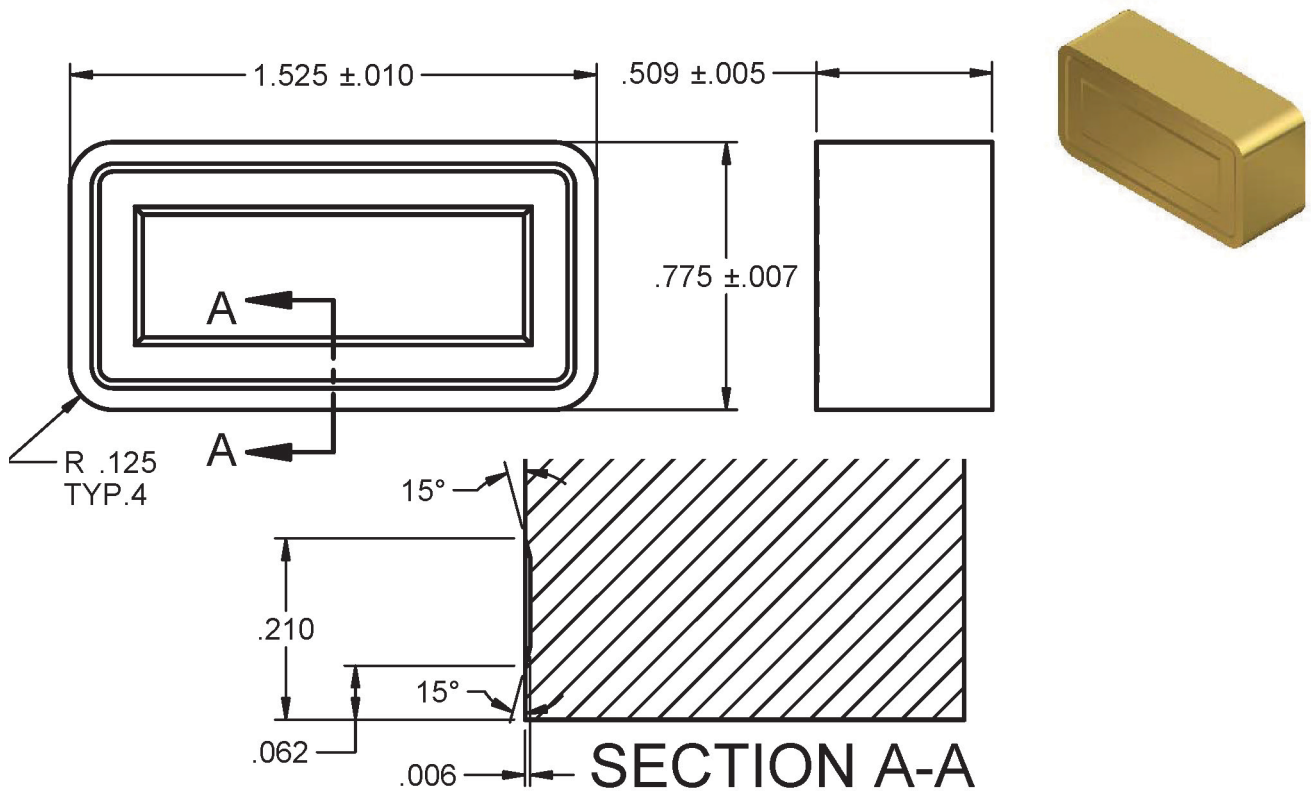
BNS



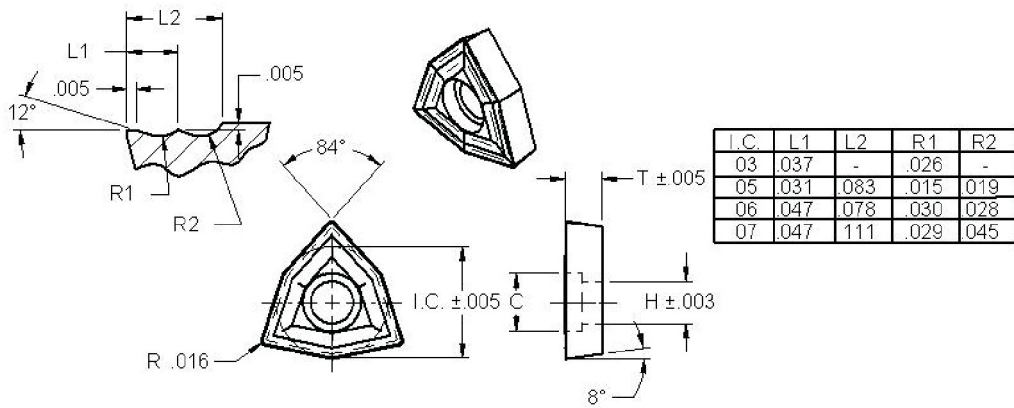
LNS6688-T085-12



C-0042-A

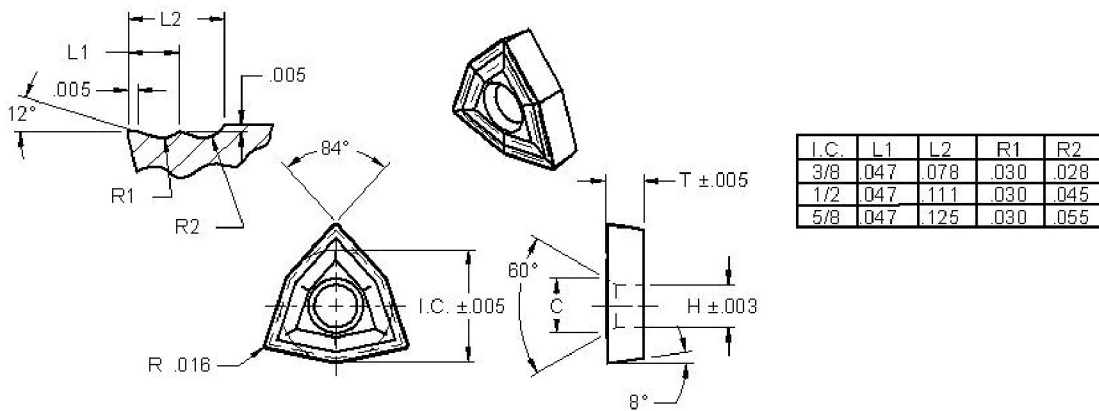


WXEH (ISO)



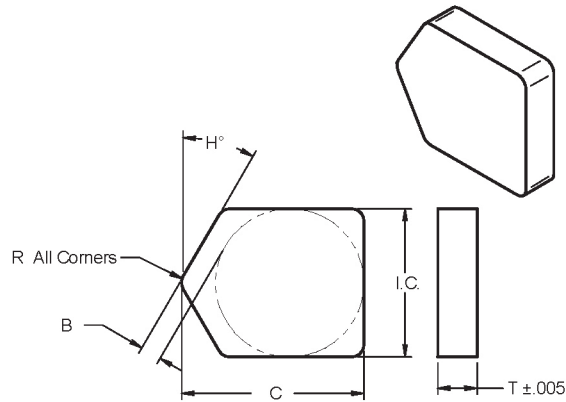
Insert	I.C.	T	H	C
WXEH030302	.251 ±.005	.112	.108	.142
WXEH050304	.330 ±.005	.128	.108	.142
WXEH060302	.409 ±.005	.129	.146	.216
WXEH070304	.487 ±.005	.161	.185	.256

WXEH (US)



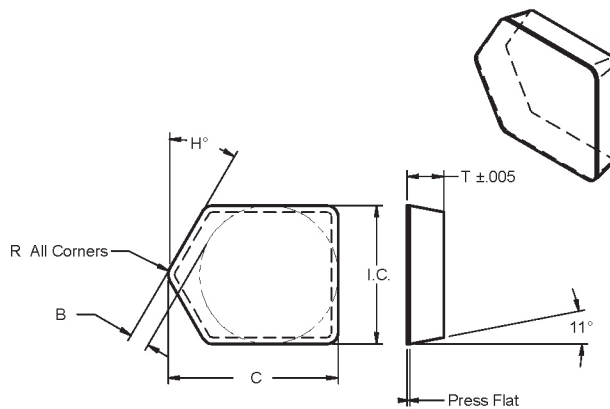
Insert	I.C.	T	H	C
WXEH321	.409 ±.005	.129	.146	.216
WXEH421	.487 ±.005	.161	.185	.256

WF-SNR



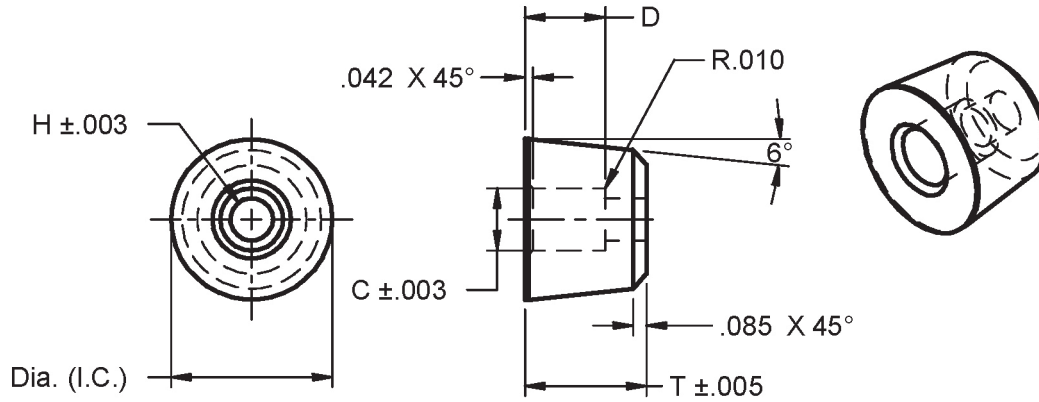
Insert	I.C.	B	T	R	H	C
WF3-SNR634	.765 ±.007	.0179	.203	1/16	3°	.7834
WF15-SNR634	.765 ±.007	.0723	.203	1/16	15°	.8512
WF30-SNR634	.765 ±.007	.1164	.203	1/16	30°	.9490
WF45-SNR634	.765 ±.007	.1314	.203	1/16	45°	1.0836

WF-SPR



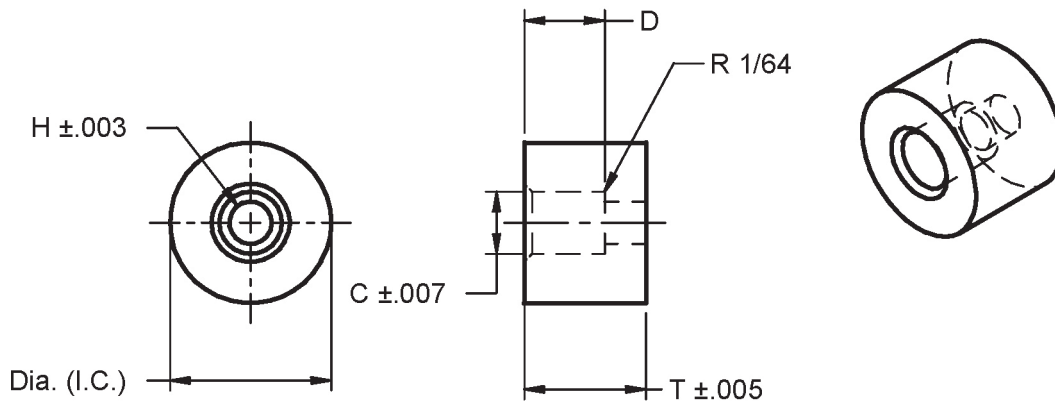
Insert	I.C.	B	T	R	H	C
WF3-SPR634	.765 ±.007	.0294	.203	1/16	3°	.796
WF15-SPR634	.765 ±.007	.1164	.203	1/16	15°	.860
WF30-SPR634	.765 ±.007		.203	1/16	30°	.949

CDH



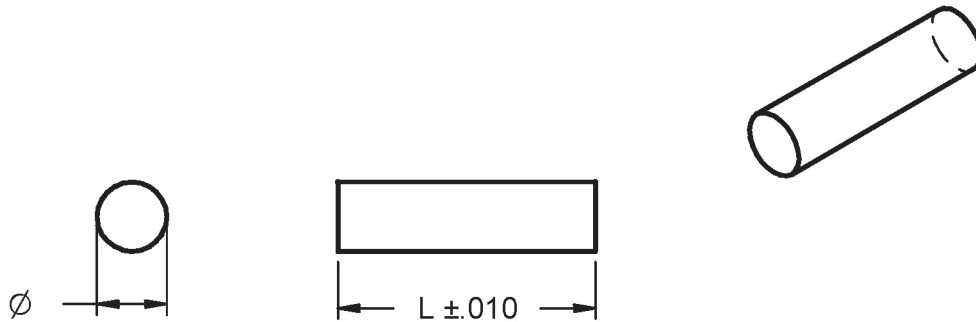
Insert	DIA	D	T	H	C
CDH42	$1.020 \pm .007$	.250/.265	.528	.269	.396
CDH43	$1.020 \pm .007$	.500/.515	.769	.269	.396
CDH53	$1.280 \pm .015$	.375/.390	.769	.394	.683

FDH



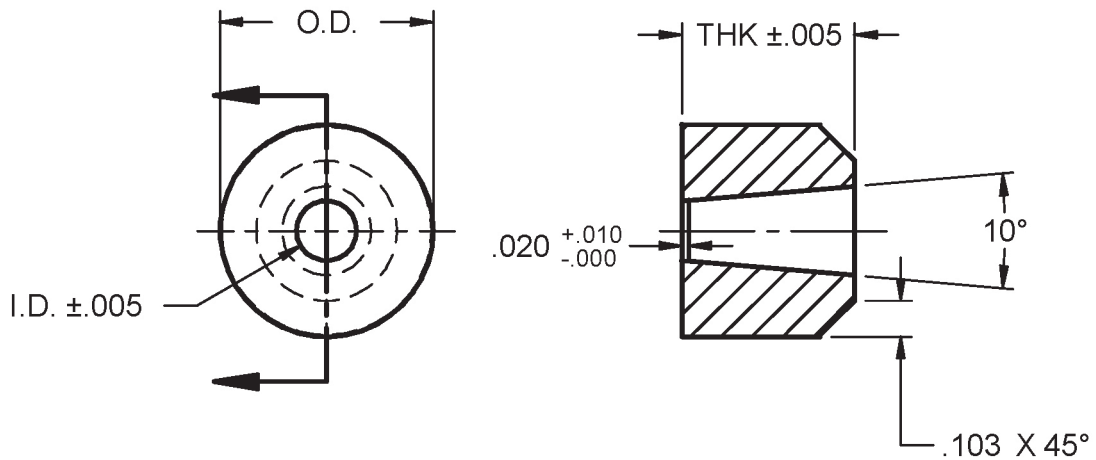
Insert	DIA	D	T	H	C	Notes
FDH33	$.770 \pm .007$	.198	.398	.255	.406	
FDH44	$1.030 \pm .010$	.262	.533	.313	.515	6° Clear.
FDH56	$1.280 \pm .015$	.399	.769	.381	.670	

BUR BLANKS



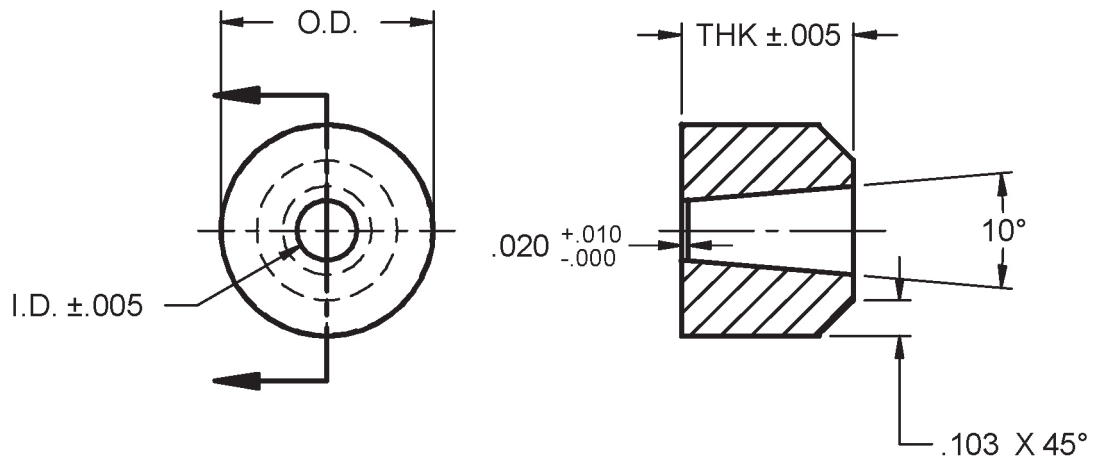
Insert	Ø	L	Ø	L
BSB-51	.260±.005	.193	1/4	3/16
BSA-51	.260±.005	500	1/4	1/2
BSA-2	.322±.005	.750	5/16	3/4
BSA-3	.385±.005	.750	3/8	3/4
BSA-4	.448±.005	1.000	7/16	1"
BSA-5	.510±.005	1.000	1/2	1"
BSA-6	.635±.005	1.000	5/8	1"
BSA-7	.762±.006	1.000	3/4	1"
BSA-9	1.014±.007	1.000	1"	1"

WIRE DIES



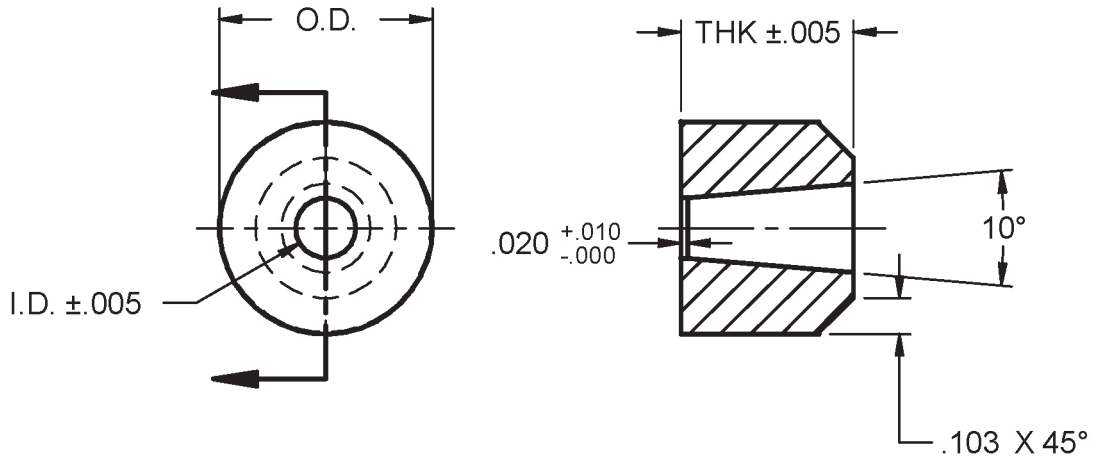
Insert	O.D.	I.D.	THK
LX-0900-0-P2	.610 ±.005	.138	.495
LX-0900-0-P3	.610 ±.005	.173	.495
LX-0900-0-P4	.610 ±.005	.191	.495
LX-0900-0-P5	.610 ±.005	.211	.495
LX-0900-0-P6	.610 ±.005	.183	.495
LX-0900-0-P7	.610 ±.005	.196	.495
LX-0900-0-P8	.610 ±.005	.148	.495
LX-0900-1-P2	.807 ±.007	.223	.495
LX-0900-1-P3	.807 ±.007	.239	.495
LX-0900-1-P4	.807 ±.007	.253	.495
LX-0900-1-P5	.807 ±.007	.260	.495
LX-0900-1-P6	.807 ±.007	.271	.495
LX-0900-1-P7	.807 ±.007	.278	.495
LX-0900-1-P8	.807 ±.007	.285	.495
LX-0900-1-P9	.807 ±.007	.300	.495
LX-0900-1-P10	.807 ±.007	.316	.495
LX-0900-1-P11	.807 ±.007	.331	.495
LX-0900-1-P12	.807 ±.007	.348	.495
LX-0900-1-P13	.807 ±.007	.363	.495
LX-0900-1-P14	.807 ±.007	.148	.495
LX-0900-1-P15	.807 ±.007	.308	.495
LX-0900-1-P16	.807 ±.007	.218	.495
LX-0900-1-P17	.807 ±.007	.208	.495
LX-0900-1-P18	.807 ±.007	.263	.495

WIRE DIES



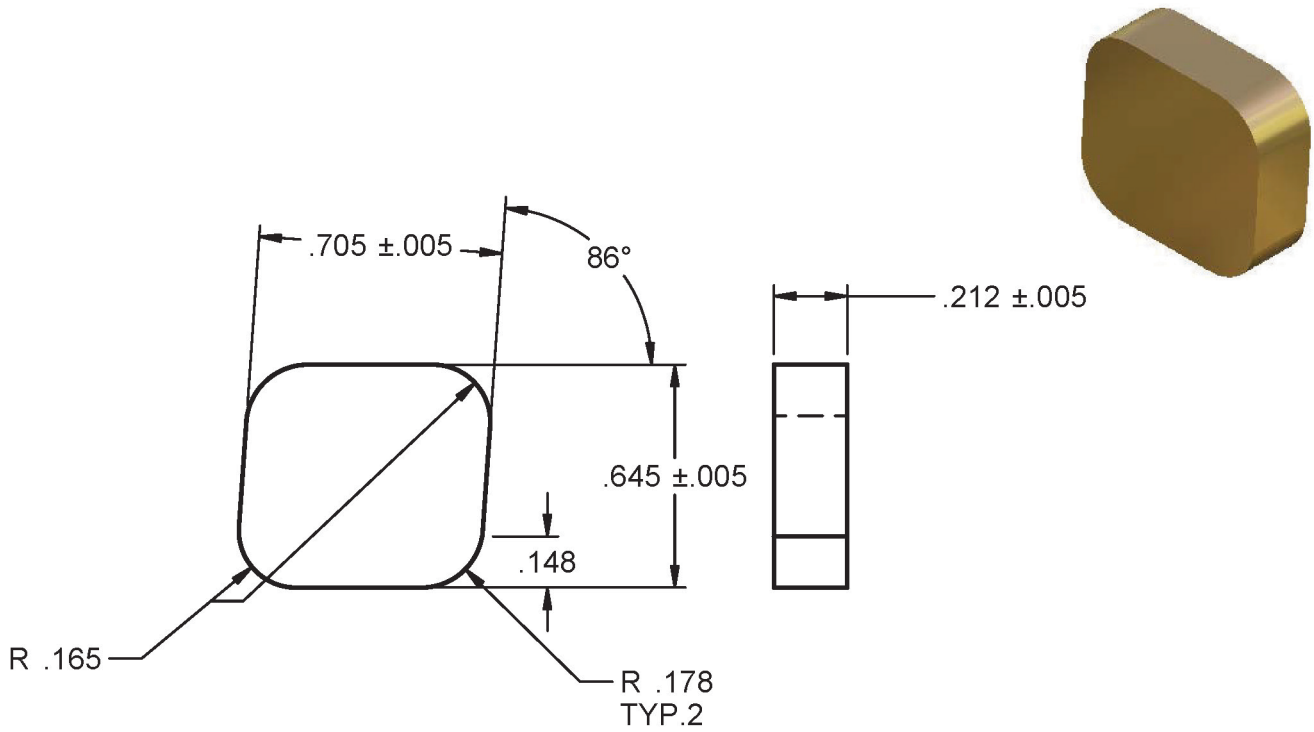
Insert	O.D.	I.D.	THK
LX-0900-1-P21	.807 ±.007	.343	.495
LX-0900-1-P22	.807 ±.007	.358	.495
LX-0900-2-P2	.925 ±.010	.378	.495
LX-0900-2-P3	.925 ±.010	.390	.495
LX-0900-2-P4	.925 ±.010	.400	.495
LX-0900-2-P5	.925 ±.010	.410	.495
LX-0900-2-P6	.925 ±.010	.434	.495
LX-0900-2-P7	.925 ±.010	.448	.495
LX-0900-2-P8	.925 ±.010	.478	.495
LX-0900-2-P9	.925 ±.010	.497	.495
LX-0900-2-P10	.925 ±.010	.463	.495
LX-0900-2-P11	.925 ±.010	.488	.495
LX-0900-2-P12	.925 ±.010	.374	.495
LX-0900-3-P4	1.049 ±.010	.503	.495
LX-0900-3-P5	1.049 ±.010	.522	.495
LX-0900-3-P6	1.049 ±.010	.558	.495
LX-0900-3-P7	1.049 ±.010	.583	.495
LX-0900-3-P8	1.049 ±.010	.608	.495
LX-0900-3-P9	1.049 ±.010	.598	.495

WIRE DIES

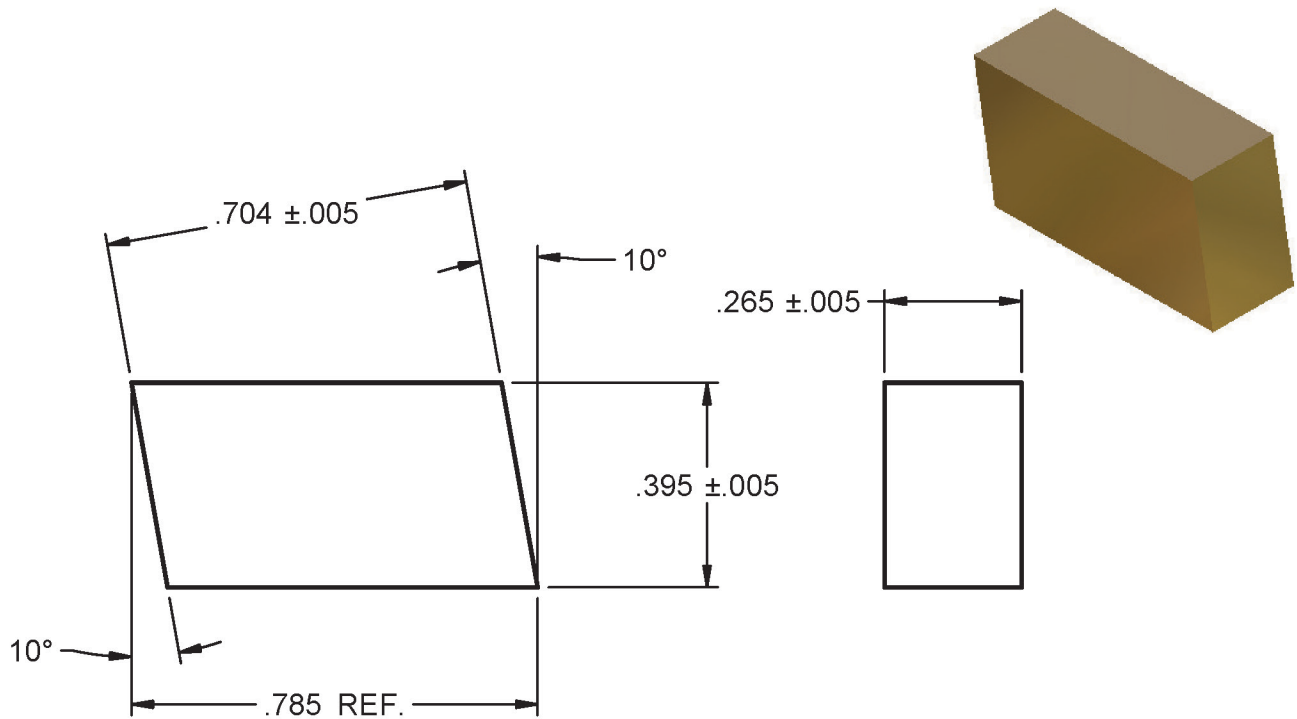


Insert	O.D.	I.D.	THK
LX-0900-4-P2	1.172 \pm .010	.713	.495
LX-0900-4-P3	1.172 \pm .010	.687	.495
LX-0900-4-P4	1.172 \pm .010	.627	.495
LX-0900-4-P5	1.172 \pm .010	.660	.495
LX-0900-4-P6	1.172 \pm .010	.644	.495
LX-0900-6-P1	1.390 \pm .010	.910	.495
LX-0900-6-P2	1.390 \pm .010	.855	.495

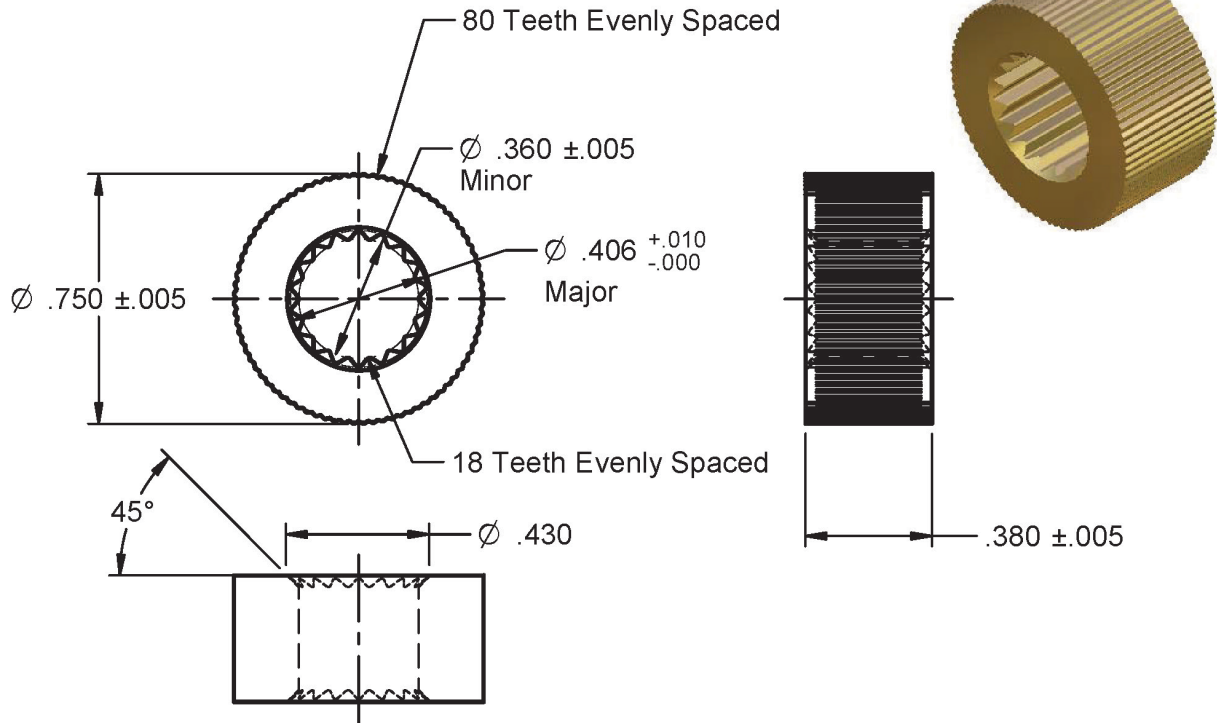
A-0477-E



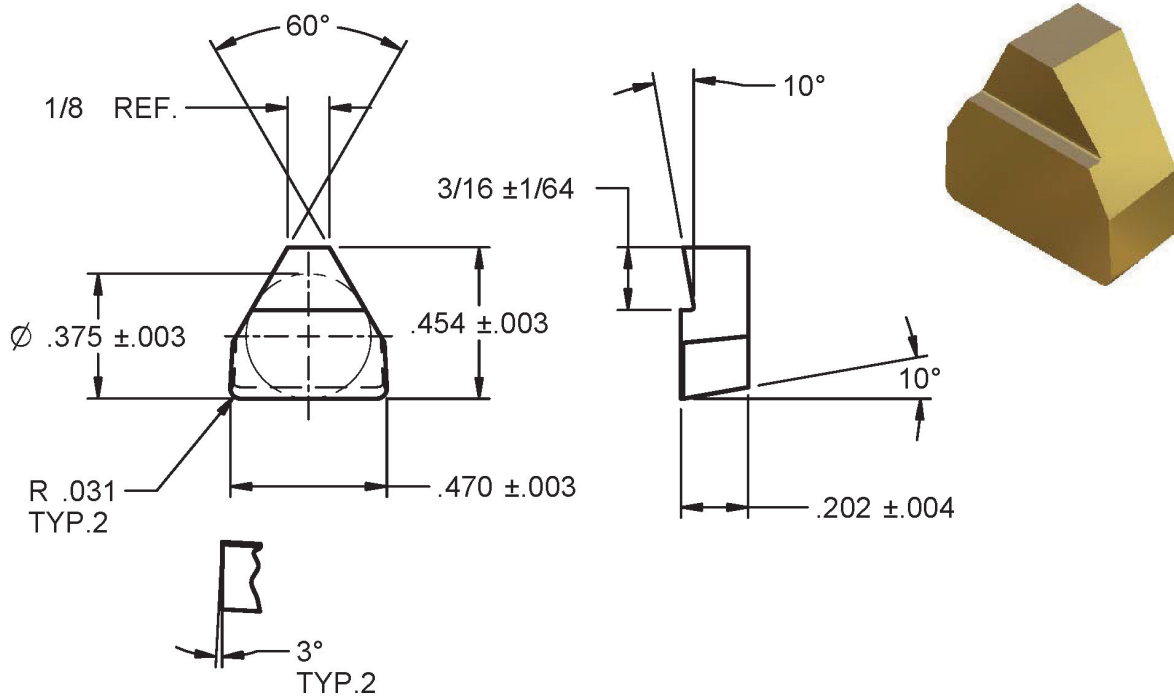
LX-0524-1 (TMI-1376)



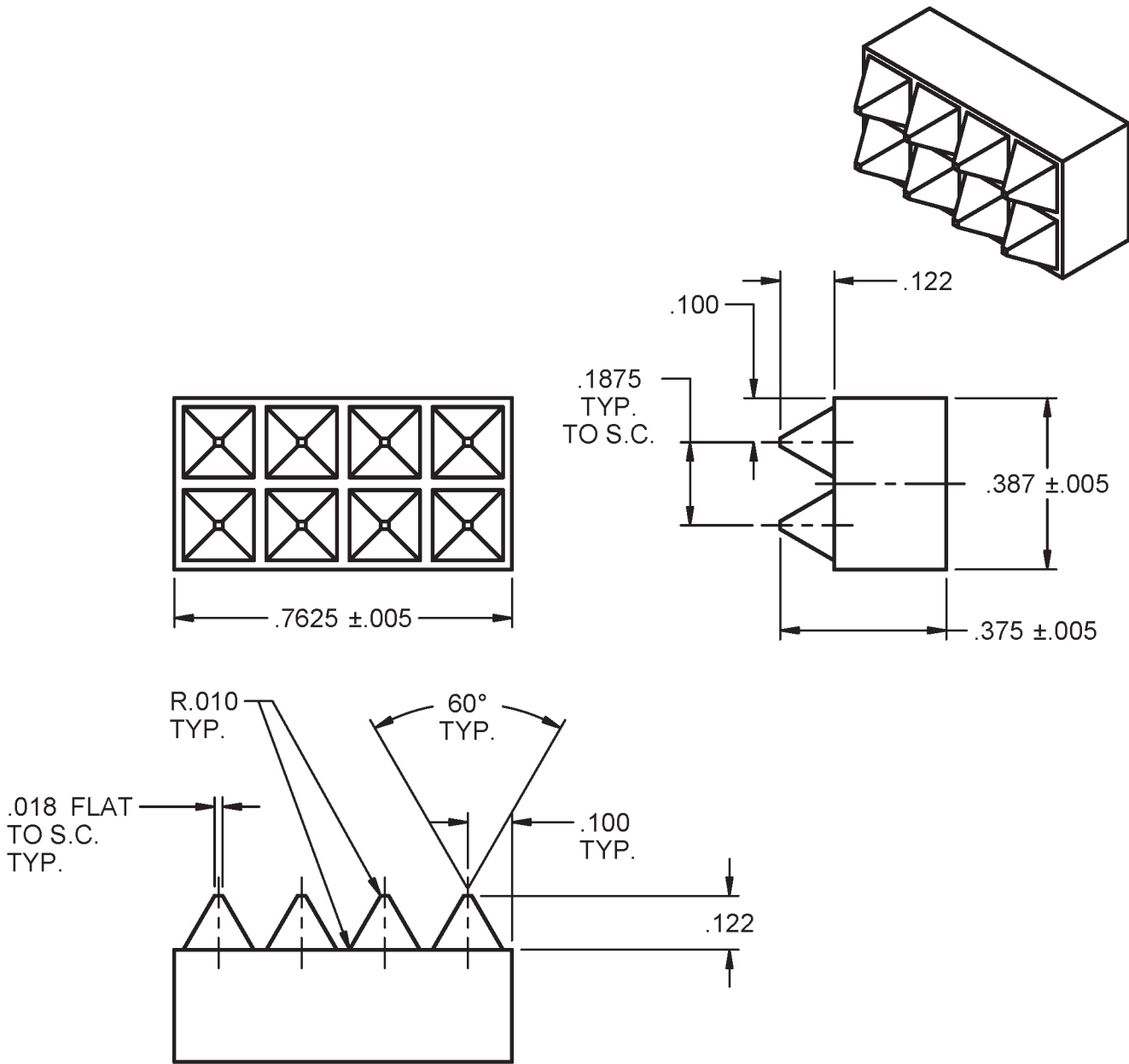
LX-1000-1 (KNURL)



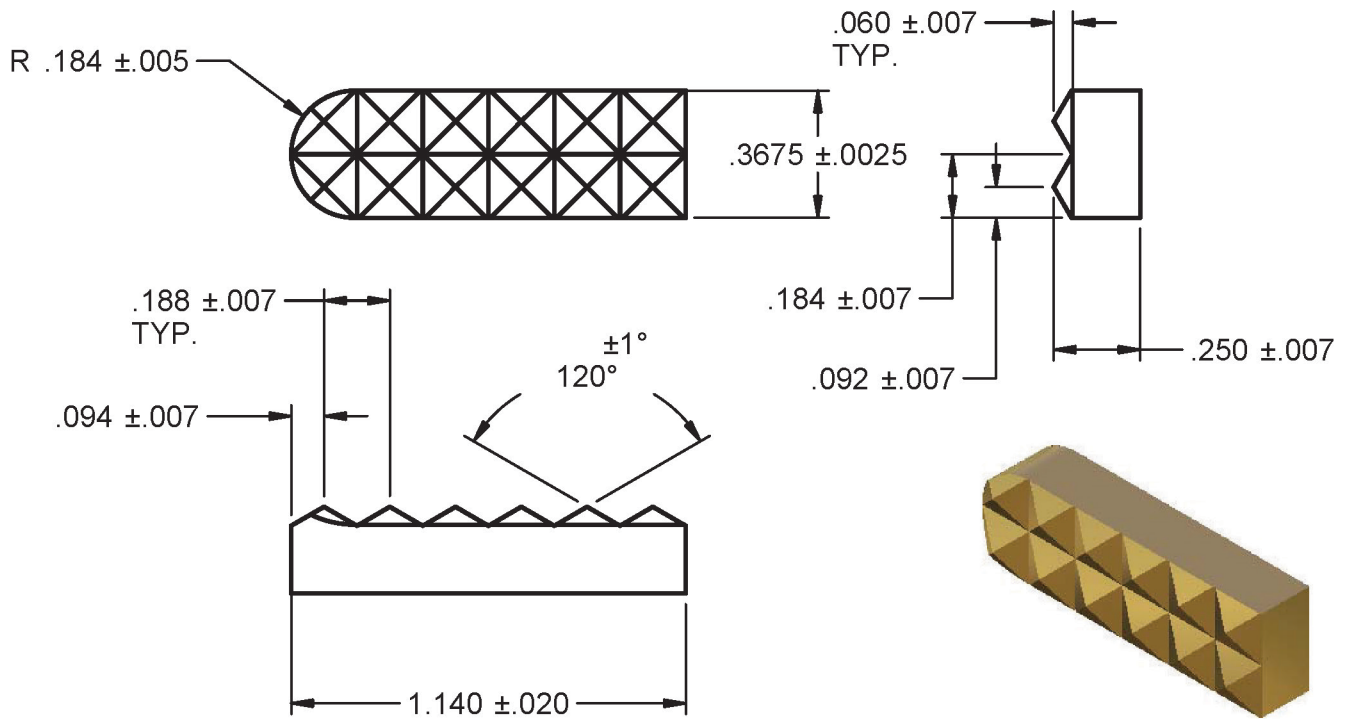
R-15229



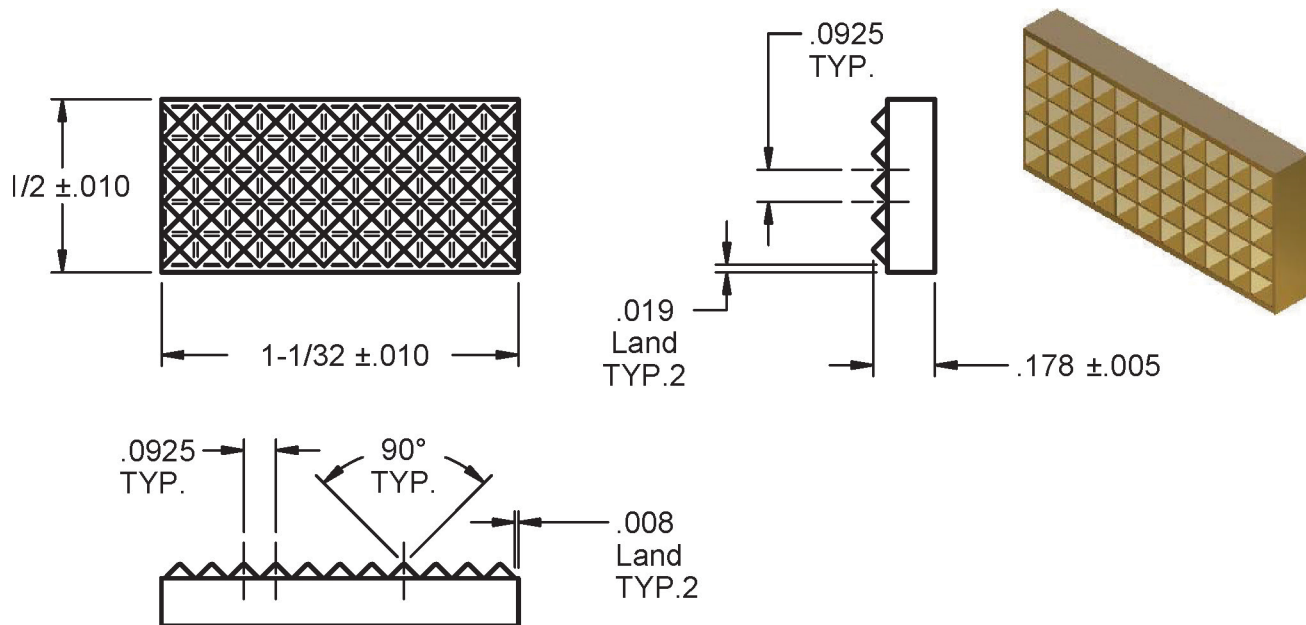
LX-0340-1 (GRIPPER)



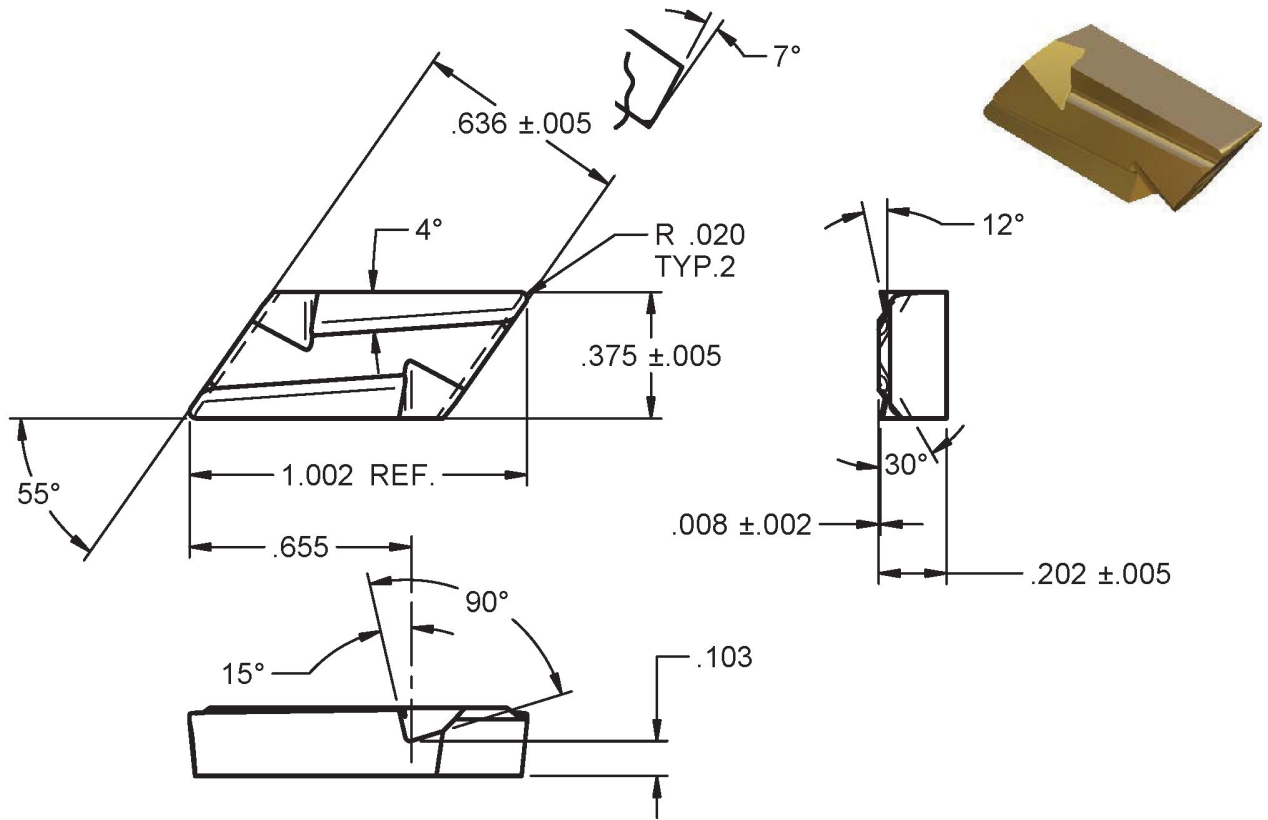
A-2281-B (GRIPPER)



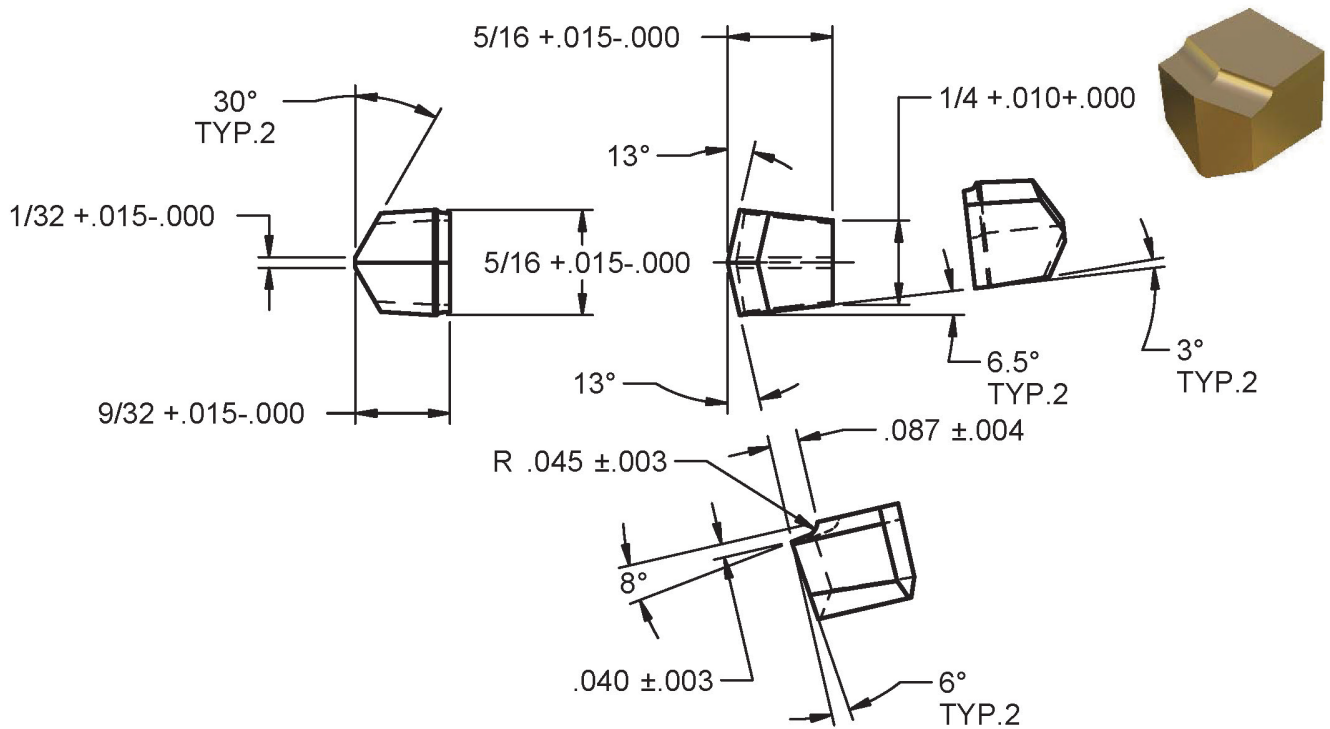
LX-0318 (GRIPPER)



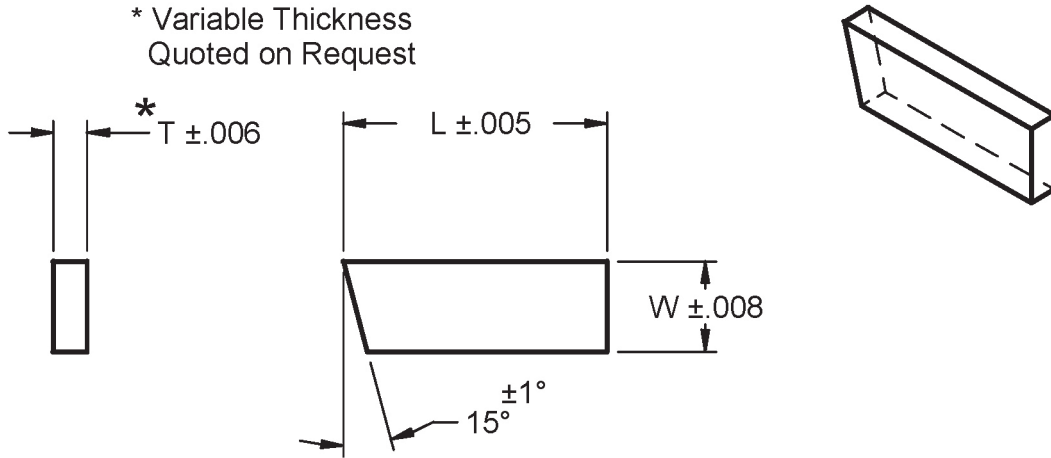
A-1462-C (KNUX160405-R11)



T-17373-C

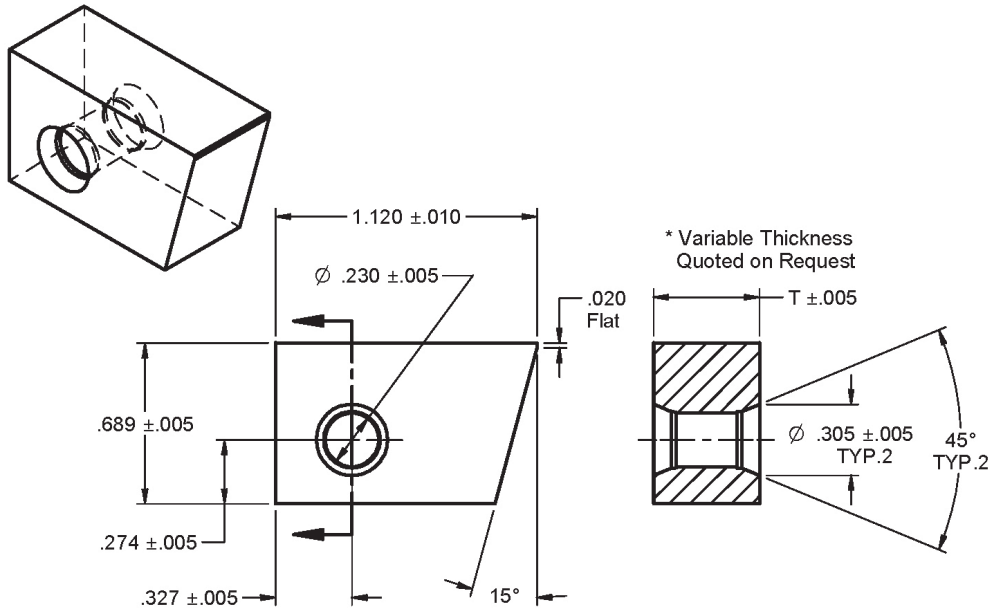


NARROW CUTOFF/GROOVING BLANKS



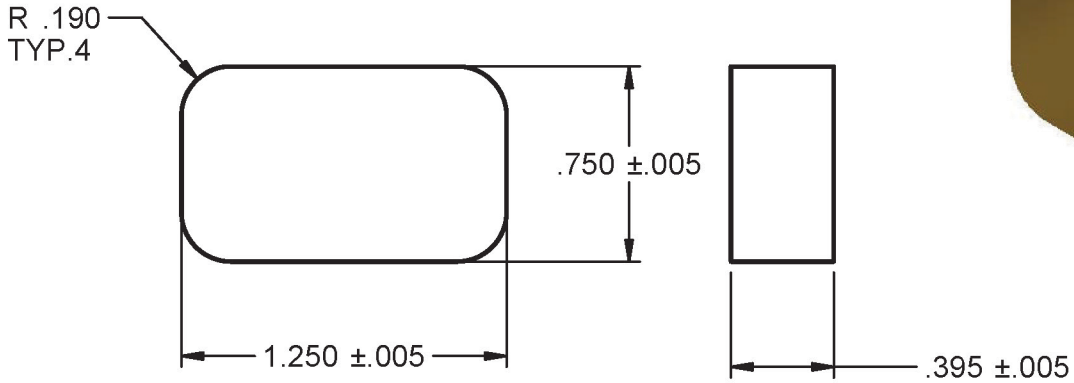
Insert	T	W	L
LX-0418-2-85	.066	.260	.685
LX-0418-2-90	.051	.260	.685
LX-0418-2-86	.096	.260	.755
LX-0418-2-87	.111	.260	.755
LX-0418-2-89	.141	.260	.755
LX-0418-2-17	.170	.265	.835
LX-0418-2-18	.190	.265	.835
LX-0418-2-19	.210	.265	.835
LX-0418-2-20	.230	.265	.835
LX-0418-2-21	.250	.265	.835
LX-0418-2-22	.270	.265	.835

LX-0743-6



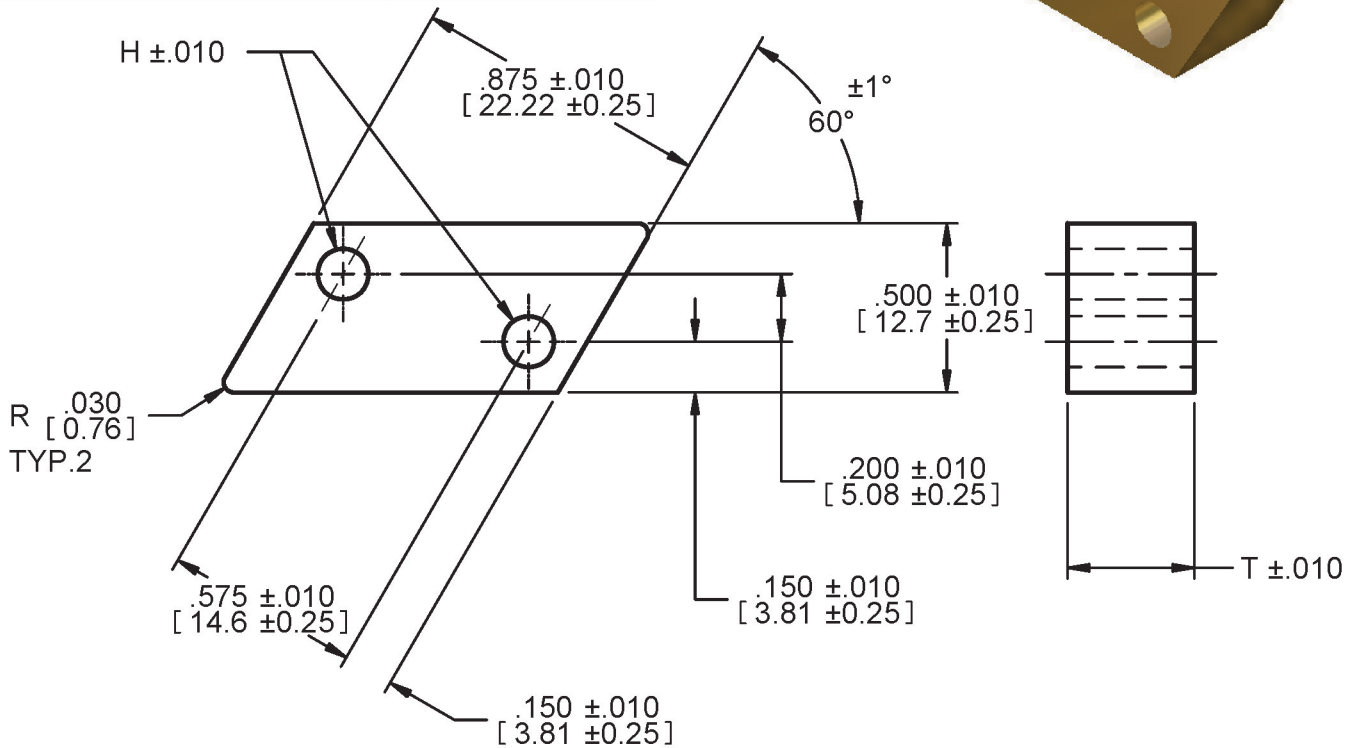
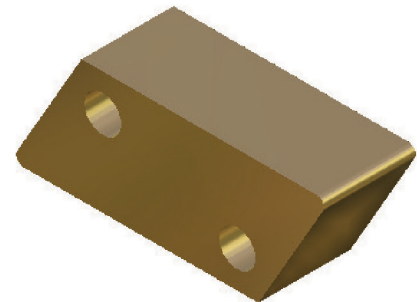
Insert	T
LX-0743-6-1	.545
LX-0743-6-2	.583
LX-0743-6-3	.453
LX-0743-6-4	.540
LX-0743-6-5	.314
LX-0743-6-6	.335
LX-0743-6-13	.604
LX-0743-6-14	.383
LX-0743-6-15	.272
LX-0743-6-16	.288

RR12K

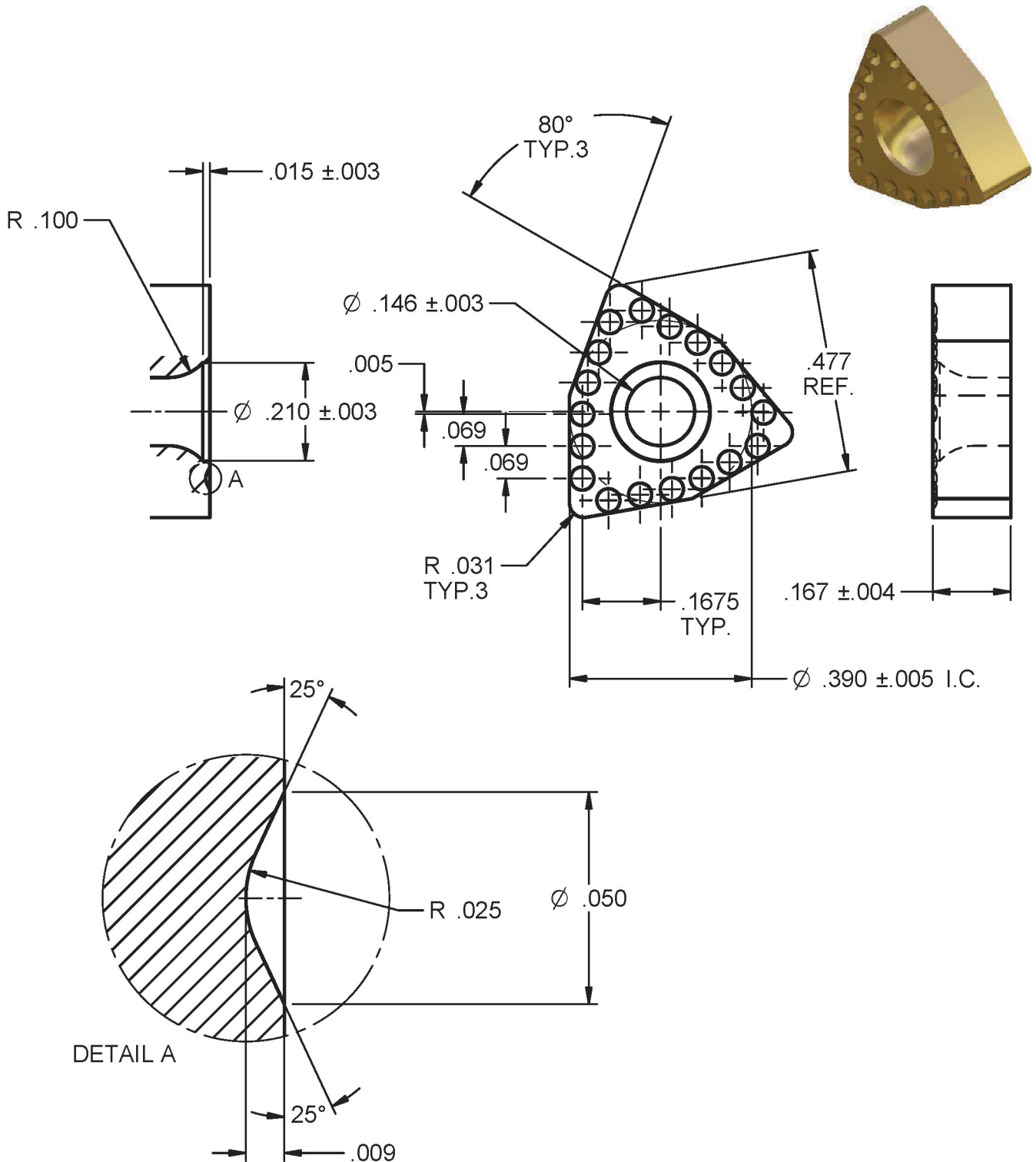


A-0302-A

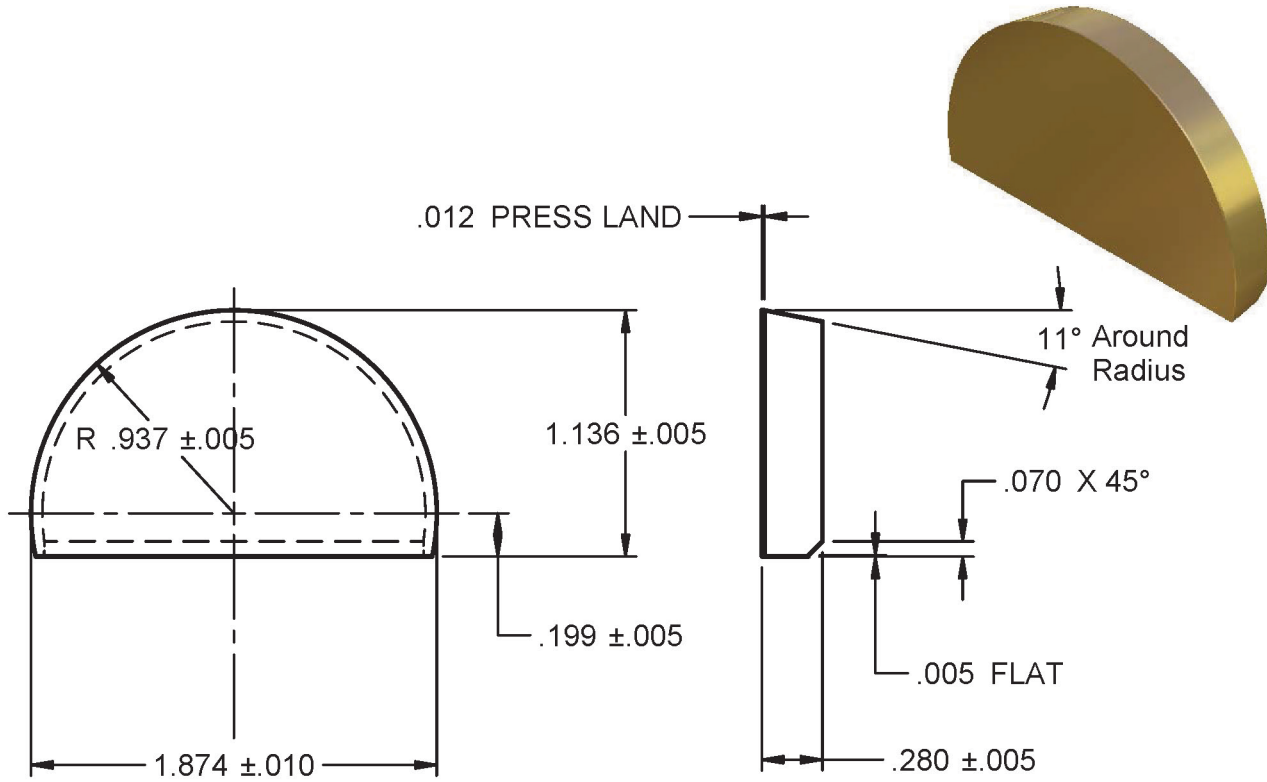
DET.	T		H	
	IN.	mm	IN.	mm
1	0.250	6.35	0.150	3.81
2	0.500	12.70	0.150	3.81
3	0.375	9.52	0.150	3.81
4	0.750	19.05	0.150	3.81
5	0.750	19.05	0.180	4.57



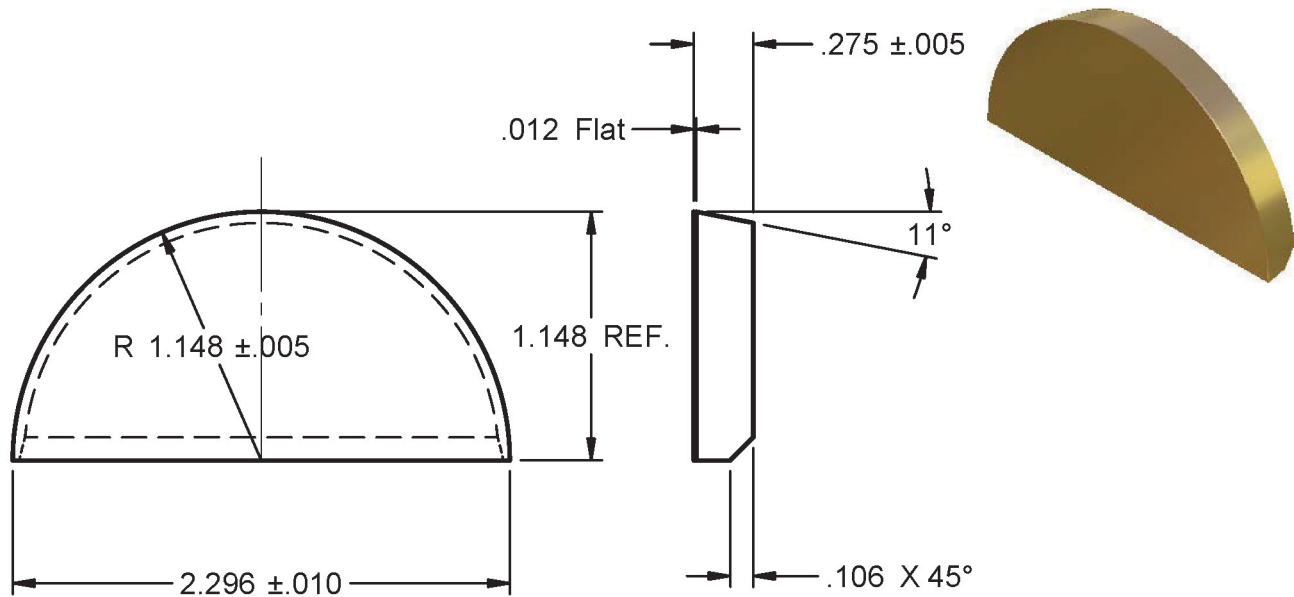
LX-0996-1 (WNRX32.52)



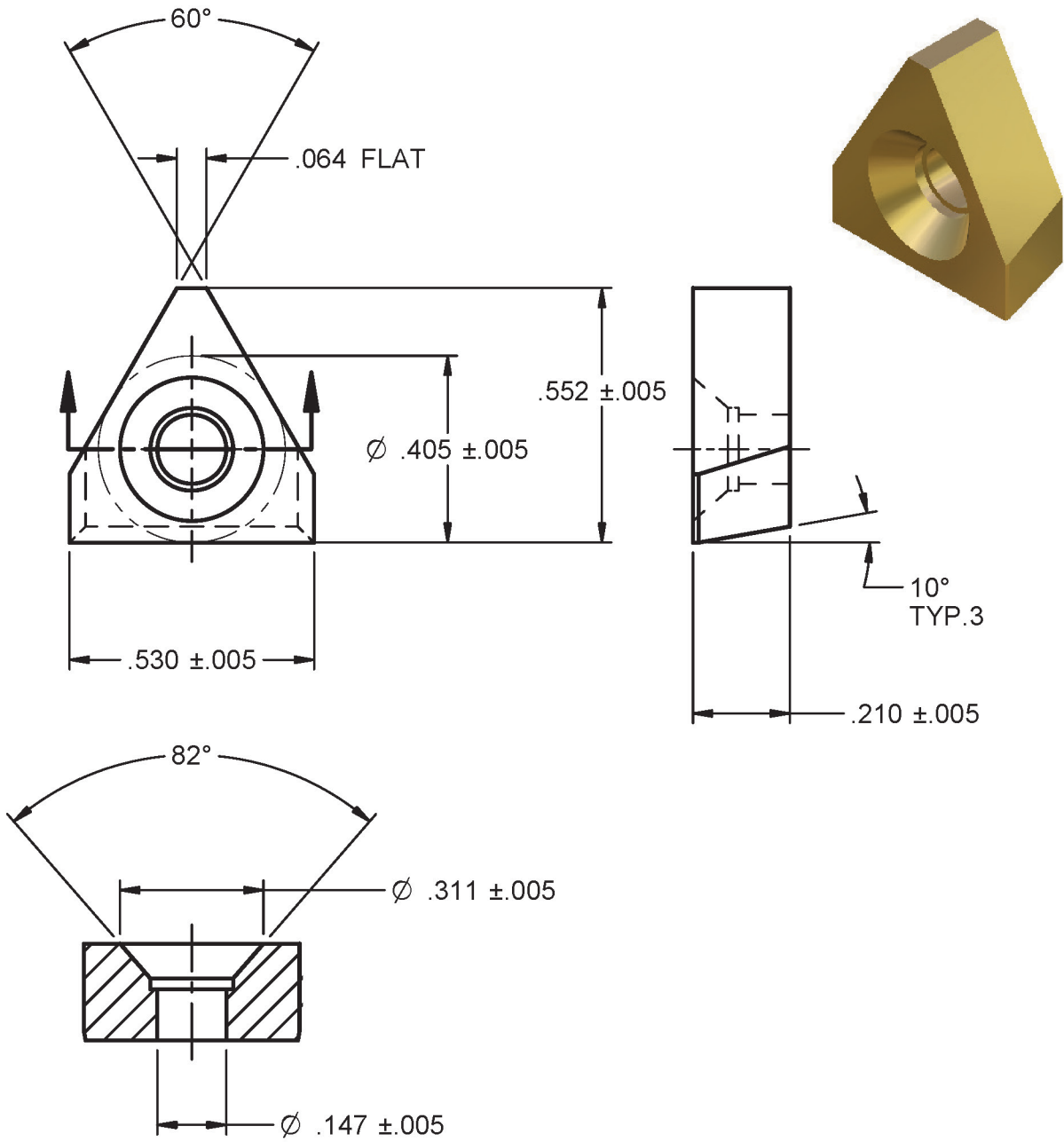
LX-1177-2



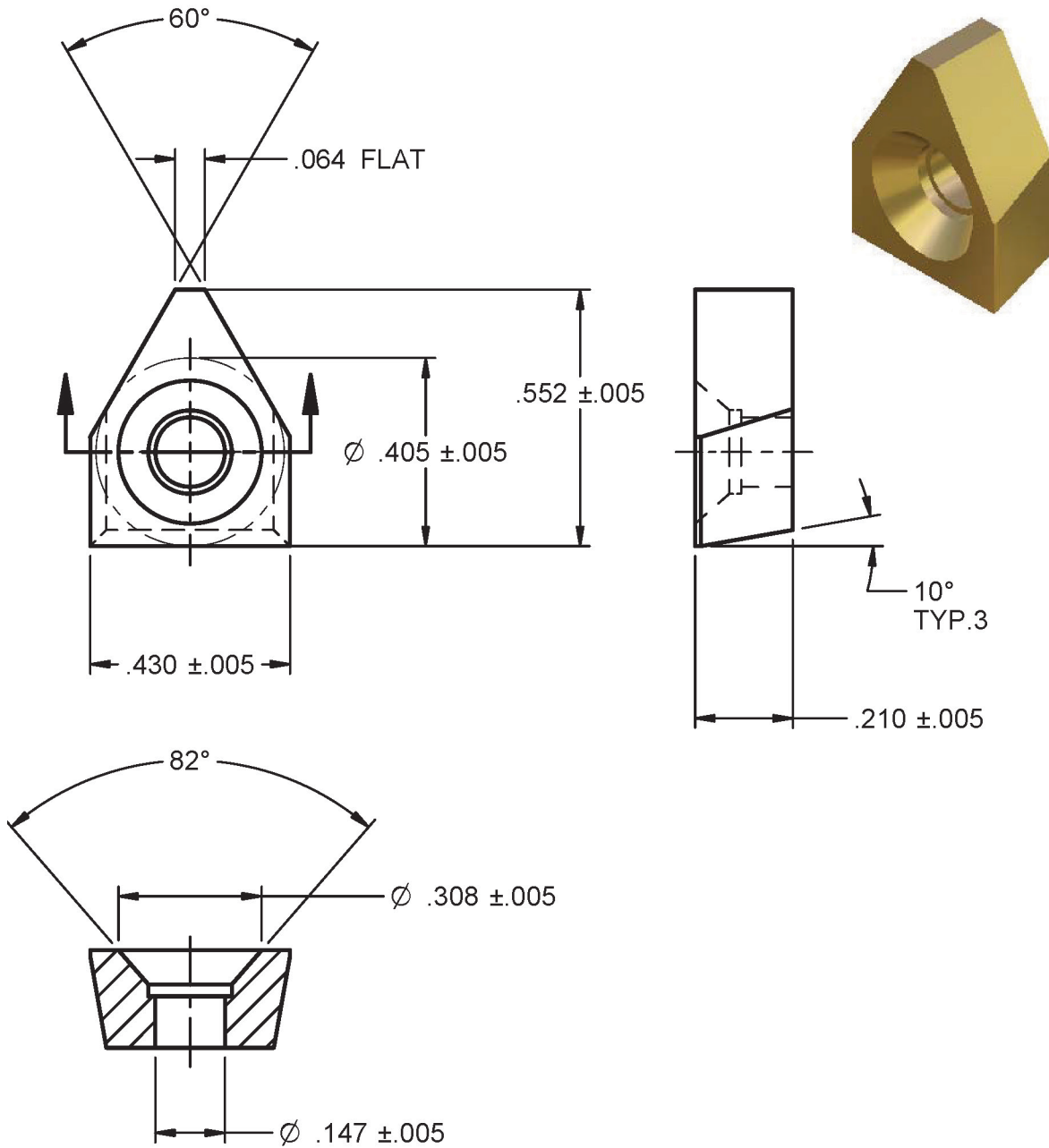
MA-69862



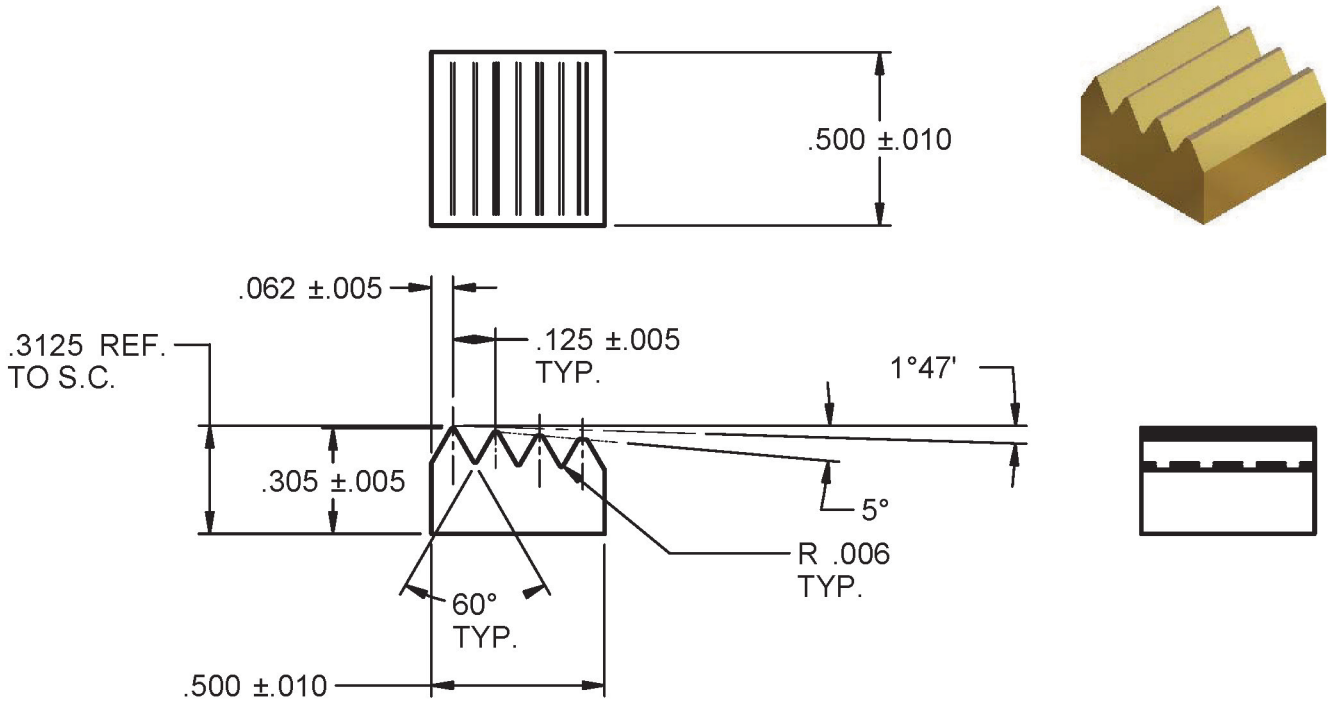
T-16732-B-1



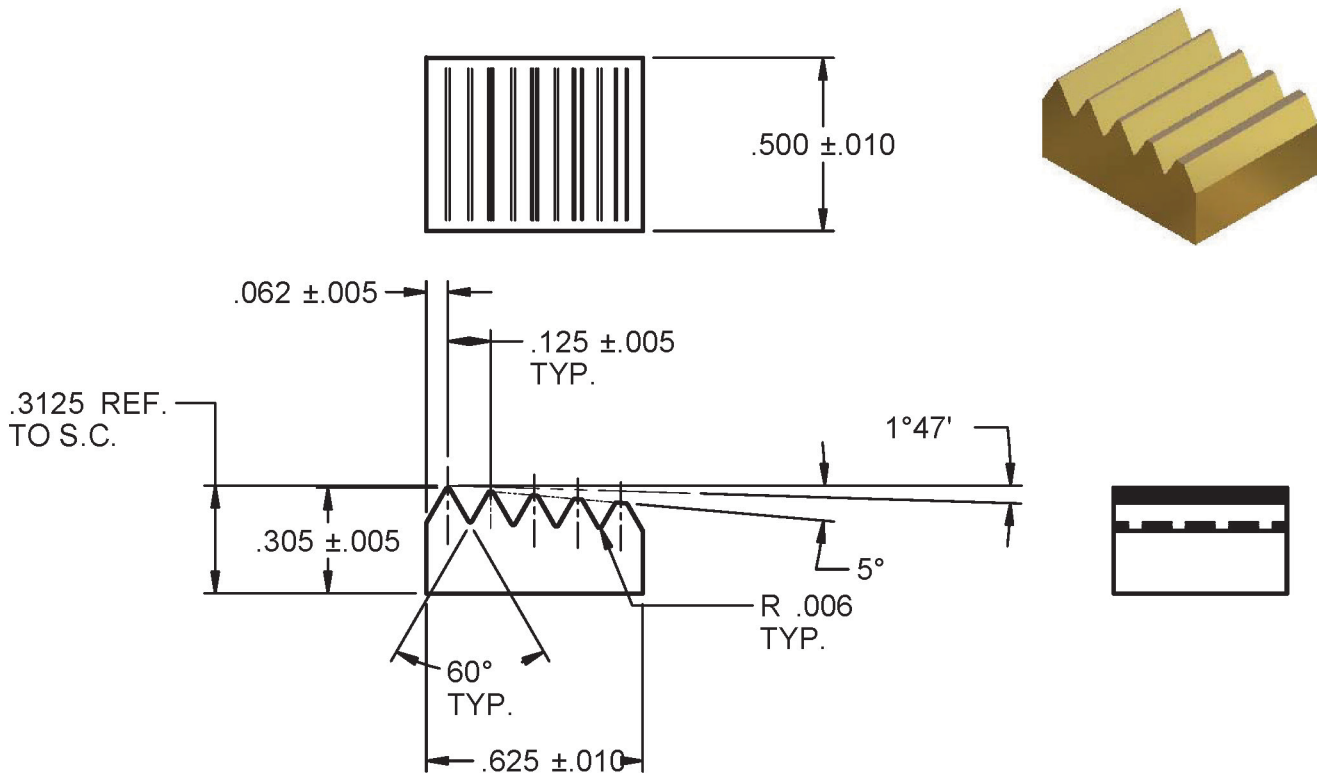
T-16732-B-12



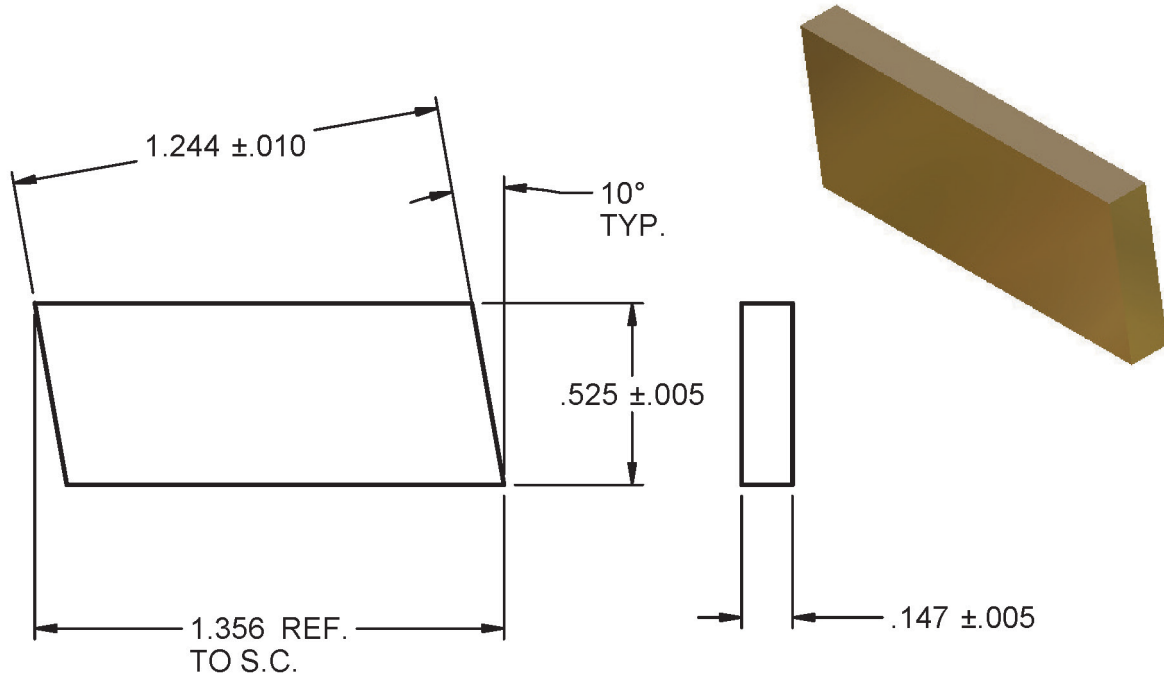
A-2348-A



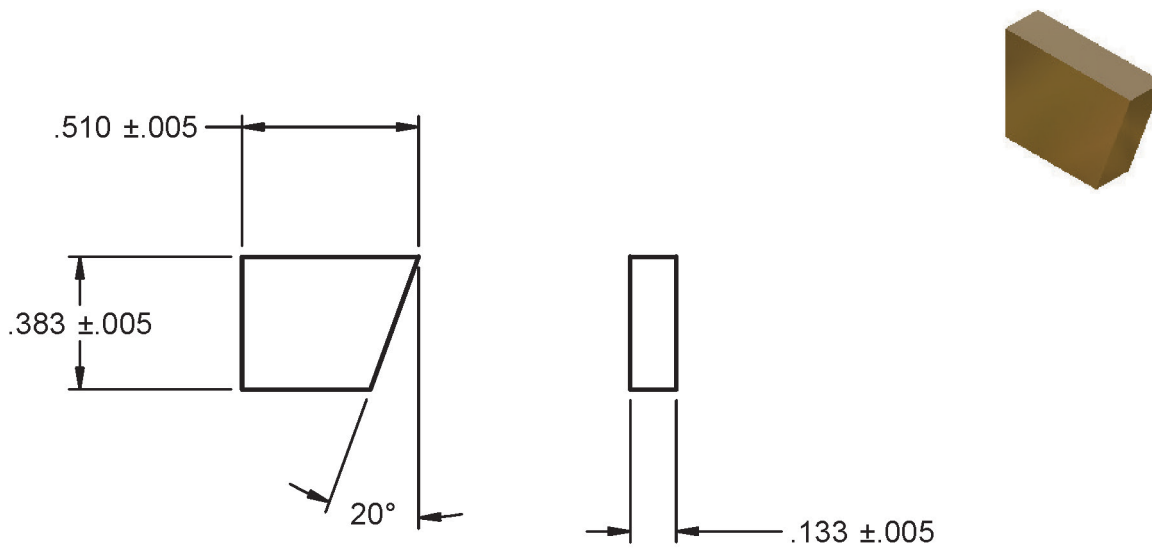
A-2349-A



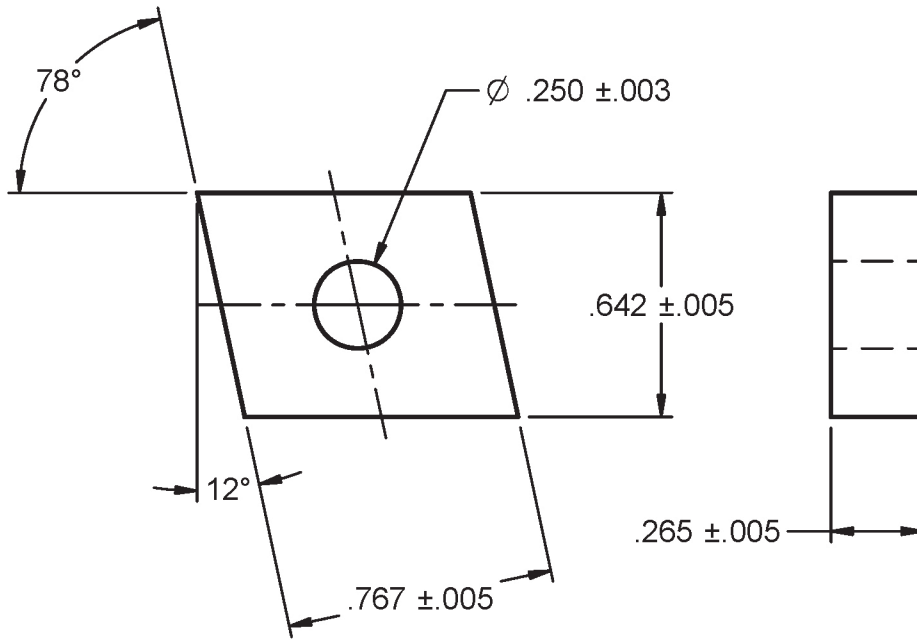
A-2277-A



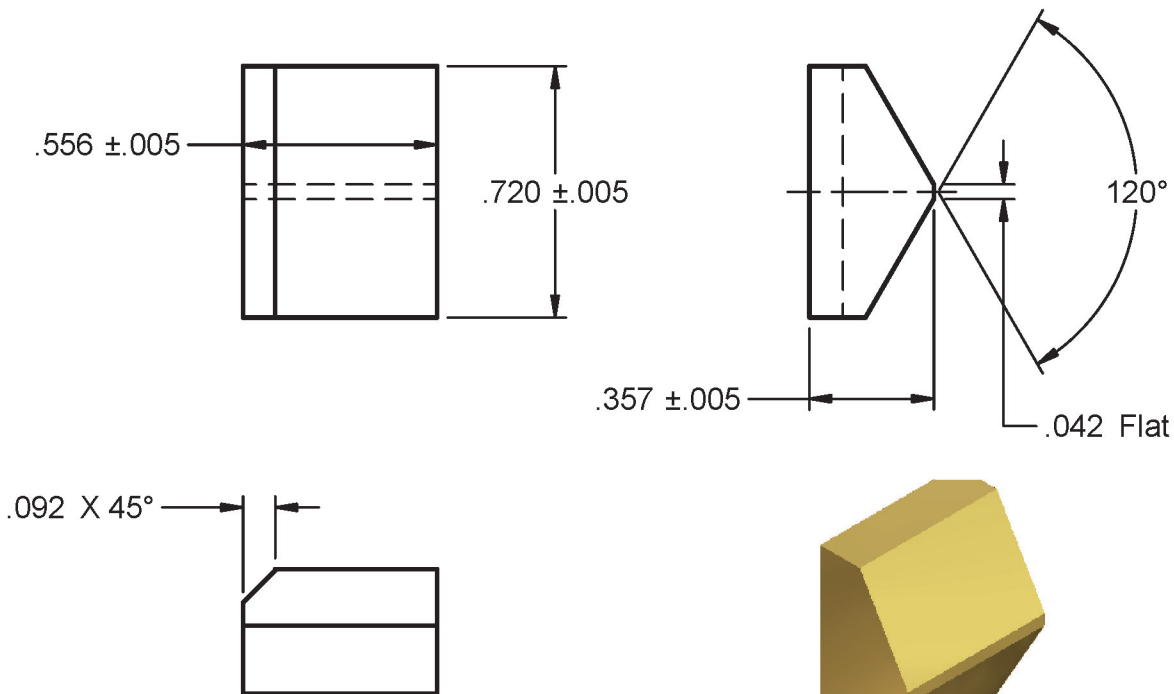
A-0957-A-4



A-1626-A (D19200-P1)

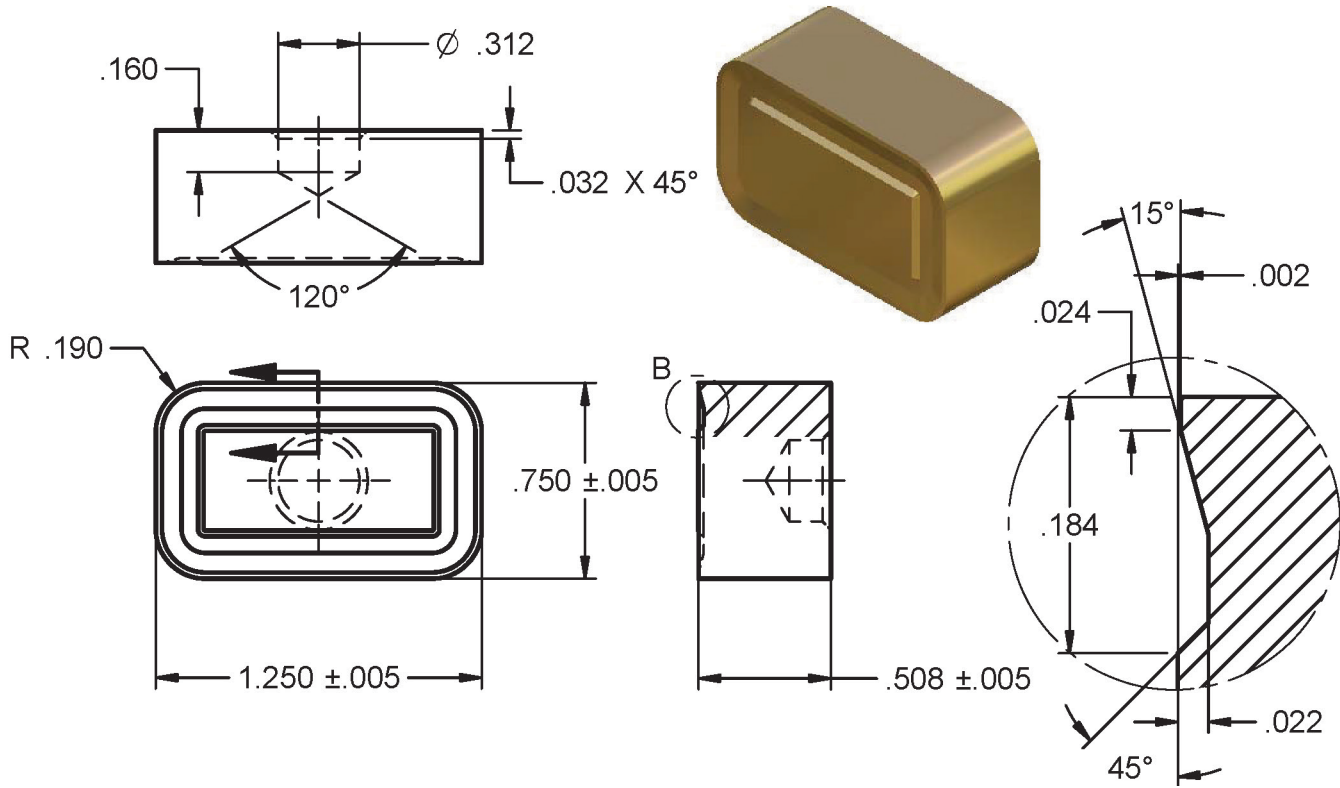


A-2213-A-2

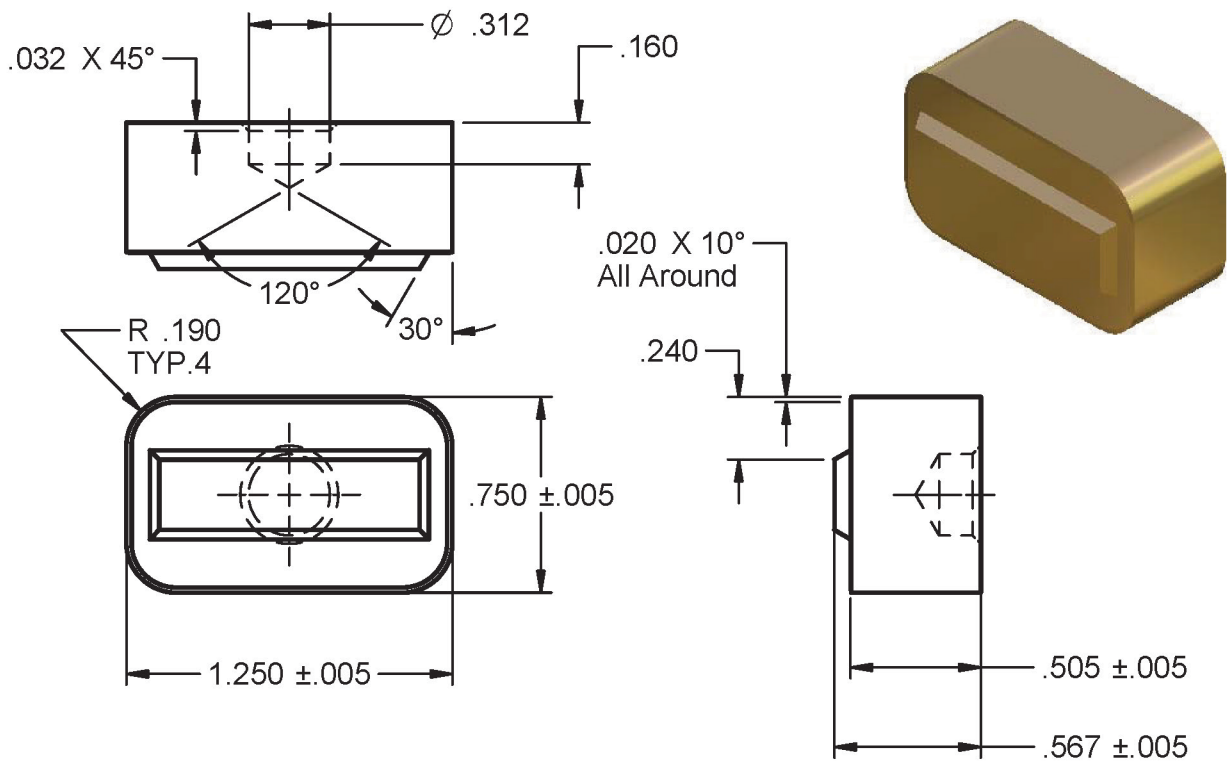


1.68315 cm³

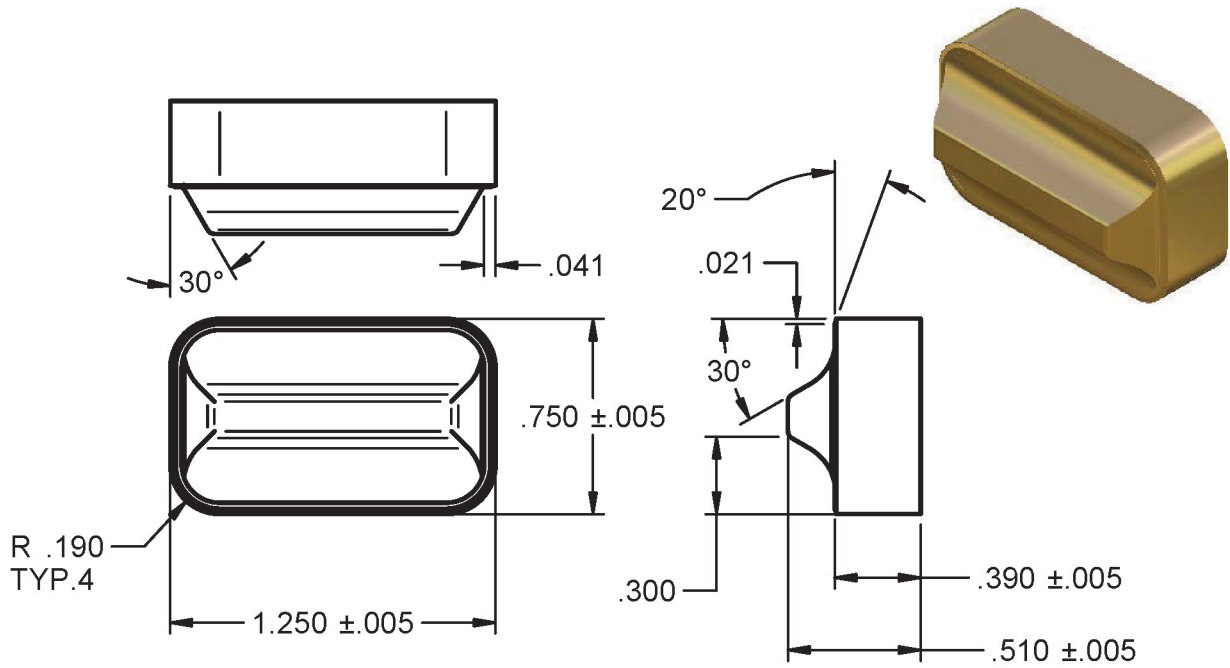
A-2182-A



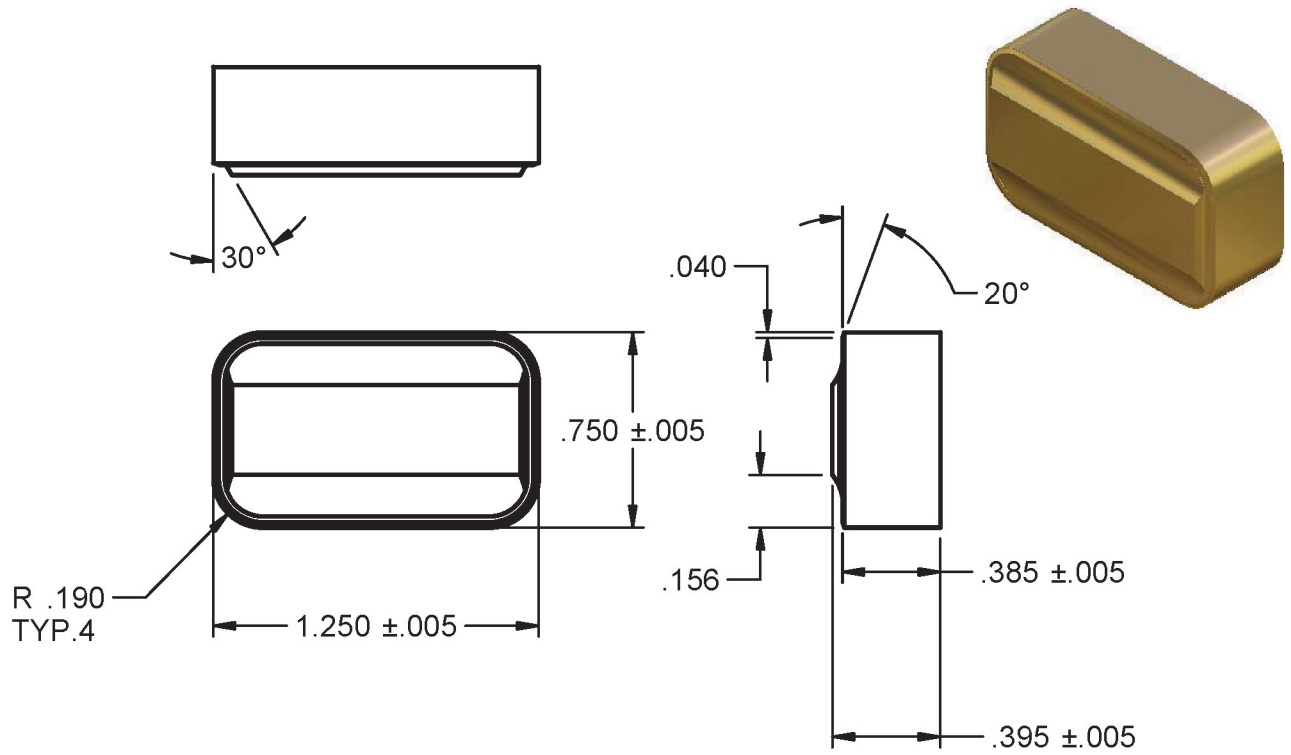
A-2650-A (DETAIL B)



A-0406-D

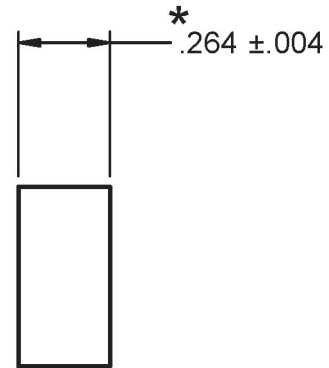
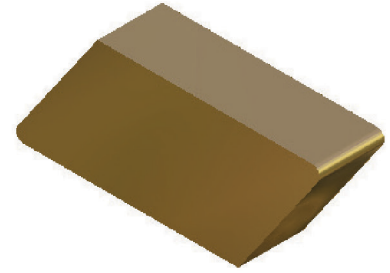
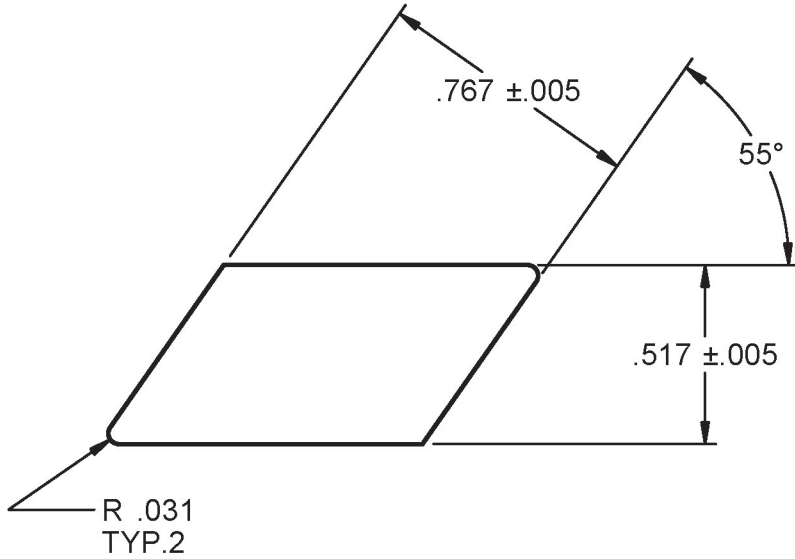


A-1023-B



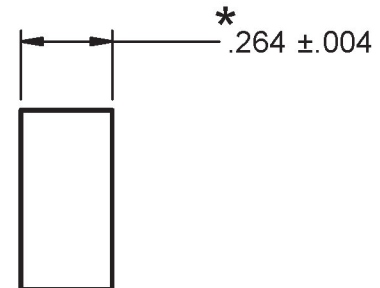
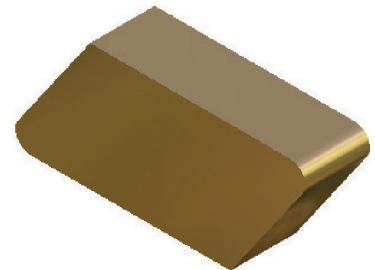
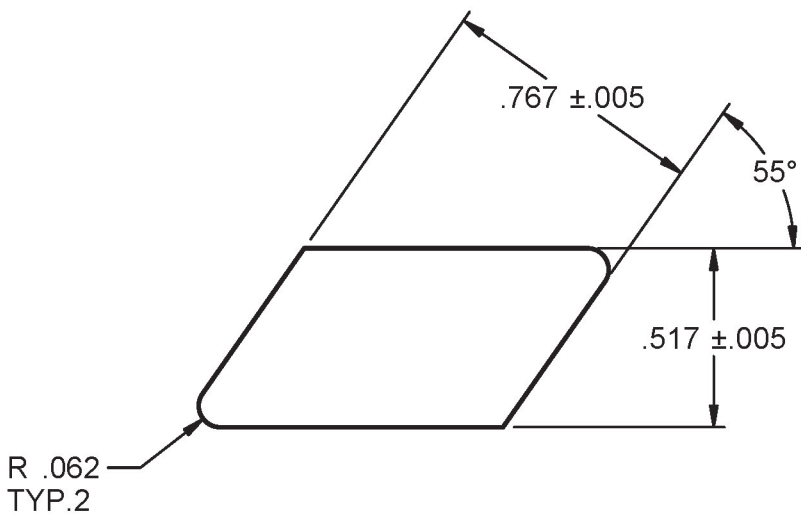
R-11115

* Variable Thickness Quoted on Request

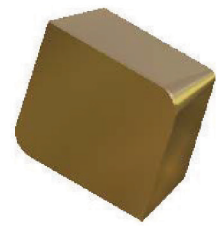
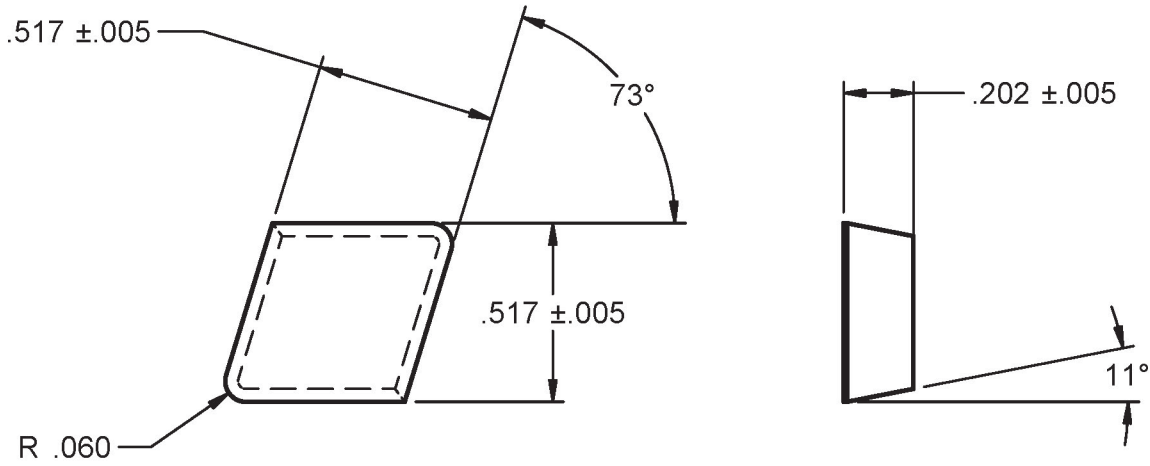


R-11114

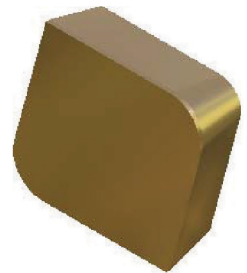
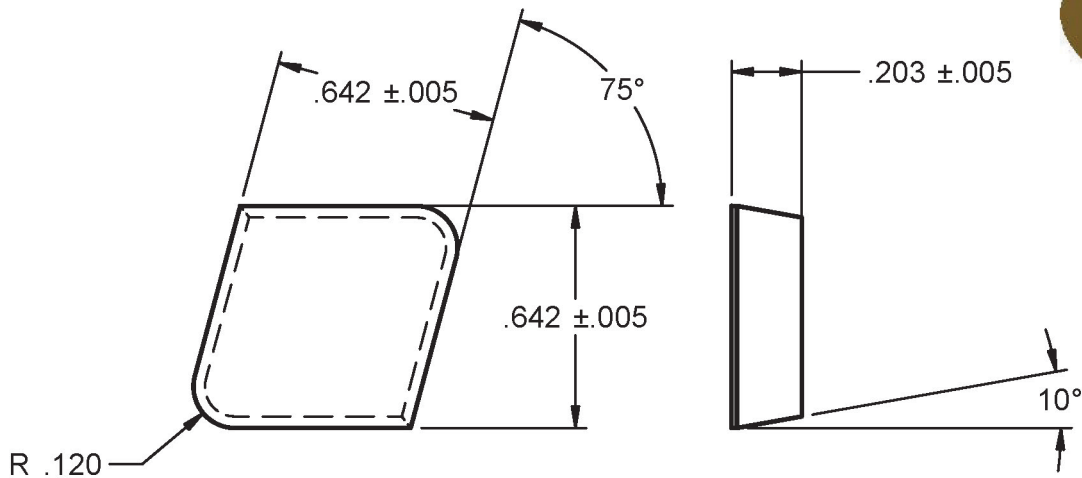
* Variable Thickness Quoted on Request



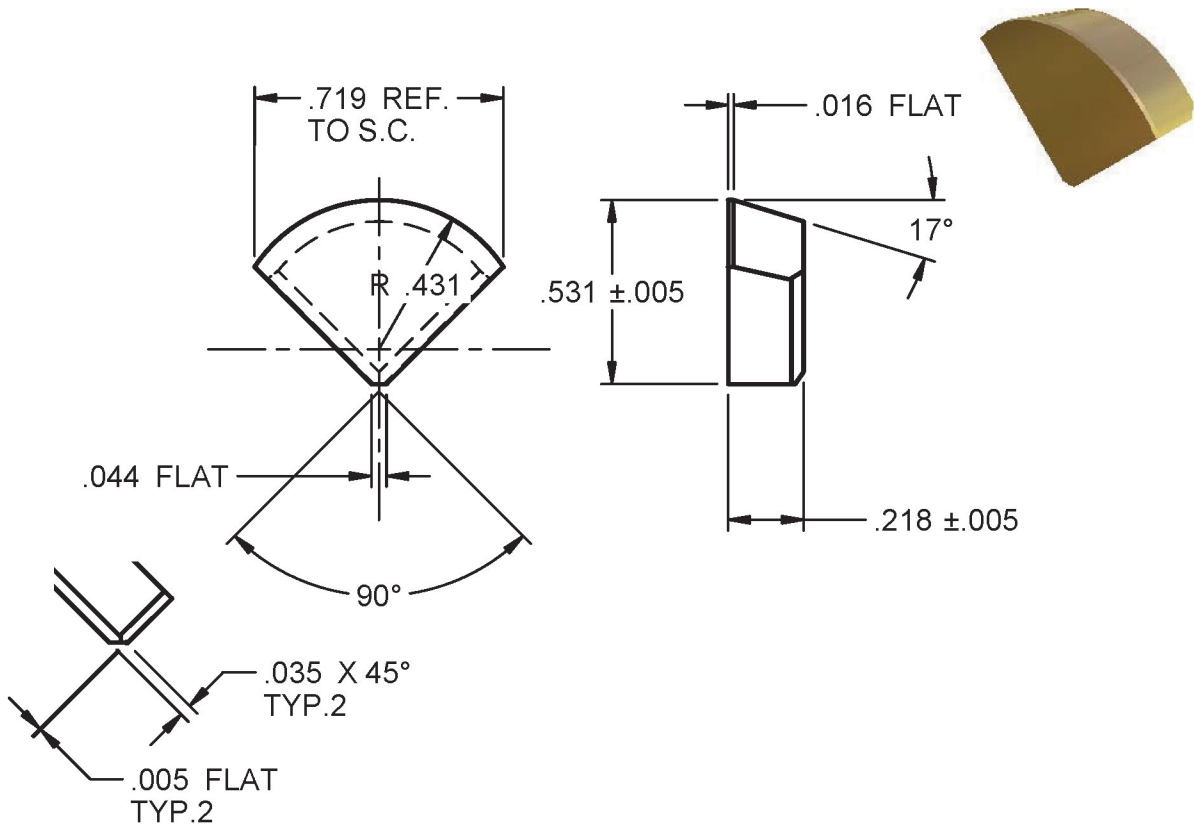
A-2838-B-8 (73° DIAMOND)



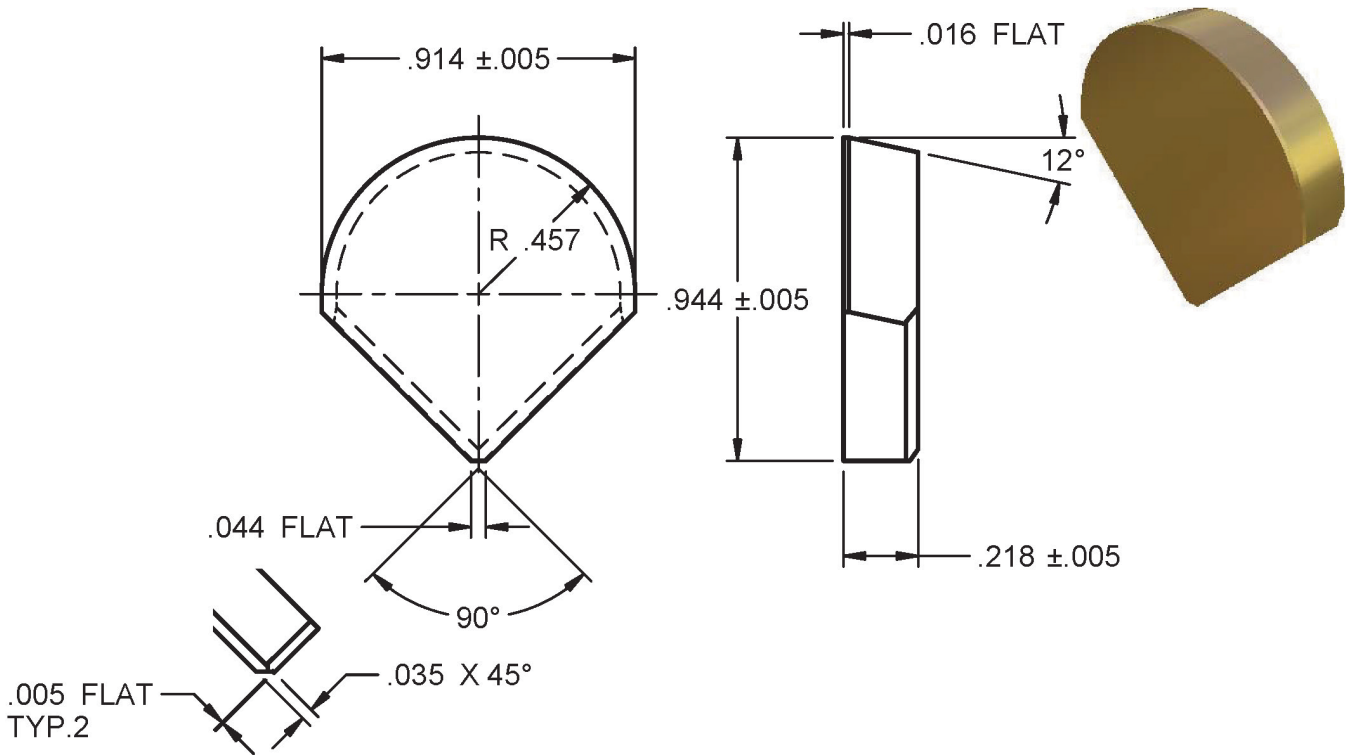
A-2838-B-9 (75° DIAMOND)



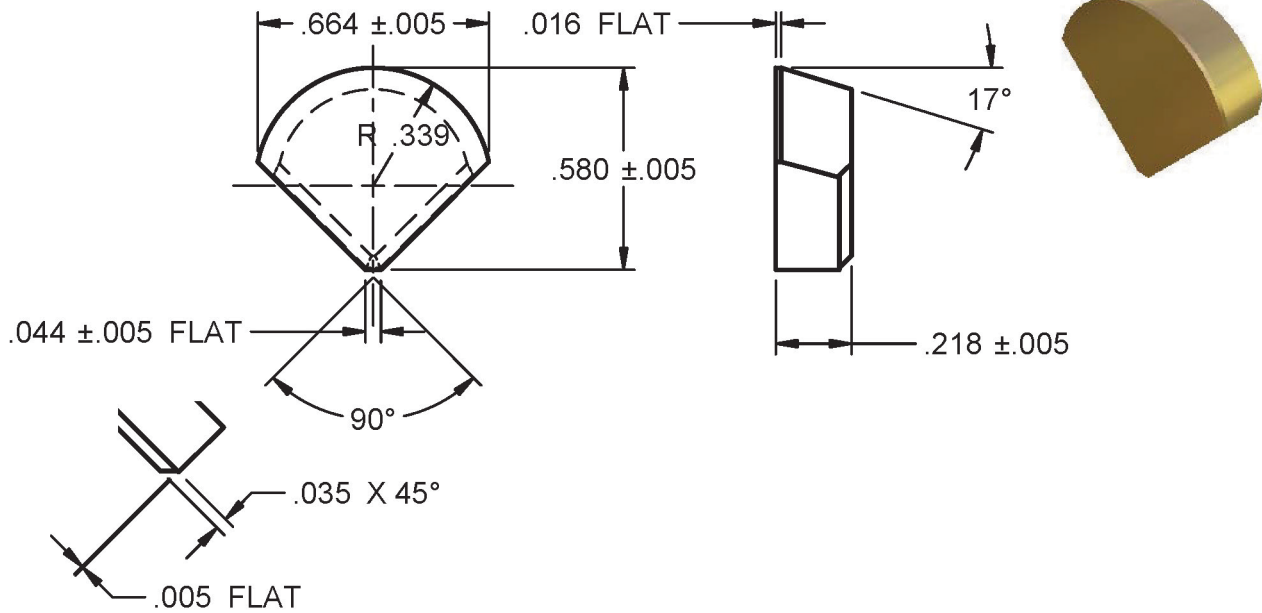
LX-1258-2



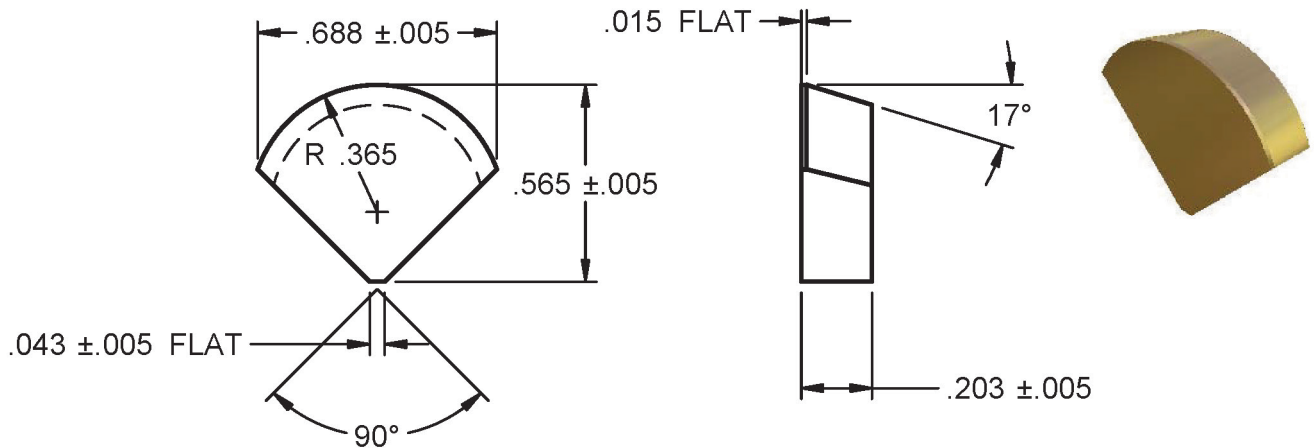
LX-1258-3



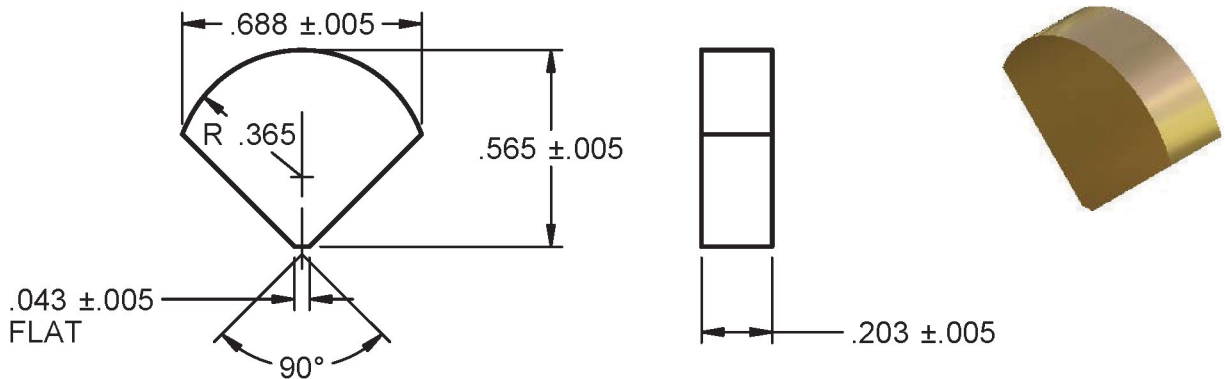
MA-68559



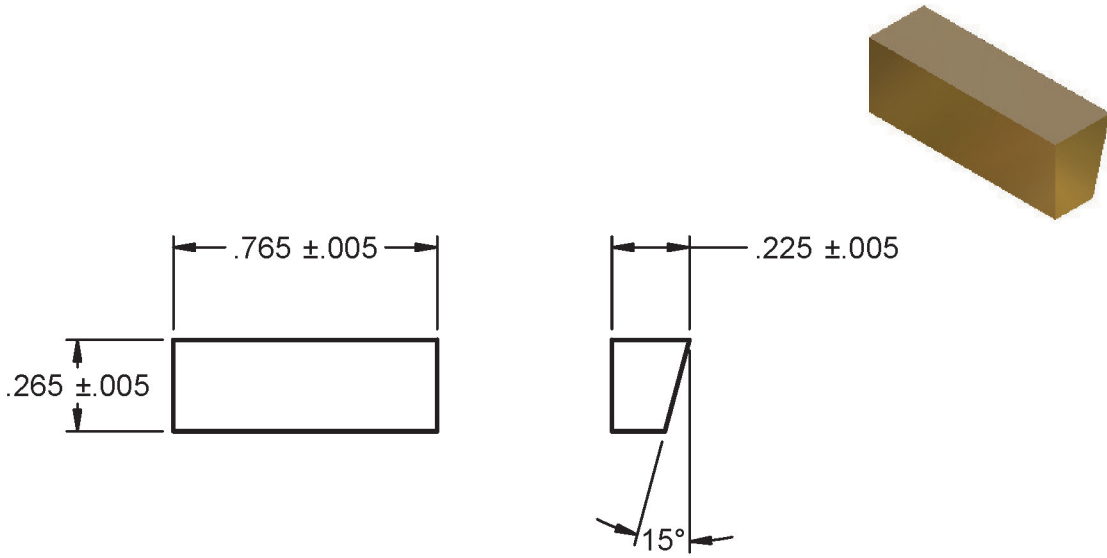
MA-69053



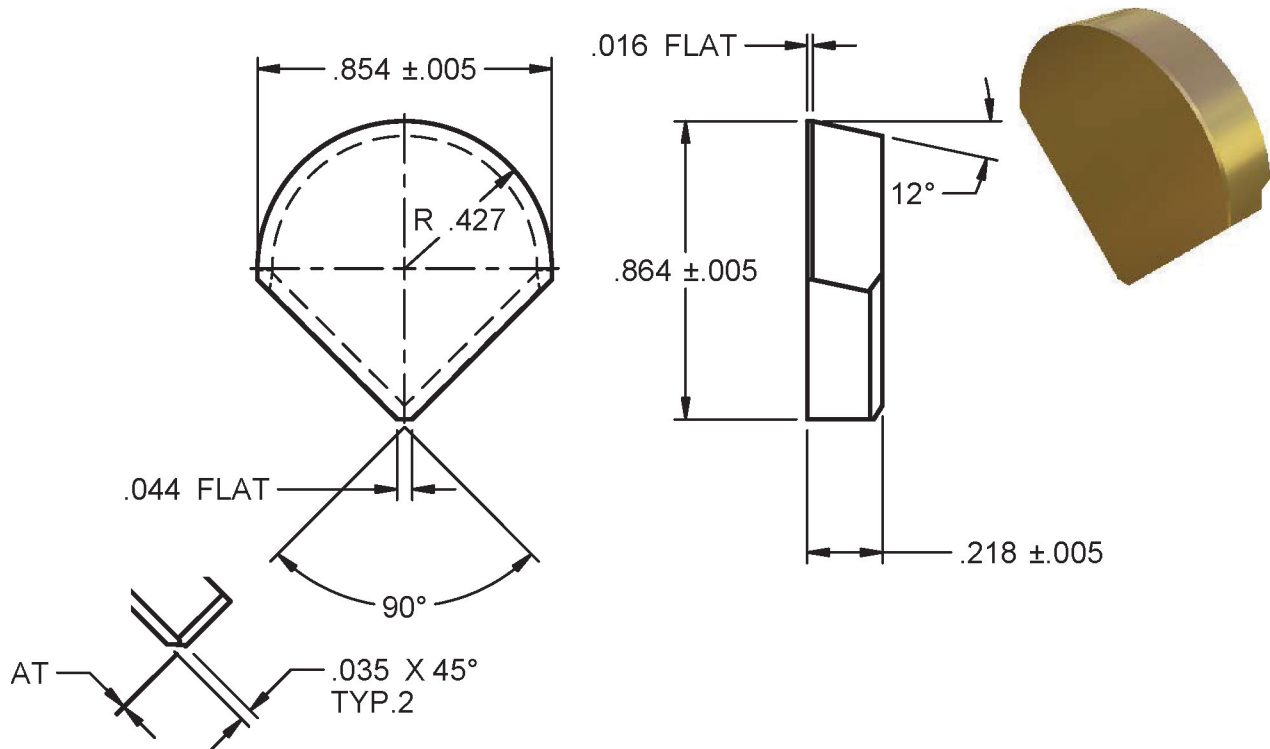
MA-690653-NEG



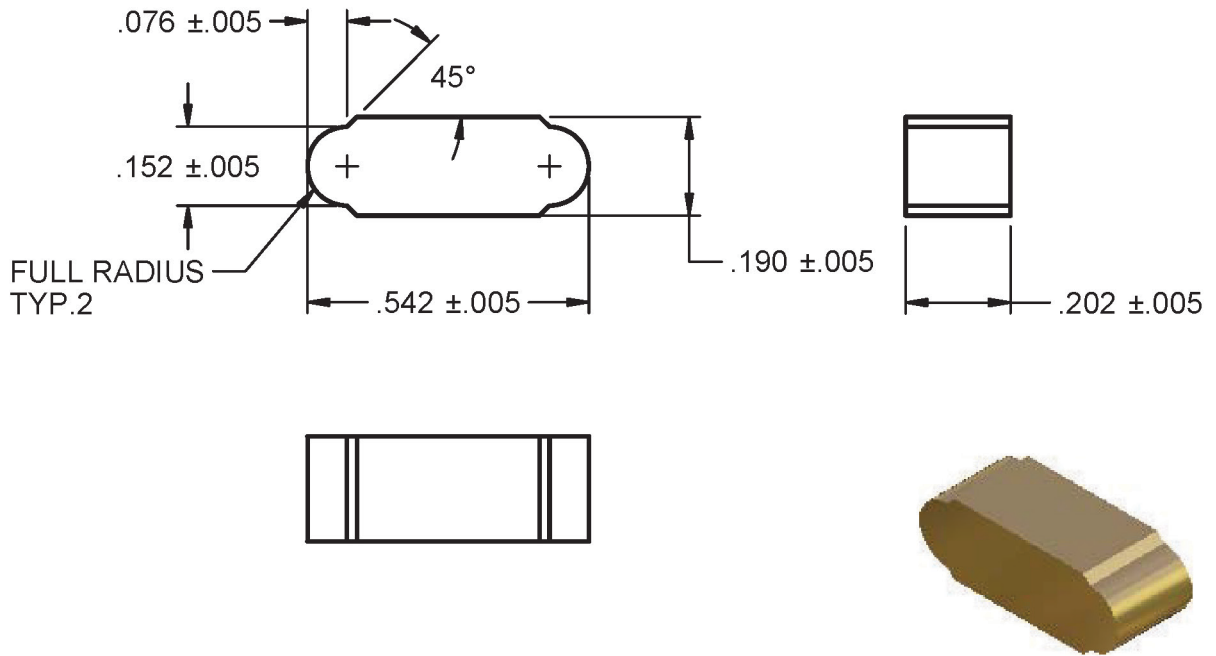
T4B



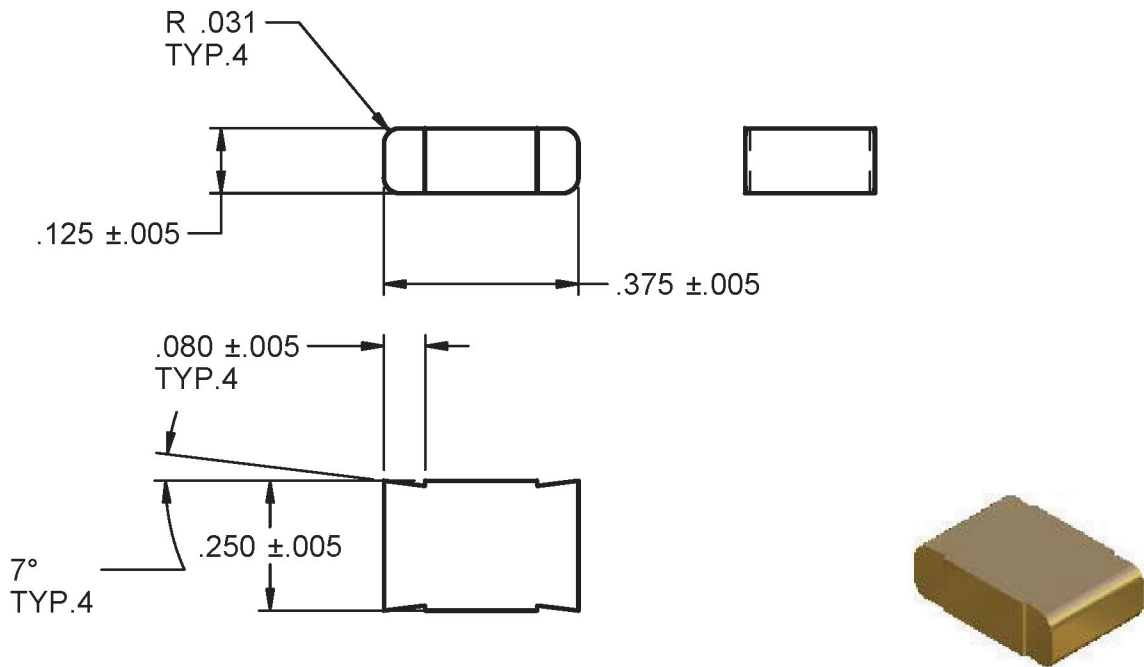
LX-1255-2



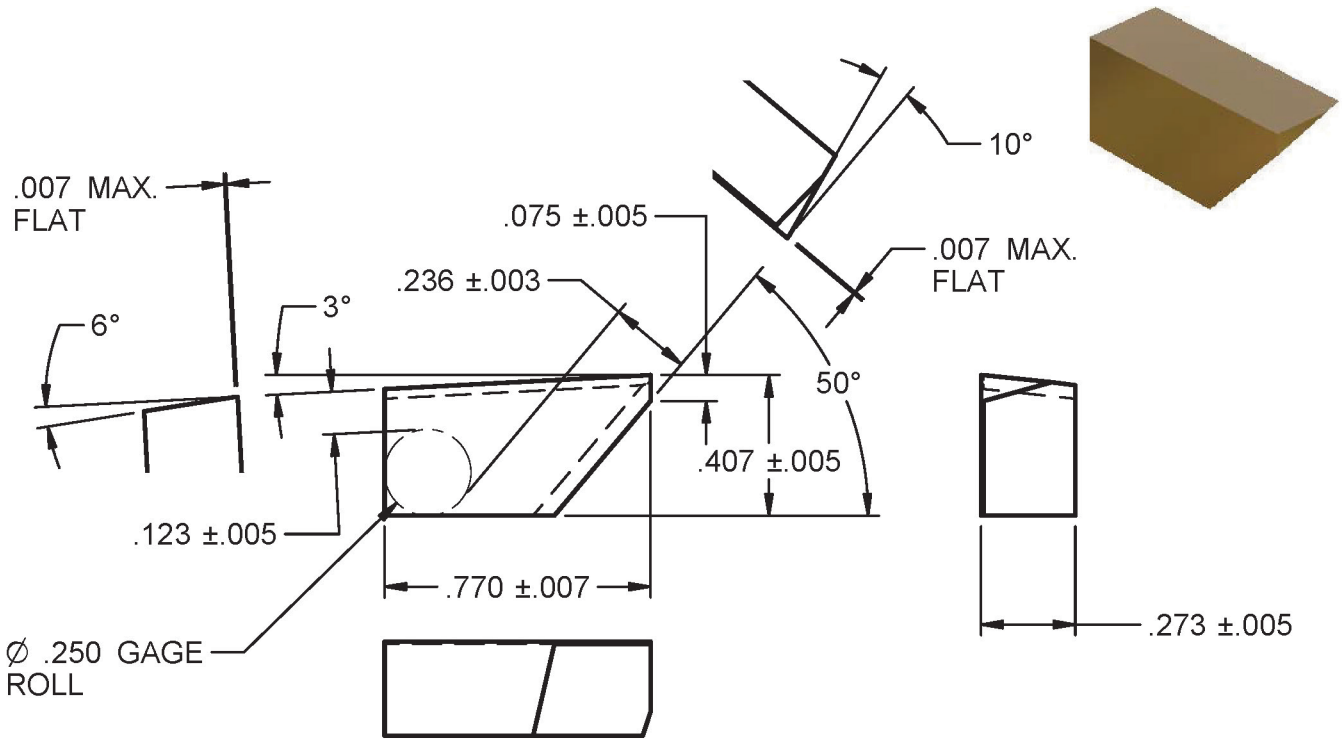
A-2948-A



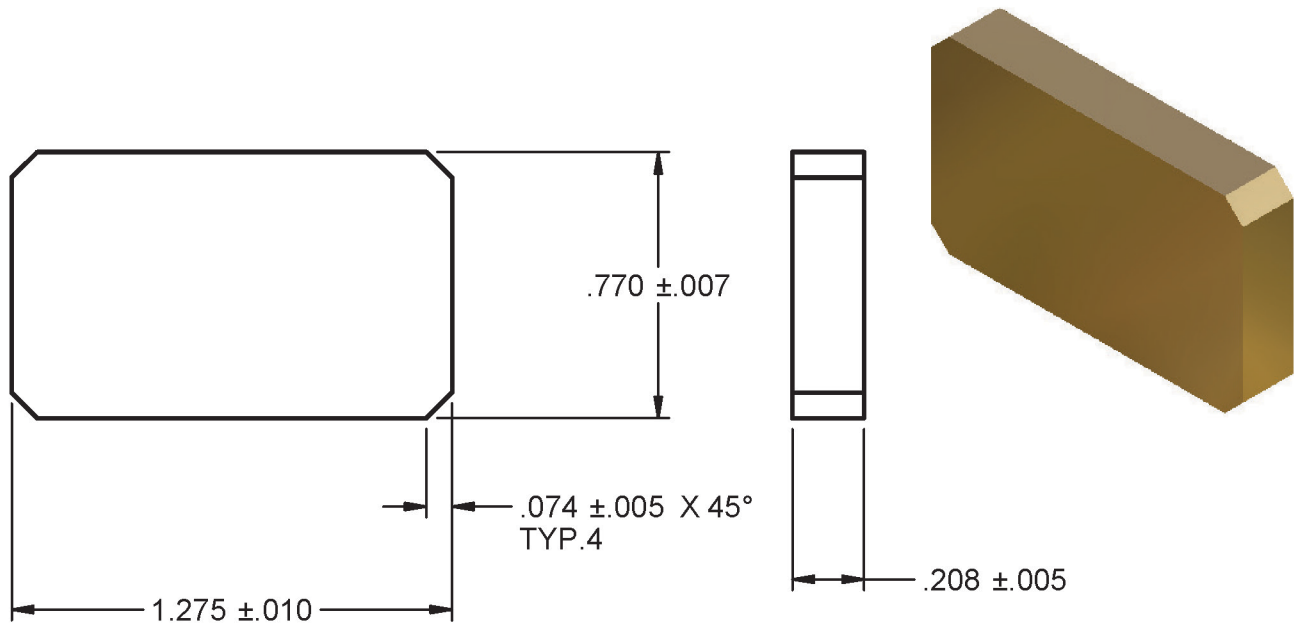
A-0235-A



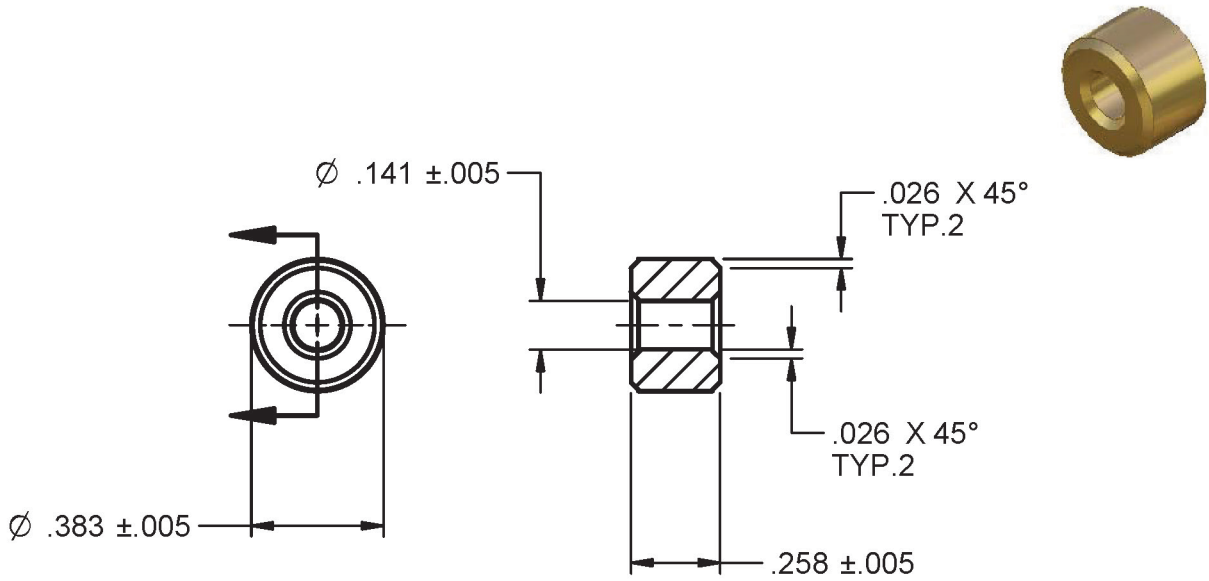
MA-70278 (A2752-A)



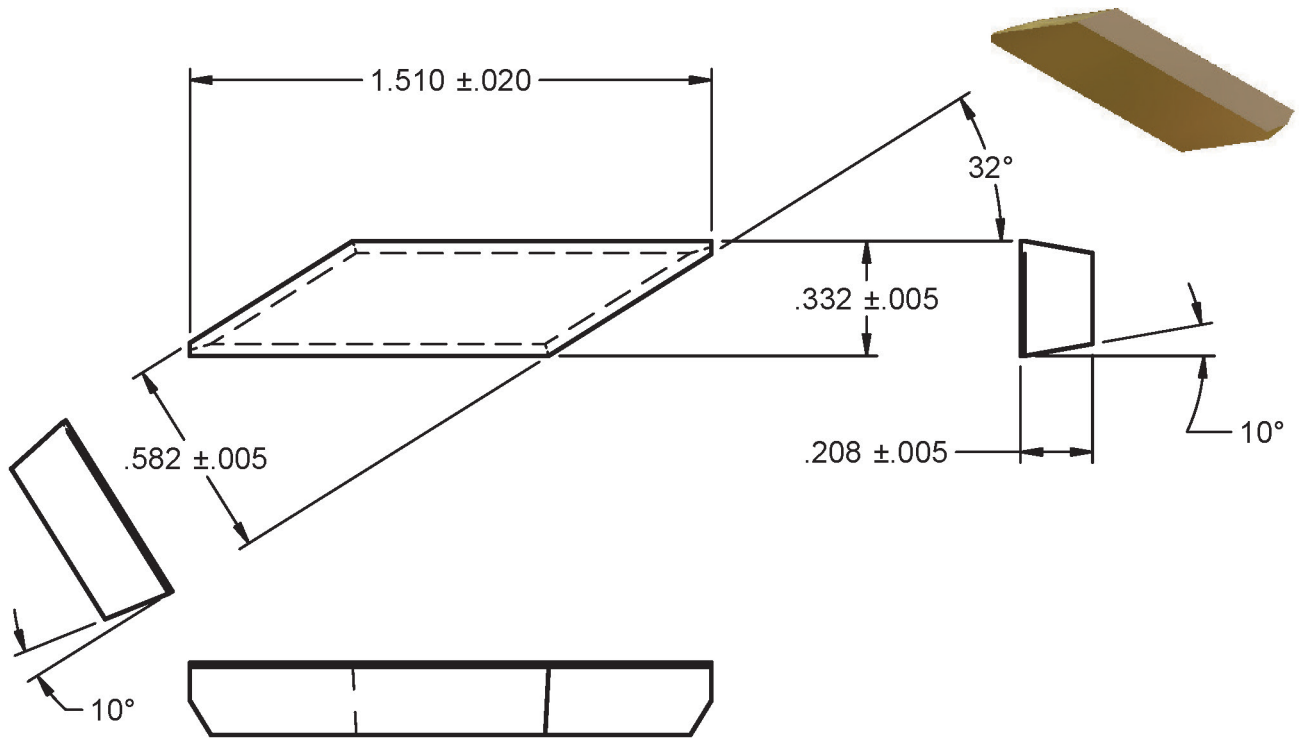
A-2500-A



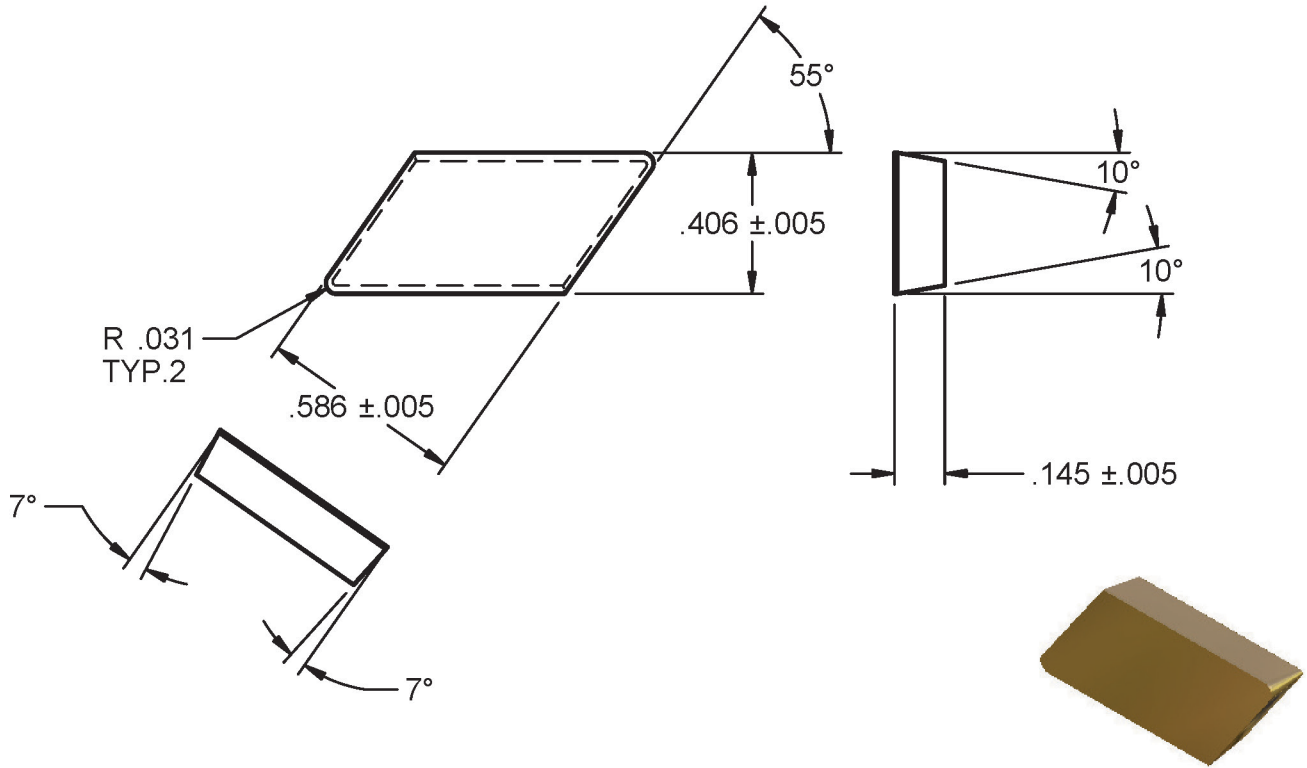
A-1657-A-5



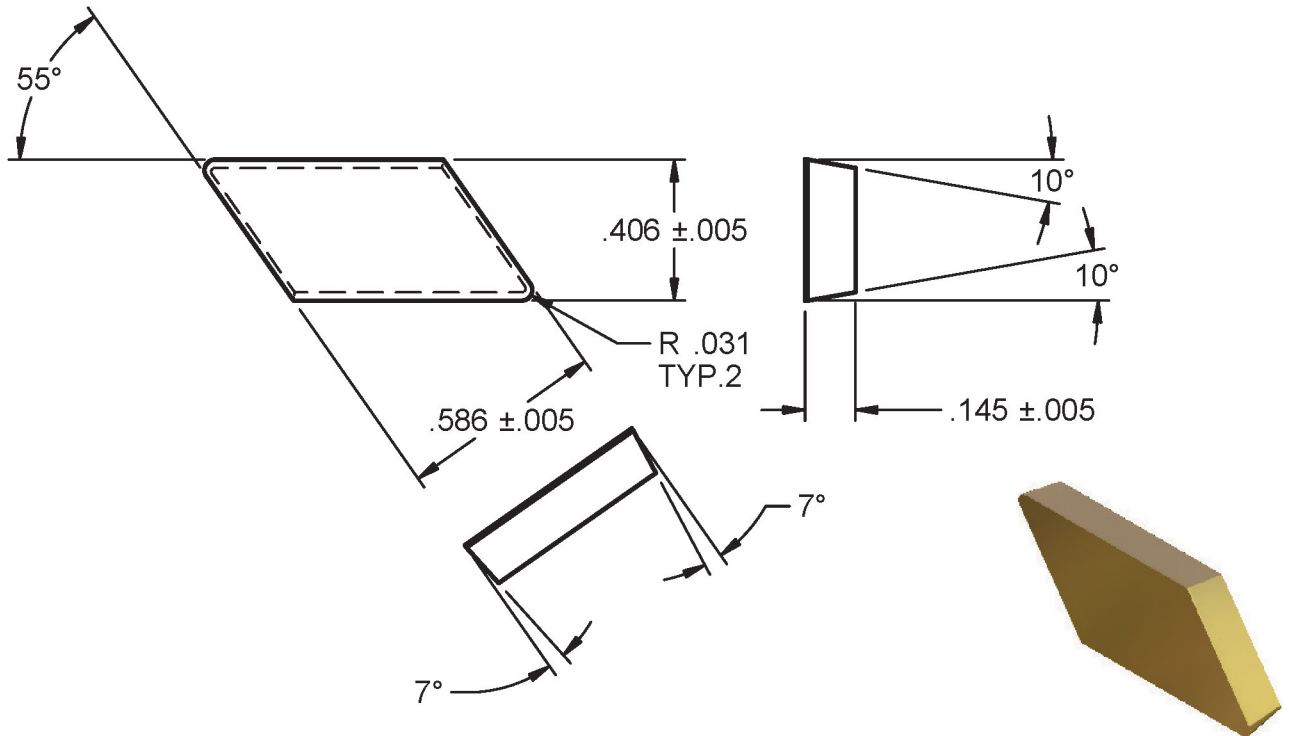
A-0976-C-1 (MA-54645, MA-54646)



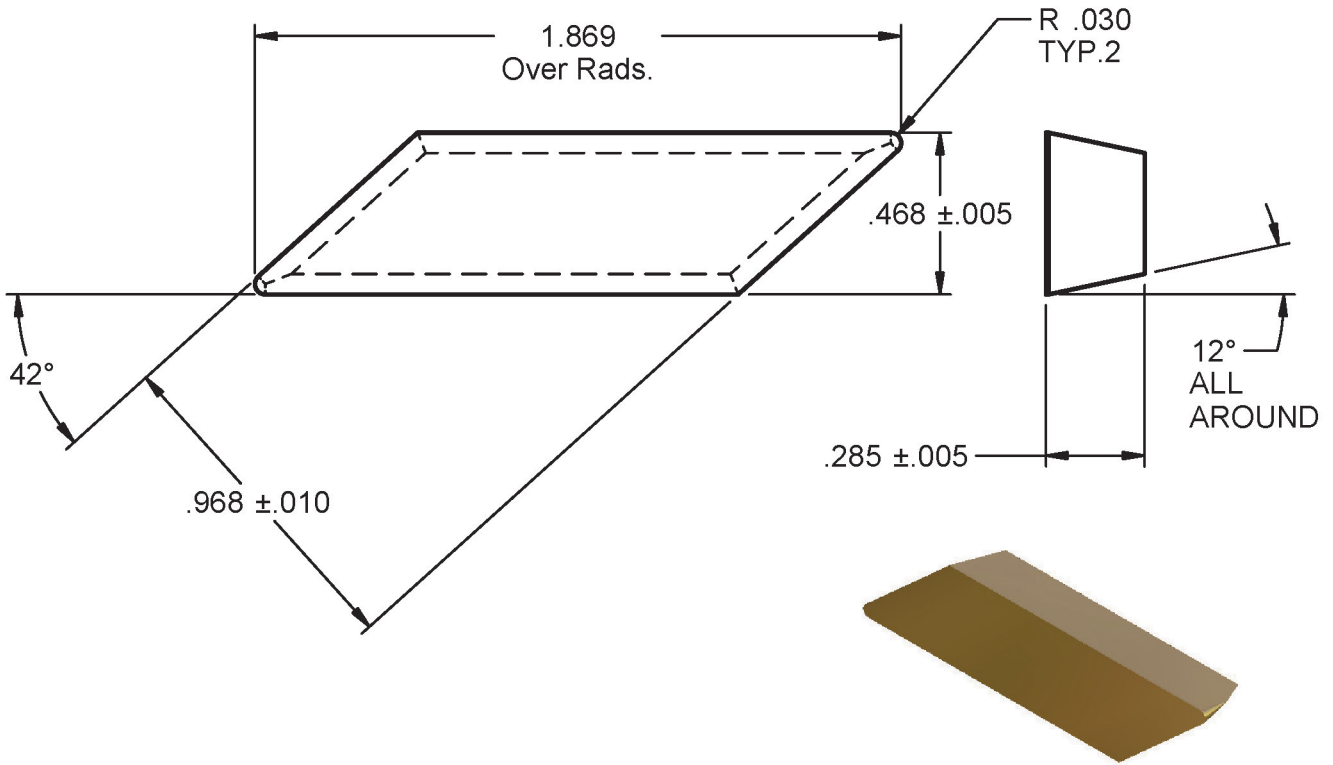
EPU-3422R



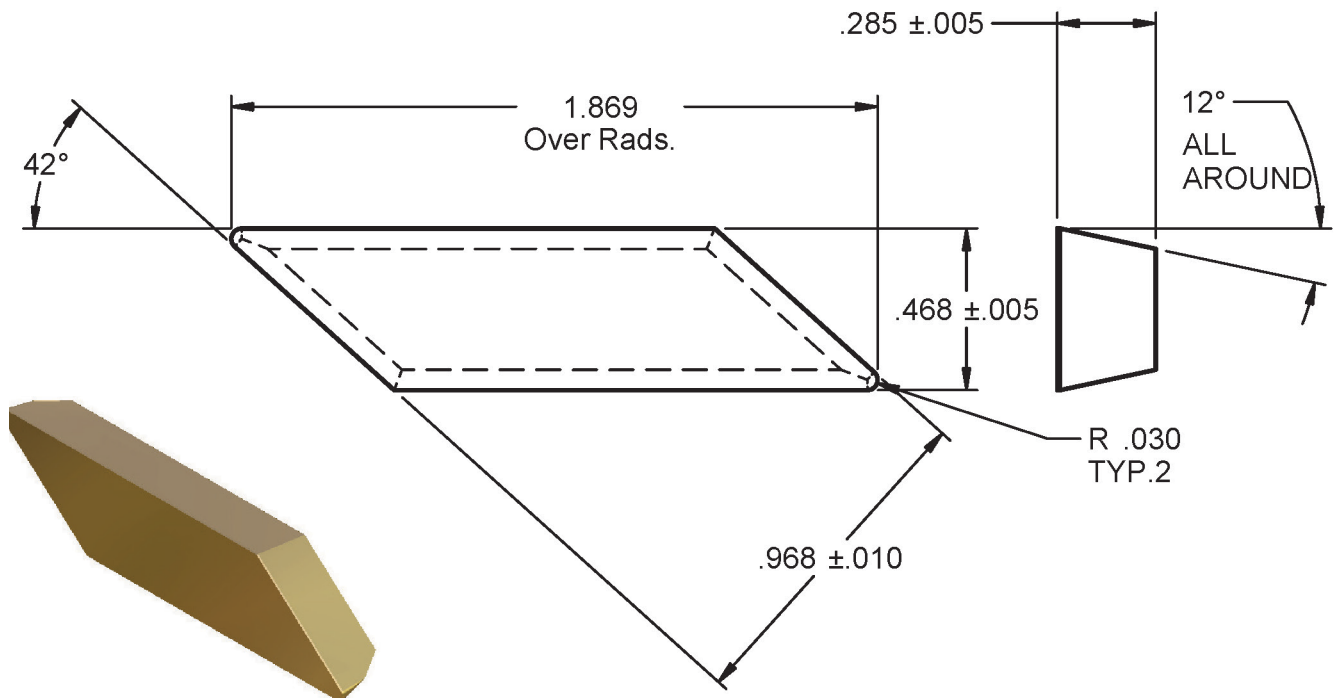
EPU-3422L



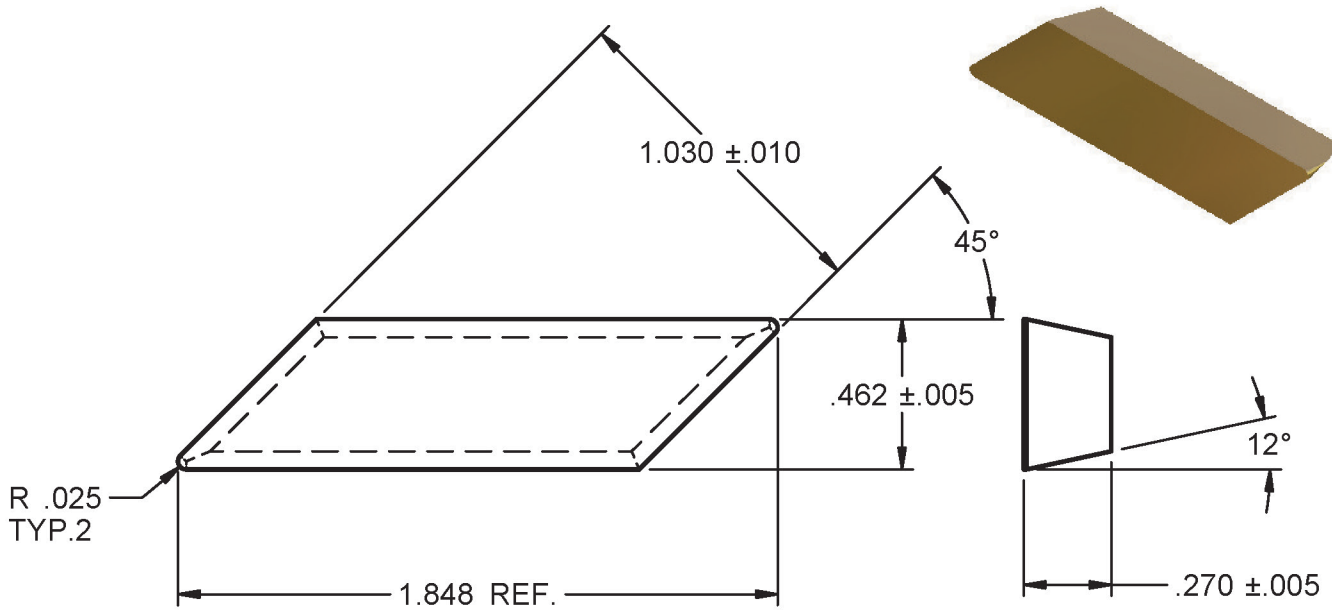
T-14447-A (MA-1329)



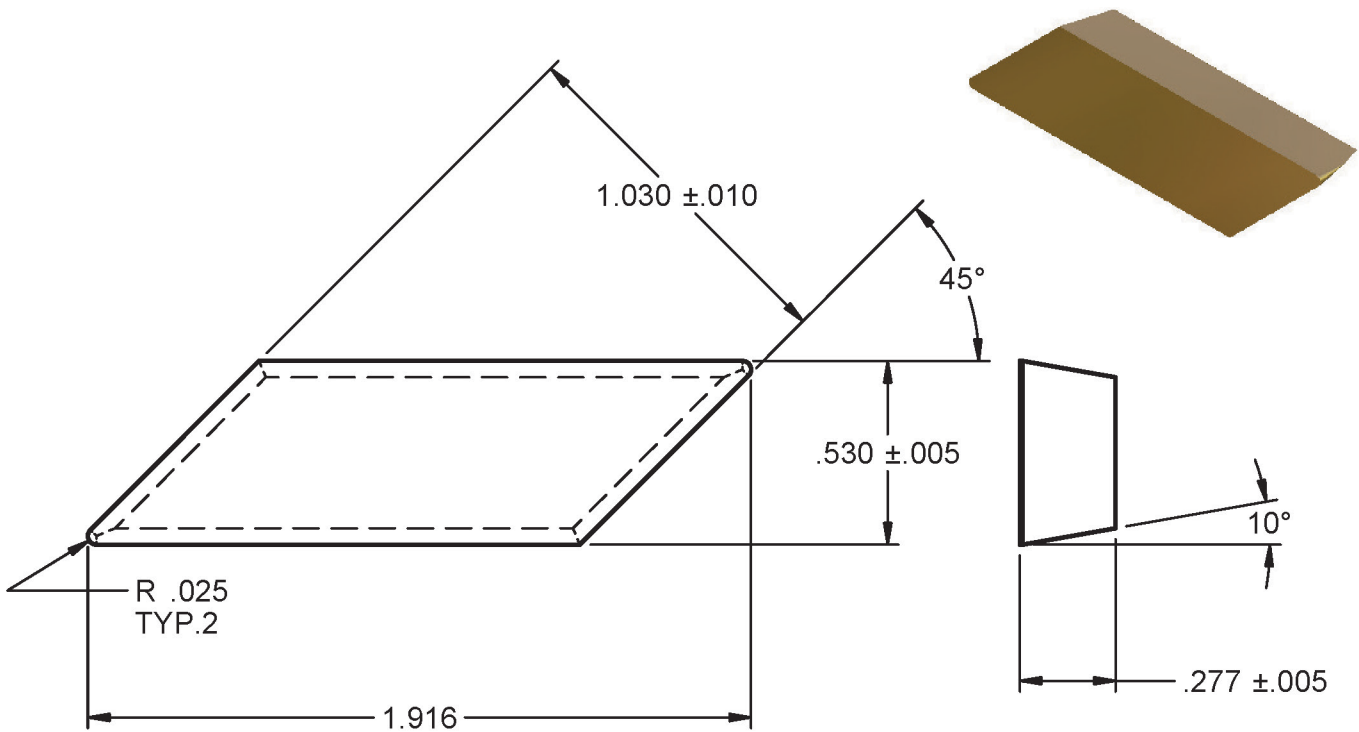
T-14448-A (MA-1328)



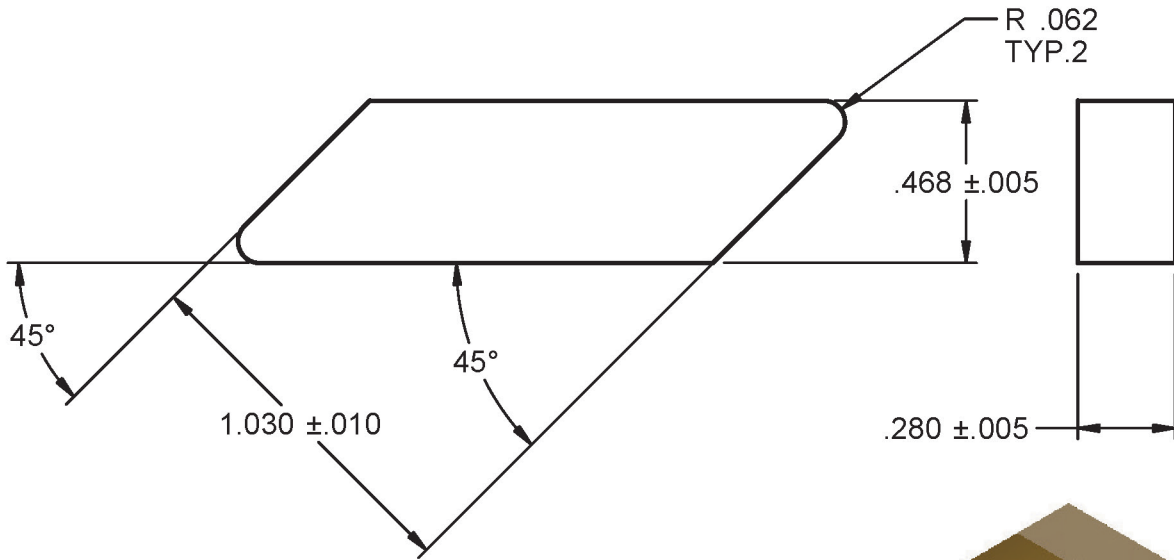
T-15914-D-3 (MA-1715)



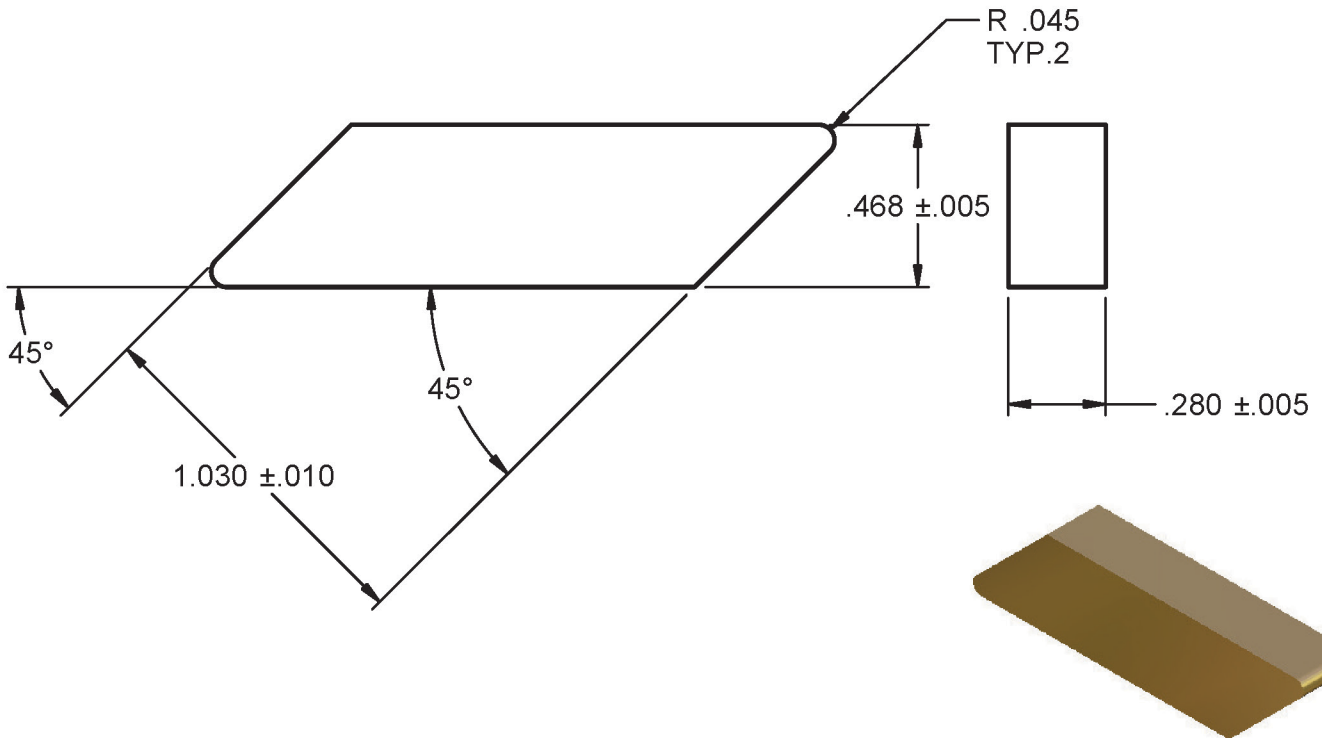
T-15914-D-1 (MA-2019)



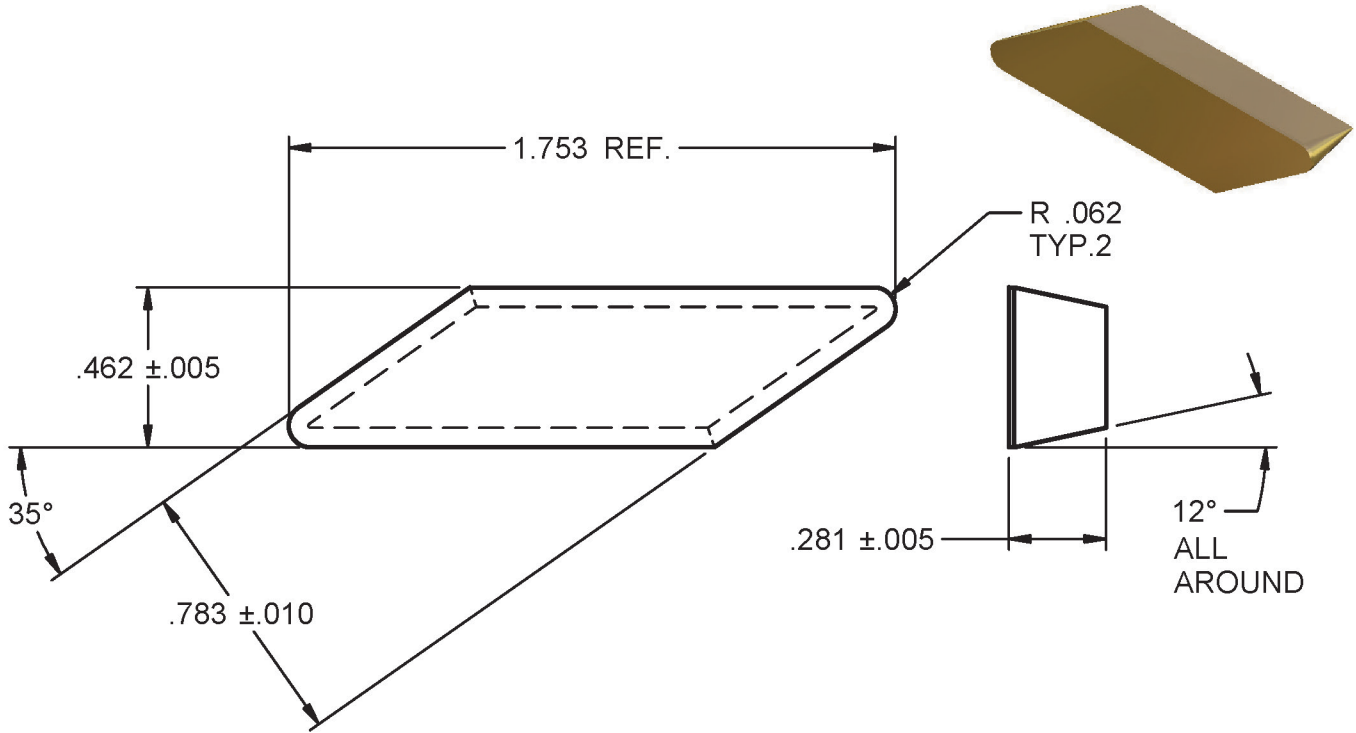
T-15914-D-6 (MA-40092)



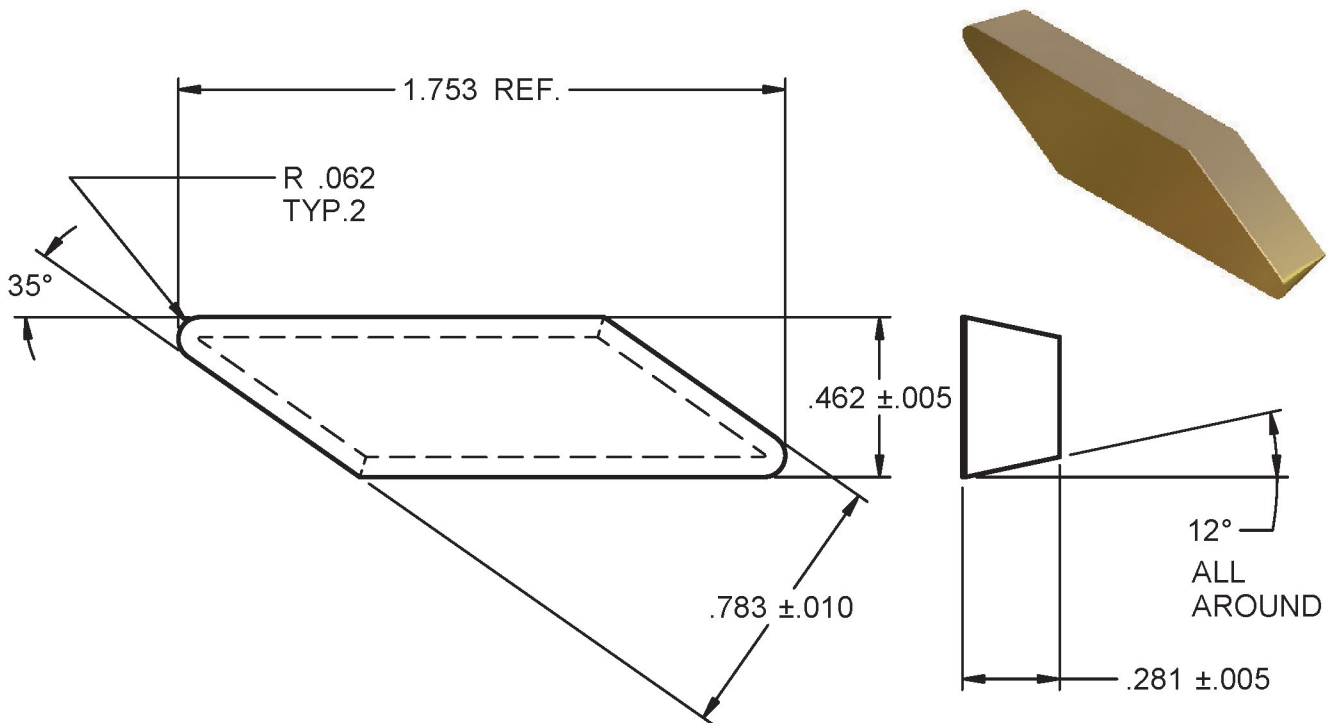
T-15914-D-4 (MA-1718)



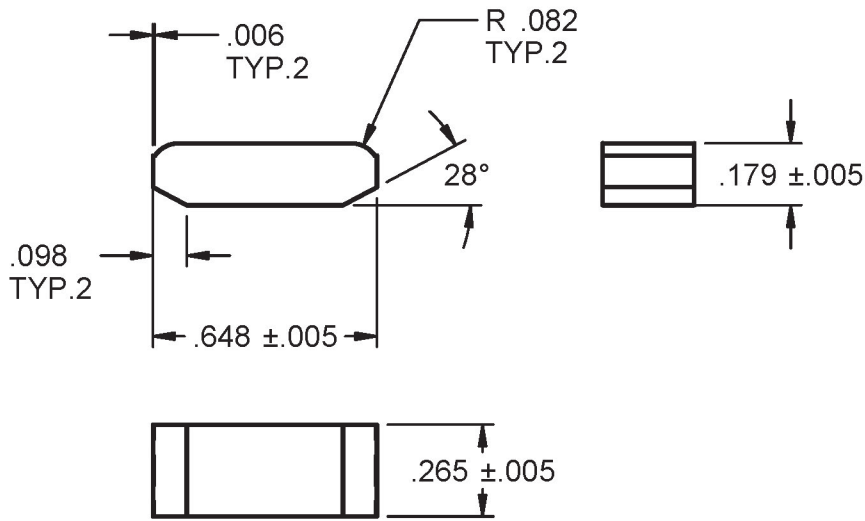
T-16925 (MA-5833)



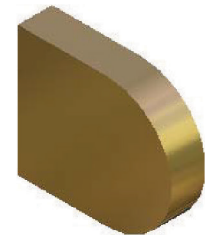
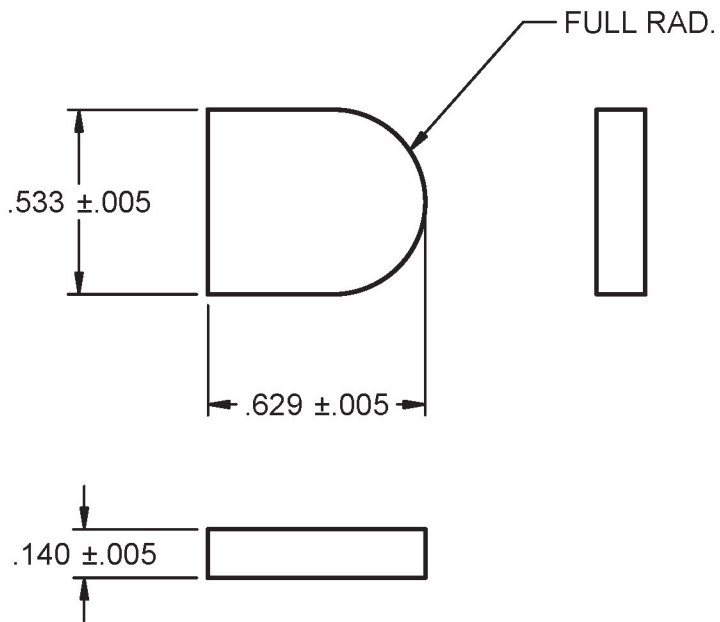
T-16926 (MA-5834)



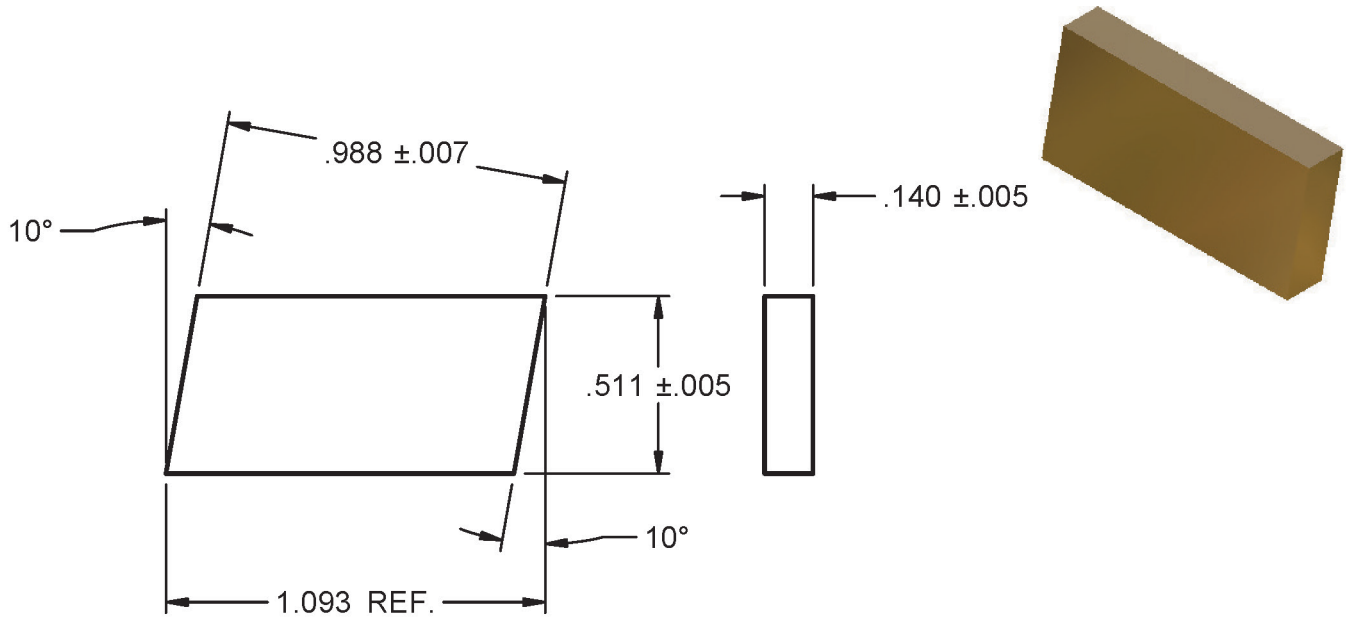
LX-1250-1 (A-2003-B)



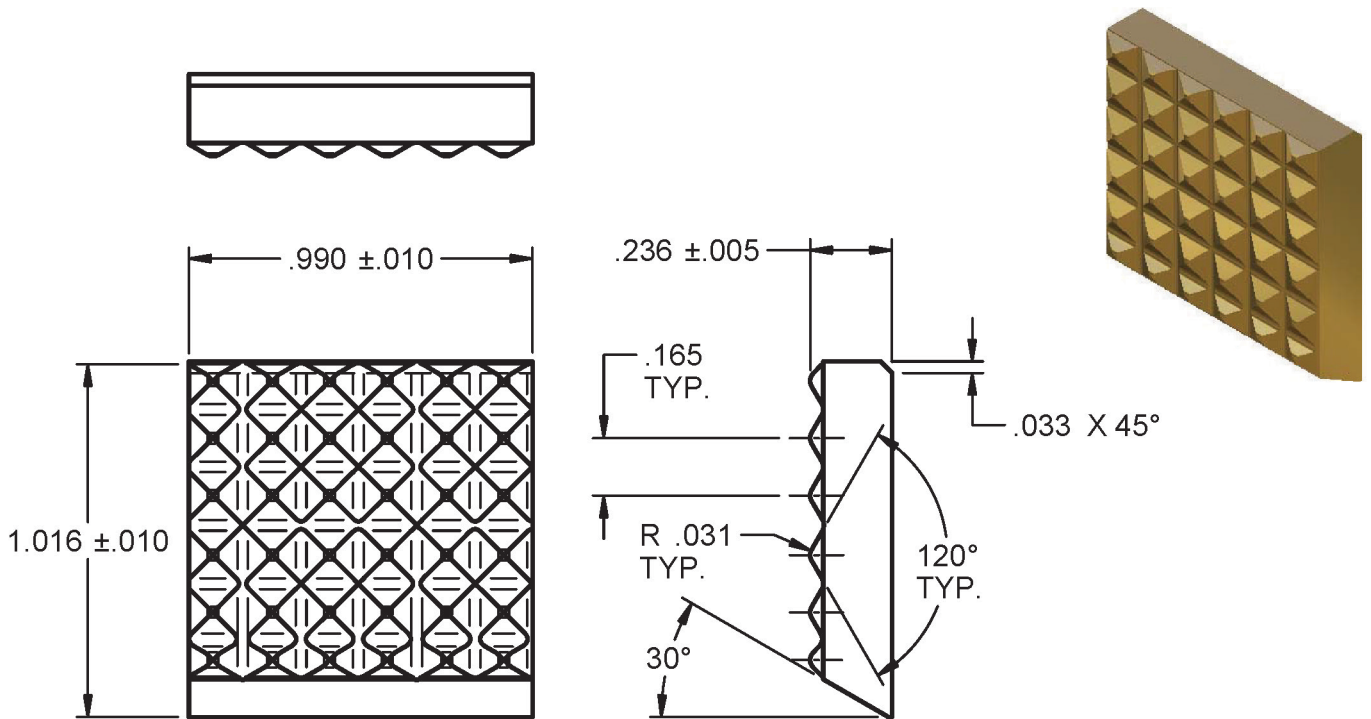
LX-1217-2



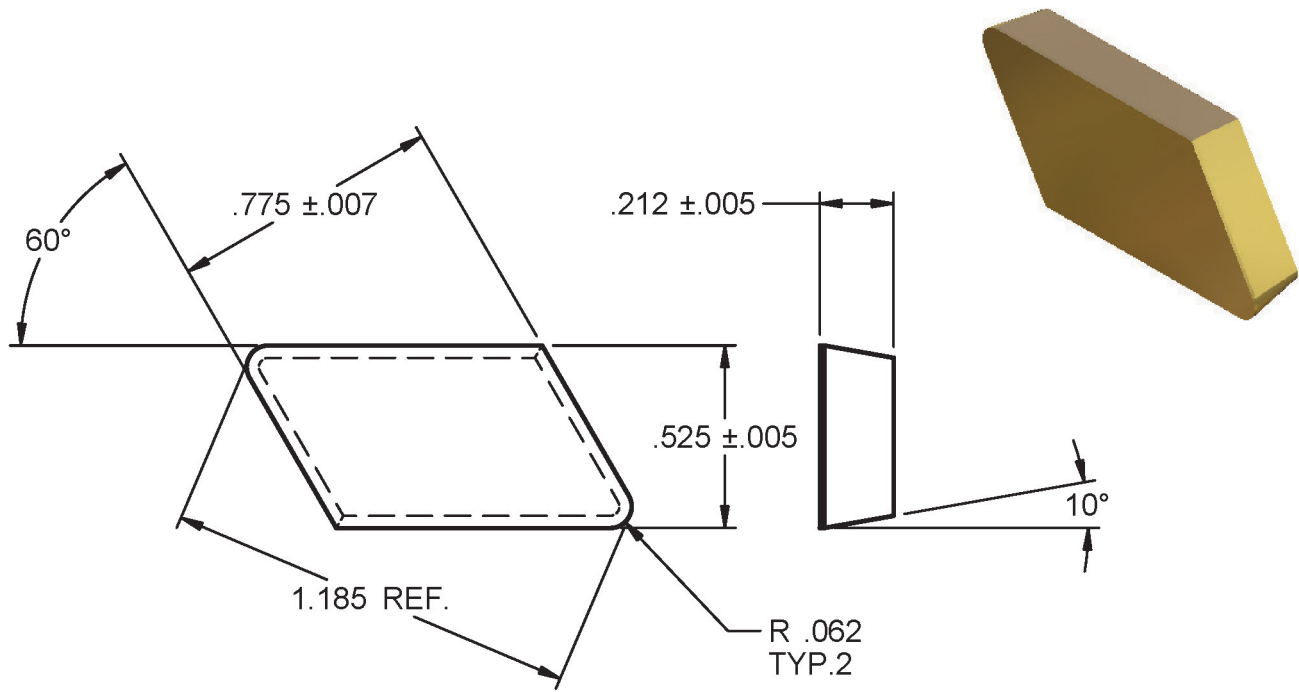
LX-1072-2



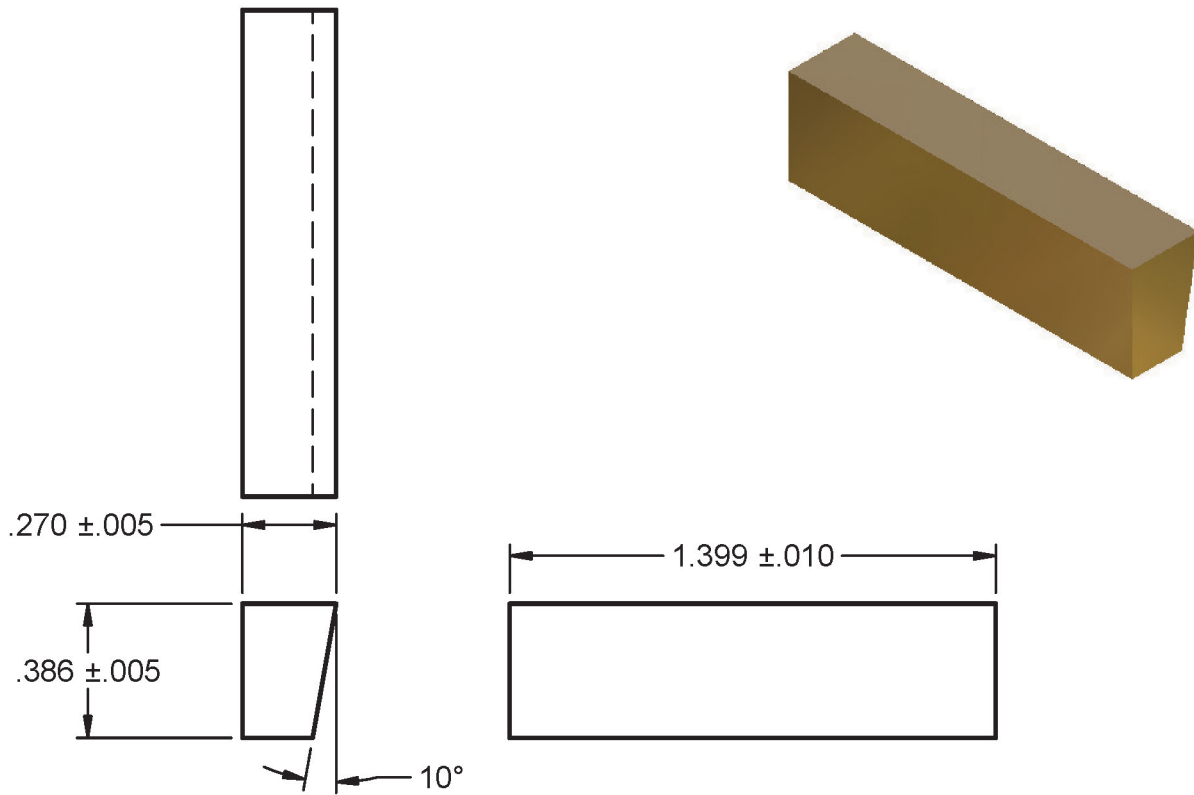
LX-1111-1 (GRIPPER)



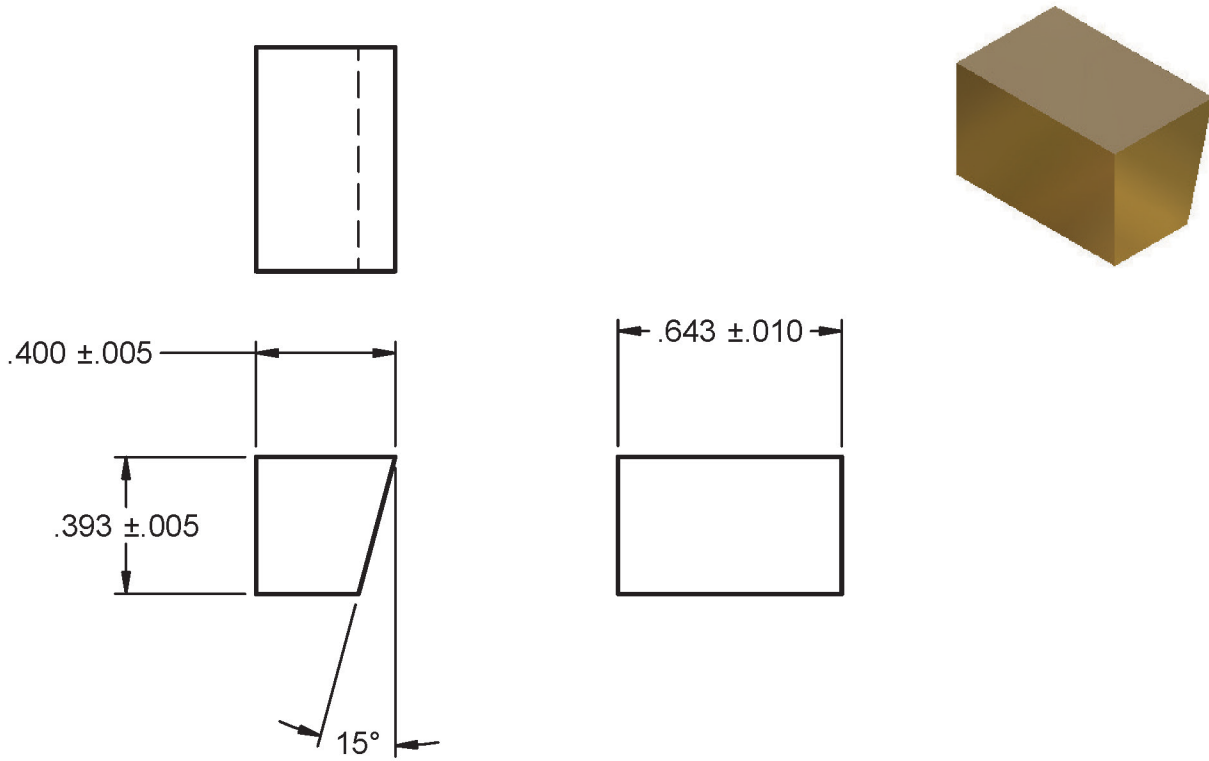
LX-0527-1 (MA-70129)



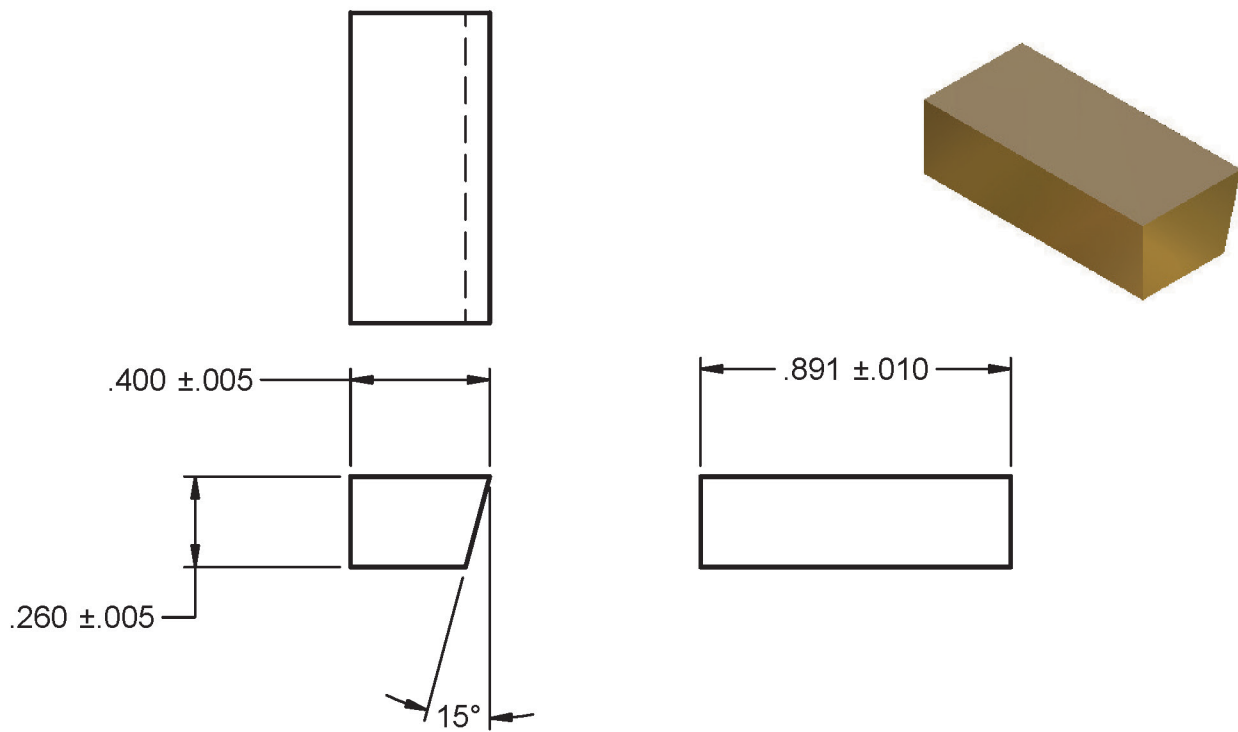
LX-0894-11



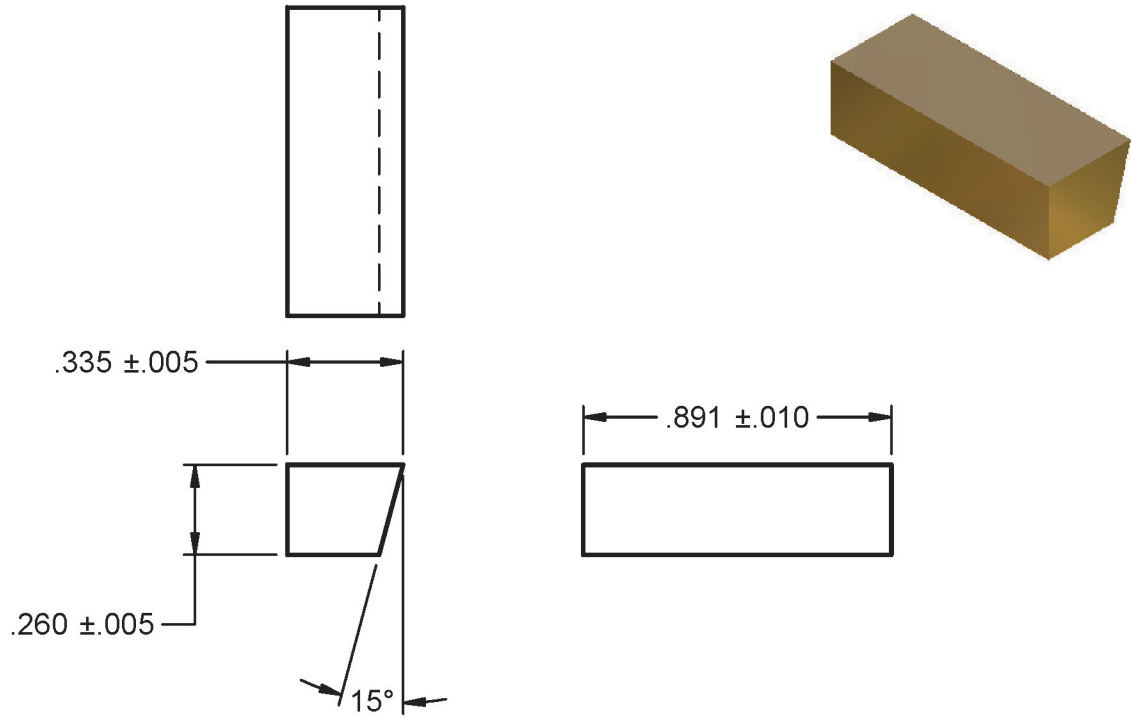
LX-0894-8



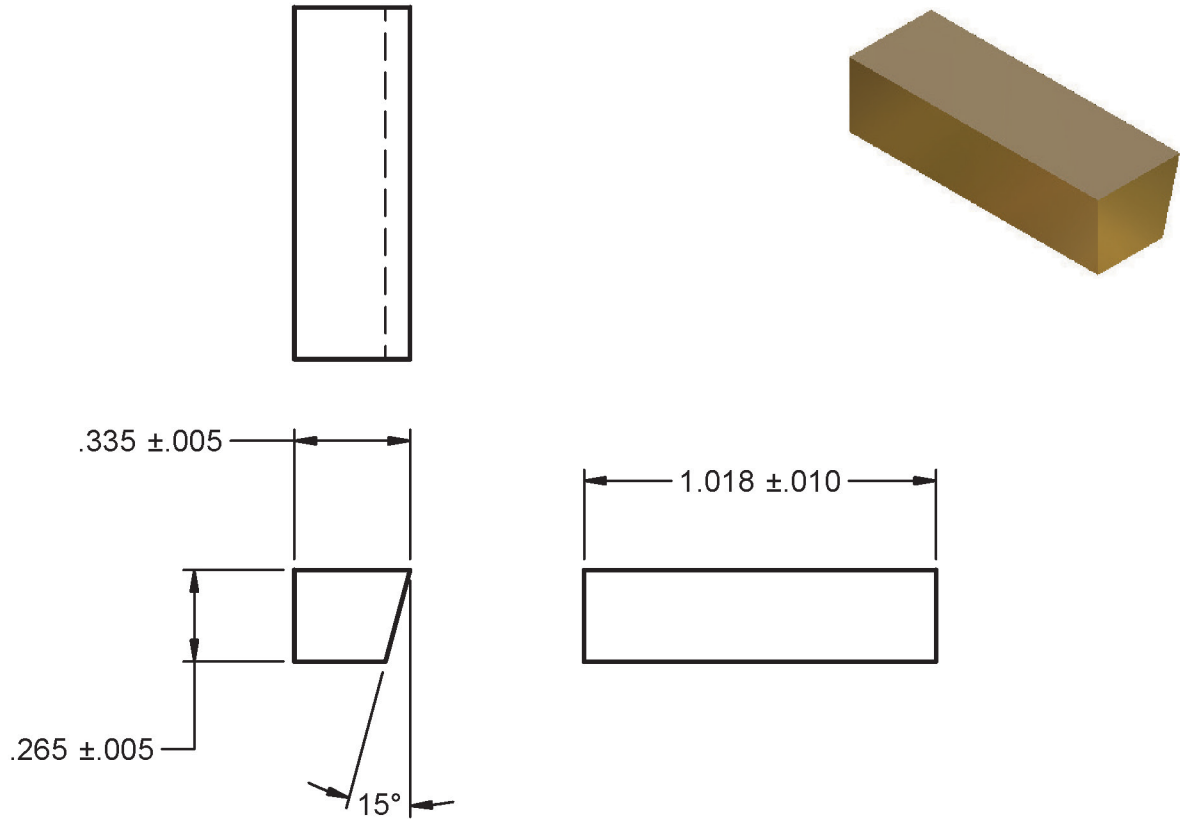
LX-0894-10



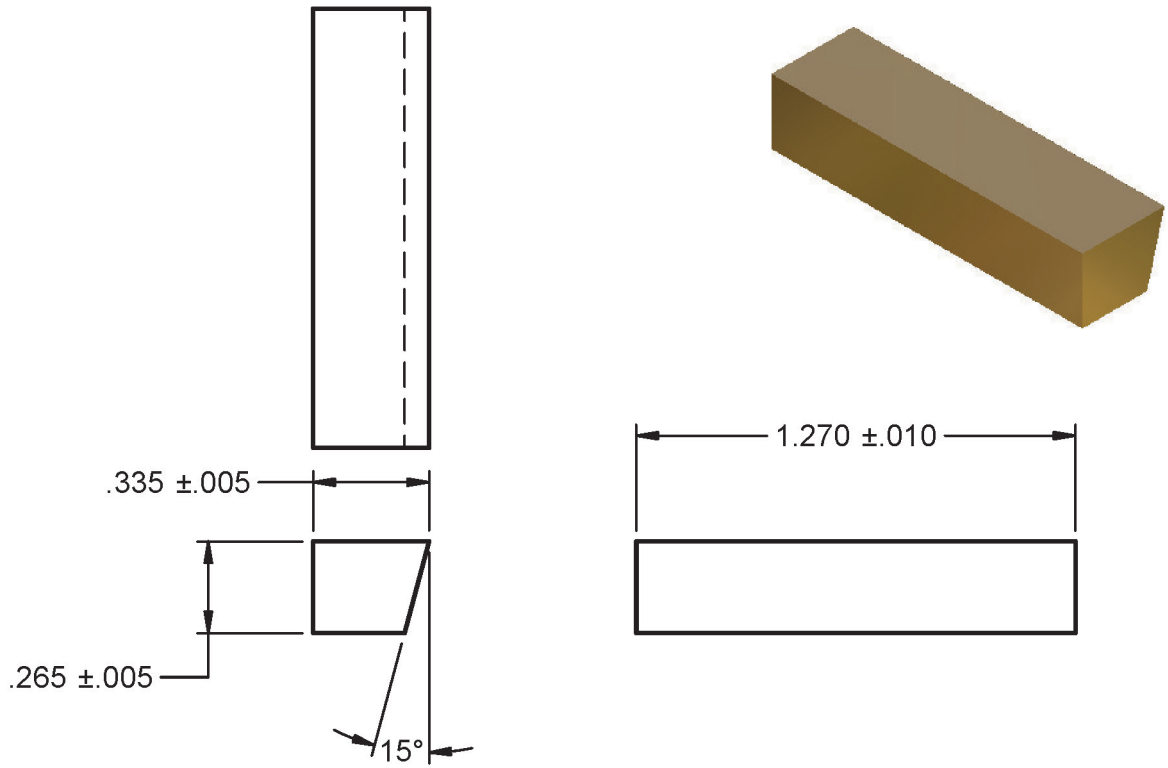
LX-0894-4



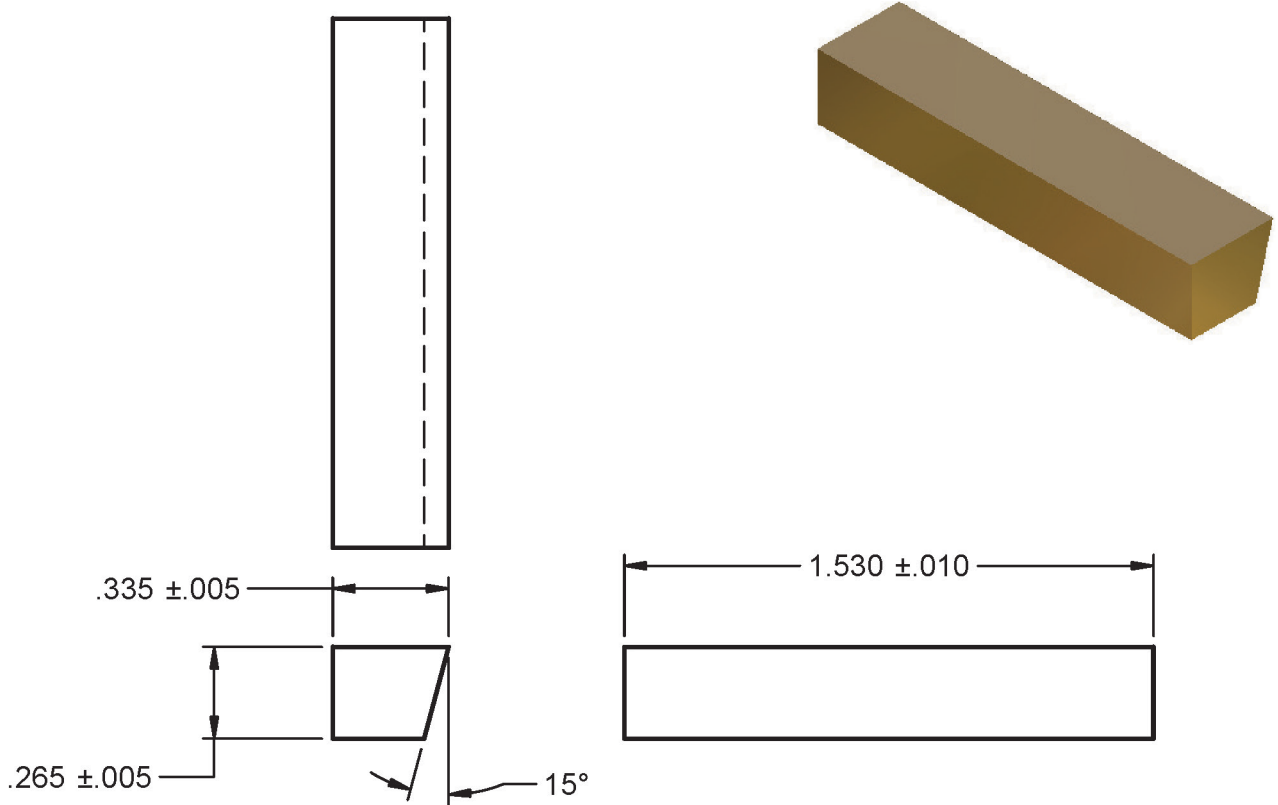
LX-0894-3



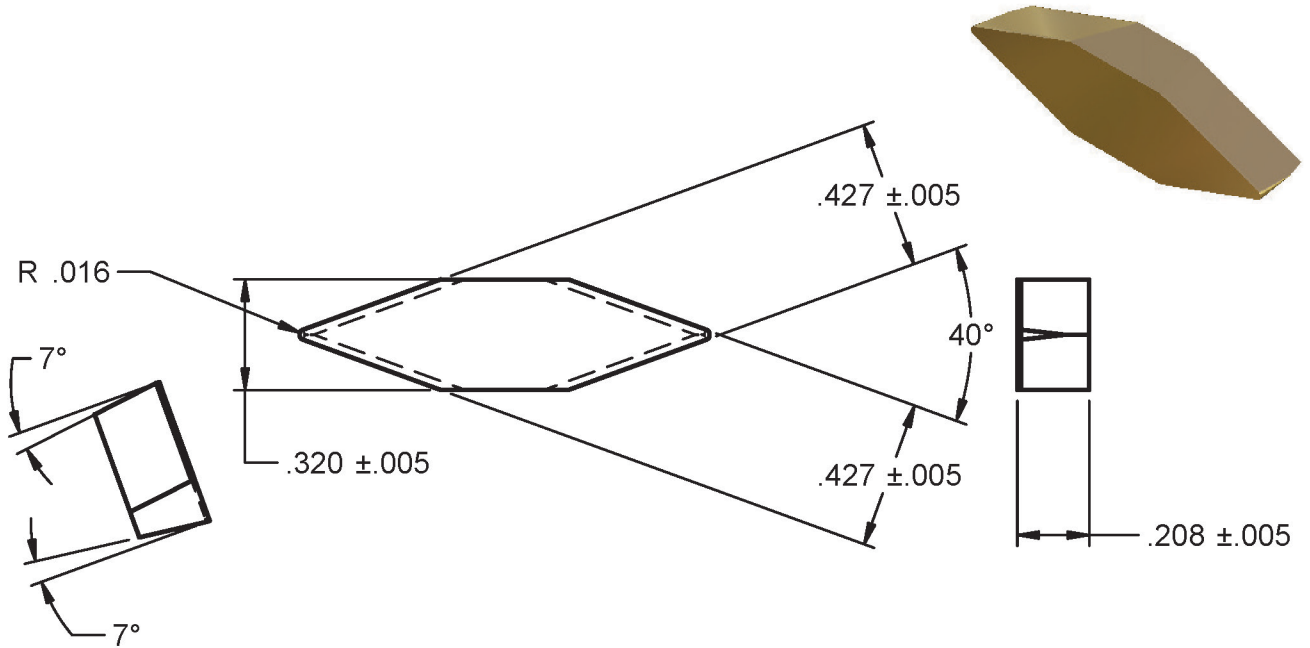
LX-0894-2



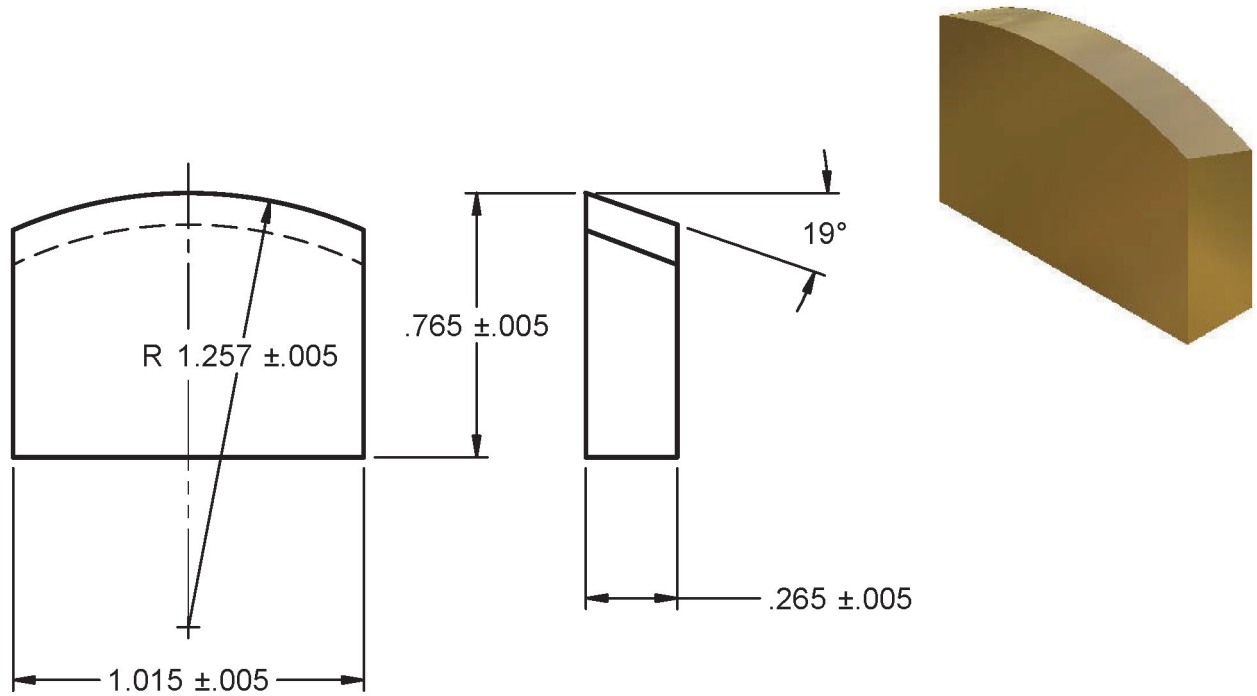
LX-0894-1



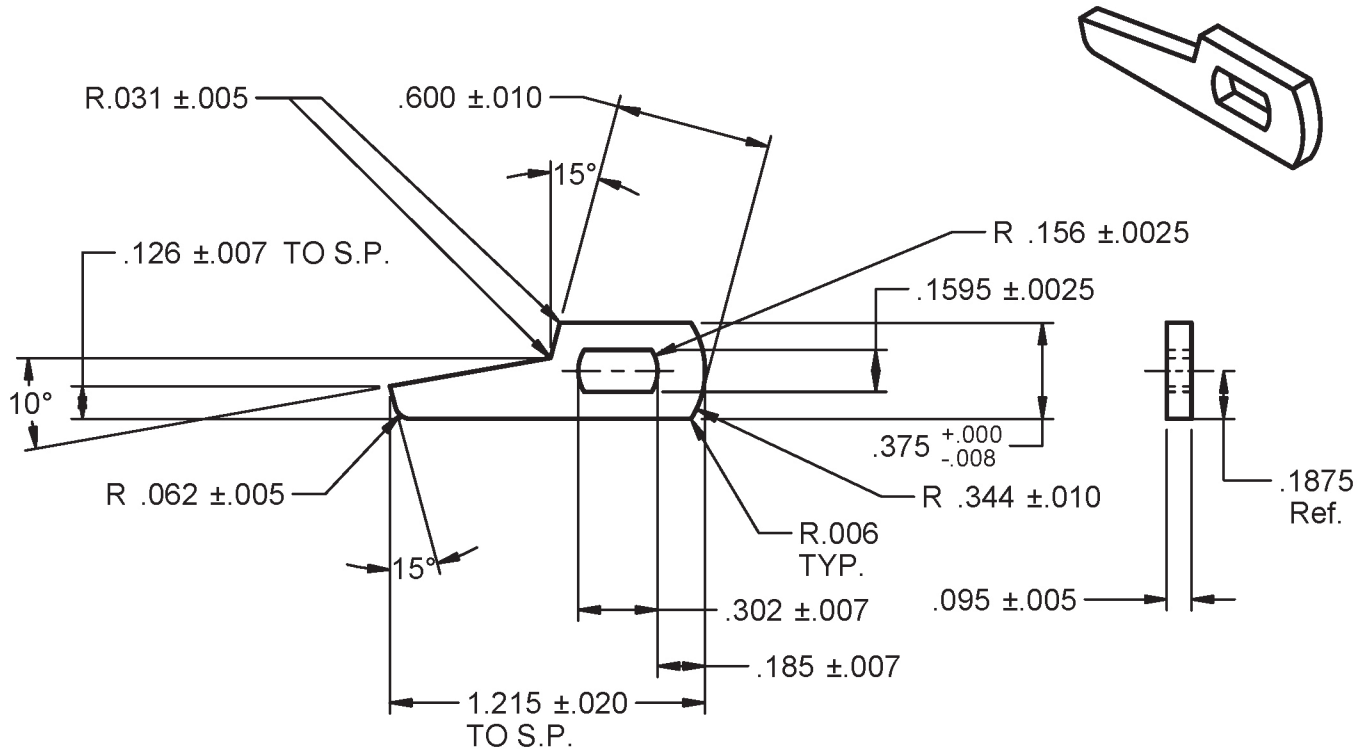
T-16241-B-1



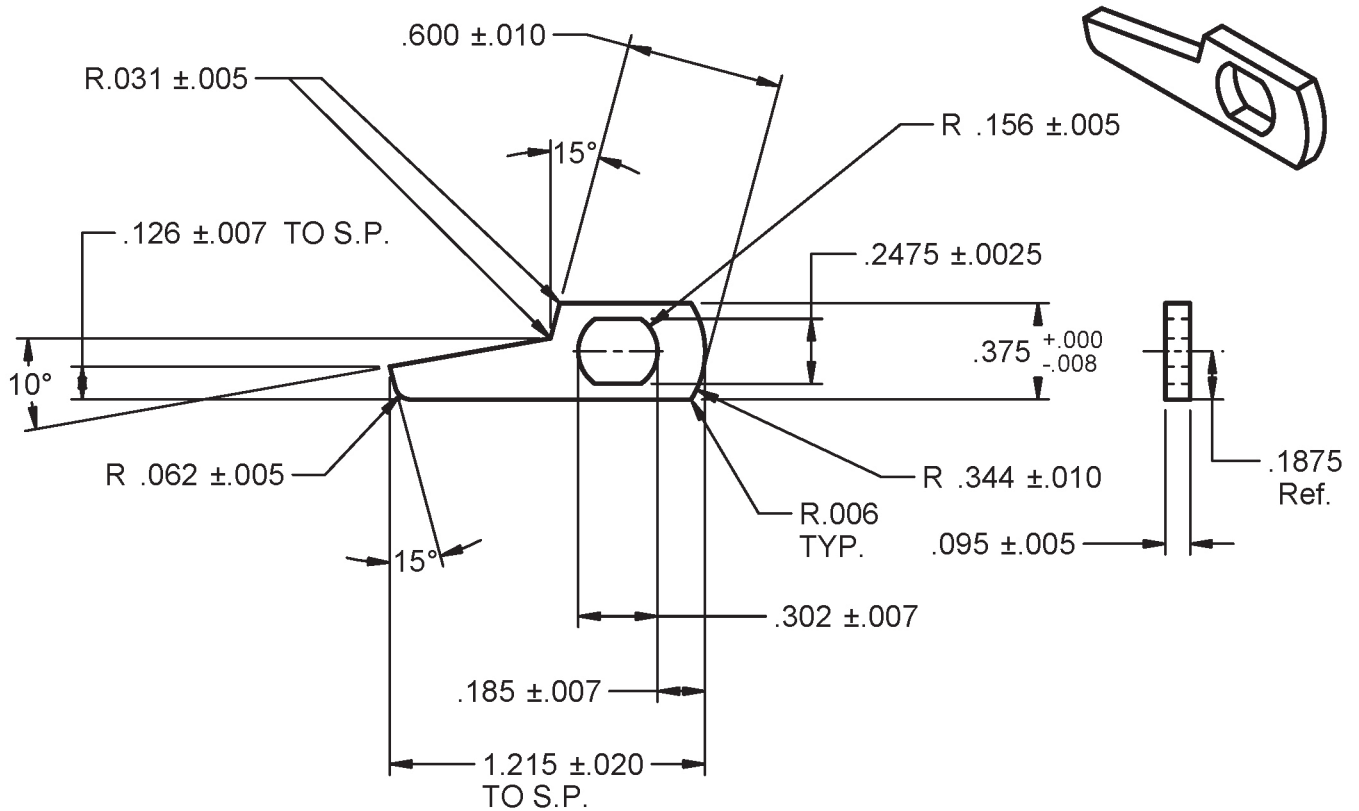
LX-0393-5 (MA-63383)



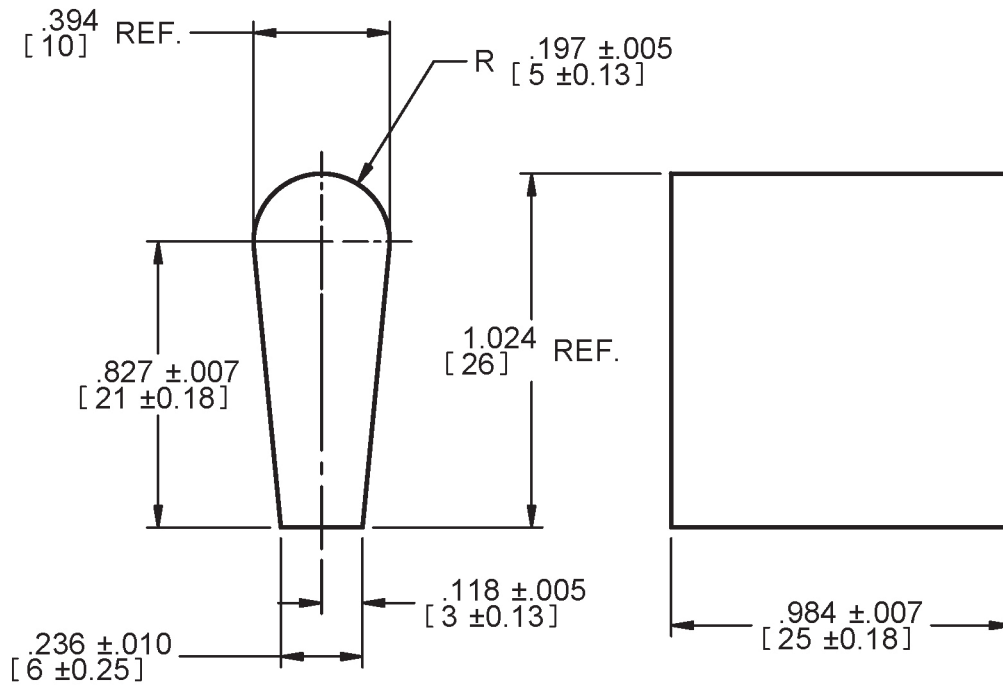
A-2283-B-1 (SHEAR BLADE)



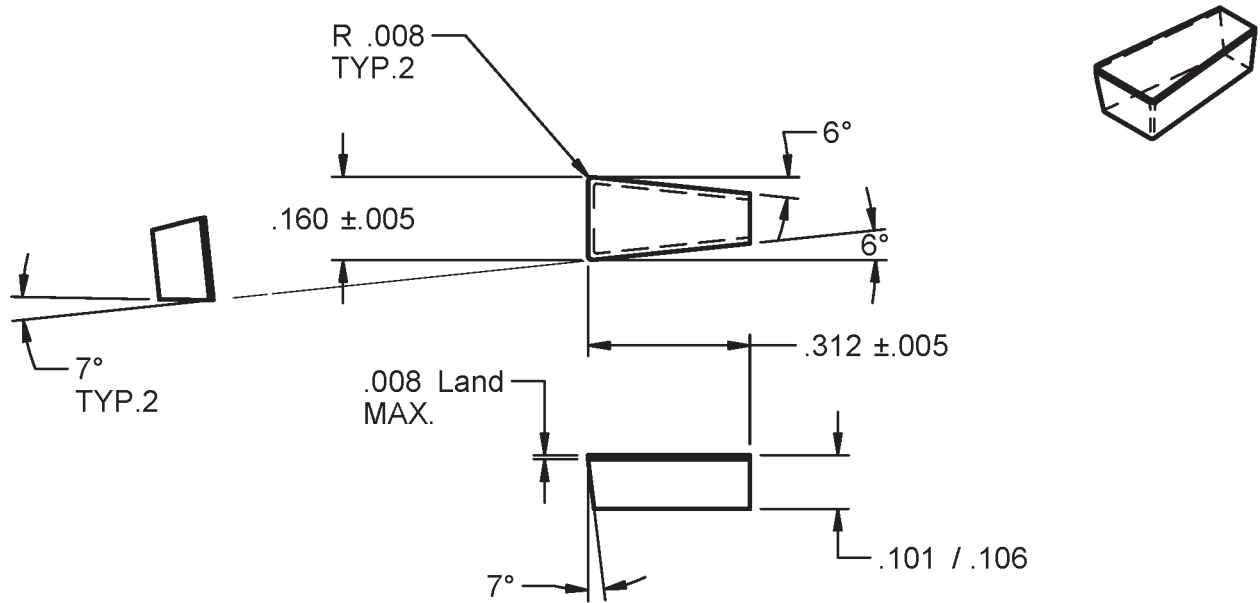
A-2283-B-2 (SHEAR BLADE)



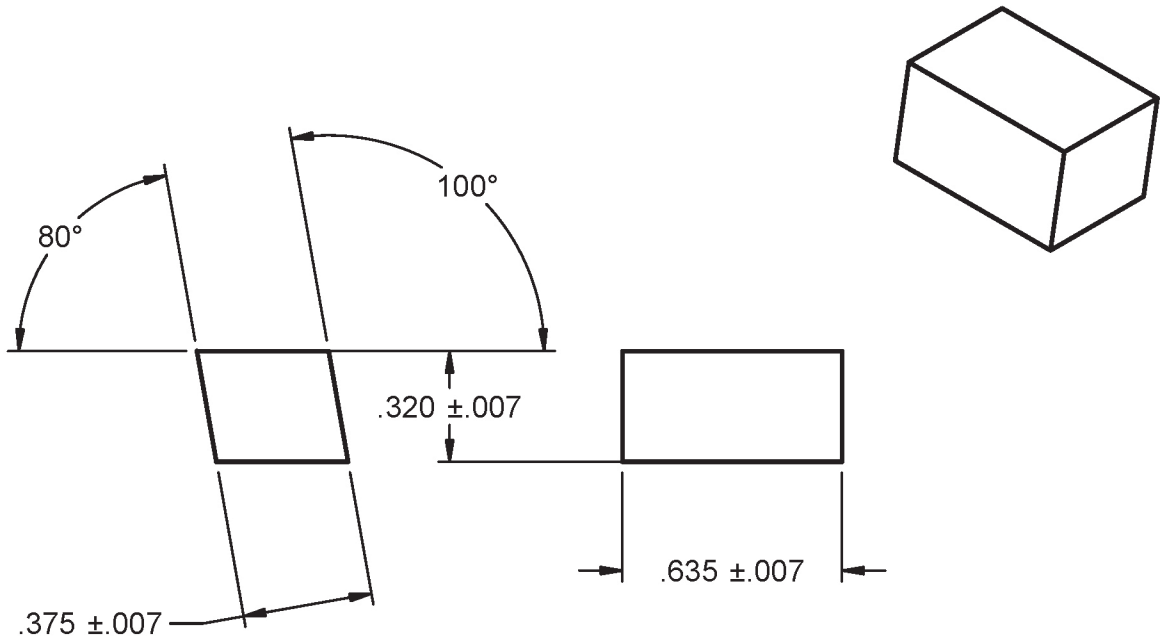
LX-0909-1 (D-19759-P1 G107)



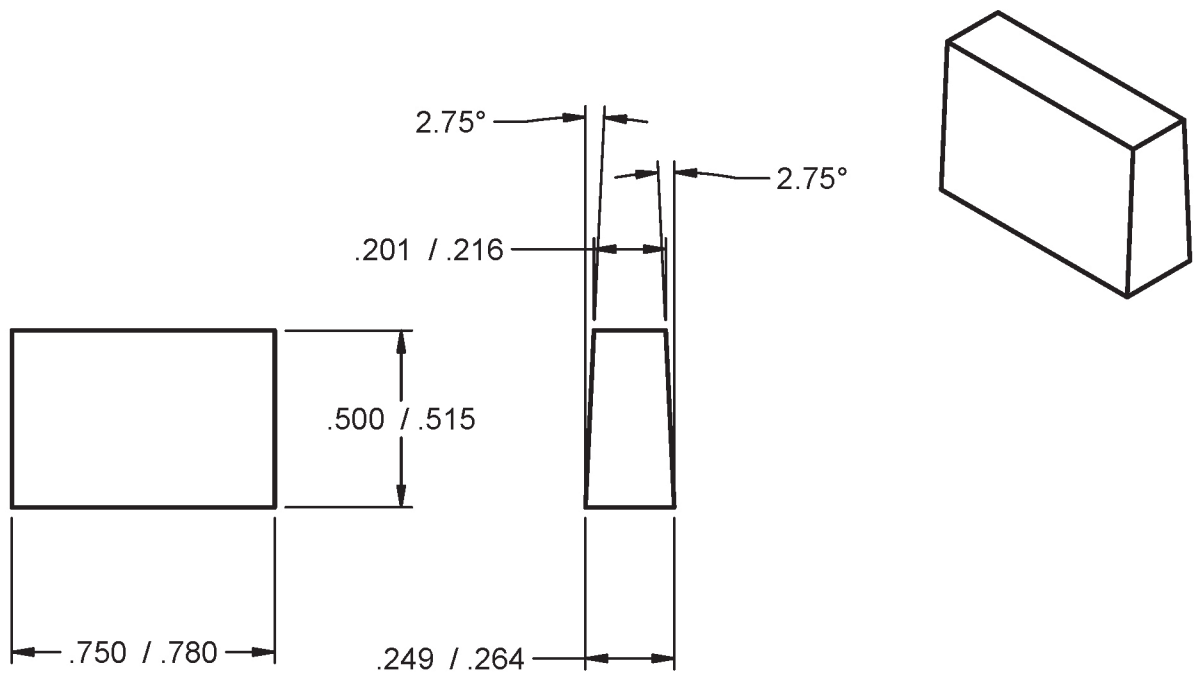
A-2180-A



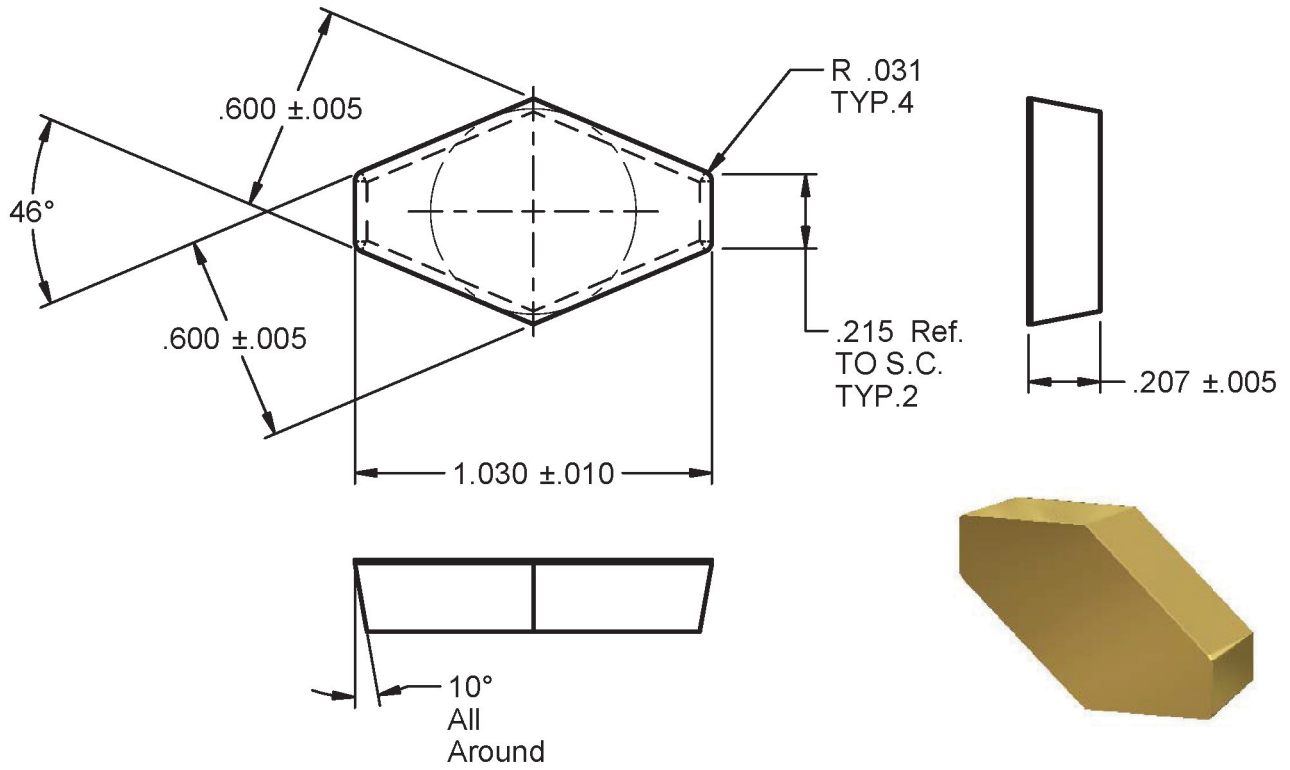
LX-0702-1



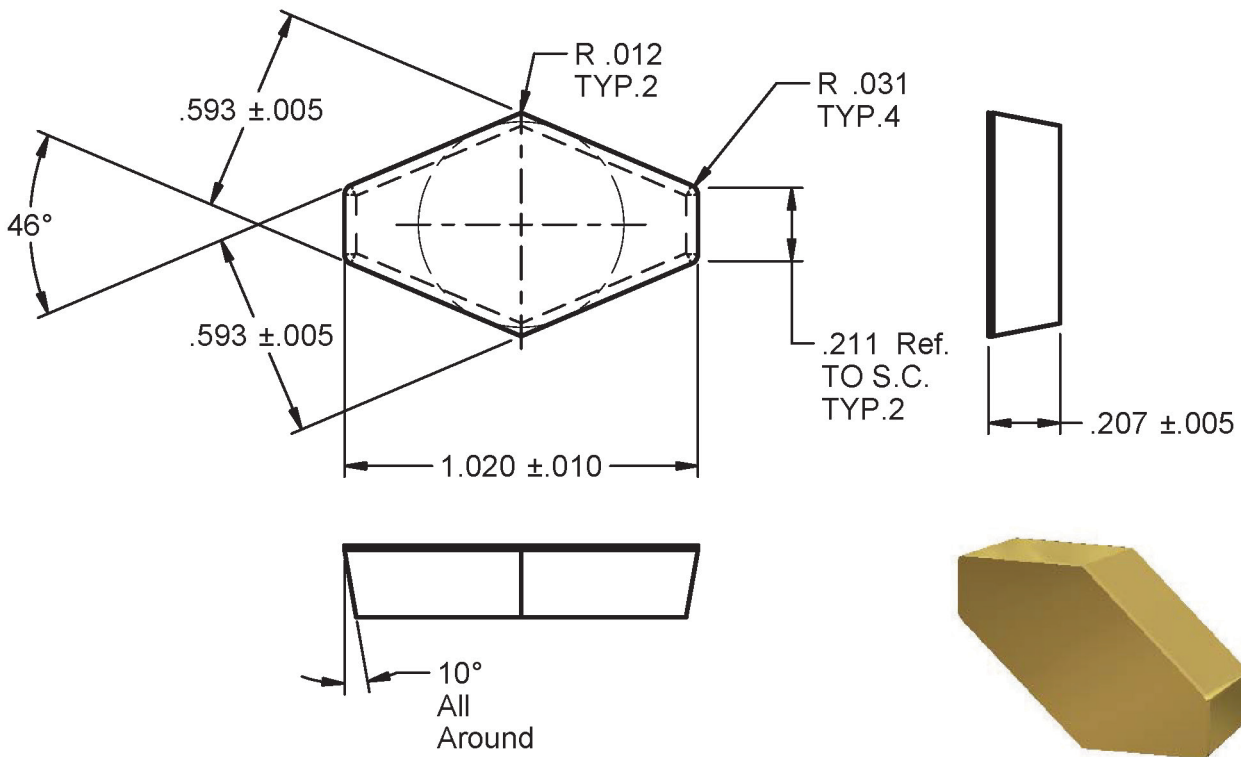
A-2839-B



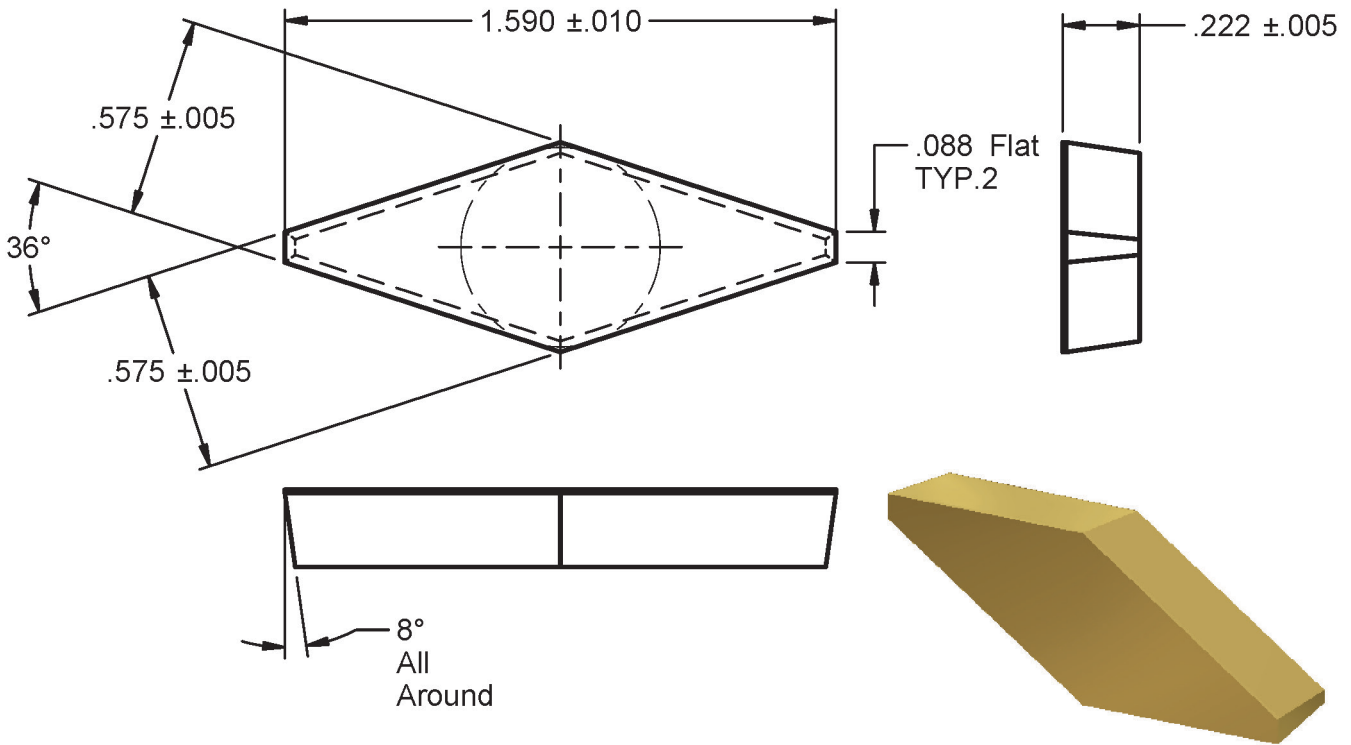
T-17824-2



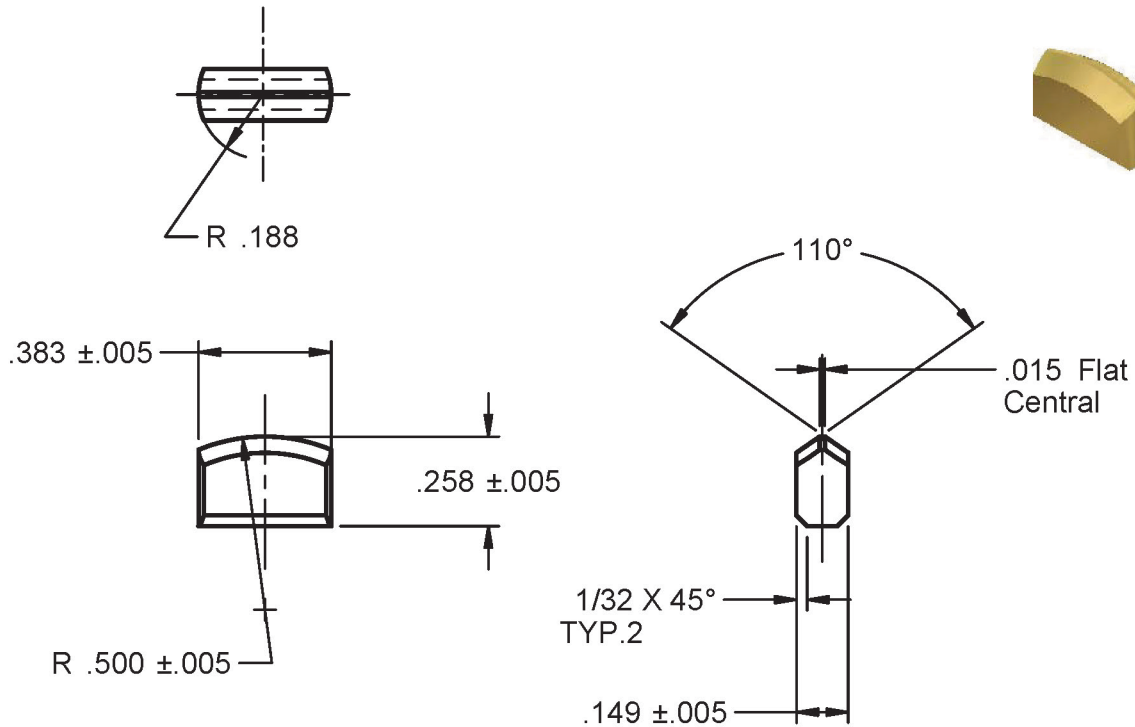
T-17824-3



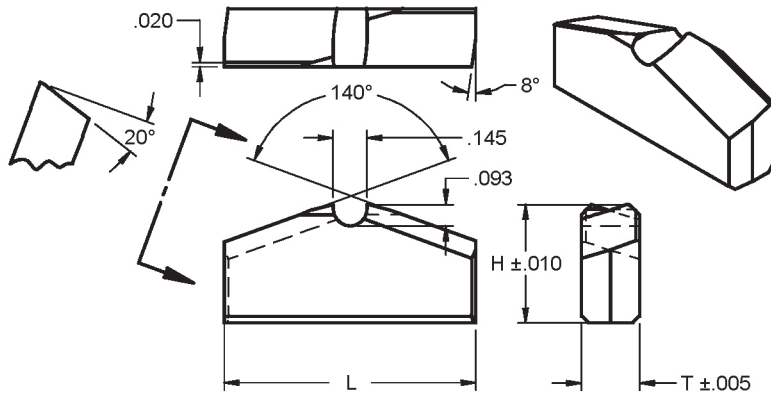
TOOL#54520 (D-115-D, N30)



A-1534-A

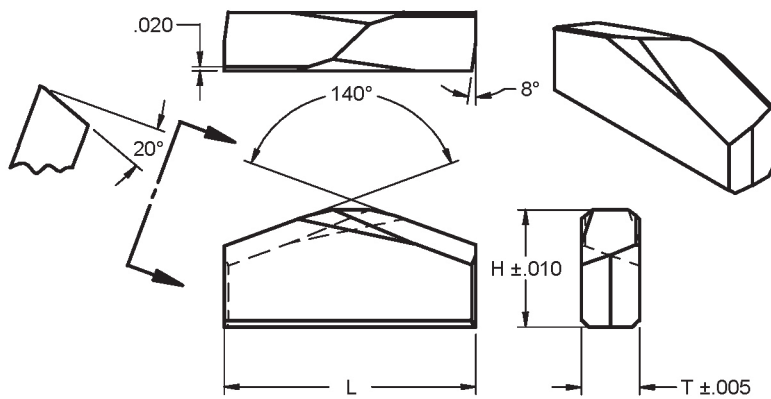


RD-SAN



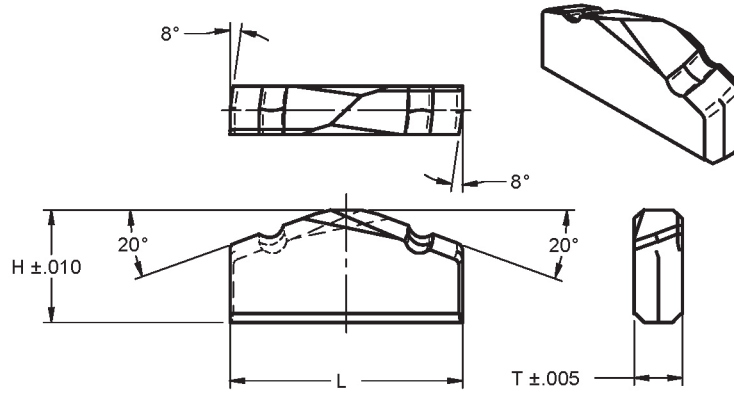
Insert	L	H	T
RD1-.400H.250THK	1.018-1.030	.400	.250
RD1-1/32.400H.250THK	1.042/1.062	.400	.250

RD-MOD



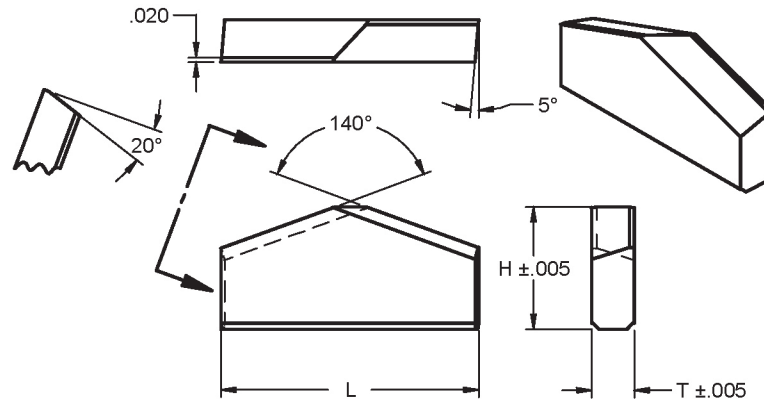
Insert	L	H	T
RD1-.400H.250THK	1.018-1.030	.400	.250
RD1-1/32.400H.250THK	1.042/1.062	.400	.250

RD1-.250THK-BH



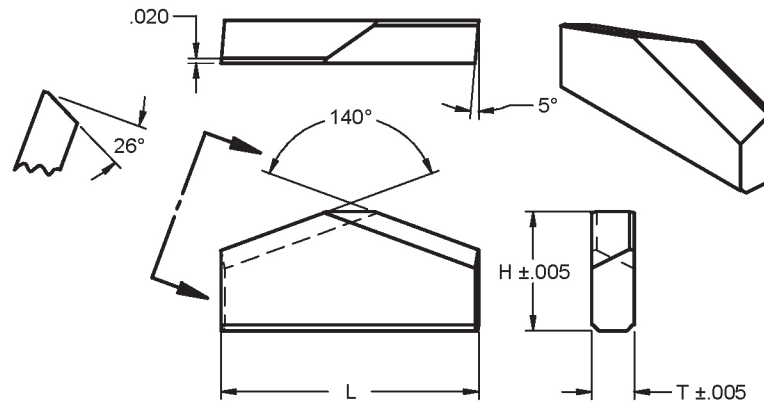
Insert	L	H	T
RD1-.400H.250THK-BH	1.015/1.030	.400	.250

RD1-20°



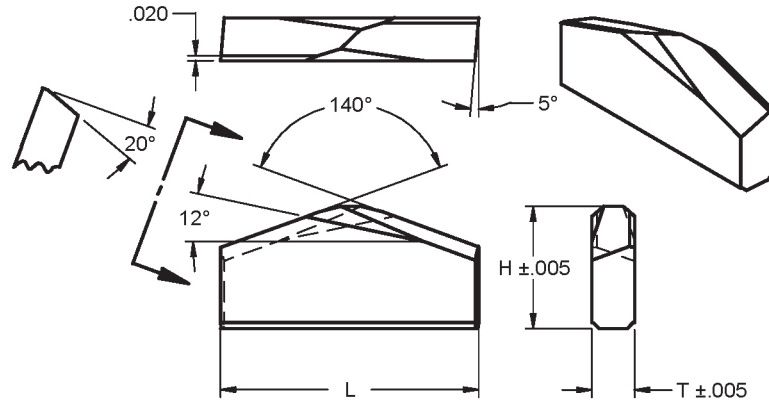
Insert	L	H	T
RD1-.400H	1.018-1.030	.400	.180
RD1-.425H	1.018-1.030	.425	.180
RD1-.450H	1.018-1.030	.450	.180
RD1-.475H	1.018-1.030	.475	.180
RD1-.500H	1.018-1.030	.500	.180

RD1-26°



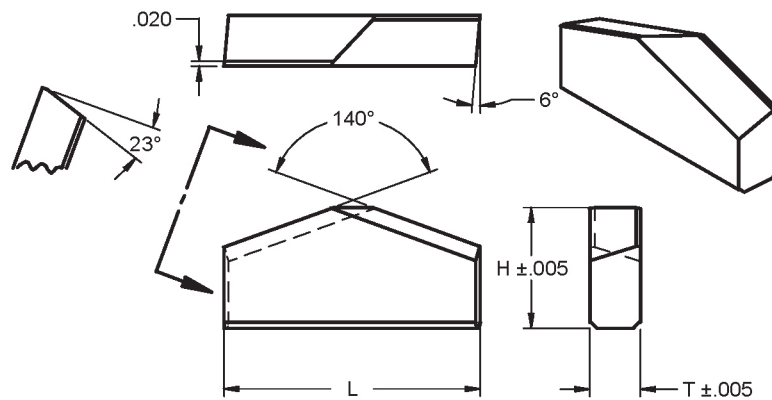
Insert	L	H	T
RD1-.425H-26°	1.018-1.030	.425	.180
RD1-.465H-26°	1.018-1.030	.465	.180
RD1-.510H-26°	1.018-1.030	.510	.180

RD1-ND15



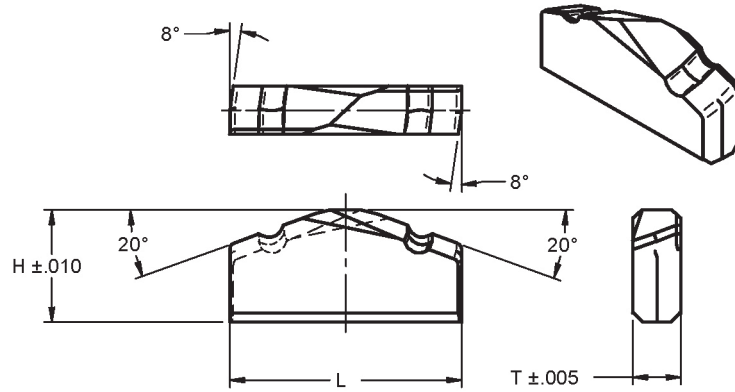
Insert	L	H	T
RD1-.425H-ND15	1.018-1.030	.425	.180
RD1-.450H-ND15	1.018-1.030	.450	.180
RD1-.485H-ND15	1.018-1.030	.485	.180

RD1-210THK



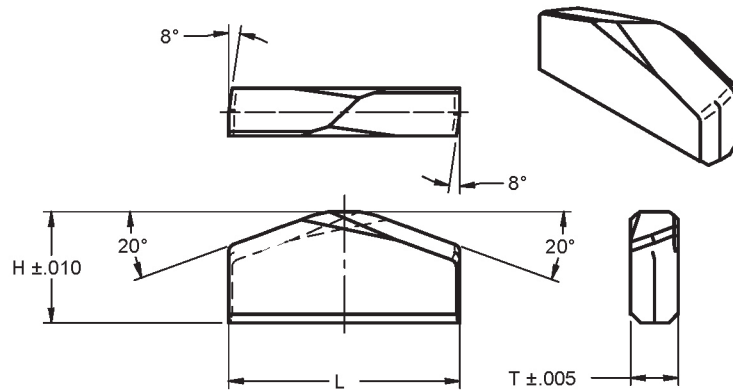
Insert	L	H	T
RD1-.425H.210THK	1.018-1.030	.425	.210
RD1-.450H.210THK	1.018-1.030	.450	.210
RD1-.475H.210THK	1.018-1.030	.475	.210
RD1-.500H.210THK	1.018-1.030	.500	.210

RD1-210THK-BH



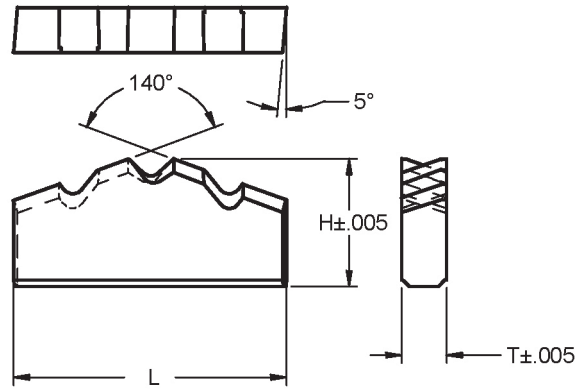
Insert	L	H	T
RD1.400H.210THK-BH	1.010/1.030	.400	.210
RD1.425H.210THK-BH	1.010/1.030	.425	.210
RD1.450H.210THK-BH	1.010/1.030	.450	.210
RD1.485H.210THK-BH	1.010/1.030	.485	.210
RD1.500H.210THK-BH	1.010/1.030	.500	.210

RD1-210THK-CT



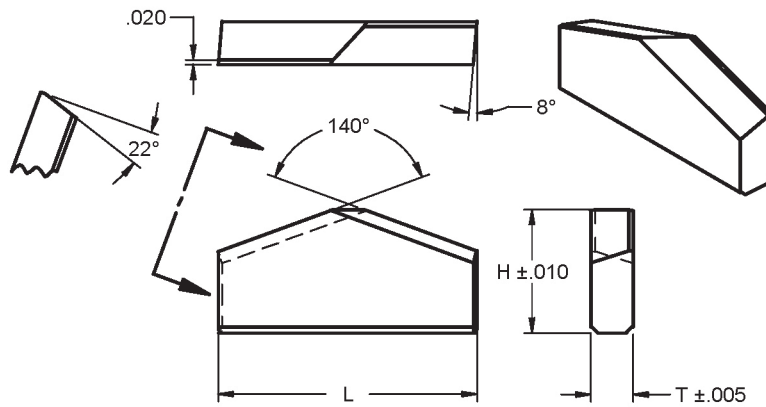
Insert	L	H	T
RD1.400H.210THK-CT	1.010/1.030	.400	.210
RD1.425H.210THK-CT	1.010/1.030	.425	.210
RD1.450H.210THK-CT	1.010/1.030	.450	.210
RD1.485H.210THK-CT	1.010/1.030	.485	.210
RD1.500H.210THK-CT	1.010/1.030	.500	.210

RD1-BH



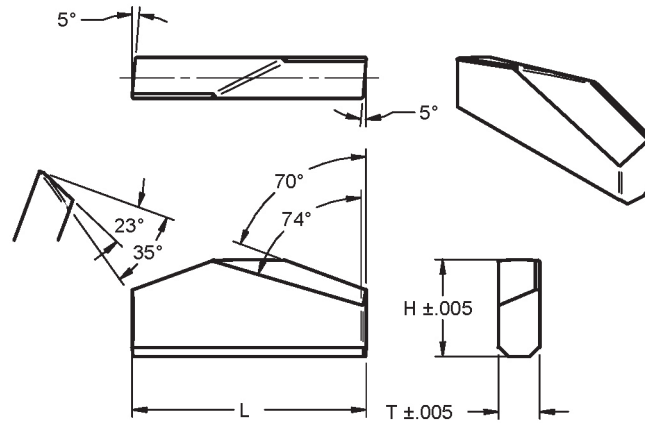
Insert	L	H	T
RD1.400H-BH	1.018/1.030	.400	.180
RD1.425H-BH	1.018/1.030	.425	.180
RD1.450H-BH	1.018/1.030	.450	.180
RD1.475H-BH	1.018/1.030	.475	.180
RD1.500H-BH	1.018/1.030	.500	.180

RD1-1/32



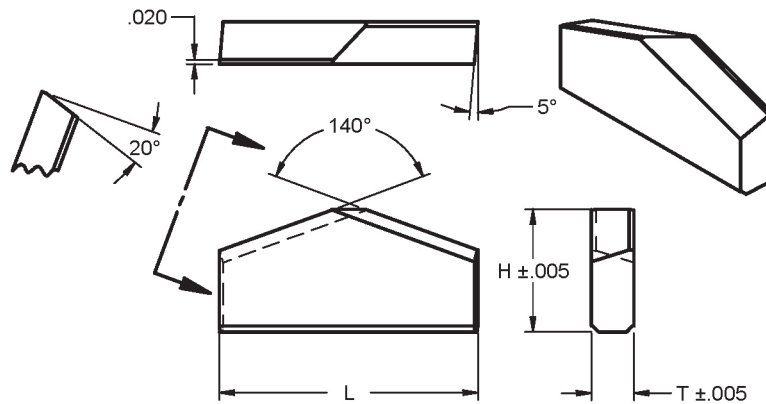
Insert	L	H	T
RD1-1/32.425H	1.042/1.062	.425	.180
RD1-1/32.450H	1.042/1.062	.450	.180
RD1-1/32.475H	1.042/1.062	.475	.180
RD1-1/32.500H	1.042/1.062	.500	.180

RD1-ME



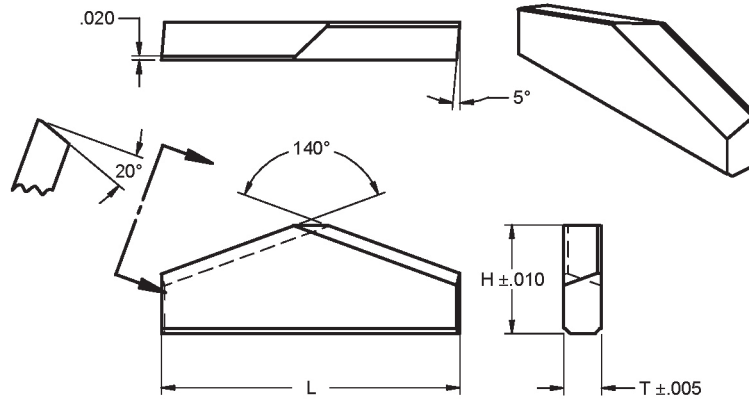
Insert	L	H	T
RD1.425H-ME	1.010/1.030	.425	.180
RD1.450H-ME	1.010/1.030	.450	.180
RD1.500H-ME	1.010/1.030	.500	.180

RD1-1/8



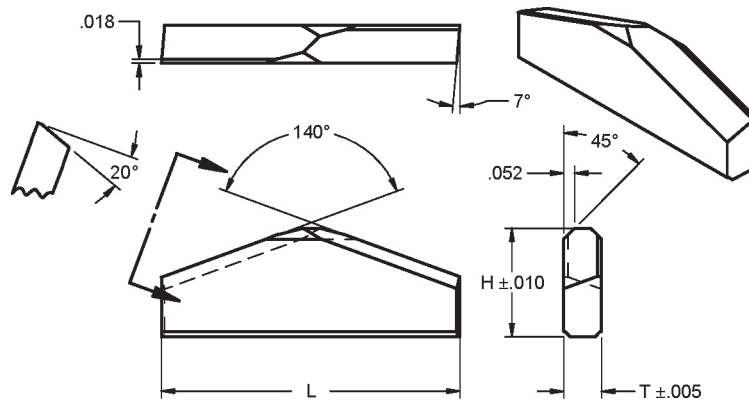
Insert	L	H	T
RD1-1/8.450H	1.100/1.120	.450	.180
RD1-1/8.485H	1.100/1.120	.485	.180
RD1-1/8.500H	1.100/1.120	.500	.180

RD1-3/8



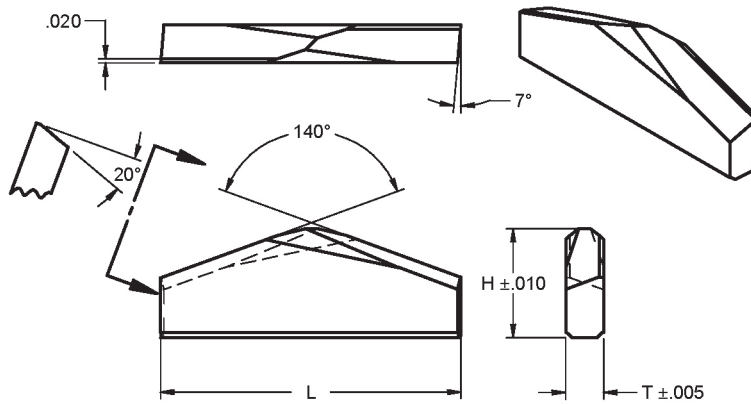
Insert	L	H	T
RD1-3/8.600H	1.385/1.405	.600	.180
RD1-3/8.650H	1.385/1.405	.650	.180
RD1-3/8.700H	1.385/1.405	.700	.180
RD1-3/8.725H	1.385/1.405	.725	.180
RD1-3/8.750H	1.385/1.405	.725	.180

RD1-3/8-BP



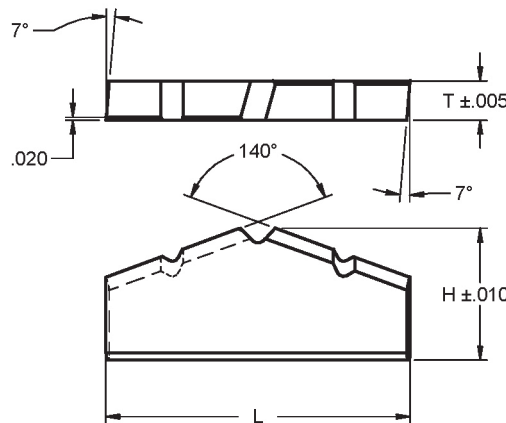
Insert	L	H	T
RD1-3/8.600H	1.385/1.405	.600	.180
RD1-3/8.650H	1.385/1.405	.650	.180
RD1-3/8.700H	1.385/1.405	.700	.180
RD1-3/8.725H	1.385/1.405	.725	.180

RD1-3/8-ND85



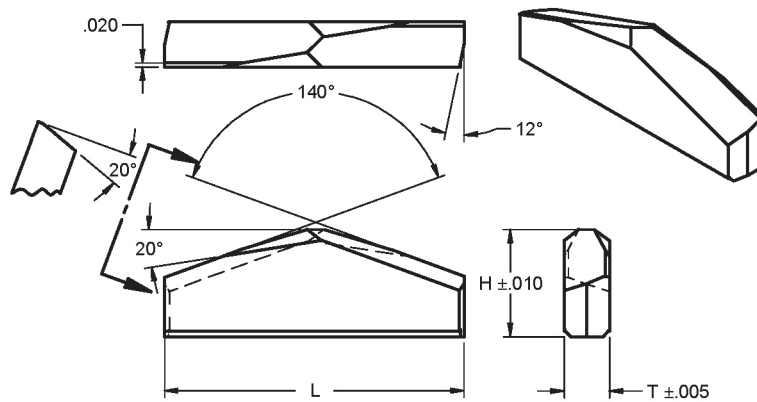
Insert	L	H	T
RD1-3/8.600H-ND85	1.385/1.405	.600	.180
RD1-3/8.650H-ND85	1.385/1.405	.650	.180
RD1-3/8.700H-ND85	1.385/1.405	.700	.180
RD1-3/8.725H-ND85	1.385/1.405	.725	.180
RD1-3/8.750H-ND85	1.385/1.405	.750	.180

RD1-3/8-BH



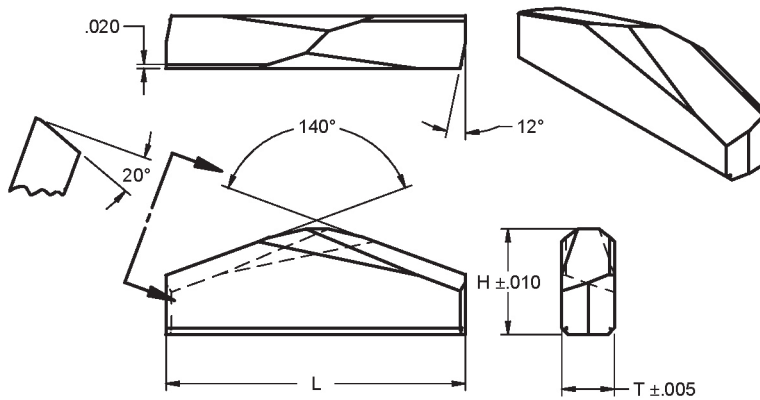
Insert	L	H	T
RD1-3/8.600H-BH	1.385/1.405	.600	.180
RD1-3/8.650H-BH	1.385/1.405	.650	.180
RD1-3/8.700H-BH	1.385/1.405	.700	.180
RD1-3/8.725H-BH	1.385/1.405	.725	.180

RD1-3/8.215-THK



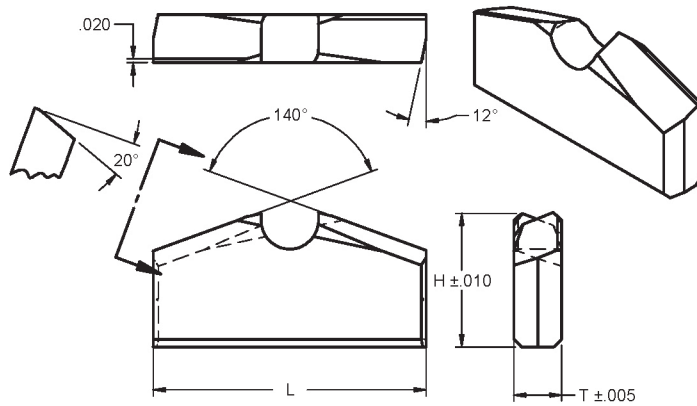
Insert	L	H	T
RD1-3/8.600H.215THK	1.385/1.405	.600	.215
RD1-3/8.650H.215THK	1.385/1.405	.650	.515
RD1-3/8.685H.215THK	1.385/1.405	.685	.215

RD1-3/8.250-THK



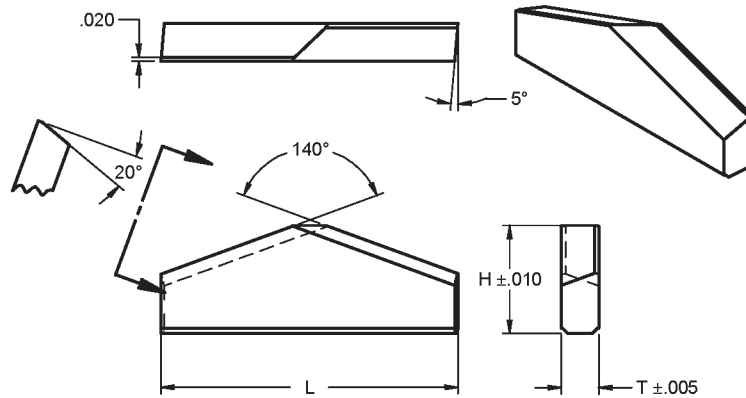
Insert	L	H	T
RD1-3/8.600H.250THK	1.385/1.405	.600	.250
RD1-3/8.650H.250THK	1.385/1.405	.650	.250
RD1-3/8.685H.250THK	1.385/1.405	.685	.250

RD1-3/8.250-PW



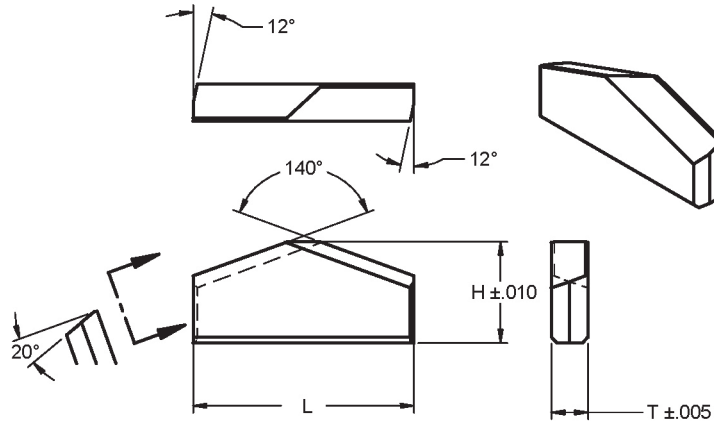
Insert	L	H	T
RD1-3/8.600H.250THK-PW	1.385/1.405	.600	.250
RD1-3/8.650H.250THK-PW	1.385/1.405	.650	.250
RD1-3/8.685H.250THK-PW	1.385/1.405	.685	.250

RD1-1/2



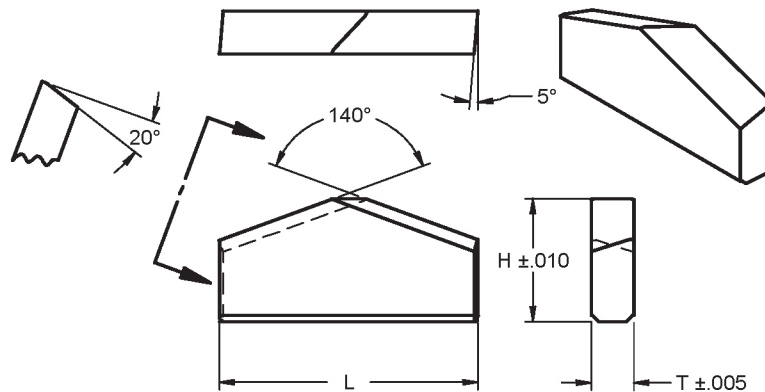
Insert	L	H	T
RD1-1/2.600H	1.500/1.540	.600	.180
RD1-1/2.650H	1.500/1.540	.650	.180
RD1-1/2.700H	1.500/1.540	.700	.180
RD1-1/2.725H	1.500/1.540	.725	.180
RD1-1/2.750H	1.500/1.540	.750	.180

RD1- 1/2.250THK



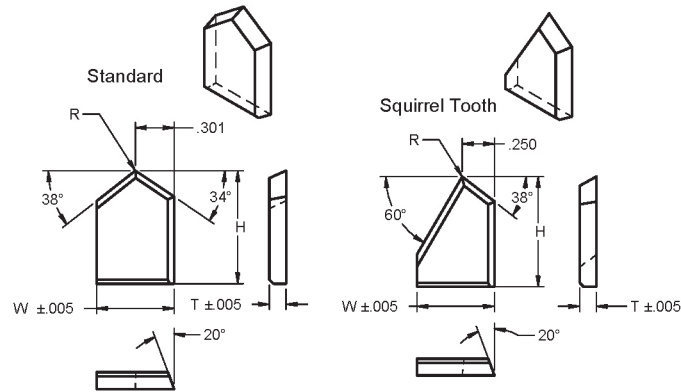
Insert	L	H	T
RD1-1/2.600H.250THK	1.500-1.540	.600	.250
RD1-1/2.650H.250THK	1.500-1.540	.650	.250
RD1-1/2.685H.250THK	1.500-1.540	.685	.250

RD1-5/8



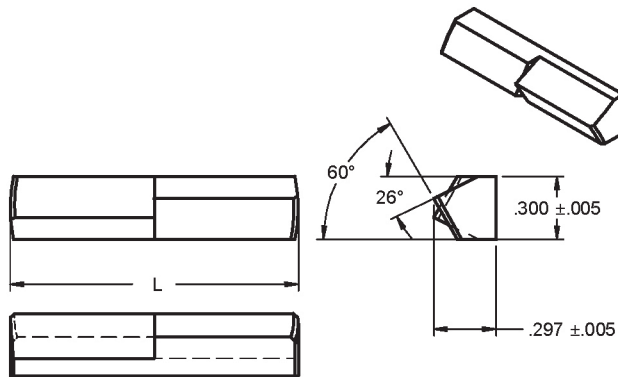
Insert	L	H	T
RD1-5/8.650H	1.625-1.640	.650	.180
RD1-5/8.700H	1.625-1.640	.700	.180
RD1-5/8.725H	1.625-1.640	.725	.180
RD1-5/8.750H	1.625-1.640	.750	.180

COAL DRILL



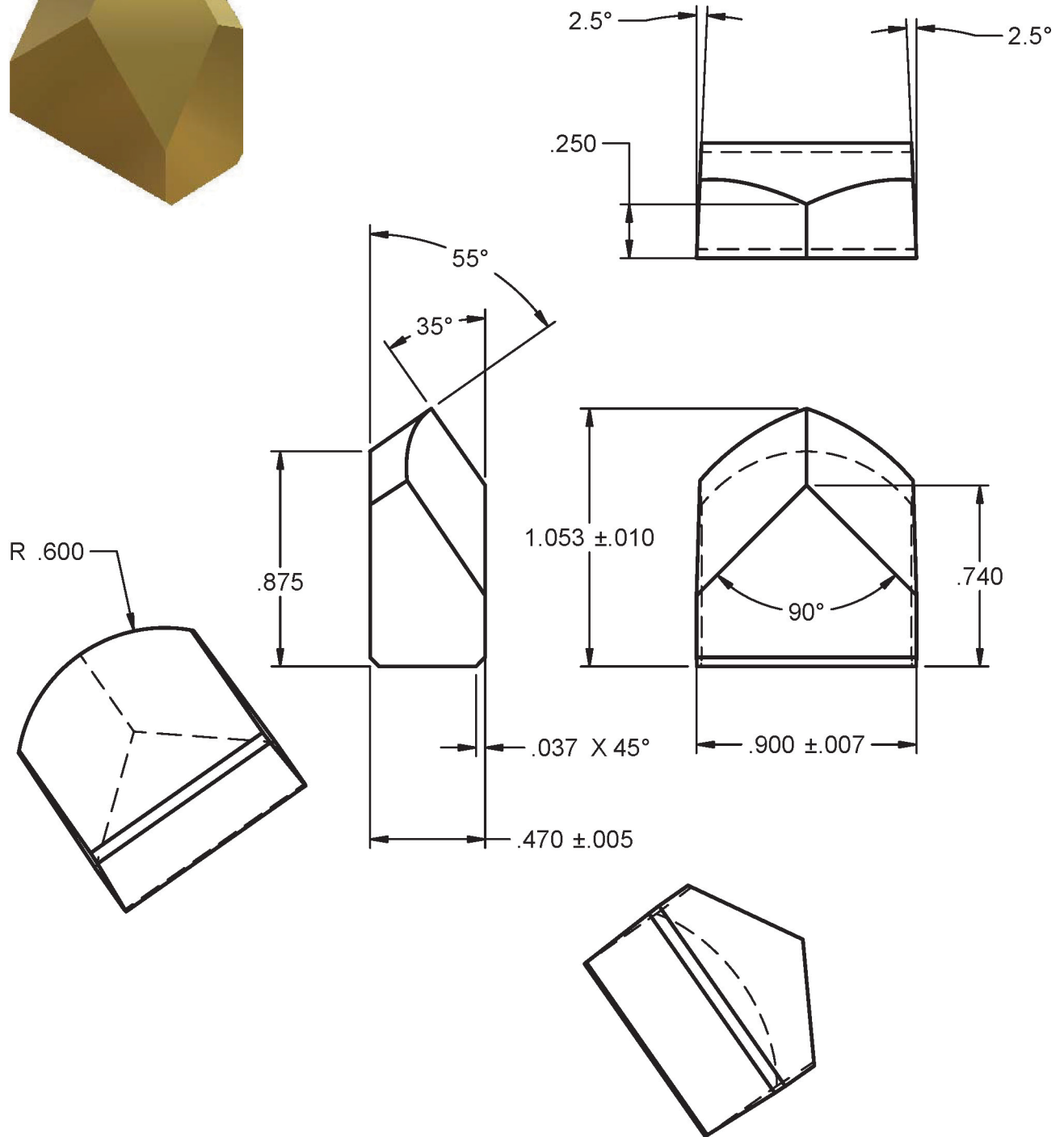
Insert	H	W	T	R
Standard	.883 ± .012	.603	.130	1/64
Squirrel Tooth	.861 ± .012	.603	.130	1/64

1-3/8 AM ROCK

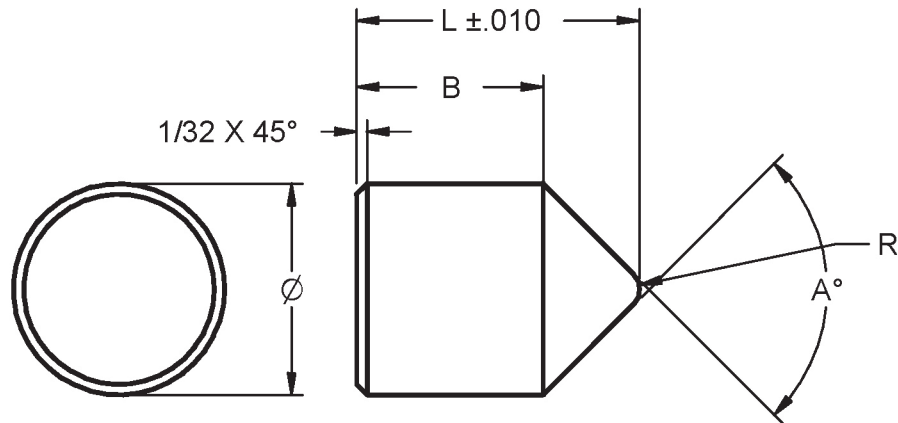


Insert	L	H	T
RD1-3/8 TamRock	1.385/1.405	.297	.300

FECON BIT

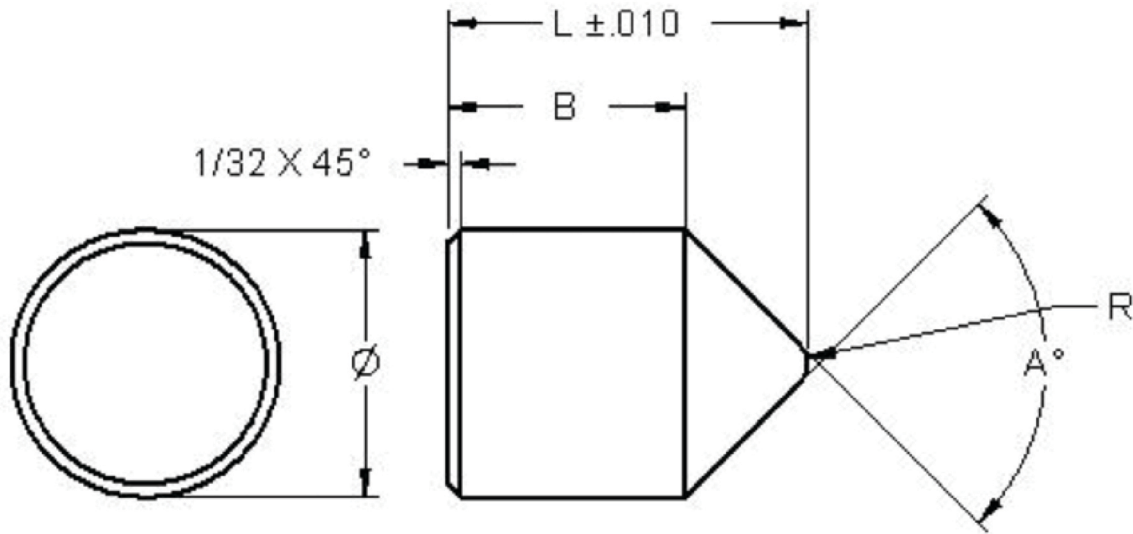


CONE POINT



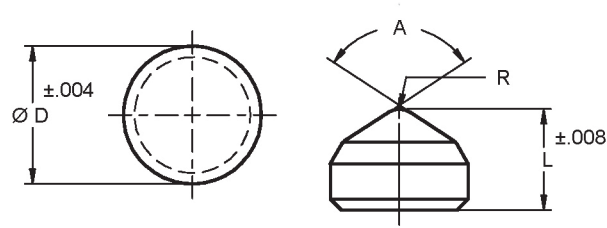
Insert	\varnothing	A°	LG	B	R	VR No
CP156-100-315LG	.153/.159	100°	.315	.254	1/64	-
CP255-60-680LG	.255/.262	60°	.680	.498	1/32	R6E
CP255-75-701LG	.255/.262	75°	.701	.562	1/32	R7E
CP270-50-774LG	.268/.275	50°	.774	.536	3/32	-
CP300-60-680LG	.300/.307	60°	.680	.455	1/32	R6S
CP300-75-691LG	.300/.307	75°	.691	.517	1/32	R7S
CP300-90-670LG	.300/.307	90°	.670	.527	1/64	R9S
CP315-60-735LG	.315/.322	60°	.735	.490	1/32	R6B
CP315-75-690LG	.315/.322	75°	.690	.511	1/32	R7B
CP315-90-647LG	.315/.322	90°	.647	.495	1/64	R9B
CP328-60-720LG	.328/.335	60°	.720	.472	1/32	R6A
CP328-67-697LG	.328/.335	67.5°	.697	.473	.022	R67A
CP349-60-734LG	.349/.356	60°	.734	.464	1/32	R6G
CP349-67-702LG	.349/.356	67.5°	.702	.464	1/32	R67G
CP349-75-672LG	.349/.356	75°	.672	.464	1/32	R7G
CP349-90-632LG	.349/.356	90°	.632	.465	1/64	R9G
CP362-60-750LG	.362/.369	60°	.750	.471	1/32	R6
CP362-67-716LG	.362/.369	67.5°	.716	.472	1/32	R67
CP362-75-688LG	.362/.369	75°	.688	.472	1/32	R7
CP362-90-688LG	.362/.369	90°	.641	.470	1/64	R9
CP408-75-720LG	.408/.415	75°	.720	.480	1/32	R7J
CP438-75-860LG	.438/.445	75°	.860	.593	1/32	R73
CP476-80-760LG	.472/.480	80°	.760	.520	.070	-
CP485-75-950LG	.458/.492	75°	.950	.653	1/32	R74
CP490-80-825LG	.485/.495	80°	.825	.580	.070	-

CONE POINT



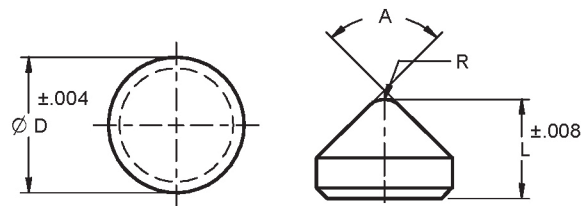
Insert	\varnothing	A°	LG	B	R	VR No
CP485-90-725LG	.458/.492	90°	.725	.491	1/64	R94B
CP602-90-907LG	.598/.606	90°	.907	.636	1/16	-
CP644-75-1000LG	.644/.651	75°	1.000	.610	1/32	R75
CP644-80-885LG	.644/.651	80°	.885	.562	.080	R85
CP703-75-1020LG	.703/.710	75°	1.020	.590	1/32	R77
CP703-80-870LG	.703/.710	80°	.870	.505	1/16	R87
CP747-80-1145LG	.747/.754	80°	1.145	.697	.090	R89
CP747-75-1250LG	.747/.754	75°	1.250	.783	1/32	R76
CP1000-90-1.325LG	.995/1.005	90°	1.325	.842	1/32	-
CP1018-78-1.125LG	1.015/1.020	78°	1.125	.550	.075	-

CAP TIP - DOUBLE ANGLE



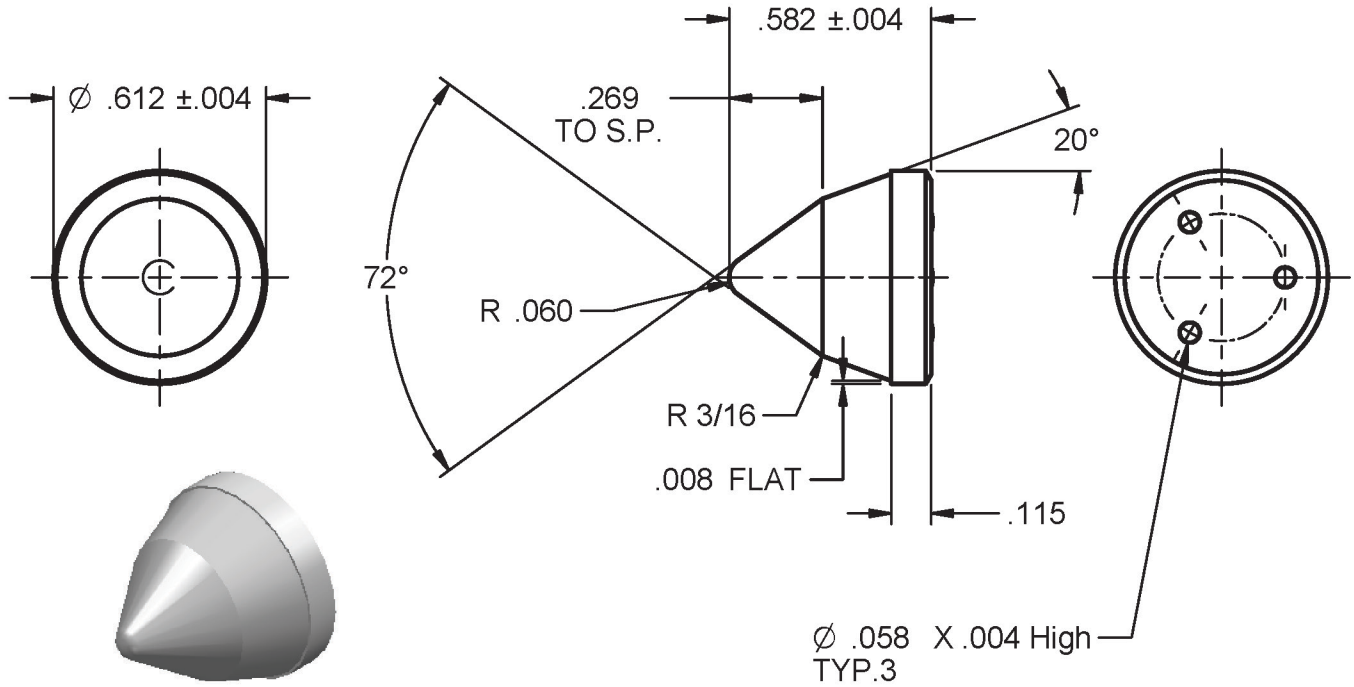
Insert	$\varnothing D$	L	A	R
R93DS	.442	.395	90°	.113
R9.77DM	.784	.575	.114°	.113
C87	.835	.745	75°	.073

CAP TIP

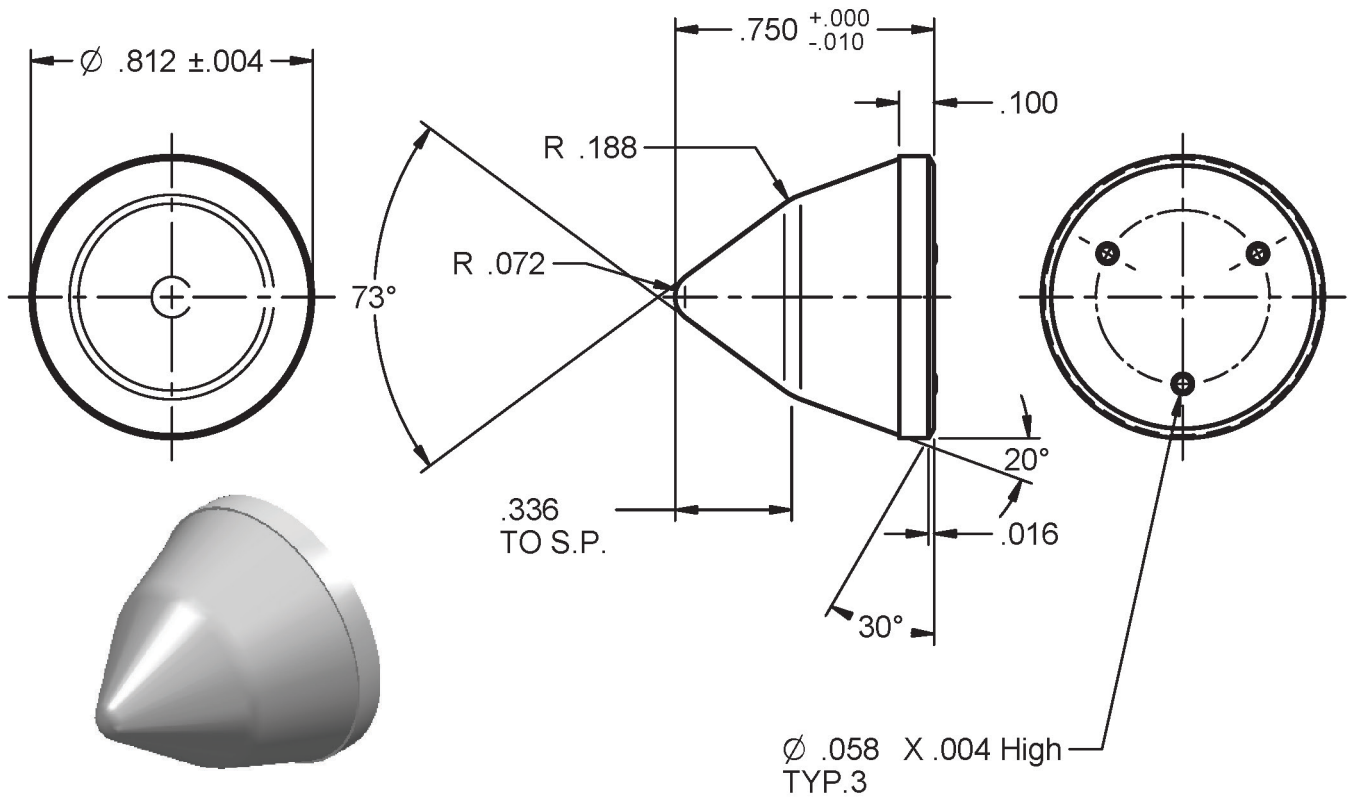


Insert	$\varnothing D$	L	A	R
R9.77S	.784	.572	90°	.125
R8P	.975	.900	46°	.250

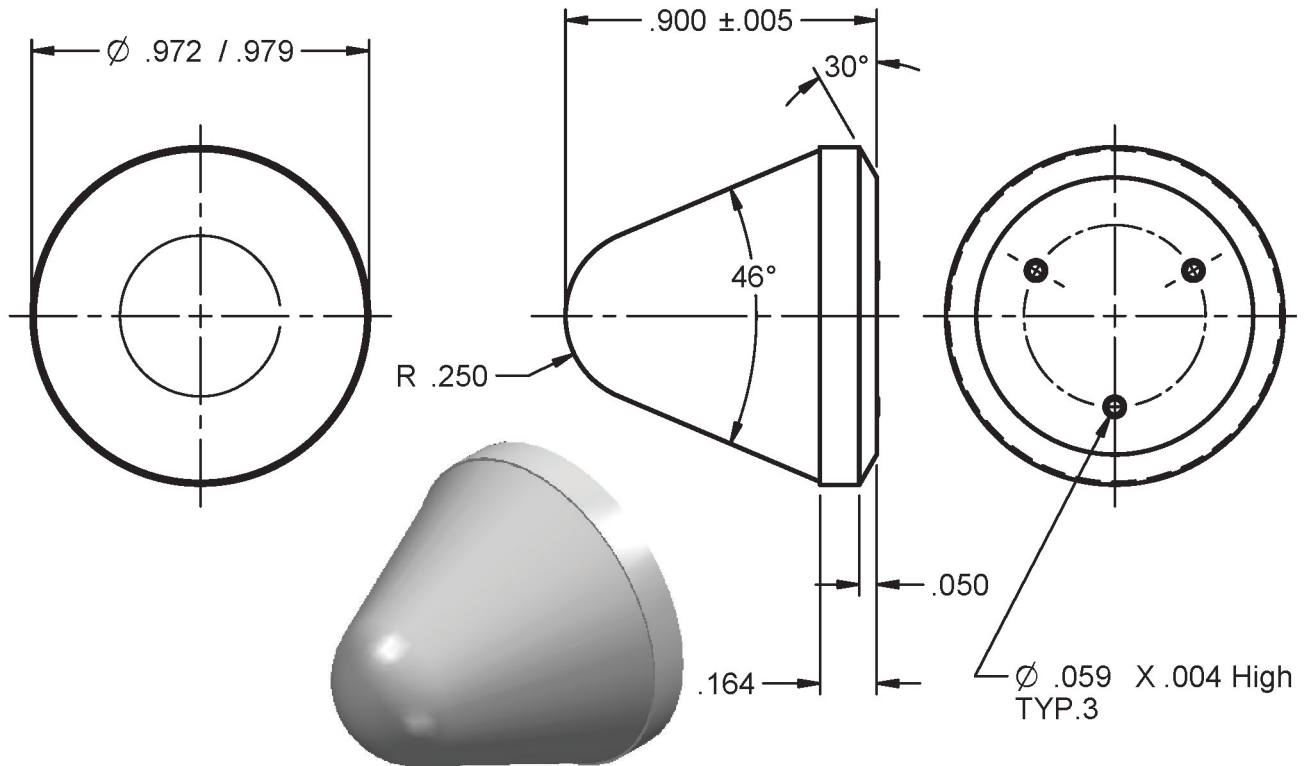
CT612-72-582LG (CAP TIP)



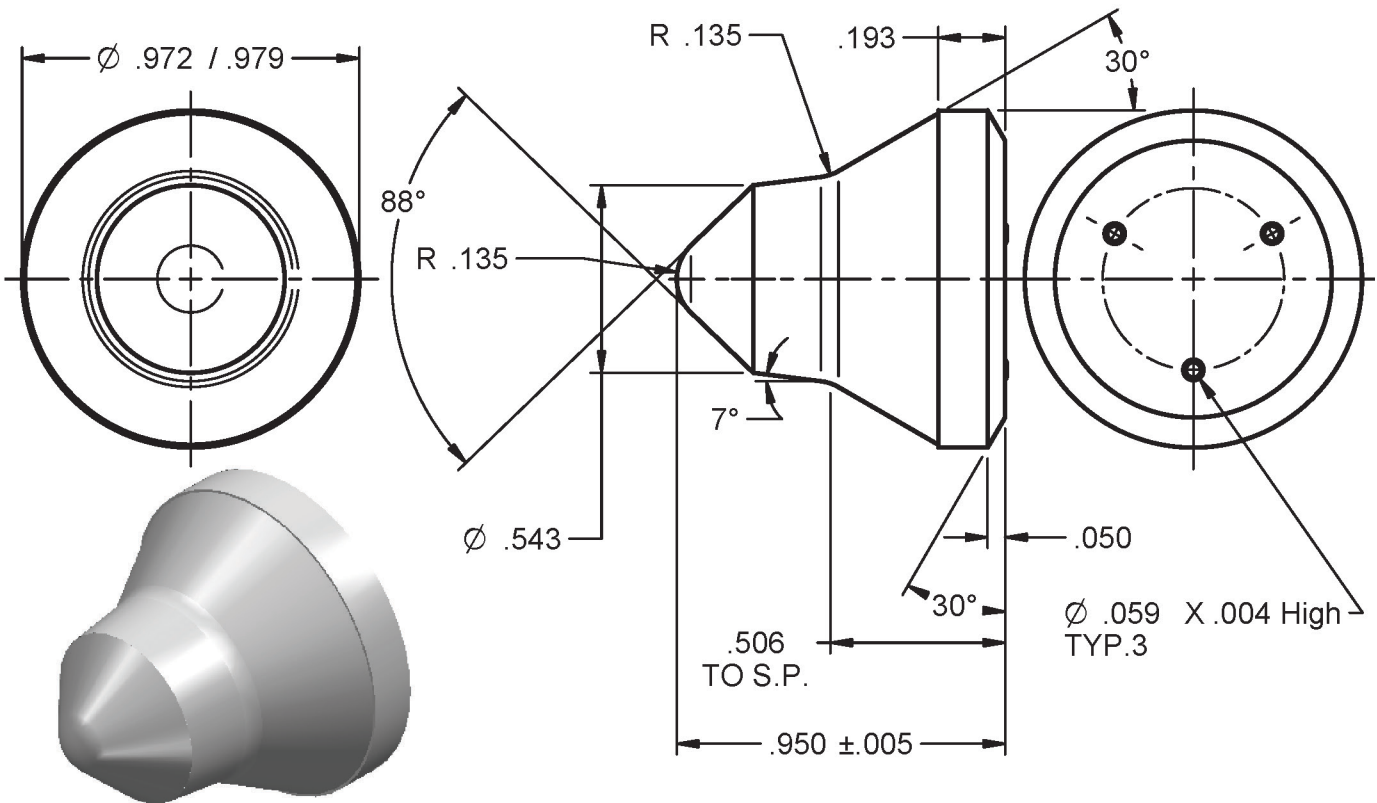
CT812-73-750LG (CAP TIP)



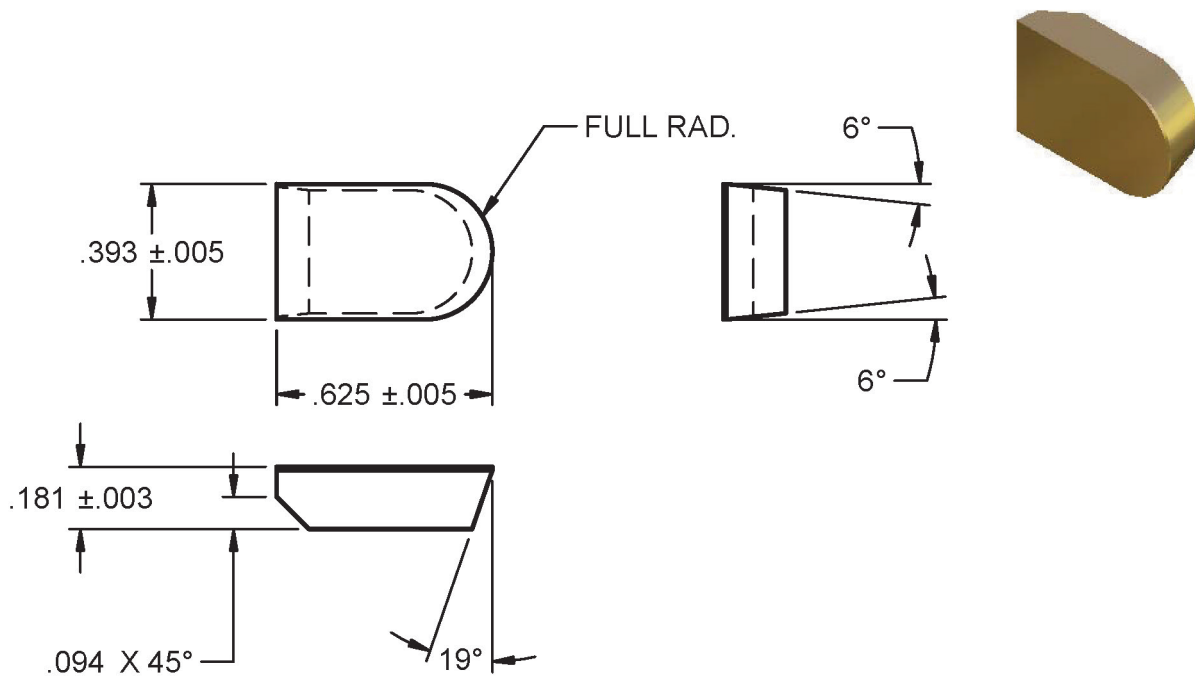
CT972-46-900LG (CAP TIP)



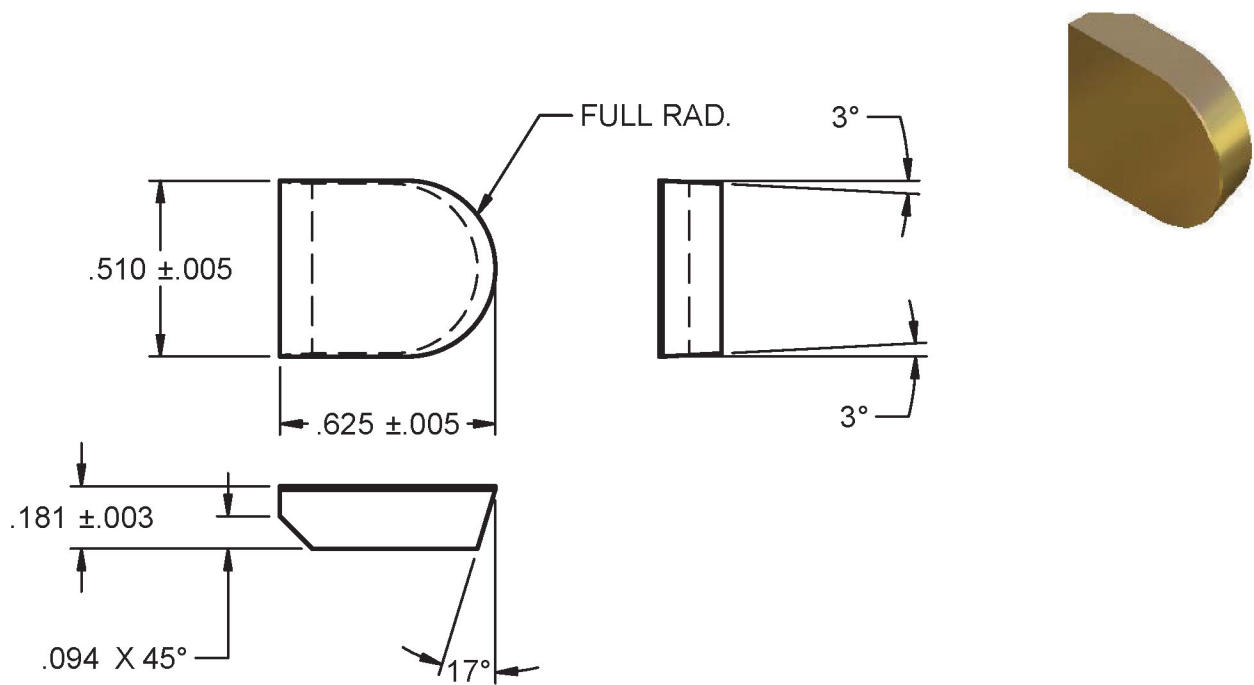
CT972-88-950LG (CAP TIP)



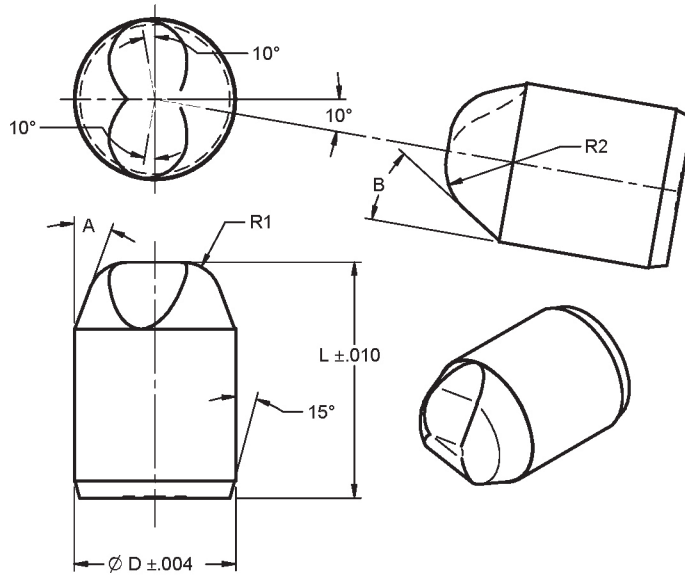
M-20 (CHAIN CUTTER BIT TIP)



M-30 (CHAIN CUTTER BIT TIP)

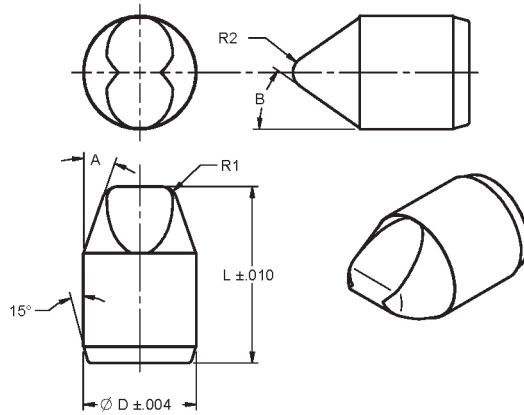


2-FLAT CHISEL POINT COMPACTS



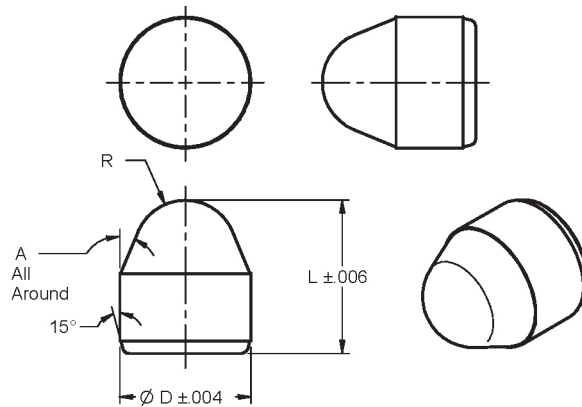
Insert	D	L	A	B	R1	R2
A-1400-B-1	.390	.469	20°	30°	.094	.156
A-1375-B-1	.513	.562	20°	32.5°	.125	.188
A-1376-B-1	.513	.625	20°	32.5°	.125	.188
A-1376-B-2	.513	.750	20°	32.5°	.125	.188
A-1515-A-1	.525	.562	20°	32.5°	.125	.188
A-1515-A-2	.525	.625	20°	32.5°	.125	.188
A-1397-B-1	.579	.719	25°	37.5°	.125	.188
A-1610-A-1	.579	.719	20°	32.5°	.125	.188
A-1395-B-1	.579	.750	20°	32.5°	.125	.188
A-1586-A-2	.589	.688	20°	37.5°	.125	.188
A-1397-B-2	.589	.719	25°	37.5°	.125	.188
A-1395-B-2	.589	.750	20°	32.5°	.125	.188
A-1396-C-1	.642	.875	20°	35°	.125	.188
A-1611-C-1	.642	.875	25°	35°	.125	.188
A-1396-C-2	.652	.875	20°	35°	.125	.188
A-1587-A	.767	1.062	20°	35°	.125	.188
A-1378-B-2	.777	1.000	25°	37.5°	.125	.188

2-FLAT CHISEL POINT COMPACTS



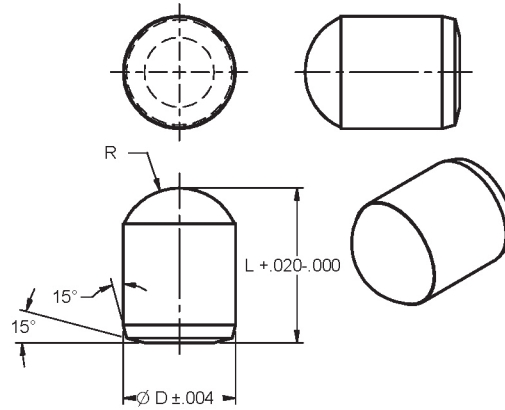
Insert	D	L	A	B	R1	R2
A-1410-B	.460	.476	25°	45°	.156	.156
A-1311-C	.520	.531	25°	45°	.156	.156
A-1717-A	.642	.812	19°	35°	.094	.094

SINGLE CONICAL COMPACTS



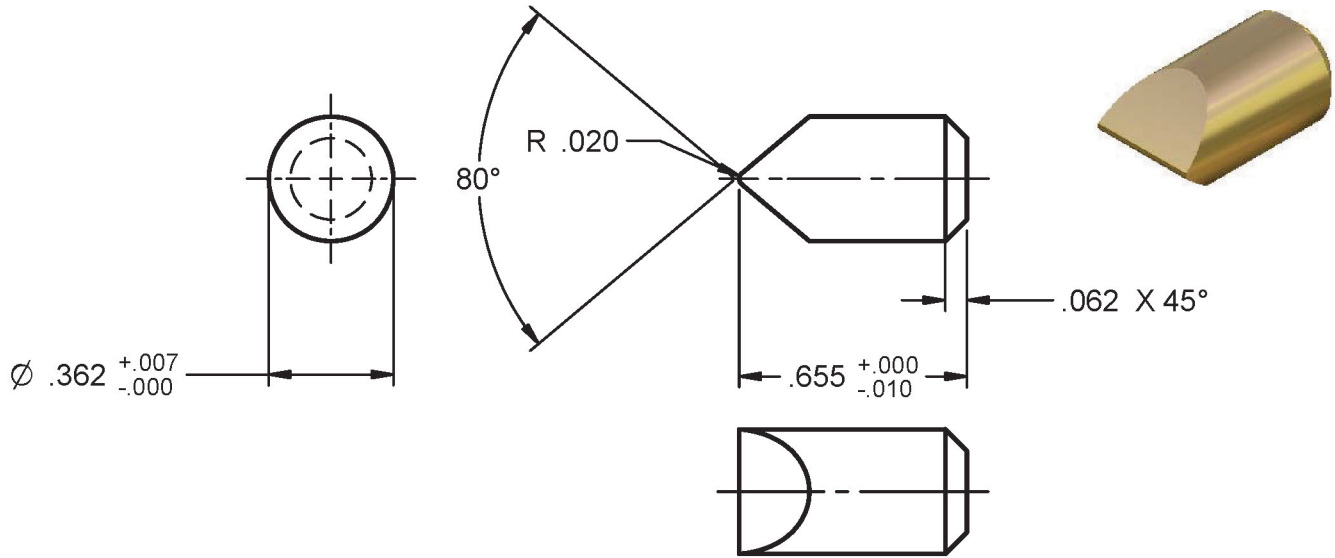
Insert	D	L	A	R
A-1989-A	.460	.477	30.5°	.188
A-1988-A	.520	.531	35°	.188
A-1932-B	.642	.750	22.5°	.250
A-1936-C	.642	.912	22.5°	.250

SPHERICAL DOME COMPACTS

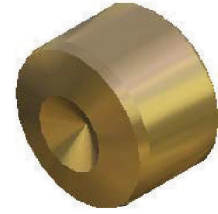
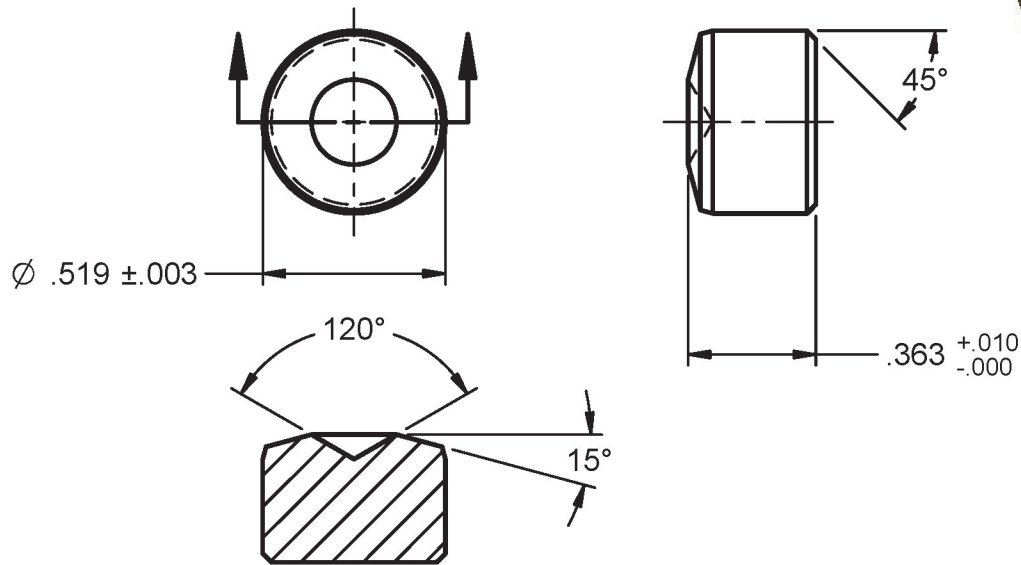


Insert	D	L	R
A-1265-B-1	.580	.750	.3125
A-1265-B-2	.580	.800	.3125

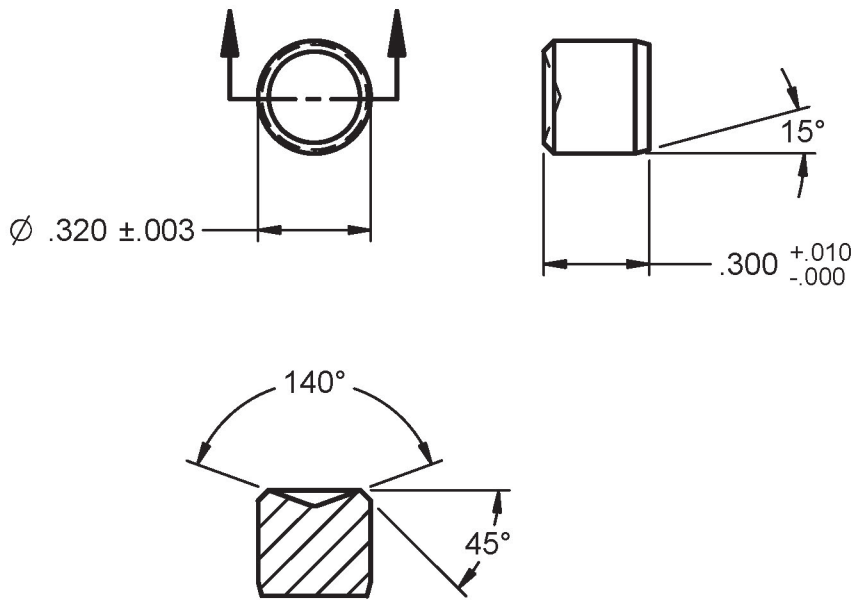
R8C



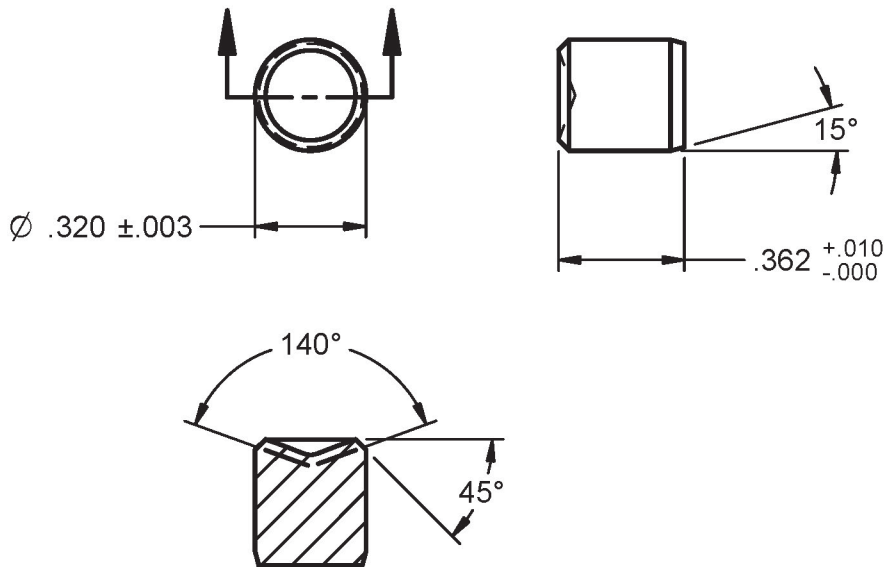
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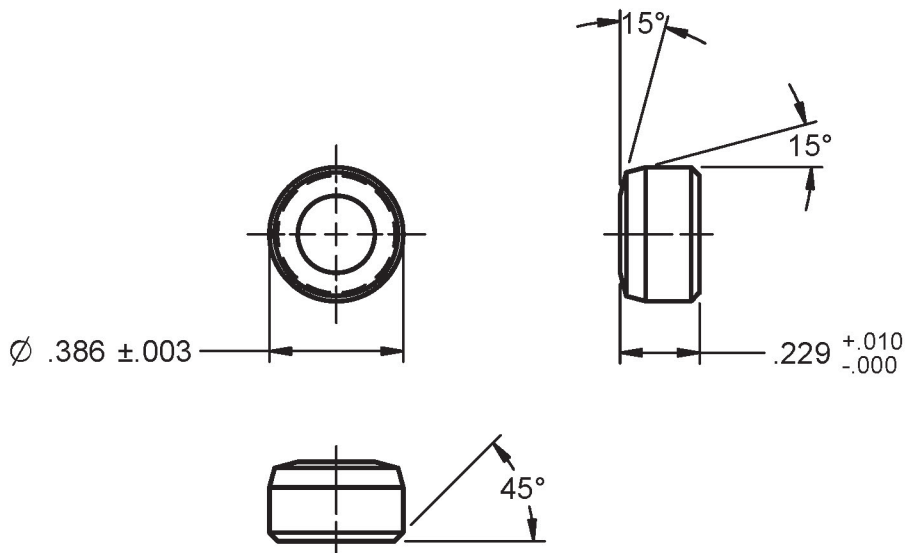
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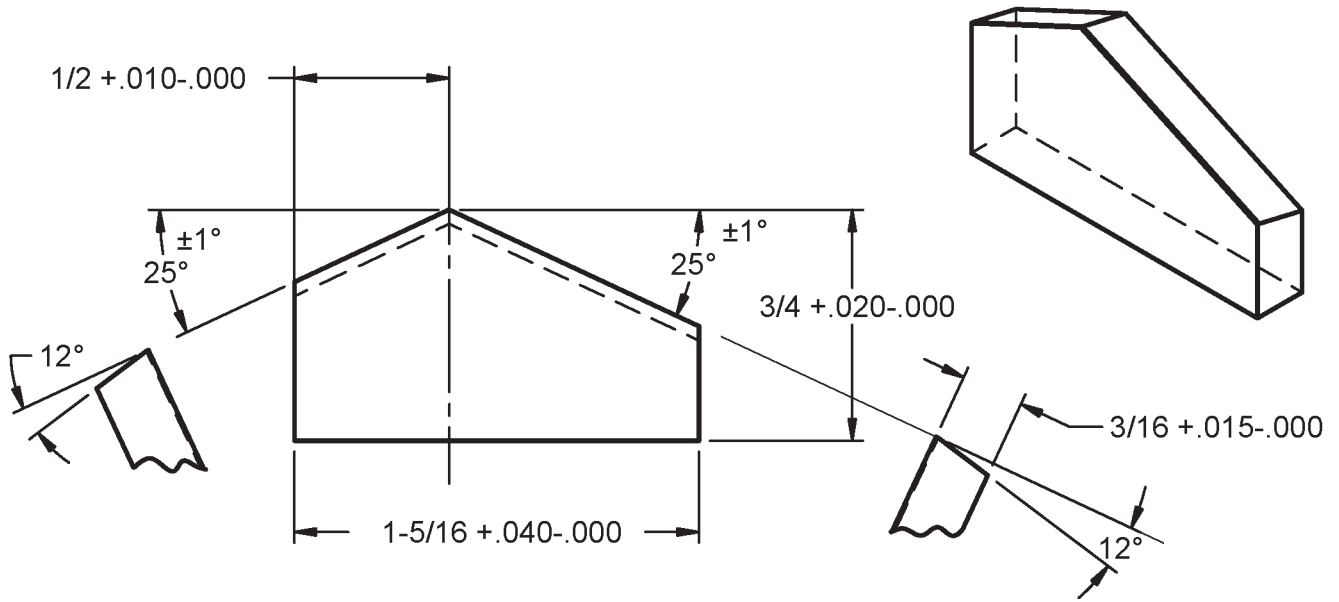
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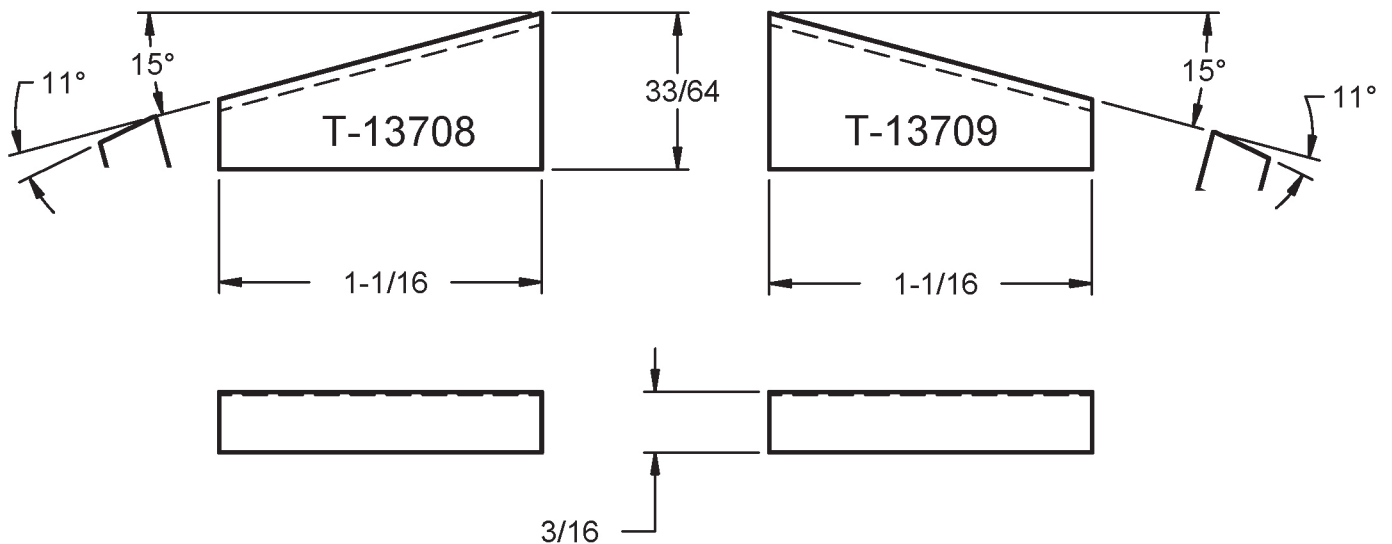
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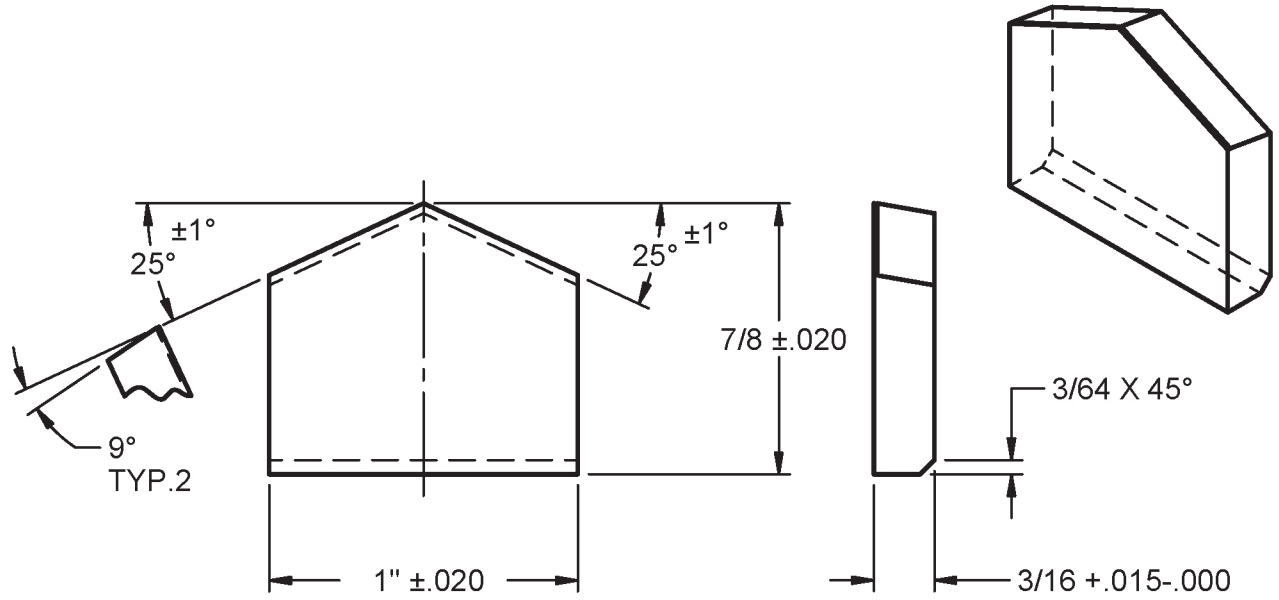
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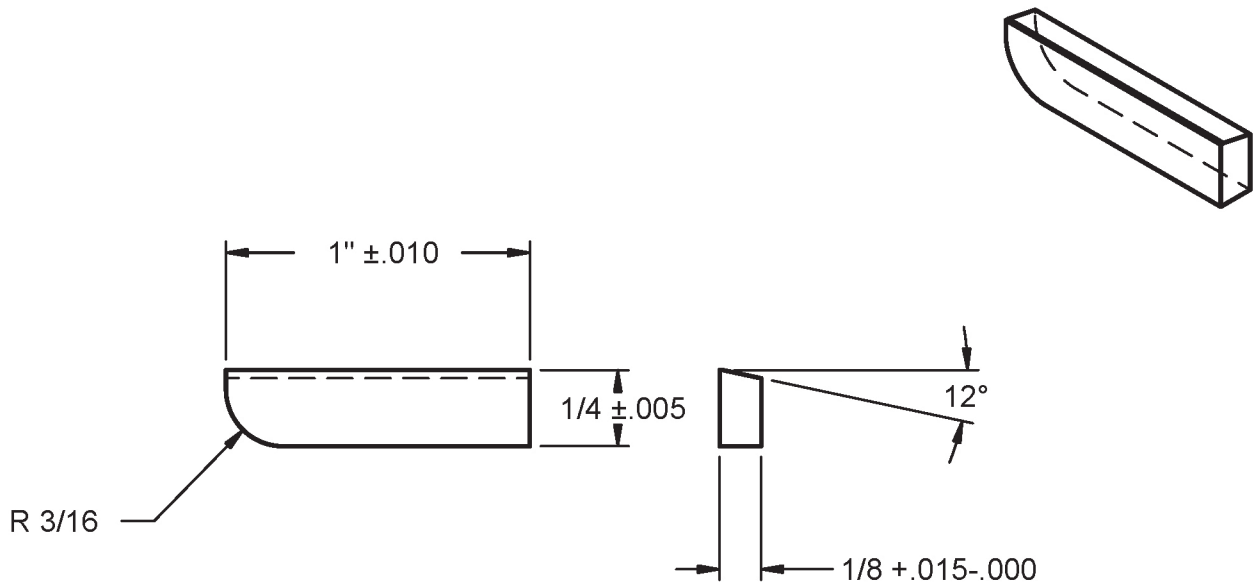
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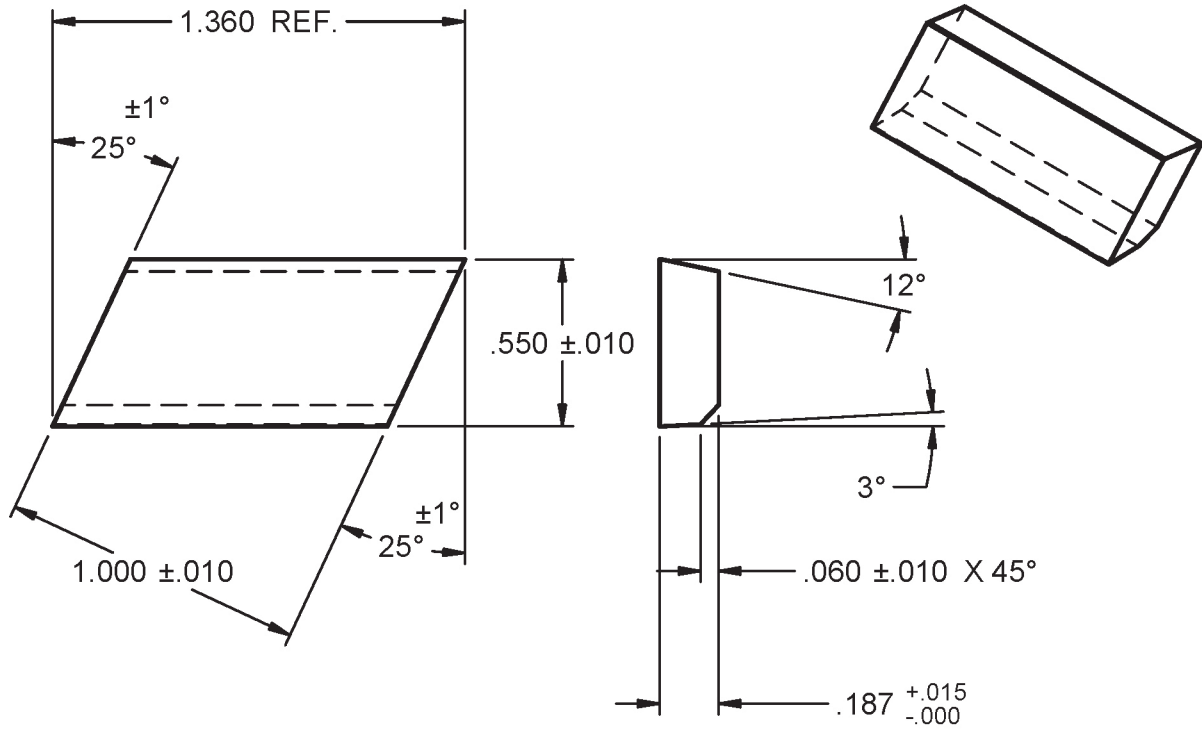
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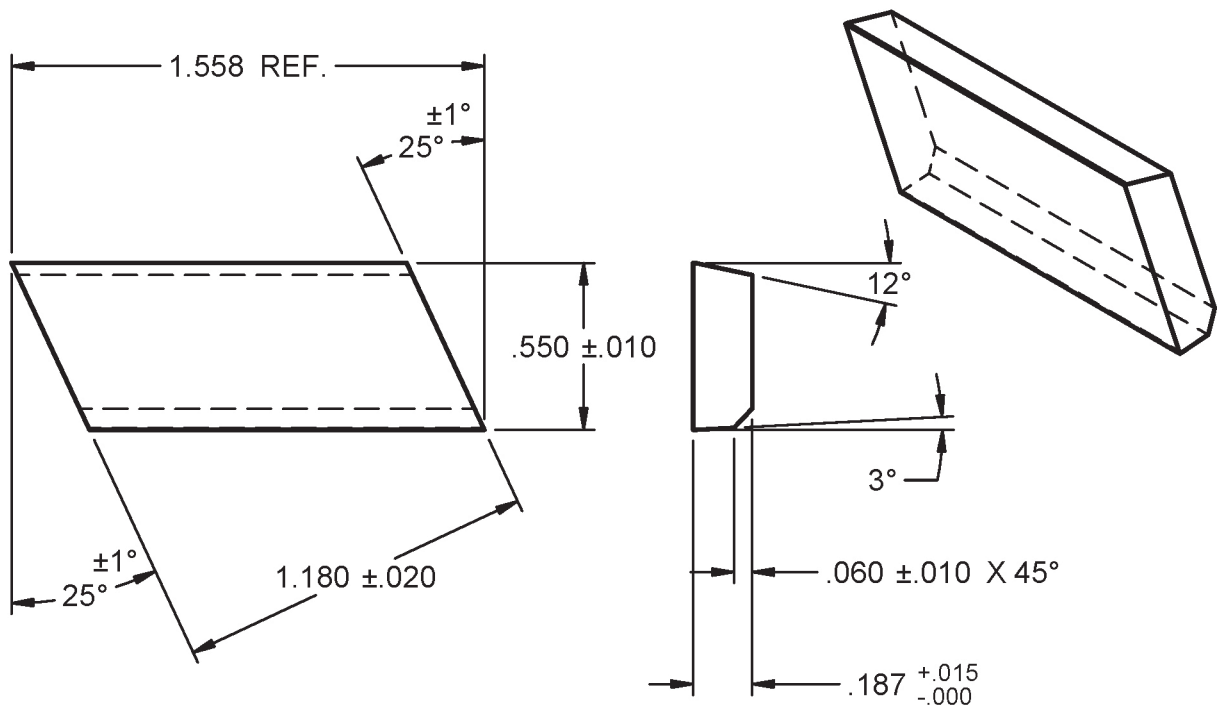
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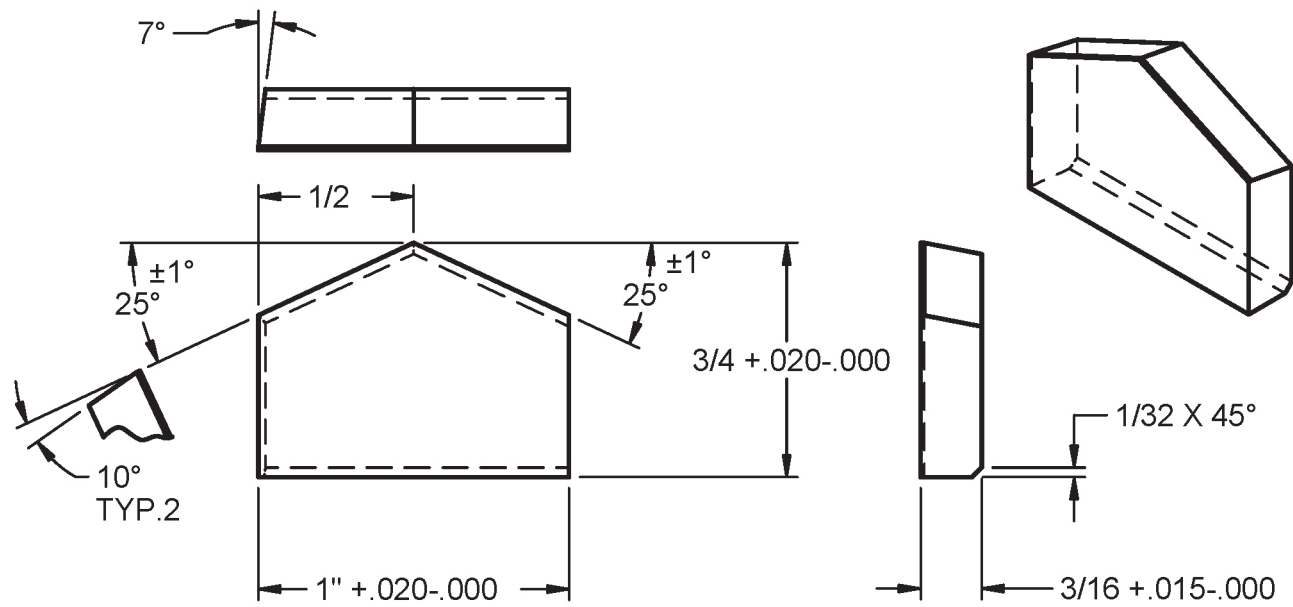
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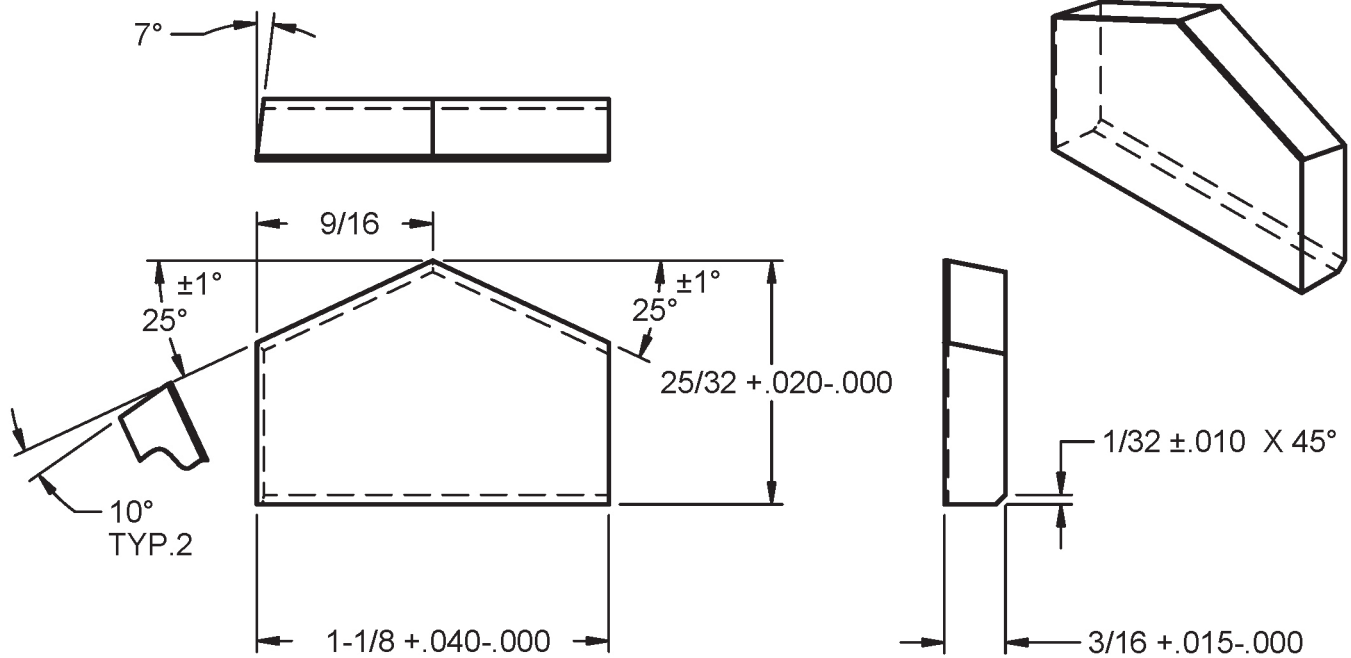
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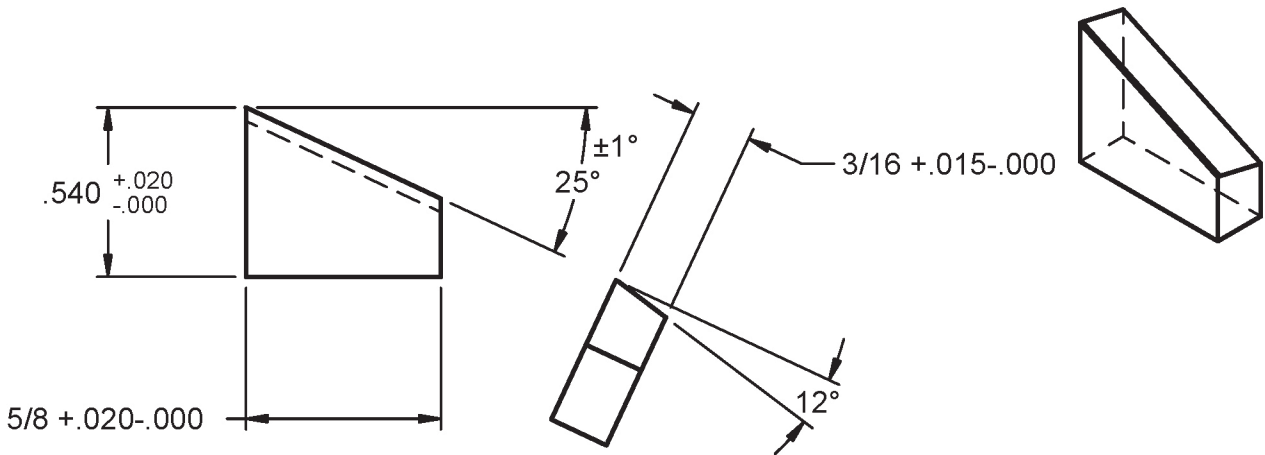
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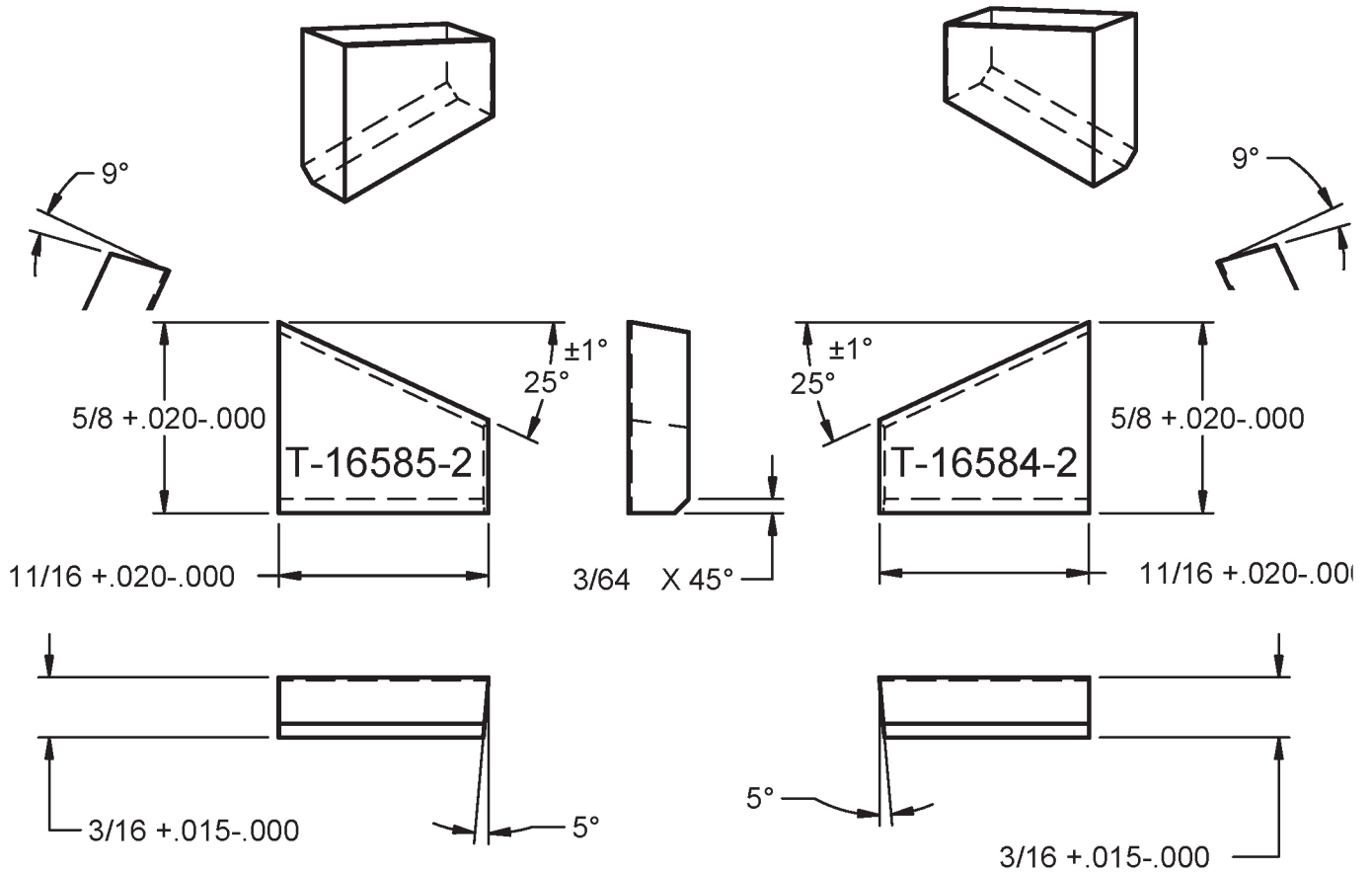
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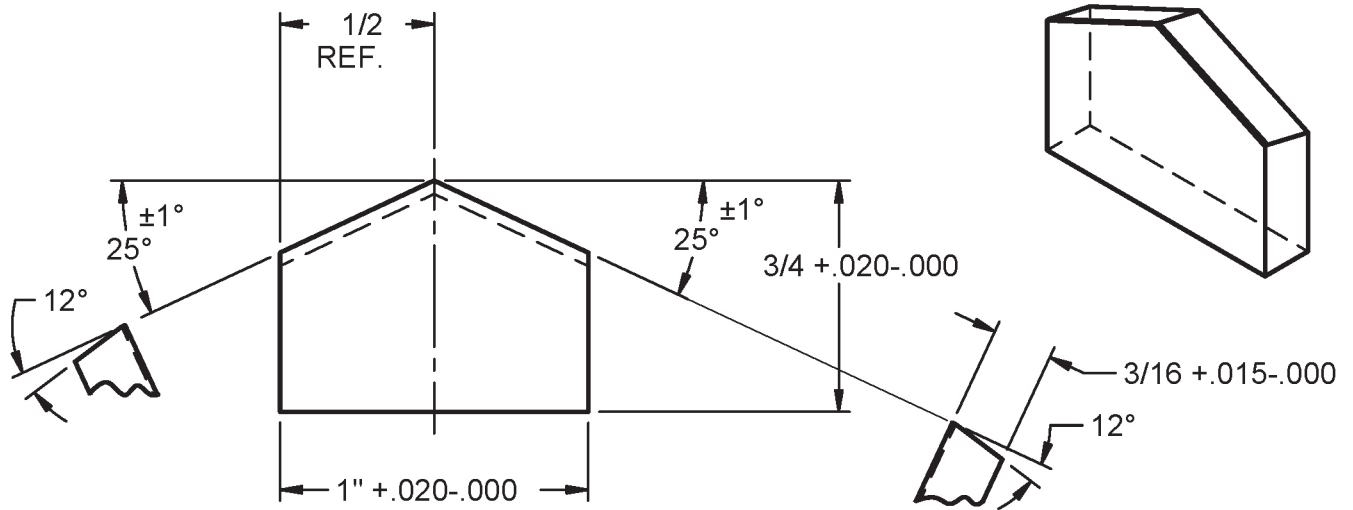
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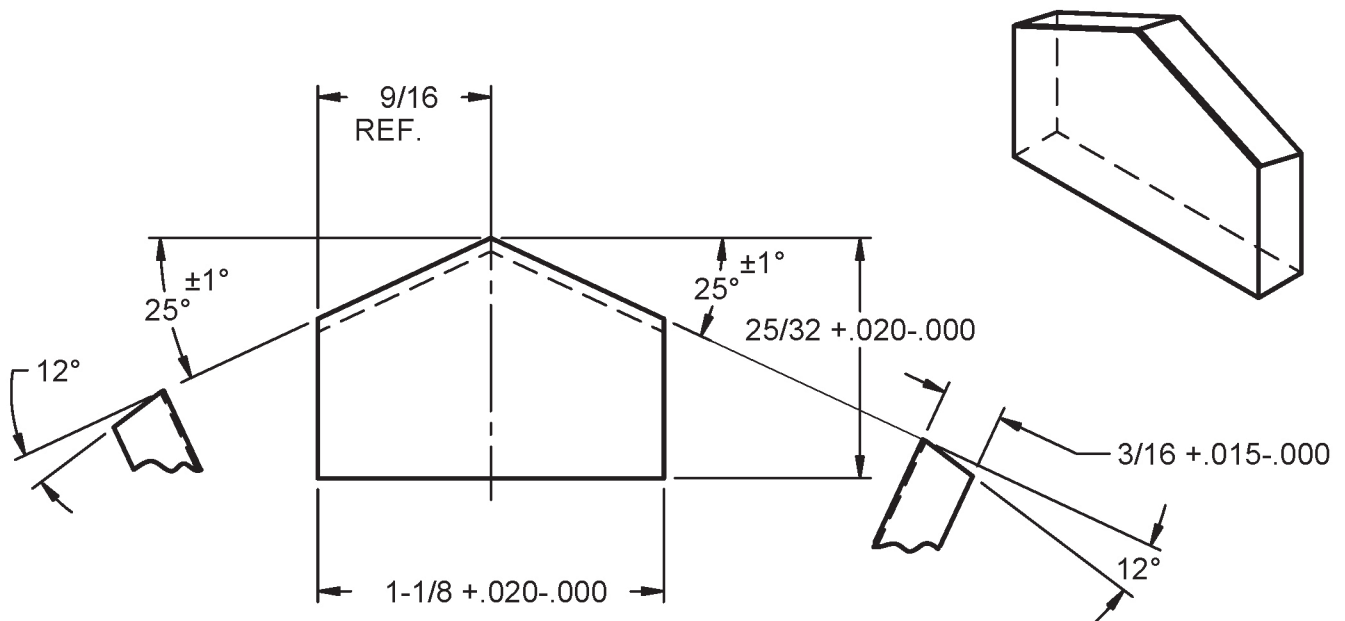
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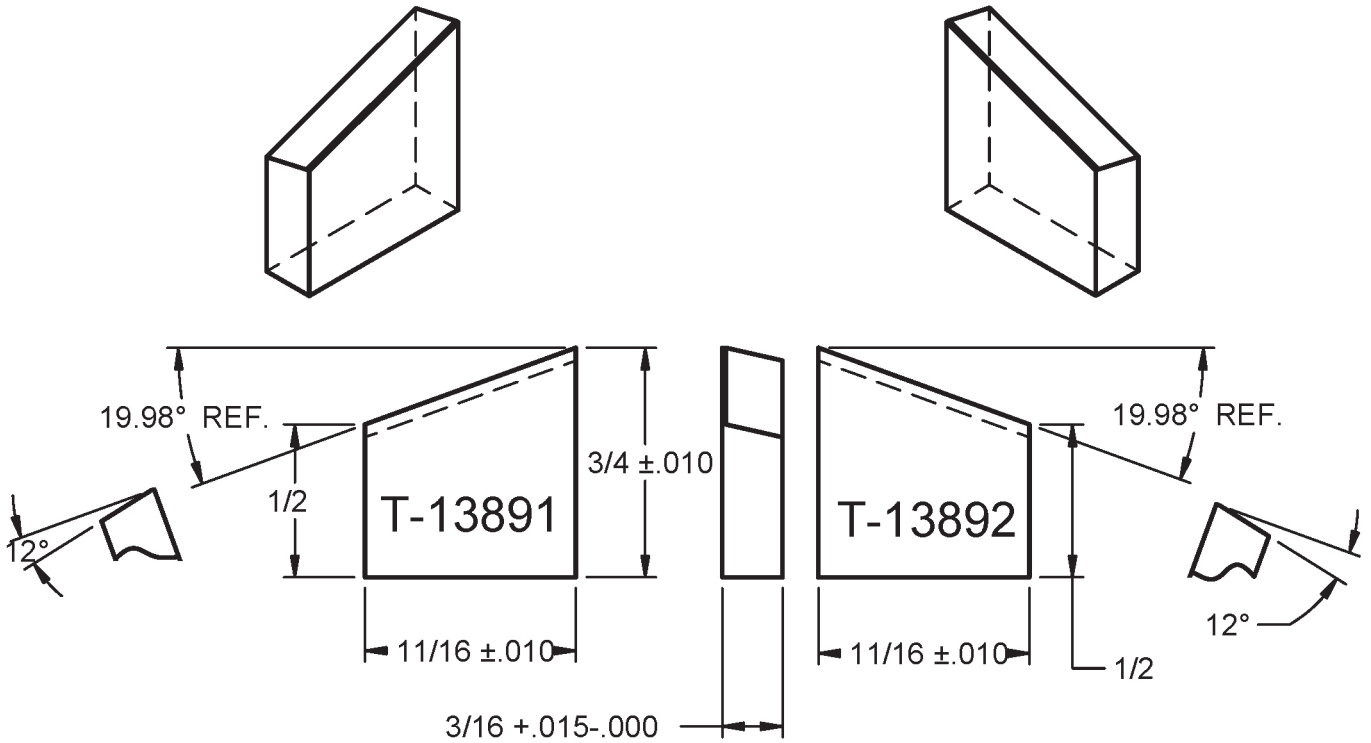
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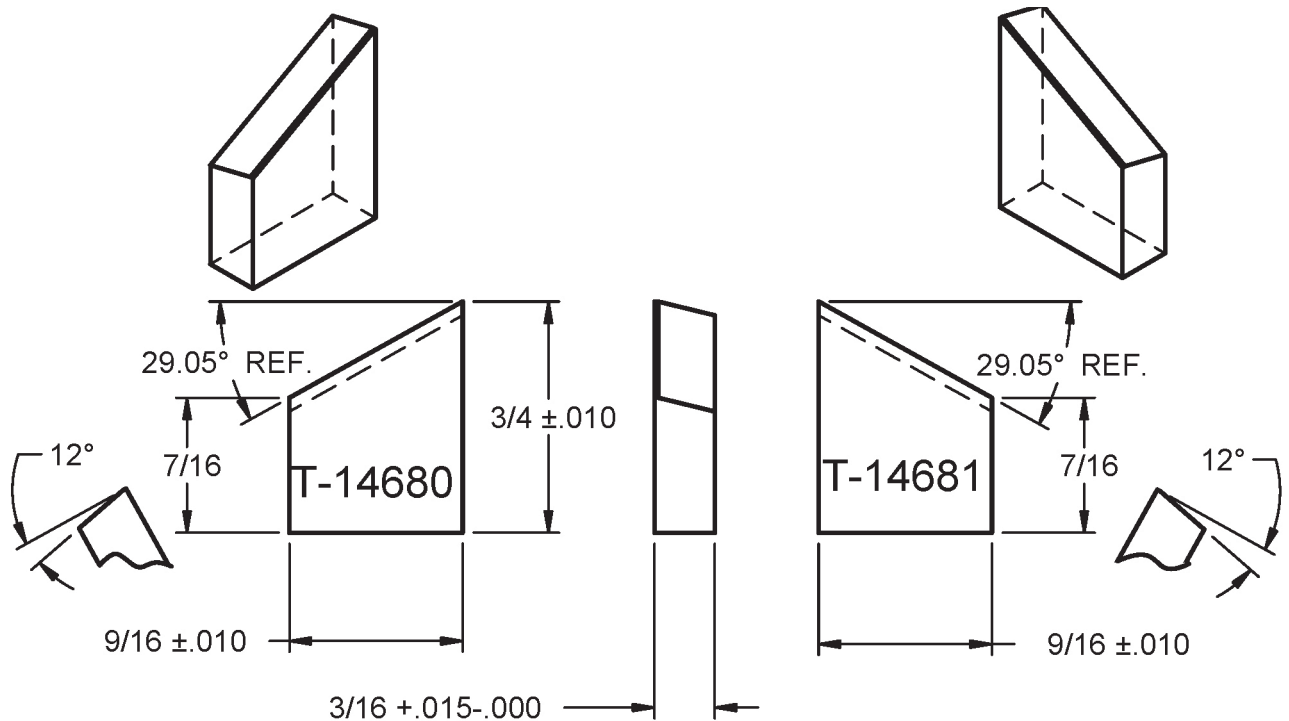
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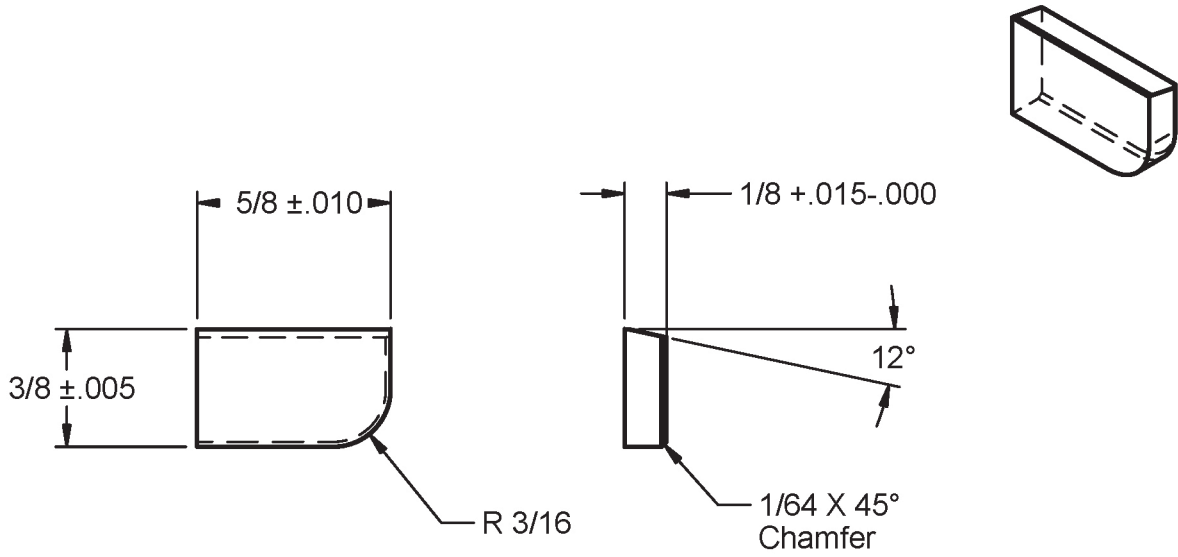
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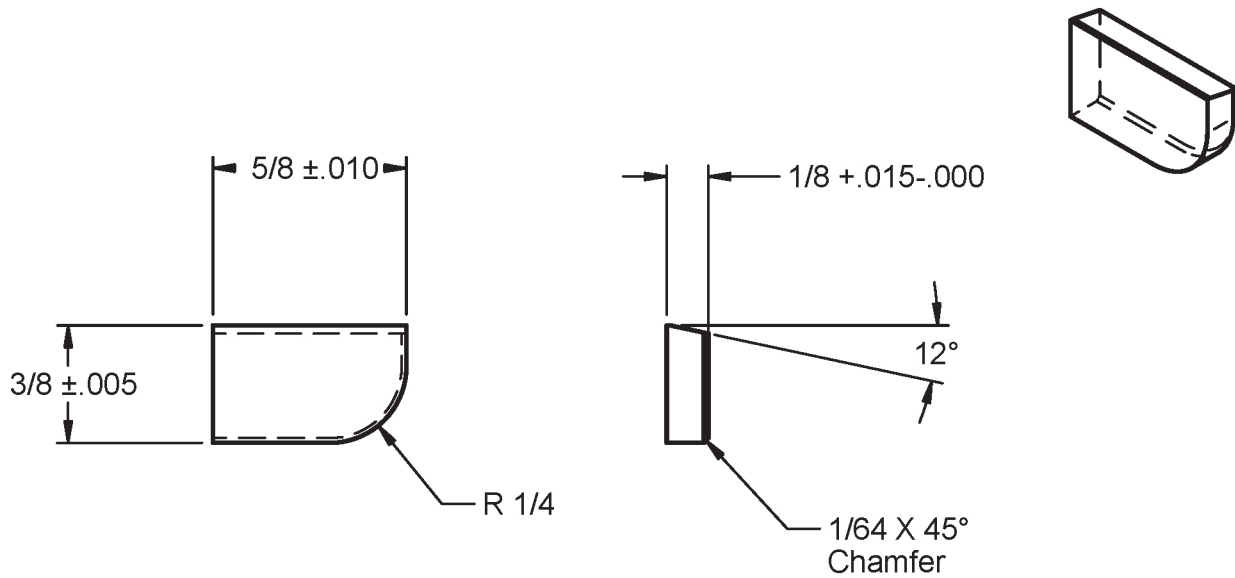
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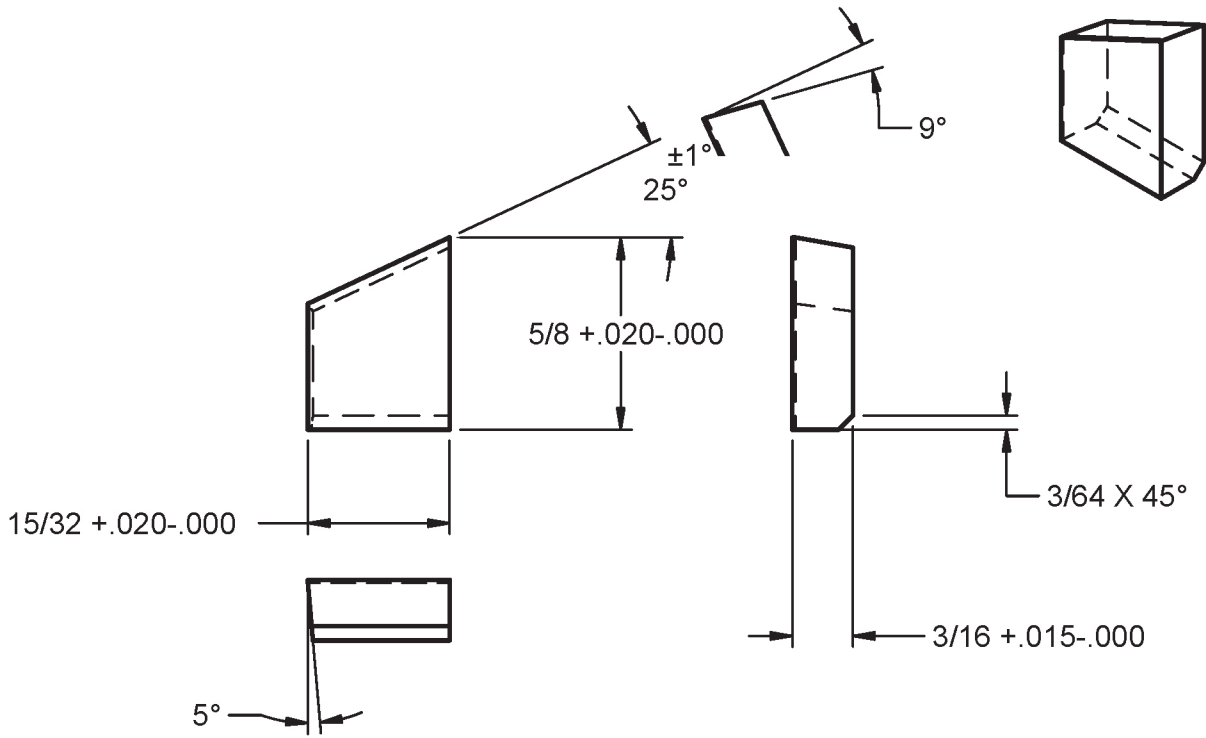
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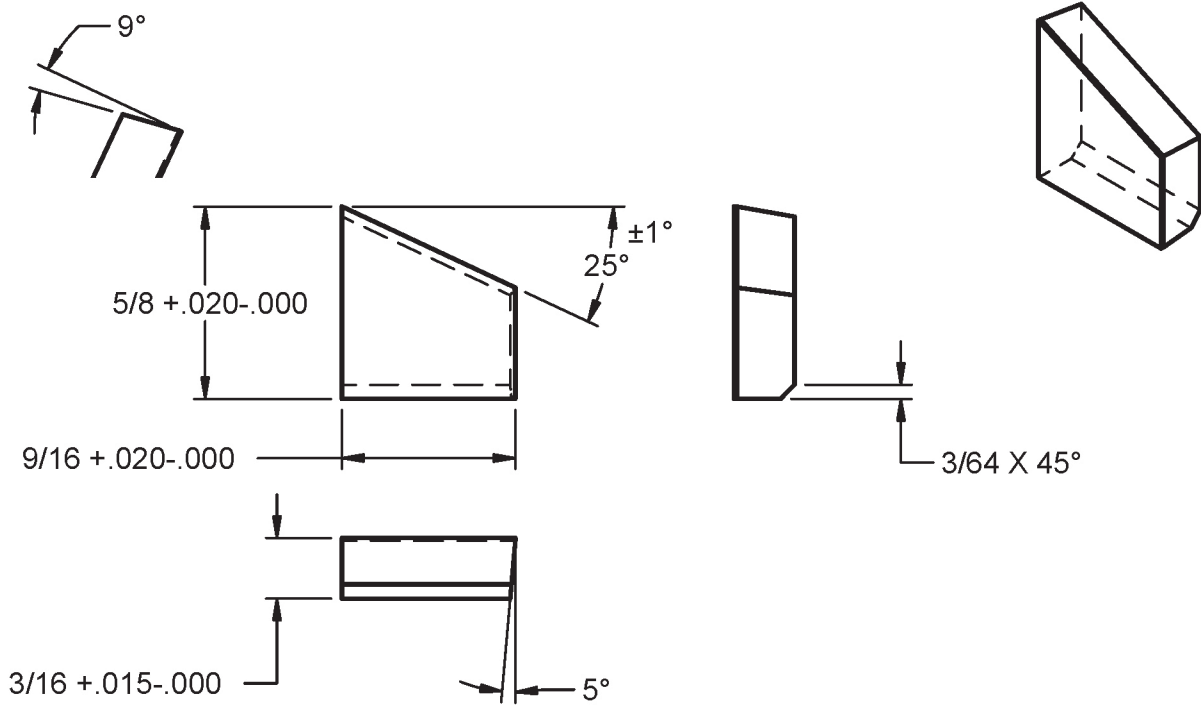
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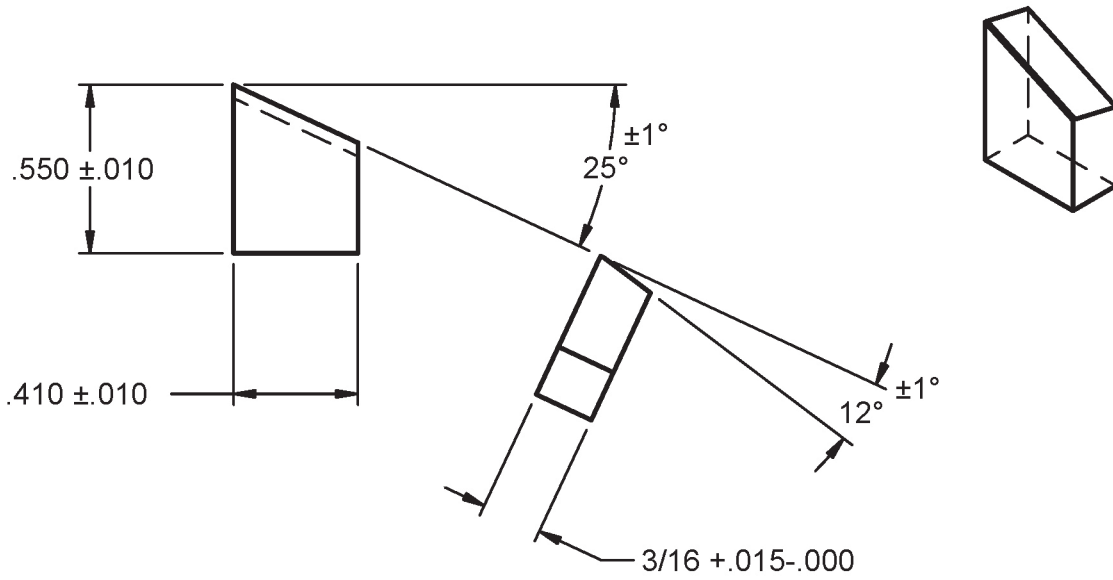
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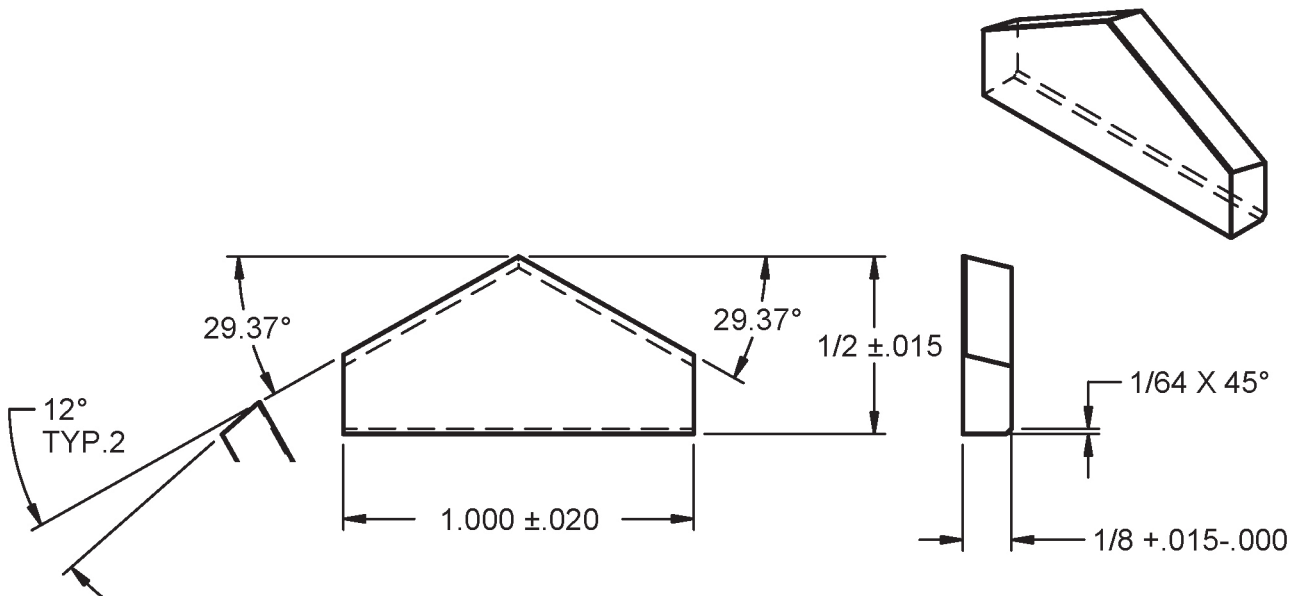
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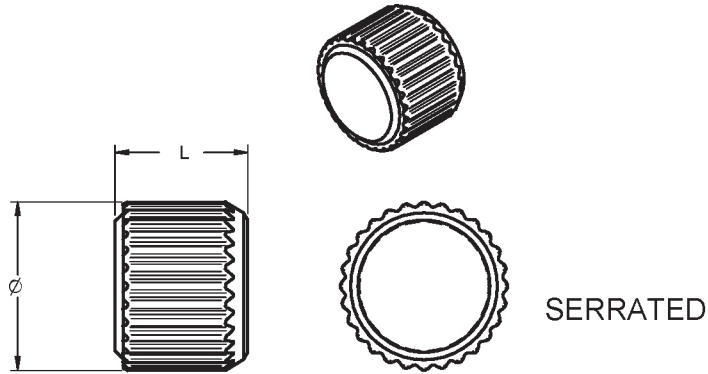
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T-13655 (GEO-PHYSICAL BLANK)

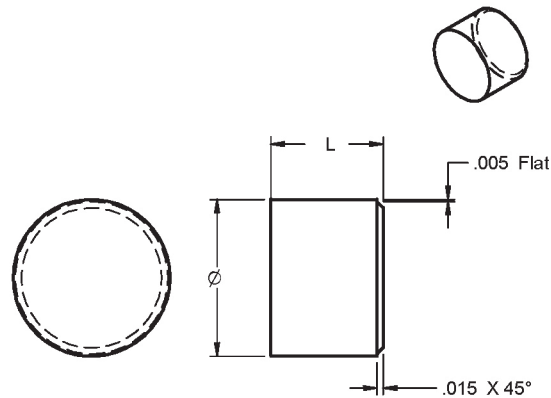


STABILIZERS



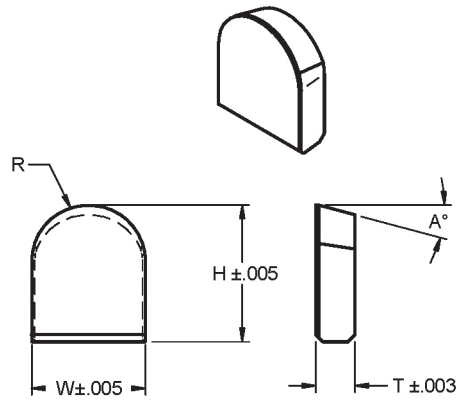
Insert	Ø	L
1/4 Ø X 3/16	.253/.263	.193
1/4 Ø X 1/4	.253/.263	.238
3/8 Ø X 1/4	.396/.406	.250
3/8 Ø X 5/16	.396/.406	.313
7/16 Ø X 3/8	.452/.464	.375
9/16 Ø X 3/8	.581/.589	.375
9/16 Ø X 1/2	.581/.589	.525

STABILIZERS



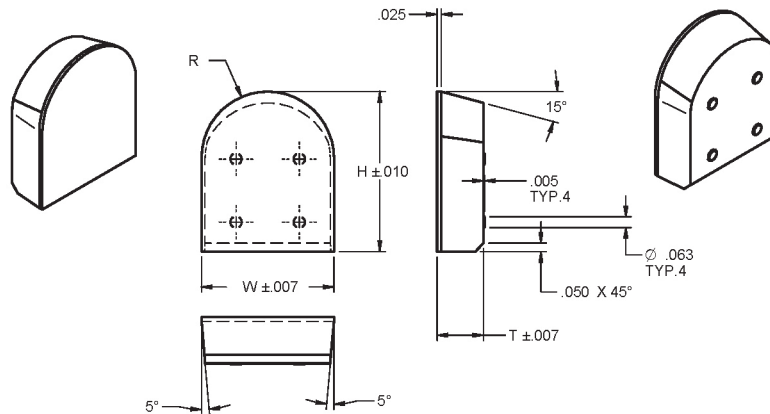
Insert	Ø	L
CARBIDE BUTTON - 0	.241/.247	.125
CARBIDE BUTTON - 1	.366/.370	.125
CARBIDE BUTTON - 2	.366/.370	.187
CARBIDE BUTTON - 3	.366/.370	.250
CARBIDE BUTTON - 4	.366/.370	.265

B11



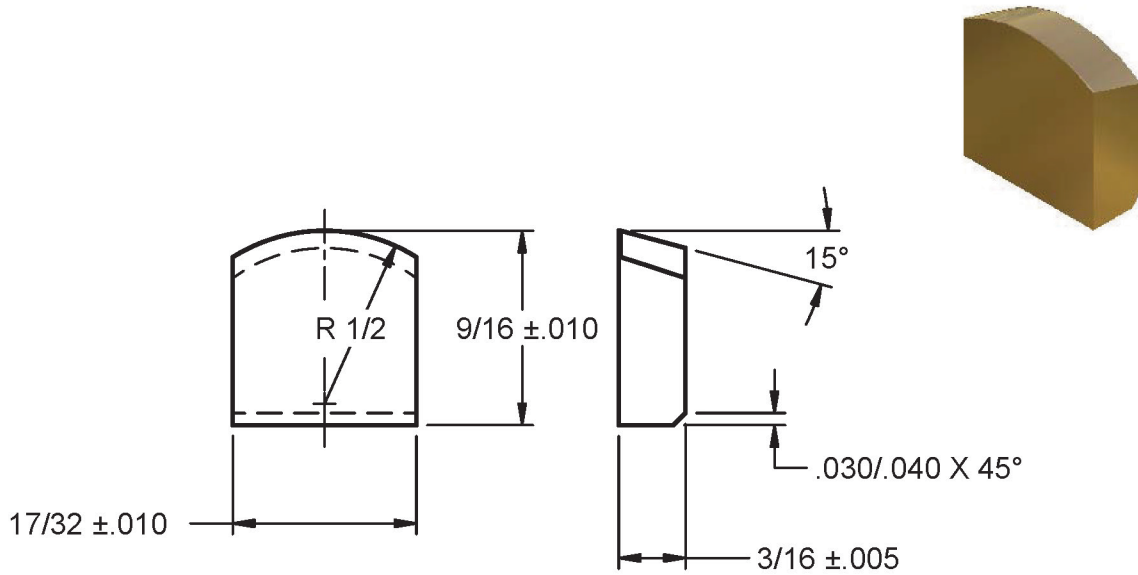
Insert	H	W	T	R
B11-19°	.635	.530	.181	.265
B11-15°	.635	.530	.181	.265

B17

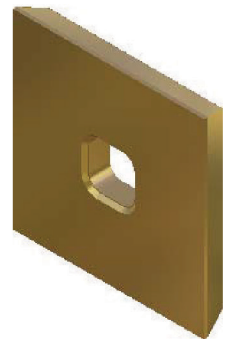
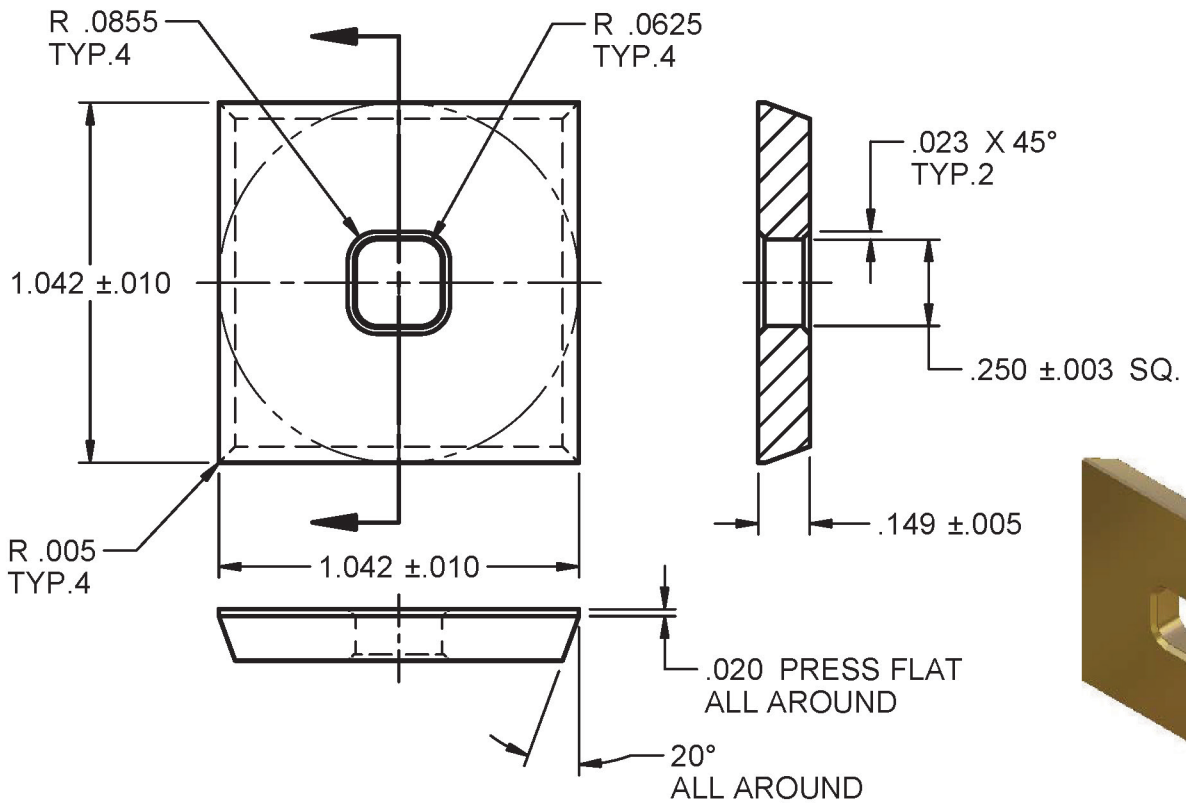


Insert	H	W	T	R
B17	.950	.785	.275	.3925

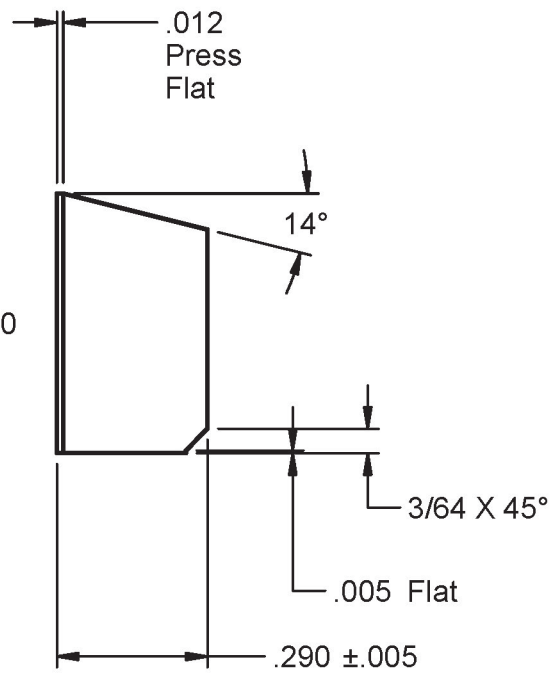
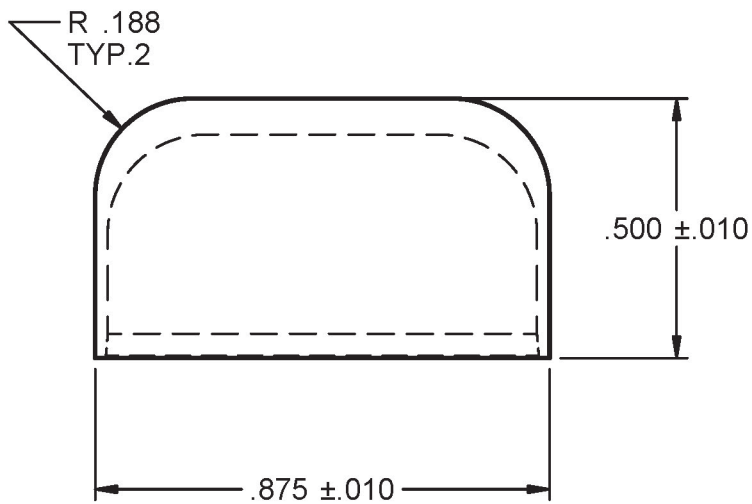
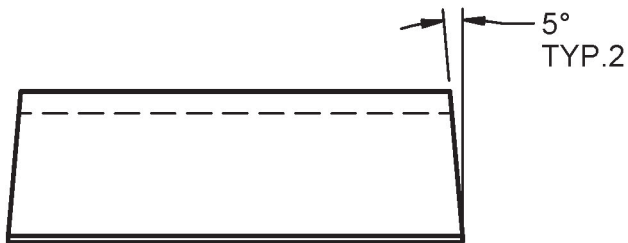
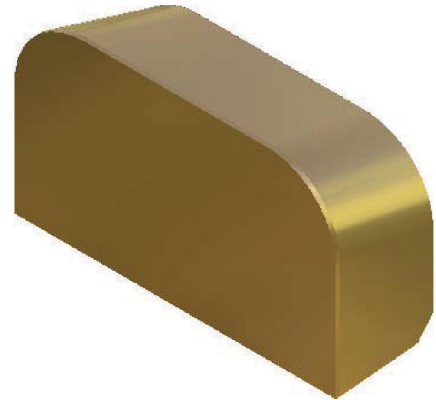
CT-101 (TB-14406)



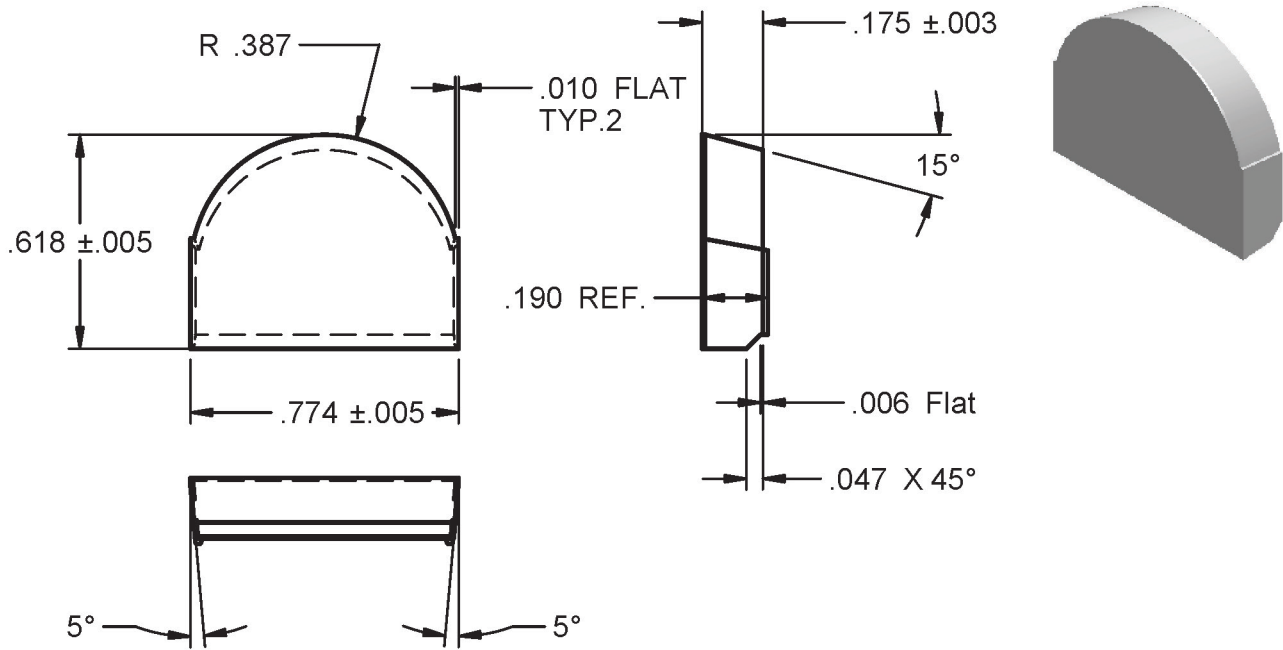
LX-1270-3



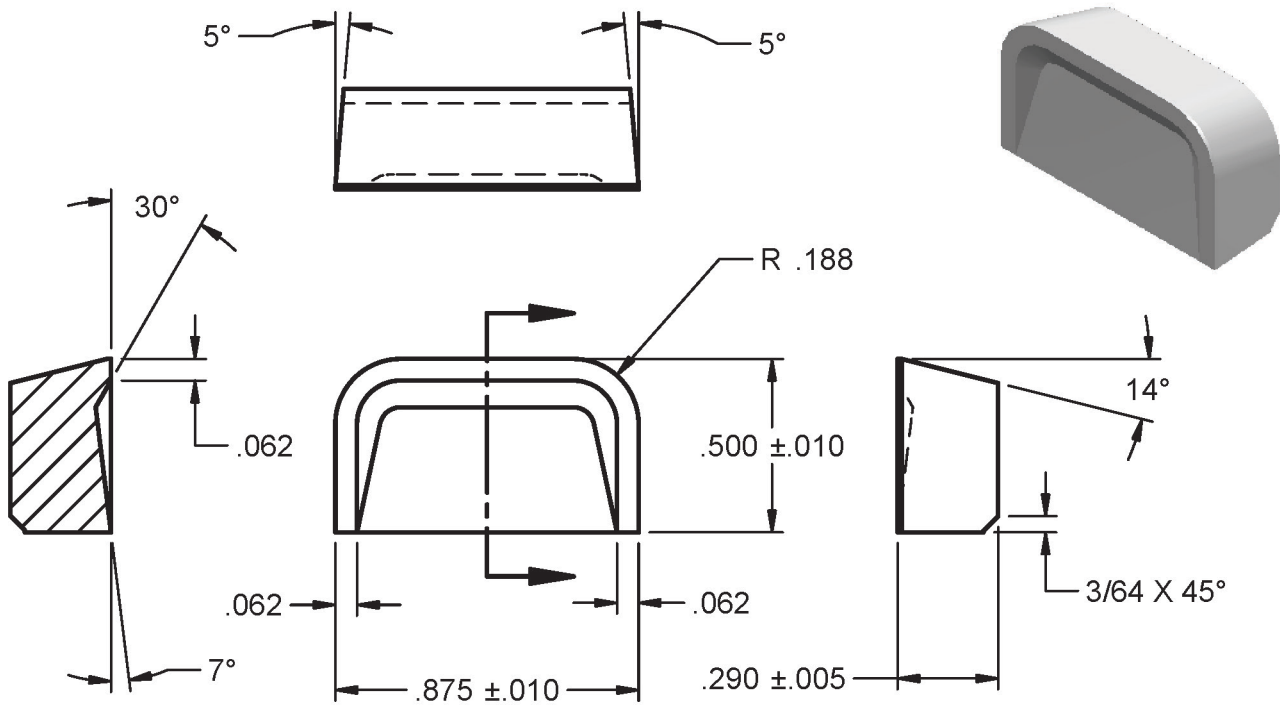
B14 STUMP CUTTER



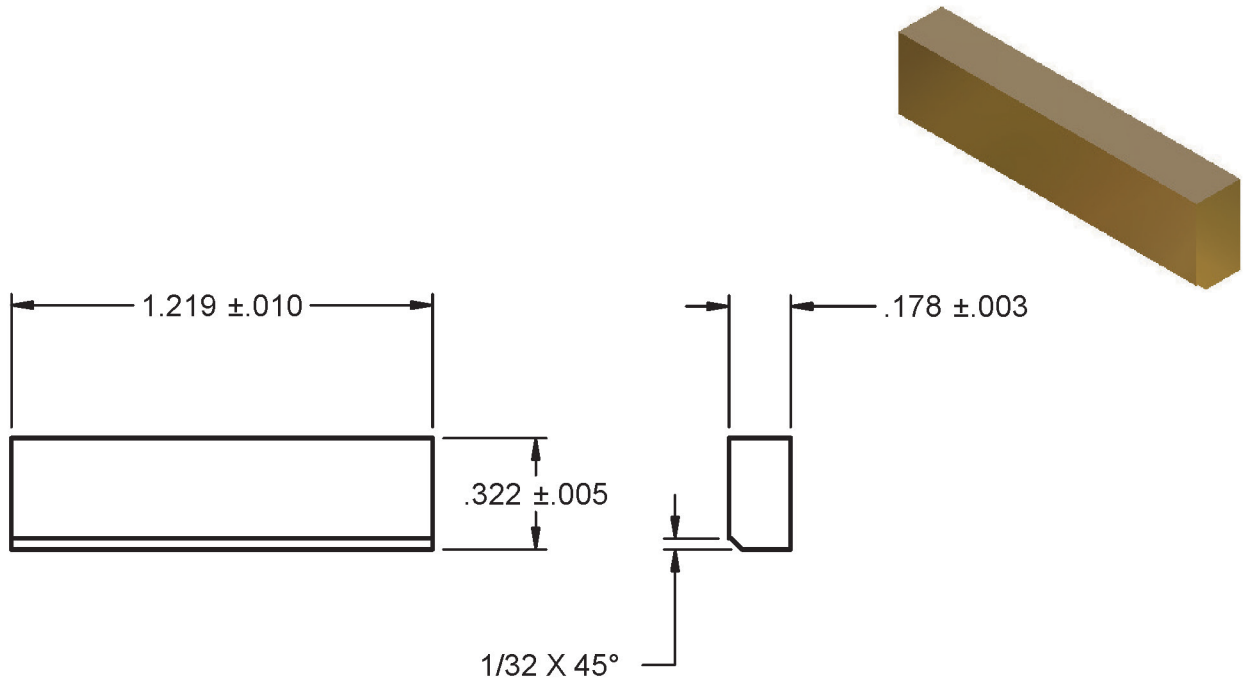
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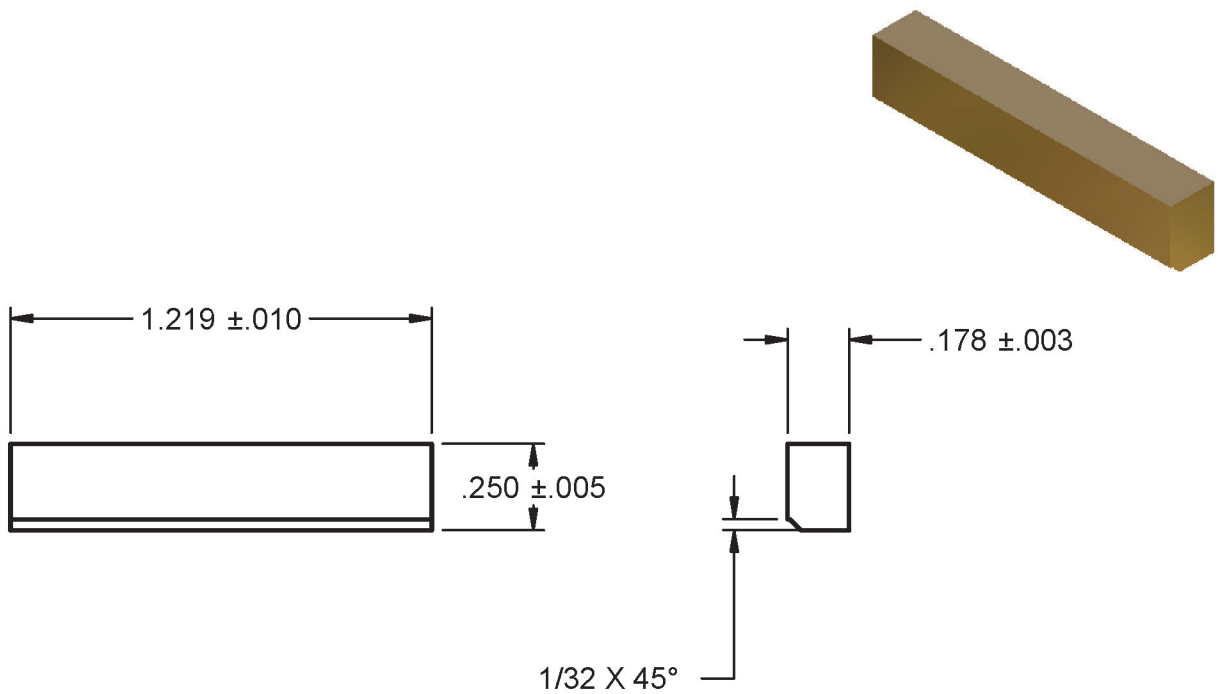
B14CB



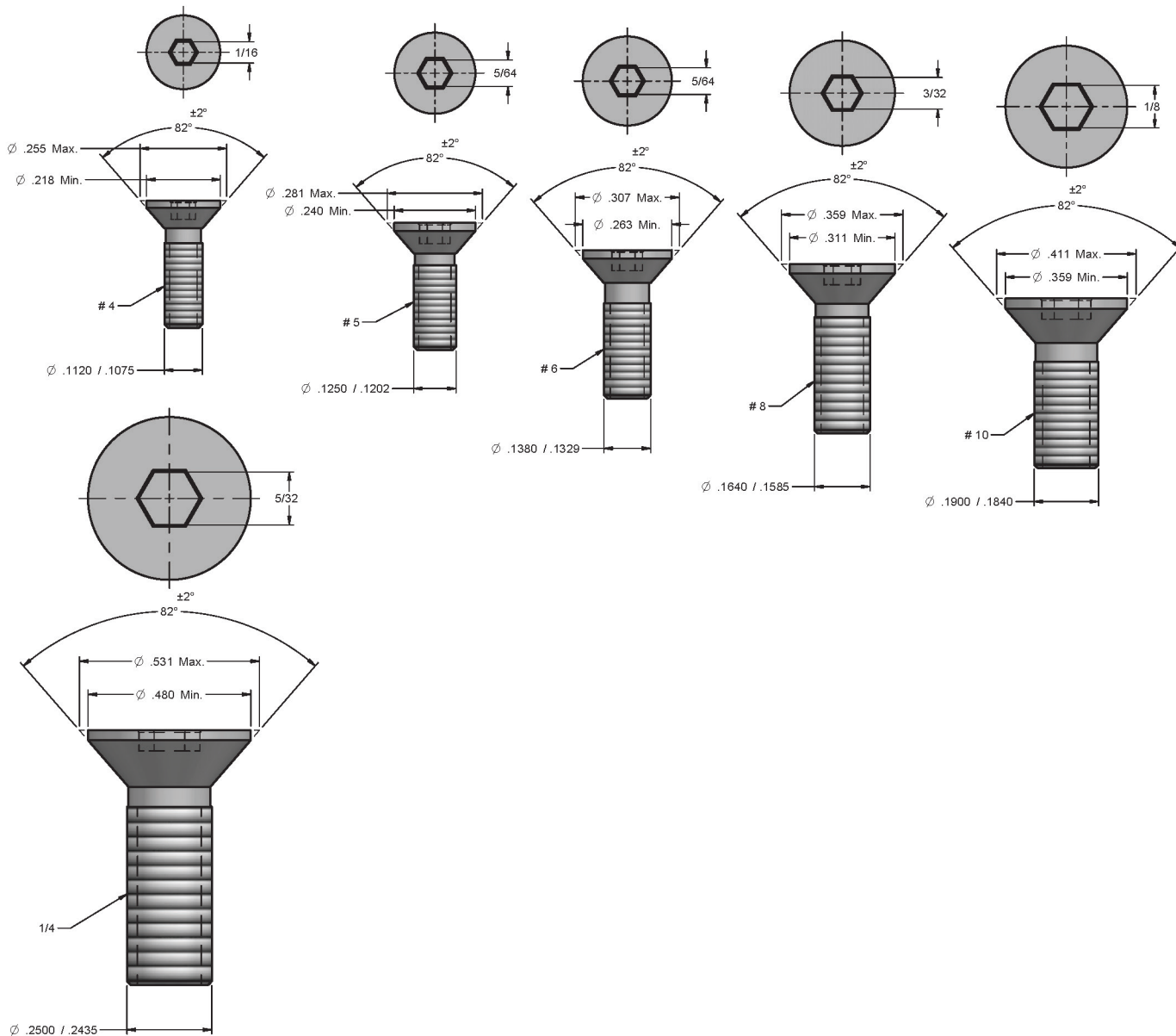
CHIPPER BIT 1



CHIPPER BIT 2

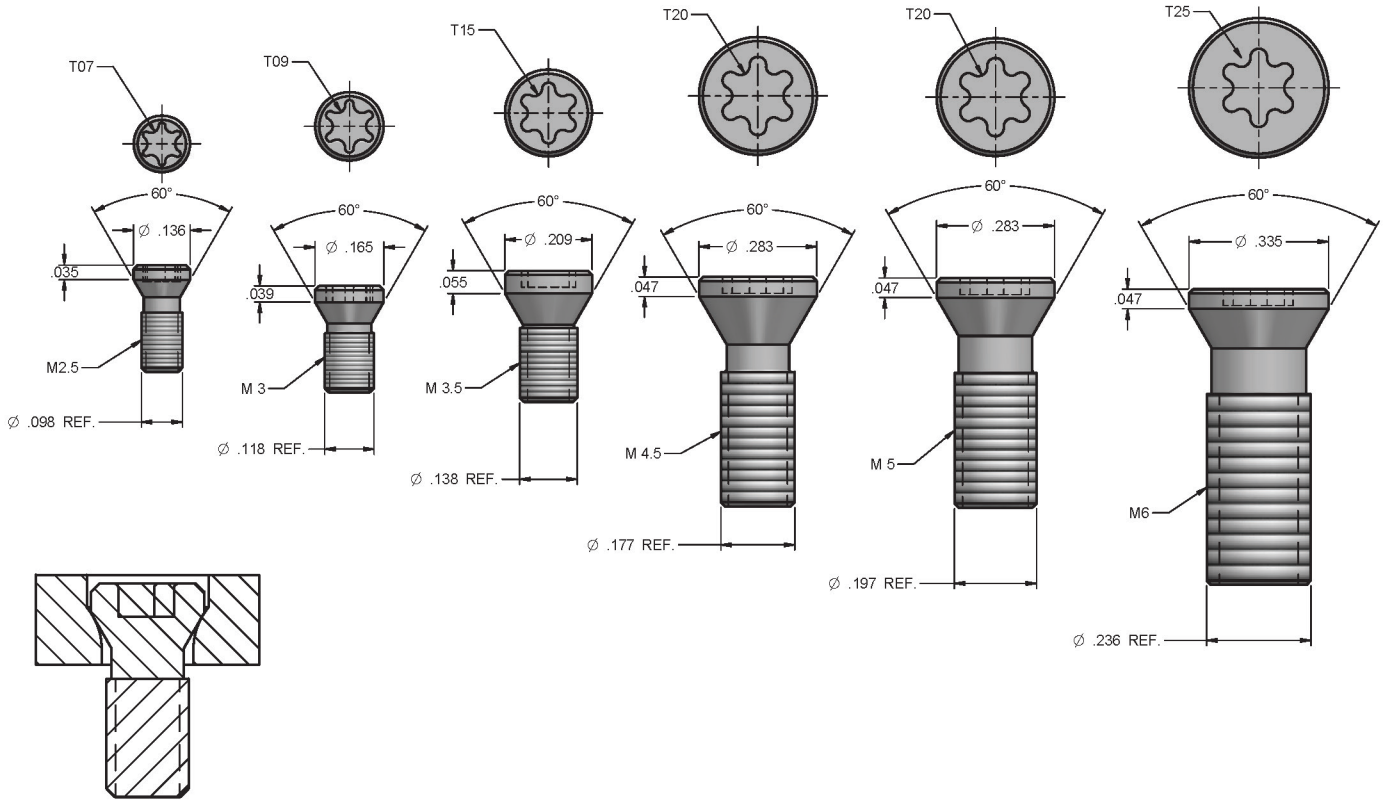


Flat Head Socket Cap Screws

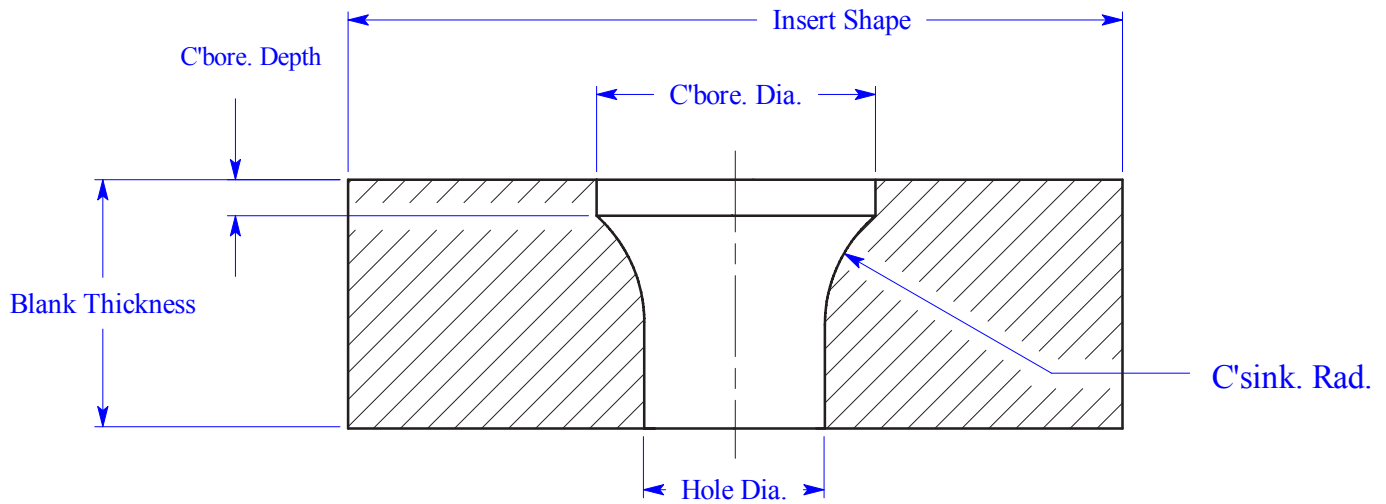


Metric Screws for ISO Style Inserts

1 of 2



Metric Screws for ISO Style Inserts

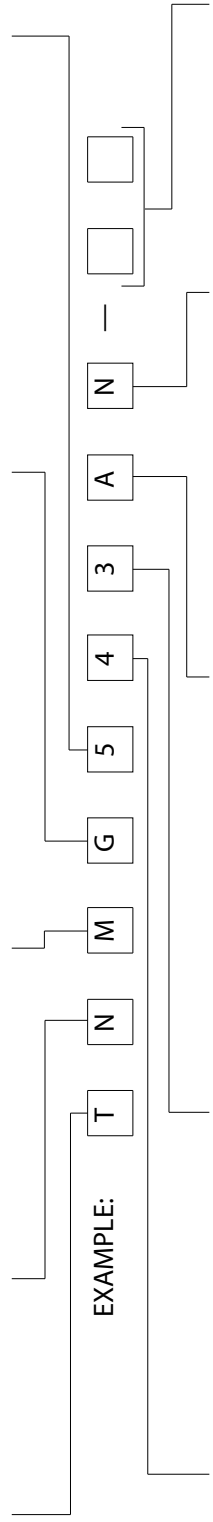


DETAIL FOR ISO STYLE HOLES, ALL SIZES ARE FOR AN UNGROUND BLANK

For Insert Shape	C,D,R,S,T,V	.156 (5/32) I.C.	.219 (7/32) I.C.	.250 (1/4) I.C.	.312 (5/16) I.C.	.375 (3/8) I.C.	.500 (1/2) I.C.	.625 (5/8) I.C.	.750 (3/4) I.C.
	R	--	--	6mm	8mm	10/12mm	--	--	--
	Hole Dia.	.087	.100	.110	.134	.173	.216	.216	.256
	C'bore. Dia.	.112	.130	.146	.177	.236	.295	.295	.354
	C'bore. Depth	.034	.039	.039	.031	.046	.060	.060	.070
	C'sink. Rad.	.060	.079	.079	.098	.138	.177	.177	.196
	Thread of Screw		M2.2	M2.5	M3	M3.5	M4.5 / M5	M4.5 / M5	M6

Designation System for Indexable Inserts Commonly Used for Turning Tools

First position	
Shape	<p>A - Parallelogram 85° B - Parallelogram 82° C - Diamond 80° D - Diamond 55° E - Diamond 75° H - Hexagon 120° K - Parallelogram 55° L - Rectangle 90° M - Diamond 86° O - Octagon 135° P - Pentagon 108° R - Round S - Square 90° T - Triangle 60° V - Diamond 35° W - Trigon 80°</p>
Second position	
Clearance	<p>A - 3° B - 5° C - 7° D - 15° E - 20° F - 25° G - 30° N - 0° P - 11°</p>
Third position	
Tolerance class ¹⁾	<p>A - 0.001 B - 0.0002 C - 0.0005 D - 0.0005 E - 0.001 F - 0.0002 G - 0.001 H - 0.0005 J - 0.0002 K - 0.0005 L - 0.001 M - 0.003-0.008²⁾ N - 0.003-0.008²⁾ U - 0.005-0.015²⁾ R - Grind Stock All Over S - Grind Stock Top & Bottom Only</p>
Fourth position	
Type	<p>A - With hole B - With hole and one countersink (70° - 90°) C - With hole and two countersinks (70° - 90°) F - Without hole with chip grooves on two rake faces G - With hole and chip grooves on two rake faces H - With hole, one countersink (70° - 90°) and chip groove on one rake face J - With hole, two countersinks (70° - 90°) and chip grooves on two rake faces M - With hole and chip groove on one rake face N - Without hole O - With hole and two countersinks (40° - 60°) R - Without hole with chip groove on one rake face T - With hole, one countersink (40° - 60°) and chip groove on rake face U - With hole, two countersinks (40° - 60°) and chip grooves on two rake faces W - With hole and one countersink (40° - 60°)</p>
Fifth position	
Size (I.C.)	<p>Regular polygons and diamonds Number of eighths of an inch in the inscribed circle as follows: Example: 5/32 inch I.C. = 1.2 3/16 inch I.C. = 1.5 7/32 inch I.C. = 1.8 1/4 inch I.C. = 2 5/16 inch I.C. = 2.5 3/8 inch I.C. = 3 1/2 inch I.C. = 4 5/8 inch I.C. = 5 3/4 inch I.C. = 6 1 inch I.C. = 8 1 1/4 inch I.C. = 10</p> <p>Rectangles and parallelograms Use two digits to size: First digit: Number of eighths of an inch in width Second digit: Number of fourths of an inch in length</p>



EXAMPLE:

Sixth position	Thickness	<p>Regular polygons, diamonds, rectangles and parallelograms. Number of sixteenths of an inch in thickness as follows: Example: 3/32 inch - 1.5 1/8 inch - 2 5/32 inch - 2.5 3/16 inch - 3 7/32 inch - 3.5 1/4 inch - 4 5/16 inch - 5 3/8 inch - 6 7/16 inch - 7 1/2 inch - 8</p>
Seventh position	Cutting-point configuration	<p>0 - 0.004-inch radius 0.5 - 0.008-inch radius 1 - 1/64-inch radius 2 - 1/32-inch radius 3 - 3/64-inch radius 4 - 1/16-inch radius 5 - 5/64-inch radius 6 - 3/32-inch radius 7 - 7/64-inch radius 8 - 1/8-inch radius</p>
Eighth position ³⁾	Edge and surface preparations	<p>A - Light Honed (0.0005 to 0.0025 inch) B - Medium Honed (0.003 to 0.0045 inch) C - Heavy Honed (0.005 to 0.007 inch) J - Polished to 4-microinch AA (Rake face only) T - Chamfered - Manufacturer's standard (Negative land - Rake face only)</p>
Ninth position ³⁾	Hand	<p>R - Right L - Left N - Neutral</p>
Tenth position	Manufacturer's option	<p>Shall only be used if desired by the manufacturer.</p>

¹⁾Tolerances given are plus and minus from nominal.
²⁾The tolerance depends on the size and shape of the insert.
³⁾Shall only be used when required.

XCAL INDUSTRIES Powder Grades

Grade	US Class	ISO Class	Hardness	Density	WC	Co	Other	Grain Size
TYPICAL VALUES								
Metal Cutting Grades								
T100/Ramet	C1	K30	91.5	14.50	89.5	10.0	0.5	Ultra Fine
T1	C1	K10/K25	91.4	14.73	92.0	8.0	0.0	Fine
T4	C4	K40	93.0	15.15	96.0	4.0	0.0	Fine
T10	C1	K20	89.8	14.30	87.0	10.0	3.0	Fine
T13	C1	K40	89.7	14.35	88.0	11.0	1.0	Fine
T14	C1	K40	90.0	14.05	85.0	12.0	3.0	Fine
T20	C2	K20	92.4	14.70	90.0	6.0	4.0	Fine
T22	C2	K20	92.0	14.95	94.0	6.0	0.0	Fine
T23	C3	K20	93.0	14.95	94.0	6.0	0.0	Ultra Fine
T24	C1	K20/K30	93.3	14.70	93.0	6.4	0.6	Fine
T28	C2/C3	K10	92.5	14.90	88.5	5.5	6.0	Fine
T50	C5	P50/M50	91.3	12.52	78.0	8.5	13.5	Medium
T52	C5	P40/M40	91.0	12.92	78.5	11.5	10.0	Fine
T54	C5	P50/m50	90.2	13.10	71.0	13.0	16.0	Medium
T55	C5	P40/M40	91.4	12.52	69.0	10.5	20.5	Medium
T56	C5	P35/M35	91.4	12.70	74.0	9.5	15.5	Medium
T60	C6	P15/M15	91.7	12.60	80.0	7.5	12.5	Fine/Medium
T70	C7	P10	92.1	11.95	67.0	6.5	26.5	Fine
T111	C1	K20/K30	91.4	14.43	88.5	11.0	0.5	Ultra Fine
T150	C1	K40	90.1	13.95	85.0	15.0	0.0	Ultra Fine
TUF XCAL Ultra Fine Grain								
TUF306	C2/C3	K05/K10	93.5	14.92	93.5	6.0	0.5	Ultra Fine
TUF108	C1/C2	K20/30	93.0	14.65	91.5	8.0	0.5	Ultra Fine
TUF110	C1/C2	K20/30	92.3	14.50	89.5	10.0	0.5	Ultra Fine
TUF112	C1	K30/40	91.8	14.30	87.5	12.0	0.5	Ultra Fine
Substrate Grades								
650S	C5	P40/M40	91.0	13.35	82.1	8.5	9.4	Medium
660S	C2/C5	P30/K30	91.6	13.60	84.6	6.0	9.4	Fine/Medium
670S	C5	P15	91.9	13.30	82.5	6.5	11.0	Medium
690S	C6	P15	92.3	14.33	85.1	5.5	9.4	Fine
Wear and Special Grades								
T21	C1/C2	K10/K20	91.5	14.80	90.0	10.0	0.0	Fine/Medium
TF78	C6/C7	P10/P20	92.6	13.40	86.0	8.0	6.0	Fine
T57	C15A	N/A	87.0	12.91	67.0	13.0	20.0	Medium
Mining								
TM6	C10	N/A	90.0	14.95	94.0	6.0	0.0	Medium
TM8	C13	N/A	89.2	14.72	62.0	8.0	0.0	Medium/Coarse
TM9	C13	N/A	88.7	14.63	61.0	9.0	0.0	Medium/Coarse
TC105	C13	N/A	87.5	14.50	89.5	10.5	0.0	Coarse
TM12	C14	N/A	88.5	14.33	88.0	12.0	0.0	Medium/Coarse
TC135	C14	N/A	86.2	14.18	86.5	13.5	0.0	Coarse
TM14	C14	N/A	86.7	14.10	86.0	14.0	0.0	Medium/Coarse
TM15	C14	N/A	87.5	14.03	85.0	15.0	0.0	Medium/Coarse
TC17	C14	N/A	85.7	13.85	83.0	17.0	0.0	Coarse
TM18	C14	N/A	86.6	13.75	82.0	18.0	0.0	Medium/Coarse

Cemented Carbide

Safety Data Sheet

According To Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules And Regulations
 Revision Date: 10/21/2015 Date of issue: 10/21/2015

Version: 1.0

SECTION 1: IDENTIFICATION

1.1. Product Identifier

Product Form: Mixture

Product Name: Cemented Carbide

Synonyms: Coated Carbide and Cemented Carbide Tools

1.2. Intended Use of the Product For professional use only.

1.3. Name, Address, and Telephone of the Responsible Party

Company

Tungste-Met

843 Lochgelly Rd., Oak Hill, WV 25901

304-469-4721

Fax 304-469-4750

1.4. Emergency Telephone Number

Emergency Number : 304-469-4721

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

GHS-US classification

Not classified

2.2. Label Elements

GHS-US Labeling

No labeling applicable

2.3. Other Hazards

This product is physiologically inert in its massive form. However, if the product is altered, user-generated dust, fines, ribbons, powders, and/or fumes may pose a physiological hazard if inhaled or ingested. Avoid inhalation of metal dusts and fumes. May cause metal fume fever, an influenza-like illness. Avoid skin and eye contact with dusts to prevent mechanical irritation. Molten product may cause thermal burns. Welding may release hazardous fumes, take appropriate precautions. Welding fumes are a known human carcinogen. Small chips, fine turnings and dust from processing may be readily ignitable and difficult to extinguish, or generate explosive hydrogen gas and heat in contact with water. Metal dust, if dispersed in sufficient quantities and in the presence of an ignition source, is a combustible dust hazard. Repeated or prolonged contact with cobalt can cause skin irritation, sensitization, and some chronic effects. If grinding fluid is used to process this product see the grinding fluid SDS for its hazard information. Additional hazardous products may be formed during processing, see decomposition products in section 10, and see section 8 for exposure controls related to these products. This product contains substances that are hazardous to aquatic life. In massive form this product does not pose any environmental hazards, however if processed into shavings, fines, or powder/dust, this product may be very toxic to aquatic life with long lasting effects.

2.4. Unknown Acute Toxicity (GHS-US)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Not applicable

3.2. Mixture

Name	Product Identifier	%	GHS-US classification
Tungsten carbide	(CAS No) 12070-12-1	55 - 96	Not classified
Cobalt	(CAS No) 7440-48-4	<= 30	Comb. Dust Acute Tox. 4 (Oral), H302 Eye Irrit. 2A, H319 Resp. Sens. 1B, H334 Skin Sens. 1, H317 Carc. 1B, H350 Repr. 2, H361 Aquatic Chronic 1, H410
Tantalum carbide (TaC)	(CAS No) 12070-06-3	<= 20	Not classified
Titanium carbide (TiC)	(CAS No) 12070-08-5	<= 20	Not classified
Niobium carbide (NbC)	(CAS No) 12069-94-2	<= 20	Flam. Sol. 1, H228
Chromium	(CAS No) 7440-47-3	<= 5	Comb. Dust

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Full text of H-phrases: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of First Aid Measures

First-aid Measures General: Never give anything by mouth to an unconscious person. If exposed or concerned: Get medical advice/attention.

First-aid Measures After Inhalation: Remove to fresh air and keep at rest in a position comfortable for breathing. If exposed or concerned: Get medical advice/attention.

First-aid Measures After Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation develops or persists. In molten form: Cool skin rapidly with cold water after contact with molten product. Removal of solidified molten material from skin requires medical assistance.

First-aid Measures After Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation develops or persists. In molten form: Removal of solidified molten material from the eyes requires medical assistance.

First-aid Measures After Ingestion: Do NOT induce vomiting. Rinse mouth. Immediately call a POISON CENTER or doctor/physician.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/Injuries: Under normal conditions of use not expected to present a significant hazard. Under milling, or physical alteration metal dusts may be produced that cause irritation of the respiratory tract, skin, and may be harmful. Molten material may release toxic, and irritating fumes. There are potential chronic health effects to consider.

Symptoms/Injuries After Inhalation: Dust particles generated during processing may cause irritation of the skin, eyes, and respiratory tract. During processing, the most significant route of exposure is by the inhalation (breathing) of fumes and dust. If fumes are inhaled, they can cause a condition commonly known as metal fume fever with symptoms which resemble influenza; Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur.

Symptoms/Injuries After Skin Contact: Contact with fumes or metal powder will irritate skin. Skin contact with large amounts of dust may cause mechanical irritation. Contact with hot, molten metal will cause thermal burns.

Symptoms/Injuries After Eye Contact: During metal processing, dusts caused from milling and physical alteration will likely cause eye irritation. Fumes from thermal decomposition or molten material will likely be irritating to the eyes. Mechanical damage via flying particles and chipped slag is possible. Risk of thermal burns on contact with molten product.

Symptoms/Injuries After Ingestion: Ingestion is not considered a potential route of exposure. Ingestion is likely to be harmful or have adverse effects.

Chronic Symptoms: Molten material may produce fumes that are toxic, or irritating, and may cause metal fume fever. When machined or physically altered material may produce dusts or ribbons that may be irritating or harmful. Repeated exposure to tantalum alloys may cause fibrosis, chronic rhinitis and "hard metal pneumoconiosis". Chromium: Certain hexavalent chromium compounds have been demonstrated to be carcinogenic on the basis of epidemiological investigations on workers and experimental studies in animals. Increased incidences of respiratory cancer have been found in chromium (VI) workers. There is an increased incidence of lung cancer in industrial workers exposed to chromium (VI) compounds. Please refer to IARC volume 23 for a more detailed discussion. Repeated or long term inhalation of cobalt may cause asthma, irritation of the lungs. Ingestion of dust containing cobalt may cause damage to the thyroid, spleen, circulatory system include the blood, and heart. Cobalt: If respirable, cobalt dust may be fatal if inhaled. Cobalt may cause cancer, and is suspected of damaging fertility or the unborn child.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If you feel unwell, seek medical advice (show the label where possible).

SECTION 5: FIRE-FIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Dry sand. Earth. Class D Extinguishing Agent (for metal powder fires). Dry chemical (for oil or electric fires).

Unsuitable Extinguishing Media: If material is hot or in dust form, do not use a heavy water stream. Do not use water when molten material is involved, contact of hot product with water will result in a violent expansion as the water turns to steam causing explosion with massive force.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: The following applies to the product if it is cut, sanded or altered in such a way that excessive and/or significant particulates and/or dusts may be generated: Combustible Dust. Dust generated from processing may present a dust explosion hazard. Small chips, turnings, dust and fines from processing may be readily ignitable.

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Explosion Hazard: Product is not explosive, however in contact with incompatibilities may release explosive hydrogen gas.

Reactivity: Hazardous reactions will not occur under normal conditions.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use firefighting measures appropriate for the surrounding fire. Do not breathe fumes from fires or vapors from decomposition. Do not allow run-off from firefighting to enter drains or water courses.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Other Information: Refer to Section 9 for flammability properties.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Avoid breathing (vapors, dust, fumes). Avoid generating dust. Do not handle until all safety precautions have been read and understood.

6.1.1. For Non-emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

6.1.2. For Emergency Responders

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Upon arrival at the scene, a first responder is expected to recognize the presence of dangerous goods, protect oneself and the public, secure the area, and call for the assistance of trained personnel as soon as conditions permit.

6.2. Environmental Precautions

Prevent entry of dusts, chips and ribbon. to sewers and public waters. Notify authorities if any material enters sewers or public waters. Notify authorities if product enters sewers or public waters.

6.3. Methods and Material for Containment and Cleaning Up

For Containment: Contain and collect as any solid. Avoid generation of dust during clean-up of spills.

Methods for Cleaning Up: Clean up spills immediately and dispose of waste safely. If molten liquid is involved: allow liquid material to solidify before cleaning up. In solid/dust form: Vacuum clean-up is preferred. If sweeping is required use a dust suppressant. Vacuum must be fitted with HEPA filter to prevent release of particulates during clean-up. Carefully shovel or sweep up spilled material and place in suitable container. Contact competent authorities after a spill.

6.4. Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection. Concerning disposal elimination after cleaning, see item 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Additional Hazards When Processed: Avoid dust production. Dust generated from processing may present a dust explosion hazard. Chips, fines, and dust can react with water or incompatible materials forming explosive/flammable hydrogen gas. Molten material may react violently with water forming explosive or flammable reactions. A thermite reaction may also occur under certain conditions. This product contains components that are environmentally hazardous and small chips and dust from processing may be very toxic to aquatic life.

Precautions for Safe Handling: Do not handle until all safety precautions have been read and understood. Use appropriate personal protection equipment (PPE). Protect skin and eyes from contact with molten material.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Do not eat, drink or smoke when using this product.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Comply with applicable regulations. Avoid creating or spreading dust.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Store away from incompatible materials.

Incompatible Products: Strong acids. Strong bases. Strong oxidizers. Corrosive substances in prolonged contact with metals may produce flammable hydrogen gas. Water (when product is in dust/molten form). Halogens. Peroxides. Chlorates. Nitrates. Azides. Oils and lubricants - will deteriorate the strength of the product.

7.3. Specific End Use(s) For professional use only.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

For substances listed in section 3 that are not listed here, there are no established exposure limits from the manufacturer, supplier, importer, or the appropriate advisory agency including: ACGIH (TLV), AIHA (WEEL), NIOSH (REL), or OSHA (PEL).

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Cobalt (7440-48-4)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.02 mg/m ³
USA ACGIH	ACGIH chemical category	Confirmed Animal Carcinogen with Unknown Relevance to Humans
USA ACGIH	Biological Exposure Indices (BEI)	15 µg/l (Medium: urine - Time: end of shift at end of workweek - Parameter: Cobalt (nonspecific))
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.05 mg/m ³ (dust and fume)
USA IDLH	US IDLH (mg/m ³)	20 mg/m ³ (dust and fume)
USA OSHA	OSHA PEL (TWA) (mg/m ³)	0.1 mg/m ³ (dust and fume)
Chromium (7440-47-3)		
USA ACGIH	ACGIH TWA (mg/m ³)	0.5 mg/m ³
USA ACGIH	ACGIH chemical category	Not Classifiable as a Human Carcinogen
USA NIOSH	NIOSH REL (TWA) (mg/m ³)	0.5 mg/m ³
USA IDLH	US IDLH (mg/m ³)	250 mg/m ³
USA OSHA	OSHA PEL (TWA) (mg/m ³)	1 mg/m ³

8.2. Exposure Controls

Appropriate Engineering Controls

: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Avoid creating or spreading dust. Ensure that dust-handling systems (such as exhaust ducts, dust collectors, vessels, and processing equipment) are designed in a manner to prevent the escape of dust into the work area (i.e., there is no leakage from the equipment). Ensure adequate ventilation, especially in confined areas. When dry sawing or grinding, use dustless systems for handling, storage, and clean up so that airborne dust does not exceed the PEL. Practice good housekeeping. Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain, clean, and fit test respirators in accordance with OSHA regulations. Maintain and test ventilation and dust collection equipment. Wash or vacuum clothing which has become dusty. Ensure all national/local regulations are observed.

Personal Protective Equipment

: Protective goggles. Gloves. Protective clothing. Insufficient ventilation: wear respiratory protection.



Materials for Protective Clothing Hand Protection

: Dust: Wear suitable protective clothing.
: Wear chemically resistant protective gloves. If material is hot, wear thermally resistant protective gloves.

Eye Protection

: Chemical safety goggles.

Skin and Body Protection

: In case of dust production: dustproof clothing.

Respiratory Protection

: If exposure limits are exceeded or irritation is experienced, approved respiratory protection should be worn. Use NIOSH-approved dust mask if dust has the potential to become airborne.

Environmental Exposure Controls

: Avoid release to the environment.

Consumer Exposure Controls

: Do not eat, drink or smoke during use.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State	: Solid
Appearance	: Dark Gray
Odor	: No odor
Odor Threshold	: No data available
pH	: No data available
Evaporation Rate	: No data available
Melting Point	: No data available
Freezing Point	: No data available
Boiling Point	: No data available

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Flash Point	: No data available
Auto-ignition Temperature	: No data available
Decomposition Temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor Pressure	: No data available
Relative Vapor Density at 20 °C	: No data available
Relative Density	: No data available
Specific Gravity	: 12.0 - 15.5 (water=1)
Solubility	: No data available
Partition Coefficient: N-Octanol/Water	: No data available
Viscosity	: No data available

9.2. Other Information No additional information available

SECTION 10: STABILITY AND REACTIVITY

- 10.1. Reactivity:** Hazardous reactions will not occur under normal conditions.
- 10.2. Chemical Stability:** Stable under normal conditions.
- 10.3. Possibility of Hazardous Reactions:** Hazardous polymerization will not occur.
- 10.4. Conditions to Avoid:** Incompatible materials. Avoid creating or spreading dust.
- 10.5. Incompatible Materials:** Strong acids. Strong bases. Strong oxidizers. Corrosive substances in prolonged contact with metals may produce flammable hydrogen gas. Water (when product is in dust/molten form). Halogens. Peroxides. Chlorates. Nitrates. Azides. Water. Oils and lubricants.
- 10.6. Hazardous Decomposition Products:** Thermal decomposition can lead to release of irritating gases and vapors. Metal oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information On Toxicological Effects

Acute Toxicity: Not classified

Cobalt (7440-48-4)	
LD50 Oral Rat	215.9 - 1140 mg/kg
LC50 Inhalation Rat	> 10 mg/l (Exposure time: 1 h)
ATE (Oral)	215.90 mg/kg body weight

Chromium (7440-47-3)	
LD50 Oral Rat	> 5000 mg/kg
LC50 Inhalation Rat	> 5.41 mg/l/4h

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Not classified

Cobalt (7440-48-4)	
IARC group	2B
National Toxicology Program (NTP) Status	Evidence of Carcinogenicity.
OSHA Hazard Communication Carcinogen List	In OSHA Hazard Communication Carcinogen list.
Chromium (7440-47-3)	
IARC group	3

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Aspiration Hazard: Not classified

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Symptoms/Injuries After Inhalation: Dust particles generated during processing may cause irritation of the skin, eyes, and respiratory tract. During processing, the most significant route of exposure is by the inhalation (breathing) of fumes and dust. If fumes are inhaled, they can cause a condition commonly known as metal fume fever with symptoms which resemble influenza; Symptoms may be delayed 4-12 hours and begin with a sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms may include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalized feeling of malaise. Fever, chills, muscular pain, mild to severe headache, nausea, occasional vomiting, exaggerated mental activity, profuse sweating, excessive urination, diarrhea and prostration may also occur.

Symptoms/Injuries After Skin Contact: Contact with fumes or metal powder will irritate skin. Skin contact with large amounts of dust may cause mechanical irritation. Contact with hot, molten metal will cause thermal burns.

Symptoms/Injuries After Eye Contact: During metal processing, dusts caused from milling and physical alteration will likely cause eye irritation. Fumes from thermal decomposition or molten material will likely be irritating to the eyes. Mechanical damage via flying particles and chipped slag is possible. Risk of thermal burns on contact with molten product.

Symptoms/Injuries After Ingestion: Ingestion is not considered a potential route of exposure. Ingestion is likely to be harmful or have adverse effects.

Chronic Symptoms: Molten material may produce fumes that are toxic, or irritating, and may cause metal fume fever. When machined or physically altered material may produce dusts or ribbons that may be irritating or harmful. Repeated exposure to tantalum alloys may cause fibrosis, chronic rhinitis and "hard metal pneumoconiosis". Chromium: Certain hexavalent chromium compounds have been demonstrated to be carcinogenic on the basis of epidemiological investigations on workers and experimental studies in animals. Increased incidences of respiratory cancer have been found in chromium (VI) workers. There is an increased incidence of lung cancer in industrial workers exposed to chromium (VI) compounds. Please refer to IARC volume 23 for a more detailed discussion. Repeated or long term inhalation of cobalt may cause asthma, irritation of the lungs. Ingestion of dust containing cobalt may cause damage to the thyroid, spleen, circulatory system include the blood, and heart. Cobalt: If respirable, cobalt dust may be fatal if inhaled. Cobalt may cause cancer, and is suspected of damaging fertility or the unborn child.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - Water

: This product in its massive form does not pose an ecotoxicity hazard. If product is altered and powder, dust, fines, shavings, small particles, ribbons, or molten form are generated this product may be considered very toxic to aquatic life with long lasting effects.

Cobalt (7440-48-4)	
LC50 Fish 1	> 100 mg/l (Exposure time: 96 h - Species: Brachydanio rerio [static])

12.2. Persistence and Degradability No additional information available

12.3. Bioaccumulative Potential

Cobalt (7440-48-4)	
BCF fish 1	(no bioaccumulation)

12.4. Mobility in Soil No additional information available

12.5. Other Adverse Effects

Other Information

: Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

Additional Information: Reuse or recycle material whenever possible. If reuse or recycling is not possible, disposal must be made according to local or governmental regulations.

SECTION 14: TRANSPORT INFORMATION

14.1. In Accordance with DOT Not regulated for transport

14.2. In Accordance with IMDG Not regulated for transport

14.3. In Accordance with IATA Not regulated for transport

SECTION 15: REGULATORY INFORMATION

15.1 US Federal Regulations

Tungsten carbide (12070-12-1)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	

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Tantalum carbide (TaC) (12070-06-3)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Titanium carbide (TiC) (12070-08-5)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Niobium carbide (NbC) (12069-94-2)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Cobalt (7440-48-4)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
SARA Section 311/312 Hazard Classes	Immediate (acute) health hazard Delayed (chronic) health hazard
SARA Section 313 - Emission Reporting	0.1 %
Chromium (7440-47-3)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Subject to reporting requirements of United States SARA Section 313	
SARA Section 313 - Emission Reporting	1.0 %
15.2 US State Regulations	
Cobalt (7440-48-4)	
U.S. - California - Proposition 65 - Carcinogens List	WARNING: This product contains chemicals known to the State of California to cause cancer.
Tungsten carbide (12070-12-1)	
RTK - U.S. - New Jersey - Right to Know Hazardous Substance List	
Cobalt (7440-48-4)	
U.S. - California - SCAQMD - Toxic Air Contaminants With Proposed Risk Values U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728) U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min) U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr) U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs) U.S. - Idaho - Occupational Exposure Limits - TWAs U.S. - Illinois - Toxic Air Contaminant Carcinogens U.S. - Illinois - Toxic Air Contaminants U.S. - Maine - Air Pollutants - Hazardous Air Pollutants U.S. - Maine - Chemicals of High Concern U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1 U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2 U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1 U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2 RTK - U.S. - Massachusetts - Right To Know List U.S. - Massachusetts - Toxics Use Reduction Act U.S. - Michigan - Occupational Exposure Limits - TWAs U.S. - Minnesota - Chemicals of High Concern U.S. - Minnesota - Hazardous Substance List U.S. - Minnesota - Permissible Exposure Limits - TWAs U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances U.S. - New Jersey - Environmental Hazardous Substances List RTK - U.S. - New Jersey - Right to Know Hazardous Substance List U.S. - New Jersey - Special Health Hazards Substances List U.S. - New Mexico - Water Quality - Standards for Ground Water of 10,000 mg/L TDS Concentration or Less U.S. - New York - Occupational Exposure Limits - TWAs U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour U.S. - Oregon - Permissible Exposure Limits - TWAs	

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U.S. - California - Safer Consumer Products - Initial List of Candidate Chemicals and Chemical Groups
 RTK - U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
 RTK - U.S. - Pennsylvania - RTK (Right to Know) List
 U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - Annual
 U.S. - Tennessee - Occupational Exposure Limits - TWAs
 U.S. - Texas - Effects Screening Levels - Long Term
 U.S. - Texas - Effects Screening Levels - Short Term
 U.S. - Vermont - Permissible Exposure Limits - TWAs
 U.S. - Washington - Permissible Exposure Limits - STELS
 U.S. - Washington - Permissible Exposure Limits - TWAs
 U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
 U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
 U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
 U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

Chromium (7440-47-3)

U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)
 U.S. - Colorado - Hazardous Wastes - Maximum Concentration for the Toxicity Characteristics
 U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Level Goals (MCLGs)
 U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Levels (MCLs)
 U.S. - Connecticut - Drinking Water Quality Standards - Groundwater Sources
 U.S. - Connecticut - Drinking Water Quality Standards - Maximum Contaminant Levels
 U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
 U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
 U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
 U.S. - Florida - Drinking Water Standards - Inorganic Contaminants - Maximum Contaminant Levels (MCLs)
 U.S. - Georgia - Drinking Water - Maximum Contaminant Levels (MCLs)
 U.S. - Idaho - Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
 U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
 U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
 U.S. - Idaho - Occupational Exposure Limits - TWAs
 U.S. - Illinois - Toxic Air Contaminants
 U.S. - Louisiana - Reportable Quantity List for Pollutants
 U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
 U.S. - Maryland - Surface Water Quality Standards - Consumption of Water and Organisms
 U.S. - Massachusetts - Allowable Ambient Limits (AALs)
 U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)
 U.S. - Massachusetts - Drinking Water - Maximum Contaminant Levels (MCLs)
 U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
 U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
 U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
 U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
 U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
 RTK - U.S. - Massachusetts - Right To Know List
 U.S. - Massachusetts - Threshold Effects Exposure Limits (TELEs)
 U.S. - Massachusetts - Toxics Use Reduction Act
 U.S. - Michigan - Occupational Exposure Limits - TWAs
 U.S. - Michigan - Polluting Materials List
 U.S. - Minnesota - Hazardous Substance List
 U.S. - Minnesota - Permissible Exposure Limits - TWAs
 U.S. - Missouri - Drinking Water - Maximum Contaminant Levels (MCLs)
 U.S. - Nebraska - Drinking Water - Maximum Contaminant Levels (MCLs)
 U.S. - Nebraska - Maximum Concentration of Contaminants for the Toxicity Characteristic
 U.S. - New Hampshire - Drinking Water - Maximum Contaminant Levels (MCLs)
 U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour
 U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual
 U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
 U.S. - New Jersey - Environmental Hazardous Substances List

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- U.S. - New Jersey - Primary Drinking Water Standards - Maximum Contaminant Levels - MCLs
- RTK - U.S. - New Jersey - Right to Know Hazardous Substance List
- U.S. - New Jersey - Special Health Hazards Substances List
- U.S. - New Jersey - Water Quality - Ground Water Quality Criteria
- U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)
- U.S. - New Mexico - Water Quality - Standards for Ground Water of 10,000 mg/L TDS Concentration or Less
- U.S. - New York - Occupational Exposure Limits - TWAs
- U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
- U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
- U.S. - North Dakota - Hazardous Wastes - Maximum Concentration for the Toxicity Characteristic
- U.S. - Oregon - Permissible Exposure Limits - TWAs
- U.S. - Pennsylvania - Drinking Water - Maximum Contaminant Levels (MCLs)
- RTK - U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
- RTK - U.S. - Pennsylvania - RTK (Right to Know) - Special Hazardous Substances
- RTK - U.S. - Pennsylvania - RTK (Right to Know) List
- U.S. - South Carolina - Maximum Contaminant Levels (MCLs)
- U.S. - Tennessee - Occupational Exposure Limits - TWAs
- U.S. - Texas - Drinking Water Standards - Maximum Contaminant Levels (MCLs)
- U.S. - Texas - Effects Screening Levels - Long Term
- U.S. - Texas - Effects Screening Levels - Short Term
- U.S. - Utah - Drinking Water - Maximum Contaminant Levels (MCLs)
- U.S. - Vermont - Hazardous Waste - Hazardous Constituents
- U.S. - Vermont - Hazardous Waste - Maximum Contaminant Concentration for Toxicity
- U.S. - Vermont - Permissible Exposure Limits - TWAs
- U.S. - Washington - Dangerous Waste - Dangerous Waste Constituents List
- U.S. - Washington - Permissible Exposure Limits - TWAs
- U.S. - West Virginia - Water Quality - Groundwater Standards - Ceiling Concentrations
- U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
- U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
- U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
- U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

SECTION 16: OTHER INFORMATION, INCLUDING DATE OF PREPARATION OR LAST REVISION

Revision Date : 10/21/2015
Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 4 (Oral)	Acute toxicity (oral) Category 4
Aquatic Chronic 1	Hazardous to the aquatic environment - Chronic Hazard Category 1
Carc. 1B	Carcinogenicity Category 1B
Comb. Dust	Combustible Dust
Eye Irrit. 2A	Serious eye damage/eye irritation Category 2A
Flam. Sol. 1	Flammable solids Category 1
Repr. 2	Reproductive toxicity Category 2
Resp. Sens. 1B	Respiratory sensitisation Category 1B
Skin Sens. 1	Skin sensitization Category 1
H228	Flammable solid
Comb. Dust	May form combustible dust concentrations in air
H302	Harmful if swallowed
H317	May cause an allergic skin reaction
H319	Causes serious eye irritation
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled
H350	May cause cancer

Cemented Carbide

Safety Data Sheet

According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

H361	Suspected of damaging fertility or the unborn child
H410	Very toxic to aquatic life with long lasting effects

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SDS US (GHS HazCom)

How does the Securities and Exchange Commission Rule for Disclosing use of Conflict Minerals affect XCAL INDUSTRIES?

XCAL INDUSTRIES is not required to comply with the reporting obligations of the SEC rule for disclosing use of conflict minerals*) (referred to herein as the “Conflict Minerals Rule”). The Conflict Mineral Rule applies to companies that are required to file reports with the Securities and Exchange Commission (the SEC) under Sections 13(a) or 15(d) of the Securities Exchange Act of 1934 (“Exchange Act”).

XCAL INDUSTRIES is not required to file reports under either Sections 13(a) or 15(d) of the Exchange Act and therefore is not subject to the Conflict Mineral Rule. However, it is likely that customers of XCAL INDUSTRIES are subject to the Conflict Minerals Rule and will be looking to XCAL INDUSTRIES as a supplier for information pertaining to the point of origination of tin, tungsten, tantalum or gold (collectively referred to as “conflict minerals”). Therefore, XCAL INDUSTRIES should act according and avoid purchasing minerals from sources that are not with certainty known to be free from unethical or illegal activities. XCAL INDUSTRIES should also undertake to identify whether any conflict minerals used in its products or materials originate in the Democratic Republic of the Congo or its adjoining countries: Angola, Burundi, Central African Republic, the Republic of the Congo, Rwanda, South Sudan, Tanzania, Uganda and Zambia (collectively referred to as the “Covered Countries”).

*) the origin of these rules is the US Dodd-Frank Act.

Do XCAL INDUSTRIES products use or contain any conflict minerals?

Yes. XCAL INDUSTRIES uses tungsten and (to a lesser extent) tantalum in their production.

Is there any tantalum or tungsten from the Covered Countries in XCAL INDUSTRIES products?

Suppliers contracted by XCAL INDUSTRIES to supply tungsten and/or tantalum all state that they are not purchasing any raw material from the Covered Countries.

How does XCAL INDUSTRIES determine that there are no conflict minerals in the products?

XCAL INDUSTRIES has spoken to each of its suppliers of conflict minerals, has received representations that the conflict minerals did not originate from the Covered Countries, and is not aware of any information that suggests that any of the representations received from its suppliers are false.

Is it possible for XCAL INDUSTRIES products to contain conflict minerals originating in the Covered Countries?

XCAL INDUSTRIES has sought and received representations from each of its suppliers of conflict minerals that such conflict minerals did not originate in the Covered Countries. Further, XCAL INDUSTRIES is not aware of any information that suggests that any of the representations received from its suppliers are false. Therefore, XCAL INDUSTRIES has no reason to believe that any of its products or materials contain conflict minerals that originated in the Covered Countries.

Are there any industry initiatives related to compliance with the Conflict Mineral Rule?

The tungsten industry is working on a joint global initiative to establish common procedures for securing full compliance with the Conflict Minerals Rule. The ambition is that it will become the industry standard for Tungsten. The initiative is known as the TI-CMC (Tungsten Industry – Conflict Mineral Commitment).

What is Tungste-Met's approach to Conflict Minerals?

XCAL INDUSTRIES condemns all activities in the raw material sector connected to illegal or unlawful exploitation of ores and that directly or indirectly finances or benefits armed groups in conflict areas.

XCAL INDUSTRIES fully supports the activities of the Organisation for Economic Co-operation and Development (OECD) to avoid the use of raw materials which finance armed groups in the Democratic Republic of Congo (DRC) or neighbouring countries.

XCAL INDUSTRIES is committed to supporting its customers in their compliance with the Conflict Minerals Rule.

TERMS AND CONDITIONS OF SALE

General – The terms and conditions contained herein constitute the entire agreement between Remet Products, Inc., dba Tungste-Met, (referred to as Tungste-Met or Seller) and its Customer. Tungste-Met will not be bound by any terms of the Customer's order to purchase. No form of acceptance except Tungste-Met's written acknowledgement sent to the Customer, or Tungste-Met's commencement of performance, shall constitute valid acceptance of the Customer's order. Any such acceptance is expressly conditioned on assent to the terms hereof and the exclusion of all other terms. The Customer shall be deemed to have assented to the terms hereof, whether or not previously received, upon accepting delivery of any products shipped by Tungste-Met. Tungste-Met shall not be liable for delay or failure in performance whatsoever due to acts of God, shortage of supplies, transportation difficulties, labor disputes, riots, war, fire, explosion, epidemics, or other occurrences beyond Tungste-Met's reasonable control or due to unforeseen circumstances. Tungste-Met makes no claim as to the suitability for purpose of its product, nor does Tungste-Met make any guarantees with respect to the level of performance of its product utilized in any given application or use by its Customer.

Pricing- Price quotations are valid for 30 days. Quantity price discounts may apply to purchase orders with single or multiple ship dates for up to one year. Quantity discount rates may vary depending on product type. Tungste-Met may change its pricing at any time without prior notice to Customer, but such changes shall not affect any accepted orders with the exception of blanket purchase orders. Tungste-Met may amend the price for any subsequent shipment of a blanket purchase order by providing the Customer thirty days written notice prior to shipment. The Customer may cancel any shipment of goods for which the price has risen by giving Tungste-Met written notice fifteen days (15) prior to scheduled shipment date. All prices are exclusive of taxes and all handling or other charges, including (without limitation), brokerage fees, tariffs, taxes, and transportation charges.

Order Acceptance- Written purchase orders are recommended for all purchases but not required. Verbal purchase orders will also be taken. Each purchase order shall constitute a firm offer and shall indicate specific products, quantity, price, shipping instructions, requested delivery dates, bill to and ship to addresses and any other special instructions. Any contingencies contained on such order are not binding upon Tungste-Met. All orders are subject to acceptance by Tungste-Met, who will accept or reject orders according to Tungste-Met's then current practices. The minimum order for any non-stock order is \$100, with the exception of test orders.

Order Changes and Cancellations – Purchase order changes affecting product configuration/options must be authorized by Tungste-Met in advance and may be subject to additional charges and/or price adjustments. Maximum period a blanket purchase order is valid is twelve (12) months. Changes to delay scheduled ship dates for blanket purchase orders must be made at least four (4) weeks in advance. Order cancellations are subject to cancellation penalties and price adjustments for specialty products already produced. Purchaser is obligated to accept any product built specifically for the Customer and held in inventory at Tungste-Met.

Delivery & Shipment – Upon receipt of purchase order, Tungste-Met will provide an estimate of lead-time until delivery. While this is not a binding commitment, Tungste-Met will make every effort to make delivery based on this lead-time estimate. Each shipment released from a blanket purchase order must be at least equal to \$500 or 8% of the order total, whichever is larger unless special arrangements are approved. Accelerated deliveries may be available with an expedite fee. Late delivery does not entitle the Customer to cancel the order or to claim damages resulting from any delay. Tungste-Met is not obligated to pay any contractual penalty should it delay in delivering product. All shipments are FOB shipping point. Shipping costs and the risk of loss from FOB point are the responsibility of the Customer. Tungste-Met shall be permitted to make partial shipments of products. Delivery shall be deemed completed upon transfer of possession to the carrier at the FOB point. The Customer should conduct any required inspection at its expense. All claims for shortage of products ordered or for incorrect charges must be presented to Tungste-Met within ten (10) calendar days after receipt by Customer.

Taxes – The Customer shall be responsible for and shall pay to the Seller, or if requested by the Seller, directly to the taxing authority, all applicable taxes, fees, levies, imports, duties, withholdings or other (including any interest and penalties thereon), if any imposed by any taxing authority by reason of sale and delivery of the Product. At Tungste-Met's option, prices may be adjusted to reflect any increase in the costs to Tungste-Met resulting from state, federal or local legislation.

Payment - Payment for all products and services shall be in U.S. dollars. Upon credit approval by Tungste-Met, payment terms shall be net thirty (30) days from the date of invoice. Orders may be subject to payment in advance or cash on delivery. Any delinquent invoice is subject to additional charges not to exceed the maximum permitted by law. First time Customers must have an approved credit application or must pay by credit card or COD. Any amounts unpaid and past due will be subject to a service charge on the unpaid balance at an interest rate equal to the lesser of 18% per annum or the maximum allowable interest rate under the applicable law. The Customer shall be responsible and liable for all expenses incurred by Tungste-Met in collection, including reasonable attorneys' fees. Tungste-Met may suspend and refuse shipment of goods in the event that the Customer's account with Tungste-Met is past due. Tungste-Met may also reject any future or pending orders while the Customer's account is past due.

Returns - We at Tungste-Met stand behind the quality and consistency of our product. We are continually upgrading our quality program; however if for any reason our product is not correct or found to be defective, we will be happy to correct or replace the questionable product to meet your specification or lastly refund your purchase. In order to receive full credit for the items, you must return the product no later than ninety (90) days after the receipt of shipment. If the product is discovered to be incorrect subsequent to the ninety-day policy, Tungste-Met reserves the right to give no credit or pay scrap value for the returned product. If no product is returned, Tungste-Met is not obligated for any refund.

Credits - Credits issued by Tungste-Met to the Customer on account of returns, allowances or otherwise are valid only if issued in writing by Tungste-Met. All credits must be utilized by the Customer against the purchase of goods or services from within one year of the credit's issuance date or they shall be rescinded. In no event shall credits, whether or not utilized within the aforesaid period, be refundable in cash.

TERMS AND CONDITIONS OF SALE

Tungste-Met shall have the right to apply all outstanding credits against amounts that may be due to Tungste-Met from the Customer at any time and from time to time.

Warranty – No warranty or guarantee, express or implied, including any warranty as to merchantability or fitness for any purpose is made.

Safety and Limitation of Liability - Purchaser is responsible for determining appropriate safety practices when installing our product into the Customer's product. No warranty, condition or representation, express, oral, or statutory, is provided to the Customer or any third party, including (without limitation) any warranty, condition or representation (a) of merchantability, fitness for a particular purpose, satisfactory quality, or arising from a course of dealing, usage, or trade practice; or (b) that the products will be free from infringement or violation of any rights, including intellectual property rights of third parties. In no event shall Tungste-Met be liable to the Customer, or any third party, for any other special, consequential, incidental, exemplary or indirect costs or damages in connection with, or as a result of the sale, performance, non-performance, delivery or non-delivery of the product, including without limitation, legal costs, installation and removal costs, production or profit arising from any cause whatsoever, regardless of the form of the action, whether in contract, tort (including negligence), strict liability or otherwise, even if advised of the possibility of such costs or damages. For the purposes of this provision, Tungste-Met includes Tungste-Met's directors, officers, employees, agents, representatives, subcontractors, and suppliers. The Customer's sole and exclusive remedy for breach or any other claim in connection with this Agreement or the Product sold pursuant to this Agreement shall be for a refund of the Total Purchase Price.

Export Orders – Customer shall obtain all licenses, permits and approvals required by any government and shall comply with all applicable laws, rules, policies and procedures of the applicable government and other competent authorities. Customer shall indemnify and hold Tungste-Met harmless for any violation or alleged violation by Customer of such laws, rules, policies, or procedures. Customer shall not export or re-export, directly or indirectly, separately or as part of any system, the Products or any technical data received from Tungste-Met, without first obtaining any license required by the applicable government, including (without limitation) the United States government and/or any other applicable competent authority. Customer also certifies that none of the products or technical data supplied by Tungste-Met will be sold or otherwise transferred to, or made available for use by or for, any entity that is engaged in the design, development, production, or use of nuclear, biological, or chemical weapons or missile technology.

Jurisdiction – The validity, interpretation and performance of this agreement shall be governed by and construed under the applicable laws of the State of West Virginia and the United States of America, as if performed wholly within the state and without giving effect to the principles of conflict of laws. The parties specifically disclaim the application of the United Nations Convention on Contracts for the International Sale of Goods. Tungste-Met and Customer hereby irrevocably and unconditionally submit to the jurisdiction of the courts of the State of West Virginia and all courts competent to hear appeal there from.



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