

CGI IN-HOUSE PRINT---DO NOT REPRODUCE



Carbide Grinding Company, Inc.

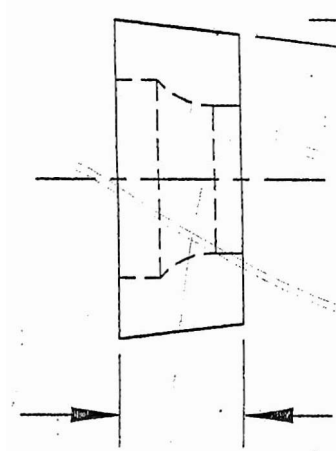
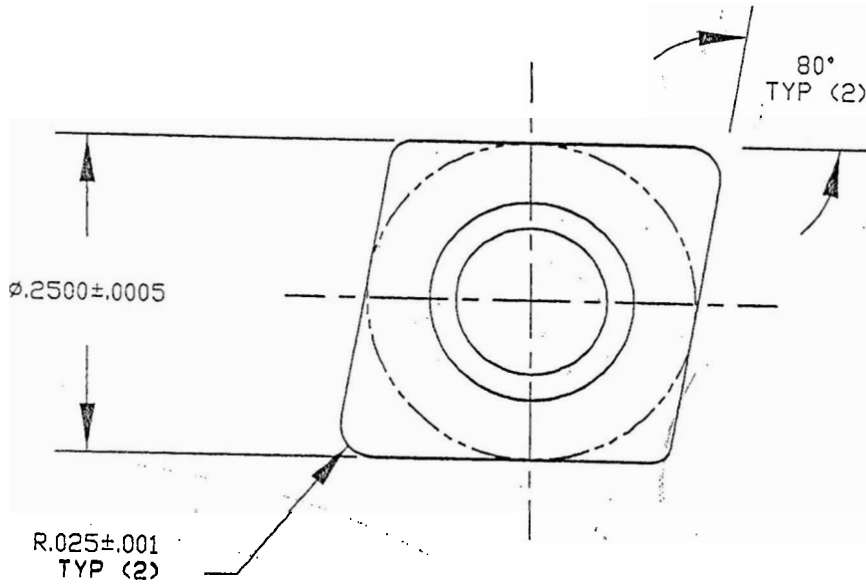
1136 DILTS STREET P. O. BOX 175 CHESTERFIELD, INDIANA 46017  
(765) 378-3309 FAX (765) 378-5150

TOLERANCES  
 ANGLES  $\pm 0^\circ 30'$   
 1 PLACE DECIMAL  $\pm .1$   
 2 PLACE DECIMAL  $\pm .01$   
 3 PLACE DECIMAL  $\pm .001$   
 (UNLESS OTHERWISE SPECIFIED)

SIZE A	DRAWN BY CGI CAD/CNC	PRINT FOR FORD REF. #84-013-945	REV
PRINT FILE		SCALE N/A	DATE 12/05/2007



ACTUAL SIZE



DRAWING NO. 9ZC-7031  
C SHEET 001

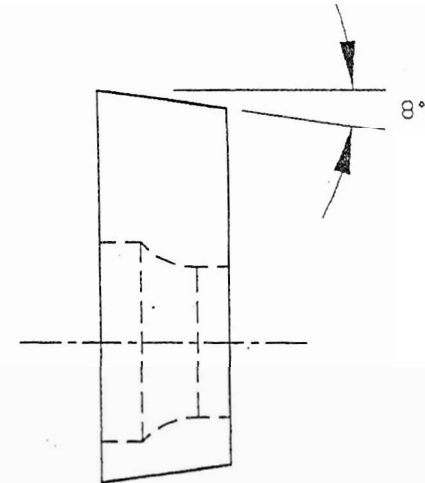
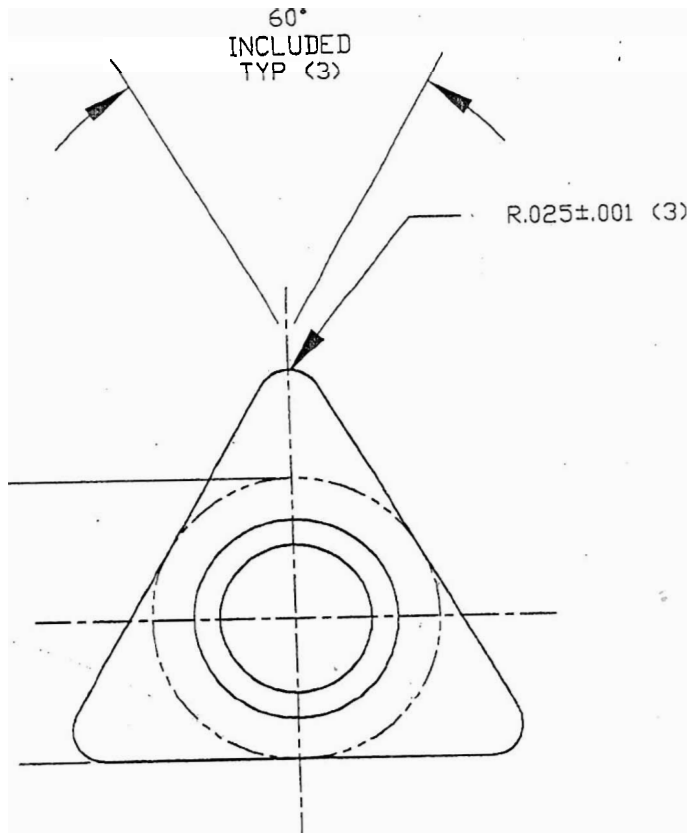
① INSERT  
 MAT'L: C2 CARBIDE  
 BLANK: CNRM-21.50  
 COATING: TITANIUM-ALUMINUM NITRIDE (TIAL)  
 FINISH: GRIND

1	1	1	CARBIDE INSERT	CNRM21.50 C2	
AMT.	SYM.	SHEET	NAME OR STOCK SIZE	MATERIAL	WT. LBS.
PART NO. -3K744-			SHEET 1	SHEETS 1	DRAWING NO. 9ZC-7031
DES. BY JDC	DET. BY JDC	TITLE TURMAT DP20, STA 8.3 FINISH BORE PUMP HOUSING MACHINING			
CHECKED BY	SAFETY OK				
DATE 07/20/05	SCALE 10:1	DIVISION: TRANSMISSION AND CHASSIS		PLANT: INDIANAPOLIS	
		LOCATION/ACTIVITY: INDIANAPOLIS			

APPROVED BY	DATE	DRAWING NO.	PART NO.
THIS SHEET ALSO USED FOR			
DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED: MILLIMETRES                      INCHES 1 PLACE : 0.3 mm                      2 PLACE : .01 2 PLACE : 0.03 mm                      3 PLACE : .001 3 PLACE : 0.015 mm                      4 PLACE : .0005			
		 3rd ANGLE PROJECTION	
MARK IDENTIFICATION AND MATERIAL NUMBERS ON TOOL DETAILS. PAINT IDENTIFICATION NUMBERS ON STRUCTURAL WORK.			
DO NOT SCALE DRAWING			



ACTUAL SIZE



DRAWING NO. 9ZC-7030  
C SHEET 001

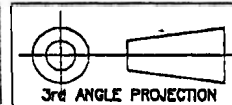
① INSERT  
 MAT'L: C2 CARBIDE  
 BLANK: TRNW21.50  
 COATING: TITANIUM-ALUMINUM NITRIDE (TiAlN)  
 FINISH: GRIND

AMT.	SYM.	SHEET	NAME OR STOCK SIZE	MATERIAL	WT. LBS.
1	1	1	CARBIDE INSERT	TRNW21.50 C2	
PART NO.			DRAWING NO.		
-3K744-			9ZC-7030		
DES. BY	DET. BY	TITLE			
JDC	JDC	TURMAT OP20, STA 8.3			
CHECKED BY	SAFETY OK	FINISH BORE			
		PUMP HOUSING MACHINING			
DATE	SCALE	DIVISION:		TRANSMISSION AND CHASSIS	
07/20/05	10:1	PLANT:		INDIANAPOLIS	
		LOCATION/ACTIVITY:		INDIANAPOLIS	

APPROVED BY	DATE	DRAWING NO.	PART NO.
		THIS SHEET ALSO USED FOR	

DIMENSIONAL TOLERANCES UNLESS OTHERWISE SPECIFIED:

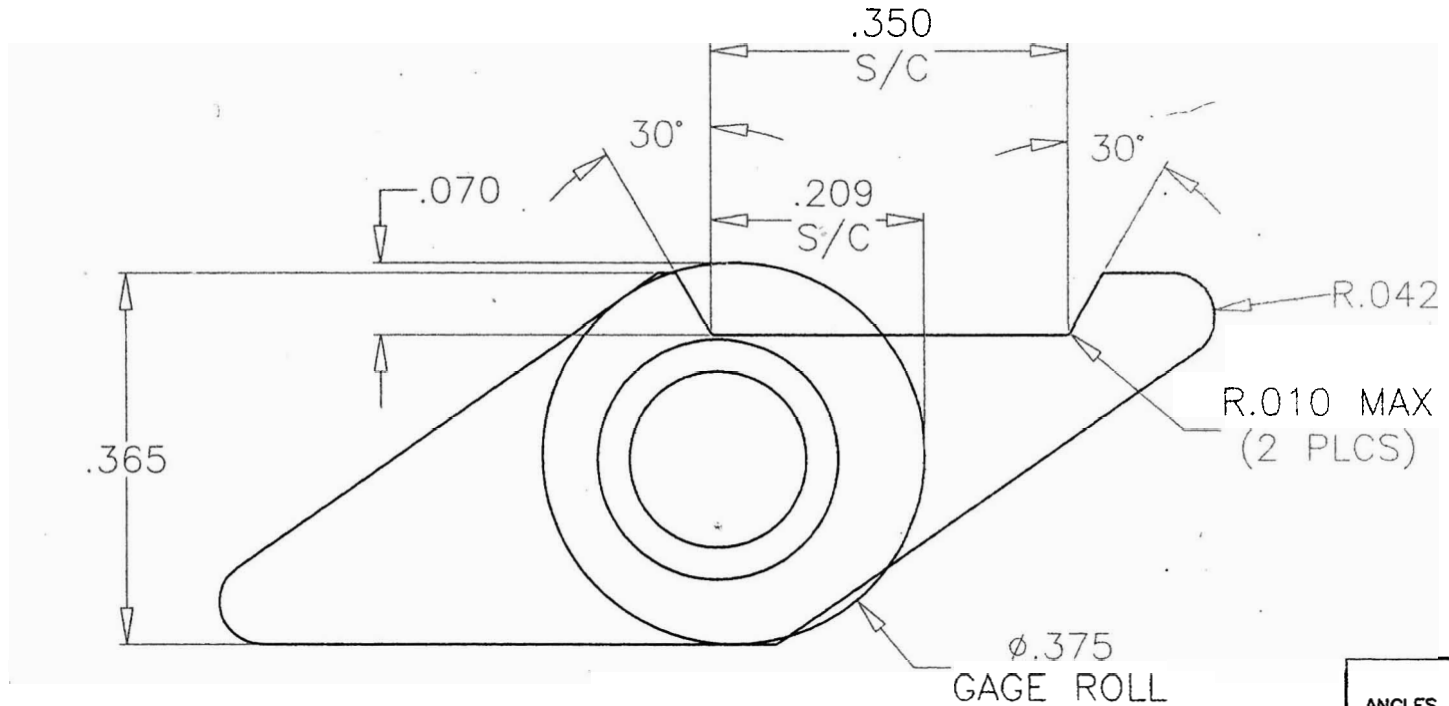
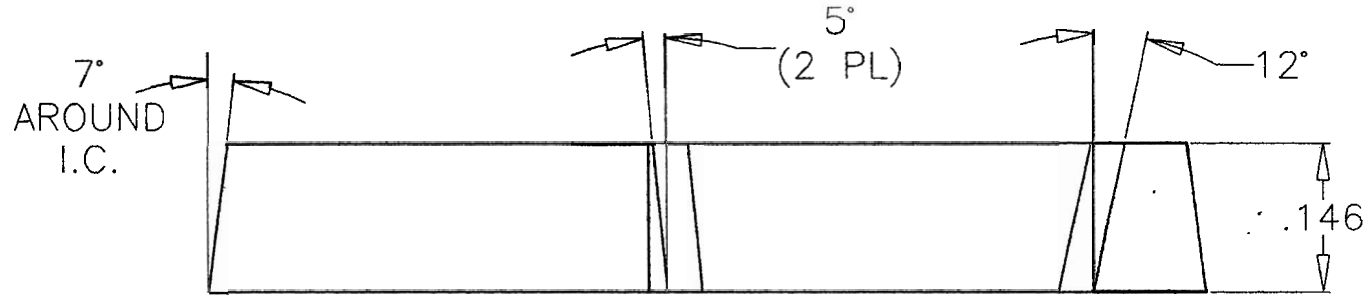
MILLIMETRES	INCHES
1 PLACE : 0.3 mm	2 PLACE : .01
2 PLACE : 0.03 mm	3 PLACE : .001
3 PLACE : 0.015 mm	4 PLACE : .0005



MARK IDENTIFICATION AND MATERIAL NUMBERS ON TOOL DETAILS.  
 PAINT IDENTIFICATION NUMBERS ON STRUCTURAL WORK.

DO NOT SCALE  
 DRAWING





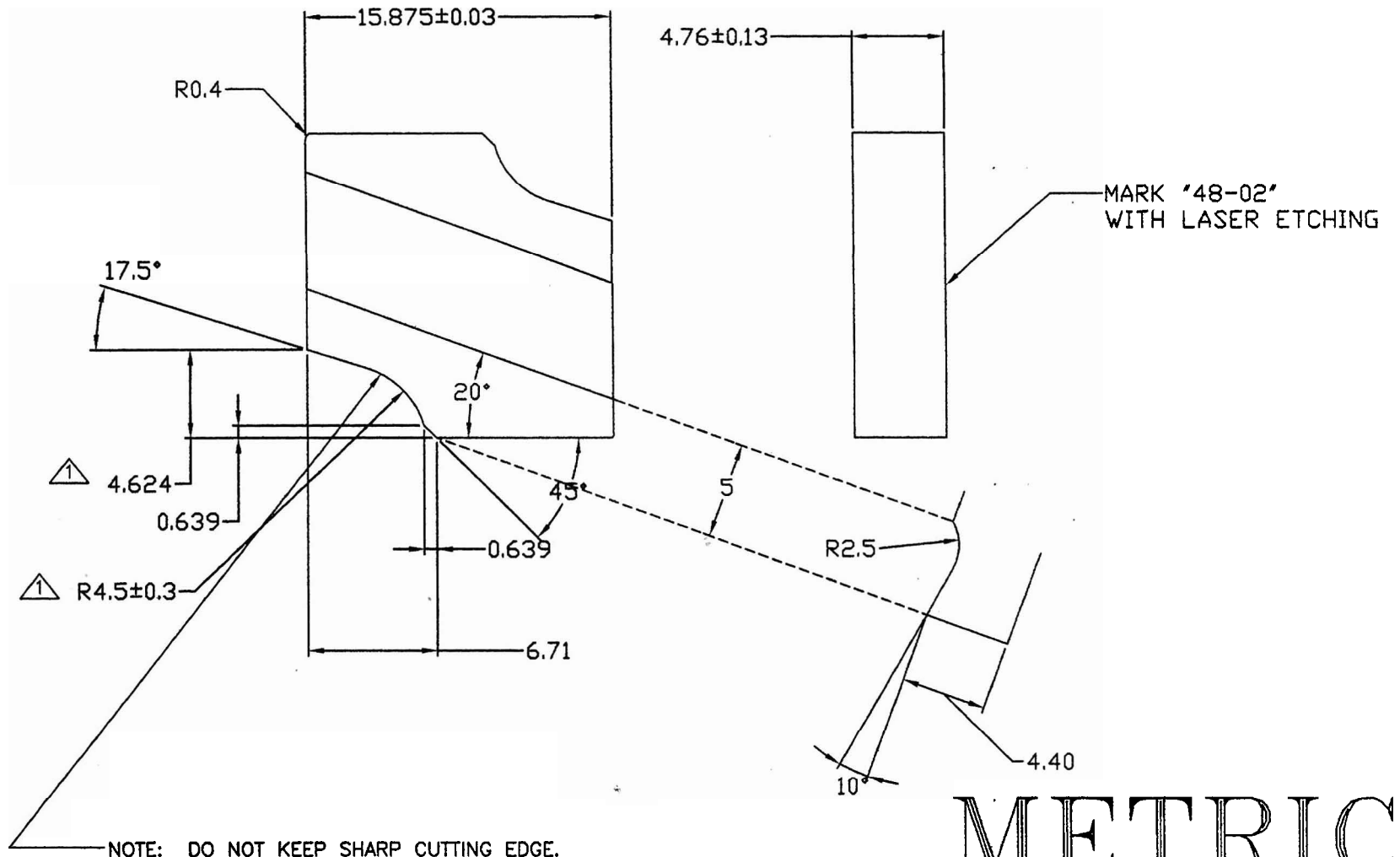
TOLERANCES  
 ANGLES  $\pm 0.30^\circ$   
 1 PLACE DECIMAL  $\pm .1$   
 2 PLACE DECIMAL  $\pm .01$   
 3 PLACE DECIMAL  $\pm .001$   
 (UNLESS OTHERWISE SPECIFIED)



Carbide Grinding Company, Inc.

1138 DILTS STREET P. O. BOX 175 CHESTERFIELD, INDIANA 46017  
 (765) 378-3309 FAX (765) 378-5150

SIZE	DRAWN BY	TITLE
A	A. COOPER	T & D
DRAWING NO. 183040 (VCGX-1608239-2A-1B)		DATE 08/11/2006

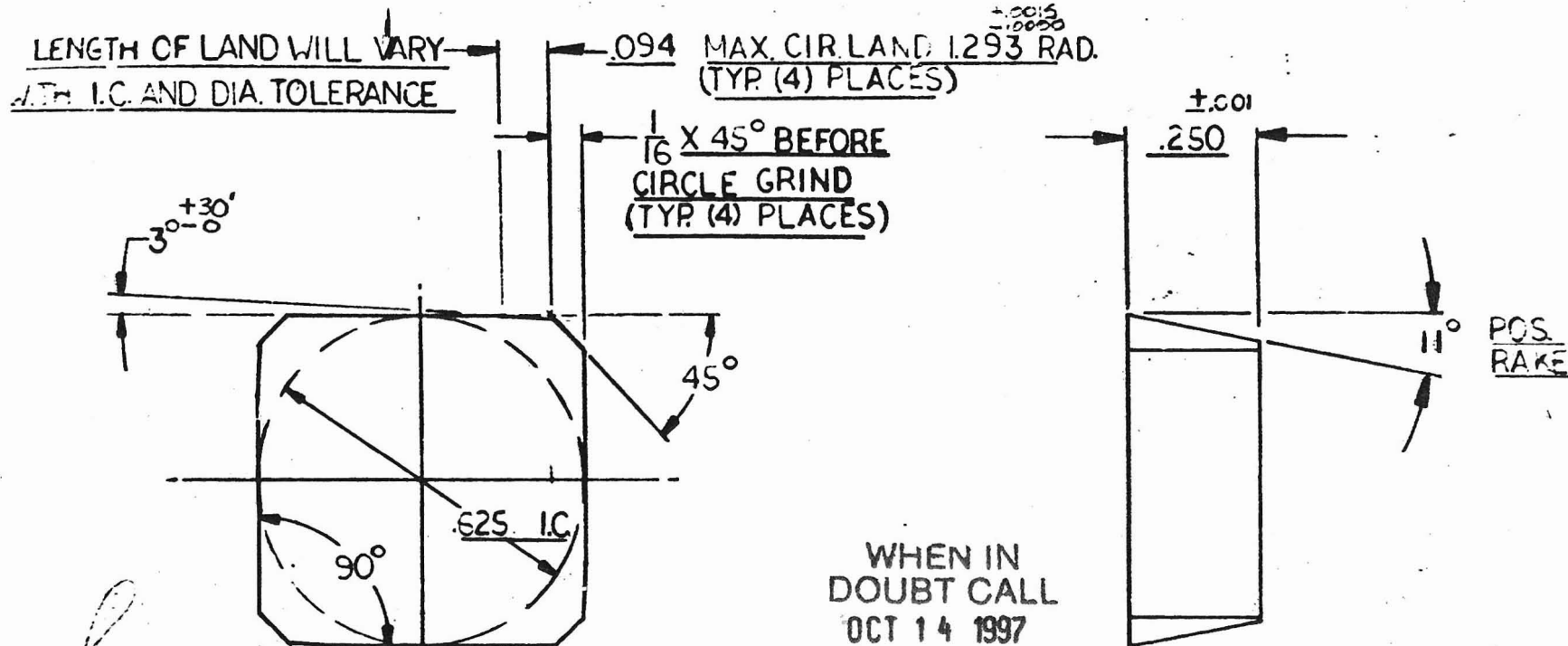


△ REVISE DIMENSIONS PER CUSTOMER REQUEST  
5-9-05 CAS

# METRIC

SCALE	TOLERANCES NOT SHOWN ARE:				MATERIAL	SCALE	TITLE	
	NOML SIZE	TOL.	NOML SIZE	TOL.				
METRIC [INCH] METRIC [INCH]	OVER INCLUDE		OVER INCLUDE		HEAT TREAT	NTS	NSK CORPORATION 1112 E. KITCHEL RD. LIBERTY, INDIANA 47353	
	0 ~ 50	±0.10	200 ~ 500	±0.30		DRAWN		CAS
	50 ~ 100	±0.15	500 ~ 1000	±0.50		DATE		
100 ~ 200	±0.20	1000 ~ 2000	±1.00	ANGULAR DIM. ±	CHECKED	PARTS LIST NO.		
PARTS MUST BE MARKED WITH DRAWING NO.	SURFACE FINISH SYMBOLS						DRAWING NO.	
	SYM.	Ra(μINCH)	SYM.	Ra(μINCH)			48-02.MAJOR.CHAMFER	
	▽	125	▽▽ (G)					
▽▽	32	▽▽▽	4					

014-600-00192



WHEN IN DOUBT CALL  
OCT 14 1997

**NOTE 6**  
INSERT TO BE CIRCLE GROUND IN A HOLDER THAT WILL PRODUCE A 1.293  $\begin{matrix} +.0015 \\ -.0000 \end{matrix}$  RAD. X .094 LENGTH LAND.

MAKE FROM TOOL DESIGN-CEP  
VALENITE  
# SPC-54 A  
GRADE: VC-24

M DEC 12 1989

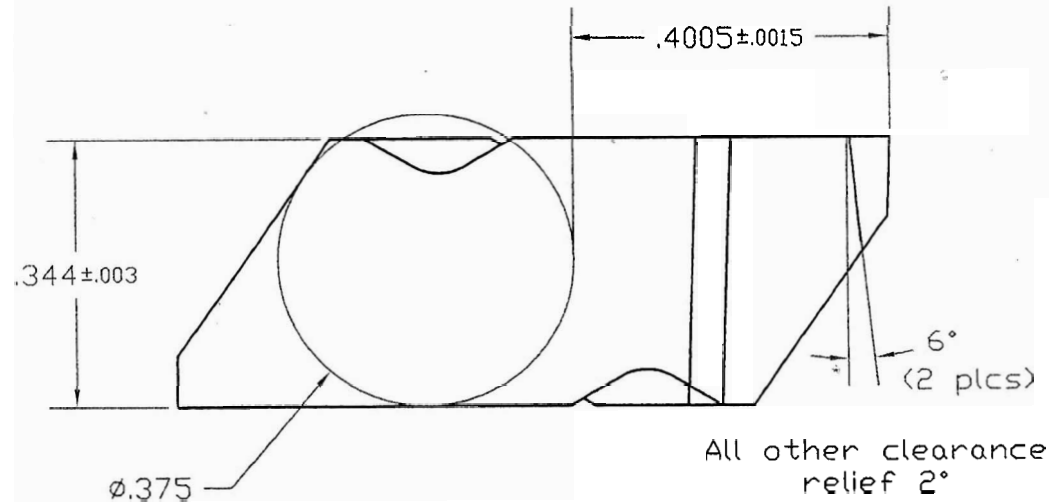
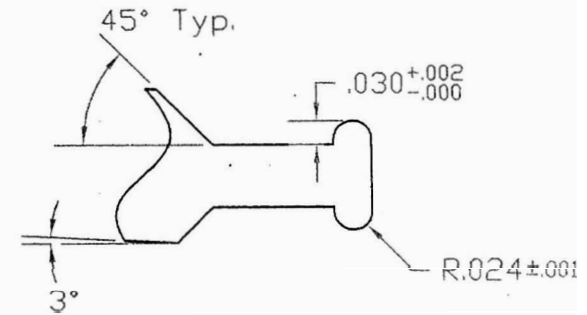
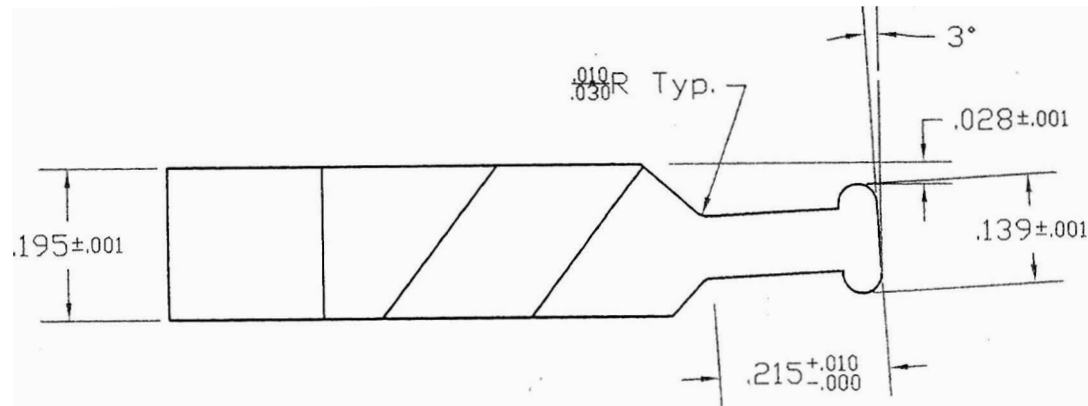
ALL INSERTS MUST BE THE SAME

OLD # 114-CT1-382-1  
USED WITH TL# 679 THRU 683-180904

014-600-00192

STANDARD TOLERANCE UNLESS OTHERWISE SPECIFIED			
MILLIMETER		INCH	
WHOLE NO.	± .5	FRACTIONAL	± .020
1 PLC. DEC.	± .2	2 PLC. DEC.	± .008
2 PLC. DEC.	± .03	3 PLC. DEC.	± .001
3 PLC. DEC.	± .013	4 PLC. DEC.	± .0005
ANGLES ± 1/4°			
MARK ON TOOL NO. AND PART NOS. BREAK ALL SHARP CORNERS AND EDGES UNLESS OTHERWISE SPECIFIED.			

DET.	DESCRIPTION	STOCK; FIN. ALLOWED	MAT.	INT. TR.	REQ'D
BILL OF MATERIAL ONE TDR# 52497					
CUMMINS ENGINE CO.					
TOOL DESIGN		COLUMBUS, INDIANA			
TOOL NAME VALENITE CARBIDE INSERT					
FOR:					
OPER:					
MACHINE:					
					DATE OCT. 14, 1980
DR.	S. PAYNE	SCALE 3x SIZE	PART No.		
CR.	FLORA	No. OF SHEETS 1	TOOL No. 014-600-00192		
APP.		SHEET No. 1			

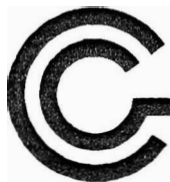


NOTE: FORM TYPICAL BOTH ENDS

USE NB-3L BLANK

ETCH TOOLS: M70-101

TOLERANCES  
 ANGLES  $\pm 1^\circ$   
 1 PLACE DECIMAL  $\pm .1$   
 2 PLACE DECIMAL  $\pm .01$   
 3 PLACE DECIMAL  $\pm .005$   
 (UNLESS OTHERWISE SPECIFIED)



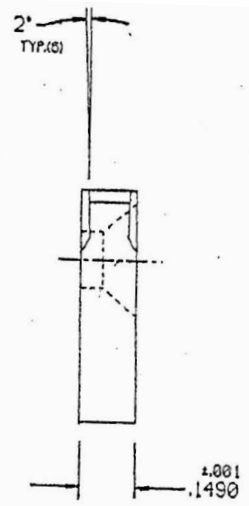
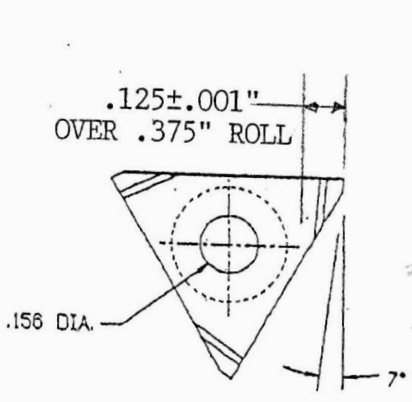
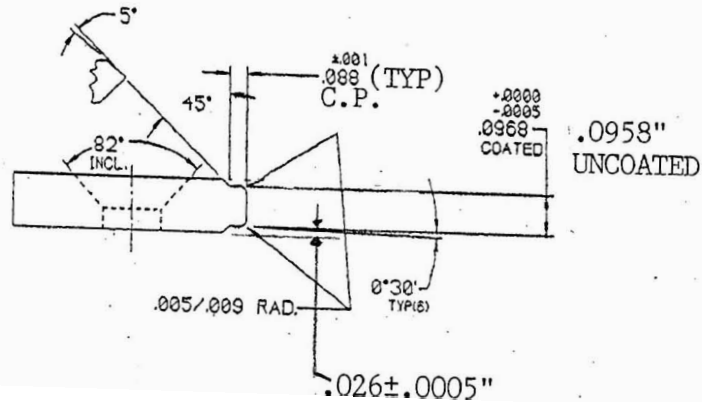
Carbide Grinding Company, Inc.

1136 DILTS STREET P. O. BOX 175 CHESTERFIELD, INDIANA 46017  
 (765) 378-3309 FAX (765) 378-5150

SIZE	DRAWN BY	TITLE		
A	A. COOPER	SA-A UNDERCUT	SCALE	DATE
DRAWING NO. SA-A-M70-101			N/A	04/25/2005



SIZE	SYM	AMT	DATE	NAME OF DETAIL	NO.



3/8 I.C.

\*GROOVALL\* INSERT  
 SMR60-1490-41145C (ALTERED)  
 MATERIAL DU-56 TS-840 COATED

- Ⓐ
- Ⓑ
- Ⓒ
- Ⓓ

ORIGINAL  
 3-16-01 ML

BRASS TAG NO.	322520
	322521
	322522
	322523

CHECK FOR SAFETY OF OPERATOR

MODEL A-009/A-006

DO NOT SCALE

TOOL WORK ATTENTION  
 ALL TOOL PATTERNS, TOOLS, DIES AND GAUGES  
 MUST BE STAMPED BY STORES WITH THEIR  
 NUMBER, TOOL NUMBER AND THE WORK DATE.  
 ALL TOOLS MUST BE KEPT IN THE WORK AREA  
 OF THE SHOP WITH THE NUMBER OF THE PATTERNS  
 OF THE TOOLS IN THE WORK AREA.

U.S.T. & CO. ITEM #0079-0232  
 U.S.T. & CO. #I-032111 2 X SIZE

CHANGES	DESCRIPTION	DATE
E	MATERIAL WAS 8A	HERB 11/30/00
D	GRIND DIM WAS .0906	HERB 1/17/98
C	COATING WAS PVD	HERB 1/17/98
B	COATING WAS TS-840	HERB 8/25/97
A	COATING WAS PVD	HERB 5/12/97
F	INFO ADDED	HERB 2/6/01

CHRYSLER CORPORATION  
 KOKOMO, IN.  
 TOOL DESIGN, KOKOMO, IN.

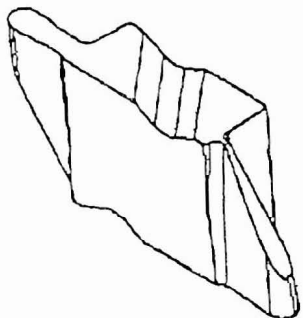
TITLE  
 \*GROOVALL\* INSERT  
 SUPPORT - REACTION SHAFT

ALSO USED FOR	4809353
EXPANDED TOOL NO.	APPROVED BY TOOL
USED WITH	80
PACKAGE NAME AND NUMBER	SEE ABOVE
DATE	80
DRIVEN NO.	96-070-0935



KENNAMETAL INSERT  
TOP NOTCH STYLE  
SIZE: 4  
HAND: RIGHT

NO	DATE	REVISION (ON CVD ONLY)	REQ BY	CHG BY	APP BY	MICRO
----	------	------------------------	--------	--------	--------	-------



NOTES:

[0,48]

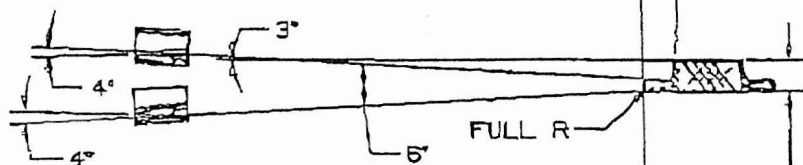
18

ALL OVER, EXCEPT AS SHOWN

2 CUTTING EDGE(S)

ALL DIMENSIONS NOT SHOWN ARE TO BE  
KENNAMETAL MANUFACTURING STANDARD

UNLESS OTHERWISE SPECIFIED IN ORDER:  
EDGE PREP PER EPS-1, SHEET 1.050.450

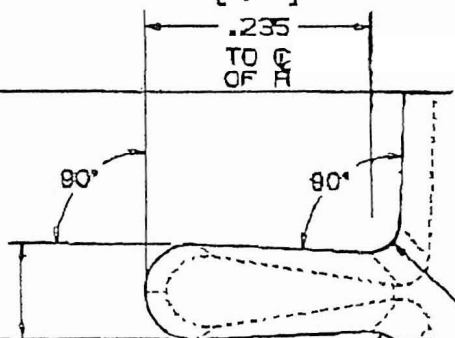


[±0,03]  
6,50  
±.001  
.258  
OVER  
BODY

[5,97]  
TO C  
OF R

ENLARGED  
VIEW  
8 X 1

[±0,03]  
6,48  
±.001  
.255  
OVER R



[±0,25]  
0,76  
±.010  
R .030

[±0,038]  
16,154  
±.0015  
.6360  
OVER R TO  
GAGE ROD

[±0,03]  
2,54  
±.001  
.100  
OVER R

±.010 [±0,25]  
.235 [5,97]  
TO C OF R

±.030 [±0,76]  
R .030 [0,76]

[±0,08]  
11,51  
±.003  
.453

[9,525]  
∅ .3750

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OR INDIRECTLY, OR ITS DISCLOSURE TO ANY THIRD  
PARTY WITHOUT THE PRIOR WRITTEN CONSENT OF  
KENNAMETAL IS PROHIBITED.

∇ = CENTER  
TO SIDE

⊕ = SURFACE  
(CALL)

S = SURFACE

✓ = INCHES  
(CALL)

UNLESS OTHERWISE SPECIFIED:

INCHES		MILLIMETERS	
X	1:1	1:X	1:25
10X	1:0.02	1:X.2	1:0.5
100X	1:0.002	1:X.02	1:0.125

ANGLES ± 1' ✓ SURFACE FINISH  
BREAK ALL SHARP CORNERS ON STEEL .002 X 45°  
CHARACTER FIRST THREAD ON TAPPED HOLES

**KENNAMETAL**

NCI INC,  
ASHEVILLE, N.C.

Dwg. Part #		
Dwg. Des. # 112442Z R02 OF 040		
Dwg. Title		
Drawn BY: SLP	11/20/00	SCALE
Checked BY: RTR	11/20/00	1:1
Approved BY: RTR	11/20/00	
Ref: MR-450R E1.235		
Type: ASSY/WFG		
Ordering Number	Dwg. Size	
1551004R00	B	

8

7

6

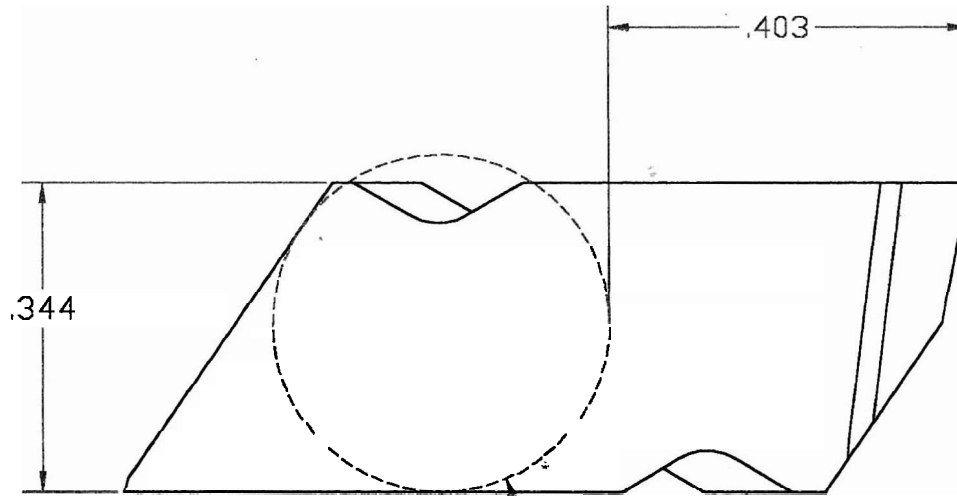
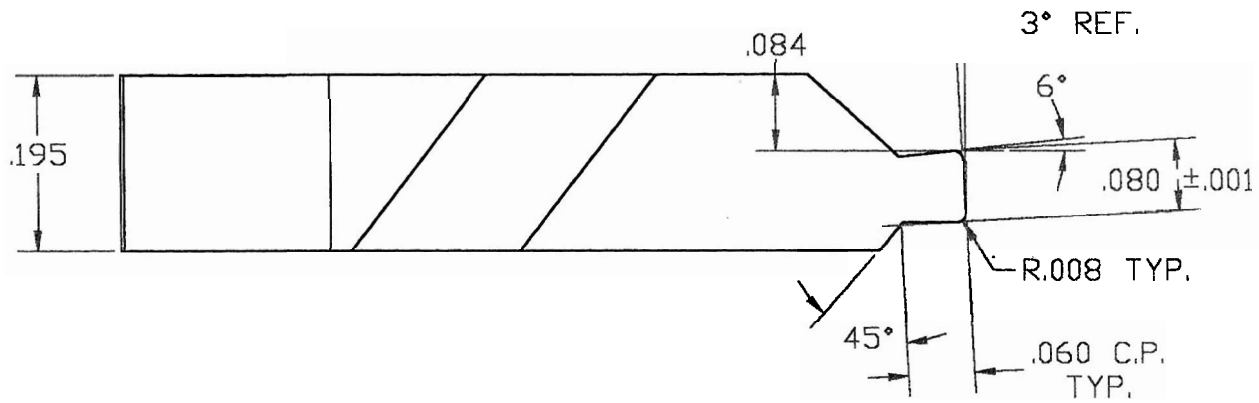
5

Inq. No.

3

Job No. 638740

1

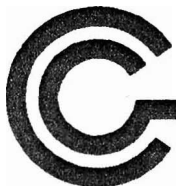


NOTE: ALL CLEARANCE AND BACK-OFF ANGLES ARE TO BE THAT OF MFG'S STANDARDS UNLESS OTHERWISE SPECIFIED.

.375 GAGE ROLL

FORM TYPICAL BOTH ENDS

TOLERANCES	
ANGLES	±0°30'
1 PLACE DECIMAL	±.1
2 PLACE DECIMAL	±.01
3 PLACE DECIMAL	±.001
(UNLESS OTHERWISE SPECIFIED)	



Carbide Grinding Company, Inc.

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(765) 378-3309 FAX (765) 378-6150

SIZE	DRAWN BY	PRINT FOR	REV
A	AC/MM	DAIMLERCHRYSLER	
PRINT FILE		SCALE	DATE
DC 86-070-1050			10/01/2003