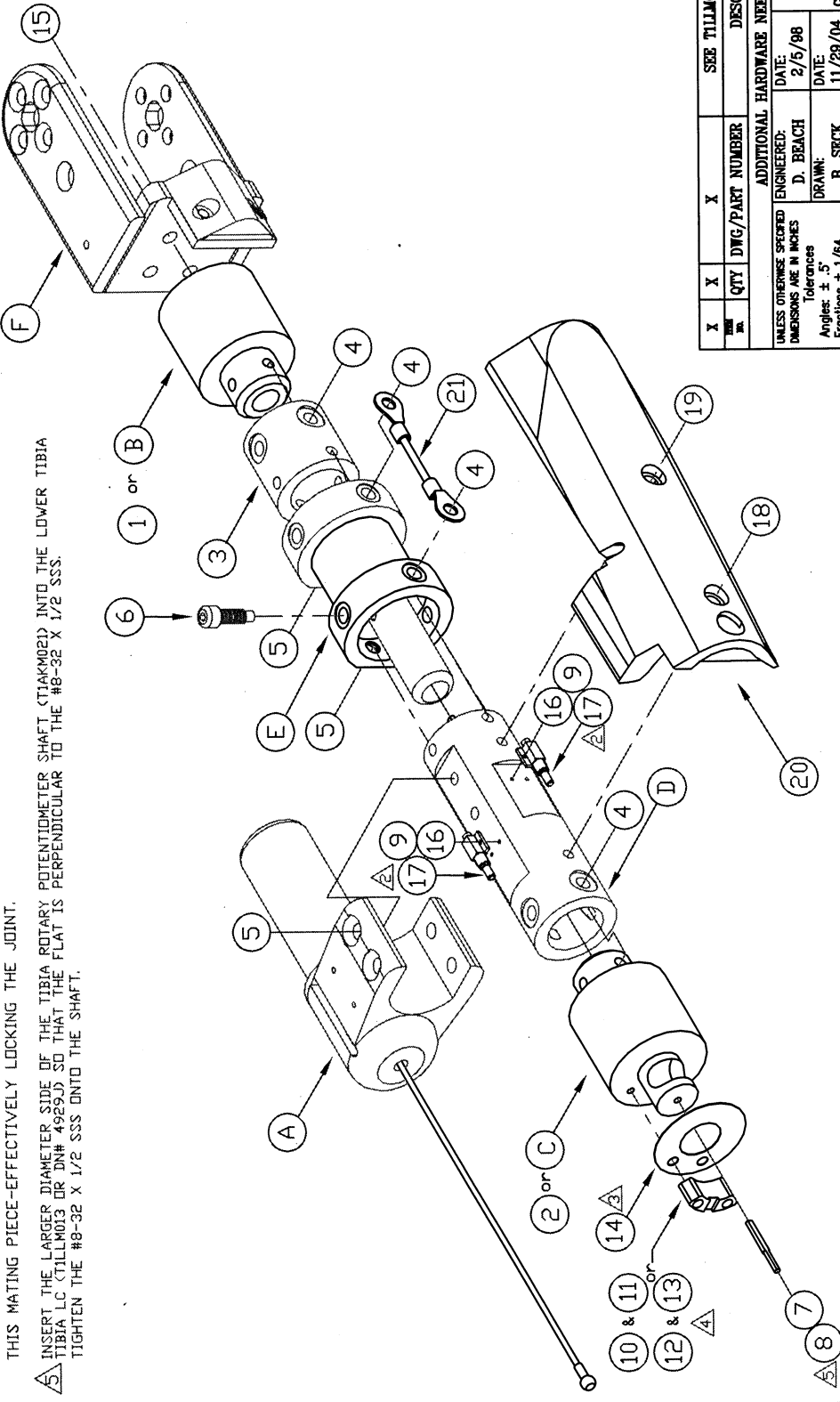


REV. #	ZONE	DESCRIPTION	DATE	BY
1	GLOBAL	CHANGED DESIGN FOR COMPLIANT MEMBER	8/25/08	D. BRACH
2	C1	CHANGED DENTON LOAD CELL MODEL NUMBER	9/14/08	D. BRACH
3	A2	CORRECTED TITLE BLOCK	9/21/08	D. BRACH
4	GLOBAL	CORRECTED LOWER TIBIA DIMENSIONS	2/25/08	D. BRACH
5	GLOBAL	UPDATED DRAWING FOR CURRENT HARDWARE	4/21/08	D. BRACH
6	ITEM 14	CORRECTED LENGTH	4/27/08	D. BRACH
7	ITEM D	ADDED LOWER TIBIA TUBE ASSEMBLY	12/7/08	D. BRACH
8	GLOBAL	CHANGED TRIAXIAL MOUNTING LOCATION	10/16/00	D. BRACH
9	GLOBAL	UPDATED DESIGN FOR DUAL UNIAXIAL AND Z ROTATION DESIGN	6/17/00	D. BRACH
10	ITEM 14	ADDED TEFLON WASHER	10/16/00	D. BRACH
11	GLOBAL	REVISED ACHILLES SPRING ASSEMBLY	5/24/01	D. BRACH
12	PARTS	CHANGED ITEM B SCREW DESCRIPTION	1/16/05	M. ARTIS
13	NOTES	ADDED NOTE 5	1/16/05	M. ARTIS
13	GLOBAL	EXPLODE ASSEMBLY, ADD GROUND STRAP	1/17/05	J. McDONALD



- NOTES:
- 1 ACHILLES SPRING TUBE ASSEMBLY IS NOT SHOWN IN THE FRONT VIEW FOR CLARITY
 - 2 THOR-LX HAS BEEN DESIGNED TO USE TWO UNIAXIAL ACCELEROMETERS TO MEASURE THE X AND Y AXIS ACCELERATION. THE RANGE ON THESE INSTRUMENTS SHOULD BE 2000g. (REFERENCE ENTRAN # EGE-73BQ-2000HD, ENDEVCO #7264)
 - 3 ATTACH THE TEFLON WASHER (TILLM015) TO THE BOTTOM SURFACE OF THE LOWER TIBIA LOAD CELL USING DOUBLE SIDED TAPE.
 - 4 TO ALLOW NORMAL Z-AXIS ROTATION, ASSEMBLE WEDGE #1 (TILLM111) TO THE BOTTOM OF THE LOWER TIBIA LOAD CELL WITH TWO 3/16 x 7/16 DOWEL PINS. THIS WEDGE MATES WITH THE ANNULAR GROOVE IN TIAKM011. TO LOCK OUT THE Z-AXIS ROTATION, ASSEMBLE WEDGE #2 (TILLM112) TO THE BOTTOM OF THE LOWER TIBIA LOAD CELL WITH TWO 3/16" x 7/8" DOWEL PINS. WHEN MATED WITH TIAKM011, THE PINS WILL ENGAGE THE HOLES IN THIS MATING PIECE EFFECTIVELY LOCKING THE JOINT.
 - 5 INSERT THE LARGER DIAMETER SIDE OF THE TIBIA ROTARY POTENTIOMETER SHAFT (TIAKM021) INTO THE LOWER TIBIA TIBIA LC (TILLM013 OR DNH 4929J) SO THAT THE FLAT IS PERPENDICULAR TO THE #8-32 X 1/2 SSS. TIGHTEN THE #8-32 X 1/2 SSS ONTO THE SHAFT.

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
X	X	SEE TILLM000 PAGE 2/2	X
ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY			
ENGINEERED:		DATE:	DEPARTMENT OF TRANSPORTATION
D. BRACH		2/5/08	NHTSA
DRAWN:		DATE:	CONTRACT NO.: D7WH 22-04-C-07010
B. SECK		11/29/04	DESIGNED BY: GFSAC, INC
CHECKED:		DATE:	125 ORCHARD DRIVE
J. McDONALD		11/29/04	BOONSHORO, MO 27173
SCALE:		REVISION	DRAWING TITLE:
1=1		13	LOWER LEG MECHANICAL ASSEMBLY
FINISH:		QUANTITY FOR AN ASSEMBLY	DRAWING NUMBER:
SEE DWGS.		1	TILLM000-1
MATERIAL:		QUANTITY FOR ENTIRE DUMMY	Page
SEE DWGS.		2	1/2

4 3 2 1

REV. #	ZONE	DESCRIPTION	DATE	BY

D C B A

REV. #	ZONE	DESCRIPTION	DATE	BY
21	1	T11M016	TIBIA GROUND STRAP	COPPER
20	1	T11M014	LOWER EXTREMITY TIBIA GUARD	VA# RP-6444
19	1	MCM# 91255A559	1/4-28 X 7/8" B.H.S.C.S	ALLOY
18	1	MCM# 91255A555	1/4-28 X 5/8" B.H.S.C.S	ALLOY
17	2	T11M110	UNIAXIAL ACCELEROMETER (2000 g)	PURCHASED
16	4	MCM# 90945A700	18-8 SS WASHER (1/16" ID, 1/8" OD)	SS
15	4	MCM# 91251A439	1/4-28 X 5/8" S.H.C.S	ALLOY
14	1	T11M015	TEFLON WASHER	TEFLON
13	2	MCM# 98381A509	3/16" x 7/8" DOWEL PIN	ALLOY
12	1	T11M112	WEDGE #2 - LOCK OUT	SEE DWG.
11	2	MCM# 98381A504	3/16" x 7/16" DOWEL PIN	ALLOY
10	1	T11M111	WEDGE #1	SEE DWG.
9	4	MCM# 91251A055	#0-80 x 1/4" S.H.C.S.	ALLOY
8	1	MCM# 92895A152	#8-32 x 1/4" SSS CONE PT.	ALLOY
7	1	T1AKM021	TIBIA ROTARY POTENTIOMETER SHAFT	1018 CRS
6	2	T11M413	PLUNGER RETAINING BOLTS	ALLOY STEEL
5	6	MCM# 91253A303	1/4-28 x 1/2" F.H.S.C.S.	ALLOY
4	12	MCM# 91255A553	1/4-28 x 1/2" B.H.S.C.S.	ALLOY
3	1	T11M011	UPPER TIBIA TUBE	6061-T6
2	1	T11M013	LOWER TIBIA MOCK LOAD CELL	1018 CRS
1	1	T11M012	UPPER TIBIA MOCK LOAD CELL	1018 CRS
F	1	T11M001	KNEE CLEVIS ASSEMBLY	SEE DWG.
E	1	T11M400	TIBIA COMPLIANT BUSHING ASSEMBLY	SEE DWG.
D	1	T11M002	LOWER TIBIA TUBE ASSEMBLY	SEE DWG.
C	1	DN# 4929 J	DEPTON LOWER TIBIA LOAD CELL (4929)	PURCHASED
B	1	DN# 4553 J	DEPTON UPPER TIBIA LOAD CELL (4553)	PURCHASED
A	1	T11M300	ACHILLES SPRING TUBE ASSEMBLY	SEE DWG.
		QTY	DWG/PART NUMBER	DESCRIPTION
ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

Tolerances
 Angles: ± .5°
 Fractions: ± 1/64
 Decimals: .xx ± .01
 .xxx ± .005
 Surface Finish: 125

* DO NOT SCALE DRAWING *

FINISH:

ENGINEERED: DATE: 2/5/98
 D. BEACH

DRAWN: DATE: 2/5/98
 D. BEACH

CHECKED: DATE: 10/6/01
 D. DELBRIDGE

SCALE: SIZE: A

REVISION: 13

QUANTITY FOR AN ASSEMBLY: 1

QUANTITY FOR ENTIRE DUMMY: 2

MATERIAL:

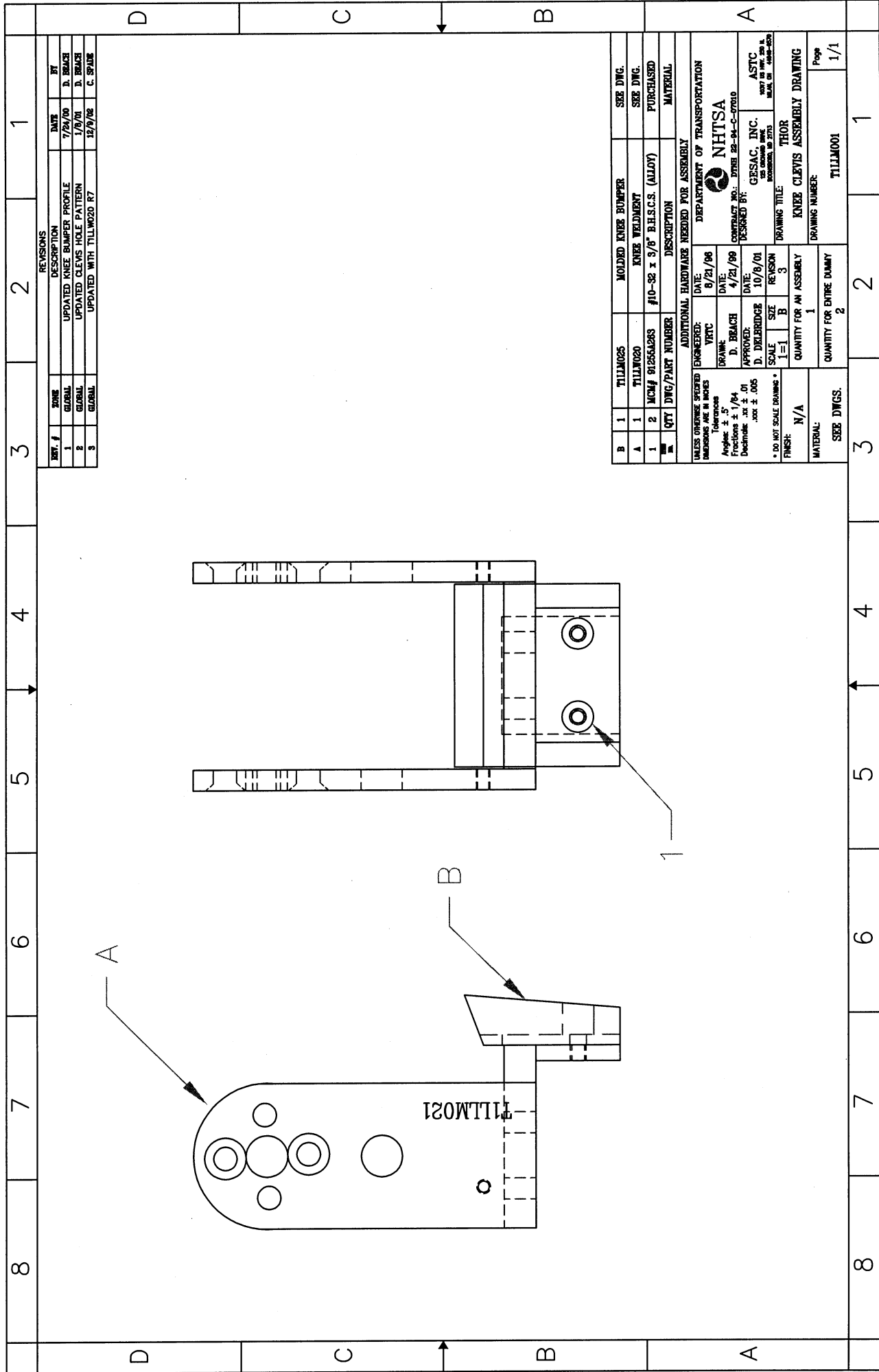
DEPARTMENT OF TRANSPORTATION
NHTSA
 CONTRACT NO.: DTRC 98-94-C-0010
 DESIGNED BY: GESAC, INC.
MEMBER OF TRANSPORTATION TRIANGLE INDUSTRIES
 ROCKHILL, MD 2173

DRAWING TITLE: THOR LOWER LEG
 MECHANICAL ASSEMBLY

DRAWING NUMBER: T11M000-2

Page: 2/2

4 3 2 1



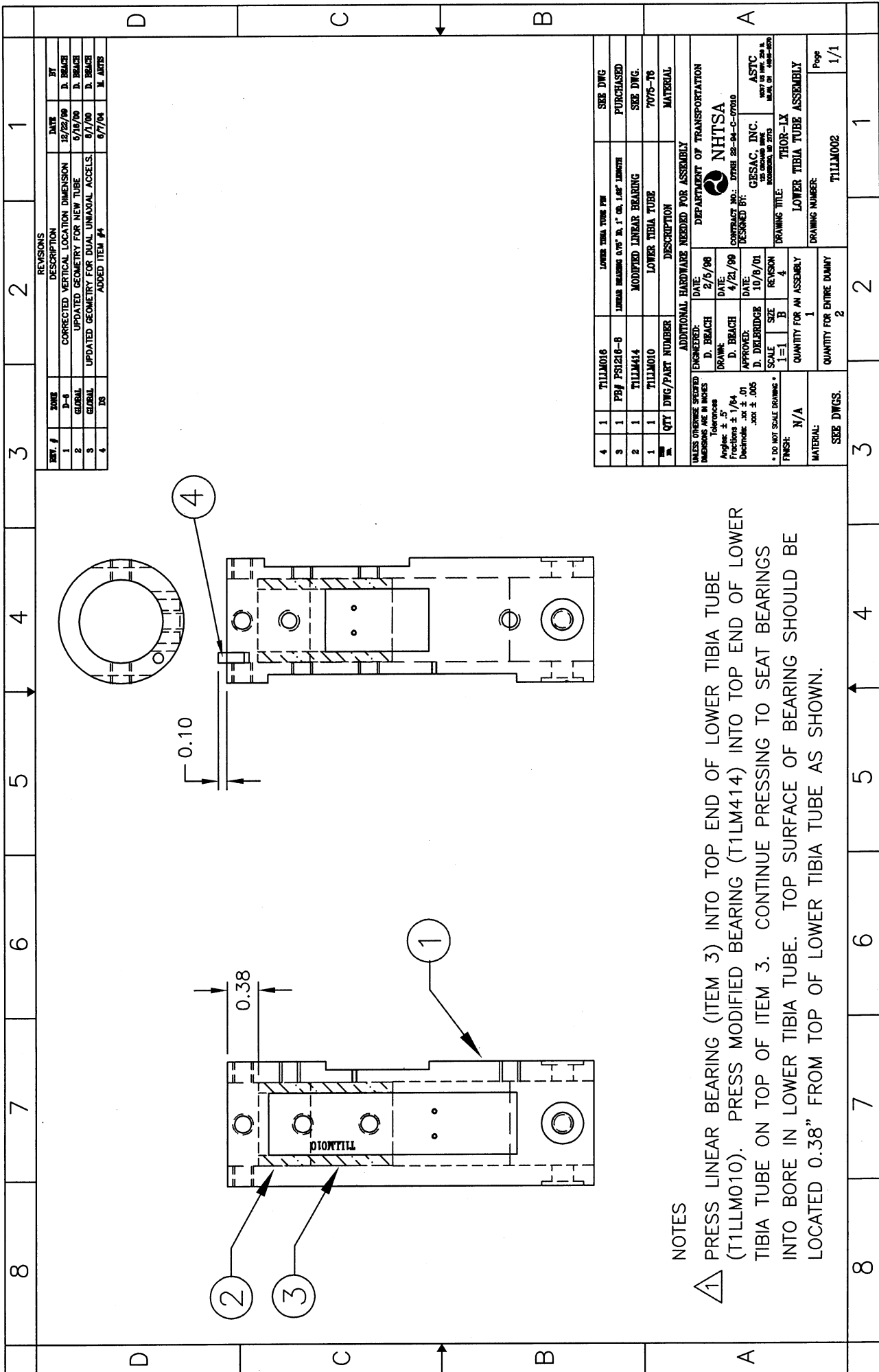
REV. #	DATE	DESCRIPTION	DATE	BY
1	GLOBAL	UPDATED KNEE BUMPER PROFILE	7/24/00	D. BRACH
2	GLOBAL	UPDATED CLEVIS HOLE PATTERN	1/9/01	D. BRACH
3	GLOBAL	UPDATED WITH T11M020 R7	12/9/02	C. SPANIE

REV. #	DATE	DESCRIPTION	DATE	BY
B 1	T11M020	MOLDED KNEE BUMPER		SEE DWG.
A 1	T11M020	KNEE WELDMENT		SEE DWG.
1	2 MCM/ 9125A08S	#10-32 x 3/8" B.H.S.S.S. (ALLOY)		PURCHASED
QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL	

UNLESS OTHERWISE SPECIFIED		DATE:
ENGINEER:	VRTC	8/21/96
DRAWN:	D. BRACH	4/21/99
APPROVED:	D. DELBERG	10/8/01
SCALE:	1=1	SIZE: B
FINISH:	N/A	REVISION: 3

ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
QUANTITY FOR AN ASSEMBLY	1
QUANTITY FOR ENTIRE DUMMY	2

DEPARTMENT OF TRANSPORTATION	
NHTSA	
CONTRACT NO.:	DTMB 22-94-C-07010
DESIGNED BY:	GESAC, INC.
<small>ASTC NOT IN USE, 2011 135 CHRYSLER BLDG. WARREN, MI 48090</small>	
DRAWING TITLE:	THOR
DRAWING NUMBER:	KNEE CLEVIS ASSEMBLY DRAWING
Page	1/1



REVISIONS			
REV. #	DATE	DESCRIPTION	BY
1	12/22/99	CORRECTED VERTICAL LOCATION DIMENSION	D. BEACH
2	6/11/00	UPDATED GEOMETRY FOR NEW TUBE	D. BEACH
3	9/1/00	UPDATED GEOMETRY FOR DUAL UNIAxIAL ACCELS.	D. BEACH
4	9/7/00	ADDED ITEM #4	M. BRIS

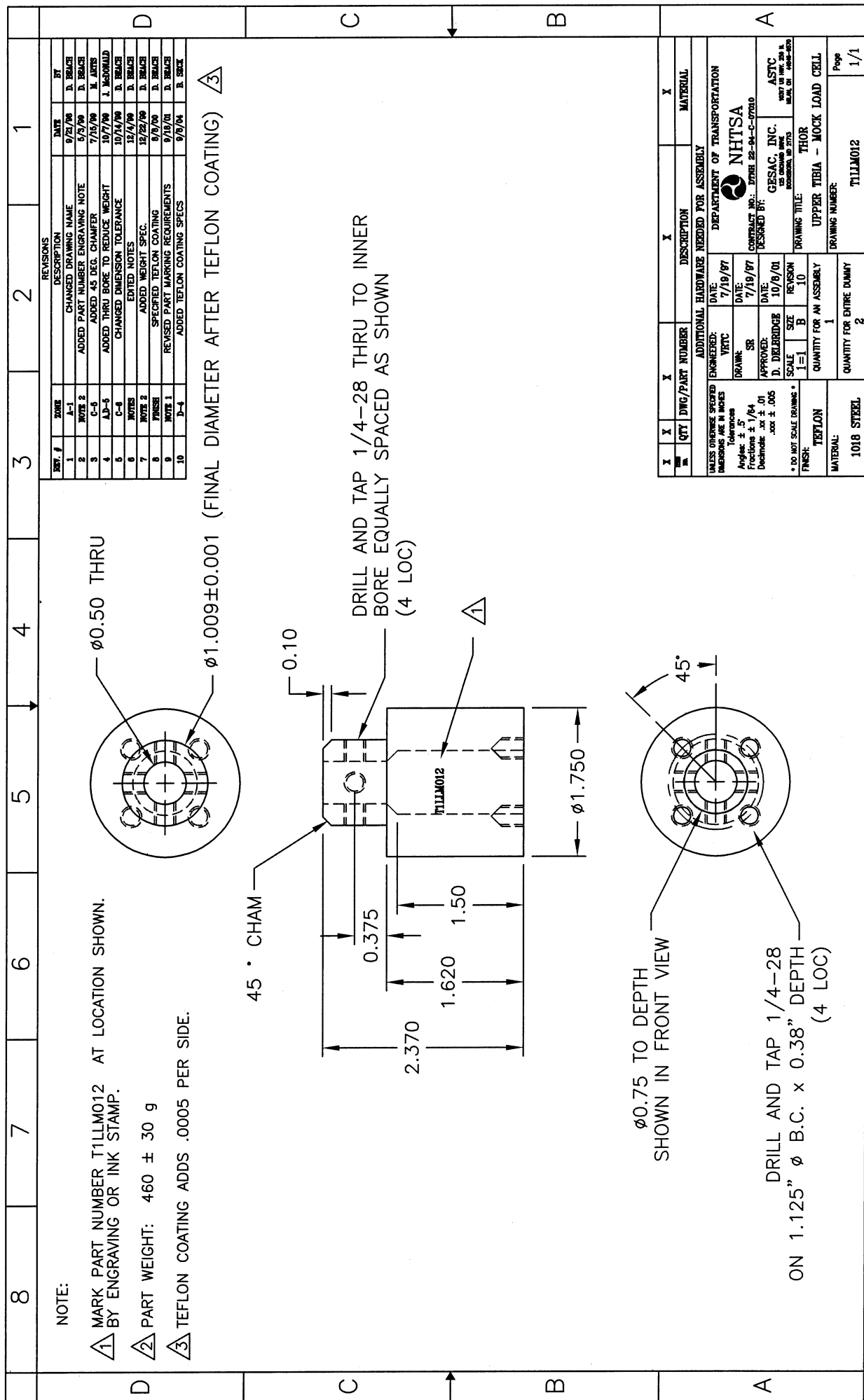
4	1	T11LM016	LOWER TIBIA TUBE P/N	SEE DWG
3	1	PPY P5216-8	LINEAR BEARING 0.75" ID, 1" OD, 1.68" LENGTH	PURCHASED
2	1	T11LM414	MODIFIED LINEAR BEARING	SEE DWG.
1	1	T11LM010	LOWER TIBIA TUBE	7075-T6
QTY		DWG/PART NUMBER	DESCRIPTION	MATERIAL

UNLESS OTHERWISE SPECIFIED		ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
ENGINEERED	DATE	ENGINEERED	DATE
D. BEACH	2/5/98		
DRAWN	DATE		
D. BEACH	4/21/99		
APPROVED	DATE		
D. DELBROCK	10/9/01		
SCALE	SIZE	REVISION	
1=1	B	4	
QUANTITY FOR AN ASSEMBLY		DRAWING TITLE	
1		THOR-1X	
QUANTITY FOR ENTIRE DUMMY		LOWER TIBIA TUBE ASSEMBLY	
2		DRAWING NUMBER	
SEE DWGS.		T11LM002	
		Page	
		1/1	

NOTES

- 1 PRESS LINEAR BEARING (ITEM 3) INTO TOP END OF LOWER TIBIA TUBE (T11LM010). PRESS MODIFIED BEARING (T11LM414) INTO TOP END OF LOWER TIBIA TUBE ON TOP OF ITEM 3. CONTINUE PRESSING TO SEAT BEARINGS INTO BORE IN LOWER TIBIA TUBE. TOP SURFACE OF BEARING SHOULD BE LOCATED 0.38" FROM TOP OF LOWER TIBIA TUBE AS SHOWN.

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1																																													
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I	<p>BORE $\phi 1.012$ THRU $\phi 1.012 \pm 0.001$ X 0.75 DEEP</p> <p>$\phi 1.495 \pm 0.002$</p> <p>1/4-28 HELICOIL INSERTS (4 LOC)</p> <p>0.188</p>																																																											
H	<p>DRILL 0.257 THRU SPOTFACE 0.50 x 0.05 DEPTH (4 LOC)</p> <p>0.375</p> <p>1.375</p> <p>0.188</p>																																																											
G	<p>$\phi 1.495 \pm 0.002$ X 0.75</p>																																																											
F	<p>NOTE:</p>																																																											
E	<p>MARK PART NUMBER T1LLM011 AT LOCATION SHOWN BY ENGRAVING OR INK STAMP.</p>																																																											
D	<p>PART MUST BE ANNOODIZED PRIOR TO INSERTION OF HELICOILS.</p>																																																											
C	<table border="1"> <thead> <tr> <th>QTY</th><th>DCG/PART NUMBER</th><th>DESCRIPTION</th><th>DESCRIPTION</th><th>PURCHASED</th></tr> </thead> <tbody> <tr> <td>4</td><td>MCM# 91782A515</td><td>1/4-28 x 0.25" HELICOIL INSERT</td><td>HELICOIL INSERT</td><td>MATERIAL</td></tr> </tbody> </table>															QTY	DCG/PART NUMBER	DESCRIPTION	DESCRIPTION	PURCHASED	4	MCM# 91782A515	1/4-28 x 0.25" HELICOIL INSERT	HELICOIL INSERT	MATERIAL																																			
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THOR-LX UPPER TIBIA TUBE		T1LLM011	1/1																																																									



NO.	QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
			ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
		ENGINEERED: VRTC	DATE: 7/19/97	DEPARTMENT OF TRANSPORTATION
		DRAWN: SR	DATE: 7/19/97	NHTSA
		APPROVED: D. DELBRIDGE	DATE: 10/6/01	CONTRACT NO.: DTMB 22-94-5-07010
		SCALE: 1=1	SIZE: B	DESIGNED BY: GESSAC, INC.
			REVISION: 10	10710 HWY. 208 N. 125 AIRBORNE BLVD. FREDERICK, MD 21753
				DRAWING TITLE: THOR
				UPPER TIBIA - MOCK LOAD CELL
				DRAWING NUMBER: T11LM012
				Page: 1/1

45° TO DEPTH SHOWN IN FRONT VIEW

DRILL AND TAP 1/4-28 ON 1.125" Ø B.C. x 0.38" DEPTH (4 LOC)

45° CHAM

0.10

DRILL AND TAP 1/4-28 THRU TO INNER BORE EQUALLY SPACED AS SHOWN (4 LOC)

0.375

1.620

1.50

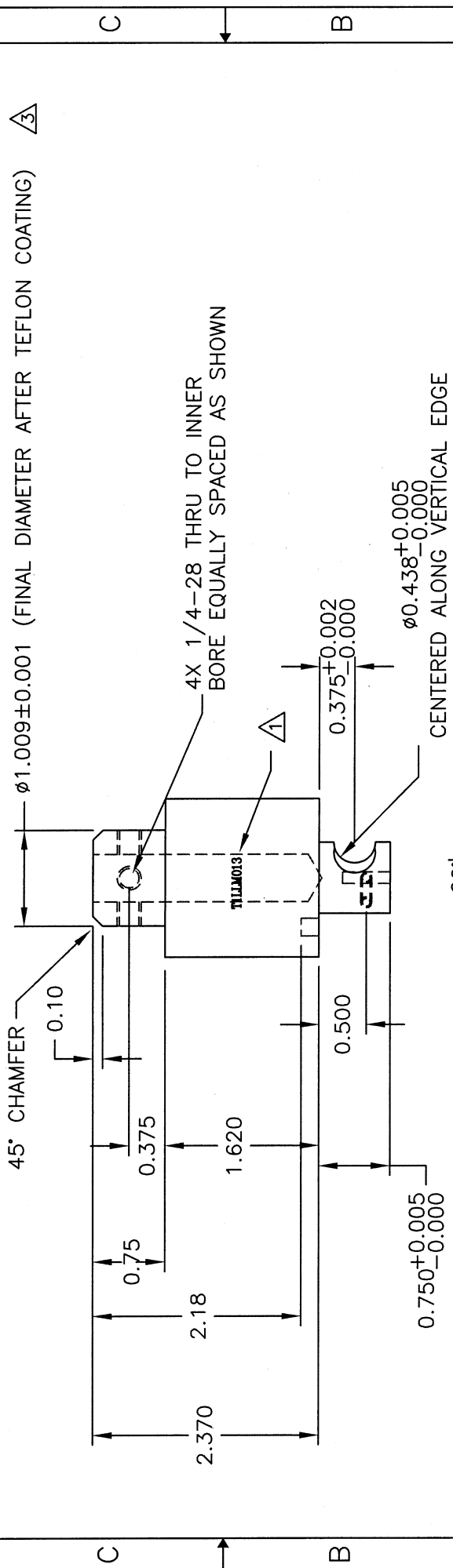
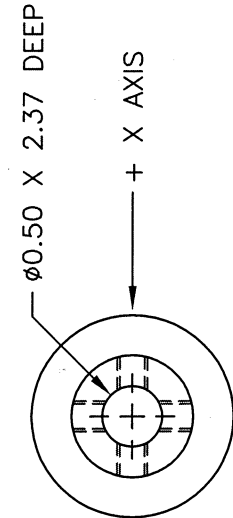
2.370

Ø1.750

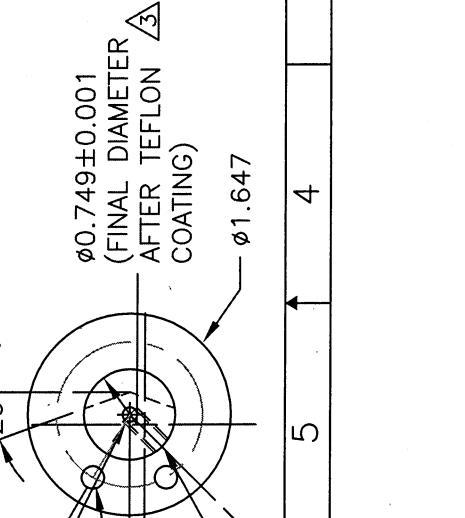
Ø0.50 THRU

Ø1.009±0.001 (FINAL DIAMETER AFTER TEFLON COATING)

REV. #	ZONE	DESCRIPTION	DATE	BY
1	A-1	CHANGED DRAWING NAME	9/25/98	D. BRADY
2	GLOBAL	ADDED PART NUMBER ENGRAVING NOTE	9/29/98	D. BRADY
3	GLOBAL	CLARIFIED DIMENSIONS	9/29/98	D. BRADY
4	B-4	ADDED 45 DEG. CHAMFER	7/15/99	J. ANDRUS
5	C-5	ADDED CENTER BORES TO REDUCE WEIGHT	10/14/99	D. BRADY
6	A-6	ADDED TAPPED HOLE DIMENSION	12/22/99	D. BRADY
7	B-7	ADDED WEIGHT SPEC FOR PART	2/8/00	D. BRADY
8	GLOBAL	CHANGED '00' OF PART FOR MT. SPEC.	6/22/00	D. BRADY
9	GLOBAL	ADDED TWO DOWEL PIN HOLES	9/9/00	D. BRADY
10	GLOBAL	SPECIFIED TEFLON FINISH	9/25/00	D. BRADY
11	FINISH	CHANGED DIMENSIONING ON B-32 TAPPED HOLE	9/25/00	D. BRADY
12	B-8	REVISD PART MARKING REQUIREMENTS	9/19/01	D. BRADY
13	NOTE 1	ADDED TEFLON COATING SPECS	9/9/04	B. SECK
14	C-1 & A-1			

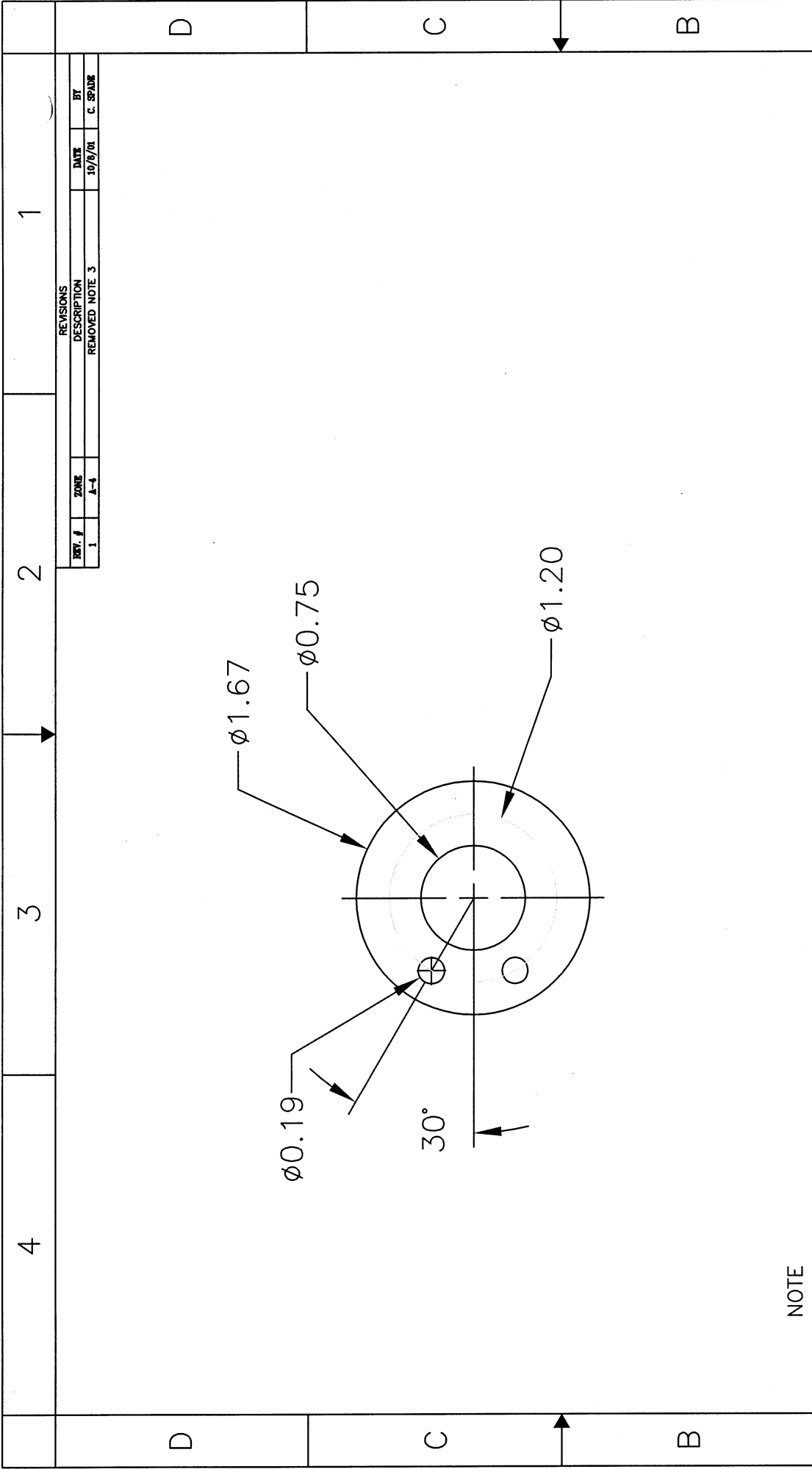


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5	C-5	ADDED CENTER BORES TO REDUCE WEIGHT	10/14/99	D. BRADY
6	A-6	ADDED TAPPED HOLE DIMENSION	12/22/99	D. BRADY
7	B-7	ADDED WEIGHT SPEC FOR PART	2/8/00	D. BRADY
8	GLOBAL	CHANGED '00' OF PART FOR MT. SPEC.	6/22/00	D. BRADY
9	GLOBAL	ADDED TWO DOWEL PIN HOLES	9/9/00	D. BRADY
10	GLOBAL	SPECIFIED TEFLON FINISH	9/25/00	D. BRADY
11	FINISH	CHANGED DIMENSIONING ON B-32 TAPPED HOLE	9/25/00	D. BRADY
12	B-8	REVISD PART MARKING REQUIREMENTS	9/19/01	D. BRADY
13	NOTE 1	ADDED TEFLON COATING SPECS	9/9/04	B. SECK
14	C-1 & A-1			

REV. #	ZONE	DESCRIPTION	DATE	BY
1	A-1	CHANGED DRAWING NAME	9/25/98	D. BRADY
2	GLOBAL	ADDED PART NUMBER ENGRAVING NOTE	9/29/98	D. BRADY
3	GLOBAL	CLARIFIED DIMENSIONS	9/29/98	D. BRADY
4	B-4	ADDED 45 DEG. CHAMFER	7/15/99	J. ANDRUS
5	C-5	ADDED CENTER BORES TO REDUCE WEIGHT	10/14/99	D. BRADY
6	A-6	ADDED TAPPED HOLE DIMENSION	12/22/99	D. BRADY
7	B-7	ADDED WEIGHT SPEC FOR PART	2/8/00	D. BRADY
8	GLOBAL	CHANGED '00' OF PART FOR MT. SPEC.	6/22/00	D. BRADY
9	GLOBAL	ADDED TWO DOWEL PIN HOLES	9/9/00	D. BRADY
10	GLOBAL	SPECIFIED TEFLON FINISH	9/25/00	D. BRADY
11	FINISH	CHANGED DIMENSIONING ON B-32 TAPPED HOLE	9/25/00	D. BRADY
12	B-8	REVISD PART MARKING REQUIREMENTS	9/19/01	D. BRADY
13	NOTE 1	ADDED TEFLON COATING SPECS	9/9/04	B. SECK
14	C-1 & A-1			



NOTE

- ① WASHER IS CUT FROM A 0.010" THICK TEFLON SHEET.
- ② HOLES MAY BE PUNCHED OUT FROM A PATTERN.

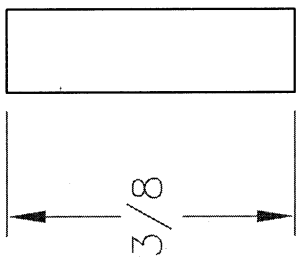
REV. #	QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
1				
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES				
ENGINNERED:	D. BEACH	DATE:	ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
DRAWN:	D. BEACH	DATE:	DEPARTMENT OF TRANSPORTATION	
APPROVED:	D. DELBRIDGE	DATE:	NHTSA	
SCALE:	1=1	REVISION:	CONTRACT NO.: DTNH 20-06-C-07007	
FINISH:	N/A	QUANTITY FOR AN ASSEMBLY:	DESIGNED BY: GESAC, INC.	
		QUANTITY FOR ENTIRE DUMMY:	125 BUCKING HOLE	
			DRAWING TITLE: THOR-LX	
			DRAWING NUMBER: TILLM015	
			Page 1/1	

4 3 2 1

D C B A

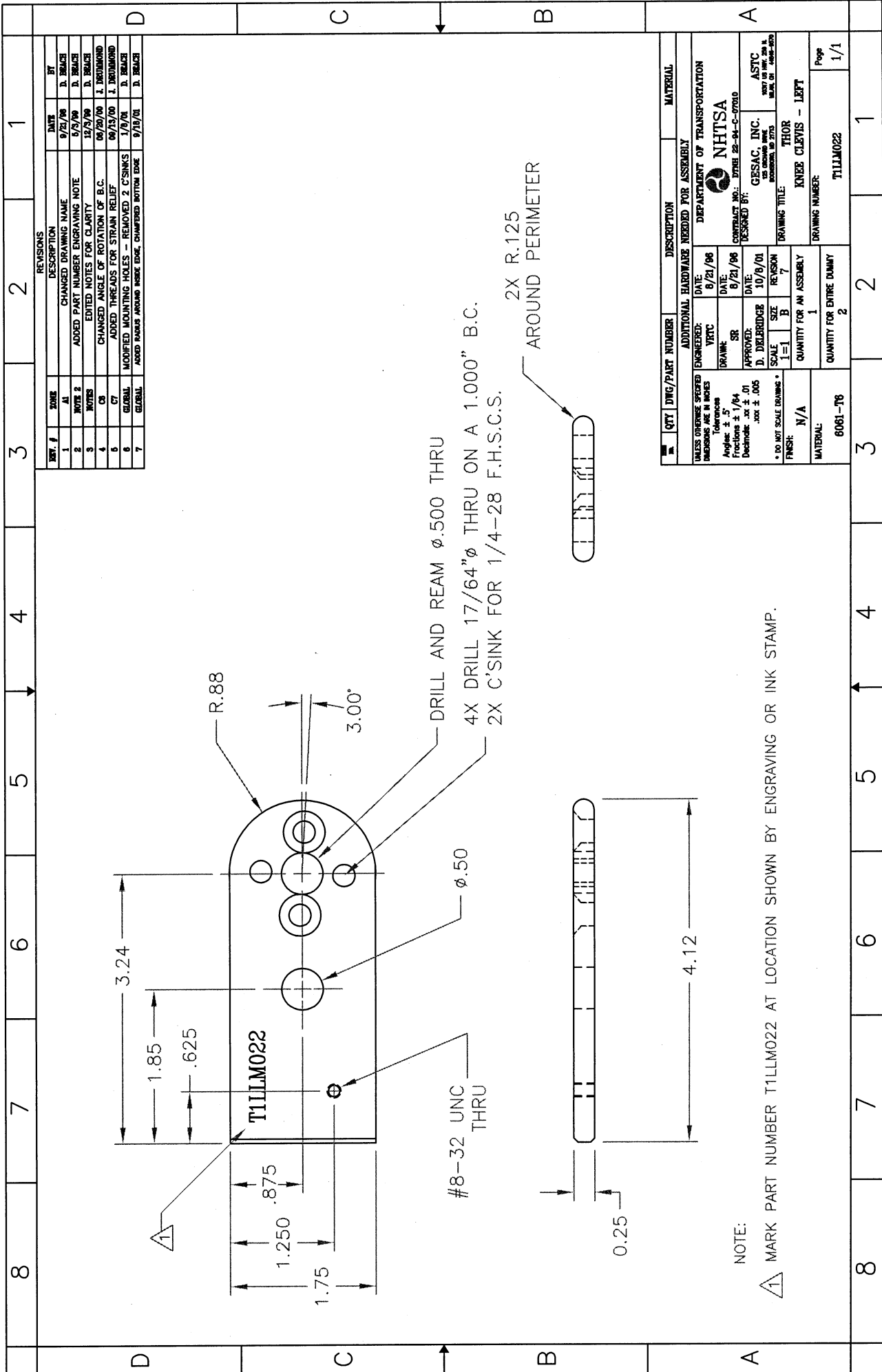
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4 3 2 1



4	3	2	1																																												
D	C	B	A																																												
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<p style="text-align: center;">DEPARTMENT OF TRANSPORTATION NHTSA CONTRACT NO.: DTNH 22-04-C-07010 DESIGNED BY: GESAC, INC. <small>125 BUCKINGHAM DRIVE BOWLING GREEN, INDIANAPOLIS, IN 47401</small></p> <p style="text-align: center;">DRAWING TITLE: THOR - LOWER EXTREMITY LOWER TIBIA TUBE PIN</p> <p style="text-align: right;">DRAWING NUMBER: T11LM016 Page 1/1</p>																																															
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D	C	B	A																																												

8	7	6	5	4	3	2	1																																													
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<p>4X DRILL 17/64" ϕ THRU ON 1.000" ϕ B.C. 2X C'SINK FOR 1/4-28 F.H.S.C.S.</p>																																																				
<p>#8-32 UNC THRU</p> <p>T1LLM021</p> <p>DRILL AND REAM .500 THRU</p> <p>2X 45° X 0.05" CHAMFER ACROSS BOTTOM EDGE</p> <p>2X R.125 AROUND PERIMETER (EXCEPT AS NOTED AT BOTTOM)</p>																																																				
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DATE: 9/21/96		Page: 1/1																																																		

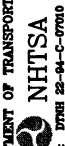


REV. #	ZONE	DESCRIPTION	DATE	BY
1	A1	CHANGED DRAWING NAME	9/21/96	D. BRACK
2	NOTE 2	ADDED PART NUMBER ENGRAVING NOTE	5/9/98	D. BRACK
3	NOTES	EDITED NOTES FOR CLARITY	12/2/98	D. BRACK
4	C5	CHANGED ANGLE OF ROTATION OF B.C.	08/20/00	J. DRUBBARD
5	C7	ADDED THREADS FOR STRAIN RELIEF	09/25/00	J. DRUBBARD
6	GLOBAL	MODIFIED MOUNTING HOLES - REMOVED 2 C'SINKS	1/9/01	D. BRACK
7	GLOBAL	ADDED RADIUS AROUND INSIDE EDGE, CHAMFERED BOTTOM EDGE	9/18/01	D. BRACK

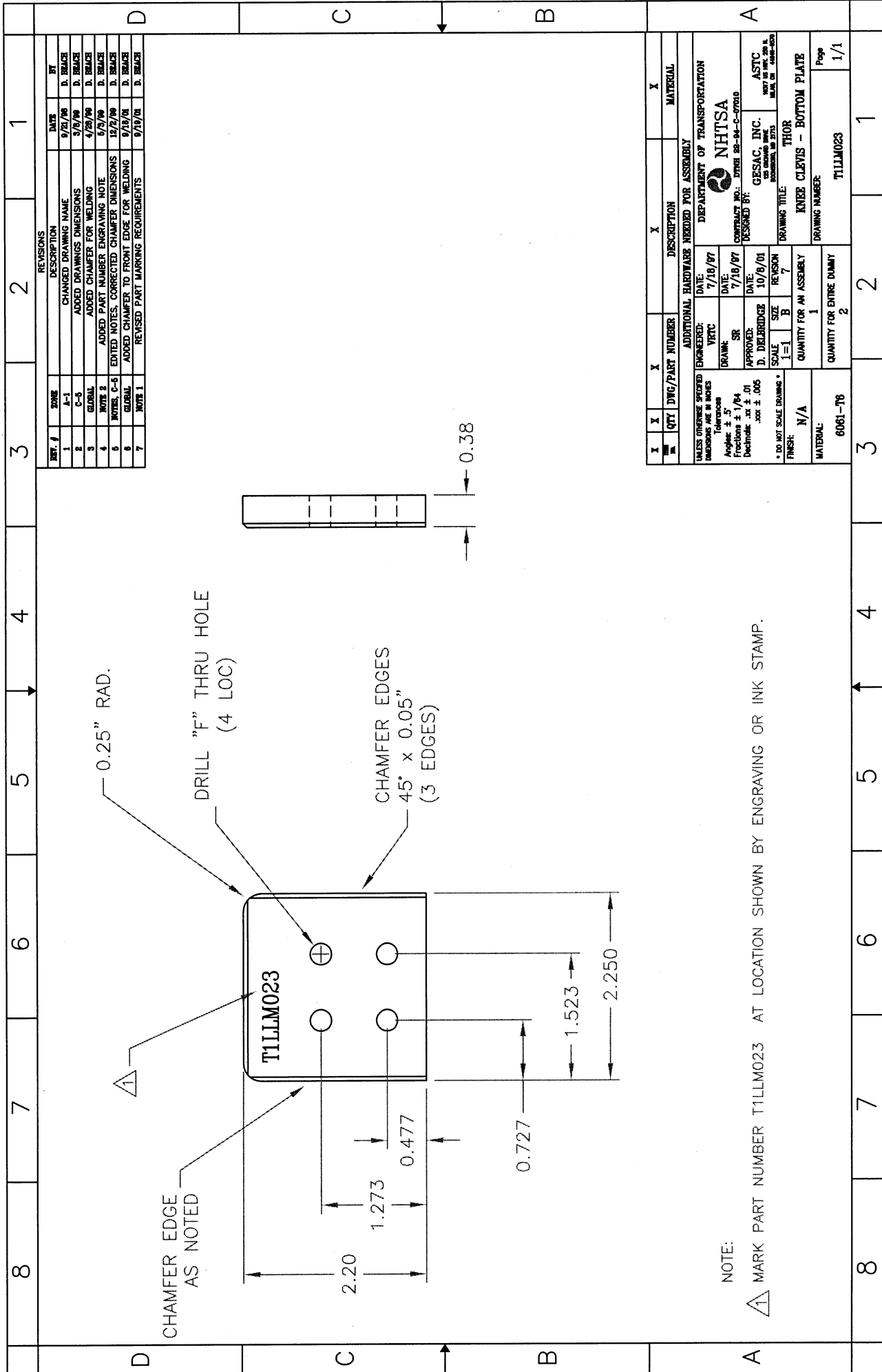
QTY	DWG/PART NUMBER	DESCRIPTION	DATE	MATERIAL
		ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY		
		ENGINEERED: DATE: 8/21/96		
		DRAWN: DATE: 8/21/96		
		APPROVED: DATE: 10/9/01		
		D. DELERIDGE		
		SCALE: SIZE: 1=1		
		REVISION: 7		
		QUANTITY FOR AN ASSEMBLY: 1		
		QUANTITY FOR ENTIRE DUMMY: 2		
		MATERIAL: 6061-T6		

NOTE:

MARK PART NUMBER T11LM022 AT LOCATION SHOWN BY ENGRAVING OR INK STAMP.



DEPARTMENT OF TRANSPORTATION
 NHTSA
 CONTRACT NO.: DTNH 22-94-C-07010
 DESIGNED BY: CESAC, INC.
 125 ORANGE WING
 BOULDER, CO 80503
 DRAWING TITLE: THOR
 KNEE CLEVIS - LEFT
 DRAWING NUMBER: T11LM022
 Page 1/1



REV. #	ZONE	DESCRIPTION	DATE	BY
1	A-1	CHANGED DRAWING NAME	9/23/98	D. BECKER
2	C-5	ADDED DRAWING DIMENSIONS	9/16/98	D. BECKER
3	GLOBAL	ADDED CHAMFER FOR WELDING	4/29/98	D. BECKER
4	NOTE 2	ADDED PART NUMBER ENGRAVING NOTE	9/29/98	D. BECKER
5	NOTES, C-5	EDITED NOTES, CORRECTED CHAMFER DIMENSIONS	12/2/98	D. BECKER
6	GLOBAL	ADDED CHAMFER TO FRONT EDGE FOR WELDING	9/19/01	D. BECKER
7	NOTE 1	REVISED PART MARKING REQUIREMENTS	9/19/01	D. BECKER

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
1	T11LM023	KNEE CLEVIS - BOTTOM PLATE	6061-T6

ENGINEERED:	DATE:	APPROVED:	DATE:
VERTC	7/18/97	D. DELBERG	10/9/01

SCALE	SIZE	REVISION
1=1	B	7

QUANTITY FOR AN ASSEMBLY	QUANTITY FOR ENTIRE DUMMY
1	2

FINISH:	FINISH:
N/A	6061-T6

ENGINEERED:	DATE:	APPROVED:	DATE:
VERTC	7/18/97	D. DELBERG	10/9/01

CONTRACT NO.:	DESIGNED BY:	DRAWING TITLE:
DTN88-84-C-0700	CESAC, INC.	KNEE CLEVIS - BOTTOM PLATE

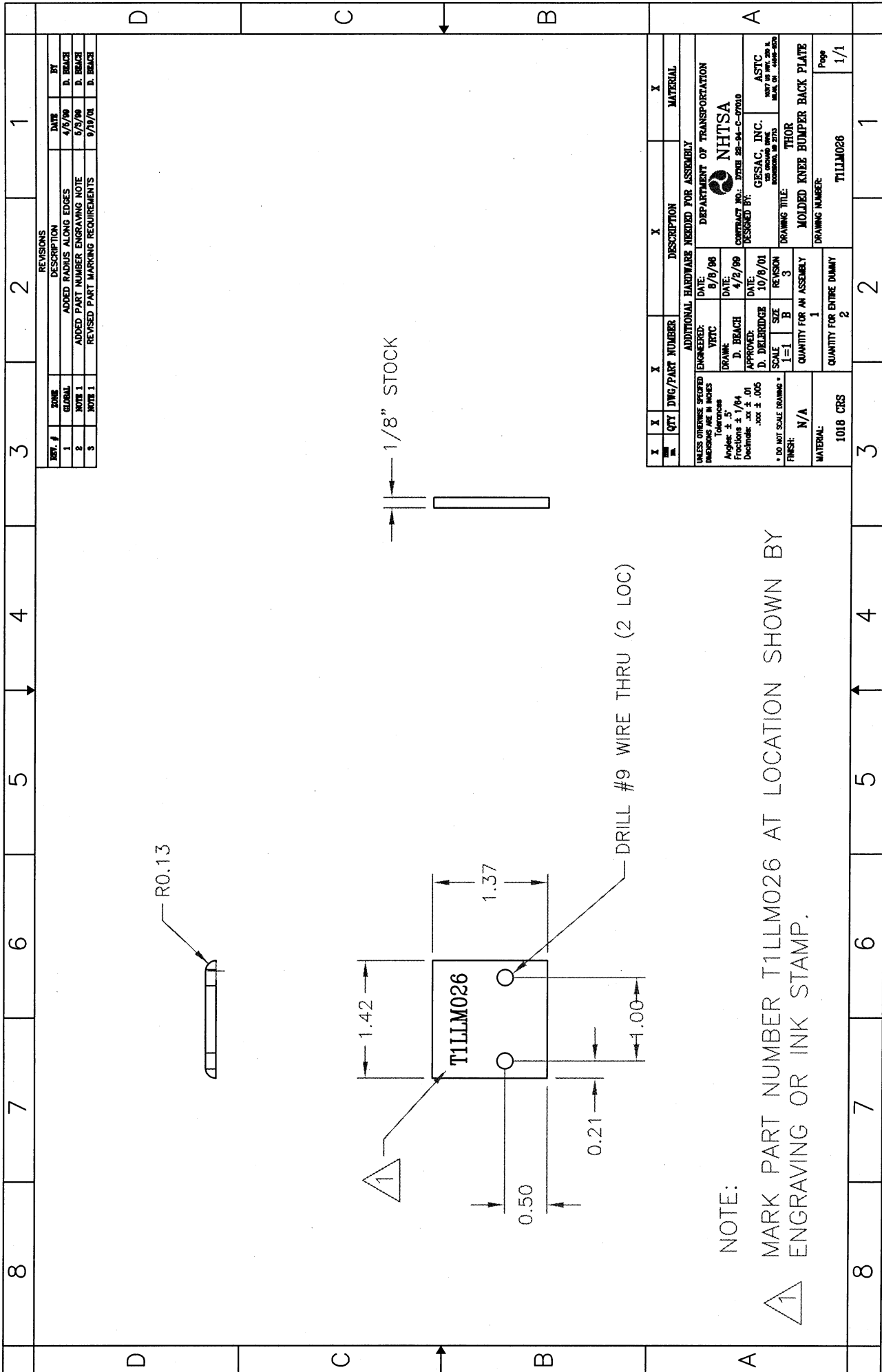
DEPARTMENT OF TRANSPORTATION	NHTSA
ASTC	THOR

DRAWING NUMBER:	PAGE
T11LM023	1/1

NOTE:

⚠ MARK PART NUMBER T11LM023 AT LOCATION SHOWN BY ENGRAVING OR INK STAMP.

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7	NOTE 3	ADDED NOTE 3	10/8/01	C. SPANIE																																																			
<p>NOTE:</p> <p>1 MARK PART NUMBER T1LLM024 AT LOCATION SHOWN BY ENGRAVING OR INK STAMP.</p> <p>2 PART MUST BE WELDED (T1LLW020) AND ANNOIDIZED PRIOR TO INSERTION OF HELICOILS.</p> <p>3 HELICOILS ARE TRIMMED APPROXIMATELY HALF A THREAD, PRIOR TO INSERTION, TO MEET PROPER LENGTH.</p>																																																							
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REVISIONS			
REV. #	ZONE	DESCRIPTION	DATE
1	GLOBAL	ADDED RADIUS ALONG EDGES	4/8/98
2		ADDED PART NUMBER ENGRAVING NOTE	5/29/99
3	NOTE 1	REVISED PART MARKING REQUIREMENTS	9/29/01

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
1018 CRS	T1LLM026	MOLDED KNEE BUMPER BACK PLATE	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
Angular Tolerances	
Profile	$\pm 1/64$
Position	± 01
Dimension	$\pm .005$

ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
ENGINEERED:	DATE: 6/6/96
DATE:	4/2/99
DRAWN:	D. BRACE
APPROVED:	D. DELBRODGE
DATE:	10/6/01
SCALE:	I=1 B=3
FINISH:	N/A

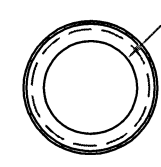
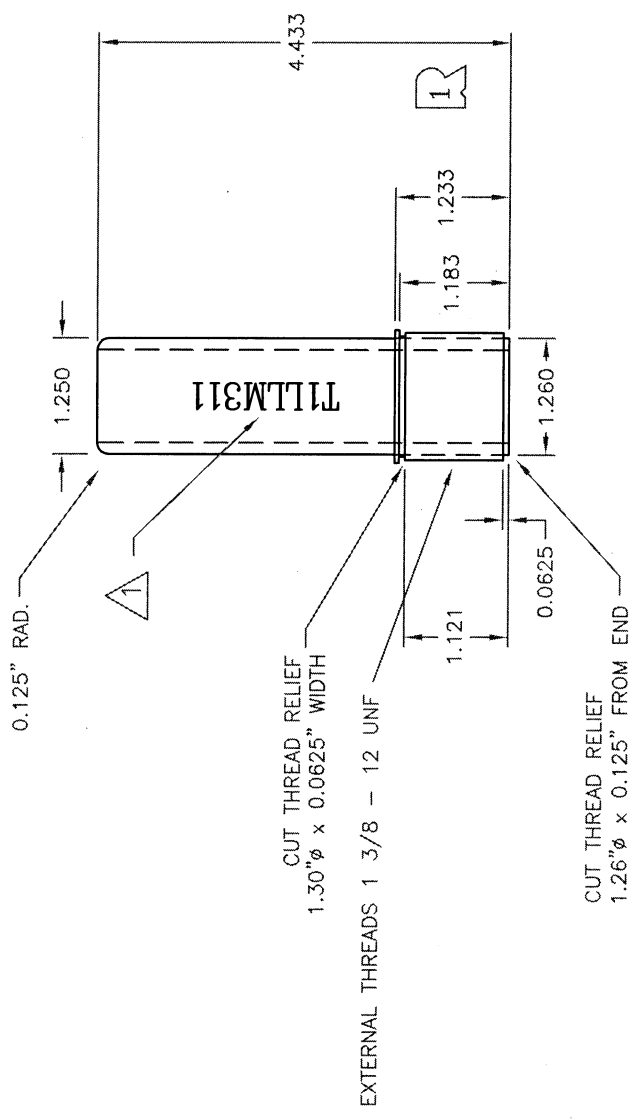
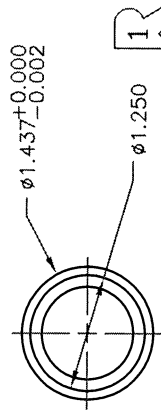
DEPARTMENT OF TRANSPORTATION	
NHTSA	
CONTRACT NO.: DTMB 92-94-C-77010	
DESIGNED BY: GESAC, INC.	
ASTC	
NOT TO BE USED FOR	
MATERIAL OF	
DRAWING TITLE: THOR	
DRAWING NUMBER: T1LLM026	
Page: 1/1	

NOTE:
 MARK PART NUMBER T1LLM026 AT LOCATION SHOWN BY ENGRAVING OR INK STAMP.

10	9	8	7	6	5	4	3	2	1																																																												
H	G	F	E	D	C	B	A																																																														
<p>NOTE:</p> <p>① ADJUST NUT AS DESCRIBED IN THOR-LX / HYBRID III VERSION 2.0 USER'S MANUAL.</p> <p>② SPRING RATE LISTED AT A NOMINAL 137 LB/IN. NOMINAL SPRING RATE IS SUPERSEDED BY STATIC TESTING REQUIREMENTS: SPRING RATE: 145 ± 7.5 LB / IN (25 ± 1.3 N/mm) MAX DEFLECTION TO SOLID HEIGHT MUST EXCEED: 1.58" (40 mm)</p> <p>③ INSERT THE ACHILLES ELASTOMERIC SPRING ELEMENT (T11LM316) INTO THE COMPRESSION SPRING. THIS ASSEMBLY MUST BE STATICALLY TESTED TO MEET THE FOLLOWING REQUIREMENTS: DEFLECTION: 1.18" (30mm) FORCE: 236 ± 24 LBF (945 TO 1155 N) N.B. SPRING CAP MUST NOT BE IN PLACE AT EITHER END FOR THIS TEST. TEMPERATURE RANGE: 18--27°C 1 HOUR RECOVERY BETWEEN TESTS</p>																																																																					
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4	MSC# 00060269	#6-32 X 0.345 HELICOIL INSERT	12/19/97	7																																													
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	QUANTITY FOR ENTIRE DUMMY: 2		Page: 1/1																																														

10	9	8	7	6	F	3	2	1
H	G	F	E	D	C	B	A	



NOTE: BORE ϕ 0.990 \pm 0.002 THRU HOLE

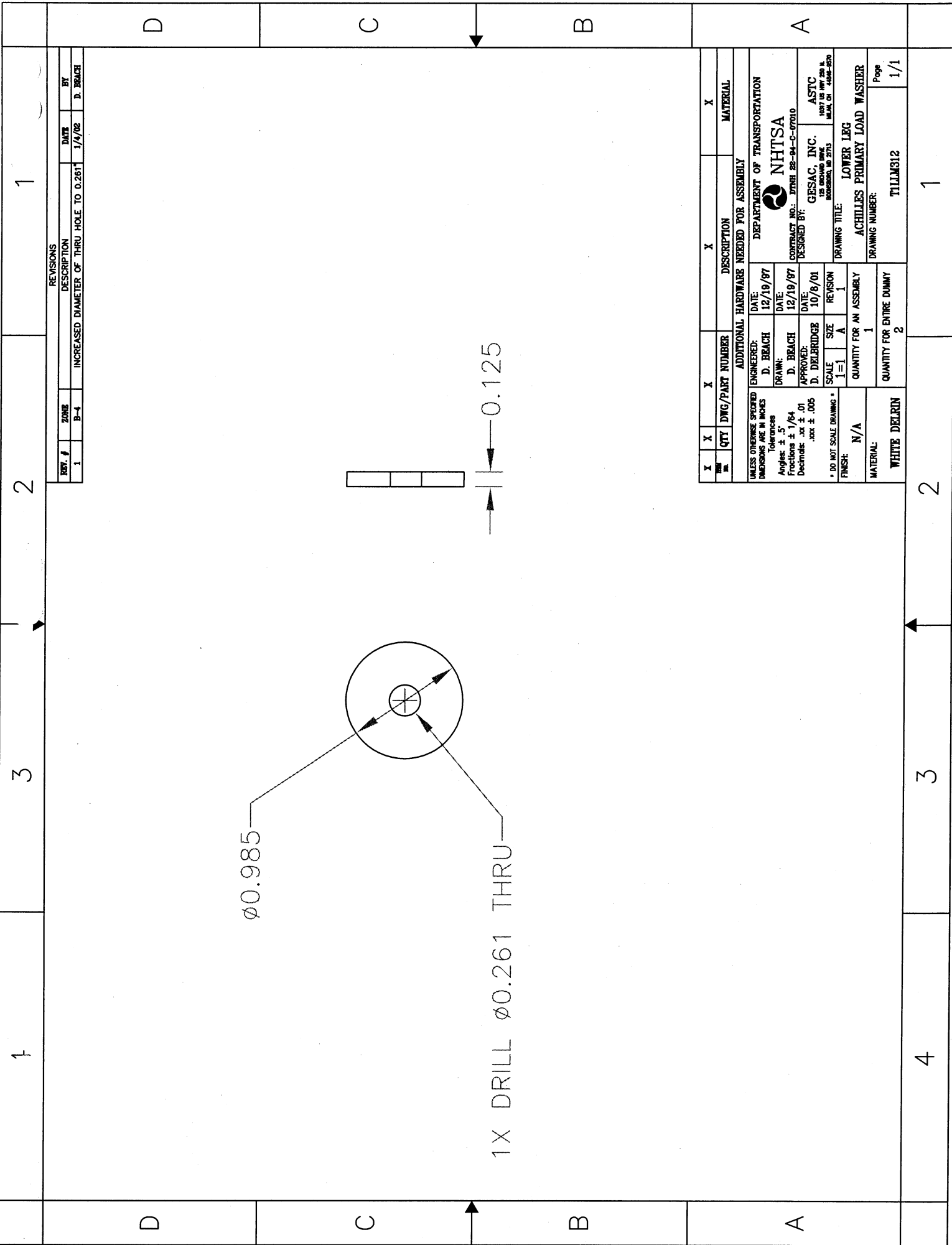
NOTE: MARK PART NUMBER T11LM311 AT LOCATION SHOWN BY ENGRAVING OR INK STAMP.

REV. #	ZONE	DESCRIPTION	DATE	BY
1	GLOBAL	MODIFIED DIMENSIONS TO REDUCE WEIGHT	3/10/98	D. BEACH
2	GLOBAL	ADDED RADIUS ALONG TOP EDGE	8/25/98	D. BEACH
3	NOTE 1	ADDED PART NUMBER ENGRAVING NOTE	5/5/99	D. BEACH
4	C-9	CHANGED THREAD RELIEF FROM 1.30 x 0.02 TO 1.28 x 0.025	12/3/99	D. BEACH
5	FINISH	SPECIFIED BLACK ANODIZE FINISH	8/8/00	D. BEACH
6	GLOBAL	REDUCED DIAMETER OF FLANGE RING	2/9/01	D. BEACH
7	D-6	INCREASED ϕ OF FLANGE RING, REDUCED HEIGHT	5/24/01	D. BEACH
8	NOTE 1	REVISED PART MARKING REQUIREMENTS	9/19/01	D. BEACH
9	B-5	DECREASED OVERALL PART LENGTH FOR ACH. LC.	1/17/02	D. BEACH

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
		ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
		ENGINEERED: D. BEACH	DATE: 12/19/97
		DRAWN: D. BEACH	DATE: 12/19/97
		APPROVED: D. DELBRIDGE	DATE: 10/8/01
		SCALE: 1=1	SIZE: C
		REVISION: 9	
		QUANTITY FOR AN ASSEMBLY: 1	
		QUANTITY FOR ENTIRE DUMMY: 2	
4	6061-T6		
3			
2			
1			

DEPARTMENT OF TRANSPORTATION
NHTSA
 CONTRACT NO.: DTRB 22-94-C-07010
 DESIGNED BY: GESAC, INC.
 125 ORCHARD DRIVE
 BOWENSBORO, IN 47313
 ASTC
 10317 US HWY. 250 N.
 MARIETTA, OH 44048 - 8070

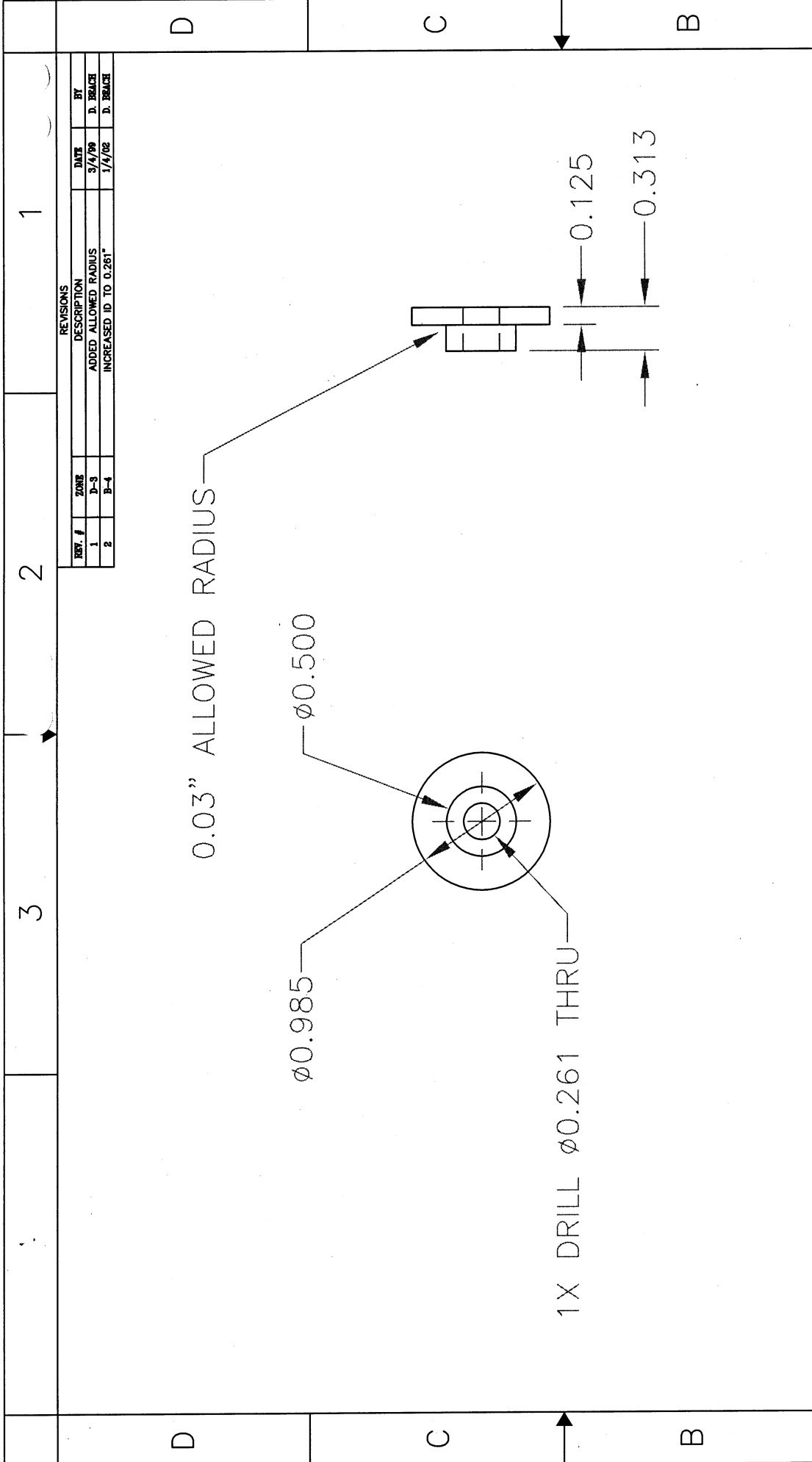
DRAWING TITLE: LOWER LEG
 DRAWING NUMBER: T11LM311
 Page 1/1



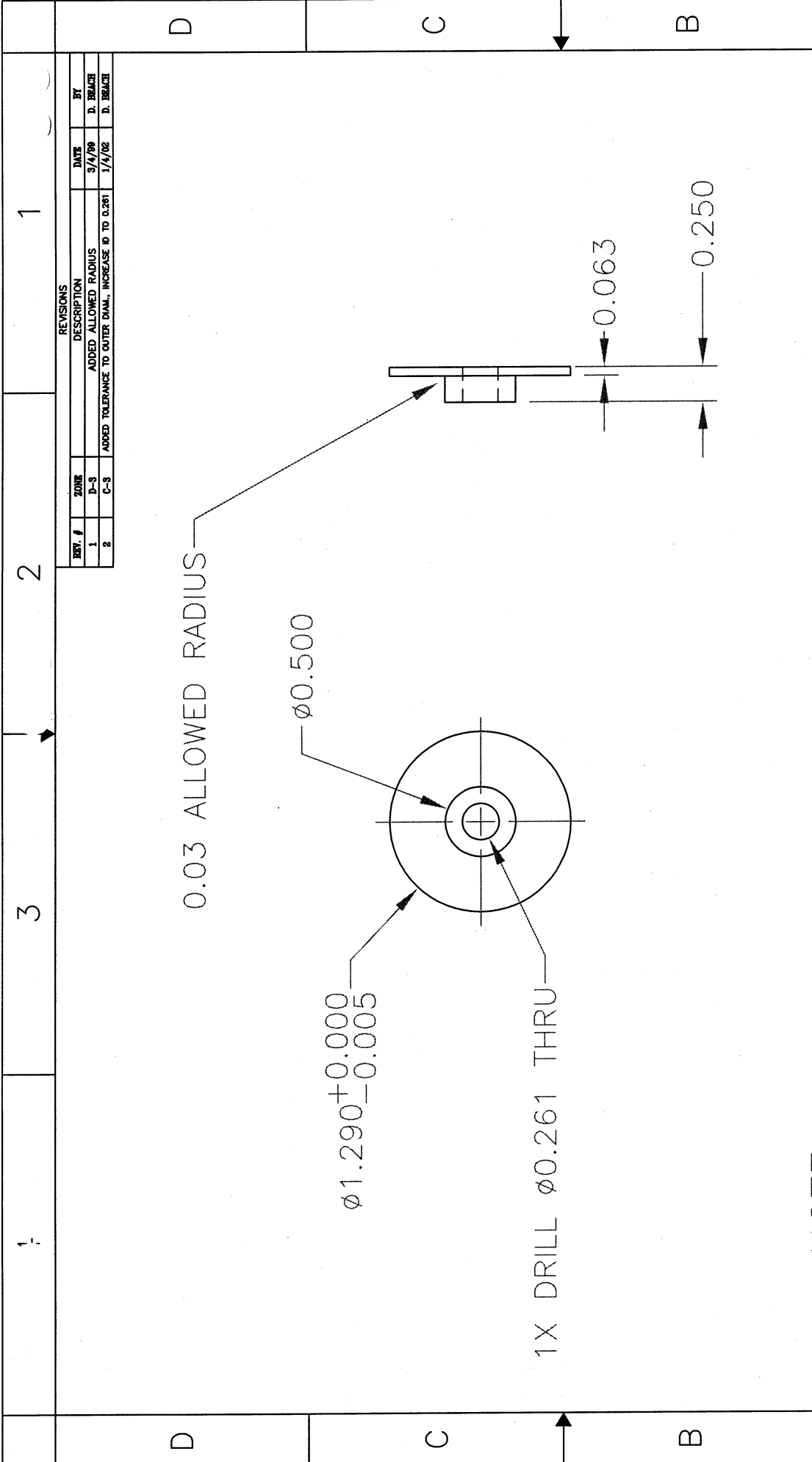
REV. #	ZONE	DESCRIPTION	DATE	BY
1	B-4	INCREASED DIAMETER OF THRU HOLE TO 0.261	1/4/02	D. BEACH

REV. #	QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
			ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
UNLESS OTHERWISE SPECIFIED:				
DIMENSIONS ARE IN INCHES				
Tolerances				
Angles	± .5			
Fractions	± 1/64			
Decimals	.xx ± .01			
	.xxx ± .005			
* DO NOT SCALE DRAWING *				
FINISH: N/A				
MATERIAL: WHITE DELRIN				
QUANTITY FOR AN ASSEMBLY: 1				
QUANTITY FOR ENTIRE DUMMY: 2				
DRAWING NUMBER: T11LM312				
Page: 1/1				

NHTSA
 DEPARTMENT OF TRANSPORTATION
 CONTRACT NO.: DTRM 22-94-C-07010
 DESIGNED BY: GESAC, INC.
 1000 W. 10TH ST.
 ROCKFORD, IL 61103
 DRAWING TITLE: LOWER LEG
 ACHILLES PRIMARY LOAD WASHER



1		2		3		4	
REV. #		ZONE		REVISIONS		DATE	
1		D-3		ADDED ALLOWED RADIUS		3/4/99	
2		B-4		INCREASED ID TO 0.261"		1/4/02	
				BY		D. BEACH	
						D. BEACH	
X		X		X		X	
QTY		DWG/PART NUMBER		DESCRIPTION		MATERIAL	
1		N/A		ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY		N/A	
UNLESS OTHERWISE SPECIFIED		ENGINEERED:		DATE:		DEPARTMENT OF TRANSPORTATION	
DIMENSIONS ARE IN INCHES		D. BEACH		12/19/97		NHTSA	
Tolerances		DRAWN:		DATE:		CONTRACT NO.: DTRM 28-94-C-0700	
Angles: ± .5		D. BEACH		12/19/97		DESIGNED BY: GESAC, INC.	
Fractions: ± 1/64		APPROVED:		DATE:		ASTC	
Decimals: .xx ± .01		D. DELBRIDGE		10/8/01		MKT 10 MAY 99 N.	
.xxx ± .005		SCALE		SIZE		MILK OF 4488-870	
* DO NOT SCALE DRAWING *		1=1		A		DRAWING TITLE: LOWER LEG	
FINISH:		N/A		REVISION		ACHILLES - SPRING CAP	
MATERIAL:		WHITE DELRIN		QUANTITY FOR AN ASSEMBLY		DRAWING NUMBER:	
				1		TILLM313	
QUANTITY FOR ENTIRE DUMMY				2		Page	
						1/1	
1		2		3		4	



REV. #	ZONE	DESCRIPTION	DATE	BY
1	D-3	ADDED ALLOWED RADIUS	3/4/99	D. BEACHE
2	C-3	ADDED TOLERANCE TO OUTER DIAM., INCREASE ID TO 0.261	1/4/02	D. BEACHE

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
		ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	

UNLESS OTHERWISE SPECIFIED:	ENGINEERED:	DATE:	DEPARTMENT OF TRANSPORTATION	
DIMENSIONS ARE IN INCHES	D. BEACHE	12/19/97	 NHTSA CONTRACT NO.: DTMB 22-94-C-07010 DESIGNED BY: ASTC 125 BROADWAY, NEW YORK, NY 10038-5070 M.A.N. OF 1449-870	
Tolerances	DRAWN:	DATE:		
Angles: ± .5	D. BEACHE	12/19/97		
Fractions: ± 1/64	APPROVED:	DATE:		
Decimals: .xx ± .01	D. DELBRIDGE	10/8/01		
	.xxx ± .005	SCALE	SIZE	REVISION
		1=1	A	2
		QUANTITY FOR AN ASSEMBLY		
		1		
		QUANTITY FOR ENTIRE DUMMY		
		2		

DRAWING TITLE	DRAWING NUMBER	Page
LOWER LEG	ACHILLES - SPRING BASE CAP	1/1

MATERIAL	440C SS

FINISH	N/A

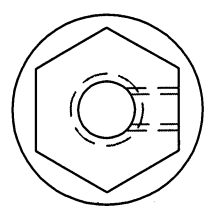
DO NOT SCALE DRAWING

NOTE:
HEAT TREAT TO 57 C

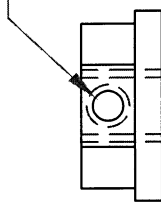
REVISIONS
1
2

4	3	2	1
D	C	B	A

REV. #	ZONE	DESCRIPTION	DATE	BY
1	A-4	CHANGED MATERIAL TO 18-8 SS	9/29/99	D. BEACH
2	NOTE 3	ADDED NOTE 3	5/24/99	D. BEACH
3	NOTE 3	CLARIFIED NOTE 3	12/17/99	D. BEACH
4	NOTE 3	CLARIFIED NOTE 3	5/29/01	D. BEACH



DRILL AND TAP #4-40
 THRU TO CENTER BORE
 (CENTER ON NUT FLAT)
 (1 LOC)



NOTE:

- ① MACHINE FROM #10-32 HEX SERRATED FLANGE NUT (18-8 SS)
- ② CHASE THREADS IN CENTER BORE
- ③ INVENTORY CONTROL REFERENCE: PART IDENTICAL TO THOR NECK PART# T2LLM318

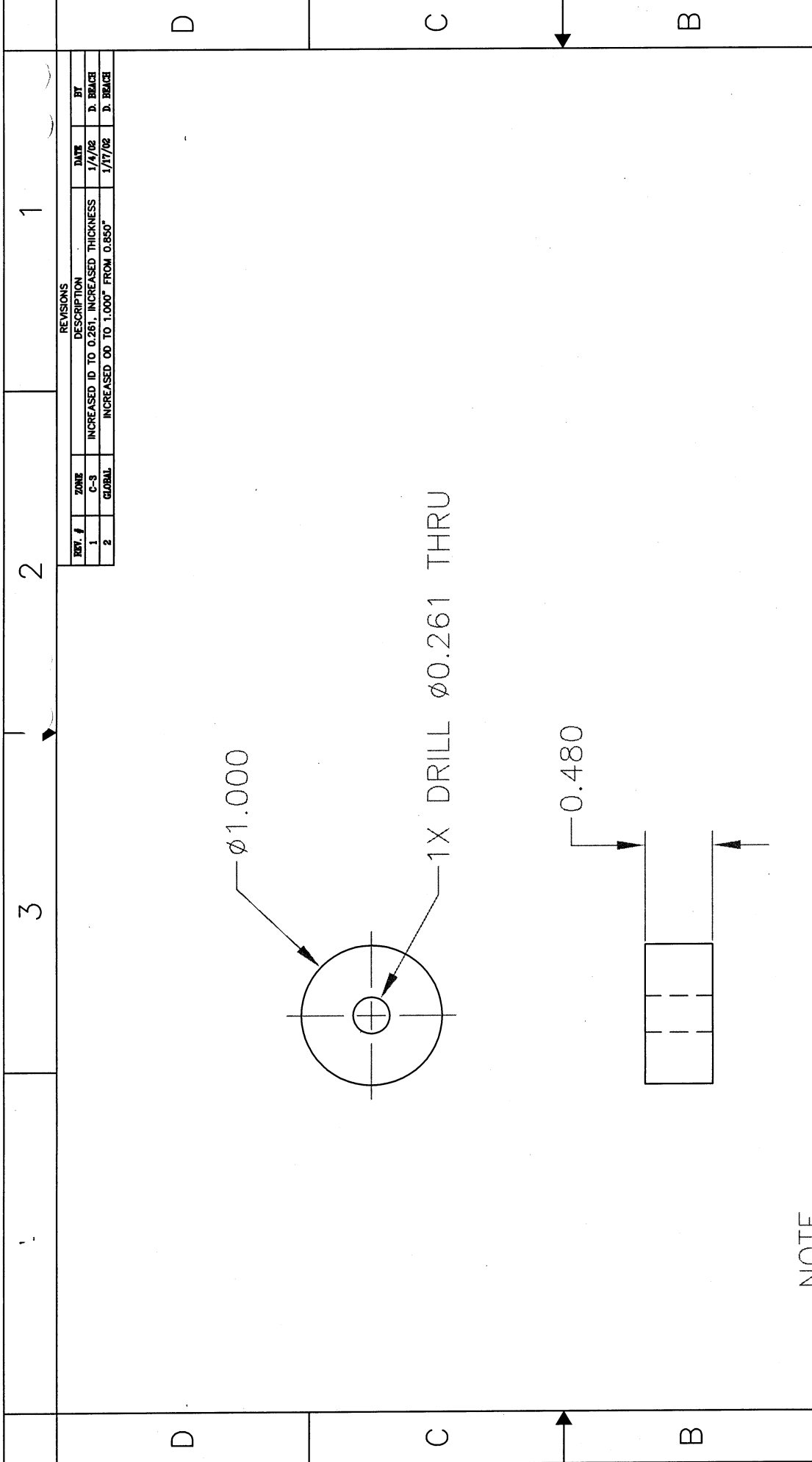
1	MSC# 93776A401	#10-32 SERRATED HEX FLANGE NUT	PURCHASED
1	QTY	DWG/PART NUMBER	DESCRIPTION
ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY			
UNLESS OTHERWISE SPECIFIED		ENGINEERED:	DATE:
DIMENSIONS ARE IN INCHES		D. BEACH	9/19/98
Tolerances		DRAWN:	DATE:
Angles: ± .5		D. BEACH	9/18/98
Fractions: ± 1/64		APPROVED:	DATE:
Decimals: .xx ± .01		D. DELBRIDGE	10/8/01
.xxx ± .005		SCALE	SIZE
REVISION		2=1	A
FINISH:		3	4
* DO NOT SCALE DRAWING *		QUANTITY FOR AN ASSEMBLY	1
MATERIAL:		QUANTITY FOR ENTIRE DUMMY	2
SEE SPECS.			

DEPARTMENT OF TRANSPORTATION
 NHTSA
 CONTRACT NO.: DTRR 22-94-C-07010
 DESIGNED BY: GESAC, INC.
 125 GREENWOOD PARK
 ROCKFORD, IL 61101-4070
 ASTC
 1407 W. HWY 200 N.
 MELBA, IL 61854-8070

DRAWING TITLE: THOR - LOWER EXTREMITY
 DRAWING NUMBER: T2LLM318
 Page 1/1

4	3	2	1
D	C	B	A

8	7	6	5	4	3	2	1																																																																																										
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		Page																																																																																															
		1/1																																																																																															



NOTE

① INVENTORY CONTROL REFERENCE: PART IDENTICAL TO T2LLM320

REVISIONS				
REV. #	ZONE	DESCRIPTION	DATE	BY
1	C-3	INCREASED ID TO 0.261, INCREASED THICKNESS	1/4/02	D. BEACH
2	GLOBAL	INCREASED OD TO 1.000" FROM 0.850"	1/17/02	D. BEACH

X	X	X	X	X	X	X	X	X	X	DESCRIPTION	
										QTY	DTG/PART NUMBER
UNLESS OTHERWISE SPECIFIED										DEPARTMENT OF TRANSPORTATION	
DIMENSIONS ARE IN INCHES										NHTSA	
Tolerances										CONTRACT NO.: DTMB 22-94-C-07010	
Angles: ± .5										DESIGNED BY: GESAC, INC. ASTC	
Fractions: 1/64										DRAWING TITLE: THOR-IX	
Decimals: .xx ± .005										MOCK ACHILLES LOAD CELL	
* DO NOT SCALE DRAWING *										DRAWING NUMBER: T2LLM320	
FINISH: CLEAR ANODIZED										Page 1/1	
MATERIAL: 6061-T6										Quantity for entire dummy	
										Quantity for an assembly	
										Quantity for an assembly	
										Quantity for an assembly	

1 2 3 4

D C B A

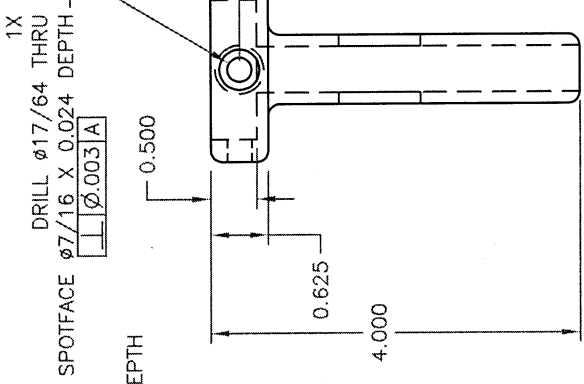
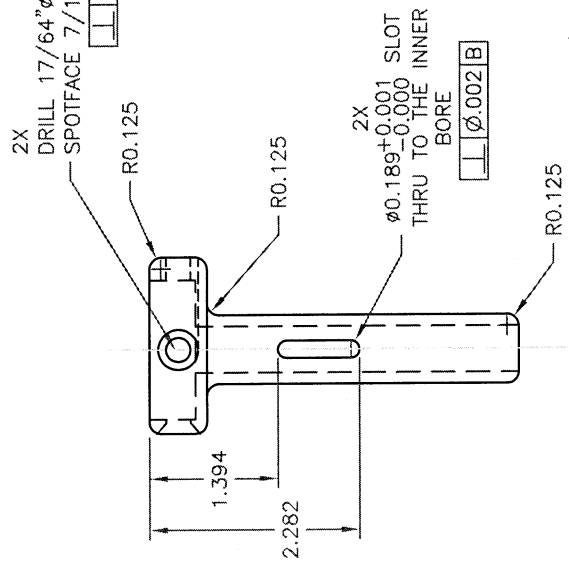
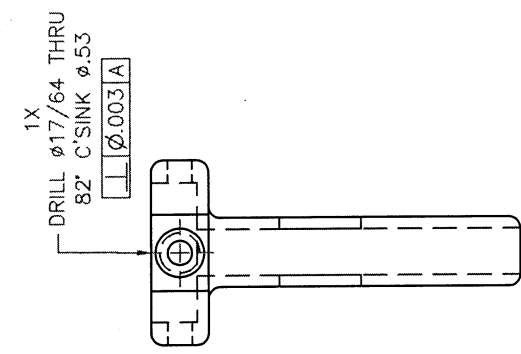
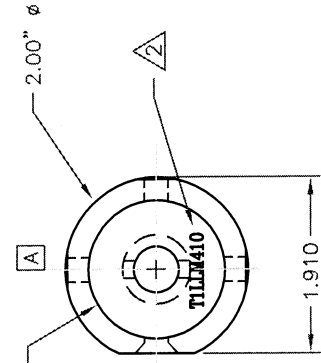
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8	7	6	5	4	3	2	1																						
<p style="text-align: center;">VIEW 1</p> <p style="text-align: center;">VIEW 2</p>																													
<p style="text-align: center;">NOTE:</p> <p>① GLUE ASSEMBLY TOGETHER WITH LORD 305 ADHESIVE</p> <p>② METAL SURFACES MUST BE SANDBLASTED AND CLEANED WITH MEK PRIOR TO BONDING. RUBBER SHOULD BE SANDED AND CLEANED WITH MEK,</p> <p>③ CYCLE ASSEMBLY THROUGH SEVERAL 50% COMPRESSION LOADING CYCLES PRIOR TO ASSEMBLY AND TESTING IN THE THOR-LX</p> <p>④ ALIGN THE HOLES IN ITEM 2 WITH THE SLOTS IN ITEM 1, AS SHOWN IN VIEW 1, USING A LOWER LEG ASSEMBLY TOOL COMPLIANT BUSHING ASSEMBLY BEARING (T1LLT011) AND A 3/16 X 3/4" DOWEL PIN ON EACH SIDE TO PREVENT ITEM 2 FROM ROTATING DURING THE BONDING PROCESS. THIS STEP IS CRITICAL TO A PROPER ASSEMBLY OF THE LOWER LEG.</p>																													
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Page	1/1																												

10	9	8	7	6	5	4	3	2	1
H	G	F	E	D	C	B	A		

REV. #	ZONE	DESCRIPTION	DATE	BY
1	GLOBAL	ADDED HOLE IN CENTER	9/19/98	D. BEACH
2	GLOBAL	INCREASED PART THICKNESS FOR DURABILITY	3/3/99	D. BEACH
3	GLOBAL	ADDED FOURTH MOUNTING BOLT HOLE	3/4/99	D. BEACH
4	GLOBAL	ADDED PART NUMBER ENGRAVING NOTE	6/6/99	D. BEACH
5	GLOBAL	ADDED 0.125" RADIUS TO EDGES	6/7/00	D. BEACH
6	NOTE 2	ADDED NOTE FOR MARKING	9/18/01	D. BEACH
7	GLOBAL	INCREASED WIDTH OF SLOT	1/29/04	M. ARTIS
7	GLOBAL	ADDED GEOMETRIC TOLERANCE	1/29/04	M. ARTIS

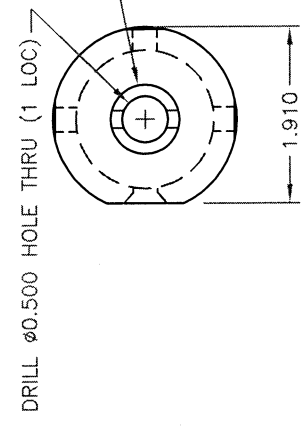


NOTES:

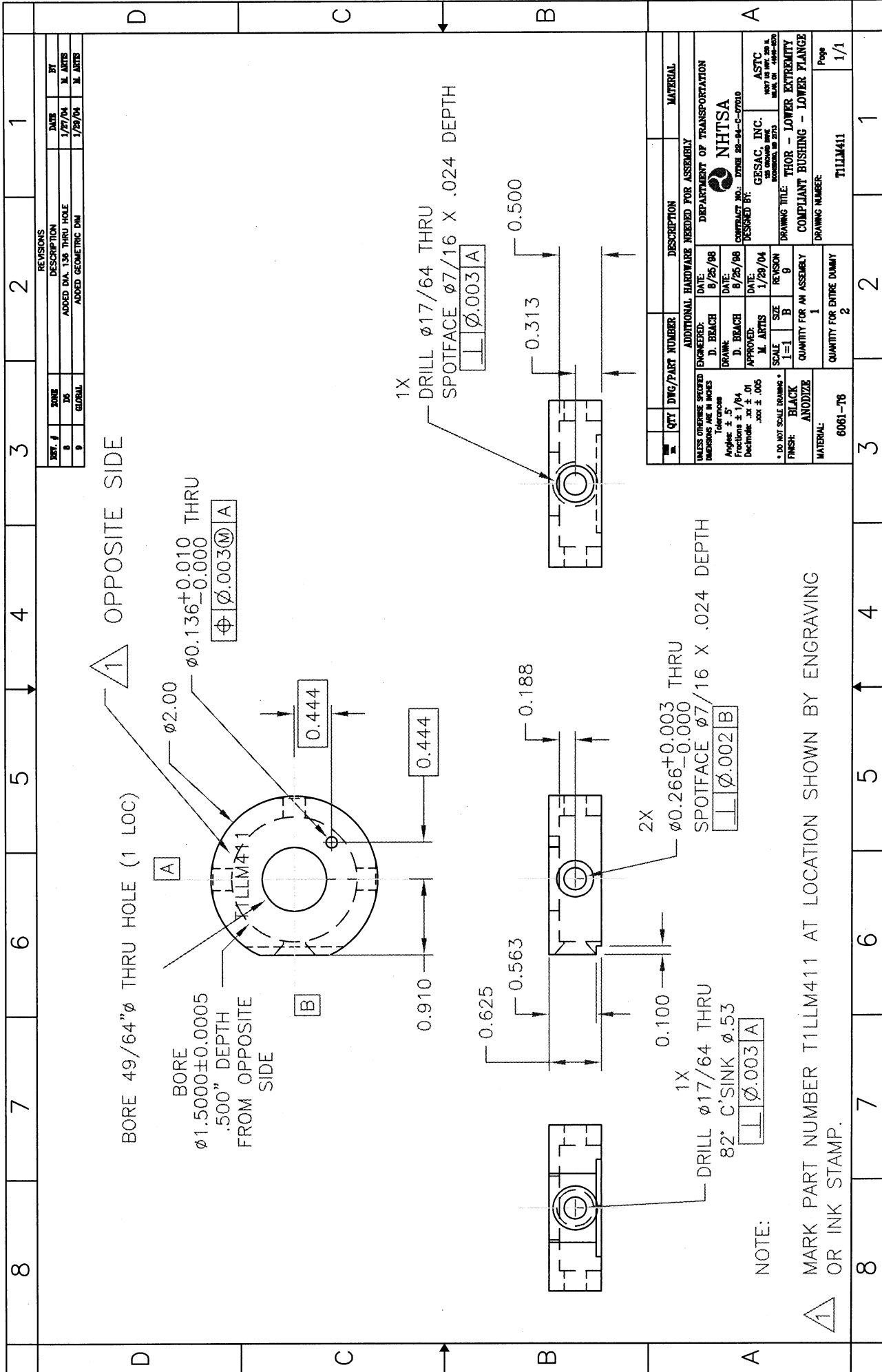
1 RADIAL ORIENTATION OF SLOT AND MOUNTING HOLES ARE CRITICAL TO PROPER OPERATION OF THE TIBIA ASSEMBLY.

2 MARK PART NUMBER T11LM410 AT LOCATION SHOWN BY EITHER ENGRAVING OR INK STAMP.

3 HEAT TREAT TO Rc 57 +/- 5



QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL																																												
1	T11LM410	THOR - LOWER EXTREMITY COMPLIANT BUSHING PLUNGER	440C SS																																												
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REVISIONS			
REV. #	DATE	BY	DESCRIPTION
1	1/27/04	M. ARTS	ADDED DIA. 136 THRU HOLE
2	1/28/04	M. ARTS	ADDED GEOMETRIC DIM.

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
1	6061-T6	6061-T6	6061-T6
2	1	QUANTITY FOR AN ASSEMBLY	
2	2	QUANTITY FOR ENTIRE DUMMY	

ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY			
ENGINEERED:	DATE:	DEPARTMENT OF TRANSPORTATION	
D. BEACH	8/26/08	NHTSA	
DESIGNED BY:	DESIGNED BY:	ASTC	
D. BEACH	8/26/08	INVT 101 WPT. 300 A.	
M. ARTS	1/28/04	JULIA Q. 10448-200	
SCALE	SIZE	DRAWING TITLE: THOR - LOWER EXTREMITY	
1=1	B	COMPLIANT BUSHING - LOWER FLANGE	
1	9	DRAWING NUMBER	
1	2	T11LM411	
1	1	Page	
1	1	1/1	

MARK PART NUMBER T11LM411 AT LOCATION SHOWN BY ENGRAVING OR INK STAMP.

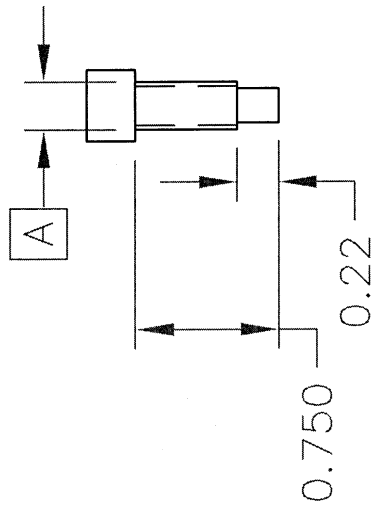
1

2

3

REVISIONS				
REV. #	ZONE	DESCRIPTION	DATE	BY
1	GLOBAL	INCREASED TIP DIAMETER	9/18/98	D. BEACH
2	GLOBAL	INCREASED OVERALL LENGTH	10/12/98	D. BEACH
3	GLOBAL	INCREASED OVERALL LENGTH, CHANGED HARDWARE	6/8/99	D. BEACH
4	B-2	DECREASED TIP DIMENSION FROM 0.188	10/9/01	D. BEACH
5	C-3	INCREASED LENGTH OF DIA. 185 SHAFT	1/29/04	M. ARTIS
6	B-2	ADDED GEOMETRIC DIM	1/29/04	M. ARTIS

1/4-28 EXT. THREAD
(STOCK)



STOCK BOLT HEAD $\phi 0.38$ — $\phi 0.185^{+0.000}_{-0.005}$ $\text{Ⓞ} \phi 0.002 \text{ A}$

D

C

B

A

1	2	MCM# 91251A440	#1/4-28 ± 3/4" S.H.C.S.	ALLOY STEEL
QTY	DWG/PART NUMBER	DESCRIPTION		MATERIAL
ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY				
ENGINEERED:		DATE:	DEPARTMENT OF TRANSPORTATION	
D. BEACH		8/28/98	NHTSA	
DRAWN:		DATE:	CONTRACT NO.: DTMB 82-94-C-07010	
D. BEACH		8/28/98	DESIGNED BY: GESAC, INC.	
APPROVED:		DATE:	ASTC	
M. ARTIS		1/28/04	155 ORANGE GROVE	
SCALE	SIZE	REVISION	DRAWING TITLE:	
1=1	A	5	PLUNGER RETAINING BOLTS	
QUANTITY FOR AN ASSEMBLY		DRAWING NUMBER:		
2	T11JM413			
QUANTITY FOR ENTIRE DUMMY		Page		
4	1/1			
MATERIAL: SEE SPECS.				

1

2

3

4

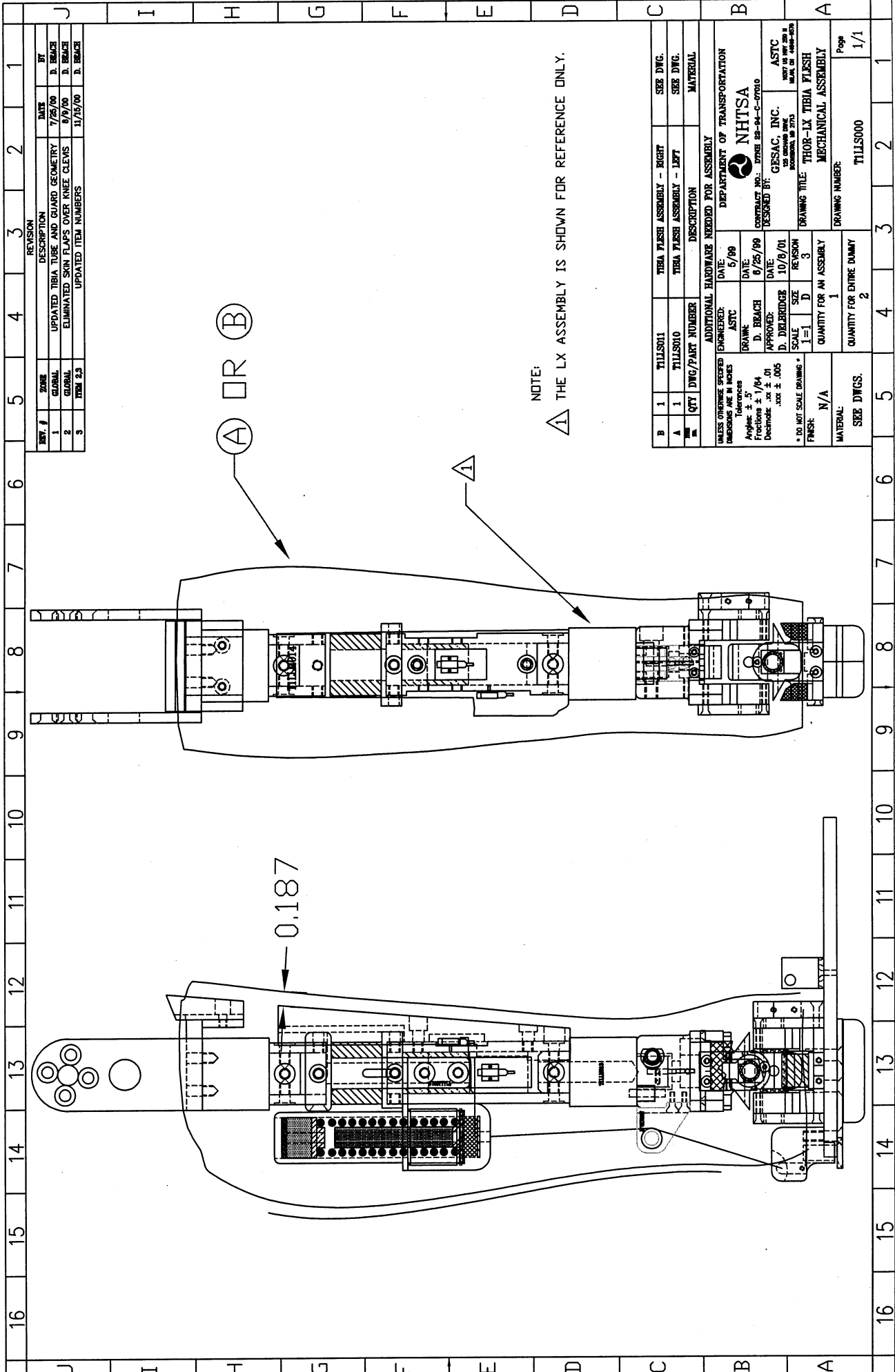
D

C

B

A

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NOTE:
 ▲ THE LX ASSEMBLY IS SHOWN FOR REFERENCE ONLY.

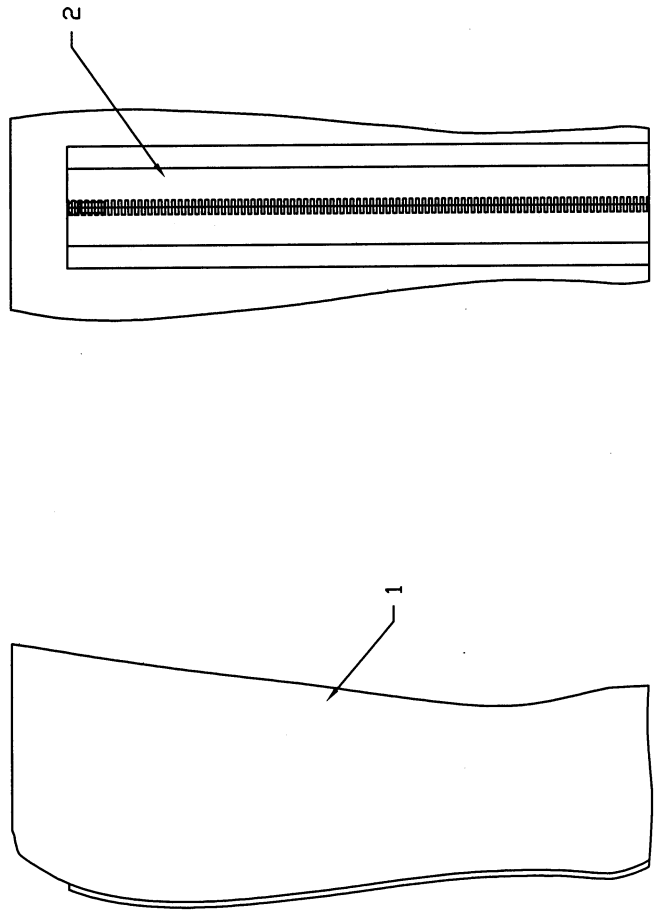
REV. #	ZONE	DESCRIPTION	DATE	BY
1	GLOBAL	UPDATED TIBIA TUBE AND GUARD GEOMETRY	7/25/00	D. BRACH
2	GLOBAL	ELIMINATED SKIN FLAPS OVER KNEE CLEVIS	9/9/00	D. BRACH
3	ITEM 2,3	UPDATED ITEM NUMBERS	11/15/00	D. BRACH

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
B 1	TILS011	TIBIA FLESH ASSEMBLY - RIGHT	SEE DWG.
A 1	TILS010	TIBIA FLESH ASSEMBLY - LEFT	SEE DWG.

ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
ENGINEERED:	ASTC
DATE:	5/99
DESIGNED BY:	ASTC
DATE:	8/25/99
APPROVED:	D. BRACH
DATE:	10/78/01
SCALE:	1 = 1
FINISH:	N/A

DEPARTMENT OF TRANSPORTATION	
NHTSA	
CONTRACT NO.:	DTMB 23-94-5-07010
DESIGNED BY:	GESAC, INC.
DATE:	10/78/01
REVISION:	3
DRAWING TITLE:	THOR-LX TIBIA FLESH
DRAWING NUMBER:	TILS000
QUANTITY FOR AN ASSEMBLY:	1
QUANTITY FOR ENTIRE DUMMY:	2
MATERIAL:	SEE DWGS.

22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A							
														REV. #	ZONE	REVISION		BY				
														1	NOTE 1	DESCRIPTION		D.				
																ADDED NOTE 1		7/18/01 C. SPADE				



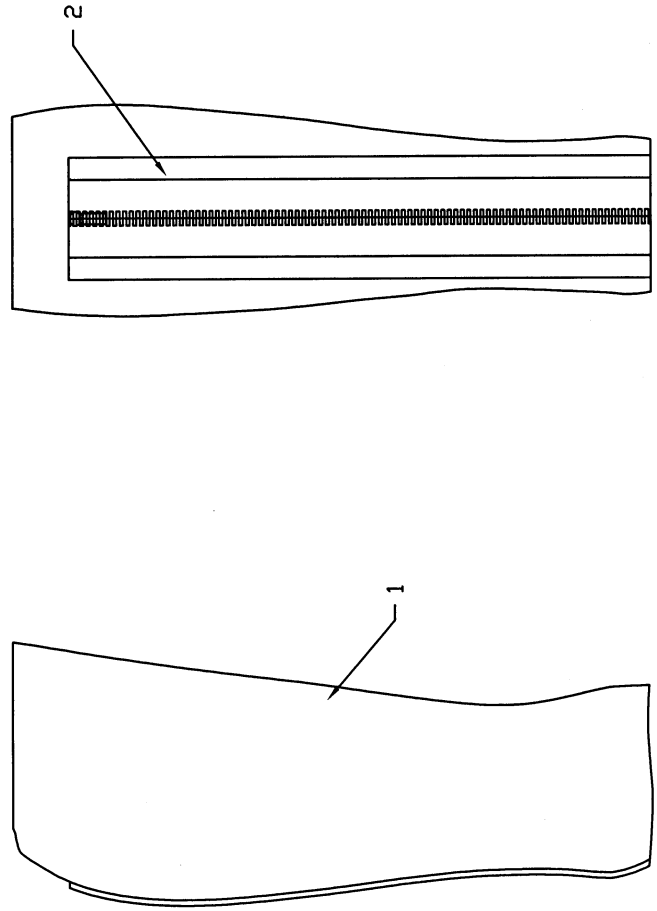
2	1	TILLS014	ZIPPER ASSEMBLY	PURCHASED
1	1	TILLS012	TIBIA VINYL - LEFT	PURCHASED
QTY	DWG/PART NUMBER	DESCRIPTION		
		MATERIAL		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES				
Tolerances				
Angles: ± .5°				
Fractions: ± 1/64				
Decimals: .xx ± .01				
.xxx ± .005				
* DO NOT SCALE DRAWING *				
FINISH:				
-				
MATERIAL:				
SEE DWGS.				
QUANTITY FOR AN ASSEMBLY				
1				
QUANTITY FOR ENTIRE DUMMY				
1				
DRAWING NUMBER:				
TILLS010				
Page				
1/1				

NOTES:

1 THE ZIPPER ASSEMBLY IS BONDED TO THE TIBIA SKIN USING VINYL GLUE

DEPARTMENT OF TRANSPORTATION
NHTSA
 CONTRACT NO.: DTRF 22-04-C-07010
 DESIGNED BY: GESAC, INC.
10000 WILSON BLVD
 FORT WORTH, TX 76116
 DRAWING TITLE: THOR-LX
 LEFT TIBIA FLESH ASSEMBLY

22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	
P	O	N	M	L	K	J	I	H	G	F	E	D	C	B	A							
REV. #		ZONE		REVISION																		
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
DESCRIPTION		ADDED NOTE 1		7/18/01																		
SPECIFIED GLUE TYPE		C. SPADRE		10/8/01																		
BY		C. SPADRE																				

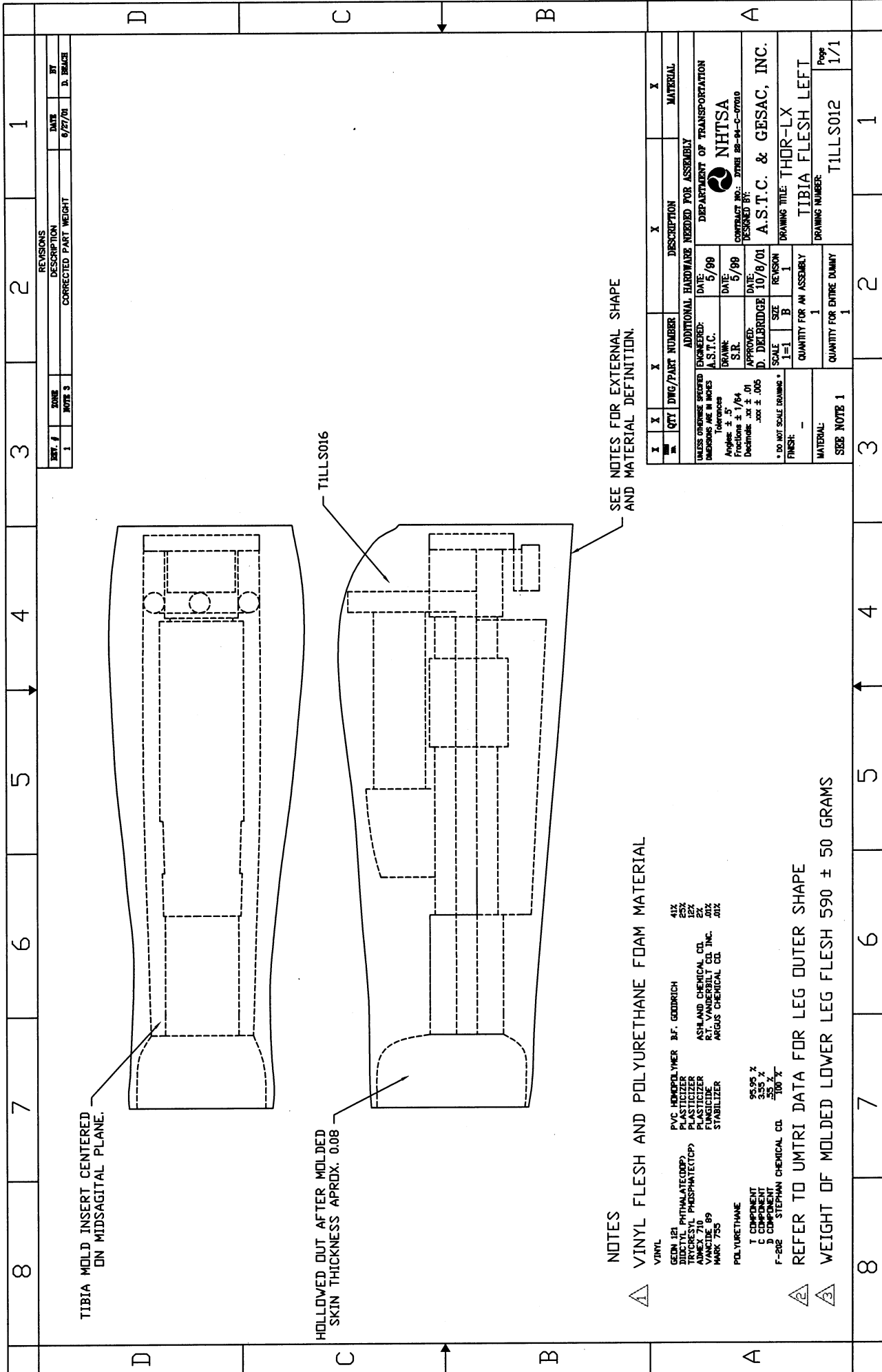


2	1	TILLS014	ZIPPER ASSEMBLY	PURCHASED
1	1	TILLS013	TIBIA VINYL - LEFT	PURCHASED
QTY	DWG/PART NUMBER	DESCRIPTION		
		MATERIAL		
ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY				
UNLESS OTHERWISE SPECIFIED		DATE: 5/99		
DIMENSIONS ARE IN INCHES		ASTC		
Tolerances		DRAWN: S.R.		
Angles: ± .5°		DATE: 5/99		
Fractions: ± 1/64		APPROVED: D. DELBRIDGE		
Decimals: .xx ± .01		DATE: 10/8/01		
.xxx ± .005		SCALE		
* DO NOT SCALE DRAWING *		SIZE		
FINISH:		1=1		
MATERIAL:		SEE DWGS.		
QUANTITY FOR AN ASSEMBLY		1		
QUANTITY FOR ENTIRE DUMMY		1		
DRAWING NUMBER:		TILLS011		
Page		1/1		

NOTES:

1 THE ZIPPER ASSEMBLY IS BONDED TO THE TIBIA SKIN USING VINYL GLUE: HH-66 VINYL CEMENT, R-H PRODUCTS CO., INC., ACTON, MASS. 01720, (978) 897-8000

DEPARTMENT OF TRANSPORTATION	
NHTSA	
CONTRACT NO.:	DTNH 22-94-C-07010
DESIGNED BY:	GESAC, INC.
DATE OF DESIGN:	10/8/99
ASTC	ASTC
DRAWING TITLE:	THOR-IX
DRAWING NUMBER:	RIGHT TIBIA FLESH ASSEMBLY



TIBIA MOLD INSERT CENTERED ON MIDSAGITAL PLANE.

HOLLOWED OUT AFTER MOLDED SKIN THICKNESS APPROX. 0.08

TILLS016

SEE NOTES FOR EXTERNAL SHAPE AND MATERIAL DEFINITION.

NOTES
 1 VINYL FLESH AND POLYURETHANE FOAM MATERIAL

- GEN 121 PHTHALATE(DOP)
- GEN 121 PLASTICIZER
- TRYCRESYL PHOSPHATE(TCP)
- ADWEX 710 PLASTICIZER
- VANCIDE 89 FUNGICIDE
- MARK 750 STABILIZER
- POLYURETHANE
- 1 COMPONENT
- 5 COMPONENT
- F-202 STEPHAN CHEMICAL CO.

- 41% P.V.C. URETHANOLYMER B.F. GOODRICH
- 25% PLASTICIZER
- 12% ASHLAND CHEMICAL CO.
- 8% A.T. VANDERBILT CO. INC.
- 10% ARGUS CHEMICAL CO.
- 95.95% 1 COMPONENT
- 53% 5 COMPONENT
- 100% F-202 STEPHAN CHEMICAL CO.

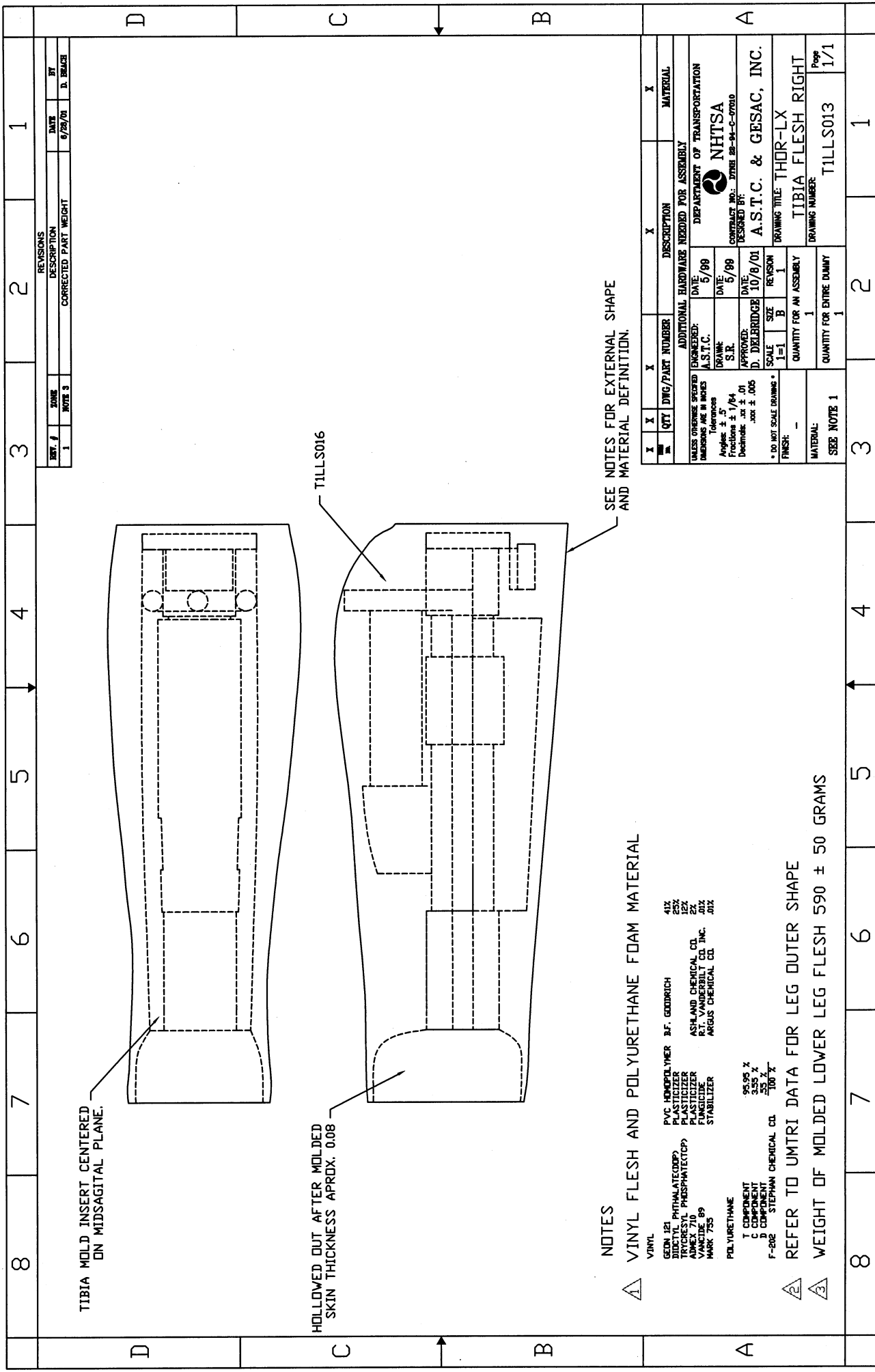
REFER TO UMTRI DATA FOR LEG OUTER SHAPE

WEIGHT OF MOLDED LOWER LEG FLESH 590 ± 50 GRAMS

REVISIONS		DATE	BY
REV. #	ZONE		
1	NOTE 3	9/27/00	D. BRACE
	DESCRIPTION		
	CORRECTED PART WEIGHT		

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
1		ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
	ENGINEERED: A.S.T.C.	DATE: 5/89	
	DRAWN: S.R.	DATE: 5/89	
	APPROVED: D. DELBRIDGE	DATE: 10/8/01	
	FINISH: ± .01	SCALE: I=1	
	± .005	SIZE: B	
	DO NOT SCALE DRAWING	REVISION: 1	
		QUANTITY FOR AN ASSEMBLY: 1	
		QUANTITY FOR ENTIRE DUMMY: 1	
		FINISH: -	
		MATERIAL: SEE NOTE 1	

DEPARTMENT OF TRANSPORTATION
 NHTSA
 CONTRACT NO.: DTMB 88-84-C-0700
 DESIGNED BY: A.S.T.C. & GESAC, INC.
 DRAWING TITLE: THOR-LX
 TIBIA FLESH LEFT
 DRAWING NUMBER: TILLS012
 Page 1/1



TIBIA MOLD INSERT CENTERED ON MIDSAGITAL PLANE.

HOLLOWED OUT AFTER MOLDED SKIN THICKNESS APPROX. 0.08

TILLS016

NOTES

1 VINYL FLESH AND POLYURETHANE FOAM MATERIAL

- 1 VINYL
- 1 GEOM 121
- 1 DIOCTYL PHTHALATE(DOP)
- 1 TRYCRESYL PHOSPHATE(TCP)
- 1 ADMEX 710
- 1 UNICIDE 89
- 1 MARK 750
- 1 POLYURETHANE
- 1 COMPONENT
- 1 COMPONENT
- 1 F-202 STEPHAN CHEMICAL CO.
- 1 P.V.C. HOMOPOLYMER B.F. GOODRICH
- 1 PLASTICIZER
- 1 PLASTICIZER
- 1 ASPHLAND CHEMICAL CO. INC.
- 1 ACRYLAUERREITL CO. INC.
- 1 PARIGUS CHEMICAL CO. INC.
- 1 41X
- 1 20X
- 1 12X
- 1 2X
- 1 10X
- 1 50X
- 1 95.95 %
- 1 53 %
- 1 100 %

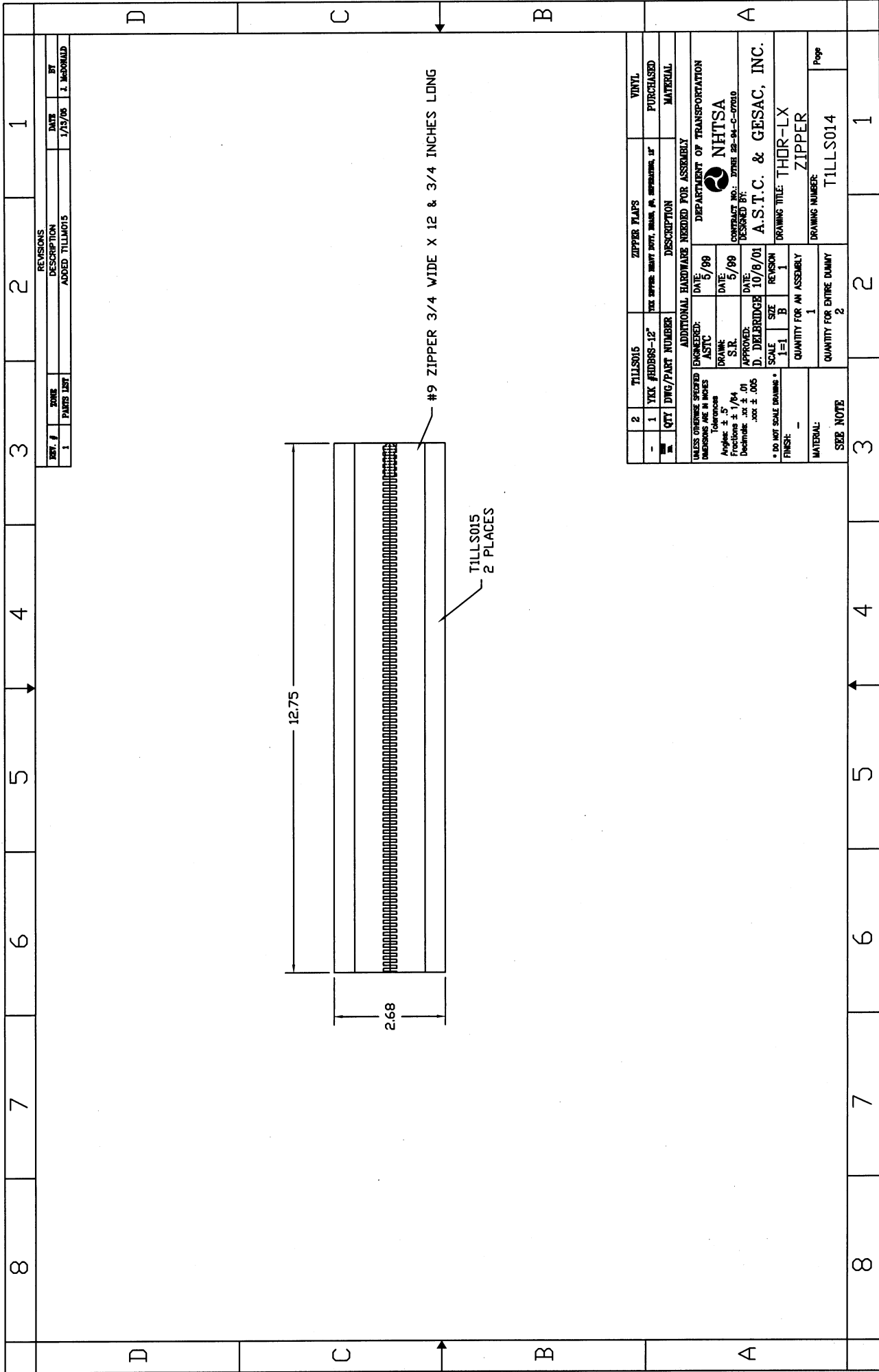
2 REFER TO UMTRI DATA FOR LEG OUTER SHAPE

3 WEIGHT OF MOLDED LOWER LEG FLESH 590 ± 50 GRAMS

SEE NOTES FOR EXTERNAL SHAPE AND MATERIAL DEFINITION.

REVISIONS			
REV. #	DATE	DESCRIPTION	BY
1	9/28/70	CORRECTED PART WEIGHT	D. BRUCE

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
1	TILLS016	ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	NHTSA
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES			
ENGINEERED:	DATE: 5/89	DEPARTMENT OF TRANSPORTATION	
TOLERANCES	A.S.T.C.		
FINISHES: ± .05	DRANK: 5/89		
DECIMALS: ± .005	APPROVED: D. DELERIDGE	CONTRACT NO.: DTMB 88-94-C-0700	
	DATE: 10/8/01	DESIGNED BY: A.S.T.C. & GESAC, INC.	
	SCALE: I=1	DRIVING TITLE: THOR-LX	
	SIZE: B	TIBIA FLESH RIGHT	
	REVISION: 1	DRAWING NUMBER: TILLS013	
	QUANTITY FOR AN ASSEMBLY: 1		
	QUANTITY FOR ENTIRE DUMMY: 1		
	SEE NOTE 1		



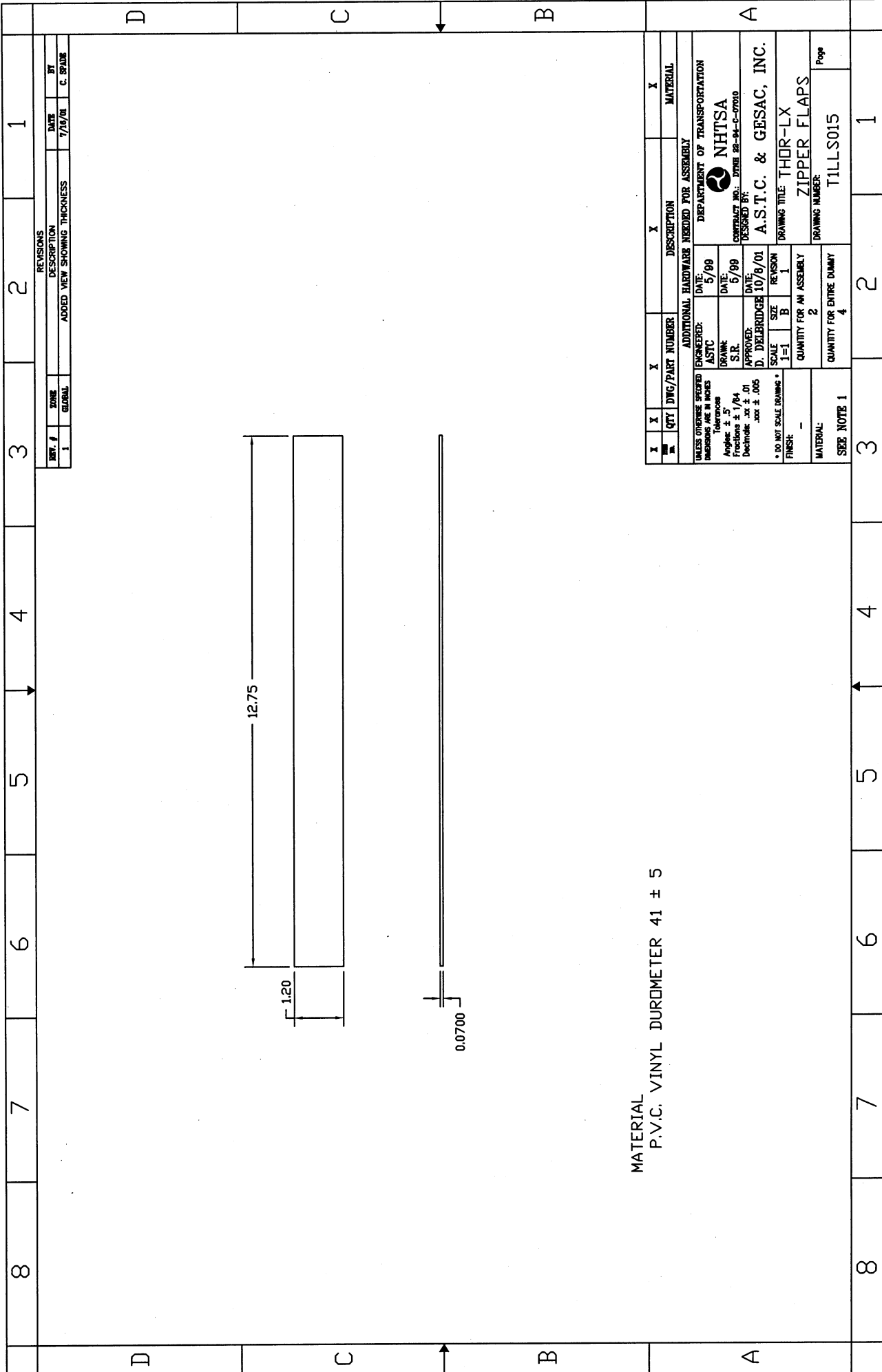
REV. #	DATE	DESCRIPTION	DATE	BY
1	1/13/05	ADDED TILLS015	1/13/05	I. McFARLAND

2	TILLS015	ZIPPER FLAPS	VINYL
-	1	YKK #HDB88-12"	PURCHASED
QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL

ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
ENGINEERED:	DATE: 5/99
ASTC	DATE: 5/99
DRAWN:	DATE: 5/99
S.R.	DATE: 10/6/01
APPROVED:	DATE: 10/6/01
D. DELBRIDGE	SCALE: 1=1
	SIZE: B
	REVISION: 1
QUANTITY FOR AN ASSEMBLY:	1
QUANTITY FOR ENTIRE DUMMY:	2

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
Tolerances:	
Angles:	± 5/64
Fractions:	± 1/64
Decimals:	± .01
	± .005
* DO NOT SCALE DRAWING *	
FINISH:	-

DEPARTMENT OF TRANSPORTATION	
NHITSA	
CONTRACT NO.: DTMB 99-04-C-07010	
DESIGNED BY: A.S.T.C. & GESAC, INC.	
DRAWING TITLE: THOR-LX	
DRAWING NUMBER:	TILLS014
Page	1



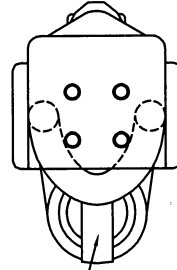
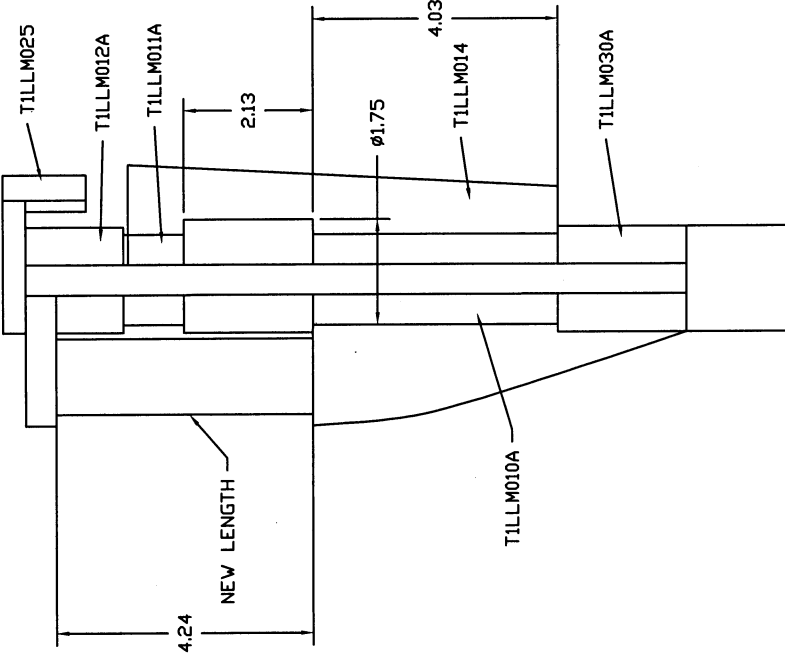
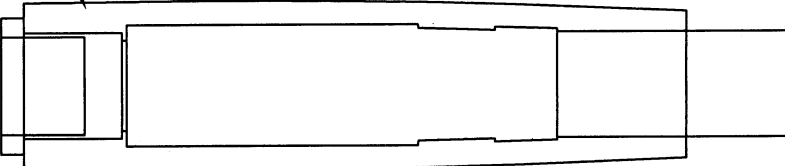
MATERIAL
P.V.C. VINYL DURDMETER 41 ± 5

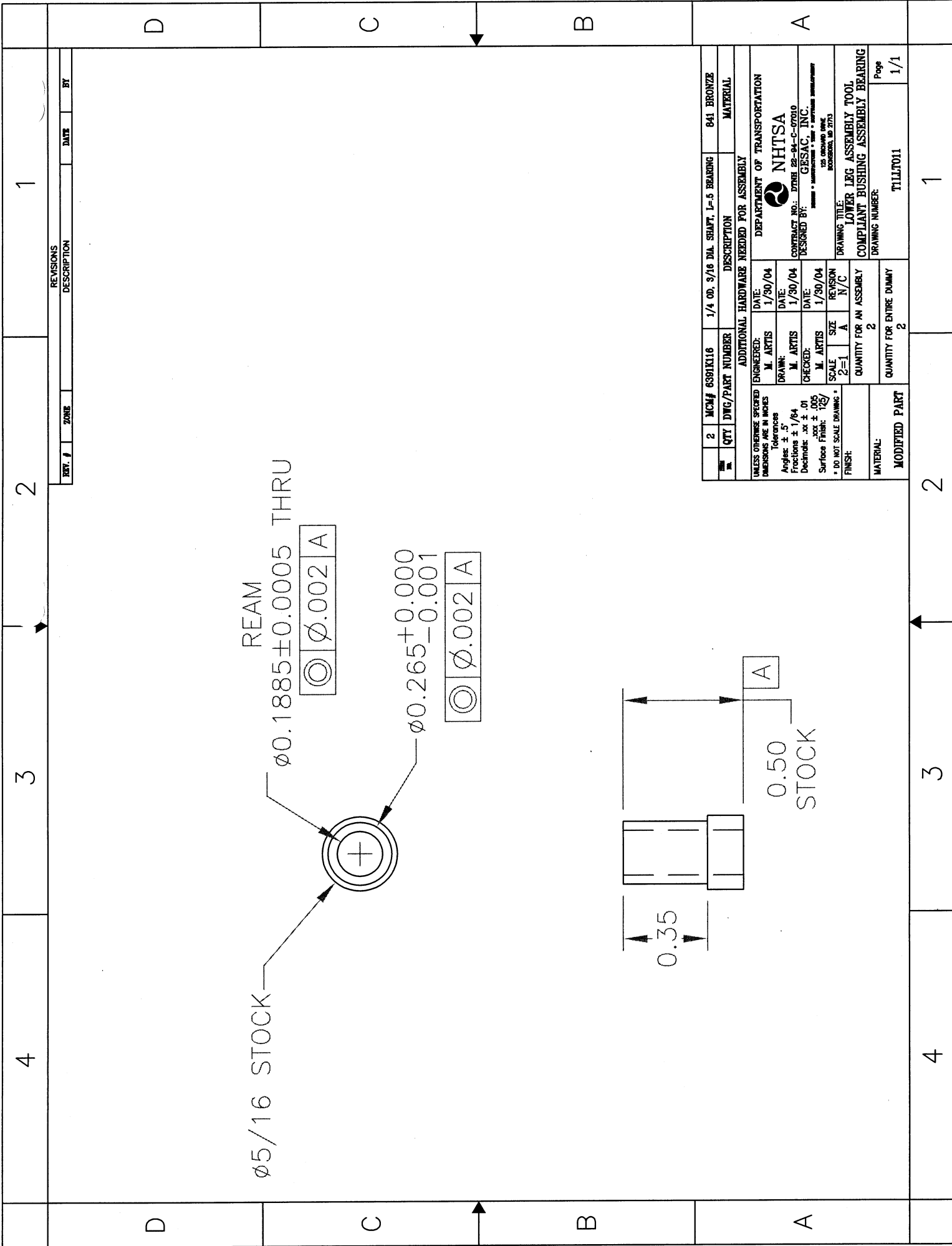
8	7	6	5	4	3	2	1
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REVISIONS		
REV. #	ZONE	DATE
1	GENERAL	7/16/00
ADDED VIEW SHOWING THICKNESS		
BY	DATE	BY
		C. SPAIN

X	X	X	X	X	X	X
NO.	QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL		
ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY ENGINEERED: DATE: 5/99 DIMENSIONS ARE IN INCHES UNLESS OTHERWISE SPECIFIED ASTC DRAWN: DATE: 5/99 S.R. APPROVED: DATE: 10/6/01 D. DELBRIDGE SCALE SIZE REVISION 1=1 B 1 FINISH: - QUANTITY FOR AN ASSEMBLY: 2 QUANTITY FOR ENTIRE DUMMY: 4 MATERIAL: SEE NOTE 1						
DEPARTMENT OF TRANSPORTATION NHTSA CONTRACT NO.: DTMB 98-04-C-0700 DESIGNED BY: A.S.T.C. & GESAC, INC. DRAWING TITLE: THOR-LX ZIPPER FLAPS DRAWING NUMBER: TILLS015 Page						

8	7	6	5	4	3	2	1
---	---	---	---	---	---	---	---

8	7	6	5	4	3	2	1																								
<table border="1"> <tr> <td>REV. #</td> <td>DATE</td> <td>BY</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>								REV. #	DATE	BY																					
REV. #	DATE	BY																													
<table border="1"> <tr> <td>REV. #</td> <td>DATE</td> <td>BY</td> </tr> <tr> <td> </td> <td> </td> <td> </td> </tr> </table>								REV. #	DATE	BY																					
REV. #	DATE	BY																													
<p>Ø0.50 CABLE ROUTINGS ACCESS HOLE FORMED TO BACK OF MOLD</p> 																															
<p>NEW LENGTH</p>  <p>Labels: TILLM025, TILLM012A, TILLM011A, TILLM014, TILLM030A, TILLM010A</p> <p>Dimensions: 4.24, 2.13, 4.03, Ø1.75</p>																															
<p>Ø0.50 CABLE CHANNELS BOTH SIDES.</p> 																															
<p>NOTE:</p> <p>⚠ ALL PIECES FOR MOLD INSERT ARE REPLICAS OF THE PARTS LISTED IF NOT LISTED MAKE SPACERS TO SIZES NOTED. WELD INSERT TOGETHER TO SAME DIMENSIONS AS ASSEMBLED LEG BONE. MATERIAL OF PARTS IS 6061 T6 ALUMINUM. USE FILLER WELD IN OPEN AREAS BETWEEN PARTS TO KEEP VINYL FROM ENTERING AREAS.</p>																															
<table border="1"> <tr> <th>QTY</th> <th>DWG/PART NUMBER</th> <th>DESCRIPTION</th> <th>MATERIAL</th> </tr> <tr> <td>1</td> <td>6081-T6</td> <td>ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY</td> <td>MATERIAL</td> </tr> <tr> <td>1</td> <td>1</td> <td>QUANTITY FOR AN ASSEMBLY</td> <td>1</td> </tr> <tr> <td>1</td> <td>1</td> <td>QUANTITY FOR ENTIRE DUMMY</td> <td>1</td> </tr> </table>								QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL	1	6081-T6	ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	MATERIAL	1	1	QUANTITY FOR AN ASSEMBLY	1	1	1	QUANTITY FOR ENTIRE DUMMY	1								
QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL																												
1	6081-T6	ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	MATERIAL																												
1	1	QUANTITY FOR AN ASSEMBLY	1																												
1	1	QUANTITY FOR ENTIRE DUMMY	1																												
<table border="1"> <tr> <td>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES</td> <td>ENGINEERED: A.S.T.C.</td> <td>DATE: 5/99</td> </tr> <tr> <td>For reference</td> <td>DRAWN: S.R.</td> <td>DATE: 5/99</td> </tr> <tr> <td>Angularities ± 1/64</td> <td>APPROVED: D. DELERIDGE</td> <td>DATE: 10/8/01</td> </tr> <tr> <td>Flatness ± .01</td> <td>SCALE: I=1</td> <td>REVISION: N/C</td> </tr> <tr> <td>Roundness ± .01</td> <td></td> <td></td> </tr> <tr> <td>Texture ± .005</td> <td></td> <td></td> </tr> <tr> <td>* DO NOT SCALE DRAWING *</td> <td></td> <td></td> </tr> <tr> <td>FINISH: -</td> <td></td> <td></td> </tr> </table>								UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	ENGINEERED: A.S.T.C.	DATE: 5/99	For reference	DRAWN: S.R.	DATE: 5/99	Angularities ± 1/64	APPROVED: D. DELERIDGE	DATE: 10/8/01	Flatness ± .01	SCALE: I=1	REVISION: N/C	Roundness ± .01			Texture ± .005			* DO NOT SCALE DRAWING *			FINISH: -		
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	ENGINEERED: A.S.T.C.	DATE: 5/99																													
For reference	DRAWN: S.R.	DATE: 5/99																													
Angularities ± 1/64	APPROVED: D. DELERIDGE	DATE: 10/8/01																													
Flatness ± .01	SCALE: I=1	REVISION: N/C																													
Roundness ± .01																															
Texture ± .005																															
* DO NOT SCALE DRAWING *																															
FINISH: -																															
<table border="1"> <tr> <td>DEPARTMENT OF TRANSPORTATION</td> <td>NHTSA</td> </tr> <tr> <td>CONTRACT NO.: DTMB 22-94-C-07010</td> <td>DESIGNED BY: A.S.T.C. & GESAC, INC.</td> </tr> <tr> <td>DRAWING TITLE: THOR-LX</td> <td>TIBIA MOLD INSERT</td> </tr> <tr> <td>DRAWING NUMBER: TILLS016</td> <td>Page 1/1</td> </tr> </table>								DEPARTMENT OF TRANSPORTATION	NHTSA	CONTRACT NO.: DTMB 22-94-C-07010	DESIGNED BY: A.S.T.C. & GESAC, INC.	DRAWING TITLE: THOR-LX	TIBIA MOLD INSERT	DRAWING NUMBER: TILLS016	Page 1/1																
DEPARTMENT OF TRANSPORTATION	NHTSA																														
CONTRACT NO.: DTMB 22-94-C-07010	DESIGNED BY: A.S.T.C. & GESAC, INC.																														
DRAWING TITLE: THOR-LX	TIBIA MOLD INSERT																														
DRAWING NUMBER: TILLS016	Page 1/1																														

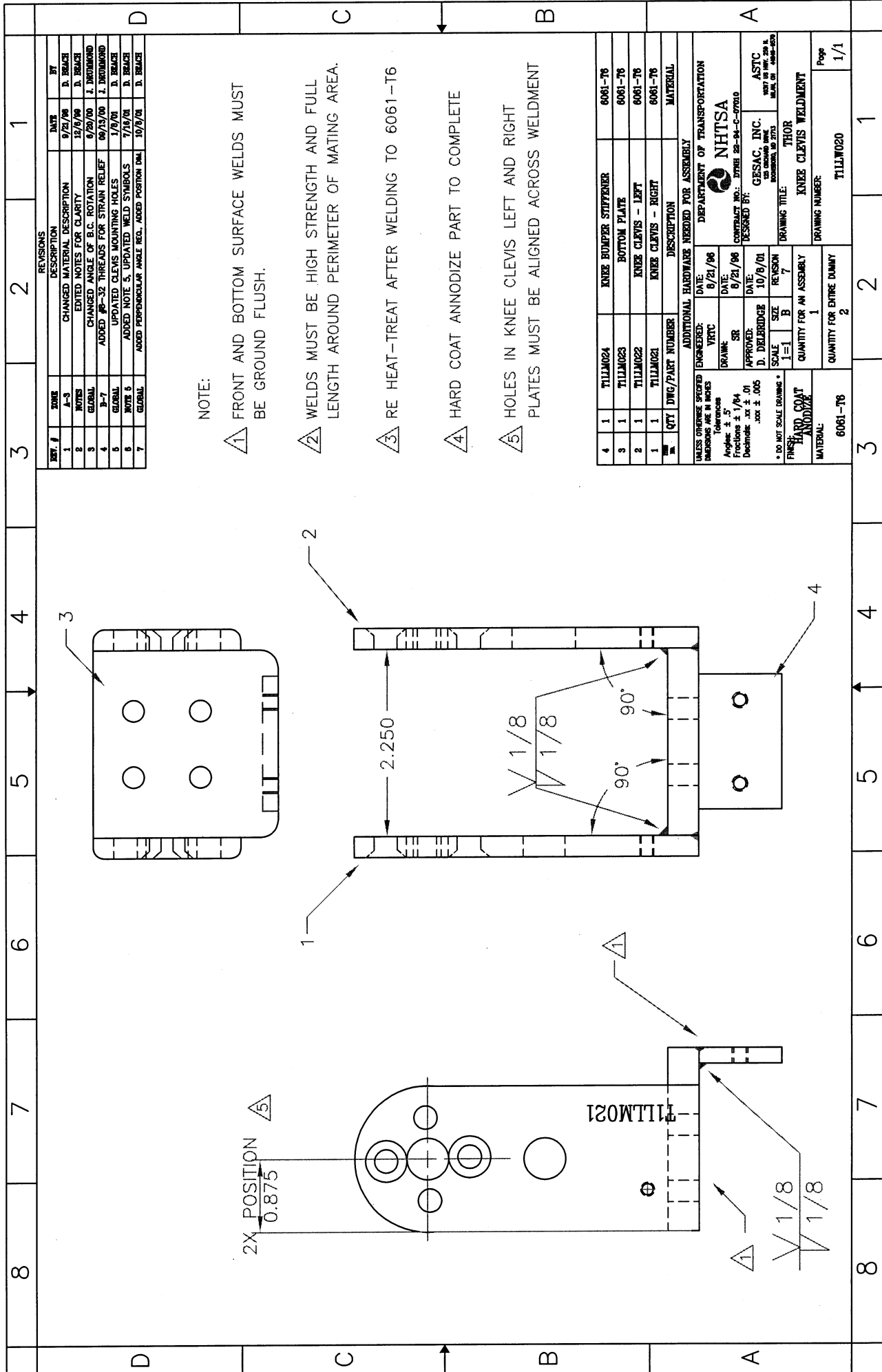


REV. #	ZONE	DESCRIPTION	DATE	BY
1				

NO.	QTY	MCM#	DWG/PART NUMBER	DESCRIPTION	MATERIAL
2		6391K116		1/4 OD, 3/16 DIA. SHAFT, L=5 BEARING	841 BRONZE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	
ENGINEERED:	M. ARTIS
DATE:	1/30/04
DRAWN:	M. ARTIS
DATE:	1/30/04
CHECKED:	M. ARTIS
DATE:	1/30/04
SCALE:	2=1
SIZE:	A
REVISION:	N/C
QUANTITY FOR AN ASSEMBLY:	2
QUANTITY FOR ENTIRE DUMMY:	2

ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
DEPARTMENT OF TRANSPORTATION	NHTSA
CONTRACT NO.: DTMB 28-94-C-0700	
DESIGNED BY: GESAC, INC.	
DRAWING TITLE: LOWER LEG ASSEMBLY TOOL COMPLIANT BUSHING ASSEMBLY BEARING	
DRAWING NUMBER: T11J7011	Page 1/1



REVISIONS			
REV #	ZONE	DESCRIPTION	DATE
1	A-3	CHANGED MATERIAL DESCRIPTION	9/22/00
2	GLOBAL	EDITED NOTES FOR CLARITY	12/15/00
3	GLOBAL	CHANGED ANGLE OF B.C. ROTATION	9/29/00
4	B-7	ADDED #8-32 THREADS FOR STRAIN RELIEF	09/23/00
5	GLOBAL	UPDATED CLEVIS MOUNTING HOLES	1/19/01
6	GLOBAL	ADDED NOTE 5, UPDATED WELD SYMBOLS	7/18/01
7	GLOBAL	ADDED PERPENDICULAR ANGLE REQ., ADDED POSITION DIM.	10/9/01

NOTE:

- 1 FRONT AND BOTTOM SURFACE WELDS MUST BE GROUND FLUSH.
- 2 WELDS MUST BE HIGH STRENGTH AND FULL LENGTH AROUND PERIMETER OF MATING AREA.
- 3 RE HEAT-TREAT AFTER WELDING TO 6061-T6
- 4 HARD COAT ANODIZE PART TO COMPLETE
- 5 HOLES IN KNEE CLEVIS LEFT AND RIGHT PLATES MUST BE ALIGNED ACROSS WELDMENT

QTY	DWG/PART NUMBER	DESCRIPTION	MATERIAL
4	TILLM024	KNEE BUMPER STIFFENER	6061-T6
3	TILLM023	BOTTOM PLATE	6061-T6
2	TILLM022	KNEE CLEVIS - LEFT	6061-T6
1	TILLM021	KNEE CLEVIS - RIGHT	6061-T6

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		ADDITIONAL HARDWARE NEEDED FOR ASSEMBLY	
ENGINEERED:	DATE: 9/21/96	ENGINEERED:	DATE: 9/21/96
DRAWN:	DATE: 8/21/96	DRAWN:	DATE: 8/21/96
APPROVED:	DATE: 10/9/01	APPROVED:	DATE: 10/9/01
D. DELERIDGE	SCALE: 1=1	D. DELERIDGE	SCALE: 1=1
FRACIONS ± 1/64	SIZE: B	FRACIONS ± 1/64	SIZE: B
DECIMALS .XX ± .005	REVISION: 7	DECIMALS .XX ± .005	REVISION: 7
DO NOT SCALE DRAWING	QUANTITY FOR AN ASSEMBLY: 1	DO NOT SCALE DRAWING	QUANTITY FOR AN ASSEMBLY: 1
FINISH: HARD COAT ANODIZE	QUANTITY FOR ENTIRE DUMMY: 2	FINISH: HARD COAT ANODIZE	QUANTITY FOR ENTIRE DUMMY: 2
MATERIAL: 6061-T6		MATERIAL: 6061-T6	

DEPARTMENT OF TRANSPORTATION
NHTSA
 CONTRACT NO.: DTNH 92-94-C-07010
 DESIGNED BY: CESAC, INC.
 100 CHANDLER BLVD.
 BOSTON, MA 02115
 DRAWING TITLE: THOR
 KNEE CLEVIS WELDMENT
 DRAWING NUMBER: TILLM020
 Page: 1/1