

Prototype Locomotive Crashworthy Component Drawings

In the event of a collision between two trains, one of the potential consequences is override of one of the vehicles onto the other. Locomotives, because of their great longitudinal strength and stiffness, are particularly susceptible to override when they collide with another vehicle. The FRA has sponsored research to develop prototype locomotive crashworthy components to mitigate the effects of a collision and prevent override. Prototype components were built and individually dynamically tested by means of rail car impact into a test wall. The tests were successful in demonstrating the effectiveness of the two prototype component designs. A research program is underway to retrofit these components onto an existing locomotive and conduct a full-scale locomotive impact test.

These drawings provide detailed information of the prototype component designs, which may be useful to companies interested in developing crashworthy components for locomotives.

PDF Portfolio Name	Drawing Number	Description
Main PBC Loose parts.pdf	TC09016-0045-1REV-.pdf	Back plate
	TC09016-0046-1REV-.pdf	Middle plate
	TC09016-0047-1REV-.pdf	Rail stopper
	TC09016-0054-1REV-.pdf	Back plate
Push-back Coupler Assembly.pdf	TC09016-0023-1REV-.pdf	Coupler test fixture assembly
	TC09016-0023-2REV-.pdf	Coupler test fixture assembly
	TC09016-0023-3REV-.pdf	Coupler test fixture assembly
	TC09016-0023-4REV-.pdf	Coupler test fixture assembly
	TC09016-0023-5REV-.pdf	Coupler test fixture assembly
TRA DAC Apr25 2011.pdf	TC09016-0005-1REV-.pdf	Top crush tube assembly
	TC09016-0005-2REV-.pdf	Top crush tube assembly
	TC09016-0006-1REV-.pdf	Half crush tube
	TC09016-0008-1REV-.pdf	Lower crush tube assembly
	TC09016-0008-2REV-.pdf	Lower crush tube assembly
	TC09016-0009-1REV-.pdf	Top anti-climber plate
	TC09016-0010-1REV-.pdf	Half crush tube
	TC09016-0011-1REV-.pdf	Bottom anti-climber plate
	TC09016-0012-1REV-.pdf	Deformable anti-climber assembly
	TC09016-0012-2REV-.pdf	Deformable anti-climber assembly
	TC09016-0013-1REV-.pdf	Backing plate
	TC09016-0014-1REV-.pdf	Reinforcement plate
	TC09016-0015-1REV-.pdf	Long rectangular steel bar
	TC09016-0017-1REV-.pdf	Short rectangular steel bar
	TC09016-0019-1REV-.pdf	Reinforcement plate
TC09016-0020-1REV-.pdf	Intermediate plate	

PDF Portfolio Name	Drawing Number	Description
TRA Side Walls Apr 25 2011.pdf	TC09016-0025-1REV-.pdf	Side wall right assembly
	TC09016-0025-2REV-.pdf	Side wall right assembly
	TC09016-0026-1REV-.pdf	Side wall left assembly
	TC09016-0026-2REV-.pdf	Side wall left assembly
	TC09016-0036-1REV-.pdf	Side wall
	TC09016-0037-1REV-.pdf	Stopper plate
	TC09016-0038-1REV-.pdf	Side stiffener - top
	TC09016-0039-1REV-.pdf	Side stiffener - middle
	TC09016-0040-1REV-.pdf	Side stiffener - bottom
	TC09016-0044-1REV-.pdf	Front plate
	TC09016-0049-1REV-.pdf	Side stiffener bottom
	TC09016-0050-1REV-.pdf	Stopper plate
	TC09016-0052-1REV-.pdf	Side stiffener - top
	TC09016-0053-1REV-.pdf	Side stiffener - middle
TRA Sliding Lug Apr25 2011.pdf	TC09016-0027-1REV-.pdf	Sliding lug assembly
	TC09016-0041-1REV-.pdf	Front plate
	TC09016-0042-1REV-.pdf	Side plate - LHS
	TC09016-0043-1REV-.pdf	Gusset
	TC09016-0048-1REV-.pdf	Top and bottom gusset
	TC09016-0051-1REV-.pdf	Side plate - RHS
TRA Support Bm Apr25 2011.pdf	TC09016-0024-1REV-.pdf	Support beam assembly
	TC09016-0024-2REV-.pdf	Support beam assembly
	TC09016-0028-1REV-.pdf	Base plate
	TC09016-0029-1REV-.pdf	Top beam
	TC09016-0030-1REV-.pdf	Top plate
	TC09016-0031-1REV-.pdf	Stiffener plate
	TC09016-0032-1REV-.pdf	Top angle
	TC09016-0033-1REV-.pdf	Bottom plate
	TC09016-0034-1REV-.pdf	Gusset - top
TC09016-0035-1REV-.pdf	Gusset - bottom	

Main PBC Loose Parts

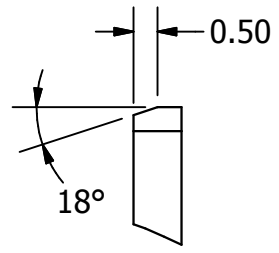
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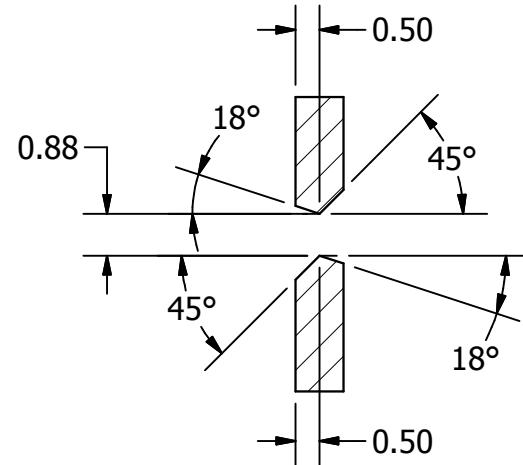
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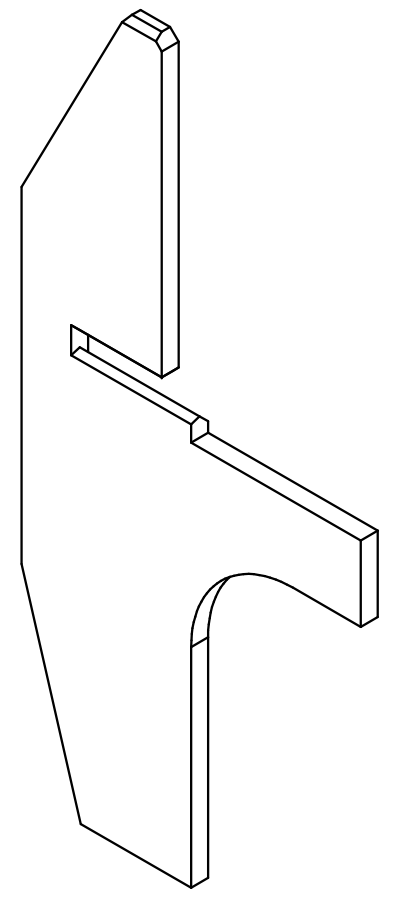
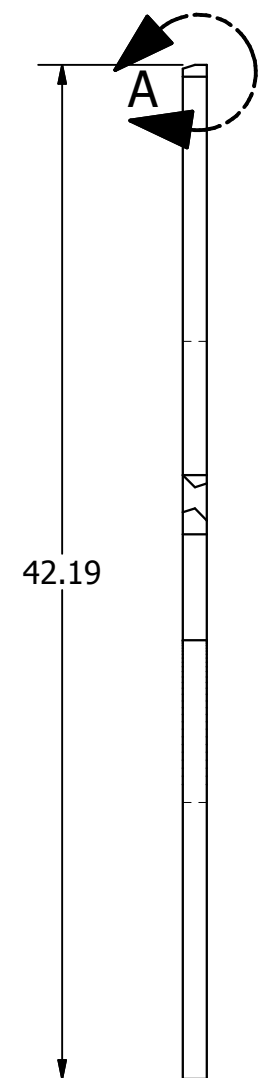
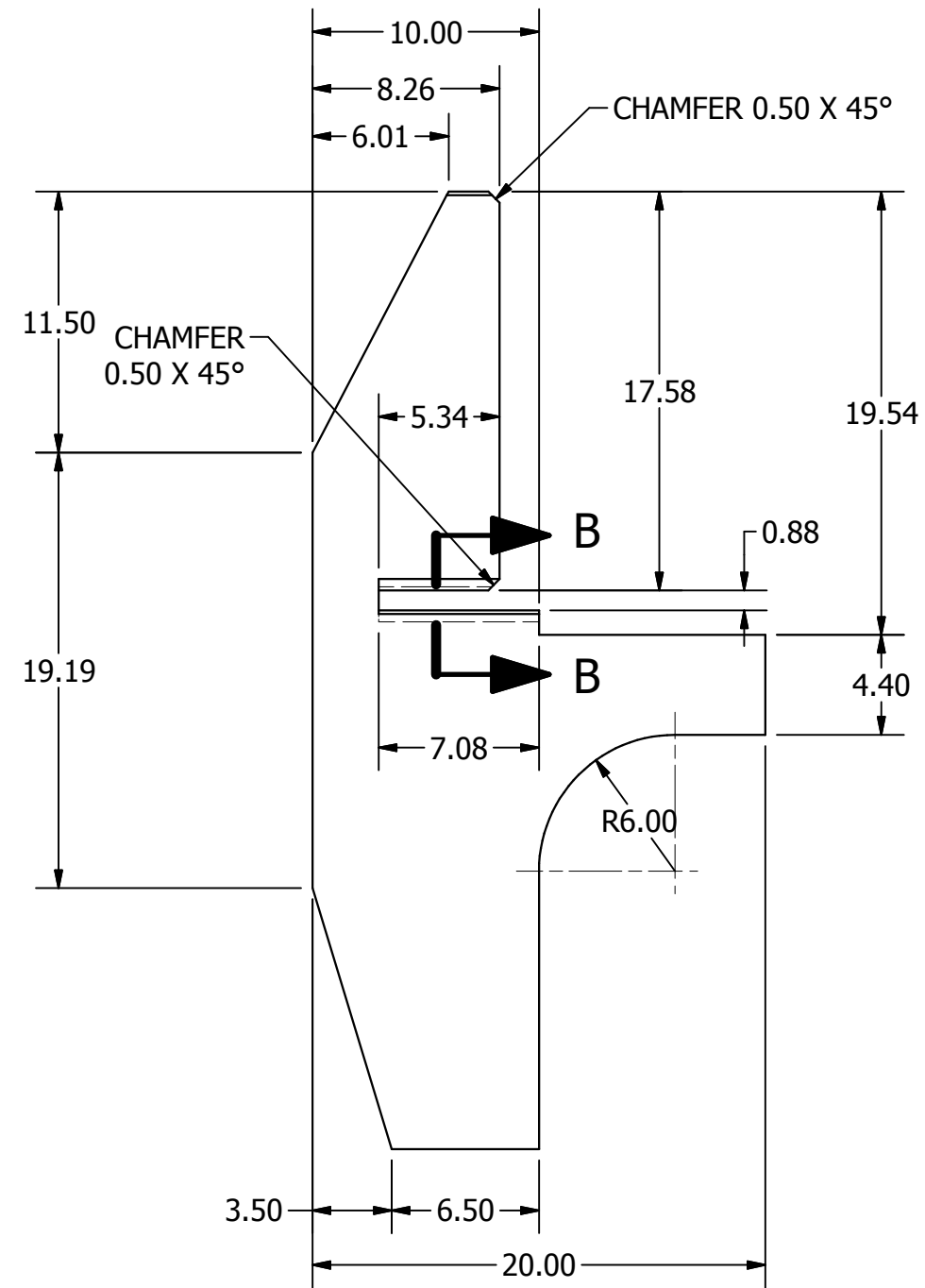
REV. -
 DRAWING No. TC09016-0054
 No. DE DESSIN



DETAIL A
 CHAMFER DETAIL
 SCALE 1 / 4



SECTION B-B
 CHAMFERS DETAIL
 SCALE 1 / 4



ISOMETRIC VIEW

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE
 2 - REMOVE ALL SHARP EDGES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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REVISIONS			

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FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0023

NEXT ASSY.

UNE DIVISION DE / A DIVISION OF		
TRA	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/04/25
DESSINE DRAWN	A. MELOCHE	11/04/25
VERIFIE CHECKED	G.AMAR	11/04/20
APPROUVE APPROVED	G.AMAR	11/04/21
DATE: YY/MM/DD		

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TITRE				TITLE			
BACK PLATE							
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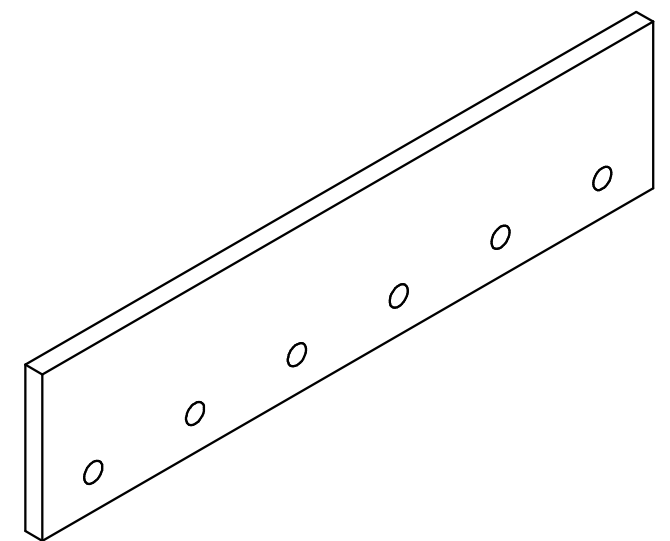
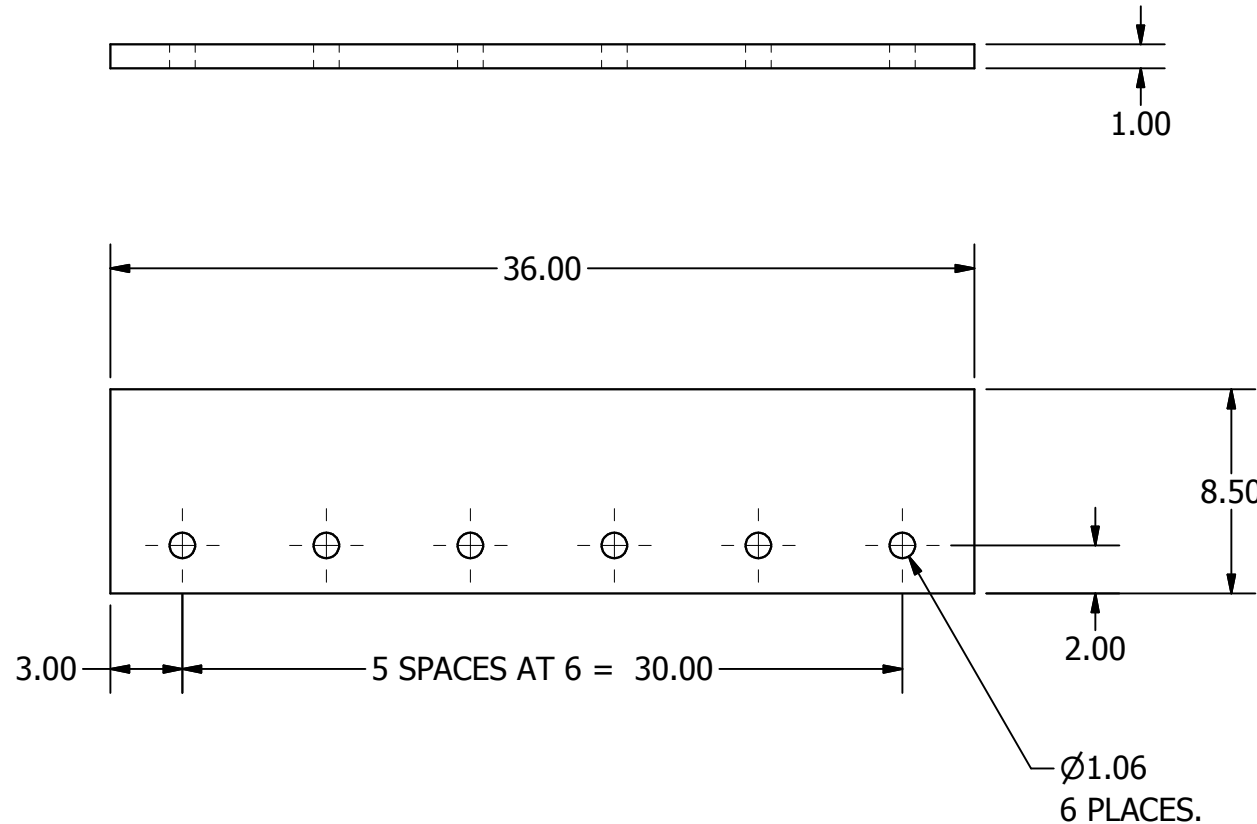
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REV. -
 DRAWING No. TC09016-0047
 No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.

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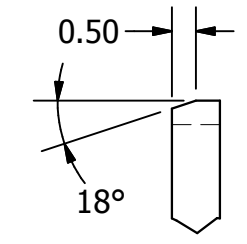
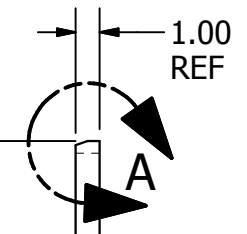
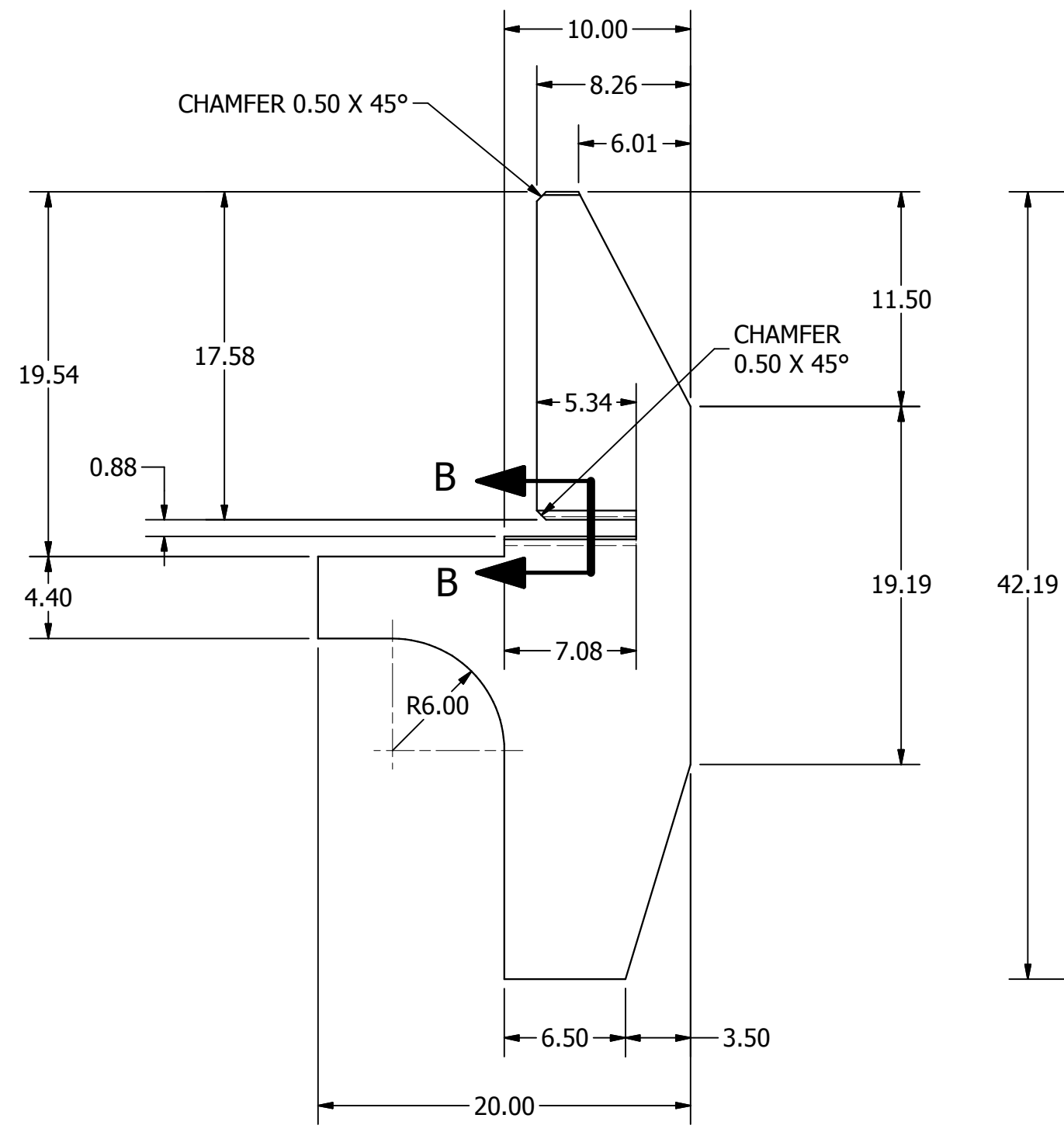
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		ANGLES ±1/2° MACHINED SURFACE FINISH 125 Mu in./N _S		No. DE CONTRAT TC-09-016		TITLE RAIL STOPPER			
		HOLE DIAMETER TOLERANCES 0 - .250" +.003" 0 - 6mm +0.08mm -.002" -0.05mm .250 - .500" +.005" 6 - 12mm +0.13mm -.003" -0.08mm +.010" +0.25mm .500" - + -.005" 12mm + -0.13mm		ENS. SUIVANT TC09016-0023		TRA DIVISION DE / A DIVISION OF TRA CANARAIL		PAGES SHEETS DE OF No. DE DESSIN TRA TRA DRAWING No. REV. 1 1 TC09016-0047 -	
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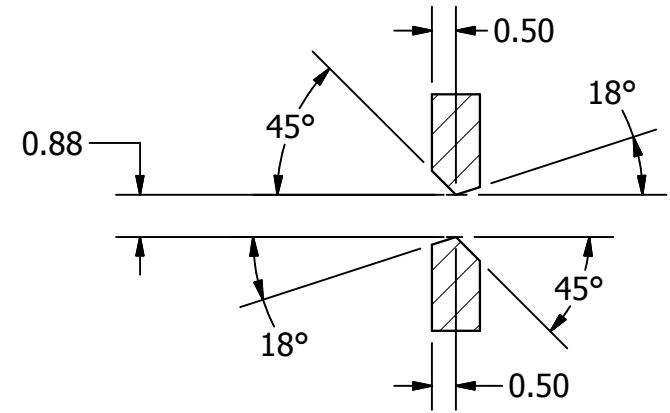
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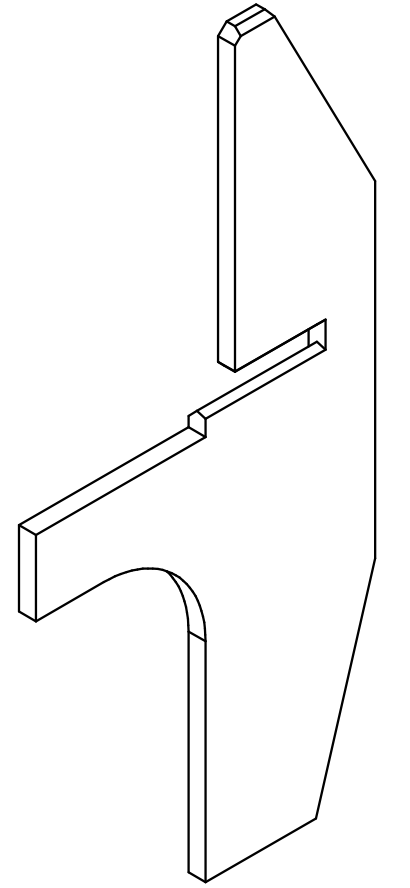
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



DETAIL A
CHAMFER DETAIL
SCALE 1 / 4



SECTION B-B
CHAMFERS DETAIL
SCALE 1 / 4



ISOMETRIC VIEW

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

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REVISIONS			

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	78" - +	±1/8"	2000mm + ±1mm
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	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No. **TC-09-016**

ENS. SUIVANT
NEXT ASSY. **TC09016-0023**

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/02/02
DESSINE DRAWN	M. SIMONEAU	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21
		DATE: YY/MM/DD

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE BACK PLATE					
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Push-back Coupler Assembly

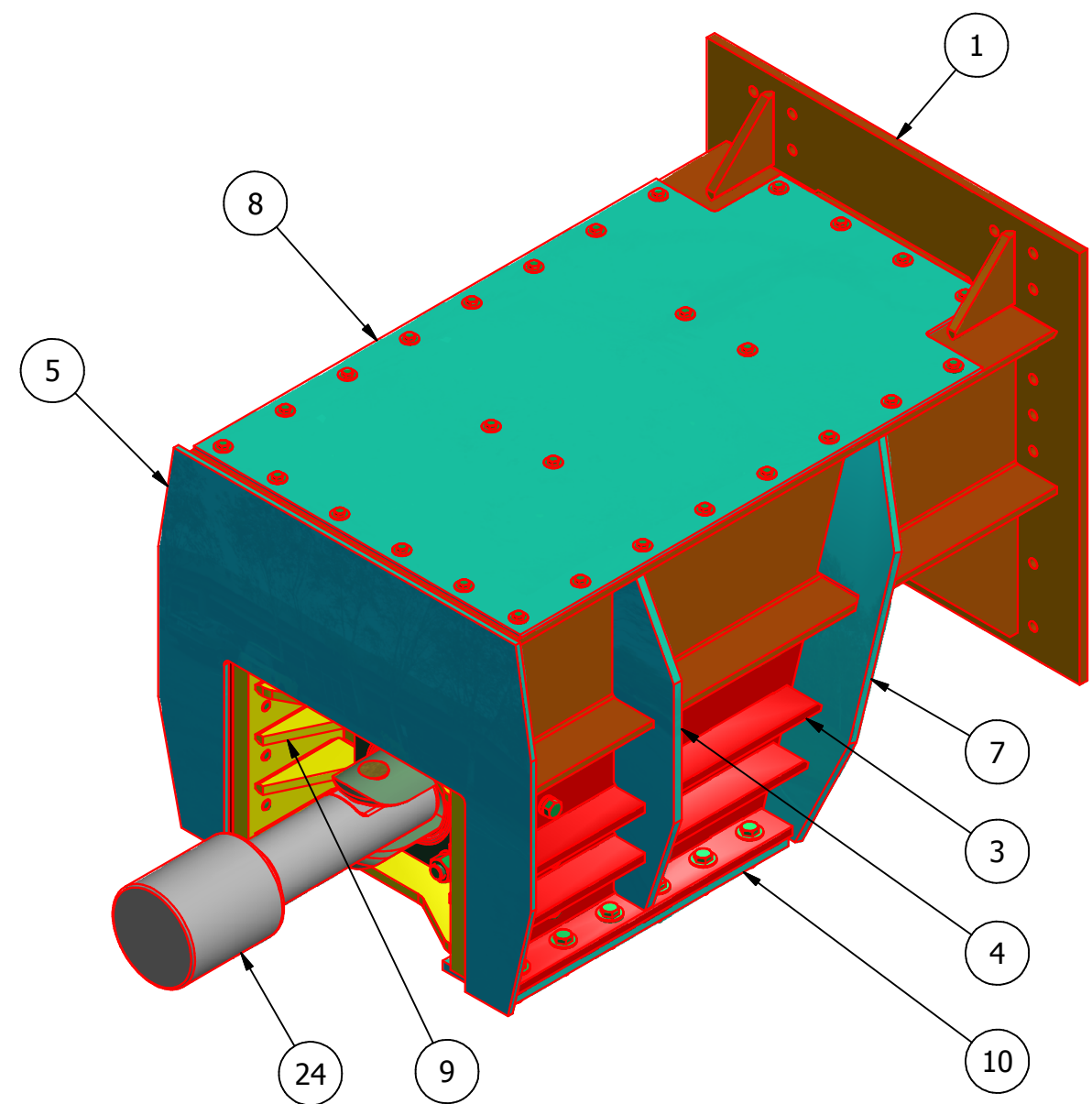
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REV. -
 DRAWING No. TC09016-0023
 No. DE DESSIN



ISOMETRIC VIEW

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1	1	SUPPORT BEAM ASSEMBLY		TC09016-0024
2	1	SIDE WALL RIGHT ASSEMBLY		TC09016-0025
3	1	SIDE WALL LEFT ASSEMBLY		TC09016-0026
4	2	MIDDLE PLATE		TC09016-0046
5	1	FRONT PLATE		TC09016-0044
6	1	BACK PLATE		TC09016-0054
7	1	BACK PLATE		TC09016-0045
8	1	TOP PLATE		TC09016-0030
9	1	SLIDING LUG ASSEMBLY		TC09016-0027
10	2	RAIL STOPPER		TC09016-0047
11	12	SHEAR BOLT		VOITH P/N TBD
12	1	DEFORMATION TUBE ASS'Y		VOITH P/N TBD
13	4	NUT, HEX GR. 8, 1 1/2-6 UNC	STEEL, ZN	McMASTER-CARR #93827A297
14	12	CAPSCREW HEX HD. GR. 5, 1-8 UNC X 3.75 LG.	STEEL, ZN	McMASTER-CARR #91247A919
15	12	NUT, HEX GR. 5, 1-8 UNC	STEEL, ZN	McMASTER-CARR #95462A548
16	28	CAPSCREW HEX HD. GR. 5, 5/8-11 UNC X 2.25 LG.	STEEL, ZN	McMASTER-CARR #91247A803
17	16	NUT, HEX GR. 5, 5/8-11 UNC	STEEL, ZN	McMASTER-CARR #95462A533
18	44	FLAT WASHER 5/8 - REGULAR	STEEL, ZN	McMASTER-CARR #90126A035
19	24	FLAT WASHER 1 - REGULAR	STEEL, ZN	McMASTER-CARR #90126A038
20	4	CAPSCREW HEX HD. GR. 8, 1 1/2-6 UNC X 10 LG.	STEEL, ZN	McMASTER-CARR #91268A965
21	8	FLAT WASHER 1 1/2 - STANDARD	STEEL, ZN	McMASTER-CARR #98023A043
22	12	INNER SHEAR BUSHING		VOITH P/N TBD
23	12	OUTER SHEAR BUSHING		VOITH P/N TBD
24	1	DUMMY COUPLER HEAD		VOITH P/N TBD
25	1	COUPLER PIN		VOITH P/N TBD

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:

- 1 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.
- 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.
- 3- WELDING & ASSEMBLY SEQUENCE SHOWN ON SHEET 3.

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	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _A			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No. **TC-09-016**

ENS. SUIVANT
 NEXT ASSY.



	DESIGNED	DATE: YY/MM/DD
CONCU	A. MELOCHE	11/02/01
DESINE	M. SIMONEAU	11/04/18
DRAWN	M. SIMONEAU	11/04/18
VERIFIE	R. TURCOT	11/04/26
CHECKED	R. TURCOT	11/04/26
APPROUVE	G. AMAR	11/04/27
APPROVED	G. AMAR	11/04/27

APPLICATION				TITLE			
LOCOMOTIVE CRASHWORTHY COMPONENTS				COUPLER TEST FIXTURE ASSEMBLY			
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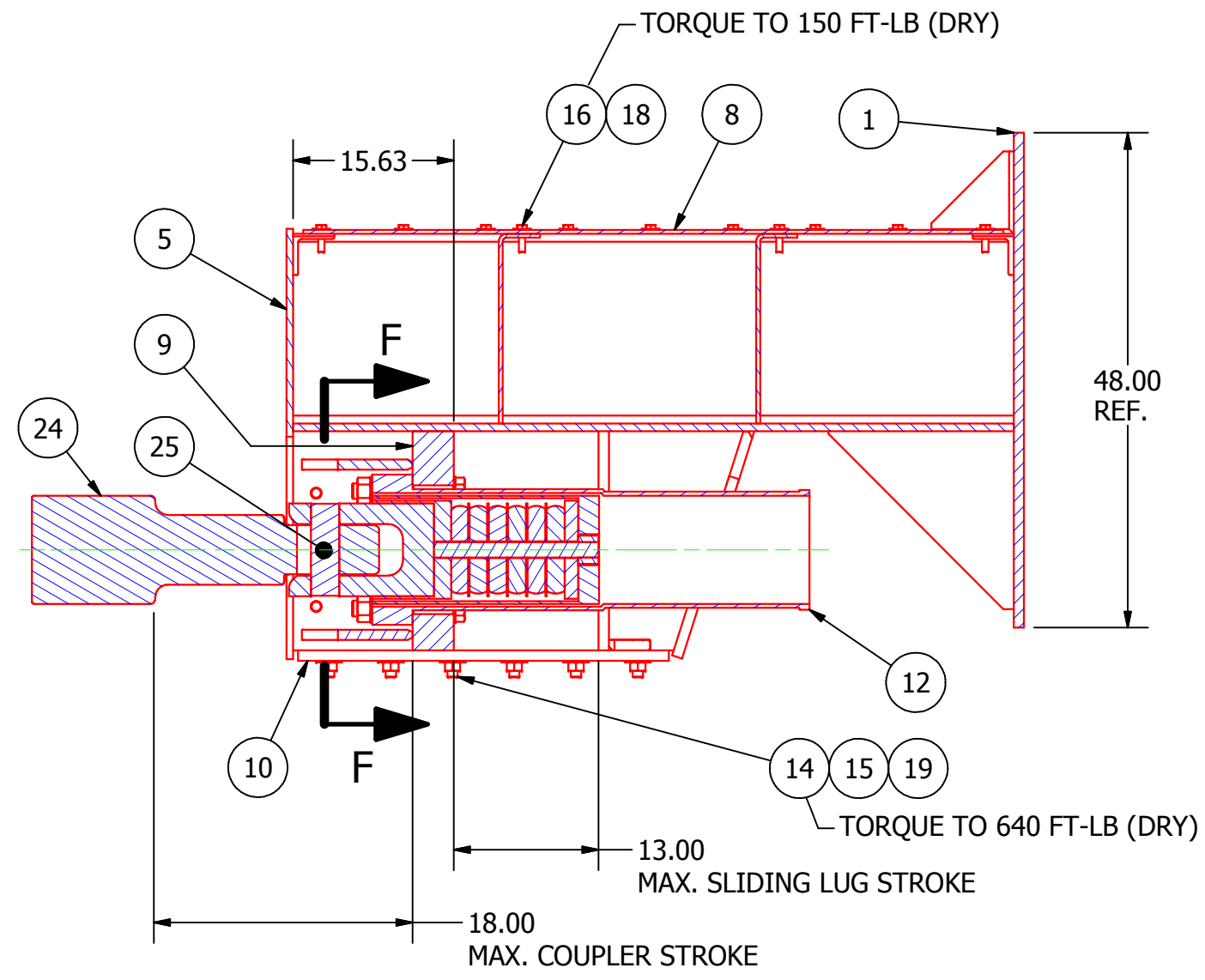
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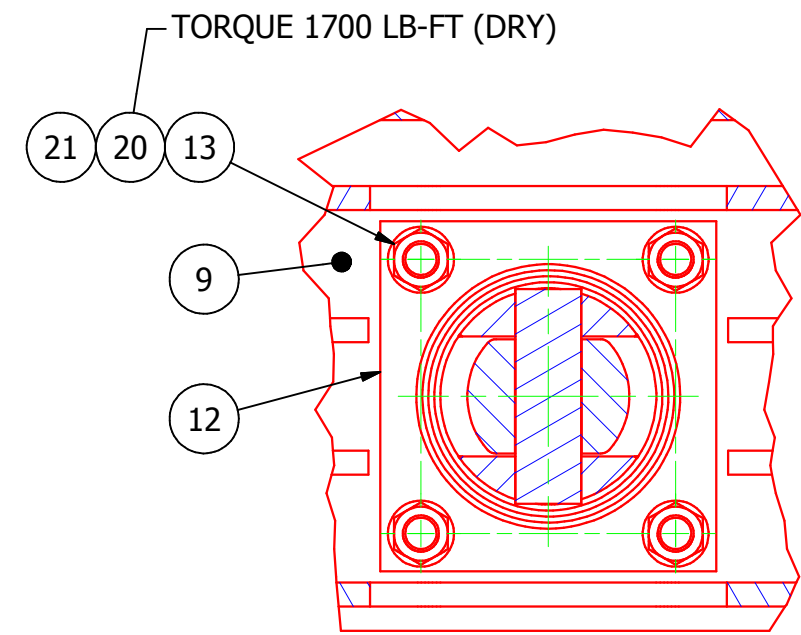
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REV. -
 DRAWING No. TC09016-0023
 No. DE DESSIN



SECTION D-D



SECTION F-F
 SCALE 1 / 16

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
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TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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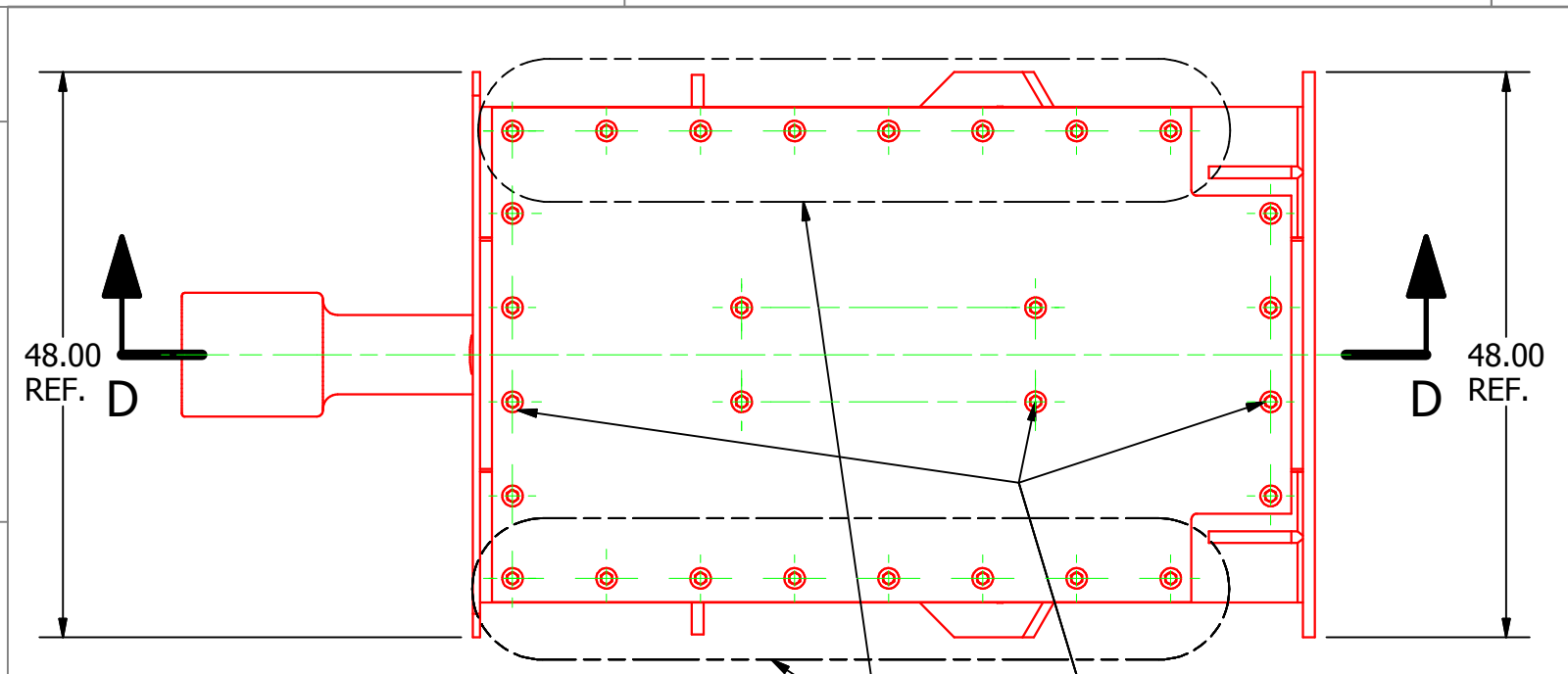
No. DE CONTRAT
 CONTRACT No. **TC-09-016**

ENS. SUIVANT NEXT ASSY.

		DATE: YY/MM/DD
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	M. SIMONEAU	11/04/18
VERIFIE CHECKED	R. TURCOT	11/04/26
APPROUVE APPROVED	G. AMAR	11/04/27

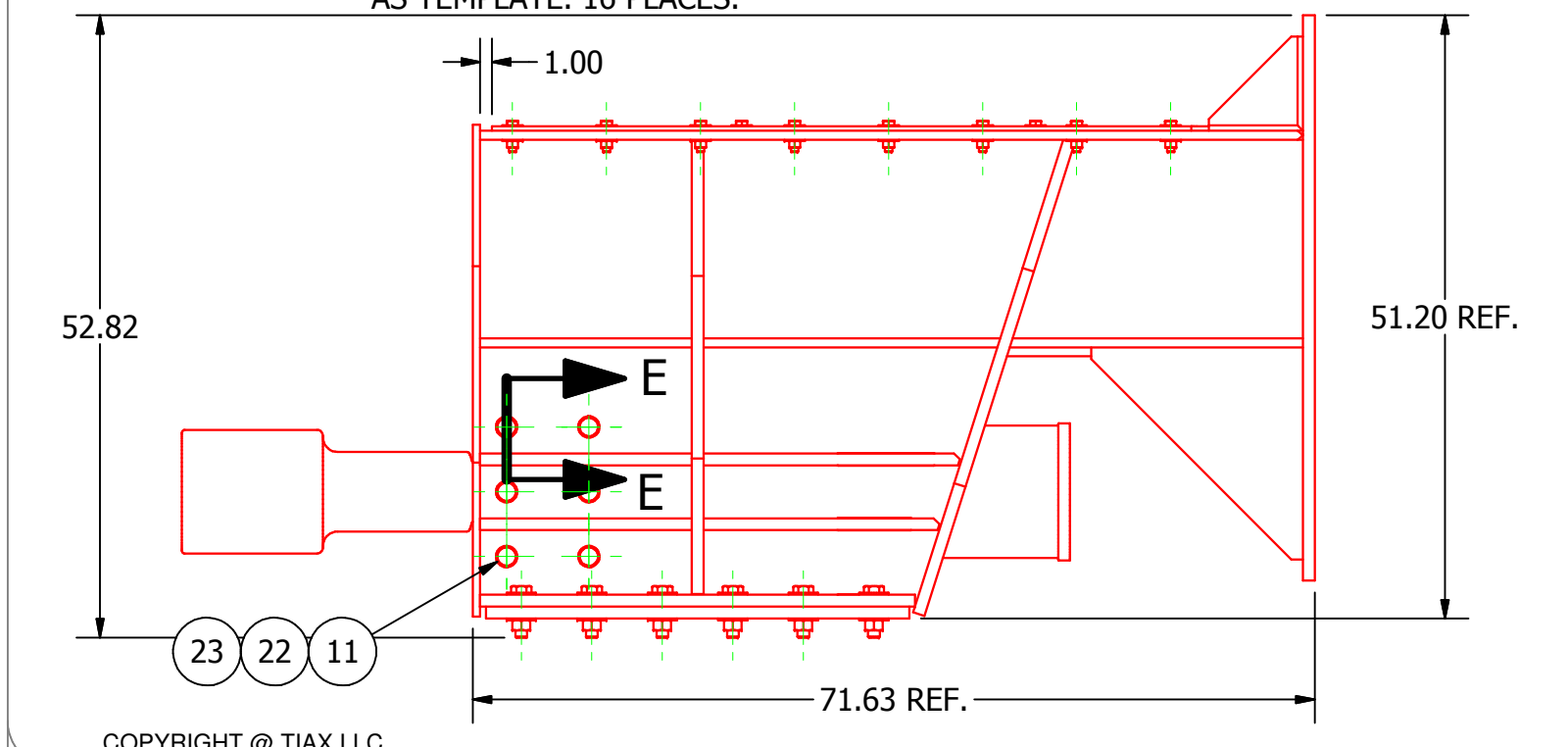
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LOCOMOTIVE CRASHWORTHY COMPONENTS				COUPLER TEST FIXTURE ASSEMBLY	
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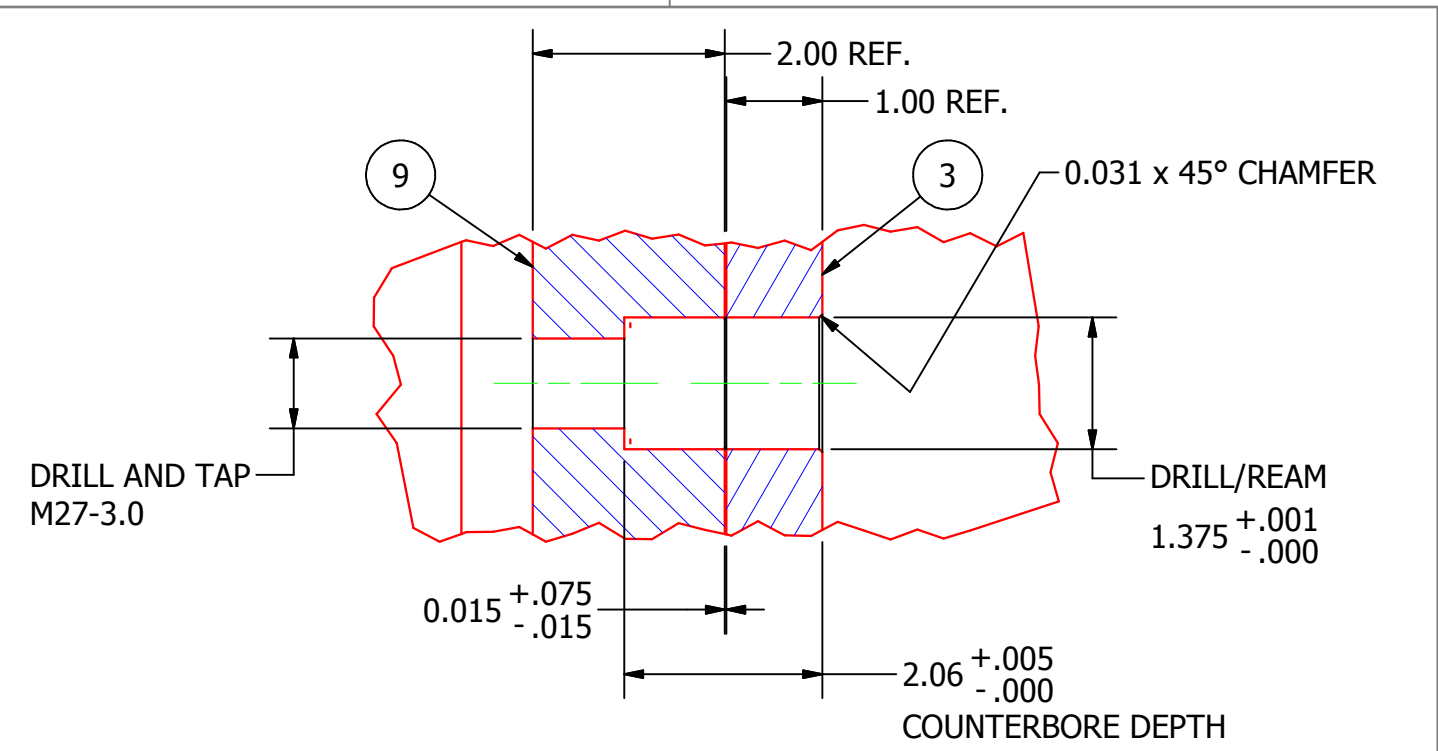


DRILL ϕ .687 THRU SUPPORT BEAM ASSY EACH SIDE. USE TOP PLATE AS TEMPLATE. 16 PLACES.

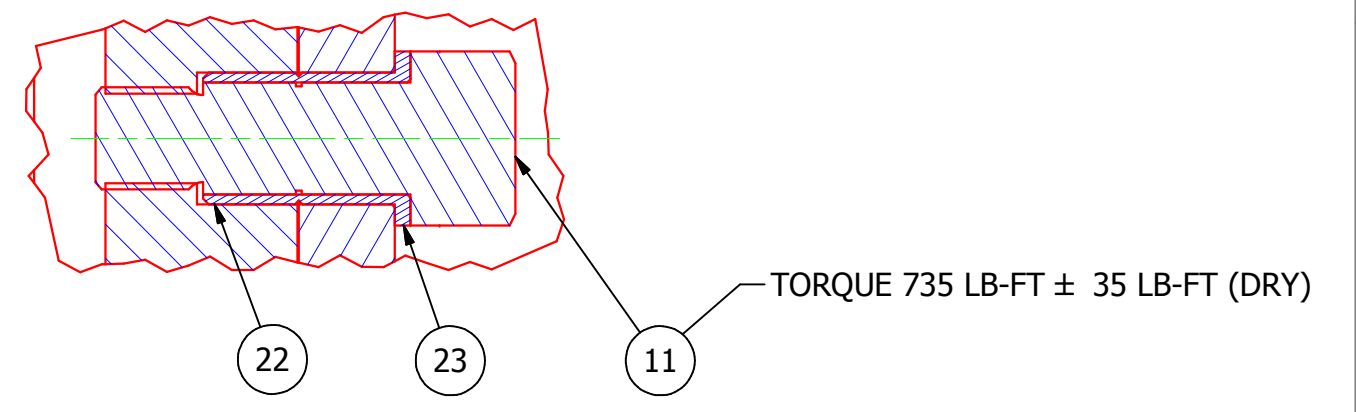
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SECTION E-E
 ITEM 11 NOT SHOWN FOR CLARITY



SECTION E-E
 SCALE 1 / 2

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PROJECTION
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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS
 IMPERIAL METRIC

TOLERANCES UNLESS OTHERWISE INDICATED

FRACTION	0 - 12"	$\pm 1/32"$	0 - 300mm	± 1 mm
	12 - 78"	$\pm 1/16"$	300 - 2000mm	± 1 mm
	78" - +	$\pm 1/8"$	2000mm +	± 1 mm
DECIMAL	0 - 12"	$\pm .005"$	0 - 300mm	± 0.15 mm
	12 - 78"	$\pm .010"$	300 - 2000mm	± 0.3 mm
	78" - +	$\pm .031"$	2000mm +	± 1 mm

ANGLES $\pm 1/2^\circ$
 MACHINED SURFACE FINISH 125 Mu in./ $\sqrt{\text{in}}$

HOLE DIAMETER TOLERANCES

0 - .250"	$+.003"$	0 - 6mm	$+0.08$ mm
	$-.002"$		-0.05 mm
.250 - .500"	$+.005"$	6 - 12mm	$+0.13$ mm
	$-.003"$		-0.08 mm
	$+.010"$		$+0.25$ mm
.500" - +	$-.005"$	12mm +	-0.13 mm

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No. DE CONTRAT
 CONTRACT No. **TC-09-016**

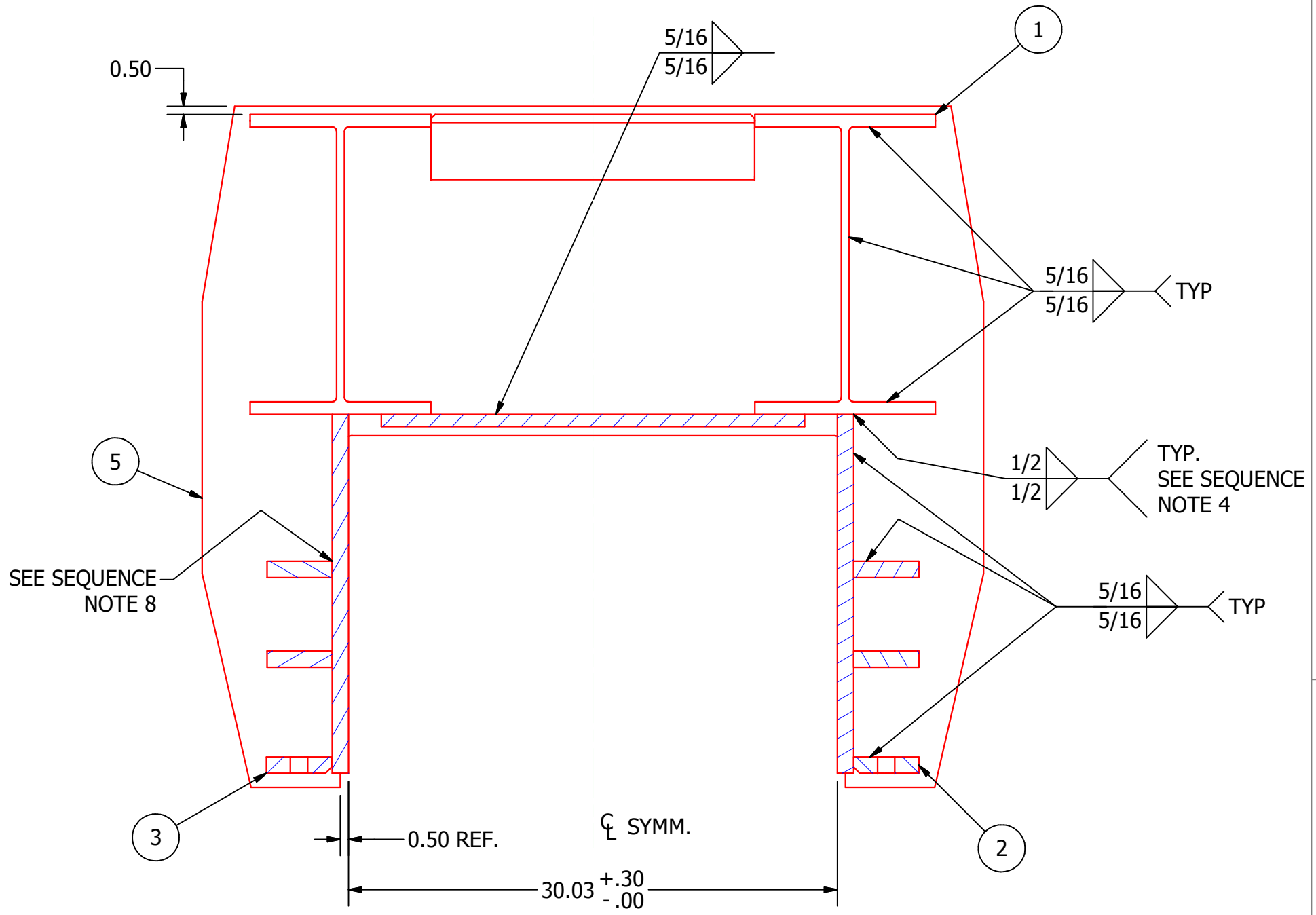
ENS. SUIVANT NEXT ASSY.

CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	11/02/01
DESSINE DRAWN	M. SIMONEAU	11/04/18	
VERIFIE CHECKED	R. TURCOT	11/04/26	
APPROUVE APPROVED	G. AMAR	11/04/27	

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE COUPLER TEST FIXTURE ASSEMBLY			
PAGE	SHEET	DE	OF
4	5		
No. DE DESSIN TRA		TRA DRAWING No.	
TC09016-0023			
ECHELLE	SCALE		
1 : 16			
REV.			-

WELDING AND ASSEMBLY SEQUENCE

1. Locate and tack weld items 2 thru 7 onto item 1. (sht. 2)
2. Install temporary bracing to ensure that design critical dimension shown on section B-B will be met. (sht. 3)
3. Complete the welding of item 5 to item 1. (sht. 3)
4. Weld items 2 & 3 to item 1 alternating between interior and outer welds, proceeding with intermittent welds to minimize heat input. (sht. 3)
5. Check dimension between items 2 & 3. (sht. 3) If out of tolerance, return to step 1, and increase slot lengths in item 4 if necessary.
6. Complete 50% of the welding of items 2 & 3 to items 4, 5, 6, 7 and let cool. (sht. 2)
7. Locate and drill for item 8, then install by bolting. (sht. 2)
8. Make longitudinal intermittent fillet welds that were done on items 2 and 3 in sub-assembly continuous and let assembly cool. (sht. 2)
9. Complete the welding of items 2 and 3 to items 1, 4, 5, 7. (sht. 2 and 3)
10. After all welding is complete, locate the sliding lug (item 9) as shown in section D-D, and match drill at a diameter of 0.75". (sht. 4 and 5)
11. Make counterbore (1.375 dia.) as shown in section E-E. (sht. 4)
12. Using drill bushings (to center the bit in the counterbored hole), drill / tap for M27 threads. (sht. 4)
13. Install inner shear bushing (item 22) with thread locker fully into counterbored holes. (sht. 4)
14. Install outer shear bushing (item 23) with thread locker fully into counterbored holes. (sht. 4)
15. Install and torque shear bolts (item 10) as shown in section E-E. (sht. 4)
16. Install item 11. (sht. 4, 5)
17. Install items 12, 24, 25. (sht. 5)
18. Test facility to provide vertical support for dummy coupler.



NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.

SECTION B-B

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PROJECTION
NOM DE FICHER: TC09016-0023.idw
FILENAME:

DIMENSION UNITS			
IMPERIAL <input type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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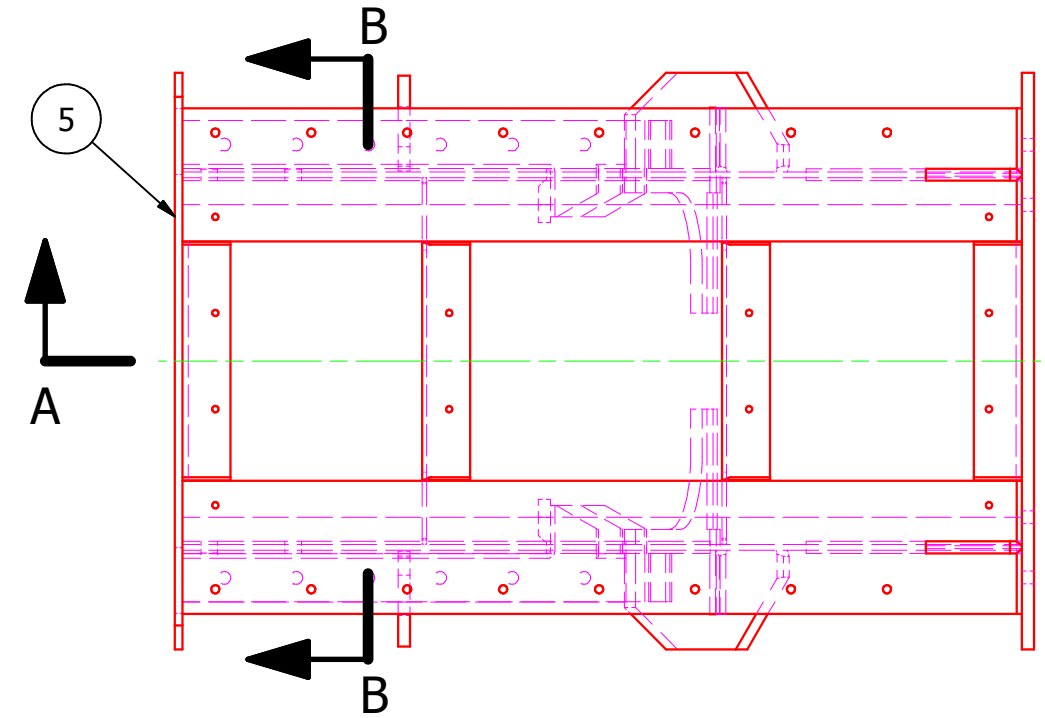
No. DE CONTRAT
CONTRACT No.
TC-09-016

ENS. SUIVANT
NEXT ASSY.

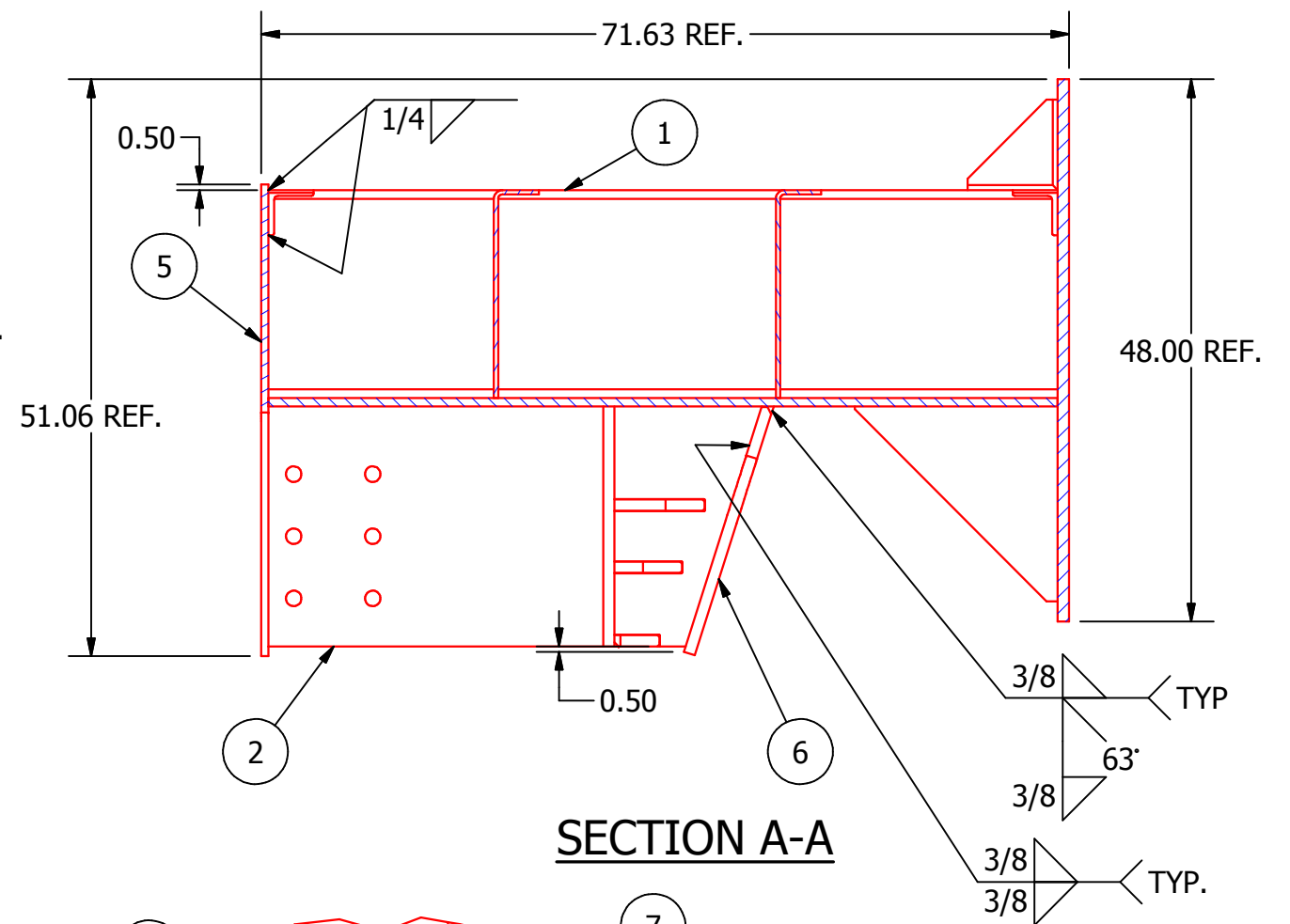
UNE DIVISION DE / A DIVISION OF		
TRA	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	M. SIMONEAU	11/04/18
VERIFIE CHECKED	R. TURCOT	11/04/26
APPROUVE APPROVED	G. AMAR	11/04/27
		DATE: YY/MM/DD

APPLICATION				TITLE			
LOCOMOTIVE CRASHWORTHY COMPONENTS				COUPLER TEST FIXTURE ASSEMBLY			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
3	5			TC09016-0023		-	
ECHELLE		SCALE					
1 : 8							

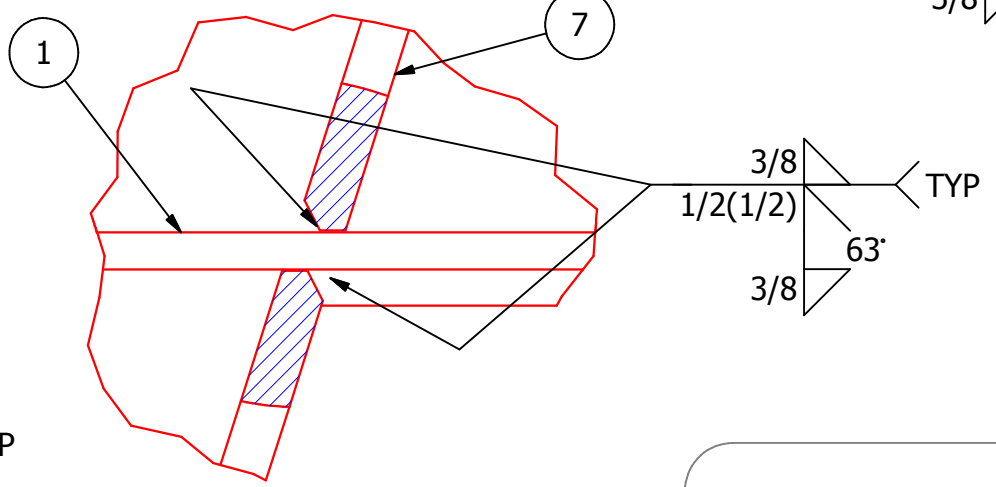
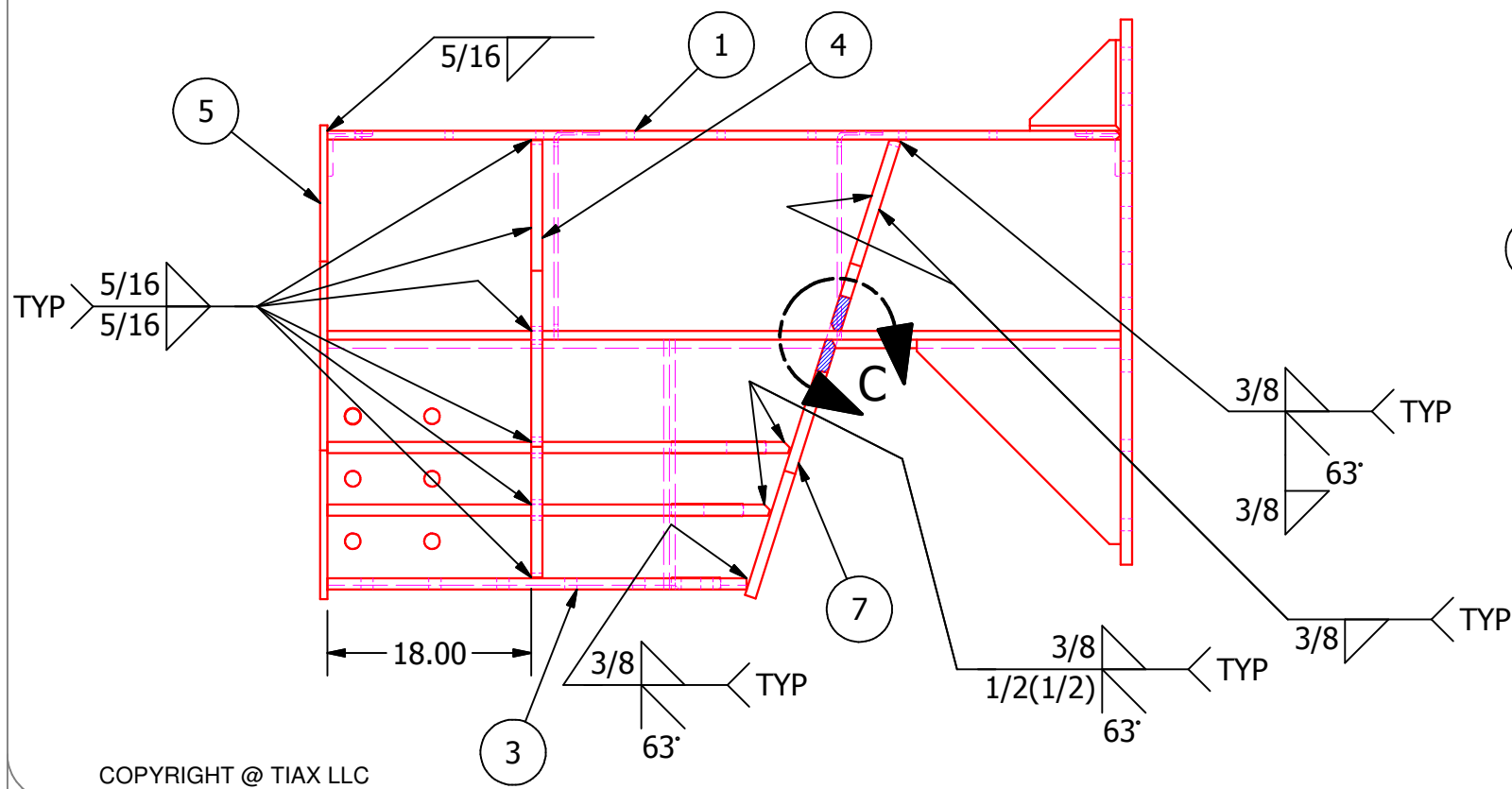
NOTE 1 - TOUTES DIMENSIONS EN POUCHES.
ALL DIMENSIONS ARE IN INCHES.



CL SYMM.
A



SECTION A-A



DETAIL C
SCALE 1 / 4

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LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
	0 - 12"	±.005"	0 - 300mm ±0.15mm
DECIMAL	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No. **TC-09-016**

ENS. SUIVANT NEXT ASSY.

UNE DIVISION DE / A DIVISION OF	
TRA	CANARAIL
CONCU DESIGNED	A. MELOCHE 11/02/01
DESSINE DRAWN	M. SIMONEAU 11/04/18
VERIFIE CHECKED	R. TURCOT 11/04/26
APPROUVE APPROVED	G. AMAR 11/04/27

APPLICATION			
LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE			
COUPLER TEST FIXTURE ASSEMBLY			
TITRE			
PAGE	SHEET	DE	OF
2	5		
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No. DE DESSIN TRA			TRA DRAWING No.
TC09016-0023			REV. -

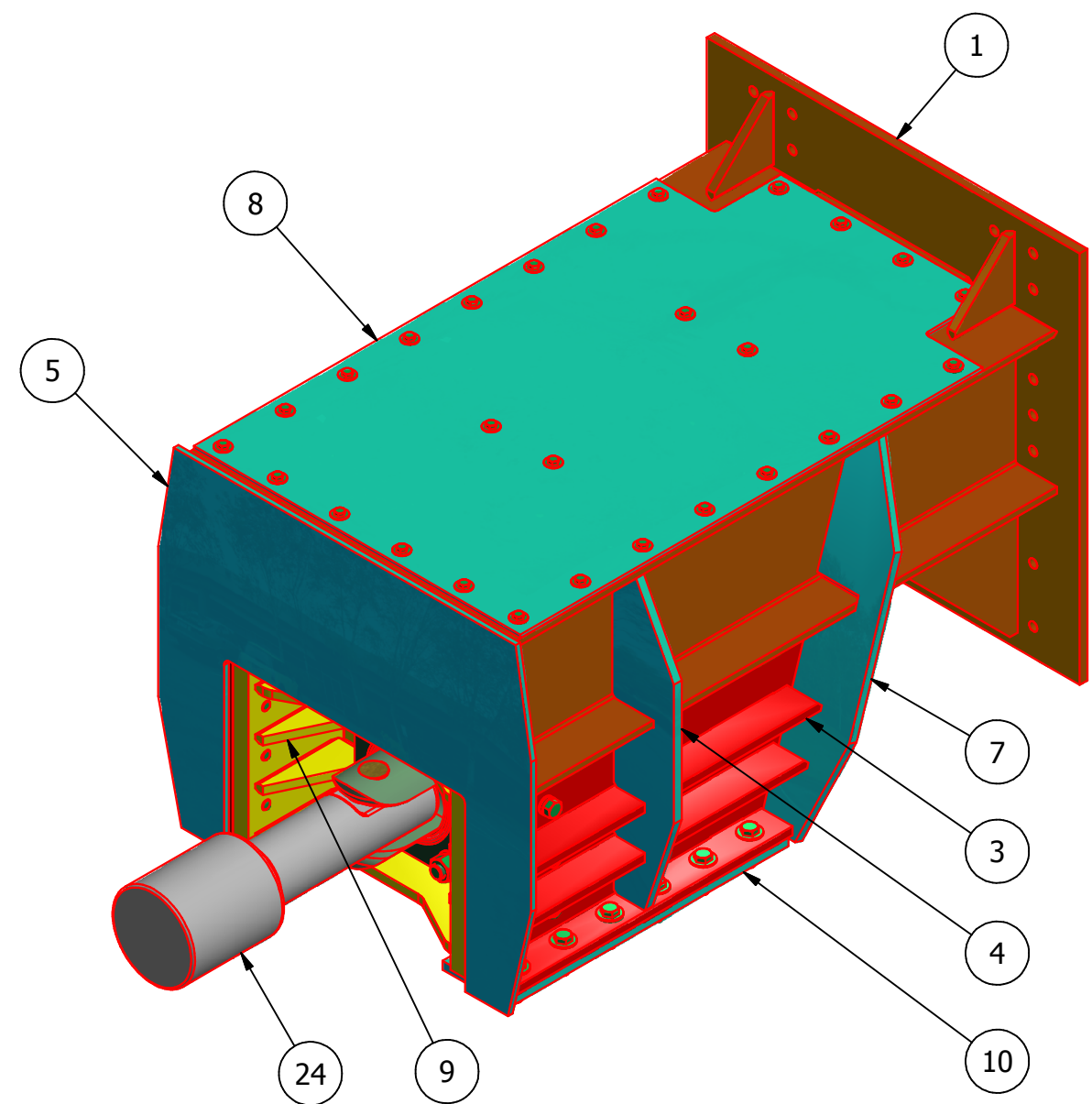
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REV. -
 DRAWING No. TC09016-0023
 No. DE DESSIN



ISOMETRIC VIEW

ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLIER P/N
1	1	SUPPORT BEAM ASSEMBLY		TC09016-0024
2	1	SIDE WALL RIGHT ASSEMBLY		TC09016-0025
3	1	SIDE WALL LEFT ASSEMBLY		TC09016-0026
4	2	MIDDLE PLATE		TC09016-0046
5	1	FRONT PLATE		TC09016-0044
6	1	BACK PLATE		TC09016-0054
7	1	BACK PLATE		TC09016-0045
8	1	TOP PLATE		TC09016-0030
9	1	SLIDING LUG ASSEMBLY		TC09016-0027
10	2	RAIL STOPPER		TC09016-0047
11	12	SHEAR BOLT		VOITH P/N TBD
12	1	DEFORMATION TUBE ASS'Y		VOITH P/N TBD
13	4	NUT, HEX GR. 8, 1 1/2-6 UNC	STEEL, ZN	McMASTER-CARR #93827A297
14	12	CAPSCREW HEX HD. GR. 5, 1-8 UNC X 3.75 LG.	STEEL, ZN	McMASTER-CARR #91247A919
15	12	NUT, HEX GR. 5, 1-8 UNC	STEEL, ZN	McMASTER-CARR #95462A548
16	28	CAPSCREW HEX HD. GR. 5, 5/8-11 UNC X 2.25 LG.	STEEL, ZN	McMASTER-CARR #91247A803
17	16	NUT, HEX GR. 5, 5/8-11 UNC	STEEL, ZN	McMASTER-CARR #95462A533
18	44	FLAT WASHER 5/8 - REGULAR	STEEL, ZN	McMASTER-CARR #90126A035
19	24	FLAT WASHER 1 - REGULAR	STEEL, ZN	McMASTER-CARR #90126A038
20	4	CAPSCREW HEX HD. GR. 8, 1 1/2-6 UNC X 10 LG.	STEEL, ZN	McMASTER-CARR #91268A965
21	8	FLAT WASHER 1 1/2 - STANDARD	STEEL, ZN	McMASTER-CARR #98023A043
22	12	INNER SHEAR BUSHING		VOITH P/N TBD
23	12	OUTER SHEAR BUSHING		VOITH P/N TBD
24	1	DUMMY COUPLER HEAD		VOITH P/N TBD
25	1	COUPLER PIN		VOITH P/N TBD

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:

- 1 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.
- 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.
- 3- WELDING & ASSEMBLY SEQUENCE SHOWN ON SHEET 3.

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 LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS
 IMPERIAL METRIC

TOLERANCES UNLESS OTHERWISE INDICATED

FRACTION	0 - 12"	±1/32"	0 - 300mm	±1mm
12 - 78"	±1/16"	300 - 2000mm	±1mm	
78" - +	±1/8"	2000mm +	±1mm	
DECIMAL	0 - 12"	±.005"	0 - 300mm	±0.15mm
12 - 78"	±.010"	300 - 2000mm	±0.3mm	
78" - +	±.031"	2000mm +	±1mm	

ANGLES ±1/2°
 MACHINED SURFACE FINISH 125 Mu in./N_A

HOLE DIAMETER TOLERANCES

0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
 CONTRACT No. **TC-09-016**

ENS. SUIVANT
 NEXT ASSY.

UNE DIVISION DE / A DIVISION OF
TRA CANARAIL

CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	11/02/01
DESSINE DRAWN	M. SIMONEAU	11/04/18	
VERIFIE CHECKED	R. TURCOT	11/04/26	
APPROUVE APPROVED	G. AMAR	11/04/27	

APPLICATION
LOCOMOTIVE CRASHWORTHY COMPONENTS

TITRE
COUPLER TEST FIXTURE ASSEMBLY

PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.
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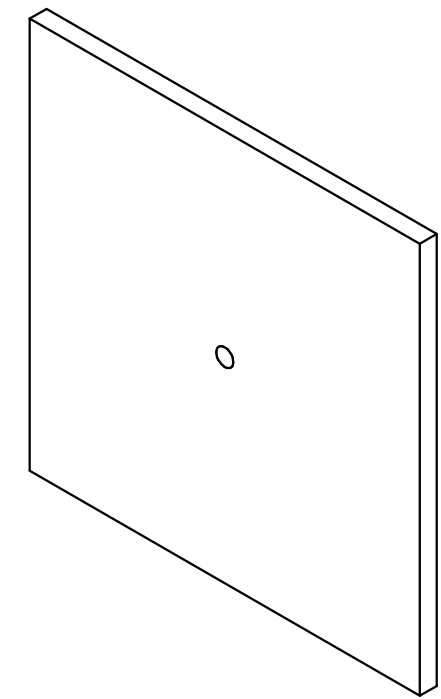
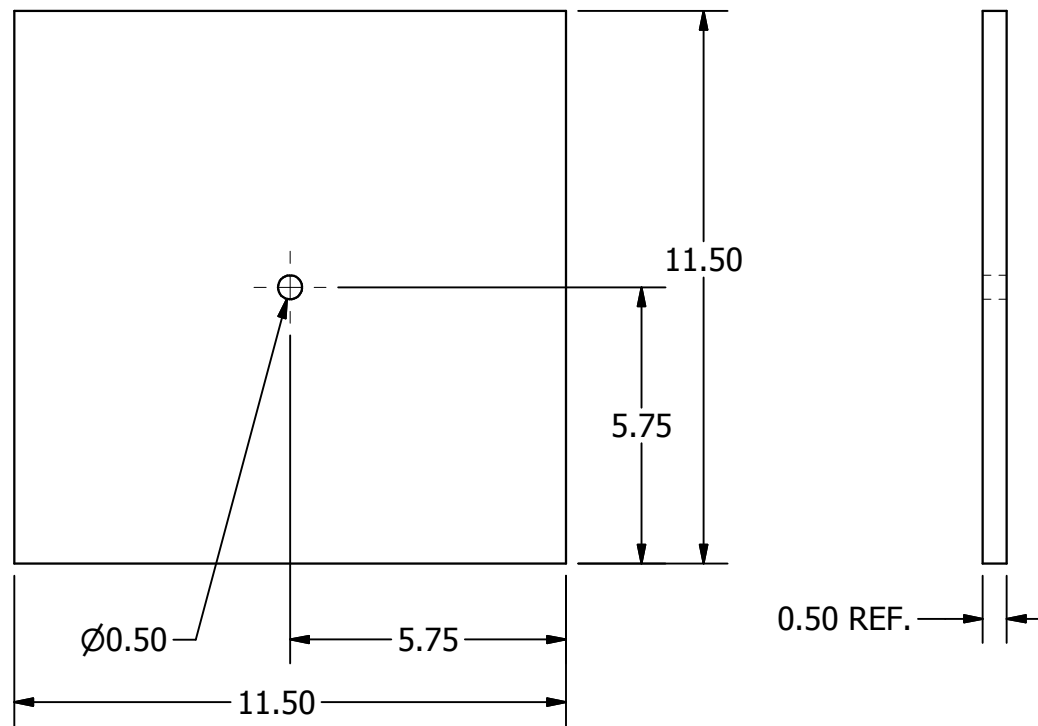
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REV. -
 DRAWING No. TC09016-0020
 No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

NOTES:
 1 - MATERIAL: 1/2" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

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LEXINGTON, MASSACHUSETTS 02421

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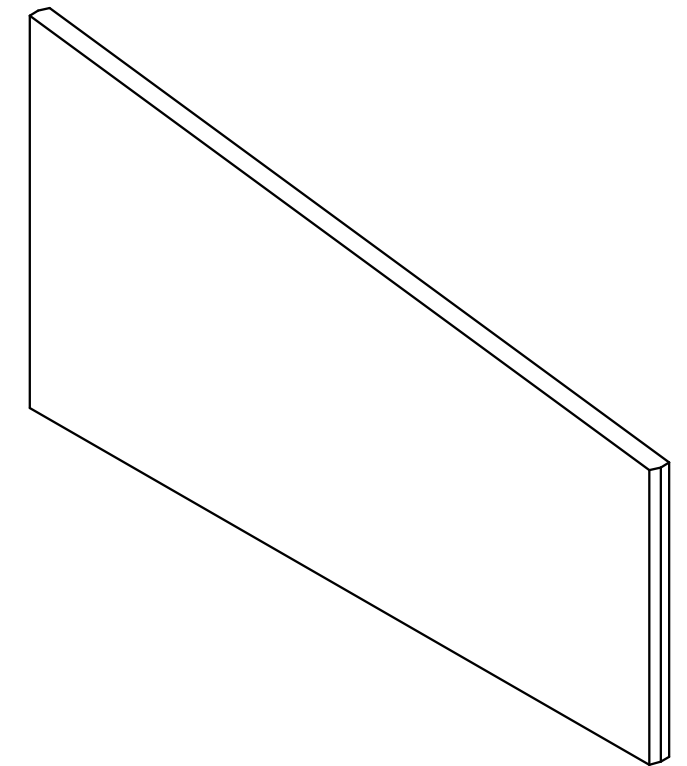
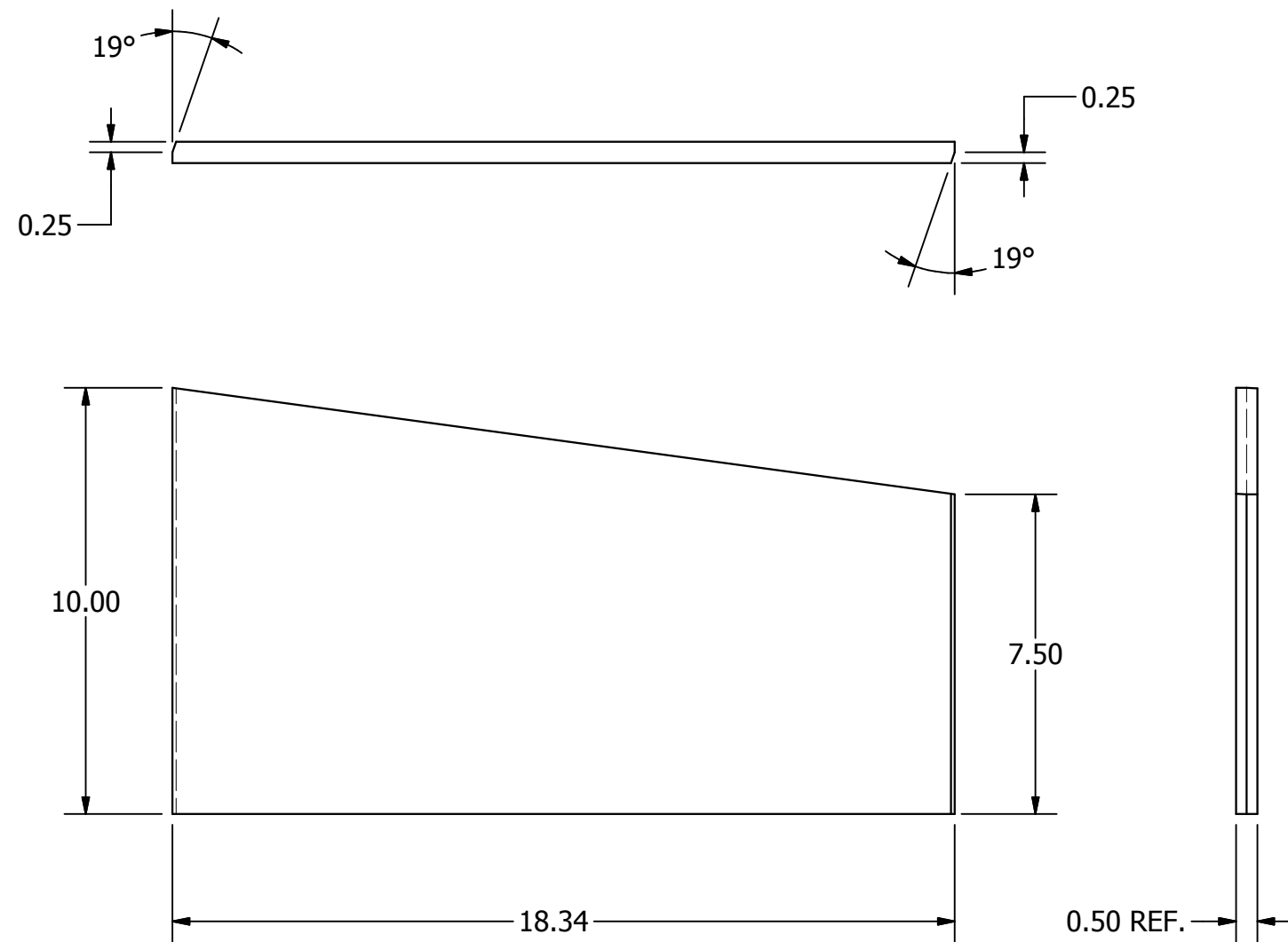
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		TOLERANCES UNLESS OTHERWISE INDICATED FRACTION 0 - 12" ±1/32" 0 - 300mm ±1mm 12 - 78" ±1/16" 300 - 2000mm ±1mm 78" - + ±1/8" 2000mm + ±1mm DECIMAL 0 - 12" ±.005" 0 - 300mm ±0.15mm 12 - 78" ±.010" 300 - 2000mm ±0.3mm 78" - + ±.031" 2000mm + ±1mm ANGLES ±1/2° MACHINED SURFACE FINISH 125 Mu in./√		No. DE CONTRAT CONTRACT No.		DATE: YY/MM/DD CONCU DESIGNED A. MELOCHE 11/01/24 DESSINE DRAWN A. MELOCHE 11/03/07 VERIFIE CHECKED G. AMAR 11/03/18 APPROUVE APPROVED G. AMAR 11/04/20		TITRE INTERMEDIATE PLATE	
		HOLE DIAMETER TOLERANCES 0 - .250" +.003" 0 - 6mm +0.08mm -.002" -0.05mm .250 - .500" +.005" 6 - 12mm +0.13mm -.003" -0.08mm +.010" +0.25mm .500" - + -.005" 12mm + -0.13mm		ENS. SUIVANT TC09016-0008		NEXT ASSY.		ECHELLE 1:4 SCALE	
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				TRA DRAWING No.		REV. -			

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 FILENAME:

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ISOMETRIC VIEW

NOTES:

- 1 - MATERIAL: 1/2" THK. ASTM A572-50 HR PLATE.
- 2 - REMOVE ALL SHARP EDGES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.

No. DE DESSIN

TC09016-0019

REV.

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LEXINGTON, MASSACHUSETTS 02421

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DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0012



DATE: YY/MM/DD		
CONCU DESIGNED	A. MELOCHE	10/10/05
DESSINE DRAWN	A. MELOCHE	11/03/08
VERIFIE CHECKED	G. AMAR	11/03/18
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION			
LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE			
REINFORCEMENT PLATE			
PAGE	SHEET	DE	OF
1	1		
Echelle		SCALE	
1:4			
No. DE DESSIN TRA		TRA DRAWING No.	
TC09016-0019			
REV.			
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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

FORMAT-B WEIGHT: 22.7 lbmass

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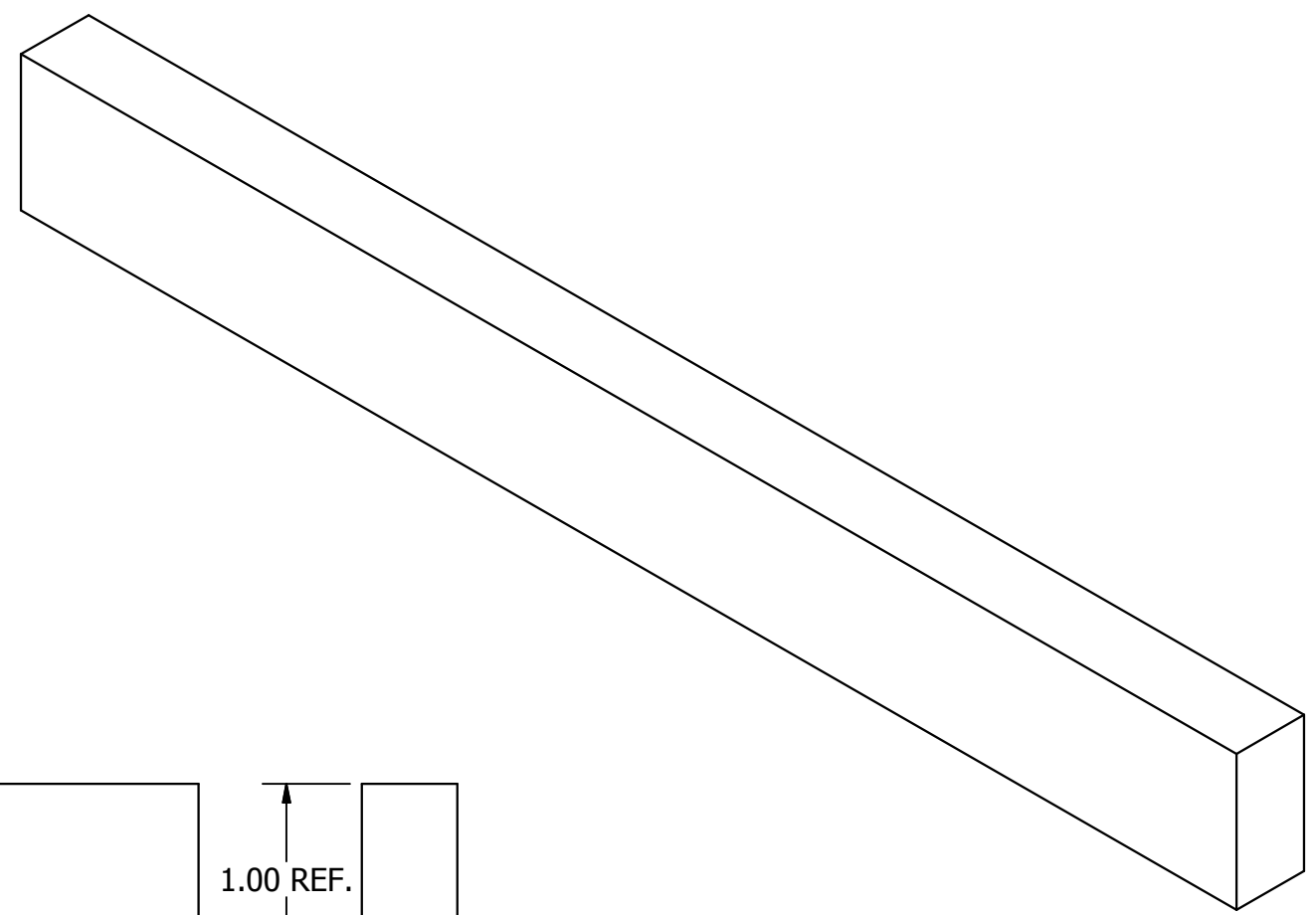
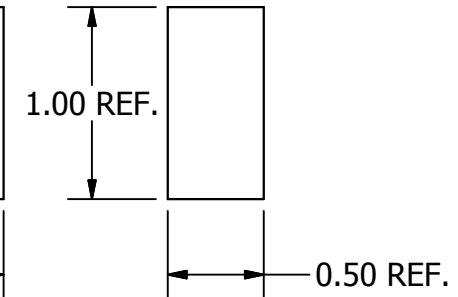
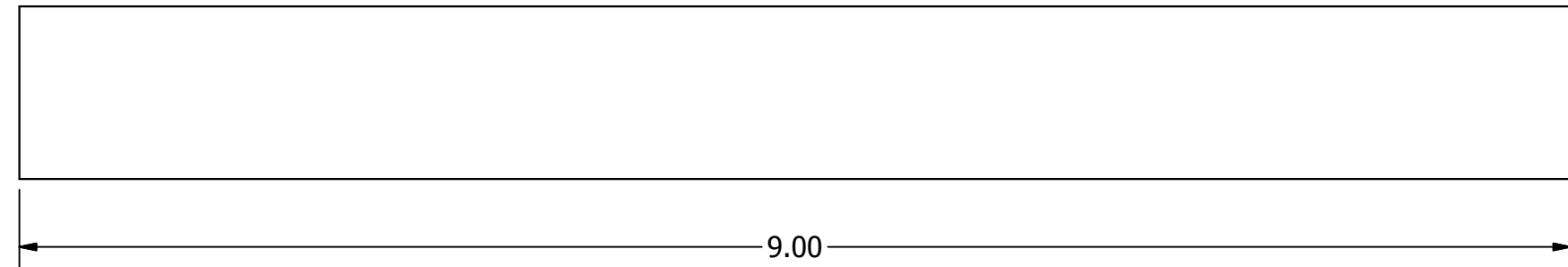
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REV. -
 DRAWING No. TC09016-0017
 No. DE DESSIN



ISOMETRIC VIEW

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:
 1 - MATERIAL: 1/2" X 1" BAR, ASTM A572 OR EQUIV.
 2 - REMOVE ALL SHARP EDGES.

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 LEXINGTON, MASSACHUSETTS 02421

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL	<input checked="" type="checkbox"/>	METRIC	<input type="checkbox"/>
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ <input checked="" type="checkbox"/> NIS			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT CONTRACT No.
 ENS. SUIVANT NEXT ASSY.
TC09016-0008

UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	11/01/21
DESSINE DRAWN	A. MELOCHE	11/03/07
VERIFIE CHECKED	G. AMAR	11/03/18
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				TITLE			
SHORT RECTANGULAR STEEL BAR							
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
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ECHELLE		SCALE					
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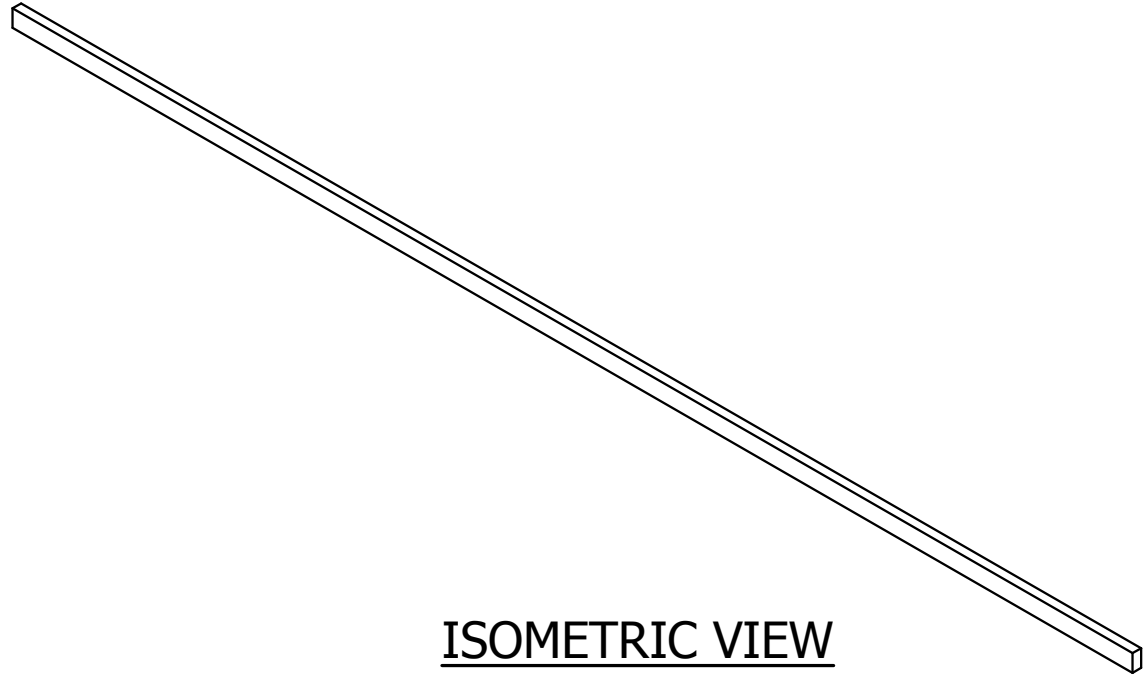
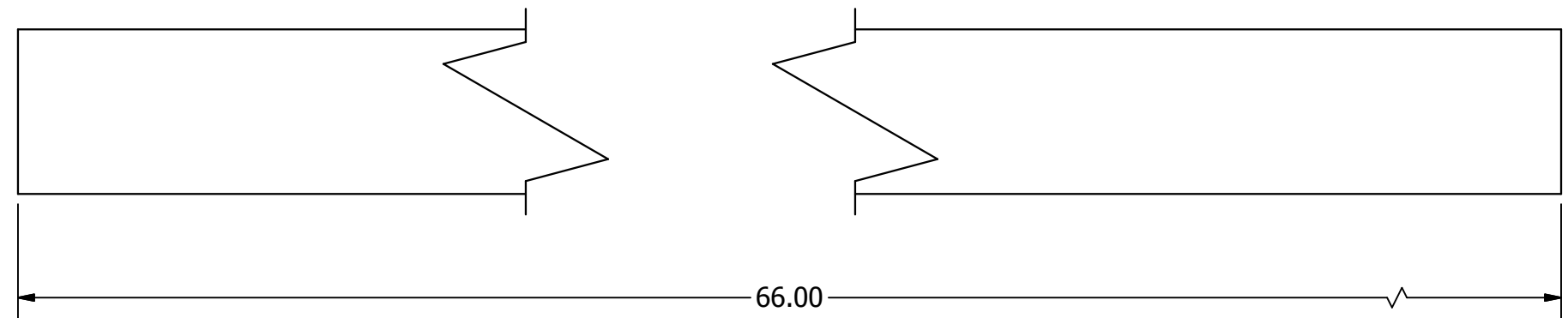
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B

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REV. -
 DRAWING No. TC09016-0015
 No. DE DESSIN



ISOMETRIC VIEW

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:
 1 - MATERIAL: 1/2" X 1" BAR, ASTM A572 OR EQUIV.
 2 - REMOVE ALL SHARP EDGES.

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 LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ <input checked="" type="checkbox"/> NIS			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0005

NEXT ASSY.

UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	11/01/21
DESSINE DRAWN	A. MELOCHE	11/03/07
VERIFIE CHECKED	G. AMAR	11/03/18
APPROUVE APPROVED	G. AMAR	11/04/20
DATE: YY/MM/DD		

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE LONG RECTANGULAR STEEL BAR					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
1	1	1	1	TC09016-0015	
ECHELLE 1:1				SCALE	
REV.					-



PROJECTION
 NOM DE FICHER: TC09016-0015.idw
 FILENAME:

FORMAT-B WEIGHT: 9.3 lbmass

D

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B

A

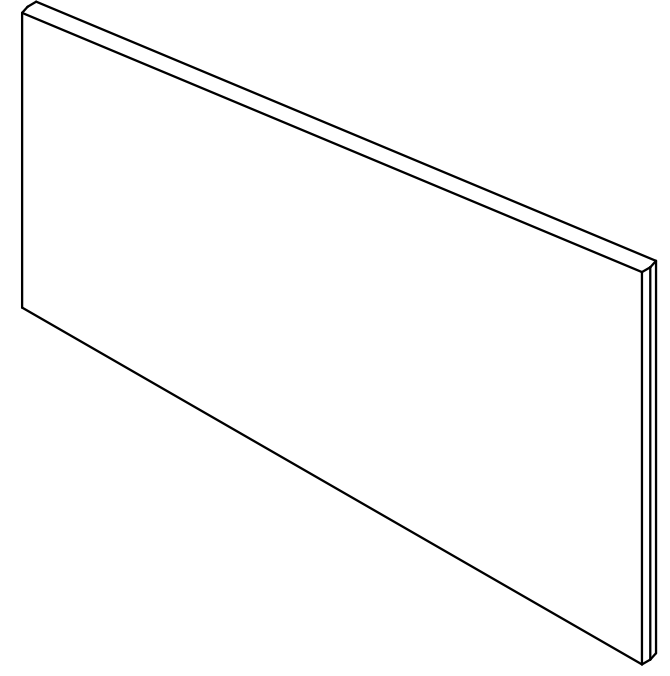
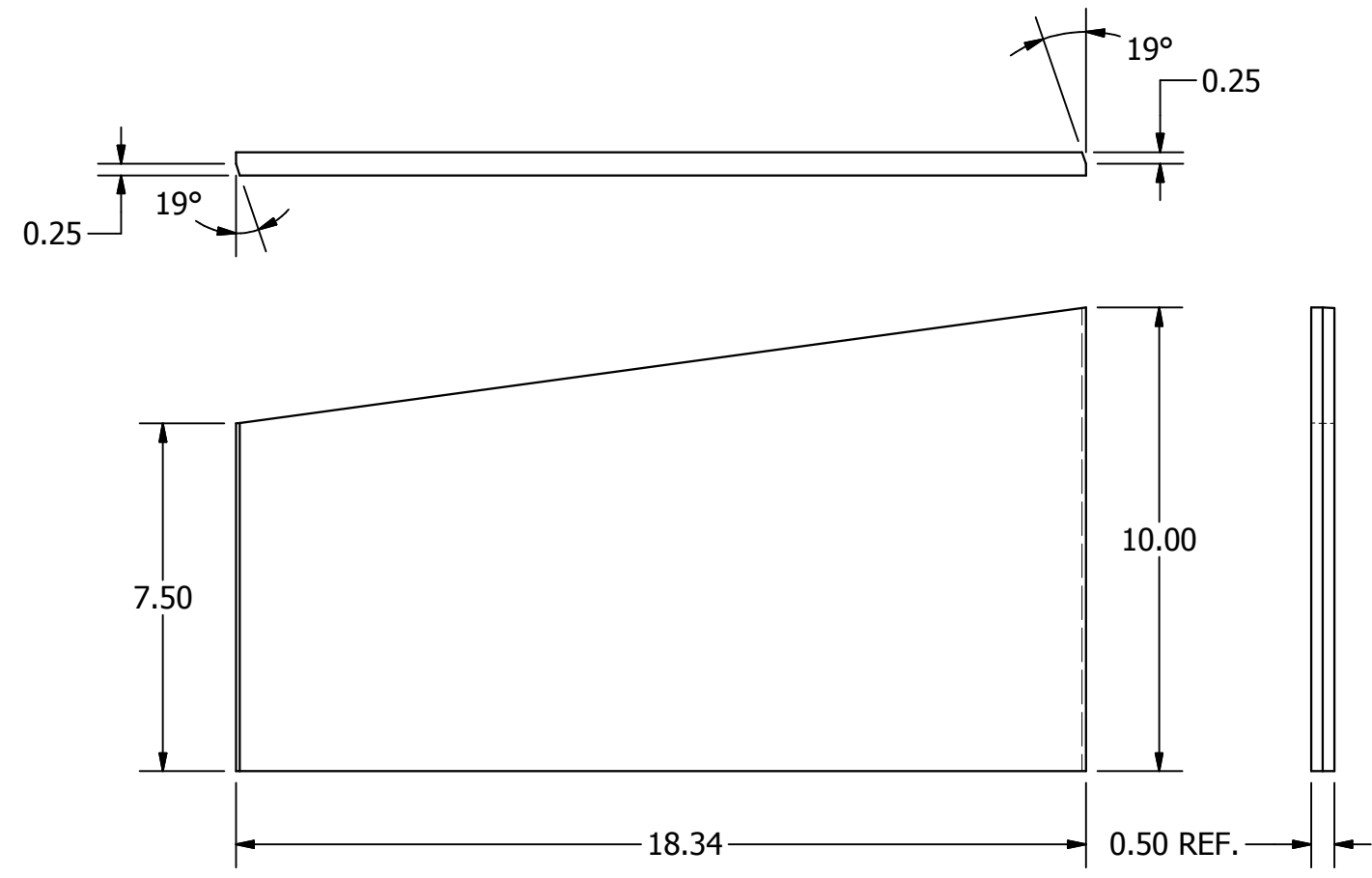
No. DE DESSIN

REV.

DRAWING No.

TC09016-0014

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

NOTES:

- 1 - MATERIAL: 1/2" THK. ASTM A572-50 HR PLATE.
- 2 - REMOVE ALL SHARP EDGES.

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PROJECTION

NOM DE FICHER: TC09016-0014.icw
FILENAME:

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT CONTRACT No.

ENS. SUIVANT NEXT ASSY. TC09016-0012



CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	10/10/05
DESSINE DRAWN	A. MELOCHE	11/03/07	
VERIFIE CHECKED	G. AMAR	11/03/18	
APPROUVE APPROVED	G. AMAR	11/04/21	

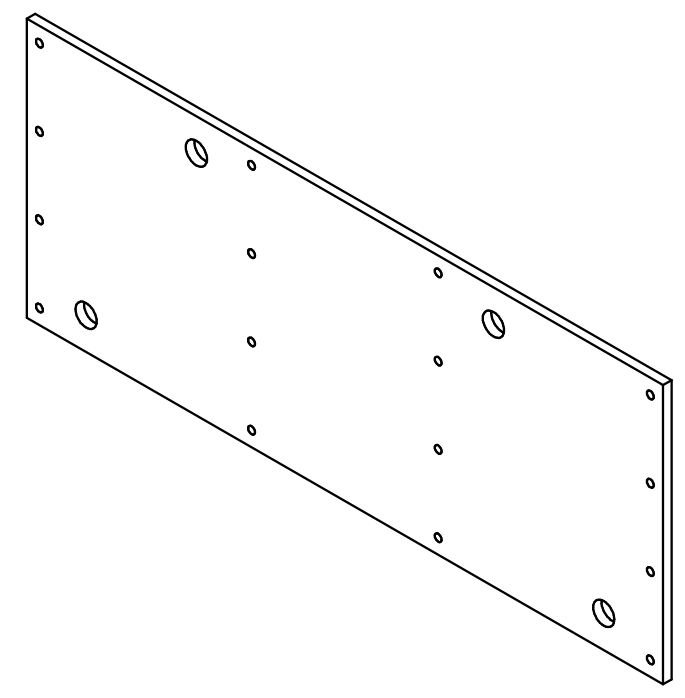
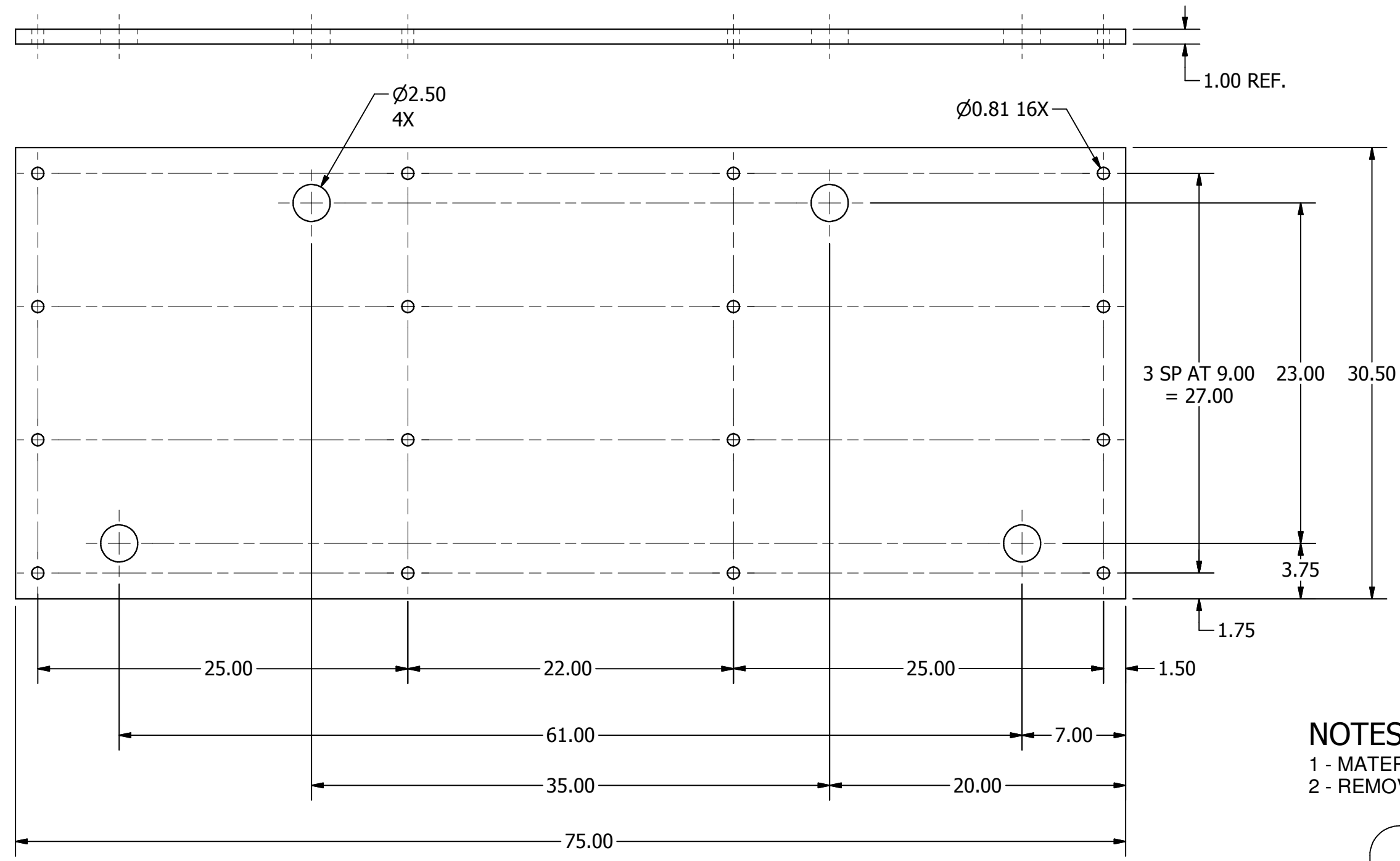
APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				REINFORCEMENT PLATE			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0014		-	
ECHELLE		SCALE					
1:4							

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

FORMAT-B WEIGHT: 22.7 lbmass

REV. -
DRAWING No. TC09016-0013
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.

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PROJECTION
NOM DE FICHER: TC09016-0013.icdw
FILENAME:

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0012

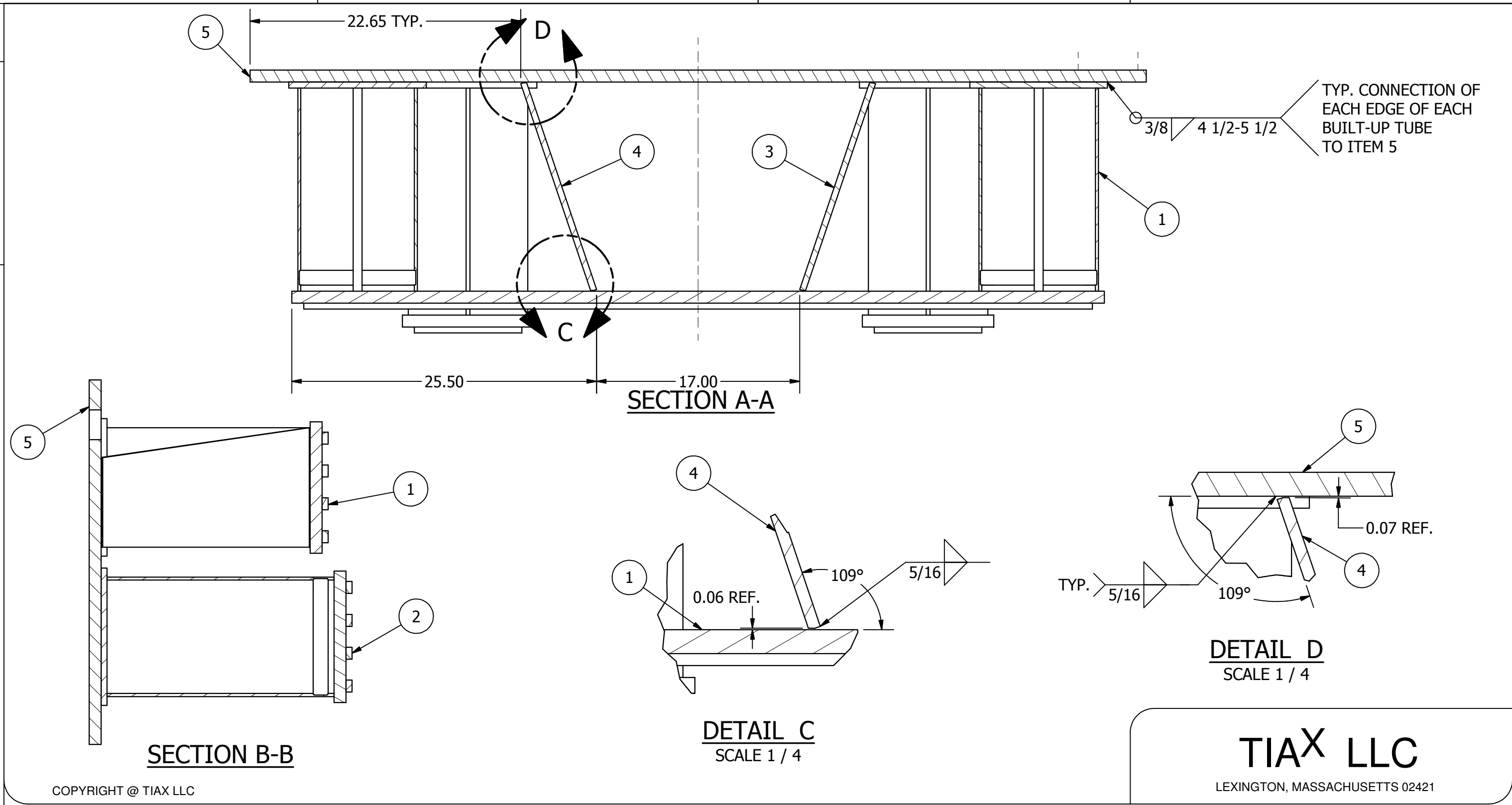


DATE: YY/MM/DD		
CONCU DESIGNED	A. MELOCHE	11/01/21
DESSINE DRAWN	A. MELOCHE	11/03/07
VERIFIE CHECKED	G. AMAR	11/03/18
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION					
LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE					
BACKING PLATE					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
1	1			TC09016-0013	
ECHELLE			SCALE		
1:8					
REV.					-

REV. -
DRAWING No. TC09016-0012
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT - NEXT ASSY.

UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	11/01/21
DESSINE DRAWN	A. MELOCHE	11/01/21
VERIFIE CHECKED	G. AMAR	11/03/18
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				DEFORMABLE ANTI-CLIMBER ASSY			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
2	2			TC09016-0012		-	
ECHELLE		SCALE					
1:8							

PROJECTION
NOM DE FICHER: TC09016-0012.icw
FILENAME:

FORMAT-B WEIGHT: N/A

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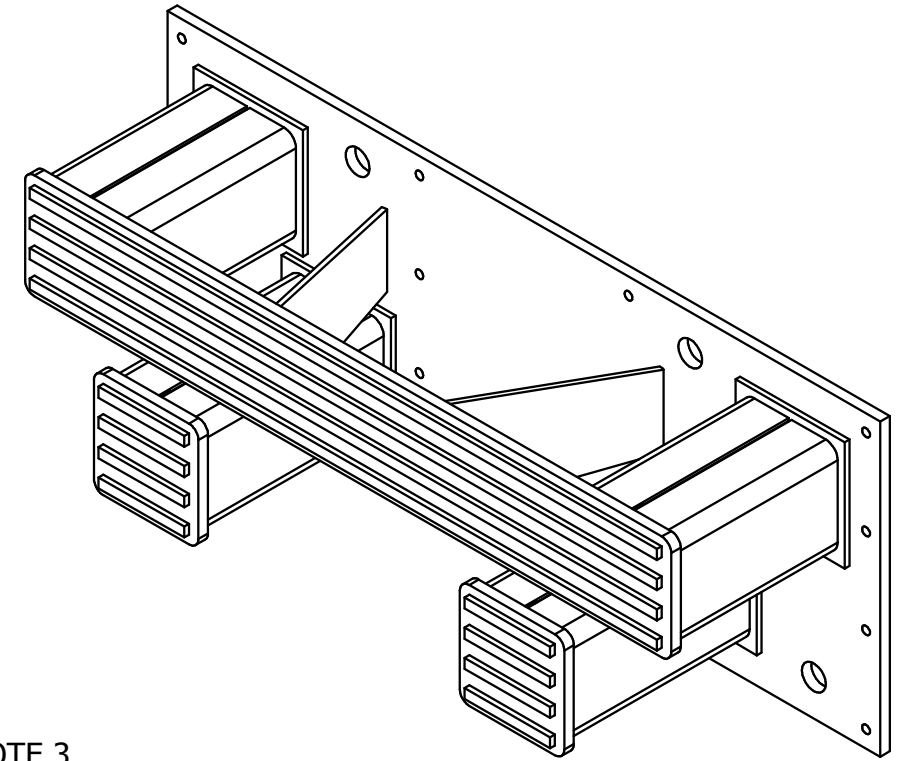
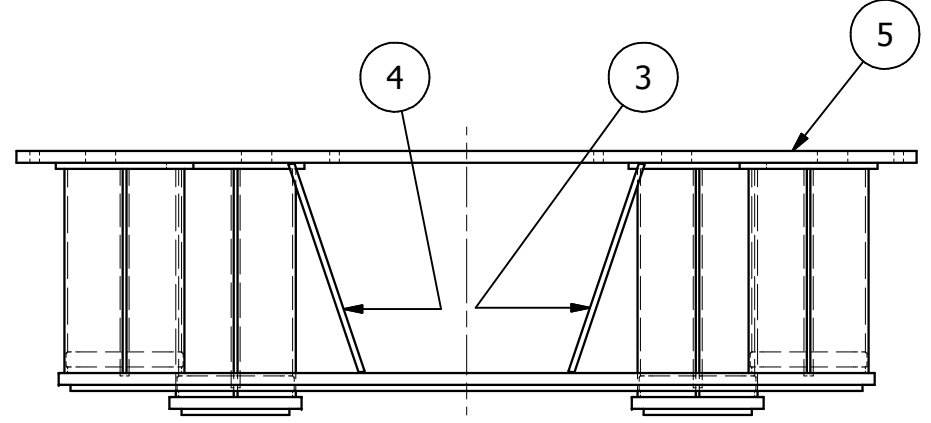
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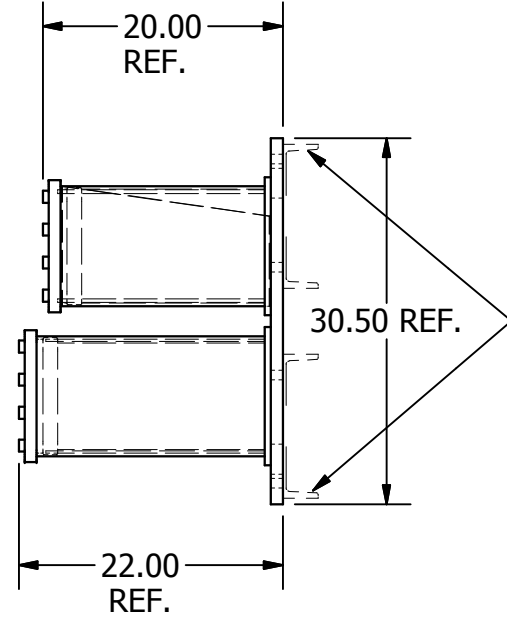
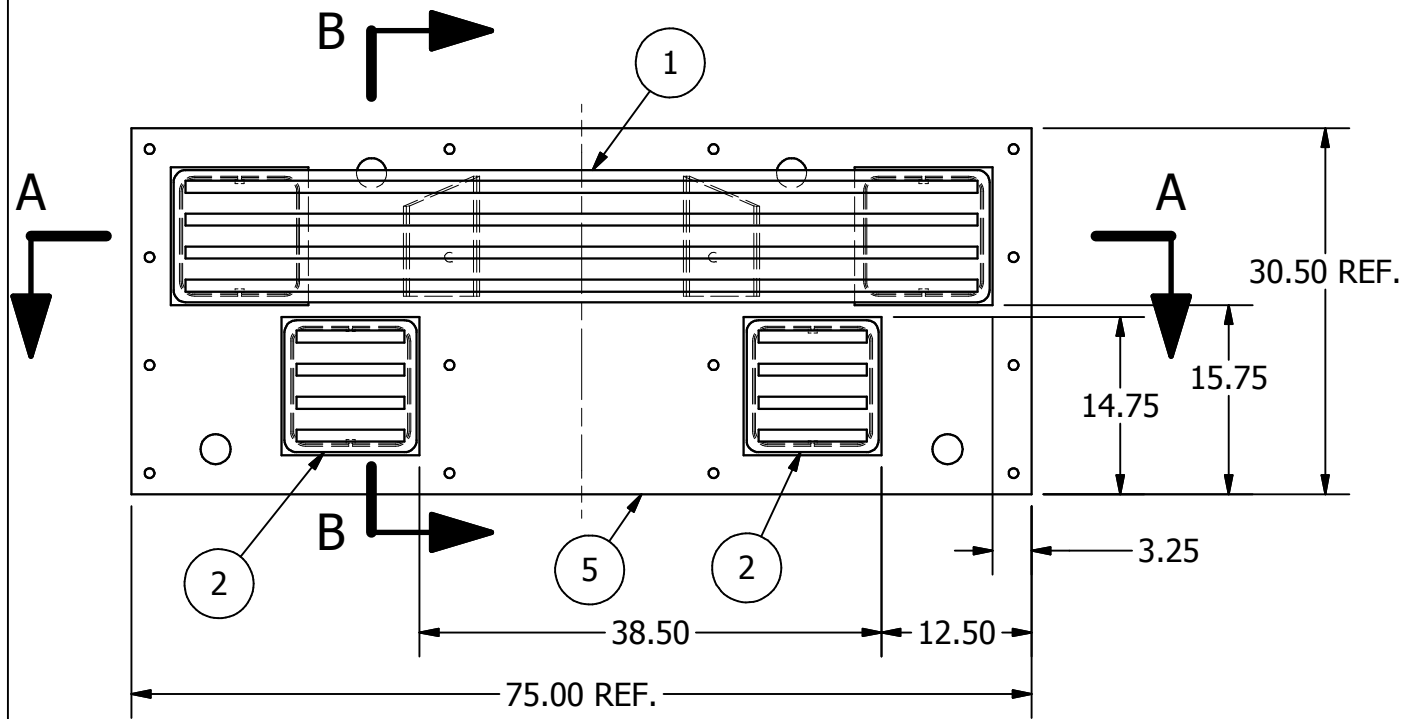
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REV. -
 DRAWING No. TC09016-0012
 No. DE DESSIN

ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLIER P/N
1	1	TOP CRUSH TUBE ASSY	-	TC09016-0005
2	2	LOWER CRUSH TUBE ASSY	-	TC09016-0008
3	1	REINFORCEMENT PLATE	-	TC09016-0014
4	1	REINFORCEMENT PLATE	-	TC09016-0019
5	1	BACKING PLATE	-	TC09016-0013



ISOMETRIC VIEW



NOTES:

- 1 - REMOVE ALL SHARP EDGES.
- 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.
- 3 - FABRICATOR TO PROVIDE BOLTED BRACING MEMBERS TO KEEP ITEM 5 FLAT DURING WELDING & SHIPPING.

NOTE 1 - TOUTES DIMENSIONS EN POUÇES. ALL DIMENSIONS ARE IN INCHES.

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 LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL	<input checked="" type="checkbox"/>	METRIC	<input type="checkbox"/>
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 NEXT ASSY.

UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	11/01/21
DESSINE DRAWN	A. MELOCHE	11/01/21
VERIFIE CHECKED	G. AMAR	11/03/18
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION				
LOCOMOTIVE CRASHWORTHY COMPONENTS				
TITRE				
DEFORMABLE ANTI-CLIMBER ASSY				
PAGE	SHEET	DE	OF	TITLE
1	2			
No. DE DESSIN TRA				TRA DRAWING No.
TC09016-0012				
ECHELLE		SCALE		REV.
1:16				-



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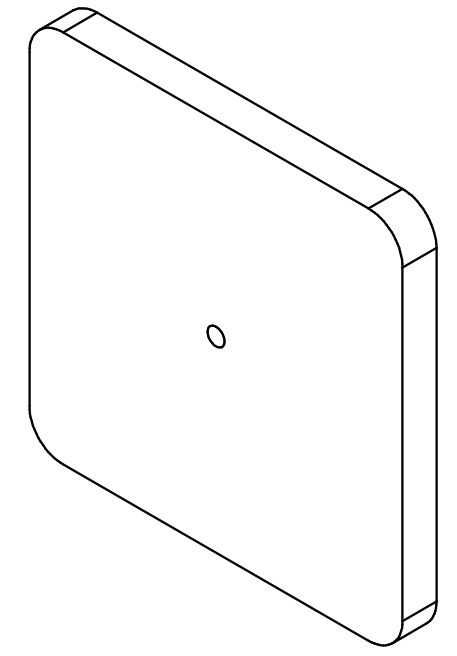
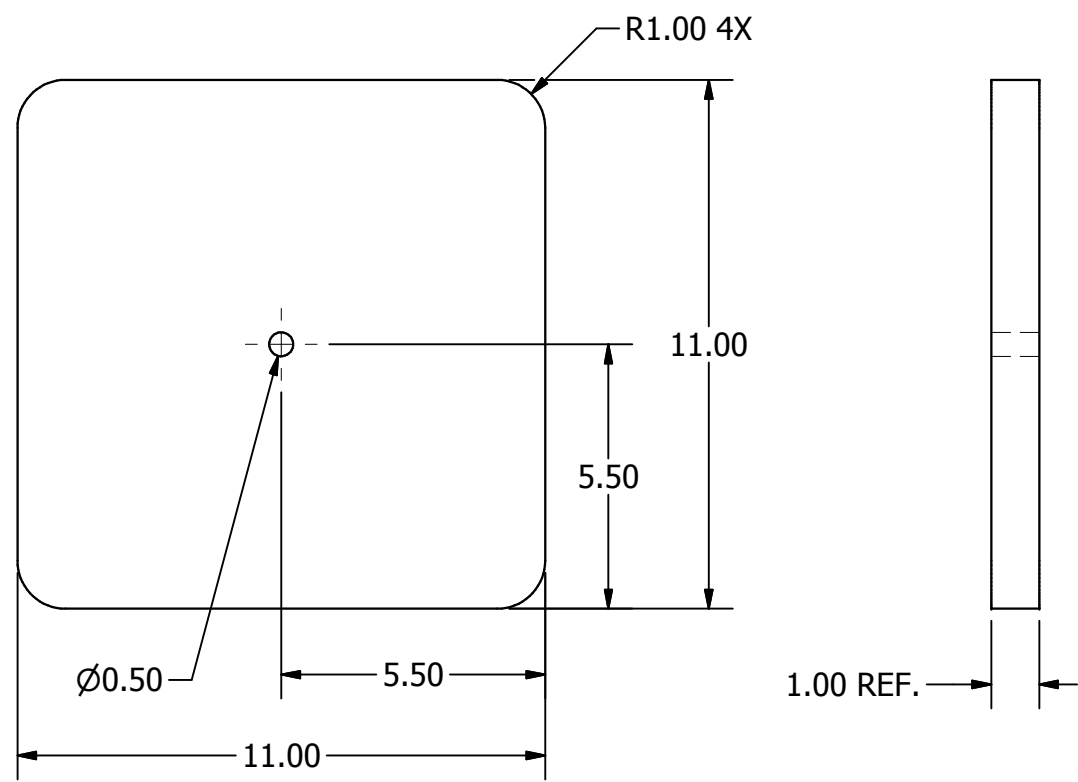
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REV. -
 DRAWING No. TC09016-0011
 No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

TIAX LLC
 LEXINGTON, MASSACHUSETTS 02421

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PROJECTION
 NOM DE FICHER: TC09016-0011.idw
 FILENAME:

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ ^{NS}			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0008

NEXT ASSY.

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	10/09/21
DESSINE DRAWN	A. MELOCHE	11/03/07
VERIFIE CHECKED	G. AMAR	11/03/17
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE BOTTOM ANTI-CLIMBER PLATE					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
1	1	1	1	TC09016-0011	
ECHELLE 1:4			SCALE		
REV.					-

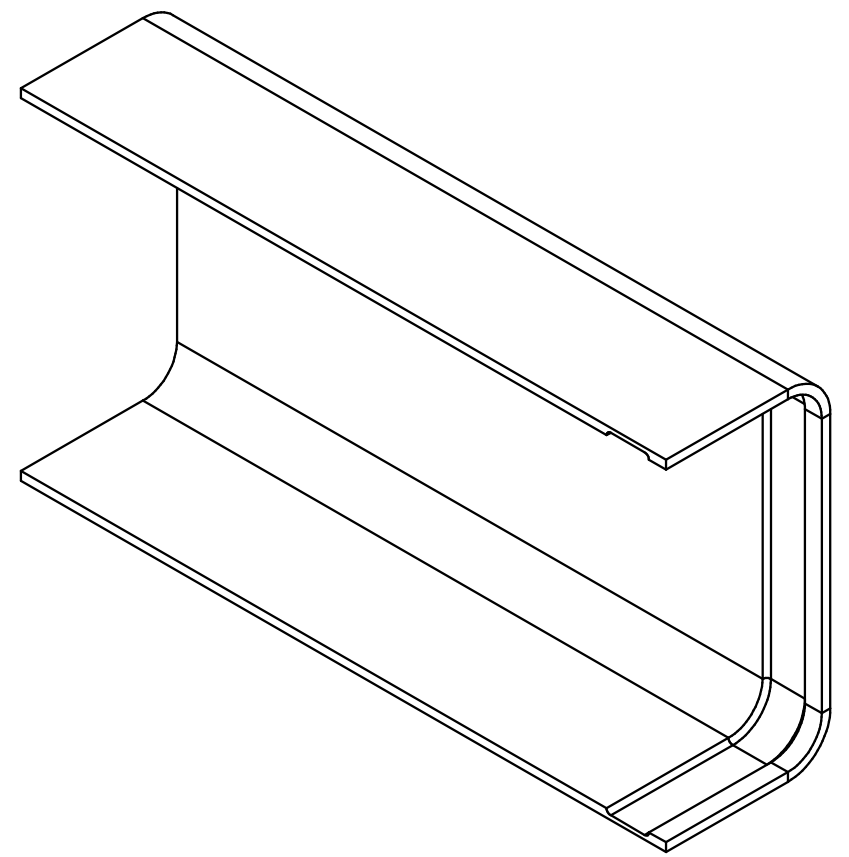
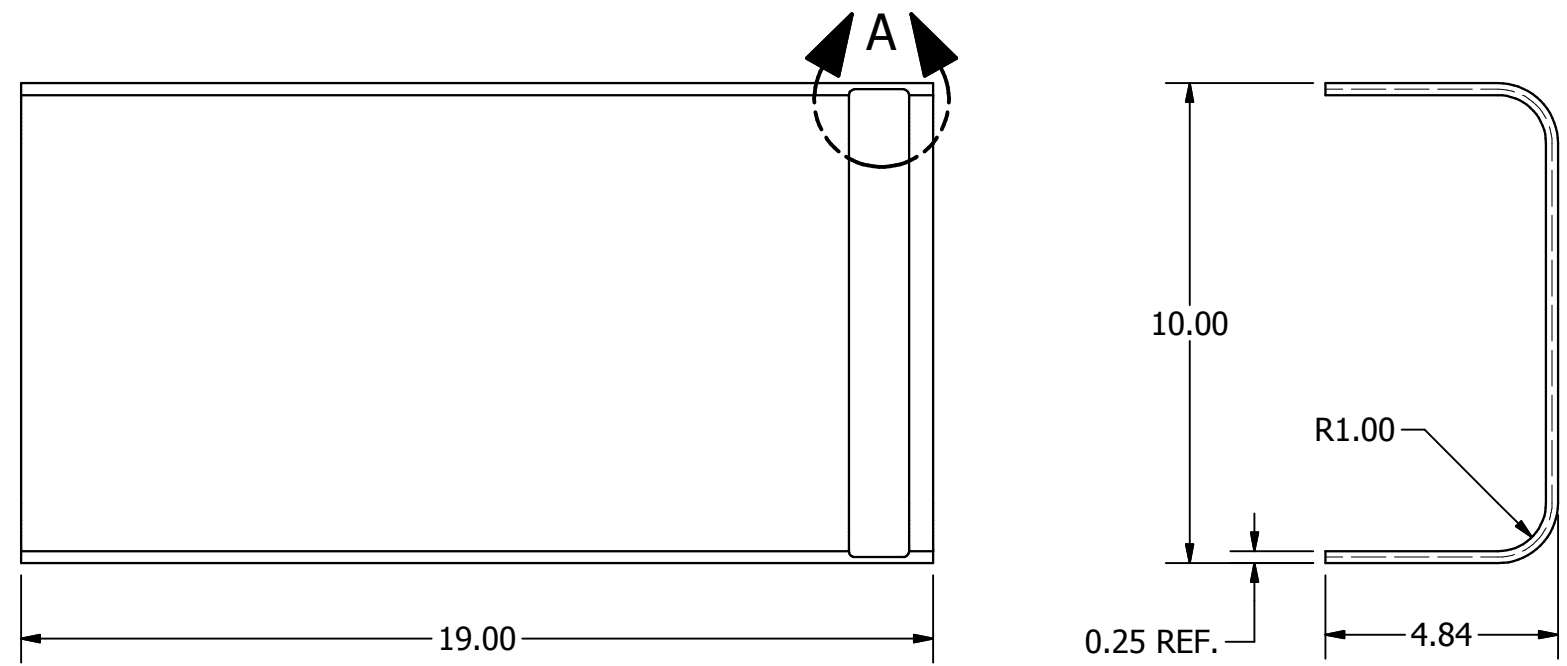
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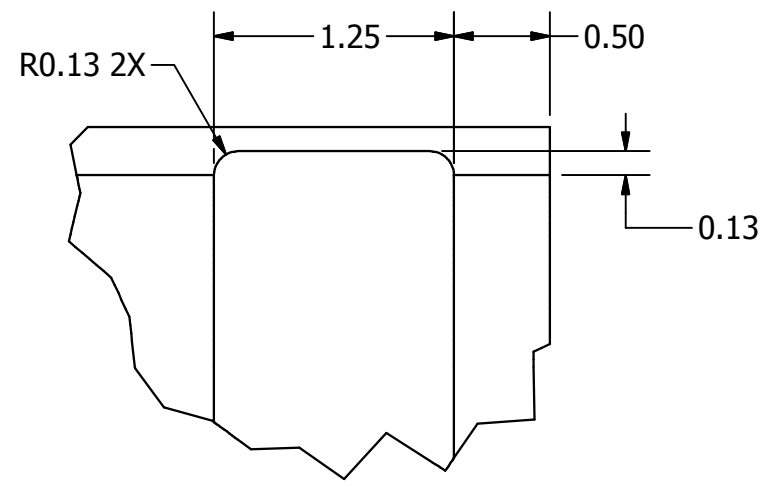
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REV. -
 DRAWING No. TC09016-0010
 No. DE DESSIN



ISOMETRIC VIEW

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.



DETAIL A
 SCALE 1 : 1

NOTES:

- 1 - MATERIAL: 1/4" THK. ASTM A572-50 HR PLATE.
- 2 - REMOVE ALL SHARP EDGES.
- 3 - MACHINED GROOVE SHOWN IN DETAIL A TO BE MADE PRIOR TO BENDING.
- 4 - AFTER BENDING, PERFORM LIQUID PENETRANT INSPECTION OF GROOVE REGION AT BENDS TO ENSURE NO CRACKING HAS OCCURED.

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 CAMBRIDGE, MASSACHUSETTS 02140

		DIMENSION UNITS		CE DOCUMENT NE PEUT ÊTRE REPRODUIT OU COPIÉ SANS CONSENTEMENT ÉCRIT DE TAYLOR RAYNAULD AMAR ET ASSOCIÉS LTÉE. THIS DOCUMENT MAY NOT BE REPRODUCED OR COPIED UNLESS EXPRESSLY AUTHORIZED BY TAYLOR RAYNAULD AMAR & ASSOCIATED LTD.	Taylor Raynauld Amar & Associates Ltd. A subsidiary of CANARAIL MONTREAL CANADA	APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS						
		IMPERIAL <input checked="" type="checkbox"/> METRIC <input type="checkbox"/>	TOLERANCES UNLESS OTHERWISE INDICATED FRACTION 0 - 12" ±1/32" 0 - 300mm ±1mm 12 - 78" ±1/16" 300 - 2000mm ±1mm 78" - + ±1/8" 2000mm + ±1mm DECIMAL 0 - 12" ±.005" 0 - 300mm ±0.15mm 12 - 78" ±.010" 300 - 2000mm ±0.3mm 78" - + ±.031" 2000mm + ±1mm			No. DE CONTRAT CONTRACT No.		TITRE HALF CRUSH TUBE				
		ANGLES ±1/2° MACHINED SURFACE FINISH 125 Mu in./N _S		DATE: YY/MM/DD 10/09/14		TITLE						
		HOLE DIAMETER TOLERANCES 0 - .250" +.003" -0.02" 0 - 6mm +0.08mm -0.05mm .250 - .500" +.005" -0.03" 6 - 12mm +0.13mm -0.08mm .500" - +.010" -0.05" 12mm + +0.25mm -0.13mm		ENS. SUIVANT TC09016-0008		NEXT ASSY.		TITLE				
				CONCU DESIGNED DESSINE DRAWN VERIFIE CHECKED APPROUVE APPROVED		A. MELOCHE A. MELOCHE G. AMAR G. AMAR		10/09/14 11/03/08 11/03/18 11/04/21		TITLE		
				No. DE CONTRAT CONTRACT No.		No. DE DESSIN TRA TRA DRAWING No.		TITLE				
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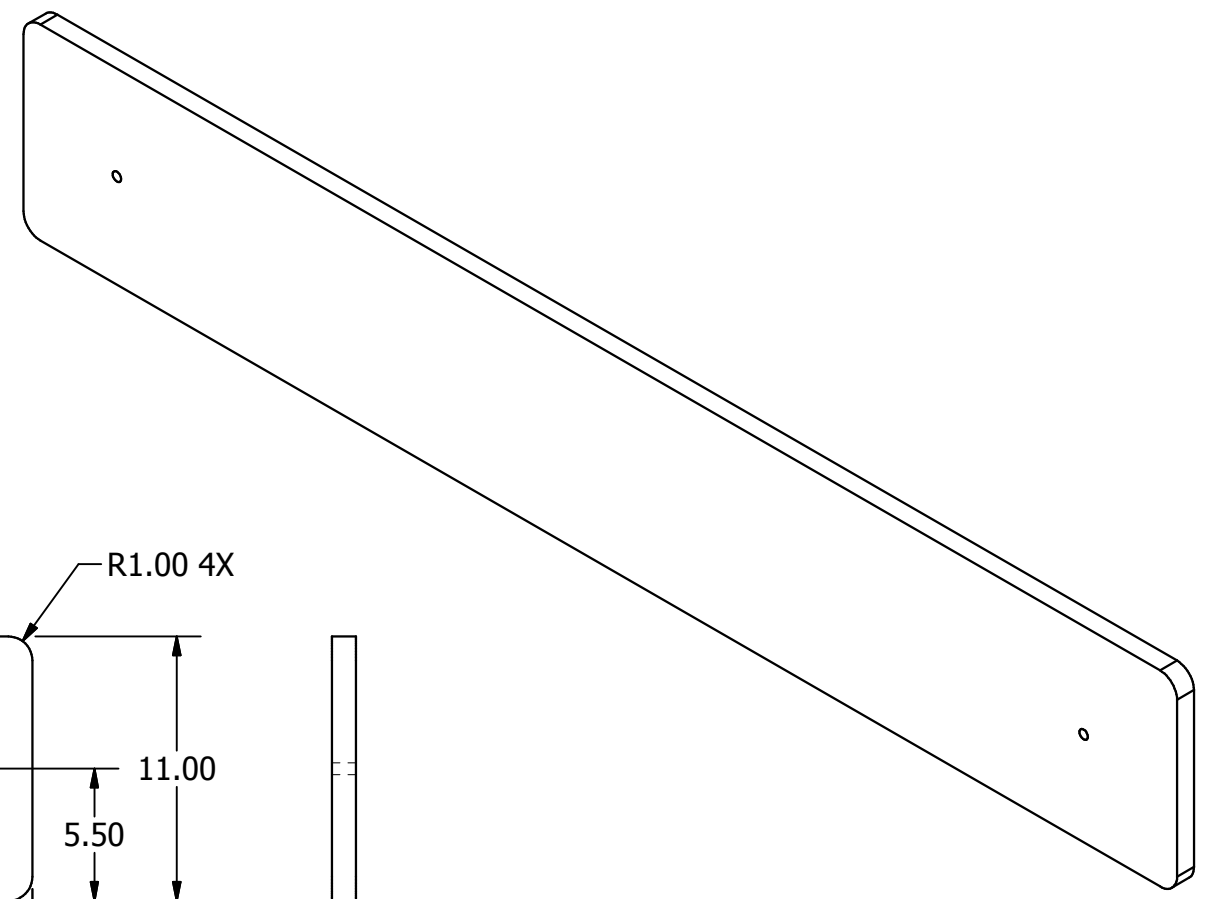
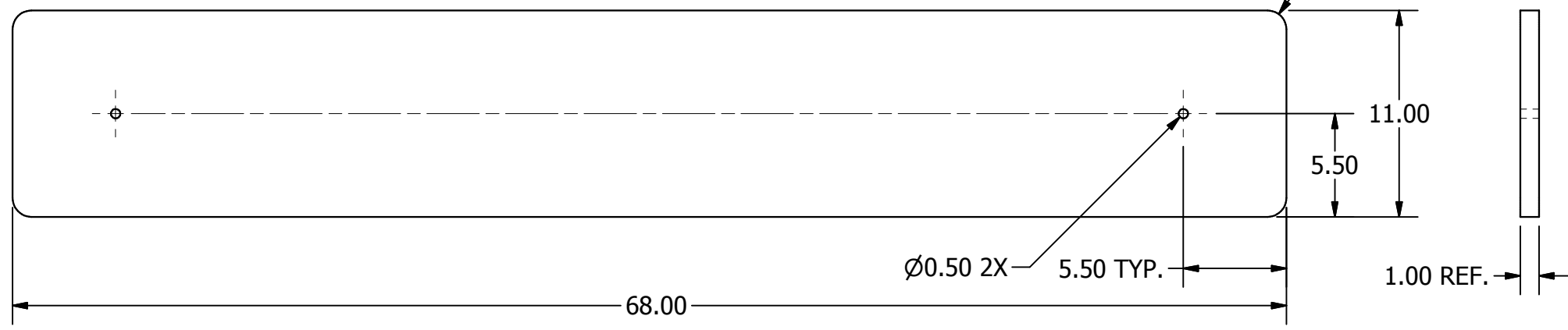
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C

B

A

REV. -
 DRAWING No. TC09016-0009
 No. DE DESSIN



ISOMETRIC VIEW

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

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 LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
	0 - 12"	±.005"	0 - 300mm ±0.15mm
DECIMAL	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES		±1/2°	
MACHINED SURFACE FINISH 125 Mu in./ ^{NS}			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0005

NEXT ASSY.

UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	10/09/21
DESSINE DRAWN	A. MELOCHE	11/03/07
VERIFIE CHECKED	G. AMAR	11/03/17
APPROUVE APPROVED	G. AMAR	11/04/20

APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				TOP ANTI-CLIMBER PLATE			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0009		-	
ECHELLE		SCALE					
1:8							



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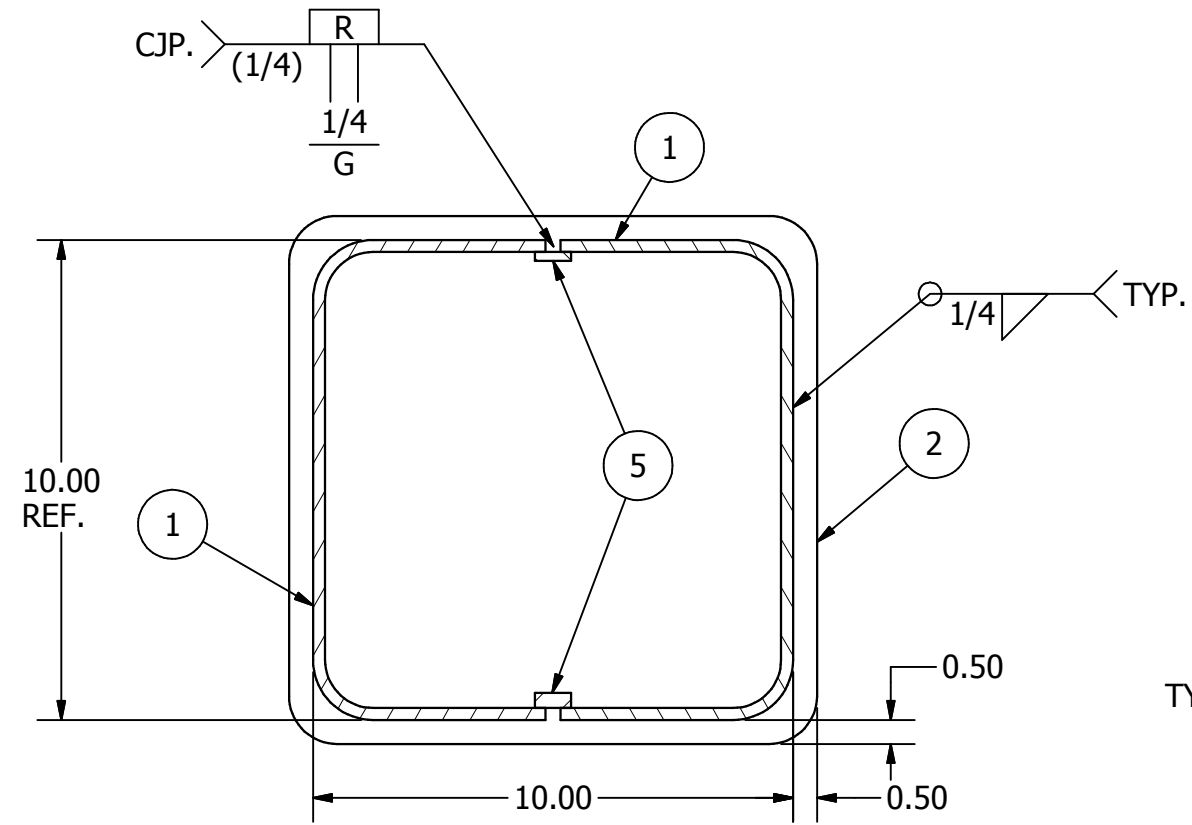
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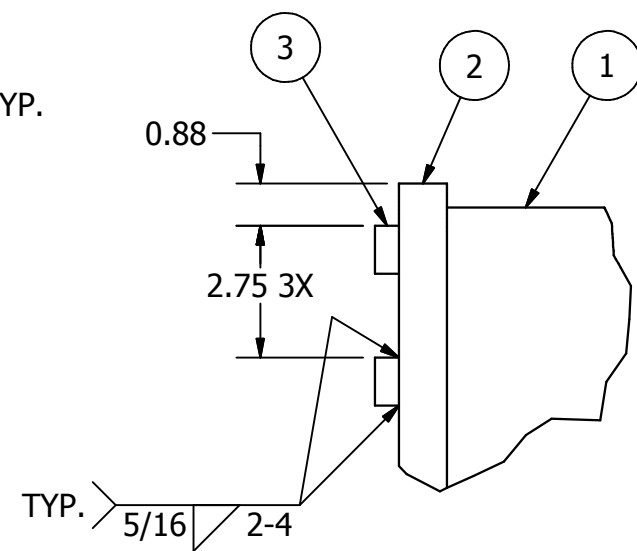
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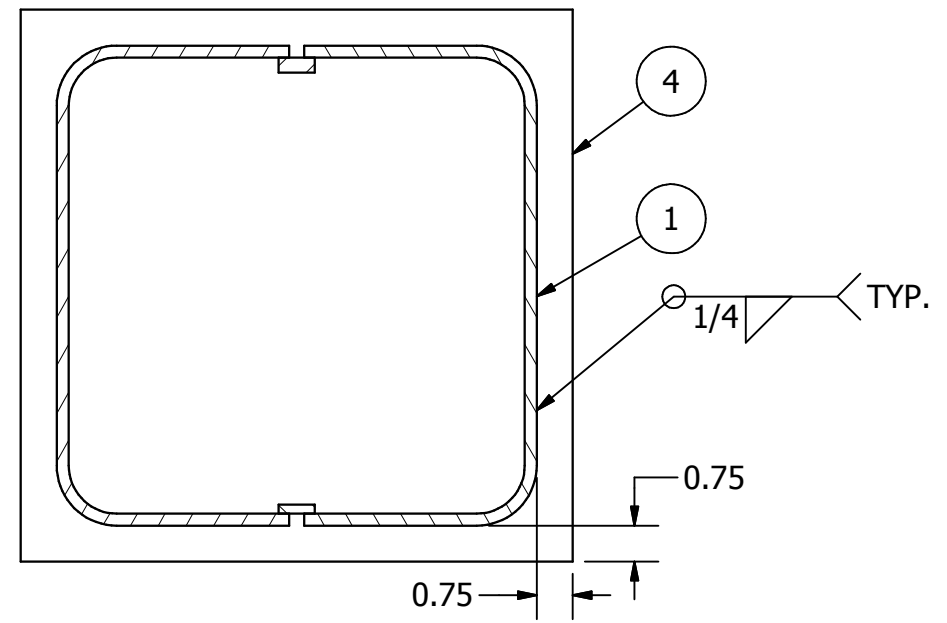
REV. -
 DRAWING No. TC09016-0008
 No. DE DESSIN



SECTION A-A



DETAIL B



SECTION C-C
SCALE 1 / 4

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
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PROJECTION
 NOM DE FICHER: TC09016-0008.icw
 FILENAME:

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
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TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ NIS			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0012

DATE: YY/MM/DD

CONCU DESIGNED A. MELOCHE 10/09/14
 DESSINE DRAWN A. MELOCHE 11/03/08
 VERIFIE CHECKED G. AMAR 11/03/18
 APPROUVE APPROVED G. AMAR 11/04/21

UNE DIVISION DE / A DIVISION OF

APPLICATION				TITLE	
LOCOMOTIVE CRASHWORTHY COMPONENTS				LOWER CRUSH TUBE ASSY	
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
2	2			TC09016-0008	
ECHELLE			SCALE		REV.
1:4					-

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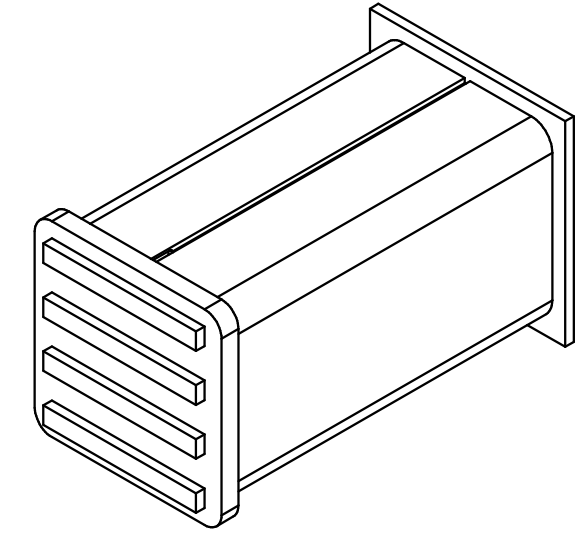
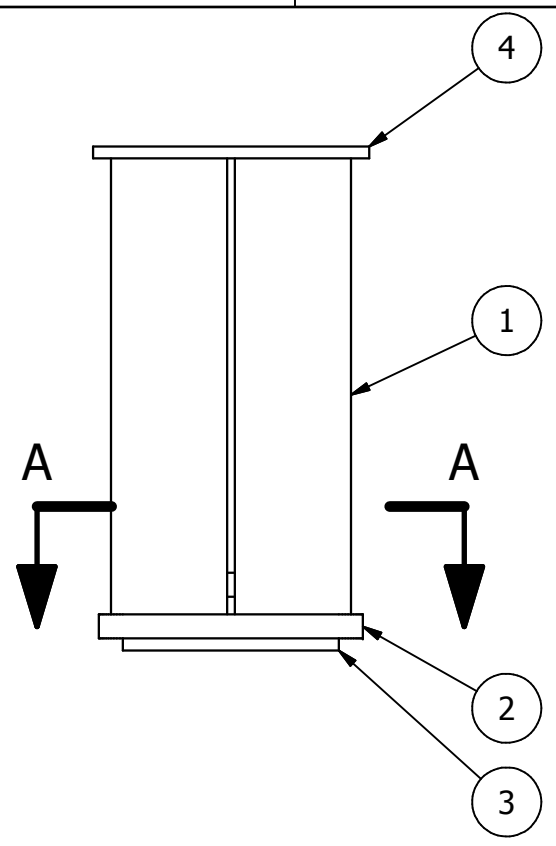
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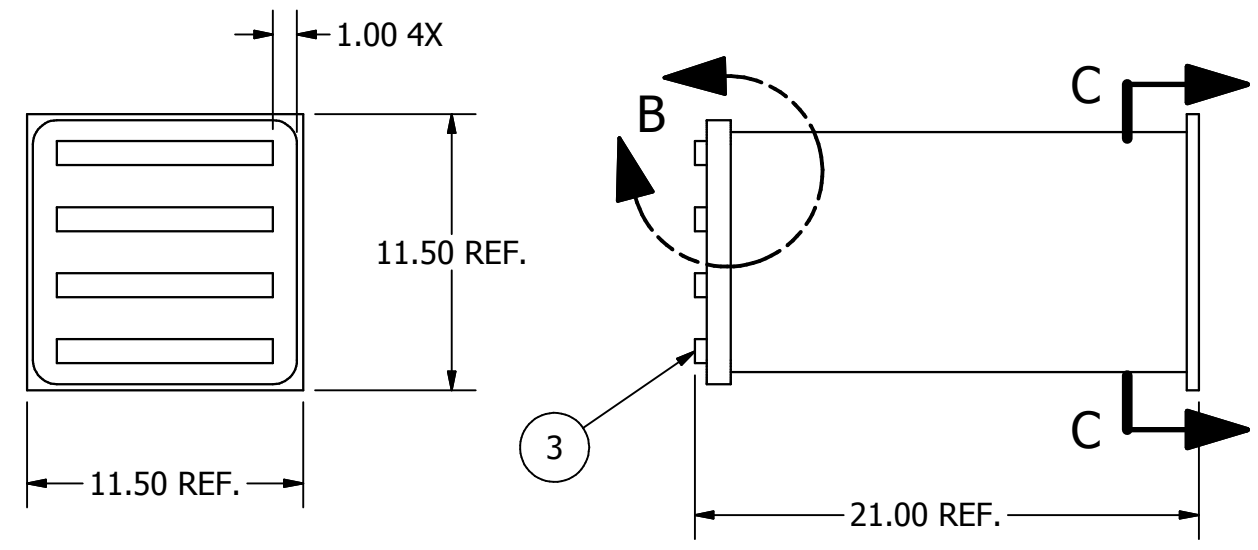
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REV. -
 DRAWING No. TC09016-0008
 No. DE DESSIN

ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLIER P/N
1	2	HALF CRUSH TUBE	-	TC09016-0010
2	1	BOTTOM ANTI-CLIMBER PLATE	-	TC09016-0011
3	4	SHORT RECTANGULAR STEEL BAR	-	TC09016-0017
4	1	INTERMEDIATE PLATE	-	TC09016-0020
5	2	CERAMIC WELD BACKING TAPE	-	-



ISOMETRIC VIEW



NOTES:
 1 - REMOVE ALL SHARP EDGES.
 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.

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 LEXINGTON, MASSACHUSETTS 02421

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PROJECTION
 NOM DE FICHER: TC09016-0008.icw
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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

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FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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 No. DE CONTRAT CONTRACT No.
 ENS. SUIVANT NEXT ASSY. TC09016-0012

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	10/09/14
DESSINE DRAWN	A. MELOCHE	11/03/08
VERIFIE CHECKED	G. AMAR	11/03/18
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS				
TITRE LOWER CRUSH TUBE ASSY				
PAGE	SHEET	DE	OF	No. DE DESSIN TRA TRA DRAWING No.
1	2			TC09016-0008
ECHELLE		SCALE		REV.
1:8				-

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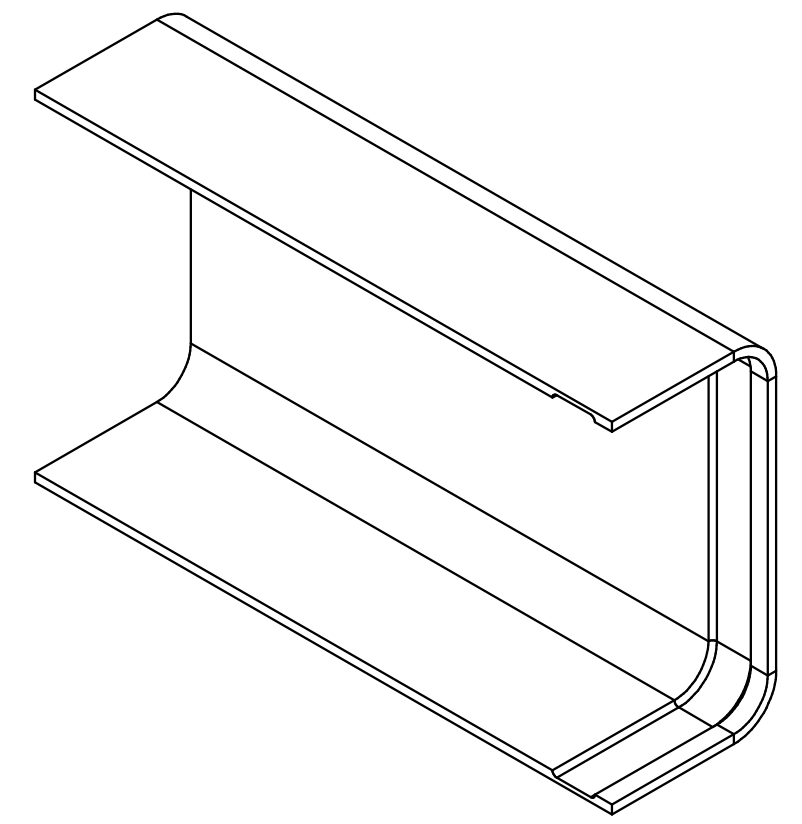
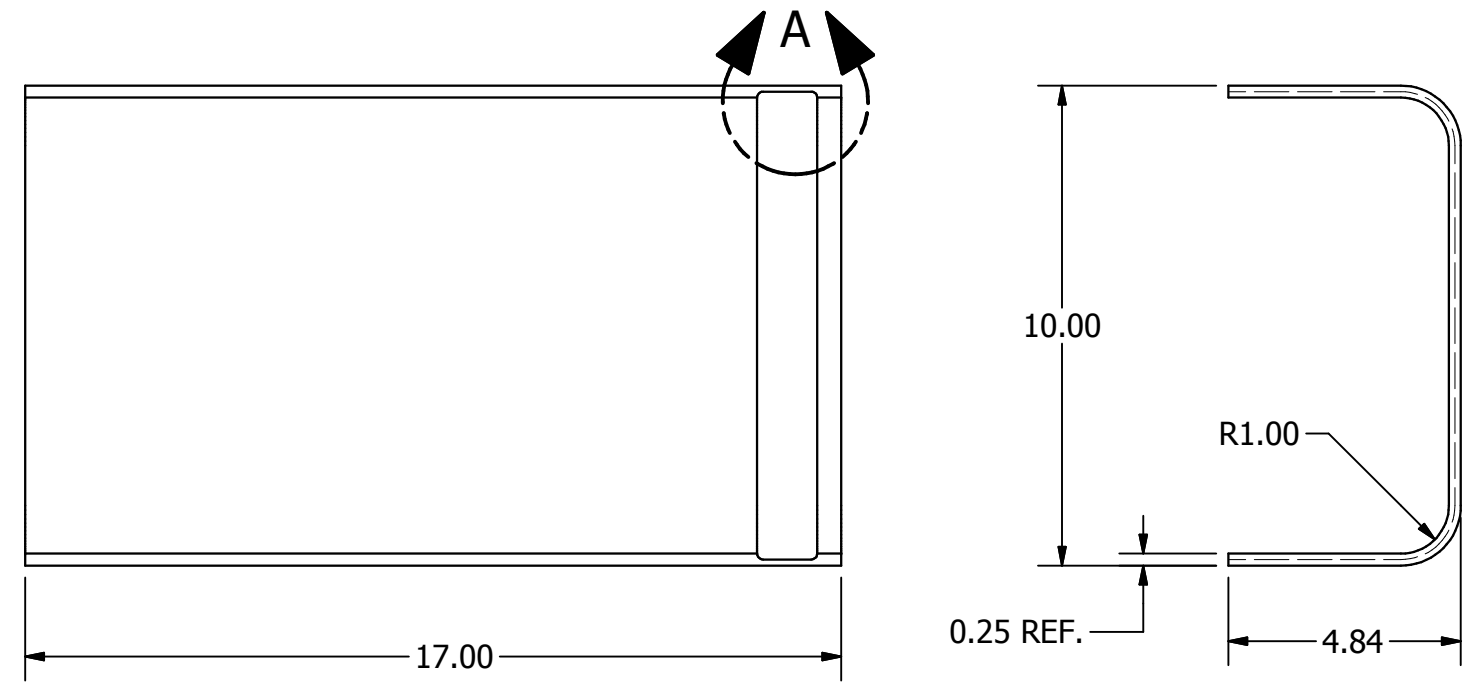
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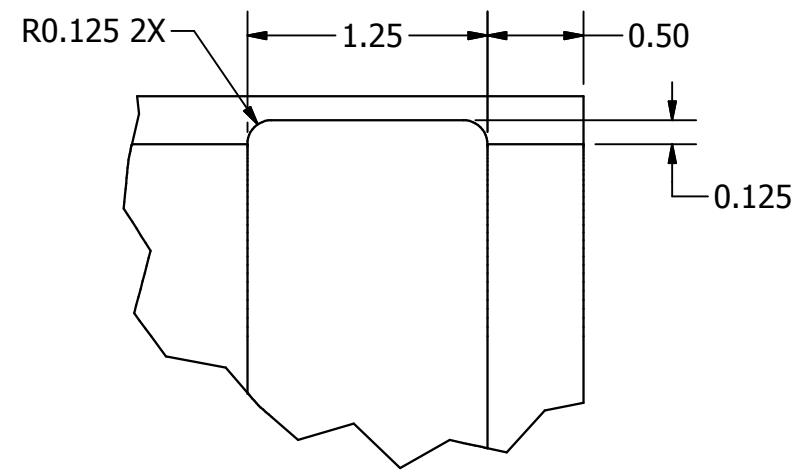
REV.

DRAWING No.

TC09016-0006



ISOMETRIC VIEW



DETAIL A

SCALE 1 : 1
(SEE NOTES 3 & 4)

NOTES:

- 1 - MATERIAL: 1/4" THK. ASTM A572-50 HR PLATE.
- 2 - REMOVE ALL SHARP EDGES.
- 3 - MACHINED GROOVE SHOWN IN DETAIL A TO BE MADE PRIOR TO BENDING.
- 4 - AFTER BENDING, PERFORM LIQUID PENETRANT INSPECTION OF GROOVE REGION AT BENDS TO ENSURE NO CRACKING HAS OCCURED.

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PROJECTION

NOM DE FICHER: TC09016-0006.idw
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	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ NIS/			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0005

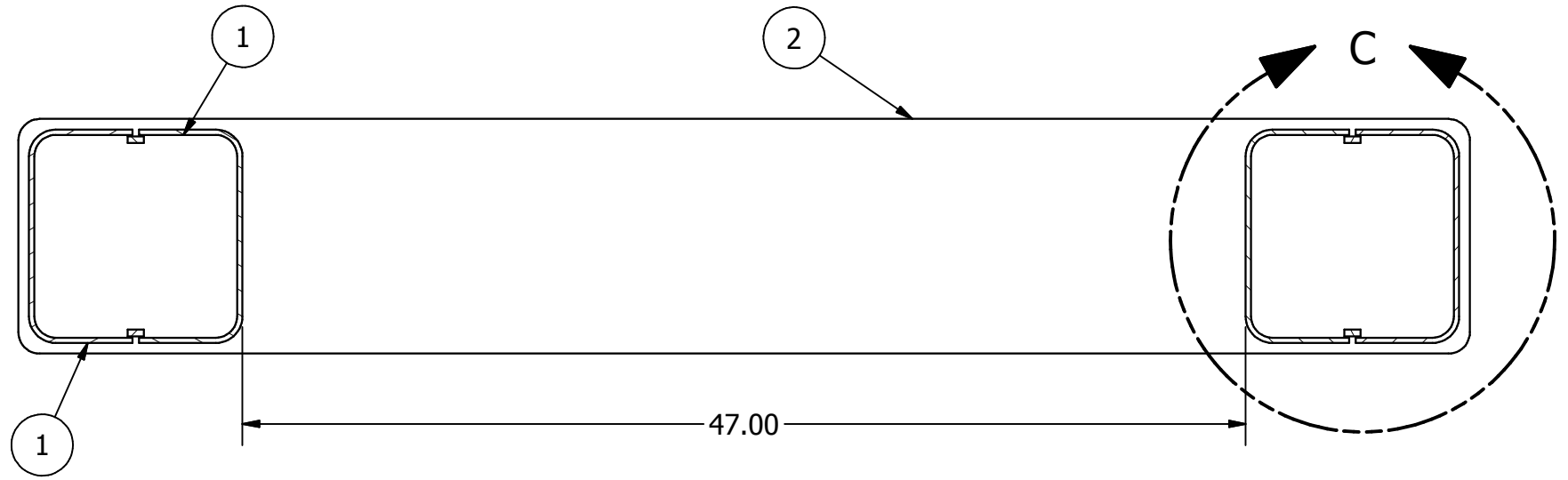


UNE DIVISION DE / A DIVISION OF		
CONCU DESIGNED	A. MELOCHE	10/09/14
DESSINE DRAWN	A. MELOCHE	11/03/07
VERIFIE CHECKED	G.AMAR	11/03/18
APPROUVE APPROVED	G.AMAR	11/04/21

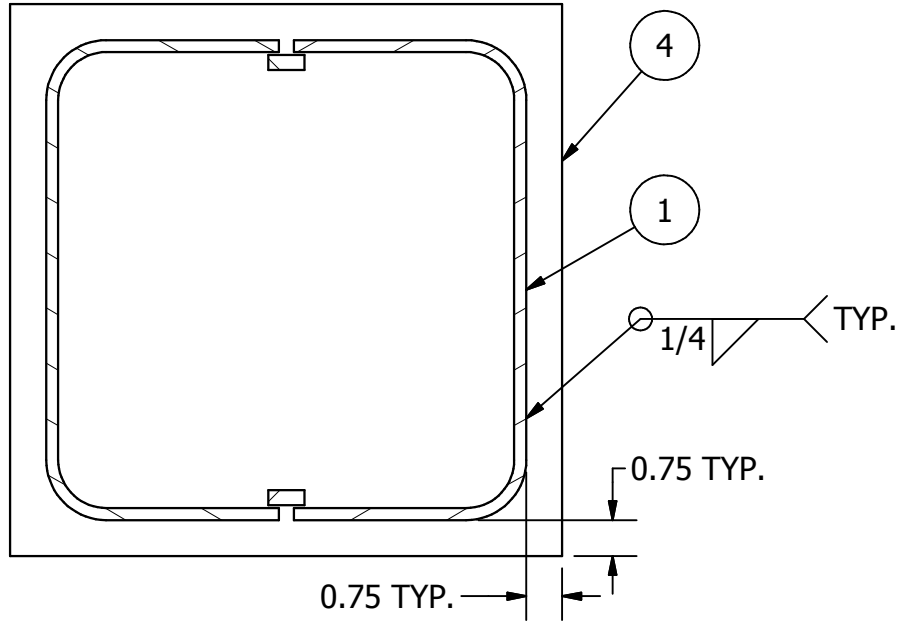
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TITRE					
HALF CRUSH TUBE					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
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ECHELLE			SCALE		
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					REV.
					-

REV. -
DRAWING No. TC09016-0005
No. DE DESSIN

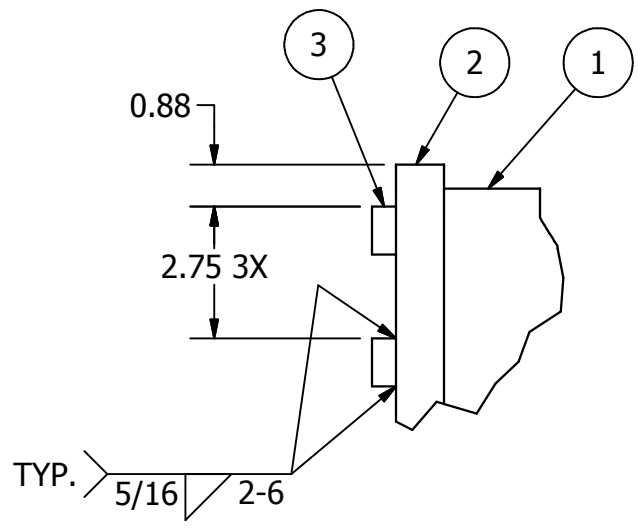
NOTE 1 - TOUTES DIMENSIONS EN POUÇES.
ALL DIMENSIONS ARE IN INCHES.



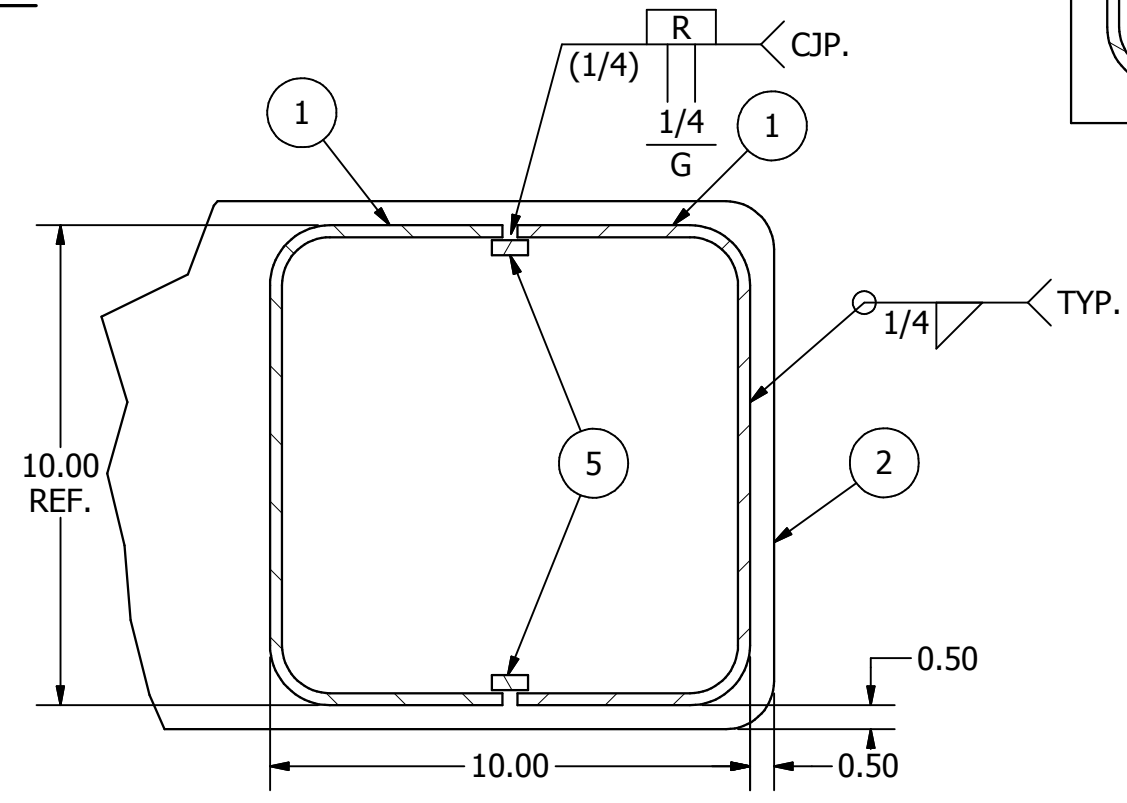
SECTION A-A



SECTION D-D
SCALE 1 / 4



DETAIL B
SCALE 1 / 4



DETAIL C
SCALE 1 / 4

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
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TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ N ₈			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0012

UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	10/09/14
DESSINE DRAWN	A. MELOCHE	11/03/07
VERIFIE CHECKED	G. AMAR	11/03/18
APPROUVE APPROVED	G. AMAR	11/04/21
		DATE: YY/MM/DD

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE TOP CRUSH TUBE ASSY					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
2	2			TC09016-0005	
ECHELLE		SCALE			
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REV.					-



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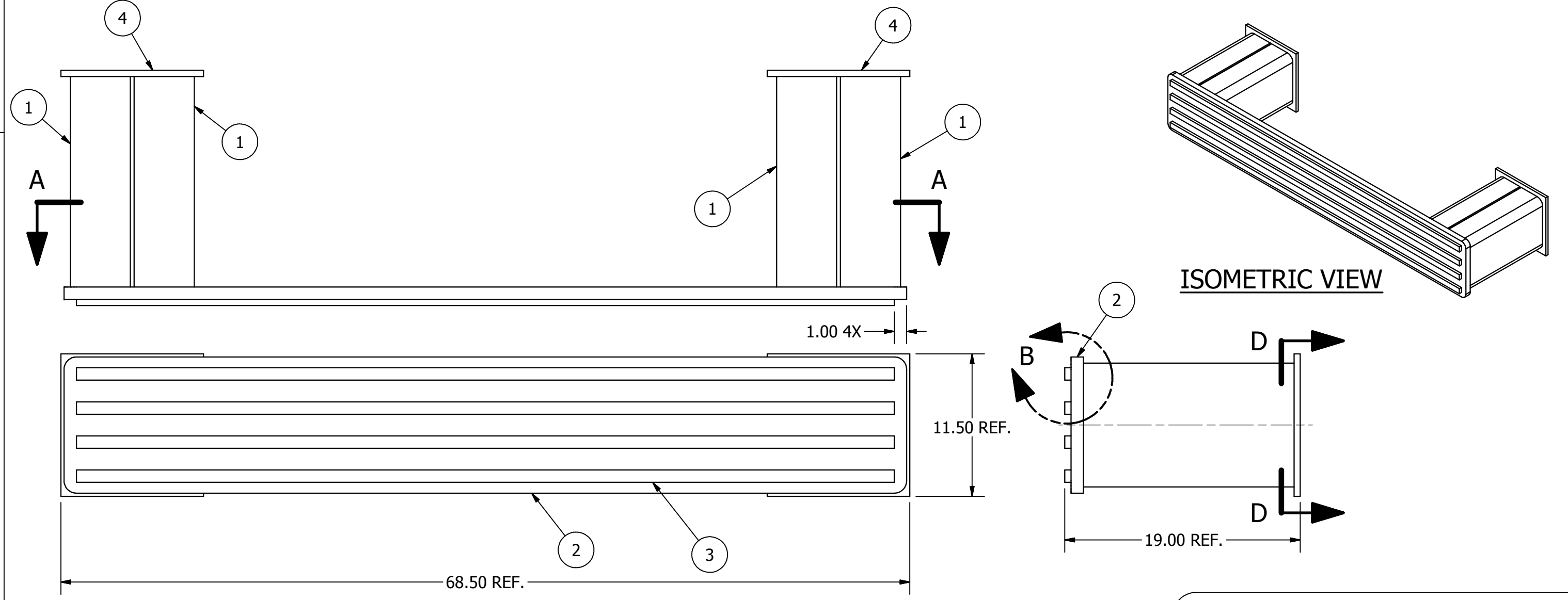
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REV. -
 DRAWING No. TC09016-0005
 No. DE DESSIN TC09016-0005

ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLIER P/N
1	4	HALF CRUSH TUBE	-	TC09016-0006
2	1	TOP ANTI-CLIMBER PLATE	-	TC09016-0009
3	4	LONG RECTANGULAR STEEL BAR	-	TC09016-0015
4	2	INTERMEDIATE PLATE	-	TC09016-0020
5	4	CERAMIC WELD BACKING TAPE	-	-



NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:
 1 - REMOVE ALL SHARP EDGES.
 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL	<input checked="" type="checkbox"/>	METRIC	<input type="checkbox"/>
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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 No. DE CONTRAT CONTRACT No. TC09016-0012
 ENS. SUIVANT NEXT ASSY.

UNE DIVISION DE / A DIVISION OF

TRA CANARAIL

	DATE: YY/MM/DD
CONCU DESIGNED	A. MELOCHE 10/09/14
DESSINE DRAWN	A. MELOCHE 11/03/07
VERIFIE CHECKED	G. AMAR 11/03/18
APPROUVE APPROVED	G. AMAR 11/04/21

APPLICATION			
LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE TITLE			
TOP CRUSH TUBE ASSY			
PAGE SHEET	DE OF	No. DE DESSIN TRA	TRA DRAWING No.
1	2	TC09016-0005	
ECHELLE	SCALE		REV.
1:8			-

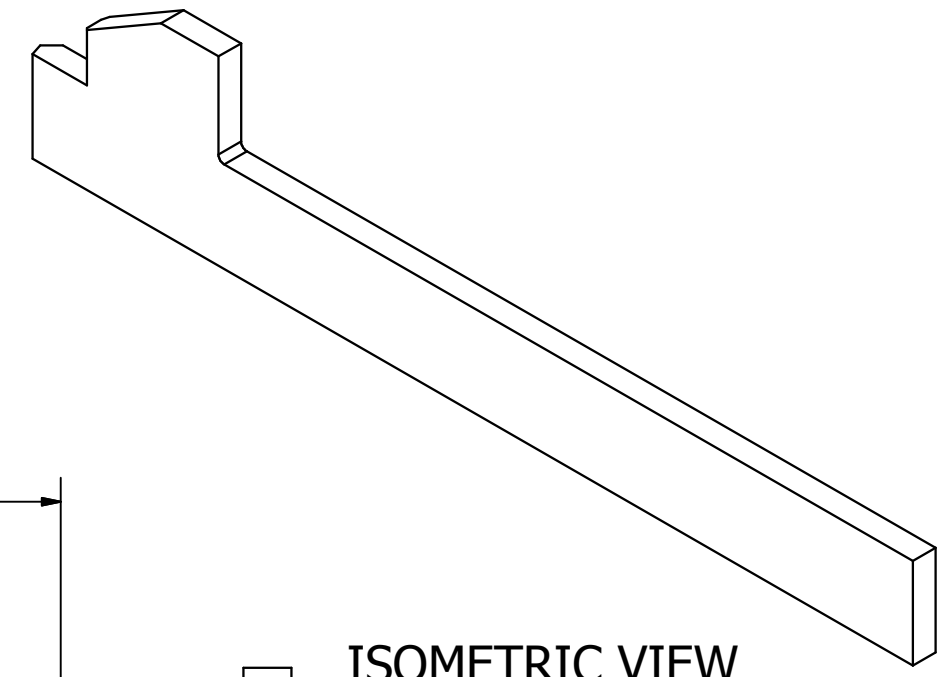
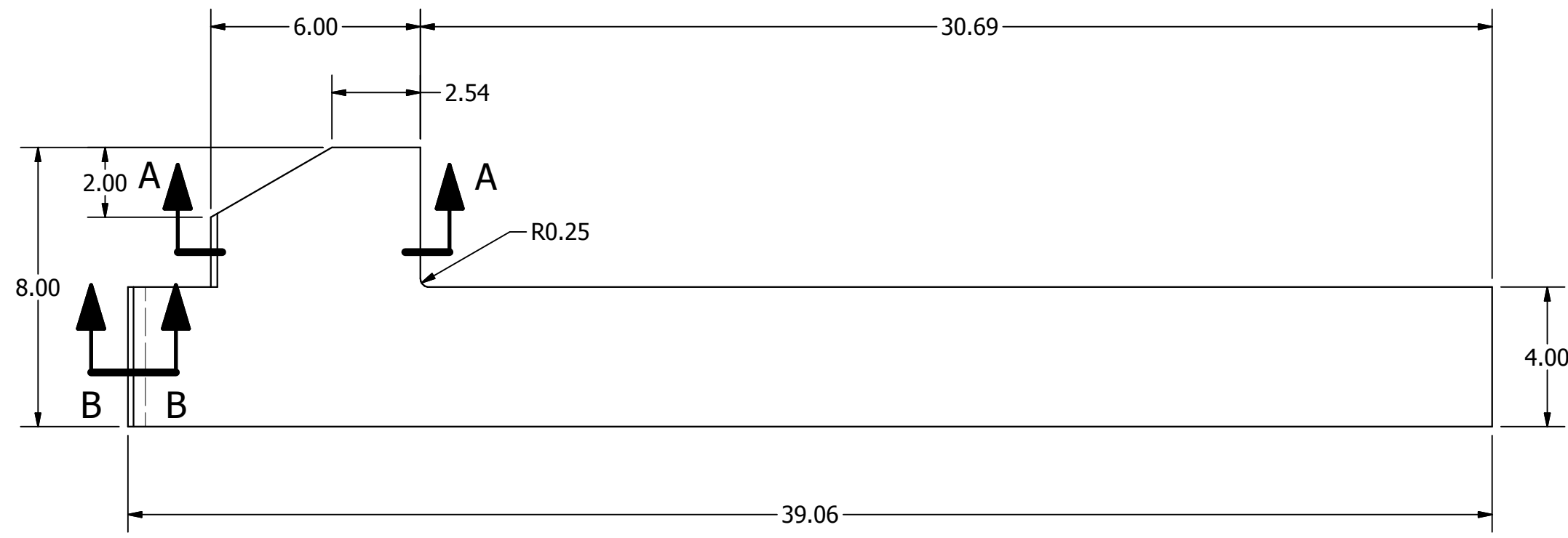
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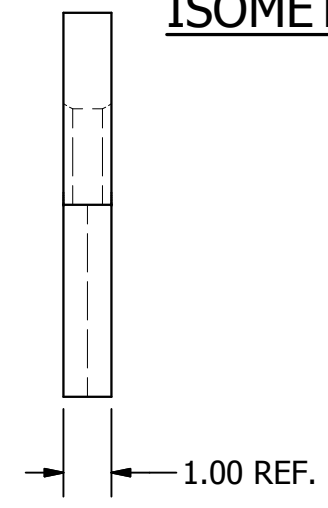
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REV. -
DRAWING No. TC09016-0053
No. DE DESSIN

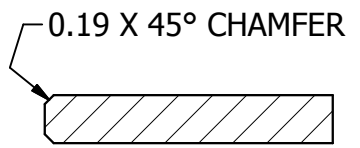
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



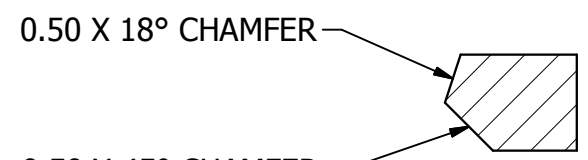
ISOMETRIC VIEW



NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.



SECTION A-A



SECTION B-B
SCALE 1 / 2

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LEXINGTON, MASSACHUSETTS 02421

PROJECTION
NOM DE FICHER: TC09016-0053.icw
FILENAME:

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

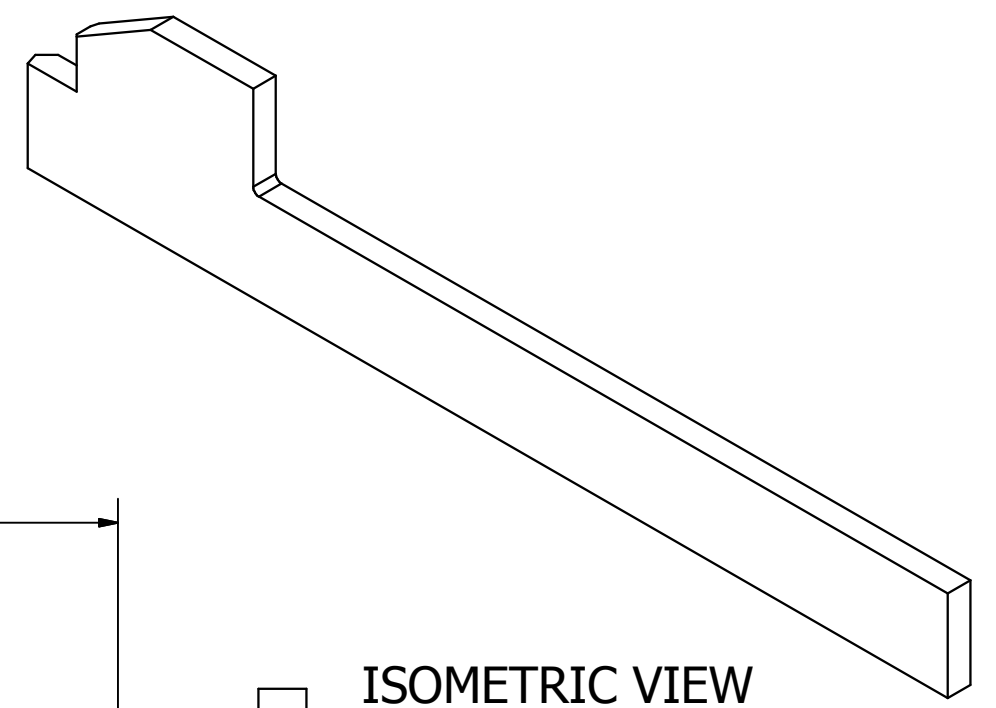
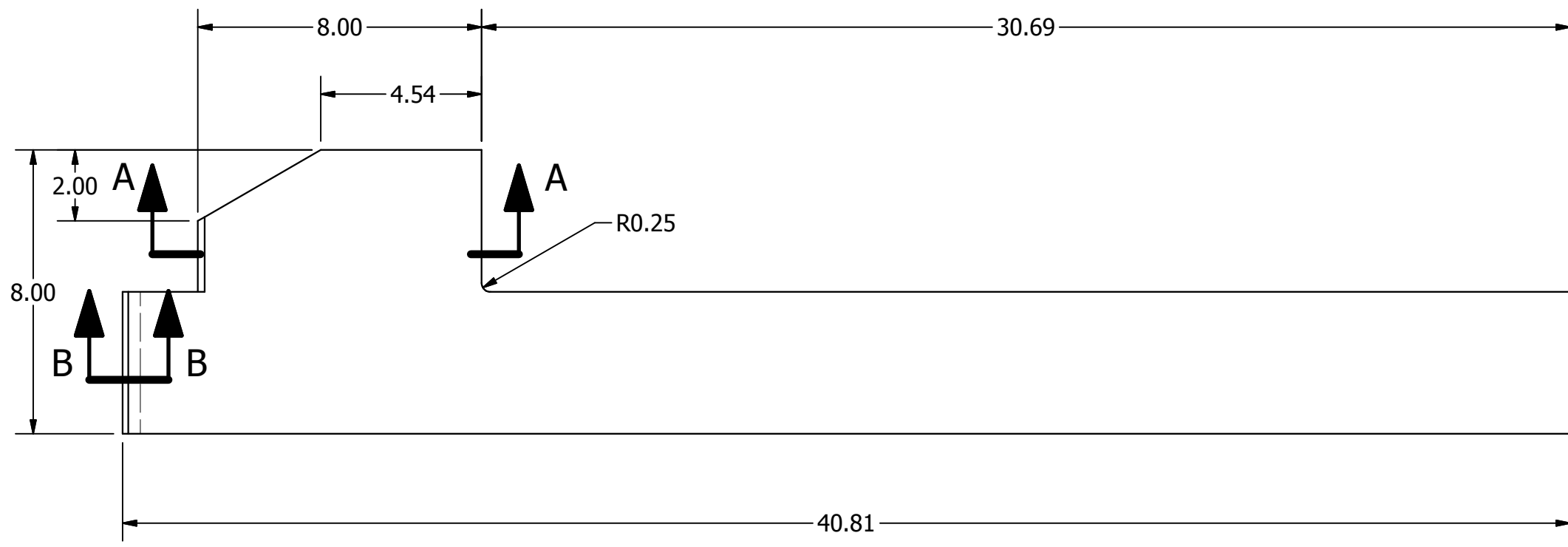
ENS. SUIVANT
NEXT ASSY.
TC09016-0026

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	M. DUMONT	11/04/25
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25
DATE: YY/MM/DD		

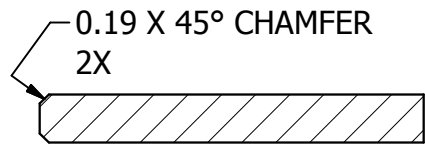
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TITRE SIDE STIFFENER -MIDDLE				
PAGE	SHEET	DE	OF	No. DE DESSIN TRA
1	1			TRA DRAWING No.
ECHELLE 1:4				SCALE
TC09016-0053				REV. -

REV. -
DRAWING No. TC09016-0052
No. DE DESSIN

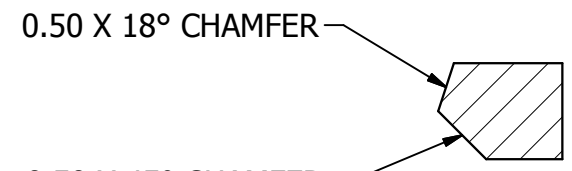
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A



SECTION B-B
SCALE 1 / 2

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

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PROJECTION
NOM DE FICHER: TC09016-0052.icw
FILENAME:

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
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TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0026

UNE DIVISION DE / A DIVISION OF

CONCU DESIGNED	M. DUMONT	11/04/25
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25

DATE: YY/MM/DD

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE SIDE STIFFENER -TOP			
PAGE 1	SHEET 1	DE 1	OF 1
No. DE DESSIN TRA TC09016-0052		TRA DRAWING No. -	
ECHELLE 1:4		SCALE	

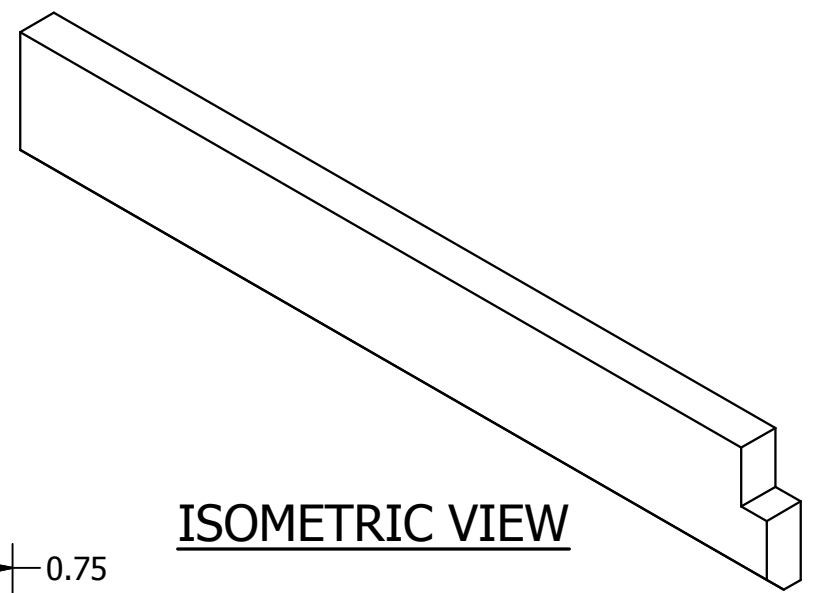
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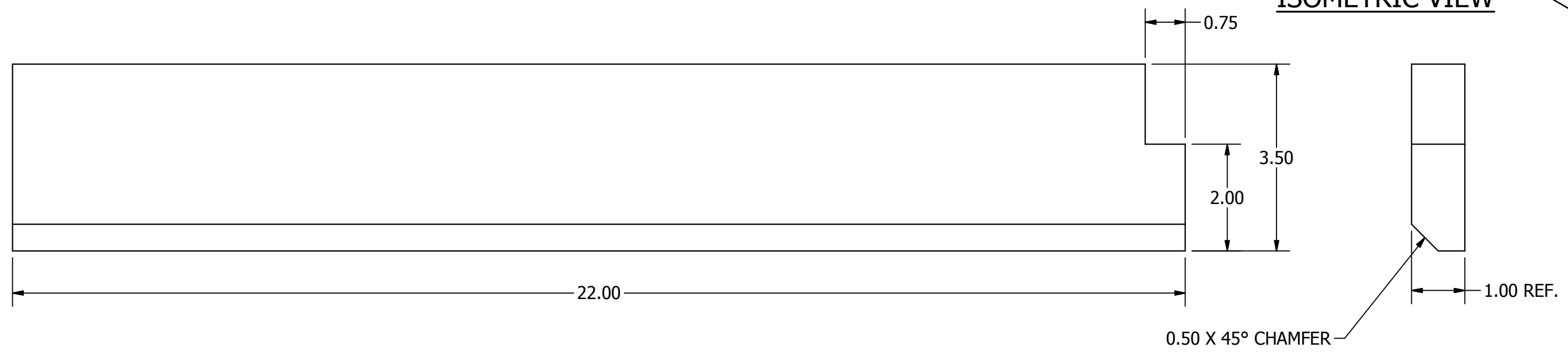
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A

REV. -
 DRAWING No. TC09016-0050
 No. DE DESSIN



ISOMETRIC VIEW



NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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PROJECTION
 NOM DE FICHER: TC09016-0050.icdw
 FILENAME:

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ ^{NIS} ✓			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0026

NEXT ASSY.

UNE DIVISION DE / A DIVISION OF

CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	11/04/20
DESSINE DRAWN	A. MELOCHE	11/04/20	
VERIFIE CHECKED	R. TURCOT	11/04/22	
APPROUVE APPROVED	G. AMAR	11/04/25	

APPLICATION				TITLE			
LOCOMOTIVE CRASHWORTHY COMPONENTS				STOPPER PLATE			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
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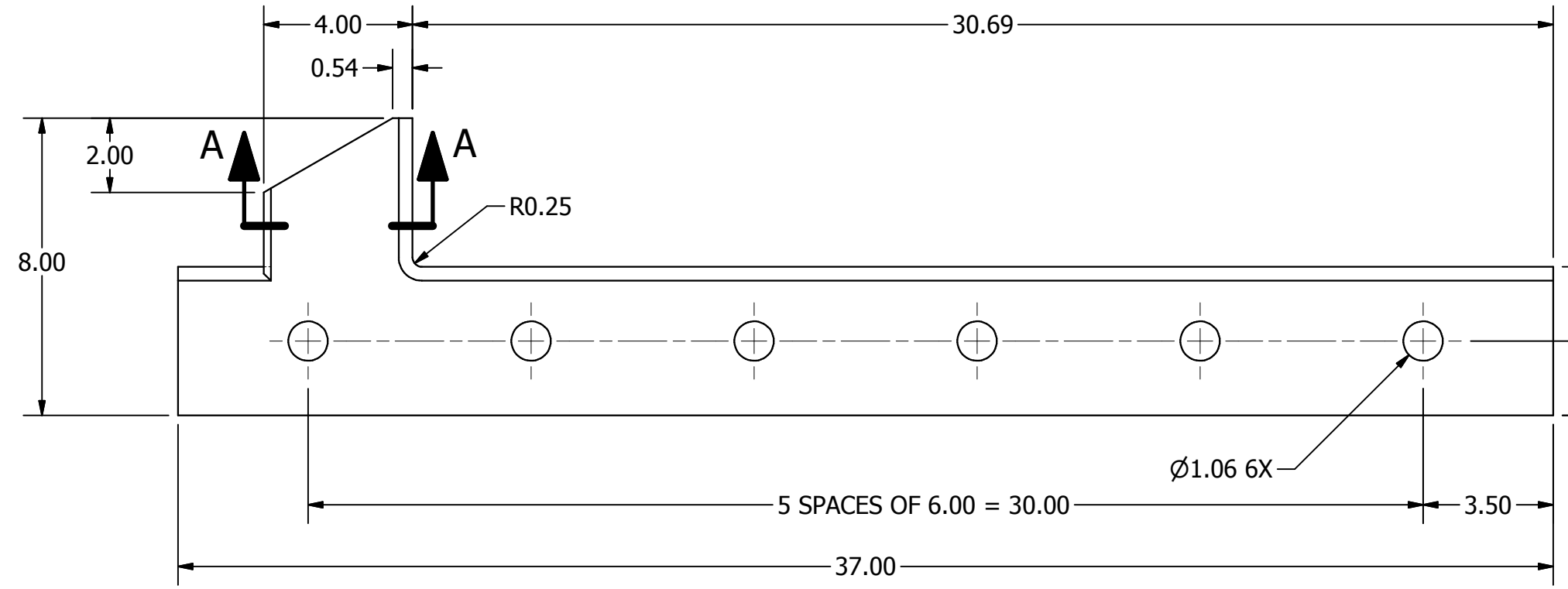
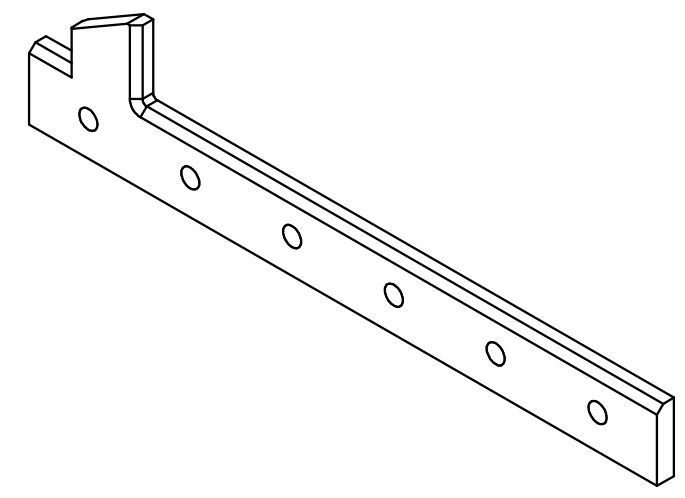
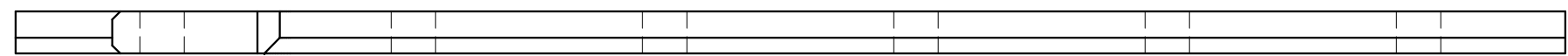
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REV. -
 DRAWING No. TC09016-0049
 No. DE DESSIN



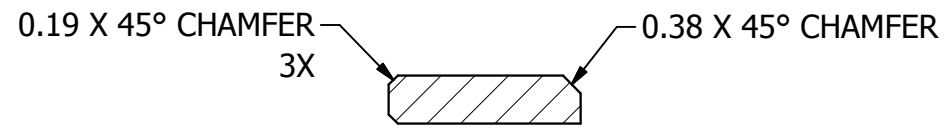
ISOMETRIC VIEW

CHAMFER 0.38 X 45°
2X

1.00 REF.

NOTES:

- 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
- 2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.



SECTION A-A

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NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.

PROJECTION
 NOM DE FICHER: TC09016-0049.icw
 FILENAME:

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TOLERANCES UNLESS OTHERWISE INDICATED			
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	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ NIS			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0026



CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	11/04/20
DESSINE DRAWN	A. MELOCHE		11/04/20
VERIFIE CHECKED	R. TURCOT		11/04/22
APPROUVE APPROVED	G. AMAR		11/04/25

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE SIDE STIFFENER BOTTOM			
PAGE	SHEET	DE	OF
1	1		
No. DE DESSIN TRA		TRA DRAWING No.	
TC09016-0049			
ECHELLE		SCALE	
1:4			
REV.			-

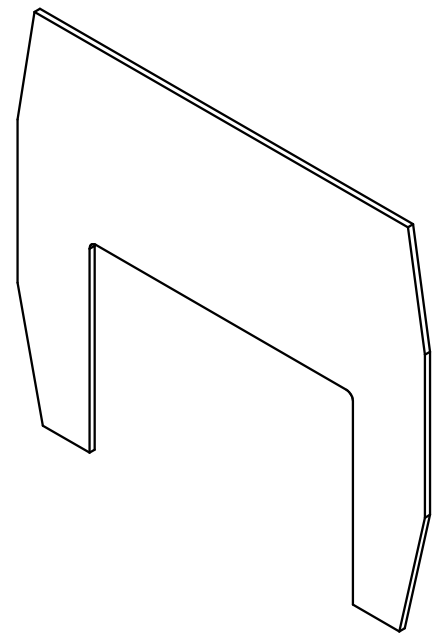
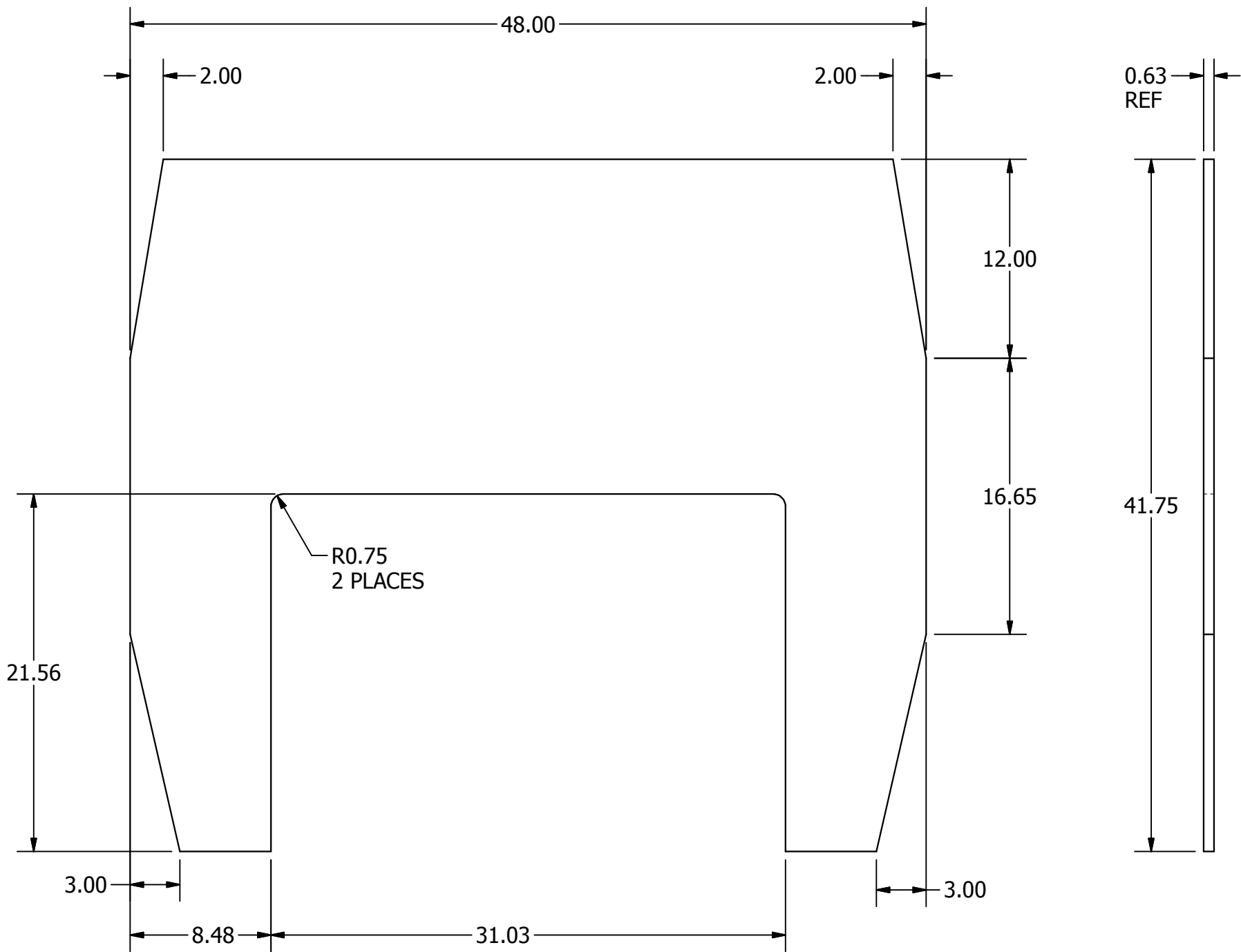
D

C

B

A

REV. -
 DRAWING No. TC09016-0044
 No. DE DESSIN



ISOMETRIC VIEW

NOTES:
 1 - MATERIAL: 5/8" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE AL SHARP EDGES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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 LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No. **TC-09-016**

ENS. SUIVANT
 NEXT ASSY. **TC09016-0023**

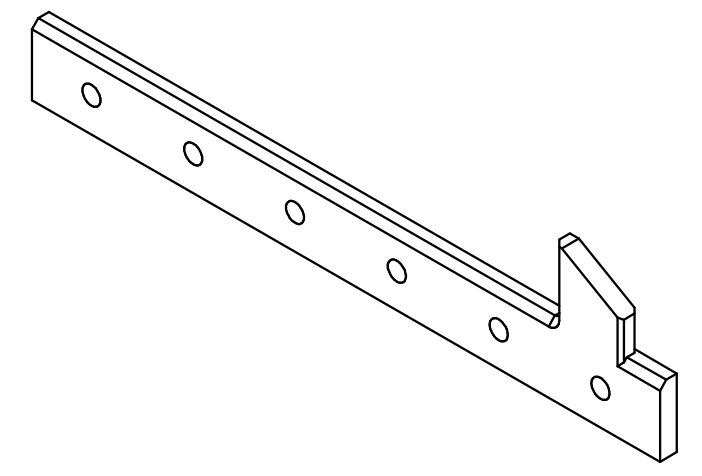
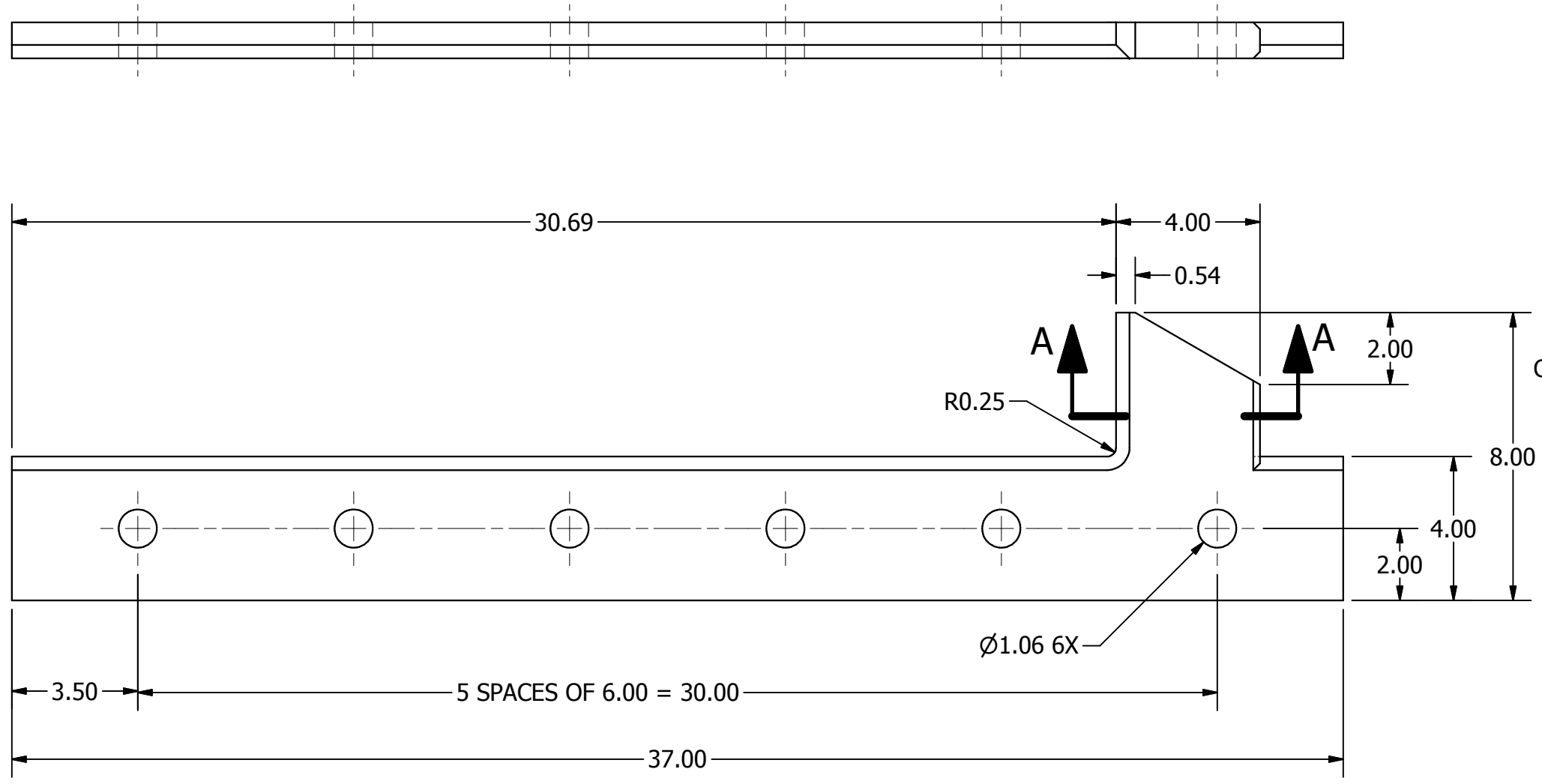
UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	11/02/02
DESSINE DRAWN	M. SIMONEAU	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/20

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE FRONT PLATE					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
1	1	1	1	TC09016-0044	
ECHELLE 1 : 8				SCALE	
REV.					-

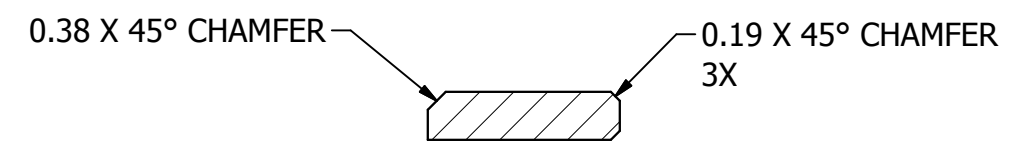
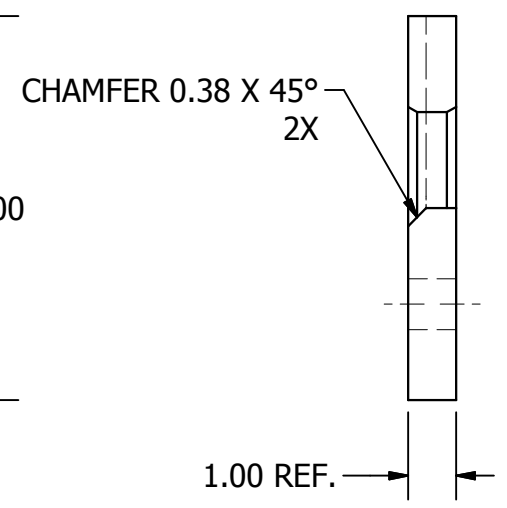
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 NOM DE FICHER: TC09016-0044.icw
 FILENAME:

REV. -
DRAWING No. TC09016-0040
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.

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LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0025

UNE DIVISION DE / A DIVISION OF

TRA CANARAIL

DATE: YY/MM/DD

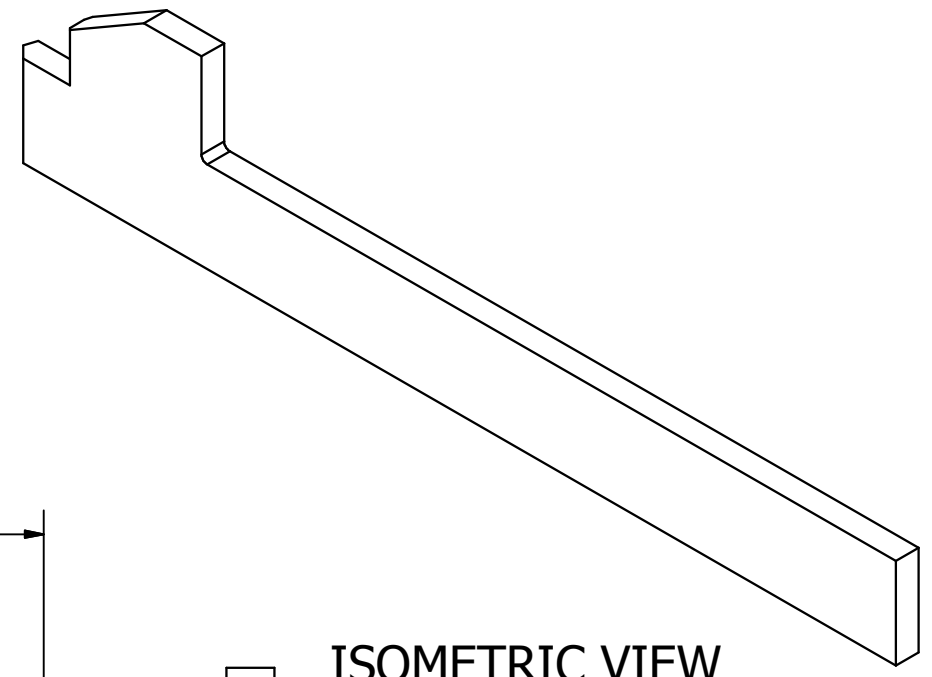
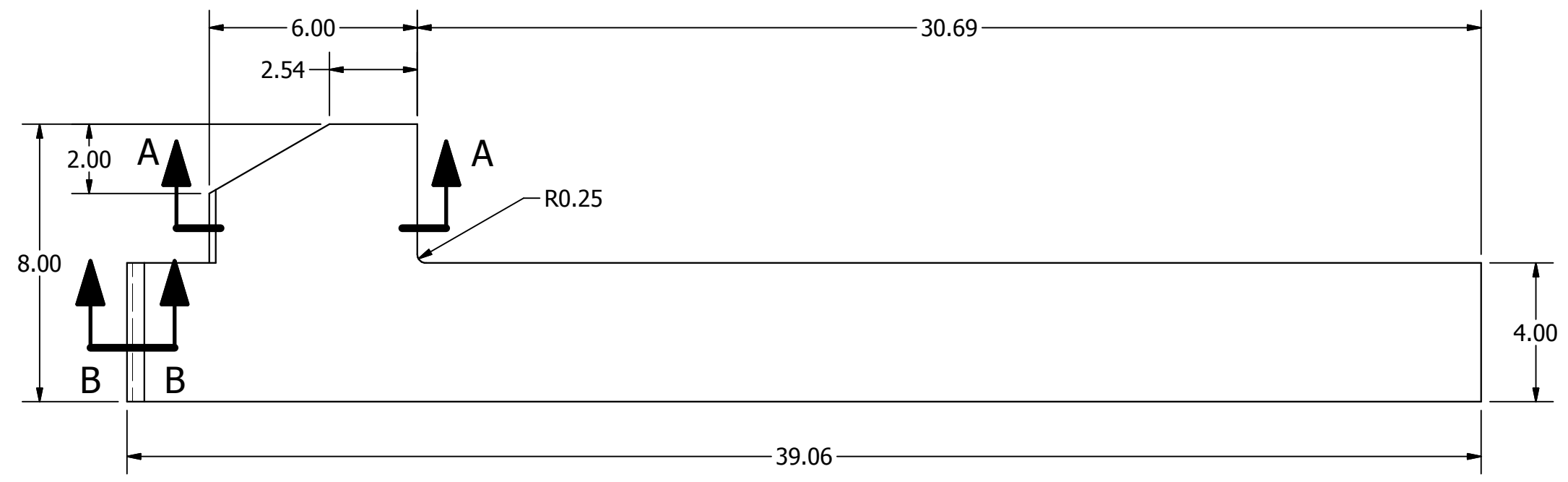
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25

APPLICATION			
LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE			TITRE
SIDE STIFFENER -BOTTOM			
PAGE	SHEET	DE	OF
1	1		
ECHELLE		SCALE	
1:4			
No. DE DESSIN TRA		TRA DRAWING No.	
TC09016-0040			
REV.			
			-

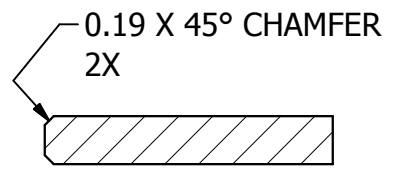
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DRAWING No. TC09016-0039
No. DE DESSIN

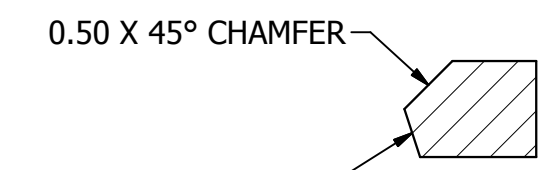
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A



SECTION B-B
SCALE 1 / 2

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

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LEXINGTON, MASSACHUSETTS 02421

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ NIS			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0025

UNE DIVISION DE / A DIVISION OF

DATE: YY/MM/DD

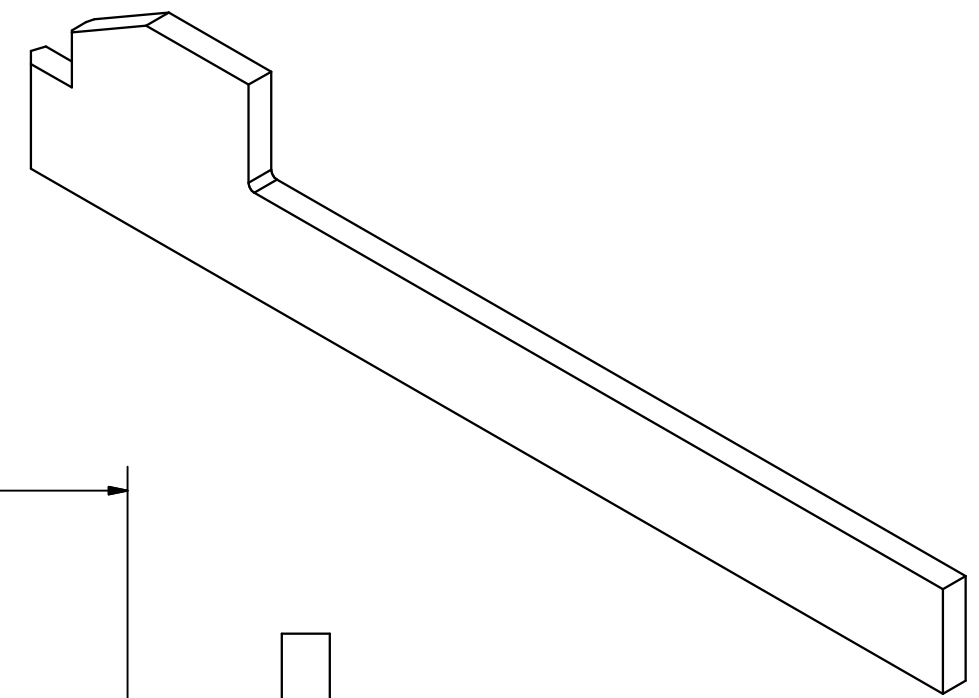
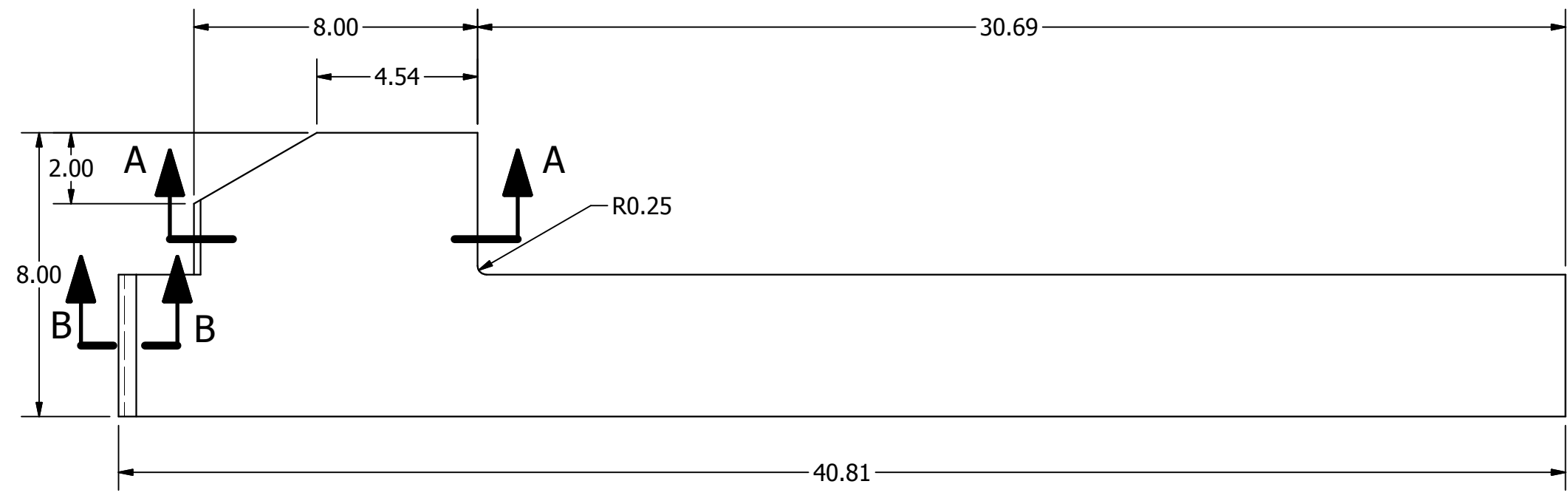
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25

APPLICATION				TITLE			
LOCOMOTIVE CRASHWORTHY COMPONENTS				SIDE STIFFENER -MIDDLE			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0039		-	
ECHELLE		SCALE					
1:4							

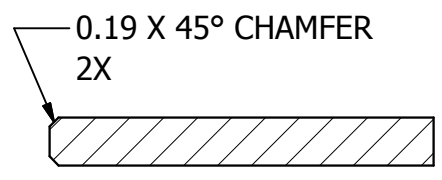
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FILENAME:

REV. -
DRAWING No. TC09016-0038
No. DE DESSIN

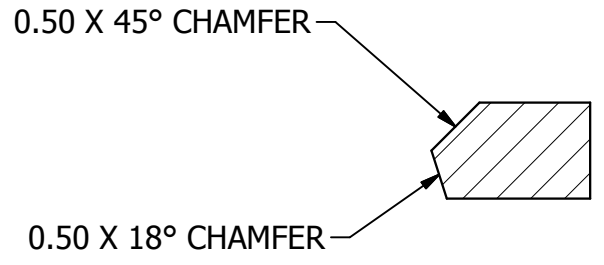
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A



SECTION B-B
SCALE 1 / 2

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

TIAX LLC
LEXINGTON, MASSACHUSETTS 02421

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0025

UNE DIVISION DE / A DIVISION OF

CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20	
VERIFIE CHECKED	R. TURCOT	11/04/22	
APPROUVE APPROVED	G. AMAR	11/04/25	

APPLICATION
LOCOMOTIVE CRASHWORTHY COMPONENTS

TITRE
SIDE STIFFENER -TOP

PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.
1	1			TC09016-0038		-
ECHELLE			SCALE			
1:4						

PROJECTION
NOM DE FICHER: TC09016-0038.icw
FILENAME:

FORMAT-B WEIGHT: 54.2 lbmass

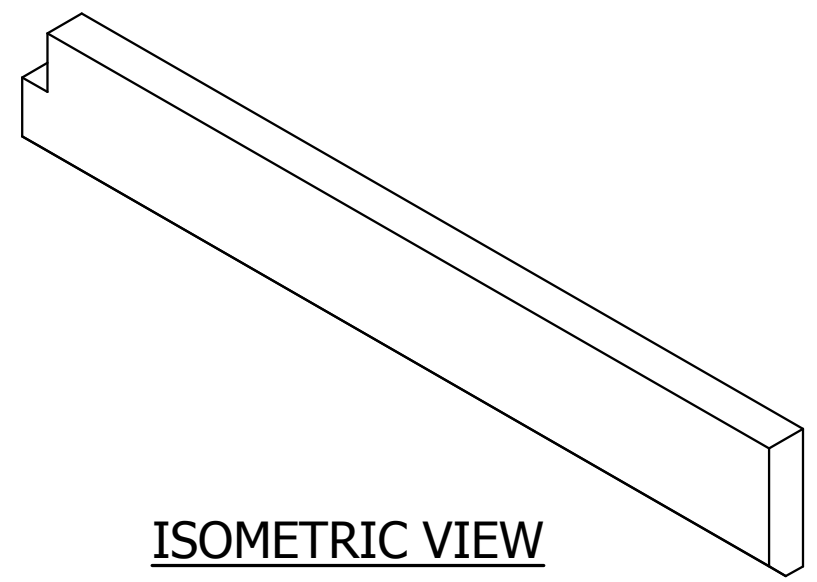
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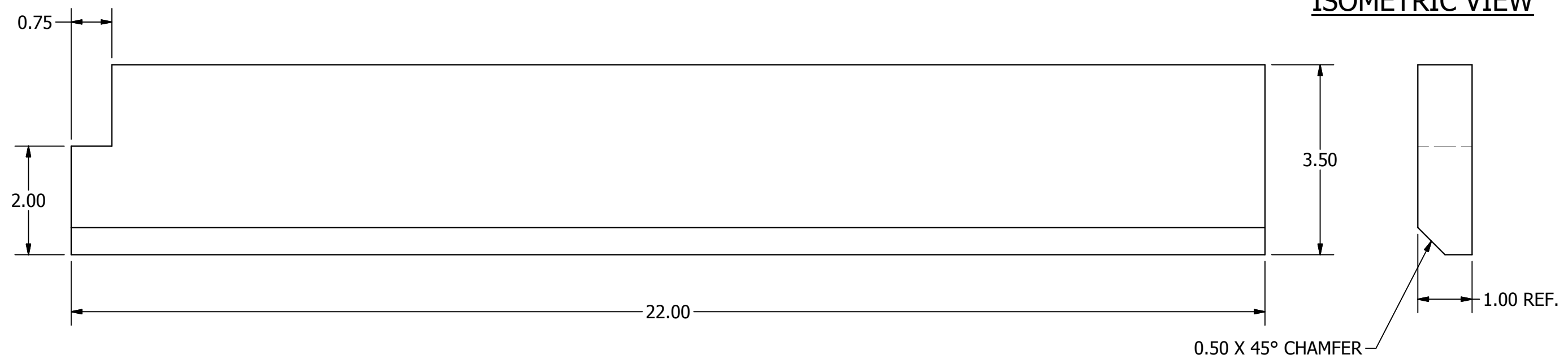
B

A

REV. -
 DRAWING No. TC09016-0037
 No. DE DESSIN



ISOMETRIC VIEW



0.50 X 45° CHAMFER

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

TIAX LLC

LEXINGTON, MASSACHUSETTS 02421

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NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.



PROJECTION
 NOM DE FICHER: TC09016-0037.icw
 FILENAME:

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ ^{NIS} ✓			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0025

NEXT ASSY.

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25
DATE: YY/MM/DD		

APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				STOPPER PLATE			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1		1	TC09016-0037		-	
ECHELLE			SCALE				
1:2							

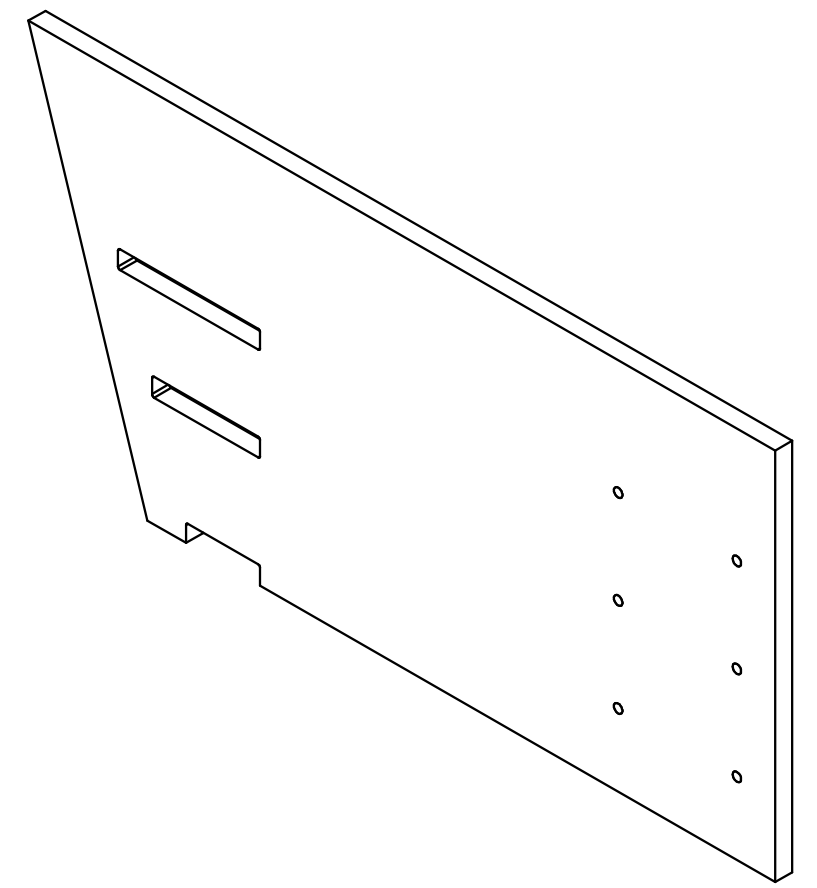
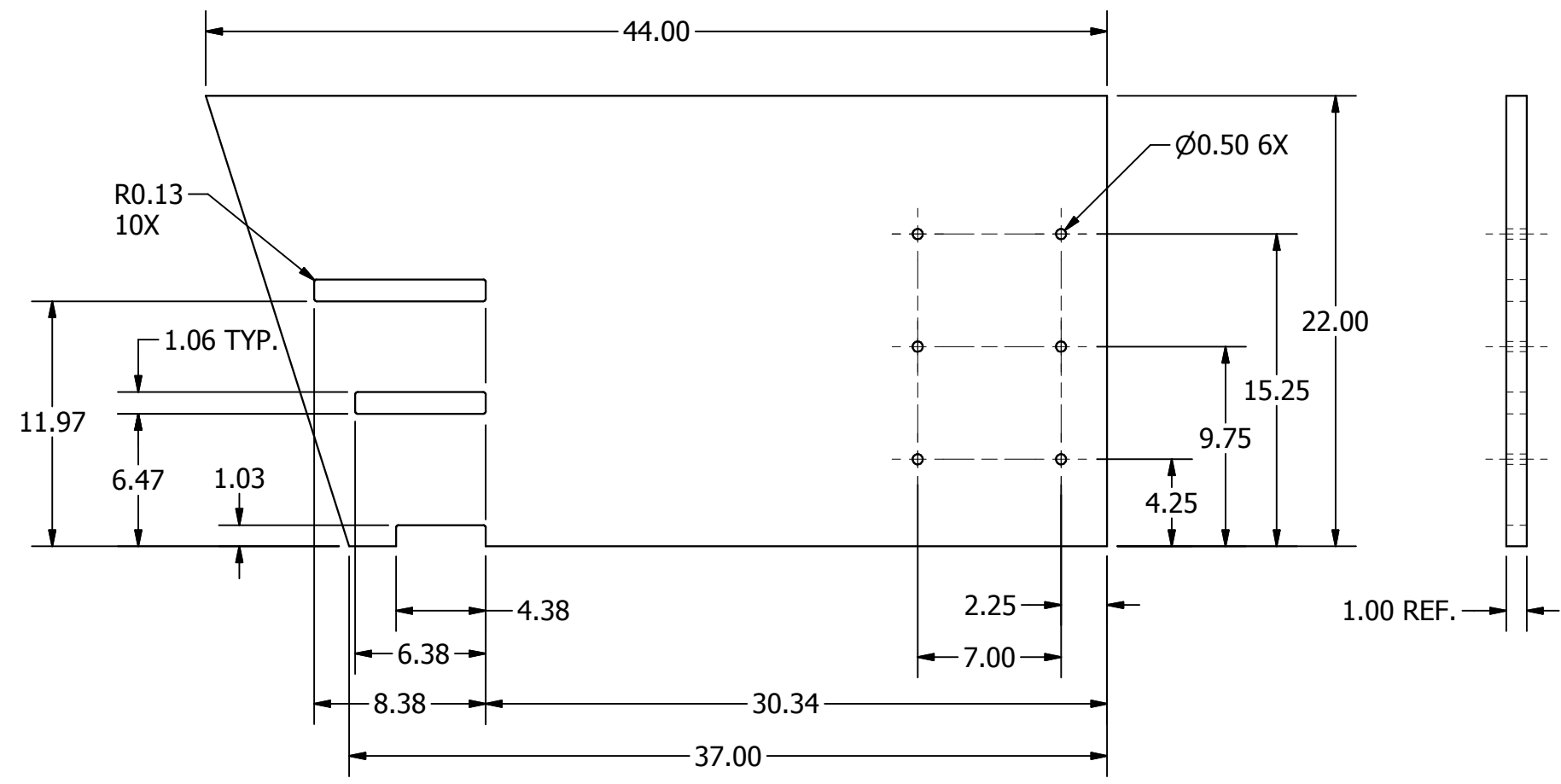
D

C

B

A

REV. -
 DRAWING No. TC09016-0036
 No. DE DESSIN



ISOMETRIC VIEW

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.

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PROJECTION
 NOM DE FICHER: TC09016-0036.idw
 FILENAME:

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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 No. DE CONTRAT CONTRACT No.
 ENS. SUIVANT NEXT ASSY. TC09016-0025

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25
DATE: YY/MM/DD		

APPLICATION			
LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE			
SIDE WALL			
PAGE	SHEET	DE	OF
1	1		
No. DE DESSIN TRA		TRA DRAWING No.	
TC09016-0036		-	
ECHELLE		SCALE	
1:8			

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

FORMAT-B WEIGHT: 246.6 lbmass

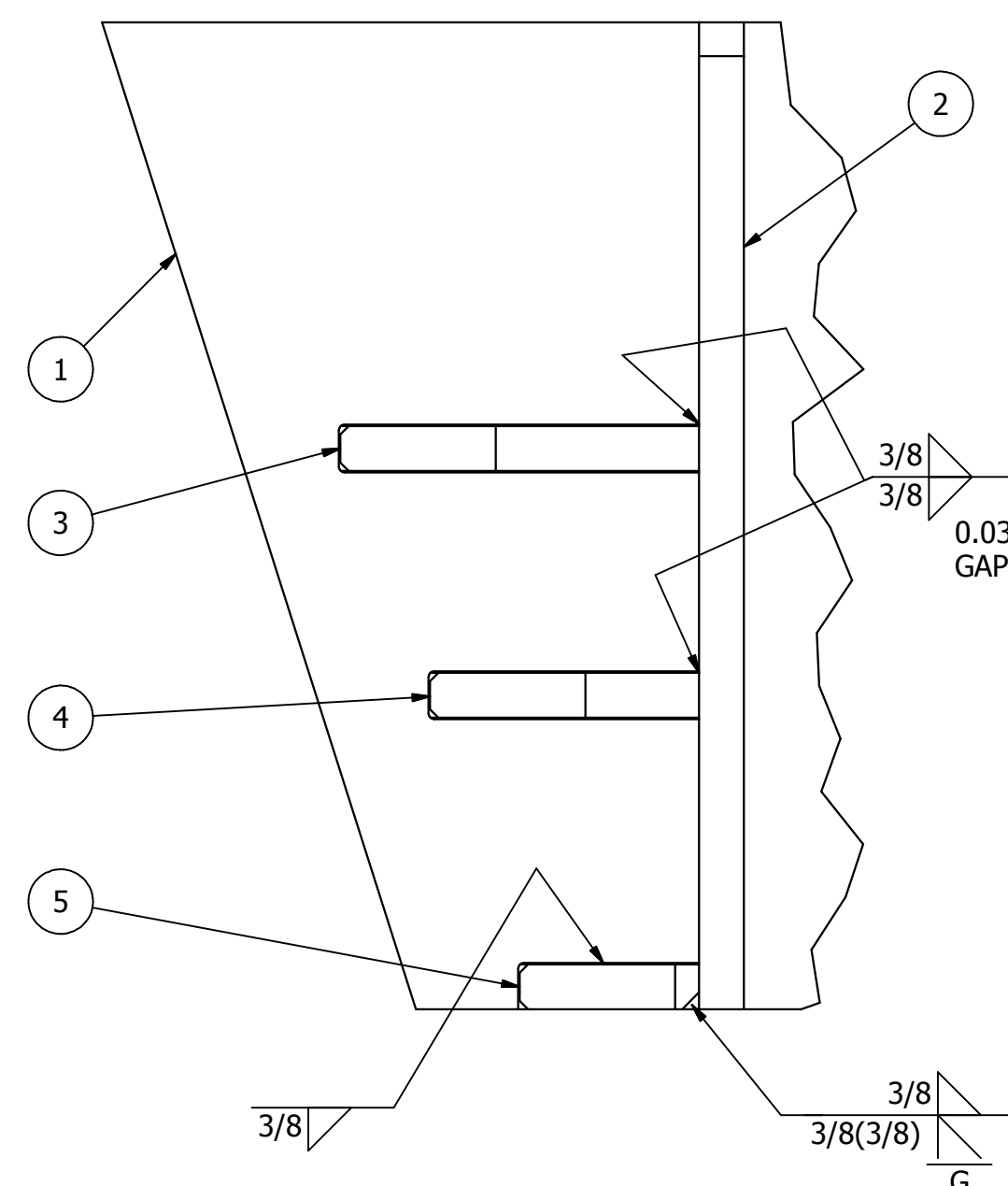
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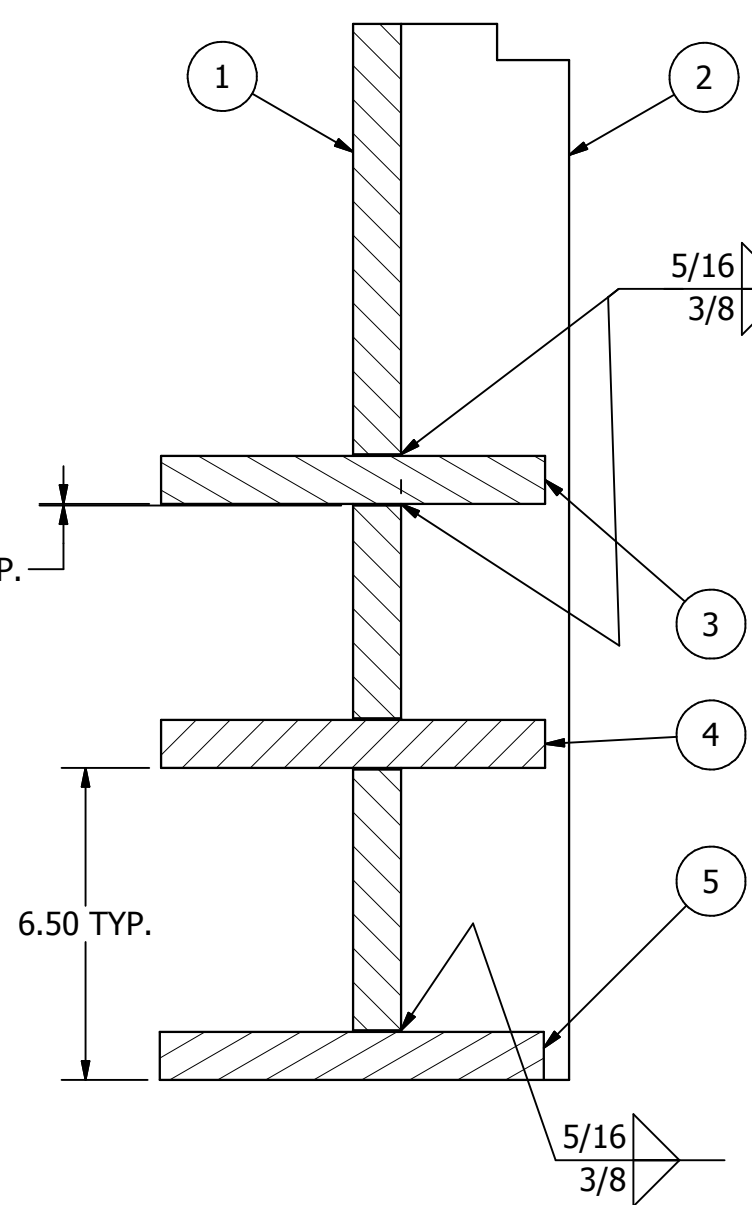
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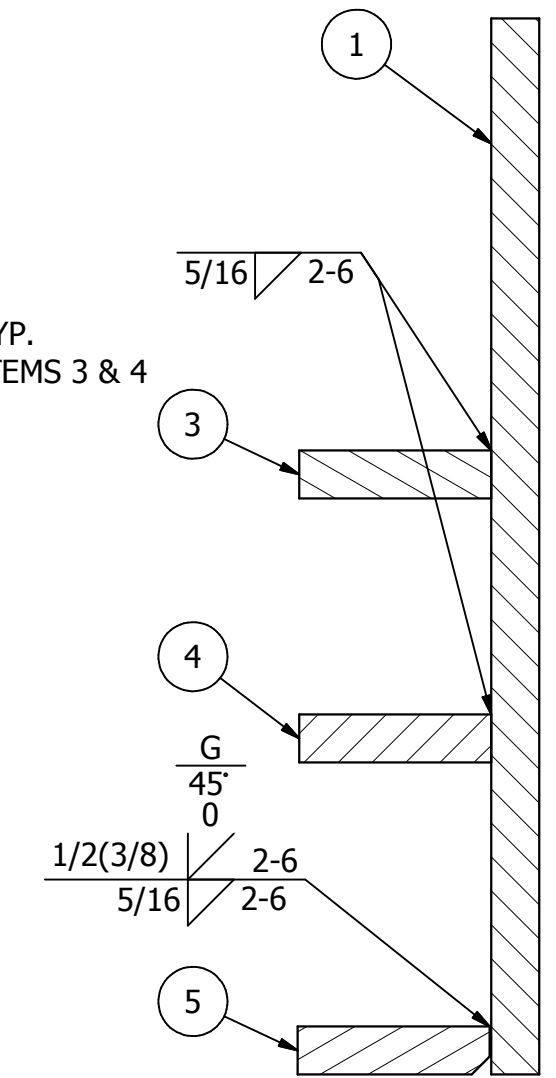
REV. -
 DRAWING No. TC09016-0026
 No. DE DESSIN



VIEW A-A
 180° ROTATED VIEW



SECTION B-B
 (TYP. WELDING AT INNER STIFFENERS)



SECTION C-C
 90° ROTATED C.W.
 (TYP. WELDING AWAY FROM INNER STIFFENERS)

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0023

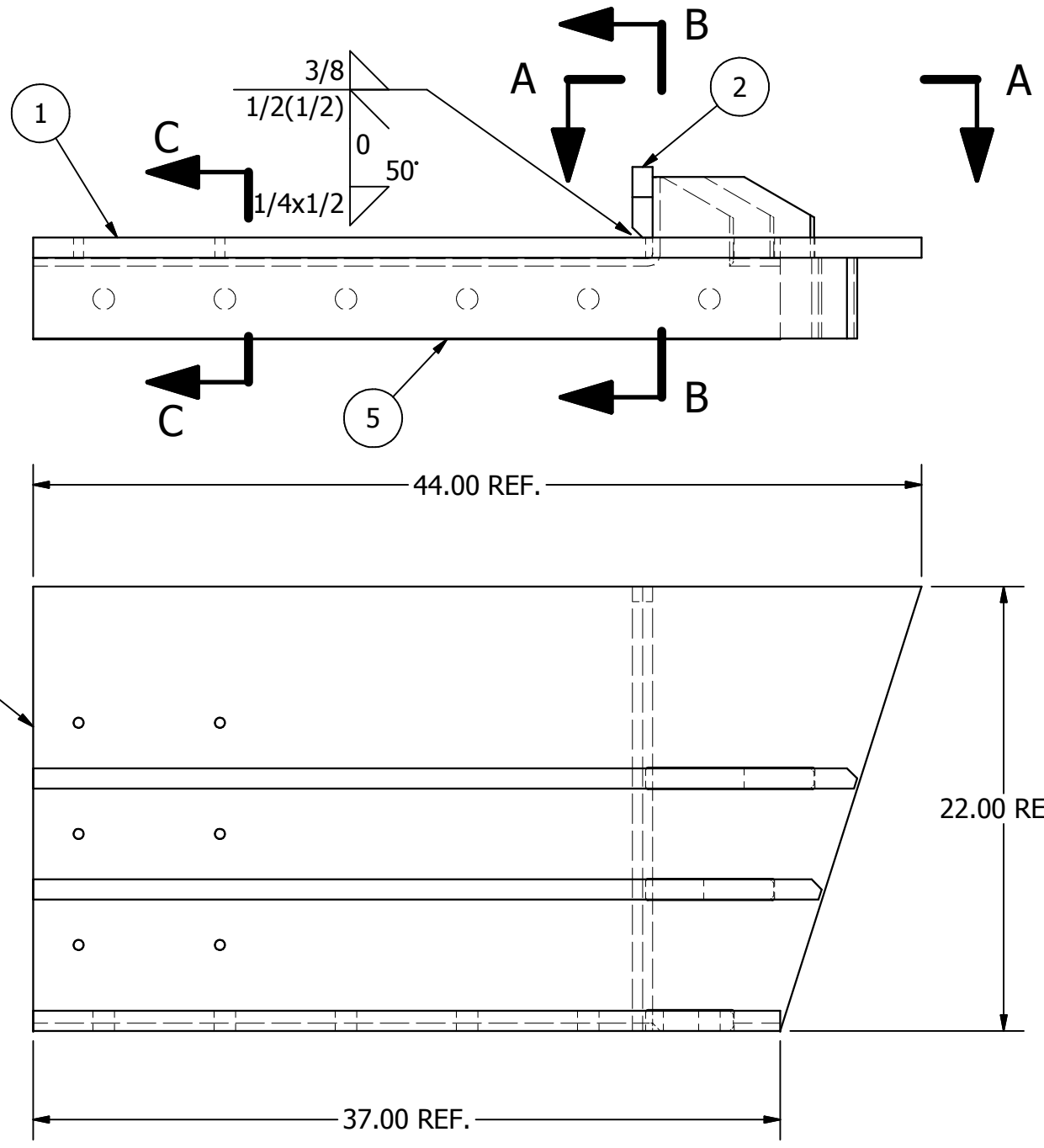
DATE: YY/MM/DD
 11/02/01
 11/04/20
 11/04/20
 11/04/21

CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

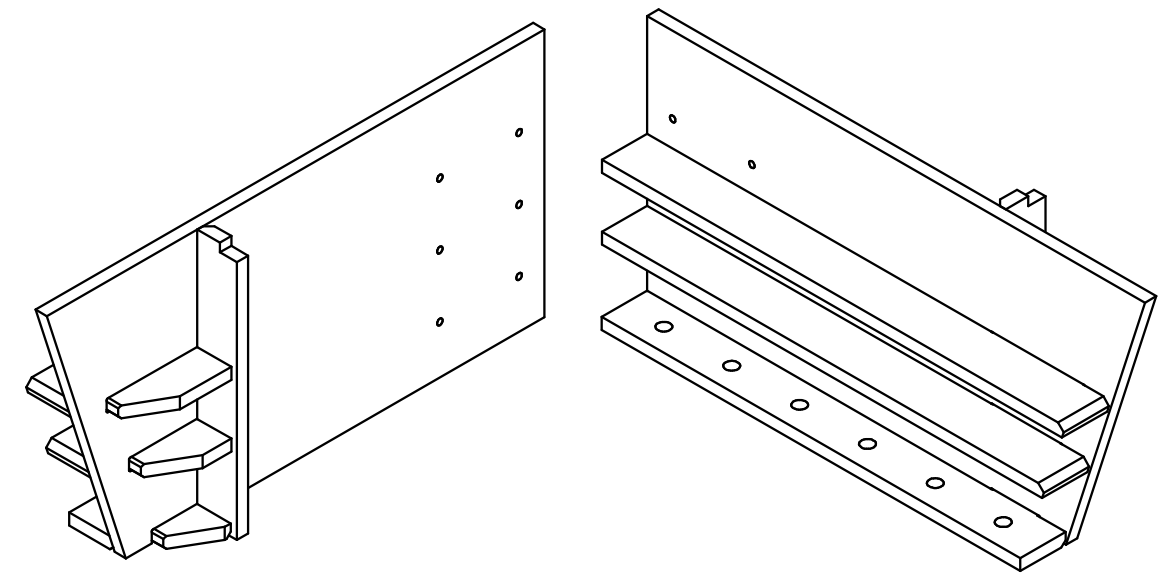
APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE SIDE WALL LEFT ASSEMBLY			
PAGE 2	SHEET 2	DE 2	OF 2
No. DE DESSIN TRA TC09016-0026		TRA DRAWING No. -	
ECHELLE 1:4		SCALE	

REV. -
DRAWING No. TC09016-0026
No. DE DESSIN TC09016-0026

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLY P/N
1	1	SIDE WALL	-	TC09016-0036
2	1	STOPPER PLATE	-	TC09016-0050
3	1	SIDE STIFFENER -TOP	-	TC09016-0052
4	1	SIDE STIFFENER -MIDDLE	-	TC09016-0053
5	1	SIDE STIFFENER BOTTOM	-	TC09016-0049



ISOMETRIC VIEW

NOTES:

- 1 - REMOVE ALL SHARP EDGES.
- 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.
- 3 - WELDING TO BE SEQUENCED TO MINIMIZE POST-WELD DISTORTION.
- 4- INTERMITTENT WELDS SHOWN IN SECTION B-B & C-C WILL BE COMPLETED ON MAIN ASSEMBLY, ON DWG TC9016-0023.

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LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0023

UNE DIVISION DE / A DIVISION OF

TRA CANARAIL

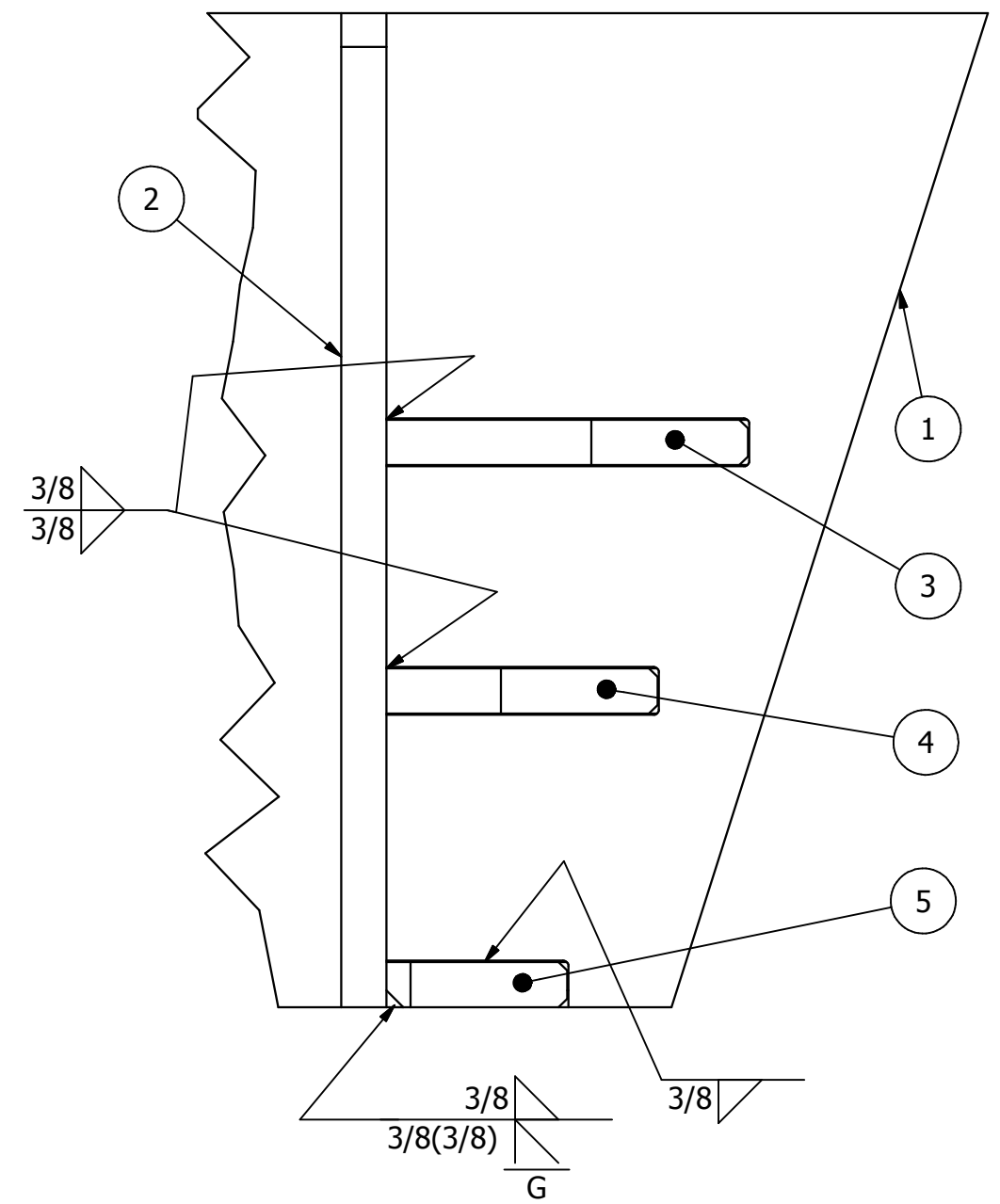
DATE: YY/MM/DD

CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION			
LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE			TITRE
SIDE WALL LEFT ASSEMBLY			
PAGE	SHEET	DE	OF
1	2		
Echelle		SCALE	
1:8			
No. DE DESSIN TRA		TRA DRAWING No.	
TC09016-0026			
REV.			-

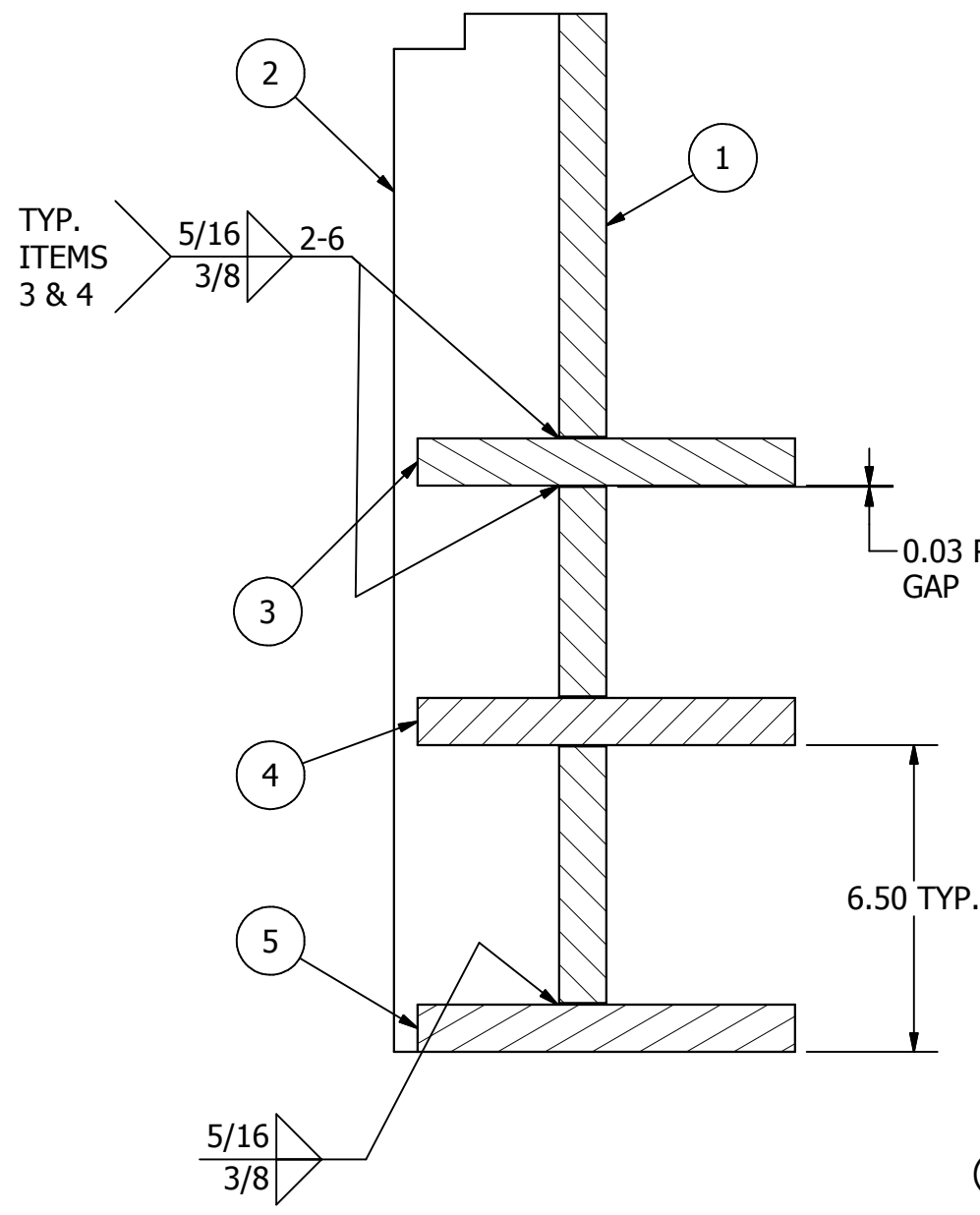
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NOM DE FICHER: TC09016-0026.icw
FILENAME:

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.

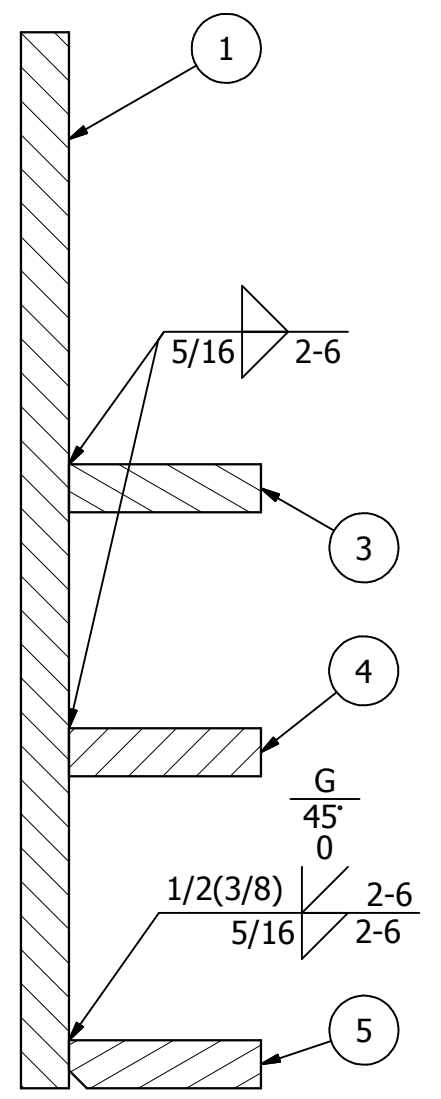


VIEW A
180° ROTATED VIEW

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SECTION B-B
(TYP. WELDING AT INNER STIFFENERS)



SECTION C-C
90° ROTATED C.C.W.
(TYP. WELDING AWAY FROM INNER STIFFENERS)

TIAX LLC
LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.

		DATE: YY/MM/DD
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/19
VERIFIE CHECKED	R. TURCOT	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION				TITLE	
LOCOMOTIVE CRASHWORTHY COMPONENTS				SIDE WALL RIGHT ASSEMBLY	
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
2	2			TC09016-0025	
ECHELLE		SCALE			
1 : 4					
REV.					-

D

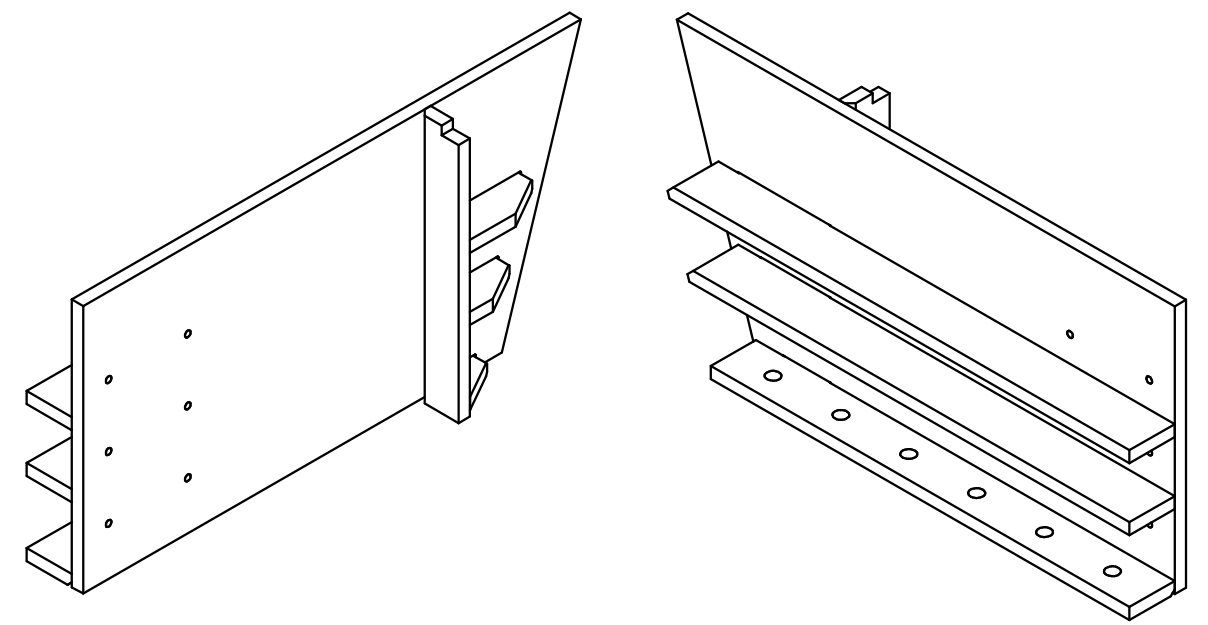
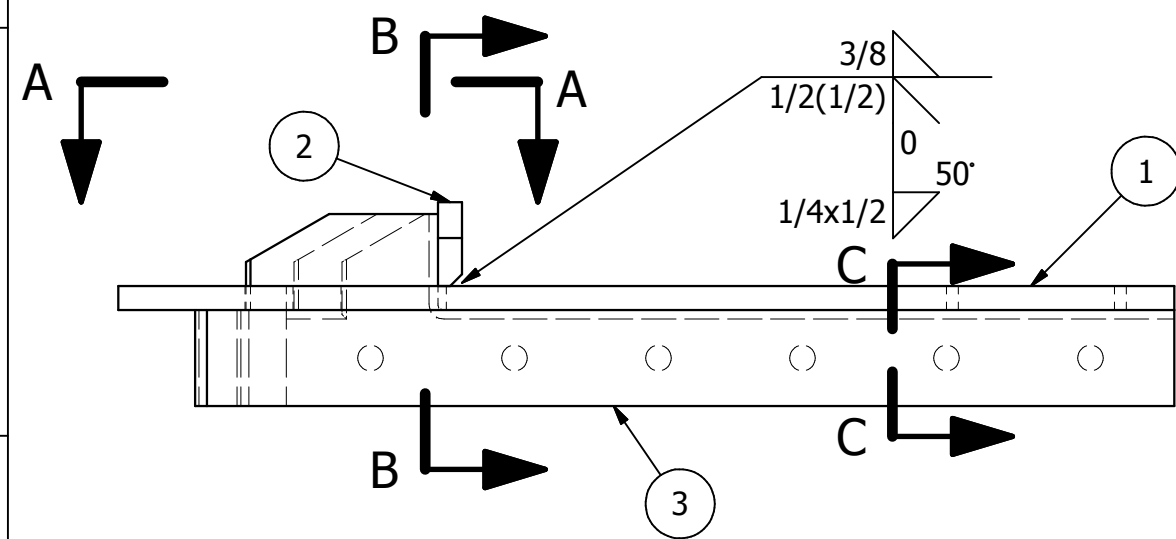
C

B

A

REV. -
 DRAWING No. TC09016-0025
 No. DE DESSIN

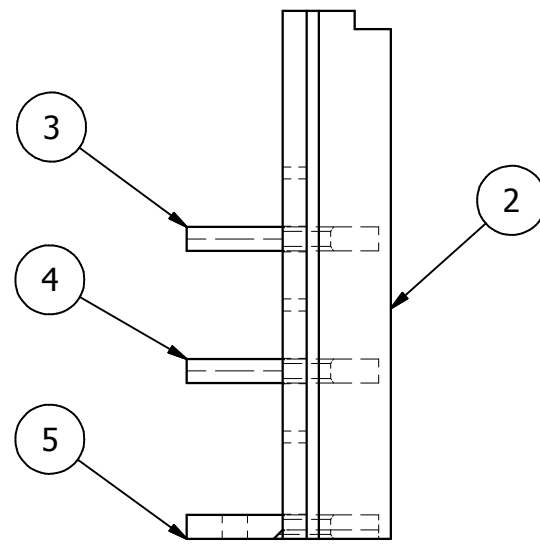
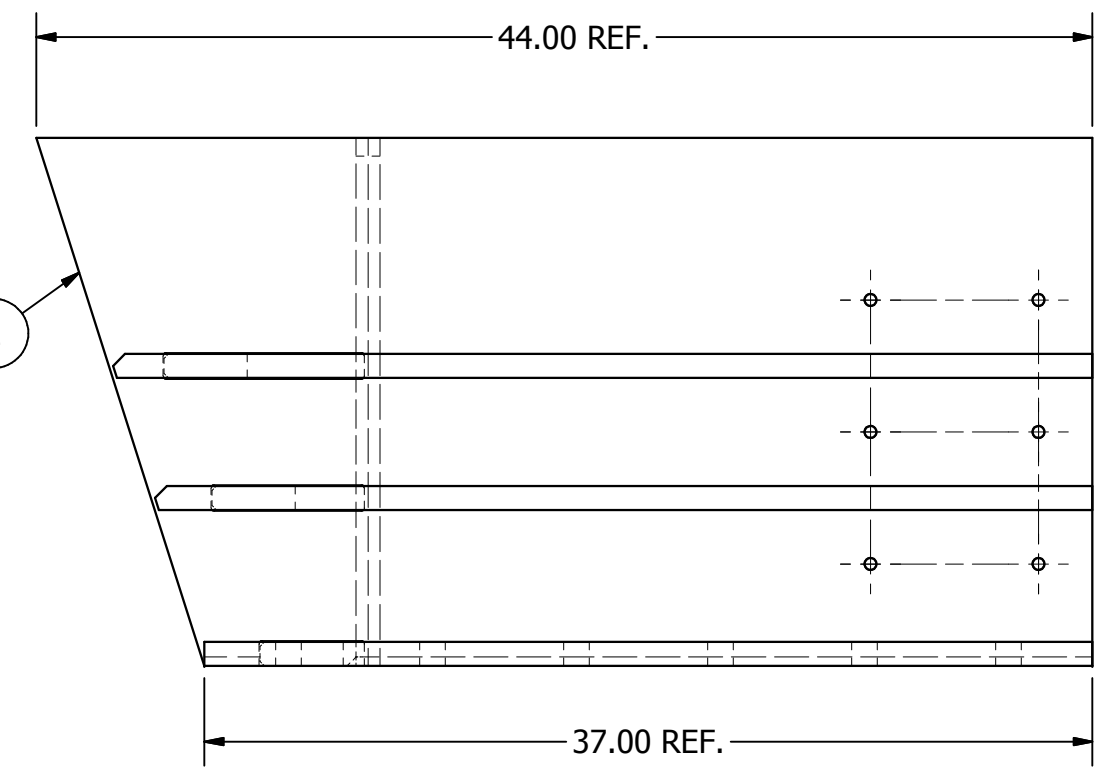
ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLY P/N
1	1	SIDE WALL	-	TC09016-0036
2	1	STOPPER PLATE	-	TC09016-0037
3	1	SIDE STIFFENER -TOP	-	TC09016-0038
4	1	SIDE STIFFENER -MIDDLE	-	TC09016-0039
5	1	SIDE STIFFENER -BOTTOM	-	TC09016-0040



ISOMETRIC VIEWS

NOTES:

- 1 - REMOVE ALL SHARP EDGES.
- 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.
- 3 - WELDING TO BE SEQUENCED TO MINIMIZE POST-WELD DISTORTION.
- 4 - INTERMITTENT WELDS SHOWN IN SECTION B-B & C-C WILL BE COMPLETED ON MAIN ASSEMBLY, ON DWG TC9016-0023.



TIAX LLC
 LEXINGTON, MASSACHUSETTS 02421

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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 No. DE CONTRAT CONTRACT No.
 ENS. SUIVANT NEXT ASSY. TC09016-0023

UNE DIVISION DE / A DIVISION OF
TRA CANARAIL
 DATE: YY/MM/DD
 CONCU DESIGNED A. MELOCHE 11/02/01
 DESSINE DRAWN A. MELOCHE 11/04/19
 VERIFIE CHECKED R. TURCOT 11/04/20
 APPROUVE APPROVED G. AMAR 11/04/21

APPLICATION				TITLE			
LOCOMOTIVE CRASHWORTHY COMPONENTS				SIDE WALL RIGHT ASSEMBLY			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	2			TC09016-0025		-	
ECHELLE			SCALE				
1:8							

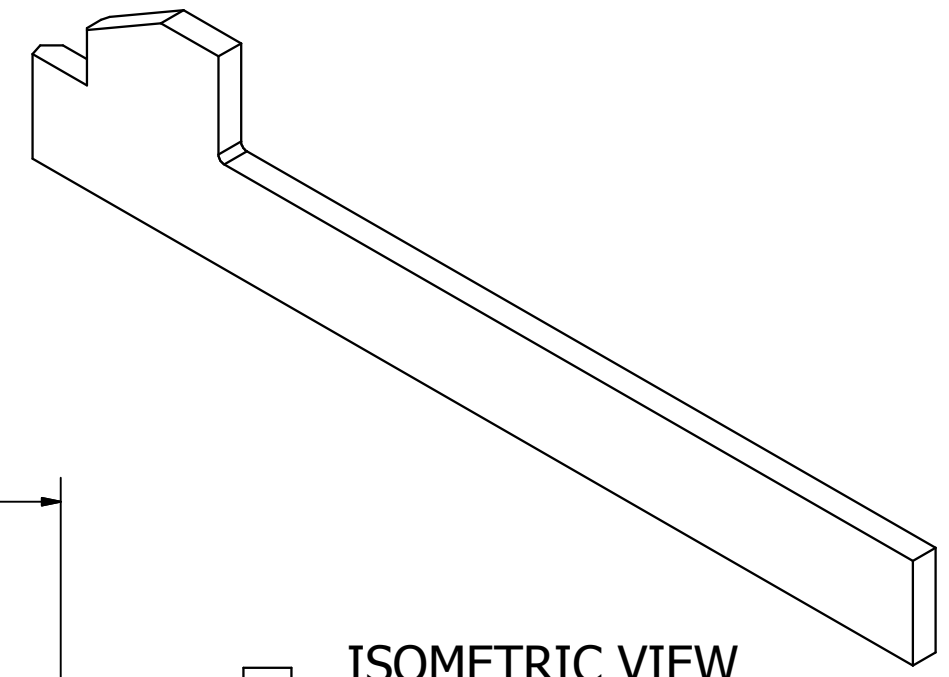
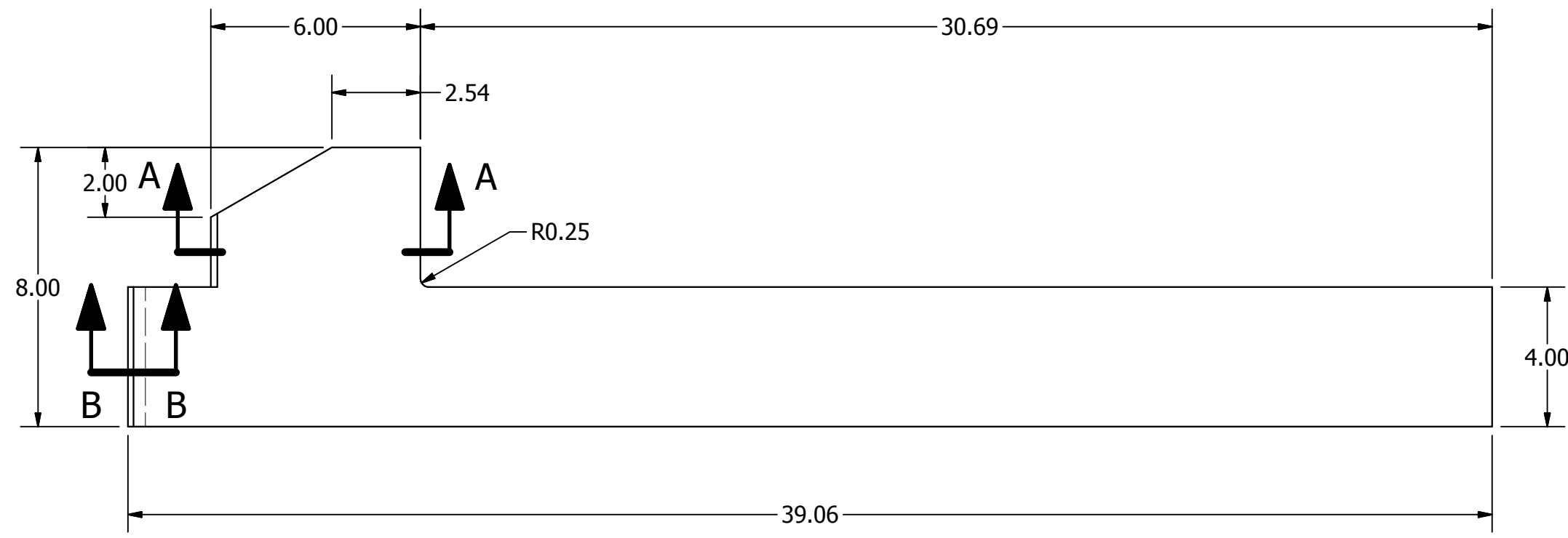
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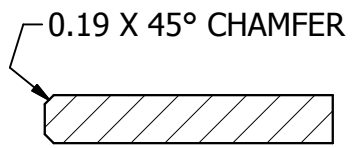
TRA Sliding Lug Apr25 2011

REV. -
DRAWING No. TC09016-0053
No. DE DESSIN

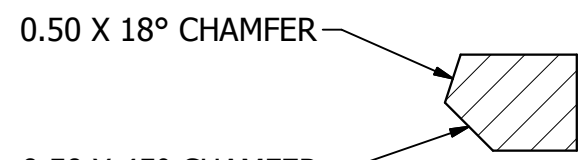
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A



SECTION B-B
SCALE 1 / 2

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

TIAX LLC
LEXINGTON, MASSACHUSETTS 02421

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0026

UNE DIVISION DE / A DIVISION OF

CONCU DESIGNED	M. DUMONT	11/04/25
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25

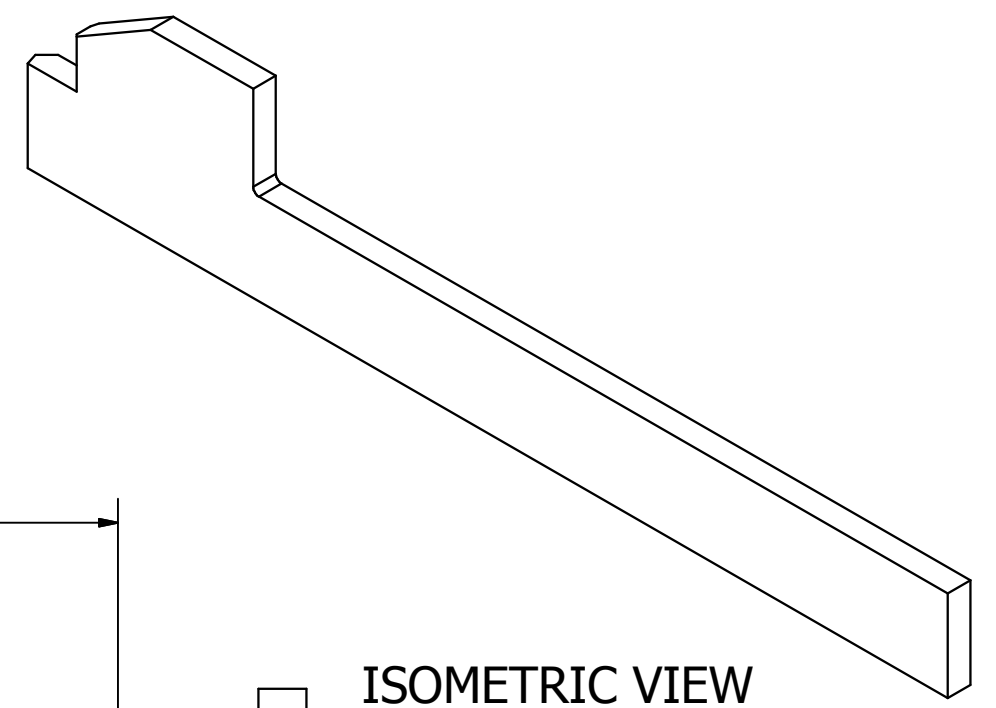
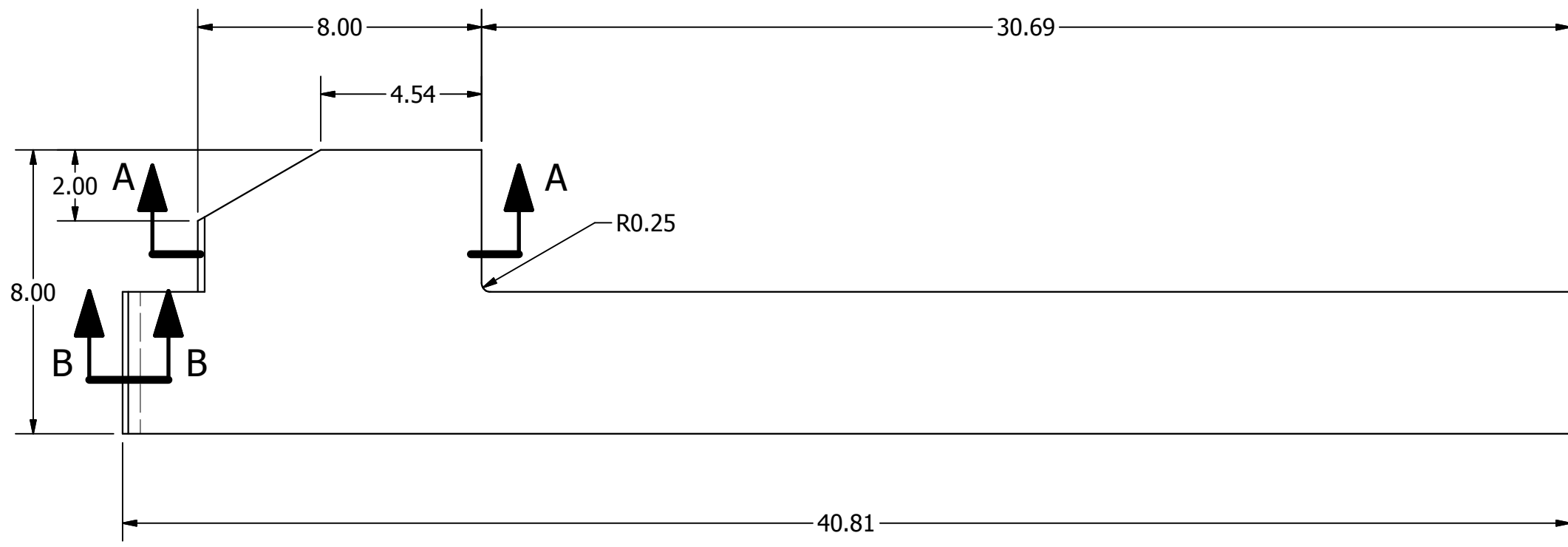
DATE: YY/MM/DD

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE SIDE STIFFENER -MIDDLE			
PAGE 1	SHEET 1	DE 1	OF 1
No. DE DESSIN TRA TC09016-0053		TRA DRAWING No. -	
ECHELLE 1:4		SCALE	

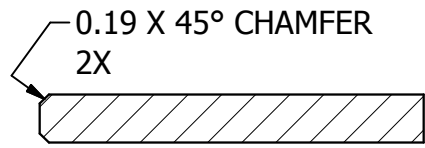
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REV. -
DRAWING No. TC09016-0052
No. DE DESSIN

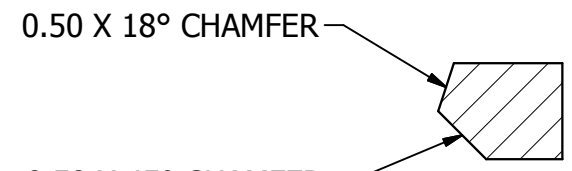
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A



SECTION B-B
SCALE 1 / 2

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

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PROJECTION
NOM DE FICHER: TC09016-0052.icw
FILENAME:

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

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TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0026

UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	M. DUMONT	11/04/25
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE SIDE STIFFENER -TOP			
PAGE 1	SHEET 1	DE 1	OF 1
No. DE DESSIN TRA TC09016-0052		TRA DRAWING No. -	
ECHELLE 1:4		SCALE	

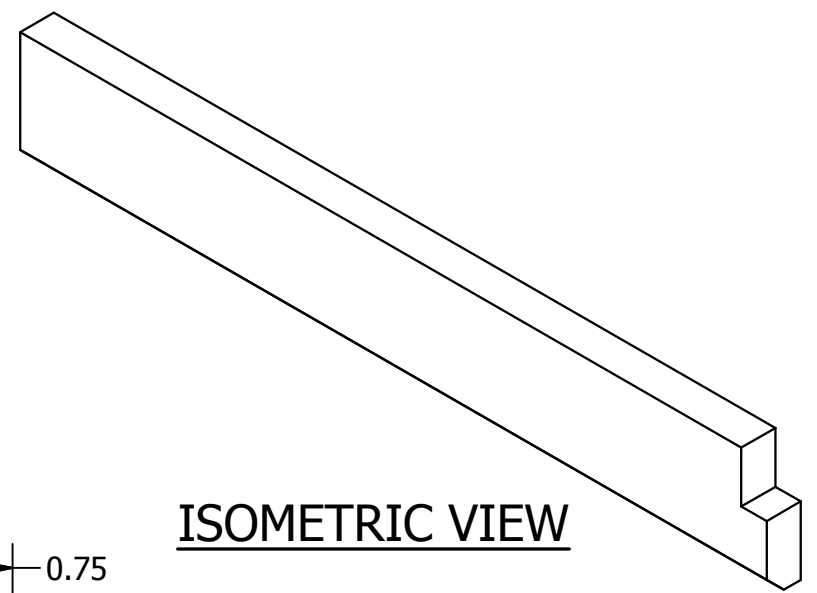
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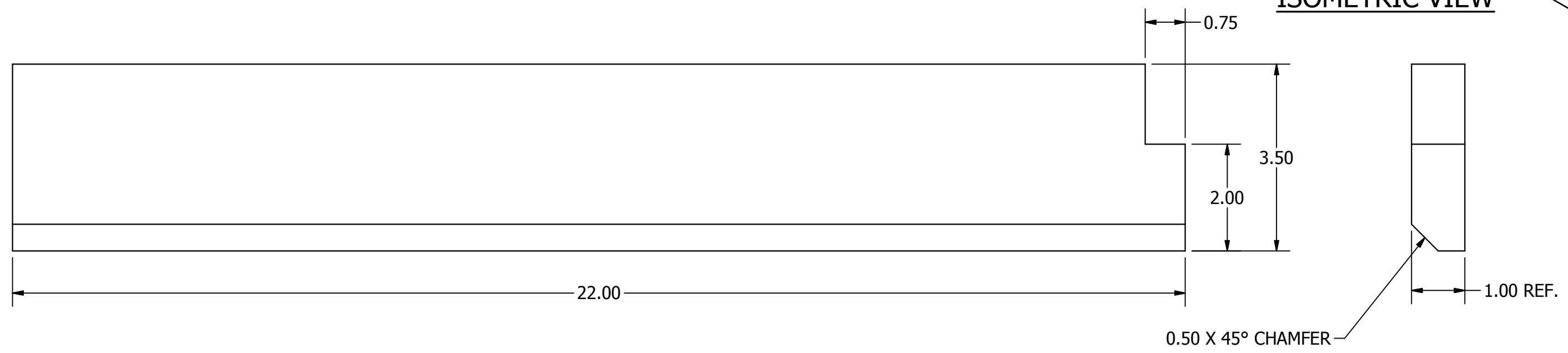
B

A

REV. -
 DRAWING No. TC09016-0050
 No. DE DESSIN



ISOMETRIC VIEW



NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL	<input checked="" type="checkbox"/>	METRIC	<input type="checkbox"/>
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ ^{NIS} ✓			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT CONTRACT No.
 ENS. SUIVANT NEXT ASSY. TC09016-0026

UNE DIVISION DE / A DIVISION OF

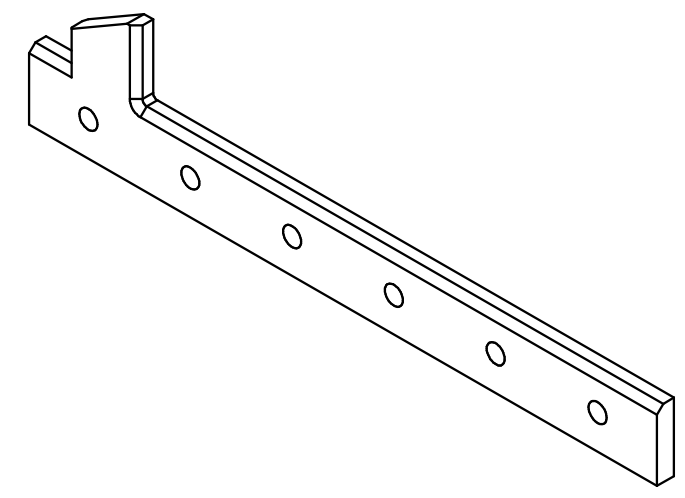
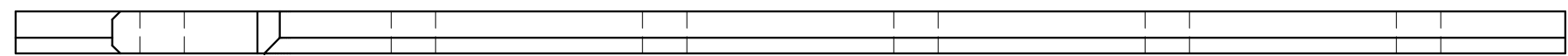
CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	11/04/20
DESSINE DRAWN	A. MELOCHE	11/04/20	
VERIFIE CHECKED	R. TURCOT	11/04/22	
APPROUVE APPROVED	G. AMAR	11/04/25	

APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				STOPPER PLATE			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0050		-	
ECHELLE		SCALE					
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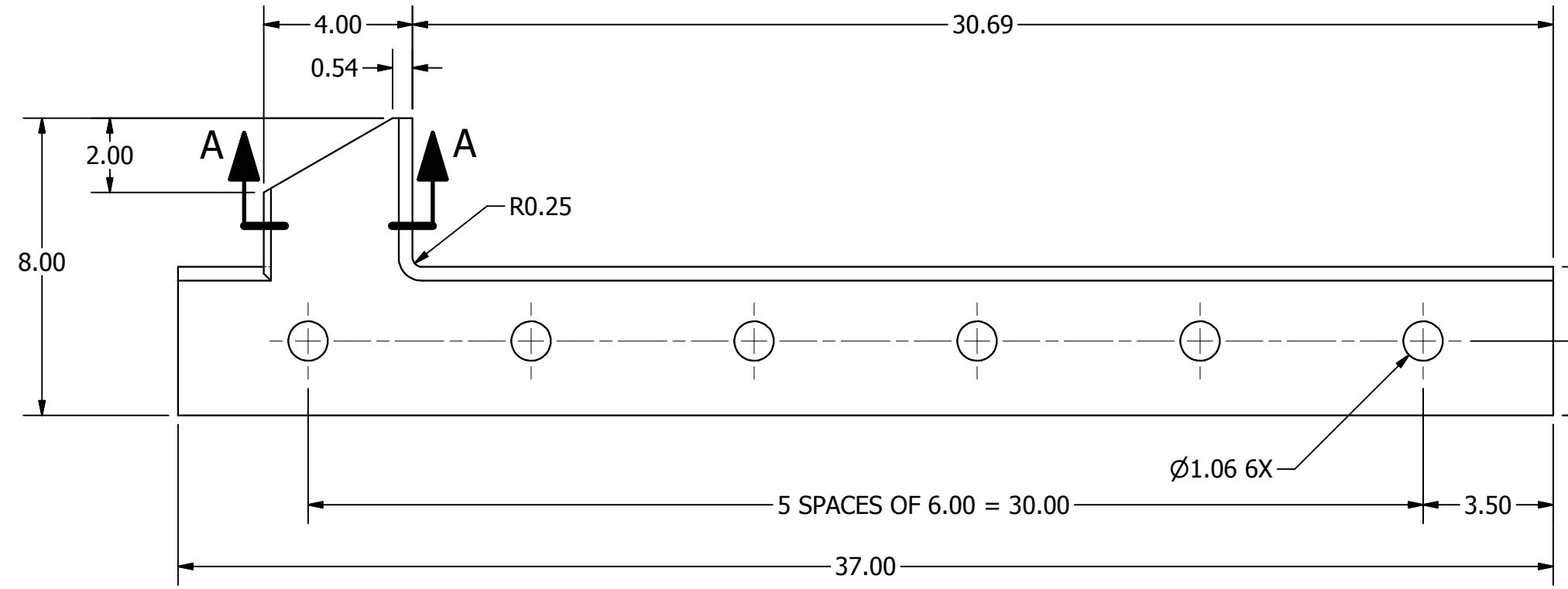
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REV. -
DRAWING No. TC09016-0049
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

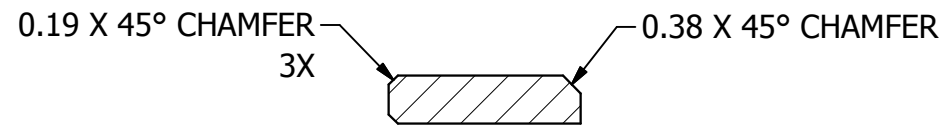


CHAMFER 0.38 X 45°
2X

1.00 REF.

NOTES:

- 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
- 2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.



SECTION A-A

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0026



UNE DIVISION DE / A DIVISION OF		
CONCU DESIGNED	DATE: YY/MM/DD	
A. MELOCHE	11/04/20	
DESSINE DRAWN	11/04/20	
A. MELOCHE		
VERIFIE CHECKED	11/04/22	
R. TURCOT		
APPROUVE APPROVED	11/04/25	
G. AMAR		

APPLICATION					
LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE					TITRE
SIDE STIFFENER BOTTOM					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
1	1			TC09016-0049	
ECHELLE		SCALE			REV.
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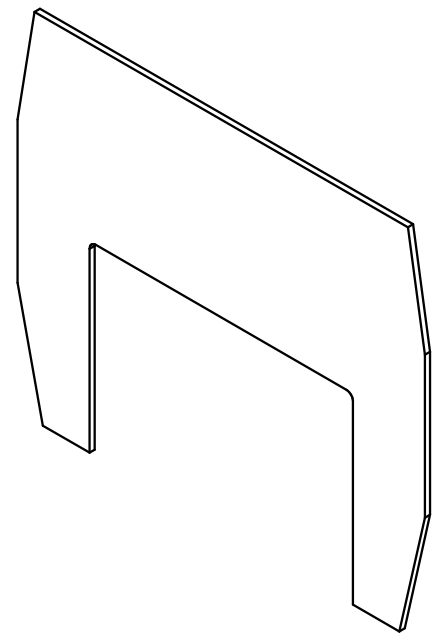
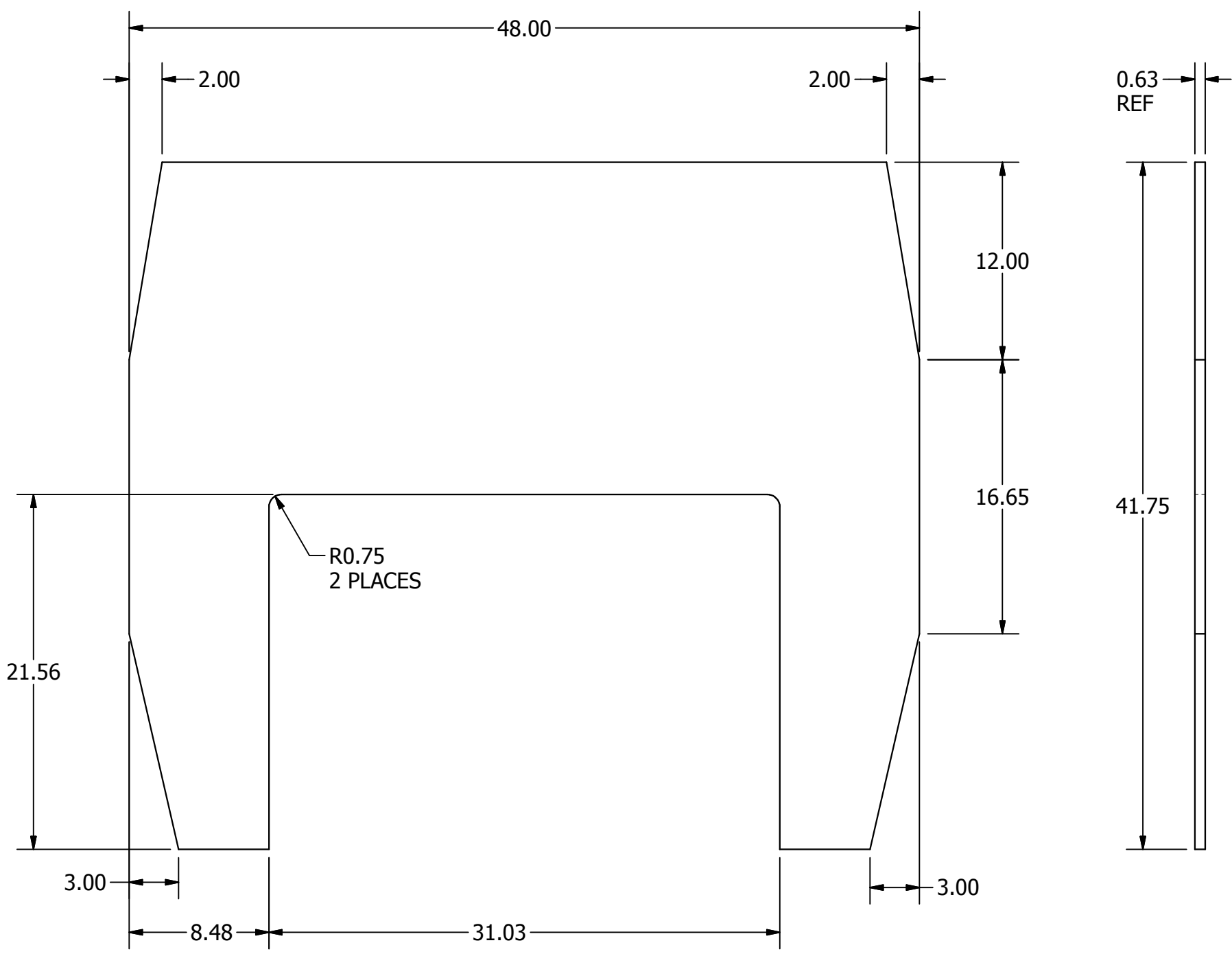
D

C

B

A

REV. -
 DRAWING No. TC09016-0044
 No. DE DESSIN



ISOMETRIC VIEW

NOTES:
 1 - MATERIAL: 5/8" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE AL SHARP EDGES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No. **TC-09-016**

ENS. SUIVANT
 NEXT ASSY. **TC09016-0023**

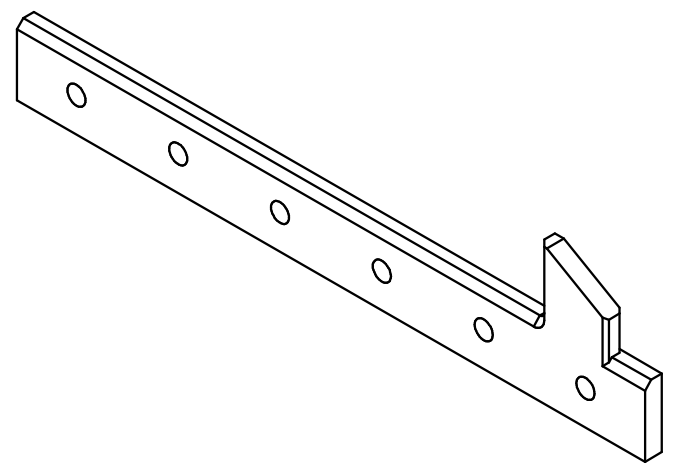
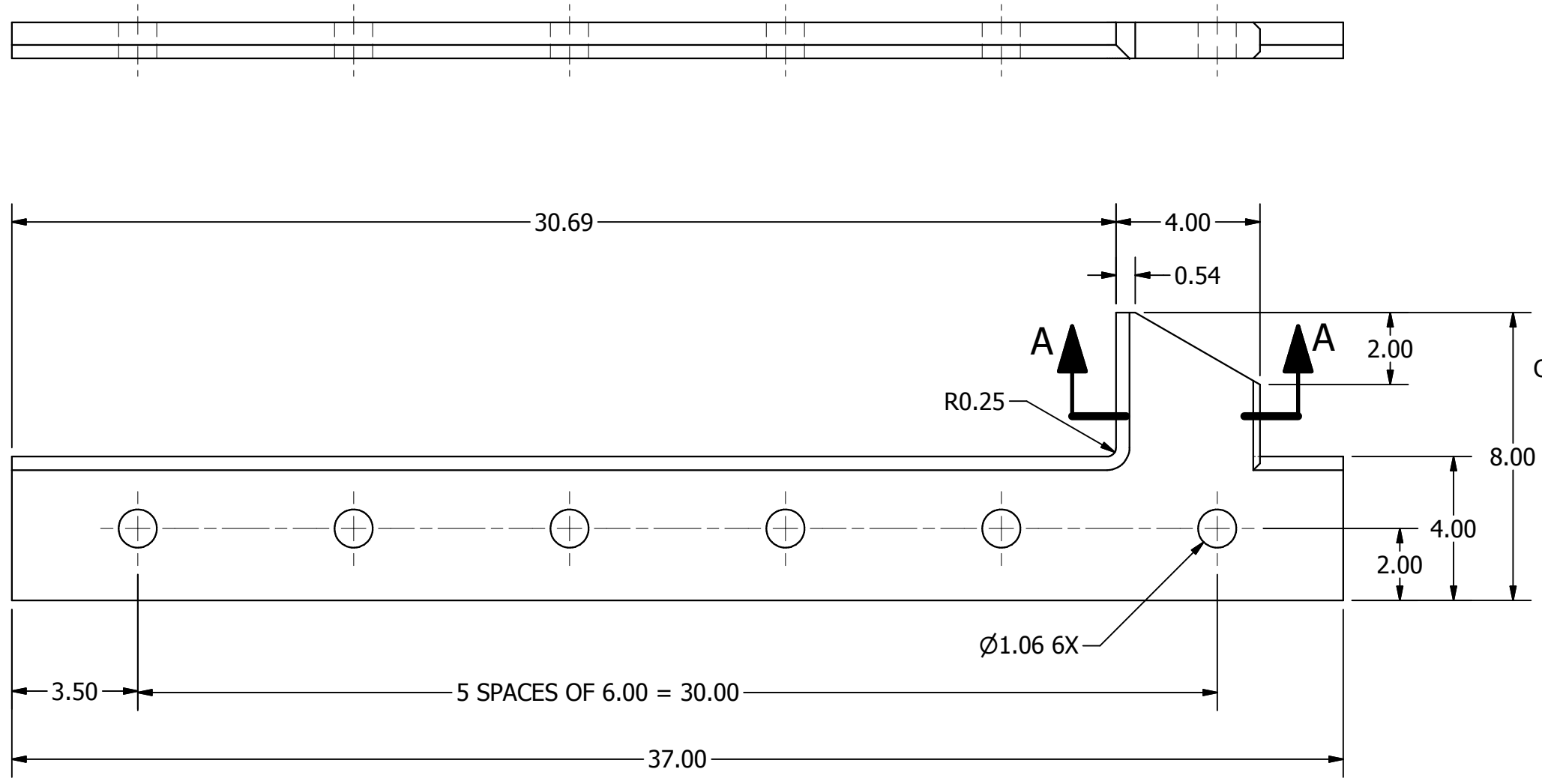
UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	11/02/02
DESSINE DRAWN	M. SIMONEAU	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/20

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE FRONT PLATE					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
1	1	1	1	TC09016-0044	
ECHELLE 1 : 8				SCALE	
REV.					-

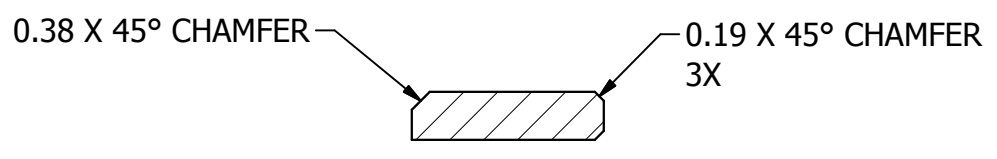
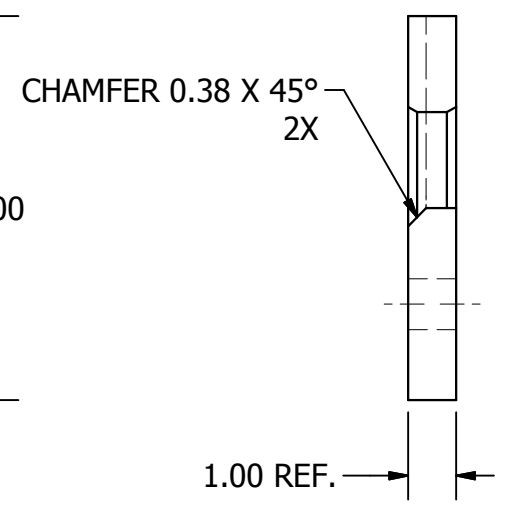
PROJECTION
 NOM DE FICHER: TC09016-0044.icw
 FILENAME:

REV. -
DRAWING No. TC09016-0040
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ ^{NIS} ✓			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0025

UNE DIVISION DE / A DIVISION OF

TRA CANARAIL

DATE: YY/MM/DD

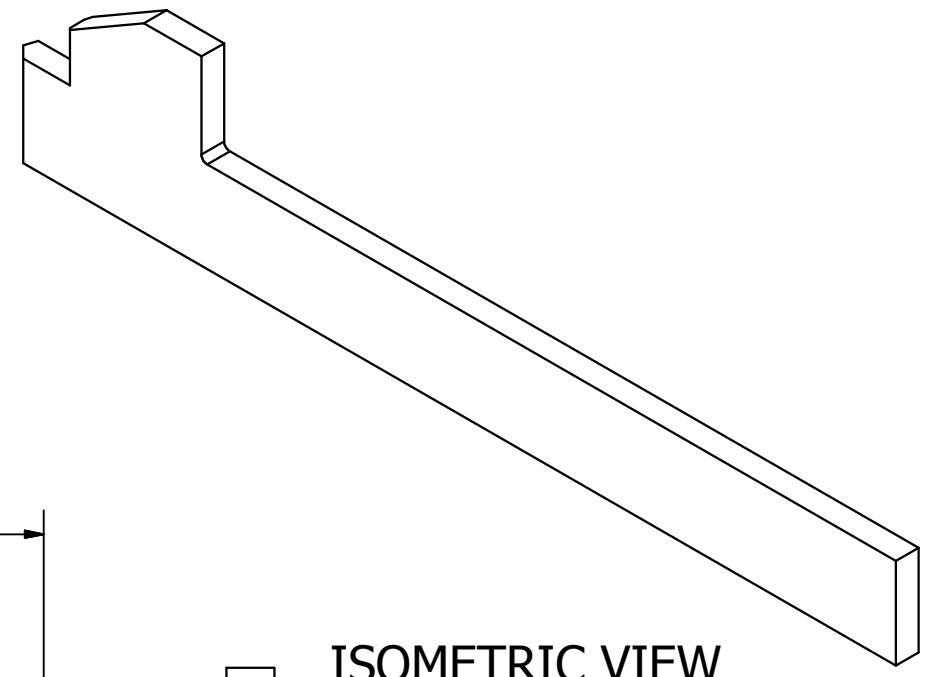
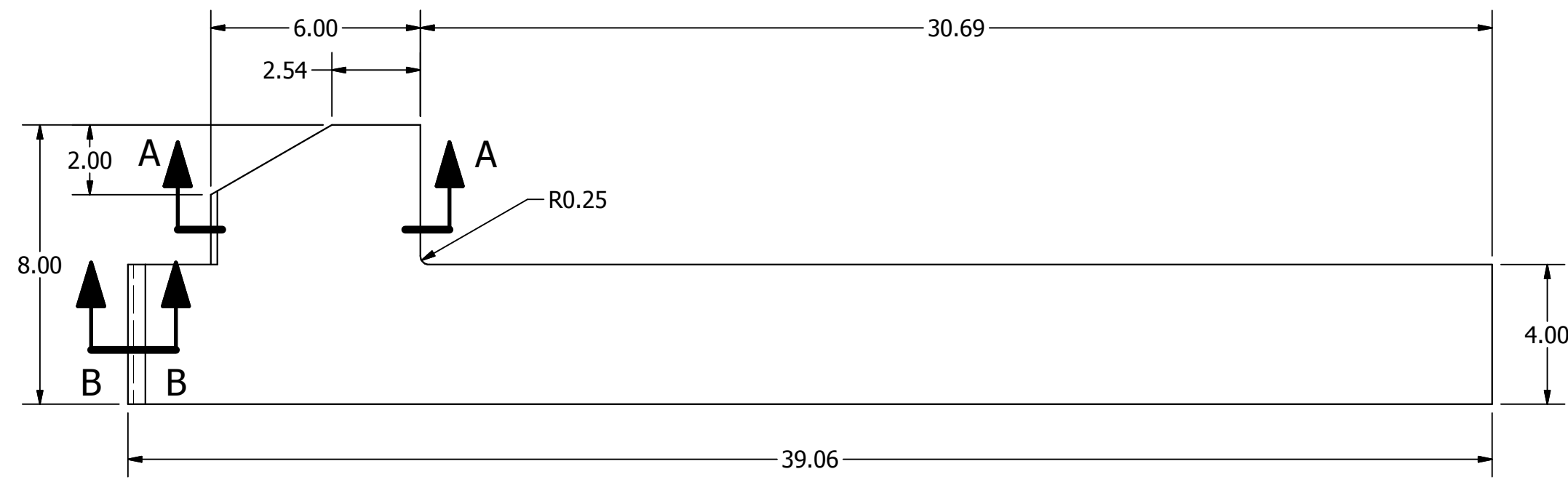
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25

APPLICATION				TITLE			
LOCOMOTIVE CRASHWORTHY COMPONENTS				SIDE STIFFENER -BOTTOM			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0040		-	
ECHELLE		SCALE					
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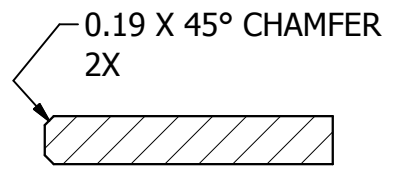
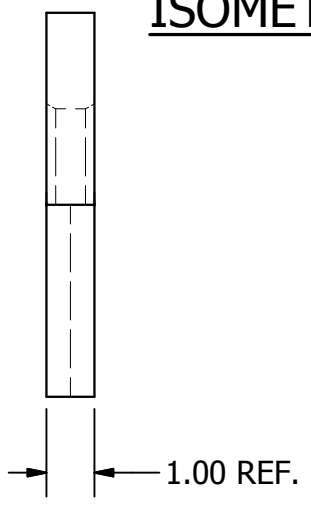
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FILENAME:

REV. -
DRAWING No. TC09016-0039
No. DE DESSIN

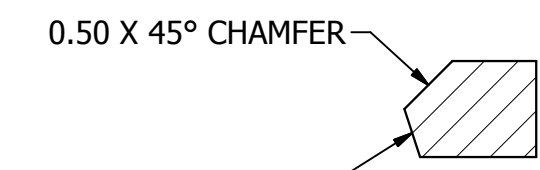
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A



SECTION B-B

SCALE 1 / 2

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

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REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0025

UNE DIVISION DE / A DIVISION OF

CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25

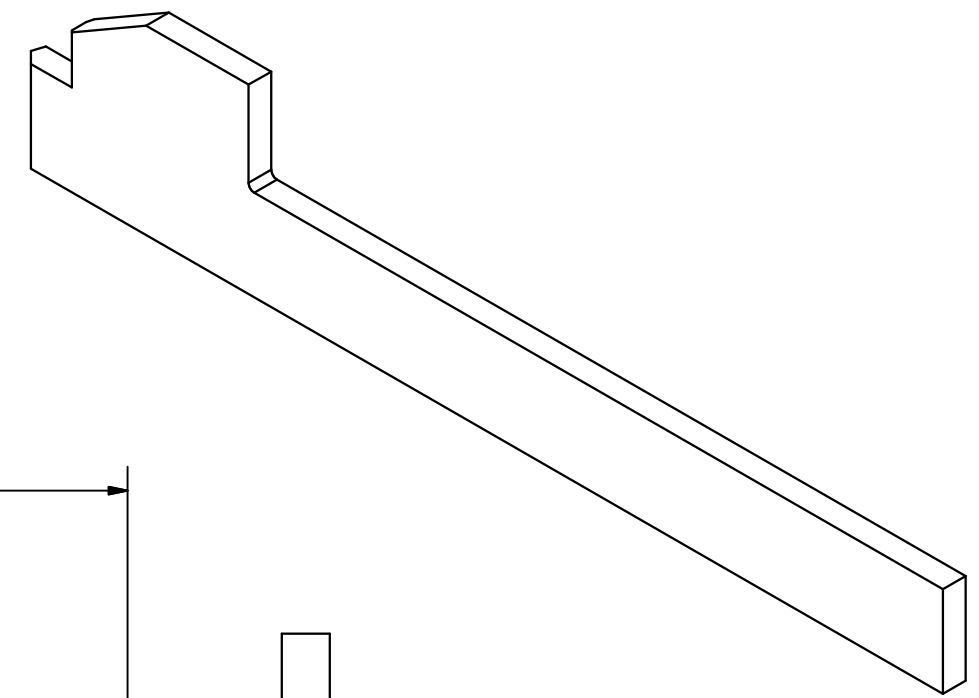
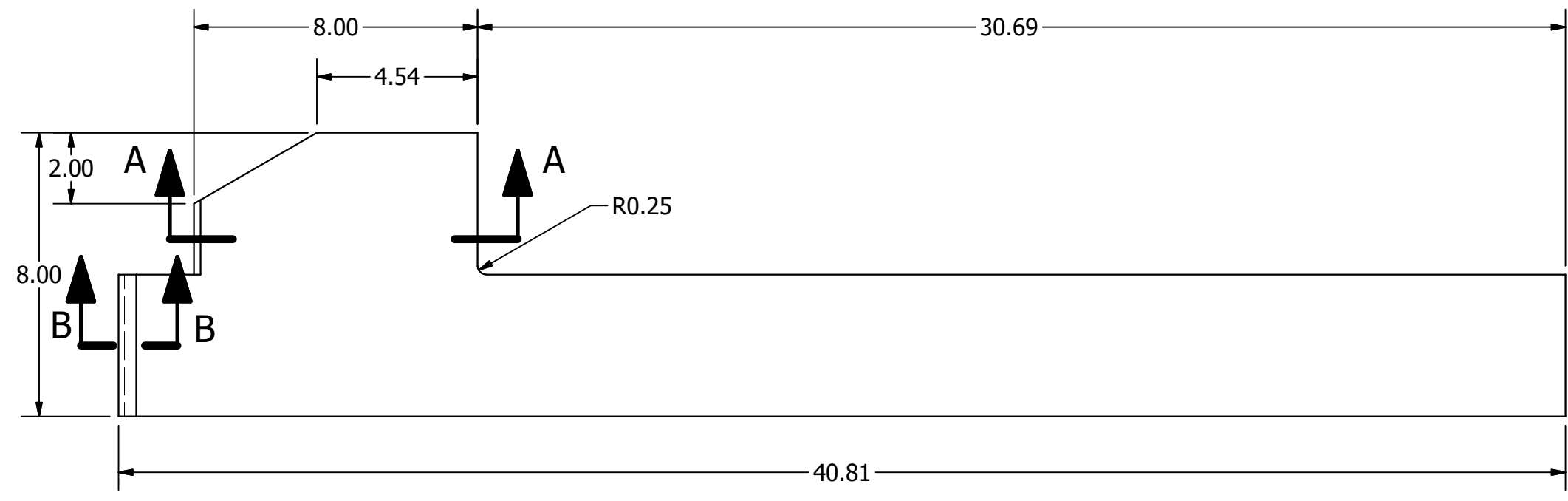
DATE: YY/MM/DD

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE SIDE STIFFENER -MIDDLE			
PAGE 1	SHEET 1	DE 1	OF 1
No. DE DESSIN TRA TC09016-0039		TRA DRAWING No. -	
ECHELLE 1:4		SCALE	

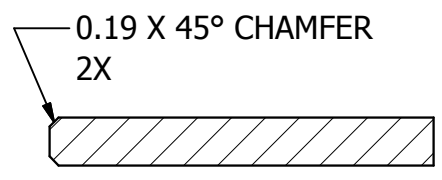
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NOM DE FICHER: TC09016-0039.icw
FILENAME:

REV. -
DRAWING No. TC09016-0038
No. DE DESSIN

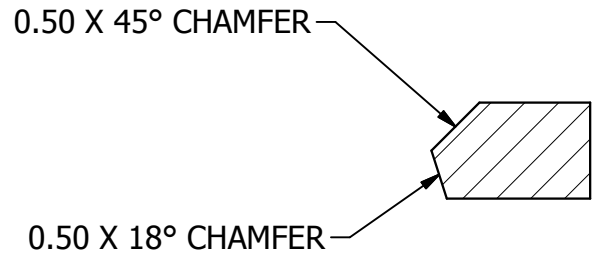
NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW



SECTION A-A



SECTION B-B
SCALE 1 / 2

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

TIAX LLC
LEXINGTON, MASSACHUSETTS 02421

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PROJECTION
NOM DE FICHER: TC09016-0038.icw
FILENAME:

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ NIS			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0025

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/22
APPROUVE APPROVED	G. AMAR	11/04/25
DATE: YY/MM/DD		

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE SIDE STIFFENER -TOP			
PAGE 1	SHEET 1	DE 1	OF 1
No. DE DESSIN TRA TC09016-0038		TRA DRAWING No.	REV. -
ECHELLE 1:4		SCALE	

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

FORMAT-B WEIGHT: 54.2 lbmass

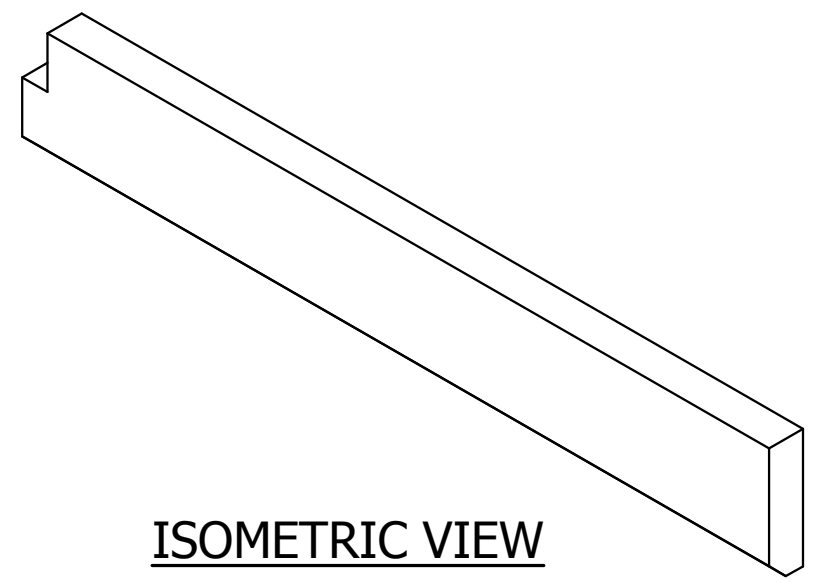
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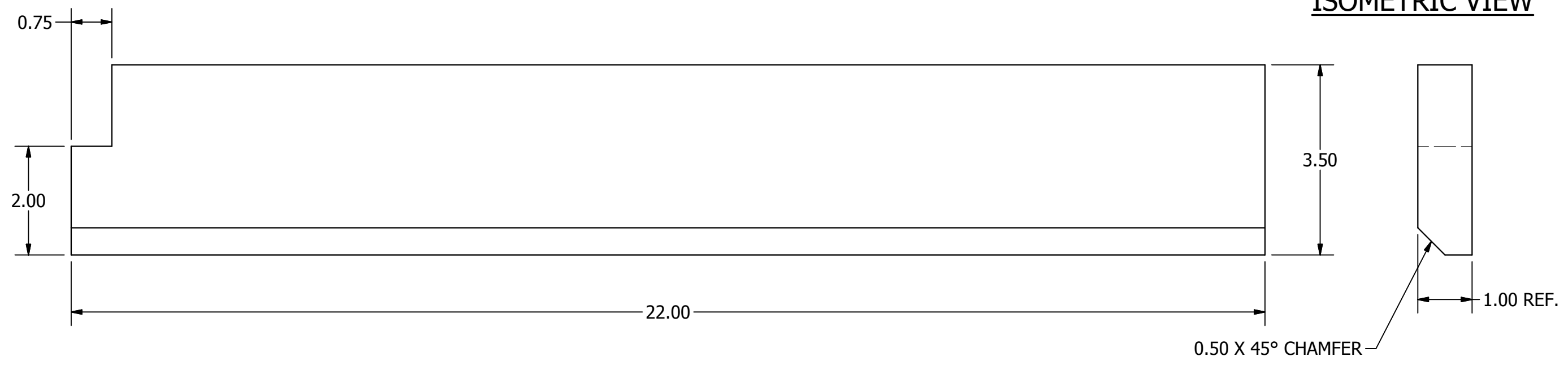
B

A

REV. -
 DRAWING No. TC09016-0037
 No. DE DESSIN



ISOMETRIC VIEW



0.50 X 45° CHAMFER

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

TIAX LLC
 LEXINGTON, MASSACHUSETTS 02421

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NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.



PROJECTION
 NOM DE FICHIER: TC09016-0037.icw
 FILENAME:

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ ^{NIS} ✓			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 TC09016-0025

NEXT ASSY.

UNE DIVISION DE / A DIVISION OF

CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20	
VERIFIE CHECKED	R. TURCOT	11/04/22	
APPROUVE APPROVED	G. AMAR	11/04/25	

APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				STOPPER PLATE			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0037		-	
ECHELLE		SCALE					
1:2							

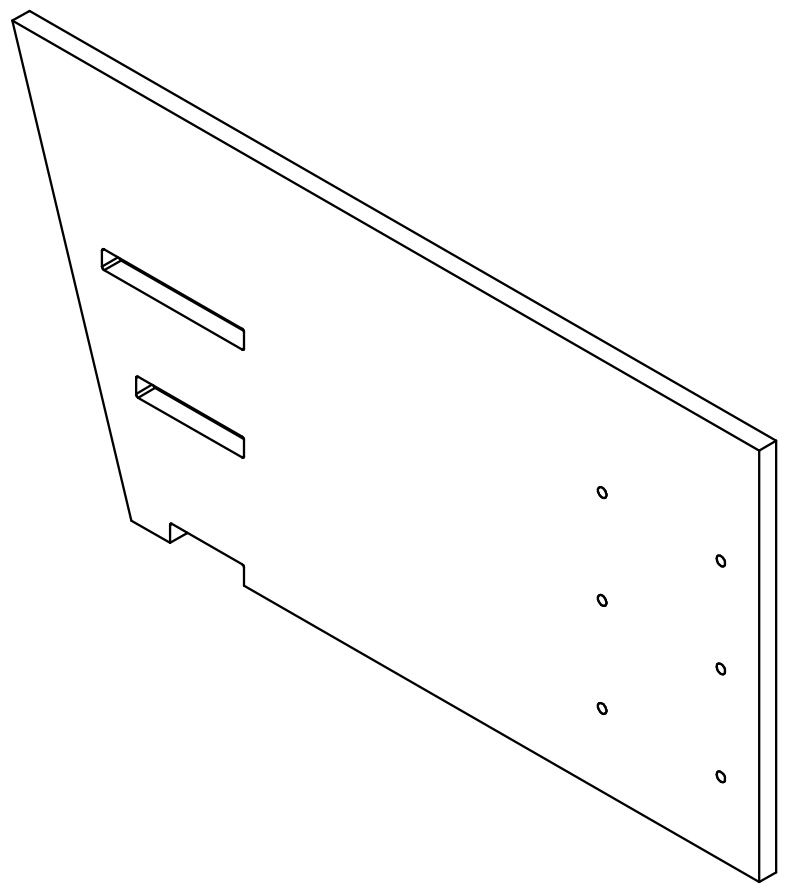
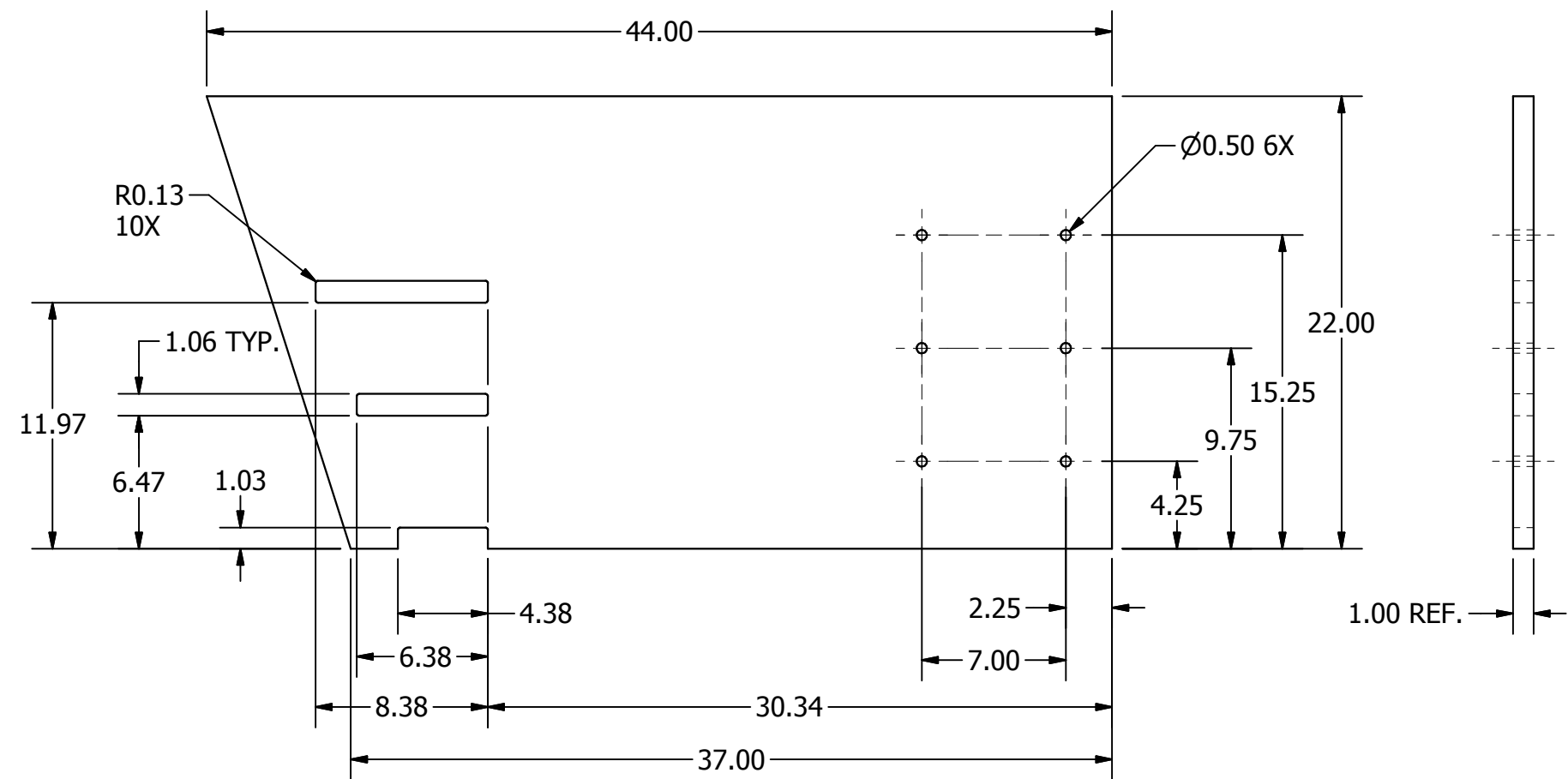
D

C

B

A

REV. -
 DRAWING No. TC09016-0036
 No. DE DESSIN



ISOMETRIC VIEW

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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 LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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 No. DE CONTRAT CONTRACT No.
 ENS. SUIVANT NEXT ASSY. TC09016-0025

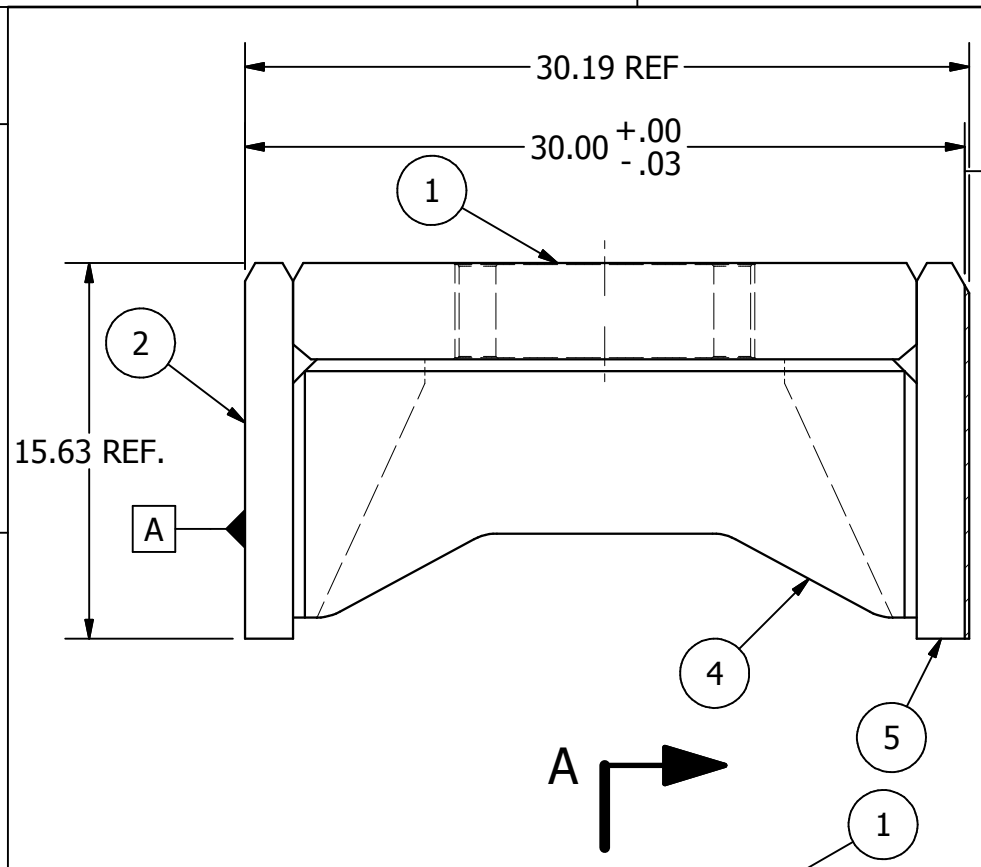
UNE DIVISION DE / A DIVISION OF

CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20	
VERIFIE CHECKED	R. TURCOT	11/04/22	
APPROUVE APPROVED	G. AMAR	11/04/25	

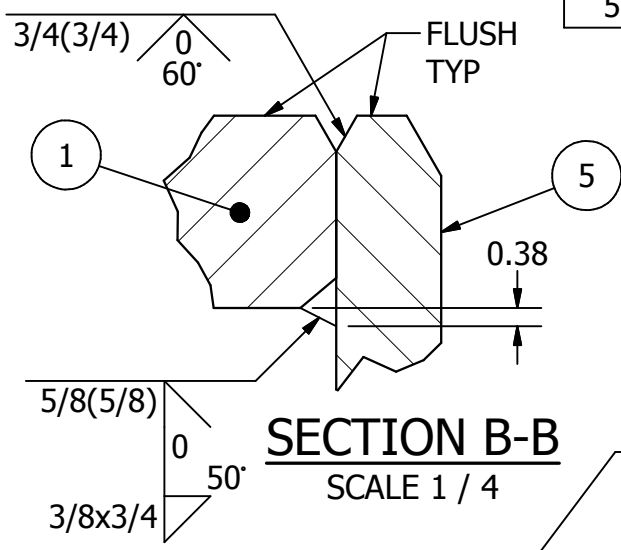
APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				SIDE WALL			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0036		-	
ECHELLE		SCALE					
1:8							

PROJECTION
 NOM DE FICHER: TC09016-0036.icw
 FILENAME:

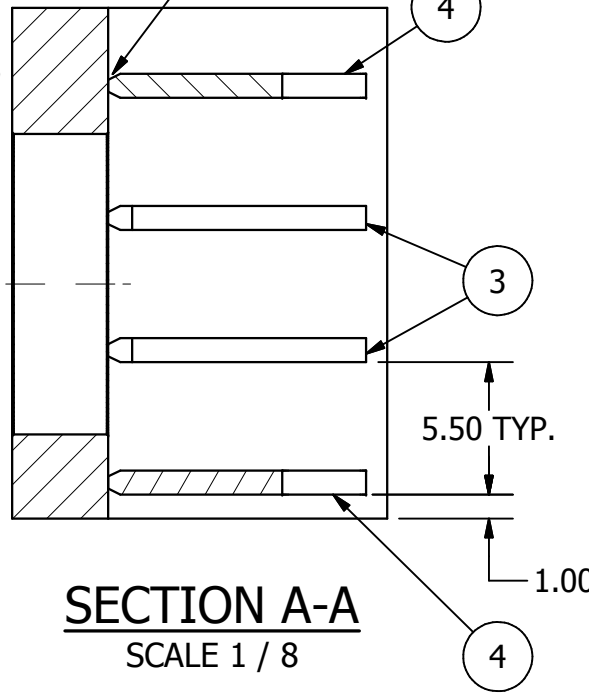
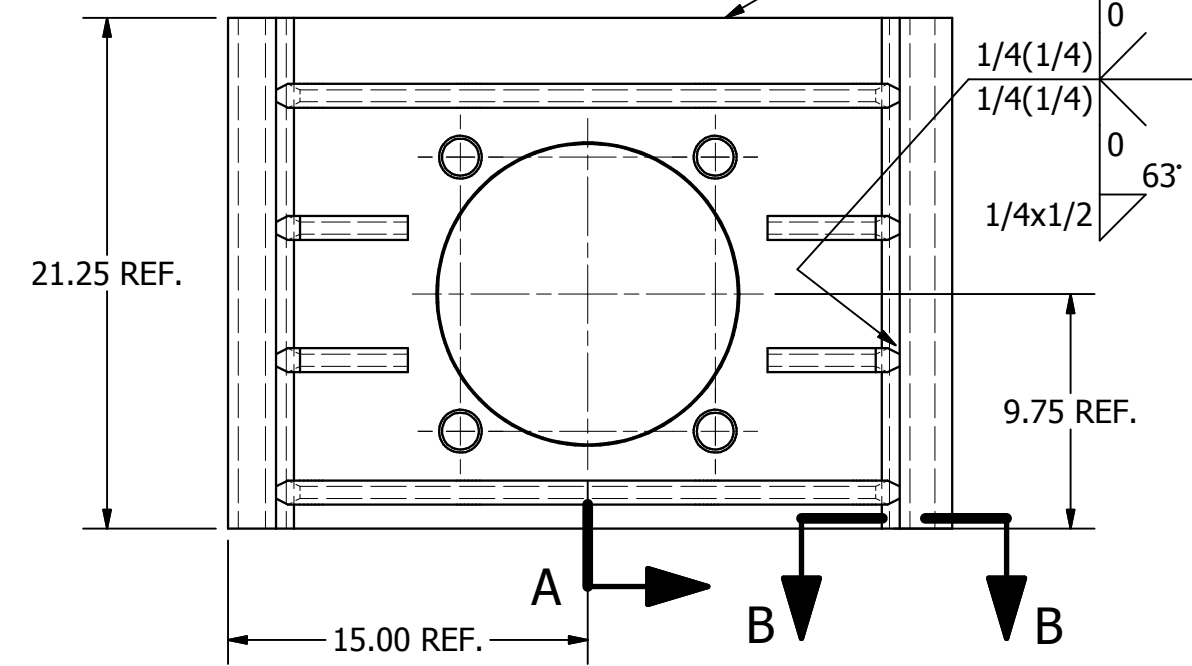
REV. -
DRAWING No. TC09016-0027
No. DE DESSIN



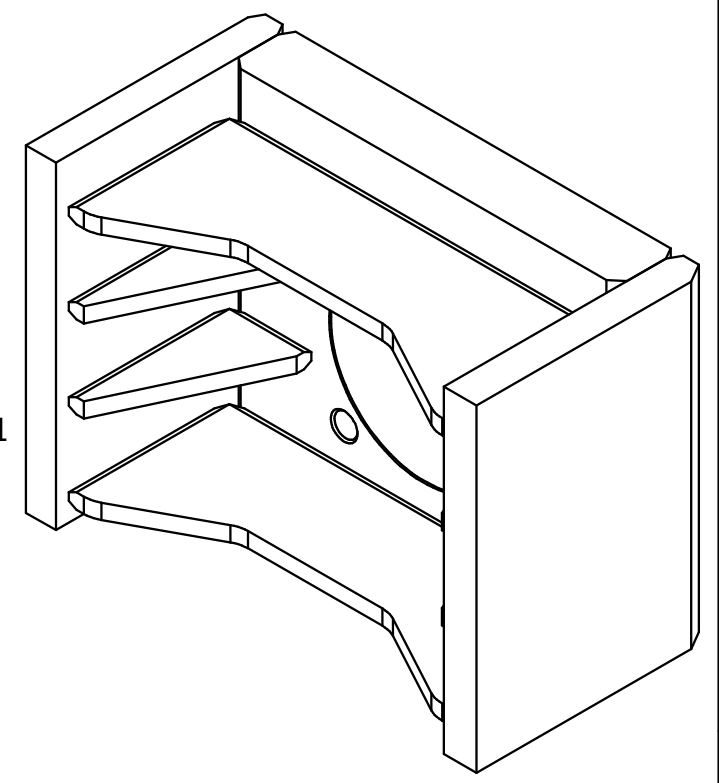
Surface finish symbol: $\sqrt{\sqrt{.015A}}$



SECTION B-B
SCALE 1 / 4



SECTION A-A
SCALE 1 / 8



ISOMETRIC VIEW

ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLIER P/N
1	1	FRONT PLATE		TC09016-0041
2	1	SIDE PLATE -LHS		TC09016-0042
3	4	GUSSET		TC09016-0043
4	2	TOP AND BOTTOM GUSSET		TC09016-0048
5	1	SIDE PLATE -RHS		TC09016-0051

NOTES:

- 1 - REMOVE ALL SHARP EDGES.
- 2 - WELDING TO COMPLY WITH AWS D15.1, LATEST REV.
- 3 - ALL MACHINING TO BE DONE AFTER WELDING IS COMPLETE AND ASSEMBLY HAS COOLED TO ROOM TEMP.

TIAX LLC
LEXINGTON, MASSACHUSETTS 02421

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL	<input checked="" type="checkbox"/>	METRIC	<input type="checkbox"/>
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ $\sqrt{\text{in}}$			
HOLE DIAMETER TOLERANCES			
	0 - .250" +.003"	0 - 6mm +0.08mm	
	-.002"	-0.05mm	
	+.005"	+0.13mm	
	-.003"	-.08mm	
	+.010"	+0.25mm	
	-.005"	-0.13mm	

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No. DE CONTRAT
CONTRACT No. **TC-09-016**

ENS. SUIVANT
TC09016-0023

DATE: YY/MM/DD
10/12/16
11/04/19
11/04/20
11/04/21

UNE DIVISION DE / A DIVISION OF

TRA CANARAIL

CONCU DESIGNED **A. MELOCHE**
DESSINE DRAWN **A. MELOCHE**
VERIFIE CHECKED **G. AMAR**
APPROUVE APPROVED **G. AMAR**

APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				SLIDING LUG ASSEMBLY			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0027		-	
ECHELLE	SCALE						
1:8							

PROJECTION
NOM DE FICHER: TC09016-0027.idw
FILENAME:

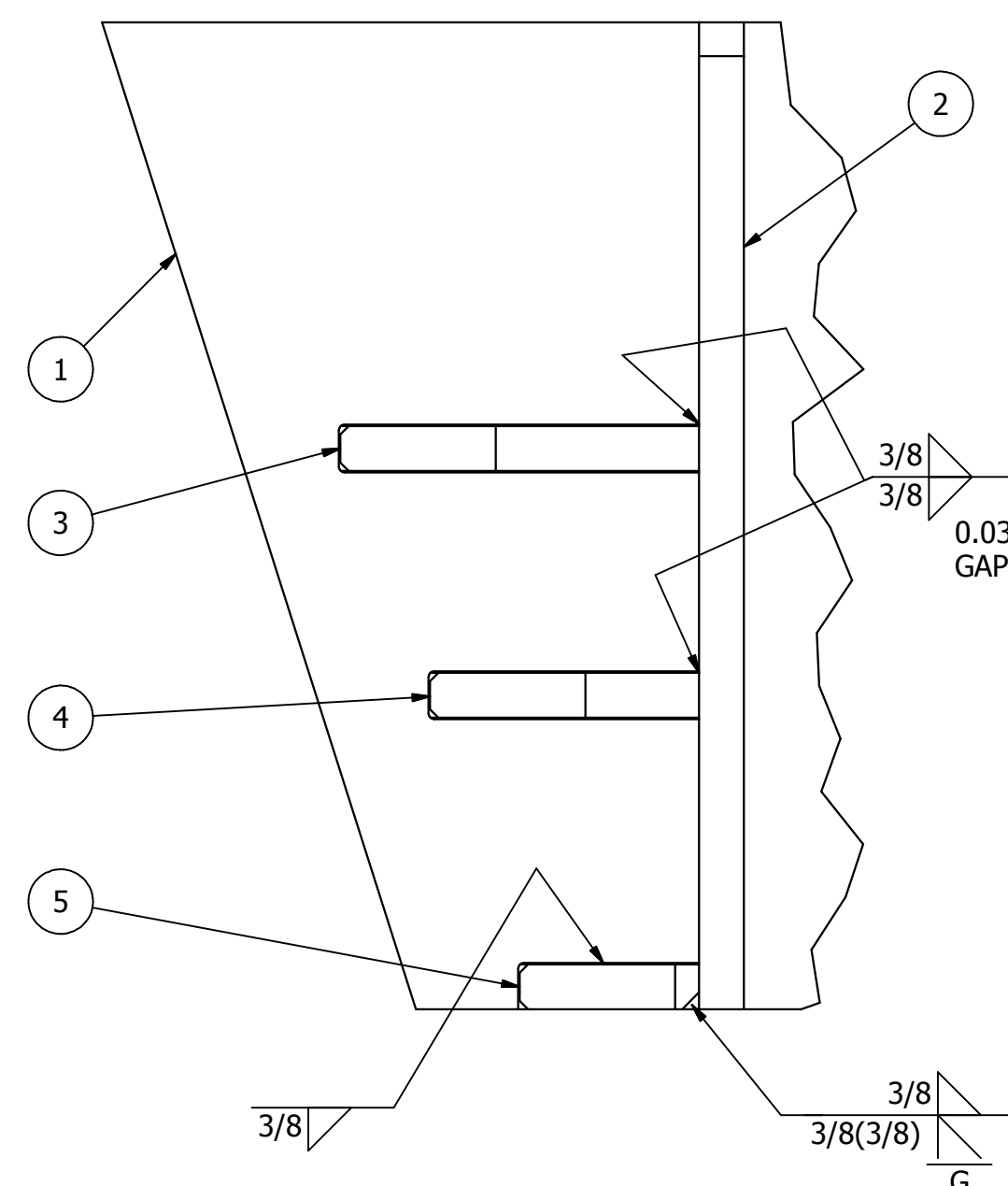
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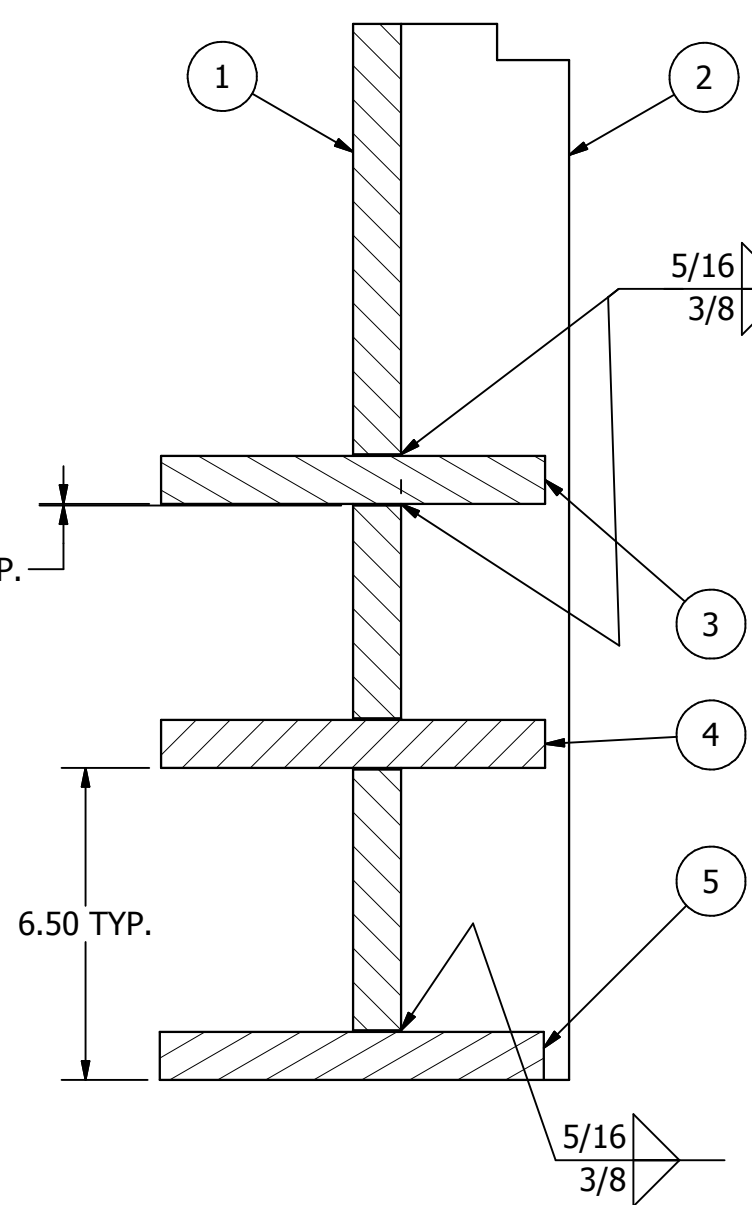
B

A

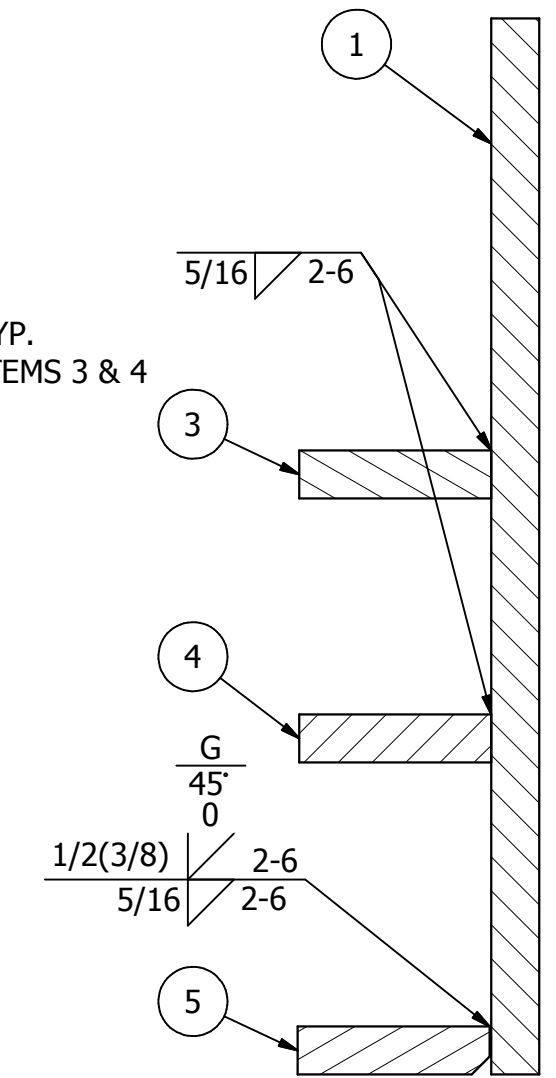
REV. -
 DRAWING No. TC09016-0026
 No. DE DESSIN



VIEW A-A
 180° ROTATED VIEW



SECTION B-B
 (TYP. WELDING AT INNER STIFFENERS)



SECTION C-C
 90° ROTATED C.W.
 (TYP. WELDING AWAY FROM INNER STIFFENERS)

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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 LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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 No. DE CONTRAT CONTRACT No.
 ENS. SUIVANT NEXT ASSY. TC09016-0023

		DATE: YY/MM/DD
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

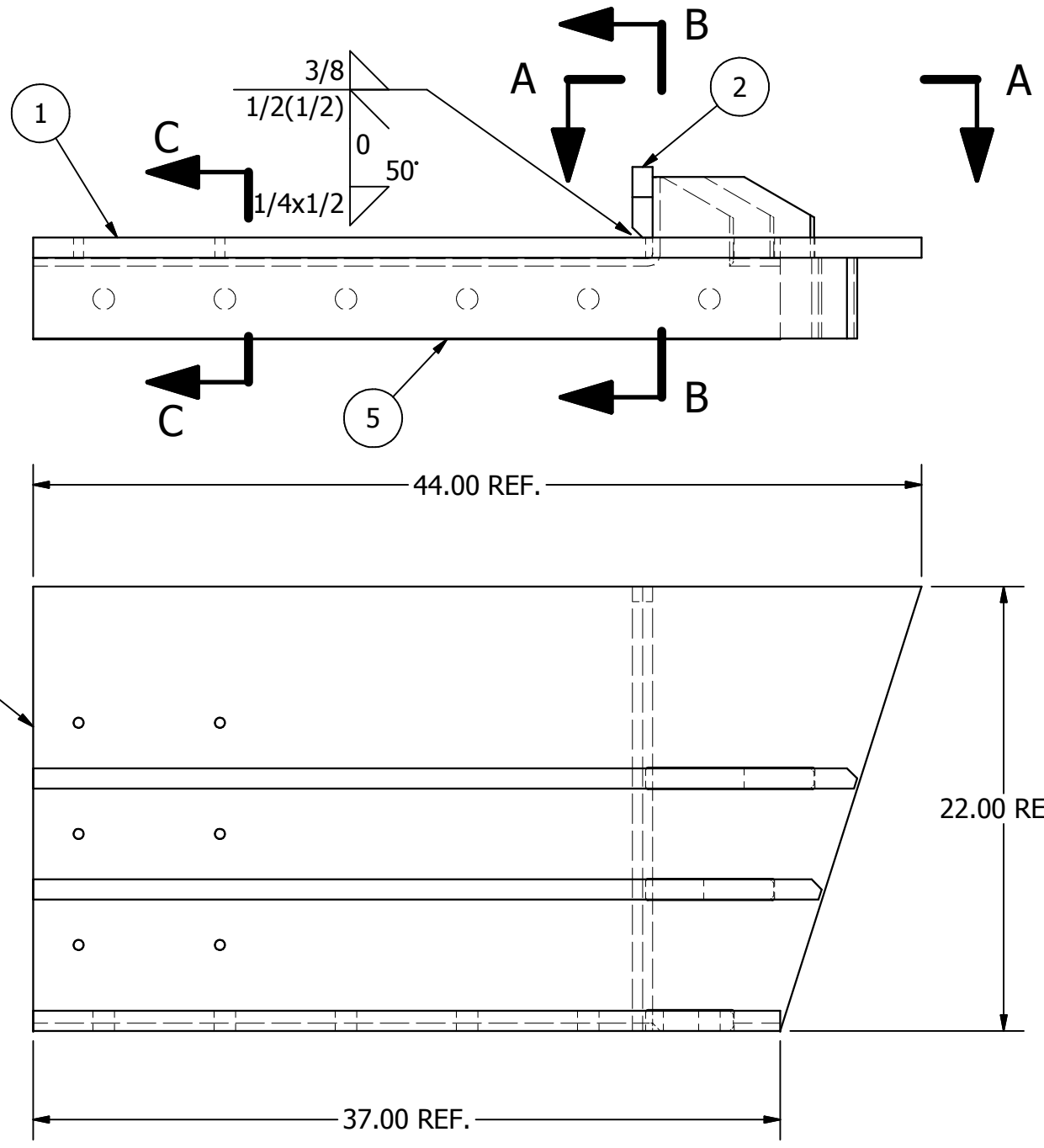
APPLICATION				
LOCOMOTIVE CRASHWORTHY COMPONENTS				
TITRE TITLE				
SIDE WALL LEFT ASSEMBLY				
PAGE	SHEET	DE	OF	No. DE DESSIN TRA TRA DRAWING No.
2	2			TC09016-0026
ECHELLE		SCALE		REV.
1:4				-



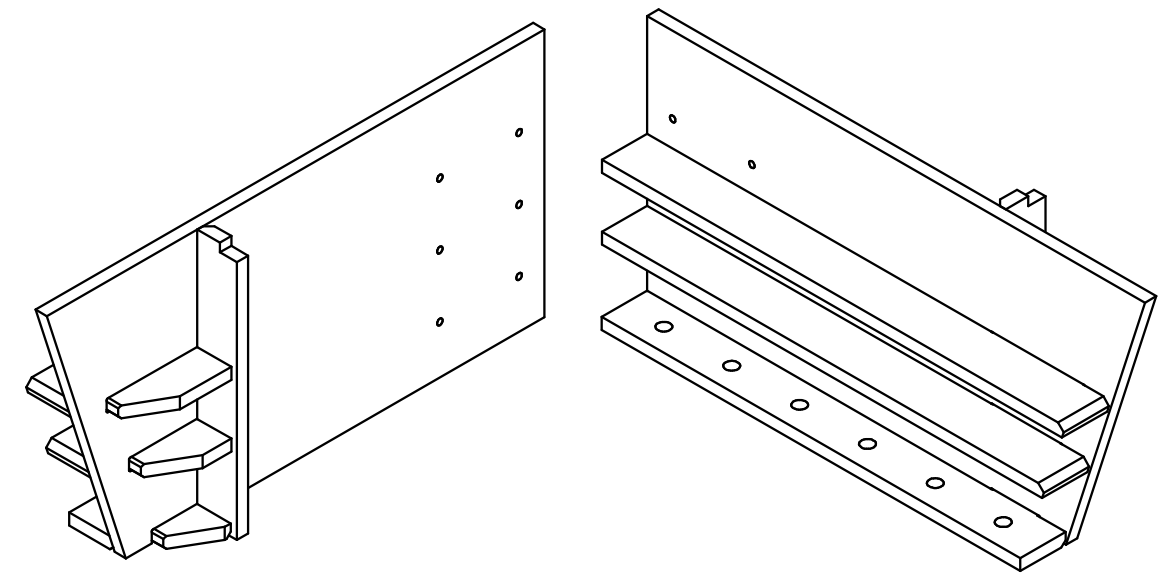
PROJECTION
 NOM DE FICHER: TC09016-0026.icdw
 FILENAME:

REV. -
DRAWING No. TC09016-0026
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLY P/N
1	1	SIDE WALL	-	TC09016-0036
2	1	STOPPER PLATE	-	TC09016-0050
3	1	SIDE STIFFENER -TOP	-	TC09016-0052
4	1	SIDE STIFFENER -MIDDLE	-	TC09016-0053
5	1	SIDE STIFFENER BOTTOM	-	TC09016-0049



ISOMETRIC VIEW

NOTES:

- 1 - REMOVE ALL SHARP EDGES.
- 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.
- 3 - WELDING TO BE SEQUENCED TO MINIMIZE POST-WELD DISTORTION.
- 4- INTERMITTENT WELDS SHOWN IN SECTION B-B & C-C WILL BE COMPLETED ON MAIN ASSEMBLY, ON DWG TC9016-0023.

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LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
CONTRACT No.

ENS. SUIVANT
NEXT ASSY.
TC09016-0023

UNE DIVISION DE / A DIVISION OF

TRA CANARAIL

DATE: YY/MM/DD

CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	R. TURCOT	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION			
LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE			TITRE
SIDE WALL LEFT ASSEMBLY			
PAGE	SHEET	DE	OF
1	2		
No. DE DESSIN TRA		TRA DRAWING No.	
TC09016-0026			
ECHELLE		SCALE	
1:8			
REV.			
			-

PROJECTION
NOM DE FICHER: TC09016-0026.icw
FILENAME:

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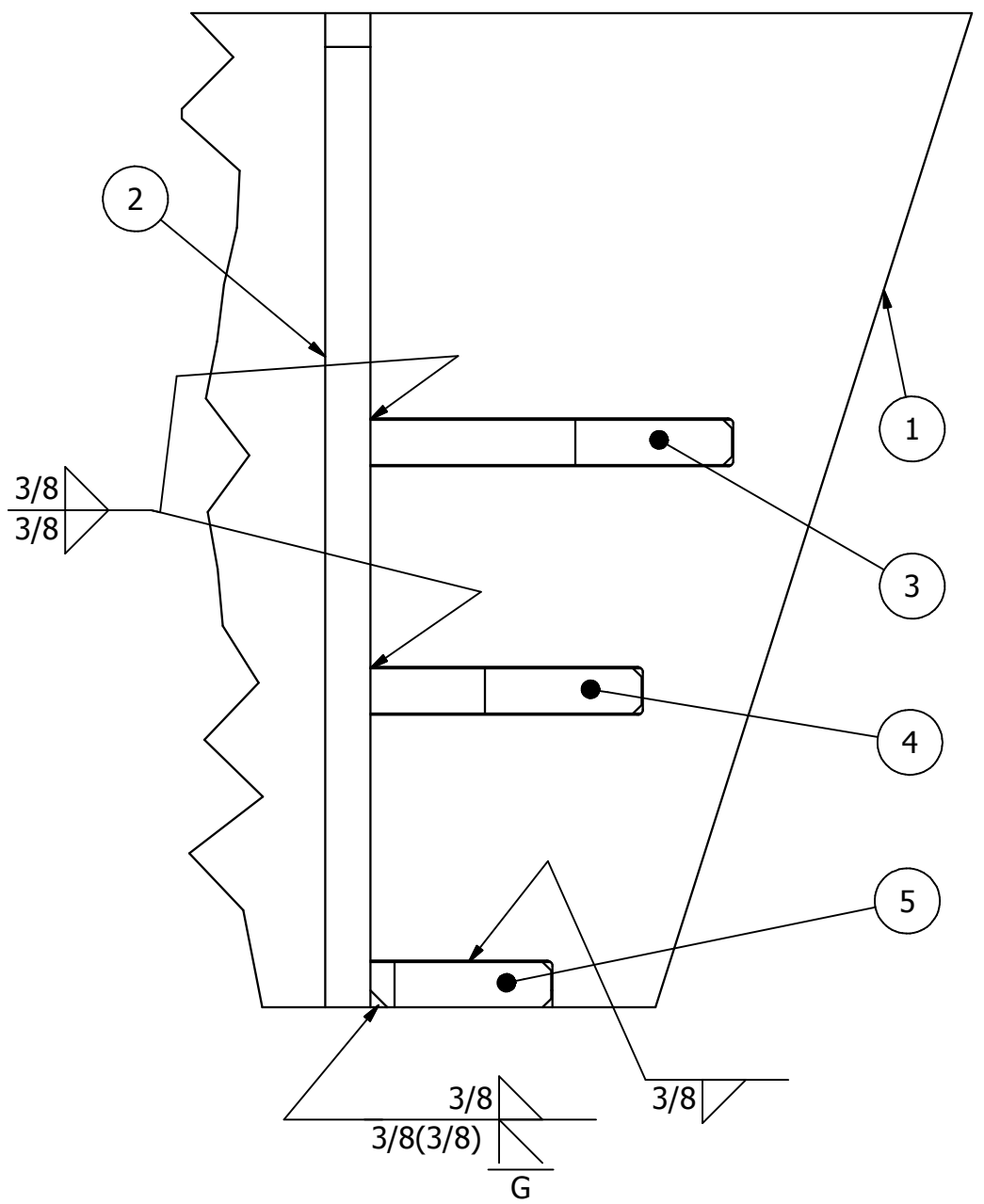
C

B

A

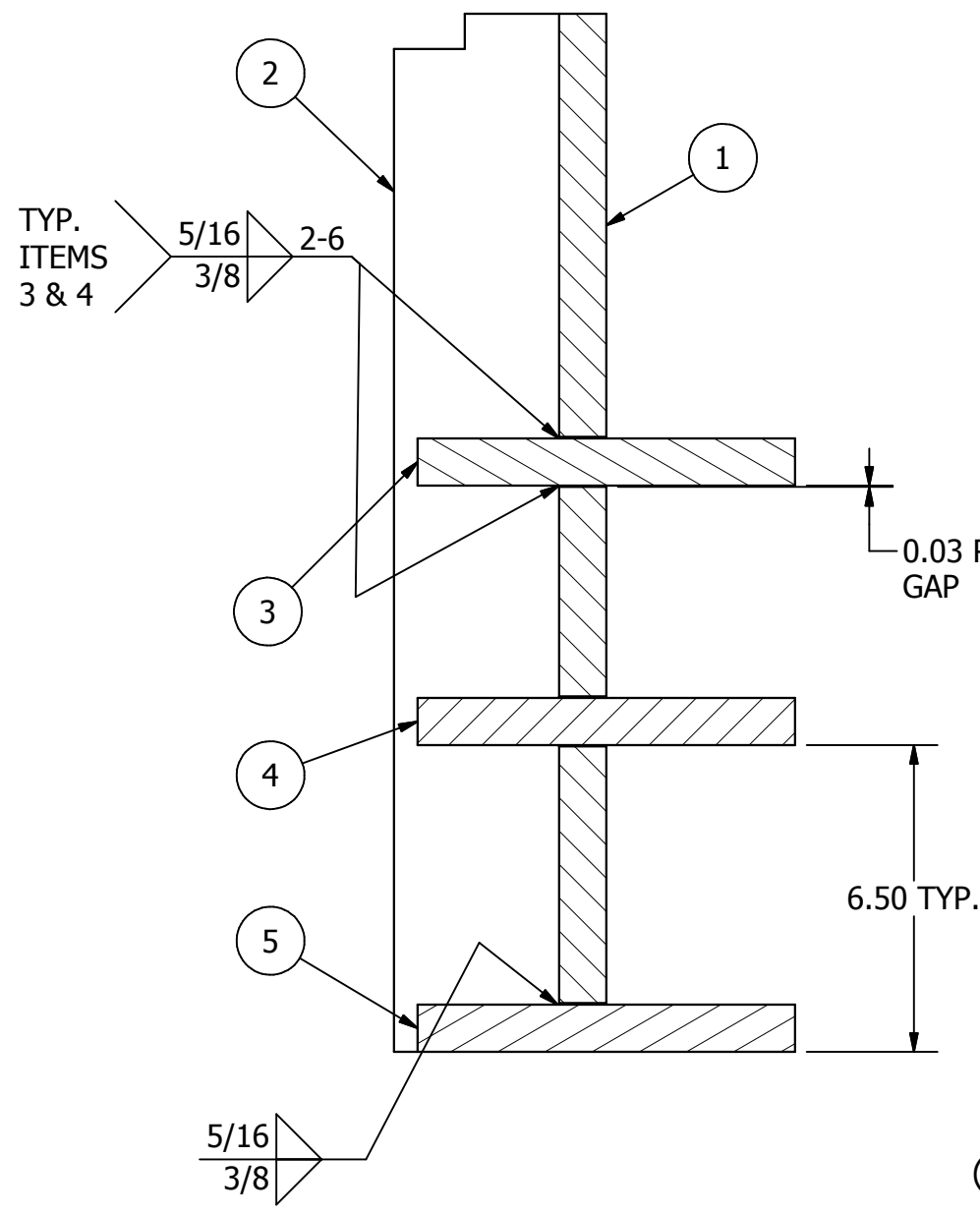
REV. -
 DRAWING No. TC09016-0025
 No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

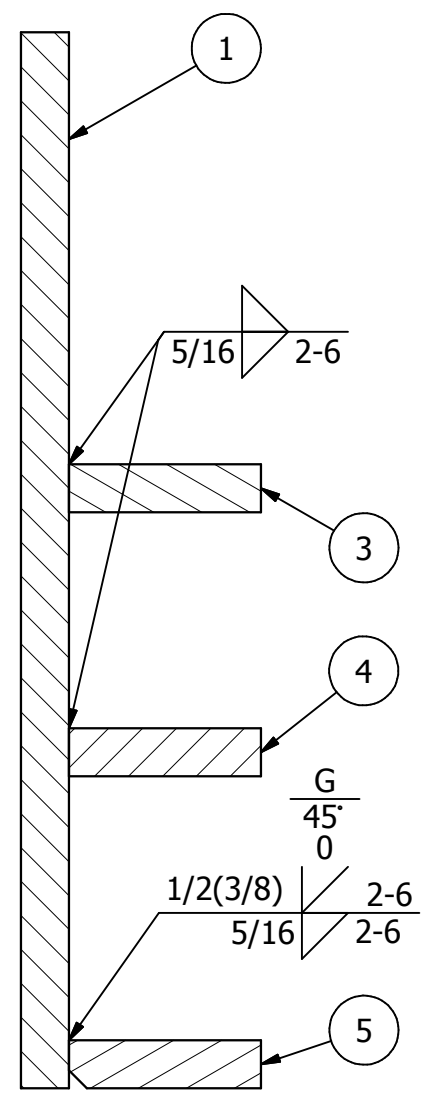


VIEW A
 180° ROTATED VIEW

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SECTION B-B
 (TYP. WELDING AT INNER STIFFENERS)



SECTION C-C
 90° ROTATED C.C.W.
 (TYP. WELDING AWAY FROM INNER STIFFENERS)

TIAX LLC

LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
 CONTRACT No.

ENS. SUIVANT
 NEXT ASSY.

		DATE: YY/MM/DD
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/19
VERIFIE CHECKED	R. TURCOT	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION				TITLE	
LOCOMOTIVE CRASHWORTHY COMPONENTS				SIDE WALL RIGHT ASSEMBLY	
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
2	2			TC09016-0025	
ECHELLE		SCALE			
1 : 4					
REV.					-

FORMAT-B WEIGHT: 414.8 lbmass

PROJECTION
 NOM DE FICHER: TC09016-0025.idw
 FILENAME:

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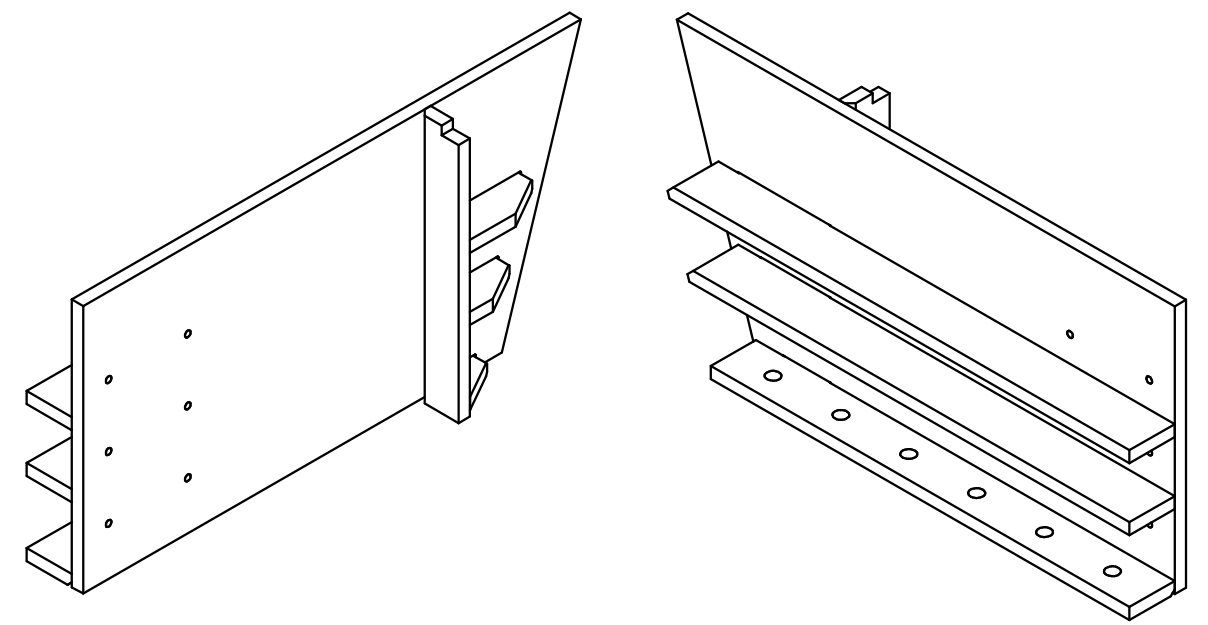
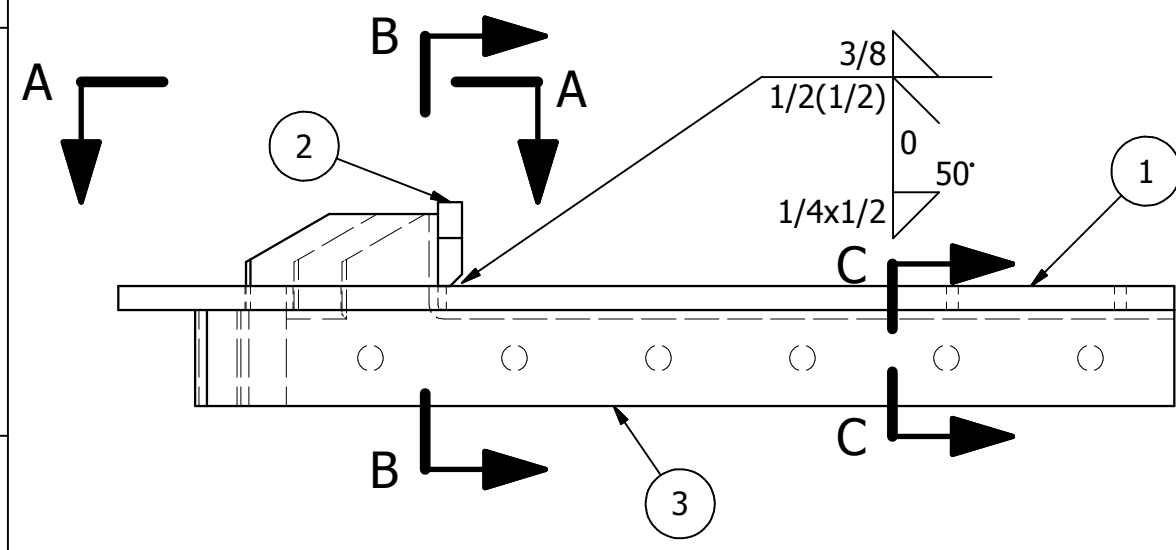
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REV. -
 DRAWING No. TC09016-0025
 No. DE DESSIN

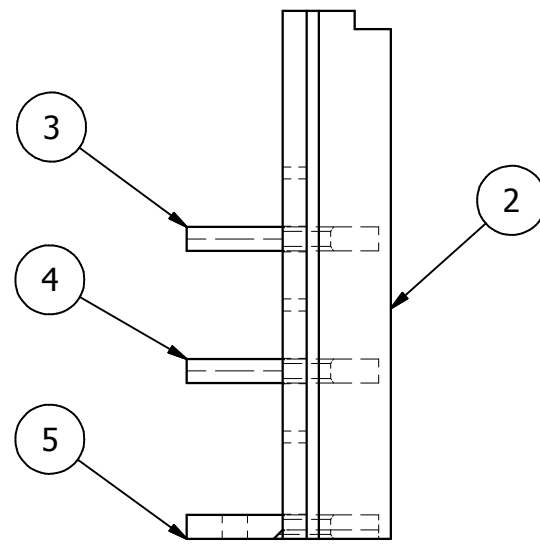
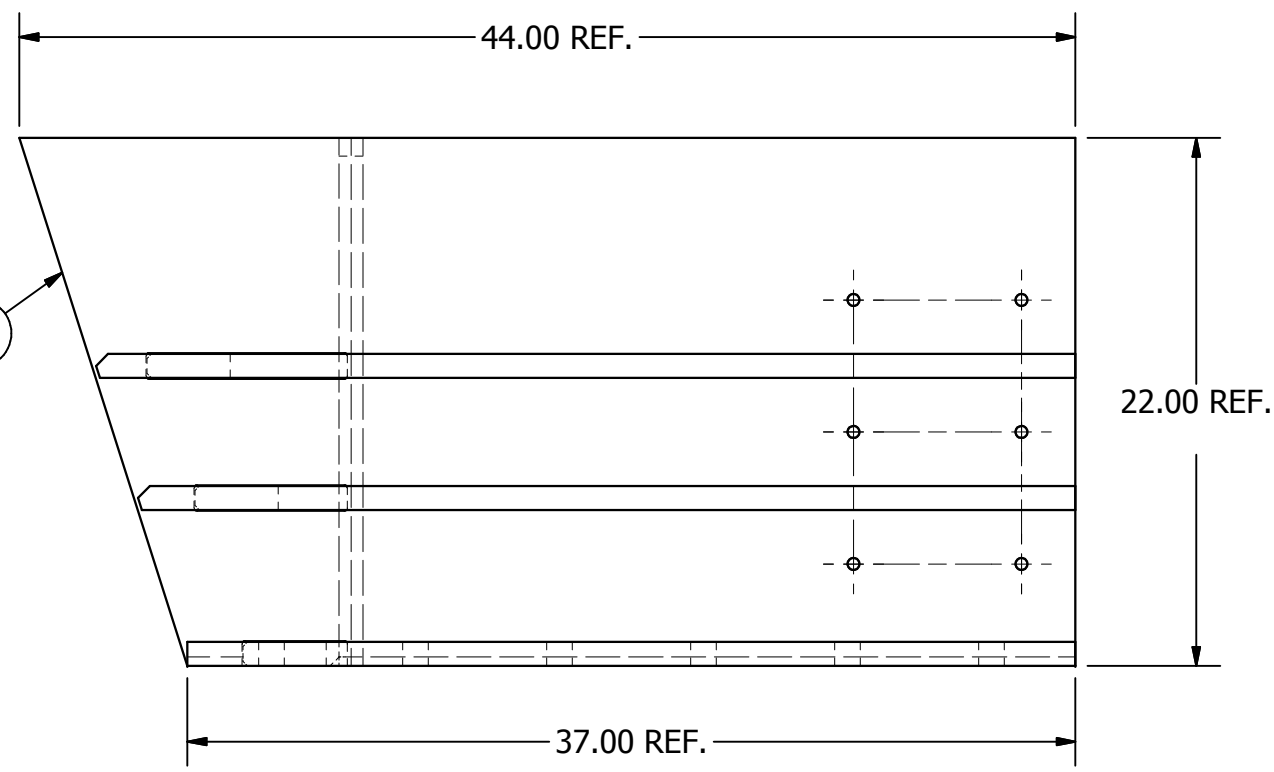
ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLY P/N
1	1	SIDE WALL	-	TC09016-0036
2	1	STOPPER PLATE	-	TC09016-0037
3	1	SIDE STIFFENER -TOP	-	TC09016-0038
4	1	SIDE STIFFENER -MIDDLE	-	TC09016-0039
5	1	SIDE STIFFENER -BOTTOM	-	TC09016-0040



ISOMETRIC VIEWS

NOTES:

- 1 - REMOVE ALL SHARP EDGES.
- 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.
- 3 - WELDING TO BE SEQUENCED TO MINIMIZE POST-WELD DISTORTION.
- 4 - INTERMITTENT WELDS SHOWN IN SECTION B-B & C-C WILL BE COMPLETED ON MAIN ASSEMBLY, ON DWG TC9016-0023.



NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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 LEXINGTON, MASSACHUSETTS 02421

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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 No. DE CONTRAT CONTRACT No.
 ENS. SUIVANT NEXT ASSY. TC09016-0023

UNE DIVISION DE / A DIVISION OF
TRA CANARAIL
 DATE: YY/MM/DD
 CONCU DESIGNED A. MELOCHE 11/02/01
 DESSINE DRAWN A. MELOCHE 11/04/19
 VERIFIE CHECKED R. TURCOT 11/04/20
 APPROUVE APPROVED G. AMAR 11/04/21

APPLICATION				TITLE			
LOCOMOTIVE CRASHWORTHY COMPONENTS				SIDE WALL RIGHT ASSEMBLY			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	2			TC09016-0025		-	
ECHELLE			SCALE				
1:8							



PROJECTION
 NOM DE FICHER: TC09016-0025.icw
 FILENAME:

TRA Support Bm Apr25 2011

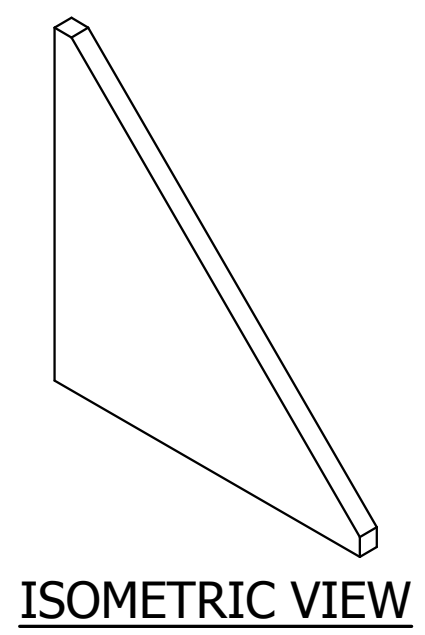
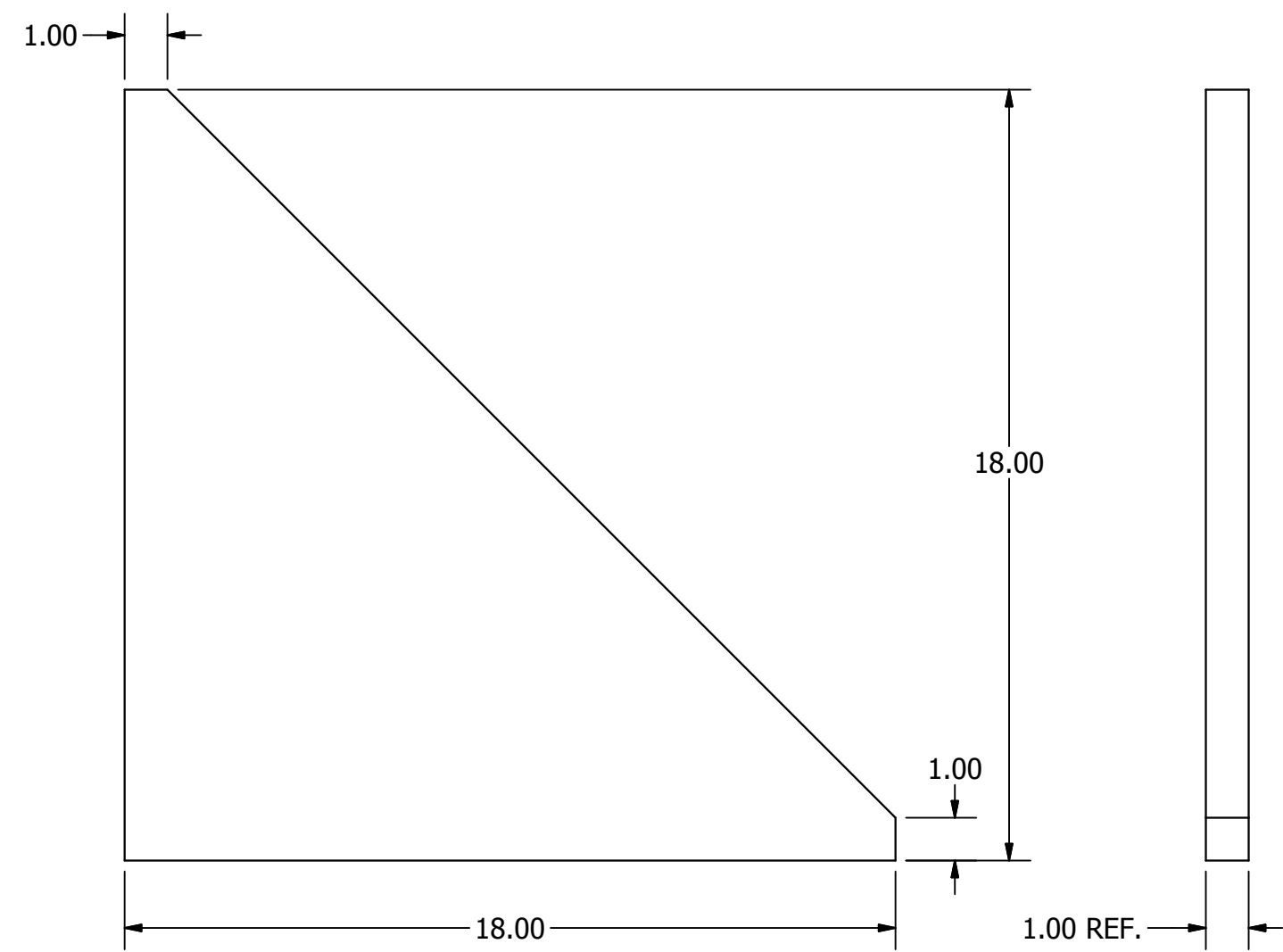
D

C

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REV. -
 DRAWING No. TC09016-0035
 No. DE DESSIN



NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:
 1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

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 LEXINGTON, MASSACHUSETTS 02421

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PROJECTION
 NOM DE FICHIER: TC09016-0035.idw
 FILENAME:

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ NIS			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No.
TC-09-016

ENS. SUIVANT
 NEXT ASSY.
TC06019-0024



DATE: YY/MM/DD		
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

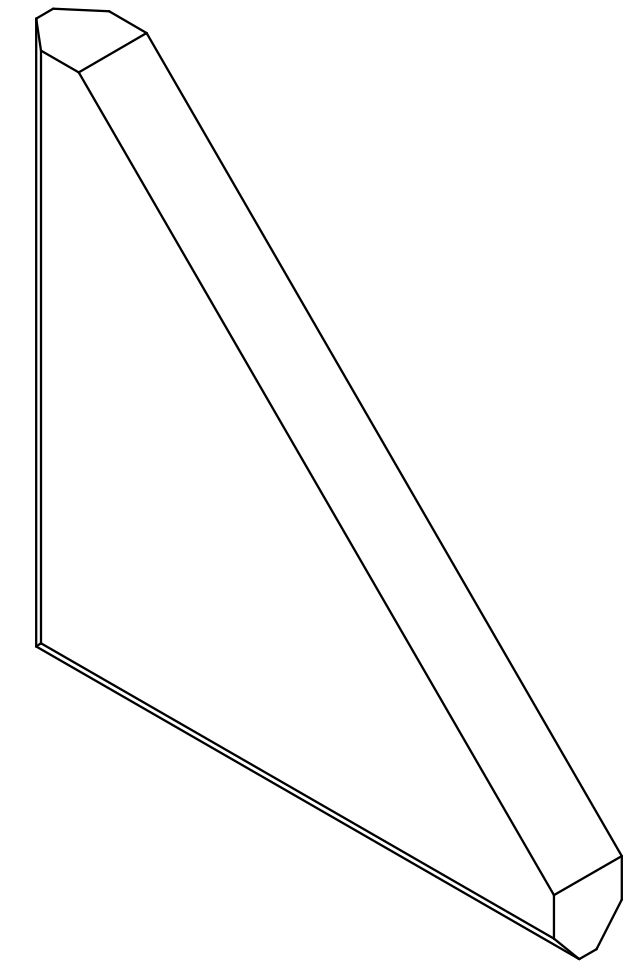
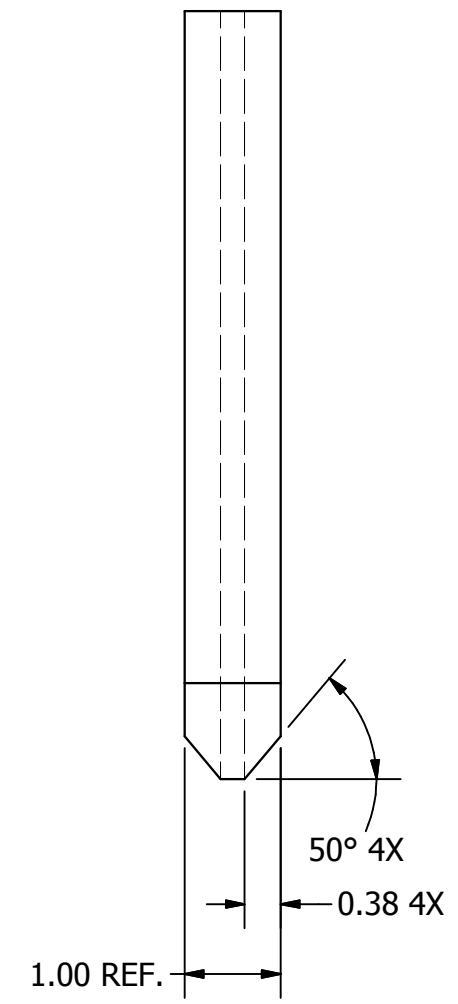
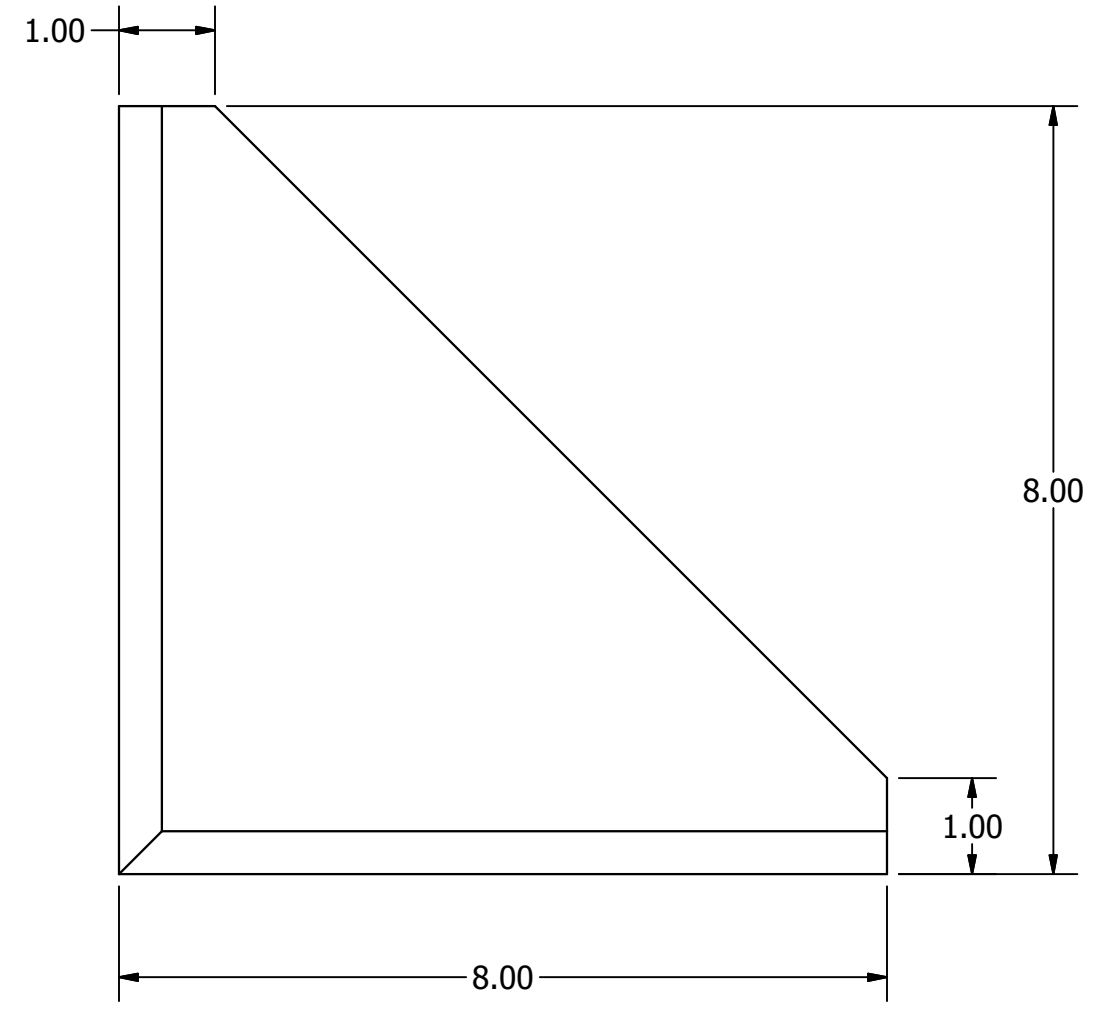
APPLICATION				TITLE			
LOCOMOTIVE CRASHWORTHY COMPONENTS				GUSSET -BOTTOM			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	1			TC09016-0035		-	
ECHELLE		SCALE					
1:4							

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

FORMAT-B WEIGHT: 51.0 lbmass

REV. -
DRAWING No. TC09016-0034
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES.

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LEXINGTON, MASSACHUSETTS 02421

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PROJECTION
NOM DE FICHER: TC09016-0034.icw
FILENAME:

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.
TC-09-016

ENS. SUIVANT
NEXT ASSY.
TC09016-0024

UNE DIVISION DE / A DIVISION OF

DATE: YY/MM/DD		
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION
LOCOMOTIVE CRASHWORTHY COMPONENTS

TITRE		TITRE	
GUSSET -TOP			
PAGE 1	SHEET 1	DE 1	OF 1
ECHELLE 1:4		SCALE	
No. DE DESSIN TRA TC09016-0034		TRA DRAWING No. -	
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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

FORMAT-B WEIGHT: 10.5 lbmass

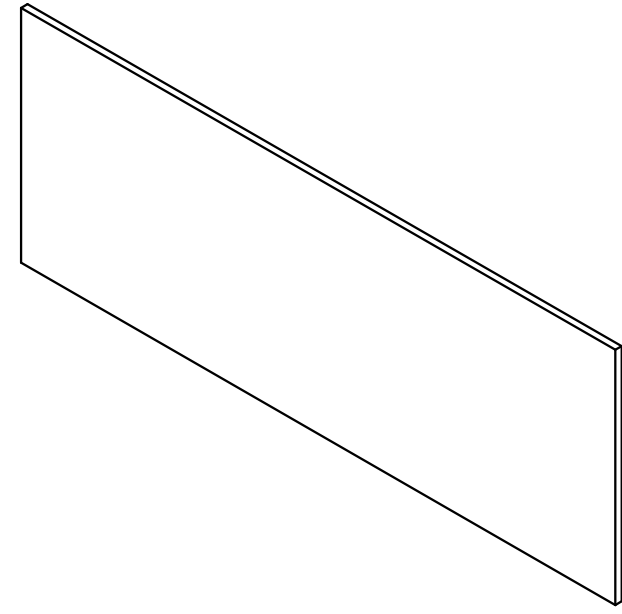
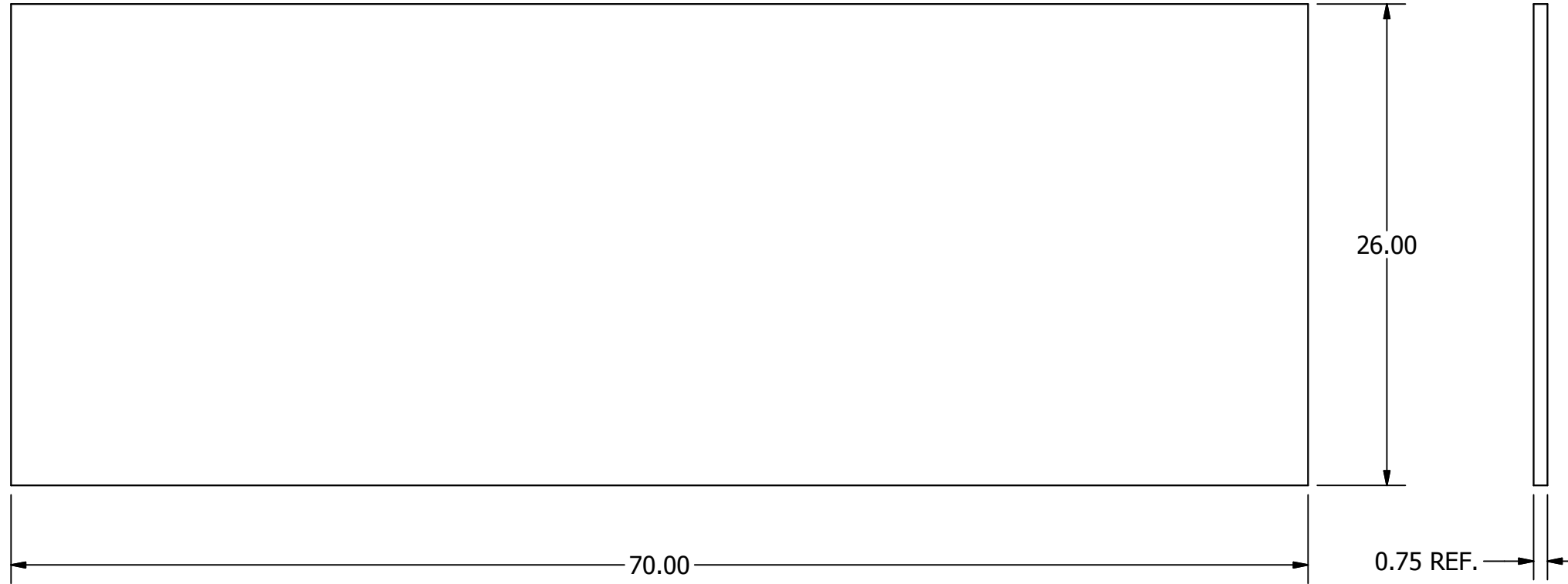
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REV. -
 DRAWING No. TC09016-0033
 No. DE DESSIN



ISOMETRIC VIEW

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:

- 1 - MATERIAL: 3/4" THK. ASTM A572-50 HR PLATE.
- 2 - REMOVE ALL SHARP EDGES.

TIAX LLC

LEXINGTON, MASSACHUSETTS 02421

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		DIMENSION UNITS IMPERIAL <input checked="" type="checkbox"/> METRIC <input type="checkbox"/>		CE DOCUMENT NE PEUT ÊTRE REPRODUIT OU COPIÉ SANS CONSENTEMENT ÉCRIT DE TAYLOR RAYNAULD AMAR ET ASSOCIÉS LTÉE. THIS DOCUMENT MAY NOT BE REPRODUCED OR COPIED UNLESS EXPRESSLY AUTHORIZED BY TAYLOR RAYNAULD AMAR & ASSOCIATED LTD.		APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
		TOLERANCES UNLESS OTHERWISE INDICATED FRACTION 0 - 12" ±1/32" 0 - 300mm ±1mm 12 - 78" ±1/16" 300 - 2000mm ±1mm 78" - + ±1/8" 2000mm + ±1mm DECIMAL 0 - 12" ±.005" 0 - 300mm ±0.15mm 12 - 78" ±.010" 300 - 2000mm ±0.3mm 78" - + ±.031" 2000mm + ±1mm		No. DE CONTRAT TC-09-016		DATE: YY/MM/DD CONCU DESIGNED A. MELOCHE 11/02/01 DESSINE DRAWN A. MELOCHE 11/04/20 VERIFIE CHECKED G. AMAR 11/04/20 APPROUVE APPROVED G. AMAR 11/04/21		TITRE BOTTOM PLATE	
		ANGLES ±1/2° MACHINED SURFACE FINISH 125 Mu in./N _S		ENS. SUIVANT TC06019-0024		No. DE DESSIN TRA TC09016-0033			
		HOLE DIAMETER TOLERANCES 0 - .250" +.003" -0.002" 0 - 6mm +0.08mm -0.05mm .250 - .500" +.005" -0.003" 6 - 12mm +0.13mm -0.08mm .500" - + .010" -0.005" 12mm + +0.25mm -0.13mm		NEXT ASSY. TC06019-0024		TRA DRAWING No. TC09016-0033			
NO	DATE	DESCRIPTIONS	PAR BY	REVISIONS		PAGE 1 OF 1 ECHELLE 1:8	REV. -		

FORMAT-B

WEIGHT: 387.6 lbmass

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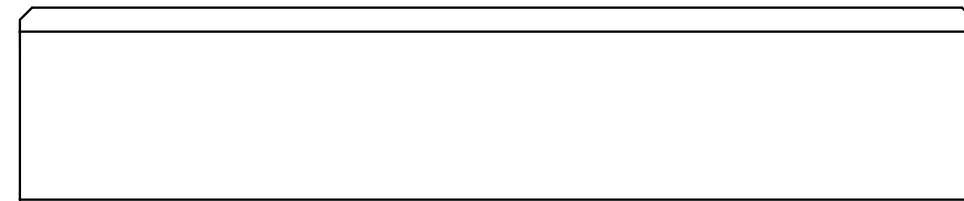
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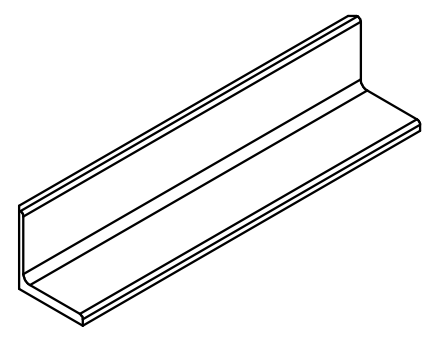
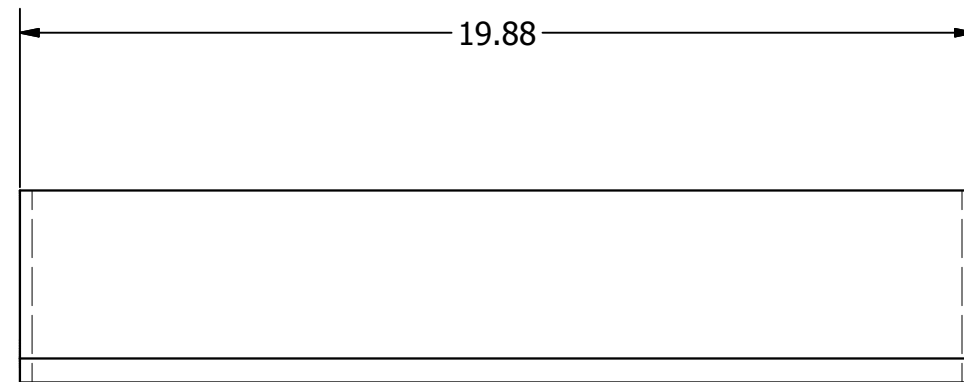
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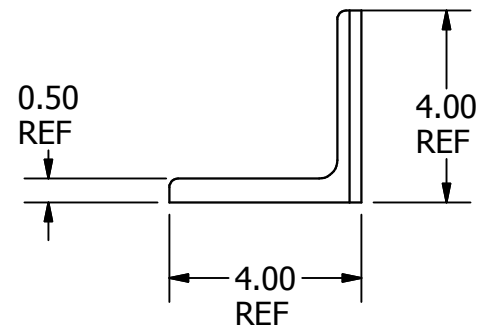
REV. -
 DRAWING No. TC09016-0032
 No. DE DESSIN



CHAMFER .25 X 45°
 2 PLACES.



ISOMETRIC VIEW



NOTES:
 1 - MATERIAL: STEEL ANGLE 4 X 4 X 1/2 ASTM A572-50.
 2 - REMOVE ALL SHARP EDGES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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PROJECTION
 NOM DE FICHER: TC09016-0032.icw
 FILENAME:

NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ NIS			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No. **TC-09-016**

ENS. SUIVANT
 NEXT ASSY. **TC09016-0024**

UNE DIVISION DE / A DIVISION OF		
TRA CANARAIL		
CONCU DESIGNED	A. MELOCHE	DATE: YY/MM/DD 10/02/07
DESSINE DRAWN	M. SIMONEAU	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE TOP ANGLE					
PAGE 1	SHEET 1	DE 1	OF 1	No. DE DESSIN TRA TC09016-0032	TRA DRAWING No. -
ECHELLE 1 : 4			SCALE		

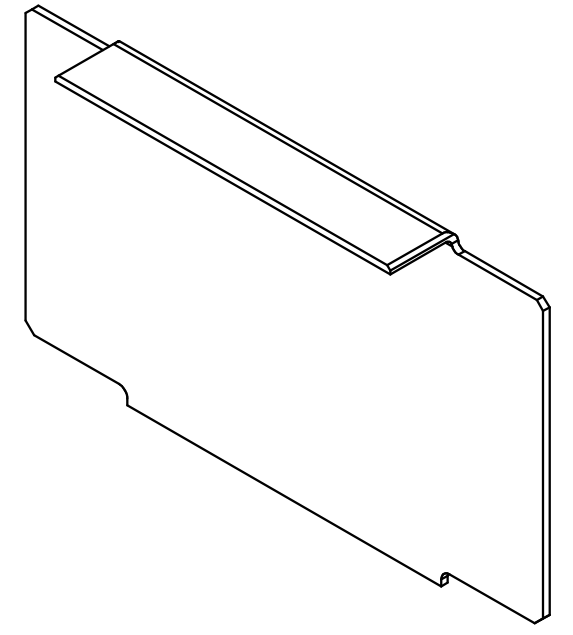
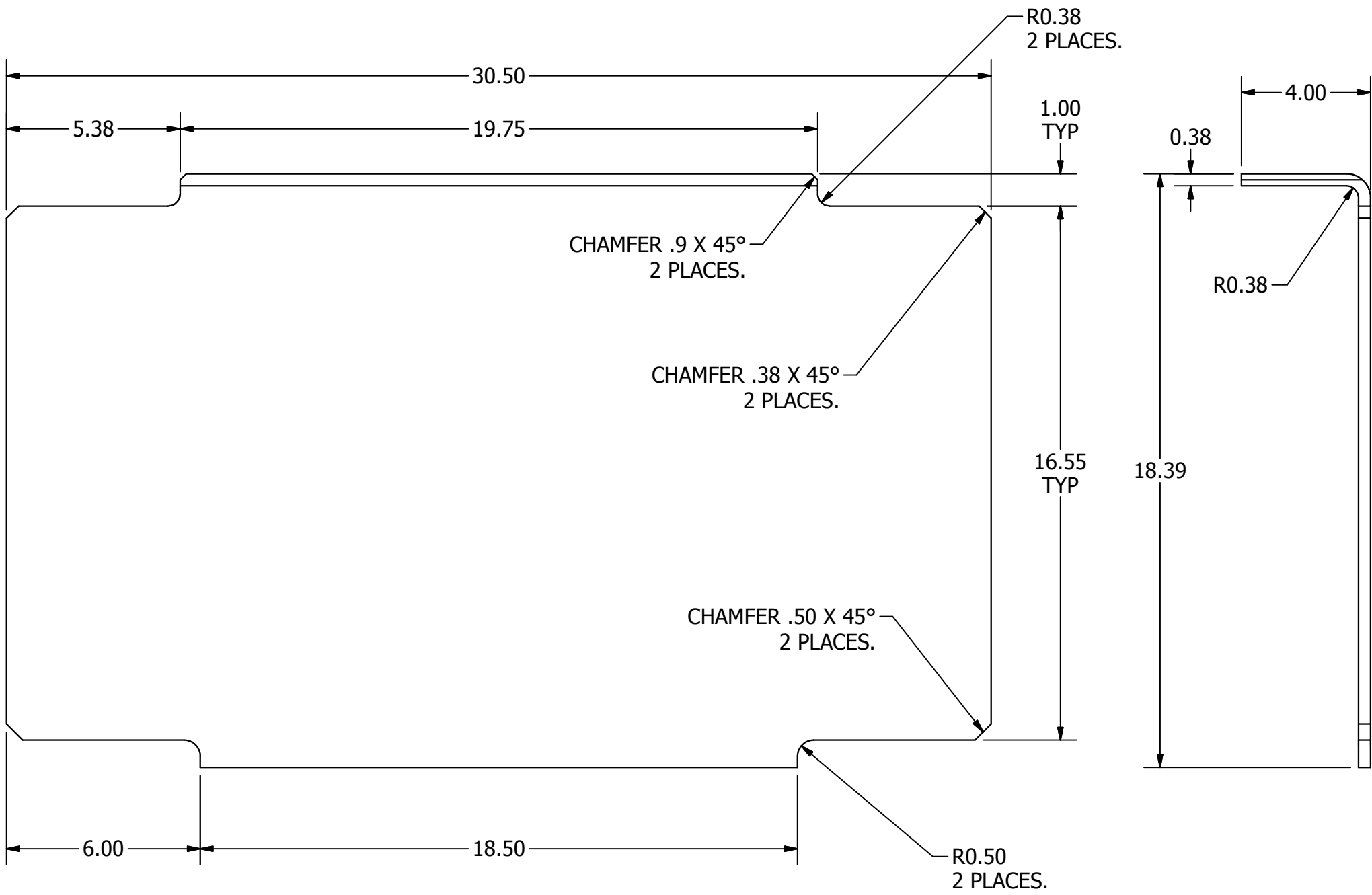
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REV. -
 DRAWING No. TC09016-0031
 No. DE DESSIN



NOTES:
 1 - MATERIAL: 3/8" THK. ASTM A572-50 HR PLATE.
 2 - REMOVE ALL SHARP EDGES.

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./ NIS/			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	±.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
 CONTRACT No. **TC-09-016**

ENS. SUIVANT
 NEXT ASSY. **TC09016-0024**

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	M. SIMONEAU	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

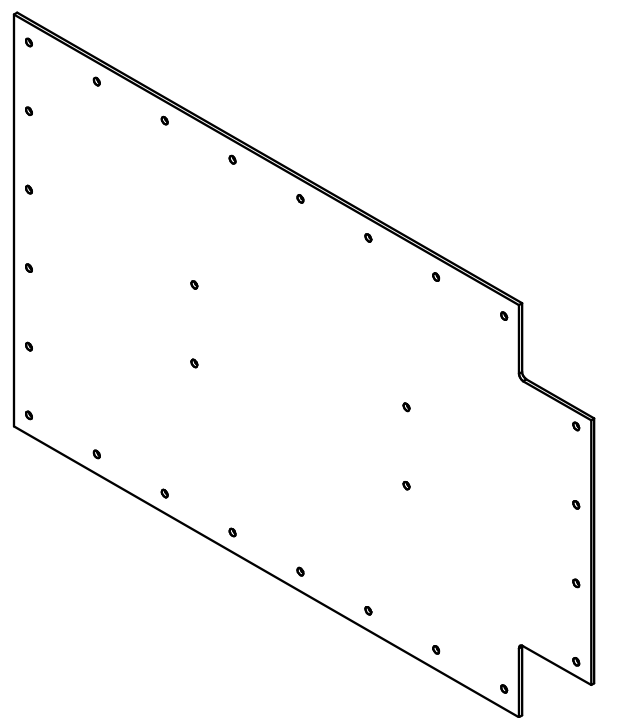
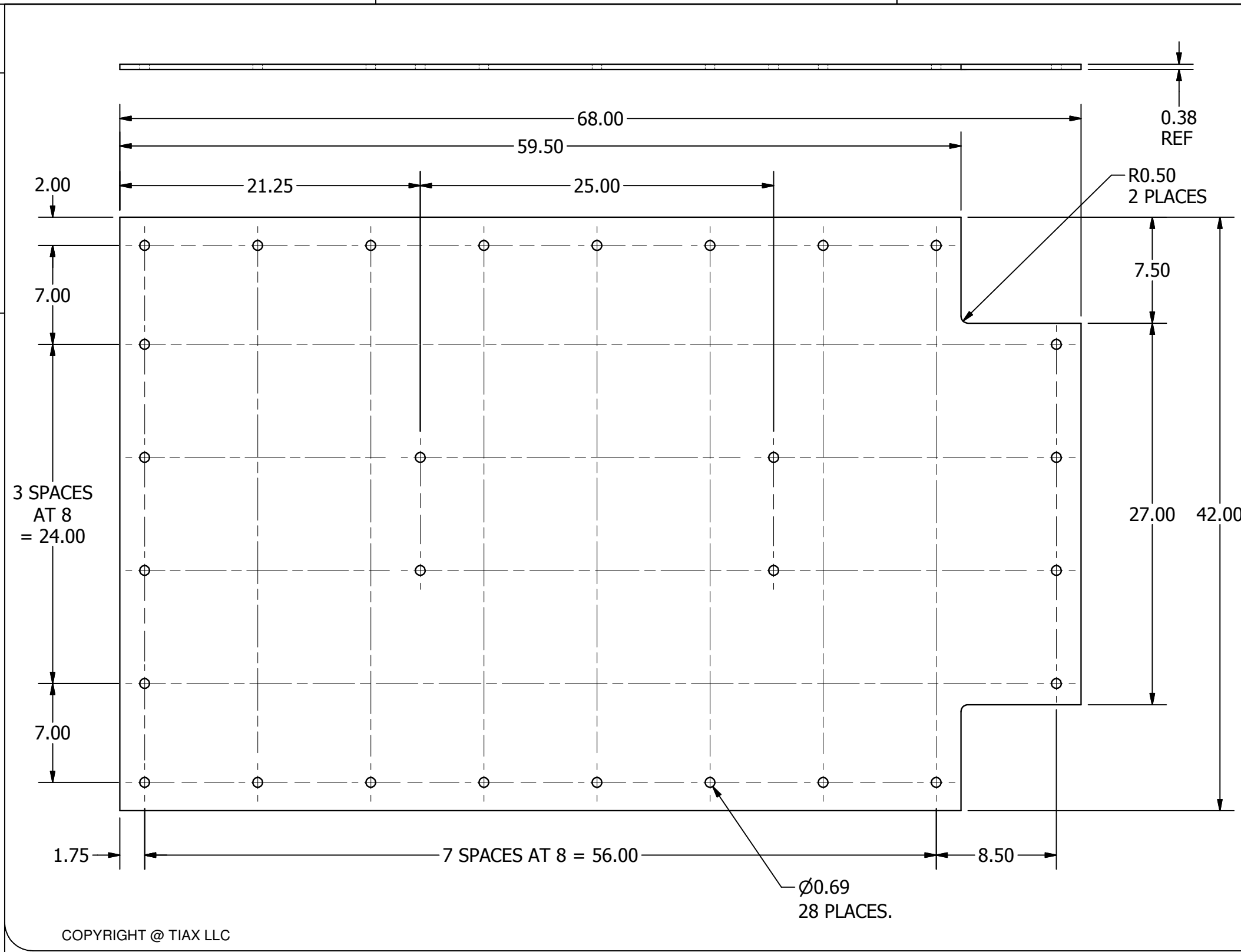
APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE STIFFENER PLATE					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
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ECHELLE		SCALE		REV.	
1 : 4				-	



PROJECTION
 NOM DE FICHER: TC09016-0031.icw
 FILENAME:

REV. -
DRAWING No. TC09016-0030
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

NOTES:
1 - MATERIAL: 3/8" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.

TIAX LLC
LEXINGTON, MASSACHUSETTS 02421

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.
TC-09-016

ENS. SUIVANT
NEXT ASSY.
TC09016-0023

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/02/02
DESSINE DRAWN	M. SIMONEAU	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21
DATE: YY/MM/DD		

APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE TOP PLATE			
PAGE	SHEET	DE	OF
1	1		
ECHELLE 1 : 8		SCALE	
No. DE DESSIN TRA TC09016-0030		TRA DRAWING No. -	
REV.		-	

PROJECTION
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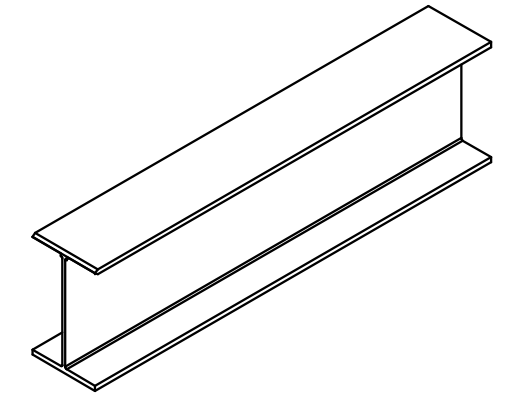
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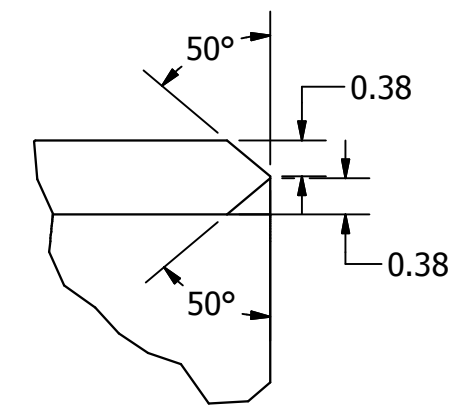
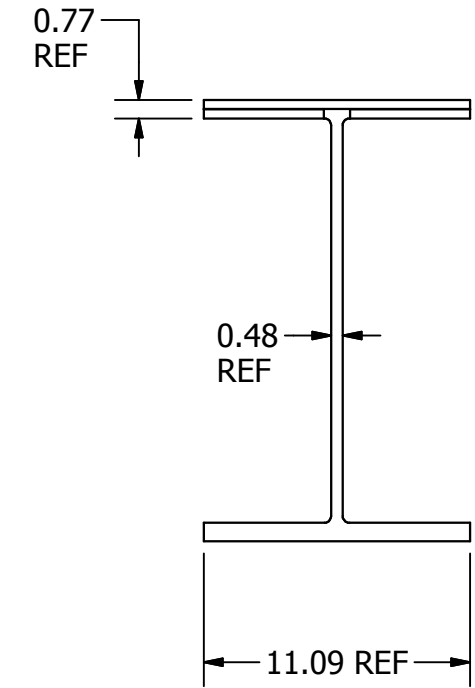
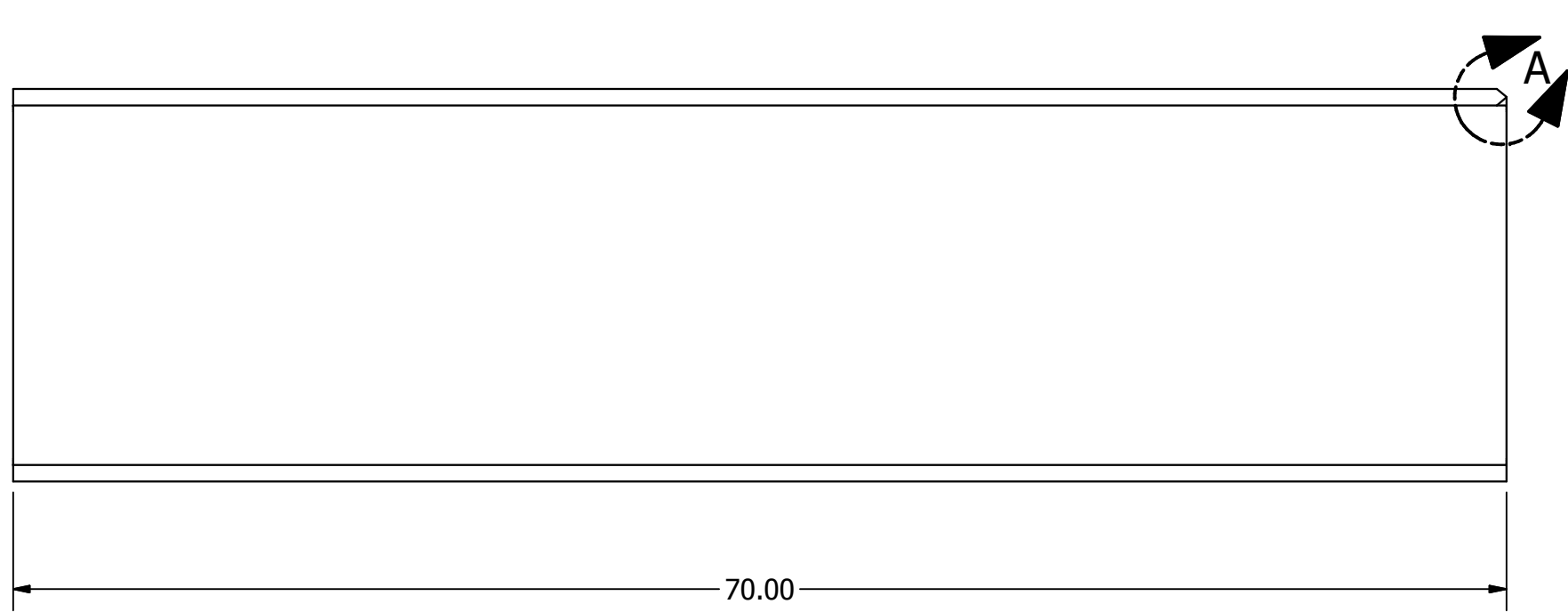
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A

REV. -
 DRAWING No. TC09016-0029
 No. DE DESSIN



ISOMETRIC VIEW



DETAIL A
SCALE 1 / 2

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
 ALL DIMENSIONS ARE IN INCHES.

NOTES:

- 1 - MATERIAL: STEEL WIDE FLANGE BEAM W18 X 86 ASTM A572-50 OR EQUIV.
- 2 - REMOVE ALL SHARP EDGES.

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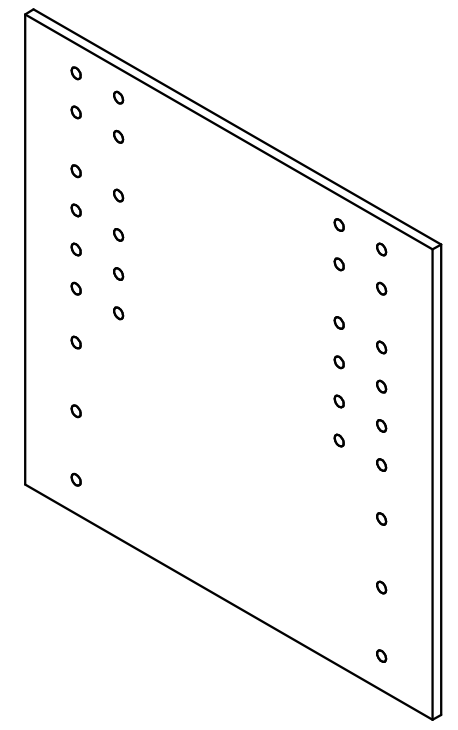
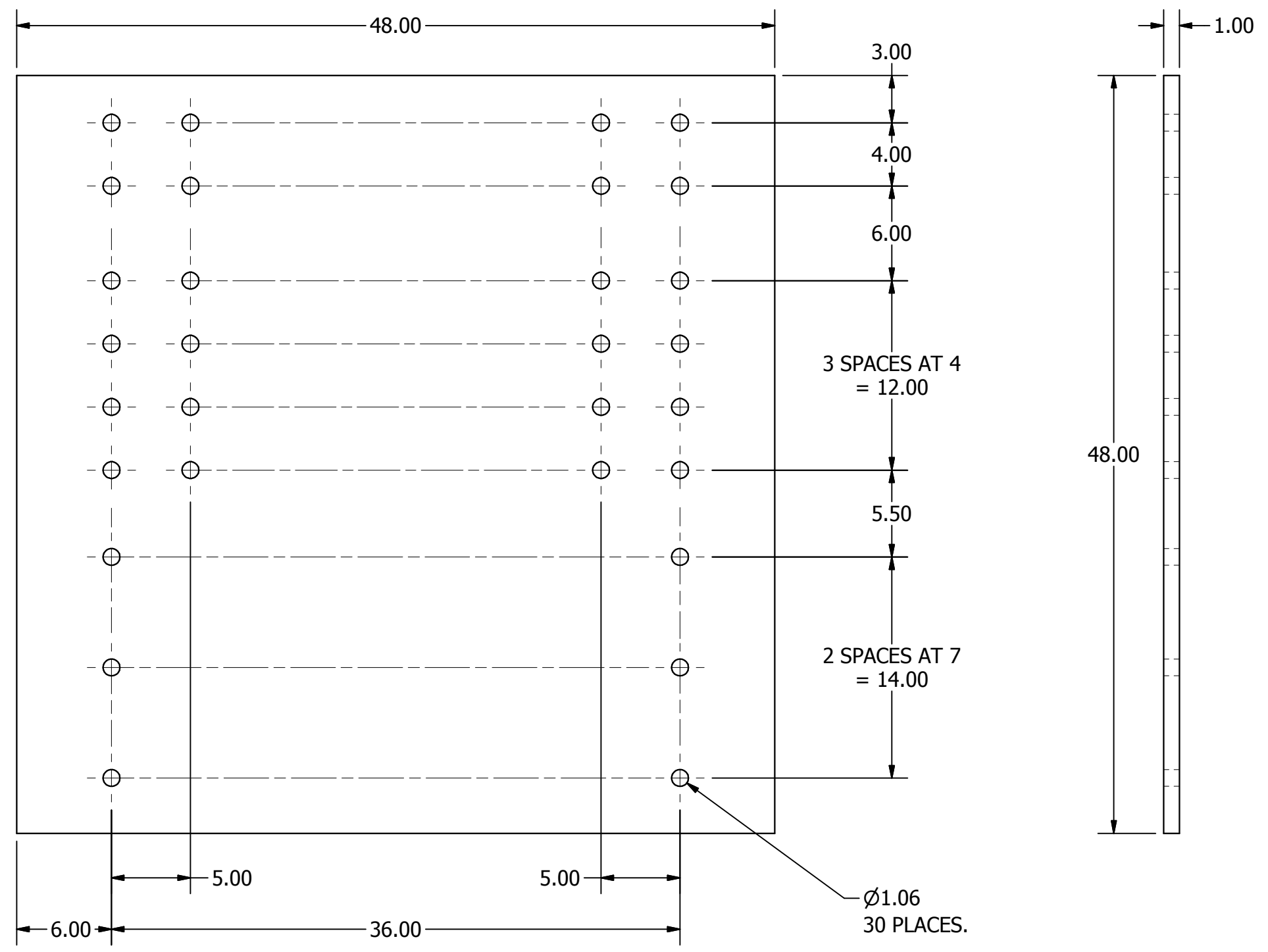
TIAX LLC
 LEXINGTON, MASSACHUSETTS 02421

		DIMENSION UNITS		CE DOCUMENT NE PEUT ÊTRE REPRODUIT OU COPIÉ SANS CONSENTEMENT ÉCRIT DE TAYLOR RAYNAULD AMAR ET ASSOCIÉS LTÉE. THIS DOCUMENT MAY NOT BE REPRODUCED OR COPIED UNLESS EXPRESSLY AUTHORIZED BY TAYLOR RAYNAULD AMAR & ASSOCIATED LTD.	UNE DIVISION DE / A DIVISION OF	APPLICATION LOCOMOTIVE CRASHWORTHY COMPONENTS																																																											
		IMPERIAL <input checked="" type="checkbox"/> METRIC <input type="checkbox"/>	TOLERANCES UNLESS OTHERWISE INDICATED <table style="font-size: x-small; width: 100%;"> <tr> <td>FRACTION</td> <td>0 - 12"</td> <td>±1/32"</td> <td>0 - 300mm</td> <td>±1mm</td> </tr> <tr> <td></td> <td>12 - 78"</td> <td>±1/16"</td> <td>300 - 2000mm</td> <td>±1mm</td> </tr> <tr> <td></td> <td>78" - +</td> <td>±1/8"</td> <td>2000mm +</td> <td>±1mm</td> </tr> <tr> <td>DECIMAL</td> <td>0 - 12"</td> <td>±.005"</td> <td>0 - 300mm</td> <td>±0.15mm</td> </tr> <tr> <td></td> <td>12 - 78"</td> <td>±.010"</td> <td>300 - 2000mm</td> <td>±0.3mm</td> </tr> <tr> <td></td> <td>78" - +</td> <td>±.031"</td> <td>2000mm +</td> <td>±1mm</td> </tr> </table>			FRACTION	0 - 12"	±1/32"	0 - 300mm	±1mm		12 - 78"	±1/16"	300 - 2000mm	±1mm		78" - +	±1/8"	2000mm +	±1mm	DECIMAL	0 - 12"	±.005"	0 - 300mm	±0.15mm		12 - 78"	±.010"	300 - 2000mm	±0.3mm		78" - +	±.031"	2000mm +	±1mm	ANGLS ±1/2° MACHINED SURFACE FINISH 125 Mu in./√		HOLE DIAMETER TOLERANCES <table style="font-size: x-small; width: 100%;"> <tr> <td>0 - .250"</td> <td>+.003"</td> <td>0 - 6mm</td> <td>+0.08mm</td> </tr> <tr> <td></td> <td>-.002"</td> <td></td> <td>-0.05mm</td> </tr> <tr> <td>.250 - .500"</td> <td>±.005"</td> <td>6 - 12mm</td> <td>+0.13mm</td> </tr> <tr> <td></td> <td>-.003"</td> <td></td> <td>-0.08mm</td> </tr> <tr> <td></td> <td>+.010"</td> <td></td> <td>+0.25mm</td> </tr> <tr> <td>.500" - +</td> <td>-.005"</td> <td>12mm +</td> <td>-0.13mm</td> </tr> </table>		0 - .250"	+.003"	0 - 6mm	+0.08mm		-.002"		-0.05mm	.250 - .500"	±.005"	6 - 12mm	+0.13mm		-.003"		-0.08mm		+.010"		+0.25mm	.500" - +	-.005"	12mm +	-0.13mm	DATE: YY/MM/DD CONCU DESIGNED A. MELOCHE 10/12/22 DESSINE DRAWN M. SIMONEAU 11/04/20 VERIFIE CHECKED G. AMAR 11/04/20 APPROUVE APPROVED G. AMAR 11/04/21	
FRACTION	0 - 12"	±1/32"	0 - 300mm	±1mm																																																													
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REVISIONS <table style="width: 100%; font-size: x-small;"> <tr> <th>NO</th> <th>DATE</th> <th>DESCRIPTIONS</th> <th>PAR BY</th> </tr> </table>		NO	DATE	DESCRIPTIONS	PAR BY			ECHELLE SCALE 1 : 8																																																									
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PROJECTION
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 FILENAME:

REV. -
DRAWING No. TC09016-0028
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



ISOMETRIC VIEW

NOTES:
1 - MATERIAL: 1" THK. ASTM A572-50 HR PLATE.
2 - REMOVE ALL SHARP EDGES AND DEBURR HOLES.

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PROJECTION
NOM DE FICHER: TC09016-0028.icw
FILENAME:

DIMENSION UNITS			
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TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm ±1mm	
	12 - 78" ±1/16"	300 - 2000mm ±1mm	
	78" - + ±1/8"	2000mm + ±1mm	
DECIMAL	0 - 12" ±.005"	0 - 300mm ±0.15mm	
	12 - 78" ±.010"	300 - 2000mm ±0.3mm	
	78" - + ±.031"	2000mm + ±1mm	
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No.
TC-09-016

ENS. SUIVANT
NEXT ASSY.
TC09016-0024

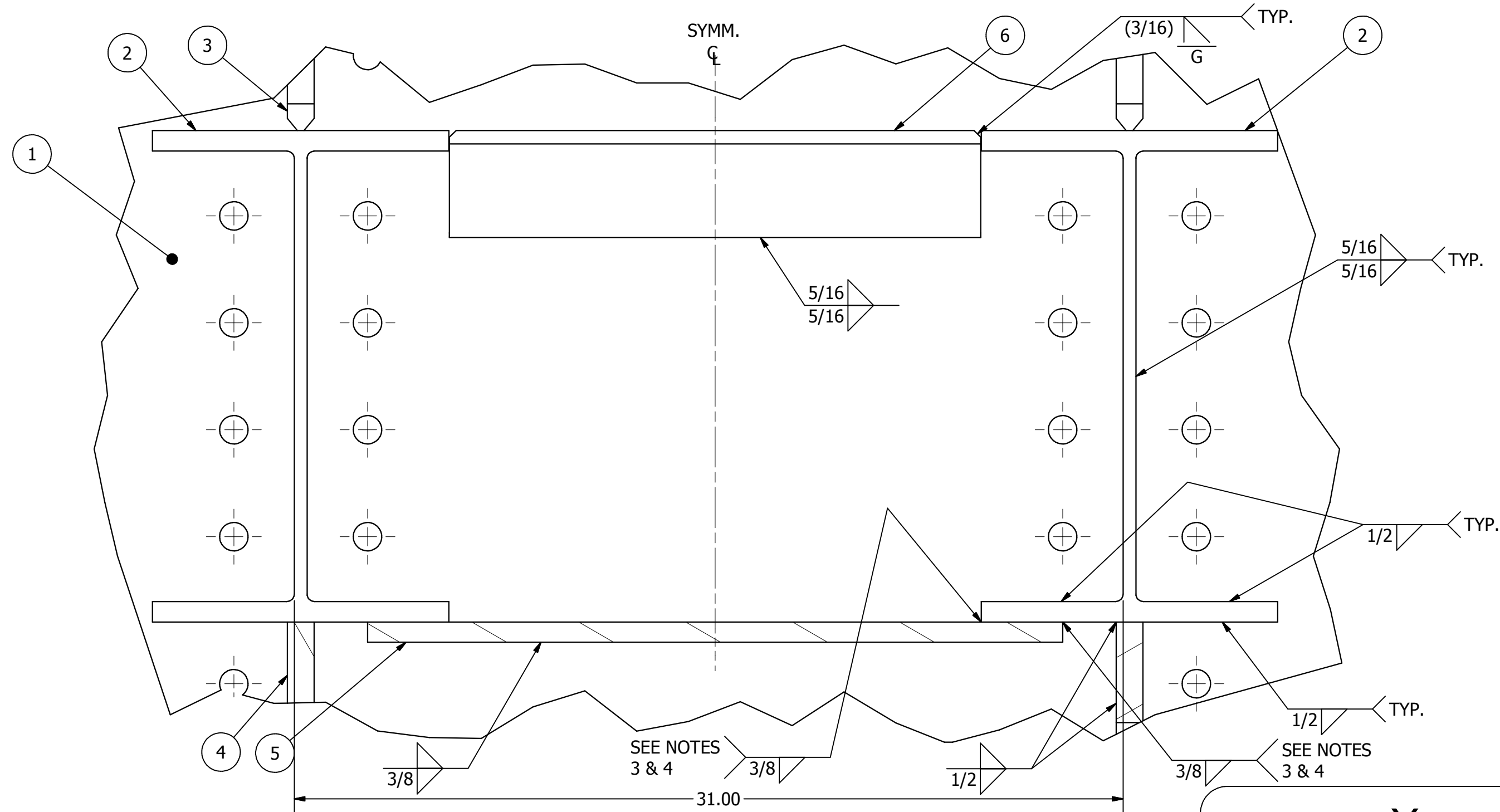


DATE: YY/MM/DD		
CONCU DESIGNED	A. MELOCHE	11/02/01
DESSINE DRAWN	M. SIMONEAU	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION					
LOCOMOTIVE CRASHWORTHY COMPONENTS					
TITRE					
BASE PLATE					
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.
1	1			TC09016-0028	
ECHELLE		SCALE			
1 : 8					
REV.					-

REV. -
DRAWING No. TC09016-0024
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.



SEE NOTES
3 & 4

SECTION B-B
(SHEET 1)

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
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TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12" ±1/32"	0 - 300mm	±1mm
	12 - 78" ±1/16"	300 - 2000mm	±1mm
	78" - + ±1/8"	2000mm +	±1mm
DECIMAL	0 - 12" ±.005"	0 - 300mm	±0.15mm
	12 - 78" ±.010"	300 - 2000mm	±0.3mm
	78" - + ±.031"	2000mm +	±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./√			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
.500" - +	+.010"	12mm +	+0.25mm
	-.005"		-0.13mm

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No. DE CONTRAT
CONTRACT No.
TC-09-016

ENS. SUIVANT
NEXT ASSY.
TC09016-0023

		DATE: YY/MM/DD
CONCU DESIGNED	A. MELOCHE	11/04/15
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

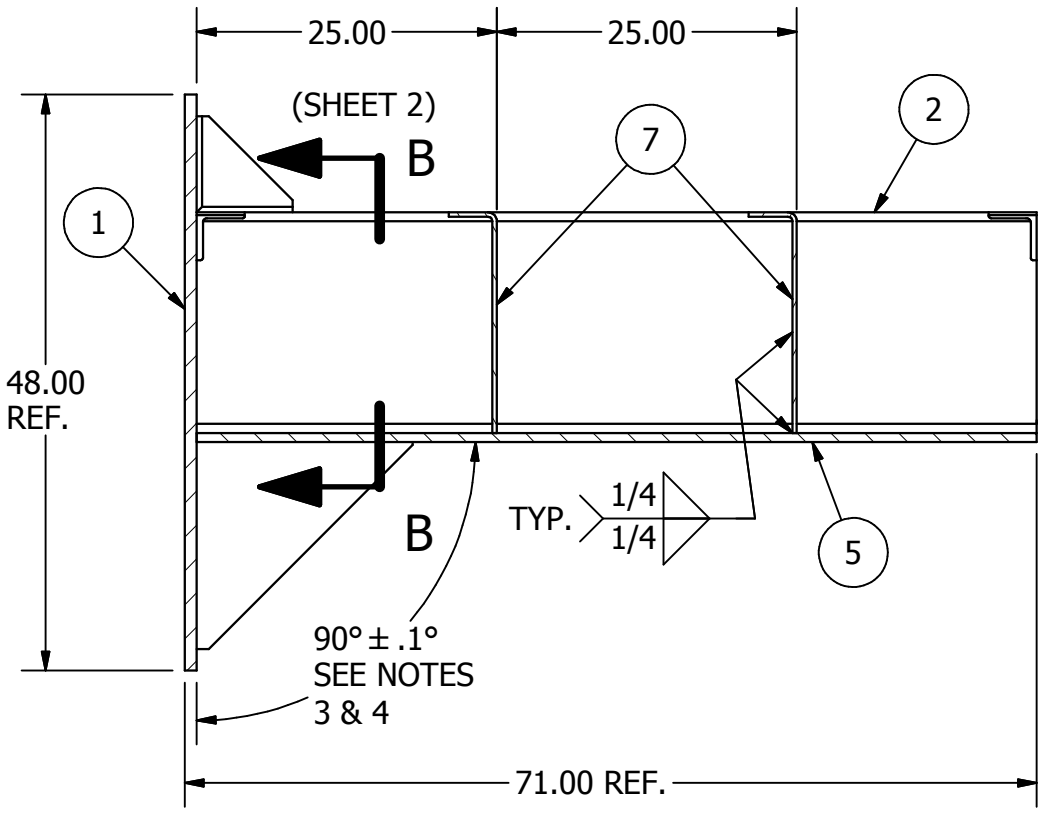
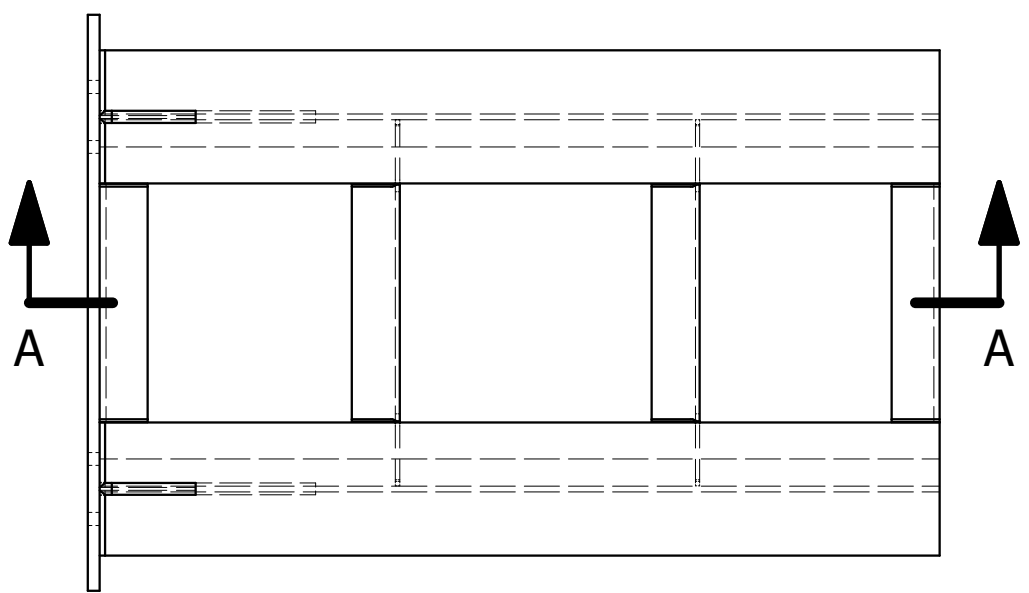
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LOCOMOTIVE CRASHWORTHY COMPONENTS				
TITRE				
SUPPORT BEAM ASSEMBLY				
TITRE				
TC09016-0024				
PAGE	SHEET	DE	OF	No. DE DESSIN TRA
2	2			TRA DRAWING No.
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PROJECTION
NOM DE FICHER: TC09016-0024.icw
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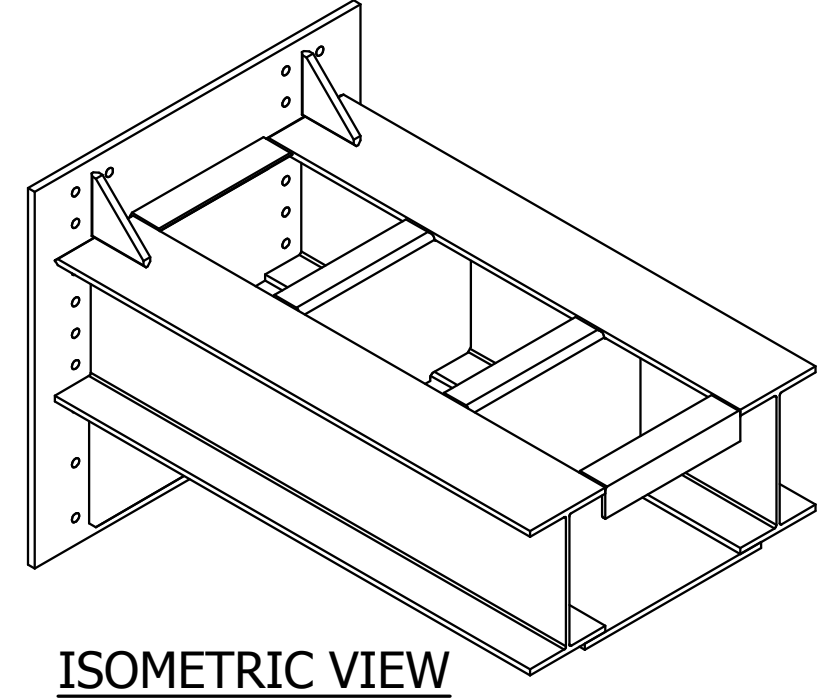
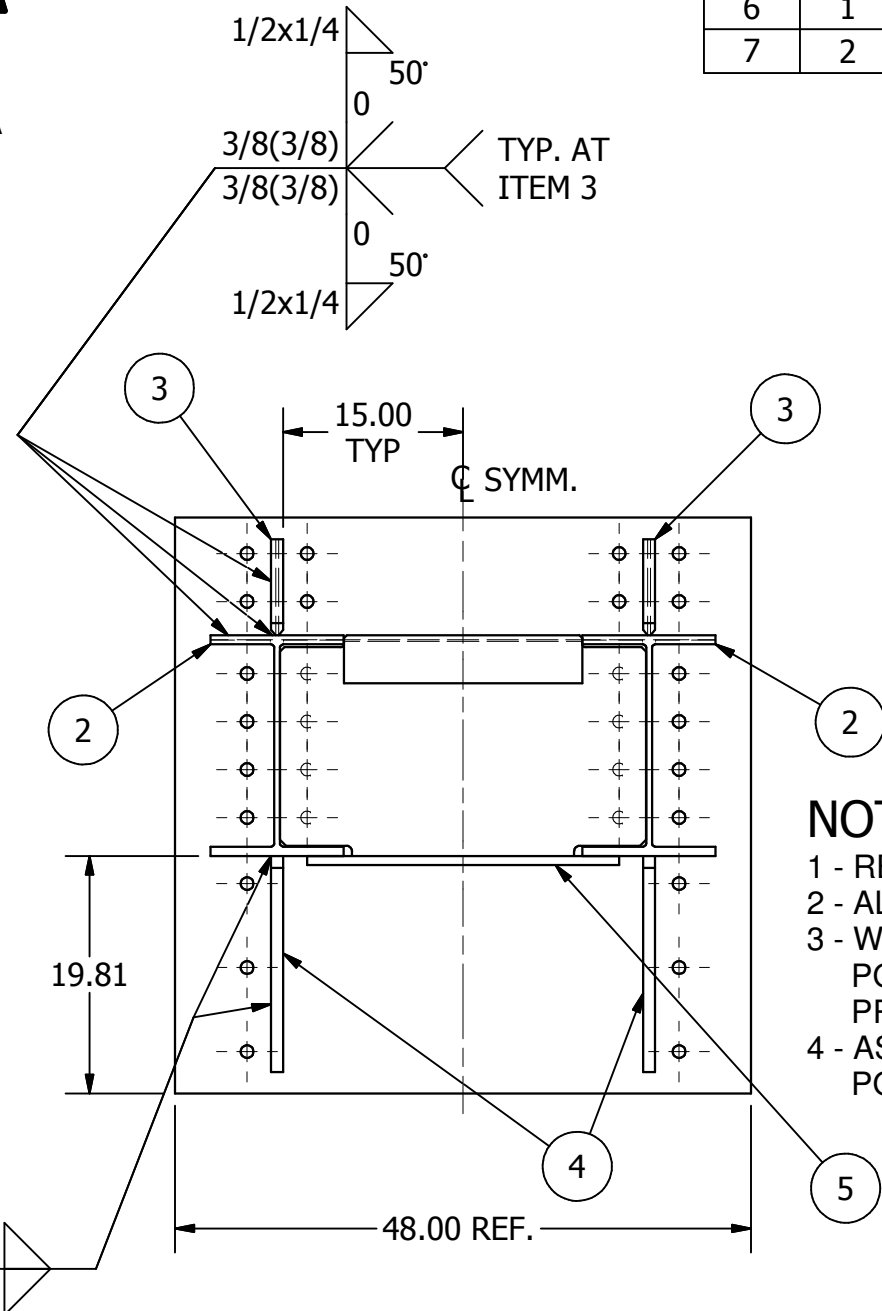
REV. -
DRAWING No. TC09016-0024
No. DE DESSIN

NOTE 1 - TOUTES DIMENSIONS EN POUCES.
ALL DIMENSIONS ARE IN INCHES.

ITEM	QTY	DESCRIPTION	MATERIAL	RECOMMENDED SUPPLIER P/N
1	1	BASE PLATE		TC09016-0028
2	2	TOP BEAM		TC09016-0029
3	2	GUSSET -TOP		TC09016-0034
4	2	GUSSET -BOTTOM		TC09016-0035
5	1	BOTTOM PLATE		TC09016-0033
6	1	TOP ANGLE		TC09016-0032
7	2	STIFFENER PLATE		TC09016-0031



SECTION A-A



ISOMETRIC VIEW

NOTES:

- 1 - REMOVE ALL SHARP EDGES.
- 2 - ALL WELDING TO COMPLY WITH AWS D15.1, LATEST REVISION.
- 3 - WELDING OF ITEM 5 TO ITEM 2 TO BE SEQUENCED TO MINIMIZE POST-WELD CAMBER. A SEQUENCE OF PRE-HEAT SHALL BE PROPOSED & ISSUED TO ENGINEER FOR REVIEW.
- 4 - ASSEMBLY TO BE APPROPRIATELY BRACED TO MINIMIZE POST-WELD DISTORTION & CAMBER.

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NO	DATE	DESCRIPTIONS	PAR BY
REVISIONS			

DIMENSION UNITS			
IMPERIAL <input checked="" type="checkbox"/>		METRIC <input type="checkbox"/>	
TOLERANCES UNLESS OTHERWISE INDICATED			
FRACTION	0 - 12"	±1/32"	0 - 300mm ±1mm
	12 - 78"	±1/16"	300 - 2000mm ±1mm
	78" - +	±1/8"	2000mm + ±1mm
DECIMAL	0 - 12"	±.005"	0 - 300mm ±0.15mm
	12 - 78"	±.010"	300 - 2000mm ±0.3mm
	78" - +	±.031"	2000mm + ±1mm
ANGLES ±1/2°			
MACHINED SURFACE FINISH 125 Mu in./N _S			
HOLE DIAMETER TOLERANCES			
0 - .250"	+.003"	0 - 6mm	+0.08mm
	-.002"		-0.05mm
.250 - .500"	+.005"	6 - 12mm	+0.13mm
	-.003"		-0.08mm
	+.010"		+0.25mm
.500" - +	-.005"	12mm +	-0.13mm

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No. DE CONTRAT
CONTRACT No. **TC-09-016**

ENS. SUIVANT
NEXT ASSY. **TC09016-0023**

UNE DIVISION DE / A DIVISION OF		
	CANARAIL	
CONCU DESIGNED	A. MELOCHE	11/04/15
DESSINE DRAWN	A. MELOCHE	11/04/20
VERIFIE CHECKED	G. AMAR	11/04/20
APPROUVE APPROVED	G. AMAR	11/04/21

APPLICATION				LOCOMOTIVE CRASHWORTHY COMPONENTS			
TITRE				SUPPORT BEAM ASSEMBLY			
PAGE	SHEET	DE	OF	No. DE DESSIN TRA	TRA DRAWING No.	REV.	
1	2			TC09016-0024		-	
ECHELLE		SCALE					
1:8							