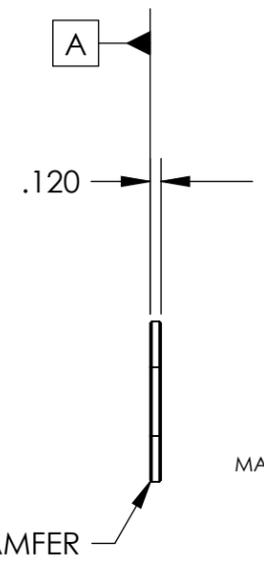
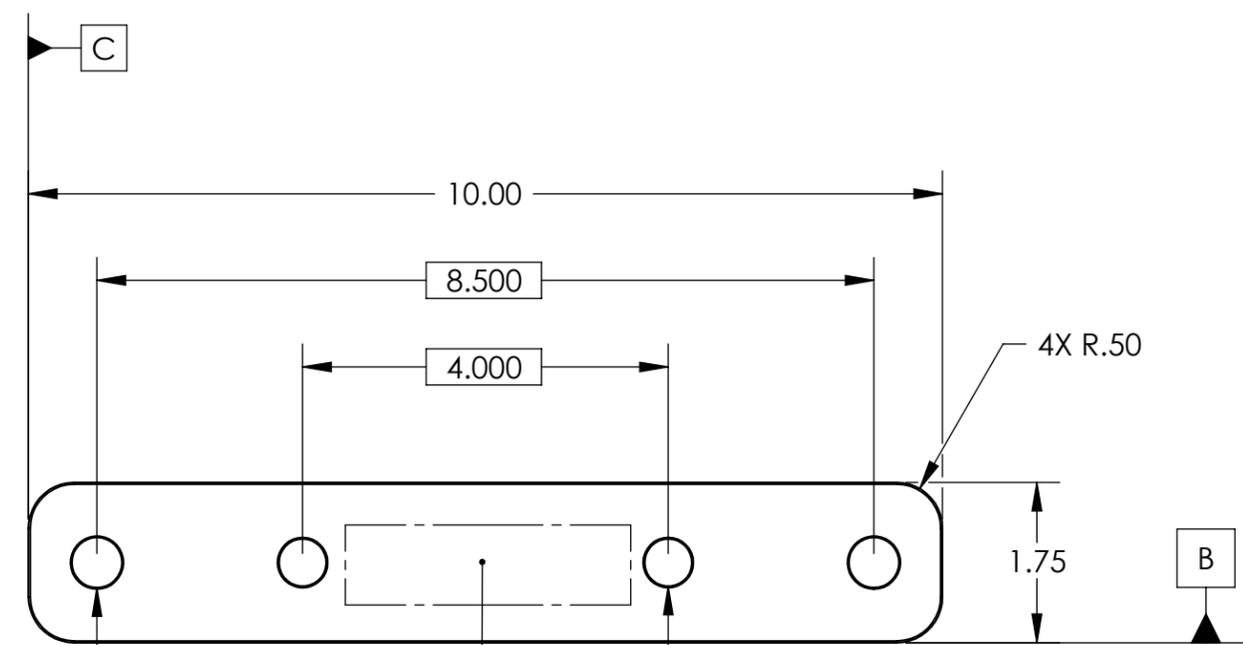
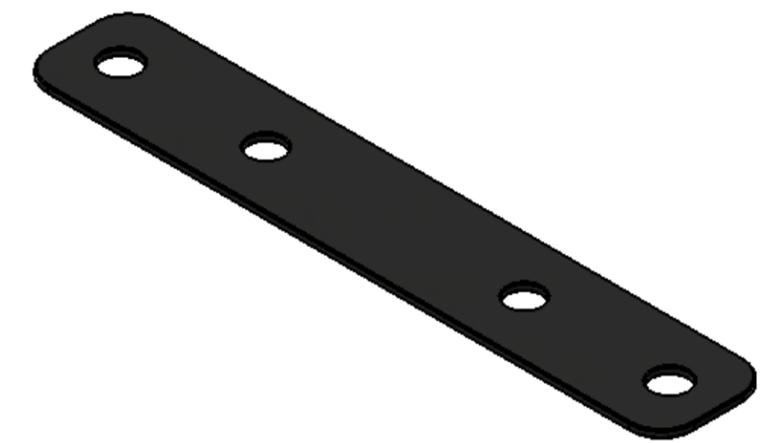


REVISION HISTORY				
REV	DATE	ECO	APPROVAL	DESCRIPTION
V1 / C	2 Jul 2007	1067	D. Bryce	Release for Enhanced LIGO.
V2	16 Apr 2009		A. Stein	Release for Advanced LIGO. Added chamfers and c'sinks.



2X ϕ .547 THRU ALL
 \surd ϕ .58 X 82°, NEAR SIDE
 \oplus ϕ .015 (M) A B C

2X ϕ .516 THRU ALL
 \surd ϕ .55 X 82°, BOTH SIDES
 \oplus ϕ .005 (M) A B C

MANUFACTURING NOTES:

- UNLESS MANUFACTURED FROM SHEET WITH FINISH OF 2B OR EQUIVALENT, MACHINE ALL SURFACES TO REMOVE OXIDES AND MILL FINISH. ABRASIVE REMOVAL TECHNIQUES (OTHER THAN DRESSED BLANCHARD GRINDING) ARE NOT ACCEPTABLE.
- ALL MACHINING FLUIDS MUST BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE, AND SILICONE, SUCH AS CINCINNATI MILACRON CIMTECH 410.
- THOROUGHLY CLEAN PART TO REMOVE ALL OIL, GREASE, DIRT, AND CHIPS.
- WHERE INDICATED, MECHANICALLY SCRIBE, STAMP, OR ENGRAVE THE FOLLOWING INFORMATION AS SHOWN BELOW: **PART NUMBER-REVISION** (AND **TYPE** IF INDICATED), FOLLOWED ON THE NEXT LINE WITH A UNIQUE 3-DIGIT **SERIAL NUMBER** STARTING AT 001 FOR THE FIRST PART AND INCREMENTING THEREAFTER. USE 0.38" TALL CHARACTERS UNLESS PART SIZE DICTATES SMALLER.

D071200-V2, TYPE 00
 S/N - ###

POST-MANUFACTURING NOTES:

P1) CLEAN TO LIGO STANDARDS, CLASS A (PER E0900047 AND E960022).

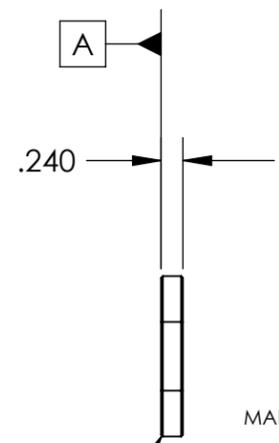
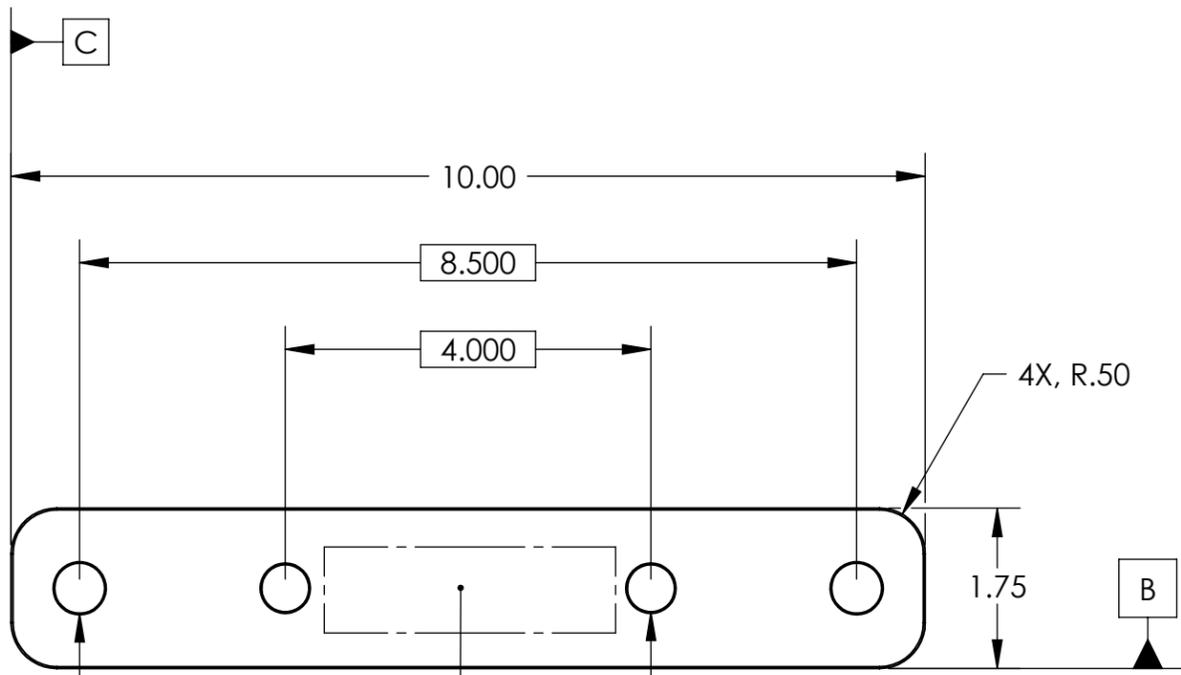
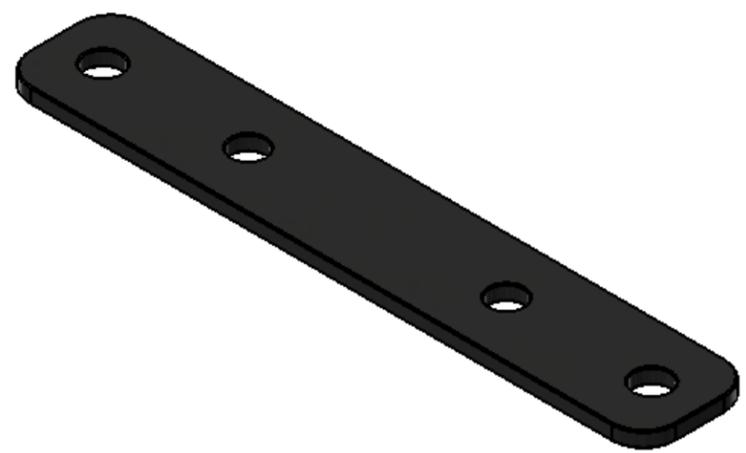
LIGO TYPE 00

APPROVALS	DATE
ENGINEERING (HPD): J. Waterman	6/15/2007
QUALITY (HPD): C. Danaher	6/15/2007
MATERIAL:	304 SS
FINISH:	None
MASS:	0.6 lbs

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 DECIMAL TOLERANCES:
 .XX \pm .015 .XXX \pm .005
 ANG TOL: \pm 1° SURFACE ROUGHNESS: 63
 REMOVE ALL SHARP EDGES.
 LEAVE .005 X 45° MIN CHAMFER,
 OR .005 MIN RADIUS.
 THIS PRINT & THE EMBEDDED CAD
 MODEL ARE THE DOCUMENTATION OF
 RECORD. UNLESS OTHERWISE SPECIFIED,
 ALL DIMENSIONS IN THE MODEL ARE
 BASIC, WITH TOLERANCES GIVEN BY:

$\overline{\text{A}}$.010 A B C

ORIGINAL DESIGN BY:	High Precision Devices			MODIFIED BY:
1668 Valtec Lane, Suite C, Boulder, Colorado 80301 Phone: (303) 447-2558 Fax: (303) 447-2548 Web Site: www.hpd-online.com				
DESCRIPTION: Adjustment Mass				
P/N:	D071200	CONFIG:	Fine, .12"	
CAD FILE NAME: D071200_Adjustment_Mass				
PROJECT: HAM ISI, Advanced LIGO				
SIZE	SCALE: 1:2	DRAWN BY:	Jonas Waterman (HPD)	REV
B	SHEET 1 OF 7	DATE PRINTED:	4/16/2009	V2



2X ϕ .547 THRU ALL
 \sphericalangle ϕ .58 X 82°, BOTH SIDES
 \oplus ϕ .015 (M) A B C

2X ϕ .516 THRU ALL
 \sphericalangle ϕ .55 X 82°, BOTH SIDES
 \oplus ϕ .005 (M) A B C

4

2X .02 X 45° CHAMFER

MANUFACTURING NOTES:

- 1) UNLESS MANUFACTURED FROM SHEET WITH FINISH OF 2B OR EQUIVALENT, MACHINE ALL SURFACES TO REMOVE OXIDES AND MILL FINISH. ABRASIVE REMOVAL TECHNIQUES (OTHER THAN DRESSED BLANCHARD GRINDING) ARE NOT ACCEPTABLE.
- 2) ALL MACHINING FLUIDS MUST BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE, AND SILICONE, SUCH AS CINCINNATI MILACRON CIMTECH 410.
- 3) THOROUGHLY CLEAN PART TO REMOVE ALL OIL, GREASE, DIRT, AND CHIPS.
- 4) WHERE INDICATED, MECHANICALLY SCRIBE, STAMP, OR ENGRAVE THE FOLLOWING INFORMATION AS SHOWN BELOW: **PART NUMBER-REVISION** (AND **TYPE** IF INDICATED), FOLLOWED ON THE NEXT LINE WITH A UNIQUE 3-DIGIT **SERIAL NUMBER** STARTING AT 001 FOR THE FIRST PART AND INCREMENTING THEREAFTER. USE 0.38" TALL CHARACTERS UNLESS PART SIZE DICTATES SMALLER.

D071200-V2, TYPE 01
 S/N - ###

POST-MANUFACTURING NOTES:

P1) CLEAN TO LIGO STANDARDS, CLASS A (PER E0900047 AND E960022).

LIGO TYPE 01

APPROVALS	DATE
ENGINEERING (HPD): J. Waterman	6/15/2007
QUALITY (HPD): C. Danaher	6/15/2007
MATERIAL:	304 SS
FINISH:	None
MASS:	1.1 lbs

UNLESS OTHERWISE SPECIFIED:

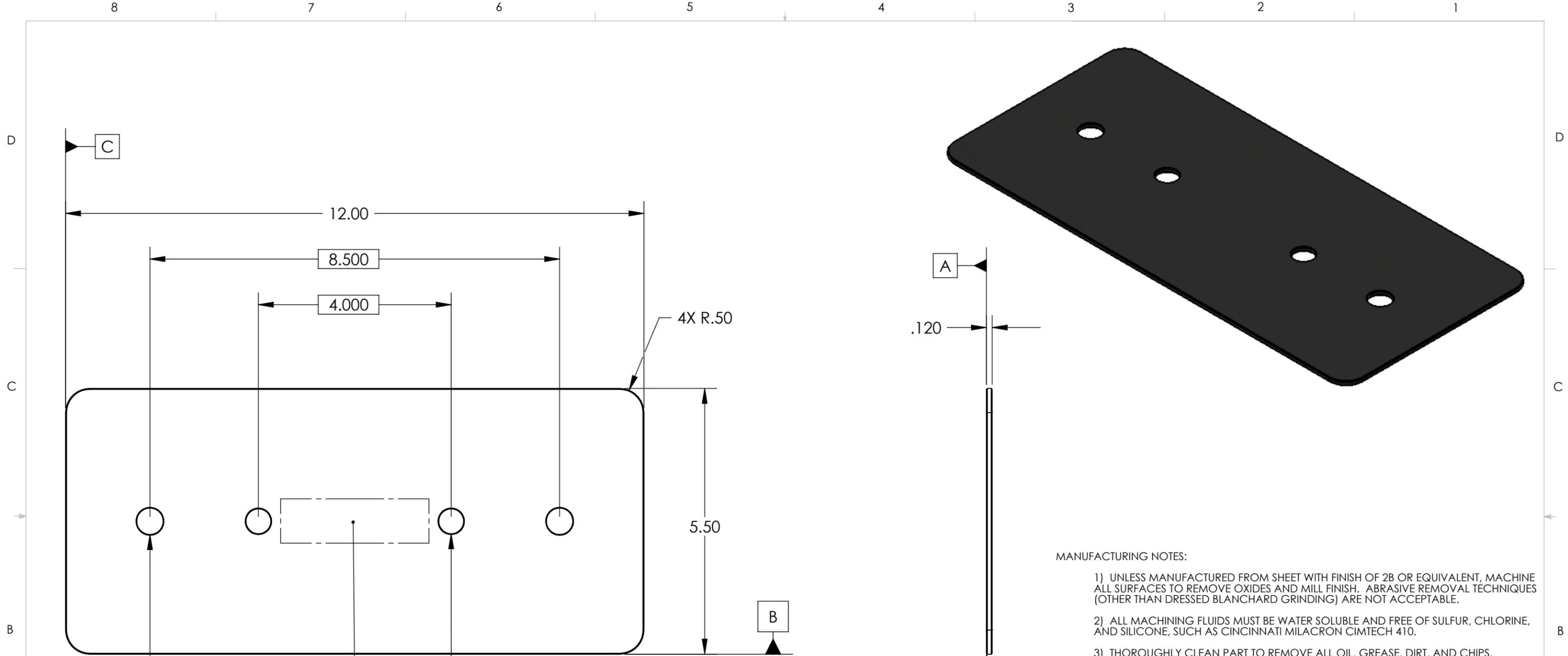
DIMENSIONS ARE IN INCHES
 DECIMAL TOLERANCES:
 .XX ±.015 .XXX ±.005
 ANG TOL: ± 1° SURFACE ROUGHNESS: 63

REMOVE ALL SHARP EDGES.
 LEAVE .005 X 45° MIN CHAMFER,
 OR .005 MIN RADIUS.

THIS PRINT & THE EMBEDDED CAD
 MODEL ARE THE DOCUMENTATION OF
 RECORD. UNLESS OTHERWISE SPECIFIED,
 ALL DIMENSIONS IN THE MODEL ARE
 BASIC, WITH TOLERANCES GIVEN BY:

$\frac{1}{4}$.010 A B C

ORIGINAL DESIGN BY:		High Precision Devices		MODIFIED BY:
		1668 Valtec Lane, Suite C, Boulder, Colorado 80301		
		Phone: (303) 447-2558 Fax: (303) 447-2548 Web Site: www.hpd-online.com		
DESCRIPTION: Adjustment Mass				
P/N:	D071200	CONFIG:	Fine, .24"	
CAD FILE NAME: D071200_Adjustment_Mass				
PROJECT: HAM ISI, Advanced LIGO				
SIZE	SCALE: 1:2	DRAWN BY: Jonas Waterman (HPD)		REV
B	SHEET 2 OF 7	DATE PRINTED:	4/16/2009	V2



2X ϕ .547 THRU ALL
 \sphericalangle ϕ .58 X 82°, BOTH SIDES
 \oplus ϕ .015 (M) A B C

2X ϕ .516 THRU ALL
 \sphericalangle ϕ .55 X 82°, BOTH SIDES
 \oplus ϕ .005 (M) A B C

MANUFACTURING NOTES:

- 1) UNLESS MANUFACTURED FROM SHEET WITH FINISH OF 2B OR EQUIVALENT, MACHINE ALL SURFACES TO REMOVE OXIDES AND MILL FINISH. ABRASIVE REMOVAL TECHNIQUES (OTHER THAN DRESSED BLANCHARD GRINDING) ARE NOT ACCEPTABLE.
- 2) ALL MACHINING FLUIDS MUST BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE, AND SILICONE, SUCH AS CINCINNATI MILACRON CIMTECH 410.
- 3) THOROUGHLY CLEAN PART TO REMOVE ALL OIL, GREASE, DIRT, AND CHIPS.
- 4) WHERE INDICATED, MECHANICALLY SCRIBE, STAMP, OR ENGRAVE THE FOLLOWING INFORMATION AS SHOWN BELOW: **PART NUMBER-REVISION** (AND **TYPE** IF INDICATED), FOLLOWED ON THE NEXT LINE WITH A UNIQUE 3-DIGIT **SERIAL NUMBER** STARTING AT 001 FOR THE FIRST PART AND INCREMENTING THEREAFTER. USE 0.38" TALL CHARACTERS UNLESS PART SIZE DICTATES SMALLER.

D071200-V2, TYPE 02
 S/N - ###

POST-MANUFACTURING NOTES:

P1) CLEAN TO LIGO STANDARDS, CLASS A (PER E0900047 AND E960022).

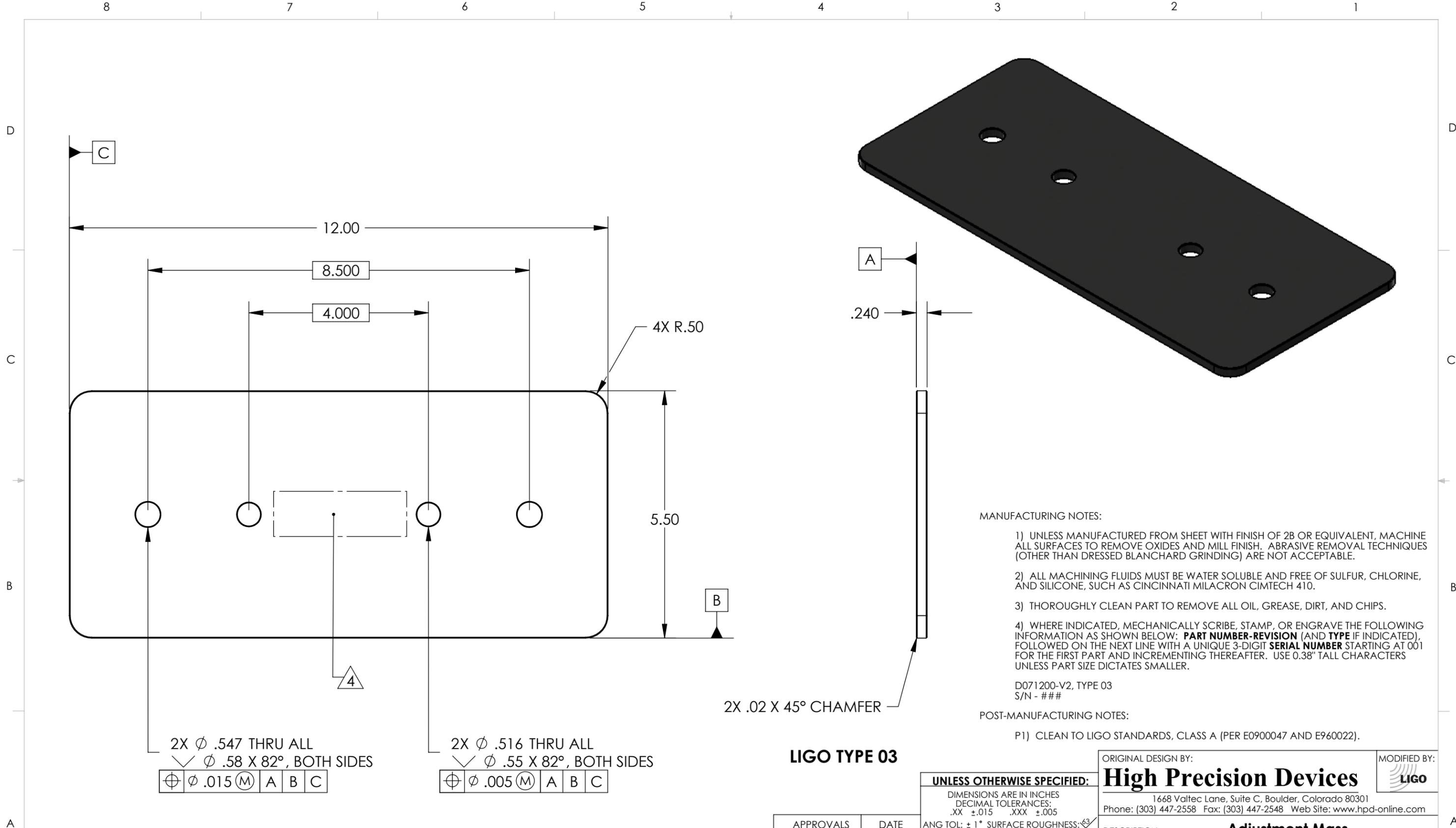
LIGO TYPE 02

APPROVALS	DATE
ENGINEERING (HPD): J. Waterman	6/15/2007
QUALITY (HPD): C. Danaher	6/15/2007
MATERIAL:	304 SS
FINISH:	None
MASS:	2.2 lbs

UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 DECIMAL TOLERANCES:
 .XX ±.015 .XXX ±.005
 ANG TOL: ± 1° SURFACE ROUGHNESS: 63
 REMOVE ALL SHARP EDGES.
 LEAVE .005 X 45° MIN CHAMFER,
 OR .005 MIN RADIUS.
 THIS PRINT & THE EMBEDDED CAD
 MODEL ARE THE DOCUMENTATION OF
 RECORD. UNLESS OTHERWISE SPECIFIED,
 ALL DIMENSIONS IN THE MODEL ARE
 BASIC, WITH TOLERANCES GIVEN BY:

$\overline{\text{A}}$.010 A B C

ORIGINAL DESIGN BY:		High Precision Devices		MODIFIED BY:
1668 Valtec Lane, Suite C, Boulder, Colorado 80301		Phone: (303) 447-2558 Fax: (303) 447-2548 Web Site: www.hpd-online.com		
DESCRIPTION: Adjustment Mass				
P/N:	D071200	CONFIG:	Medium, .12"	
CAD FILE NAME: D071200_Adjustment_Mass				
PROJECT: HAM ISI, Advanced LIGO				
SIZE	SCALE: 1:2	DRAWN BY:	Jonas Waterman (HPD)	REV
B	SHEET 3 OF 7	DATE PRINTED:	4/16/2009	V2



MANUFACTURING NOTES:

- 1) UNLESS MANUFACTURED FROM SHEET WITH FINISH OF 2B OR EQUIVALENT, MACHINE ALL SURFACES TO REMOVE OXIDES AND MILL FINISH. ABRASIVE REMOVAL TECHNIQUES (OTHER THAN DRESSED BLANCHARD GRINDING) ARE NOT ACCEPTABLE.
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- 3) THOROUGHLY CLEAN PART TO REMOVE ALL OIL, GREASE, DIRT, AND CHIPS.
- 4) WHERE INDICATED, MECHANICALLY SCRIBE, STAMP, OR ENGRAVE THE FOLLOWING INFORMATION AS SHOWN BELOW: **PART NUMBER-REVISION** (AND **TYPE** IF INDICATED), FOLLOWED ON THE NEXT LINE WITH A UNIQUE 3-DIGIT **SERIAL NUMBER** STARTING AT 001 FOR THE FIRST PART AND INCREMENTING THEREAFTER. USE 0.38" TALL CHARACTERS UNLESS PART SIZE DICTATES SMALLER.

D071200-V2, TYPE 03
S/N - ###

POST-MANUFACTURING NOTES:

- P1) CLEAN TO LIGO STANDARDS, CLASS A (PER E0900047 AND E960022).

2X .02 X 45° CHAMFER

LIGO TYPE 03

APPROVALS	DATE
ENGINEERING (HPD): J. Waterman	6/15/2007
QUALITY (HPD): C. Danaher	6/15/2007
MATERIAL:	304 SS
FINISH:	None
MASS:	4.5 lbs

UNLESS OTHERWISE SPECIFIED:

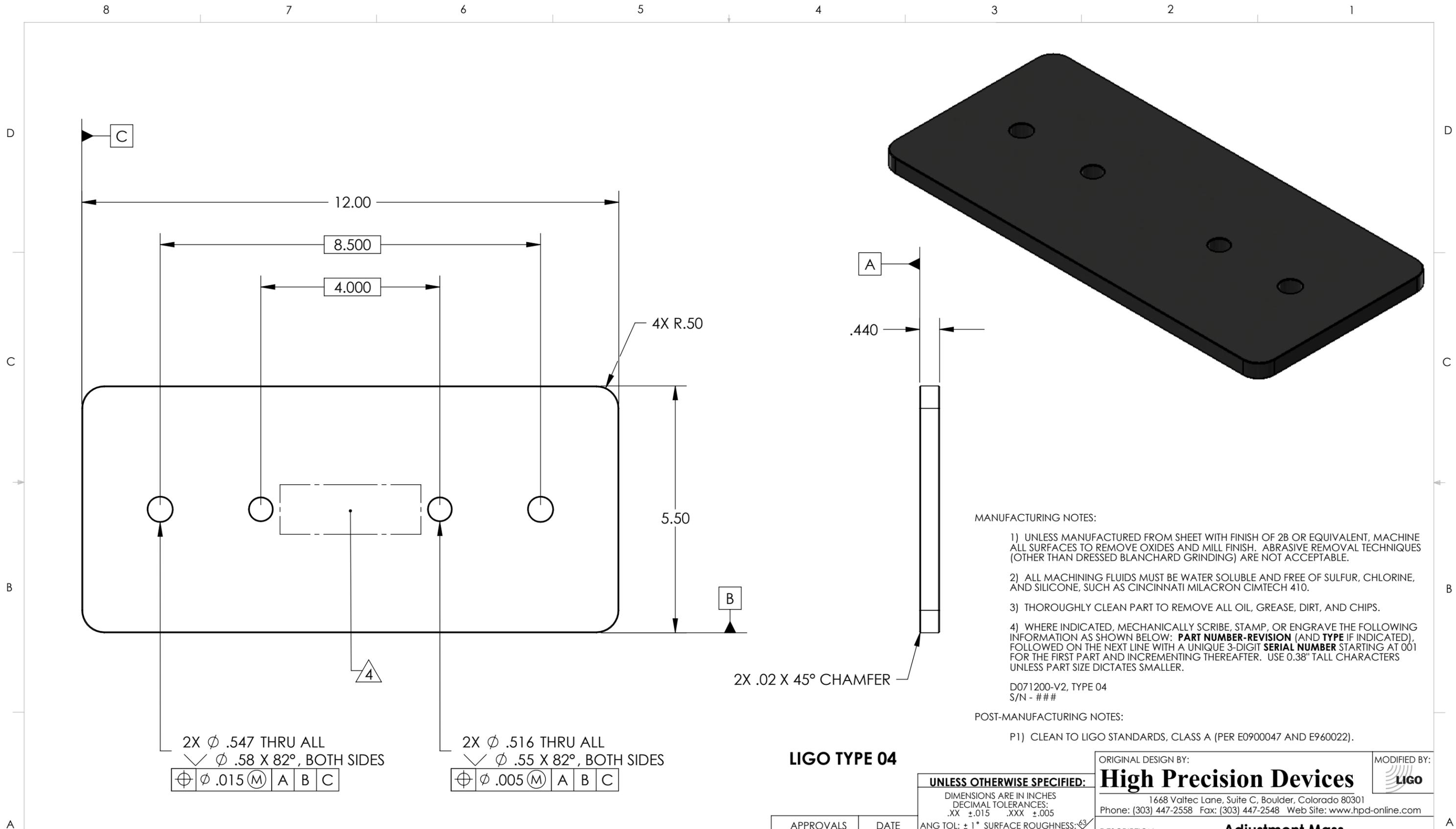
DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCES:
.XX ±.015 .XXX ±.005

ANG TOL: ± 1° SURFACE ROUGHNESS: 6.3
REMOVE ALL SHARP EDGES.
LEAVE .005 X 45° MIN CHAMFER,
OR .005 MIN RADIUS.

THIS PRINT & THE EMBEDDED CAD MODEL ARE THE DOCUMENTATION OF RECORD. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN THE MODEL ARE BASIC, WITH TOLERANCES GIVEN BY:

	.010	A	B	C
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ORIGINAL DESIGN BY:		High Precision Devices		MODIFIED BY:
		1668 Valtec Lane, Suite C, Boulder, Colorado 80301		
		Phone: (303) 447-2558 Fax: (303) 447-2548 Web Site: www.hpd-online.com		
DESCRIPTION: Adjustment Mass				
P/N:	D071200	CONFIG:	Medium, .24"	
CAD FILE NAME: D071200_Adjustment_Mass				
PROJECT: HAM ISI, Advanced LIGO				
SIZE	SCALE: 1:2	DRAWN BY: Jonas Waterman (HPD)		REV
B	SHEET 4 OF 7	DATE PRINTED: 4/16/2009	V2	



2X ϕ .547 THRU ALL
 \sphericalangle ϕ .58 X 82°, BOTH SIDES
 \oplus ϕ .015 (M) A B C

2X ϕ .516 THRU ALL
 \sphericalangle ϕ .55 X 82°, BOTH SIDES
 \oplus ϕ .005 (M) A B C

MANUFACTURING NOTES:

- 1) UNLESS MANUFACTURED FROM SHEET WITH FINISH OF 2B OR EQUIVALENT, MACHINE ALL SURFACES TO REMOVE OXIDES AND MILL FINISH. ABRASIVE REMOVAL TECHNIQUES (OTHER THAN DRESSED BLANCHARD GRINDING) ARE NOT ACCEPTABLE.
 - 2) ALL MACHINING FLUIDS MUST BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE, AND SILICONE, SUCH AS CINCINNATI MILACRON CIMTECH 410.
 - 3) THOROUGHLY CLEAN PART TO REMOVE ALL OIL, GREASE, DIRT, AND CHIPS.
 - 4) WHERE INDICATED, MECHANICALLY SCRIBE, STAMP, OR ENGRAVE THE FOLLOWING INFORMATION AS SHOWN BELOW: **PART NUMBER-REVISION** (AND **TYPE** IF INDICATED), FOLLOWED ON THE NEXT LINE WITH A UNIQUE 3-DIGIT **SERIAL NUMBER** STARTING AT 001 FOR THE FIRST PART AND INCREMENTING THEREAFTER. USE 0.38" TALL CHARACTERS UNLESS PART SIZE DICTATES SMALLER.
- D071200-V2, TYPE 04
S/N - ###

POST-MANUFACTURING NOTES:

P1) CLEAN TO LIGO STANDARDS, CLASS A (PER E0900047 AND E960022).

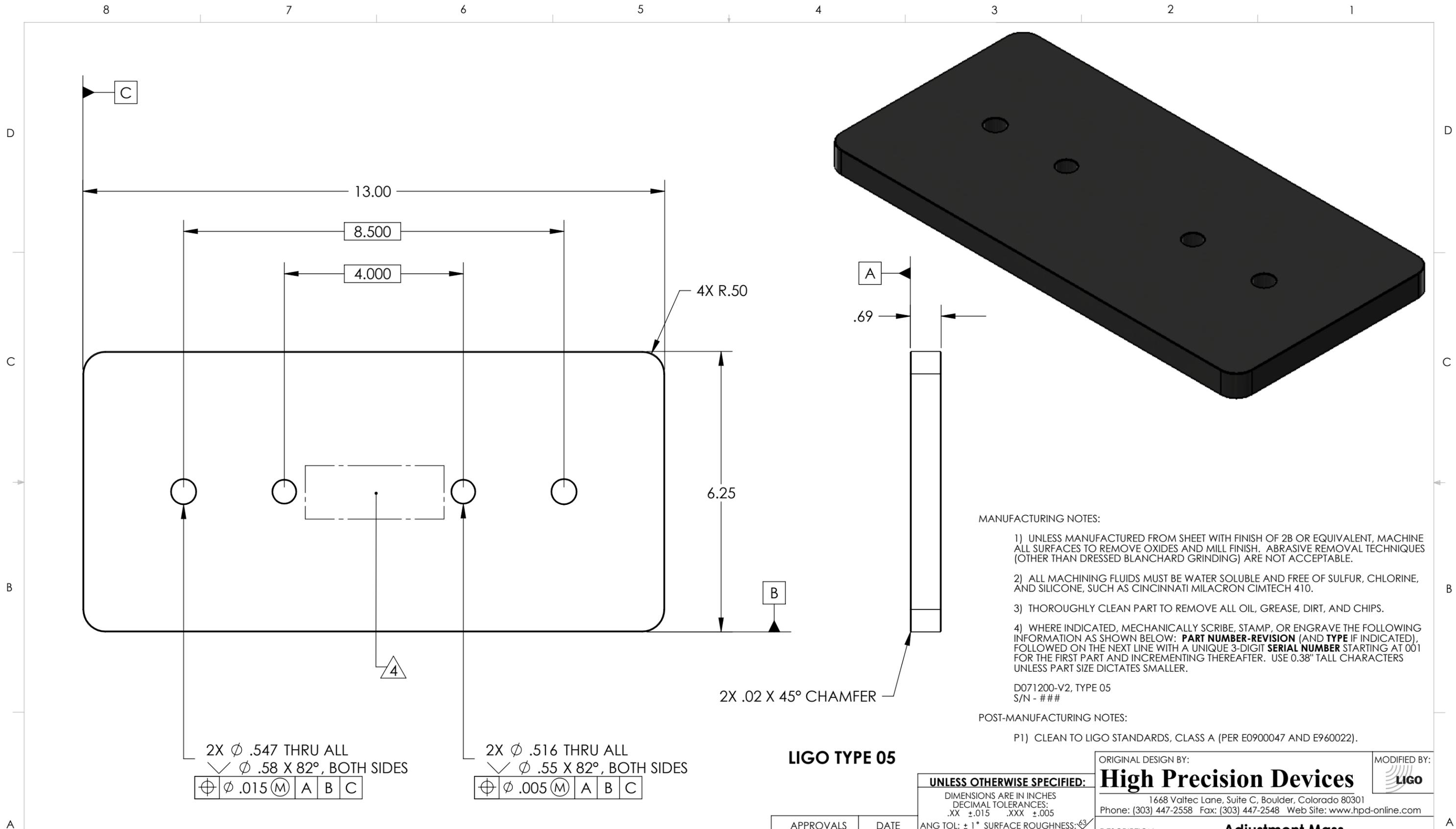
LIGO TYPE 04

APPROVALS	DATE
ENGINEERING (HPD): J. Waterman	6/15/2007
QUALITY (HPD): C. Danaher	6/15/2007
MATERIAL:	304 SS
FINISH:	None
MASS:	8.2 lbs

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
DECIMAL TOLERANCES:
.XX ±.015 .XXX ±.005
ANG TOL: ± 1° SURFACE ROUGHNESS: 6.3
REMOVE ALL SHARP EDGES.
LEAVE .005 X 45° MIN CHAMFER,
OR .005 MIN RADIUS.
THIS PRINT & THE EMBEDDED CAD
MODEL ARE THE DOCUMENTATION OF
RECORD. UNLESS OTHERWISE SPECIFIED,
ALL DIMENSIONS IN THE MODEL ARE
BASIC, WITH TOLERANCES GIVEN BY:

	.010	A	B	C
--	------	---	---	---

ORIGINAL DESIGN BY:		High Precision Devices		MODIFIED BY:
		1668 Valtec Lane, Suite C, Boulder, Colorado 80301		
		Phone: (303) 447-2558 Fax: (303) 447-2548 Web Site: www.hpd-online.com		
DESCRIPTION: Adjustment Mass				
P/N:	D071200	CONFIG:	Medium, .44"	
CAD FILE NAME: D071200_Adjustment_Mass				
PROJECT: HAM ISI, Advanced LIGO				
SIZE	SCALE: 1:2	DRAWN BY: Jonas Waterman (HPD)		REV
B	SHEET 5 OF 7	DATE PRINTED: 4/16/2009	V2	



2X ϕ .547 THRU ALL
 \sphericalangle ϕ .58 X 82°, BOTH SIDES
 \oplus ϕ .015 (M) A B C

2X ϕ .516 THRU ALL
 \sphericalangle ϕ .55 X 82°, BOTH SIDES
 \oplus ϕ .005 (M) A B C

MANUFACTURING NOTES:

- 1) UNLESS MANUFACTURED FROM SHEET WITH FINISH OF 2B OR EQUIVALENT, MACHINE ALL SURFACES TO REMOVE OXIDES AND MILL FINISH. ABRASIVE REMOVAL TECHNIQUES (OTHER THAN DRESSED BLANCHARD GRINDING) ARE NOT ACCEPTABLE.
- 2) ALL MACHINING FLUIDS MUST BE WATER SOLUBLE AND FREE OF SULFUR, CHLORINE, AND SILICONE, SUCH AS CINCINNATI MILACRON CIMTECH 410.
- 3) THOROUGHLY CLEAN PART TO REMOVE ALL OIL, GREASE, DIRT, AND CHIPS.
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D071200-V2, TYPE 05
 S/N - ###

POST-MANUFACTURING NOTES:

P1) CLEAN TO LIGO STANDARDS, CLASS A (PER E0900047 AND E960022).

LIGO TYPE 05

APPROVALS	DATE
ENGINEERING (HPD): J. Waterman	6/15/2007
QUALITY (HPD): C. Danaher	6/15/2007
MATERIAL:	304 SS
FINISH:	None
MASS:	16.0 lbs

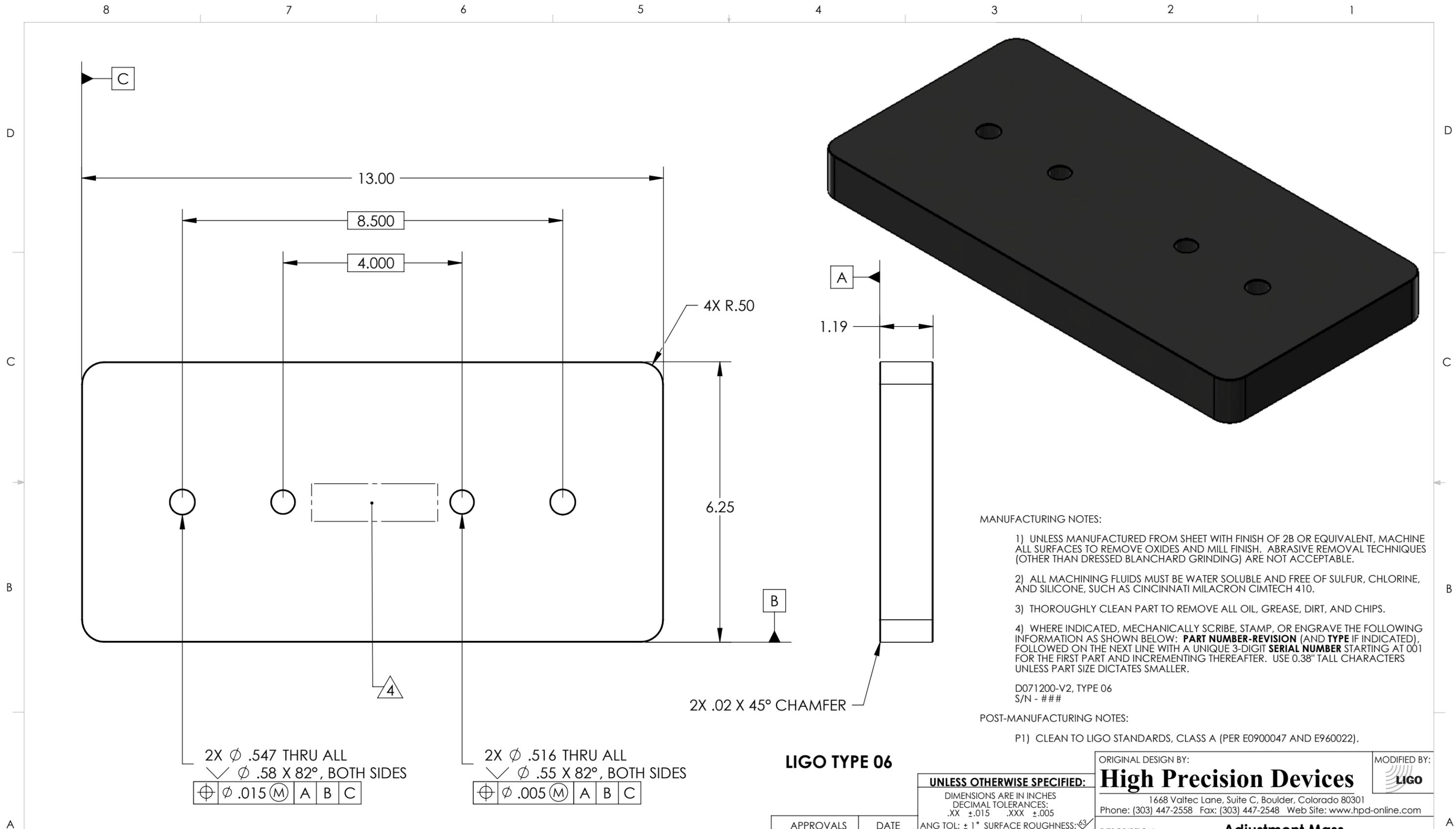
UNLESS OTHERWISE SPECIFIED:
 DIMENSIONS ARE IN INCHES
 DECIMAL TOLERANCES:
 .XX ±.015 .XXX ±.005
 ANG TOL: ± 1° SURFACE ROUGHNESS: 63

REMOVE ALL SHARP EDGES.
 LEAVE .005 X 45° MIN CHAMFER,
 OR .005 MIN RADIUS.

THIS PRINT & THE EMBEDDED CAD
 MODEL ARE THE DOCUMENTATION OF
 RECORD. UNLESS OTHERWISE SPECIFIED,
 ALL DIMENSIONS IN THE MODEL ARE
 BASIC, WITH TOLERANCES GIVEN BY:

$\overline{\text{A}}$.010 A B C

ORIGINAL DESIGN BY:		High Precision Devices		MODIFIED BY:
		1668 Valtec Lane, Suite C, Boulder, Colorado 80301		
		Phone: (303) 447-2558 Fax: (303) 447-2548 Web Site: www.hpd-online.com		
DESCRIPTION: Adjustment Mass				
P/N:	D071200	CONFIG:	Coarse, .69"	
CAD FILE NAME: D071200_Adjustment_Mass				
PROJECT: HAM ISI, Advanced LIGO				
SIZE	SCALE: 1:2	DRAWN BY: Jonas Waterman (HPD)	REV	
B	SHEET 6 OF 7	DATE PRINTED: 4/16/2009	V2	



MANUFACTURING NOTES:

- 1) UNLESS MANUFACTURED FROM SHEET WITH FINISH OF 2B OR EQUIVALENT, MACHINE ALL SURFACES TO REMOVE OXIDES AND MILL FINISH. ABRASIVE REMOVAL TECHNIQUES (OTHER THAN DRESSED BLANCHARD GRINDING) ARE NOT ACCEPTABLE.
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D071200-V2, TYPE 06
S/N - ###

POST-MANUFACTURING NOTES:

P1) CLEAN TO LIGO STANDARDS, CLASS A (PER E0900047 AND E960022).

2X ϕ .547 THRU ALL
 \sphericalangle ϕ .58 X 82°, BOTH SIDES

\oplus	ϕ .015 (M)	A	B	C
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2X ϕ .516 THRU ALL
 \sphericalangle ϕ .55 X 82°, BOTH SIDES

\oplus	ϕ .005 (M)	A	B	C
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LIGO TYPE 06

APPROVALS	DATE
ENGINEERING (HPD): J. Waterman	6/15/2007
QUALITY (HPD): C. Danaher	6/15/2007
MATERIAL:	304 SS
FINISH:	None
MASS:	27.6 lbs

UNLESS OTHERWISE SPECIFIED:		
DIMENSIONS ARE IN INCHES DECIMAL TOLERANCES: .XX ±.015 .XXX ±.005		
ANG TOL: ± 1° SURFACE ROUGHNESS: 63		
REMOVE ALL SHARP EDGES. LEAVE .005 X 45° MIN CHAMFER, OR .005 MIN RADIUS.		
THIS PRINT & THE EMBEDDED CAD MODEL ARE THE DOCUMENTATION OF RECORD. UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS IN THE MODEL ARE BASIC, WITH TOLERANCES GIVEN BY:		
	.010	A B C

ORIGINAL DESIGN BY:		MODIFIED BY:	
High Precision Devices			
1668 Valtec Lane, Suite C, Boulder, Colorado 80301 Phone: (303) 447-2558 Fax: (303) 447-2548 Web Site: www.hpd-online.com			
DESCRIPTION: Adjustment Mass			
P/N:	D071200	CONFIG:	Coarse, 1.19"
CAD FILE NAME: D071200_Adjustment_Mass			
PROJECT: HAM ISI, Advanced LIGO			
SIZE	SCALE: 1:2	DRAWN BY: Jonas Waterman (HPD)	REV
B	SHEET 7 OF 7	DATE PRINTED: 4/16/2009	V2