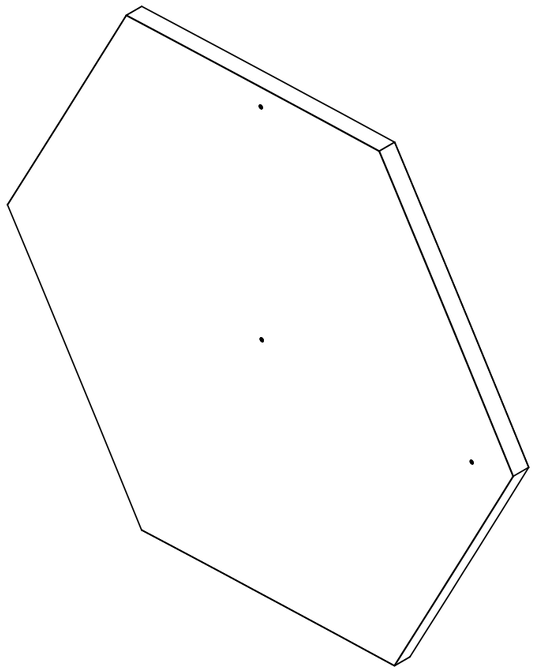
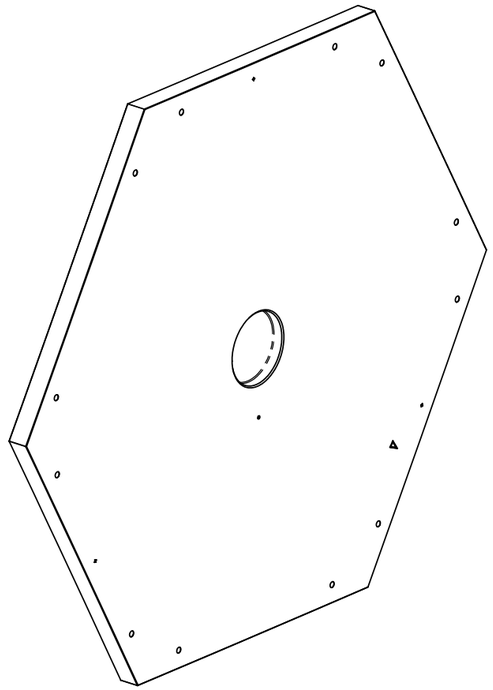
TMT.OPT.DWG.07.001.REL03

REVISIONS				
REV	SHEET/ZONE	DESCRIPTION	DATE	APPROVED
A	1/B7	REMOVED " MARKING ON EDGE OF SEGMENT SHALL BE APPROXIMATELY CENTERED ACROSS THE THICKNESS" FROM END OF LOCAL NOTE 16	03/07/07	L. STEPP
B	1/A8	MOVED ALL NOTES FROM SHEET 1 TO SHEET 4	03/26/08	V.STEPHENS C. BAFFES (TMT)
	1/A4-A5	ADDED PROPRIETARY STAMP AND THIRD ANGLE PROJECTION STAMP		
	2/A6,C3,C6	LOCAL NOTE 7 WAS LOCAL NOTE 8		
	2/B4	ADDED LOCAL NOTES 21 AND 22		
	2/C1	ADDED LOCAL NOTE 6 (2 PLACES)		
	2/C4	ADDED LOCAL NOTE 15. LOCAL NOTE 8 WAS LOCAL NOTE 7		
	2/C5,C6,D6	ADDED FIDUCIAL LABELS "FO," "F+X," AND "F+Y"		
	2/C5,C8,D6	MODIFIED FIDUCIALS TO BE "BULLSEYES" INSTEAD OF CIRCUMSCRIBED CROSSES (SHOWN AS LARGE DIAMETER = 8MM, SMALL DIAMETER = 2MM)		
	2/C8	REMOVED -XPSA FIDUCIAL		
	2/D1	ADDED LOCAL NOTE 19		
	2/D8	ADDED 575.000+/-0.025 DIMENSION FOR FIDUCIAL F+Y		
	3/B1,D1,D3	ADDED LOCAL NOTE 20		
		ADDED SHEET 4		
	4/D8	NOTE 3: "FINISHED PRIMARY MIRROR" WAS "POLISHED". "(TMT.OPT.TEC.07.044)" WAS "(HDC-280001-0003)"		
	4/D8	NOTE 4: REMOVED LOCAL NOTE DESIGNATION (FLAG). MOVED MATERIAL/THICKNESS TABLE TO BE WITHIN NOTE 4.		
	4/D8	NOTE 5: EXTENSIVELY REVISED FIRST SENTENCE		
	4/D8	NOTE 6: EXTENSIVELY REVISED		
	4/D8	CHANGED NOTE 6 TO A LOCAL NOTE (FLAG)		
	4/C8	NOTE 7: EXTENSIVELY REVISED		
	4/D8	NOTE 8: EXTENSIVELY REVISED		
	4/B8	NOTE 9: "(TMT.OPT.TEC.07.044)" WAS "(HDB-280001-0003)"		
	4/B8	NOTE 13: "19.529" WAS "18.593"		
	4/B8	NOTE 14: "FINISHED PRIMARY MIRROR SEGMENT SPECIFICATION (TMT.OPT.SPE.07.002)" WAS "SEGMENT SPECIFICATION DOCUMENT: TMT.OPT.SPE.07.002"		
	4/B8	NOTE 16: "(TMT.OPT.TEC.07.044)" WAS "(HDB-280001-0003)"		
	4/A8	NOTE 17: DELETED "OR OTHER FEATURES". "PERMANENTLY MARKED" WAS "LOCATED". "(TMT.OPT.TEC.07.044)" WAS "(HDB-280001-0003)". ADDED "DESIGN OF FIDUCIALS IS TBD"		
	4/A8	ADDED NOTES 19, 20, 21, AND 22		
C	1/A4	"NEXT ASSEMBLY 280-TMT-01-11000" WAS "PART NO. 280-TMT-01-01000"	09/12/08	V.STEPHENS C. BAFFES (TMT)
	1/A6	REMOVED PROPRIETARY PROPERTY STATEMENT		
	2/B2	CENTERED "Z_POCKET" IN BASIC DIMENSION BOX		
	2/B3	ADDED SR 62525.8+/-3000.0 DIMENSION AND .125 TOTAL RUNOUT GEOMETRIC TOLERANCE TO BACK SURFACE OF MIRROR		
	2/C1	"126.000 DIAMETER (AREA OF .100 PROFILE TOLERANCE)" WAS "139.500 DIAMETER (AREA OF .100 FLATNESS TOLERANCE)". 156.000 DIAMETER WAS 174.000		
	2/D1	.050 PROFILE TOLERANCE WAS 0.025		
	3/A4	"15.0" WAS "25.0"		
	3/B3	"25.0" WAS "50.0"		
	3/B5	"R565.0" WAS "R590.0"		
	3/C3	ADDED 3X ASSEMBLY FEATURE AND ASSOCIATED DIMENSIONS, NOTE 21		
	3/C6,A7	ADDED SECTION H-H		
	4/B8	REV C LOCAL NOTE 11: "19.693" WAS REV B LOCAL NOTE 13: "19.529"		
	4/D8	NOTE 5: EXTENSIVELY REVISED. DELETED REV. B LOCAL NOTE 6.		
	4/MULT	RENUMBERED / DELETED / ADDED NOTES: NOTES 6-9 WERE NOTES 7-10. NOTES 10-16 WERE NOTES 12-18. NOTE 17 WAS NOTE 20. NOTE 18 WAS NOTE 21. NOTE 19 WAS NOTE 22. DELETED REV. B NOTE 19. ADDED REV C NOTES 20, 21		
	2,3/MULT	EXTENSIVELY RENUMBERED / DELETED / ADDED NOTES		



FRONT ISOMETRIC VIEW



BACK ISOMETRIC VIEW

SEE SHEET 4 FOR NOTES

HYTEC RELEASED DOCUMENT

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
-TOLERANCES-

DECIMALS
.X = +/- 1.0
.XX = +/- .30
.XXX = +/- .100

ANGULAR = +/- 30'

FINISH: SEE NOTES

NEXT ASSEMBLY: 280-TMT-01-11000

CAD GENERATED DRAWING,
DO NOT MANUALLY UPDATE
DO NOT SCALE DRAWING

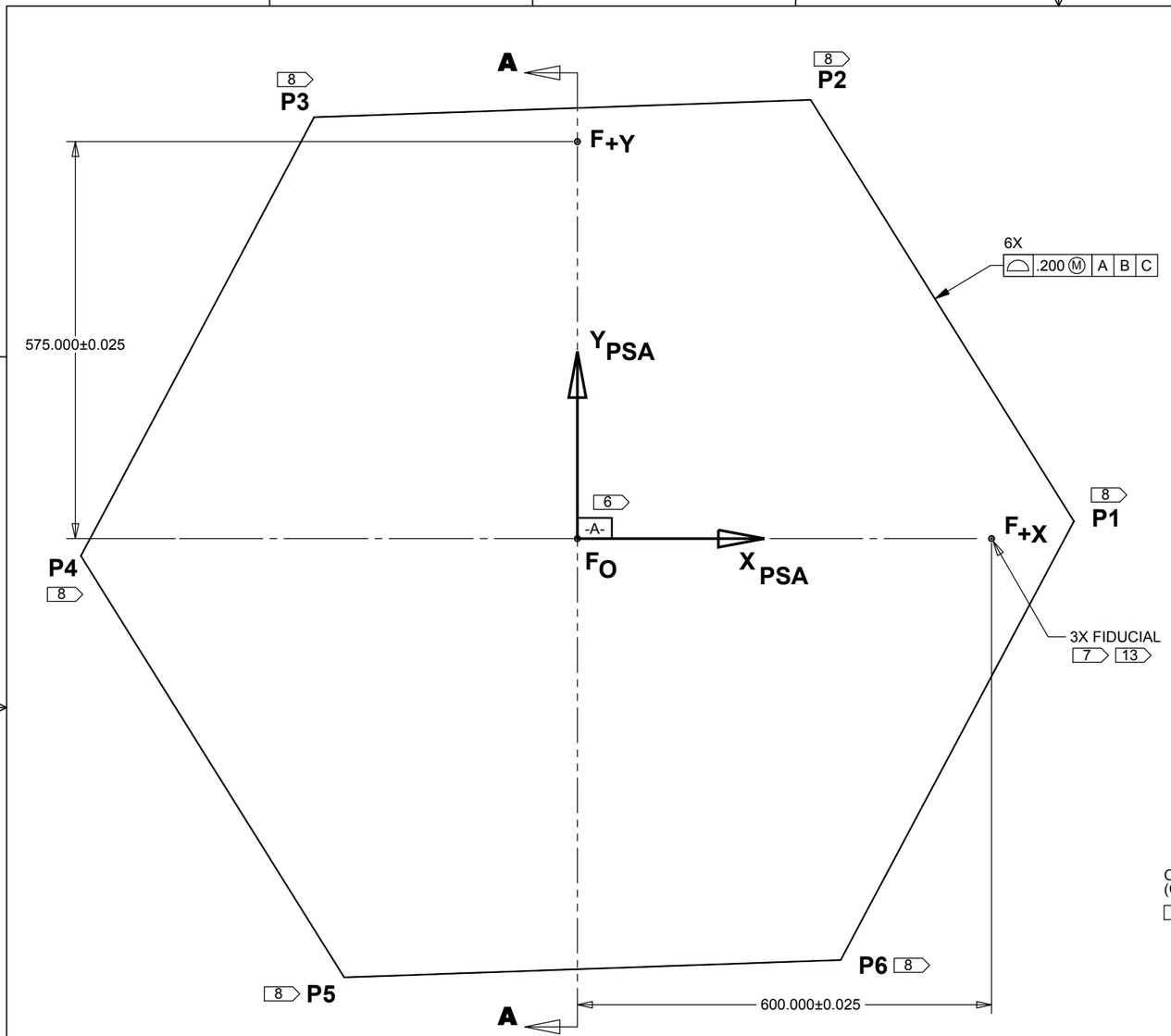
	SIGNATURE	DATE
Designer	Alan Tubb	3/5/2007
Drawn	Alan Tubb	3/5/2007
Checked	Larry Stepp	3/5/2007
Engineer	Larry Stepp	3/5/2007
Approved	Larry Stepp	3/5/2007

HYTEC, INC

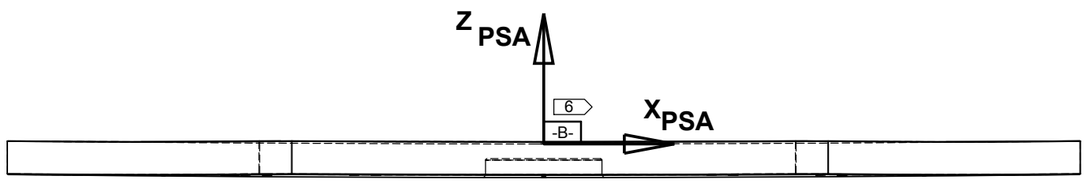
TITLE: TMT
M1 POLISHED SEGMENT

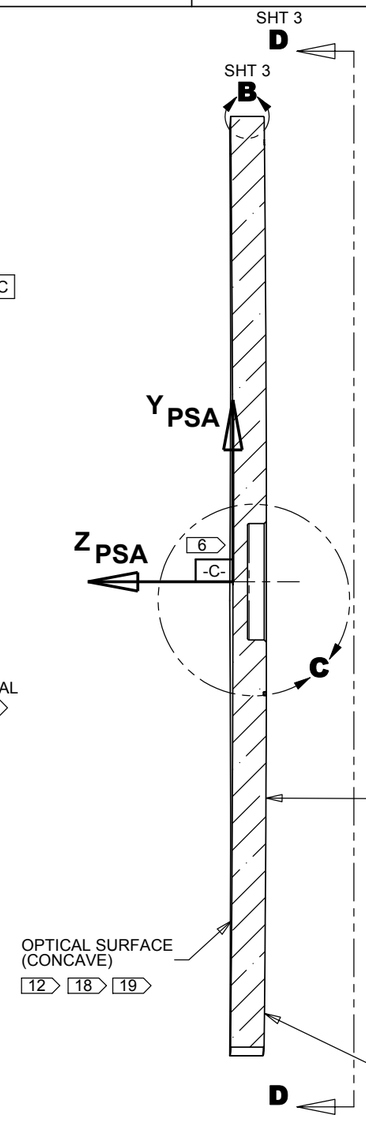
DWG. NO. 280-TMT-01-01000 | REV C | SHEET NO. 1 of 4

SCALE 1:6 | SHEET SIZE D

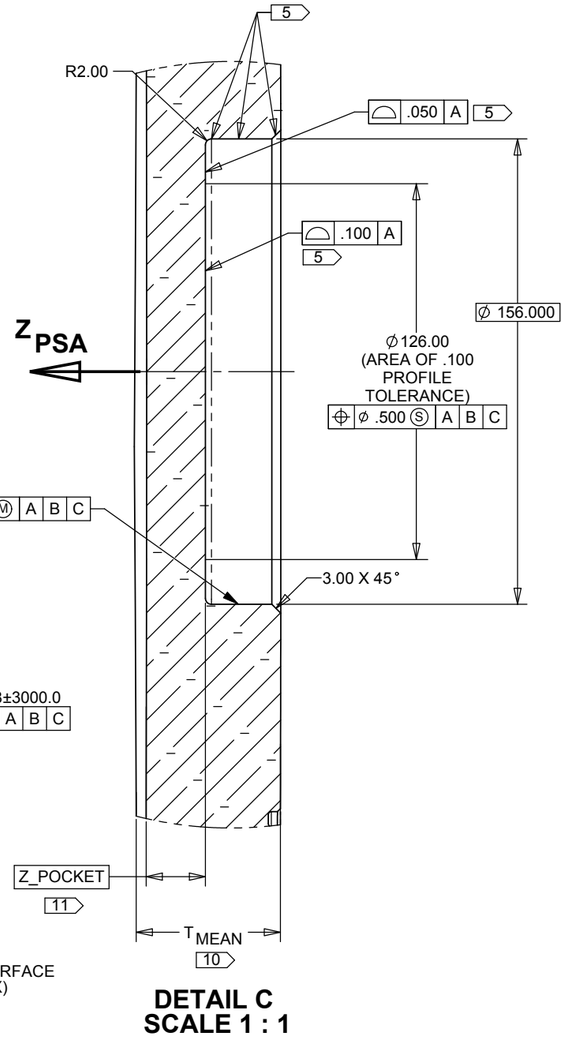


FRONT VIEW
(OPTICAL SURFACE)





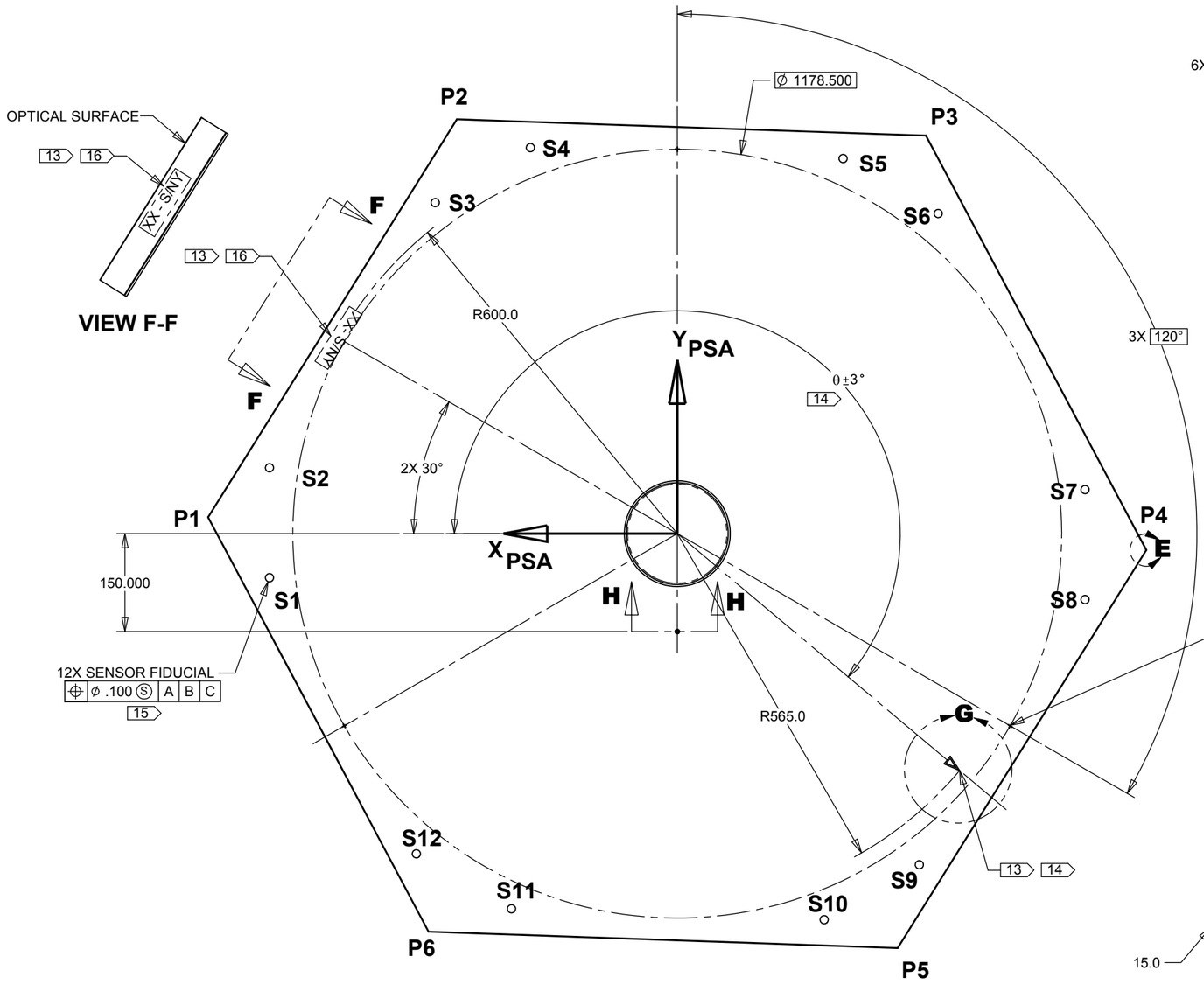
SECTION A-A

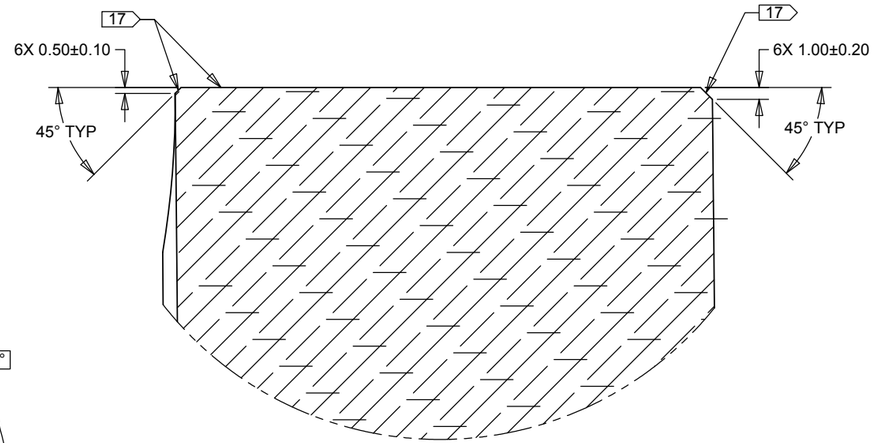


DETAIL C
SCALE 1 : 1

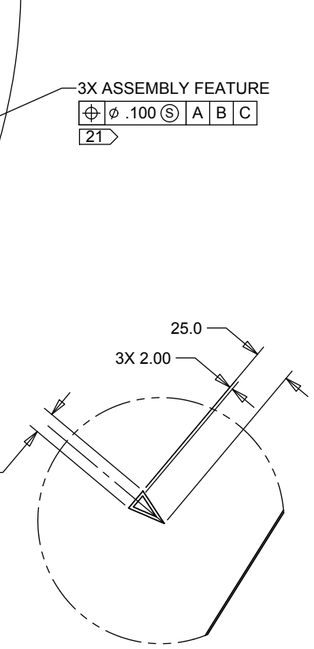
HYTEC
RELEASED
DOCUMENT

DWG. NO.	REV	SHEET NO.
280-TMT-01-01000	C	2 of 4
SCALE 1:4		SHEET SIZE D



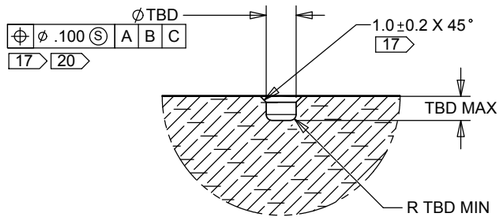


DETAIL B
SCALE 4 : 1



DETAIL G
SCALE 1 : 2

DETAIL E
SCALE 4 : 1



SECTION H-H
SCALE 2 : 1

HYTEC
RELEASED
DOCUMENT

DWG. NO.	REV	SHEET NO.
280-TMT-01-01000	C	3 of 4
SCALE 1:4		SHEET SIZE D

NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL DIMENSIONS IN MILLIMETERS.
2. DIMENSIONS AND TOLERANCING PER ASME Y14.5M-1994.
3. THIS DRAWING IS COMPLETE ONLY WHEN USED IN CONJUNCTION WITH THE FINISHED PRIMARY MIRROR SEGMENT SPECIFICATION (TMT.OPT.SPE.07.002) AND THE SEGMENTATION DATABASE (TMT.OPT.TEC.07.044).
4. MAKE FROM CIRCULAR MENISCUS MIRROR BLANK PER SPECIFICATION FOR PRIMARY SEGMENT BLANKS (TMT.OPT.SPE.07.001). BLANKS SHALL BE INSPECTED PRIOR TO ANY POLISHING OR MACHINING OPERATIONS. FOR REFERENCE ONLY, BLANK THICKNESS IS AS FOLLOWS:

MATERIAL	BLANK THICKNESS (mm)
GLASS CERAMIC	46
FUSED SILICA	51

5 INDICATED SURFACES SHALL BE GROUND AND POLISHED OR ETCHED. IN ORDER TO MINIMIZE SUBSURFACE DAMAGE, GRINDING SHALL BE DONE IN STEPS USING PROGRESSIVELY SMALLER ABRASIVE GRAINS. EACH GRINDING STEP SHALL REMOVE MATERIAL TO A DEPTH OF AT LEAST 1.5X THE MAXIMUM GRAIN SIZE OF THE PREVIOUS GRINDING STEP. THE FINAL GRINDING STEP SHALL UTILIZE AN ABRASIVE GRAIN SIZE OF 15um MAX. AFTER GRINDING, THE SURFACE SHALL BE POLISHED OR ACID ETCHED TO REMOVE 25um (MIN) OF MATERIAL. ALL DIMENSIONS AND TOLERANCES APPLY AFTER ETCHING.

6 DATUMS -A-, -B- AND -C- DEFINE THE THEORETICAL REFERENCE SYSTEM FOR THE POLISHED SEGMENT. THE SEGMENT GEOMETRY AND OPTICAL SURFACE ARE DEFINED RELATIVE TO THESE DATUMS PER THE FINISHED PRIMARY MIRROR SEGMENT SPECIFICATION (TMT.OPT.SPE.07.002) AND THE SEGMENTATION DATABASE (TMT.OPT.TEC.07.044).

FOR EACH SEGMENT, THE REFERENCED DOCUMENTS DEFINE A THEORETICAL OPTICAL SURFACE, ORIGIN, AND COORDINATE SYSTEM. THE ZPSA AXIS IS THE NORMAL OF THE THEORETICAL OPTICAL SURFACE AT THE ORIGIN. THE PLANES OF THE THEORETICAL PSA COORDINATE SYSTEM ARE SPECIFIED AS DATUMS -A-, -B- AND -C- AS FOLLOWS:

DATUM -A- SHALL BE THE XPSA - YPSA PLANE
DATUM -B- SHALL BE THE XPSA - ZPSA PLANE
DATUM -C- SHALL BE THE YPSA - ZPSA PLANE

7 THREE FIDUCIALS (SHOWN SCHEMATICALLY) SHALL BE ENGRAVED INTO THE OPTICAL SURFACE. SIZE AND SHAPE OF THE FIDUCIALS ARE TBD. BY DEFINITION, EACH FIDUCIAL LIES ON THE THEORETICAL OPTICAL SURFACE. THE THREE FIDUCIALS FORM A 3-2-1-DOF KINEMATIC CONSTRAINT WITH RESPECT TO DATUMS -A-, -B- AND -C- AS FOLLOWS:

FIDUCIAL FO SHALL COINCIDE WITH THE ORIGIN OF THE PSA COORDINATE SYSTEM (INTERSECTION OF DATUMS -A-, -B- AND -C-). THIS IS A 3-DOF CONSTRAINT.

FIDUCIAL F+X LIES ON DATUM -B-, AND SHALL BE OFFSET FROM DATUM -A- AT ZPSA=ZF+X, WHERE ZF+X IS THE ZPSA COORDINATE OF THE THEORETICAL OPTICAL SURFACE AT THE FIDUCIAL. THIS IS A 2-DOF CONSTRAINT.

FIDUCIAL F+Y SHALL BE OFFSET FROM DATUM -A- AT ZPSA=ZF+Y, WHERE ZF+Y IS THE ZPSA COORDINATE OF THE THEORETICAL OPTICAL SURFACE AT THE FIDUCIAL. THIS IS A 1-DOF CONSTRAINT.

8 HEXAGON VERTEX CORNER POINTS (P1-6) ARE DEFINED IN THE SEGMENTATION DATABASE (TMT.OPT.TEC.07.044). VERTEX POINT COORDINATES ARE TO BE TREATED AS BASIC DIMENSIONS PRIOR TO ADDING FILLET RADII OR CHAMFERS.

9 . SEGMENT THICKNESS SHALL BE MEASURED AT THE SIX VERTICES AND RECORDED AS VALUES T1-T6. MEASUREMENT SHALL BE MADE WITHIN 10mm OF THE VERTEX.

10 MEAN SEGMENT THICKNESS (T_MEAN) SHALL BE DEFINED AS THE AVERAGE OF THE THICKNESS AT EACH VERTEX (Ti). THE MEAN THICKNESS SHALL BE 45+/-0.5mm FOR A GLASS-CERAMIC SEGMENT, AND 50+/-0.5mm FOR A FUSED-SILICA SEGMENT.

11 THE CENTRAL POCKET DEPTH IS DETERMINED BASED ON THE MEASURED MEAN SEGMENT THICKNESS DETERMINED IN NOTE 10. THE POCKET DEPTH DIMENSION “Z_POCKET” IS CALCULATED AS 19.693*(T_MEAN / T_NOM) WHERE T_NOM IS 45mm FOR GLASS-CERAMIC OR 50mm FOR FUSED-SILICA. THE DIMENSION "Z_POCKET" IS TO BE TREATED AS A BASIC DIMENSION.

12 FINISHED OPTICAL SURFACE SHAPE AND MEASUREMENT REQUIREMENTS ARE SPECIFIED IN THE FINISHED PRIMARY MIRROR SEGMENT SPECIFICATION (TMT.OPT.SPE.07.002).

13 AFTER MARKING OR ENGRAVING, FEATURES SHALL BE ETCHED TO REDUCE SUBSURFACE DAMAGE.

14 THE M1 ORIENTATION MARKING SHALL BE ENGRAVED AS SHOWN AT THE ANGLE SPECIFIED IN THE SEGMENTATION DATABASE (TMT.OPT.TEC.07.044).

15 TWELVE FIDUCIALS FOR LOCATING EDGE SENSORS SHALL BE PERMANENTLY MARKED ON THE BACK SURFACE AT LOCATIONS SPECIFIED IN THE SEGMENTATION DATABASE (TMT.OPT.TEC.07.044). DESIGN OF FIDUCIALS IS TBD.

16 SEGMENT IDENTIFICATION (CONSISTING OF THE TWO DIGIT SEGMENT NUMBER AND SINGLE DIGIT SERIAL NUMBER) SHALL BE ENGRAVED IN THE LOCATIONS SHOWN WITH 25+/-1mm HIGH CHARACTERS. EXAMPLE: 05-S/N2 CORRESPONDS TO SEGMENT TYPE NUMBER 5, SERIAL NUMBER 2. MARKING ON EDGE OF SEGMENT SHALL BE APPROXIMATELY CENTERED ACROSS THE THICKNESS.

17 SEGMENT EDGES, EDGE CHAMFERS, EDGE CORNER RADII, AND DIAPHRAGM CLOCKING HOLE SHALL HAVE A SMOOTH GROUND FINISH. SURFACE ROUGHNESS SHALL BE 0.4 MICRONS RMS MAX. IN ORDER TO MINIMIZE SUBSURFACE DAMAGE, GRINDING SHALL BE DONE IN STEPS USING PROGRESSIVELY SMALLER ABRASIVE GRAINS. EACH GRINDING STEP SHALL REMOVE MATERIAL TO A DEPTH OF AT LEAST 1.5X THE MAXIMUM GRAIN SIZE OF THE PREVIOUS GRINDING STEP. THE FINAL GRINDING STEP SHALL UTILIZE AN ABRASIVE GRAIN SIZE OF 15um MAX. ACID ETCHING OF THESE FEATURES AFTER GRINDING IS PERMISSIBLE.

18 OPTICAL SURFACE ROUGHNESS SHALL BE AS SPECIFIED IN THE FINISHED PRIMARY MIRROR SEGMENT SPECIFICATION (TMT.OPT.SPE.07.002).

19 OPTICAL SURFACE SCRATCH-DIG SHALL BE AS SPECIFIED IN THE FINISHED PRIMARY MIRROR SEGMENT SPECIFICATION (TMT.OPT.SPE.07.002).

20 ASSEMBLY FEATURE: DIAPHRAGM INSTALLATION TOOL CLOCKING HOLE.

21 ASSEMBLY FEATURE: ASSEMBLY FIXTURE KINEMATIC LOCATING FEATURES. DESIGN OF THESE FEATURES IS TBD.

HYTEC
RELEASED
DOCUMENT

DWG. NO.	REV.	SHEET NO.
280-TMT-01-01000	C	4 of 4
SCALE 1:1		SHEET SIZE D