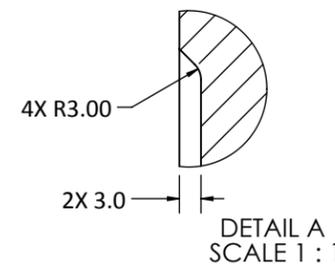
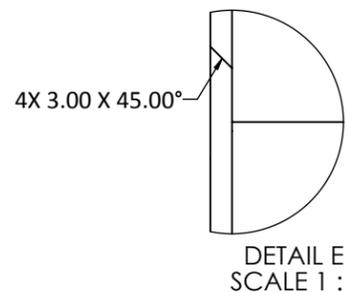
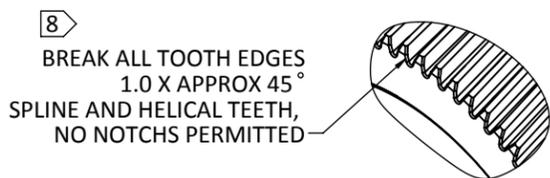
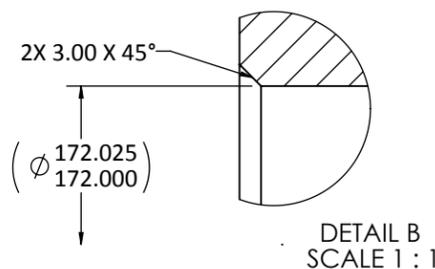
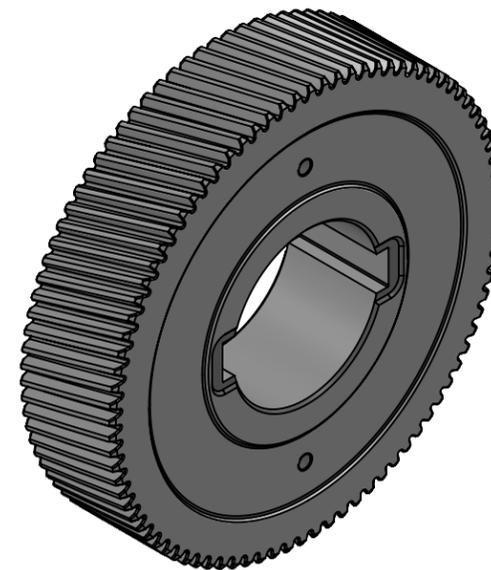
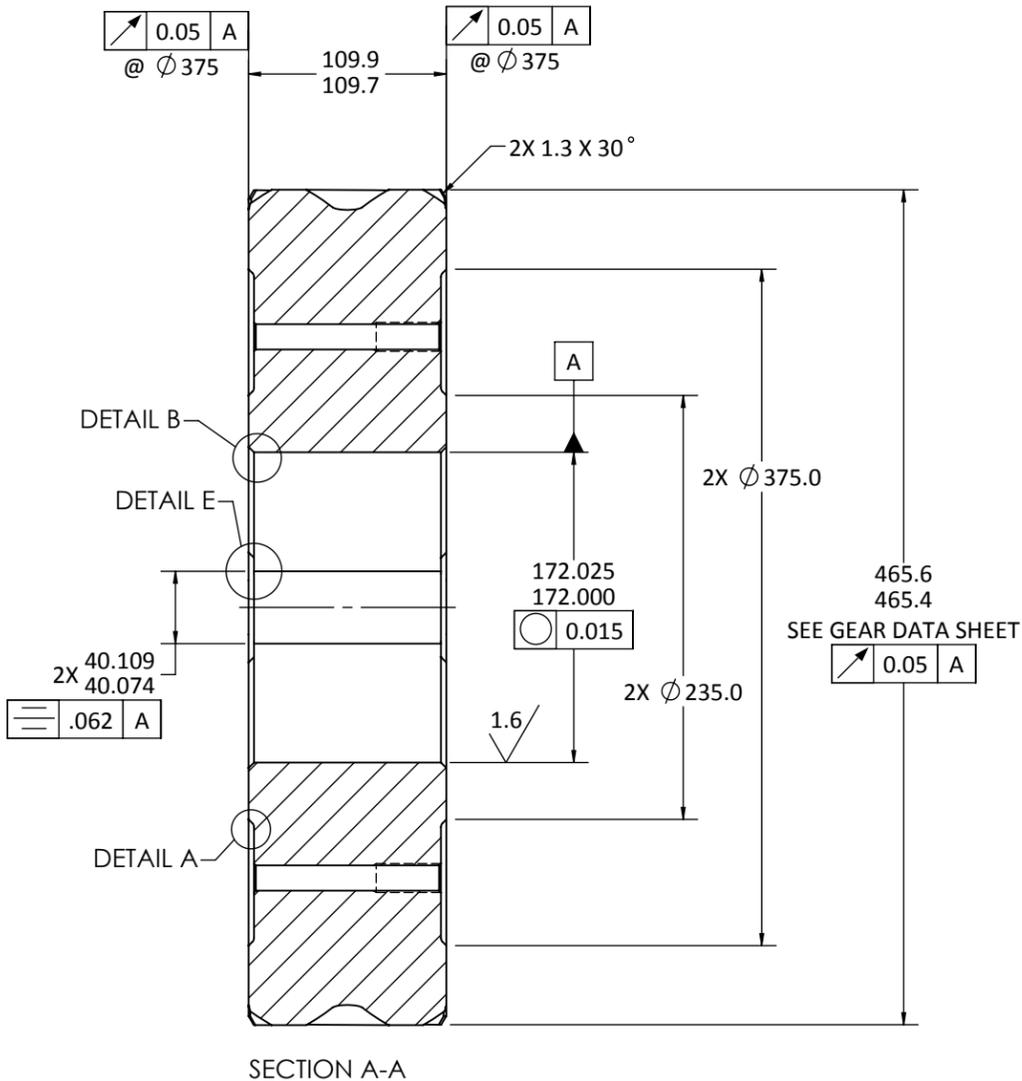
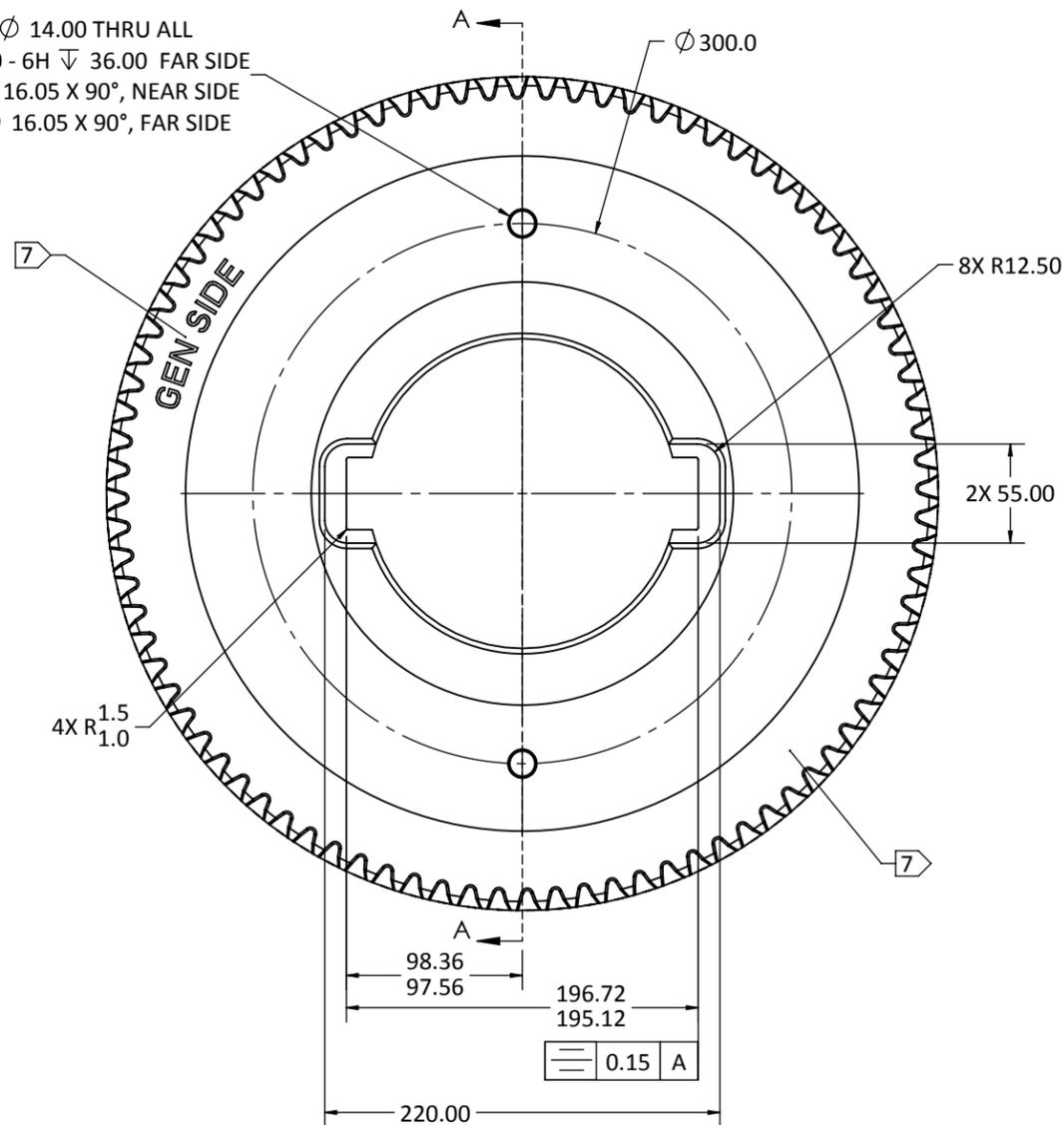


2X ϕ 14.00 THRU ALL
M16X2.0 - 6H ∇ 36.00 FAR SIDE
 \surd ϕ 16.05 X 90°, NEAR SIDE
 \surd ϕ 16.05 X 90°, FAR SIDE



NOTES:
SEE NOTES ON PAGE 2

REV	CHANGED FROM	BY	DATE	APRD
A	PRE-RELEASE	JFC	8/29/12	
B	UPDATED CHARTS ON P2: REVIEWED & UPDATED PER 1509-ENC-004	JFC	10/26/12	
C	CHANGES PER NREL DRW REVIEW REQUEST	CPS	3/6/13	
D	RELEASE FOR PRODUCTION	CPS	4/18/13	
E	REPAIR DANGLING DIMENSION LEADERS, NOTE FLAGS	JMG	10/17/13	
F	CHANGES REQUESTED PER MANUFACTURER DRW REVIEW	CPG	12/02/13	
G	NOTE 1 -MATERIAL AGMA GRADE 2 WITH CLEANLINESS CERTIFICATION	CH	4/2/14	
H	CLARIFIED MPI NOTE, REMOVED REDUNDANT NOTE 3	CH	4/4/14	

REPORT ERRORS & CHANGES
REMOVE ALL BURRS AND SHARP EDGES
DIMENSIONS ARE IN MILLIMETERS.
UNSPECIFIED TOLERANCES:
DECIMALS: FINISH: ANGLES:
X. \pm 1.0 3.2 μ m Ra \leq \pm 0.5°
.X \pm 0.5
.XX \pm 0.25
COPYRIGHT ©
NOT TO BE REPRODUCED OR USED TO MAKE
OTHER DRAWINGS OR MACHINERY
DRAWN JFC DATE: 8/29/12
CHECKED NJB THIRD ANGLE PRJ

MADE FROM MODEL: PEI 251241-B

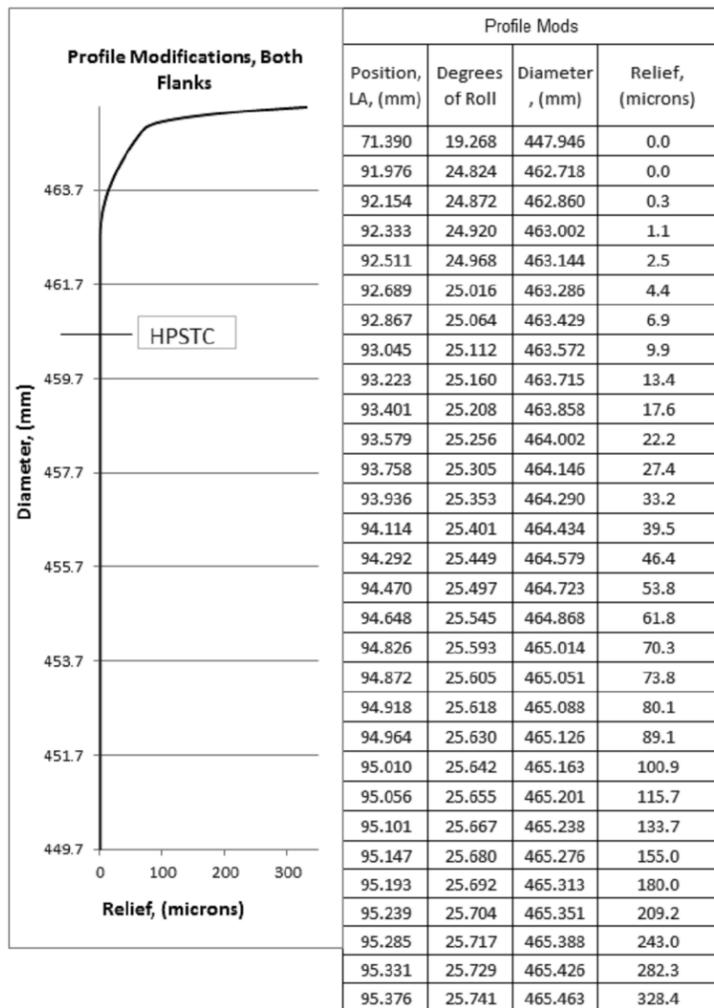
National Renewable Energy Laboratory

TITLE: GEAR, HIGH SPEED SHAFT

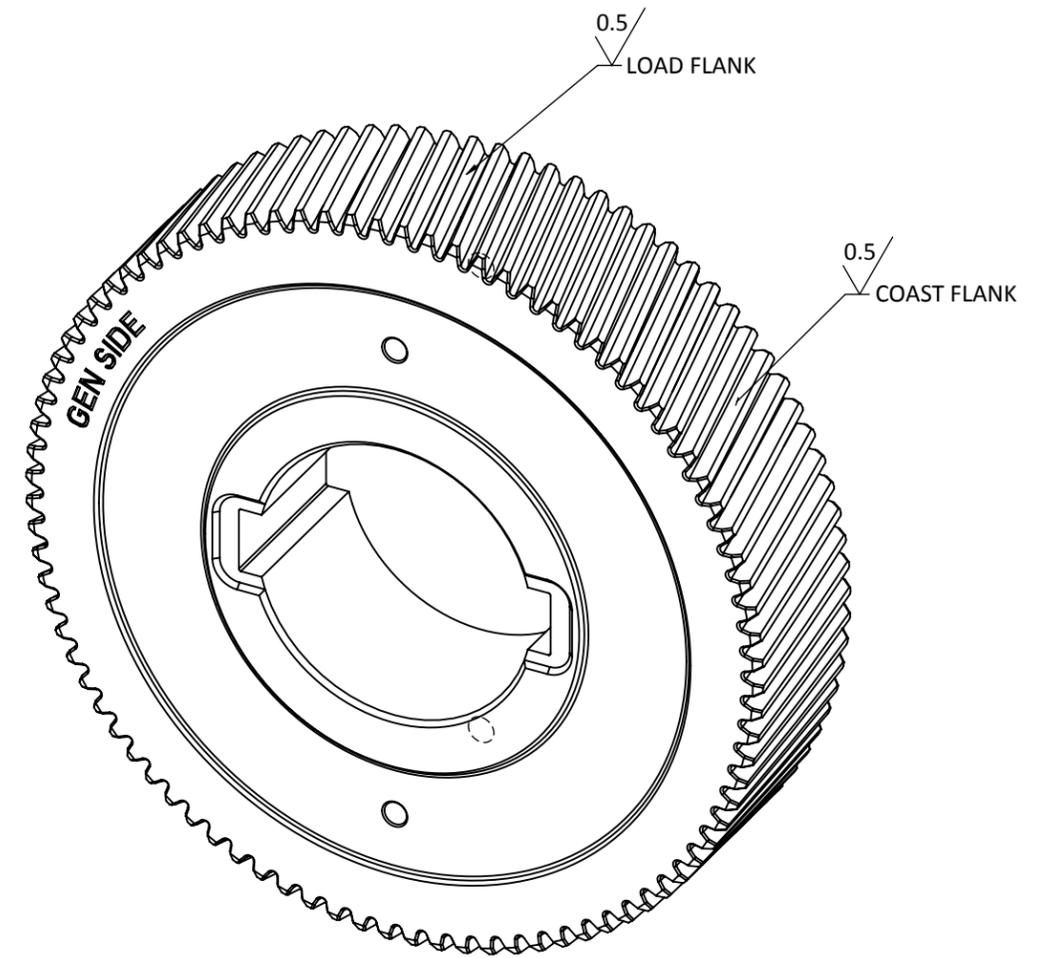
SIZE **B** DWG. NO. 254510 REV **H**

SCALE: 1:4 WEIGHT: 14.65 kgs SHEET 1 OF 2

External Involute Helical Gear Data	
Number of Teeth	88
Normal Module (mm)	5.0000
Normal Pressure Angle	20.0000
Whole depth Constant (REF)	2.350
Oper pitch diameter (mm)	456.0000
Gen Pitch diameter (mm)	453.4700
Base diameter (mm)	424.5815
Major Diameter (REF) (mm)	465.463
Form Diameter with Pinion (mm)	447.946
Root Diameter (REF) (mm)	440.59
Min Tool Tip Radius (mm)	2.10
Addendum Modification X2	0.2024
Hand of Helix	Left
Gen Helix Angle	14.0000
Lead (mm)	5713.8308
Number of teeth in Mate	22
Center Distance (mm)	285.000
Normal cir BL w/ Pinion (max/min) (mm)	0.3 / 0.2
Quality per AGMA 2015-1	A 5
Quality Datum Surface	A-B
Trans Cir TT on Gen Dia, (max/min) (mm)	8.354 / 8.299
Size over 9.4 balls (max/min) (mm)	469.17 / 469.035
Span over 12 teeth (max/min) (mm)	176.7 / 176.65



NO LEAD MODIFICATIONS



NOTES:

- MATERIAL: SAE E9310; ALT. E9310H, 4820, 4820H, 18 CRNIMO, 7-6 17 CRNIMO 7 STEEL BAR OR FORGING. MATERIAL SHALL CONFORM TO EN-10084 AND ISO 6336-5 GRADE MQ, OR AGMA 2001-D04-GRADE 2 WITH MATERIAL CLEANLINESS CERTIFIED TO ASTM E45 METHOD 'A' TO MEET

A		B		C		D	
Thin	Heavy	Thin	Heavy	Thin	Heavy	Thin	Heavy
3	3	2.5	1.5	2.5	1.5	2	1.5

- PROVIDE INSPECTION REPORTS OR PROOF ACCORDING TO THE PROVISIONS EN-10204-3.1.
-
- ULTRASONIC TESTING: TESTING OF FORGINGS MUST FOLLOW THE PROVISIONS OF EN-10228-3 LEVEL 3 (AGMA A-388- TO AN EQUIVALENT 3 mm FLAT BOTTOMED HOLE IS AN ACCEPTABLE ALTERNATIVE.)
- CRACK TESTING: MAGNETIC PARTICLE TEST GROUND SURFACES TO ISO 6336-5 GRADE MQ (ALT: AGMA 2001-D04-GRADE 2) NO CRACKS ALLOWED.
- HEAT TREAT: CARBURIZE TEETH 1.2/2.2mm EFFECTIVE CASE DEPTH, HARDEN TO 58/61 HRC, CORE HARDNESS 28/40 HRC MIN. @ MID-TOOTH ROOT DIAMETER REMAINDER OF SURFACES OPTIONAL. PROCESS PER AGMA 2001-D04 GRADE 2. CASE DEPTH IS ON FINISHED GEAR TEETH, AFTER GRINDING. KEEP THREADS SOFT
- IDENTIFY WITH PART NUMBER, REV LEVEL, SUPPLIER INITIALS, JOB NUMBER, SHOP ORDER NUMBER, AND WORDS "GEN SIDE" AS SHOWN FOR PROPER ASSEMBLY TO LOAD FLANK
- GROUND TOOTH FLANKS AND FULL ROOT FILLET MUST BLEND WITHOUT GRIND NOTCH
- HELICAL GEAR TEETH MUST MEET GRIND TEMPER REQUIREMENTS OF AGMA 2007 CODE GRADE FB-1
- RADIAL ALIGNMENT OF GEAR TEETH TO OTHER FEATURES NOT REQUIRED
- ALL UNSPECIFIED FILLETS-R3, UNSPECIFIED CHAMFERS-1x45

REPORT ERRORS & CHANGES REMOVE ALL BURRS AND SHARP EDGES DIMENSIONS ARE IN MILLIMETERS. UNSPECIFIED TOLERANCES:		National Renewable Energy Laboratory TITLE: GEAR, HIGH SPEED SHAFT	
DECIMALS:	FINISH:		
X. ±1.0 .X ±0.5 .XX ±0.25	3.2 $\sqrt{\mu\text{m Ra}}$	≤ ± 0.5°	
COPYRIGHT © NOT TO BE REPRODUCED OR USED TO MAKE OTHER DRAWINGS OR MACHINERY		SIZE	DWG. NO.
DRAWN	JFC	DATE: 8/29/12	B 254510
CHECKED	NJB	THIRD ANGLE PRJ	
		SCALE: 1:4	WEIGHT: 14.65 kgs
		SHEET 2 OF 2	