GENERAL NOTES

1.0 SYMBOLS AND ABBREVIATIONS:

"	INCHES	KPAD	KILOPASCAL DIFFERENTIAL
'	FEET	KPAG	KILOPASCAL GAGE
AC	ALTERNATING CURRENT	KW	KILOWATT
ACFM	ACTUAL CUBIC FEET PER MINUTE	L	LITER
AH	AMPERE HOURS	LPM	LITERS PER MINUTE
BAR	BAR	LBF	POUND FORCE
BARG	BAR GAGE	LBS	POUNDS
BARD	BAR DIFFERENTIAL	M	METER
BTU	BRITISH THERMAL UNIT	M^3	CUBIC METER
°C	DEGREE CELSIUS	M/S	METERS PER SECOND
CFM	CUBIC FEET PER MINUTE	MM	MILLIMETER
CS	CENTISTOKES (MM SQUARED PER SECOND)	MPH	MILES PER HOUR
DC	DIRECT CURRENT	MIN	MINUTE
DIFF	DIFFERENTIAL	N	NEWTONS
°F	DEGREE FAHRENHEIT	NM^3	NORMAL CUBIC METER
FT	FEET	PSI	POUNDS PER SQUARE INCH
GAL	GALLONS	PSID	POUNDS PER SQUARE INCH DIFFERENTIAL
GPM	GALLONS PER MINUTE	PSIG	POUNDS PER SQUARE INCH GAGE
HR	HOUR	SCF	STANDARD CUBIC FEET
KG	KILOGRAM	SCFM	STANDARD CUBIC FEET PER MINUTE
KJ	KILOJOULE	SSU	SAYBOLTS SECONDS UNIVERSAL
KN	KILONEWTON	VAC	VOLTS ALTERNATING CURRENT
KPA	KILOPASCAL	VDC	VOLTS DIRECT CURRENT

NOTE: FLOW, PRESSURE AND TEMPERATURE VALUES SHOWN ON THIS DRAWING ARE INTENDED FOR USE IN THE DESIGN OF EXTERNAL SYSTEMS AND EQUIPMENT ONLY AND CANNOT BE USED IN ANY TURBINE PERFORMANCE CALCULATIONS.

1.1 SPECIFICATIONS: THE FOLLOWING SOLAR DOCUMENTS APPLY TO THIS DRAWING.

- ES 9-54 FASTENER INSTALLATION AND TORQUE VALUES
- ES 9-62 INGESTIVE CLEANING SOLAR GAS TURBINE ENGINES
- ES 9-98 FUEL, AIR, AND WATER (OR STEAM) FOR SOLAR GAS TURBINE ENGINES
- ES 9-224 LUBRICATING OIL FOR SOLAR GAS TURBINES
- ES 9-414 ELEVATING AND LEVELING PACKAGE BASES
- ES 2184 CLEANING AND FLUSHING OF HYDRAULIC SYSTEMS/COMPONENTS
- ES 2201 AUXILIARY SERVICE AIR

INSTALLATION INSTRUCTIONS FOR:

- ES 1746 LUBE OIL TANK VENT WITH SEPARATOR AND FLAME ARRESTOR
- ES 1632 EXHAUST SILENCER FOR SOLAR TURBINE ENGINES

1.2 SYSTEM DRAWINGS:

- 75681-149543 AIR ASSIST/ENGINE DRAIN
- 75681-149544 LUBE OIL SYSTEM SCHEMATIC
- 75681-149545 FUEL SYSTEM SCHEMATIC
- 75681-149546 DIRECT AC START SYSTEM
- 75681-149222 AUXILIARY ARRANGEMENT INSTALLATION.
- 75681-149223 TURBOMACHINERY MECHANICAL INSTALLATION.
- 75681-149310 ELECTRICAL SCHEMATIC
- 75681-149311 WIRING DIAGRAM
- 75681-149312 INTERFACE/INTERCONNECT DIAGRAM

TURBINE EXHAUST SYSTEM

2.0 GENERAL EXHAUST SYSTEM DESIGN GUIDELINES:

A. SUPPORT OF THE EXHAUST SYSTEM SHOULD PREVENT DAMAGE TO SOLAR SUPPLIED COMPONENTS DUE TO THERMAL EXPANSION. SEE PACKAGE INSTALLATION SECTION OF THE TURBOMACHINERY MECHANICAL INSTALLATION NOTES FOR APPLICABLE PACKAGE LIMITS AND CRITERIA.

B. MOUNTING BRACKETS MAY BE WELDED TO THE SHELL OF THE DUCTING. THE TYPICAL METAL THICKNESS AND TYPE IS 10 GAUGE, (0.134" (3.4 MM) THICK NOMINAL), ASTM A36/A569 UNLESS OTHERWISE STATED IN THESE NOTES.

C. THE EXPANSION JOINT, WILL NOT SUPPORT THE WEIGHT OF DUCTING OR COMPONENTS. THE ALLOWABLE DISPLACEMENTS OF THE EXPANSION JOINT ARE : AXIAL = 1 1/2" (38 MM), LATERAL = 1 1/2" (38 MM), RADIAL = 0 DEGREES. THE EXPANSION JOINT HAS NO APPRECIABLE SPRING RATE.

2.1 WHEN ASSEMBLING OR DISASSEMBLING THE SYSTEM, USE THE LIFTING LUGS PROVIDED TO HANDLE EACH COMPONENT INDIVIDUALLY. EMPLOY INDUSTRY ACCEPTED LIFTING TECHNIQUES WHEN LIFTING LUGS ARE NOT PROVIDED. REFER TO COMPONENT WEIGHTS AND ASSUME A GEOMETRIC CENTER OF GRAVITY. DO NOT USE THE LIFTING LUGS FOR PERMANENT MOUNTING, (SEE NOTE 2.0, PARAGRAPH B).

2.2 THE DRAIN CONNECTIONS SHOWN ON THE ANCILLARY COMPONENTS ARE DESIGNED TO REMOVE EXCESSIVE AMOUNTS OF RAIN OR MOISTURE FROM THE SYSTEM DURING EXTENDED SHUT DOWN PERIODS. CONNECTION TO THESE DRAINS IS OPTIONAL FOR THE CUSTOMER. RAIN AND MOISTURE IS ALSO REMOVED VIA THE EXHAUST COLLECTOR DRAIN ON THE PACKAGE.

2.3 ATTACHING HARDWARE KITS ARE INCLUDED FOR ALL FLANGES IN SOLAR SCOPE OR THE TURBINE EXHAUST INTERFACE FLANGE, (AS APPLICABLE). HARDWARE IS NOT SUPPLIED FOR ANY OTHER DOWNSTREAM CONNECTIONS. HARDWARE IS NOT SUPPLIED FOR FOUNDATION OR SUPPORT STEEL INTERFACES, UNLESS INCLUDED IN SOLAR SCOPE.

2.4 THE STATIC PRESSURE DROP ACROSS ALL ITEMS SHOWN ON THIS INSTALLATION DRAWING IS 2.5" H2O (64 MM). IF ADDITIONAL DUCTING OR DEVICES DONE BY OTHERS IS USED, THE PRESSURE DROP OF THAT DUCTING OR DEVICE SHOULD BE SUBTRACTED FROM THE ALLOWABLE DROP ALLOCATED FOR IN THE TURBINE PERFORMANCE GUARANTEE.

2.5 INDIVIDUAL COMPONENTS OF THE TURBINE EXHAUST SYSTEM ARE DESIGNED TO WITHSTAND A WINDLOAD OF 120 MI/HR (193 KM/HR) OR EQUIVALENT SEISMIC OR LATERAL ACCELERATION. ASSEMBLIES OF INDIVIDUAL COMPONENTS CAN NOT BE CONSIDERED TO BE STRUCTURALLY ADEQUATE TO THE SAME LOADS WITHOUT ADDITIONAL ENGINEERING.

2.6 BARE METAL EXHAUST SURFACES TYPICALLY OPERATE AROUND 900°F (482°C). PERSONNEL PROTECTION IS RECOMMENDED AND CARE MUST BE TAKEN IN THE LOCATION OF HOT EXHAUST SURFACES. DO NOT LOCATE EXHAUST COMPONENTS ON OR NEAR FLAMMABLE SURFACES

2.7 THE ALLOWABLE FLANGE LOADS ON THE EXHAUST SILENCER, ARE 2000 LBS (8.92 KN) AXIAL, 750 LBS (3.3 KN) SHEAR AND 5400 LBS*FT (35.5 KN*M) MOMENT. CARE SHOULD BE TAKEN TO ENSURE THAT THE STACK DESIGN DOES NOT EXCEED THESE LOADS.

TURBINE AIR INLET SYSTEM

3.0 A MINIMUM CLEARANCE OR CLEAR AREA IS REQUIRED TO SERVICE THE FILTER ELEMENTS AND TO ENSURE PROPER AIRFLOW TO THE TURBINE. DO NOT BLOCK DOOR SWINGS OR ACCESS AREAS.

3.1 MOUNTING BRACKETS MAY BE WELDED TO THE SHELL OF THE DUCTING. THE TYPICAL METAL THICKNESS AND TYPE IS 10 GAUGE, (0.134" (3.4 MM) THICK NOMINAL), ASTM A36/A569 UNLESS OTHERWISE STATED IN THESE NOTES. DO NOT WELD ON FILTERS OR SILENCERS. WELDING ON THESE DEVICES MAY RESULT IN FIRE OR DAMAGE TO THE DEVICE.

3.2 WHEN ASSEMBLING OR DISASSEMBLING THE SYSTEM, USE THE LIFTING LUGS PROVIDED TO HANDLE EACH COMPONENT INDIVIDUALLY. EMPLOY INDUSTRY ACCEPTED LIFTING TECHNIQUES WHEN LIFTING LUGS ARE NOT PROVIDED. REFER TO COMPONENT WEIGHTS AND ASSUME A GEOMETRIC CENTER OF GRAVITY. DO NOT USE THE LIFTING LUGS FOR PERMANENT MOUNTING, (SEE NOTE 3.1).

3.3 NOTE NOT USED.

3.4 ATTACHING HARDWARE KITS ARE INCLUDED FOR ALL FLANGES IN SOLAR SUPPLIED COMPONENTS OR THE TURBINE INLET INTERFACE FLANGE, (AS APPLICABLE). HARDWARE IS NOT SUPPLIED FOR ANY OTHER UPSTREAM CONNECTIONS. HARDWARE IS NOT SUPPLIED FOR FOUNDATION OR SUPPORT STEEL INTERFACES, UNLESS INCLUDED IN SOLAR SCOPE.

3.5 THE TOTAL PRESSURE DROP ACROSS ALL ITEMS SHOWN ON THIS INSTALLATION DRAWING IS 2.25" H_2O (57 MM H_2O). IF ADITIONAL DUCTING OR DEVICES DONE BY OTHERS IS USED, THE PRESSURE DROP OF THAT DUCTING SHOULD BE SUBTRACTED FROM THE ALLOWABLE PRESSURE DROP IN THE TURBINE PERFORMANCE GUARANTEE.

3.6 INDIVIDUAL COMPONENTS OF THE TURBINE INLET SYSTEM ARE DESIGNED TO WITHSTAND A WINDLOAD OF 120 MI/HR (193 KM/HR) OR EQUIVALENT SEISMIC OR LATERAL ACCELERATION. ASSEMBLIES OF INDIVIDUAL COMPONENTS CANNOT BE CONSIDERED TO BE STRUCTURALLY ADEQUATE TO THE SAME LOADS WITHOUT ADDITIONAL ENGINEERING.

3.7 DUCTING DESIGN, IF DONE BY OTHERS, SHOULD FOLLOW API 616/RP 11-PGT AND/OR SMACNA STANDARDS AND SPECIFICATIONS. RECOMMENDED WALL THICKNESS IS NOT LESS THAN 10 GAUGE, (0.134" (3.4 MM) THICK NOMINAL), WITH 1" X 1" X 1/8", (25 MM X 25 MM X 3 MM) ANGLE STIFFENERS ON 4' (1219 MM) SPACING MINIMUM TO MAINTAIN DUCTING RIGIDITY. ACCESS PORTS MUST BE ADDED TO THE DUCTING AFTER THE INLET FILTER AND APPROXIMATELY 10' (3000 MM) THERE AFTER ON THE HORIZONTAL RUN. ACCESS PORT MUST BE ADDED TO THE DUCT SITTING ON TOP OF THE INLET SILENCER. LEAKS IN DUCTING OR DUCTING INTERCONNECTS CAN NOT BE ALLOWED AND MAY CAUSE ENGINE DAMAGE OR FREQUENT ENGINE MAINTENANCE. CARE SHOULD BE TAKEN IN THE DESIGN TO ENSURE THAT NO LOOSE OBJECTS CAN BE INGESTED INTO THE ENGINE. THE DESIGN PRESSURE DIFFERENTIAL FOR THE DUCTING SHOULD BE NO LESS THAN 20" (508 MM) H_2O. THE DESIGN PARAMETERS EXPLAINED HERE HAVE BEEN FOUND TO BE ADEQUATE FOR ALL OPERATING CONDITIONS OF THE ENGINE, ANY DESIGN MUST CONSIDER CONDITIONS OTHER THAN NOMINAL OPERATING SUCH AS LIGHT-OFF, FLAME-OUT OR COMPRESSOR SURGE/STALL.

3.8 FOR DETAILED INFORMATION ON THE AIR FILTER, REFER TO VENDOR SUPPLIED INSTALLATION, OPERATION, AND MAINTENANCE MANUAL INCLUDED IN THE SOLAR OPERATION AND MAINTENANCE SUPPLEMENTAL DATA. AIR FILTER TECHNICAL DATA:

- INITIAL CLEAN DELTA P: 1.5" (38 MM) H_2O
- HIGH DELTA P SWITCH SET POINTS: 5" (127 MM) H_2O ALARM, 7" (178 MM) H_2O SHUTDOWN

REV	REV	REV	REV B	REV A	REV NC
			75046-J 12-17-04	75046-H 10-27-04	75046-A 8-03-04

REVISIONS

ZONE	LTR	DESCRIPTION	DATE	APPROVED
	NC	INITIAL SUBMITTAL PER PRD 75046	7-30 2004	J.P.M.
	A	REVISED TO REFLECT ENGINEERING CHANGES PER PRD 75046	10-26 2004	J.P.M.
	B	REVISED TO REFLECT AS-SHIPPED CONFIGURATION PER PRD 75046	12-17 2004	J.P.M.

SANTEE COOPER DWG#
G-R1-TG-105-00-0001-001

CUSTOMER
SANTEE COOPER
RICHLAND COUNTY LANDFILL
GAS-TO-ENERGY FACILITY

- [x] SUBMITTED FOR REVIEW — DATE 7-30-04
- [ ] CERTIFIED AS NOTED WITH ⬭ — DATE
- [x] CERTIFIED FOR CONSTRUCTION — DATE 12-17-04

SYMBOLS

- (2) DENOTES EXTERNAL CONNECTION POINT
- △A DENOTES REVISION
- ⬡2 DENOTES COMPONENT OR INSTRUMENTATION
- A/12 DENOTES DRAWING ZONE LOCATION

FSCM NO. 66195

APPROVED

	NAME	DATE
PROJECT MGR.	J. BOGUSLAW	7-30-04
ANCILLARY ENGR.	J. MUYCO	7-23-04
ENCLOSURE ENGR.	NA	
PACKAGE ENGR.	D. COOLEY	7-30-04
HYDRO-MECH ENGR.	NA	
G.A. DESIGNER	J.P. MUYCO	7-23-04

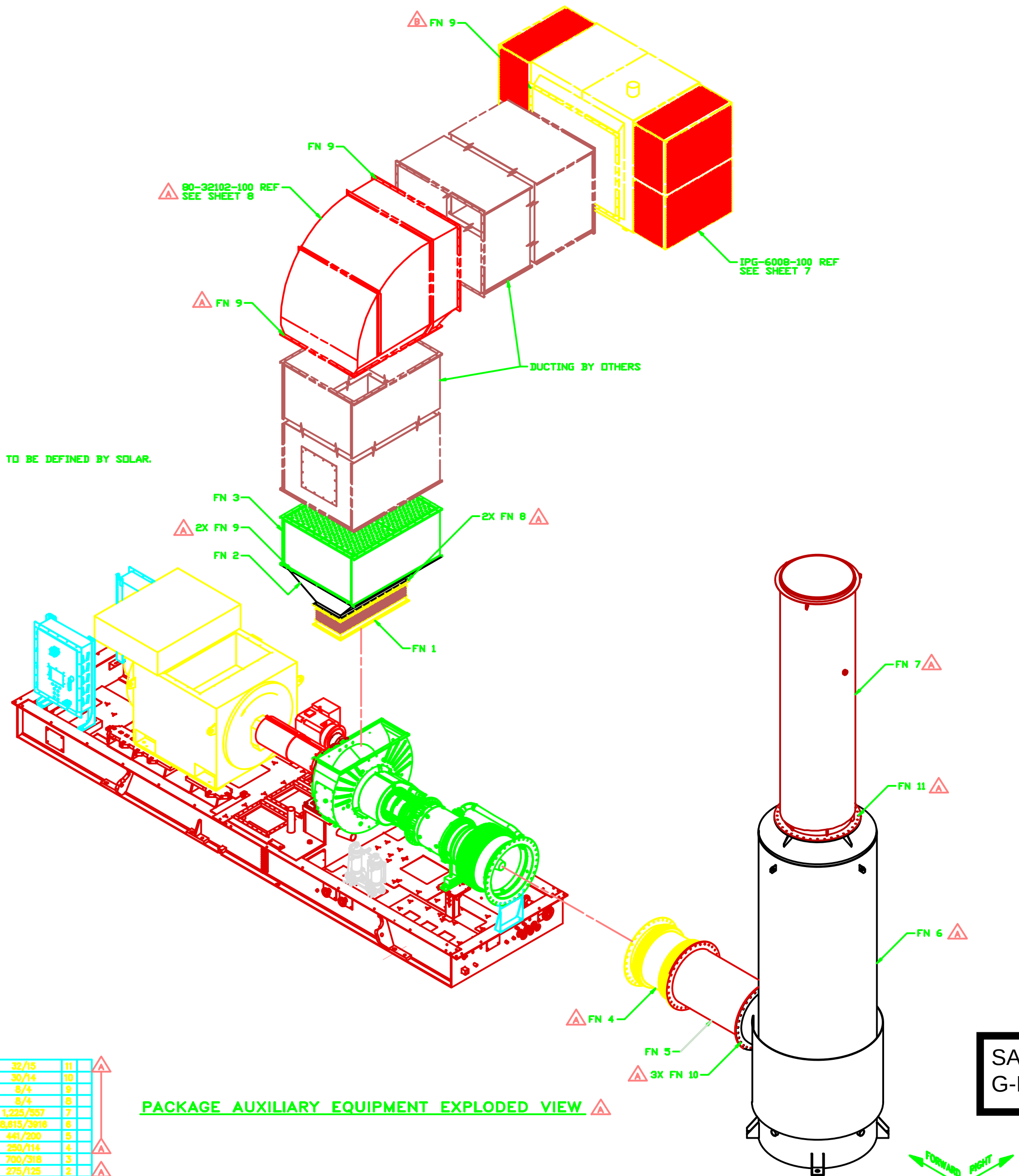
SOLAR PROJECT ITEM NO. 2-75681

CUSTOMER IDENT. NO. SEE ABOVE

DRAWING TITLE
TAURUS 60
POWER GENERATION
AUXILIARY EQUIPMENT
MECHANICAL INSTALLATION

Solar Turbines
A Caterpillar Company

DRAWING NO. 75681-149222 — REV B



NOTE: POSITION OF ALL REF PARTS ARE NOT TO BE DEFINED BY SOLAR.

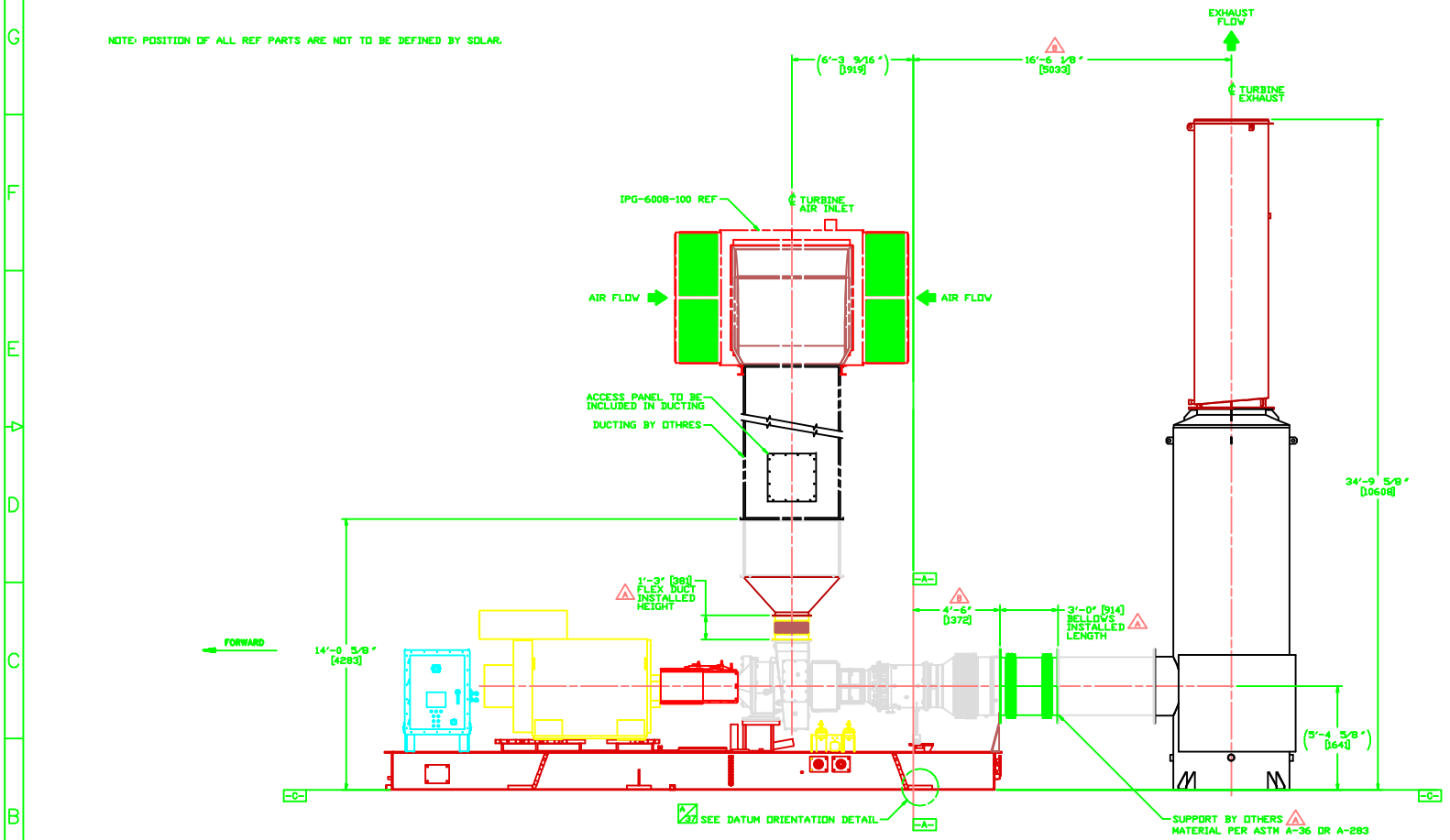
PACKAGE AUXILIARY EQUIPMENT EXPLODED VIEW

SANTEE COOPER DWG#
G-R1-TG-105-00-0001-002

QTY. (ASSY)	QTY. (ASSY)	EQUIPMENT PART NUMBER	EQUIPMENT NOMENCLATURE OR DESCRIPTION	EQUIPMENT ENVELOPE SIZE (IN)	EQUIPMENT WEIGHT (LBS/KG)	FIND NO.	ZONE LOC.
	1	AX-5618-102	HARDWARE KIT, 53" EXH FLANGE	KIT	32/15	11	
	3	AX-5614-102	HARDWARE KIT, 46" EXH FLANGE	KIT	30/14	10	
	5	1061674-200	HARDWARE KIT, 60" X 72" FLANGE	KIT	8/4	9	
	2	1061674-100	HARDWARE KIT, 21" X 56" FLANGE	KIT	8/4	8	
	1	AX-5621-100	RAIN STACK, STRAIGHT	52 X 53 X 180	1,225/557	7	
	1	1048865-100	SILENCER, EXH, FLOOR STANDING	82 X 89 X 238	8,615/3916	6	
	1	AX-5624-100	DUCT, STRAIGHT, EXHAUST	46 X 46 X 60	441/200	5	
	1	AX-5644-100	BELLOWS, EXHAUST	36 X 46 X 46	250/114	4	
	1	1049634-100	SILENCER, AIR INLET	36 X 64 X 76	700/318	3	
	1	AX-5250-100	DUCT, TRANSITION	24 X 64 X 72	275/125	2	
	1	AX-3242-106	DUCT, FLEXIBLE	15 X 25 X 60	115/52	1	

Solar Turbines
A Caterpillar Company

DRAWING NO. 75681-149222 | REV B | SHEET 2



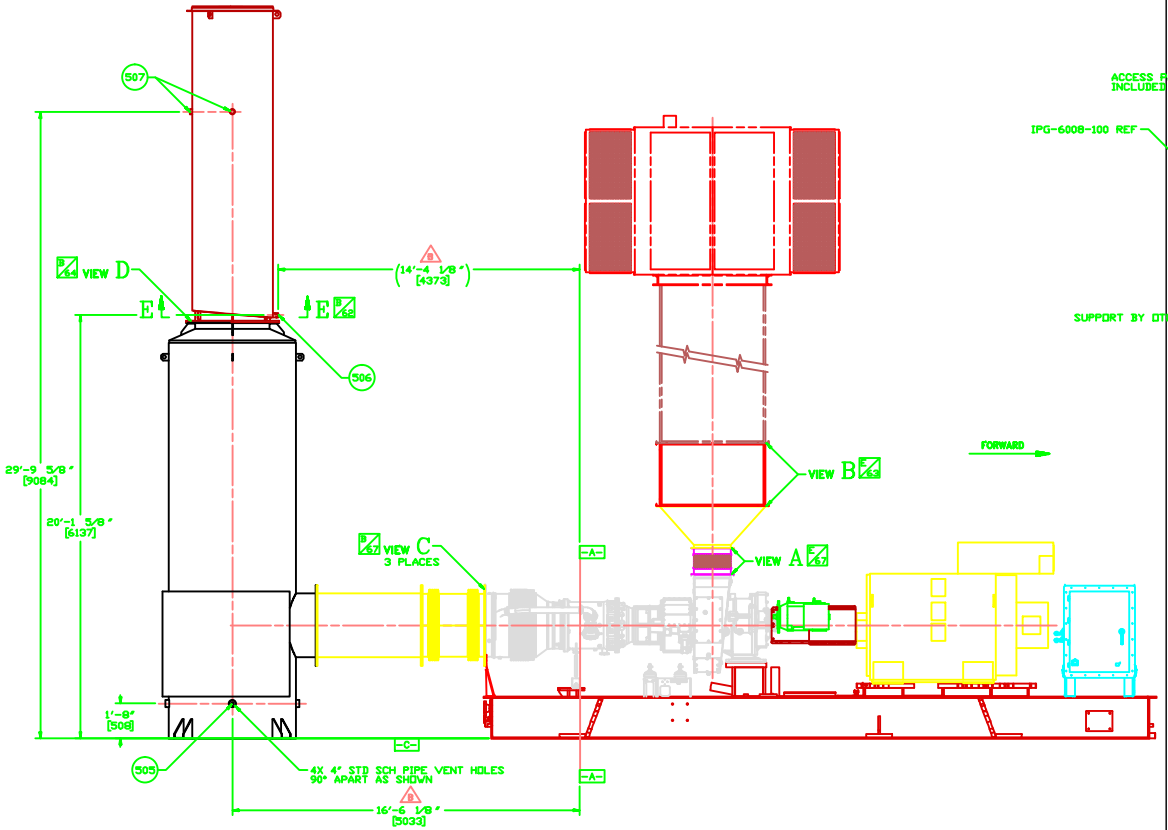
LEFT SIDE ELEVATION

SANTEE COOPER DWG#
G-R1-TG-105-00-0001-003

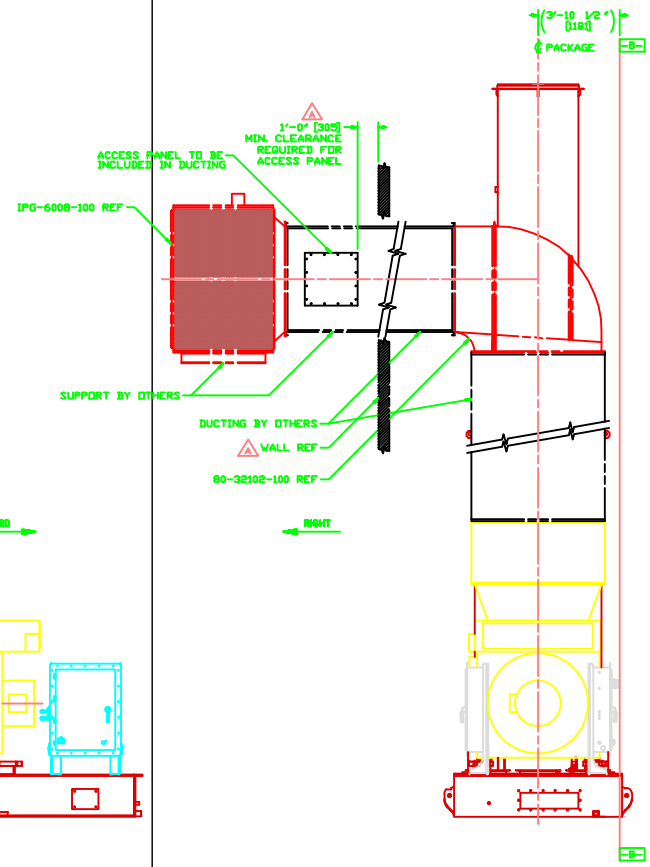
Solar Turbines
A Caterpillar Company
DRAWING NO. 75681-149222
REV B
SHEET 3

TABLE 1 – EXTERNAL CONNECTIONS

ITEM	DESCRIPTION	REFERENCE NOTE	ZONE
505	EXHAUST SILENCER DRAIN 1" NPT (CAPPED), SCH 40 CARBON STEEL		B/48
506	EXHAUST RAIN STACK DRAIN 2" NPT (CAPPED), SCH 40 CARBON STEEL		D/47
507	EXHAUST EMISSIONS TEST PORTS, HALF COUPLINGS (2 PLACES) 2" NPT		F/48



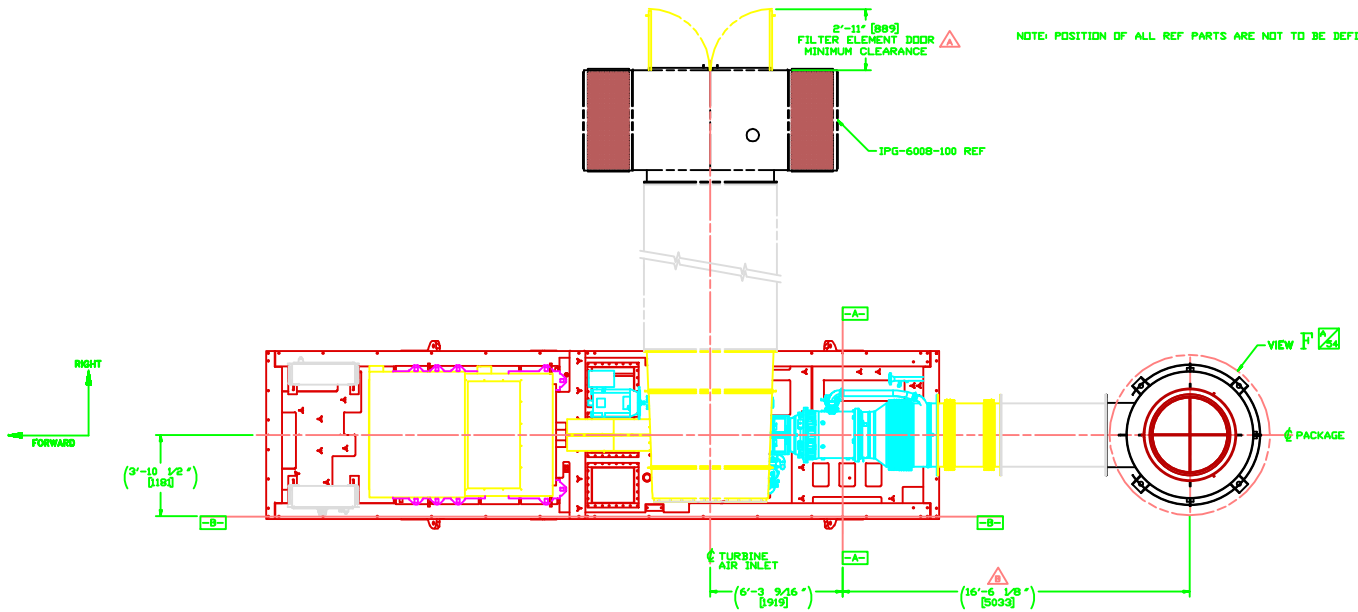
RIGHT SIDE ELEVATION



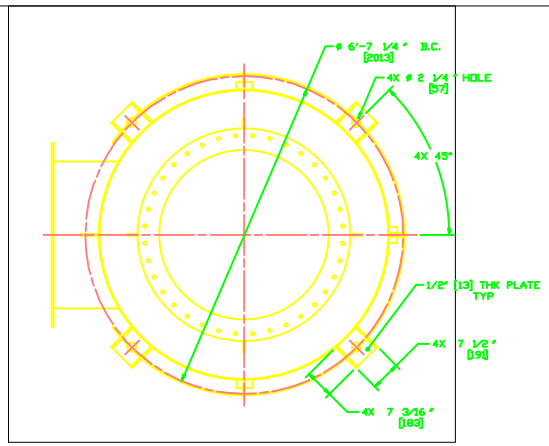
FORWARD END ELEVATION

SANTEE COOPER DWG#
G-R1-TG-105-00-0001-004

Solar Turbines
A Caterpillar Company
DRAWING NO. 75681-149222
REV B
SHEET 4



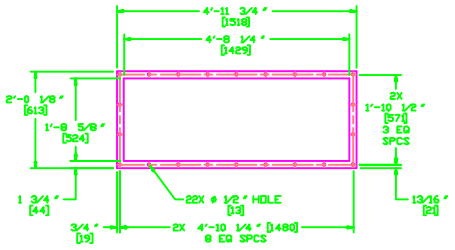
TOP VIEW



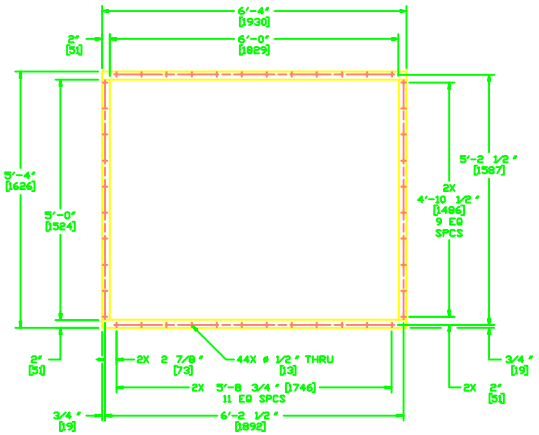
VIEW F

SANTEE COOPER DWG#
G-R1-TG-105-00-0001-005

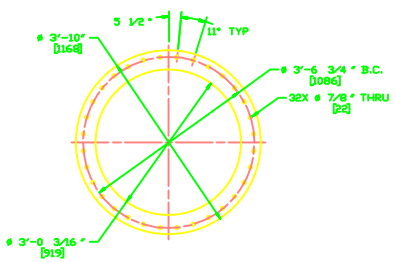
Solar Turbines
A Caterpillar Company
DRAWING NO. 75681-149222
REV B
SHEET 5



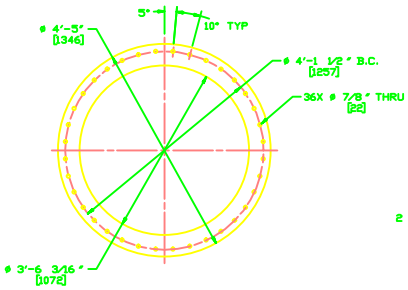
VIEW A 5/43



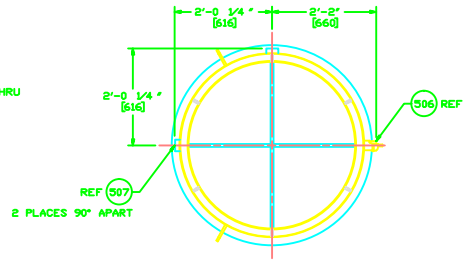
VIEW B 5/43



VIEW C 5/45



VIEW D 5/47



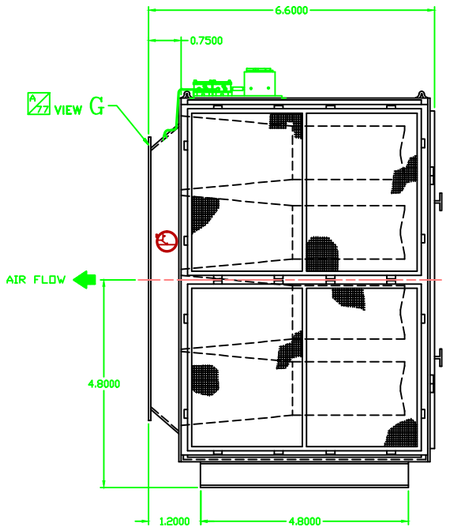
VIEW E-E 5/45

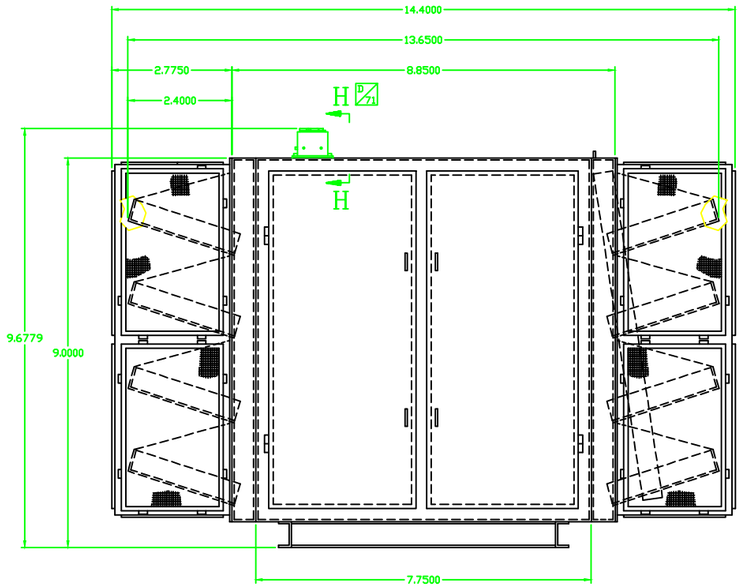
SANTEE COOPER DWG#
G-R1-TG-105-00-0001-006

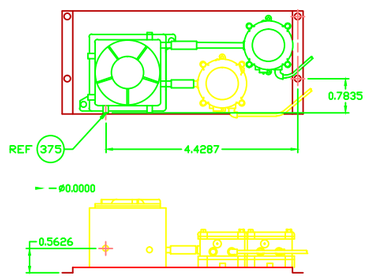
Solar Turbines
A Caterpillar Company
DRAWING NO. 75681-149222
REV B
SHEET 6

TABLE 1 (CONTINUED) – EXTERNAL CONNECTIONS

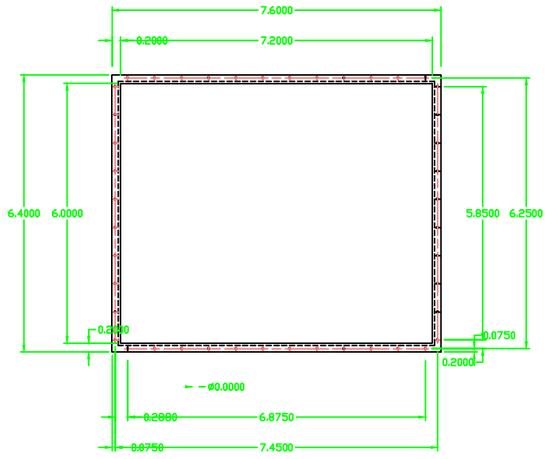
ITEM	DESCRIPTION	REFERENCE NOTE	ZONE
375	D.C. JUNCTION BOX, 24 VDC 3/4" NPTF		D/72



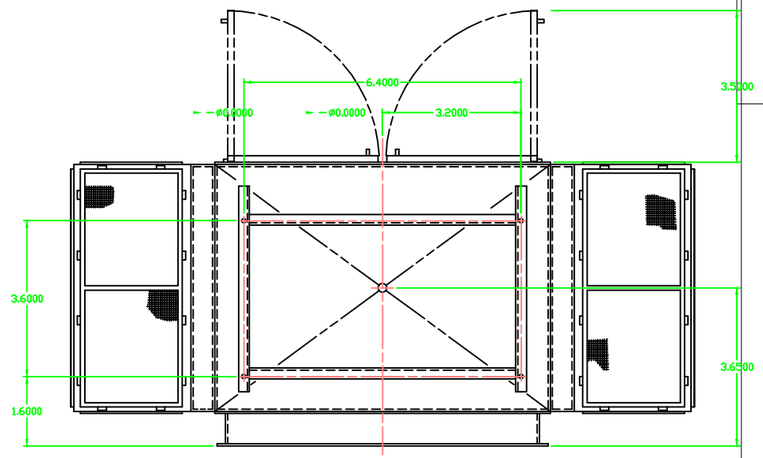




VIEW H–H G/14
ROTATED 90° CW



VIEW G G/18



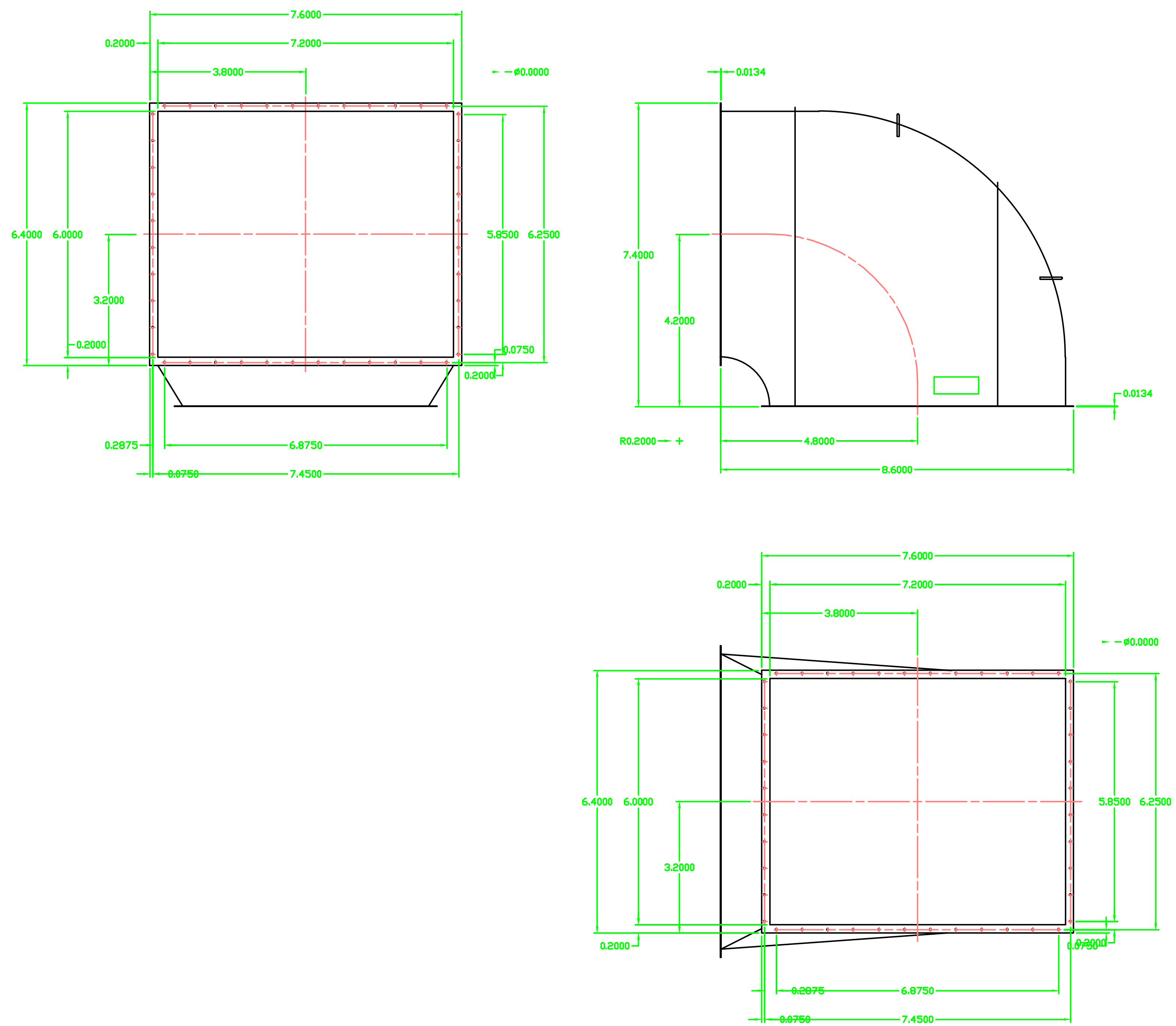
AIR FILTER, BARRIER, BACK OUTLET

APPROXIMATE WEIGHT: 2100 LBS [950 KG]
LOOSE SHIPPED ITEM
PN IPG-6008-100

SANTEE COOPER DWG#
G-R1-TG-105-00-0001-007

Solar Turbines
A Caterpillar Company

DRAWING NO. 75681-149222
REV B
SHEET 7



ELBOW DUCT, AIR INLET A

APPROXIMATE WEIGHT: 725 LBS (363 KG)
LOOSE SHIPPED ITEM
PN 80-32102-100

SANTEE COOPER DWG#
G-R1-TG-105-00-0001-008

Solar Turbines
A Caterpillar Company

DRAWING NO.	REV B
75681-149222	SHEET 8