



- NOTES:
- ALL DRAWINGS ARE IN METRIC MEASUREMENTS
 - ALL ENGINEERING PRACTICES SHALL BE APPLIED WITH REGARDS TO HOLE AND SHAFT TOLERANCES.
 - WHERE SCREWS OR BOLTS ARE USED THE CLEARANCE HOLES SHALL BE APPROXIMATELY 5% TO 8% LARGER THAN THE MATCHING TAPPED HOLE.
 - PREFERABLY ALL TAPPED HOLES AND MATCHING SCREWS AND/OR BOLTS TO BE METRIC FINE (MF)
 - MATERIALS SPECIFIED ON THE DRAWINGS ARE INDICATIVE ONLY. THE BUILDER CAN MAKE HIS/HER OWN MATERIAL CHOICE.
 - ALL CONNECTIONS/JOINTS WHICH HAVE STEAM PRESSURE APPLIED TO IT SHALL BE SILVER/HARD SOLDERED.
 - COMPRESSION SPRINGS ARE DRAWN IN COMPRESSED STATE (CP), UNCOMPRESSED STATE IS APPROX 40% TO 60% LONGER THEN COMPRESSED STATE.
 - WHERE PREFERRED SCREW OR RIVETED CONNECTIONS CAN BE OMITTED AND PARTS CAN BE BONDED TOGETHER BY USING EITHER HIGH STRENGTH GLUE, EPOXY RESIN, OR SOLDER.
 - PARTS WHICH ARE DIRECTLY EXPOSED TO STEAM AND/OR WATER SHOULD BE CONSTRUCTED USING NON-FERROUS OR NON CORROSIVE MATERIAL SUCH AS BRASS, BRONZE, GUNMETAL, STAINLESS STEEL, COPPER OR MONEL.
 - THE ORDER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED AND THE MODEL IS ASSEMBLED IS ENTIRELY LEFT TO THE BUILDER/MODEL MAKER.
 - A COLOUR SCHEME FOR THIS PROJECT IS ENTIRELY LEFT UP TO THE MODEL MAKER.
 - THE MANNER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED IS ENTIRELY LEFT UP TO THE BUILDER.
 - USE LOCTITE, ON SCREW OR PRESS FIT CONNECTIONS OR SURFACES, WERE DEEMED NECESSARY TO PREVENT PARTS FROM LOOSENING.
 - WASHERS SHALL BE USED WHERE DEEMED NECESSARY.
 - INQUIRE AT THE APPROPRIATE AUTHORITIES WHETHER OR NOT THIS BOILER REQUIRES A PRESSURE TEST CERTIFICATE
 - XX. ERRORS AND/OR OMISSIONS MAY OCCUR IN THE DRAWINGS, DO NOT HESITATE TO CONTACT ME SO THAT THE ERRORS/OMISSIONS CAN BE RECTIFIED.

OTHER ABBREVIATIONS

- DP = DEEP
 DAA= DRILL AFTER ASSEMBLY
 D&TAA= DRILL AND TAP AFTER ASSEMBLY
 CF = CLOSE FIT (SIZE FOR SIZE)
 PF = PRESS FIT
 PFAA= PRESS FIT AFTER ASSEMBLY
 PCD = PITCH CIRCLE DIAMETER
 RM = REAM
 HEX = HEXAGON, 6SIDED
 CP = COMPRESSED
 KNL = KNURLED
 CSK = COUNTERSINK
 PL = PLACES
 DWL= DOWEL
 T&B = TOP AND BOTTOM
 (T)HESOP=(TAPPED)HOLES EQUALLY SPACED ON PCD
 (T)HESOC=(TAPPED)HOLES EQUALLY SPACED ON CIRCUMFERENCE
 [SA-xxx]= SUB ASSEMBLY-xxx

MATERIAL ABBREVIATIONS:

- ALU = ALUMINIUM
 BRS = BRASS
 BRZ = BRONZE OR GUNMETAL (BRZ/GM)
 CI = CAST IRON
 CU = COPPER
 GRA = GRAPHITE
 MS = MILD STEEL/BRIGHT MILD STEEL
 S/S = SILVER STEEL OR STAINLESS STEEL
 SPS = SPRING STEEL
 PEEK= POLYETHER ETHER KETONE
 SYN = SYNTHETIC MATERIAL SUCH AS VETON, NYLON, TEFLON OR RUBBER

IN GENERAL SYNTHETIC MATERIALS SOULD BE ABLE TO WITHSTAND THE HEAT AND PRESSURE(S) APPLIED TO THEM.

nnn/nnn MEANS THAT EITHER MATERIAL CAN BE USED

QTY.	PART NUMBER	QTY.	PART NUMBER
1	CEASAR-6-01-WHEEL AXLE	1	CEASAR-1-01-MAIN UNDER FRAME
1	CEASAR-6-01-WHEEL AXLE	4	CEASAR-1-02-WHEEL AXLE BEARING
4	CEASAR-6-02-WHEEL	2	CEASAR-1-03-MAIN FRAME END BRACKET
1	CEASAR-6-03-CRANKSHAFT	1	CEASAR-1-04-FOOT PLATE
1	CEASAR-6-04-CRANK WEB	1	CEASAR-1-07-OILER CONTAINER
1	CEASAR-6-05-CRANK PIN	1	CEASAR-1-08-OILER CONTAINER TOP SCREW
1	CEASAR-6-06-FLYWHEEL	1	CEASAR-1-09-OILER STEAM DISCHARGE PIPE
1	CEASAR-6-07-DRIVING GEAR WHEEL	1	CEASAR-1-10-OILER STEAM INLET PIPE
1	CEASAR-6-08-DRIVEN GEAR WHEEL	QTY.	PART NUMBER
1	CEASAR-6-09-DRIVEN GEAR WHEEL SHAFT	1	CEASAR-2-01-BOILER SHELL
1	CEASAR-6-10-DRIVEN SHAFT SPACER	1	CEASAR-2-02-BOILER COVER BURNER END
1	CEASAR-6-11-CYLINDER	1	CEASAR-2-03-BOILER COVER CHIMNEY END
1	CEASAR-6-12-CYLINDER LID	1	CEASAR-2-04-BOILER FLAME PIPE
1	CEASAR-6-13-CYLINDER PORT BLOCK	4	CEASAR-2-05-BOILER STAND OFF
1	CEASAR-6-14-CYLINDER ROCKING SHAFT	2	CEASAR-2-06-BOILER STAND OFF INSULATOR DISC
1	CEASAR-6-15-ROCKING SHAFT SPACER	2	CEASAR-2-07-BOILER STAND OFF INSULATOR
1	CEASAR-6-16-ROCKING SHAFT SPRING	1	CEASAR-2-08-14x11.5xM8 BOILER BUSH TYPE-1
1	CEASAR-6-17-PISTON	2	CEASAR-2-09-14x11.5xM8 BOILER BUSH TYPE-2
1	CEASAR-6-18-DRIVING PULLEY	1	CEASAR-2-10-BOILER END DEFLECTOR
1	CEASAR-6-19-DRIVEN WHEEL PULLEY	1	CEASAR-2-11-WATER FILLER CAP
1	CEASAR-6-20-DRIVING BELT	2	CEASAR-2-12-BURNER CLAMP
QTY.	PART NUMBER	2	CEASAR-2-13-BOILER BURNER STAND OFF
1	CEASAR-7-01-CABIN SHELL	1	CEASAR-2-14-SAFFETY VALVE BODY
2	CEASAR-7-02- CABIN COVER PLATE	1	CEASAR-2-15-SAFFETY VALVE BALL
2	CEASAR-7-03-HOLE COVER TYPE-1	1	CEASAR-2-16-SAFFETY VALVE STEM
4	CEASAR-7-04-HOLE COVER TYPE-2	1	CEASAR-2-17-SAFFETY VALVE TOP RING
6	CEASAR-7-05-ROOF PILLAR	1	CEASAR-2-18-SAFFETY VALVE SPRING
3	CEASAR-7-06-BUFFER HOUSING	1	CEASAR-2-19-SAFFETY VALVE TOP SCREW NUT
3	CEASAR-7-07-BUFFER	1	CEASAR-2-20-STM T-OFF BANJO FITTING
3	CEASAR-7-08-M10 BUFFER NUT	1	CEASAR-2-21-STM T-OFF BANJO FITTING SCREW
3	CEASAR-7-09-PULL HOOK	1	CEASAR-2-22-BOILER THERMAL INSULATOR BLANKET
1	CEASAR-7-10-ROOF	1	CEASAR-2-23-BOILER GLADDING
1	CEASAR-7-11-ROOF CHIMNEY RING	1	CEASAR-2-24-CHIMNEY
1	CEASAR-7-12-CHIMNEY CROWN	QTY.	PART NUMBER
1	CEASAR-7-13-ROOF TRIM	1	CEASAR-3-01-GAS TANK SHELL
2	CEASAR-7-14-ROOF STIFFENING STRIP	2	CEASAR-3-02-GAS TANK END CAP
2	CEASAR-7-15-CABIN STIFFENING STRIP	2	CEASAR-3-03-14x11.5xM8 GAS TANK BUSH TYPE-1
1	CEASAR-7-16-CABIN TRIM	1	CEASAR-3-04-14x11.5xM8 GAS TANK BUSH TYPE-2
1	CEASAR-7-16-CABIN TRIM	1	CEASAR-3-05-GAS TANK SUPPLY VALVE HOUSING
4	CEASAR-7-17-LIFTING SUPPORT	1	CEASAR-3-06-GAS TANK SUPPLY VALVE SPINDLE
4	CEASAR-7-18-LAMP BRACKET	1	CEASAR-3-07-GAS TANK SUPPLY VALVE SPINDLE NUT
4	CEASAR-7-19-HAND RAIL	1	CEASAR-3-08-GAS TANK SUPPLY NIPPLE
8	CEASAR-7-20-HAND RAILSUPPORT	1	CEASAR-3-09-GAS TANK AIR RELIEF VALVE HOUSING
4	CEASAR-7-21-LANTARN BODY	1	CEASAR-3-10-GAS TANK AIR RELIEF VALVE SPINDLE
4	CEASAR-7-22-LANTARN LENS COVER	1	CEASAR-3-11-GAS TANK AIR RELIEF VALVE SPINDLE NUT
4	CEASAR-7-23-LANTARN LENS	1	CEASAR-3-12-M8x4 PIPE NUT
4	CEASAR-7-24-LANTRAN BACK PLATE	1	CEASAR-3-13-GAS SUPPLY PIPE
4	CEASAR-7-25-LANTRAN TOP BRACKET	1	CEASAR-3-14-GAS TANK FILLER VALVE HOUSING
4	CEASAR-7-26-LANTRAN REAR BRACKET	1	CEASAR-3-15-GAS TANK FILLER VALVE
4	CEASAR-7-27-LANTRAN CARRY HANDLE	1	CEASAR-3-16-GAS TANK FILLER VALVE TOP
4	CEASAR-7-28-LANTRAN VENT	1	CEASAR-3-17-GAS TANK FILLER VALVE SPRING
4	CEASAR-7-29-LANTRAN BASE	QTY.	PART NUMBER
2	CEASAR-7-30-ROOF FASTENING STRIP	1	CEASAR-4-01-BURNER TUBE
2	CEASAR-7-31-NAME PLATE	1	CEASAR-4-02-BURNER FLAME PIPE COVER
QTY.	PART NUMBER	1	CEASAR-4-03-BURNER GAS SPRAY NOZZLE
1	CEASAR-64mm-RAIL	1	CEASAR-4-04-BURNER GAS SPRAY NOZZLE HOLDER
86	CEASAR-M2.5 NUT	1	CEASAR-4-05-BURNER SUPPLY NIPPLE
80	CEASAR-M2.5x4 PAN HEAD SCREW	1	CEASAR-4-06-BURNER TUBE COVER PLATE
6	CEASAR-M2.5x6 PAN HEAD SCREW	1	CEASAR-4-07-M8x4 PIPE NUT
8	CEASAR-M3 NUT	QTY.	PART NUMBER
6	CEASAR-M3x7 C-SINK SCREW	1	CEASAR-5-01-GEARBOX BASE PLATE
8	CEASAR-M3x7 GRUB SREW	1	CEASAR-5-02-GEARBOX SIDE FRAME-PORT BLOCK
14	CEASAR-M3x8 PAN HEAD SCREW	1	CEASAR-5-03-GEARBOX SIDE FRAME
1	CEASAR-M4 NUT	2	CEASAR-5-04-CRANKSHAFT BEARING BUSH
4	CEASAR-M4x10 PAN HEAD SCREW	2	CEASAR-5-05-GEARBOX BEARING BUSH
1	CEASAR-M4x14 GRUB SREW	2	CEASAR-5-06-CONNECTOR NIPPLE
1	CEASAR-M5x8 GRUB SREW	2	CEASAR-5-07-PIPE NUT
2	CEASAR-M5x10 PAN HEAD SCREW	1	CEASAR-5-08-EXHAUST PIPE
2	CEASAR-M5x16 PAN HEAD SCREW		
1	CEASAR-M6 NUT		

NOTE ON DRIVE SYSTEM: IF SO DESIRED THE 2 DRIVE PULLEYS (6-18 & 6-19) CAN BE REPLACED BY CHAIN SPROCKETS AND THE DRIVE BELT (6-20) SHOULD BECOME A CHAIN.

NOTES: LOOSELY BASED ON A MODEL WHICH WAS FOUND IN A MODEL ENGINEERING MAGAZINE

TITLE
GAS FIRED MODEL OF A NARROW GAUGE TRAM LOCO CALLED "CEASAR". (64mm/2.5")

DRAWING CONTENTS
ISOMETRIC VIEW, BILL OF MATERIALS AND NOTES

PROJECT No 07E-11-00
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PROJECTION
JDWDS
 DATE OCTOBER-2016
 SHEET: 02 OF 07
 MODEL SCALE: 1:1
 DWG SCALE: 1:1 @A3 OR AS SHOWN
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