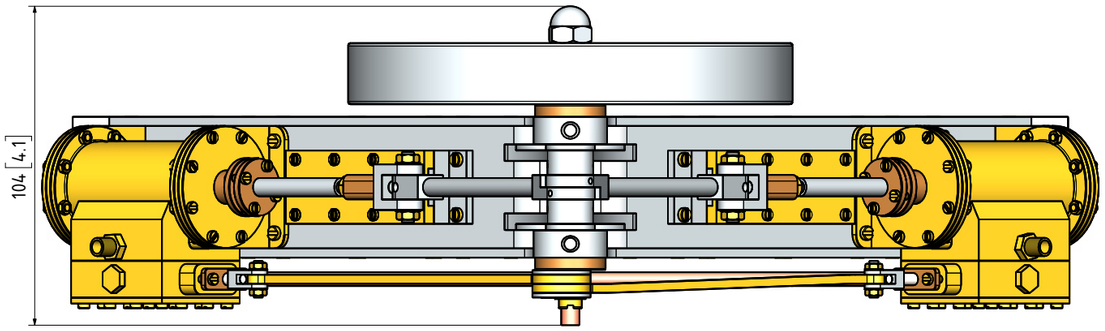
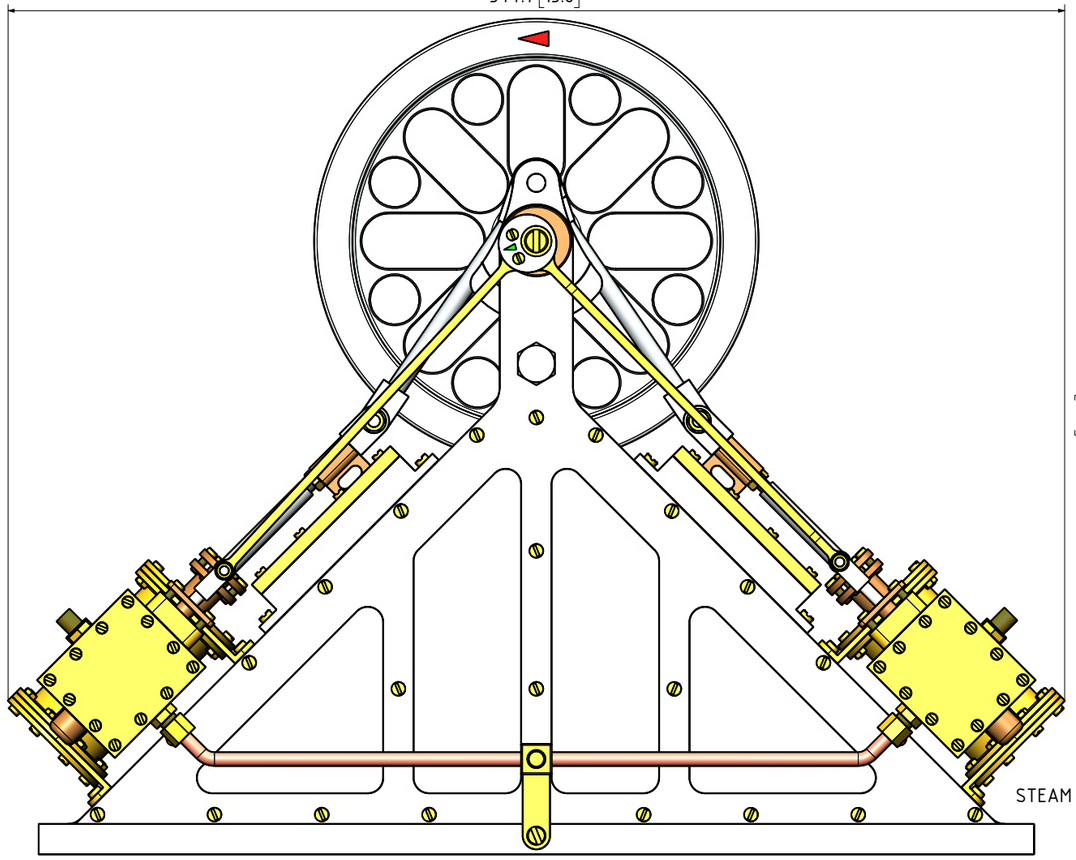
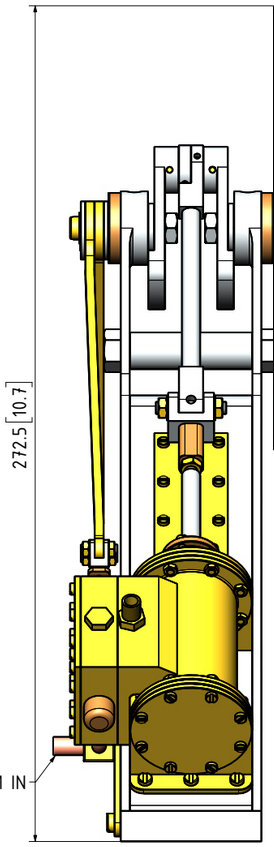
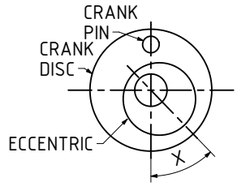




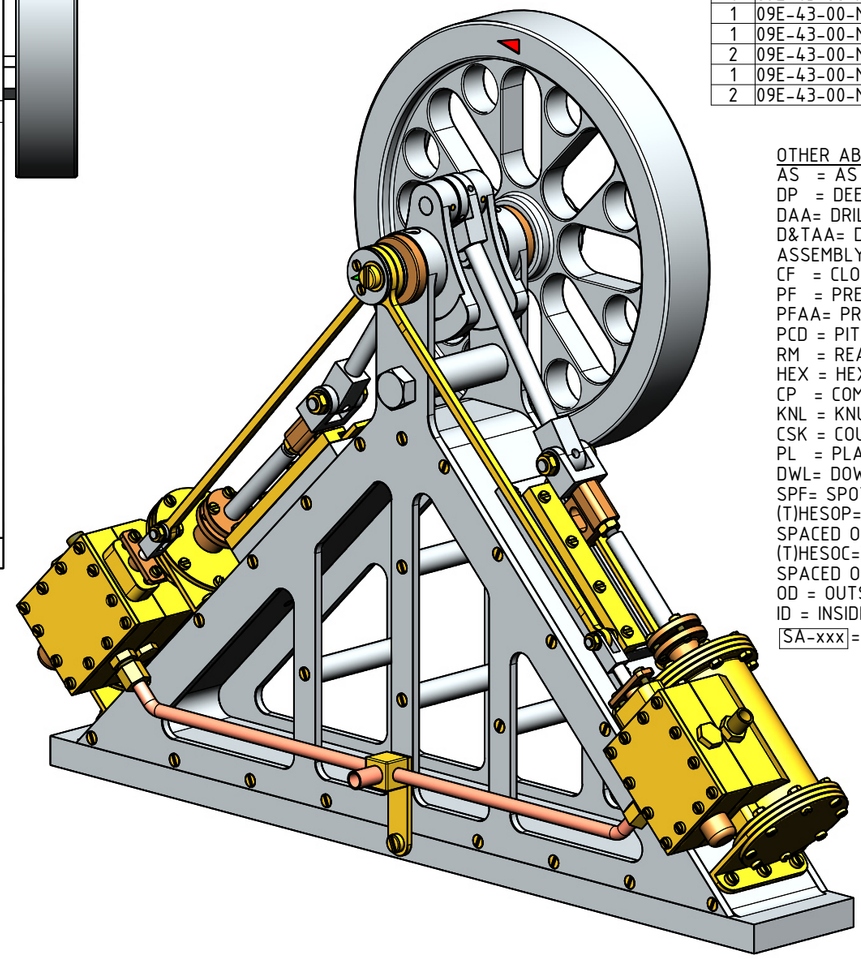


THE OFF SET ANGLE OF THE ECCENTRIC IN RELATION TO THE CRANK AXIS TO BE EXPERIMENTALLY DETERMINED FOR THE SMOOTH RUNNING OF THE ENGINE AND SATISFACTION OF THE BUILDER



MATERIAL ABBREVIATIONS:
ALU = ALUMINIUM
HALU= HARD ALUMINIUM
BRS = BRASS
BRZ = BRONZE OR GUNMETAL (BRZ/GM)
CI = CAST IRON
CU = COPPER
GRA = GRAPHITE
MS = MILD STEEL/BRIGHT MILD STEEL
SS = 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
1	09E-43-00-1-01-BASE MOUNTING FRAME
4	09E-43-00-1-02-CYLINDER STAND
2	09E-43-00-1-03-CYLINDER
2	09E-43-00-1-04-STEAM CHEST+PORT BLOCK
2	09E-43-00-1-05-CYLINDER FRONT COVER
2	09E-43-00-1-06-CYLINDER REAR COVER
2	09E-43-00-1-07-CROSSHEAD GUIDE
4	09E-43-00-1-08-EXHAUST PLUG
4	09E-43-00-1-09-EXHAUST CONNECTOR
2	09E-43-00-1-10-PIPE NUT M6x4.5
1	09E-43-00-1-11-STEAM SUPPLY PIPE
1	09E-43-00-2-01-CRANKSHAFT
2	09E-43-00-2-02-PISTON+CROSSHEAD
2	09E-43-00-2-03-SLIDE VALVE+ROD
1	09E-43-00-2-04-ECCENTRIC SHEAVE
1	09E-43-00-2-05-ECCENTRIC STRAP-1
1	09E-43-00-2-06-ECCENTRIC STRAP-2
2	09E-43-00-2-07-CON-ROD
32	09E-43-00-M2.5 NUT
24	09E-43-00-M2.5x12 PAN HEAD SCREW
24	09E-43-00-M2.5x20 PAN HEAD SCREW
4	09E-43-00-M2.5x4 C-SINK SCREW
1	09E-43-00-M2.5x7 GRUB SREW
44	09E-43-00-M2.5x8 PAN HEAD SCREW
4	09E-43-00-M3 NUT
4	09E-43-00-M3 WASHER
48	09E-43-00-M3x10 C-SINK SCREW
24	09E-43-00-M3x8 PAN HEAD SCREW
6	09E-43-00-M4 NUT
4	09E-43-00-M4 WASHER
1	09E-43-00-M4x10 PAN HEAD SCREW
1	09E-43-00-M5 WASHER
1	09E-43-00-M5x8 PAN HEAD SCREW
2	09E-43-00-M6 NUT-SPECIAL
1	09E-43-00-M8 DOME NUT
2	09E-43-00-M8x20 HEX BOLT



OTHER ABBREVIATIONS
AS = AS SHOWN
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 = HEXACON, 6SIDED
CP = COMPRESSED
KNL = KNURLED
CSK = COUNTERSINK
PL = PLACES
DWL= DOWEL
SPF= SPOTFACE
(T)HESOP=(TAPPED)HOLES EQUALLY SPACED ON PCD
(T)HESOC=(TAPPED)HOLES EQUALLY SPACED ON CIRCUMFERENCE
OD = OUTSIDE DIAMETER
ID = INSIDE DIAMETER
SA-xxx = SUB ASSEMBLY-xxx

NOTES:
0. ALL DRAWINGS ARE IN METRIC MEASUREMENTS
1. ALL ENGINEERING PRACTICES SHALL BE APPLIED WITH REGARDS TO HOLE AND SHAFT TOLERANCES.
2. WHERE SCREWS OR BOLTS ARE USED THE CLEARANCE HOLES SHALL BE APPROXIMATELY 5% TO 8% LARGER THAN THE MATCHING TAPPED HOLE.
3. PREFERABLY ALL TAPPED HOLES AND MATCHING SCREWS AND/OR BOLTS TO BE METRIC FINE (MF)
4. MATERIALS SPECIFIED ON THE DRAWINGS ARE INDICATIVE ONLY. THE BUILDER CAN MAKE HIS/HER OWN MATERIAL CHOICE.
5. ALL CONNECTIONS/JOINTS WHICH HAVE STEAM PRESSURE APPLIED TO IT SHALL BE SILVER/HARD SOLDERED.
6. COMPRESSION SPRINGS ARE DRAWN IN COMPRESSED STATE (CP), UNCOMPRESSED STATE IS APPROX 40% TO 60% LONGER THEN COMPRESSED STATE.
7. 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.
8. 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.
9. THE ORDER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED AND THE MODEL IS ASSEMBLED IS ENTIRELY LEFT TO THE BUILDER/MODEL MAKER.
10. A COLOUR SCHEME FOR THIS PROJECT IS ENTIRELY LEFT UP TO THE MODEL MAKER.
11. THE MANNER IN WHICH THE PARTS/COMPONENTS ARE MANUFACTURED IS ENTIRELY LEFT UP TO THE BUILDER.
12. USE LOCTITE, ON SCREW OR PRESS FIT CONNECTIONS OR SURFACES, WERE DEEMED NECESSARY TO PREVENT PARTS FROM LOOSENING.
13. WASHERS AND/OR SPRINGWASHERS SHALL BE USED WHERE DEEMED NECESSARY.
XX. ERRORS AND/OR OMISSIONS MAY OCCUR IN THE DRAWINGS, DO NOT HESITATE TO CONTACT ME SO THAT THE ERRORS/OMISSIONS CAN BE RECTIFIED.

NOTES: THIS ENGINE WAS DESIGNED/DEVELOPED BY J.A.M. DE WAAL

TITLE
A SIMPLE 2 CYLINDER DIAGONAL STEAM ENGINE (BORE=28mm STROKE=38mm)

DRAWING CONTENTS
GENERAL ARRANGEMENT, NOTES, ISOMETRIC VIEW, BILL OF MATERIALS

PROJECT No 09E-43-00
JDW DRAUGHTING SERVICES
J.A.M. DE WAAL. 12 BRIGHTWELL STREET PAPAKURA 2110. NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION
JDWDS
DATE JUNE 2020
SHEET: 01 OF 04

MODEL SCALE: 1:1
DWG SCALE: 1:1 @A3 OR AS SHOWN
Copyright © J.A.M. DE WAAL PAPAKURA NZ
A3 No: 09E-43-00-SHT01

DRAWINGS ARE FOR PERSONAL USE ONLY NOT FOR COMMERCIAL PURPOSES

1-01.1
1-01.3
1-01.2
1-01.4
1-01.5
1-02
1-03
1-04.1
1-04.2
1-04.3
1-04.4
1-04.5
1-04.6
1-04.7
1-05
1-06.1
1-06.2
1-06.3
1-06.4
1-07.1
1-07.2
VIEW-"A"
OPPOSITE FACE EQUAL
SCALE 1:2
TAKE OVER ALL HOLES FROM 1-01.1
CSK
R5-14PL
M3 ↧ 10-40PL
M4 ↧ 10
DAA
BRS
BRZ
SYN
MS
ALU/MS
SEAL
NEAR SIDE ONLY
SOLDER TO 1-03
2mm THICK
SECTION A-A
VIEW-"A" OPPOSITE SLOPE MIRROR IMAGE SCALE 1:2
SCALE 1:1.5

NOTES: THIS ENGINE WAS DESIGNED/DEVELOPED BY J.A.M. DE WAAL

TITLE
A SIMPLE 2 CYLINDER DIAGONAL STEAM ENGINE (BORE=28mm STROKE=38mm)

DRAWING CONTENTS
PARTS AND ASSEMBLIES

PROJECT No 09E-43-00
JDW DRAUGHTING SERVICES
J.A.M. DE WAAL. 12 BRIGHTWELL STREET PAPAKURA 2110. NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION | JDWDS | MODEL SCALE: 1:1
DATE JUNE 2020 | DWG SCALE: 1:1 @A3 OR AS SHOWN
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SHEET: 02 OF 04 | A3 | No: 09E-43-00-SHT02

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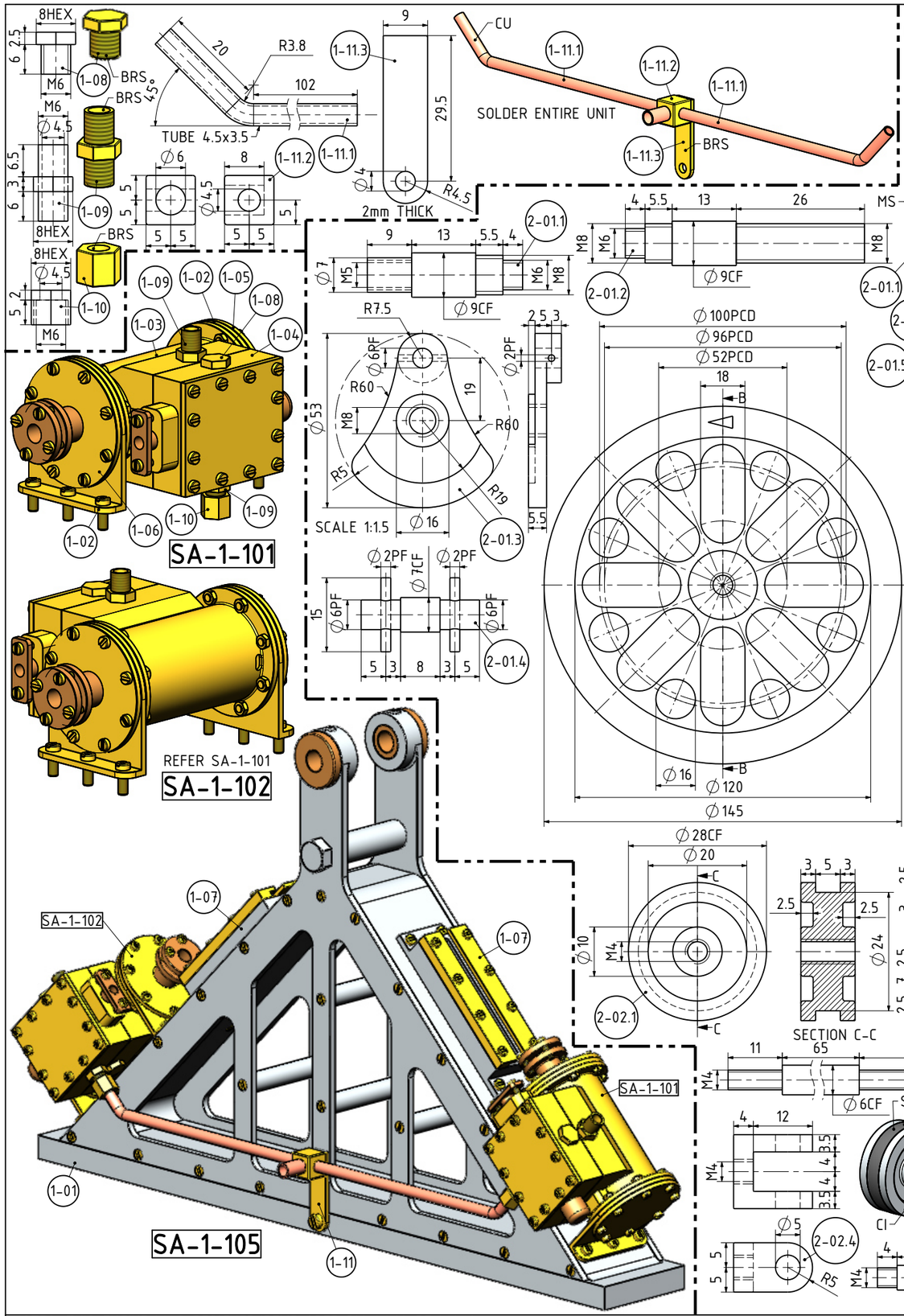

NOTES: THIS ENGINE WAS DESIGNED/DEVELOPED BY J.A.M. DE WAAL

TITLE

A SIMPLE 2 CYLINDER DIAGONAL STEAM ENGINE (BORE=28mm STROKE=38mm)

DRAWING CONTENTS

PARTS AND ASSEMBLIES

PROJECT No 09E-43-00

JDW DRAUGHTING SERVICES

J.A.M. DE WAAL. 12 BRIGHTWELL STREET PAPAKURA 2110. NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION | JDWDS | MODEL SCALE: 1:1

DATE: JUNE 2020 | DWG SCALE: 1:1 @A3 OR AS SHOWN

SHEET: 03 OF 04 | A3 | No: 09E-43-00-SHT03

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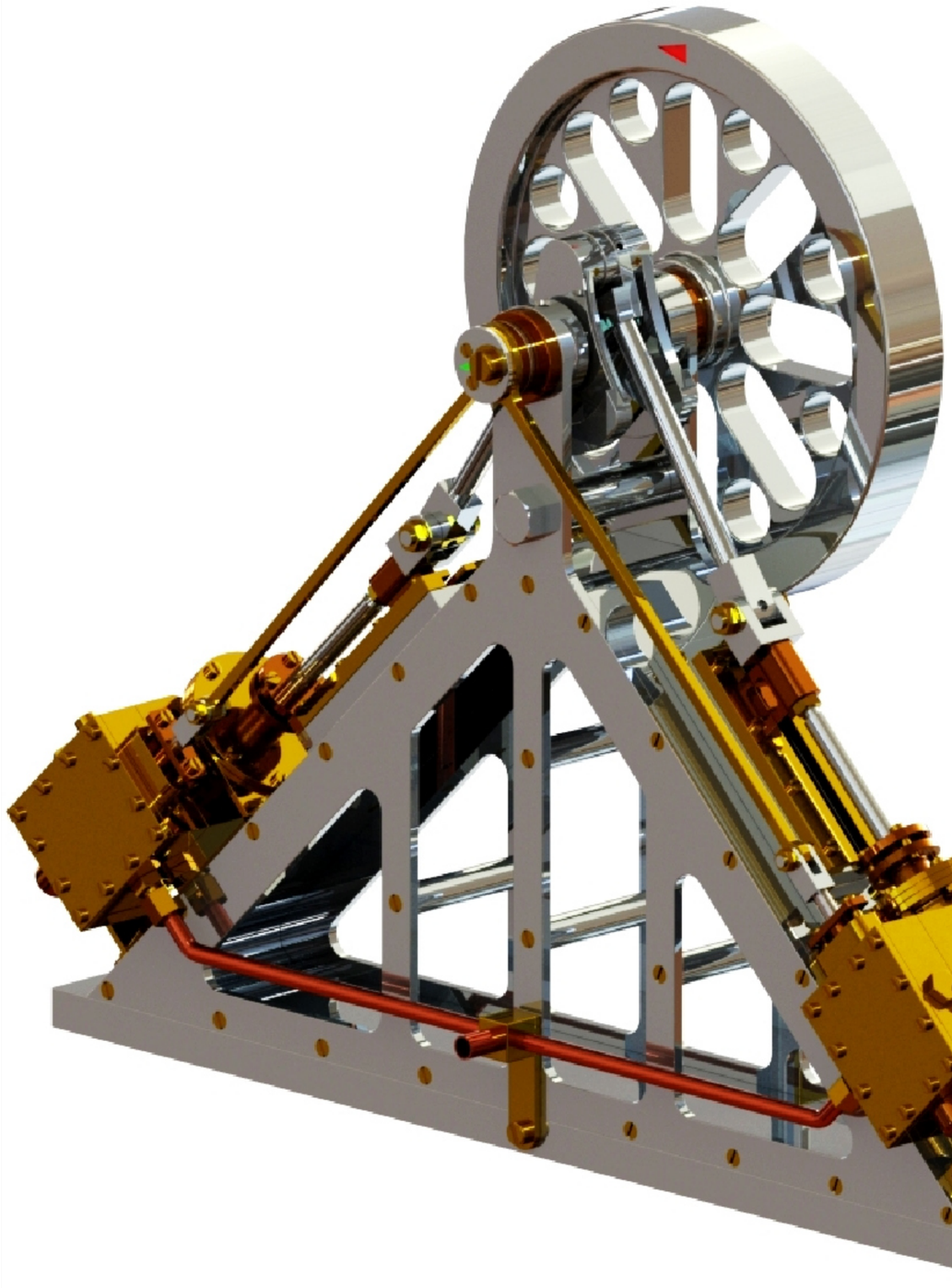

NOTES: THIS ENGINE WAS DESIGNED/DEVELOPED BY J.A.M. DE WAAL

TITLE
A SIMPLE 2 CYLINDER DIAGONAL STEAM ENGINE (BORE=28mm STROKE=38mm)

DRAWING CONTENTS
RENDERED PICTURE

PROJECT No 09E-43-00
JDW DRAUGHTING SERVICES
J.A.M. DE WAAL. 12 BRIGHTWELL STREET PAPAKURA 2110. NEW ZEALAND. PHONE: 0064 09 2988815. MOB: 0211791000 E-MAIL: dewaal@xtra.co.nz.

PROJECTION JDWDS
DATE JUNE 2020
SHEET: 04 OF 04 A3

MODEL SCALE: 1:1
DWG SCALE: 1:1 @A3 OR AS SHOWN
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No: 09E-43-00-SHT04

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