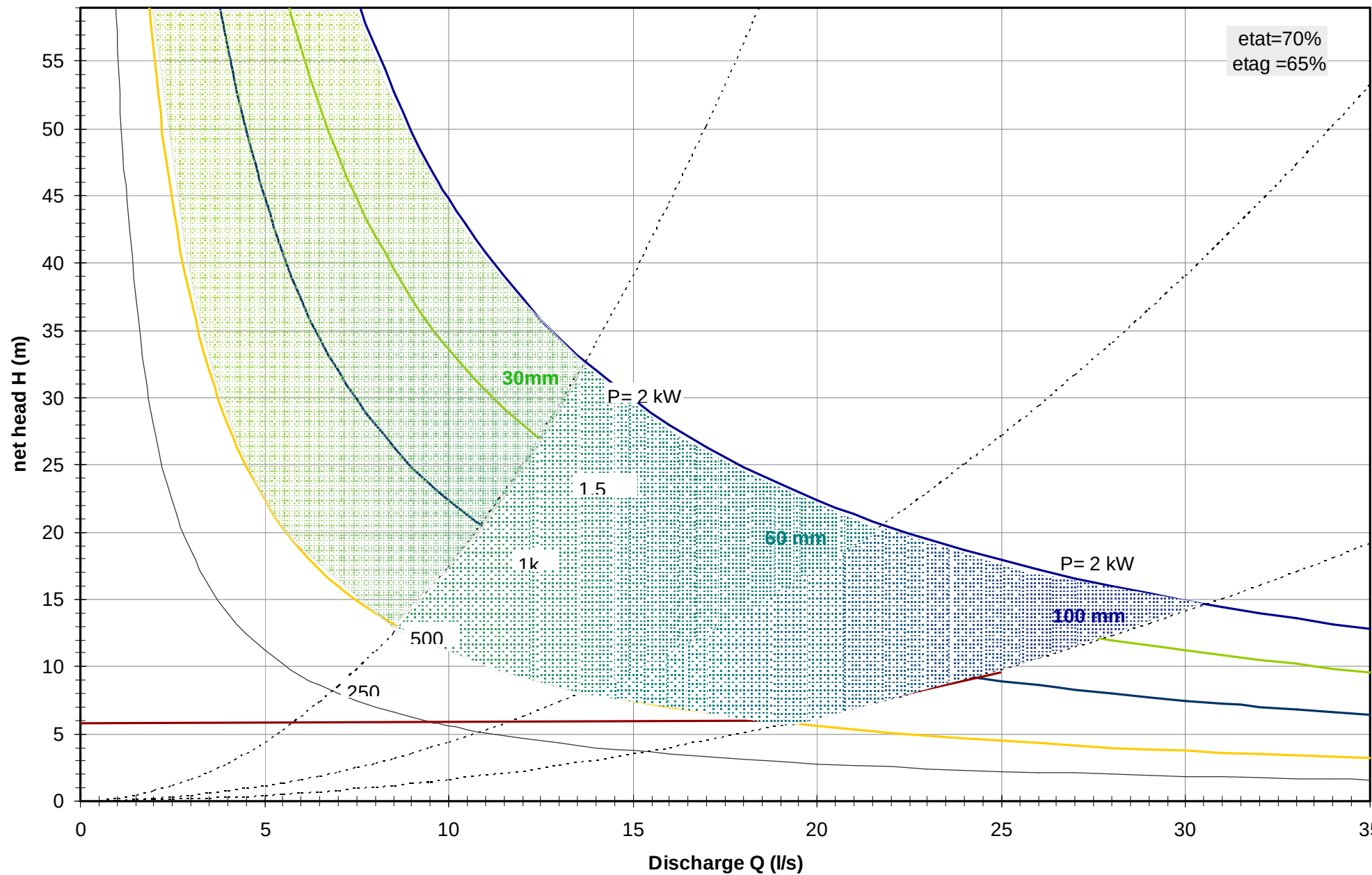


DESIGN

**ENTEC
CrossFlow Turbine
TP100d**

**Production Drawing
REVISION 4.0
VERSION 29.10.2010**

Application Limits TP.100.a - [PicoCrossflow]



PRODUCTION DRAWING

Material List – 01

Turbine Assembly – 02

Housing Sub Assembly – 03

Guide Vane Sub Assembly – 04

Actuator Sub Assembly – 05

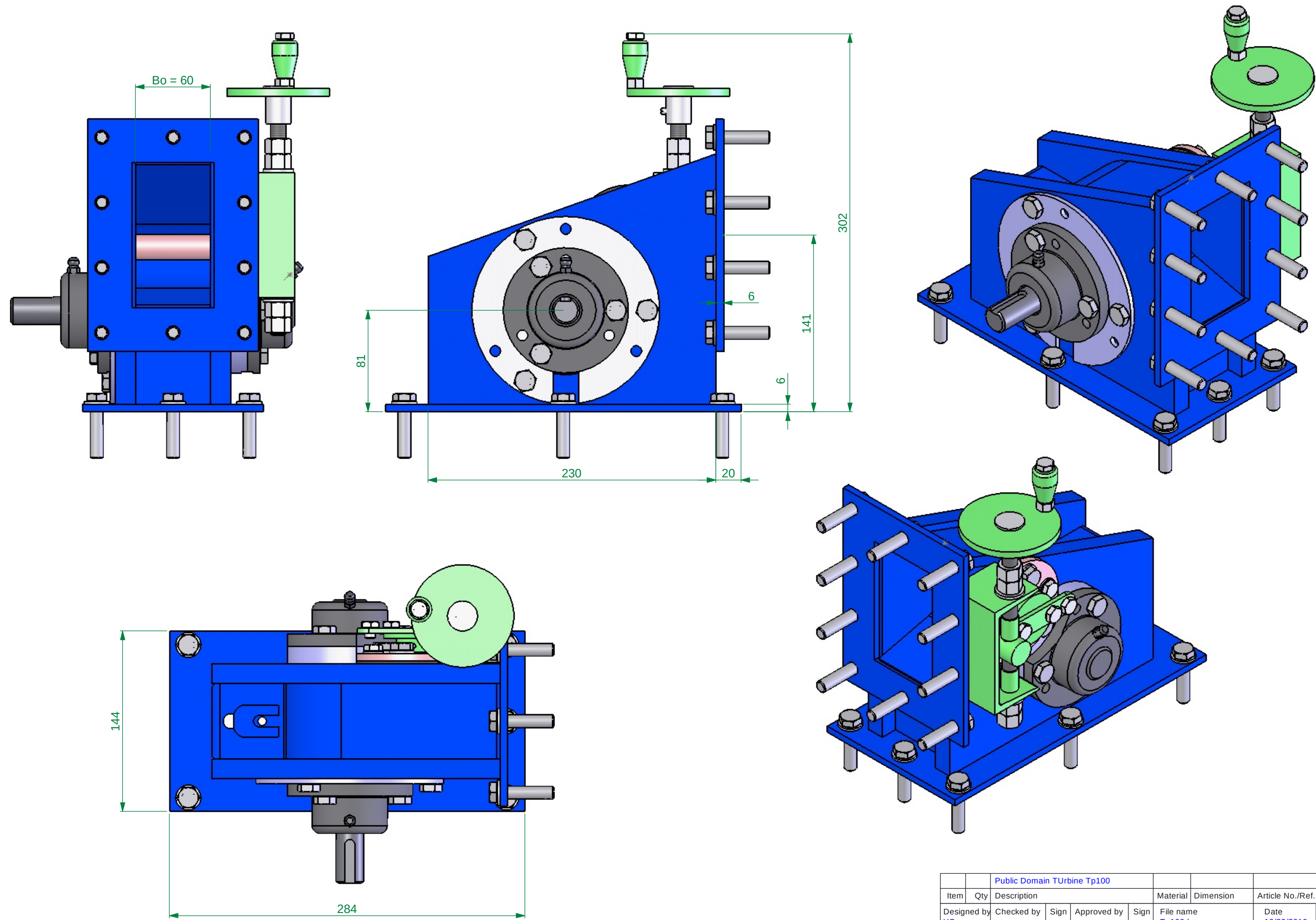
Runner Sub Assembly – 06

Not Valid Drawings – 07

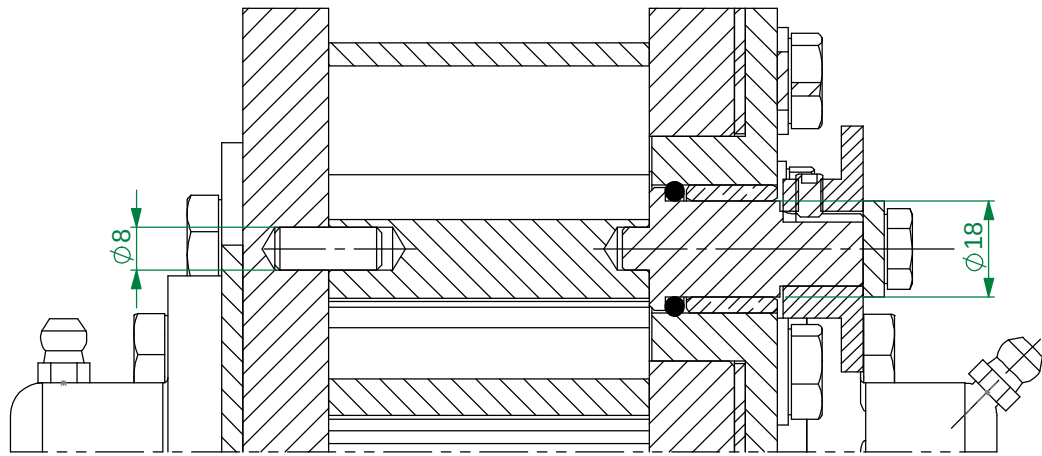
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A

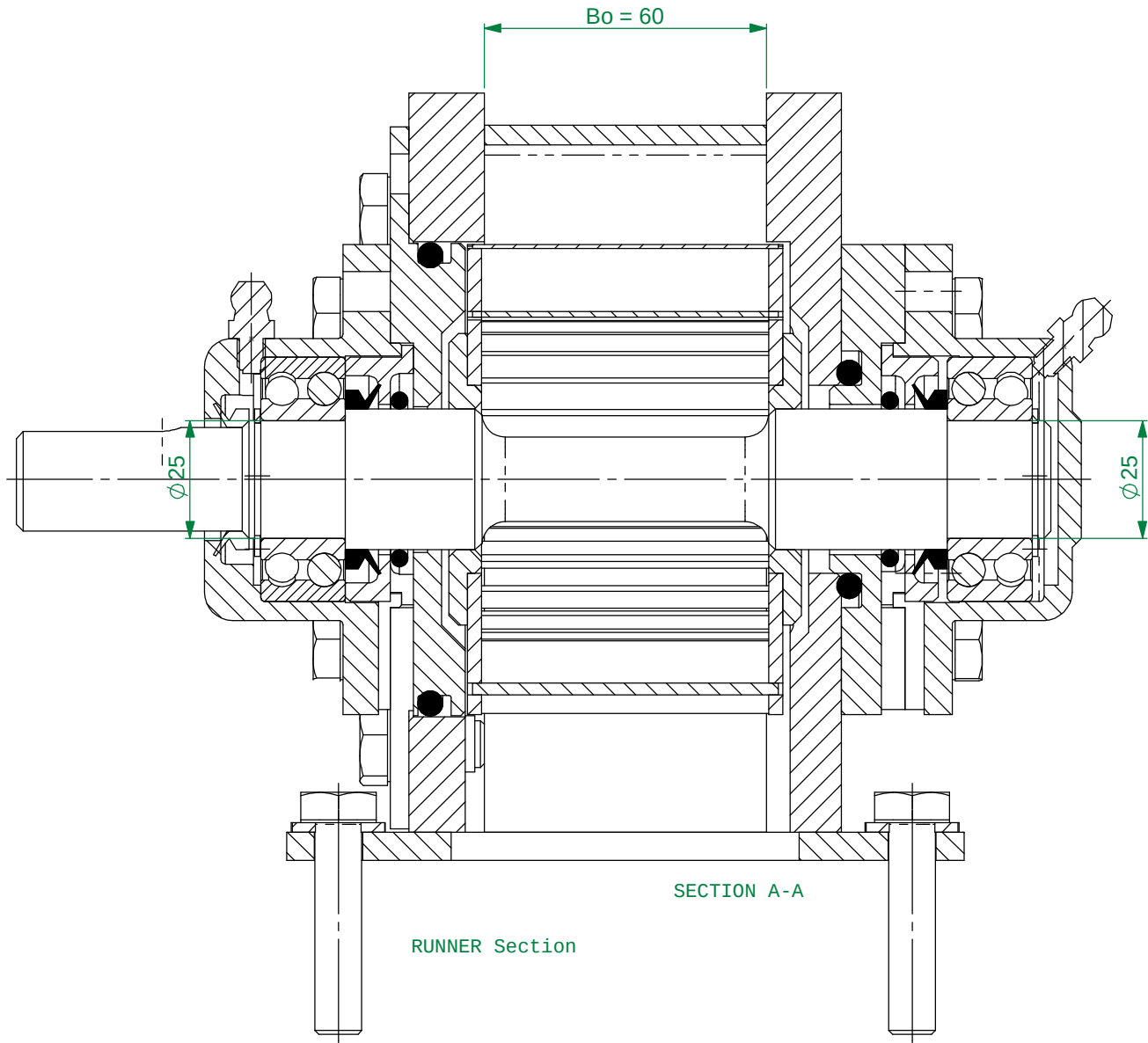
Turbine Assembly



Public Domain Turbine Tp100						17.3	
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YC	-	-	-	-	Tp100d	10/29/2010	1:2
Copyright by entec ag Drawing may be used exclusively with permission				entec ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch		Title/Name Public Domain Turbine Tp100	
				Drawing Number Tp100d		Revision d	Sheet 1/1
						Form A2	

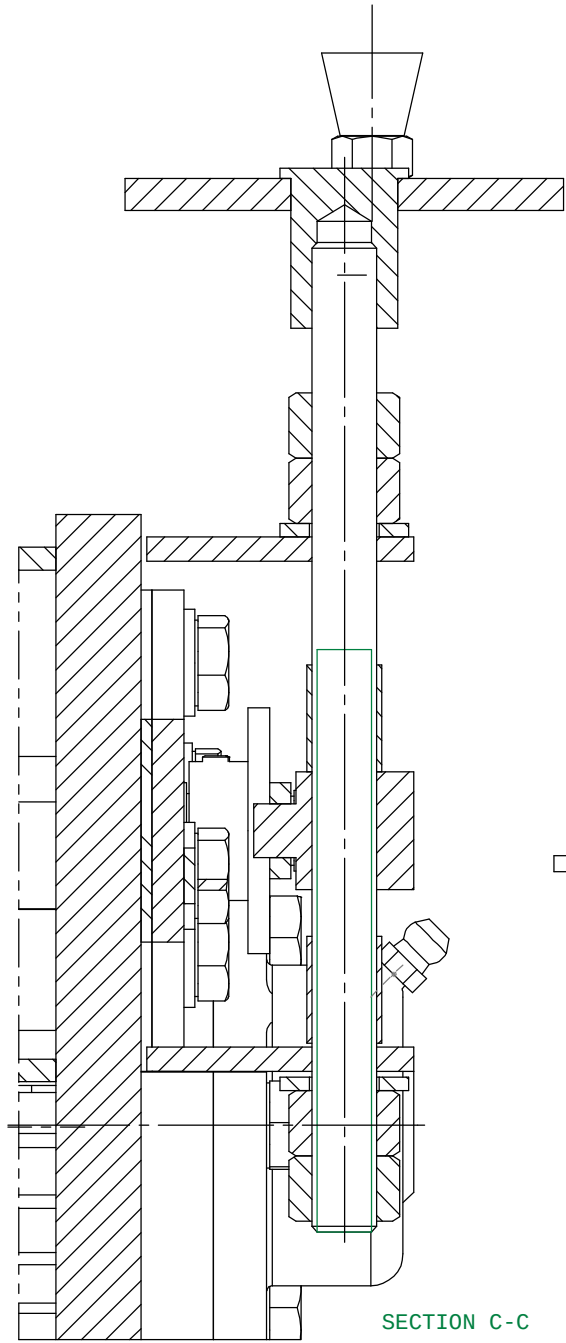


GUIDE VANE Section



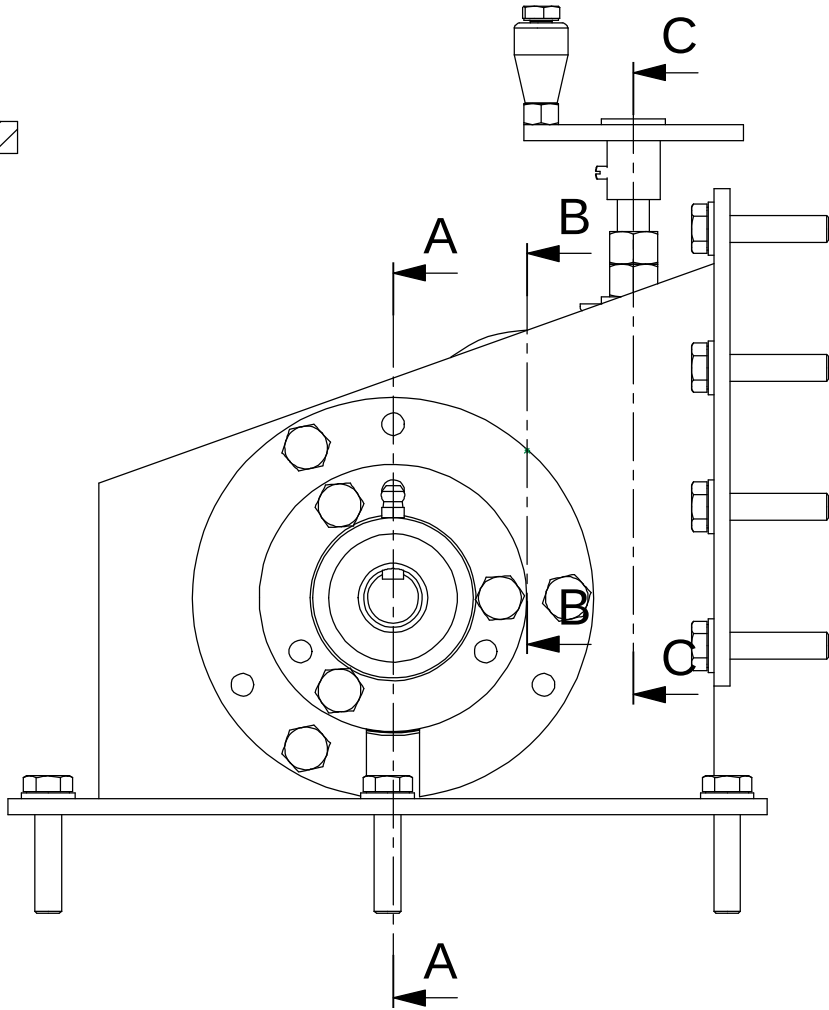
SECTION A-A

RUNNER Section



SECTION C-C

ACTUATOR Section

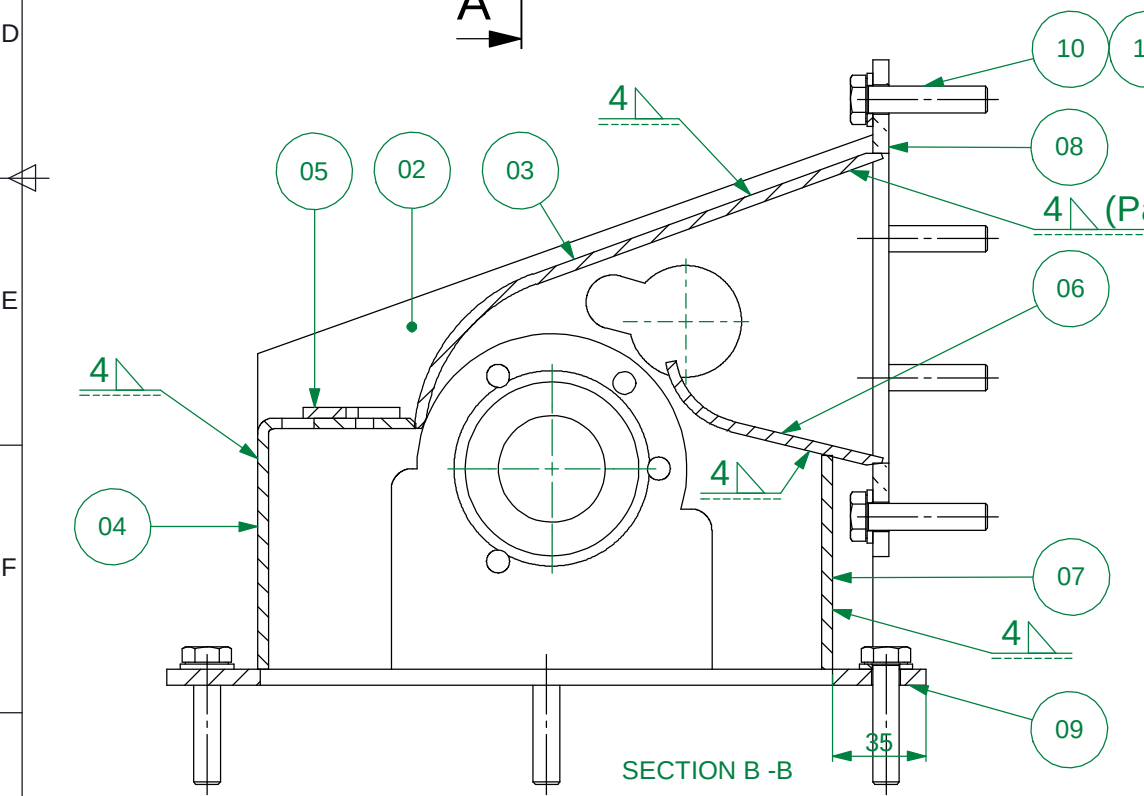
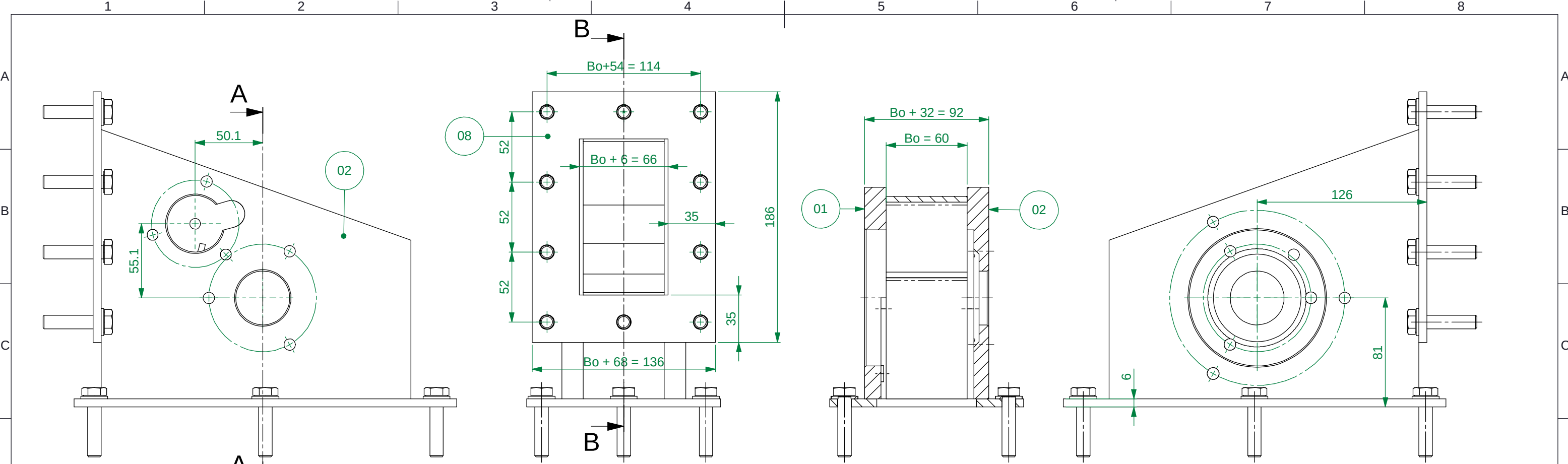


		Public Domain TURbine Tp100							17.3
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Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Public Domain TURbine Tp100				
					Drawing Number Tp100d			Revision d	Sheet 1/1

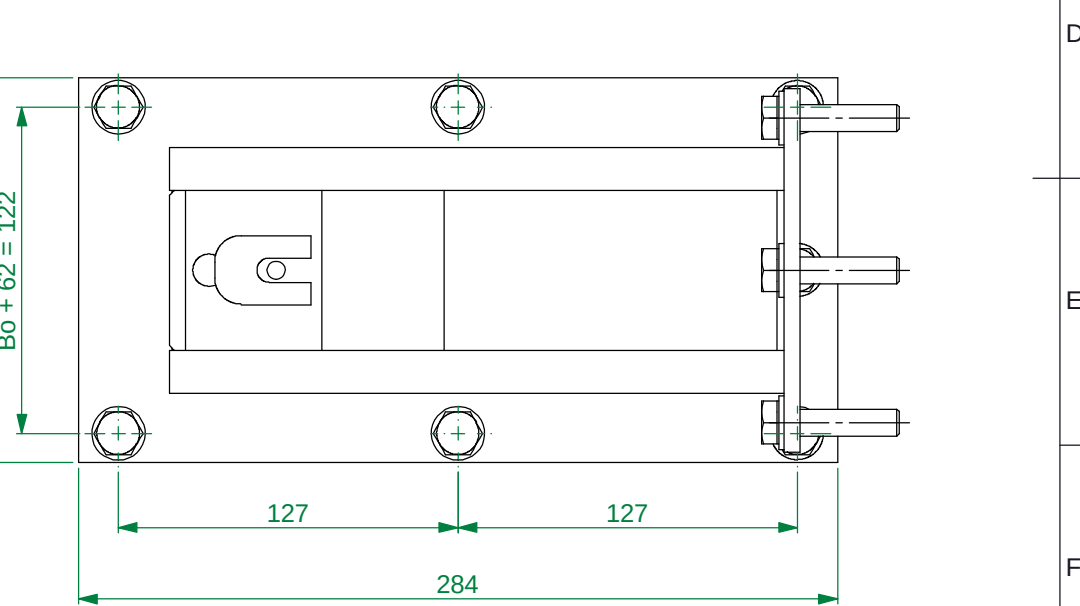
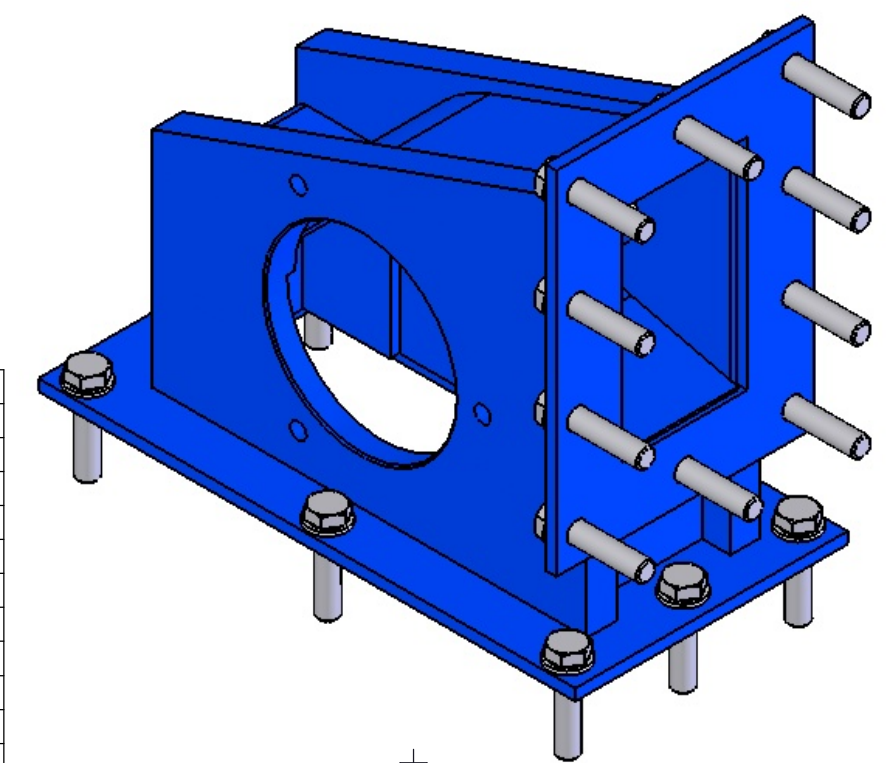
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B

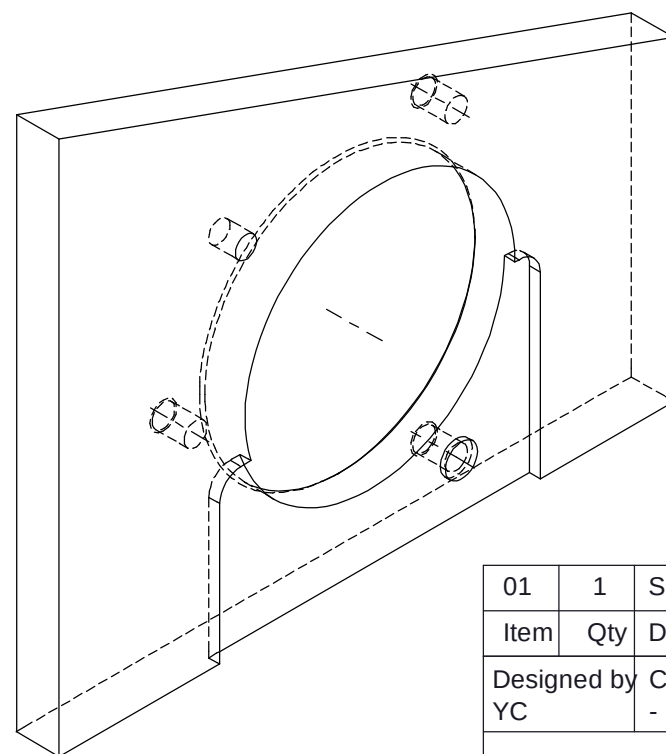
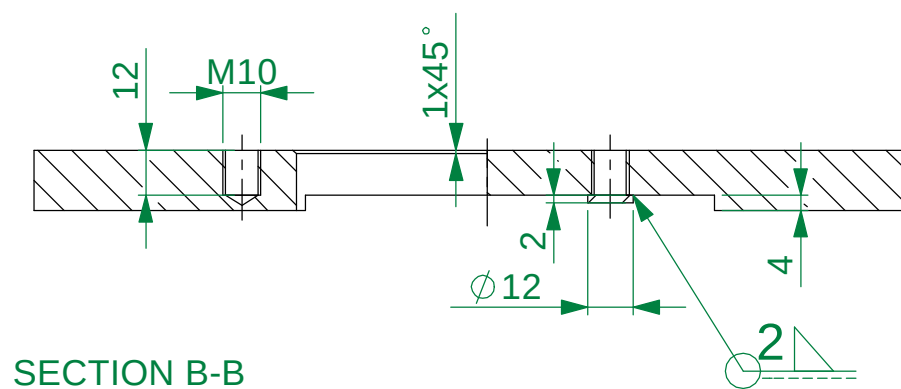
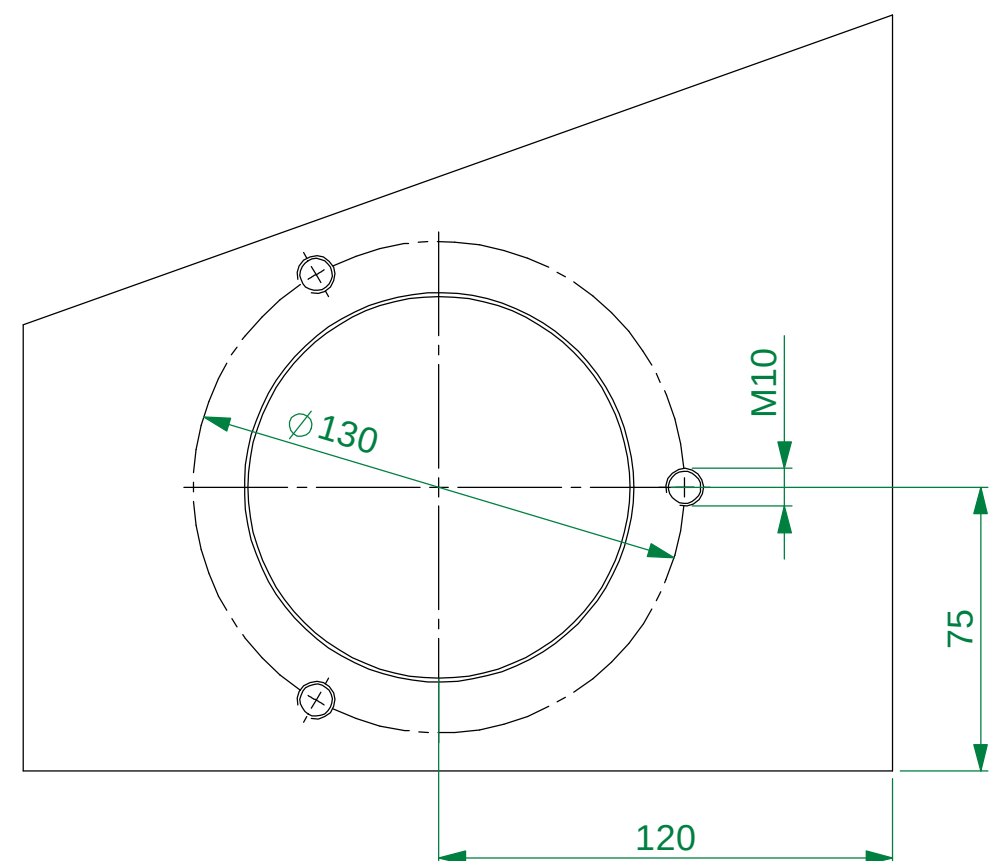
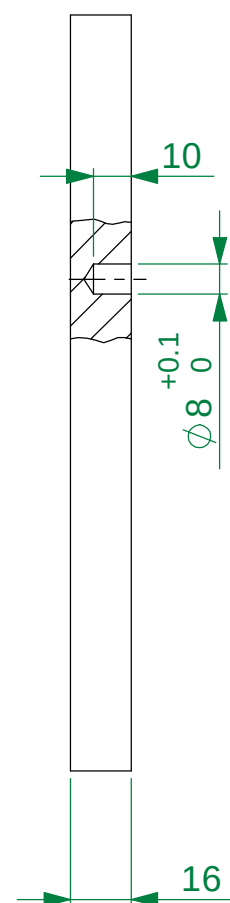
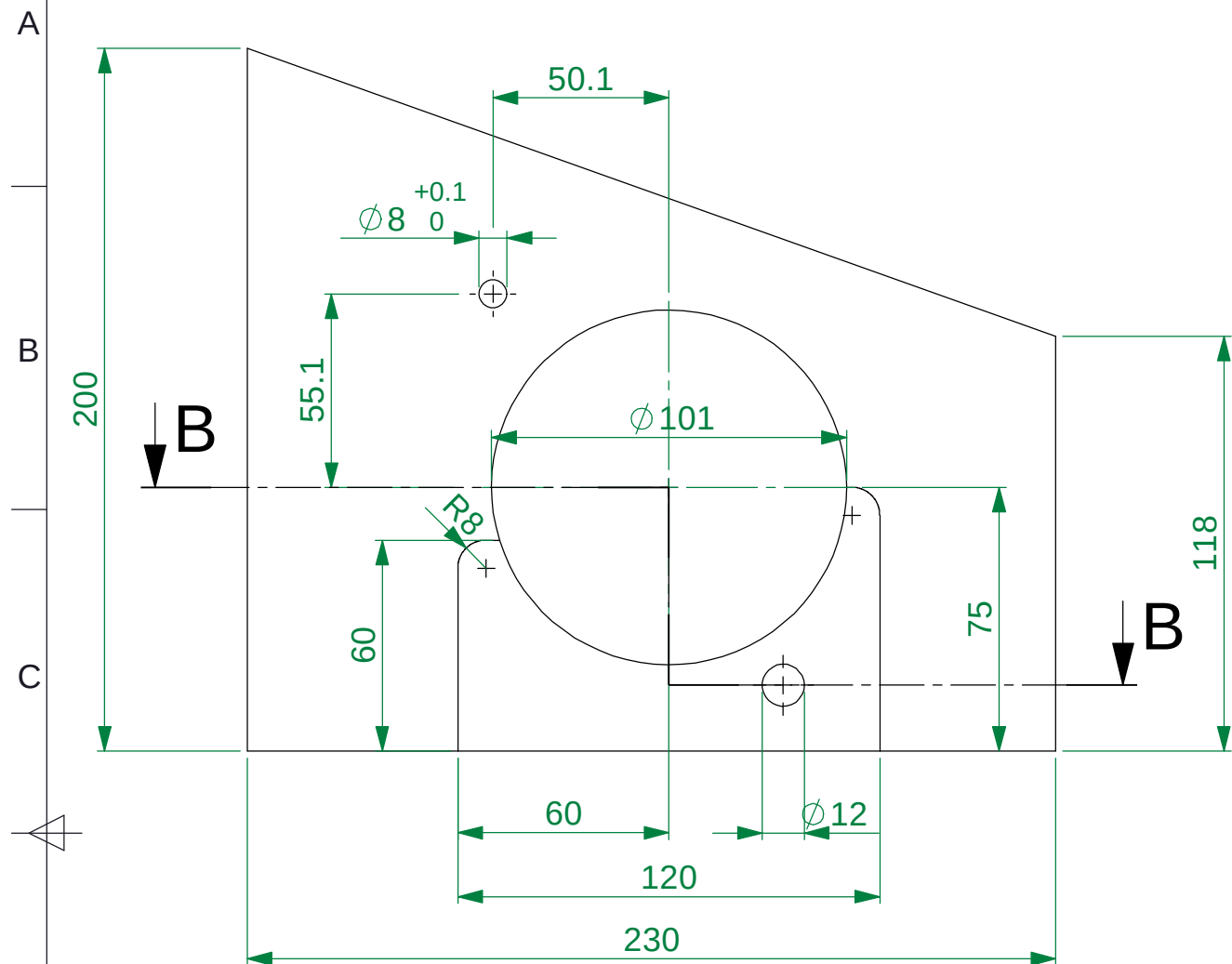
Housing Sub Assembly



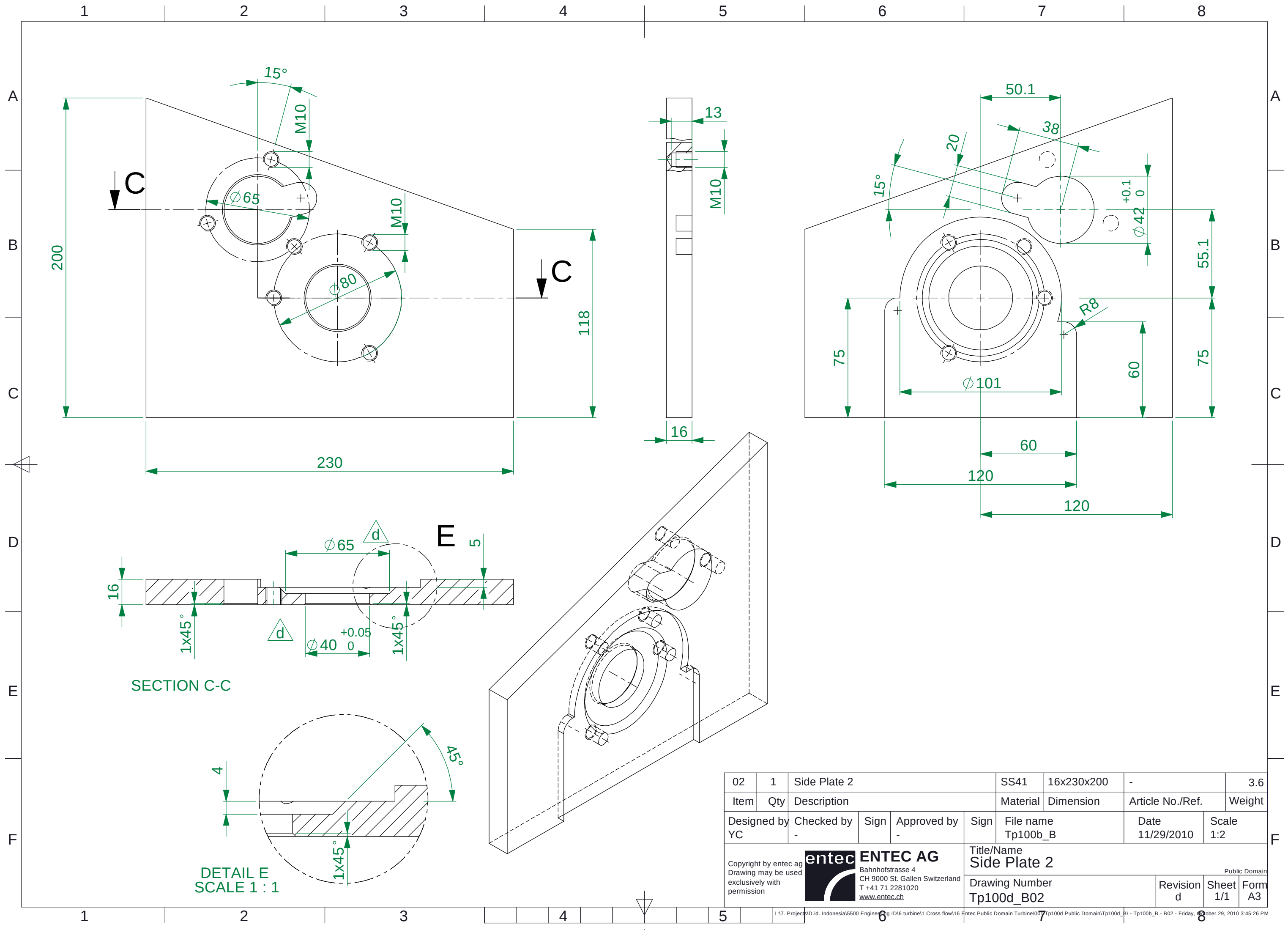
11	15	Washer	SS41	Ø10.5xØ20x2	Washer ISO 7089 - 10
10	17	Hexagonal Bolt	ST50		ISO 4014 - M10 x 45 x 26-N
9	1	Base Flange	SS41	6x284x144	Tp100d_B09
8	1	Penstock Flange	SS41	6x186x136	Tp100d_B08
7	1	Front Plate	SS41	4x100x80	Tp100d_B07
6	1	Lower Contour	SS41	4x60x93	Tp100d_B06
5	1	Ventilation Plate	SS41	4x36x26	Tp100d_B05
4	1	Back Plate	SS41	4x30x147	Tp100d_B04
3	1	Top Contour	SS41	4x60x212	Tp100d_B03
2	1	Side Plate 2	SS41	16x230x200	Tp100d_B02
1	1	Side Plate 1	SS41	16x230x200	Tp100d_B01
Item	Qty	Description	Material	Dimension	Article No./Reference



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Copyright by entec ag Drawing may be used exclusively with permission					Title/Name Housing Assembly	
Drawing Number Tp100d_B00					Revision d	Sheet 1/1
Form A2					Public Domain	

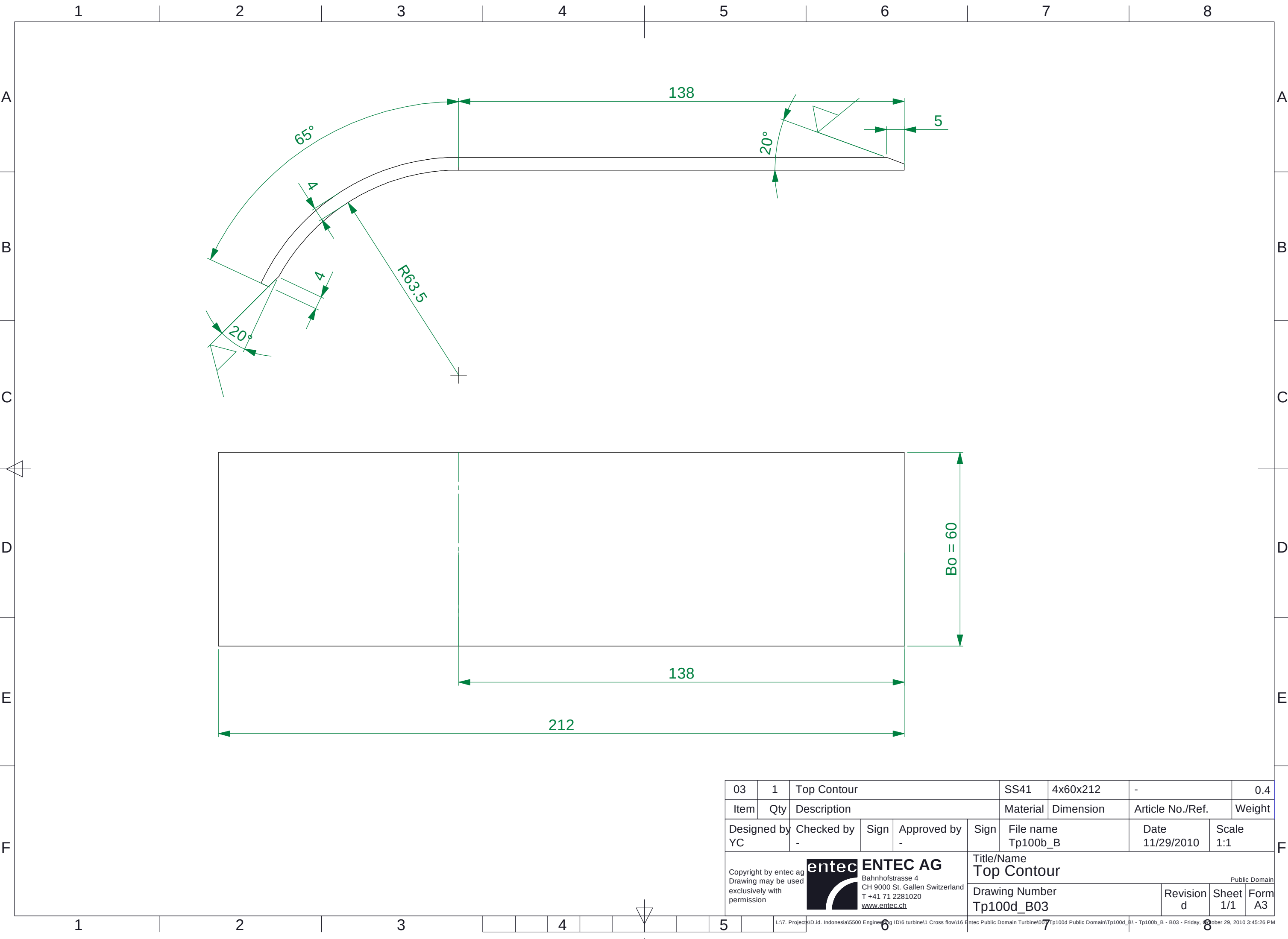


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Item	Qty	Description				Material	Dimension	Article No./Ref.		Weight		
Designed by YC		Checked by -	Sign	Approved by -	Sign	File name Tp100b_B		Date 11/29/2010	Scale 1:2			
Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Side Plate 1						Public Domain	
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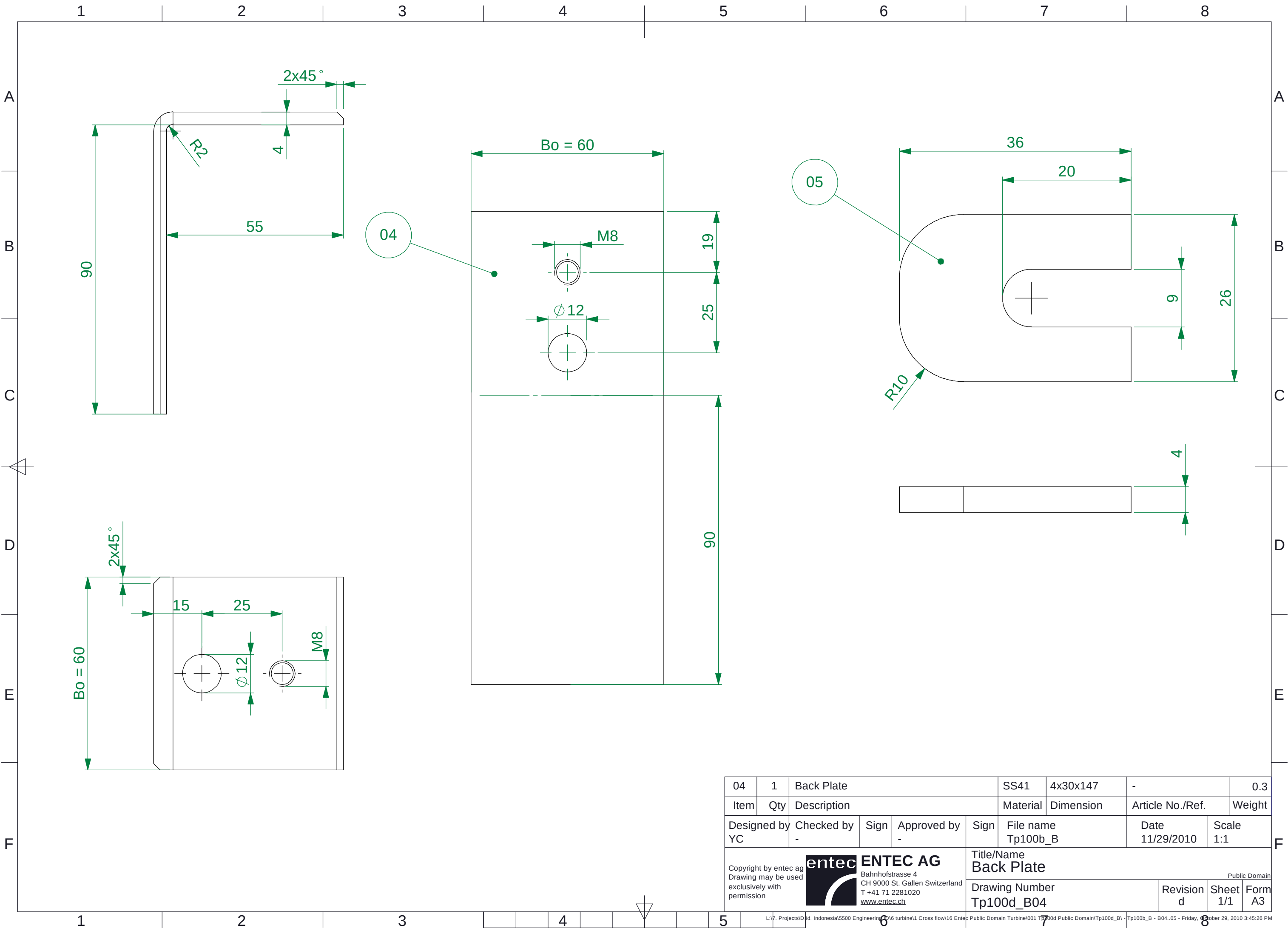


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Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Side Plate 2				
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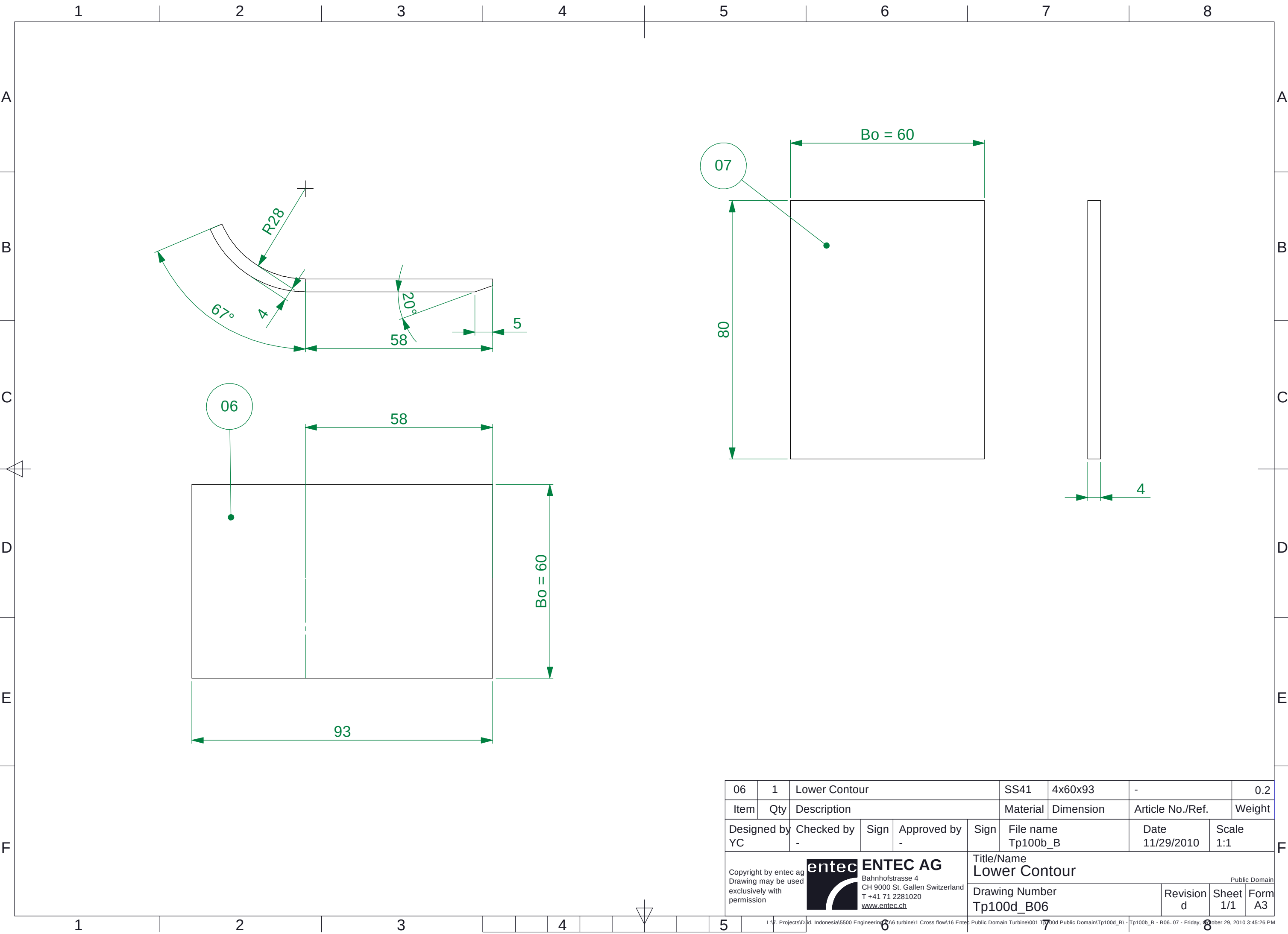
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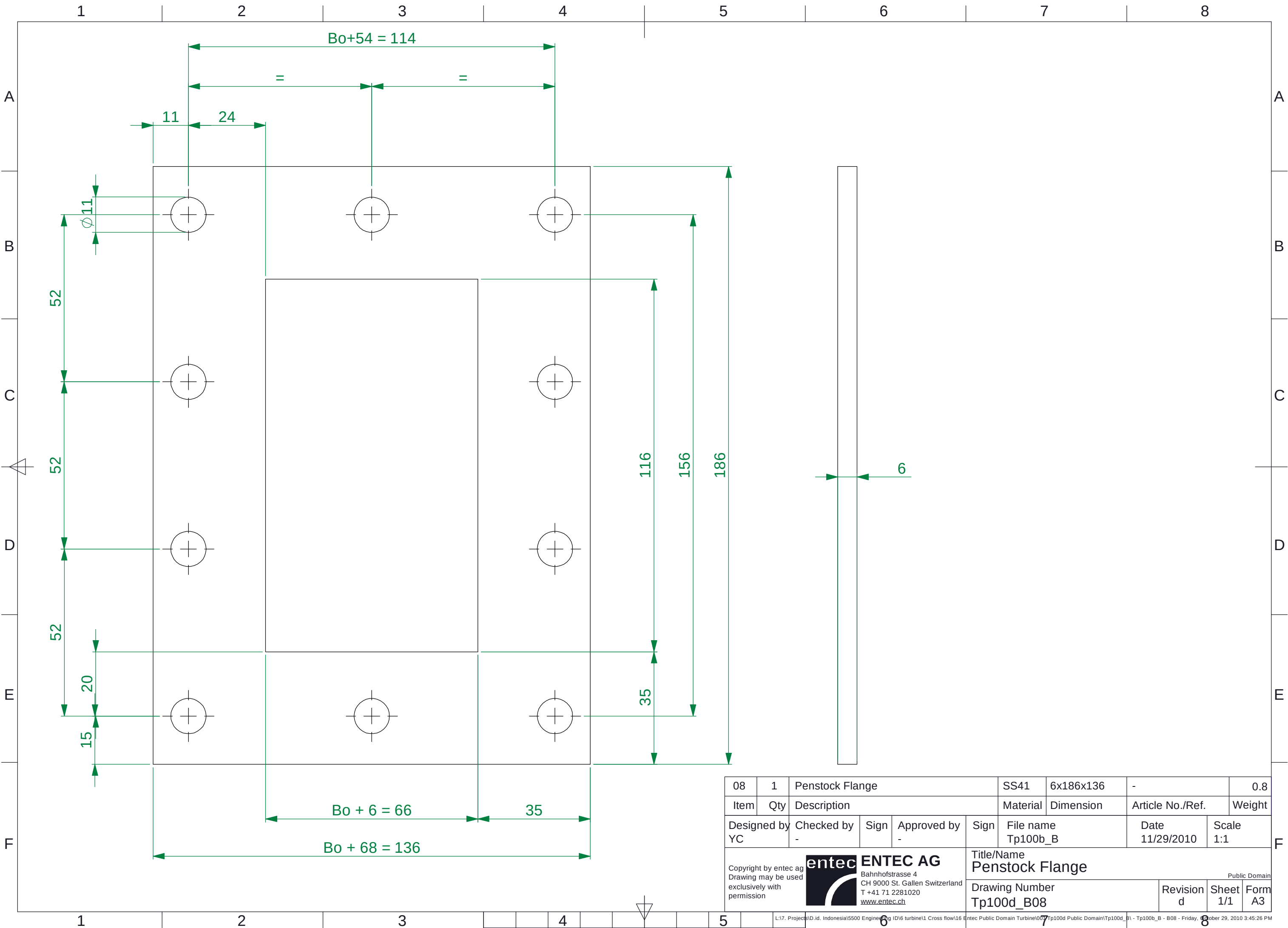
03	1	Top Contour				SS41	4x60x212	-	0.4
Item	Qty	Description				Material	Dimension	Article No./Ref.	Weight
Designed by YC	Checked by -	Sign	Approved by -	Sign	File name Tp100b_B		Date 11/29/2010	Scale 1:1	
Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Top Contour				
					Drawing Number Tp100d_B03			Revision d	Sheet 1/1



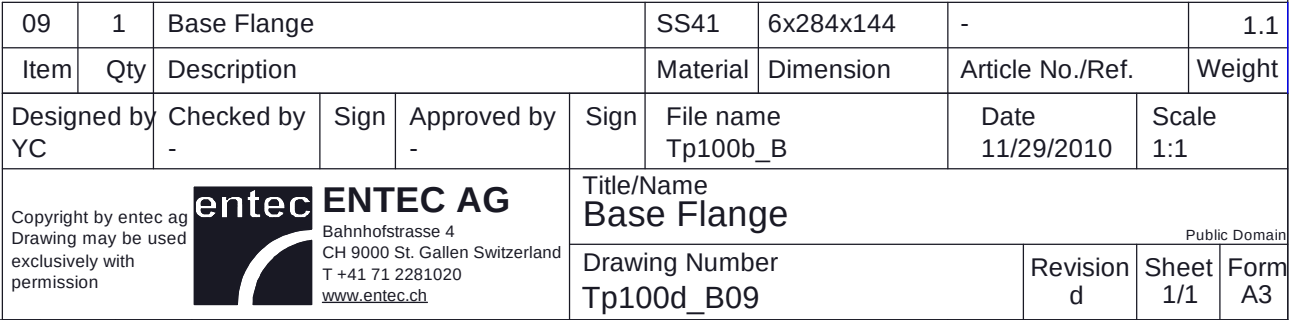
04	1	Back Plate				SS41	4x30x147	-	0.3
Item	Qty	Description				Material	Dimension	Article No./Ref.	Weight
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Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Back Plate				
					Drawing Number Tp100d_B04			Revision d	Sheet 1/1



06	1	Lower Contour				SS41	4x60x93	-	0.2
Item	Qty	Description				Material	Dimension	Article No./Ref.	Weight
Designed by YC	Checked by -	Sign	Approved by -	Sign	File name Tp100b_B		Date 11/29/2010	Scale 1:1	
Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Lower Contour				
					Drawing Number Tp100d_B06			Revision d	Sheet 1/1



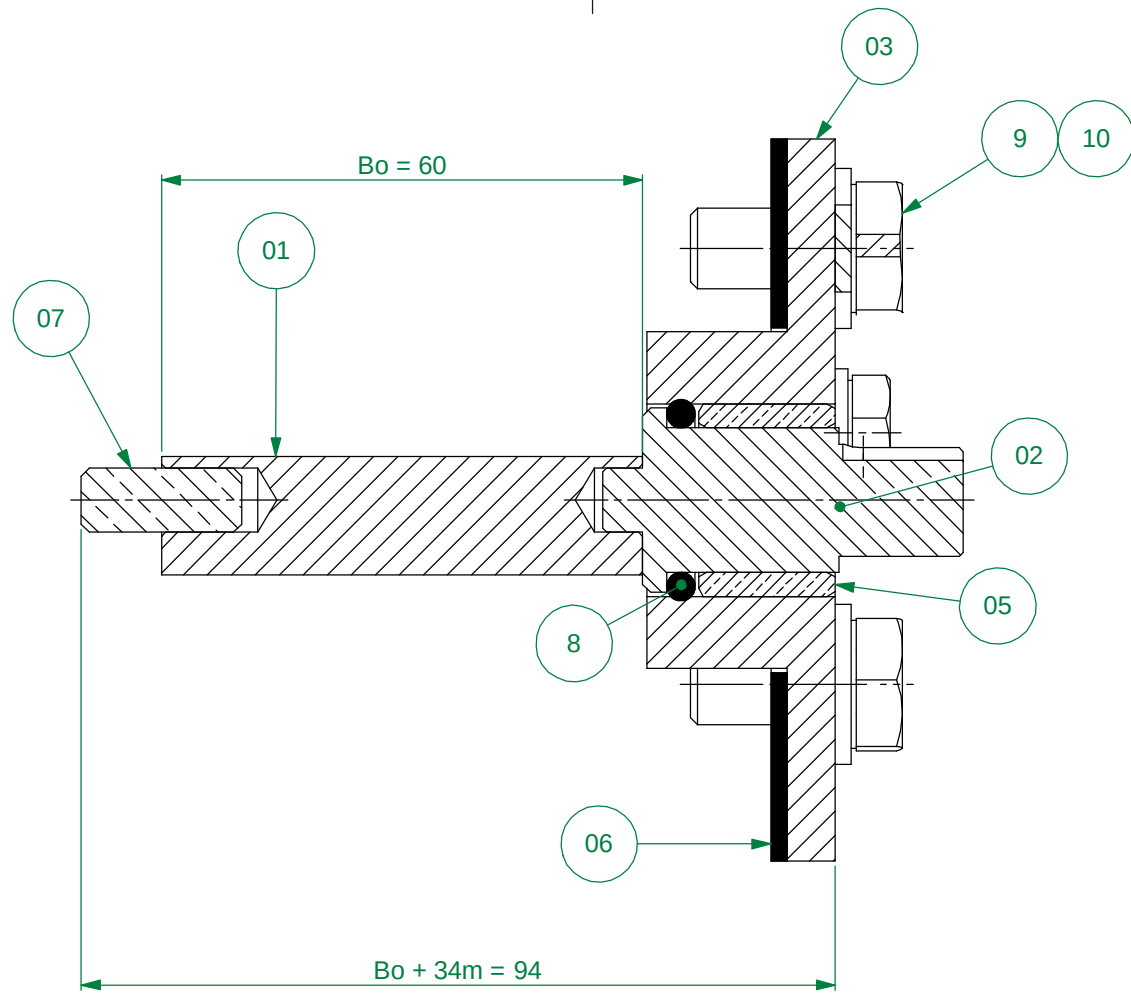
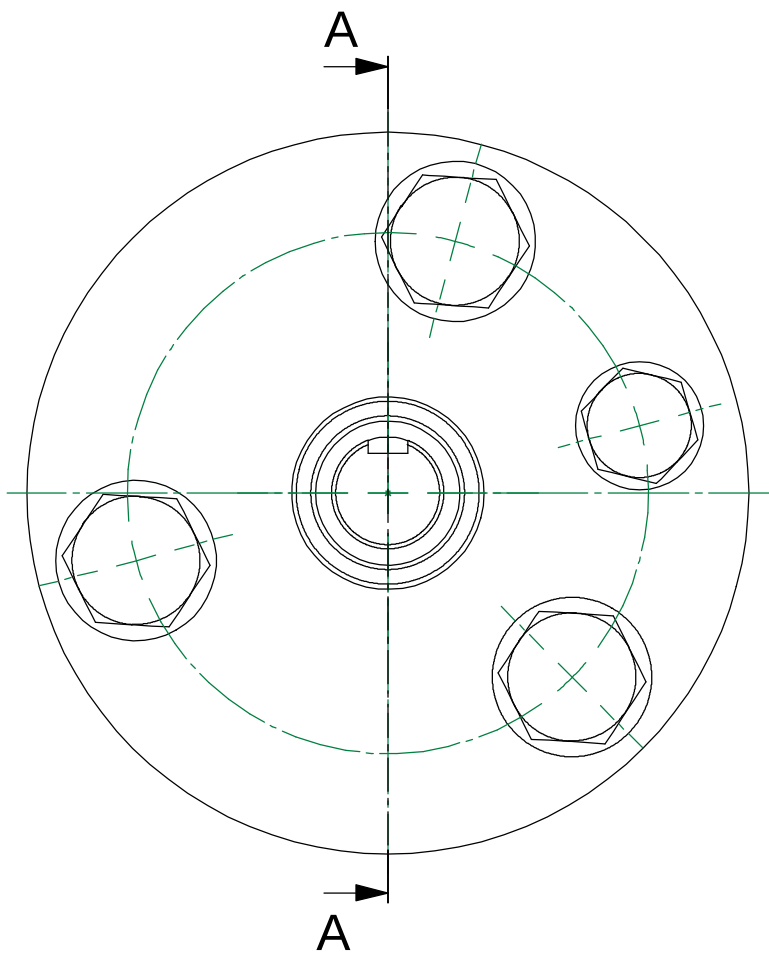
08	1	Penstock Flange				SS41	6x186x136	-	0.8
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Designed by YC	Checked by -	Sign	Approved by -	Sign	File name Tp100b_B		Date 11/29/2010	Scale 1:1	
Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Penstock Flange				
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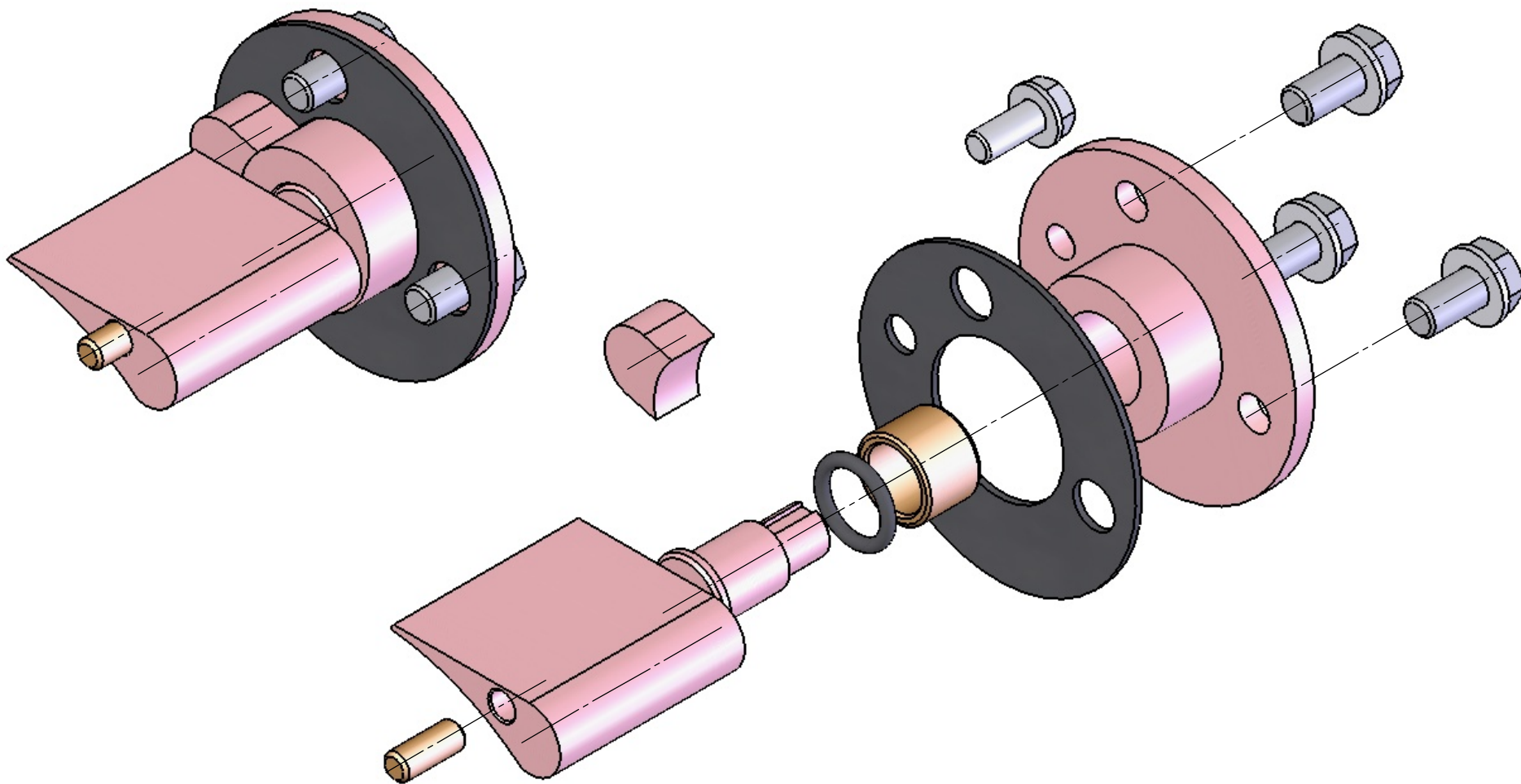
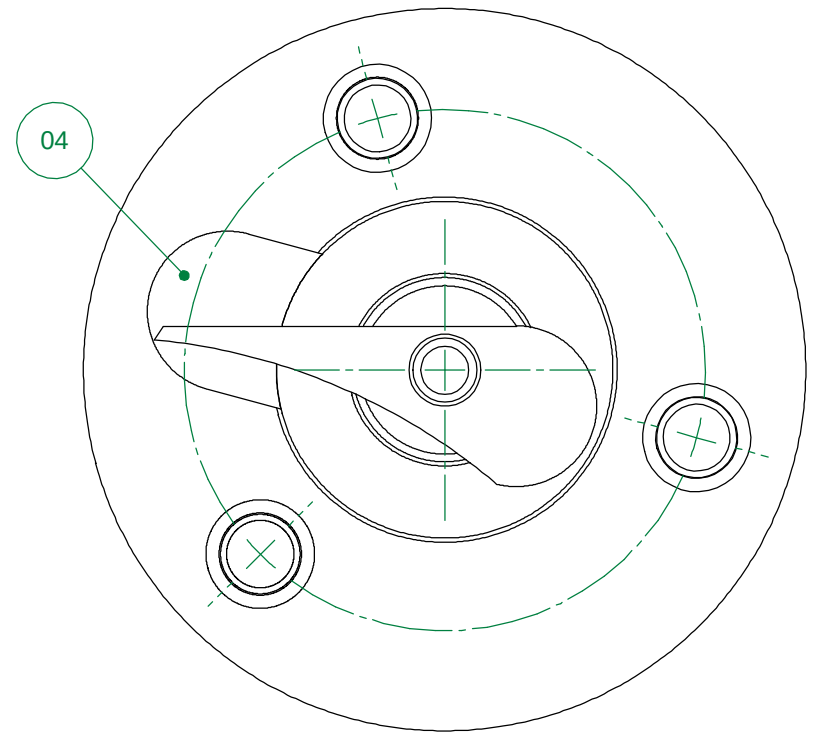
C	Nozzle Sub Assy		C
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C

Guide Vane Sub Assembly

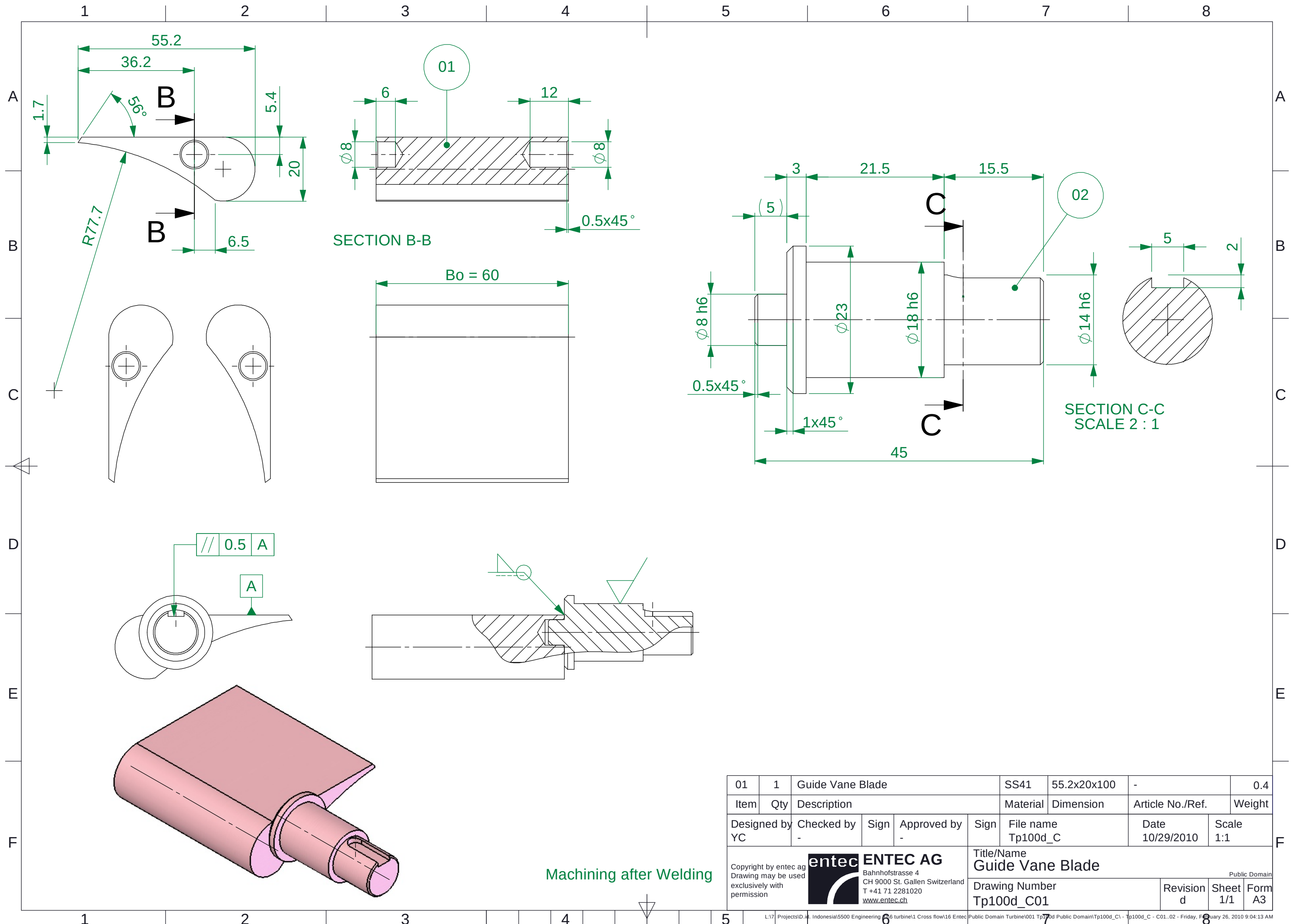


SECTION A-A

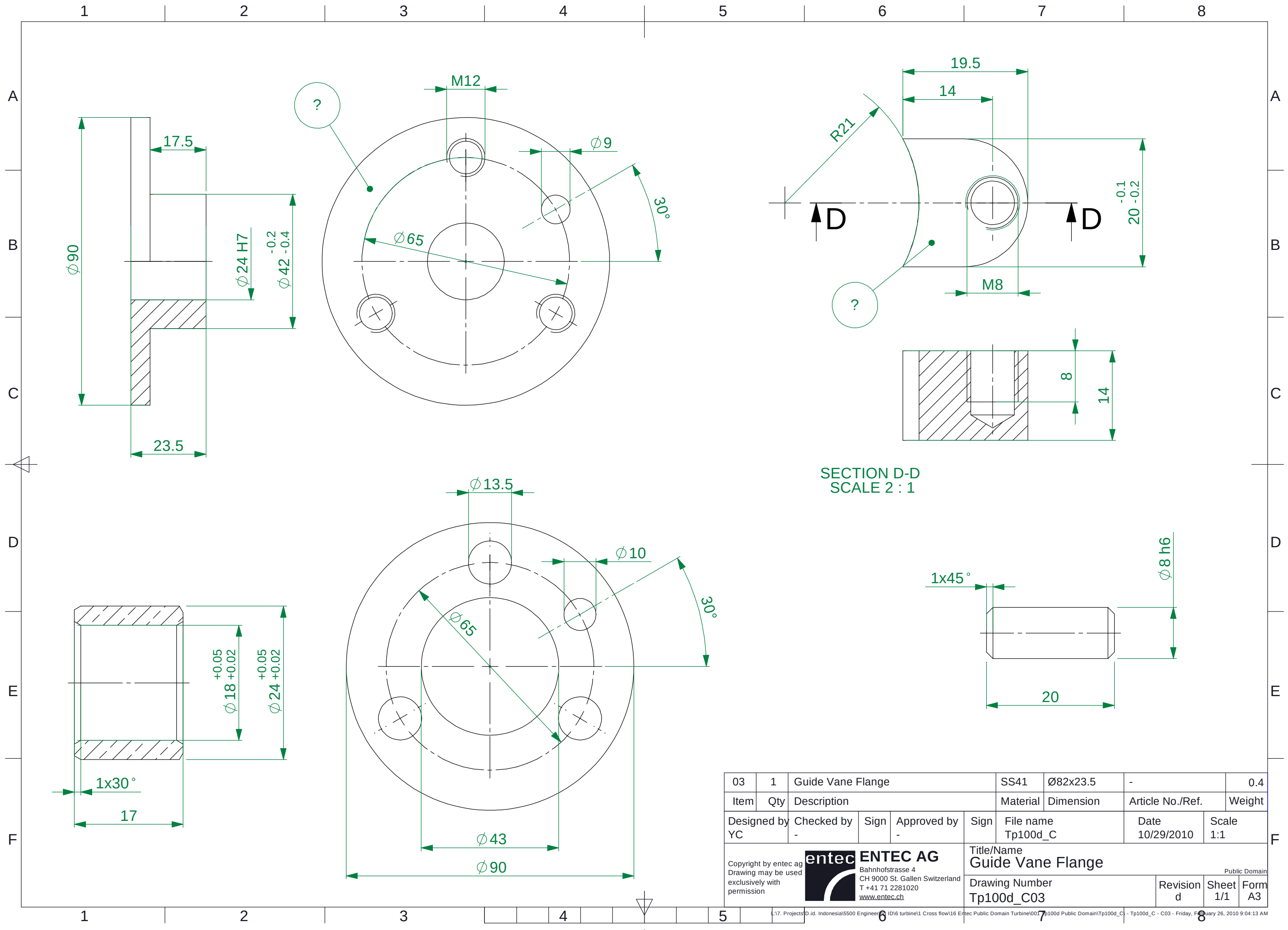


12	1	Plain Washer	SS41	Ø16xØ8.4x1.6	Washer ISO 7089 - 8
11	1	Hex Bolt	SS41	M8x20	ISO 4014 - M8
10	3	Washer	SS41	Ø10.5xØ20x2	Washer ISO 7089 - 10
9	3	Hexagonal Bolt	ST50	M10x20	ISO 4014 - M10
8	1	O-Ring	Rubber	Ø5.33xØ40ID	O-Ring
7	1	NDE Guide Vane Pin	Brass	Ø8x20	Tp100d_C07
6	1	Gasket	Rubber	3xØ90	Tp100d_C06
5	1	Sliding Bush	Brass	Ø24xØ18x17	Tp100d_C05
4	1	Insert Plate	SS41	14x20x19.5	Tp100d_C04
3	1	Guide Vane Flange	SS41	Ø82x23.5	Tp100d_C03
2	1	Guide Vane Shaft	SS41	Ø23x45	Tp100d_C02
1	1	Guide Vane Blade	SS41	55.2x20x100	Tp100d_C01

-	1	Guide Vane Assembly				-	-	-	0.9
Item	Qty	Description				Material	Dimension	Article No./Ref.	Weight
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Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Guide Vane Assembly				
					Drawing Number Tp100d_C00				
Public Domain									



01	1	Guide Vane Blade			SS41	55.2x20x100	-	0.4
Item	Qty	Description			Material	Dimension	Article No./Ref.	Weight
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					Drawing Number Tp100d_C01		Revision d	Sheet 1/1
					Form A3			

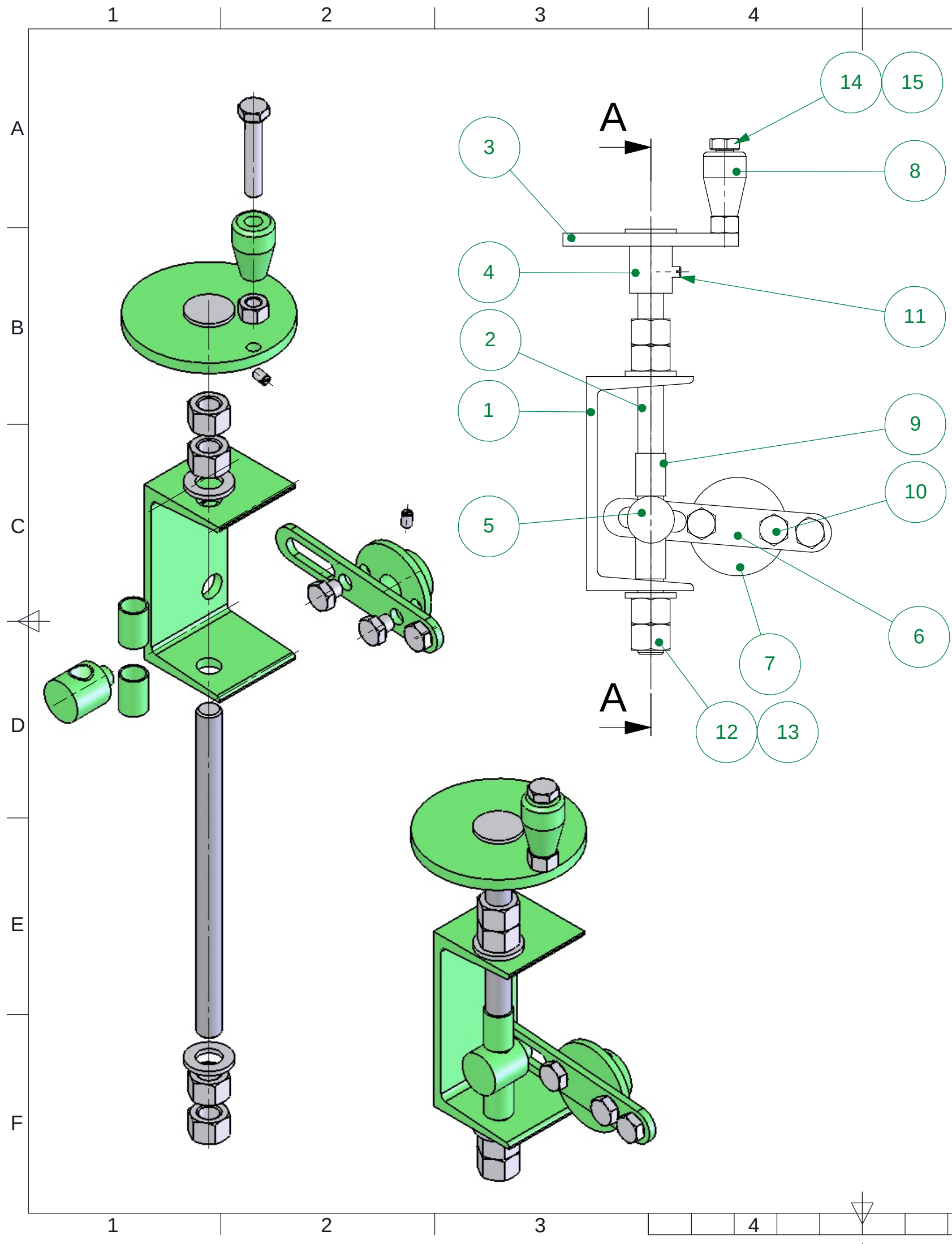


03	1	Guide Vane Flange				SS41	Ø82x23.5	-	0.4
Item	Qty	Description				Material	Dimension	Article No./Ref.	Weight
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Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Guide Vane Flange				
					Drawing Number Tp100d_C03			Revision d	Sheet 1/1

D	Nozzle Actuator Sub Assy		D
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D

Actuator Sub Assembly



Rev	Zone	Description	Date	Approved	Article No./Reference
d	-	-	1/1/2000	-	RLB

SECTION A-A

15	1	Hexagon Nut	SS41	M8	Hexagon Nut ISO - 4034 - M8 - N
14	1	Hex Bolt	SS41	M8x45	ISO 4014 - M8
13	2	Plain Washer	SS41	Ø13xØ24x2.5	Washer ISO 7089 - 12
12	4	Hexagon Nut	SS41	M12	Hexagon Nut ISO - 4034 - M12 - N
11	2	Set Screw	SS41	M5x8	ISO 4766 - M5 x 8-N
10	3	Hex Bolt	SS41	M8x8	ISO 4014 - M8
9	2	Stopper	SS41	Ø14xØ12	Tp100d_D09
8	1	Wheel Handle	SS41	Ø20x30	Tp100d_D08
7	1	Flange Bush	SS41	Ø46x15	Tp100d_D07
6	1	Lever	SS41	4x107x18	Tp100d_D06
5	1	Special Nut	SS41	Ø22x30	Tp100d_D05
4	1	Bush	SS41	Ø24x30	Tp100d_D04
3	1	Spindle Wheel	SS41	Ø82x6	Tp100d_D03
2	1	Stud Bolt	SS41	M12	DIN 976-2 -- MFS M12 x 120 --- N
1	1	Support Plate	SS41	UNP 100x50x50	Tp100d_D01

Item	Qty	Description	Material	Dimension	Article No./Reference				
Designed by	YC	Checked by	-	Sign	Approved by	Sign	File name	Date	Scale
							Tp100b_D	10/29/2010	1:2

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Title/Name
Guide Vane Actuator

Drawing Number
Tp100d_D00

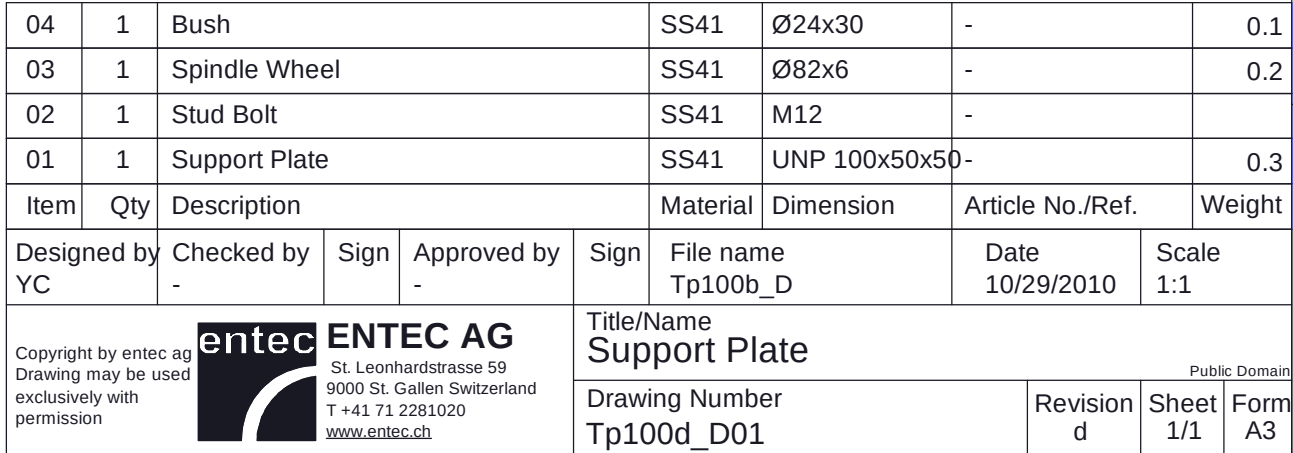
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Sheet
1/1

Form
A3

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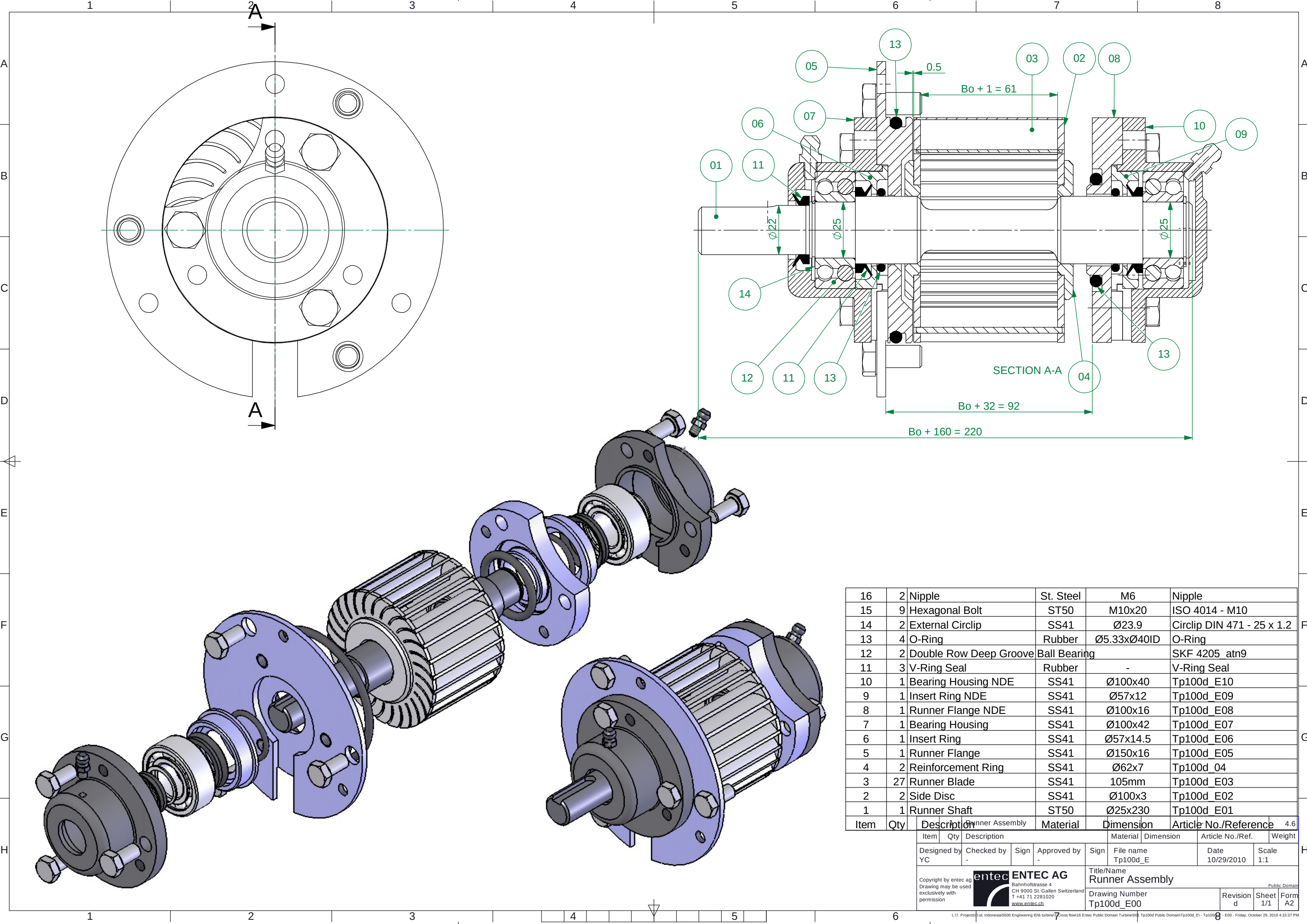
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E	Runner Sub Assy		E
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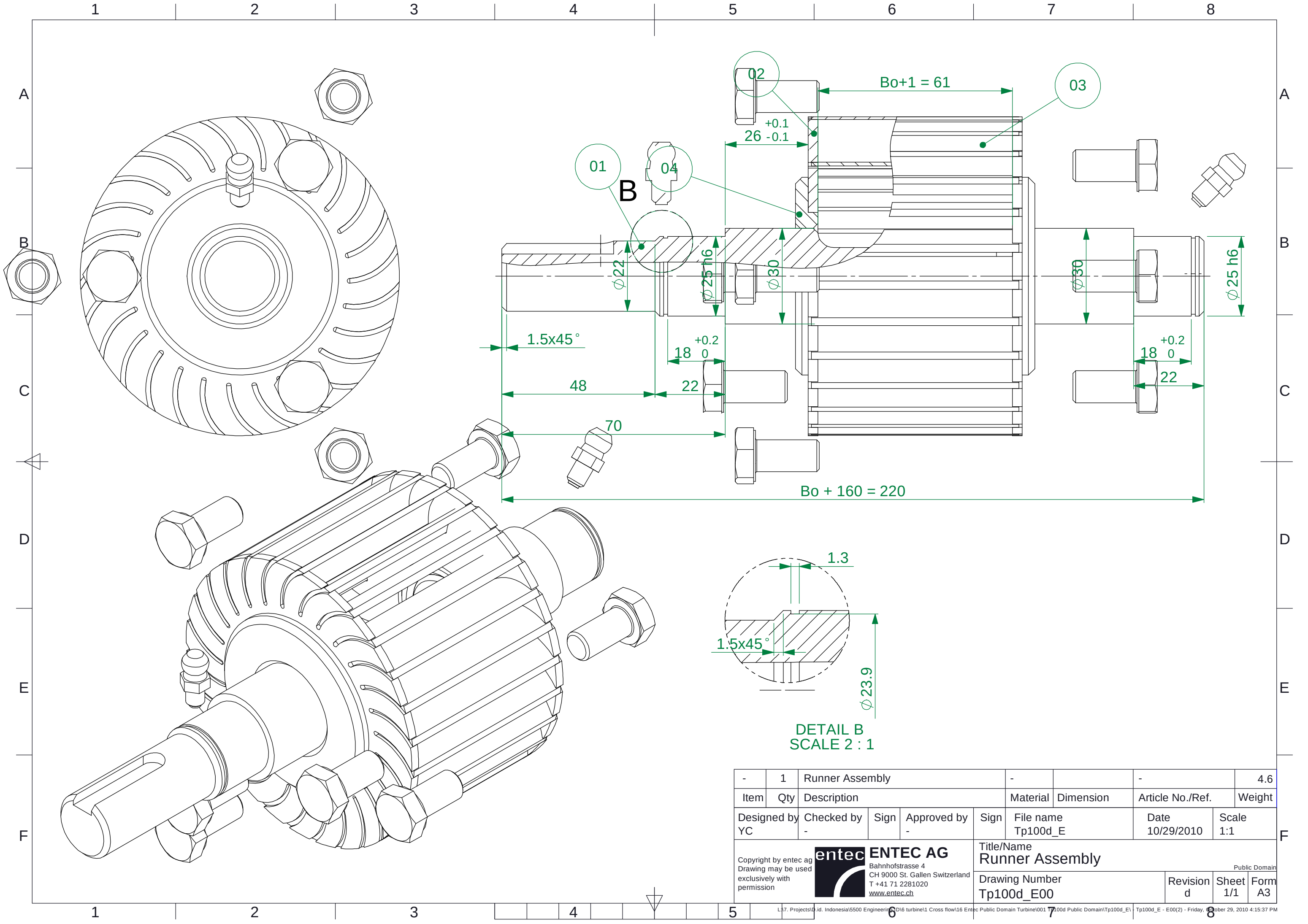
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Runner Sub Assembly

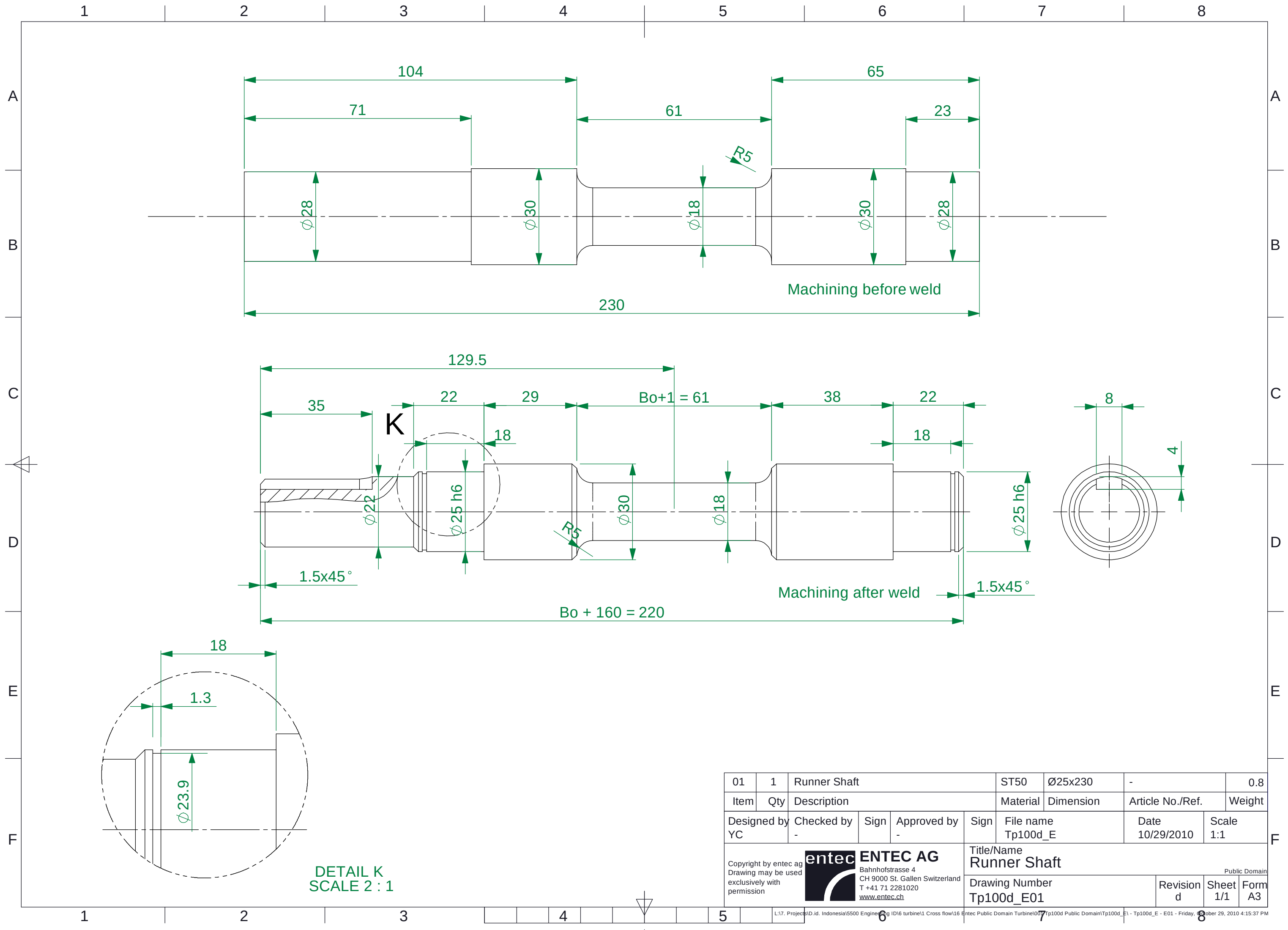


16	2	Nipple	St. Steel	M6	Nipple
15	9	Hexagonal Bolt	ST50	M10x20	ISO 4014 - M10
14	2	External Circlip	SS41	Ø23.9	Circlip DIN 471 - 25 x 1.2
13	4	O-Ring	Rubber	Ø5.33xØ40ID	O-Ring
12	2	Double Row Deep Groove	Ball Bearing		SKF 4205 atn9
11	3	V-Ring Seal	Rubber	-	V-Ring Seal
10	1	Bearing Housing NDE	SS41	Ø100x40	Tp100d E10
9	1	Insert Ring NDE	SS41	Ø57x12	Tp100d E09
8	1	Runner Flange NDE	SS41	Ø100x16	Tp100d E08
7	1	Bearing Housing	SS41	Ø100x42	Tp100d E07
6	1	Insert Ring	SS41	Ø57x14.5	Tp100d E06
5	1	Runner Flange	SS41	Ø150x16	Tp100d E05
4	2	Reinforcement Ring	SS41	Ø62x7	Tp100d 04
3	27	Runner Blade	SS41	105mm	Tp100d E03
2	2	Side Disc	SS41	Ø100x3	Tp100d E02
1	1	Runner Shaft	ST50	Ø25x230	Tp100d E01
Item	Qty	Description	Material	Dimension	Article No./Reference

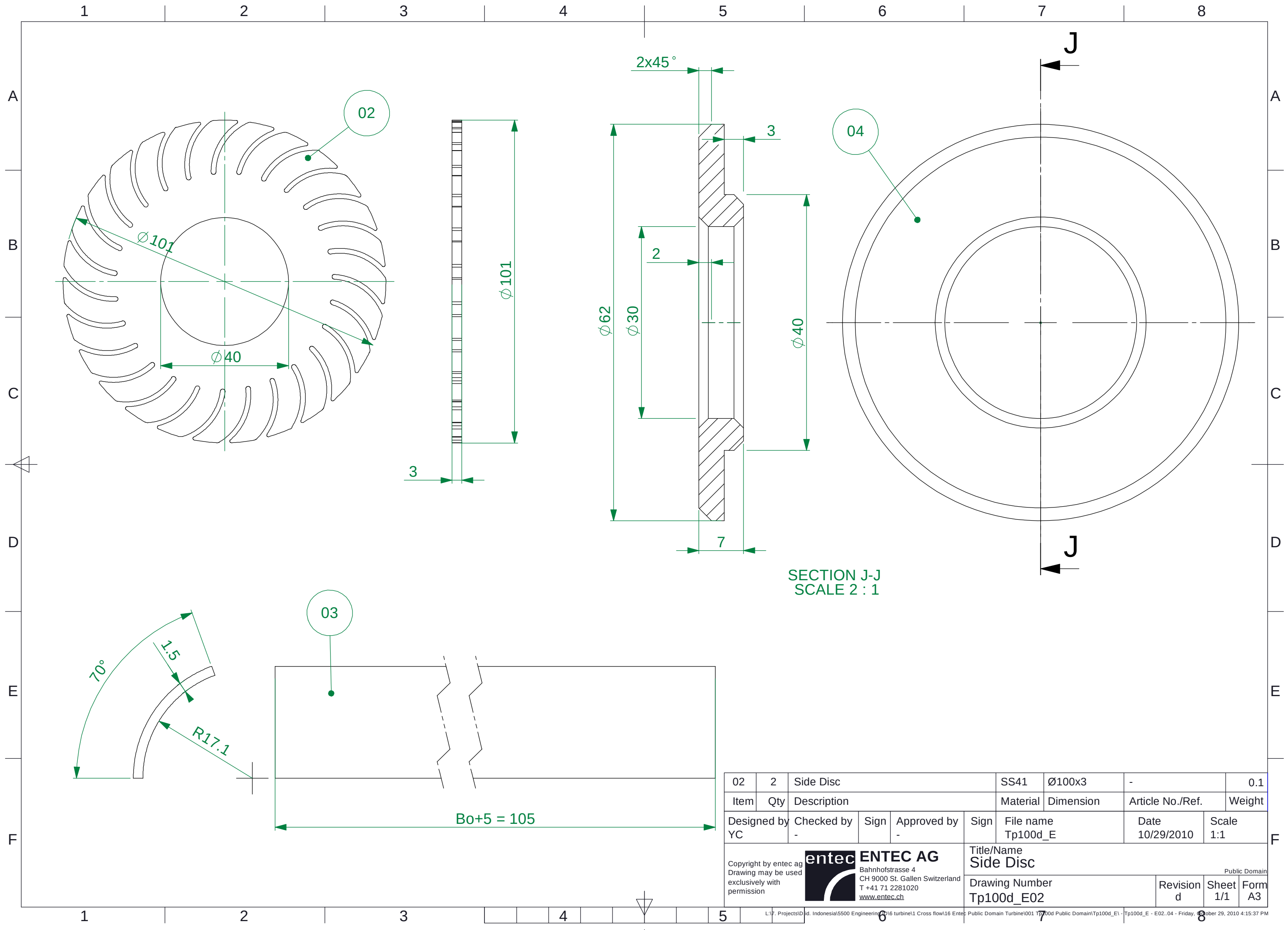
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Designed by	Checked by	Sign	Approved by	Sign	File name	Date
YC	-	-	-	-	Tp100d_E	10/29/2010
Copyright by entec ag Drawing may be used exclusively with permission			entec ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch			Title/Name Runner Assembly
Drawing Number Tp100d_E00					Revision d	Sheet 1/1
Public Domain					Form A2	



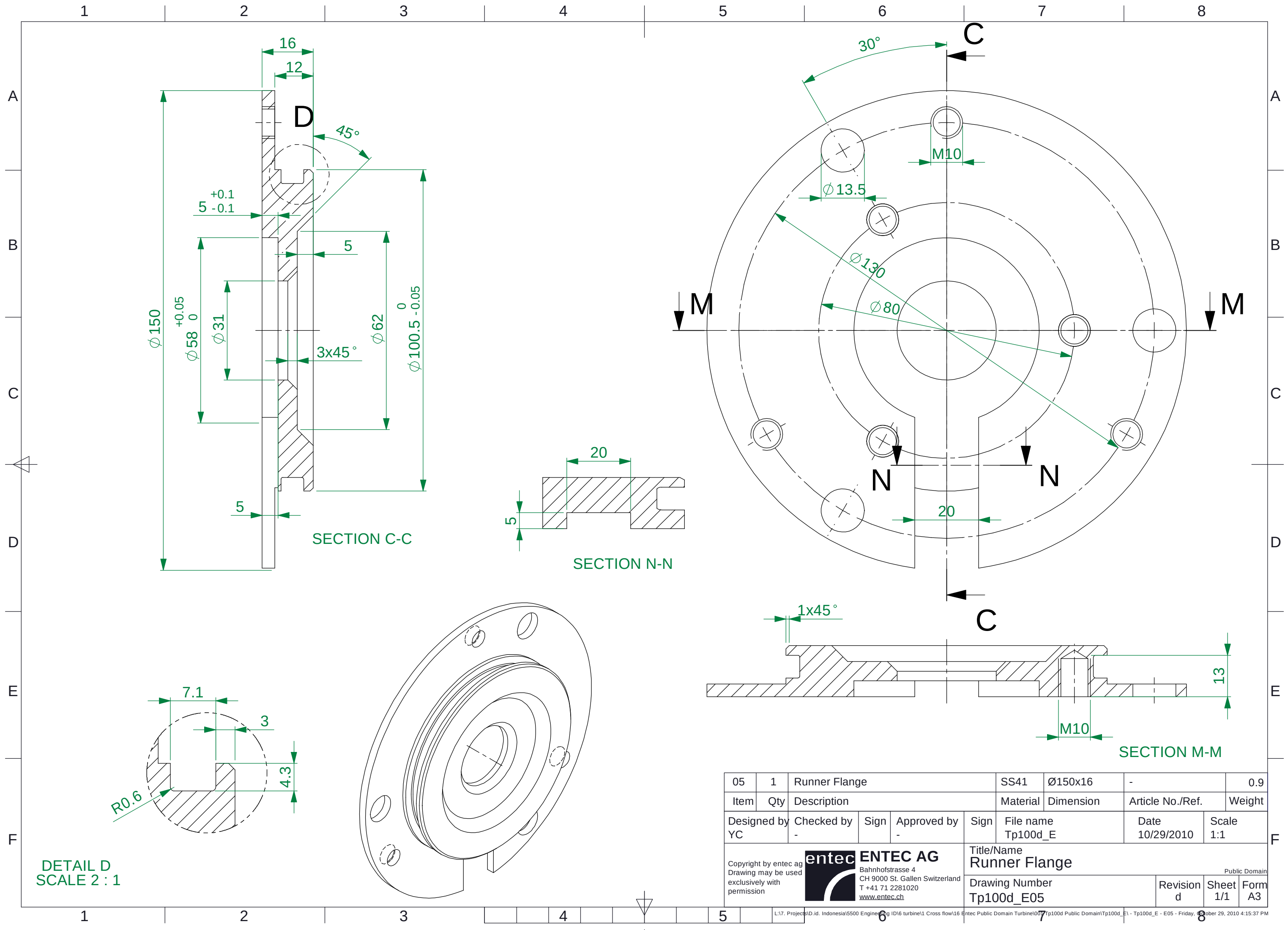
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Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Runner Assembly					
					Drawing Number Tp100d_E00			Revision d	Sheet 1/1	Form A3
					Public Domain					



01	1	Runner Shaft				ST50	Ø25x230	-	0.8
Item	Qty	Description				Material	Dimension	Article No./Ref.	Weight
Designed by YC	Checked by -	Sign	Approved by -	Sign	File name Tp100d_E		Date 10/29/2010	Scale 1:1	
Copyright by entec ag Drawing may be used exclusively with permission ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Runner Shaft				
					Drawing Number Tp100d_E01			Revision d	Sheet 1/1

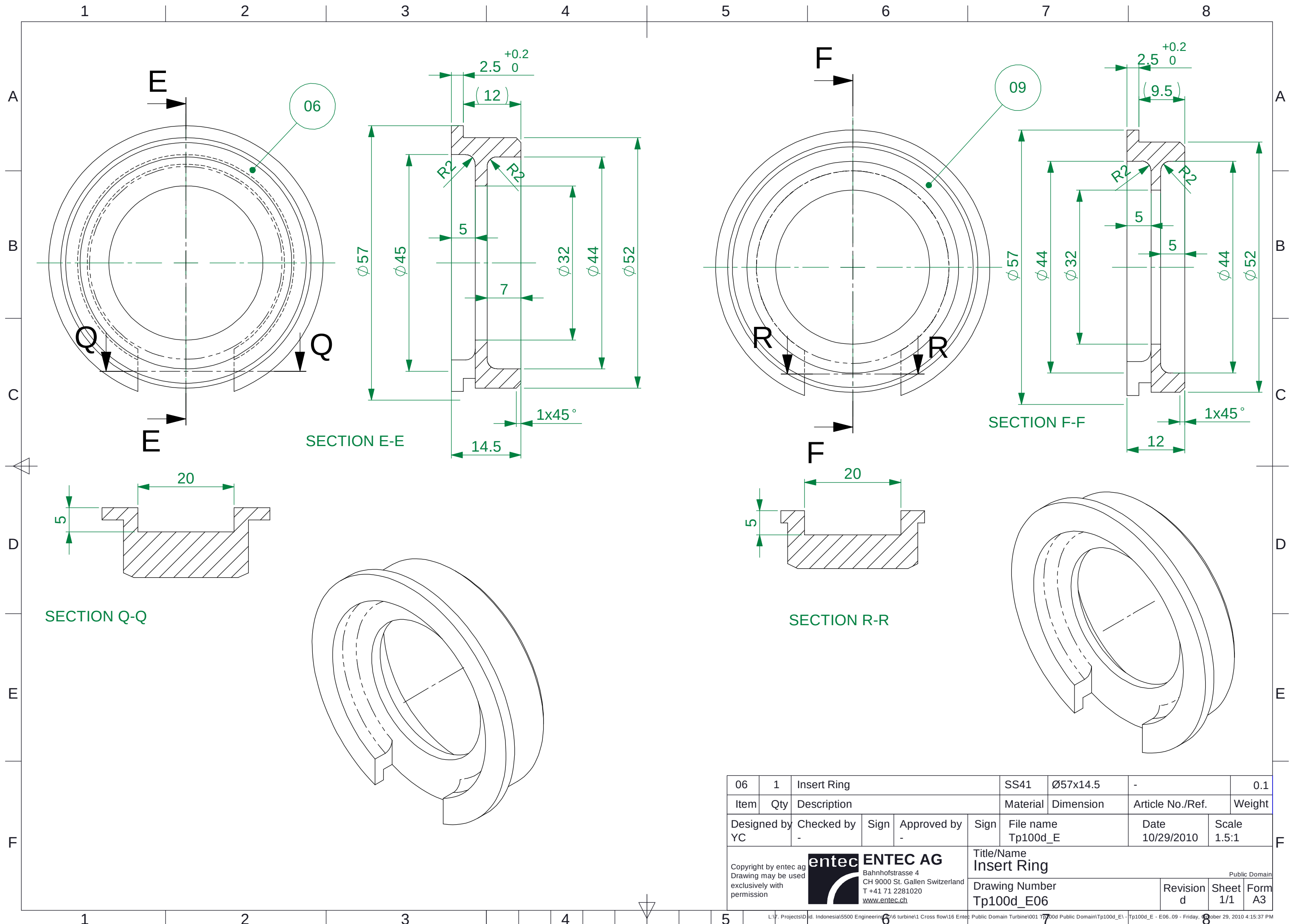


02	2	Side Disc				SS41	Ø100x3	-	0.1
Item	Qty	Description				Material	Dimension	Article No./Ref.	Weight
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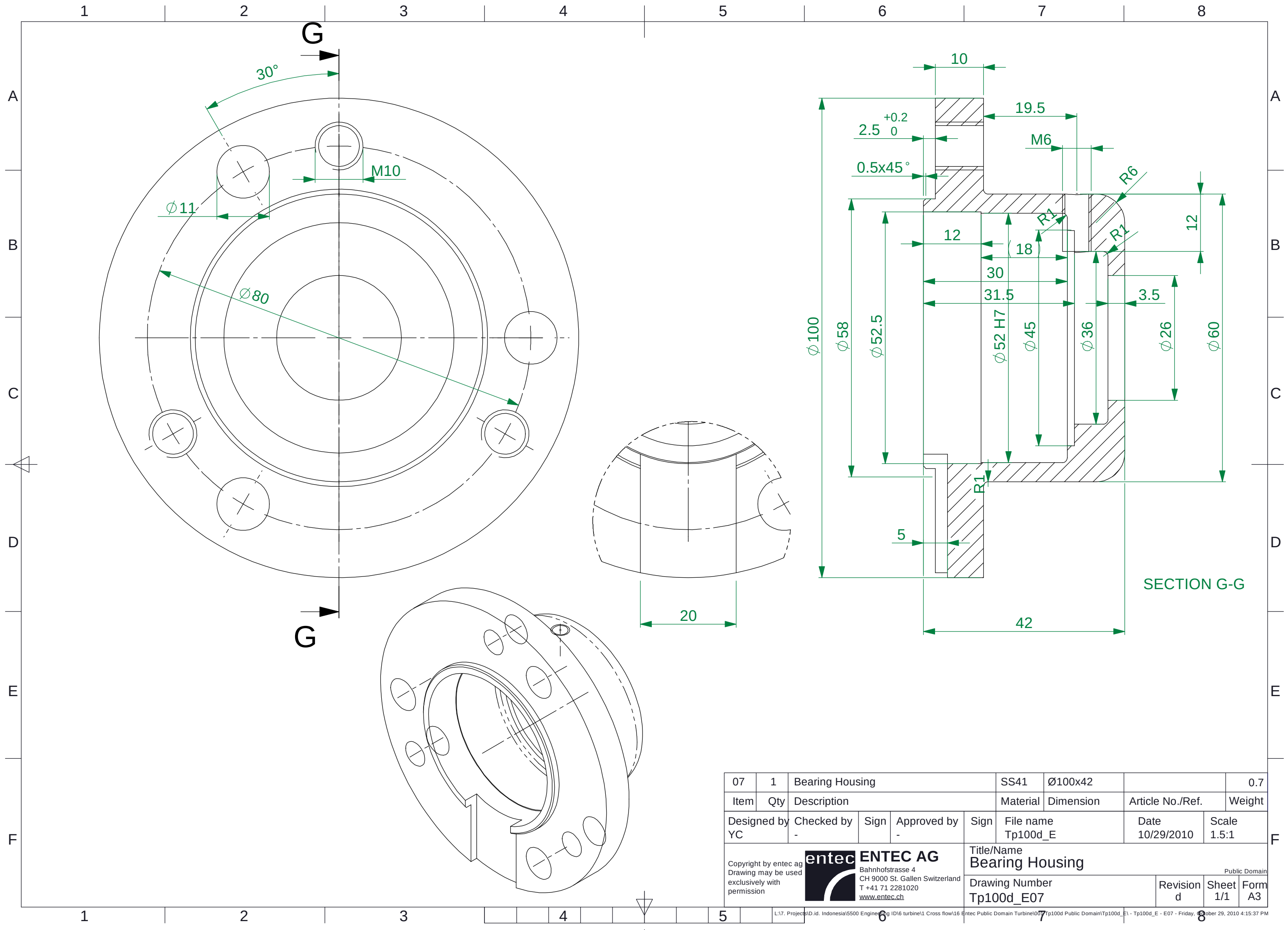


DETAIL D
SCALE 2 : 1

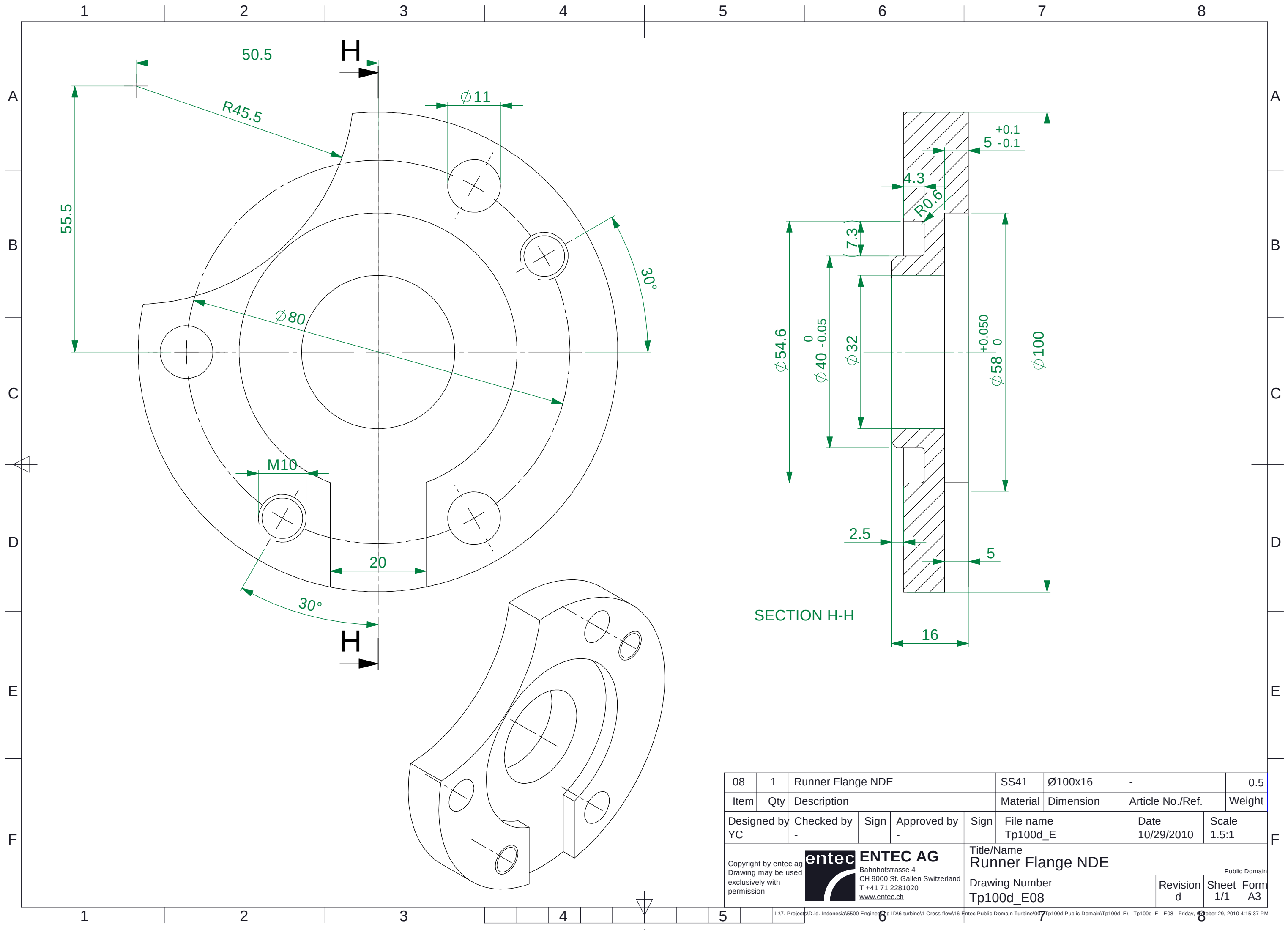
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Copyright by entec ag Drawing may be used exclusively with permission ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch						Title/Name Runner Flange					
						Drawing Number Tp100d_E05					



06	1	Insert Ring				SS41	Ø57x14.5	-	0.1
Item	Qty	Description				Material	Dimension	Article No./Ref.	Weight
Designed by YC		Checked by -	Sign	Approved by -	Sign	File name Tp100d_E		Date 10/29/2010	Scale 1.5:1
Copyright by entec ag Drawing may be used exclusively with permission ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Insert Ring				
					Drawing Number Tp100d_E06				Revision d



07	1	Bearing Housing				SS41	Ø100x42			0.7
Item	Qty	Description				Material	Dimension	Article No./Ref.		Weight
Designed by YC	Checked by -	Sign	Approved by -	Sign	File name Tp100d_E		Date 10/29/2010		Scale 1.5:1	
Copyright by entec ag Drawing may be used exclusively with permission  ENTEC AG Bahnhofstrasse 4 CH 9000 St. Gallen Switzerland T +41 71 2281020 www.entec.ch					Title/Name Bearing Housing					
					Drawing Number Tp100d_E07				Revision d	



08	1	Runner Flange NDE				SS41	Ø100x16	-	0.5			
Item	Qty	Description				Material	Dimension	Article No./Ref.		Weight		
Designed by YC		Checked by -	Sign	Approved by -	Sign	File name Tp100d_E		Date 10/29/2010		Scale 1.5:1		
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					Drawing Number Tp100d_E08				Revision d	Sheet 1/1	Form A3	

F	Base Frame Sub Assy		F
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F

Base Frame Sub Assembly

07	Not Valid Drawings		7
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07

Not Valid Drawing