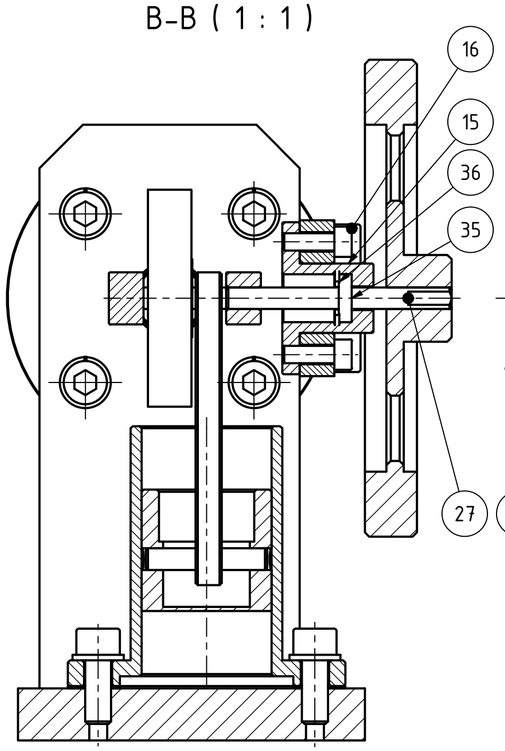
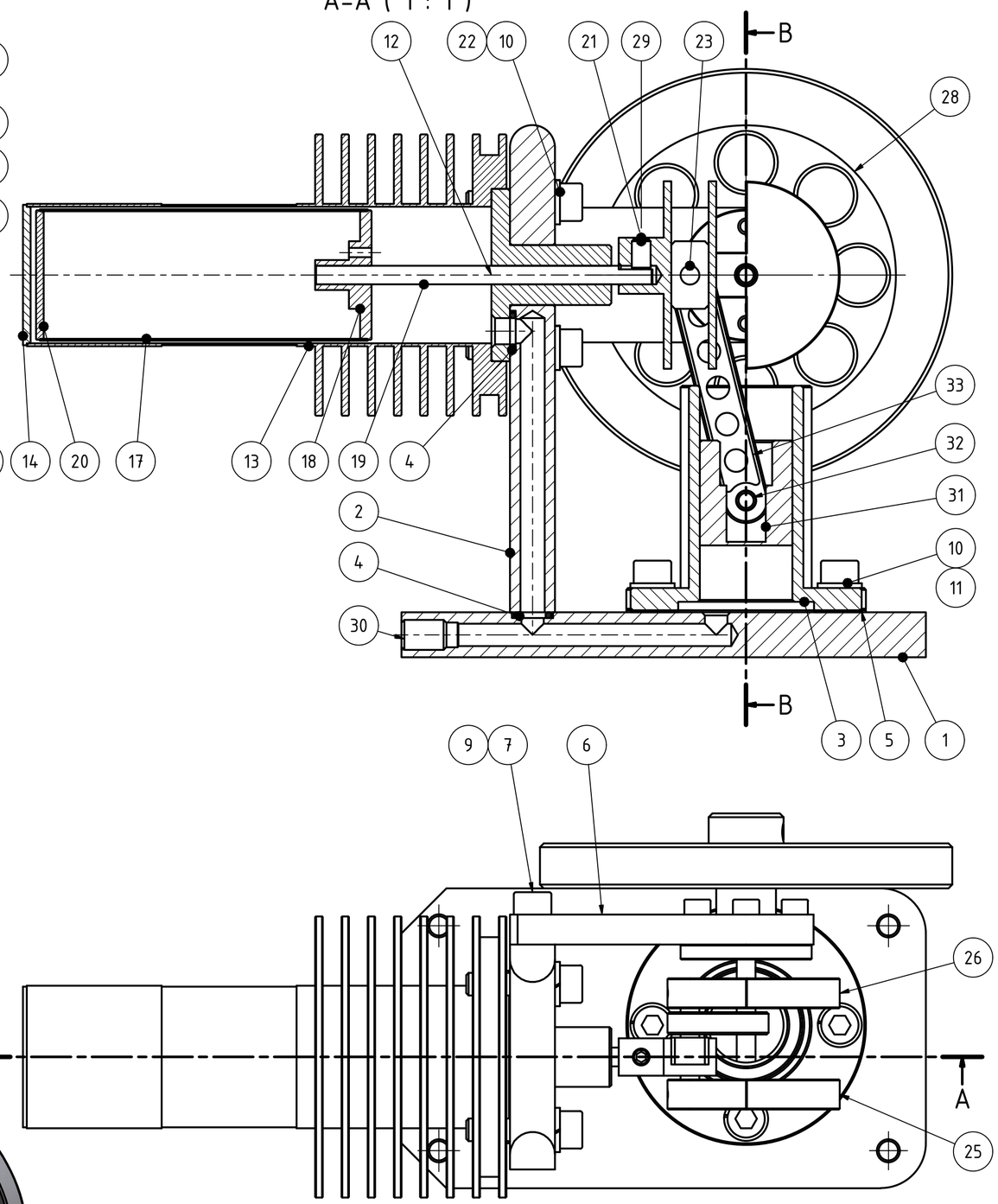
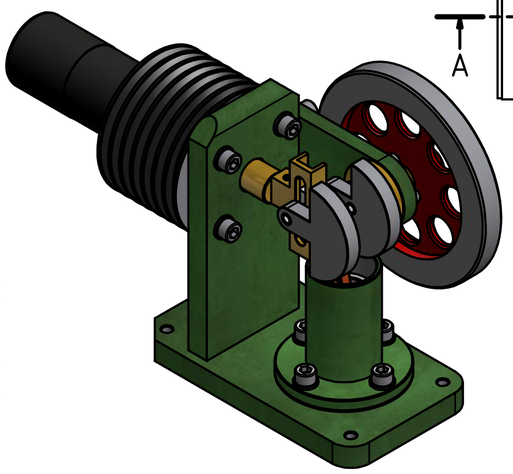
B-B (1 : 1)



A-A (1 : 1)





PARTS LIST				
ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
1	1	Base		Stainless Steel
2	1	Standard		Steel, Mild
3	1	Cylinder		Steel, Mild
4	2	Air Channel Packing		Rubber
5	1	Cylinder Packing		Rubber
6	1	Support		Steel, Mild
7	4	DIN 912 - M6 x 20	Cylinder Head Cap Screw	Steel, Mild
8	2	ISO 8734 - 5 x 20 - A	Parallel pins	Steel
9	2	ISO 8734 - 3 x 16 - A	Parallel pins	Steel
10	8	DIN 128 - A6	Spring Washer	Steel, Mild
11	4	DIN 912 - M6 x 16	Cylinder Head Cap Screw	Steel, Mild
12	1	Cylinder Cover		Brass, Soft Yellow
13	1	Heat Exchange Cylinder		Stainless Steel
14	1	Heat Exchange Cylinderhead		Stainless Steel
15	1	Bearing Support		Brass, Soft Yellow
16	4	DIN 912 - M4 x 12	Cylinder Head Cap Screw	Steel, Mild
17	1	Heat Exchange Piston Tube		Copper
18	1	Heat Exchange Piston Exhaust		Copper
19	1	Heat Exchange Piston Shaft		Copper
20	1	Heat Exchange Piston Head		Copper
21	1	Crosshead		Brass, Soft Yellow
22	4	DIN 912 - M6 x 25	Cylinder Head Cap Screw	Steel, Mild
23	1	Slide		PVC-U
24	1	Crankshaft		Stainless Steel
25	1	Counterweight B		Steel, Mild
26	1	Counterweight A		Steel, Mild
27	1	Flywheelshaft		Stainless Steel
28	1	Flywheel		Steel, Mild
29	2	DIN 913 - M5 x 8	Hexagon Socket Screw	Steel, Mild
30	1	DIN 913 - M8 x 12	Hexagon Socket Screw	Steel, Mild
31	1	Piston		Steel, Mild
32	1	Piston Pin		Stainless Steel
33	1	Crankrod		Copper
35	1	DIN 625 SKF - SKF 618/5	Single row ball bearings	Steel, Mild
36	1	DIN 472 - 12x1	Retaining rings for bores	Steel, Mild
37	2	DIN 913 - M3 x 4	Hexagon Socket Set Screw	Steel, Mild

Revision	Date	Description

Engineered by:

	Name:	Date:
Designer:	Galba, J.	17/07/2010
Approved:	Galba, J.	17/07/2010

Scale: 1:1

SheetSize: A2

Project:
Miniature Model Hot Air Engine

Material:

Total Mass: N/A

Title:
Horizontal Stirling Engine
Assembly

InventorWizard be/nl

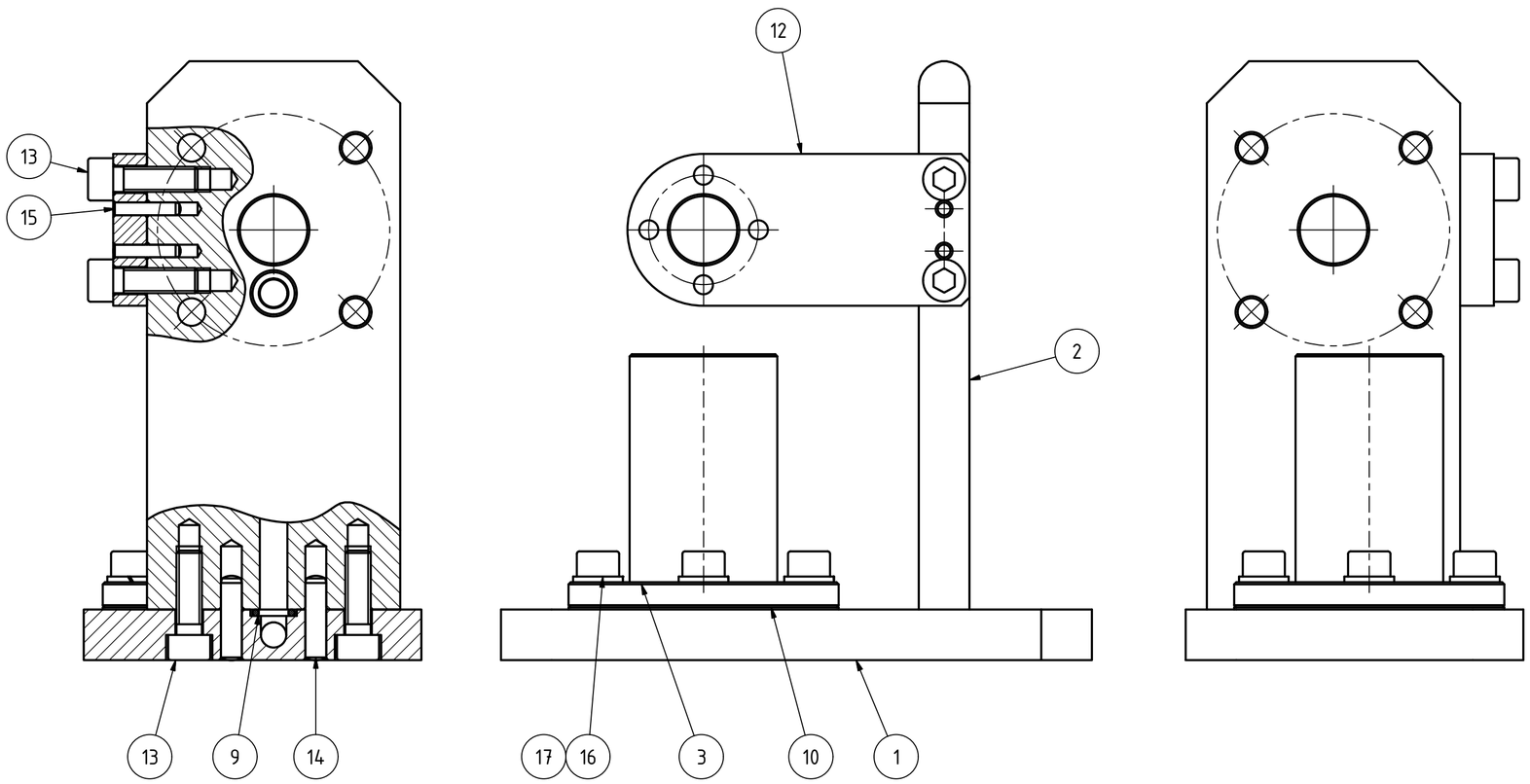
Drawingnumber:

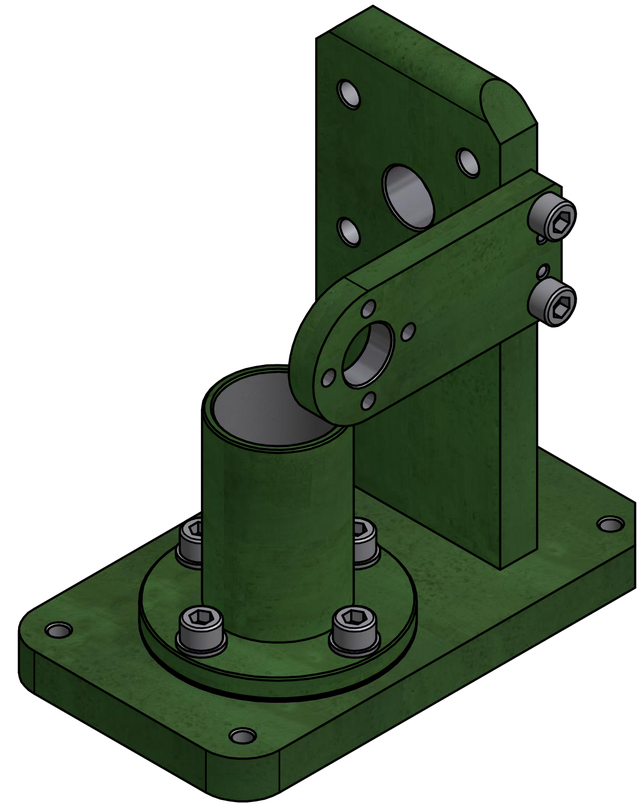
Sheet:
0001

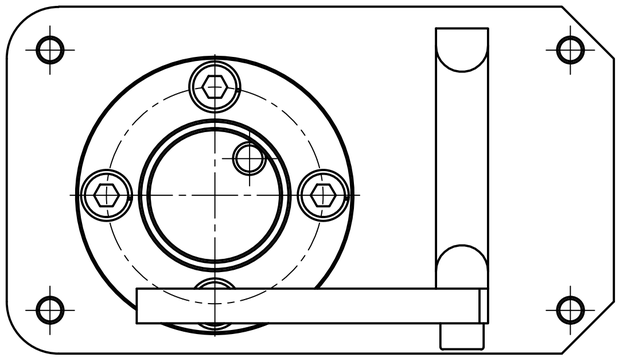
Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD

PARTS LIST				
ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
1	1	Base		Stainless Steel
2	1	Standard		Steel, Mild
3	1	Cylinder		Steel, Mild
9	2	Air Channel Packing		Rubber
10	1	Cylinder Packing		Rubber
12	1	Support		Steel, Mild
13	4	DIN 912 - M6 x 20	Cylinder Head Cap Screw	Steel, Mild
14	2	ISO 8734 - 5 x 20 - A	Parallel pins of hardened steel and martensitic stainless steel (Dowel pins)	Steel
15	2	ISO 8734 - 3 x 16 - A	Parallel pins of hardened steel and martensitic stainless steel (Dowel pins)	Steel
16	4	DIN 128 - A6	Spring Washer	Steel, Mild
17	4	DIN 912 - M6 x 16	Cylinder Head Cap Screw	Steel, Mild







Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 1:1
	Designer:	Galba, J.	17/07/2010	SheetSize: A2
	Approved:	Galba, J.	17/07/2010	

Project:
Miniature Model Hot Air Engine

Material:

Total Mass: N/A

Title:
Horizontal Stirling Engine
Assembly Base

InventorWizard.be/nl

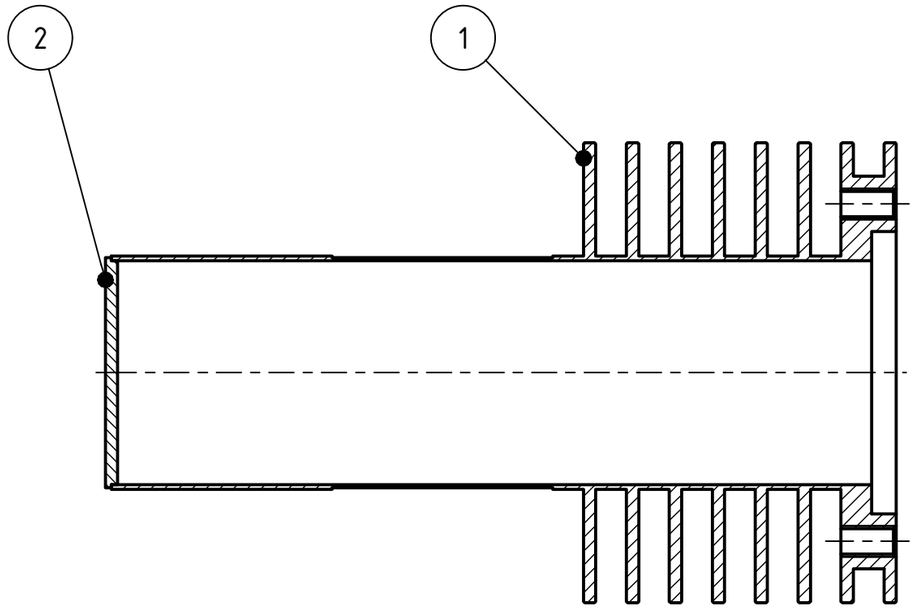
Drawingnumber:

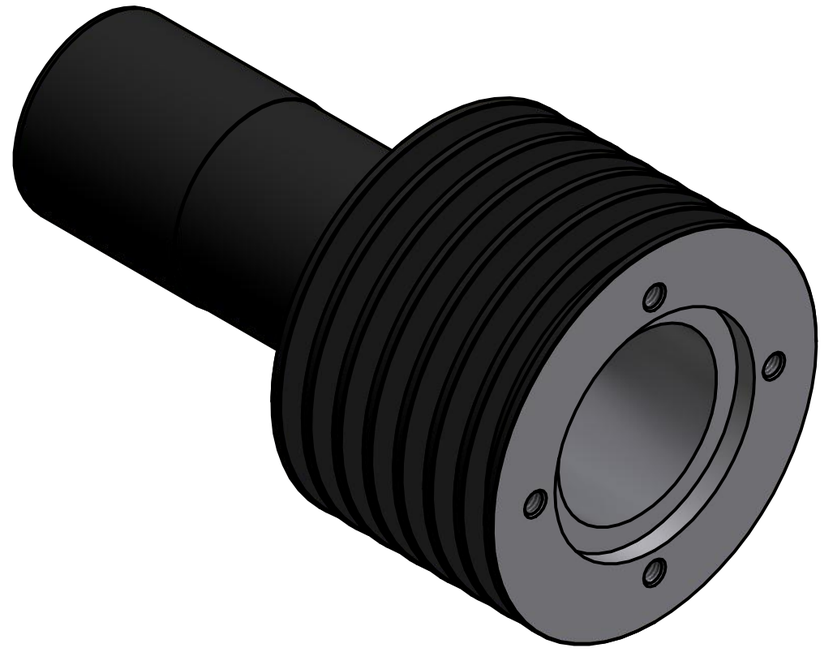
Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor
Revisions only permitted by CAD

PARTS LIST				
ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
1	1	Heat Exchange Cylinder		Stainless Steel
2	1	Heat Exchange Cylinderhead		Stainless Steel





Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 1:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material:
Total Mass: 0,584 kg

Title:
Horizontal Stirling Engine
Assembly Heat Exchange Cylinder

InventorWizard be/nl

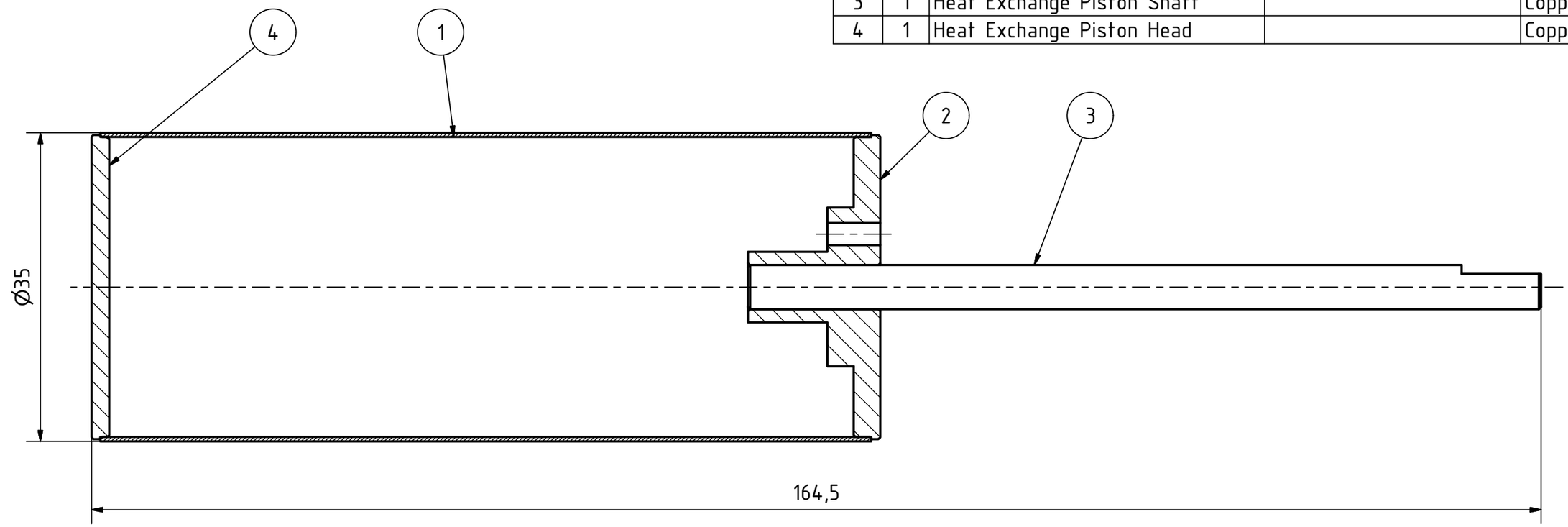
Drawingnumber:

Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD

PARTS LIST				
ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL
1	1	Heat Exchange Piston Tube		Copper
2	1	Heat Exchange Piston Exhaust		Copper
3	1	Heat Exchange Piston Shaft		Copper
4	1	Heat Exchange Piston Head		Copper



Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

	For measurements (deviations in mm)								Fillets and chamfers					Angles (in ° and ')				
	Dimensions in mm								Dimensions in mm					Length of the shortest leg				
Accuracyclass (ISO 2768.1)	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 2:1
SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material:
Total Mass: 0.107 kg

Title:
Horizontal Stirling Engine
Assembly Heat Exchange Piston

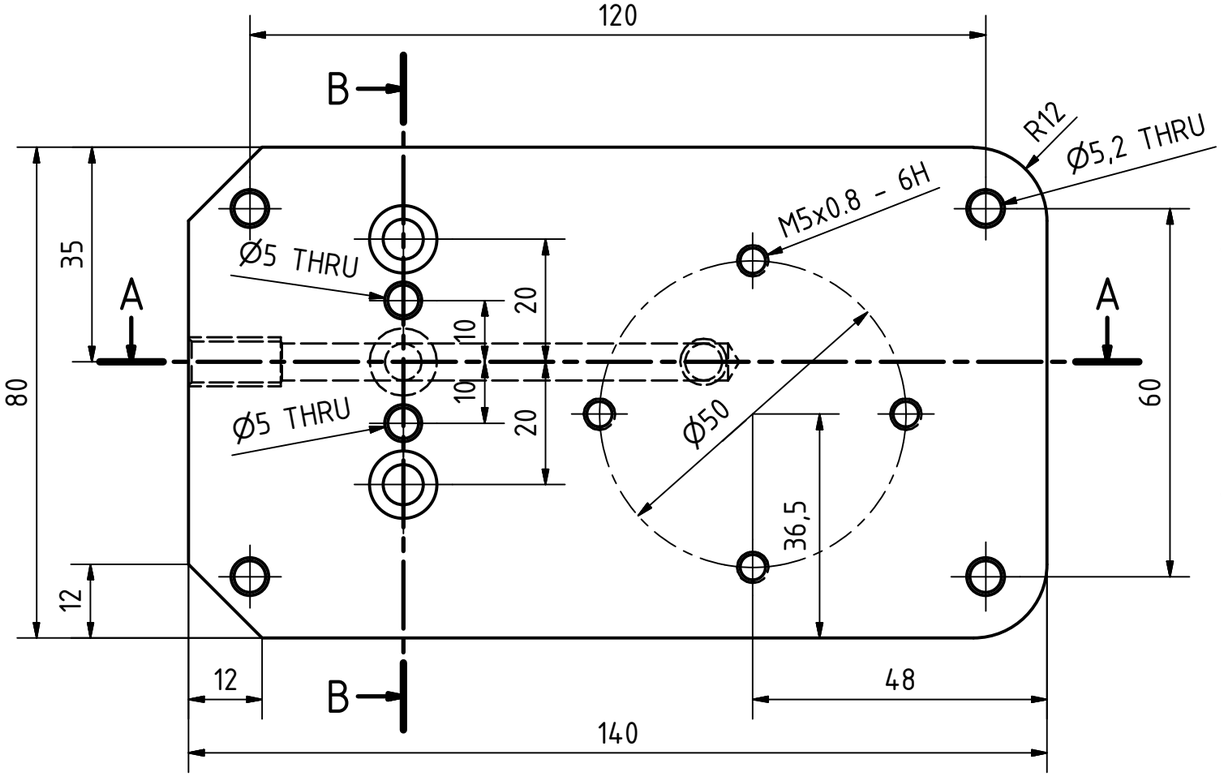
InventorWizard.be/nl

Drawingnumber:

Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD



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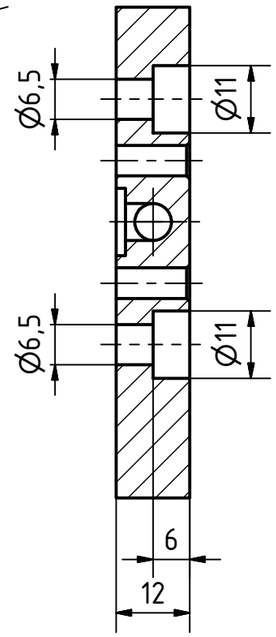
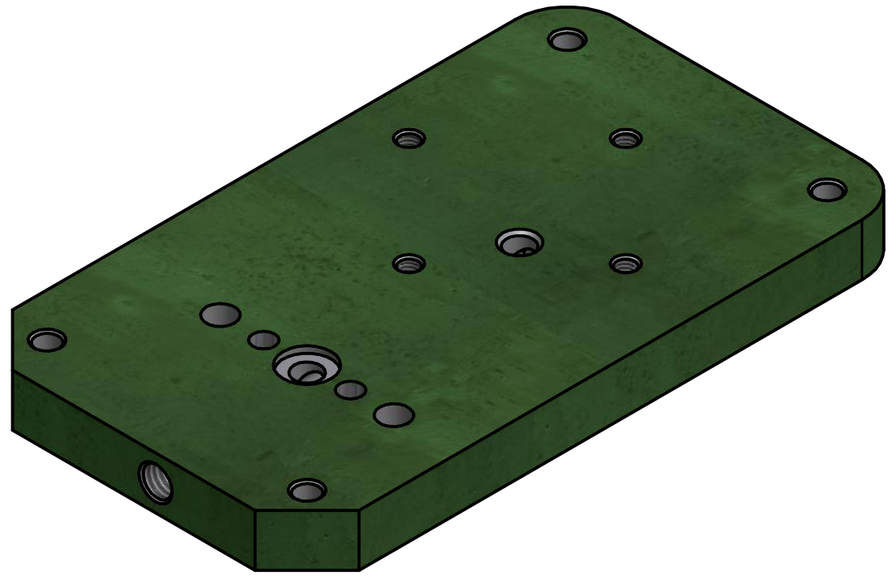
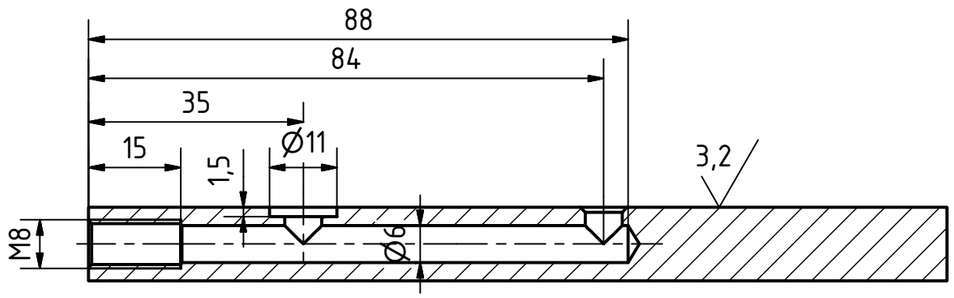




Break Sharp Edges: 0,1 mm

A-A (1 : 1)



Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 1:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Stainless Steel
Total Mass: 1.013 kg

Title:
Horizontal Stirling Engine
Base

InventorWizard be/nl

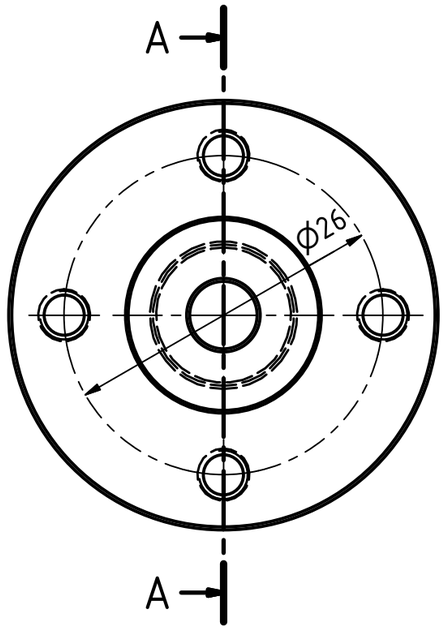
Drawingnumber:

Sheet:
0001

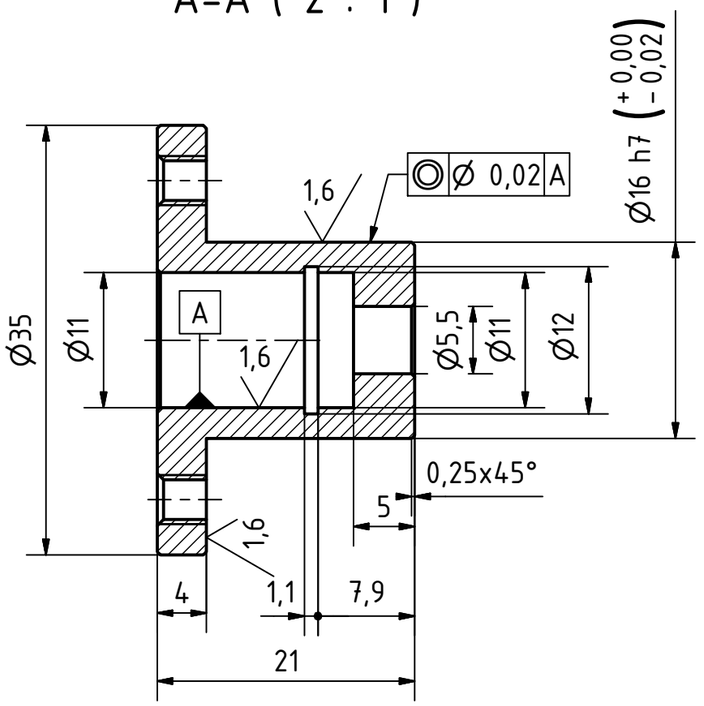
Design State:
Released

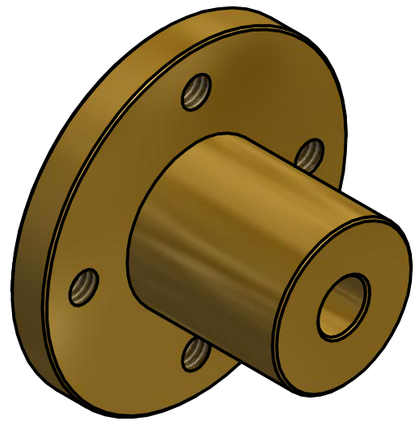
Drawing made with autodesk Inventor Revisions only permitted by CAD

3,2



A-A (2 : 1)





Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	Fillets and chamfers Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	Angles (in ° and ') Length of the shortest leg to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 2:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Brass, Soft Yellow
Total Mass: 0.046 kg

Title:
Horizontal Stirling Engine
Bearing Support

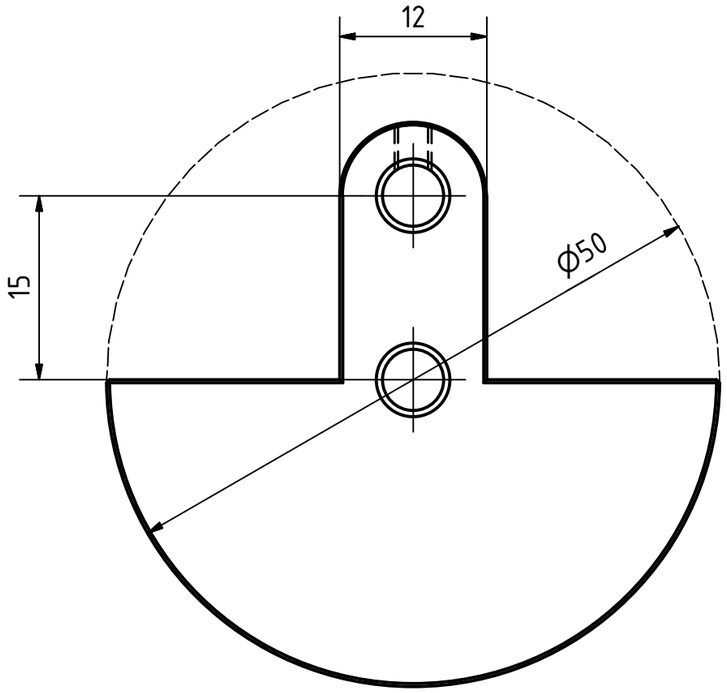
InventorWizard be/nl

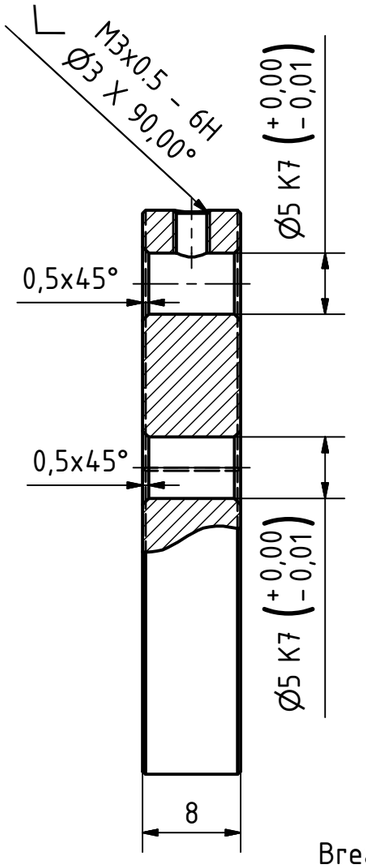
Drawingnumber:

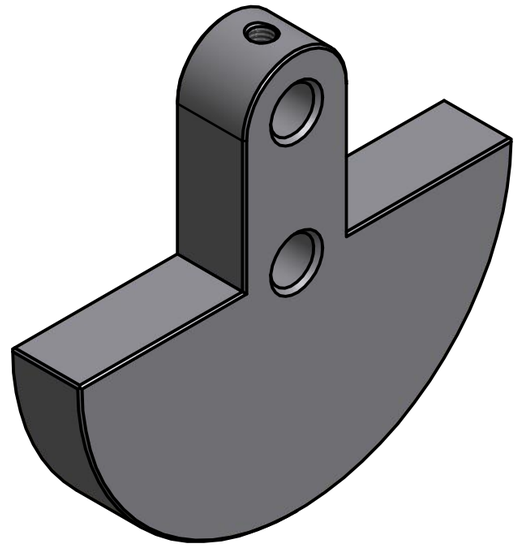
Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD







Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) — Dimensions in mm								Fillets and chamfers — Dimensions in mm					Angles (in ° and ') — Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 2:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Steel, Mild
Total Mass: 0.074 kg

Title:
Horizontal Stirling Engine
Counterweight A

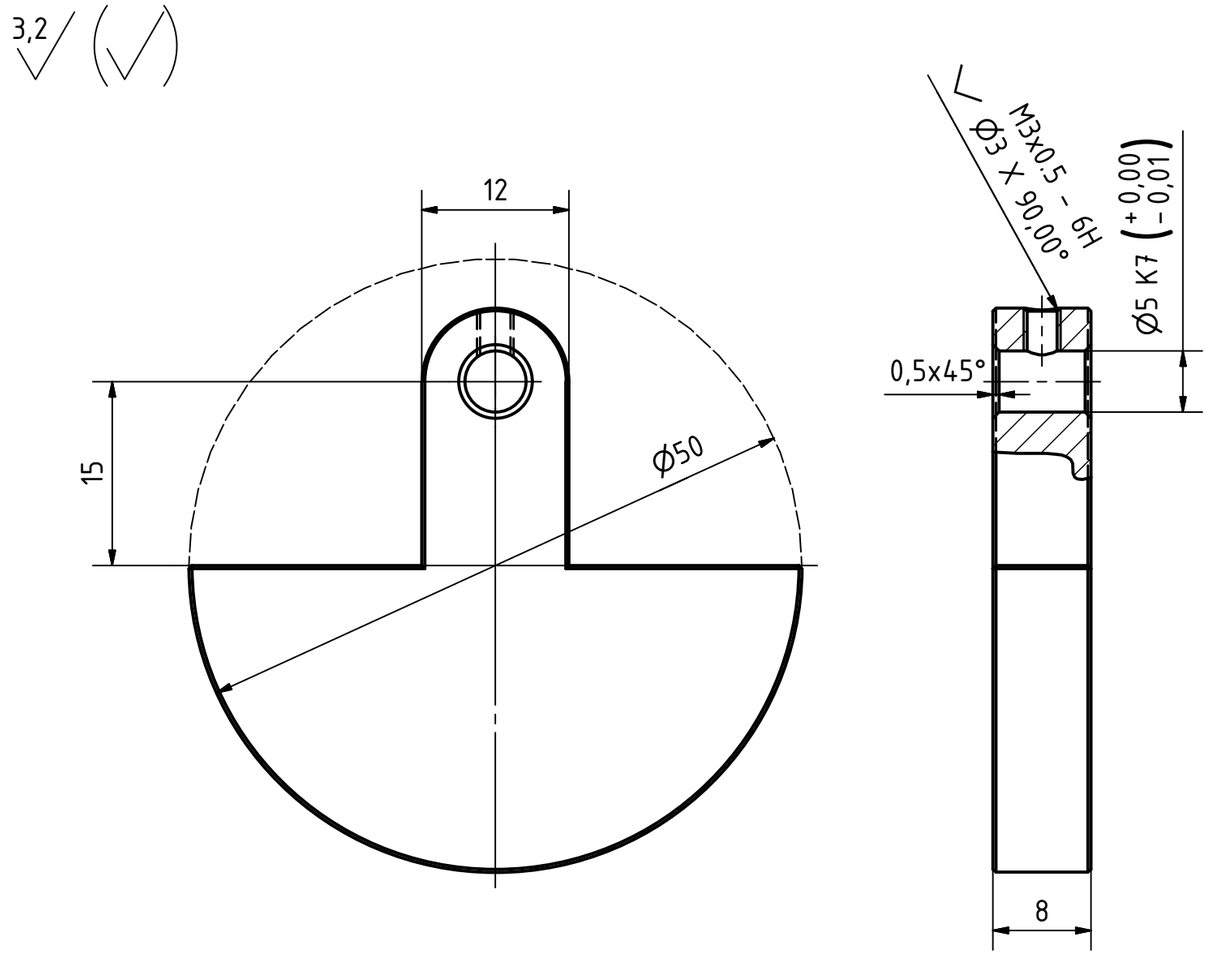
InventorWizard be/nl

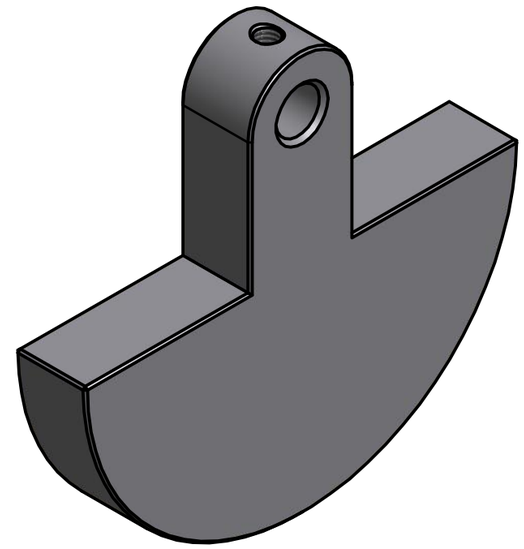
Drawingnumber:

Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD





Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

	For measurements (deviations in mm)								Fillets and chamfers					Angles (in ° and ')				
Accuracyclass (ISO 2768.1)	Dimensions in mm								Dimensions in mm					Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:

	Name:	Date:
Designer:	Galba, J.	17/07/2010
Approved:	Galba, J.	17/07/2010

Scale: 2:1

SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Steel, Mild

Total Mass: 0.075 kg

Title:
Horizontal Stirling Engine
Counterweight B

InventorWizard.be/.nl

Drawingnumber:

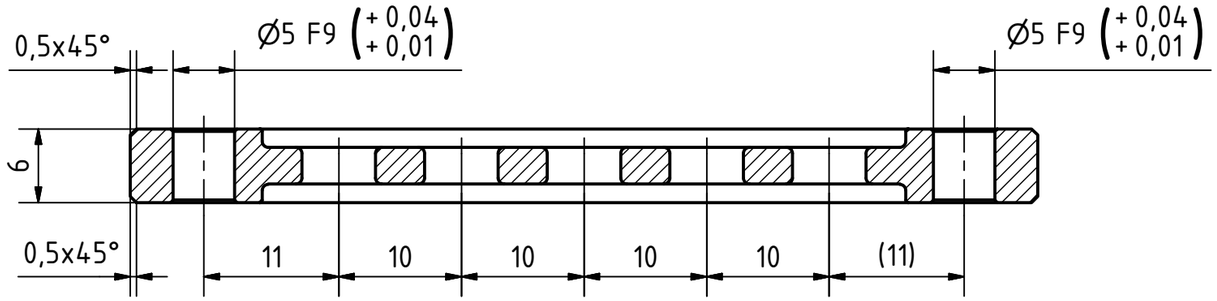
Sheet:
0001

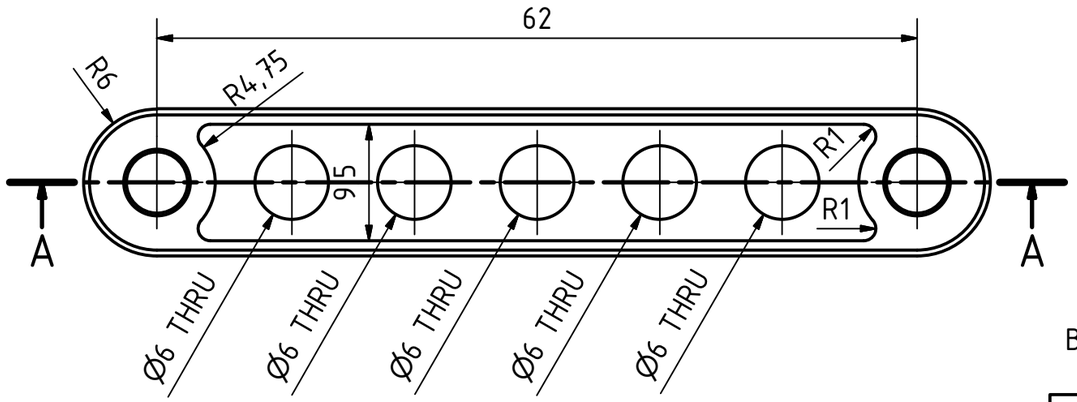
Design State:
Released

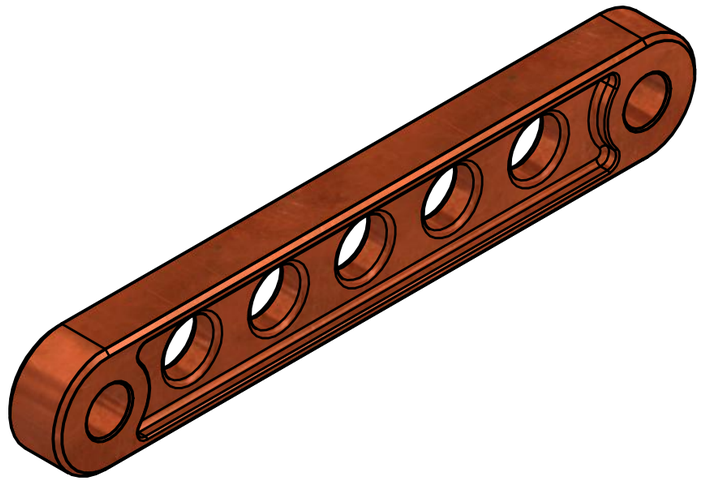
Drawing made with autodesk Inventor Revisions only permitted by CAD

1,6

A-A (2 : 1)







Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 2:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Copper
Total Mass: 0.026 kg

Title:
Horizontal Stirling Engine
Crankrod

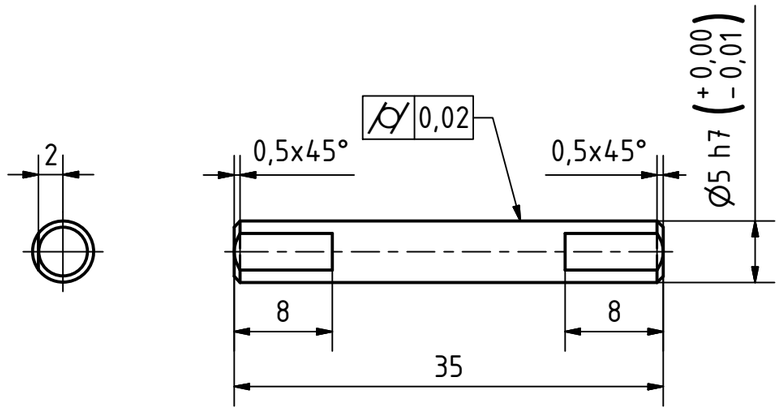
InventorWizard be/nl

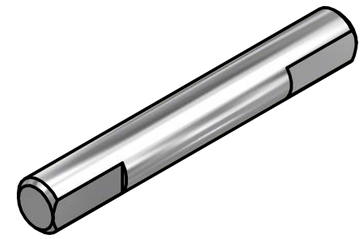
Drawingnumber:

Sheet: 0001

Design State: Released

Drawing made with autodesk Inventor Revisions only permitted by CAD





Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	Fillets and chamfers Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	Angles (in ° and ') Length of the shortest leg to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 2:1
	Designer:	Galba, J.	17/07/2010	SheetSize: A3
	Approved:	Galba, J.	17/07/2010	

Project:
Miniature Model Hot Air Engine

Material: Stainless Steel

Total Mass: N/A

Title:
Horizontal Stirling Engine
Crankshaft

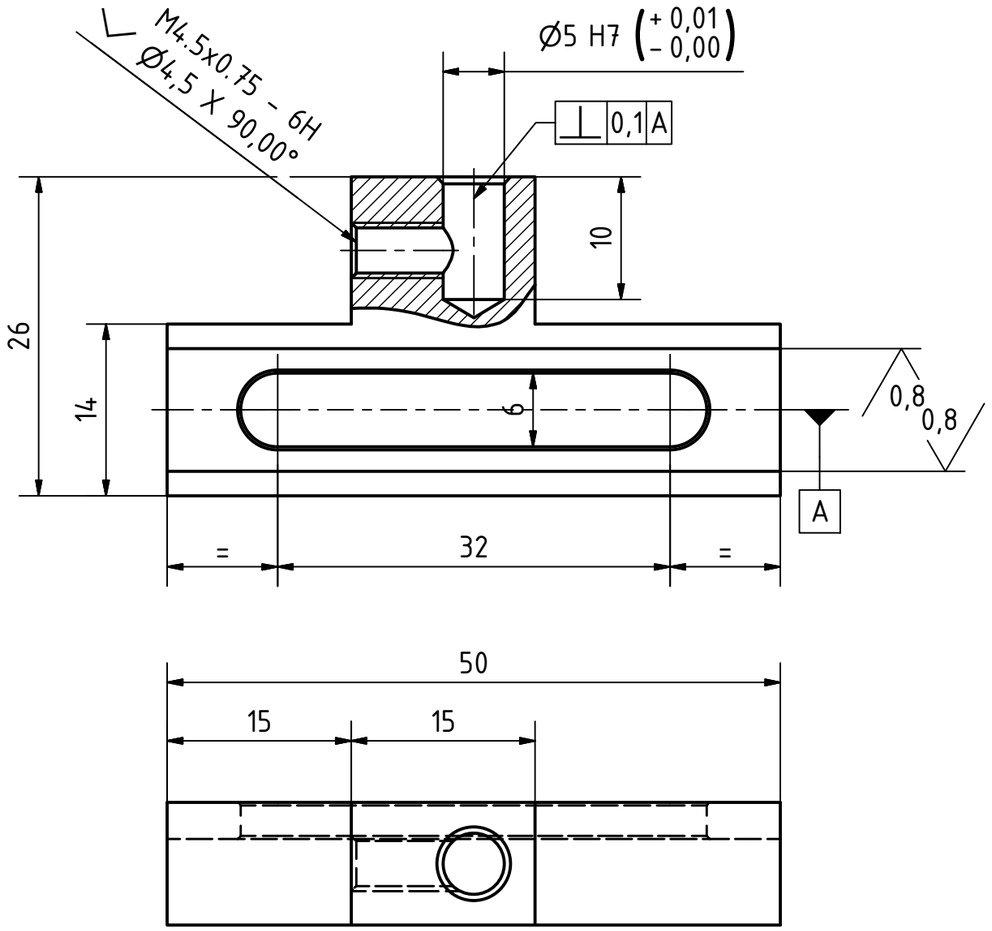
InventorWizard be/.nl

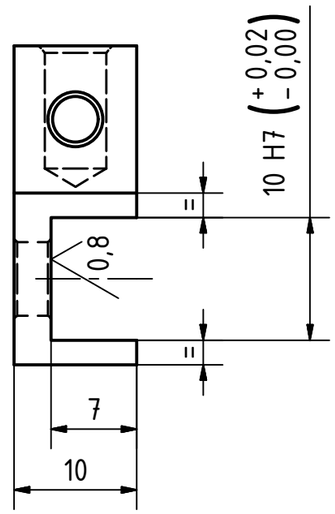
Drawingnumber:

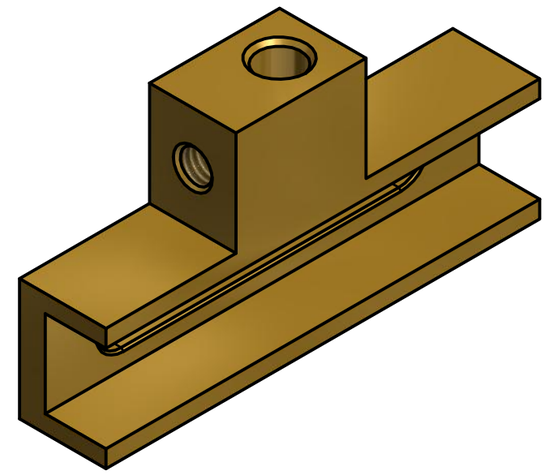
Sheet: 0001

Design State: Released

Drawing made with autodesk Inventor Revisions only permitted by CAD







Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 2:1
SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Brass, Soft Yellow
Total Mass: 0.037 kg

Title:
Horizontal Stirling Engine
Crosshead

InventorWizard be/nl

Drawingnumber:

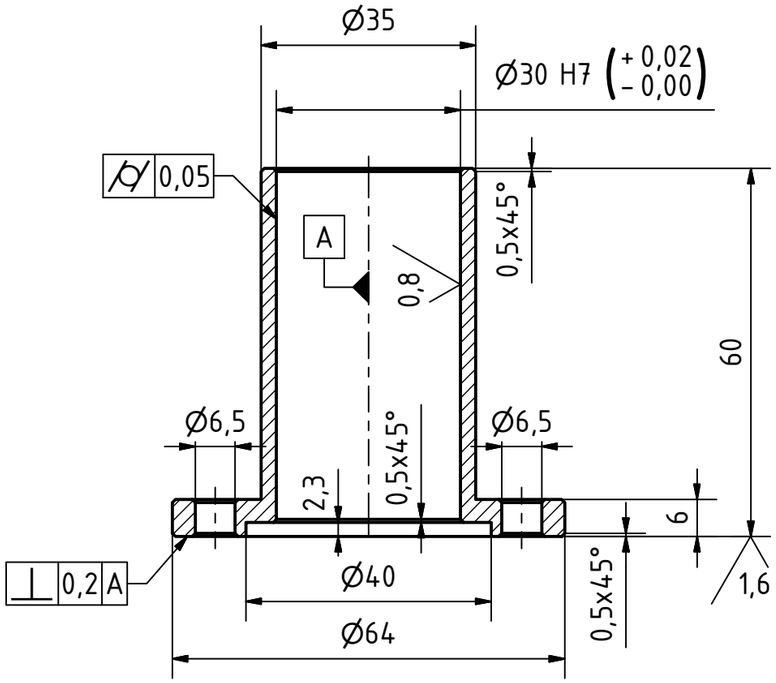
Sheet: 0001

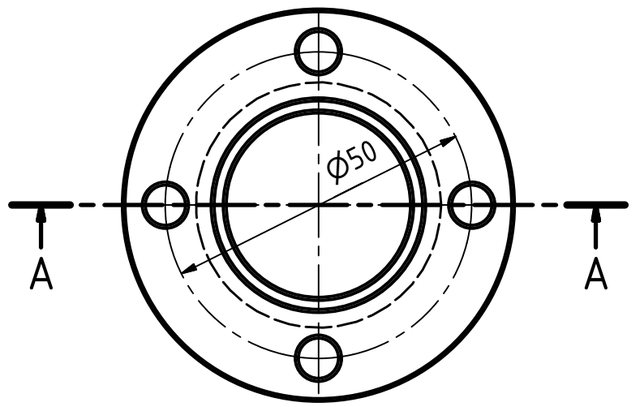
Design State: Released

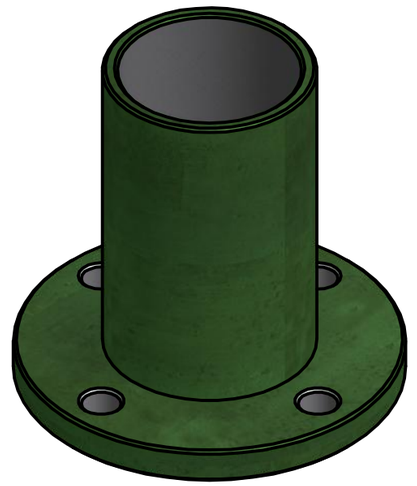
Drawing made with autodesk Inventor Revisions only permitted by CAD

3,2

A-A (1 : 1)







Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 1:1
SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Steel, Mild
Total Mass: 0.210 kg

Title:
Horizontal Stirling Engine
Cylinder

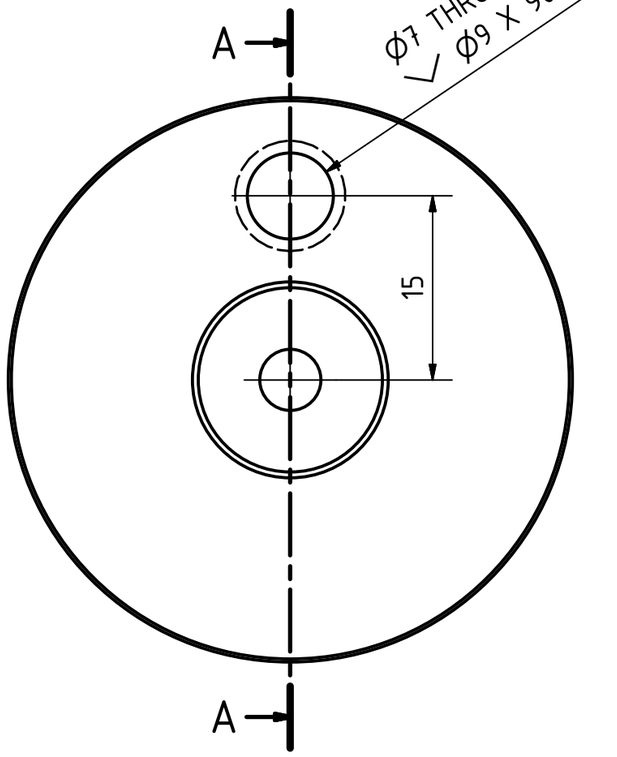
InventorWizard.be/nl

Drawingnumber:

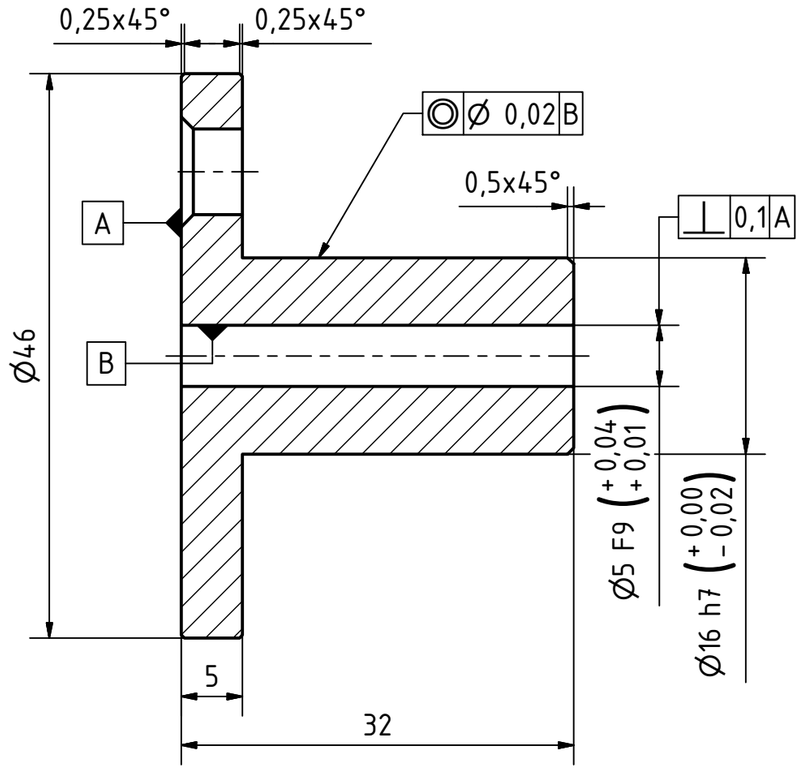
Sheet:
0001

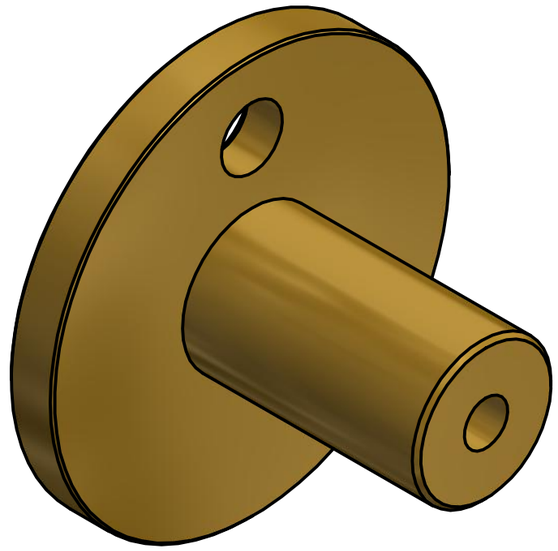
Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD



A-A (2 : 1)





Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 2:1
SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Brass, Soft Yellow
Total Mass: 0.109 kg

Title:
Horizontal Stirling Engine
Cylinder Cover

InventorWizard be/nl

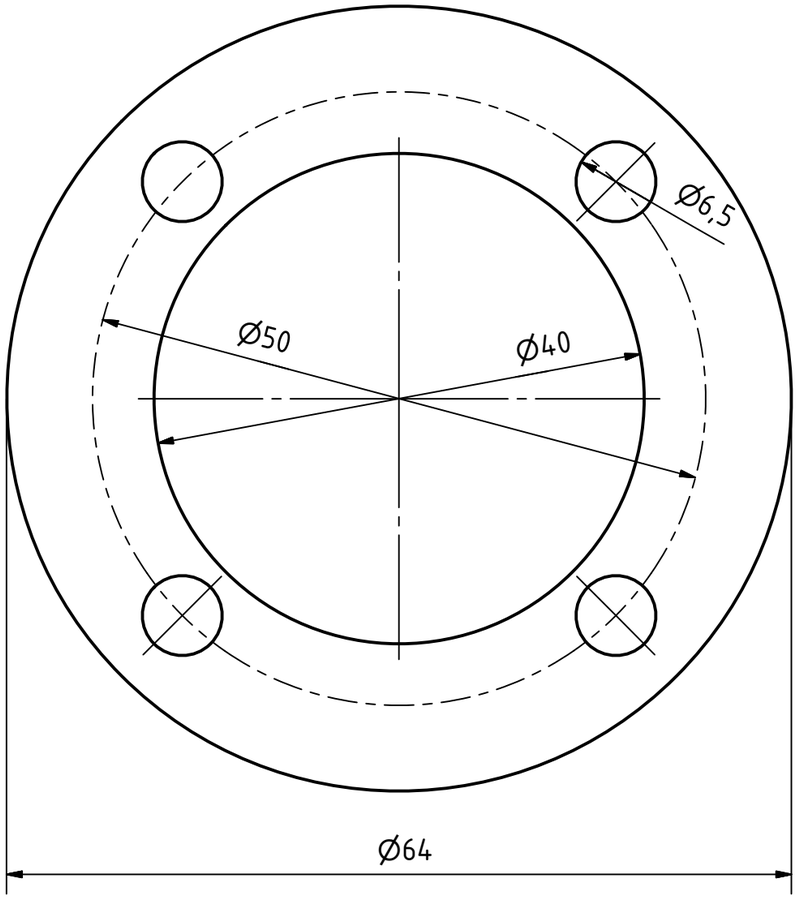
Drawingnumber:

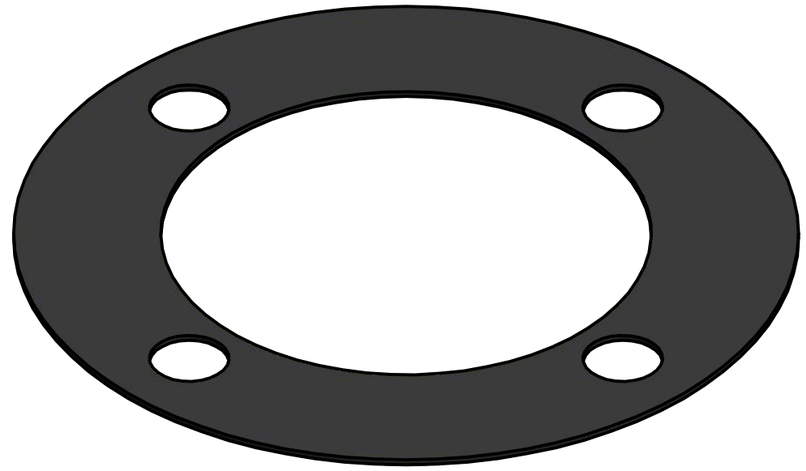
Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD

THICKNESS: 0,5mm





Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) — Dimensions in mm								Fillets and chamfers — Dimensions in mm					Angles (in ° and ') — Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 2:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Rubber
Total Mass: 0.001 kg

Title:
Horizontal Stirling Engine
Cylinder Packing

InventorWizard.be/nl

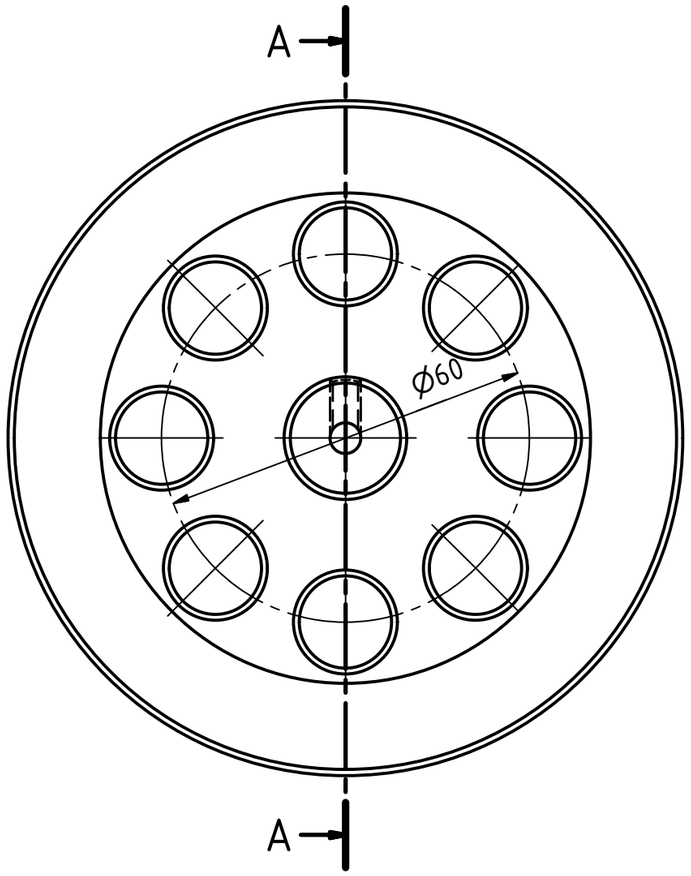
Drawingnumber:

Sheet: 0001

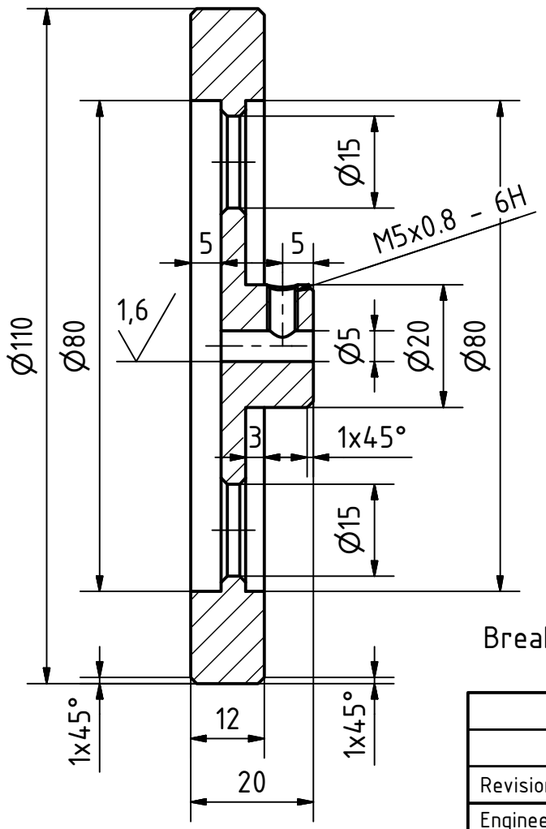
Design State: Released

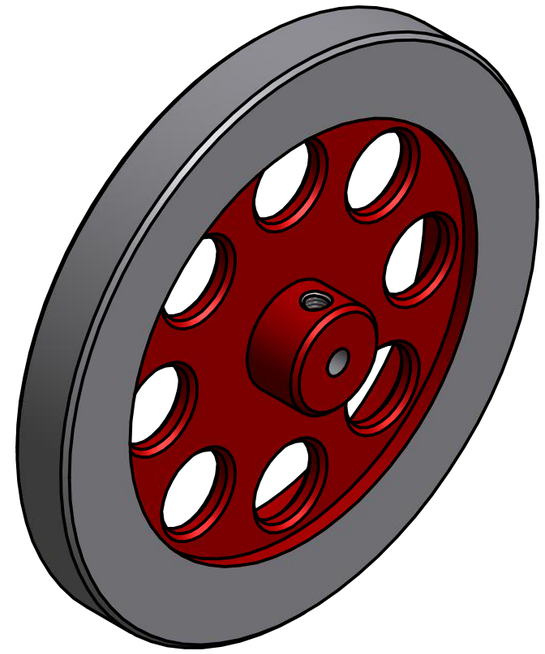
Drawing made with autodesk Inventor Revisions only permitted by CAD

3,2



A-A (1 : 1)





Break Sharp Edges: 0,1 mm

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 1:1

SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Steel, Mild

Total Mass: 0.554 kg

Title:
Horizontal Stirling Engine
Flywheel

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

InventorWizard be/nl

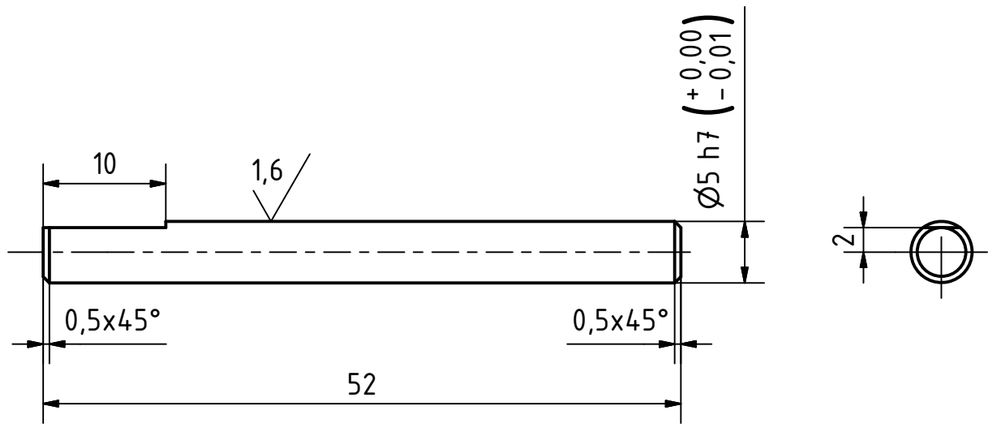
Drawingnumber:

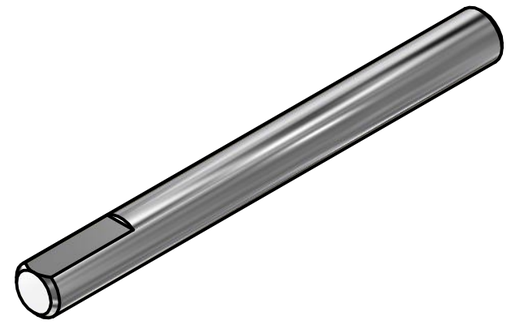
Sheet: 0001

Design State: Released

Drawing made with autodesk Inventor Revisions only permitted by CAD

3,2





Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 2:1

SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Stainless Steel

Total Mass: 0.008 kg

Title:
Horizontal Stirling Engine
Flywheelshaft

InventorWizard.be/.nl

Drawingnumber:

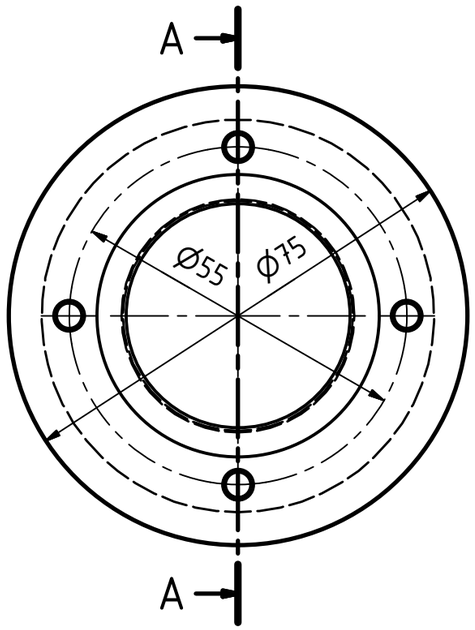
Sheet:
0001

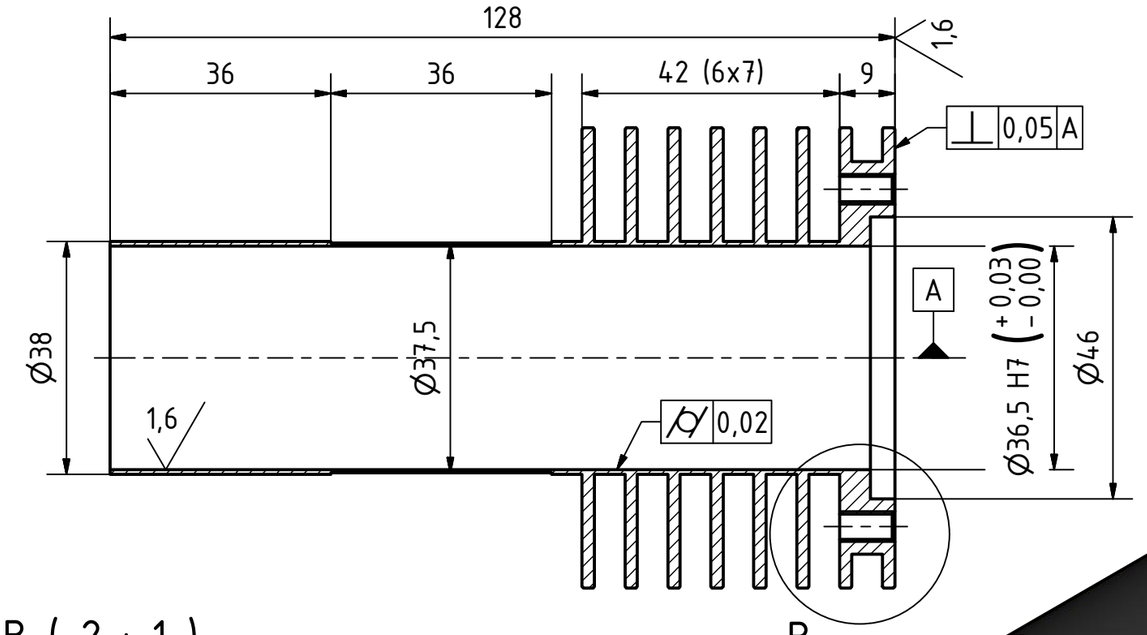
Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD

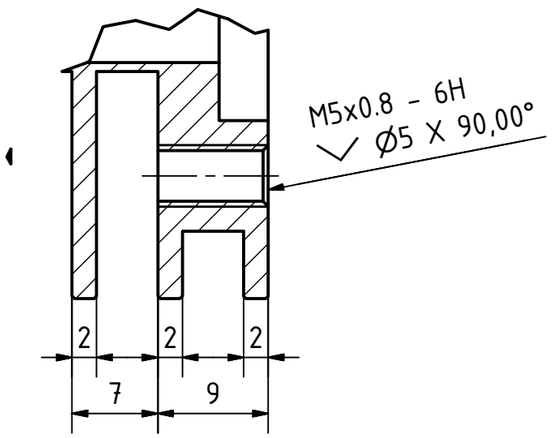
3,2

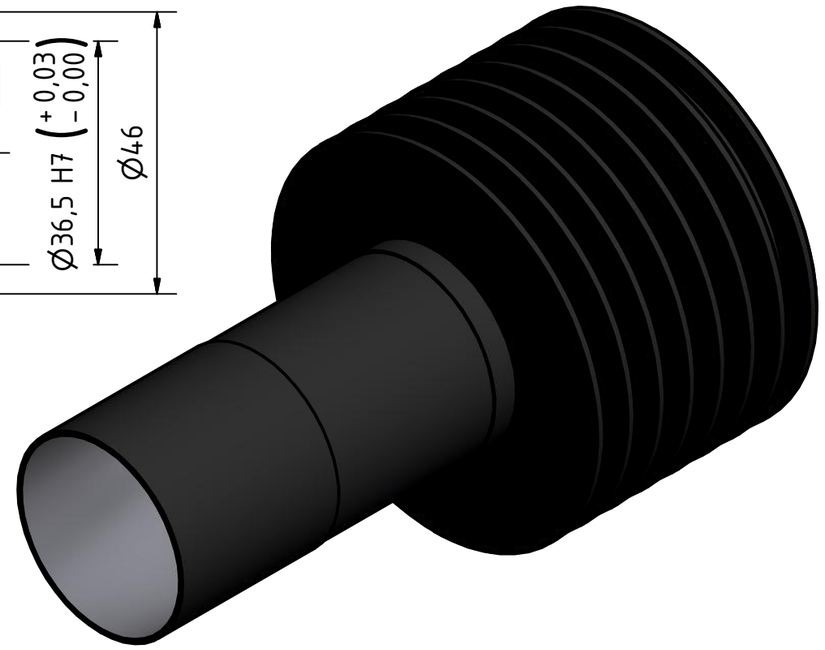
A–A (1 : 1)





B (2 : 1)





Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	Fillets and chamfers Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	Angles (in ° and ') Length of the shortest leg to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 1:1

SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Stainless Steel

Total Mass: 0.566 kg

Title:
Horizontal Stirling Engine
Heat Exchange Cylinder

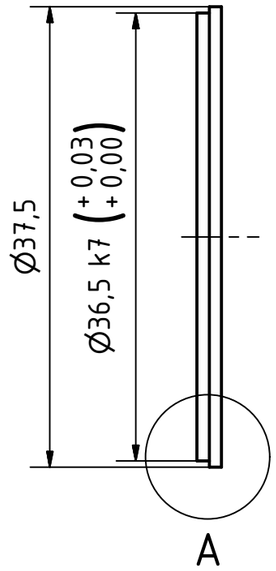
InventorWizard be/nl

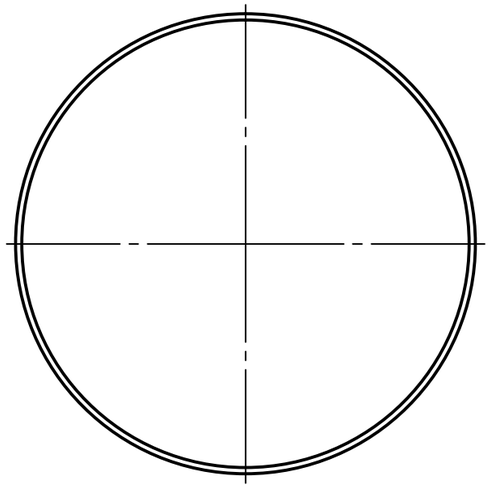
Drawingnumber:

Sheet:
0001

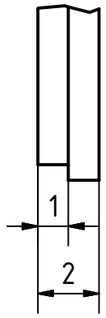
Design State:
Released

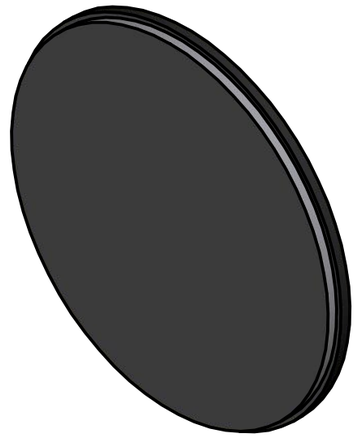
Drawing made with autodesk Inventor Revisions only permitted by CAD





A (5 : 1)





Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 2:1
SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Stainless Steel
Total Mass: 0.017 kg

Title:
Horizontal Stirling Engine
Heat Exchange Cylinderhead

InventorWizard be/nl

Drawingnumber:

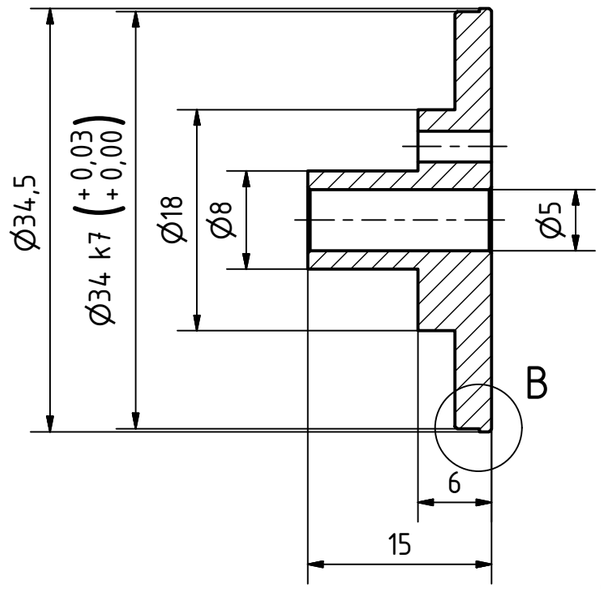
Sheet:
0001

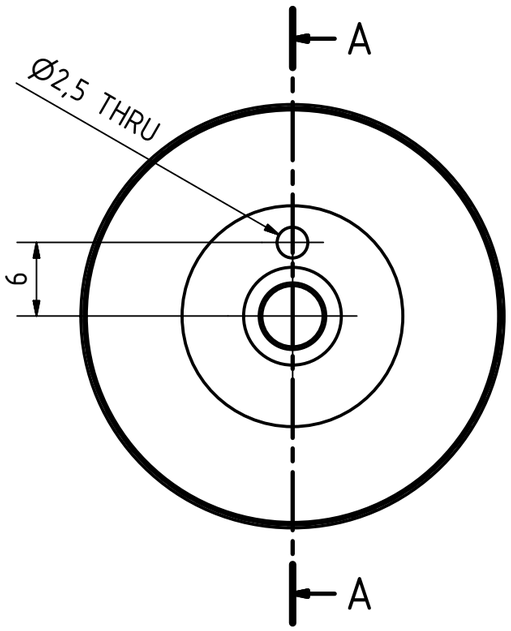
Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD

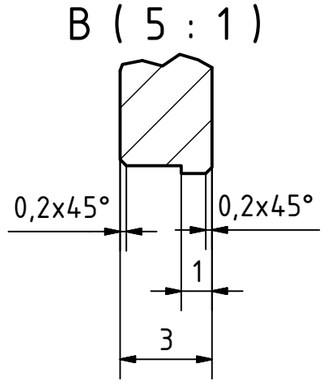
1,6

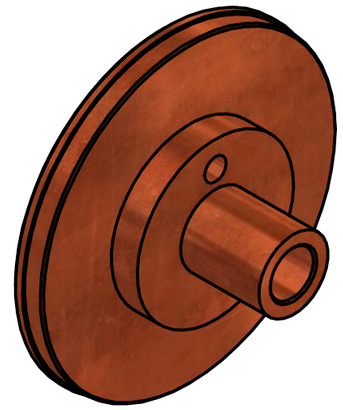
A-A (2 : 1)





B (5 : 1)





Break Sharp Edges: 0,1 mm

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 2:1

SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Copper

Total Mass: 0.033 kg

Title:
Horizontal Stirling Engine
Heat Exchange Piston Exhaust

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

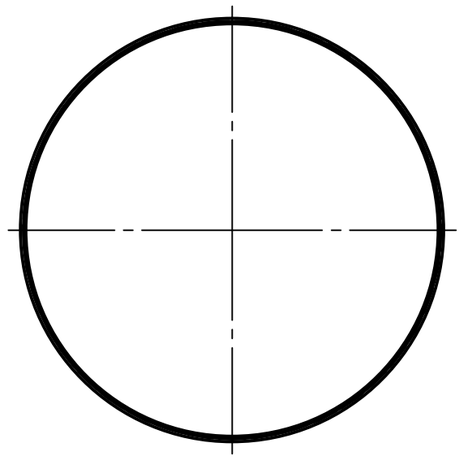
InventorWizard be/nl

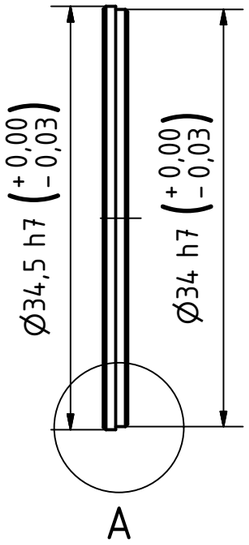
Drawingnumber:

Sheet: 0001

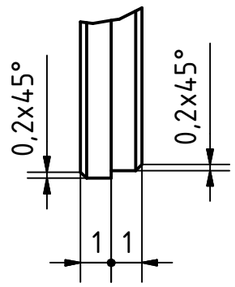
Design State: Released

Drawing made with autodesk Inventor Revisions only permitted by CAD





A (5 : 1)



Break Sharp Edges: 0,1 mm

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 2:1

SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Copper

Total Mass: 0.016 kg

Title:
Horizontal Stirling Engine
Heat Exchange Piston Head

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8

Fillets and chamfers Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400
±0,2	±0,5	±1	±2	±4
±0,4	±1	±2	±4	±8

Angles (in ° and ') Length of the shortest leg to 10	>10 to 50	>50 to 120	>120 to 400	above 400
±1°	±30'	±20'	±10'	±5'
±1°30'	±1°	±30'	±15'	±10'
±3°	±2°	±1°	±30'	±20'

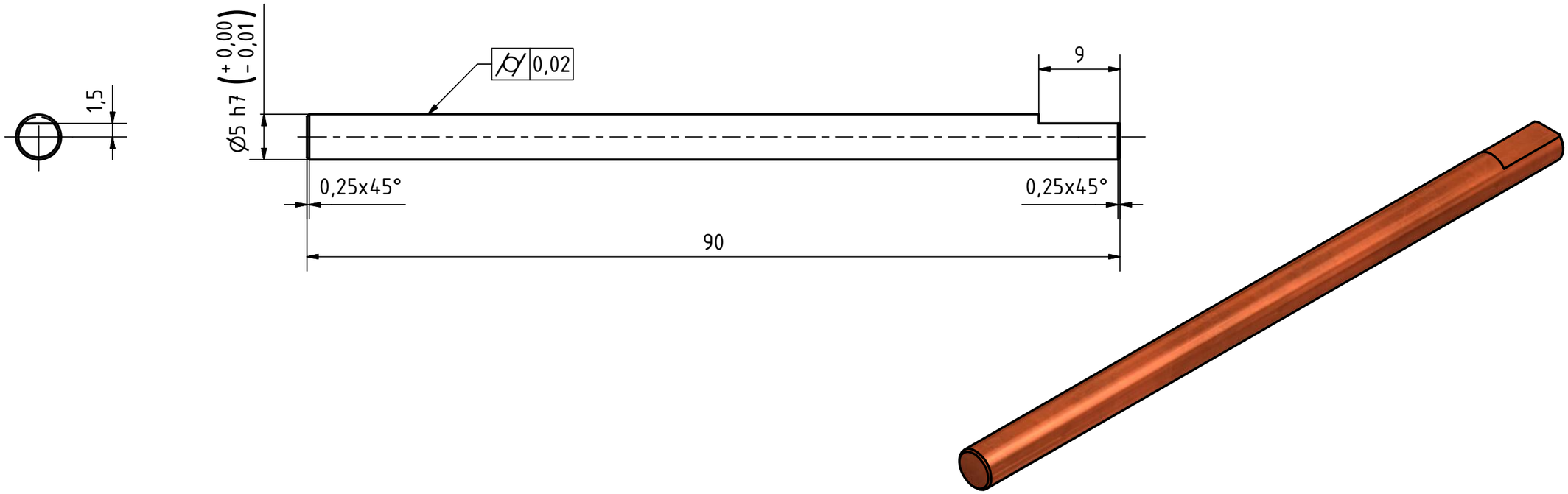
InventorWizard.be/.nl

Drawingnumber:

Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD



Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) — Dimensions in mm								Fillets and chamfers — Dimensions in mm					Angles (in ° and ') — Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	–	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 2:1
	Designer:	Galba, J.	17/07/2010	SheetSize: A3
	Approved:	Galba, J.	17/07/2010	

Project:
Miniature Model Hot Air Engine

Material: Copper
Total Mass: 0.016 kg

Title:
Horizontal Stirling Engine
Heat Exchange Piston Shaft

InventorWizard be/nl

Drawingnumber:

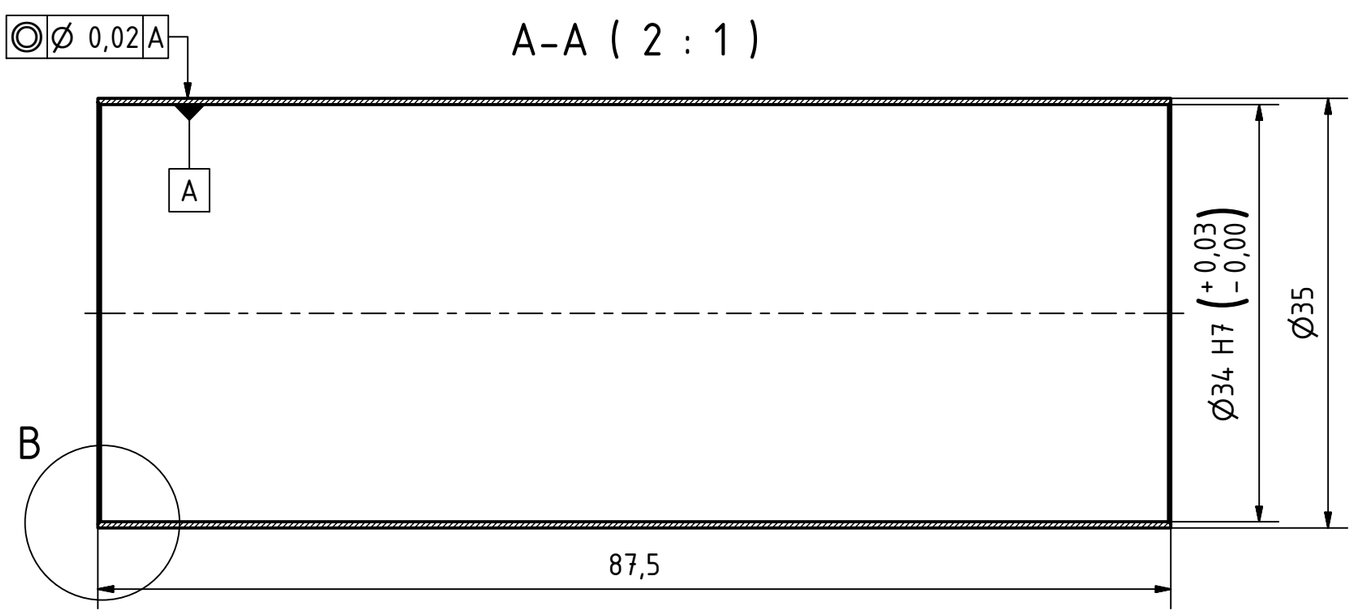
Sheet: 0001

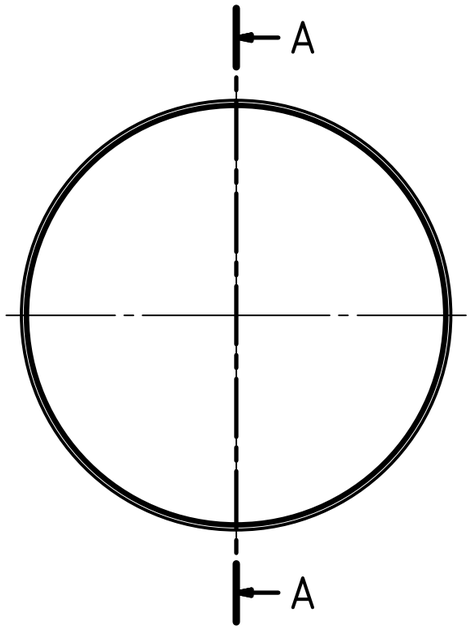
Design State: Released

Drawing made with autodesk Inventor Revisions only permitted by CAD

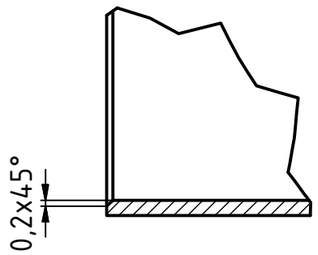
1,6

A-A (2 : 1)





B (5 : 1)



Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 2:1
	Designer:	Galba, J.	17/07/2010	SheetSize: A3
	Approved:	Galba, J.	17/07/2010	

Project:
Miniature Model Hot Air Engine

Material: Copper
Total Mass: 0.042 kg

Title:
Horizontal Stirling Engine
Heat Exchange Piston Tube

InventorWizard.be/.nl

Drawingnumber:

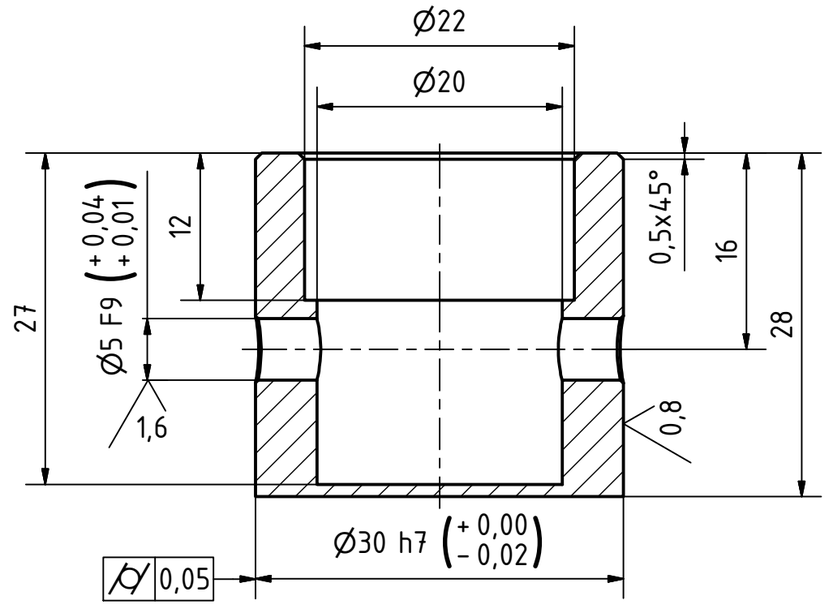
Sheet:
0001

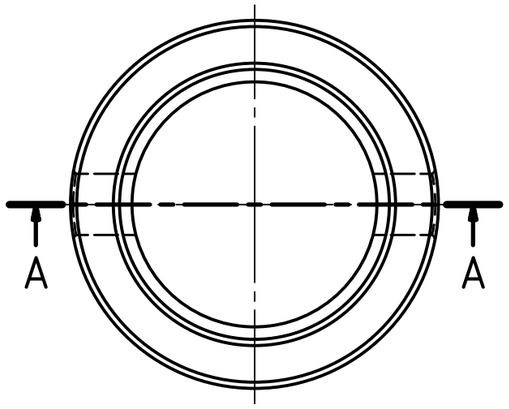
Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD

3,2

A-A (2 : 1)





Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 2:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Steel, Mild

Total Mass: 0.081 kg

Title:
Horizontal Stirling Engine
Piston

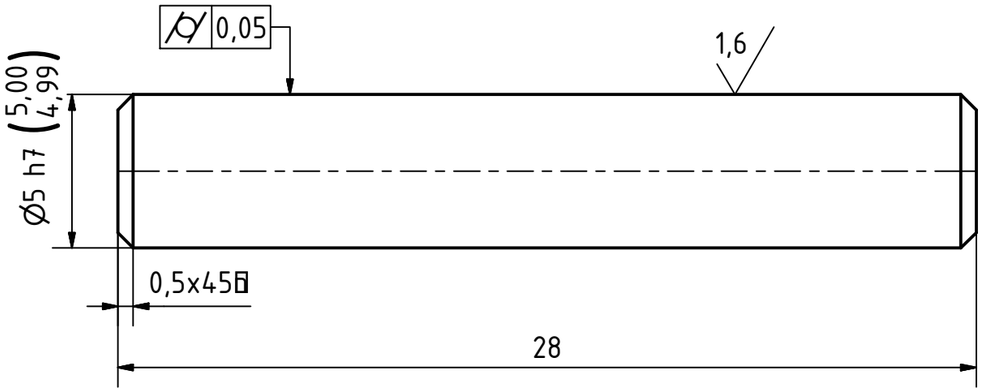
InventorWizard.be/nl

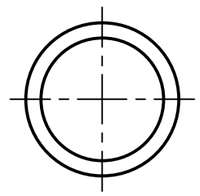
Drawingnumber:

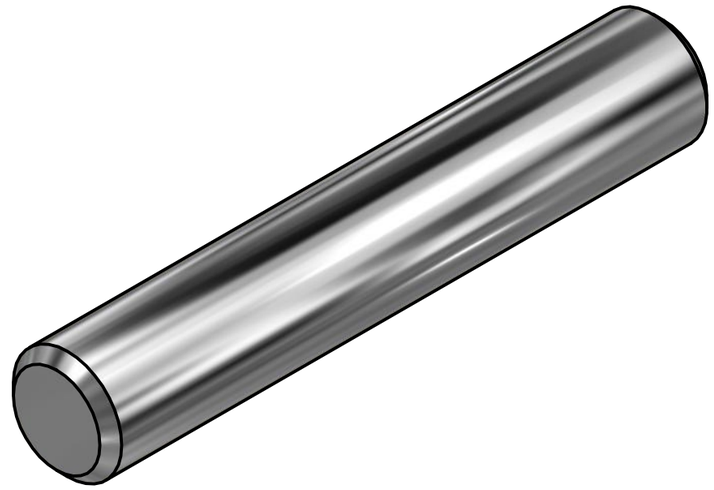
Sheet: 0001

Design State: Released

Drawing made with autodesk Inventor Revisions only permitted by CAD







Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 5:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Stainless Steel
Total Mass: 0.004 kg

Title:
Horizontal Stirling Engine
Piston Pin

InventorWizard.be/nl

Drawingnumber:

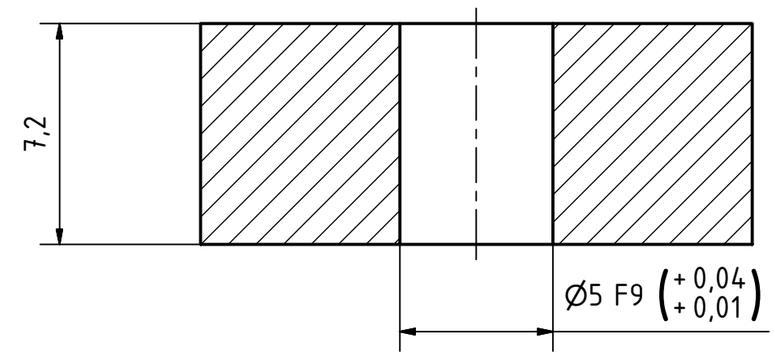
Sheet:
0001

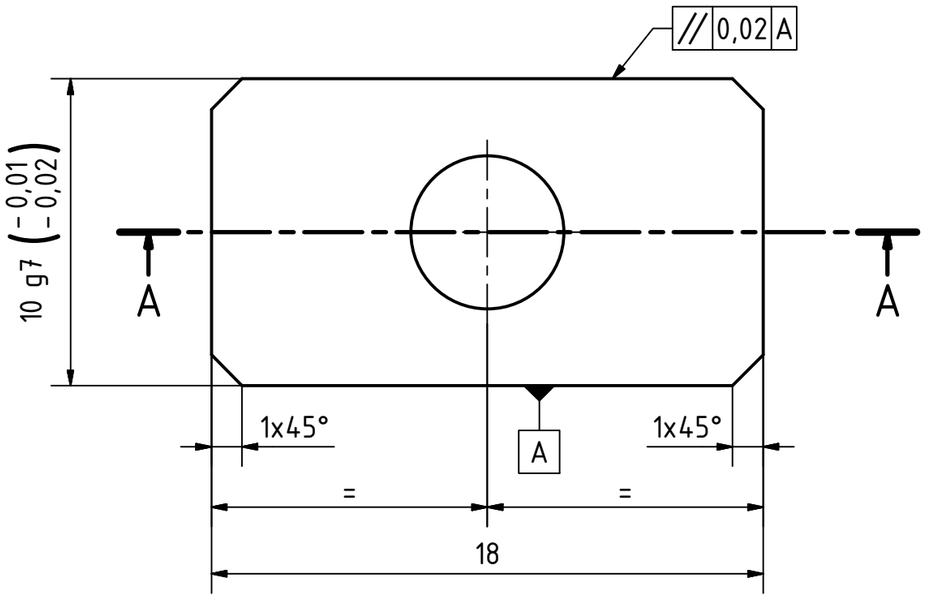
Design State:
Released

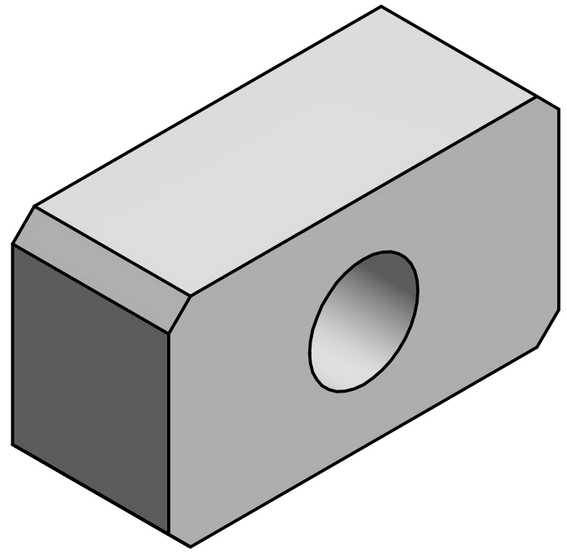
Drawing made with autodesk Inventor Revisions only permitted by CAD

0,8

A-A (5 : 1)







Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm								Fillets and chamfers Dimensions in mm					Angles (in ° and ') Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:	Scale: 5:1
	Designer:	Galba, J.	17/07/2010	
	Approved:	Galba, J.	17/07/2010	SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: PVC-U

Total Mass: 0.002 kg

Title:
Horizontal Stirling Engine
Slide

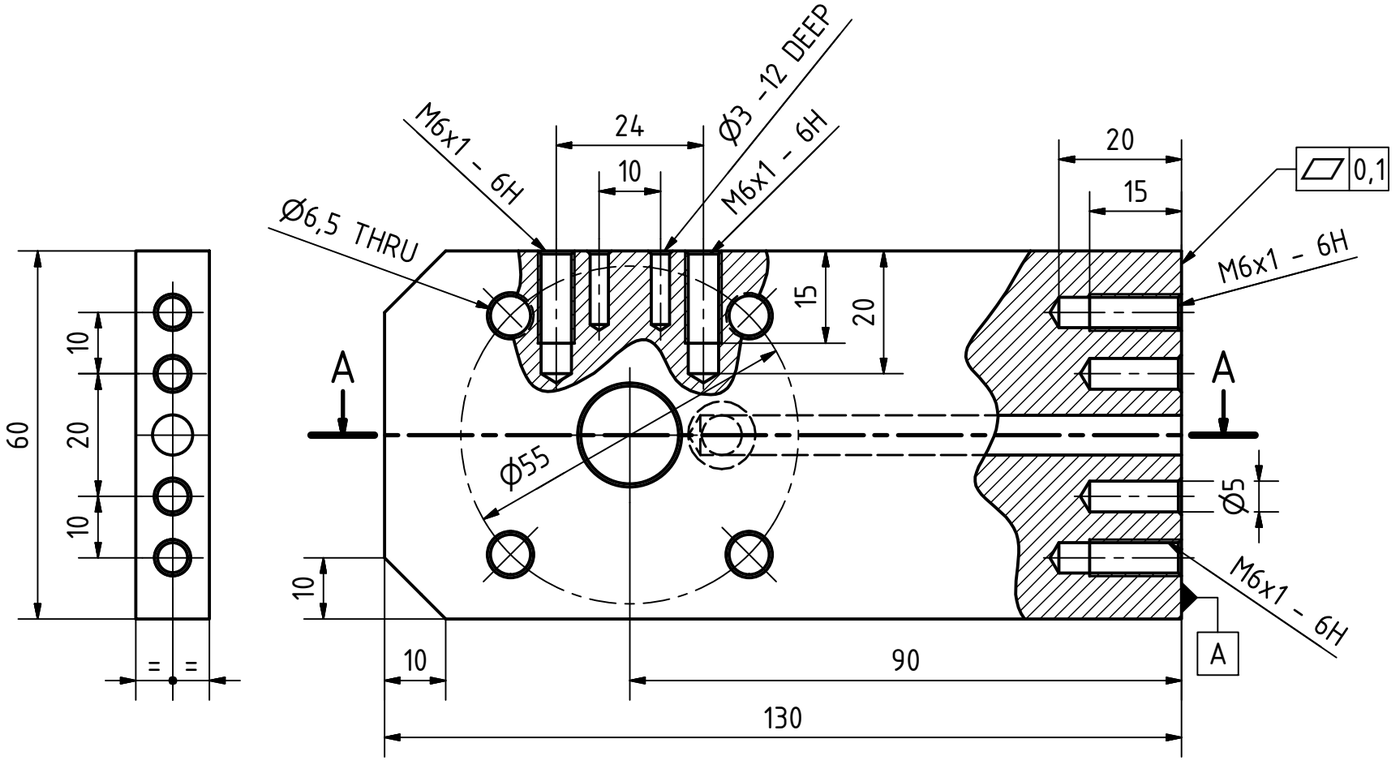
InventorWizard be/nl

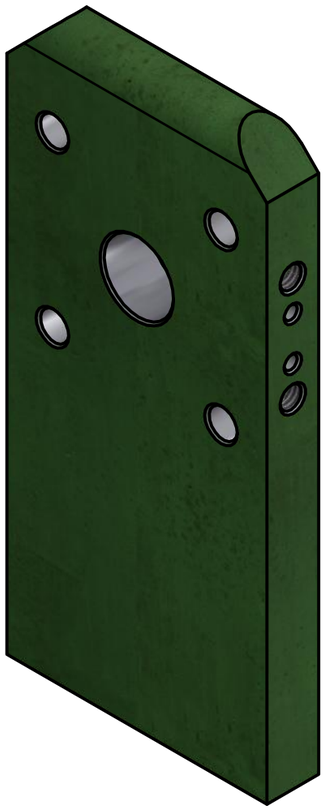
Drawingnumber:

Sheet: 0001

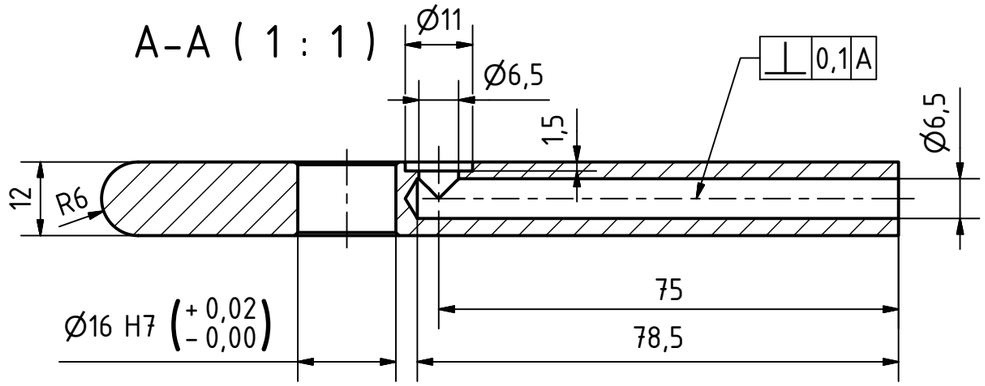
Design State: Released

Drawing made with autodesk Inventor Revisions only permitted by CAD





A-A (1 : 1)



Break Sharp Edges: 0,1 mm

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 1:1

SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Steel, Mild

Total Mass: 0.649 kg

Title:
Horizontal Stirling Engine
Standard

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

	For measurements (deviations in mm)								Fillets and chamfers					Angles (in ° and ')				
Accuracyclass (ISO 2768.1)	Dimensions in mm								Dimensions in mm					Length of the shortest leg				
	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

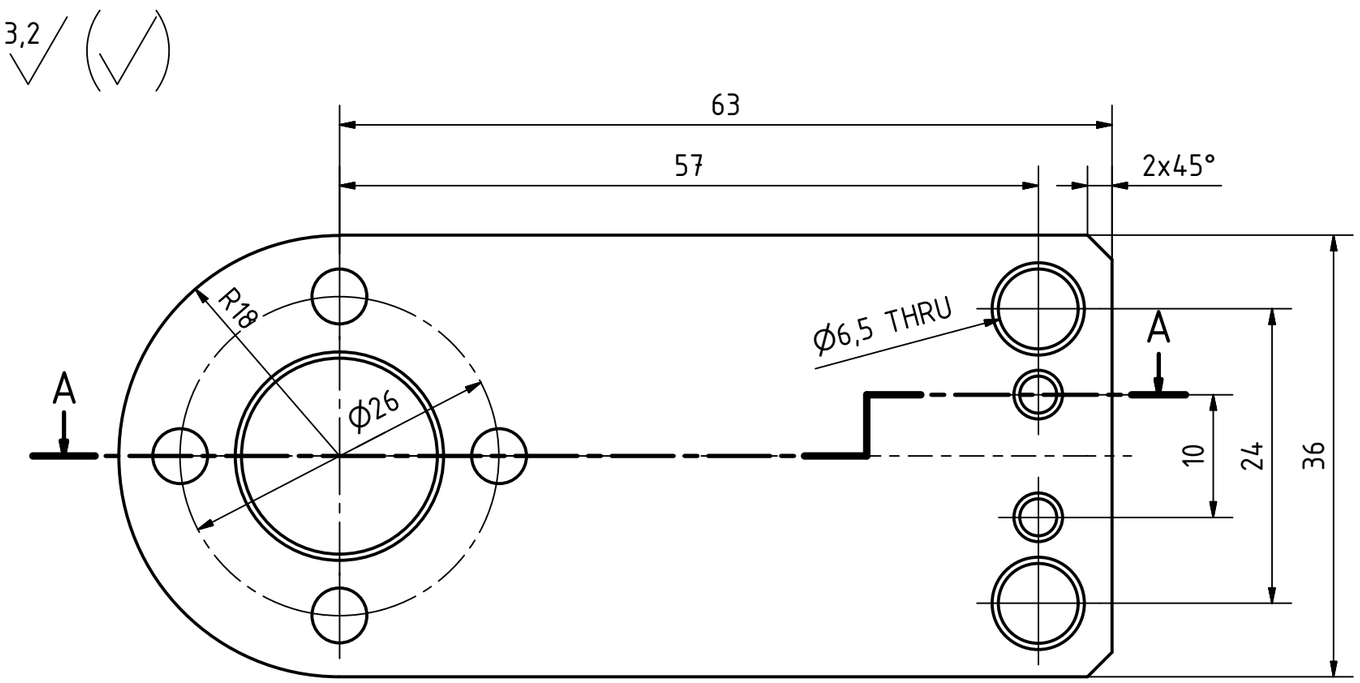
InventorWizard be/nl

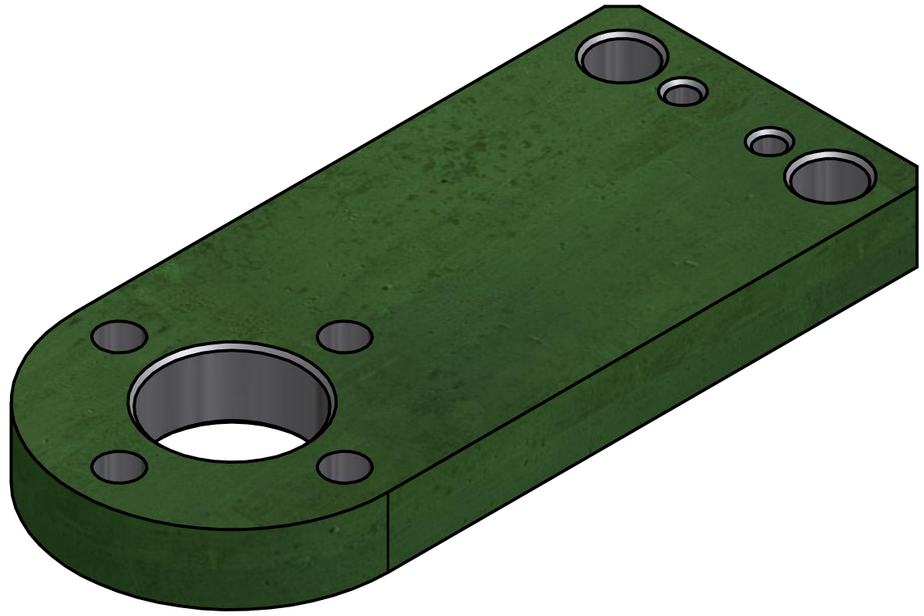
Drawingnumber:

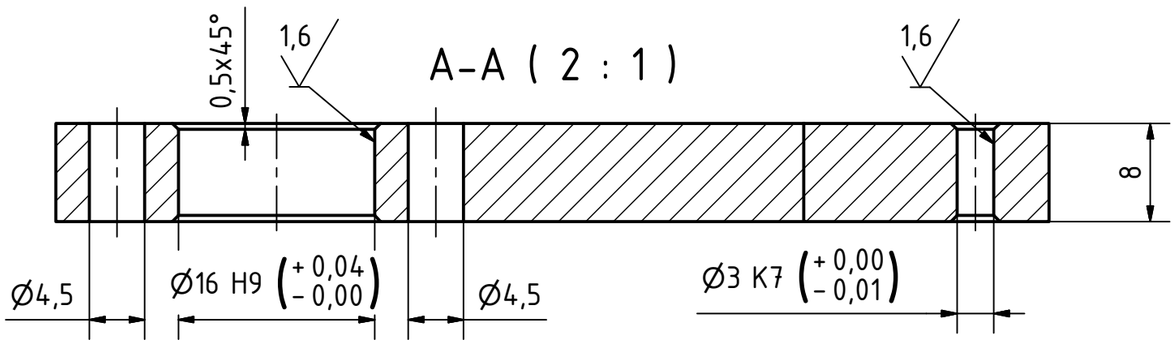
Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD







Break Sharp Edges: 0,1 mm

Corresponding symbols		▽	▼	▽▽	▼▼	▽▽▽	▼▼▼	
Roughness Classes (NBN 88-02) (ISO 1302)	N11	N10	N9	N8	N7	N6	N5	N4
Roughness Value "Ra" in µm (NBN 88-02) (ISO 1302)	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2

Allowable deviations for dimensions without tolerance indication (machined surfaces)

Accuracyclass (ISO 2768.1)	For measurements (deviations in mm) Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	>400 to 1000	>1000 to 2000	>2000 to 4000	Fillets and chamfers Dimensions in mm 0,5 to 3	>3 to 6	>6 to 30	>30 to 120	>120 to 400	Angles (in ° and ') Length of the shortest leg to 10	>10 to 50	>50 to 120	>120 to 400	above 400
f Fine	±0,05	±0,05	±0,1	±0,15	±0,2	±0,3	±0,5	±0,8	±0,2	±0,5	±1	±2	±4	±1°	±30'	±20'	±10'	±5'
m Medium	±0,1	±0,1	±0,2	±0,3	±0,5	±0,8	±1,2	±2										
c Rough	±0,2	±0,3	±0,5	±0,8	±1,2	±2	±3	±4	±0,4	±1	±2	±4	±8	±1°30'	±1°	±30'	±15'	±10'
v Very Rough	-	±0,5	±1	±1,5	±2,5	±4	±6	±8						±3°	±2°	±1°	±30'	±20'

Revision	Date	Description

Engineered by:		Name:	Date:
	Designer:	Galba, J.	17/07/2010
	Approved:	Galba, J.	17/07/2010

Scale: 2:1
SheetSize: A3

Project:
Miniature Model Hot Air Engine

Material: Steel, Mild
Total Mass: 0.152 kg

Title:
Horizontal Stirling Engine
Support

InventorWizard.be/nl

Drawingnumber:

Sheet:
0001

Design State:
Released

Drawing made with autodesk Inventor Revisions only permitted by CAD