



ÉCOLE
CENTRALE LYON

CAR #81

BRAKE SYSTEM

University	Ecole Centrale de Lyon
System	Brake System
Assembly	Front Brake Rotor
P/N Base	BR A0100
Suffix	AA
Details	Front Brake Rotor assembly

[Back to BOM](#)

Car #	81
-------	----

Asm Cost	\$ 101,82
----------	-----------

Qty	2
-----	---

FileLink1

FileLink2

FileLink3

Extended Cost	\$ 203,64
---------------	-----------

ItemOrder	Part	Part Cost	Quantity	Sub Total
10	Brake Rotor	\$ 3,39	1	\$ 3,39
20	Brake Shrink Disc	\$ 6,51	1	\$ 6,51
30	Brake Bobbin	\$ 0,27	6	\$ 1,61
40	Brake Caliper Spacer	\$ 0,28	2	\$ 0,56
			Sub Total	\$ 12,08

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Brake Caliper, Beringer 2D1	Brake Caliper (in reality Beringer 2P1A is used)	\$ 83,00		unit							1	\$ 83,00
20	Brake Pad, Iron or Steel Rotor	Brake Pad	\$ 0,00	4 272,39	mm^3			Circular sector	1,424E-03	0,003		2	\$ 1,71
												Sub Total	\$ 84,71

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Assemble, 1kg, Line on Line	Line up Pad	\$ 0,13	unit	2			\$ 0,26
20	Assemble, 1kg, Loose	Insert Bobbins and Washer	\$ 0,06	unit	6			\$ 0,36
30	Assemble, 1kg, Line on Line	Assemble Brake Rotor and Shrink Disc	\$ 0,13	unit	1			\$ 0,13
40	Assemble, 1kg, Line on Line	Insert Retaining Ring	\$ 0,13	unit	6			\$ 0,78
50	Assemble, 1kg, Line on Line	Assemble Brake Rotor onto Hub	\$ 0,13	unit	1			\$ 0,13
60	Assemble, 1kg, Loose	Put Caliper and Spacer in place	\$ 0,06	unit	1			\$ 0,06
70	Ratchet <= 25.4 mm	Bolt Caliper and Spacer on Upright	\$ 0,75	unit	2			\$ 1,50
80	Safety Wire, Install	For Caliper Bolts locking device	\$ 0,60	unit	2			\$ 1,20
							Sub Total	\$ 4,42

ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total
10	Bolt,Grade 8.8 (SAE)	Bolt Caliper on Upright	\$ 0,12	8	mm	30	mm	2	\$ 0,24
20	Washer, Grade 8.8 (SAE 5)	Bolt Caliper on Upright	\$ 0,01	8	mm			2	\$ 0,02
30	Retaining Ring, External	Secure Brake Bobbin on Brake Rotor	\$ 0,04	11,5	mm			6	\$ 0,24
40	Washer, Grade 8.8 (SAE 5)	Shim between Brake Bobbin and Brake Rotor	\$ 0,01	12	mm			12	\$ 0,12
								Sub Total	\$ 0,61

University

Ecole Centrale de Lyon

System

Brake System

Assembly

Front Brake Rotor

Part

Brake Rotor

P/N Base

Suffix

AA

Details

Bought, cost as made

FileLink1

FileLink2

FileLink3

Back to BOM

Car #

81

Part Cost

\$ 3,39

Qty

1

FileLink1

FileLink2

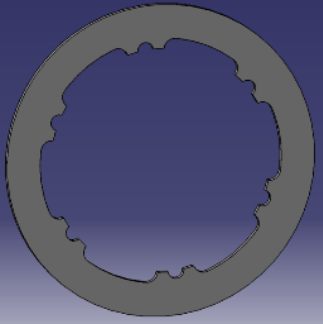
FileLink3

Extended Cost

\$ 3,39

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Cast Iron (per kg)	Stock material for part	\$ 1,00	1,467	kg			Circle area, 230mm diameter	0,042	4,50E-03	7850	1	\$ 1,47
												Sub Total	\$ 1,47

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cut	\$ 1,30	unit	1	4 parts cut from a single machine setup	0,25	\$ 0,33
20	Laser Cut	Cutout shape	\$ 0,01	cm	63,95	Material - Cast Iron	2,5	\$ 1,60
							Sub Total	\$ 1,92



University

Ecole Centrale de Lyon

System

Brake System

Assembly

Front Brake Rotor

Part

Brake Shrink Disc

P/N Base

BR 01002

Suffix

AA

Details

Allows brake rotor to be mounted floating

FileLink1

Drawing

FileLink2

FileLink3

Car #

81

Part Cost

\$ 6,51

Qty

1

FileLink1

FileLink2

FileLink3

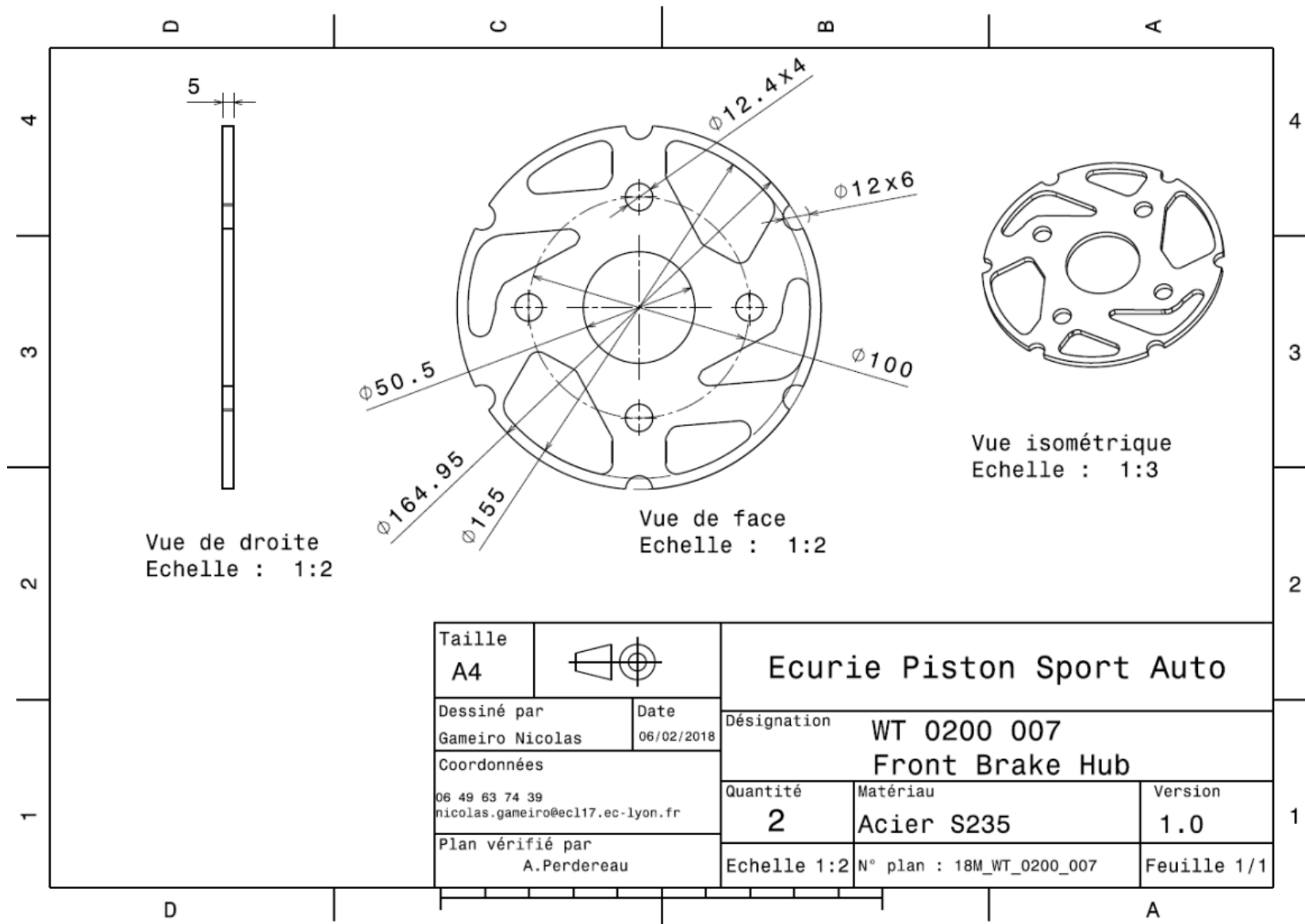
Extended Cost

\$ 6,51

Back to BOM

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Mild (per kg)	Stock material for part	\$ 2,25	0,839	kg			Circle Area, 164.95mm diameter	2,14E-02	0,005	7850	1	\$ 1,89
20	Paint	To protect part from rust	\$ 10,00	0,032	m^2								\$ 0,32
												Sub Total	\$ 2,21

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	\$ 1,30	unit	1	4 parts cut from a single machine setup	0,25	\$ 0,33
20	Laser Cut	Cutout shape	\$ 0,01	cm	126,9	Material - Steel	3	\$ 3,81
30	Aerosol apply	To protect part from rust	5,25	m^2	0,032		1	\$ 0,17
							Sub Total	\$ 4,30



University	Ecole Centrale de Lyon		Back to BOM	Car #	81	Part Cost	\$ 0,27
System	Brake System	FileLink1				Qty	6
Assembly	Front Brake Rotor	FileLink2		FileLink1			
Part	Brake Bobbin	FileLink3		FileLink2		Extended Cost	\$ 1,61
P/N Base	BR 01003			FileLink3			
Suffix	AA						
Details	Bobbins between Brake Rotor and Brake Shrink Disc						

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Mild (per kg)	Material for Bobbin	\$ 2,25	0,016	kg			Circle Area, 17mm diameter	2,270E-04	0,009	7850	1	\$ 0,04
												Sub Total	\$ 0,04

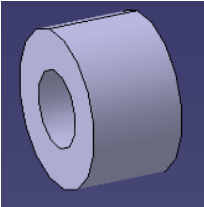
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for machining	\$ 1,30	unit	1	24 parts made from one machining setup	0,04	\$ 0,05
20	Machining		\$ 0,04	cm^3	1,486	Material - Steel	3	\$ 0,18
							Sub Total	\$ 0,23

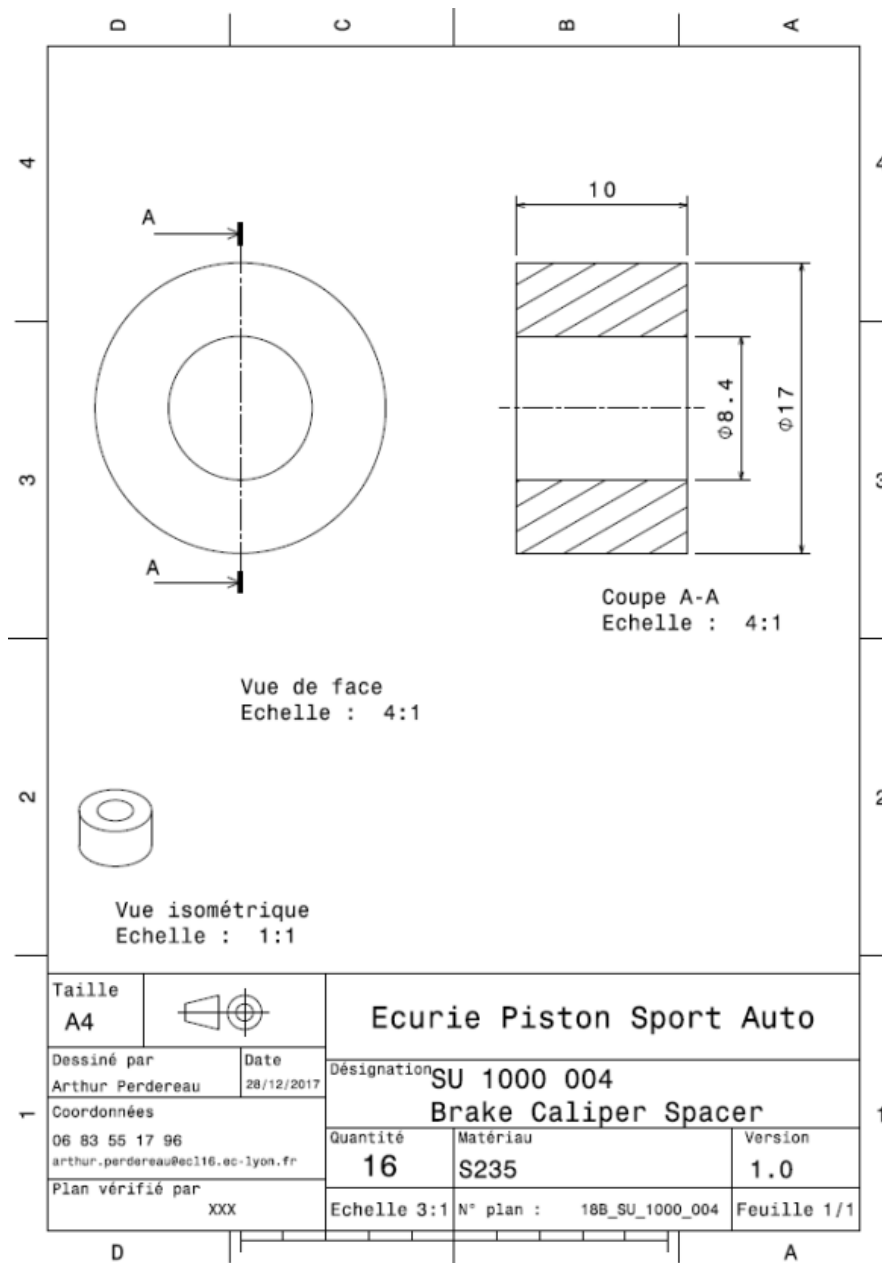


University	Ecole Centrale de Lyon			Back to BOM				Car #	81			Part Cost	\$ 0,28
System	Brake System	FileLink1	Drawing					FileLink1				Qty	2
Assembly	Front Brake Rotor	FileLink2						FileLink2				Extended Cost	\$ 0,56
Part	Brake Caliper Spacer	FileLink3						FileLink3					
P/N Base	BR 01004												
Suffix	AA												
Details	Spacer between Caliper and Upright												

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Mild (per kg)	Stock material for caliper spacer	\$ 2,25	0,018	kg			Circular, 17mm diameter	2,27E-04	0,010	7850	1	\$ 0,04
												Sub Total	\$ 0,04

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cut	\$ 1,30	unit	1	8 parts cut from a single machine setup	0,125	\$ 0,16
20	Laser Cut	Cutout shape	\$ 0,01	cm	2,639	Material - Steel	3	\$ 0,08
							Sub Total	\$ 0,24





University	Ecole Centrale de Lyon	Back to BOM										Car #	81	Asm Cost	\$ 101,89
System	Brake System													Qty	2
Assembly	Rear Brake Rotor											FileLink1			
P/N Base	BR A0200											FileLink2			
Suffix	AA											FileLink3			
Details	Rear Brake Rotor assembly														
ItemOrder	Part	Part Cost	Quantity	Sub Total											
10	Brake Rotor	\$ 3,39	1	\$ 3,39											
20	Brake Shrink Disc	\$ 6,58	1	\$ 6,58											
30	Brake Bobbin	\$ 0,27	6	\$ 1,61											
40	Brake Caliper Spacer	\$ 0,28	2	\$ 0,56											
			Sub Total	\$ 12,15											
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total		
10	Brake Caliper, Beringer 2D1	Brake Caliper (in reality Beringer 2P1A is used)	\$ 83,00		unit							1	\$ 83,00		
20	Brake Pad, Iron or Steel Rotor	Brake Pad	\$ 0,00	4 272,39	mm^3			Circular sector	1,424E-03	0,003		2	\$ 1,71		
												Sub Total	\$ 84,71		
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total							
10	Assemble, 1kg, Line on Line	Line up Pad	\$ 0,13	unit	2			\$ 0,26							
>	Assemble, 1kg, Loose	Insert Bobbins and Washer	\$ 0,06	unit	6			\$ 0,36							
30	Assemble, 1kg, Line on Line	Assemble Brake Rotor and Shrink Disc	\$ 0,13	unit	1			\$ 0,13							
40	Assemble, 1kg, Line on Line	Insert Retaining Ring	\$ 0,13	unit	6			\$ 0,78							
50	Assemble, 1kg, Line on Line	Assemble Brake Rotor onto Hub	\$ 0,13	unit	1			\$ 0,13							
60	Assemble, 1kg, Loose	Put Caliper and Spacer in place	\$ 0,06	unit	1			\$ 0,06							
70	Ratchet <= 25.4 mm	Bolt Caliper and Spacer on Upright	\$ 0,75	unit	2			\$ 1,50							
80	Safety Wire, Install	For Caliper Bolts locking device	\$ 0,60	unit	2			\$ 1,20							
							Sub Total	\$ 4,42							
ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total						
10	Bolt,Grade 8.8 (SAE)	Bolt Caliper on Upright	\$ 0,12	8	mm	30	mm	2	\$ 0,24						
20	Washer, Grade 8.8 (SAE 5)	Bolt Caliper on Upright	\$ 0,01	8	mm			2	\$ 0,02						
30	Retaining Ring, External	Secure Brake Bobbin on Brake Rotor	\$ 0,04	11,5	mm			6	\$ 0,24						
40	Washer, Grade 8.8 (SAE 5)	Shim between Brake Bobbin and Brake Rotor	\$ 0,01	12	mm			12	\$ 0,12						
								Sub Total	\$ 0,61						

University

System

Assembly

Part

P/N Base

Suffix

Details

Ecole Centrale de Lyon

Brake System

[Rear Brake Rotor](#)

Brake Rotor

BR 02001

AA

Bought, cost as made

FileLink1

FileLink2

FileLink3

[Back to BOM](#)

Car #

81

Part Cost

\$ 3,39

Qty

1

FileLink1

FileLink2

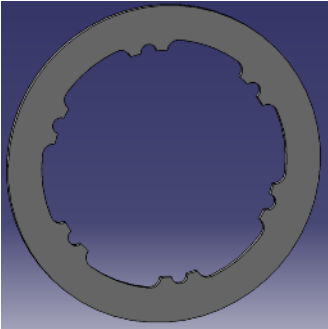
FileLink3

Extended Cost

\$ 3,39

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Cast Iron (per kg)	Stock material for part	\$ 1,00	1,467	kg			Circle area, 230mm diameter	0,042	0,005	7850	1	\$ 1,47
												Sub Total	\$ 1,47

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cut	\$ 1,30	unit	1	4 parts cut from a single machine setup	0,25	\$ 0,33
20	Laser Cut	Cutout shape	\$ 0,01	cm	63,95	Material - Cast Iron	2,5	\$ 1,60
							Sub Total	\$ 1,92



University

System

Assembly

Part

P/N Base

Suffix

Details

Ecole Centrale de Lyon
Brake System
[Rear Brake Rotor](#)
Brake Shrink Disc
BR 02002
AA
Allows brake rotor to be mounted floating

FileLink1

FileLink2

FileLink3

[Drawing](#)

Car #

81

Part Cost

\$ 6,58

Qty

1

Extended Cost

\$ 6,58

FileLink1

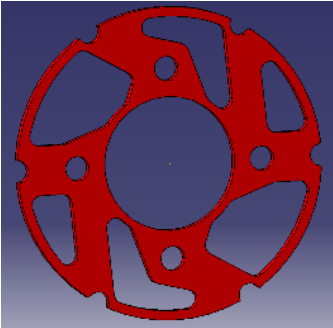
FileLink2

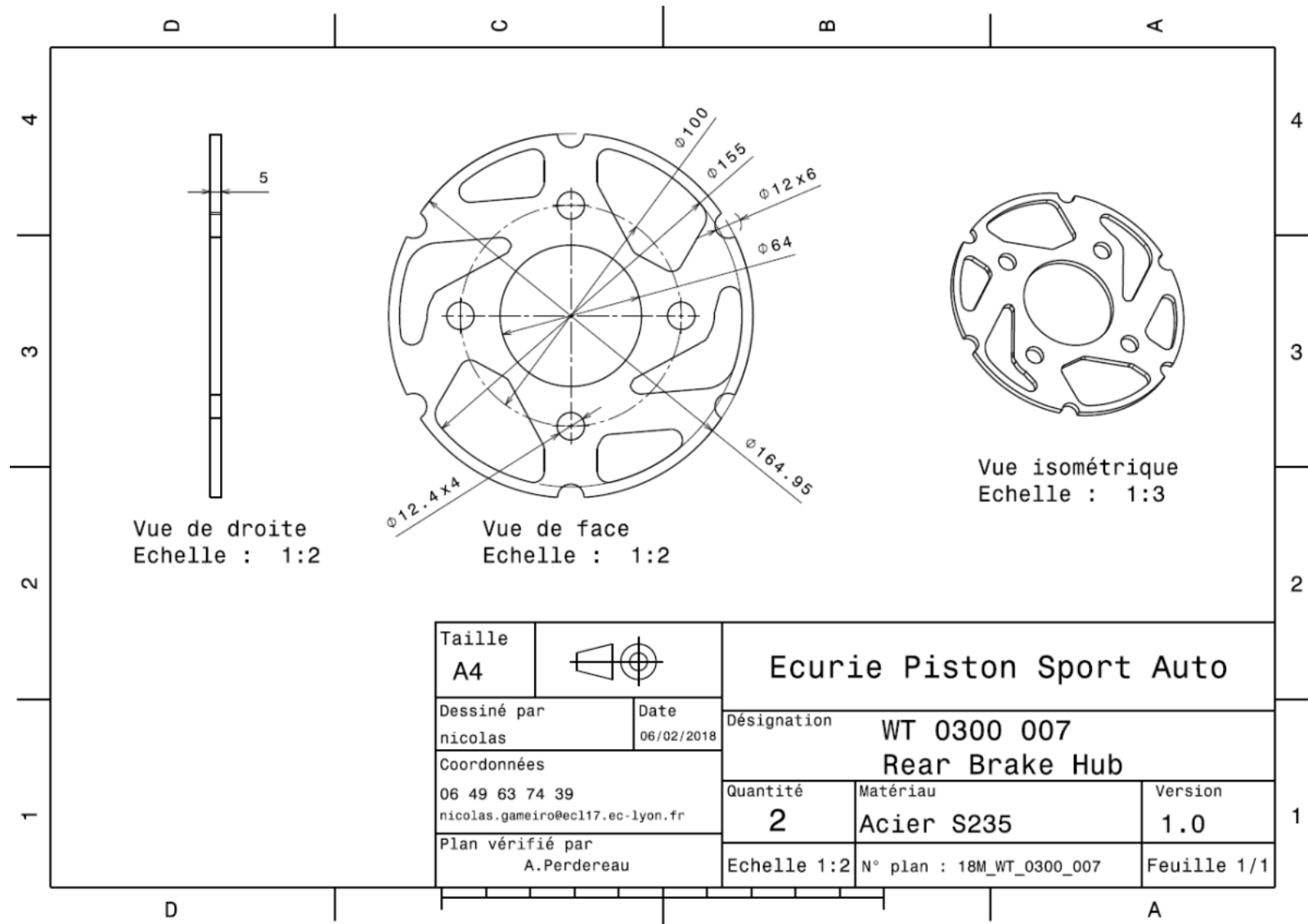
FileLink3

Back to BOM

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Mild (per kg)	Stock material for part	\$ 2,25	0,839	kg			Circle Area, 164.95mm diameter	2,14E-02	0,005	7850	1	\$ 1,89	
20	Paint	To protect part from rust	\$ 10,00	0,028	m^2								\$ 0,28	
													Sub Total	\$ 2,17

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cutting	\$ 1,30	unit	1	4 parts cut from a single machine setup	0,25	\$ 0,33
20	Laser Cut	Cutout shape	\$ 0,01	cm	131,4	Material - Steel	3	\$ 3,94
30	Aerosol apply	To protect part from rust	5,25	m^2	0,028		1	\$ 0,15
							Sub Total	\$ 4,41





University

System

Assembly

Part

P/N Base

Suffix

Details

Ecole Centrale de Lyon
Brake System
[Rear Brake Rotor](#)
Brake Bobbin
BR 02003
AA
Bobbins between Brake Rotor and Brake Shrink Disc

FileLink1

FileLink2

FileLink3

[Back to BOM](#)

Car #

81

FileLink1

FileLink2

FileLink3

Part Cost

\$ 0,27

Qty

6

Extended Cost

\$ 1,61

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Mild (per kg)	Material for Bobbin	\$ 2,25	0,016	kg			Circle Area, 17mm diameter	2,27E-04	0,009	7850	1	\$ 0,04
												Sub Total	\$ 0,04

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for machining	\$ 1,30	unit	1	24 parts made from one machining setup	0,04	\$ 0,05
20	Machining		\$ 0,04	cm^3	1,486	Material - Steel	3	\$ 0,18
							Sub Total	\$ 0,23



University	Ecole Centrale de Lyon														
System	Brake System														
Assembly	Rear Brake Rotor														
Part	Brake Caliper Spacer														
P/N Base	BR 02004														
Suffix	AA														
Details	Spacer between Caliper and Upright														

FileLink1 [Drawing](#)

FileLink2

FileLink3

[Back to BOM](#)

Car # 81

Part Cost \$ 0,28

Qty 2

FileLink1

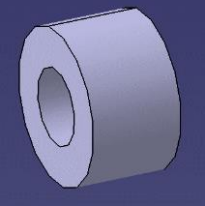
FileLink2

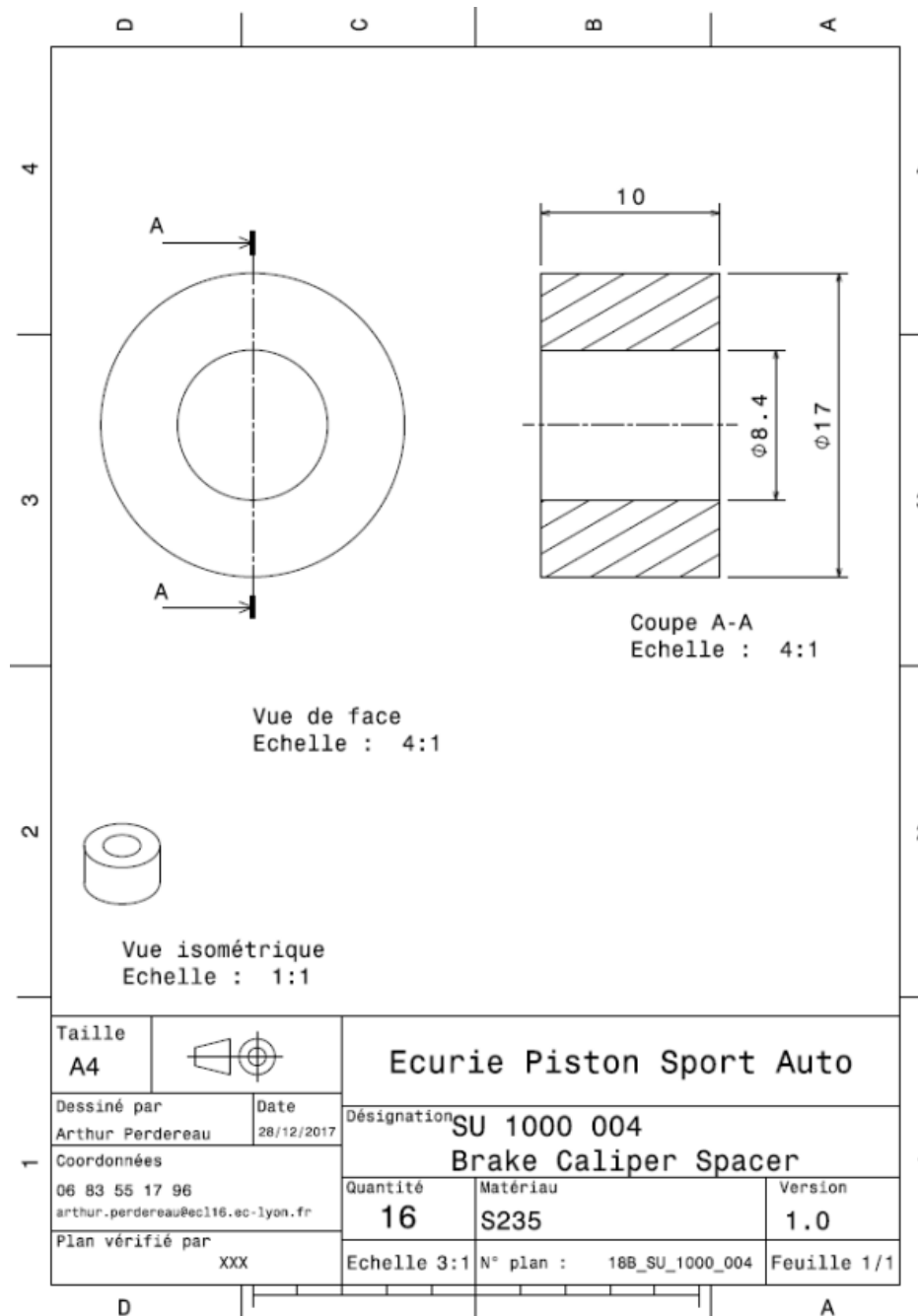
FileLink3

Extended Cost \$ 0,56

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Mild (per kg)	Stock material for caliper spacer	\$ 2,25	0,018	kg			Circular, 17mm diameter	2,27E-04	0,010	7850	1	\$ 0,04
												Sub Total \$ 0,04	

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cut	\$ 1,30	unit	1	8 parts cut from a single machine setup	0,125	\$ 0,16
20	Laser Cut	Cutout shape	\$ 0,01	cm	2,639	Material - Steel	3	\$ 0,08
							Sub Total	\$ 0,24





University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Asm Cost	\$ 705,13
System	Brake System				Qty	1
Assembly	Brake Circuit Assembly		FileLink1		Extended Cost	\$ 705,13
P/N Base	BR A0300		FileLink2			
Suffix	AA		FileLink3			
Details	Brake line assembly					

ItemOrder	Part	Part Cost	Quantity	Sub Total
10	Hydraulic Fluid Reservoir Mount	\$ 1,72	1	\$ 1,72
20	Distribution Tee Mount	\$ 1,66	1	\$ 1,66
30	Internal Spacer	\$ 0,73	2	\$ 1,45
40	External Spacer	\$ 0,67	2	\$ 1,33
	Sub Total			\$ 6,16

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Master Cylinder, AP, CP7855	Master cylinder	\$ 174,50									2	\$ 349,00
20	Balance Bar, Tilton 72-250	Balance bar	\$ 30,00									1	\$ 30,00
30	Hydraulic Fluid Reservoir, Remote (Plastic)	Fluid reservoir	\$ 5,00									2	\$ 10,00
40	Brake Light Pressure Switch Banjo Bolt	Brake light switch	\$ 8,00									1	\$ 8,00
50	Hose, High Pressure, Stainless Steel Braided Outer	Brake line - GOODRIDGE's braking hose 6003 serie	\$ 13,22	6,45	mm							4,8	\$ 63,46
60	Hose, Rubber (per m)	Brake line - Hose between Master Cylinder and Fluid Reservoir	\$ 2,16	12	mm							0,5	\$ 1,08
70	Adapter/L.P./Union//Aluminum/Anodized	Brake line - AN7 to AN6	\$ 2,42	11,11	mm	9,53	mm					2	\$ 4,83
80	Adapter/L.P./Union//Aluminum/Anodized	Brake line - AN6 right to AN6 left	\$ 2,32	9,53	mm	9,53	mm					2	\$ 4,64
90	Fitting/L.P./Straight/Aluminum/Anodized	Brake line - GOODRIDGE's braking hose AN6 end	\$ 6,49	9,53	mm							6	\$ 38,96
100	Fitting/L.P./Elbow/45 deg./Aluminum/Anodized	Brake line - GOODRIDGE's braking hose AN6 end	\$ 17,42	9,53	mm							2	\$ 34,84
110	Adapter/L.P./Union//Aluminum/Anodized	Brake line - AN6 to 10mm	\$ 2,35	9,53	mm	10	mm					6	\$ 14,10
120	Adapter/L.P./Female Flare Tee//Brass	Brake line - Splitter Tee	\$ 3,67	10	mm	6,45	mm					2	\$ 7,33
130	Banjo Fitting, 45 Deg., Steel	Brake line	\$ 16,93	6,45	mm							4	\$ 67,73
140	Banjo Bolt, Steel	Brake line	\$ 4,39	6,45	mm							4	\$ 17,54
150	Crush Washer	Brake line	\$ 0,28	6	mm							12	\$ 3,38
160	Fluid, Oil	Braking fluid	\$ 0,11	0,15	L							1	\$ 0,11
170	Paint	Protect steel tab from rust	\$ 10,00	2,40E-03	m^2							2,40E-03	\$ 0,02
	Sub Total												\$ 655,03

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Weld	Welding the Hydraulic Fluid Reservoir Mount	\$ 0,15	cm	2,8			\$ 0,42
20	Weld	Welding the Distribution Tee Mount	\$ 0,15	cm	2,3			\$ 0,35
30	Aerosol Apply	Painting for the Mounts	\$ 5,25	m^2	2,40E-03			\$ 0,01
40	Assemble, 1kg, Loose	Positioning the Balance Bar on the Brake Pedal Supports	\$ 0,06	unit	1			\$ 0,06
50	Hand, Loose <= 6.35mm	Fixing the Master Cylinder on the Balance Bar	\$ 0,25	unit	2			\$ 0,50
60	Assemble, 1kg, Loose	Positioning the M6 Bolt through the Master Cylinder bearings, the Internal Spacers, the External Spacers and the Brake Pedal	\$ 0,06	unit	1			\$ 0,06
70	Ratchet <= 6,35mm	Fixing the Bolt to the Master Cylinder Bearings (through the Brake Pedal)	\$ 0,50	unit	1			\$ 0,50
80	Reaction Tool <= 6.35mm	Fixing the Bolt to the Master Cylinder Bearings (through the Brake Pedal)	\$ 0,25	unit	1			\$ 0,25
90	Assemble, 1kg, Loose	Positioning the Hydraulic Fluid Reservoirs on the Hydraulic Fluid Reservoir Mount	\$ 0,06	unit	1			\$ 0,06
100	Ratchet <= 6.35mm	Fixing the Hydraulic Fluid Reservoir on the Hydraulic Fluid Reservoir Mount	\$ 0,50	unit	2			\$ 1,00
110	Reaction Tool <= 6.35mm	Fixing the Hydraulic Fluid Reservoir on the Hydraulic Fluid Reservoir Mount	\$ 0,25	unit	2			\$ 0,50
120	Assemble, 1kg, Loose	Positioning Distribution Tee and Washer on Distribution Tee Mount	\$ 0,06	unit	1			\$ 0,06
130	Ratchet <= 6.35mm	Fixing Distribution Tee and Washer on Distribution Tee Mount	\$ 0,50	unit	1			\$ 0,50

140	Reaction Tool <= 6.35mm	Fixing Distribution Tee and Washer on Distribution Tee Mount	\$ 0,25	unit	1			\$ 0,25
150	Assemble, 1kg, Line-on-Line	Positioning Adapter (AN7 to AN6) on Master Cylinders	\$ 0,13	unit	2			\$ 0,26
160	Ratchet <= 25.4mm	Fixing Adapter (AN7 to AN6) on Master Cylinder	\$ 0,75	unit	2			\$ 1,50
170	Assemble, 1kg, Line-on-Line	Positioning Adapter (AN6 right to AN6 left) on Master Cylinder	\$ 0,13	unit	2			\$ 0,26
180	Ratchet <= 25.4mm	Fixing Adapter (AN6 right to AN6 left) on Master Cylinder	\$ 0,75	unit	2			\$ 1,50
190	Cut (scissors, knife)	Cut Rubber Hose between Hydraulic Fluid Reservoir and Master Cylinder	\$ 0,06	cm	1,2	Repeat - 2	2	\$ 0,14
200	Saw or tubing cuts	Cut Steel Hose between Master Cylinder and Distribution Tee	\$ 0,40	cm	0,645	Repeat - 2	2	\$ 0,52
210	Saw or tubing cuts	Cut Steel Hose between Distribution Tee and Caliper	\$ 0,40	cm	0,645	Repeat - 4	4	\$ 1,03
220	Saw or tubing cuts	Cut Steel Hose between Distribution Tees	\$ 0,40	cm	0,645			\$ 0,26
230	Hand, Tight <= 6.35mm	Put the hose in the Banjos and in the Adapters	\$ 0,50	unit	12			\$ 6,00
240	Wrench <= 25.4mm	Tighten the Banjos and the Adapters	\$ 1,50	unit	12			\$ 18,00
250	Reaction Tool <= 25.4mm	Tighten the Banjos and the Adapters	\$ 0,25	unit	12			\$ 3,00
260	Hand, Loose <= 25.4mm	Put Hose between Hydraulic Fluid Reservoir and Master Cylinder	\$ 0,50	unit	4			\$ 2,00
270	Install Tie Wrap (Zip Tie, Cable Clamp)	Install clamps on the frame and the A-Arms	\$ 0,09	unit	22			\$ 1,98
Sub Total								\$ 40,97

ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total
10	Bolt, Grade 12.9	Fixing the M6 Bolt to the Master Cylinder Bearings (through the Brake Pedal)	\$ 0,53		6 mm		110 mm	1	\$ 0,53
20	Washer, Grade 12.9	Fixing the M6 Bolt to the Master Cylinder Bearings (through the Brake Pedal)	\$ 0,02					2	\$ 0,04
30	Nut, Grade 12.9	Fixing the M6 Bolt to the Master Cylinder Bearings (through the Brake Pedal)	\$ 0,05		6 mm			1	\$ 0,05
40	Bolt, Grade 8,8 (SAE 5)	Fixing Hydraulic Fluid Reservoir to Hydraulic Fluid Reservoir Mount	\$ 0,18		6 mm		70 mm	1	\$ 0,18
50	Nut, Grade 8.8 (SAE 5)	Fixing Hydraulic Fluid Reservoir to Hydraulic Fluid Reservoir Mount	\$ 0,03		6 mm			3	\$ 0,09
60	Bolt, Grade 8.8 (SAE 5)	Fixing Distribution Tee to Distribution Tee Mount	\$ 0,04		6 mm		20 mm	1	\$ 0,04
70	Washer, Grade 8.8 (SAE 5)	Fixing Distribution Tee to Distribution Tee Mount	\$ 0,01					2	\$ 0,02
80	Nut, Grade 8.8 (SAE 5)	Fixing Distribution Tee to Distribution Tee Mount	\$ 0,03		6 mm			1	\$ 0,03
90	Hose Clamp, Worm Drive	Between Hydraulic Fluid Reservoir and Rubber Hose	\$ 0,55		13 mm			2	\$ 1,10
100	Tie Wrap	Fix the brake line and the Distribution Tee on the frame	\$ 0,04					22	\$ 0,88
Sub Total								\$ 2,97	

ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total
10	Welds - Welding Fixture	Weld the Hydraulic Fluid Reservoir Mount and the Distribution Tee Mount to the frame	500	point	4	3000	1	\$ 0,67
Sub Total								\$ 0,67

University

System

Assembly

Part

P/N Base

Suffix

Details

Ecole Centrale de Lyon
Brake System
[Brake Circuit Assembly](#)
Hydraulic Fluid Reservoir Mount
BR 03001
AA

FileLink1

FileLink2

FileLink3

[Drawing](#)

[Back to BOM](#)

Car #

81

FileLink1

FileLink2

FileLink3

Part Cost

Qty

Extended Cost

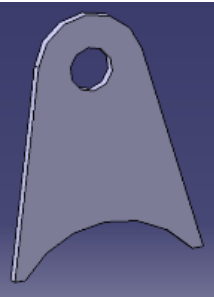
\$ 1,72

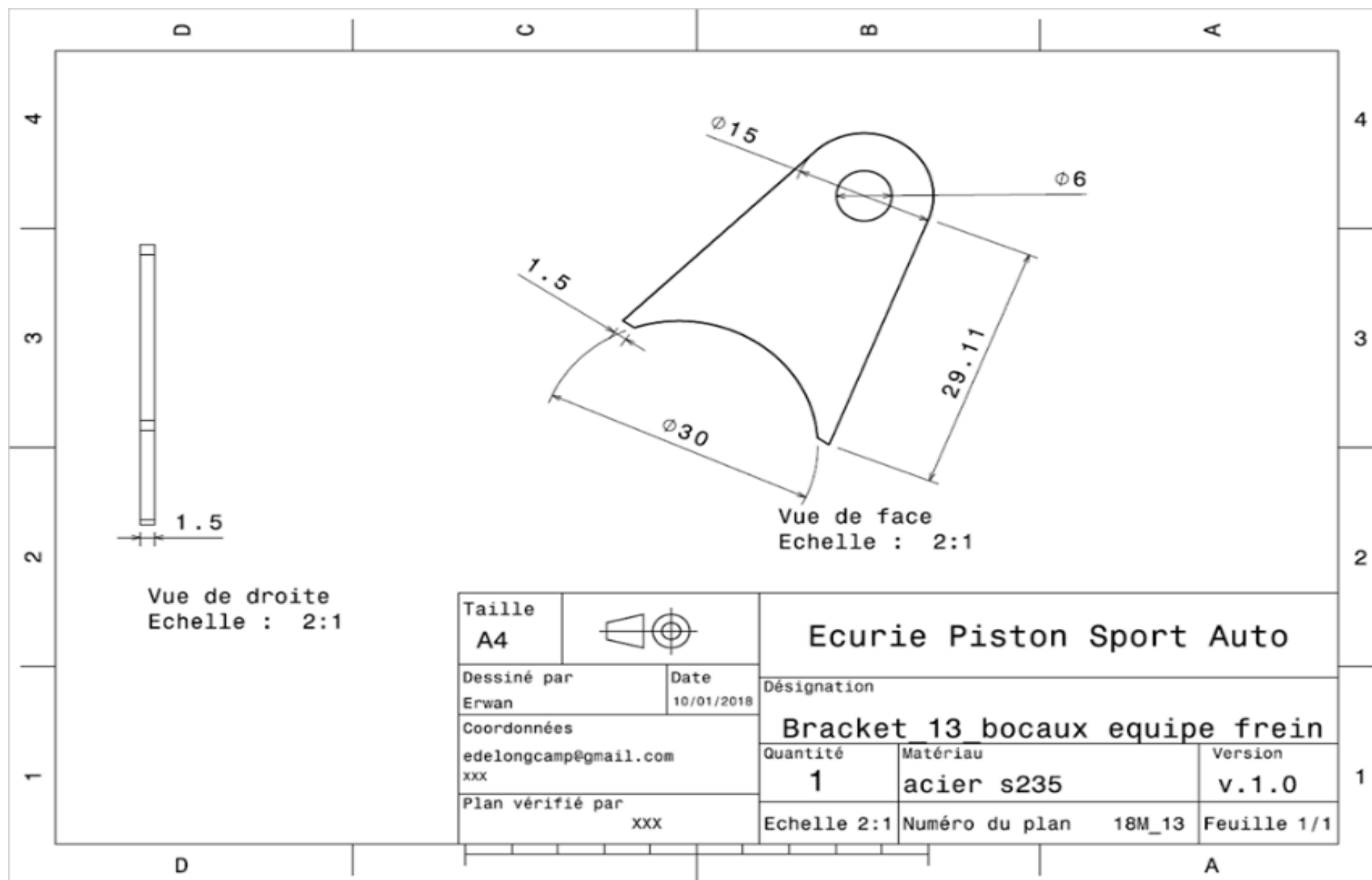
1

\$ 1,72

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Mild		\$ 2,25	0,014	kg			Rectangular area, 40x30mm	1,20E-03	1,50E-03	7850	1	\$ 0,03
												Sub Total	\$ 0,03

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cut	\$ 1,30	unit	1		1	\$ 1,30
20	Laser Cut		\$ 0,01	cm	12,795	Material - Steel	3	\$ 0,38
							Sub Total	\$ 1,68



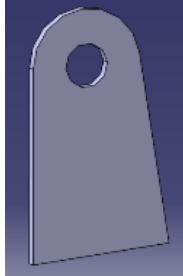


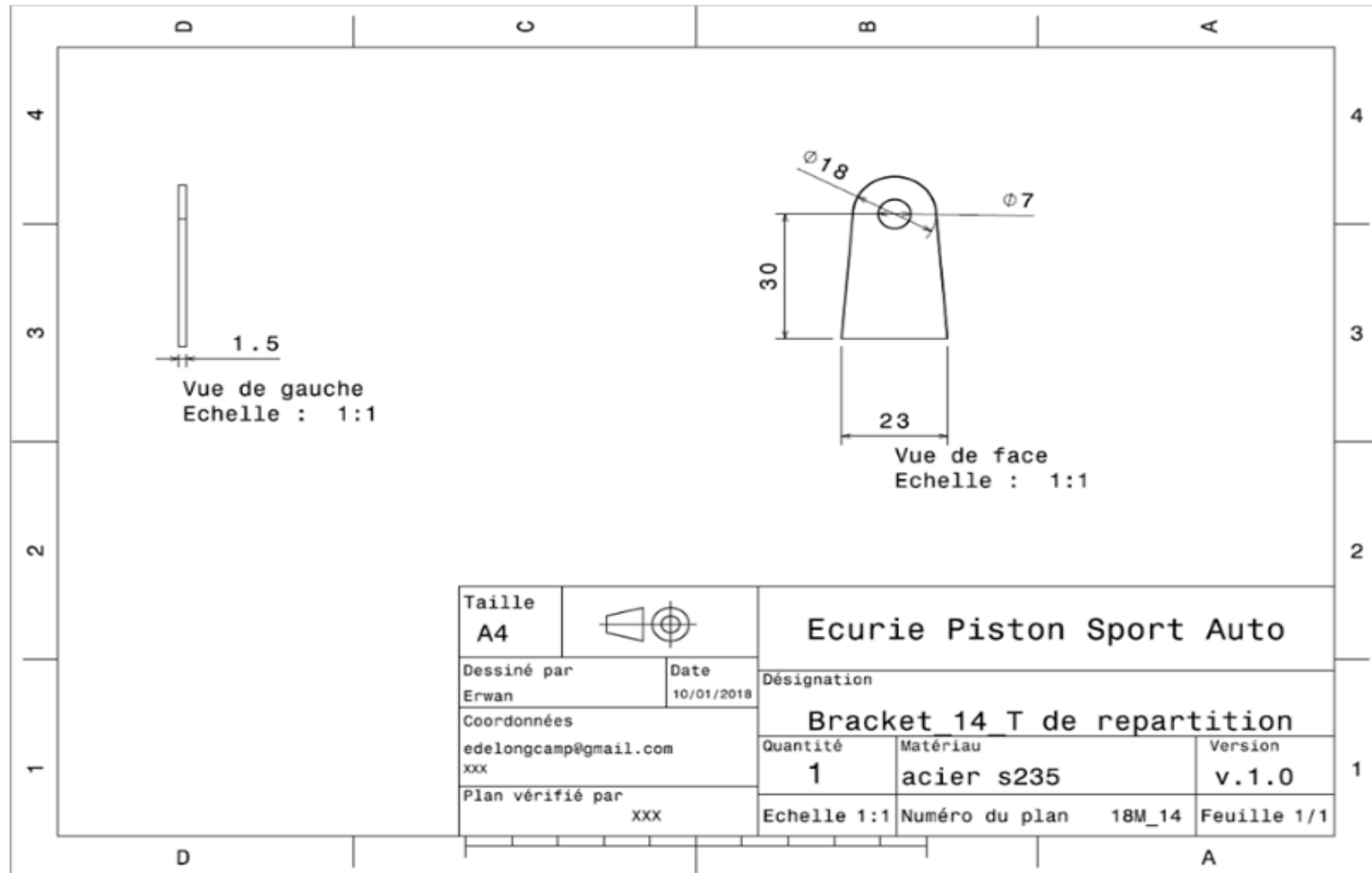
University	Ecole Centrale de Lyon			Back to BOM									
System	Brake System												
Assembly	Brake Circuit Assembly	FileLink1		Drawing									
Part	Distribution Tee Mount	FileLink2											
P/N Base	BR 03002	FileLink3											
Suffix	AA												
Details													

Car #	81	Part Cost		\$ 1,66
		Qty		1
FileLink1				
FileLink2				
FileLink3				
		Extended Cost		\$ 1,66

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Mild		\$ 2,25	0,012	kg			Rectangular area, 40x25mm	0,001	1,50E-03	7850	1,00	\$ 0,03
												Sub Total	\$ 0,03

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove	Setup for laser cut	\$ 1,30	unit	1		1	\$ 1,30
20	Laser Cut		\$ 0,01	cm	11,047	Material - Steel	3	\$ 0,33
							Sub Total	\$ 1,63





University

System

Assembly

Part

P/N Base

Suffix

Details

Ecole Centrale de Lyon
Brake System
[Brake Circuit Assembly](#)
Internal Spacer
BR 03003
AA
Internal Spacer next to the Master Cylinders

FileLink1

FileLink2

FileLink3

[Drawing](#)

Car #

81

Part Cost

Qty

Extended Cost

\$ 0,73

2

\$ 1,45

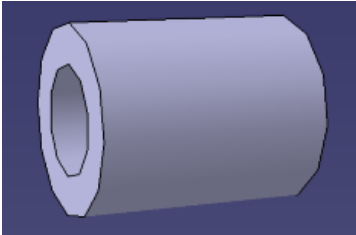
FileLink1

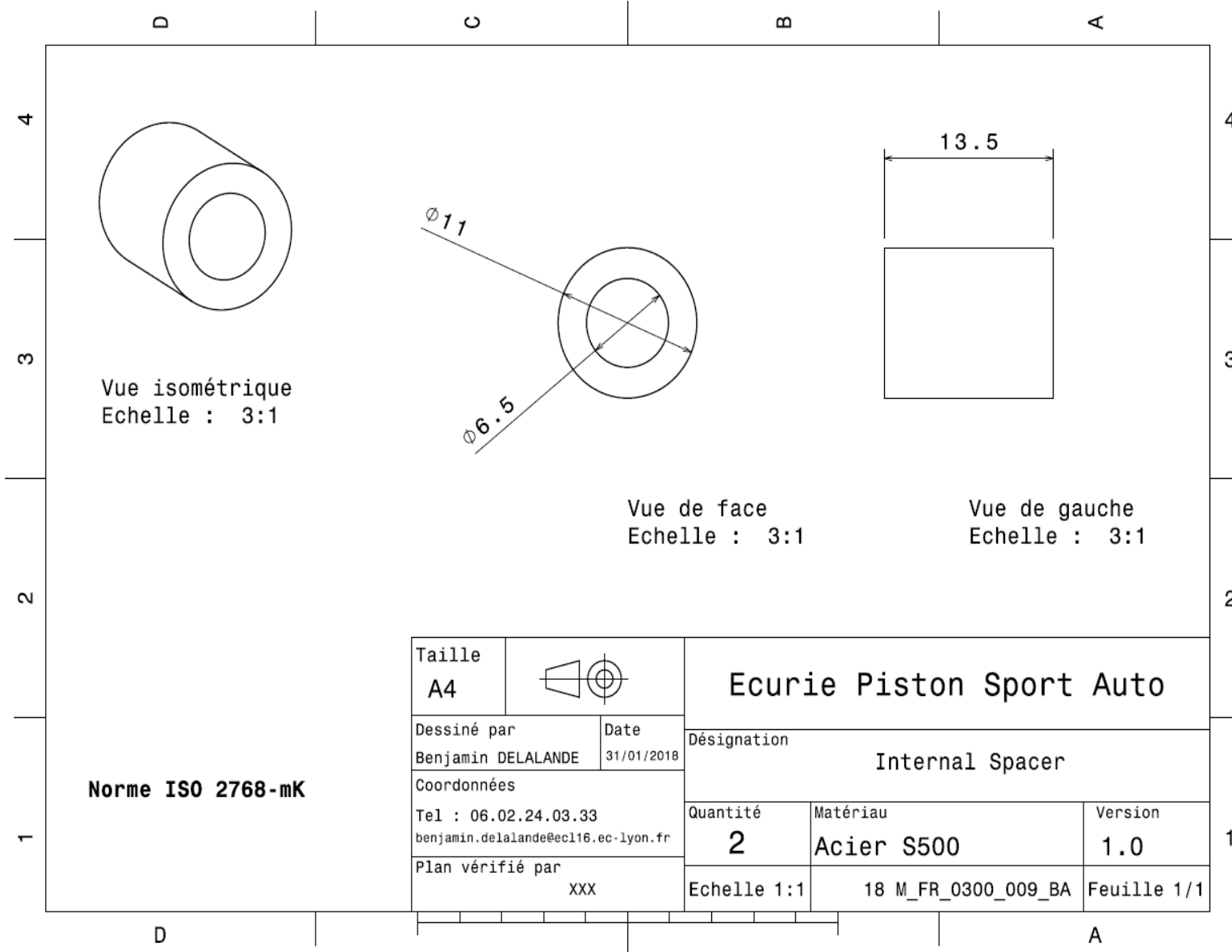
FileLink2

FileLink3

ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy		\$ 2,25	0,010	kg				9,50E-05	0,014	7850	1	\$ 0,02	
													Sub Total	\$ 0,02

ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total
10	Machining Setup, Install and remove		\$ 1,30	unit	1	2 parts cut from a single machine setup	0,5	\$ 0,65
20	Machining		\$ 0,04	cm^3	0,432	Material - Steel	3	\$ 0,05
							Sub Total	\$ 0,70





University

Ecole Centrale de Lyon

System

Brake System

Assembly

[Brake Circuit Assembly](#)

Part

External Spacer

P/N Base

BR 03004

Suffix

AA

Details

External Spacer next to the Master Cylinders

FileLink1

[Drawing](#)

FileLink2

FileLink3

Car #

81

Part Cost

\$ 0,67

Qty

2

Extended Cost

\$ 1,33

FileLink1

FileLink2

FileLink3

Back to BOM



