



CAR #81



ÉCOLE
CENTRALE LYON

FRAME
&
BODY

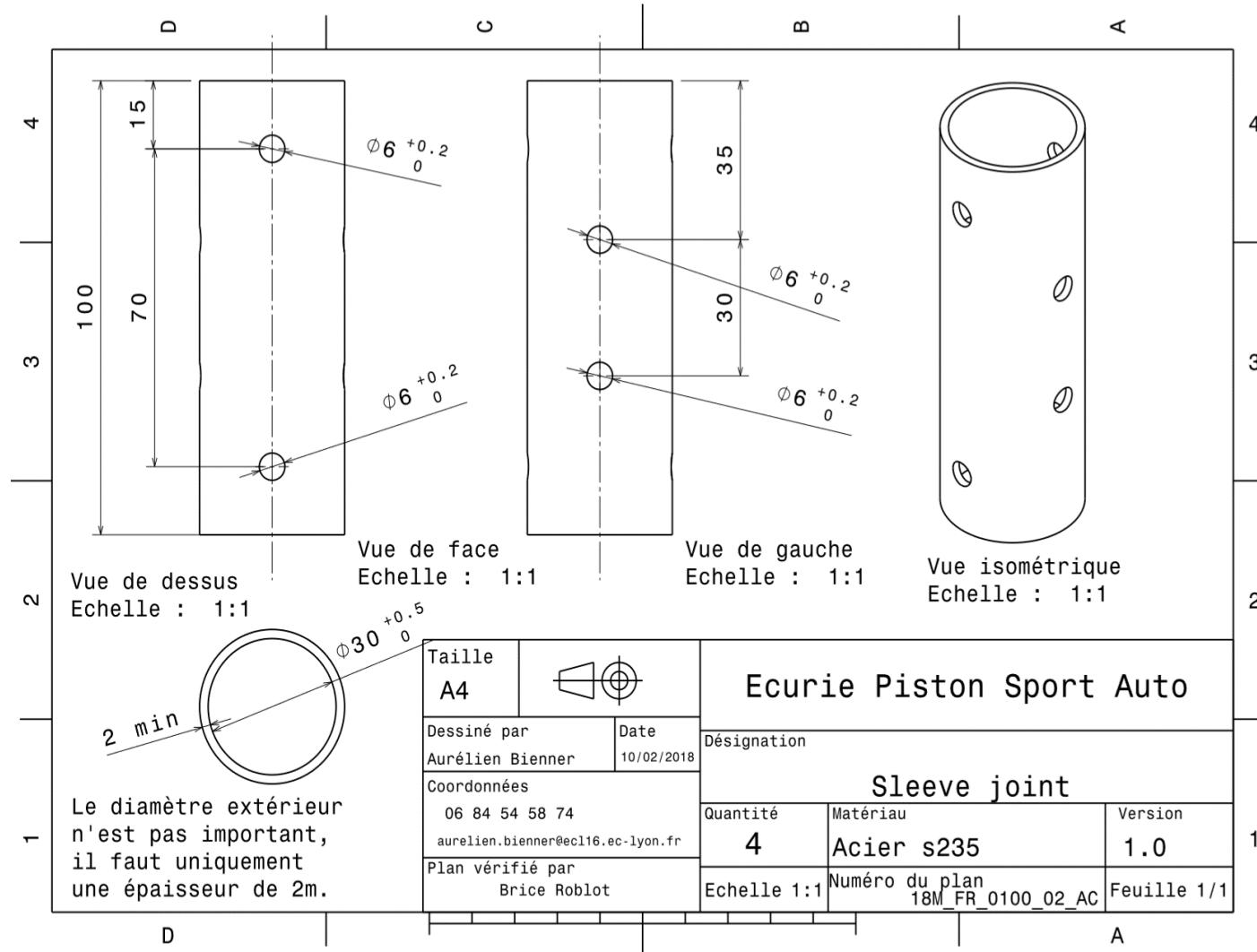
University	Ecole Centrale de Lyon	Back to BOM				Car #	81	Asm Cost	\$ 944,41				
System	Frame and Body					Qty	1						
Assembly	Frame					FileLink1							
P/N Base	FR A0100					FileLink2							
Suffix	AA					FileLink3							
Details	Tubular and space frame												
ItemOrder	Part	Part Cost	Quantity	Sub Total									
10	Bend Round steel tubing	\$ 23,75	1	\$ 23,75									
20	Straight round steel tubing	\$ 256,01	1	\$ 256,01									
30	Anti-intusion plate	\$ 9,13	1	\$ 9,13									
40	Sleeved joint	\$ 3,92	4	\$ 15,68									
			Sub Total	\$ 304,56									
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Paint	Painting of the frame	\$ 10,00		3,07	m^2						3,07	\$ 30,70
												Sub Total	\$ 30,70
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Weld round tubing		\$ 0,50	cm	993			\$ 496,50					
20	Weld round tubing	Anti-intrusion plate	\$ 0,50	cm	20			\$ 10,00					
30	Aerosol Apply	Painting of the frame	\$ 5,25	m^2	3,07			\$ 16,12					
40	Ratchet <= 25.4 mm	Sleeved joints	\$ 0,75	unit	16			\$ 12,00					
50	Reaction Tool <= 25.4 mm	Sleeved joints	\$ 0,25	unit	16			\$ 4,00					
							Sub Total	\$ 538,62					
ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total				
10	Bolt, Grade 8.8 (SAE)	Bolt on sleeved joints	\$ 0,16		8 mm		40 mm		16	\$ 2,56			
20	Nut, Grade 8.8 (SAE 5)	Nut on sleeved joints	\$ 0,04		8 mm				16	\$ 0,64			
								Sub Total	\$ 3,20				
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total					
10	Welds - Welding Fixture	Frame Welding fixture	\$ 500,00	point	204	3000	1	\$ 34,00					
20	Welds - Welding Fixture	Anti-intrusion fixture	\$ 500,00	point	20	300	1	\$ 33,33					
							Sub Total	\$ 67,33					

University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 23,75							
System	Frame and Body		Qty	1									
Assembly	Frame	FileLink1	FileLink1		FileLink2								
Part	Bend Round steel tubing	FileLink2	FileLink2		FileLink3								
P/N Base	FR 01001	FileLink3	FileLink3		Extended Cost	\$ 23,75							
Suffix	AA												
Details	Hoops of the frame												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Alloy	Main Hoop	\$ 2,25	3,599	kg			Round, 30 x 2 mm	1,759E-04	2,620	7850	1	\$ 8,14
20	Steel, Alloy	Front Hoop	\$ 2,25	2,041	kg			Round, 30 x 2 mm	1,759E-04	1,500	7850	1	\$ 4,66
												Sub Total	\$ 12,80
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Tube bends	Main Hoop bends	\$ 0,75	Bend	5		1	\$ 3,75					
20	Tube bends	Front Hoop bends	\$ 0,75	Bend	4		1	\$ 3,00					
30	Tube cut	Cut to proper length	\$ 0,15	cm	8		1	\$ 1,20					
40	Tube end preparation for welding		\$ 0,75	end	4		1	\$ 3,00					
							Sub Total	\$ 10,95					

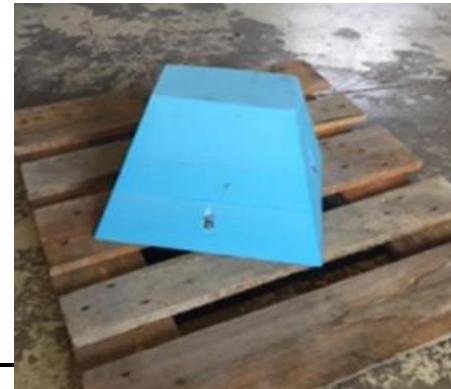
University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 256,01							
System	Frame and Body		Qty	1	FileLink1								
Assembly	Frame		FileLink1		FileLink2								
Part	Straight round steel tubing		FileLink2		FileLink3								
P/N Base	FR 01002		Extended Cost	\$ 256,01	FileLink3								
Suffix	AA												
Details													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Alloy	Shoulder Harness Mounting Bar	\$ 2,25	0,764	kg			Round, 30 x 2 mm	1,759E-04	0,553	7850	1	\$ 1,72
		Side impact structure, Front Bulkhead, Roll Hoop Bracing, Front Bulkhead Support, Main Hoop											
20	Steel, Alloy	Bracing Support	\$ 2,25	12,947	kg			Round, 30 x 1,5 mm	1,343E-04	11,923	7850	1	\$ 28,28
30	Steel, Alloy	Jacking point & Miscellaneous	\$ 2,25	13,508	kg			Round, 25 x 1,5 mm	1,107E-04	15,034	7850	1	\$ 29,41
40	Steel, Alloy	Miscellaneous	\$ 2,25	3,009	kg			Round, 20 x 1,5 mm	8,718E-05	4,471	7850	1	\$ 6,88
50	Steel, Alloy	Miscellaneous	\$ 2,25	1,877	kg			Round, 15 x 1,5 mm	6,362E-05	3,710	7850	1	\$ 4,17
60	Steel, Alloy	Miscellaneous	\$ 2,25	1,877	kg			Round, 20 x 4 mm	2,011E-04	0,084	7850	1	\$ 0,30
													Sub Total \$ 70,76
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Tube cut	Cut to proper length	\$ 0,15	unit	337		1	\$ 50,55					
20	Tube end preparation for welding		\$ 0,75	end	176		1	\$ 132,00					
30	Machining Setup, Install and remove	Engine mounts machining	\$ 1,30	unit	2		1	\$ 2,60					
40	Machining	Engine mounts machining	\$ 0,04	cm^3	8,2E-01	Material - Steel	3	\$ 0,10					
								Sub Total \$ 185,25					

University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 9,13							
System	Frame and Body		Qty	1									
Assembly	Frame	FileLink1	FileLink1										
Part	Ant-intrusion plate	FileLink2	FileLink2										
P/N Base	FR 01003	FileLink3	FileLink3		Extended C	\$ 9,13							
Suffix	AA												
Details													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Alloy	Anti-intrusion plate	\$ 2,25	1,790	kg			Rectangular area	0,152	1,50E-03	7850	1	\$ 4,03
													Sub Total \$ 4,03
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Machining Setup, Install and remove	Setup for metal shearing	\$ 1,30	unit	1		1	\$ 1,30					
20	Sheet metal shearing	Cutout shape	\$ 0,25	cut	4		1	\$ 1,00					
30	Drilled holes < 25.4 mm dia.		\$ 0,35	hole	8		1	\$ 2,80					
							Sub Total	\$ 5,10					

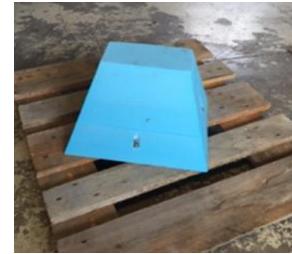
University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 3,92								
System	Frame and Body				Qty	4								
Assembly	Frame	FileLink1	Drawing		FileLink1									
Part	Sleeved joint	FileLink2			FileLink2									
P/N Base	FR 01004	FileLink3			FileLink3									
Suffix	AA				Extended C	\$ 15,68								
Details														
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy	Sleeve joint	\$ 2,25	0,158	kg			Round , 34 x 2 mm	2,011E-04	0,100	7850	1	\$ 0,36	
													Sub Total	\$ 0,36
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30						
20	Machining	Inner	\$ 0,04	cm^3	21,6			\$ 0,86						
30	Drilled holes < 25,4 mm dia.		\$ 0,35	hole	4			\$ 1,40						
							Sub Total	\$ 3,56						



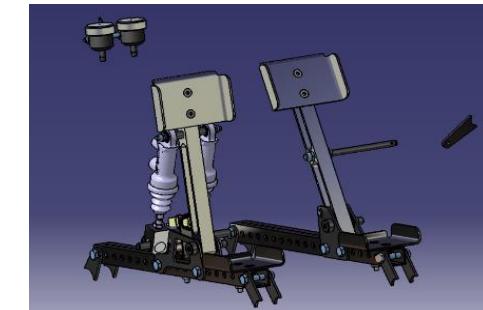
University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Asm Cost	\$ 46,02							
System	Frame and Body		Qty	1									
Assembly	Impact Attenuator		FileLink1										
P/N Base	FR A0200		FileLink2										
Suffix	AA		FileLink3										
Details	FSAE Impact Attenuator				Extended Cost	\$ 46,02							
ItemOrder	Part	Part Cost	Quantity	Sub Total									
10	Impact Attenuator	\$ 35,19	1	\$ 35,19									
			Sub Total	\$ 35,19									
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Adhesive	To glue IA on frame	\$ -	1	unit								\$ -
												Sub Total	\$ -
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Brush apply	To glue IA on frame	\$ 0,02	cm^2	541,38		1	\$ 10,83					
							Sub Total	\$ 10,83					
ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total				
10	Bolt,Grade 8.8 (SAE 5)	DELETED	\$ 0,39	8	mm		80	mm	0	\$ -			
20	Bolt,Grade 8.8 (SAE 5)	DELETED	\$ 0,53	8	mm		100	mm	0	\$ -			
30	Bolt,Grade 8.8 (SAE 5)	DELETED	\$ 0,21	8	mm		50	mm	0	\$ -			
40	Nut, Grade 8.8 (SAE 5)	DELETED	\$ 0,04	8	mm				0	\$ -			
50	Washer, Grade 8.8 (SAE 5)	DELETED	\$ 0,01	1	Unit				0	\$ -			
							Sub Total	\$ -					



University	Ecole Centrale de Lyon	Car #	81	Part Cost	\$ 35,19								
System	Frame and Body	Qty	1										
Assembly	Impact Attenuator	FileLink1											
Part	Impact Attenuator	FileLink2											
P/N Base	FR 02001	FileLink3											
Suffix	AA												
Details	FSAE Impact Attenuator Type 15, Bought, Cost as Made												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Foam, Expanding, Non-Structural	First part of foam	\$ 15,00	0,229	kg			Rectangular area, 355x305 mm	1,08E-01	0,085	25	1	\$ 3,44
20	Foam, Expanding, Non-Structural	Second part of foam	\$ 15,00	0,153	kg			Rectangular area, 305x237 mm	7,23E-02	0,085	25	1	\$ 2,30
30	Foam, Expanding, Non-Structural	Third part of foam	\$ 15,00	0,085	kg			Rectangular area, 237x169 mm	4,01E-02	0,085	25	1	\$ 1,27
40	Adhesive	Assemble foam parts, cost included in process	\$ -										\$ -
													Sub Total \$ 7,01
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Non-metallic cutting > 76.2 mm	Cut first part side	\$ 1,40	cut	1	Material - Foam	0,33	\$ 0,46					
20	Brush apply	Apply glue on first part	\$ 0,02	cm^2	723			\$ 14,46					
30	Non-metallic cutting > 76.2 mm	Cut second part side	\$ 1,40	cut	1	Material - Foam	0,33	\$ 0,46					
40	Brush apply	Apply glue on second part	\$ 0,02	cm^2	401			\$ 8,02					
50	Non-metallic cutting > 76.2 mm	Cut third part side	\$ 1,40	cut	1	Material - Foam	0,33	\$ 0,46					
60	Assemble, 1 kg, Loose	Glue 3 parts	\$ 0,06	Unit	2			\$ 0,12					
70	Drilled holes < 25.4 mm dia.	Drill holes for bolts	\$ 0,35	Hole	8			\$ 2,80					
80	Drilled holes < 25.4 mm dia.	Drill larger holes at each extremities of the part	\$ 0,35	Hole	4			\$ 1,40					
								Sub Total \$ 28,19					



University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Asm Cost	\$ 102,92								
System	Frame and Body		Qty	1										
Assembly	Pedal box		FileLink1											
P/N Base	FR A0300		FileLink2											
Suffix	AA		FileLink3											
Details	The assembly of brake and accelerator pedals		Extended Cost	\$ 102,92										
ItemOrder	Part	Part Cost	Quantity	Sub Total										
10	Rail	\$ 3,11	2	\$ 6,22										
20	Brake pedal	\$ 5,69	1	\$ 5,69										
30	Accelerator pedal	\$ 4,84	1	\$ 4,84										
40	Foot top support	\$ 2,10	2	\$ 4,20										
50	Heel support	\$ 2,02	2	\$ 4,03										
60	Brake pedal support	\$ 3,26	2	\$ 6,52										
70	Brake over-travel switch support	\$ 2,03	1	\$ 2,03										
80	Accelerator pedal support	\$ 2,12	2	\$ 4,24										
90	Cable support	\$ 4,21	1	\$ 4,21										
100	Rear rail mount	\$ 0,86	4	\$ 3,44										
110	Front rail mount	\$ 0,80	4	\$ 3,18										
120	Sheath for cable mount	\$ 1,86	1	\$ 1,86										
				Sub Total	\$ 50,45									
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Bearing, Needle	Pedal pivot	\$ 4,28	15 mm		10 mm						4	\$ 17,12	
20	Paint	Painting the Mounts	\$ 10,00	0,18 m^2								0,18	\$ 1,80	
													Sub Total	\$ 18,92
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Weld	Welding the Front and Rear Rails Mounts to the frame	\$ 0,15	cm	18			\$ 2,70						
20	Weld	Welding the Sheath for Cable Mount	\$ 0,15	cm	2,1			\$ 0,32						
30	Aerosol Apply	Painting of the Mounts	\$ 5,25	m^2	0,18			\$ 0,95						
40	Assemble, 1 kg, Loose	Inserting the Rail between the Front and Rear Rails Mounts	\$ 0,06	unit	2			\$ 0,12						
50	Ratchet <= 25.4 mm	Fixing the Rails to the Front and Rear Rails Mounts	\$ 0,75	unit	4			\$ 3,00						
60	Reaction Tool <= 25.4 mm	Fixing the Rails to the Front and Rear Rails Mounts	\$ 0,25	unit	4			\$ 1,00						
70	Assemble, 1 kg, Loose	Positioning the Accelerator Pedal Supports on the right Pedal Rail	\$ 0,06	unit	2			\$ 0,12						
80	Ratchet <= 25.4 mm	Fixing the Accelerator Pedal Supports on the right Pedal Rail	\$ 0,75	unit	2			\$ 1,50						
90	Reaction Tool <= 25.4 mm	Fixing the Accelerator Pedal Supports on the right Pedal Rail	\$ 0,25	unit	2			\$ 0,50						
100	Assemble, 1 kg, Loose	Positioning the Brake Pedal Supports on the left Pedal Rail	\$ 0,06	unit	2			\$ 0,12						
110	Ratchet <= 25.4 mm	Fixing the Brake Pedal Supports on the left Pedal Rail	\$ 0,75	unit	2			\$ 1,50						
120	Reaction Tool <= 25.4 mm	Fixing the Brake Pedal Supports on the left Pedal Rail	\$ 0,25	unit	2			\$ 0,50						
130	Assemble, 1 kg, Loose	Inserting the Needle Bearings in Brake and Accelerator Pedals	\$ 0,06	unit	4			\$ 0,24						
140	Assemble, 1 kg, Loose	Positioning the Accelerator pedal on the Accelerator Pedal Supports (with the washers)	\$ 0,06	unit	1			\$ 0,06						
150	Ratchet <= 25.4 mm	Fixing the Accelerator Pedal on the Accelerator Pedal Supports	\$ 0,75	unit	1			\$ 0,75						
160	Reaction Tool <= 25.4 mm	Fixing the Accelerator Pedal on the Accelerator Pedal Supports	\$ 0,25	unit	1			\$ 0,25						
170	Assemble, 1 kg, Loose	Positioning the Brake Pedal on the Brake Pedal Supports (with the washers)	\$ 0,06	unit	1			\$ 0,06						
180	Ratchet <= 25.4 mm	Fixing the Brake Pedal on the Brake Pedal Supports	\$ 0,75	unit	1			\$ 0,75						
190	Reaction Tool <= 25.4 mm	Fixing the Brake Pedal on the Brake Pedal Supports	\$ 0,25	unit	1			\$ 0,25						
200	Assemble, 1 kg, Loose	Inserting the Over-Travel Bolt between the Accelerator Supports	\$ 0,06	unit	1			\$ 0,06						
210	Ratchet <= 6.35 mm	Fixing the Over-Travel Bolt to the Accelerator Supports	\$ 0,50	unit	2			\$ 1,00						
220	Reaction Tool <= 6.35 mm	Fixing the Over-Travel Bolt to the Accelerator Supports	\$ 0,25	unit	2			\$ 0,50						
230	Assemble, 1 kg, Loose	Positioning the Brake Over-Travel Switch Support on the Left Pedal Rail	\$ 0,06	unit	1			\$ 0,06						
240	Ratchet <= 6.35 mm	Fixing the Brake Over-Travel Switch Support to the Left Pedal Rail	\$ 0,75	unit	1			\$ 0,75						
250	Reaction Tool <= 6.35 mm	Fixing the Brake Over-Travel Switch Support to the Left Pedal Rail	\$ 0,25	unit	1			\$ 0,25						
260	Assemble, 1 kg, Loose	Positioning the Cable Support on the Accelerator Pedal	\$ 0,06	unit	1			\$ 0,06						
270	Ratchet <= 25.4 mm	Fixing the Cable Support to the Accelerator Pedal	\$ 0,75	unit	1			\$ 0,75						
280	Reaction Tool <= 25.4 mm	Fixing the Cable Support to the Accelerator Pedal	\$ 0,25	unit	1			\$ 0,25						
290	Assemble, 1 kg, Loose	Positioning the Heel Support on the Pedal Rails	\$ 0,06	unit	2			\$ 0,12						
300	Ratchet <= 6.35 mm	Fixing the Heel Support on the Pedal Rails	\$ 0,50	unit	4			\$ 2,00						
310	Reaction Tool <= 6.35 mm	Fixing the Heel Support on the Pedal Rails	\$ 0,25	unit	4			\$ 1,00						
320	Assemble, 1 kg, Loose	Positioning the Foot Top Support on the Brake Pedal	\$ 0,06	unit	1			\$ 0,06						
330	Ratchet <= 6.35 mm	Fixing the Foot Top Support on the Brake Pedal	\$ 0,50	unit	2			\$ 1,00						
340	Reaction Tool <= 6.35 mm	Fixing the Foot Top Support on the Brake Pedal	\$ 0,25	unit	2			\$ 0,50						
350	Assemble, 1 kg, Loose	Positioning the Foot Top Support on the Accelerator Pedal	\$ 0,06	unit	1			\$ 0,06						
360	Ratchet <= 6.35 mm	Fixing the Foot Top Support on the Accelerator Pedal	\$ 0,50	unit	2			\$ 1,00						
370	Reaction Tool <= 6.35 mm	Fixing the Foot Top Support on the Accelerator Pedal	\$ 0,25	unit	2			\$ 0,50						
380	Assemble, 1 kg, Loose	Positioning the Cable in the Cable Support	\$ 0,06	unit	1			\$ 0,06						
390	Ratchet <= 6.35 mm	Fixing the Cable to the Cable Support	\$ 0,50	unit	1			\$ 0,50						
400	Assemble, 1 kg, Loose	Positioning the Sheath for Cable to Sheath for cable mount	\$ 0,06	unit	1			\$ 0,06						
410	Hand, Loose <= 6.35 mm	Fixing the Sheath for Cable to Sheath for cable mount	\$ 0,25	unit	1			\$ 0,25						
								Sub Total	\$ 25,47					

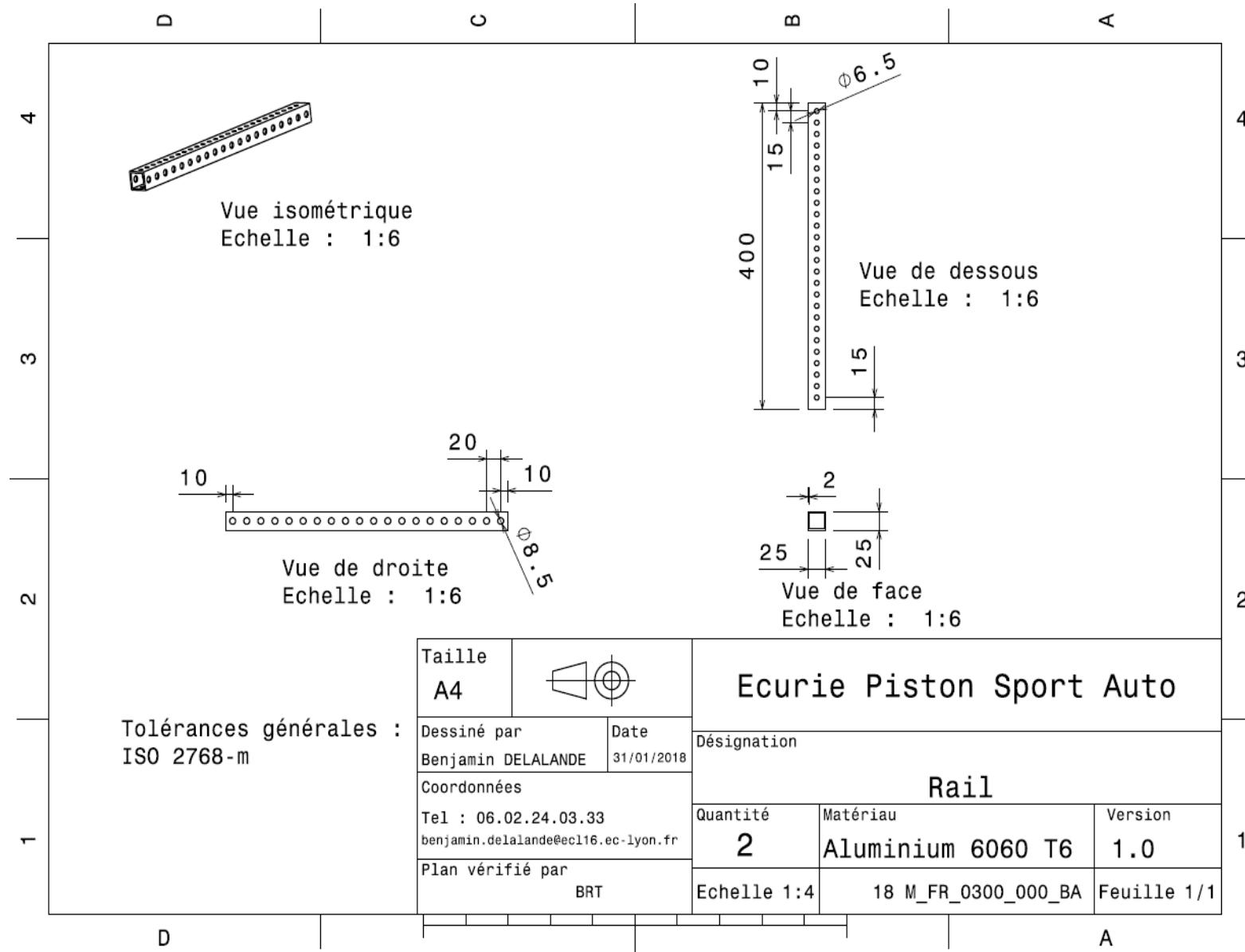


ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total
10	Bolt, Grade 8.8 (SAE 5)	Fixing the Rails to the Front and Rear Rails Mounts	\$ 0,21	8 mm		50 mm		4	\$ 0,84
20	Washer, Grade 8.8 (SAE 5)	Fixing the Rails to the Front and Rear Rails Mounts	\$ 0,01		unit			8	\$ 0,08
30	Nut, Grade 8.8 (SAE 5)	Fixing the Rails to the Front and Rear Rails Mounts	\$ 0,04	8 mm				4	\$ 0,18
40	Bolt, Grade 8.8 (SAE 5)	Fixing the Accelerator Pedal Supports on the right Pedal Rail	\$ 0,21	8 mm		50 mm		2	\$ 0,42
50	Washer, Grade 8.8 (SAE 5)	Fixing the Accelerator Pedal Supports on the right Pedal Rail	\$ 0,01		unit			4	\$ 0,04
60	Nut, Grade 8.8 (SAE 5)	Fixing the Accelerator Pedal Supports on the right Pedal Rail	\$ 0,04	8 mm				2	\$ 0,09
70	Bolt, Grade 8.8 (SAE 5)	Fixing the Brake Pedal Supports on the left Pedal Rail	\$ 0,21	8 mm		50 mm		2	\$ 0,42
80	Washer, Grade 8.8 (SAE 5)	Fixing the Brake Pedal Supports on the left Pedal Rail	\$ 0,01		unit			4	\$ 0,04
90	Nut, Grade 8.8 (SAE 5)	Fixing the Brake Pedal Supports on the left Pedal Rail	\$ 0,04	8 mm				2	\$ 0,09
100	Bolt, Grade 8.8 (SAE 5)	Fixing the Accelerator Pedal on the Accelerator Pedal Supports	\$ 0,34	10 mm		50 mm		1	\$ 0,34
110	Washer, Grade 8.8 (SAE 5)	Fixing the Accelerator Pedal on the Accelerator Pedal Supports	\$ 0,01		unit			4	\$ 0,04
120	Nut, Grade 8.8 (SAE 5)	Fixing the Accelerator Pedal on the Accelerator Pedal Supports	\$ 0,07	10 mm				1	\$ 0,07
130	Bolt, Grade 8.8 (SAE 5)	Fixing the Brake Pedal on the Brake Pedal Supports	\$ 0,34	10 mm		50 mm		1	\$ 0,34
140	Washer, Grade 8.8 (SAE 5)	Fixing the Brake Pedal on the Brake Pedal Supports	\$ 0,01		unit			4	\$ 0,04
150	Nut, Grade 8.8 (SAE 5)	Fixing the Brake Pedal on the Brake Pedal Supports	\$ 0,07	10 mm				1	\$ 0,07
160	Bolt, Grade 8.8 (SAE 5)	Fixing the Over-Travel Bolt to the Accelerator Supports	\$ 0,05	4 mm		50 mm		1	\$ 0,05
170	Thread Insert	Fixing the Over-Travel Bolt to the Accelerator Supports	\$ 0,40	4 mm				2	\$ 0,80
180	Nut, Grade 8.8 (SAE 5)	Fixing the Over-Travel Bolt to the Accelerator Supports	\$ 0,02	4 mm				1	\$ 0,02
190	Bolt, Grade 8.8 (SAE 5)	Fixing the Brake Over-Travel Switch Support to the Left Pedal Rail	\$ 0,09	6 mm		40 mm		1	\$ 0,09
200	Washer, Grade 8.8 (SAE 5)	Fixing the Brake Over-Travel Switch Support to the Left Pedal Rail	\$ 0,01		unit			2	\$ 0,02
210	Nut, Grade 8.8 (SAE 5)	Fixing the Brake Over-Travel Switch Support to the Left Pedal Rail	\$ 0,03	6 mm				1	\$ 0,03
220	Washer, Grade 8.8 (SAE 5)	Fixing the Cable Support to the Accelerator Pedal	\$ 0,01		unit			2	\$ 0,02
230	Nut, Grade 8.8 (SAE 5)	Fixing the Cable Support to the Accelerator Pedal	\$ 0,04	8 mm				2	\$ 0,09
240	Bolt, Grade 8.8 (SAE 5)	Fixing the Heel Support on the Pedal Rails	\$ 0,07	6 mm		30 mm		4	\$ 0,26
250	Washer, Grade 8.8 (SAE 5)	Fixing the Heel Support on the Pedal Rails	\$ 0,01		unit			4	\$ 0,04
260	Nut, Grade 8.8 (SAE 5)	Fixing the Heel Support on the Pedal Rails	\$ 0,03	6 mm				4	\$ 0,12
270	Bolt, Grade 8.8 (SAE 5)	Fixing the Foot Top Support on the Brake and Accelerator Pedals	\$ 0,07	6 mm		30 mm		4	\$ 0,26
280	Washer, Grade 8.8 (SAE 5)	Fixing the Foot Top Support on the Brake and Accelerator Pedals	\$ 0,01		unit			4	\$ 0,04
290	Nut, Grade 8.8 (SAE 5)	Fixing the Foot Top Support on the Brake and Accelerator Pedals	\$ 0,03	6 mm				4	\$ 0,12
300	Bolt, Grade 8.8 (SAE 5)	Fixing the Cable to the Cable Support	\$ 0,02	3 mm		10 mm		1	\$ 0,02

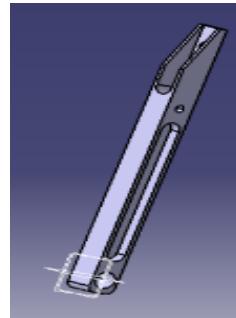
Sub Total \$ 5,08

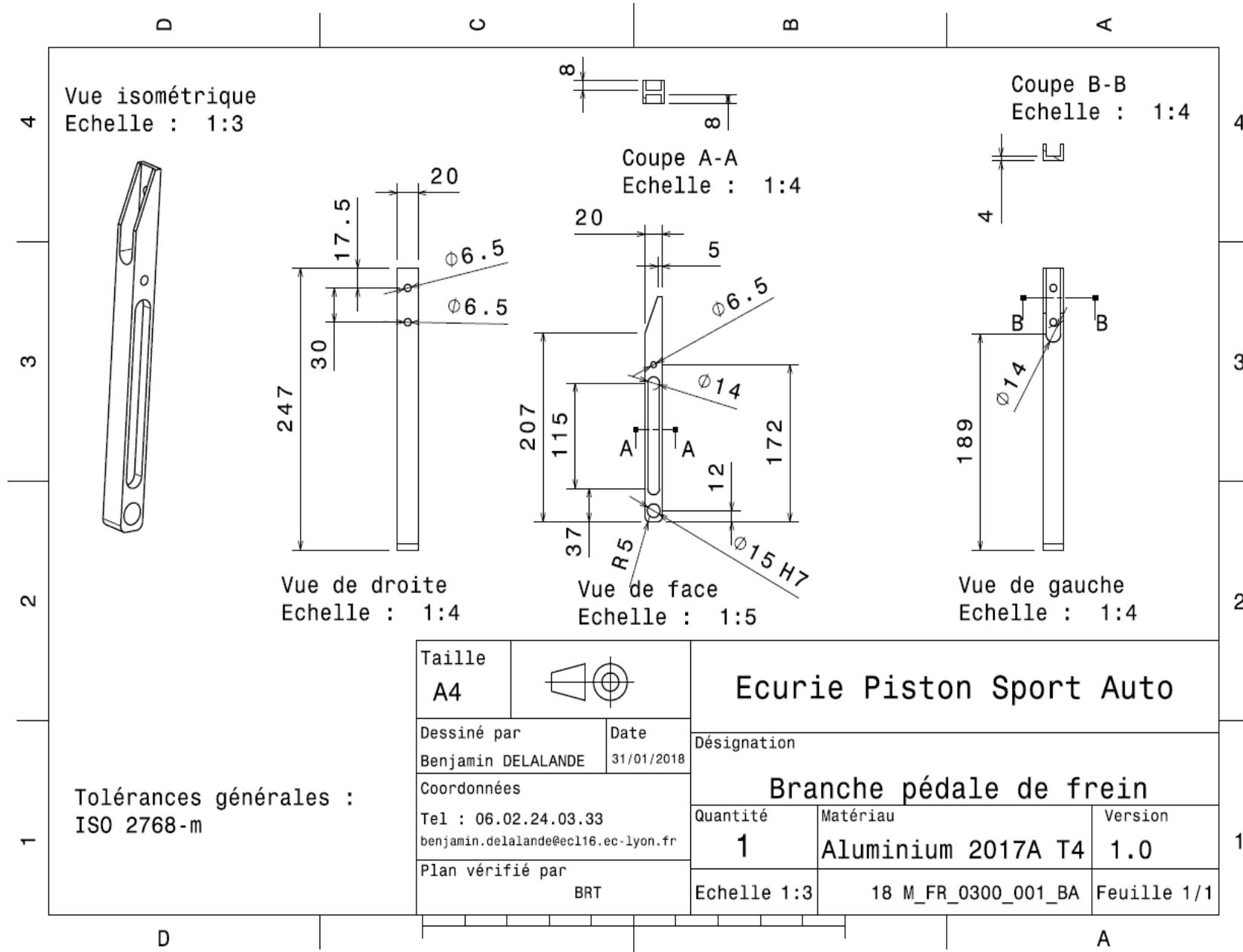
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total
10	Welds - Welding Fixture	Mounts welded to the chassis	\$ 500,00	point	18	3000	1	\$ 3,00
								Sub Total \$ 3,00

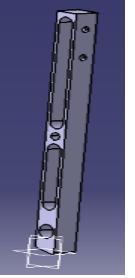
University	Ecole Centrale de Lyon	Back to BOM								Car #	81	Part Cost	\$ 3,11
System	Frame and Body									FileLink1	Drawing	Qty	2
Assembly	Pedal box									FileLink1		Extended Cost	\$ 6,22
Part	Rail									FileLink2			
P/N Base	FR 03001									FileLink3			
Suffix	AA												
Details	Rail mounted on the chassis supporting the pedals												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Aluminum, Normal (per kg)		\$ 4,20	0,200	kg				1,84E-04	0,400	2712	1	\$ 0,84
												Sub Total	\$ 0,84
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30					
20	Machining	Vertical holes	\$ 0,04	cm^3	3,45	Material - Aluminum	1	\$ 0,14					
30	Machining Setup, Change		\$ 0,65	unit	1			\$ 0,65					
40	Machining	Horizontal holes	\$ 0,04	cm^3	4,54	Material - Aluminum	1	\$ 0,18				Sub Total	\$ 2,27

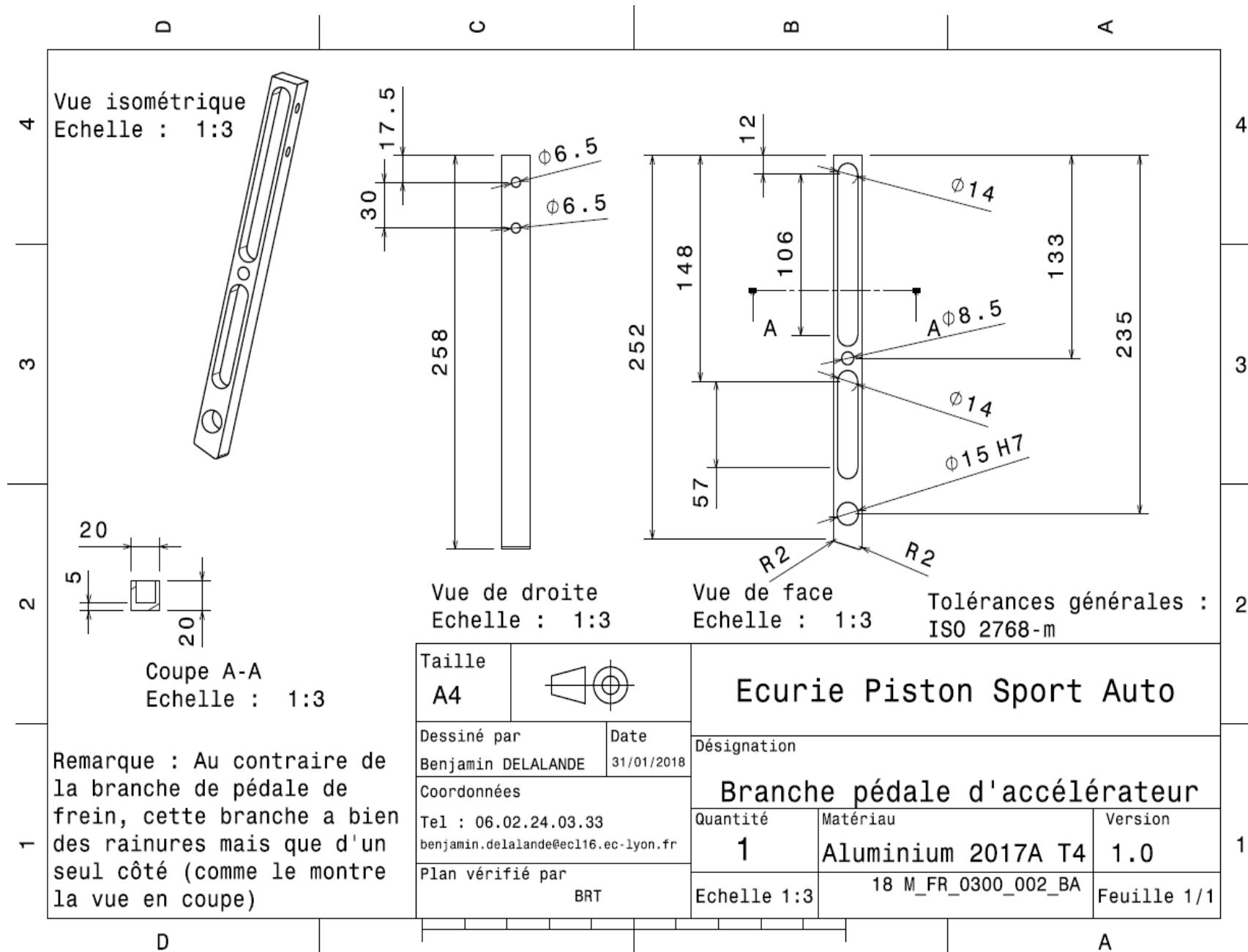


University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 5,69								
System	Frame and Body		Qty	1										
Assembly	Pedal box		FileLink1		FileLink2									
Part	Brake pedal		FileLink3		FileLink1									
P/N Base	FR 03002				FileLink2									
Suffix	AA				FileLink3									
Details	Branch of the Brake Pedal													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Aluminum, Normal (per kg)		\$ 4,20	0,271	kg				0,005	0,020	2712	1	\$ 1,14	
													Sub Total	\$ 1,14
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30						
20	Machining		\$ 0,04	cm^3	18,3	Material - Aluminum	1	\$ 0,73						
30	Machining Setup, Change		\$ 0,65	unit	1			\$ 0,65						
40	Machining	Side	\$ 0,04	cm^3	14,2	Material - Aluminum	1	\$ 0,57						
50	Machining Setup, Change		\$ 0,65	unit	1			\$ 0,65						
60	Machining	Back	\$ 0,04	cm^3	16,2	Material - Aluminum	1	\$ 0,65						
							Sub Total	\$ 4,55						

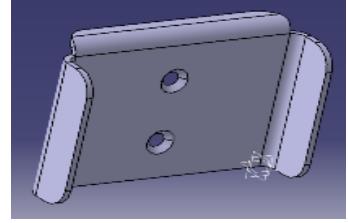


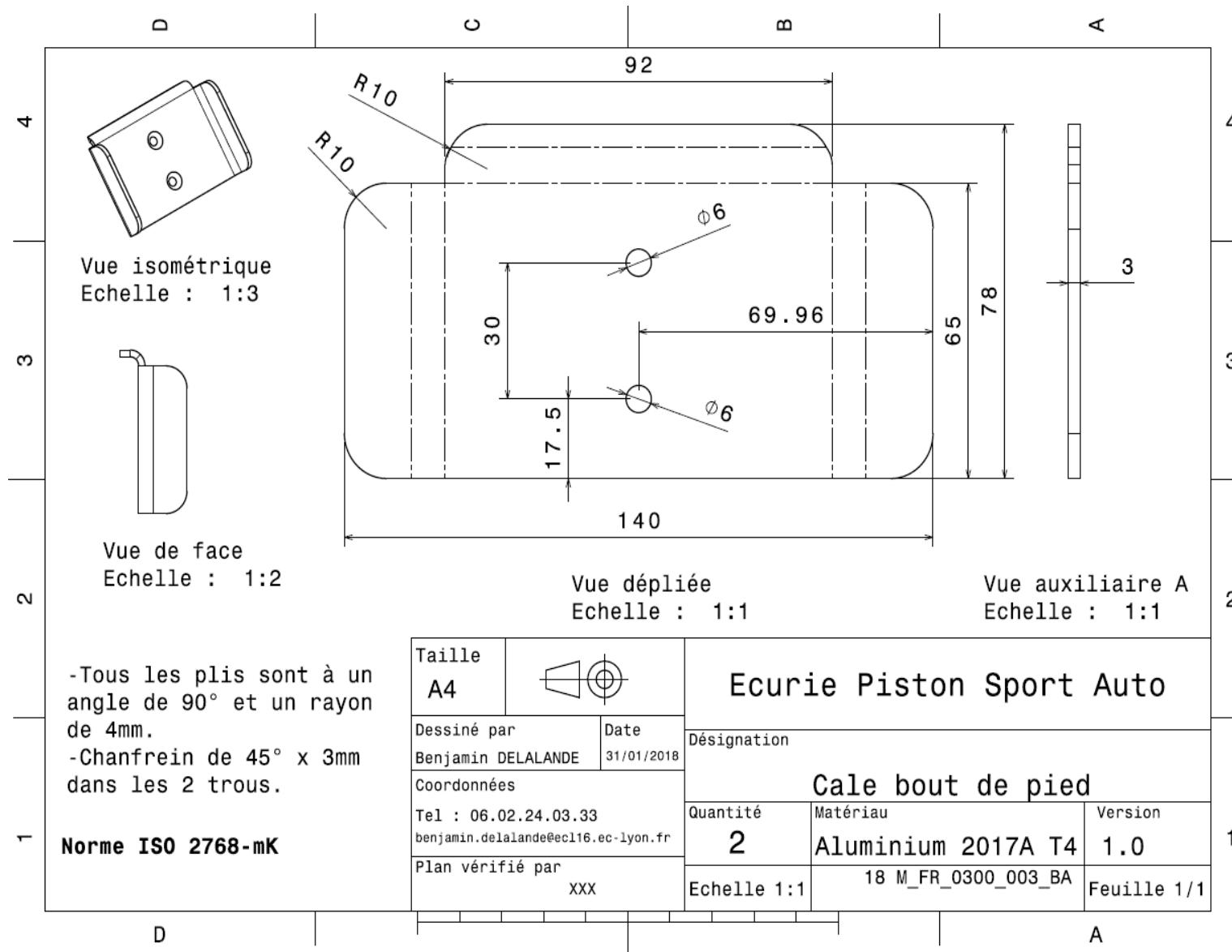


University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 4,84							
System	Frame and Body				Qty	1							
Assembly	Pedal box	FileLink1	Drawing	FileLink1									
Part	Accelerator Pedal	FileLink2		FileLink2									
P/N Base	FR 03003	FileLink3		FileLink3									
Suffix	AA												
Details	Branch of the Accelerator Pedal												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Aluminum, Normal (per kg)		\$ 4,20	0,271	kg				0,005	0,020	2712	1	\$ 1,14
													Sub Total \$ 1,14
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30					
20	Machining	Side and si	\$ 0,04	cm^3	43,6	Material - Aluminum	1	\$ 1,74					
30	Machining Setup, Change		\$ 0,65	unit	1			\$ 0,65					
40	Machining	front	\$ 0,04	cm^3	0,2	Material - Aluminum	1	\$ 0,01					
							Sub Total	\$ 3,70					

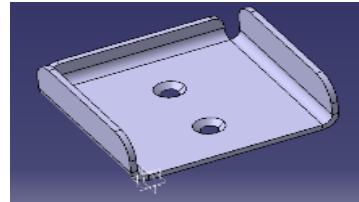


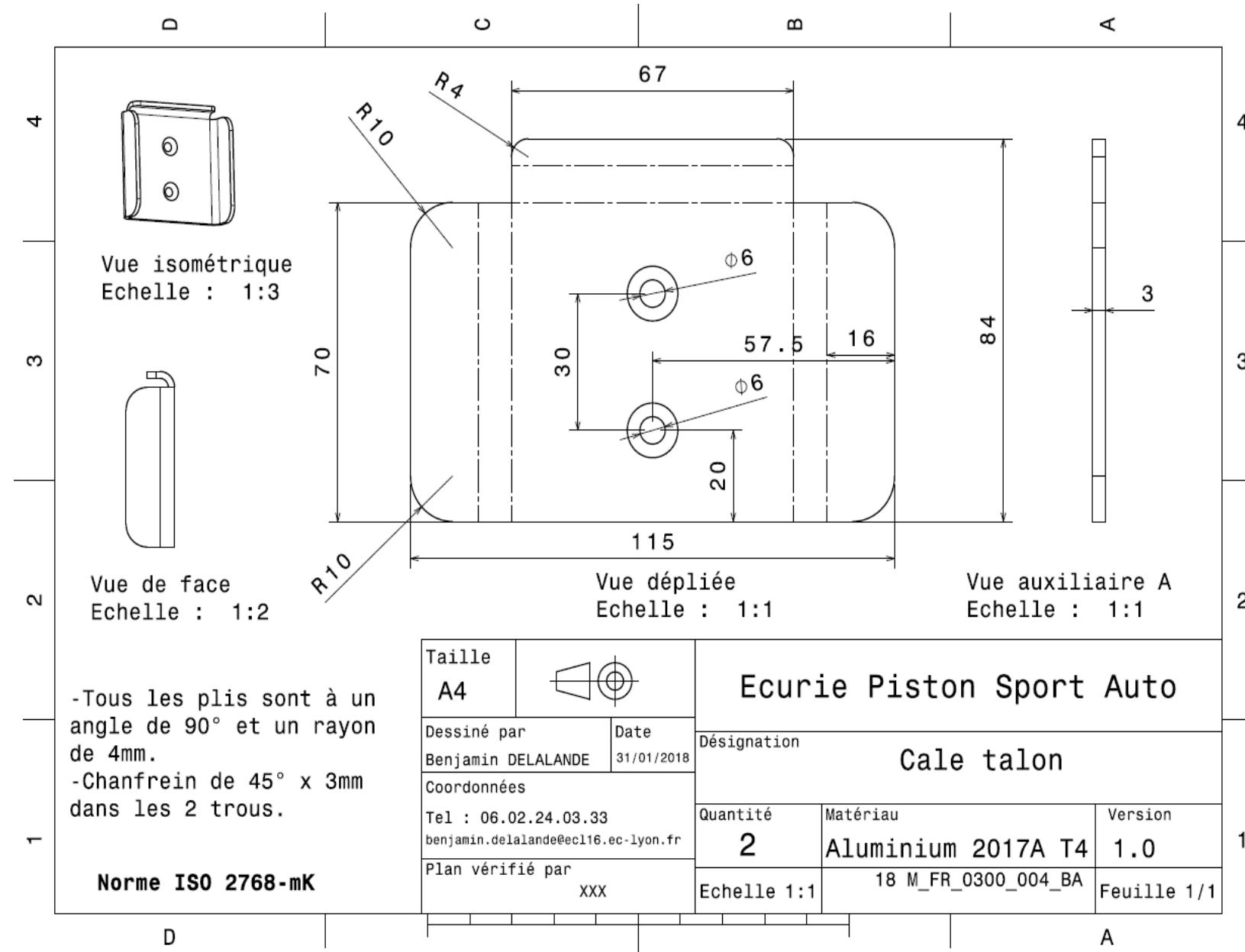
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System	Frame and Body		Qty	2	FileLink1									
Assembly	Pedal box		FileLink2		FileLink3									
Part	Foot Top Support				Extended	\$ 4,20								
P/N Base	FR 03004													
Suffix	AA													
Details	Support for the top of the foot													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Aluminum, Normal (per kg)		\$ 4,20	0,074	kg			frontal area	1,09E-02	2,50E-03	2712	1	\$ 0,31	
													Sub Total	\$ 0,31
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	Laser cut		\$ 0,01	cm	35,9	Material - Aluminum	1	\$ 0,36						
30	Sheet metal bends		\$ 0,25	bend	3			\$ 0,75						
40	Hand Finish - Material Removal	Chamfer	\$ 0,20	cm^3	0,162	Material - Aluminum	1	\$ 0,03						
							Sub Total	\$ 1,79						



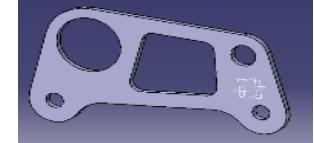


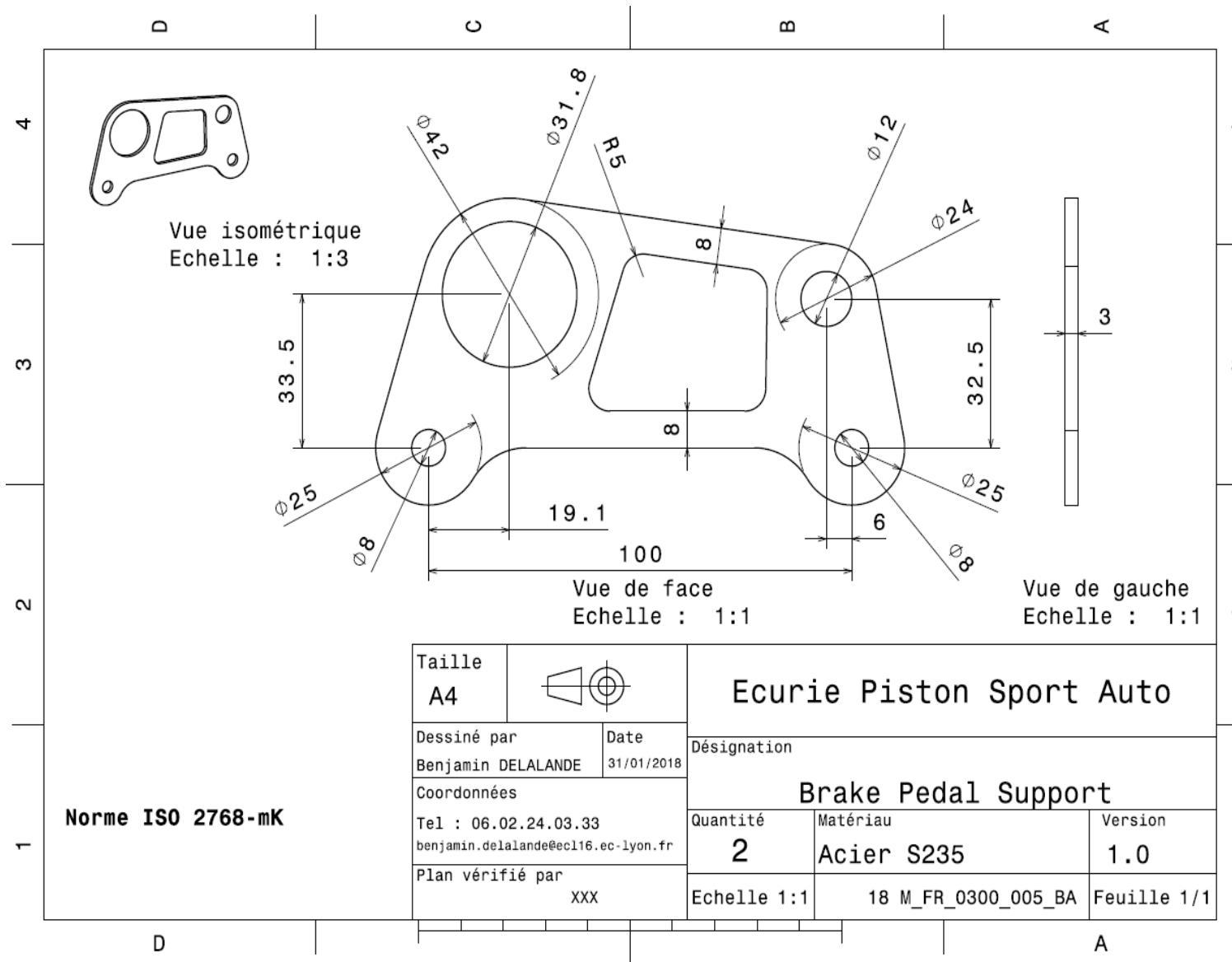
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System	Frame and Body											Drawing	FileLink1	Qty	2	
Assembly	Pedal box											FileLink1	FileLink2	FileLink3	Extended	\$ 4,03
Part	Heel Support											FileLink1	FileLink2	FileLink3		
P/N Base	FR 03005											FileLink1	FileLink2	FileLink3		
Suffix	AA											FileLink1	FileLink2	FileLink3		
Details	Support for the heel											FileLink1	FileLink2	FileLink3		
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2		Unit2	Area Name	Area	Length	Density	Quantity	Sub Total		
10	Aluminum, Normal (per kg)		\$ 4,20	0,065	kg				frontal area	9,58E-03	2,50E-03	2712	1	\$ 0,27	Sub Total	\$ 0,27
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	Laser cut		\$ 0,01	cm	31,2	Material - Aluminum		1	\$ 0,31							
30	Sheet metal bends		\$ 0,25	bend	3				\$ 0,75							
40	Hand Finish - Material Removal	Chamfer	\$ 0,20	cm^3	0,162	Material - Aluminum		1	\$ 0,03							
								Sub Total	\$ 1,74							

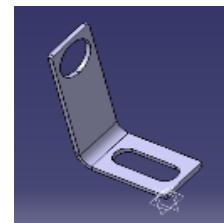


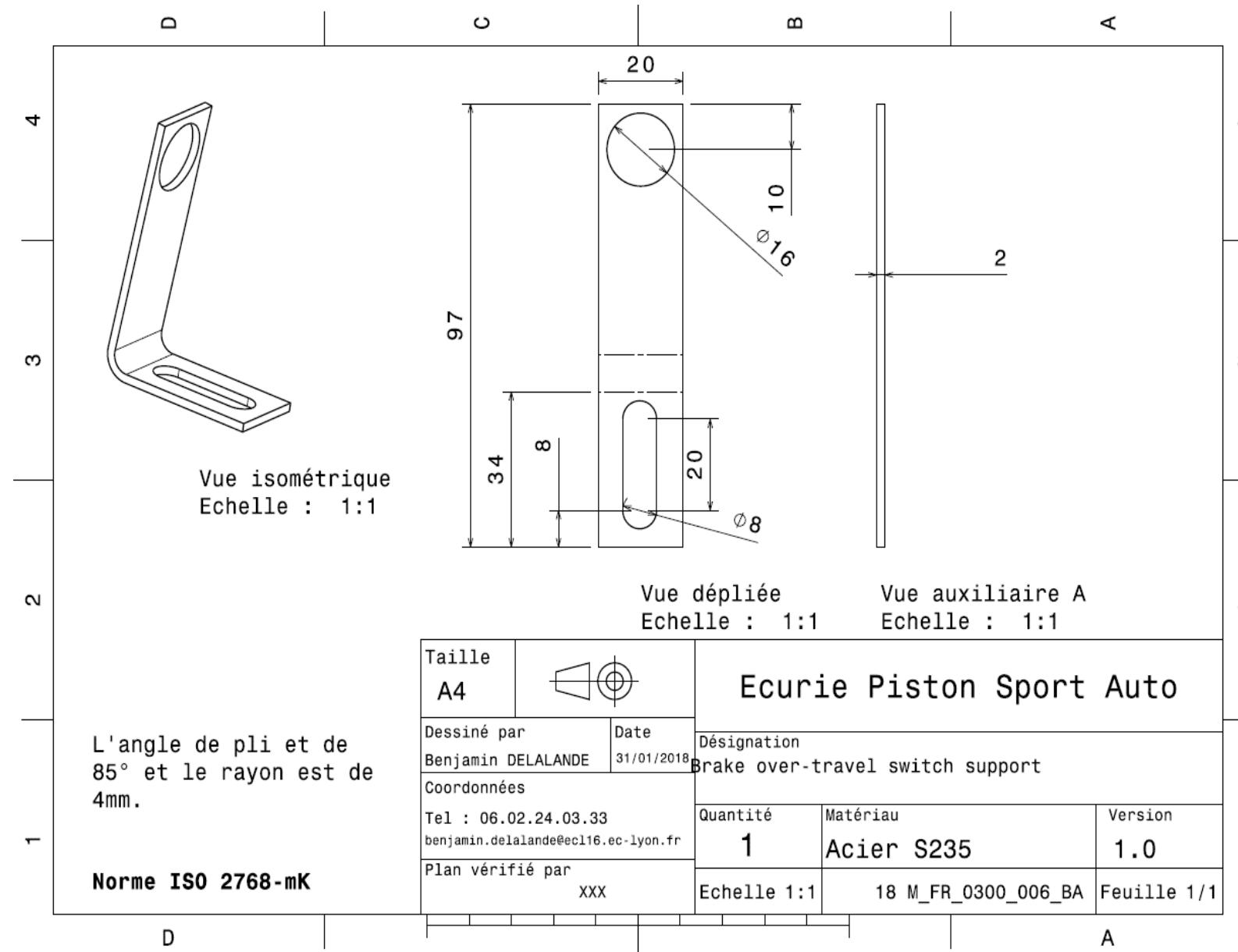


University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 3,26								
System	Frame and Body		Qty	2										
Assembly	Pedal box		FileLink1											
Part	Brake Pedal Support		FileLink2											
P/N Base	FR 03006		FileLink3											
Suffix	AA													
Details	Side Support for the Brake Pedal													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy		\$ 2,25	0,206	kg			frontal area	8,75E-03	0,003	7850	1	\$ 0,46	
20	Paint		\$ 10,00	0,010	m^2								\$ 0,10	
													Sub Total \$ 0,56	
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	Laser Cut		\$ 0,01	cm	66,6	Material - Steel	3	\$ 2,00						
30	Aerosol apply	To protect part from rust	\$ 5,25	m^2	0,010		1	\$ 0,05						Sub Total \$ 2,70

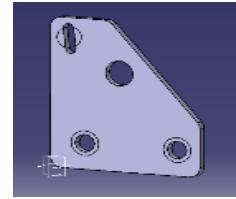




University	Ecole Centrale de Lyon	Back to BOM								Car #	81	Part Cost	\$ 2,03	
System	Frame and Body									Qty	1			
Assembly	Pedal box									FileLink1				
Part	Brake over-travel switch support									FileLink2				
P/N Base	FR 03007									FileLink3				
Suffix	AA									Extended	\$ 2,03			
Details	Support for the Brake Over-Travel Switch									FileLinks				
<hr/>														
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy		\$ 2,25	0,031	kg			frontal Area	0,002	0,002	7850	1	\$ 0,07	
20	Paint		\$ 10,00	0,004	m^2								\$ 0,04	
													Sub Total	\$ 0,11
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30						
20	Laser Cut		\$ 0,01	cm	11,7	Material - Steel	3	\$ 0,35						
30	Sheet metal bends		\$ 0,25	bend	1			\$ 0,25						
40	Aerosol apply	To protect part from rust	\$ 5,25	m^2	0,004			\$ 0,02						
													Sub Total	\$ 1,92
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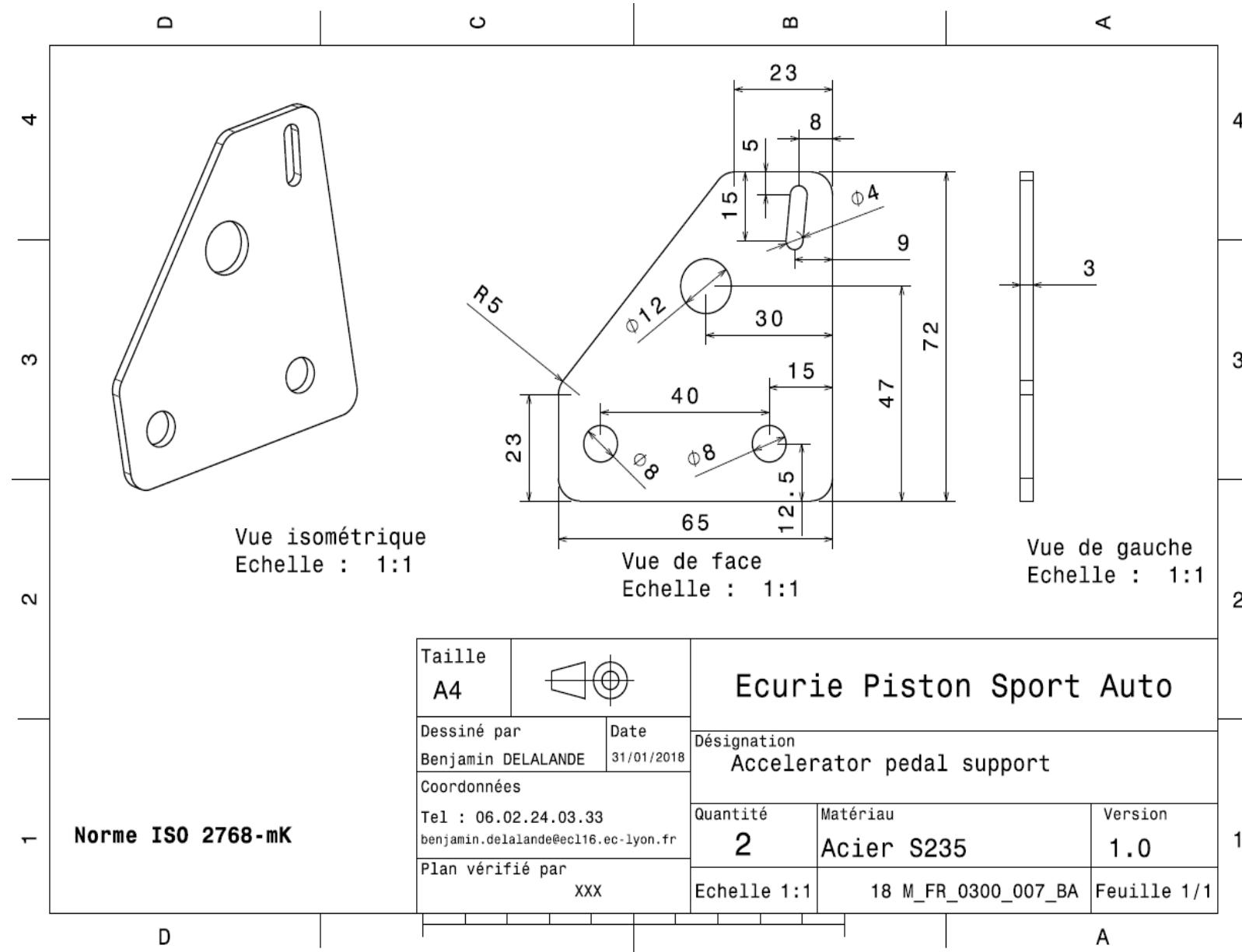


University	Ecole Centrale de Lyon	Car #	81										
System	Frame and Body	Part Cost	\$ 2,12										
Assembly	Pedal box	Qty	2										
Part	Accelerator pedal support	FileLink1											
P/N Base	FR 03008	FileLink2											
Suffix	AA	FileLink3											
Details	Side Support for the Accelerator Pedal												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Alloy		\$ 2,25	0,110	kg			frontal area	4,68E-03	0,003	7850	1	\$ 0,25
20	Paint		\$ 10,00	0,008	m^2								\$ 0,08
													Sub Total \$ 0,33
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	Laser Cut		\$ 0,01	cm	36,6	Material - Steel	3	\$ 1,10					
30	Aerosol apply	To protect	\$ 5,25	m^2	0,008			\$ 0,04					
							Sub Total	\$ 1,79					

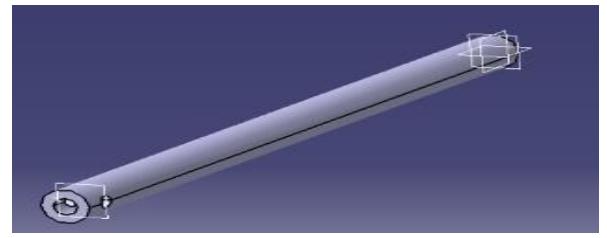


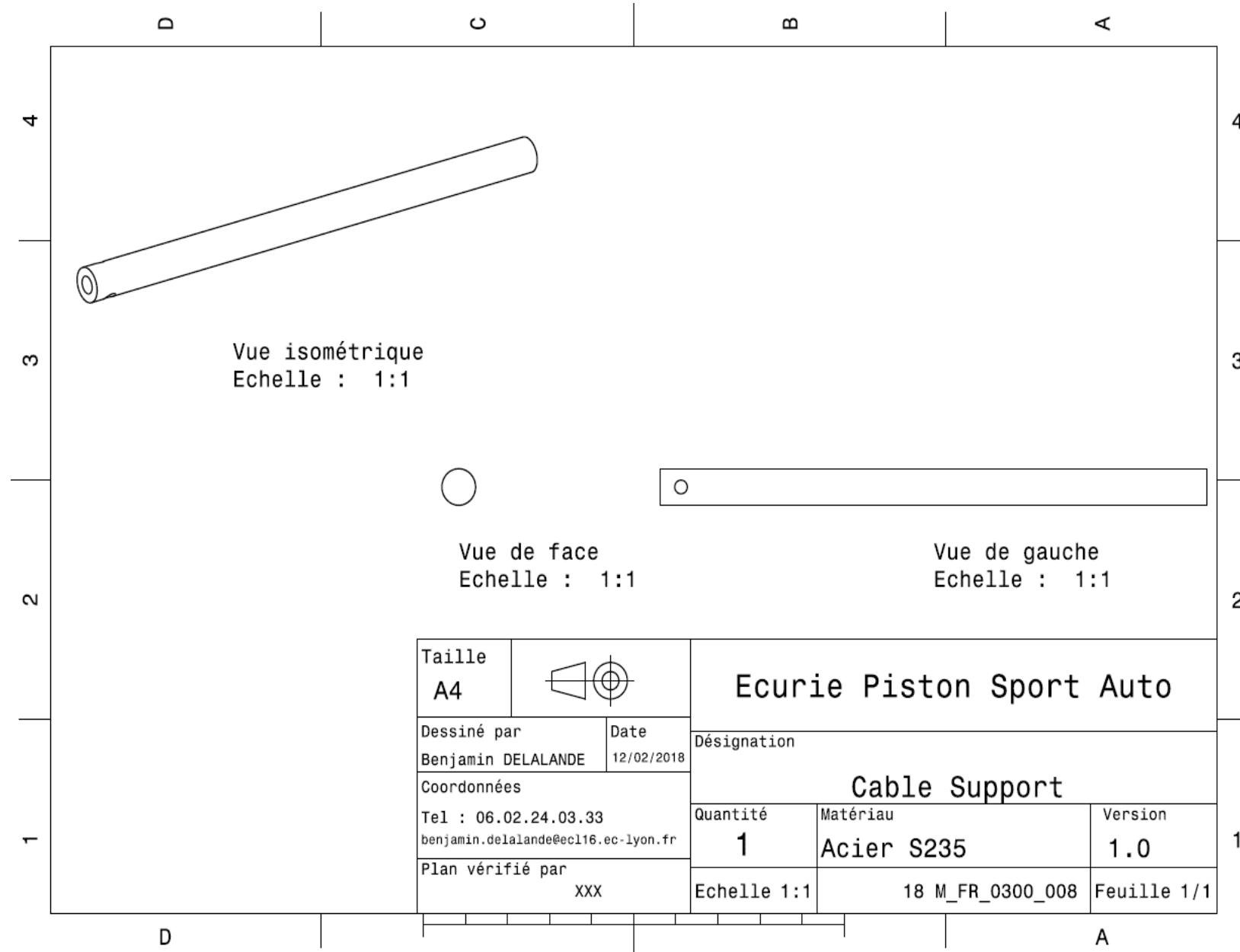
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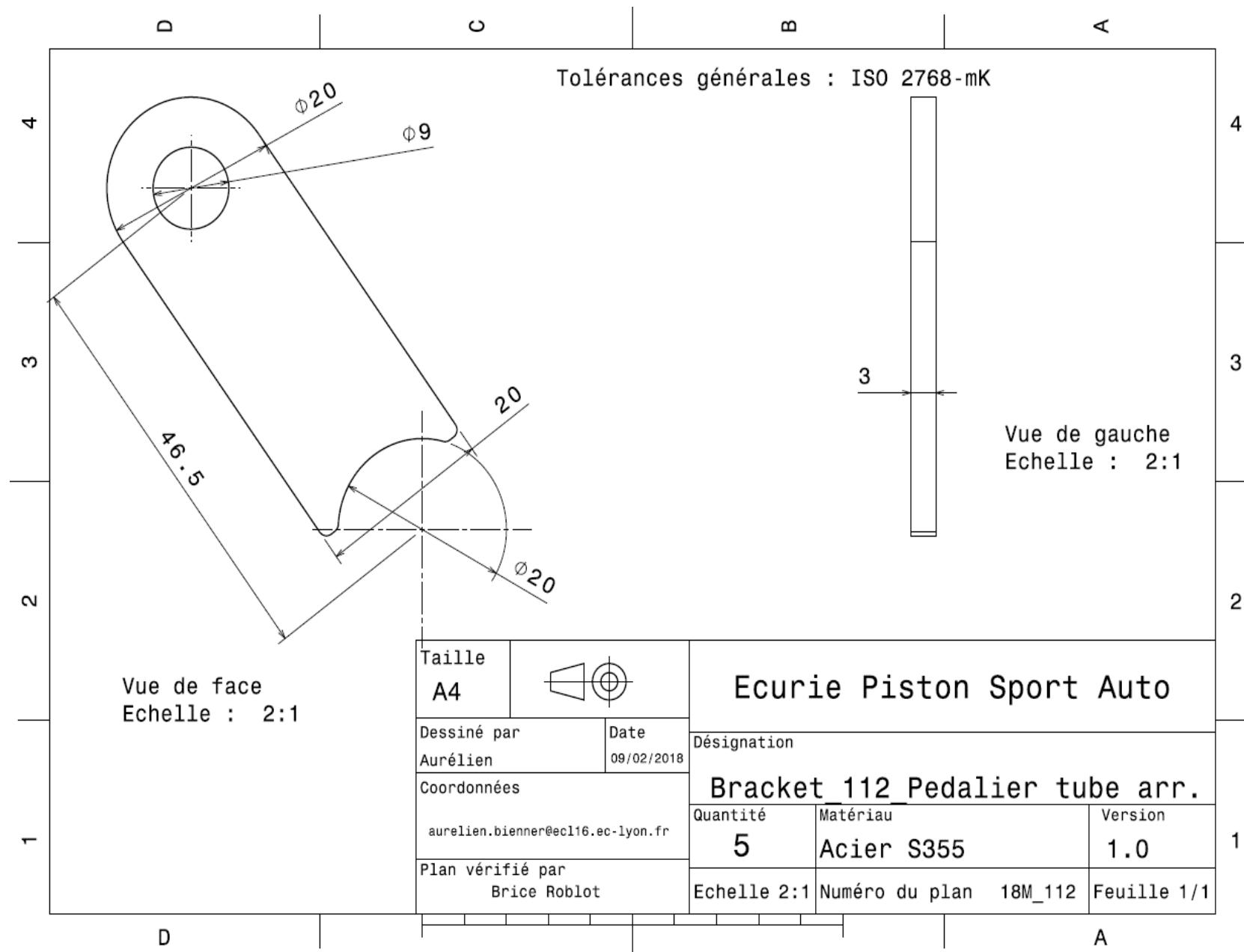


University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 4,21								
System	Frame and Body		Qty	1										
Assembly	Pedal box		FileLink1											
Part	Cable Support		FileLink2											
P/N Base	FR 03009		FileLink3											
Suffix	AA													
Details	Part supporting the Brake Cable													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy		\$ 2,25	0,051	kg				5,03E-05	0,130	7850	1	\$ 0,12	
													Sub Total	\$ 0,12
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30						
20	Threading, External (machining)		\$ 0,10	cm	4,0	Material - Steel	3	\$ 1,20						
30	Machining Setup, Change		\$ 0,65	unit	1			\$ 0,65						
40	Drilled holes < 25.4 mm dia.		\$ 0,35	hole	1			\$ 0,35						
50	Threading, Internal (machining)		\$ 0,10	cm	0,8	Material - Steel	3	\$ 0,24						
60	Drilled holes < 25.4 mm dia.		\$ 0,35	hole	1			\$ 0,35						
							Sub Total	\$ 4,09						





University	Ecole Centrale de Lyon	Back to BOM		Car #	81	Part Cost	\$ 0,86							
System	Frame and Body			Qty	4									
Assembly	Pedal box			FileLink1		FileLink2								
Part	Rear Rail Mount			FileLink3		Extended C	\$ 3,44							
P/N Base	FR 03010													
Suffix	AA													
Details	Rear Mount to fix the Rail													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy		\$ 2,25	0,024	kg				1,02E-03	0,003	7850	1	\$ 0,05	
													Sub Total	\$ 0,05
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit	1	4 parts cut from a single machine setup	0,25	\$ 0,33						
20	Laser Cut		\$ 0,01	cm	16,03	Material -Steel	3	\$ 0,48						
							Sub Total	\$ 0,81						



University	Ecole Centrale de Lyon											Car #	81	Part Cost	\$ 0,80
System	Frame and Body											Qty	4		
Assembly	Pedal box											FileLink1			
Part	Front Rail Mount											FileLink2			
P/N Base	FR 03011											FileLink3			
Suffix	AA											Extended	\$ 3,18		
Details	Front Mount to fix the Rail											FileLink1			
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2		Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy		\$ 2,25	0,031	kg					1,32E-03	0,003	7850	1	\$ 0,07	
													Sub Total	\$ 0,07	
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier		Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit		1	4 parts cut from a single machine setup	0,25	\$ 0,33						
20	Laser Cut		\$ 0,01	cm	13,34	Material - Steel		3	\$ 0,40						
								Sub Total	\$ 0,73						

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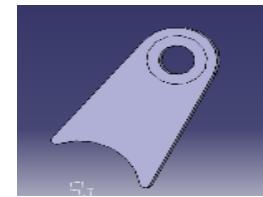
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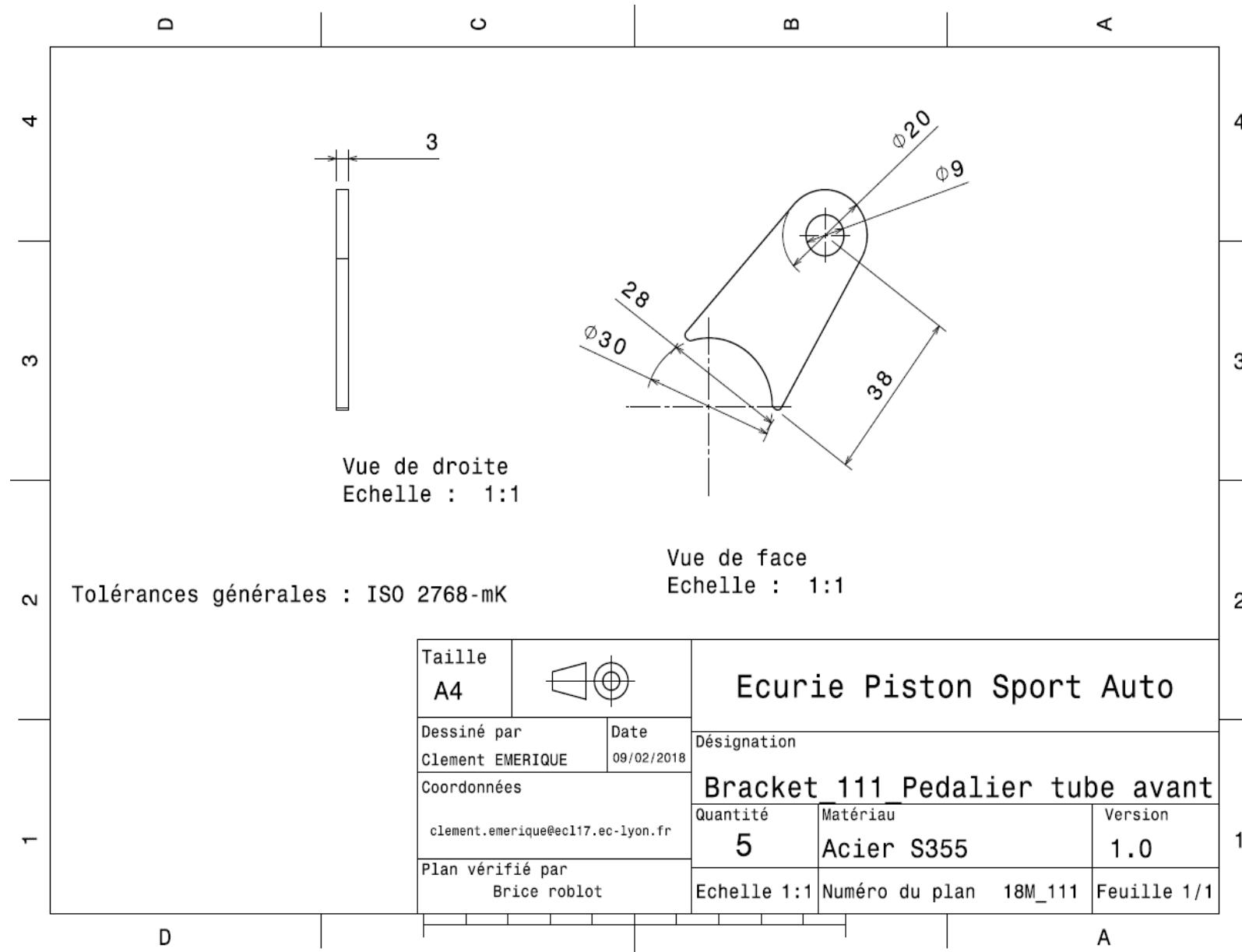
[Car #](#) 81

[Part Cost](#) \$ 0,80
[Qty](#) 4

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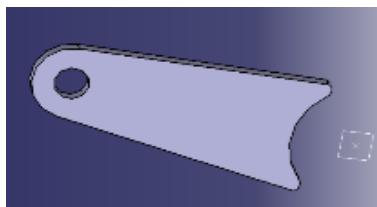
[Extended](#) \$ 3,18



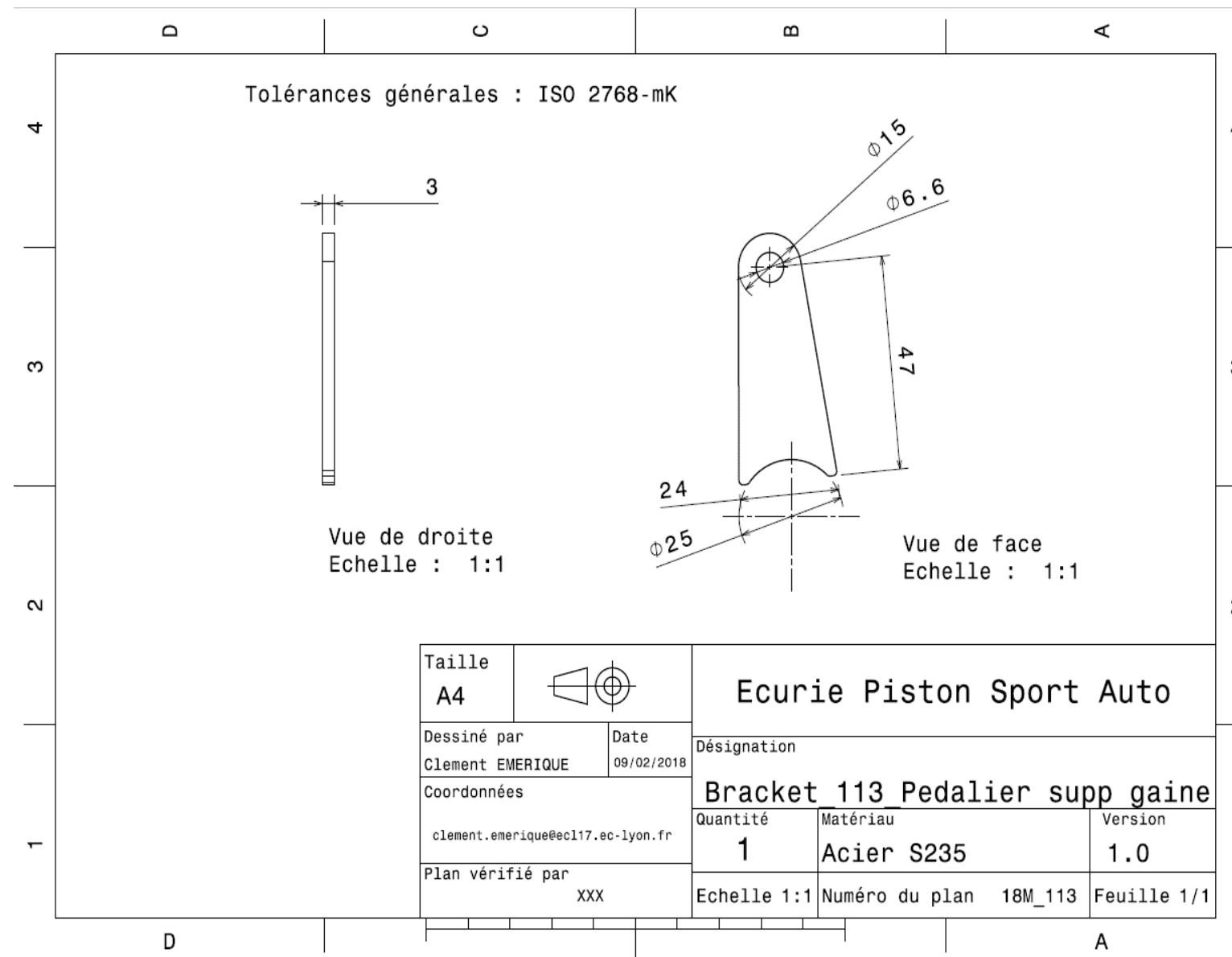


University	Ecole Centrale de Lyon	Car #	81	Part Cost	\$ 1,86									
System	Frame and Body	Qty	1											
Assembly	Pedal box	FileLink1												
Part	Sheath for cable mount	FileLink2												
P/N Base	FR 03012	FileLink3												
Suffix	AA			Extended	\$ 1,86									
Details	Mount which hold the Sheath for Cable													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy		\$ 2,25	0,030	kg				1,29E-03	0,003	7850	1	\$ 0,07	
													Sub Total	\$ 0,07
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30						
20	Laser Cut		\$ 0,01	cm	16,23	Material - Steel	3	\$ 0,49						
								Sub Total	\$ 1,79					

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[FileLink1](#) [Drawing](#)
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[FileLink3](#)



University	Ecole Centrale de Lyon													
System	Frame and Body													
Assembly	Floor Pan													
P/N Base	FR A0400													
Suffix	AA													
Details	The assembly of the floor pan													
ItemOrder	Part	Part Cost	Quantity	Sub Total										
10	Front Floor Pan Plate	\$ 8,18	1	\$ 8,18										
20	Back Floor Pan Plate	\$ 20,07	1	\$ 20,07										
30	Floor Pan Bracket	\$ 0,51	10	\$ 5,06										
				Sub Total \$ 33,31										
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Paint	Painting the Brackets	\$ 10,00	1,25E-02	m^2								1,25E-02	\$ 0,12
													Sub Total	\$ 0,12
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Weld	Welding Brackets to the frame	\$ 0,15	cm	25			\$ 3,75						
20	Aerosol Apply	Painting the Brackets	\$ 5,25	m^2	1,25E-02			\$ 0,07						
30	Assemble, 3 kg, Line-on-Line	Positioning the Front Floor Pan Plate on the Brackets	\$ 0,38	unit	4			\$ 1,52						
40	Ratchet <= 6.35 mm	Fixing the Front Floor Pan Plate to the Brackets	\$ 0,50	unit	4			\$ 2,00						
50	Reaction Tool <= 6.35 mm	Fixing the Front Floor Pan Plate to the Brackets	\$ 0,25	unit	4			\$ 1,00						
60	Assemble, 3 kg, Line-on-Line	Positioning the Back Floor Pan Plate on the Brackets	\$ 0,38	unit	6			\$ 2,28						
70	Ratchet <= 6.35 mm	Fixing the Back Floor Pan Plate to the Brackets	\$ 0,50	unit	6			\$ 3,00						
80	Reaction Tool <= 25.4 mm	Fixing the Back Floor Pan Plate to the Brackets	\$ 0,25	unit	6			\$ 1,50					Sub Total	\$ 15,12
ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total					
10	Bolt, Grade 8.8 (SAE 5)	Fixing the Front and Rear Plates to the Brackets	\$ 0,02	4	mm	20	mm	10	\$ 0,22					
20	Washer, Grade 8.8 (SAE 5)	Fixing the Front and Rear Plates to the Brackets	\$ 0,01					20	\$ 0,20					
30	Nut, Grade 8.8 (SAE 5)	Fixing the Front and Rear Plates to the Brackets	\$ 0,02	4	mm			10	\$ 0,20				Sub Total	\$ 0,62
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total						
10	Welds - Welding Fixture	Brackets welded to the chassis	\$ 500,00	point	20	3000	1	\$ 3,33					Sub Total	\$ 3,33

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Car # 81

Asm Cost \$ 52,50

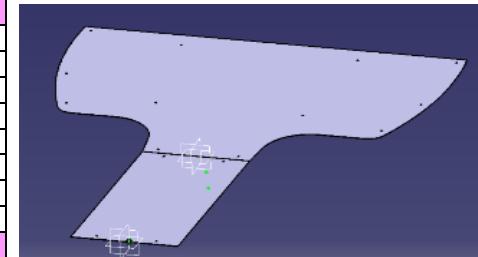
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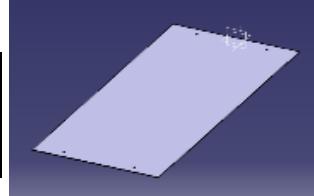
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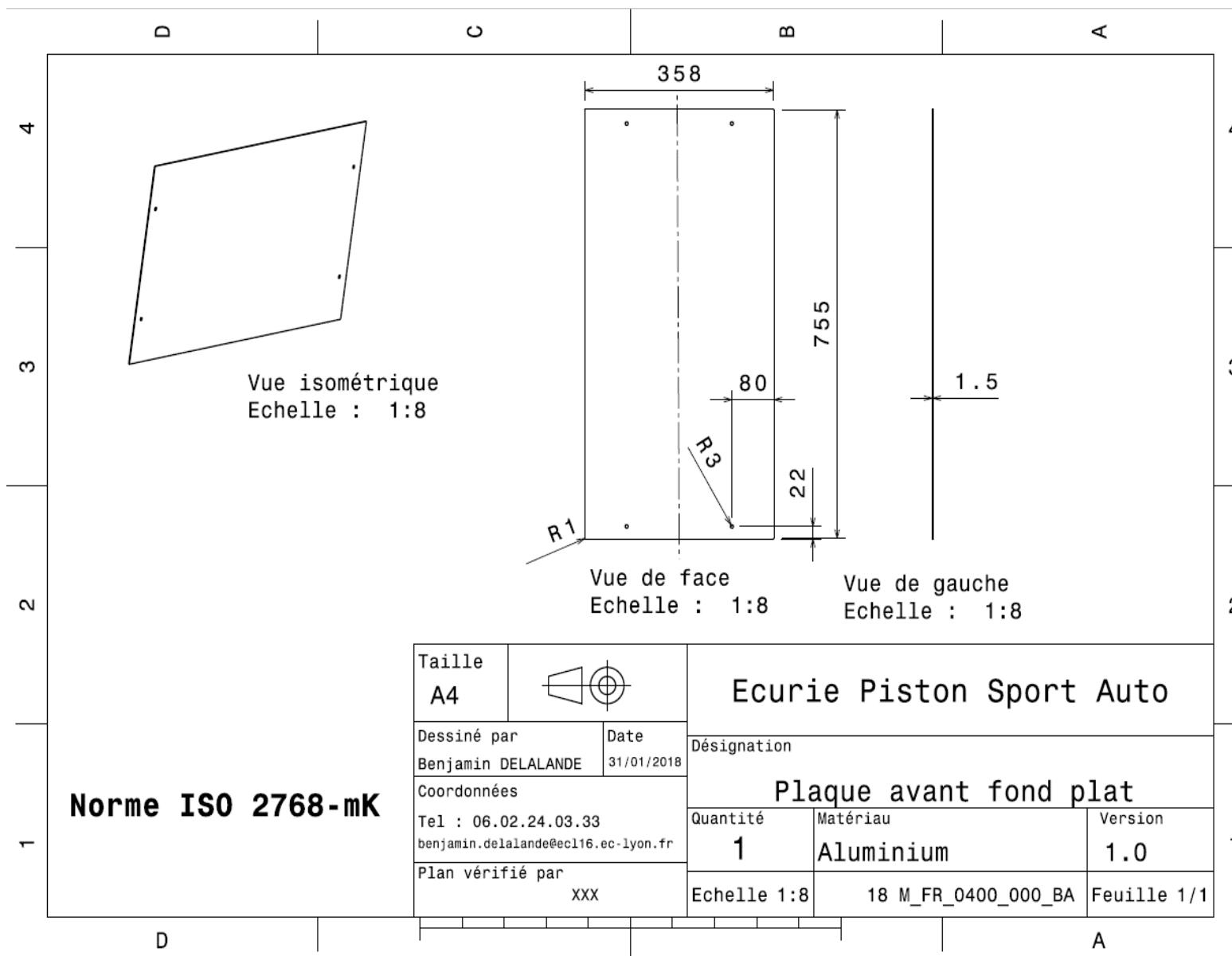
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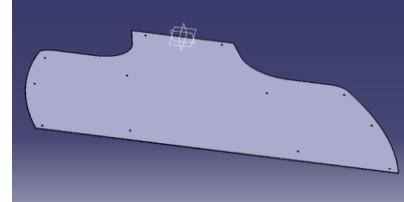
Extended Cost \$ 52,50

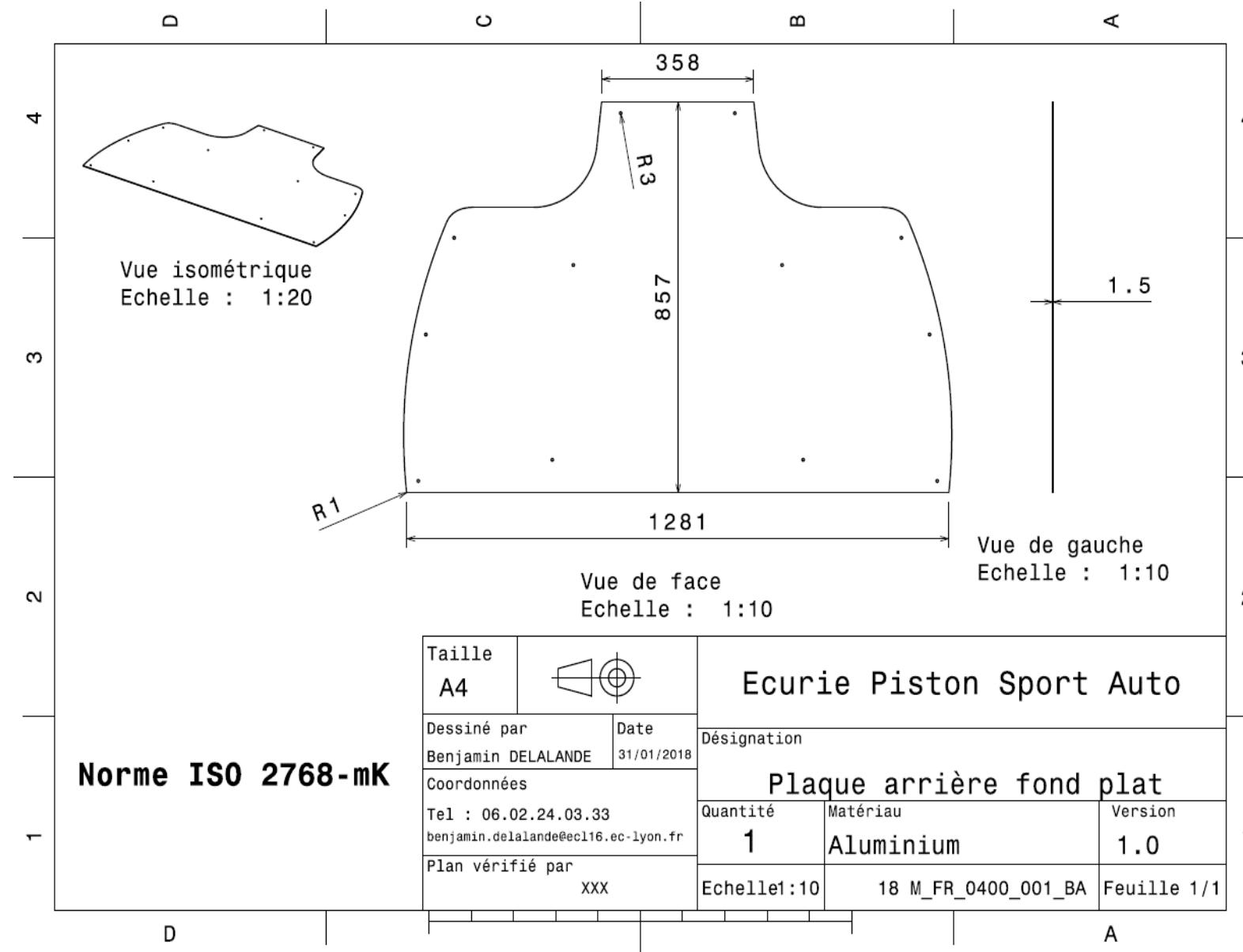


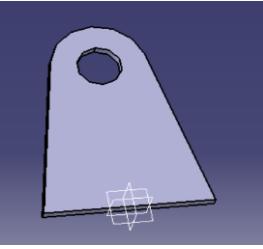
University	Ecole Centrale de Lyon	Back to BOM										Car #	81	Part Cost	\$ 8,18		
System	Frame and Body											Qty	1				
Assembly	Floor Pan											FileLink1					
Part	Front Floor Pan Plate											FileLink2					
P/N Base	FR 04001											FileLink3					
Suffix	AA											Extended Cost	\$ 8,18				
Details																	
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total				
10	Aluminum, Normal (per kg)		\$ 4,20	1,108	kg				2,72E-01	1,50E-03	2712	1	\$ 4,65		Sub Total	\$ 4,65	
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total									
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30									
20	Laser Cut		\$ 0,01	cm	222,60	Material - Aluminum	1	\$ 2,23									
							Sub Total	\$ 3,53									

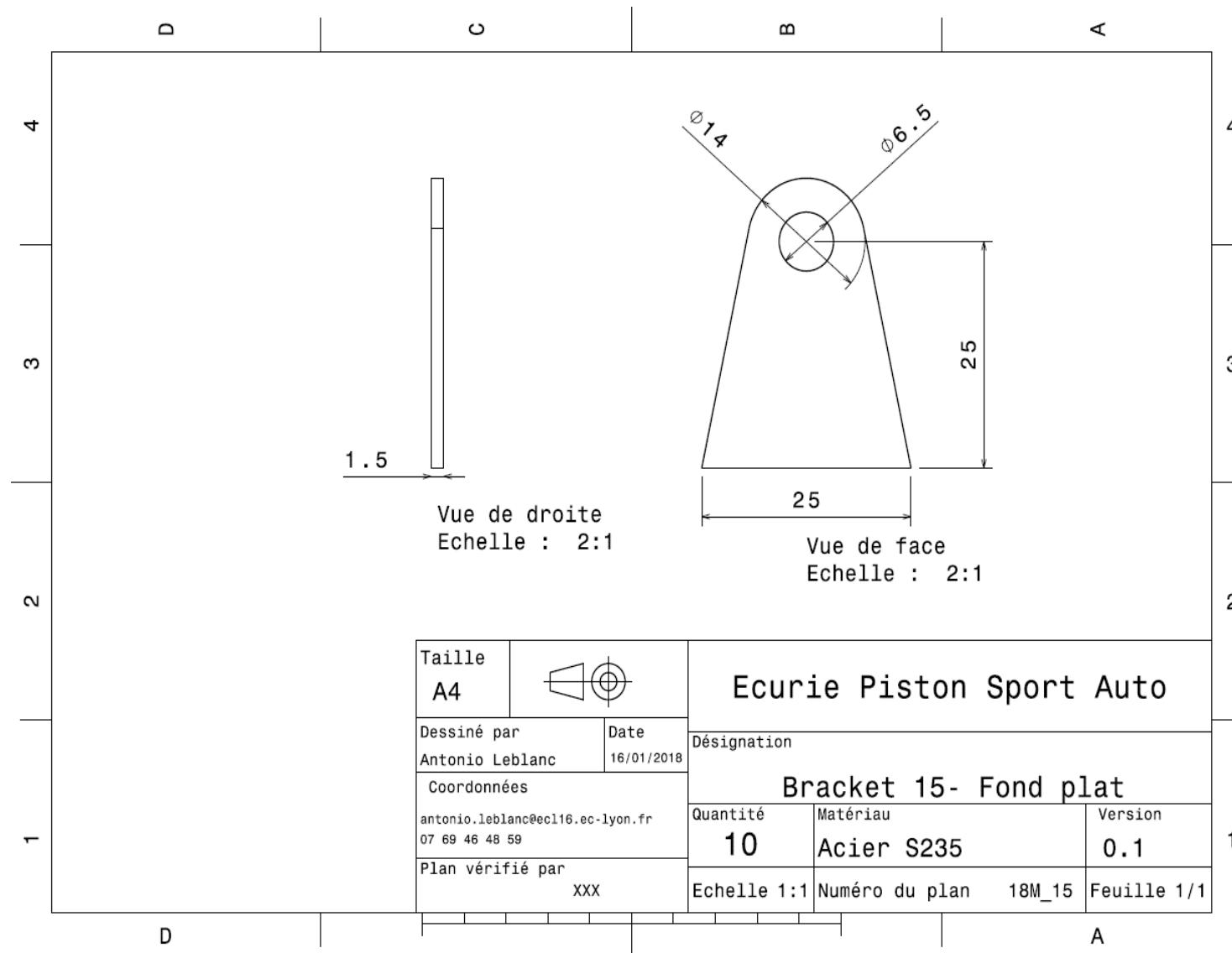


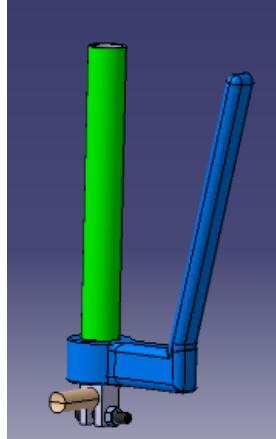
University	Ecole Centrale de Lyon	Back to BOM										Car #	81	Part Cost	\$ 20,07
System	Frame and Body											Qty	1		
Assembly	Floor Pan											FileLink1			
Part	Back Floor Pan Plate											FileLink2			
P/N Base	FR 04002											FileLink3			Extended C \$ 20,07
Suffix	AA														
Details															
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total		
10	Aluminum, Normal (per kg)		\$ 4,20	3,535	kg					0,869	1,50E-03	2712	1	\$ 14,85	
													Sub Total	\$ 14,85	
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total							
10	Machining Setup, Install and remove		\$ 1,30	unit	1										
20	Laser Cut		\$ 0,01	cm	392,2	Material - Aluminum	1	\$ 3,92							
							Sub Total	\$ 5,22							





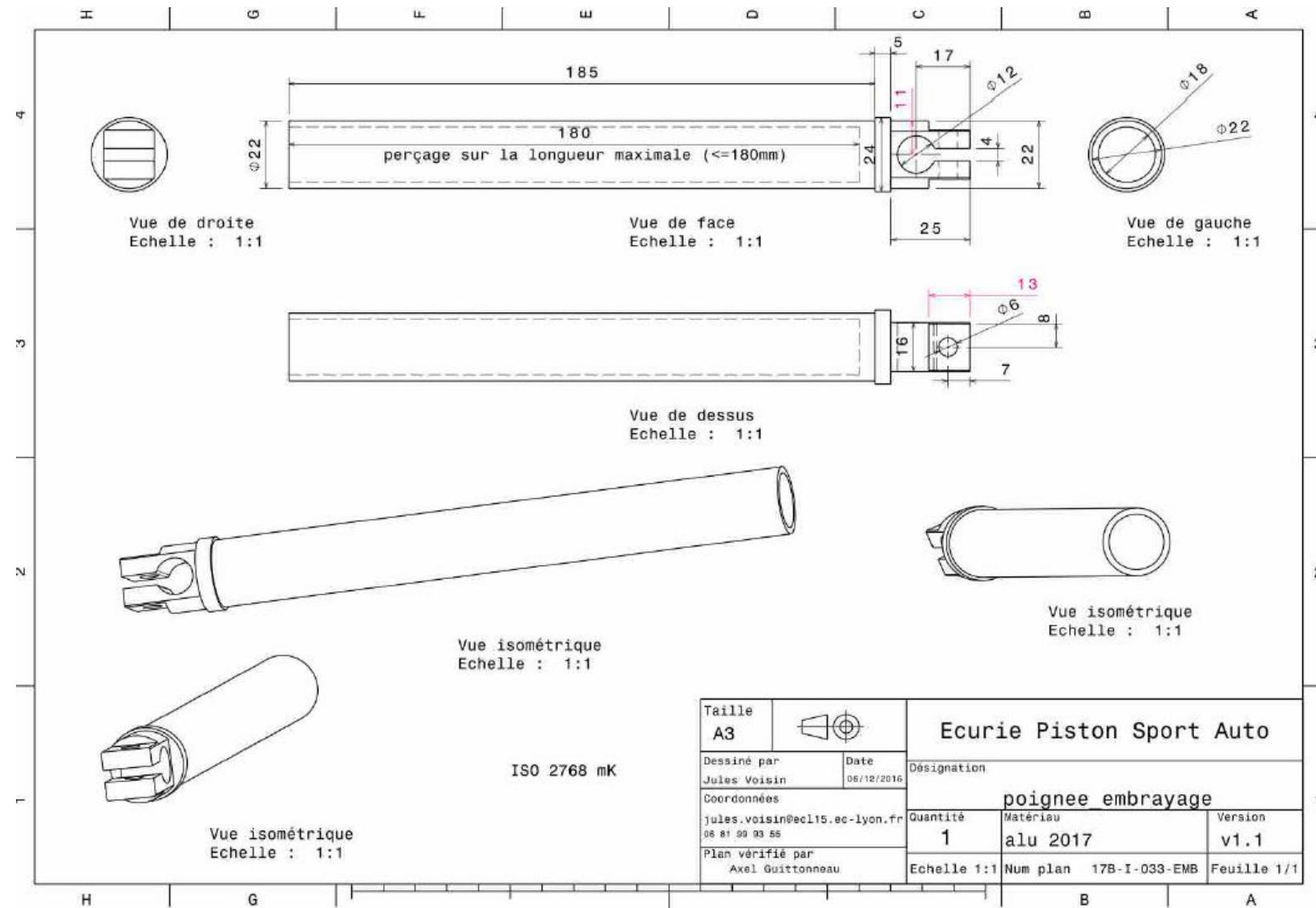
University	Ecole Centrale de Lyon	Back to BOM		Car #	81	Part Cost	\$ 0,51							
System	Frame and Body					Qty	10							
Assembly	Floor Pan	FileLink1	Drawing	FileLink1										
Part	Floor Pan Bracket	FileLink2		FileLink2										
P/N Base	FR 04003	FileLink3		FileLink3		Extended	\$ 5,06							
Suffix	AA													
Details														
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy		\$ 2,25	0,010	kg				8,25E-04	1,50E-03	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	10 parts cut from a single machine setup	0,1	\$ 0,13						
20	Laser Cut		\$ 0,01	cm	11,80	Material -Steel	3	\$ 0,35						
							Sub Total	\$ 0,48						



University	Ecole Centrale de Lyon	Back to BOM		Car #	81	Asm Cost	\$ 58,11						
System	Frame and Body			Qty	1								
Assembly	Clutch actuation system			FileLink1									
P/N Base	FR A0500			FileLink2									
Suffix	AA			FileLink3									
Details	made in 2017												
ItemOrder	Part	Part Cost	Quantity	Sub Total									
10	Lever Handle	\$ 4,37	1	\$ 4,37									
20	Handle padding	\$ 7,40	1	\$ 7,40									
30	Clutch mount	\$ 2,37	1	\$ 2,37									
40	Lever joint	\$ 11,77	1	\$ 11,77									
50	Actuation lever	\$ 10,15	1	\$ 10,15									
				Sub Total	\$ 36,06								
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Cable, Pull	Clutch actuation	\$ 15,00							1,10		1	\$ 16,50
20	Paint	Protect clutch from rust	\$ 10,00	0,05	m^2							1	\$ 0,50
30	Cable adjuster	Clutch cable	\$ 1,00									2	\$ 2,00
												Sub Total	\$ 19,00
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Weld	Welding clutch mount on frame	\$ 0,15	unit	6		1	\$ 0,90					
20	Aerosol Apply	Protect clutch mount from rust	\$ 5,25	m^2	0,05		1	\$ 0,26					
30	Assemble, 1kg, Line-on-Line	Connect lever handle with clutch mount	\$ 0,13	unit	1		1	\$ 0,13					
40	Assemble, 1kg, Loose	Put handle padding on lever handle	\$ 0,06	unit	1		1	\$ 0,06					
50	Ratchet <= 6,35 mm	Install M6 bolt between mount and lever handle	\$ 0,50	unit	1		1	\$ 0,50					
60	Reaction Tool <= 6,35 mm	Install M6 nut blocking	\$ 0,25	unit	1		1	\$ 0,25					
70	Assemble, 1kg, Interference	Put lever joint on lever handle	\$ 0,19	unit	1		1	\$ 0,19					
80	Assemble, 1kg, Line-on-Line	Put clutch cable on clutch lever	\$ 0,13	unit	1		1	\$ 0,13					
90	Assemble, 1kg, Interference	Connect cable on engine	\$ 0,19	unit	1		1	\$ 0,19					
							Sub Total	\$ 2,60					
ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total				
10	Bolt, Grade 8.8 (SAE 5)		\$ 0,07	6	mm	32	mm	1	\$ 0,07				
20	Nut, Grade 8,8 (SAE 5)		\$ 0,03	6	mm			1	\$ 0,03				
30	Washer, Grade 8.8 (SAE 5)		\$ 0,01					2	\$ 0,02				
								Sub Total	\$ 0,12				
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIn	Sub Total					
10	Welds - Welding Fixture	Welding clutch mount on frame	\$ 500,00	point	2	3000	1	\$ 0,33					
							Sub Total	\$ 0,33					

University	Ecole Centrale de Lyon									Back to BOM	Car #	81	Part Cost	\$ 4,37
System	Frame and Body									FileLink1	Drawing	FileLink1	Qty	1
Assembly	Clutch actuation system									FileLink2		FileLink2	Extended Cost	\$ 4,37
Part	Lever Handle									FileLink3		FileLink3		
P/N Base	FR 05001													
Suffix	AA													
Details														
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Aluminum	Stock material for part	\$ 4,20	0,222	kg			Bar 381 mm Square	3,81E-04	0,215	2712	1	\$ 0,93	Sub Total \$ 0,93
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit	1		1	\$ 1,30						
20	Machining	Main shape contouring	\$ 0,04	cm	8	Material -Aluminum	1	\$ 0,31						
30	Machining Setup, Change		\$ 0,65	unit	1		1	\$ 0,65						
40	Machining		\$ 0,04	cm^3	1	Material -Aluminum	1	\$ 0,05						
50	Machining Setup, Change		\$ 0,65	unit	1		1	\$ 0,65						
60	Machining		\$ 0,04	cm^3	3,3	Material -Aluminum	1	\$ 0,13						
70	Drilled holes < 25,4 mm dia.	Weigth reduction	\$ 0,35	hole	1	Material -Aluminum	1	\$ 0,35						
							Sub Total	\$ 3,44						



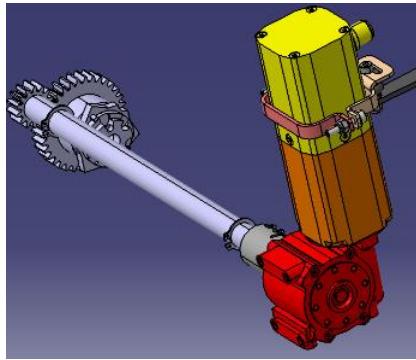


University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 7,40							
System	Frame and Body		Qty	1									
Assembly	Clutch actuation system		FileLink1										
Part	Handle padding		FileLink2										
P/N Base	FR 05002		FileLink3										
Suffix	AA				Extended	\$ 7,40							
Details					FileLink3								
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Rubber	Smooth hand contact	\$ 3,30	0,100	kg							1100	1 \$ 0,33
													Sub Total \$ 0,33
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Die casting	Produce handle padding	\$ 4,00	kg	0,1		1	\$ 0,40					
							Sub Total	\$ 0,40					
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FracInId	Sub Total					
10	Die casting - Die	Produce handle padding	\$ 10 000,00	die	2	3000	1	\$ 6,67					
							Sub Total	\$ 6,67					

University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 2,37								
System	Frame and Body		Qty	1										
Assembly	Clutch actuation system	FileLink1	FileLink1											
Part	Clutch mount	FileLink2	FileLink2											
P/N Base	FR 05003	FileLink3	FileLink3		Extended Cost	\$ 2,37								
Suffix	AA													
Details														
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, mild	Stock material for part	\$ 2,25	0,043	kg			Bar 113mm Square	1,13E-04	0,048	7850	1	\$ 0,10	
													Sub Total \$ 0,10	
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30	unit	1			\$ 1,30						
20	Machining		\$ 0,04	cm^3	5			\$ 0,20						
30	Machining Setup, Change		\$ 0,65	unit	1			\$ 0,65						
40	Machining	removing weight	\$ 0,04	cm^3	3			\$ 0,13						
								Sub Total \$ 2,28						

University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 11,77							
System	Frame and Body				Qty	1							
Assembly	Clutch actuation system				FileLink1								
Part	Lever joint				FileLink2								
P/N Base	FR 05004				FileLink3								
Suffix	AA												
Details													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, mild	Stock material for part	\$ 2,25	0,250	kg							7850	1 \$ 0,56
													Sub Total \$ 0,56
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Die casting	Produce lever joint	\$ 4,00	kg	0,25		1	1	\$ 1,00				
20	Machining Setup, Install and remove		\$ 1,30	unit	1			1	\$ 1,30				
30	Machining	Main shape machining	\$ 0,04	cm^3	6	Material - Steel		3	\$ 0,72				
40	Machining Setup, Change		\$ 0,65	unit	1			1	\$ 0,65				
50	Machining	collar machining	\$ 0,04	cm^3	0,6	Material - Steel		3	\$ 0,07				
60	Drilled holes < 25,4 mm dia.	holes	\$ 0,35	hole	2			1	\$ 0,70				
70	Threading, Internal (machining)		\$ 0,10	cm	1			1	\$ 0,10				
							Sub Total	\$ 4,54					
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FracInId	Sub Total					
10	Die casting - Die	Lever joint	\$ 10 000,00	die	2	3000	1	1 \$ 6,67					
							Sub Total	\$ 6,67					

University	Ecole Centrale de Lyon	Back to BOM										Car #	81	Part Cost	\$ 10,15
System	Frame and Body											Qty	1		
Assembly	Clutch actuation system											FileLink1			
Part	Actuation lever											FileLink2			
P/N Base	FR 05005											FileLink3			
Suffix	AA											Extended Cost	\$ 10,15		
Details												FileLink3			
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total		
10	Aluminum, Normal	Stock material for part	\$ 4,20	0,150	kg							2712	1	\$ 0,63	
													Sub Total	\$ 0,63	
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total							
10	Die casting	Produce lever casting	\$ 4,00	kg	0,15		1	1	\$ 0,60						
20	Machining Setup, Install and remove		\$ 1,30	unit	1			1	\$ 1,30						
30	Machining	Main shape machining	\$ 0,04	cm^3	6,3	Material - Aluminum		1	\$ 0,25						
40	Drilled holes < 25,4 mm dia.	holes	\$ 0,35	hole	2			1	\$ 0,70						
							Sub Total	\$ 2,85							
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FracInId	Sub Total							
10	Die casting - Die	Actuation lever	\$ 10 000,00	die	2	3000	1	\$ 6,67							
							Sub Total	\$ 6,67							

University	Ecole Centrale de Lyon	Back to BOM		Car #	81	Asm Cost	\$ 115,48						
System	Frame and Body			Qty	1								
Assembly	Shifter			FileLink1									
P/N Base	FR A0600			FileLink2									
Suffix	AA			FileLink3									
Details				Extended Cost	\$ 115,48								
ItemOrder	Part	Part Cost	Quantity	Sub Total									
10	Engine gear boxx drum gear	\$ 12,69	1	\$ 12,69									
20	Engine gear box shifting pinion shaft	\$ 18,88	1	\$ 18,88									
30	Engine gear box actator tab	\$ 1,60	1	\$ 1,60									
40	Front engine gearbox actuator mount	\$ 2,82	1	\$ 2,82									
50	Rear engine gearbox actuator mount	\$ 2,56	1	\$ 2,56									
60	Engine gearbox actuator coupling	\$ 7,49	1	\$ 7,49									
		Sub Total	\$ 46,04										
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Paint	Protect steel tab from rust	\$ 10,00	0,005	m^2								1 \$ 0,05
20	Motor, 12 Volt,DC Brushless Servo	Engine gearbox actuator	\$ 40,00		1 unit								1 \$ 40,00
30	Mount, Viration-Damping Sandwich	Maintain motor to frame	\$ 2,43		9 mm								1 \$ 2,43
													Sub Total \$ 42,48
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Weld	Welding gear tab on frame	\$ 0,15	cm	5			1 \$ 0,75					
20	Aerosol Apply	Protect gear tab from rust	\$ 5,25	m^2	0,005			1 \$ 0,03					
30	Power Tool <= 25,4 mm	Remove engine case bolts	\$ 0,25	unit	13	Disassemble		0,8 \$ 2,60					
40	Assemble, 3kg, Line-on-Line	Remove engine case	\$ 0,38	unit	1	Disassemble		0,8 \$ 0,30					
50	Power Tool <= 6,35 mm	Remove clutch pressure bolts	\$ 0,25	unit	5	Disassemble		0,8 \$ 1,00					
60	Assemble, 1 kg, Loose	Remove clutch pressure springs	\$ 0,06	unit	5	Disassemble		0,8 \$ 0,25					
70	Assemble, 1 kg, Loose	Remove pressure disc assembly	\$ 0,06	unit	1	Disassemble		0,8 \$ 0,05					
80	Assemble, 1 kg, Loose	Remove clutch disc assembly	\$ 0,06	unit	1	Disassemble		0,8 \$ 0,05					
90	Power Tool <= 25,4 mm	Remove central clutch nut	\$ 0,25	unit	1	Disassemble		0,8 \$ 0,20					
100	Assemble, 1 kg, Loose	Remove central clutch assembly	\$ 0,06	unit	1	Disassemble		0,8 \$ 0,05					
110	Assemble, 1 kg, Loose	Remove clutch guide	\$ 0,06	unit	1	Disassemble		0,8 \$ 0,05					
120	Assemble, 1 kg, Loose	Remove clutch roller case assembly	\$ 0,06	unit	1	Disassemble		0,8 \$ 0,05					
130	Assemble, 1 kg, Loose	Remove clutch flywheel	\$ 0,06	unit	1	Disassemble		0,8 \$ 0,05					
140	Power Tool <= 6,35 mm	Remove shifting shaft retaining bolt	\$ 0,25	unit	5	Disassemble		0,8 \$ 1,00					
150	Assemble, 1 kg, Loose	Remove shifting shaft retaining plate	\$ 0,06	unit	1	Disassemble		0,8 \$ 0,05					
160	Assemble, 3 kg, Line-on-Line	Remove shifting shaft	\$ 0,38	unit	1	Disassemble		0,8 \$ 0,30					
170	Power Tool <= 25,4 mm	Remove shifting shaft stop	\$ 0,25	unit	1	Disassemble		0,8 \$ 0,20					
180	Power Tool <= 6,35 mm	Remove gearsift drum stopper bolt	\$ 0,25	unit	1	Disassemble		0,8 \$ 0,20					
190	Assemble, 1 kg, Interference	Remove shift drum stopper assembly	\$ 0,19	unit	1	Disassemble		0,8 \$ 0,15					
200	Power Tool <= 25,4 mm	Remove shift star bolt	\$ 0,25	unit	1	Disassemble		0,8 \$ 0,20					
210	Assemble, 1 kg, Loose	Mount gearbox drum gear	\$ 0,06	unit	1			1 \$ 0,06					
220	Power Tool <= 25,4 mm	Tighten shift star bolt	\$ 0,25	unit	1			1 \$ 0,25					
230	Assemble, 1 kg, Interference	Mount retaining ring on shifting pinion shaft	\$ 0,19	unit	1			1 \$ 0,19					
240	Assemble, 1 kg, Loose	Mount washer on shifting pinion shaft	\$ 0,06	unit	1			1 \$ 0,06					
250	Assemble, 1 kg, Line-on-Line	Mount shifting pinion shaft	\$ 0,13	unit	1			1 \$ 0,13					
260	Assemble, 1 kg, Loose	Mount washer on shifting pinion shaft	\$ 0,06	unit	1			1 \$ 0,06					
270	Assemble, 1 kg, Interference	Mount retaining ring on shifting pinion shaft	\$ 0,19	unit	1			1 \$ 0,19					
280	Assemble, 1 kg, Line-on-Line	Mount gearbox actuator coupling	\$ 0,13	unit	1			1 \$ 0,13					
290	Assemble, 3 kg, Loose	Mount clutch flywheel	\$ 0,19	unit	1			1 \$ 0,19					
300	Assemble, 1 kg, Loose	Mount clutch roller case assembly	\$ 0,06	unit	1			1 \$ 0,06					
310	Assemble, 1 kg, Loose	Mount clutch guide	\$ 0,06	unit	1			1 \$ 0,06					
320	Assemble, 1 kg, Loose	Mount central clutch	\$ 0,06	unit	1			1 \$ 0,06					
330	Assemble, 1 kg, Loose	Mount central clutch washers	\$ 0,06	unit	1			1 \$ 0,06					
340	Power Tool <= 25,4 mm	Tighten central clutch nut	\$ 0,25	unit	1			0,8 \$ 0,20					
350	Assemble, 1 kg, Loose	Mount clutch discs	\$ 0,06	unit	1			\$ 0,06					
360	Assemble, 1 kg, Loose	Mount pressure disc assembly	\$ 0,06	unit	1			\$ 0,06					
370	Assemble, 1 kg, Loose	Mount clutch pressure springs	\$ 0,06	unit	1			\$ 0,06					
380	Power Tool <= 6,35 mm	Mount clutch pressure bolts	\$ 0,25	unit	5	Fastener Engagement Length > 2D		1,25 \$ 1,56					

390	Assemble, 3 kg, Line-on-Line	Mount engine case	\$ 0,38	unit	1		1	\$ 0,38
400	Power Tool <= 25.4 mm	Mount engine case bolts	\$ 0,25	unit	13	Fastener Engagement Length > 2D	1,25	\$ 4,06
410	Assemble, 1 kg, Loose	Mount front actuator mount	\$ 0,06	unit	1		1	\$ 0,06
420	Assemble, 1 kg, Loose	Mount rear actuator mount	\$ 0,06	unit	1		1	\$ 0,06
430	Assemble, 1 kg, Loose	Mount washers on screws	\$ 0,06	unit	2		1	\$ 0,13
440	Assemble, 1 kg, Loose	Mount screws on actuator mount	\$ 0,06	unit	2		1	\$ 0,13
450	Assemble, 1 kg, Loose	Mount washers on screws	\$ 0,06	unit	2		1	\$ 0,13
460	Hand - Start Only	Mount nut on screws	\$ 0,12	unit	2		1	\$ 0,24
470	Assemble, 3 kg, Line-on-Line	Mount actuator assembly on coupling	\$ 0,38	unit	1		1	\$ 0,38
480	Assemble, 1 kg, Loose	Mount elastomere on tab	\$ 0,06	unit	1		1	\$ 0,06
490	Assemble, 1 kg, Loose	Align rear mount with tab	\$ 0,06	unit	1		1	\$ 0,06
500	Assemble, 1 kg, Loose	Mount washer on elastomere screw	\$ 0,06	unit	1		1	\$ 0,06
510	Wrench <= 6.35 mm	Tighten elastomer screw	\$ 1,00	unit	1	Fastener Engagement Length > 4D	1,5	\$ 1,50
520	Wrench <= 6.35 mm	Tighten actuator mount's bolts	\$ 1,00	unit	2		1,25	\$ 2,50
530	Reaction Tool <= 6.35 mm		\$ 0,25	unit	2			\$ 0,50
540	Wrench <= 6.35 mm	Tighten coupling bolts	\$ 1,00	unit	4		1,25	\$ 5,00

Sub Total \$ 26,22

ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total
10	Bolt,Grade 8.8 (SAE 5)	Fasten star gear to the shaft	\$ 0,16	8	mm		40	mm	1 \$ 0,16
20	Bolt,Grade 8.8 (SAE 5)	Lock actuator between mount brackets	\$ 0,02	4	mm		20	mm	3 \$ 0,06
30	Washer, Grade 8.8 (SAE 5)	Lock actuator between mount brackets	\$ 0,01	4	mm				5 \$ 0,05
40	Nut, Grade 8.8 (SAE 5)	Lock actuator between mount brackets	\$ 0,01	4	mm				2 \$ 0,02
50	Washer, Grade 8.8 (SAE 5)	Make contact between rings and engine case	\$ 0,01	unit					2 \$ 0,02
60	Retaining Ring, External	Retain shifting pinion shaft	\$ 0,05	14	mm				2 \$ 0,10

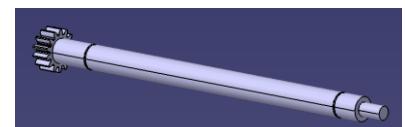
Sub Total \$ 0,41

ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total
10	Welds - Welding Fixture	Welding gear tab	\$ 500,00	point	2		3000	1 \$ 0,33
								Sub Total \$ 0,33

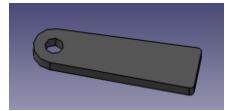
University	Ecole Centrale de Lyon	Back to BOM								Car #	81	Part Cost	\$ 12,69		
System	Frame and Body									Qty	1				
Assembly	Shifter									FileLink1					
Part	Engine gear box drum gear									FileLink2					
P/N Base	FR 06001									FileLink3					
Suffix	AA									FileLink1					
Details										FileLink2					
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total		
10	Steel, Alloy	Material for part	\$ 2,25	0,241	kg							7850	1	\$ 0,54	
												Sub Total	\$ 0,54		
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total							
10	Machining Setup, Install and remove	Setup for machining	\$ 1,30	unit	1		1	\$ 1,30							
20	Machining	Shift star contact	\$ 0,04	cm^3	50	Material - Steel	3	\$ 6,00							
30	Machining Setup, Change		\$ 0,65	unit	1		1	\$ 0,65							
40	Machining	Screw holes	\$ 0,04	cm^3	5	Material - Steel	3	\$ 0,60							
50	Drilled holes < 25,4 mm dia.		\$ 0,35	hole	6		1	\$ 2,10							
60	Gear Shaping (hobbing)		\$ 0,50	cm^3	1	Material - Steel	3	\$ 1,50							
								Sub Total	\$ 12,15						



University	Ecole Centrale de Lyon	Back to BOM								Car #	81	Part Cost	\$ 18,88
System	Frame and Body									Qty	1		
Assembly	Shifter									FileLink1			
Part	Engine gear box shifting pinion shaft									FileLink2			
P/N Base	FR 06002									FileLink3			
Suffix	AA									Extended	\$ 18,88		
Details										FileLink3			
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Alloy	Material for part	\$ 2,25	0,298	kg							7850	1 \$ 0,67
													Sub Total \$ 0,67
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Machining Setup, Install and remove	Setup for machining	\$ 1,30	unit	1		1	\$ 1,30					
20	Machining	Shift star contact	\$ 0,04	cm^3	97	Material - Steel	3	\$ 11,64					
30	Machining Setup, Change		\$ 0,65	unit	1		1	\$ 0,65					
40	Machining	Screw holes	\$ 0,04	cm^3	1	Material - Steel	3	\$ 0,12					
50	Gear shaping (hobbing)		\$ 0,50	cm^3	3	Material - Steel	3	\$ 4,50					
							Sub Total	\$ 18,21					

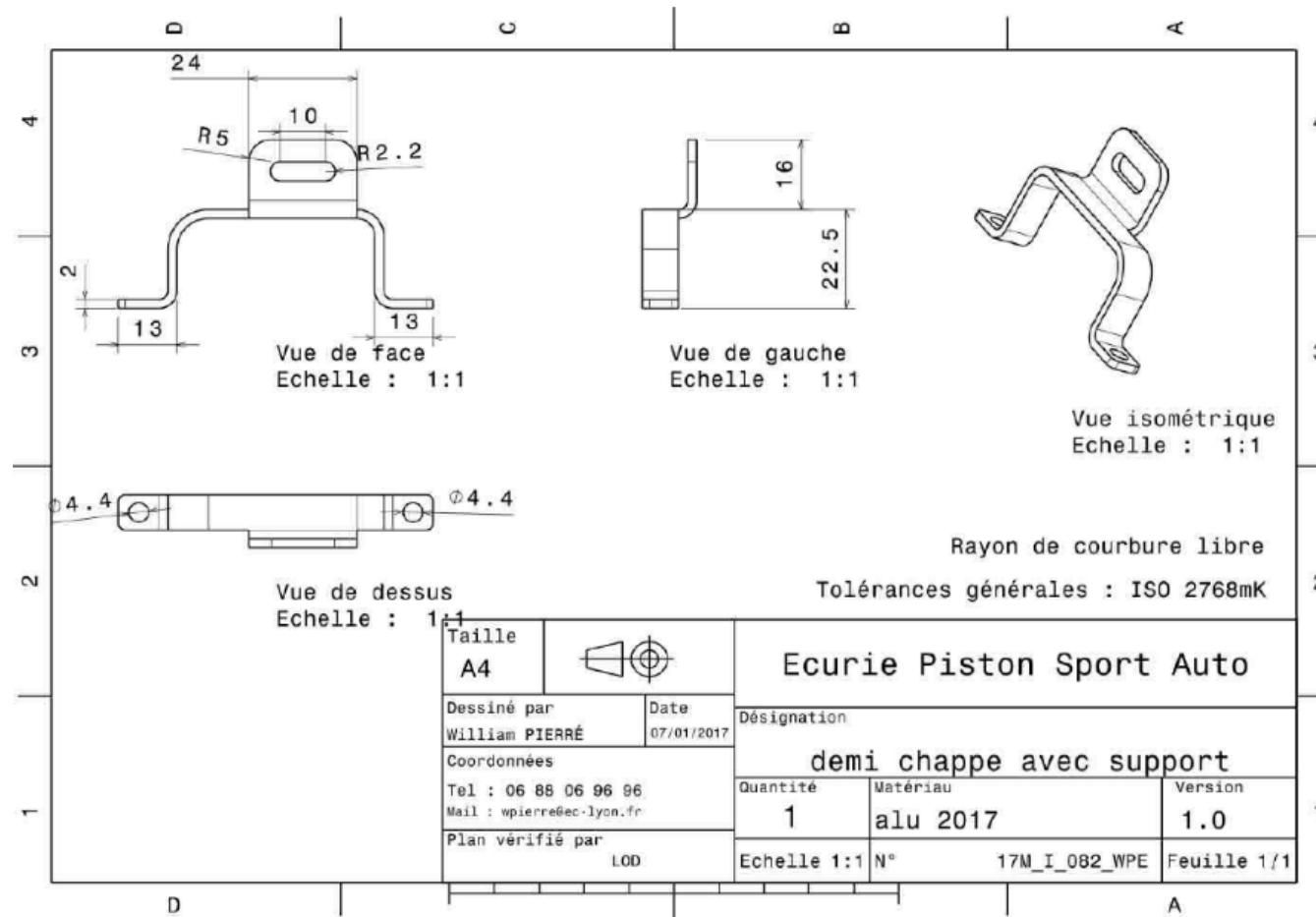


University	Ecole Centrale de Lyon	Back to BOM										Car #	81	Part Cost	\$ 1,60
System	Frame and Body											Qty	1		
Assembly	Shifter											FileLink1			
Part	Engine gear box actuator tab											FileLink2			
P/N Base	FR 06003											FileLink3		Extended	\$ 1,60
Suffix	AA														
Details															
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2		Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Mild, (per kg)	Material for tube part	\$ 2,25	0,010	kg							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	Setup for laser cut	\$ 1,30	unit	1			1	\$ 1,30						
20	Laser Cut		\$ 0,01	cm	9	Material - Steel		3	\$ 0,28						
								Sub Total	\$ 1,58						



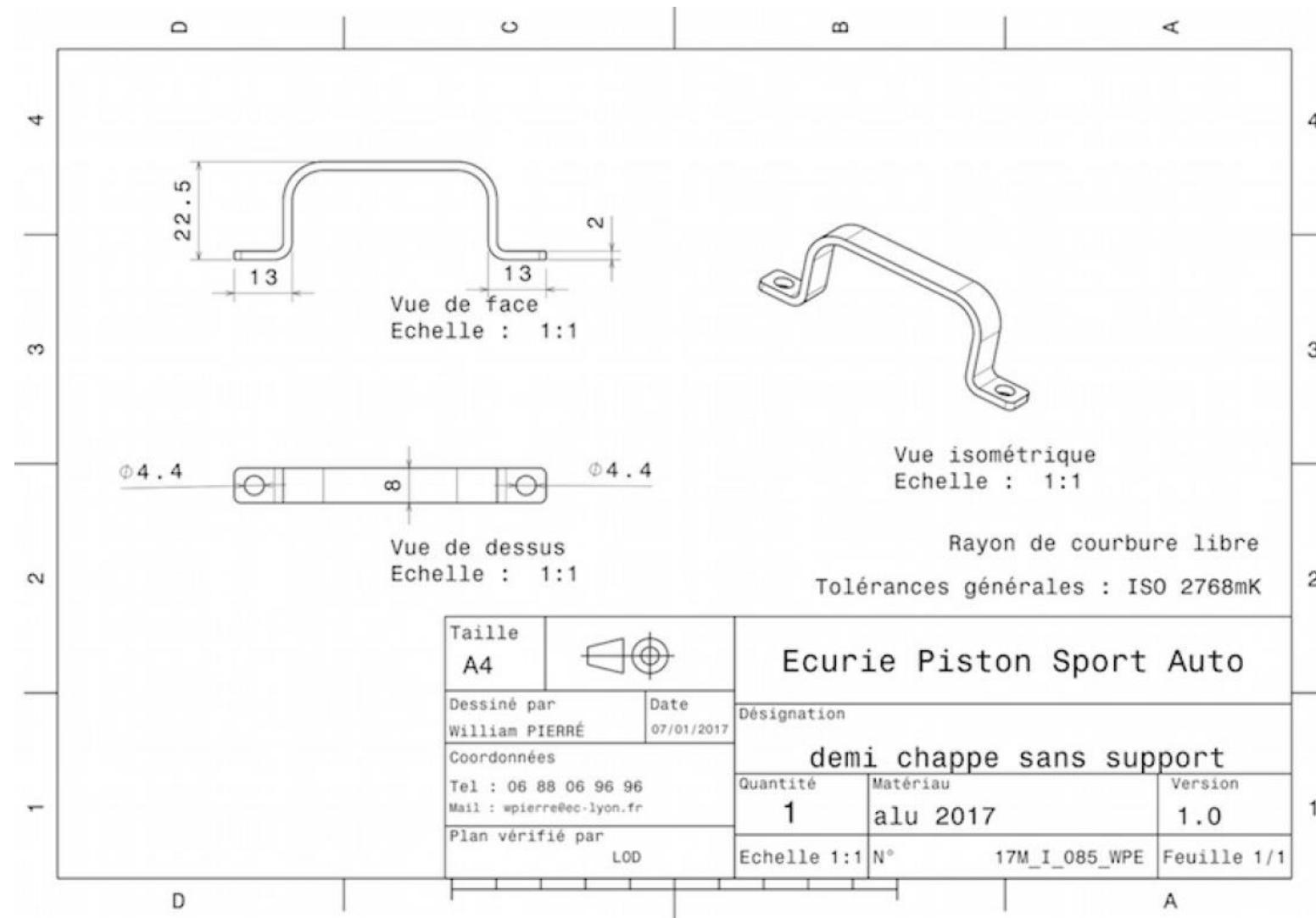
University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 2,82							
System	Frame and Body		Qty	1									
Assembly	Shifter	FileLink1	FileLink1		FileLink2								
Part	Front engine gearbox actuator mount	FileLink2	FileLink2		FileLink3								
P/N Base	FR 06004	FileLink3	FileLink3		Extended	\$ 2,82							
Suffix	AA												
Details													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Aluminium Normal	Material for part	\$ 4,20	0,007	kg							2712	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 machining	\$ 1,30	unit	1			1	\$ 1,30				
20	Laser Cut		\$ 0,01	cm^3	24	Material - Aluminium		1	\$ 0,24				
30	Sheet metal bends		\$ 0,25	bend	5			1	\$ 1,25				
								Sub Total	\$ 2,79				

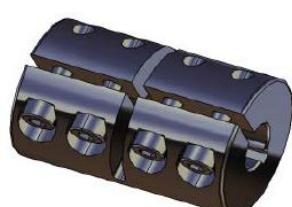




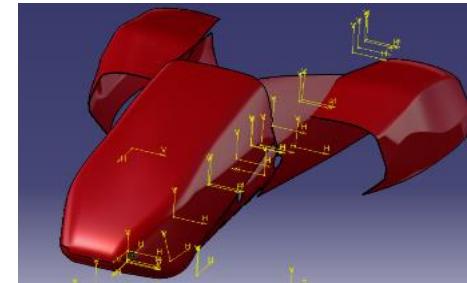
University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 2,56							
System	Frame and Body		Qty	1									
Assembly	Shifter	FileLink1	FileLink1										
Part	Rear engine gearbox actuator mount	Drawing	FileLink2										
P/N Base	FR 06005		FileLink3										
Suffix	AA												
Details													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Aluminium Normal	Material for part	\$ 4,20	0,004	kg							2712	1 \$ 0,02
													Sub Total \$ 0,02
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Machining Setup, Install and remove	Setup for machining	\$ 1,30	unit	1		1	\$ 1,30					
20	Laser Cut		\$ 0,01	cm^3	24	Material - Aluminium	1	\$ 0,24					
30	Sheet metal bends		\$ 0,25	bend	4		1	\$ 1,00					
							Sub Total	\$ 2,54					



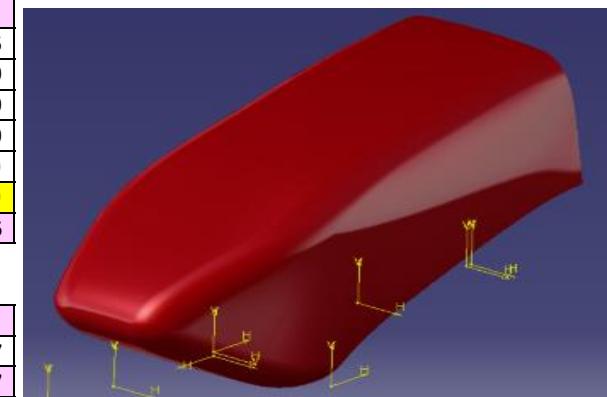


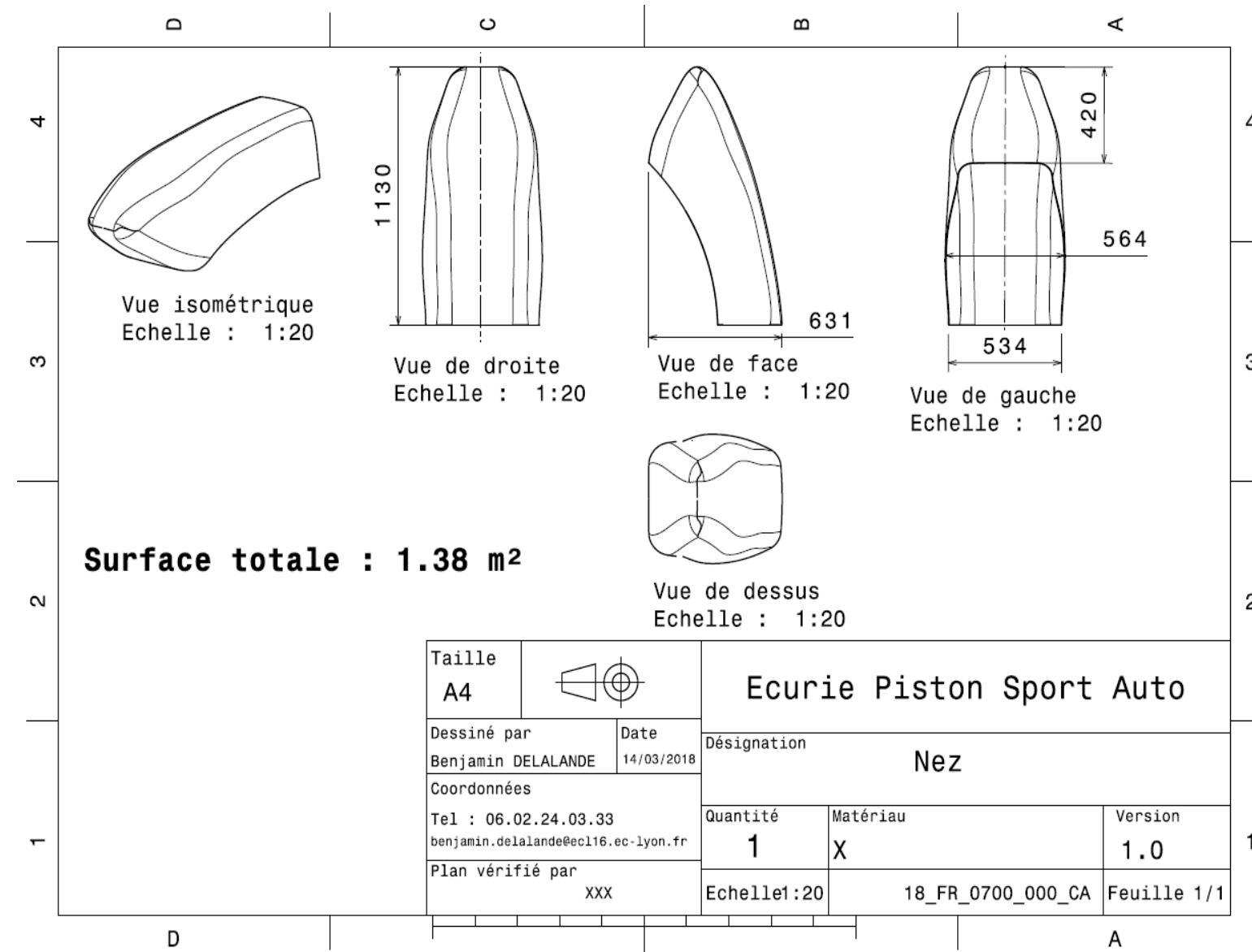
University	Ecole Centrale de Lyon	Back to BOM							Car #	81	Part Cost	\$ 7,49	
System	Frame and Body								Qty	1			
Assembly	Shifter								FileLink1				
Part	Engine gearbox actuator coupling								FileLink2				
P/N Base	FR 06006								FileLink3				
Suffix	AA								FileLink1				
Details	Bought, cost as made								FileLink2				
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Steel, Normal	Material for part	\$ 2,25	0,177	kg						7 850	1	\$ 0,40
												Sub Total	\$ 0,40
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Machining Setup, Install and remove	Setup for machining	\$ 1,30	unit	1		1	\$ 1,30					
20	Machining		\$ 0,04	cm^3	5	Material - Steel	3	\$ 0,60					
30	Machining Setup, Change		\$ 0,65	unit	1		1	\$ 0,65					
40	Machining		\$ 0,04	cm^3	3	Material - Steel	3	\$ 0,36					
50	Machining Setup, Change		\$ 0,65	unit	1		1	\$ 0,65					
60	Machining		\$ 0,04	cm^3	1	Material - Steel	3	\$ 0,12					
70	Machining Setup, Change		\$ 0,65	unit	1		1	\$ 0,65					
80	Machining		\$ 0,04	cm^3	1	Material - Steel	3	\$ 0,12					
90	Drilled holes < 25,4 mm dia.		\$ 0,35	holes	4		1	\$ 1,40					
100	Threading, Internal (machining)		\$ 0,10	cm^3	4	Material - Steel	3	\$ 1,20					
							Sub Total	\$ 7,05					
ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total				
10	Bolt,Grade 8.8 (SAE 5)		\$ 0,01	3	mm		10	mm	4	\$ 0,04			
									Sub Total	\$ 0,04			

University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Asm Cost	\$ 1 263,52								
System	Frame and Body		Qty	1										
Assembly	Bodywork				FileLink1									
P/N Base	FR A0700				FileLink2									
Suffix	AA				FileLink3									
Details	The assembly of the bodywork													
ItemOrder	Part	Part Cost	Quantity	Sub Total										
10	Nose	\$ 258,83	1	\$ 258,83										
20	Left Inlet	\$ 108,29	1	\$ 108,29										
30	Right Inlet	\$ 108,29	1	\$ 108,29										
40	Front Side Plate	\$ 121,72	2	\$ 243,44										
50	Back Side Plate	\$ 212,86	2	\$ 425,72										
60	Back Inlet Bracket	\$ 1,08	2	\$ 2,15										
70	Front Inlet Bracket	\$ 1,08	2	\$ 2,16										
80	Nose Bracket	\$ 0,74	4	\$ 2,95										
				Sub Total	\$ 1 151,83									
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Paint	Painting the Brackets	\$ 10,00	6,05E-03	m^2								\$ 0,06	
20	Paint	Painting the Nose, the Right Inlet and the Left Inlet	\$ 10,00		1,16	m^2							\$ 11,60	
													Sub Total	\$ 11,66
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.		Sub Total					
10	Weld	Welding the Brackets	\$ 0,15	cm	5,3				\$ 0,80					
20	Aerosol Apply	Painting of the body	\$ 5,25	m^2	1,16				\$ 6,09					
30	Aerosol Apply	Painting of the brackets	\$ 5,25	m^2	6,05E-03				\$ 0,03					
40	Assemble, 1 kg, Loose	Positioning the Pin (Quick Release) on the nose	\$ 0,06	unit	4				\$ 0,24					
50	Hand, Loose > 25.4 mm	Fixing the Pin (Quick Release) to the nose	\$ 0,75	unit	4				\$ 3,00					
60	Assemble, 1 kg, Loose	Positioning the bolt of the Pin (Quick Release) on the Nose Brackets	\$ 0,06	unit	4				\$ 0,24					
70	Ratchet <= 25.4 mm	Fixing the bolt of the Pin (Quick Release) to the Nose Brackets	\$ 0,75	unit	4				\$ 3,00					
80	Reaction Tool <= 25.4 mm	Fixing the bolt of the Pin (Quick Release) to the Nose Brackets	\$ 0,25	unit	4				\$ 1,00					
90	Assemble, 3 kg, Loose	Positioning the nose on the chassis	\$ 0,19	unit	4				\$ 0,76					
100	Assemble, 1 kg, Loose	Positioning the Left Inlet on the Brackets	\$ 0,06	unit	5				\$ 0,30					
110	Ratchet <= 6.35 mm	Fixing the Left Inlet to the Brackets and the Floor Pan	\$ 0,50	unit	5				\$ 2,50					
120	Reaction Tool <= 6.35 mm	Fixing the Left Inlet to the Brackets and the Floor Pan	\$ 0,25	unit	5				\$ 1,25					
130	Assemble, 1 kg, Loose	Positioning the Right Inlet on the Brackets and the Floor Pan	\$ 0,06	unit	5				\$ 0,30					
140	Ratchet <= 6.35 mm	Fixing the Right Inlet to the Brackets and the Floor Pan	\$ 0,50	unit	5				\$ 2,50					
150	Reaction Tool <= 6.35 mm	Fixing the Right Inlet to the Brackets and the Floor Pan	\$ 0,25	unit	5				\$ 1,25					
160	Assemble, 1 kg, Loose	Fixing the Velcro to the Frame	\$ 0,06	unit	8	Both sides			\$ 0,96					
170	Assemble, 1 kg, Loose	Fixing the Velcro to the side plates	\$ 0,06	unit	8	Both sides			\$ 0,96					
180	Assemble, 1 kg, Loose	Fixing the Front Side Plates to the Chassis	\$ 0,06	unit	1	Both sides			\$ 0,12					
190	Assemble, 1 kg, Loose	Fixing the Back Side Plates to the Chassis	\$ 0,06	unit	1	Both sides			\$ 0,12					
								Sub Total	\$ 25,42					
ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total					
10	Bolt, Grade 8.8 (SAE 5)	Fixing the Inlets to the Brackets	\$ 0,03	4	mm	30	mm		\$ 0,31					
20	Washer, Grade 8.8 (SAE 5)	Fixing the Inlets to the Brackets	\$ 0,01		unit				\$ 0,20					
30	Nut, Grade 8.8 (SAE 5)	Fixing the Inlets to the Brackets	\$ 0,02	4	mm				\$ 0,20					
40	Pin, Quick Release	Fixing the Nose to the Brackets	\$ 16,56	8	mm	40	mm		\$ 66,24					
50	Hook and Loop, Hook Side (Velcro)	Fixing the Side Plates	\$ 0,003	1000	cm^2				\$ 3,00					
60	Hook and Loop, Loop Side (Velcro)	Fixing the Side Plates	\$ 0,002	1000	cm^2				\$ 2,00					
								Sub Total	\$ 71,95					
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded		Sub Total					
10	Welds - Welding Fixture	Brackets welded to the chassis	\$ 500,00	point	16	3000			\$ 2,67					
								Sub Total	\$ 2,67					

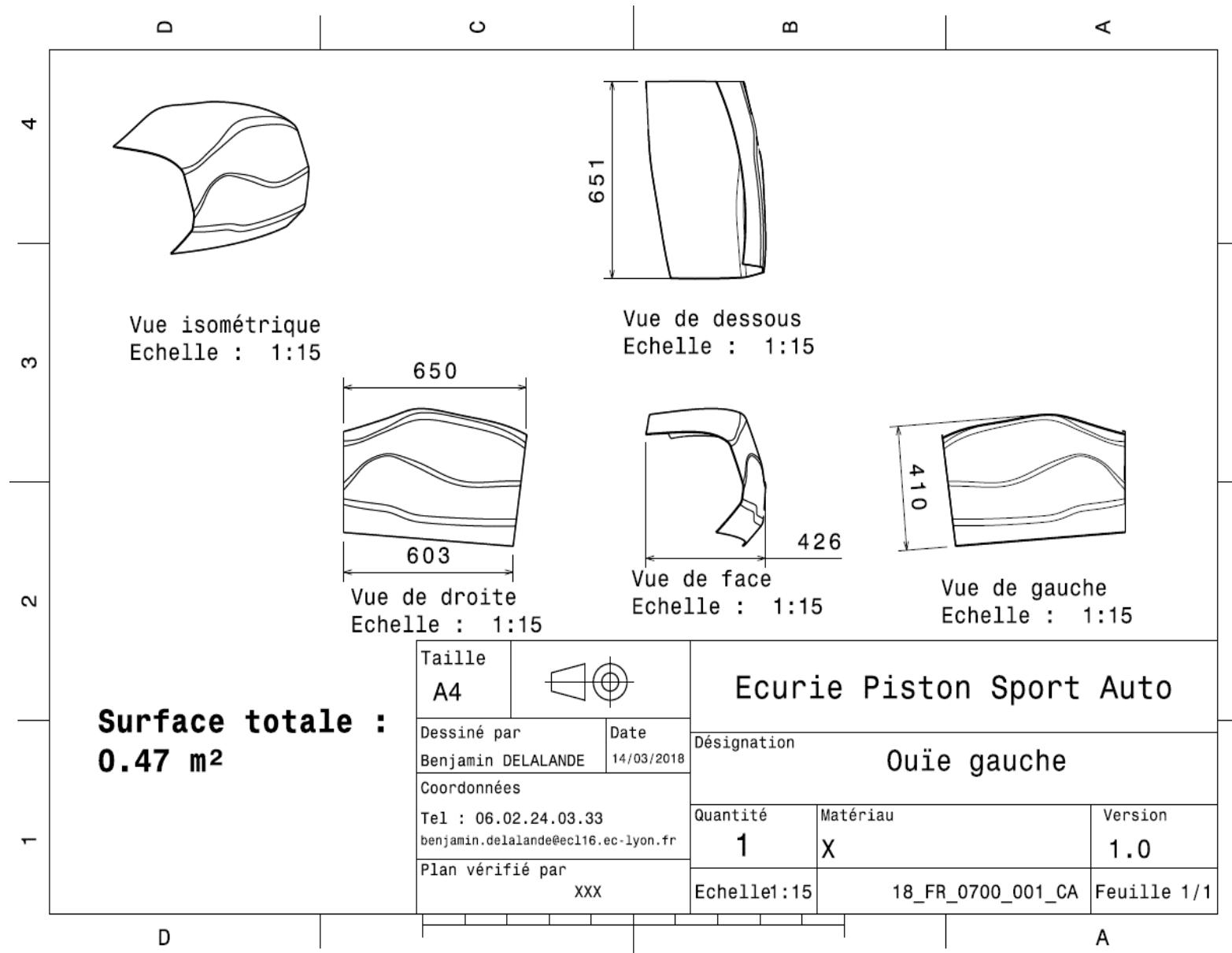


University	Ecole Centrale de Lyon	Car #	81	Part Cost	\$ 258,83								
System	Frame and Body	Qty	1	FileLink1	Drawing								
Assembly	Bodywork	FileLink1		FileLink2									
Part	Nose	FileLink2		FileLink3									
P/N Base	FR 07001	FileLink3		Extended Cost	\$ 258,83								
Suffix	AA												
Details	Nose covering the front of the chassis												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Glass Fiber, 1 Ply (kg)		\$ 100,00	0,414	kg				1,380	1,36E-04	2200	2	\$ 82,80
													Sub Total \$ 82,80
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Cut (scissors, knife)		\$ 0,06	cm	278	For the 2 plies	2	\$ 33,36					
20	Lamination, Manual		\$ 35,00	m^2	1,34	For the 2 plies	2	\$ 93,80					
30	Resin application, Manual		\$ 5,00	m^2	1,34	For the 2 plies	2	\$ 13,40					
40	Cure, Room Temperature		\$ 10,00	m^2	1,34			\$ 13,40					
50	Drilled holes < 25.4 mm dia.		\$ 0,35	hole	4			\$ 1,40					
60	Non-metallic cutting > 76.2 mm		\$ 1,40	cut	1	Material - Composite	2	\$ 2,80					
							Sub Total	\$ 158,16					
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total					
10	Lamination - Mold Tool		\$ 20 000,00	m^2	2,68	3000	1	\$ 17,87					
							Sub Total	\$ 17,87					

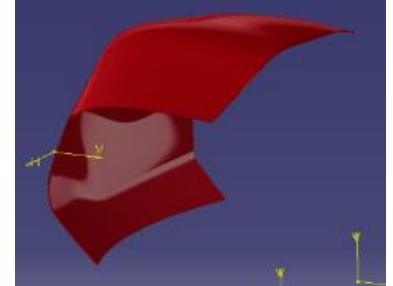


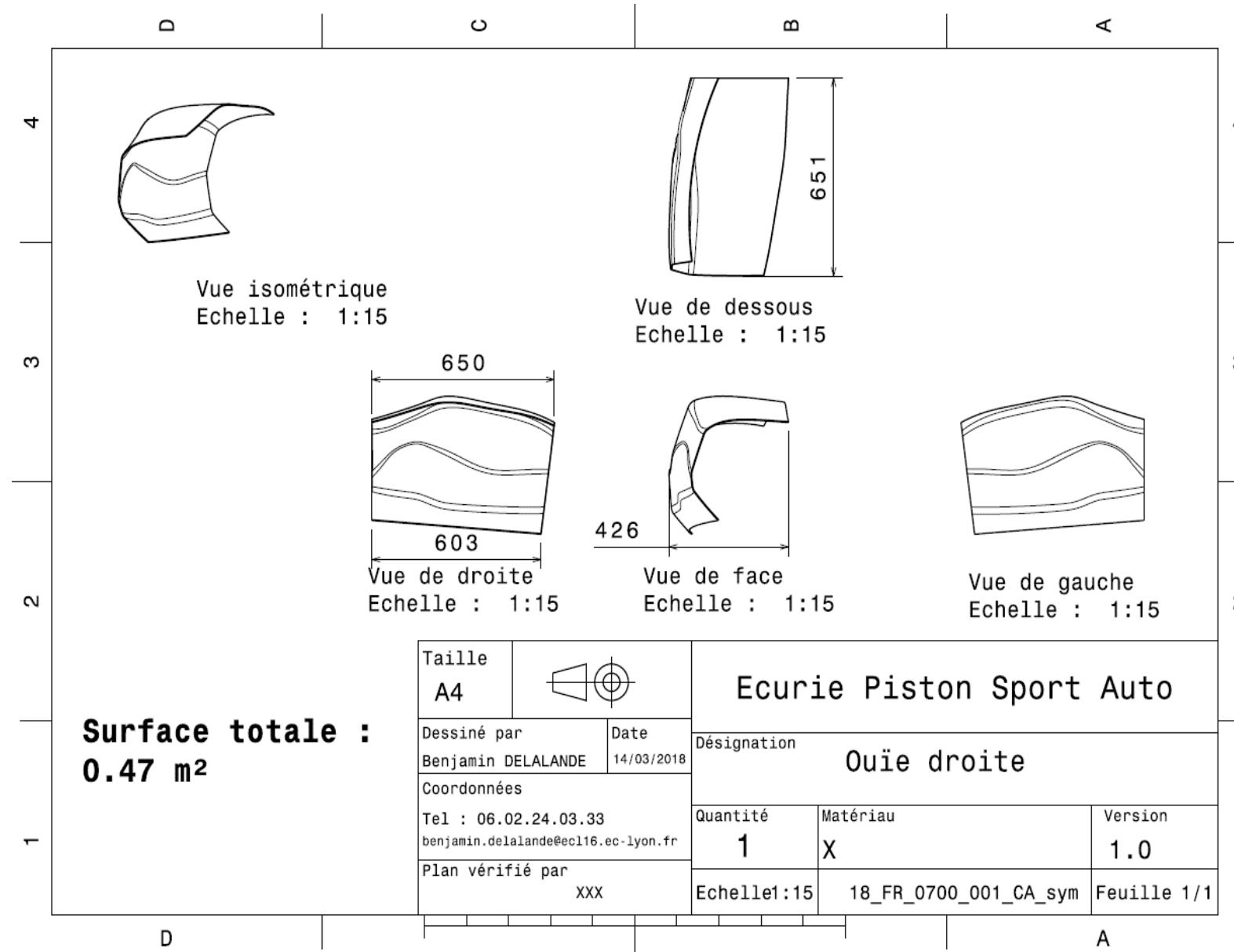


University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 108,29							
System	Frame and Body		Qty	1	FileLink1	Drawing							
Assembly	Bodywork	FileLink2			FileLink2								
Part	Left Inlet	FileLink3			FileLink3								
P/N Base	FR 07002												
Suffix	AA												
Details	Left Inlet covering the cooling system												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Glass Fiber, 1 Ply (kg)		\$ 100,00	0,141	kg				0,470	1,36E-04	2200	2	\$ 28,20
													Sub Total \$ 28,20
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier		Mult. Val.					
10	Cut (scissors, knife)		\$ 0,06	cm	242	For the 2 plies		2	\$ 29,04				
20	Lamination, Manual		\$ 35,00	m^2	0,45	For the 2 plies		2	\$ 31,50				
30	Resin application, Manual		\$ 5,00	m^2	0,45	For the 2 plies		2	\$ 4,50				
40	Cure, Room Temperature		\$ 10,00	m^2	0,45				\$ 4,50				
50	Drilled holes < 25.4 mm dia.		\$ 0,35	hole	5				\$ 1,75				
60	Non-metallic cutting > 76.2 mm		\$ 1,40	cut	1	Material - Composite		2	\$ 2,80				
								Sub Total	\$ 74,09				
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF		FractionIncluded					
10	Lamination - Mold Tool		\$ 20 000,00	m^2	0,9		3000	1	\$ 6,00				
								Sub Total	\$ 6,00				

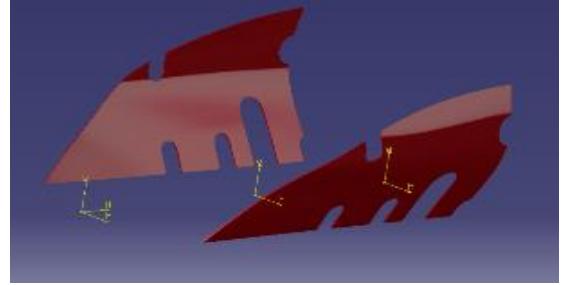


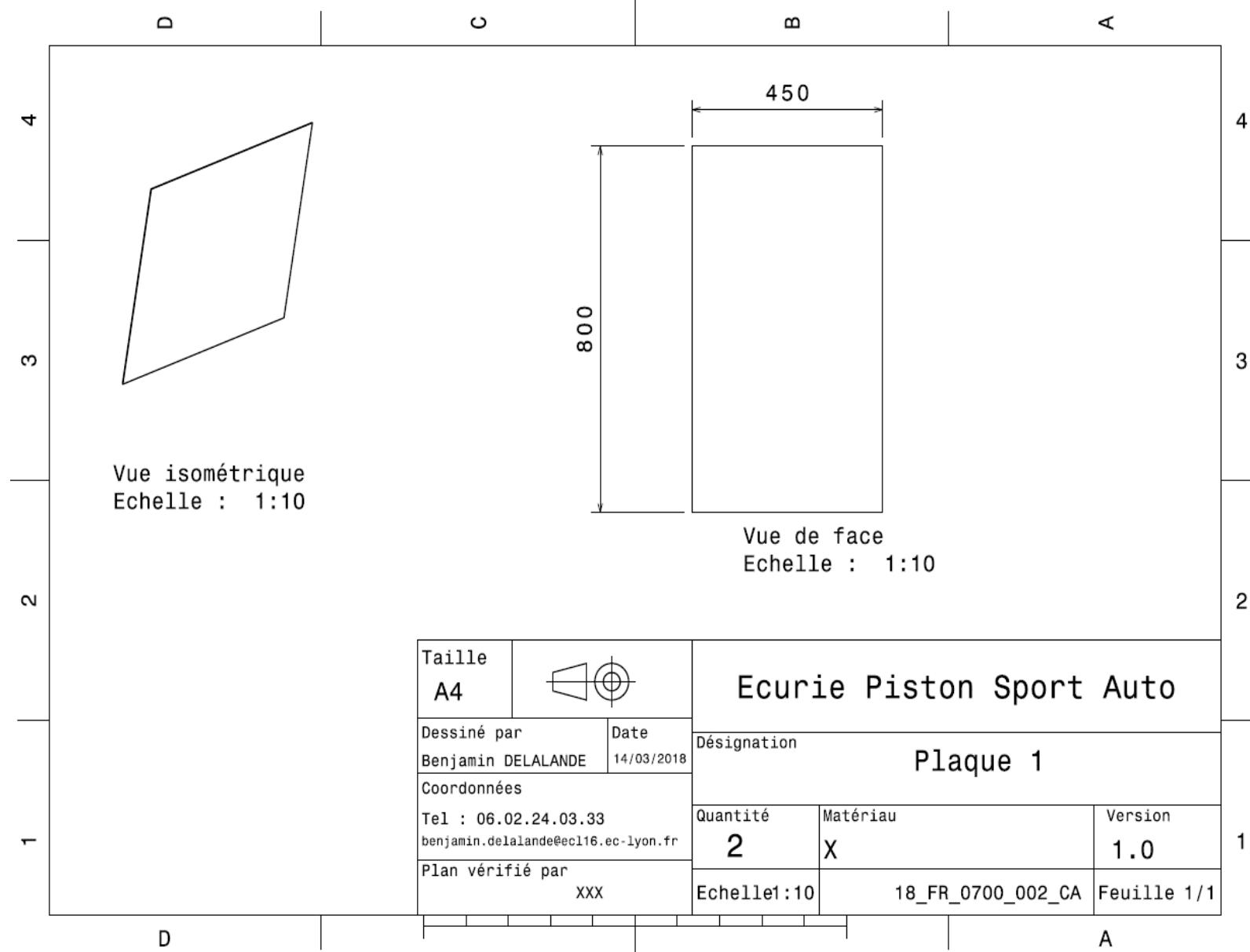
University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 108,29							
System	Frame and Body		Qty	1	FileLink1								
Assembly	Bodywork	FileLink2	FileLink2		FileLink3								
Part	Right Inlet	FileLink3			Extended Cost	\$ 108,29							
P/N Base	FR 07003												
Suffix	AA												
Details	Right Inlet covering the exhaust system												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Glass Fiber, 1 Ply (kg)		\$ 100,00	0,141	kg				0,470	1,36E-04	2200	2	\$ 28,20
													Sub Total \$ 28,20
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Cut (scissors, knife)		\$ 0,06	cm	242	For the 2 plies		2	\$ 29,04				
20	Lamination, Manual		\$ 35,00	m^2	0,45	For the 2 plies		2	\$ 31,50				
30	Resin application, Manual		\$ 5,00	m^2	0,45	For the 2 plies		2	\$ 4,50				
40	Cure, Room Temperature		\$ 10,00	m^2	0,45				\$ 4,50				
50	Drilled holes < 25.4 mm dia.		\$ 0,35	hole	5				\$ 1,75				
60	Non-metallic cutting > 76.2 mm		\$ 1,40	cut	1	Material - Composite		2	\$ 2,80				
							Sub Total	\$ 74,09					
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total					
10	Lamination - Mold Tool		\$ 20 000,00	m^2	0,9	3000	1	\$ 6,00					
							Sub Total	\$ 6,00					



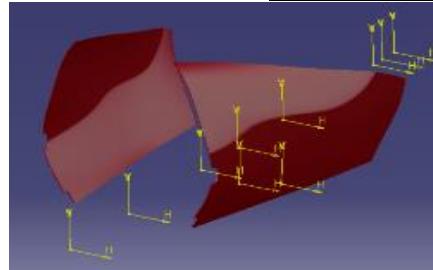


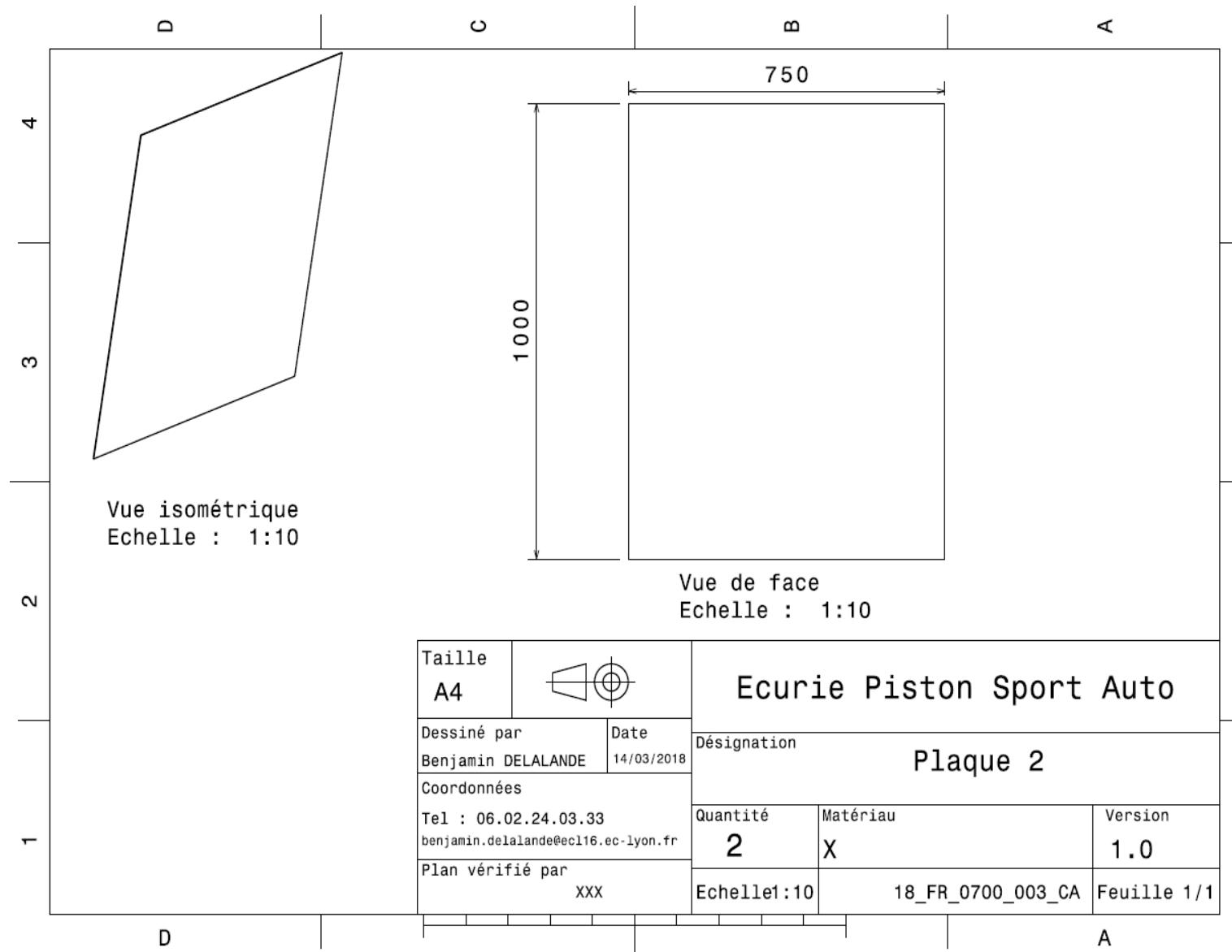
University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 121,72							
System	Frame and Body	FileLink1	Drawing	FileLink1	Qty	2							
Assembly	Bodywork	FileLink2		FileLink2	Extended Cost	\$ 243,44							
Part	Front Side plate	FileLink3		FileLink3									
P/N Base	FR 07004												
Suffix	AA												
Details	Front Side Plate												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Glass Fiber, 1 Ply (kg)		\$ 100,00	0,072	kg				0,360	9,09E-05	2200	1	\$ 7,20
20	Carbon Fiber, 1 Ply (kg)		\$ 200,00	0,029	kg				0,360	5,06E-05	1580	2	\$ 11,52
												Sub Total	\$ 18,72
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Cut (scissors, knife)		\$ 0,06	cm	290	For the 3 plies	3	\$ 52,20					
20	Lamination, Manual		\$ 35,00	m^2	0,32	For the 3 plies	3	\$ 33,60					
30	Resin application, Manual		\$ 5,00	m^2	0,32	For the 3 plies	3	\$ 4,80					
40	Cure, Room Temperature		\$ 10,00	m^2	0,32			\$ 3,20					
50	Non-metallic cutting > 76.2 mm		\$ 1,40	cut	1	Material - Composite	2	\$ 2,80					
							Sub Total	\$ 96,60					
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total					
10	Lamination - Mold Tool		\$ 20 000,00	m^2	0,96	3000	1	\$ 6,40					
							Sub Total	\$ 6,40					



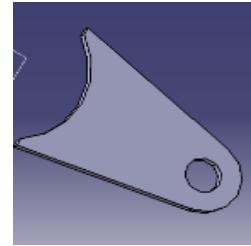


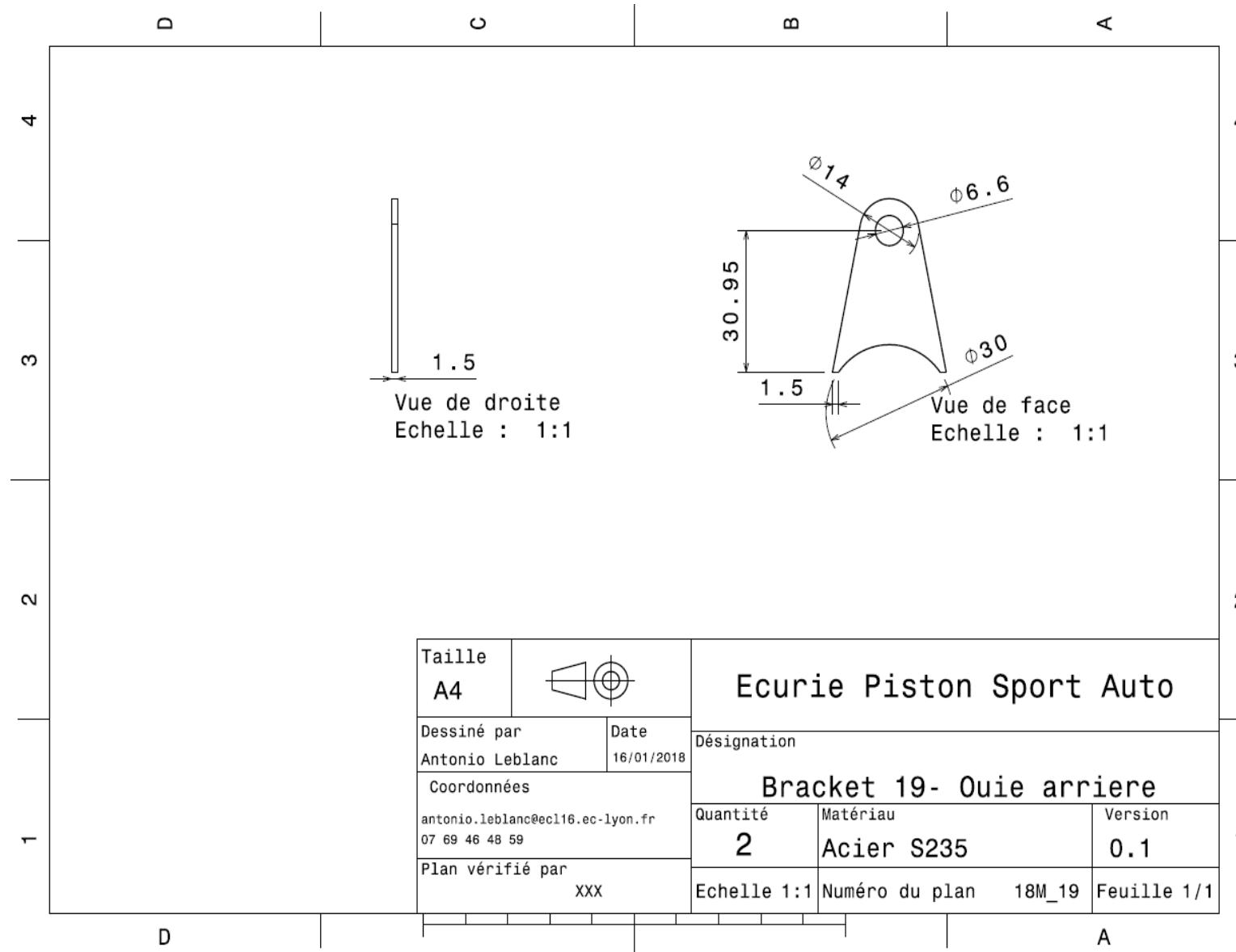
University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 212,86							
System	Frame and Body		Qty	2	FileLink1	Drawing							
Assembly	Bodywork	FileLink2	FileLink1		FileLink2								
Part	Back Side Plate	FileLink3	FileLink2		FileLink3								
P/N Base	FR 07005		Extended Cost	\$ 425,72									
Suffix	AA												
Details	Back Side Plate												
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Glass Fiber, 1 Ply (kg)		\$ 100,00	0,150	kg				0,750	9,09E-05	2200	1	\$ 15,00
20	Carbon Fiber, 1 Ply (kg)		\$ 200,00	0,060	kg				0,750	5,06E-05	1580	2	\$ 24,00
												Sub Total	\$ 39,00
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Cut (scissors, knife)		\$ 0,06	cm	367	For the 3 plies	3	\$ 66,06					
20	Lamination, Manual		\$ 35,00	m^2	0,70	For the 3 plies	3	\$ 73,50					
30	Resin application, Manual		\$ 5,00	m^2	0,70	For the 3 plies	3	\$ 10,50					
40	Cure, Room Temperature		\$ 10,00	m^2	0,70			\$ 7,00					
50	Non-metallic cutting > 76.2 mm		\$ 1,40	cut	1	Material - Composite	2	\$ 2,80					
							Sub Total	\$ 159,86					
ItemOrder	Tooling	Use	UnitCost	Unit	Quantity	PVF	FractionIncluded	Sub Total					
10	Lamination - Mold Tool		\$ 20 000,00	m^2	2,1	3000	1	\$ 14,00					
							Sub Total	\$ 14,00					

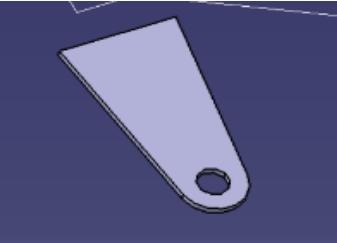


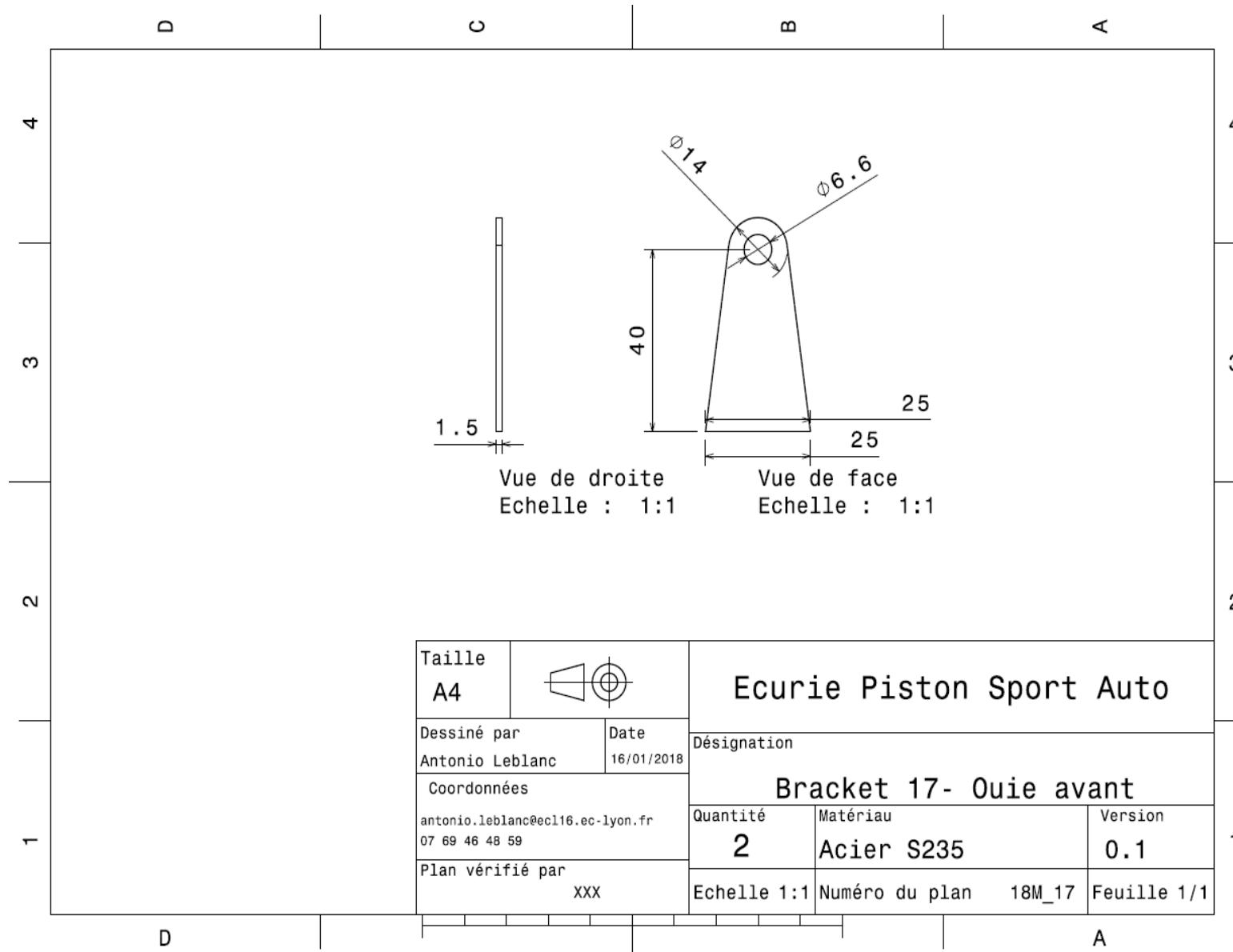


University	Ecole Centrale de Lyon									Back to BOM					
System	Frame and Body									FileLink1	Drawing				
Assembly	Bodywork									FileLink2					
Part	Back Inlet Bracket									FileLink3					
P/N Base	FR 07006									FileLink1	Car #	81	Part Cost	\$ 1,08	
Suffix	AA									FileLink2	Qty	2	FileLink3	Extended Cost	\$ 2,15
Details															
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2		Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy (kg)		\$ 2,25	0,007	kg				frontal area	6,09E-04	1,50E-03	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	Laser Cut		\$ 0,01	cm	13,7	Material - Steel		3	\$ 0,41					Sub Total	\$ 1,06

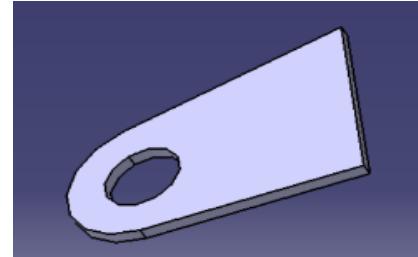


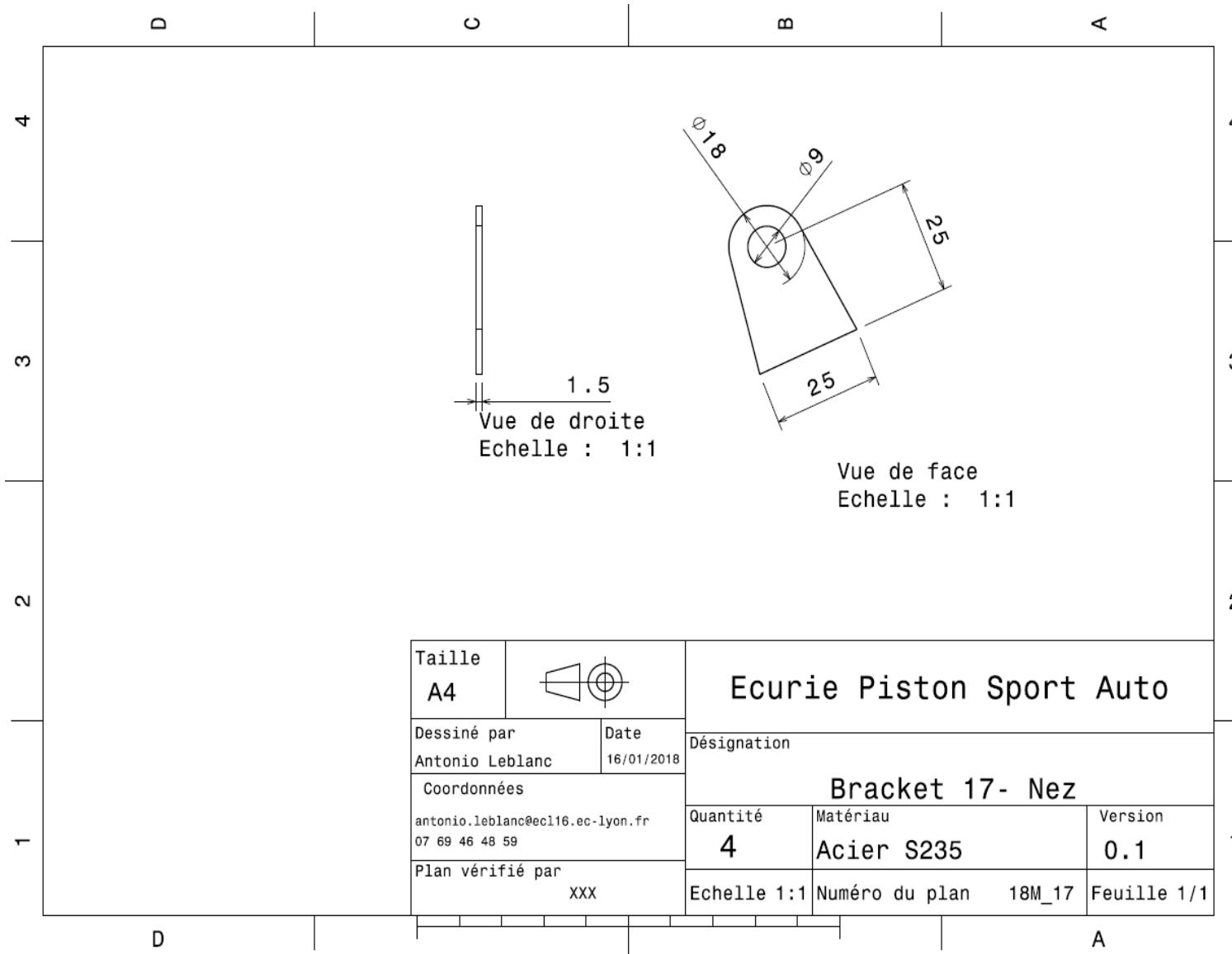


University	Ecole Centrale de Lyon	Back to BOM		Car #	81	Part Cost	\$ 1,08							
System	Frame and Body			FileLink1		Qty	2							
Assembly	Bodywork			FileLink2										
Part	Front Inlet Bracket			FileLink3										
P/N Base	FR 07007					Extended Cost	\$ 2,16							
Suffix	AA													
Details														
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy (kg)		\$ 2,25	0,010	kg			frontal Area	8,54E-04	1,50E-03	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	1,00	2 parts made from the same plate		0,5	\$ 0,65					
20	Laser Cut		\$ 0,01	cm	13,54	Material - Steel		3	\$ 0,41					
								Sub Total	\$ 1,06					



University	Ecole Centrale de Lyon									Back to BOM					
System	Frame and Body									FileLink1	Drawing				
Assembly	Bodywork									FileLink2					
Part	Nose Bracket									FileLink3					
P/N Base	FR 07008									FileLink1	Car #	81	Part Cost	\$ 0,74	
Suffix	AA									FileLink2	Qty	4	FileLink3	Extended Cost	\$ 2,95
Details															
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2		Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Steel, Alloy (kg)		\$ 2,25	0,007	kg				frontal area	6,32E-04	1,50E-03	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	4 parts cut from a single machine setup		0,25	\$ 0,33						
20	Laser Cut		\$ 0,01	cm	13,20	Material - Steel		3	\$ 0,40						
								Sub Total	\$ 0,72						





University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Asm Cost	\$ 32,66							
System	Frame and Body		Qty	1									
Assembly	Gearshifting paddles		FileLink1										
P/N Base	FR A0800		FileLink2										
Suffix	AA		FileLink3										
Details	Bought from Pro Shift, cost as made												
ItemOrder	Part	Part Cost	Quantity	Sub Total									
10	Paddles mount main part	\$ 6,50	1	\$ 6,50									
20	Paddles rockers	\$ 4,63	2	\$ 9,25									
30	Paddles	\$ 4,03	2	\$ 8,07									
		Sub Total		\$ 23,82									
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Spring, Compression (General)	Rockers callback springs	\$ 1,00										2 \$ 2,00
20	Switch, Toggle	Gearshifting signal switches	\$ 1,00										2 \$ 2,00
													Sub Total \$ 4,00
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Assemble, 1 kg, Line on line	Paddles rockers on main part assembling	\$ 0,13		2				1 \$ 0,26				
20	Ratchet <= 6.35 mm	M4 Bolts assembling	\$ 0,50		2	Engagement Length>4D	1,5	\$ 1,50					
30	Reaction tool <= 6,35 mm	M4 nuts tightening	\$ 0,25		2				1 \$ 0,50				
40	Assemble, 1 kg, Interference	Springs installation	\$ 0,02		2				1 \$ 0,04				
50	Assemble, 1 kg, Line on line	Switches installation	\$ 0,13		2				1 \$ 0,26				
60	Assemble, 1 kg, Loose	Paddles on paddles rockers assembling	\$ 0,06		2				1 \$ 0,12				
70	Ratchet <= 6.35 mm	M3 bolts assembling	\$ 0,50		4				1 \$ 2,00				
									Sub Total \$ 4,68				
ItemOrder	Fastener	Use	UnitCost	Size1	Unit1	Size2	Unit2	Quantity	Sub Total				
10	Bolt, Grade 8.8 (SAE 5)	Rocker axles	0,04	4	mm		40	mm		2	\$ 0,08		
20	Bolt, Grade 8.8 (SAE 5)	Paddles on rockers assembling bolts	0,01	3	mm		10	mm		4	\$ 0,04		
30	Nut, Grade 8.8 (SAE 5)	Rocker axles nuts	0,02	4	mm					2	\$ 0,04		
										Sub Total	\$ 0,16		

University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 6,50								
System	Frame and Body		Qty	1										
Assembly	Gearshifting paddles		FileLink1											
Part	Paddles mount main part		FileLink2											
P/N Base	FR 08001		FileLink3											
Suffix	AA				Extended Cost	\$ 6,50								
Details	Bought part, cost as made				FileLink3									
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Plastic, Polycarbonate		\$ 3,30	0,210	kg			Rectangular 100 mm x50mm	0,0050	0,035	1200	1	\$ 0,69	
													Sub Total	\$ 0,69
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30		1		1	\$	1,30					
20	Machining	Main shape machining	\$ 0,04	cm^3	120,5	Material - Plastic	0,5	\$	2,41					
30	Drilled holes < 25.4 mm dia.	Steering wheel bolts holes	\$ 0,35		3		1	\$	1,05					
40	Drilled holes < 25.4 mm dia.	Axles holes	\$ 0,35		2	Machine - Hole Length >= 4D	1,5	\$	1,05					
							Sub Total	\$	5,81					

University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 4,63								
System	Frame and Body		Qty	2										
Assembly	Gearshifting paddles	FileLink1	FileLink1											
Part	Paddles rockers	FileLink2	FileLink2											
P/N Base	FR 08002	FileLink3	FileLink3		Extended Cost	\$ 9,25								
Suffix	AA													
Details	Bought part, cost as made													
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total	
10	Plastic, Polycarbonate		\$ 3,30	0,034	kg			Rectangular 40 mm x 35 mm	1,40E-03	0,02	1200	1	\$ 0,11	
													Sub Total	\$ 0,11
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total						
10	Machining Setup, Install and remove		\$ 1,30		1		1	\$ 1,30						
20	Machining		\$ 0,04	cm^3	23,5	Material - Plastic	0,5	\$ 0,47						
30	Drilled holes < 25,4 mm dia.	Rocker axles holes	\$ 0,35	unit	1		1,5	\$ 0,53						
40	Drilled holes < 25,4 mm dia.	Paddles mounting holes	\$ 0,35		6		1	\$ 2,10						
50	Threading, internal	Paddles mounting threads	\$ 0,10	cm	2,4	Material - Plastic	0,5	\$ 0,12						
							Sub Total	\$ 4,52						

University	Ecole Centrale de Lyon	Back to BOM	Car #	81	Part Cost	\$ 4,03							
System	Frame and Body		Qty	2									
Assembly	Gearshifting paddles		FileLink1										
Part	Paddles		FileLink2										
P/N Base	FR 08003		FileLink3										
Suffix	AA				Extended Cost	\$ 8,07							
Details	Bought part, cost as made				FileLink1								
					FileLink2								
					FileLink3								
ItemOrder	Material	Use	UnitCost	Size1	Unit1	Size2	Unit2	Area Name	Area	Length	Density	Quantity	Sub Total
10	Titanium		\$ 22,00	0,038	kg			Rectangular 125 mm x 45 mm	0,0056	0,002	4500	1	\$ 0,84
													Sub Total
													\$ 0,84
ItemOrder	Process	Use	UnitCost	Unit	Quantity	Multiplier	Mult. Val.	Sub Total					
10	Machining Setup, Install and remove		\$ 1,30		1		1	\$ 1,30					
20	Laser cut	Paddle contouring	\$ 0,01	cm	52	Material - Titanium	3,65	\$ 1,90					
							Sub Total	\$ 3,20					