Installation Manual

Wood & Steel Guardrails

Model T-MASH18 4MS2
Containment Level TL2

STEELGAL
NZ LIMITED

27.10.2020

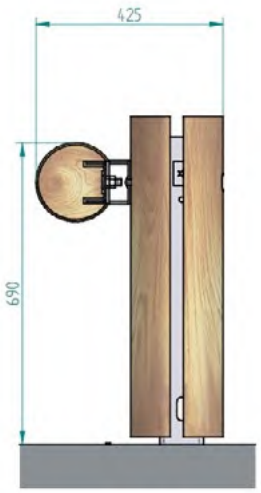
www.steelgal.co.nz

T-MASH 18

The first Tertu's steel backed timber barrier crash-tested according to U.S standard MASH

TECHNICAL INFORMATION

- Rail made of a round log ø 18 cm backed with a steel U channel inserted in the wooden rail
- With wooden spacer & post-cladding
- C100 steel posts in 1.50 m : 2 m spacing



PERFORMANCES

Crash tested in accordance with the requirements of the standards MASH (Manual for Assessing Safety Hardware) at **LEVEL TL 2** :

▸ 2.2 T pick up at 70 km/h ▸ 1100 kg car at the same speed ▸ impact angles 25°

General information		
Test agency	CSI S.p.a (Italy)	
Test article		
Installation length (m)	80.0	
Foundation type and condition	compacted soil	
Test vehicle		
Type	2270P	
Model	Chevrolet Silverado 1500	
Mass (kg)		
Curb : 2239	Test inertial : 2308.8	Gross static : 2308.8
Impact conditions		
Speed (km/h)	70.1	
Angle (deg)	24.5	
Impact severity (kJ)	78.2	
Impact location	0.8 m before post	
Exit Speed (km/h)	N/A	
Exit Angle (deg)	N/A	

Post impact trajectory	
Vehicle stability	Satisfactory
Stopping distance	10 m downstream
Vehicle snogging	None
Vehicle pocketing	None
Occupant risk value	
Impact Velocity (m/s)	
X-direction : 5.2	Y-direction :3.2
Ridedown acceleration	
X-direction : -6.1	Y-direction : -2.5
THIV : 21.2	PHD : 6.3
ASI 2010 : 0.42	Test article damage : moderate
Test article deflections (m)	
Permanent : 0.83	Dynamic : 0.99
Working Width Dynamic	1.49 (vehicle) - 2.35 (wood)
Vehicle damage	
Max.internal deformation	87 mm
Max.external deformation	390 mm

WOOD & STEEL GUARDRAIL
MODEL « T-MASH18 4MS2 »

Brief description:

The system does include:

- C100 steel posts with 2 m spacing: C100 special for TM18
- pressure treated wooden spacers Ø 18 cm: SPACERS TM18 (2 elements)
- 4m-long steel backed timber rails with logs Ø 18 cm; wood & steel components are assembled together on production site with bolts TRCC 16x160
- a main fishplate connecting 2 rails: TL62TM18MASH
- an intermediate fishplate TL38TM18MASH
- a steel curved fishplate connecting 2 rails for terminal ends: TL62 TM18 EXTREMITE
- pre-installed TRCC 16x40 bolts securing the fishplate TL62TM18MASH assembly with 2 rails
- upstream & downstream tensioners with bearing plate and threaded rod.

BILL OF MATERIALS FOR 4 M

Item	Tertu code	Description	Quantity	Weight
Steel post	C100150TM18	Post C100x50x25x5 with 3 holes Length = 1500 Steel S235JR	2	12.70 Kg
Wooden spacer	ECARTC100075TM18	Spacer Ø180 drilled with notch, 2 elements, in 0.73 m	2	8 Kg
Rail	TM18PRM4M	Includes: 1 pressure treated log Ø 180, length 3980 with 4 holes + 1 steel U channel 90x45x4 steel S355JR length 3920 with 4 TRCC 16x40 bolts. The complete rail is assembled on production site with 4 TRCC 16x160 bolts	1	70 Kg
Connecting fishplate	TL62TM18MASH	Structural steel 80x10, length 620 S355JR 1 welded steel fuse box	1	3.88 Kg
Connecting fishplate for terminal	TL62TM18EXTREMITE	Structural curved steel 80x10, length 618 S355JR 1 welded teel fuse box	1	4.10 Kg
Intermediatefishplate	TL38TM18MASH	Structural steel 80 x 10 length 380mm S335JR 1 welded steel fuse box	1	2.60 Kg
Fishplate for terminal buried end	TL41TM18	Structural curved steel 80x10, length 410 with 3 standard holes + one oblong hole S355JR		2.7 Kg
Bolt TRCC Round head, square neck	TRCC16160 TRCC16040 TRCC12090GALVAFT TRCC12040GALVA	Class 5.8 Class 6.8 Class 8.8 Class 5.8	4 pre-mounted 4 pre-mounted 1 1	0.28 Kg 0.10 Kg 0.18 Kg 0.10 Kg
Nut	ECROUM16 ECROUM1632- ECROUM12	Class 5.5 for TRCC 16x160 Class 6.8 for TRCC 16x40 Class 8.8 for TRCC 12x100	4 pre-mounted	0.28 Kg 0.35 Kg 0.10 Kg

Weight per lm = 30.58 Kg including steel posts for TM18 1.50m length C100150TM18

Installation method

Recommended tools :

The T-MASH18 4MS2 can be installed with the same technics and tools as required for steel crash barriers in particular:
Post driving machine adapted to suit C100 profile post, a torque wrench, a socket wrench / nut spanner (M16 nut), compressor and lorry mounted lifting arm.

1 - Post installation (drawing 1)
Posts C100150TM18 in 1.5 m shall be driven into the ground every 2 meters as shown according to direction of traffic; service height above ground = 700 mm

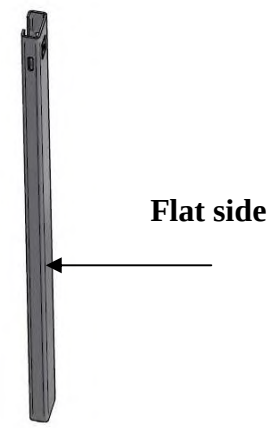
- Spacer & fishplates installation (drawing 2 & 3)
Place the front part of the spacer « SPACER TM18 » directly onto its corresponding C100 post,
then arrange the connecting fishplate TL62TM18MASH and intermediate fishplate TL38TM18MASH on the following support having previously inserted screw TRCC12-90 head inside the fuse box and finally bolt the complete set onto the C100 posts.

2 - Rail TM18 4MS2 installation (drawing 4 et 5)
Place the 4m-rails with the threaded bolts 16x40 facing the fishplate TL62TM18MASH, introduce the said bolts inside the TL62TM18MASH corresponding openings, then tighten the complete set with the four nuts M16x32. To assemble the beam to the intermediate post, put the bolts TRCC 16-160 in front of the lights of the fishplate TL38TM18MASH and tighten with the nuts and washers M16.

3 - Spacer back cover installation (drawing 6)
Spacer back cover shall be placed on C100 post with a bolt TRCC 12x40 introduced inside post with oblong hole whose nut shall remain outside cover.

4 - Adjustment (drawing 7)
After components installation, the height of the rails can be adjusted whilst using the C100 posts openings.

1



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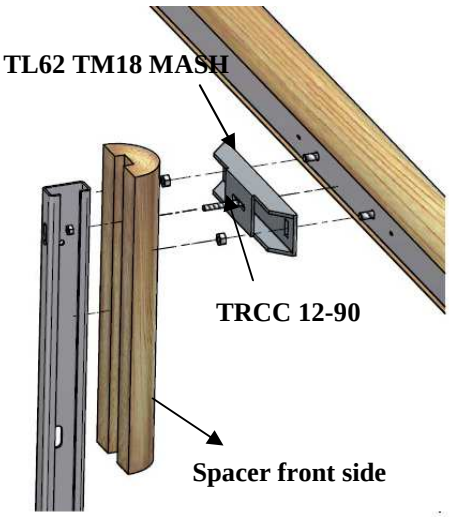

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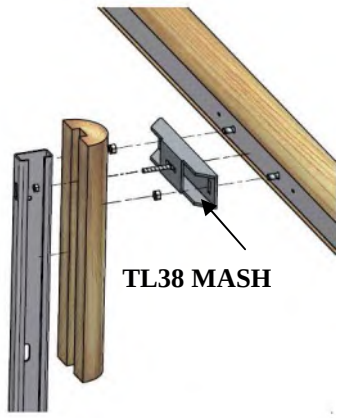

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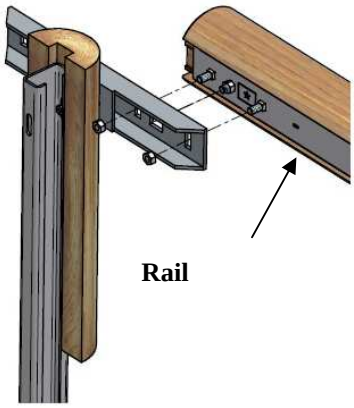

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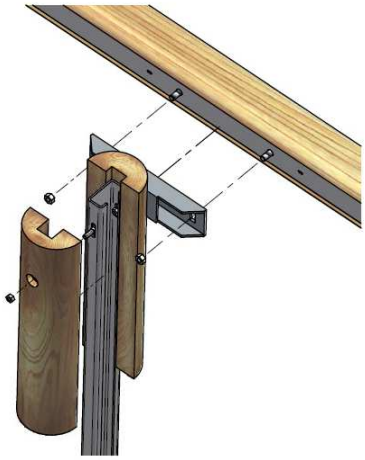

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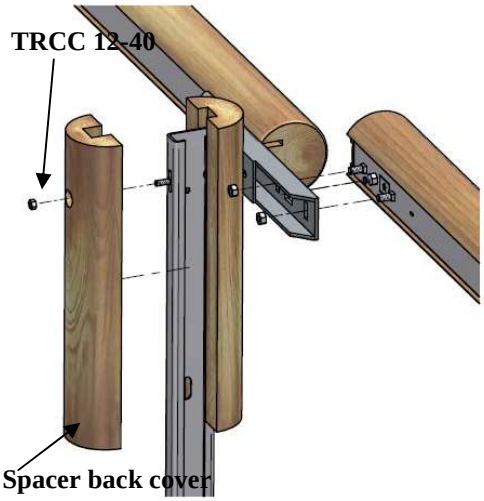

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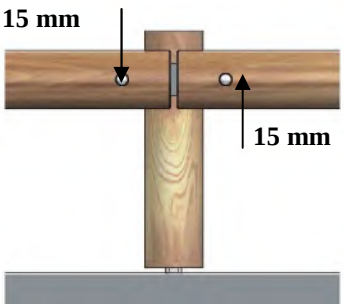

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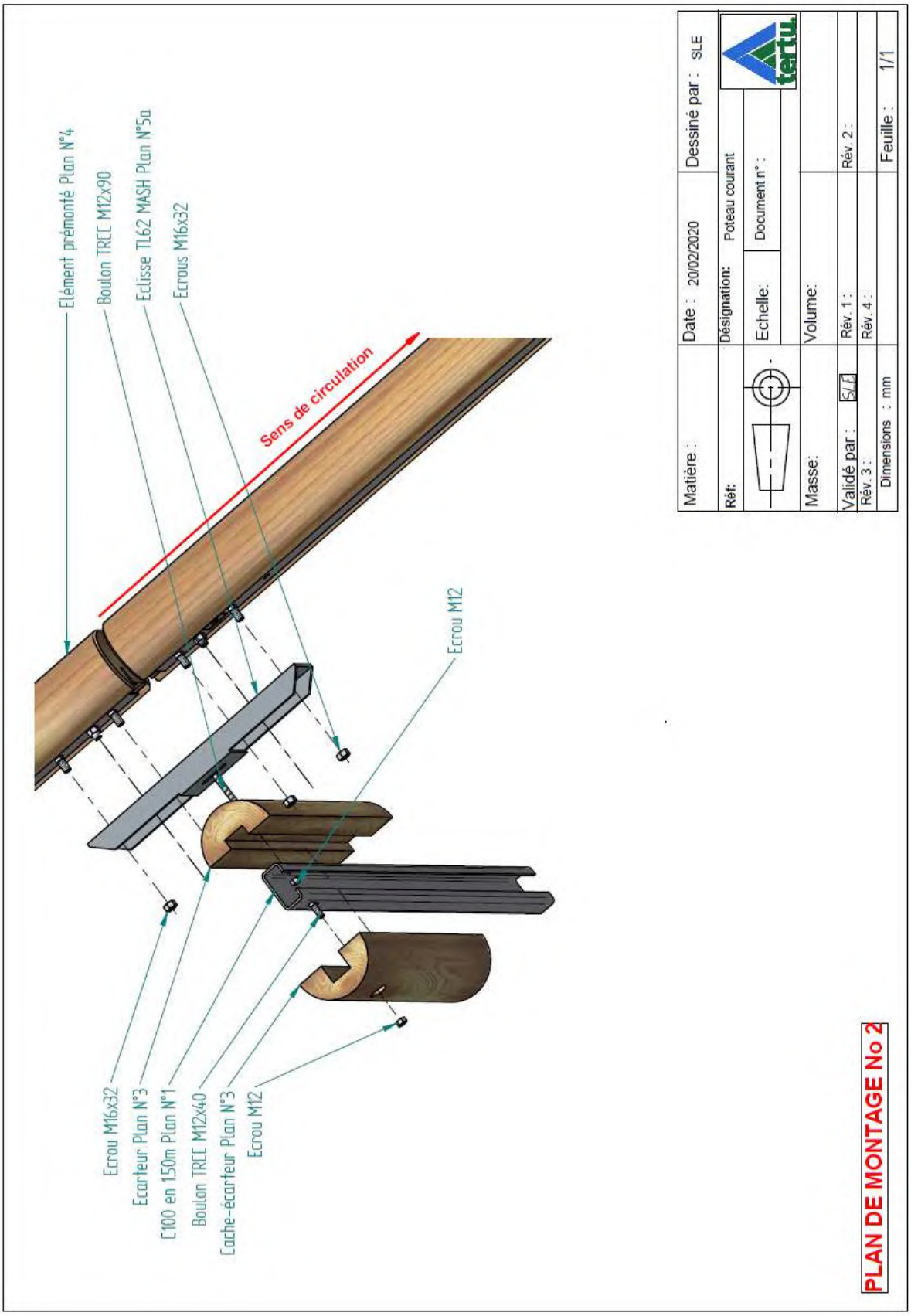
Installation drawing main post
T-MASH18 4MS2



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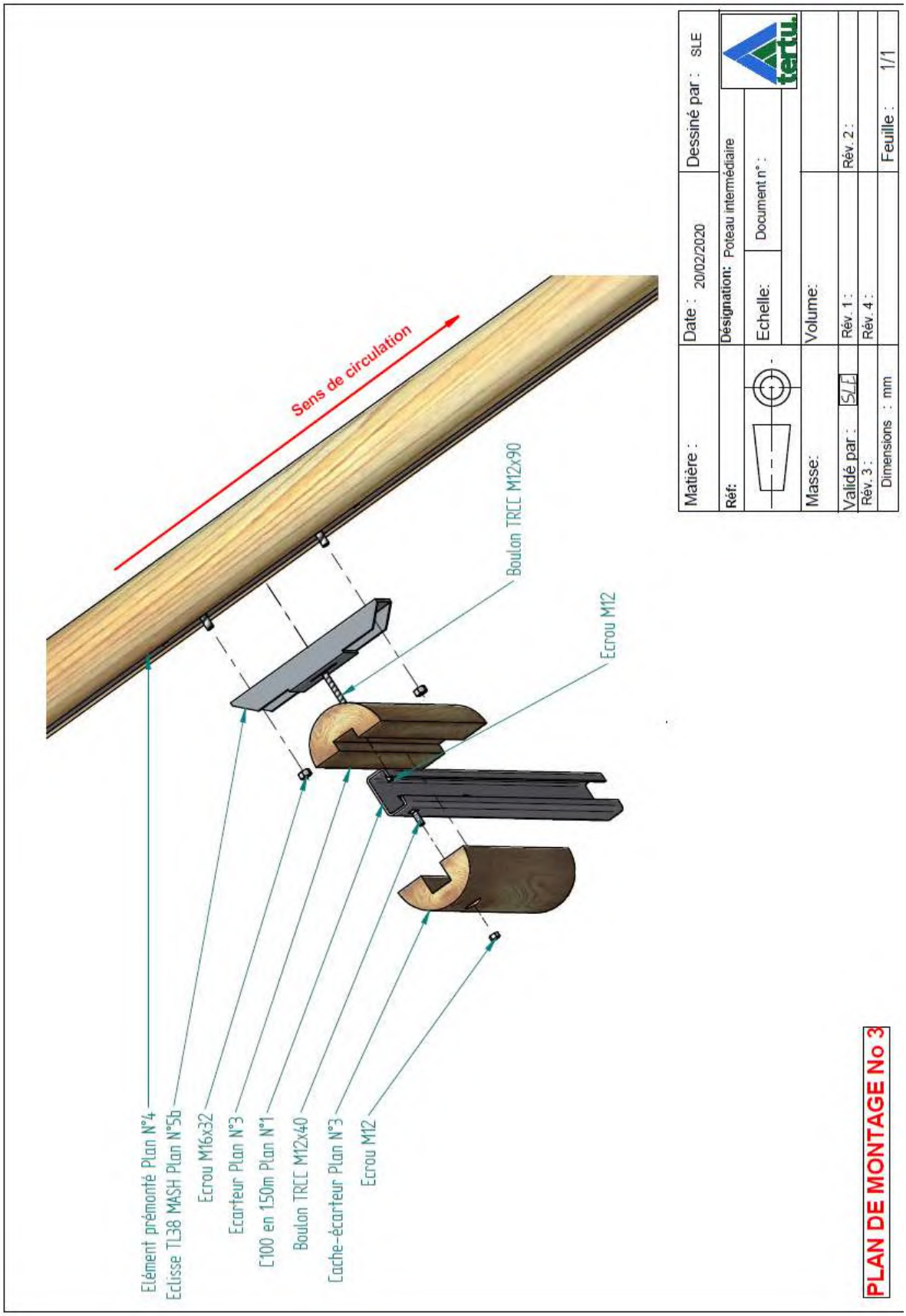
Installation drawing intermediary post T-MASH18 4MS2



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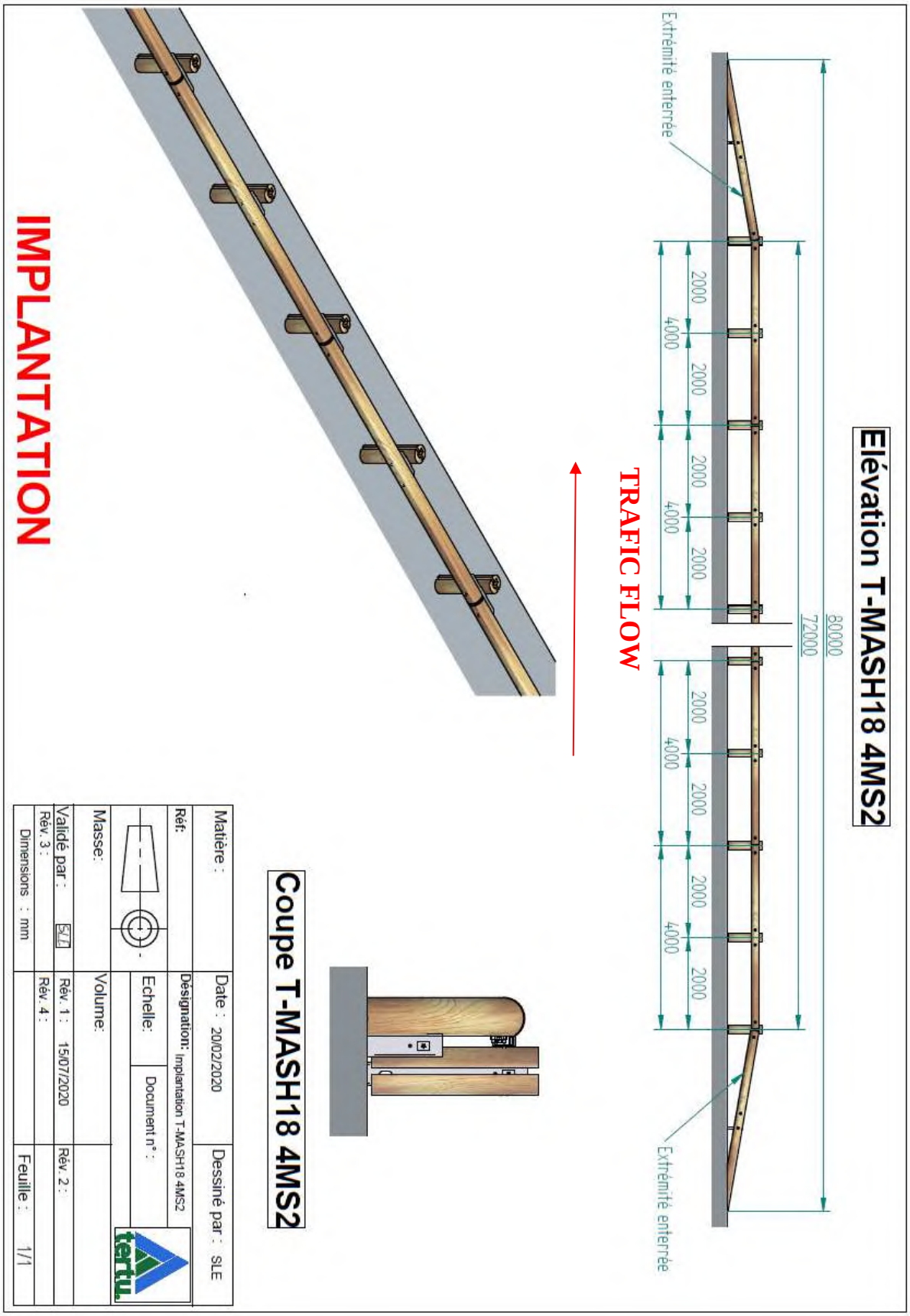
Elevation drawing T-MASH18 4MS2



RAIL SERVICE HEIGHT :

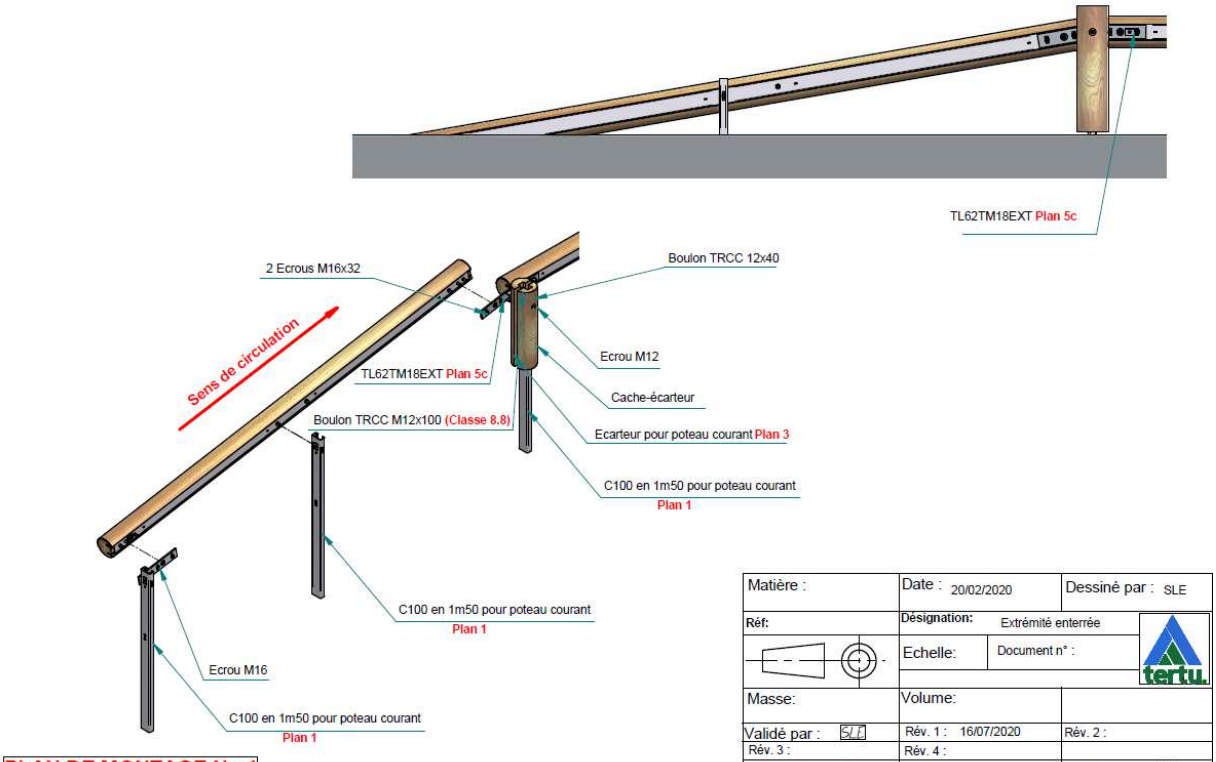
The top-line of the rail face should be 70 cm (+0,-5 cm) above the average elevation of the road shoulder in a 50 cm wide band in front of the said rail. At no time, should the center-line of the rail face be less than 55 cm above the average elevation of the road shoulder in front of the rail section in question. For the rails, the tightening torque is 140 Nm.

MINIMAL LENGTH for Full Guardrail System Strength Development

The minimum recommended length required is 80 lm, with 2x4 M end terminals included, in order to assure a proper correct anchorage of the system. For shorter lengths, it is recommended to contact our Export Department for a prior study.

End terminals treatment (drawing below)

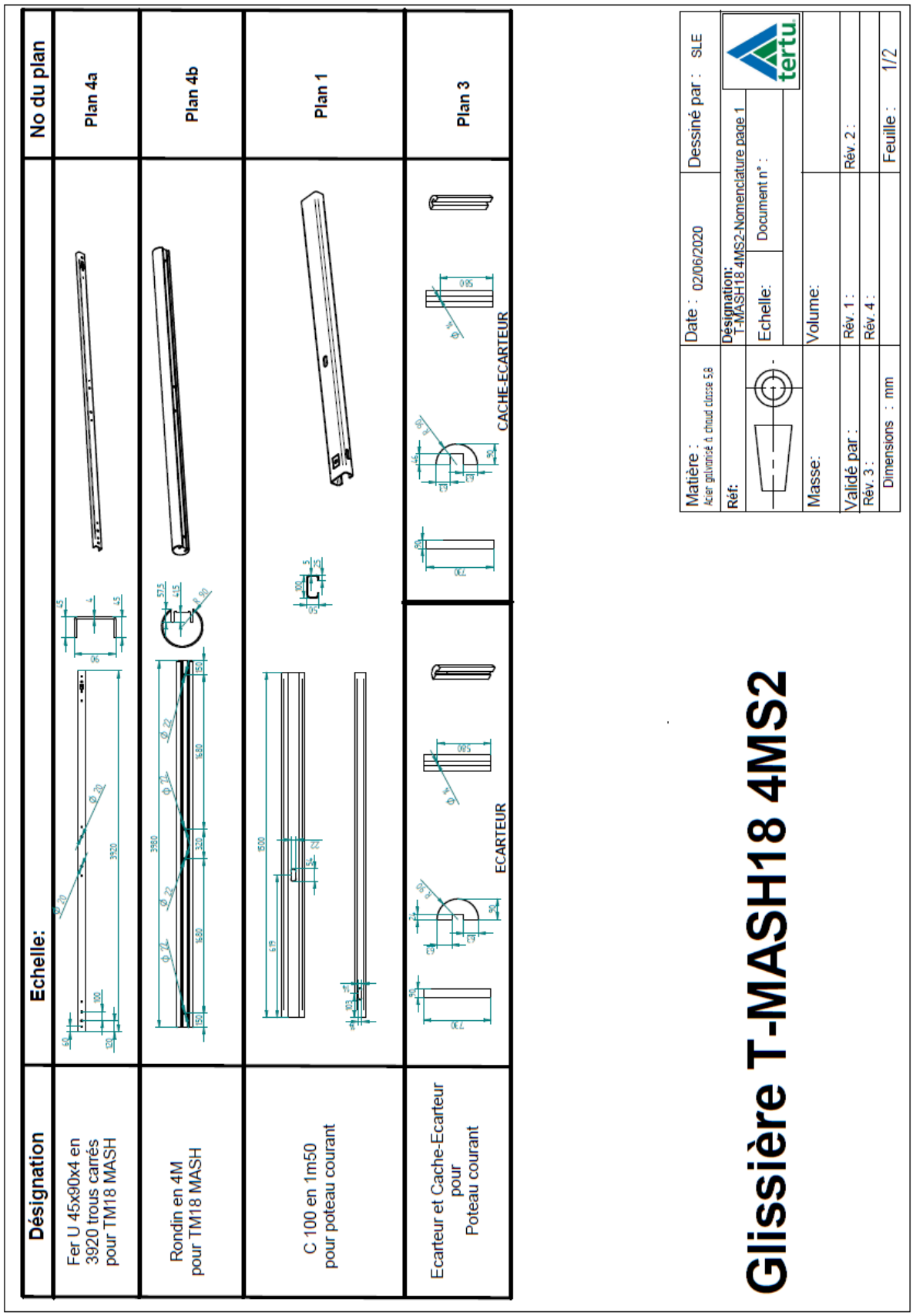
The terminals can be dropped on a 4m-length with the ends buried into the ground. The guardrail can also be terminated horizontally inside the back slope. For each terminal, a curved fishplate TL62TM18 is necessary for dropping the 4m-rail and a fishplate TL41TM18 is requested for securing the buried C100 TM18 1.50m post.



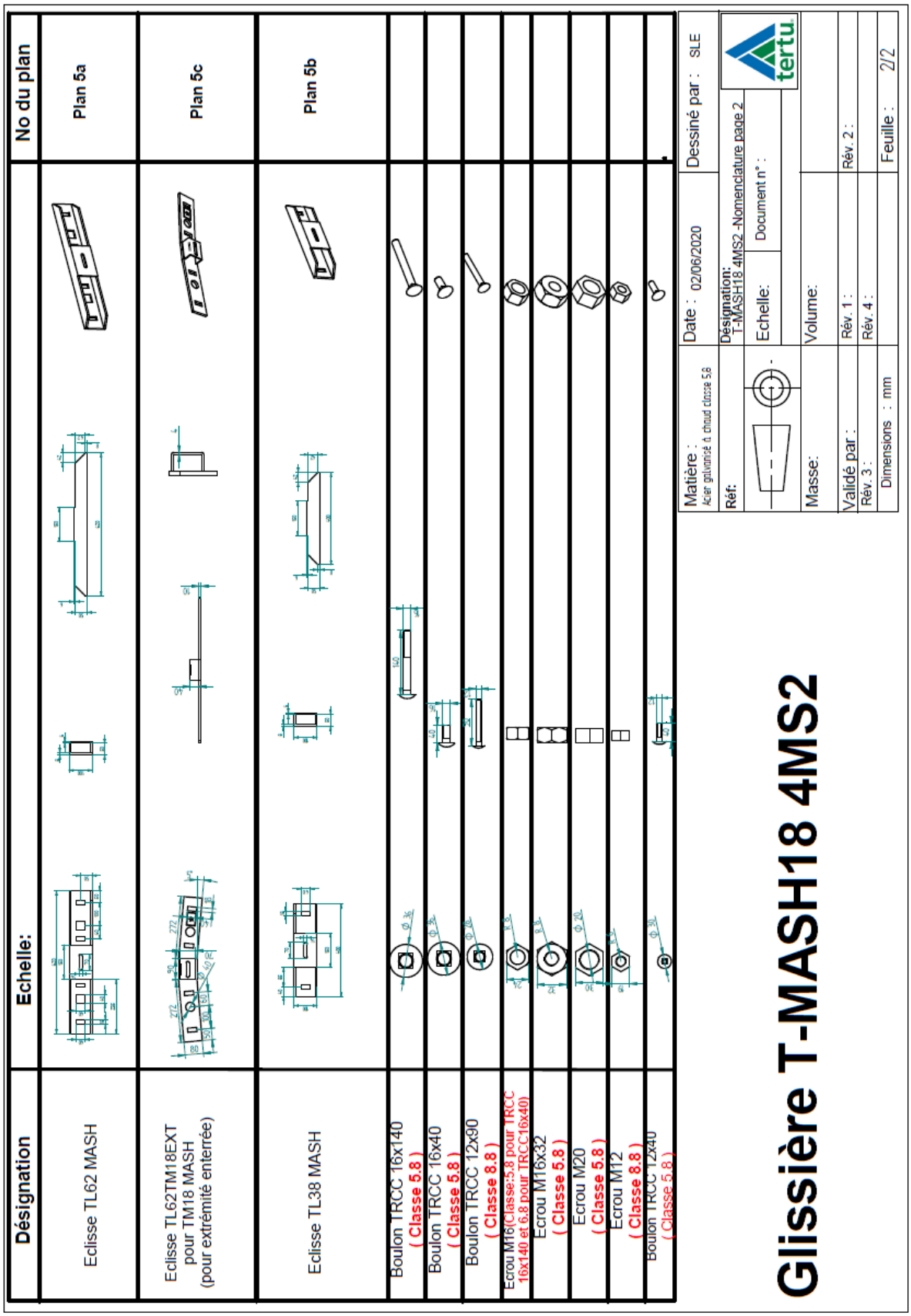
PLAN DE MONTAGE No 1

Matière :	Date : 20/02/2020	Dessiné par : SLE
Réf:	Désignation: Extrémité enterrée	
	Echelle:	Document n° :
Masse:	Volume:	
Validé par : SLE	Rév. 1 : 16/07/2020	Rév. 2 :
Rév. 3 :	Rév. 4 :	
Dimensions : mm		Feuille : 1/1

Parts description T-MASH18 4MS2



Parts description T-MASH18 4MS2



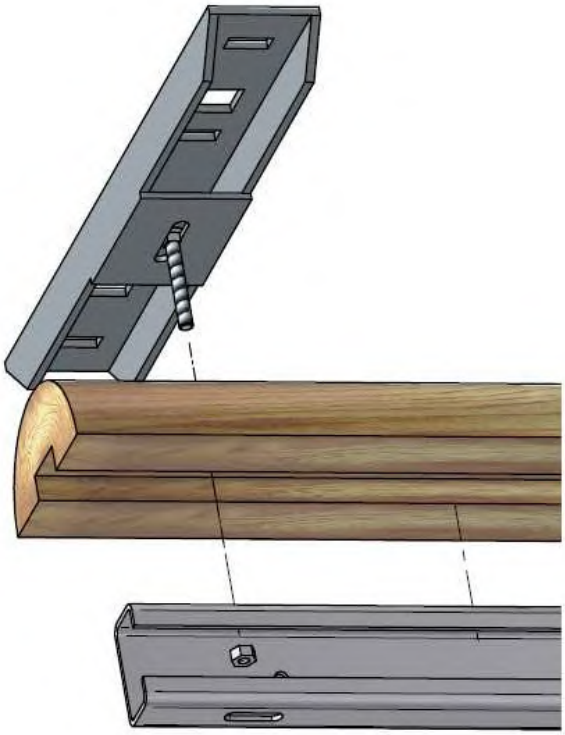


FIGURE 2

FIGURE 1

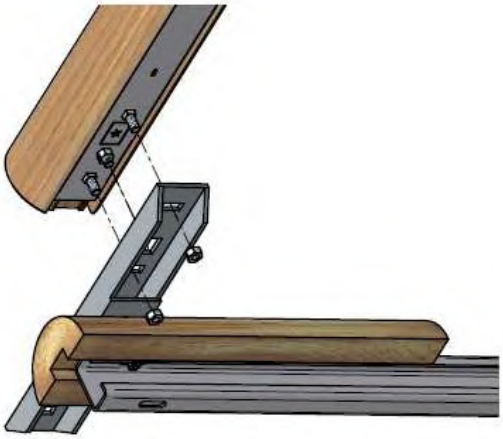


FIGURE 4

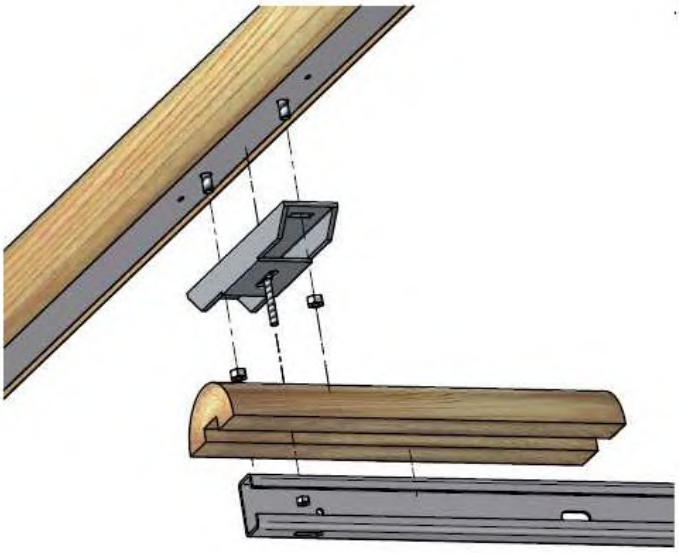


FIGURE 3

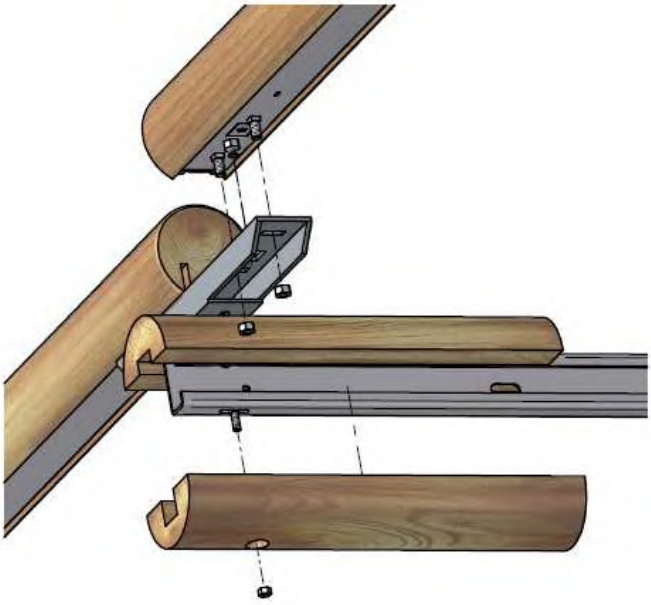


FIGURE 6

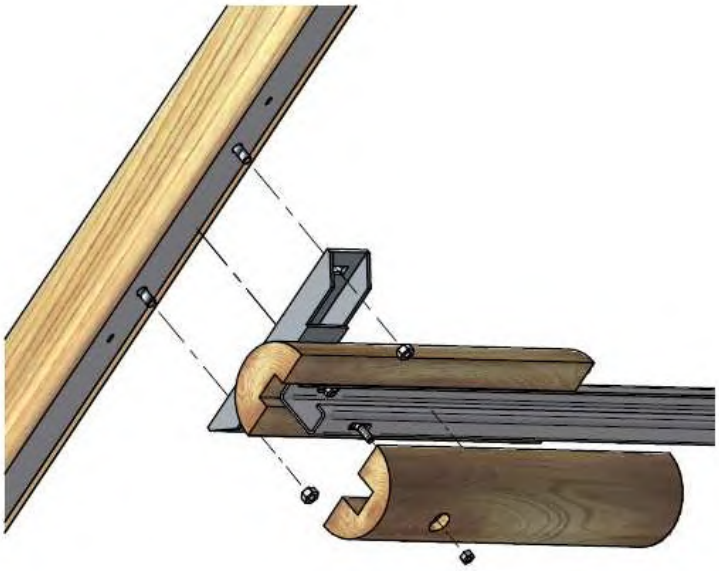
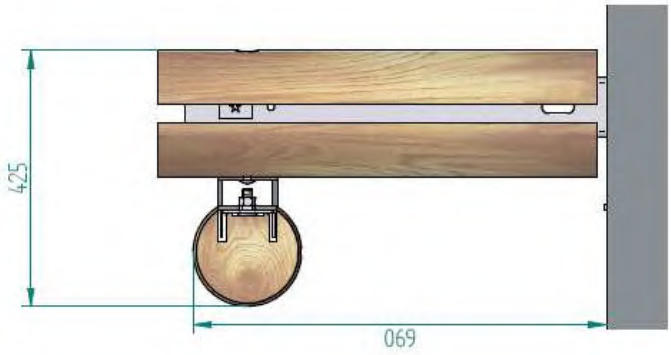


FIGURE 5



COUPE

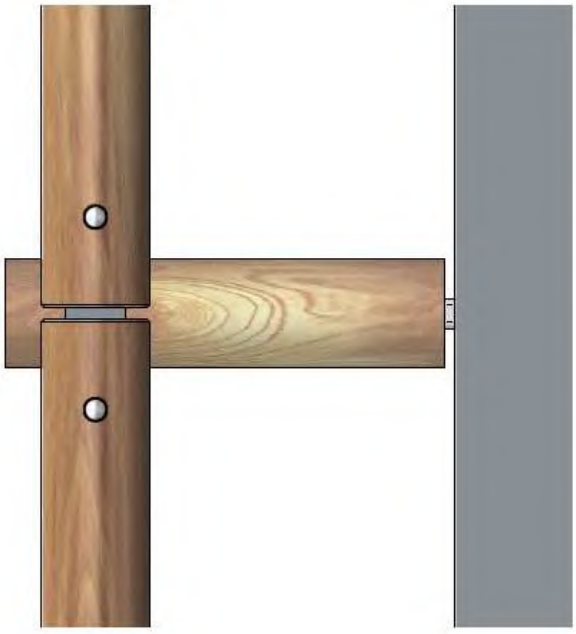
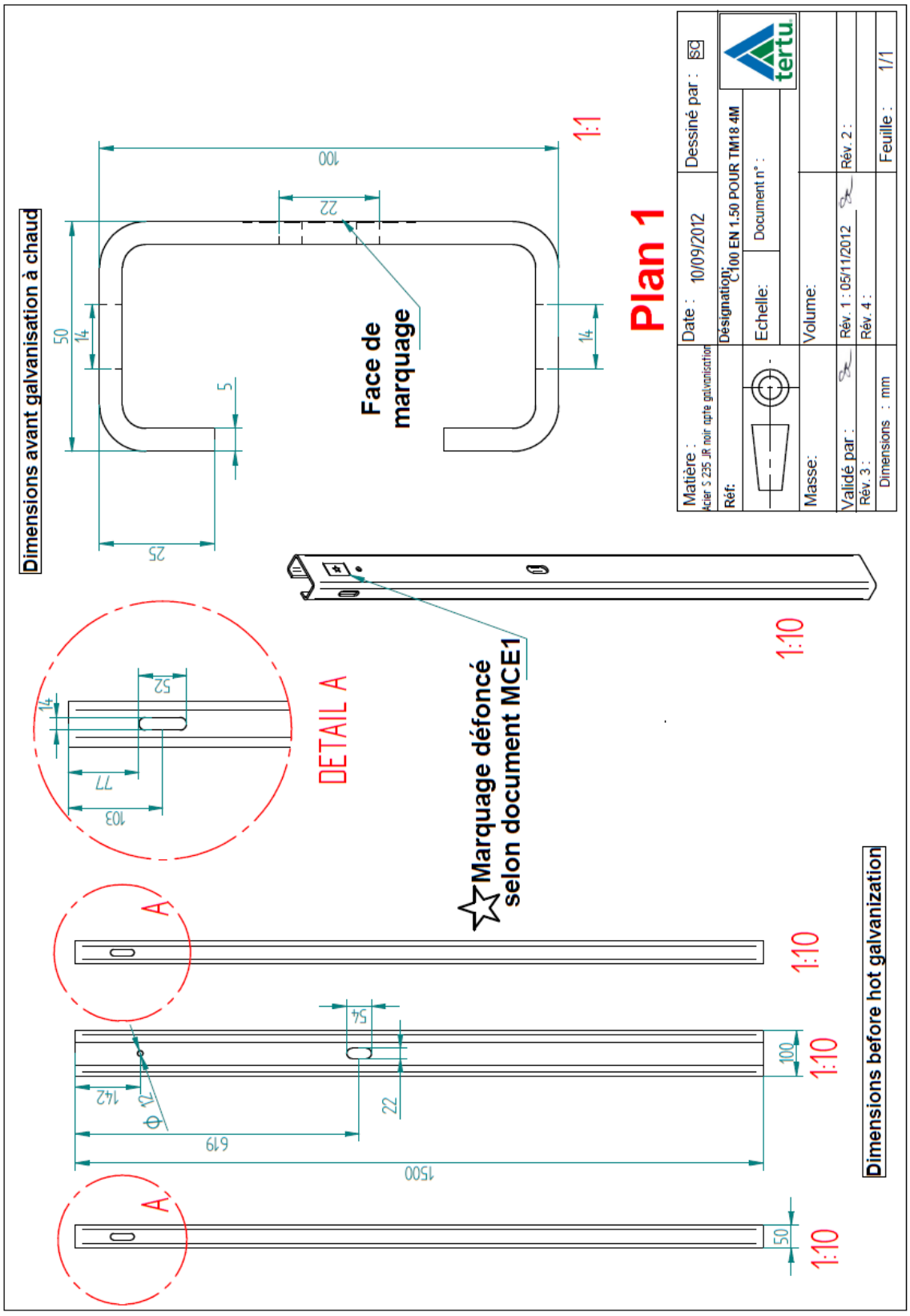


FIGURE 7

Parts drawing T-MASH18 4MS2



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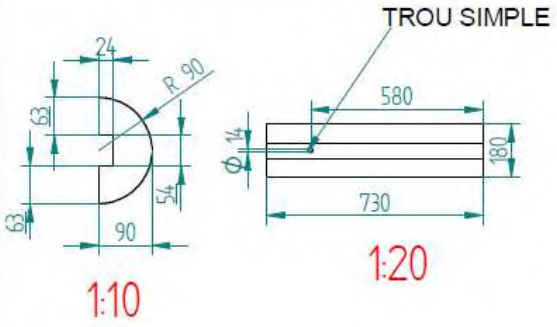
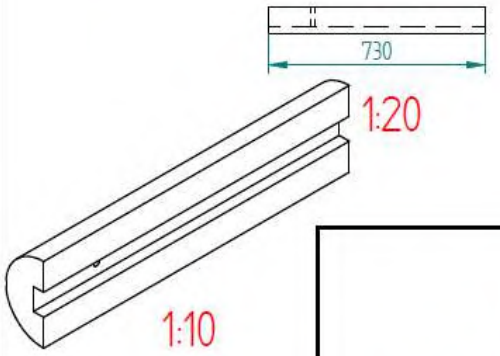
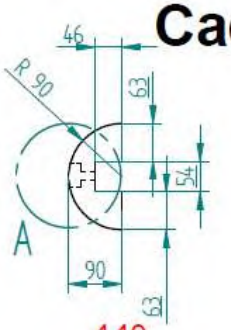
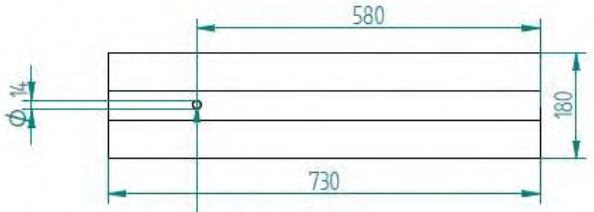
Ecarteur



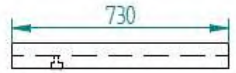


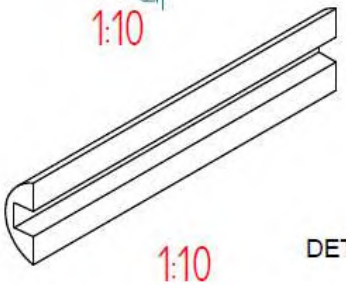
Cache-écarteur





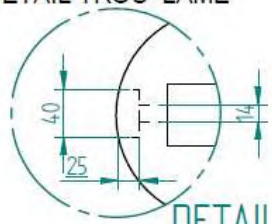
TROU LAME 1:10





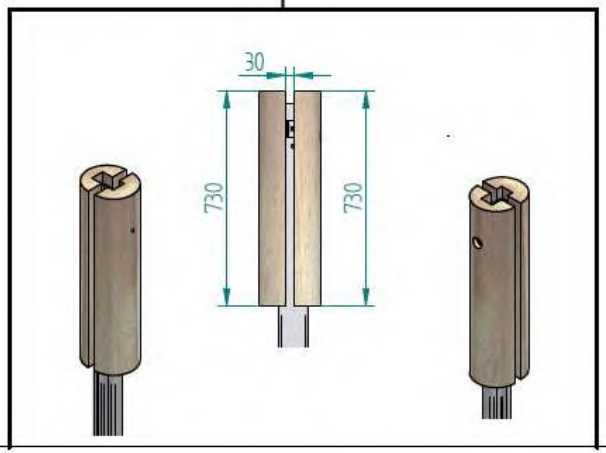
1:10

DETAIL TROU LAME



1:20

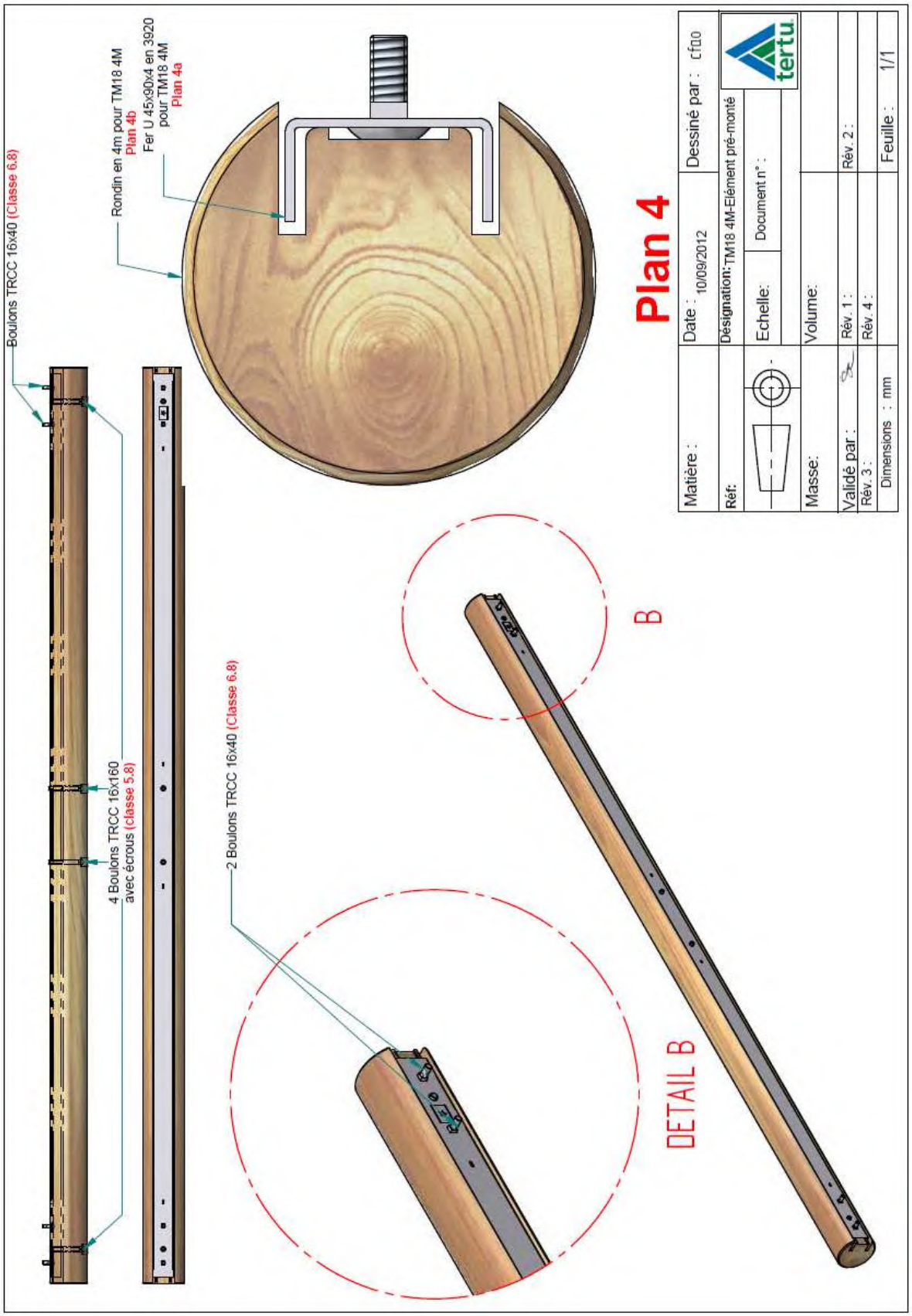
Plan N°3

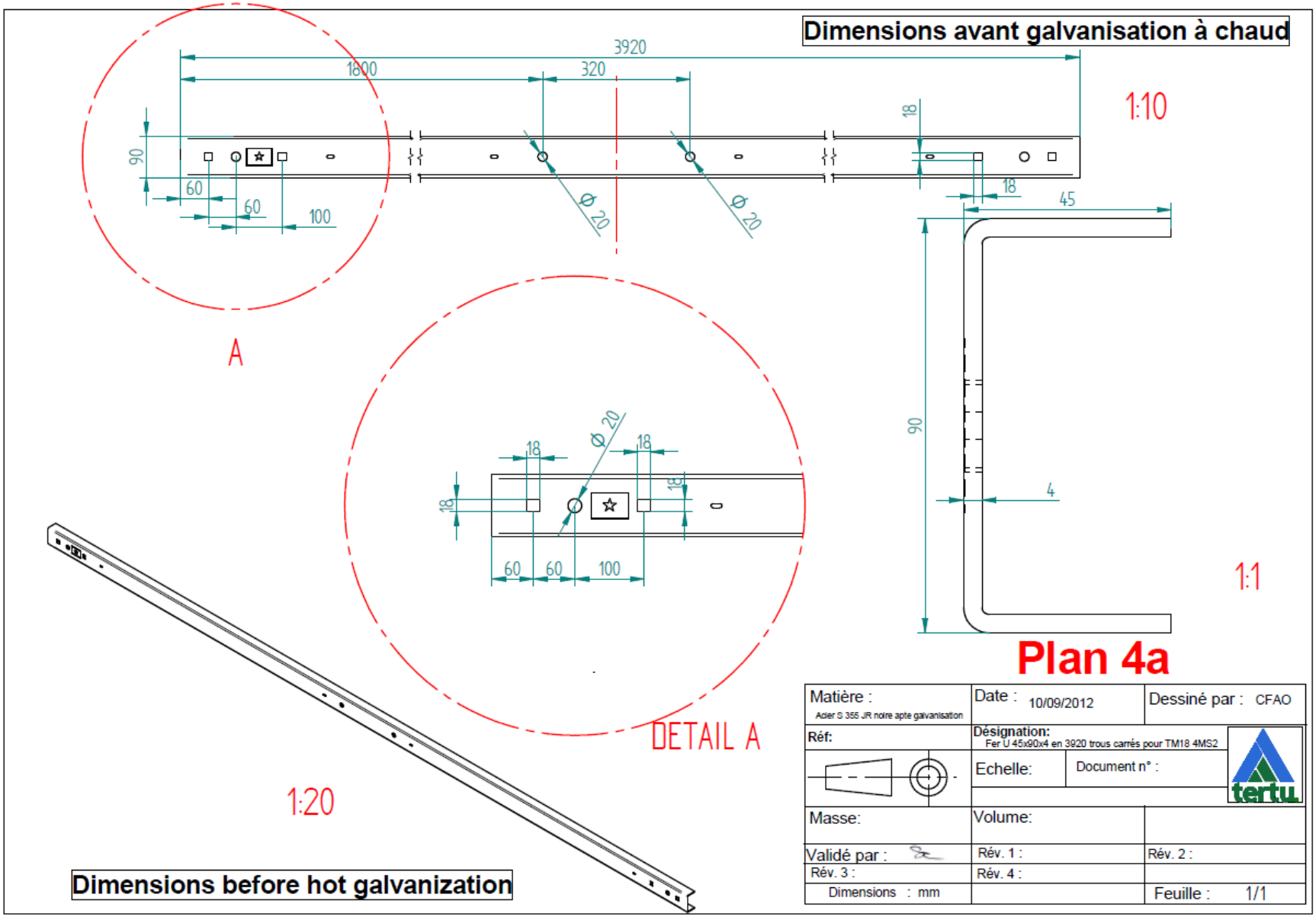


DETAIL A

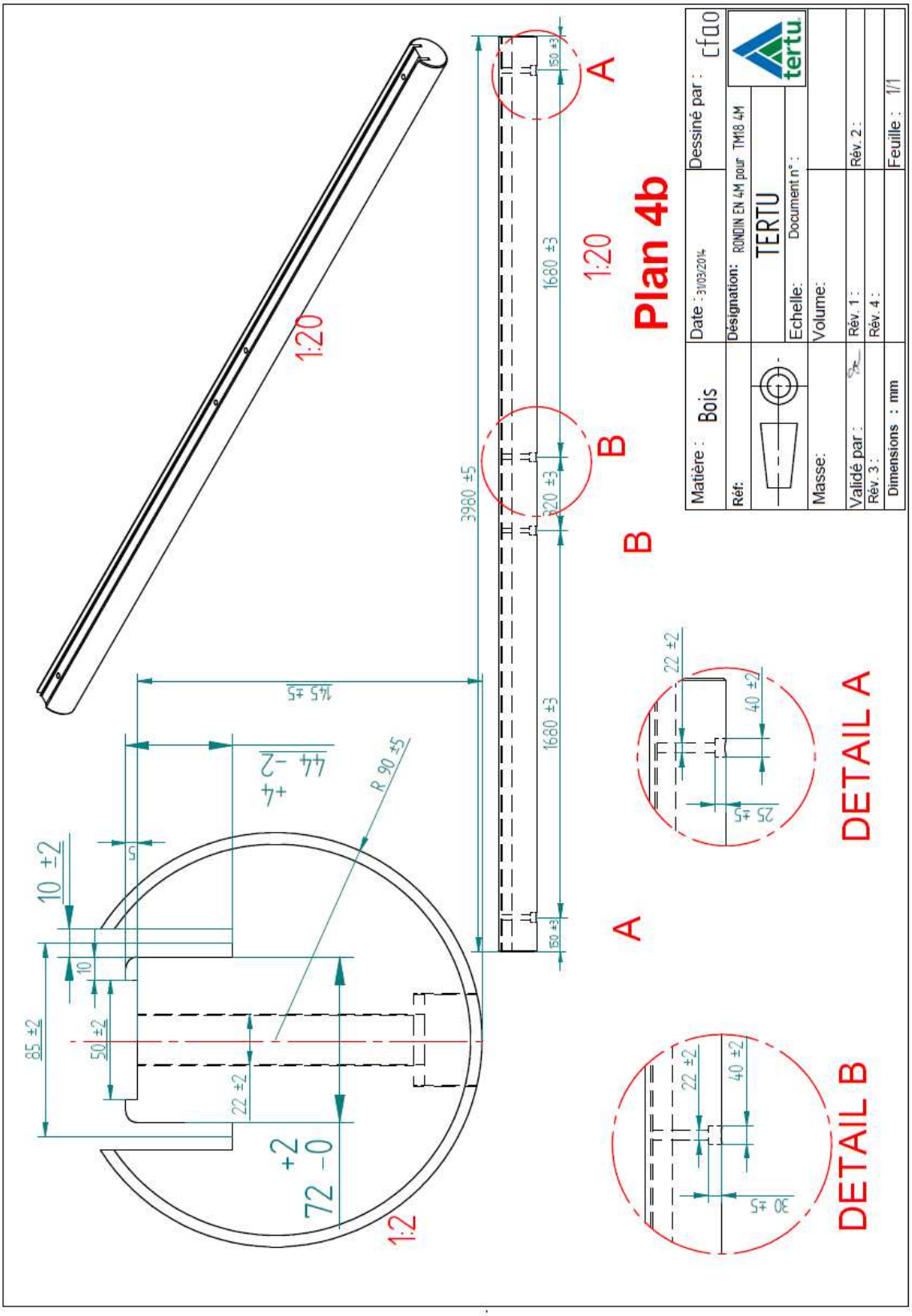
Matière :	Date : 12/03/2015	Dessiné par : sc
Réf:	Désignation: Ecarteur + cache écarteur TM18 de 0.73m	
	Echelle: / Document n° :	
Masse:	Volume:	
Validé par :	Rév. 1 : 02/2014	Rév. 2 : 12/03/2015
Rév. 3 : 15/11/2016	Rév. 4 : 05/01/2017	
Dimensions : mm		Feuille : 1/1

tertu

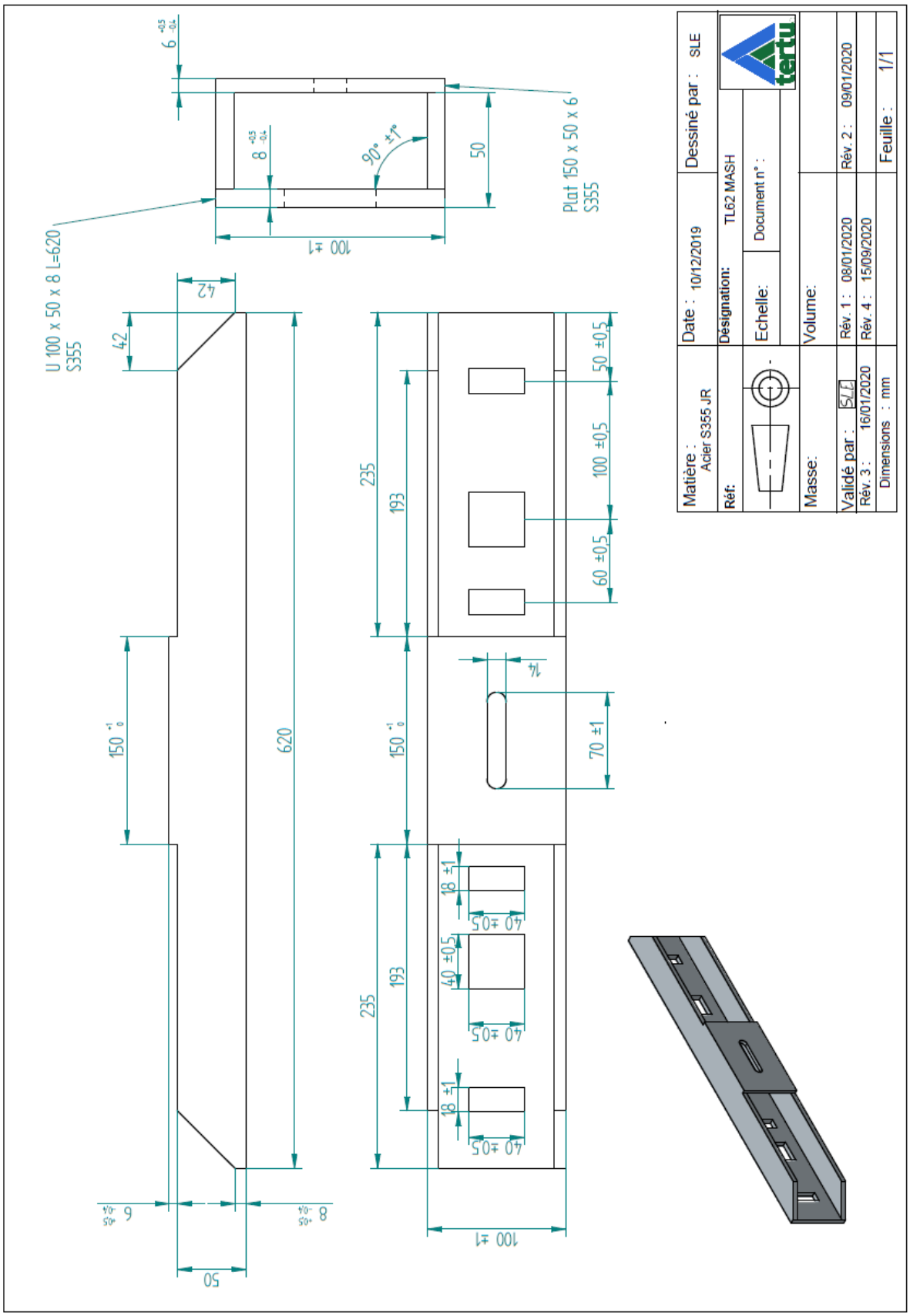



Dimensions avant galvanisation à chaud
3920
1800
320
1:10
90
60
60
100
Ø 20
Ø 20
18
18
45
A
Ø 20
18
18
18
18
60
60
100
90
4
1:1
DETAIL A
1:20
Dimensions before hot galvanization
Matière :
Acier S 355 JR noire apte galvanisation
Date : 10/09/2012
Dessiné par : CFAO
Réf:
Désignation:
Fer U 45x90x4 en 3920 trous carrés pour TM18 4MS2
Echelle:
Document n° :
Masse:
Volume:
Validé par :
Rév. 1 :
Rév. 2 :
Rév. 3 :
Rév. 4 :
Dimensions : mm
Feuille : 1/1

Plan 4a



PLAN 5a



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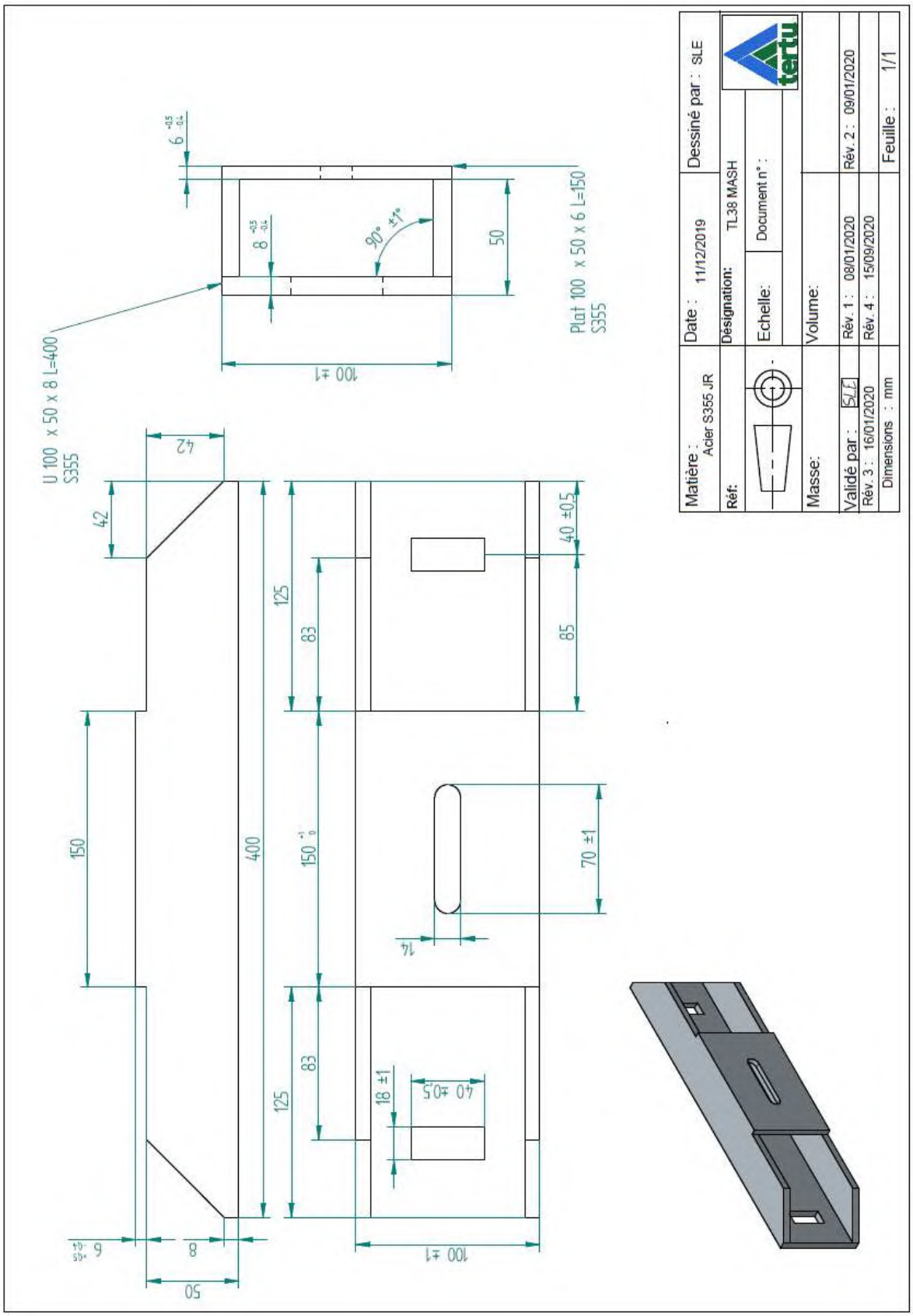
PLAN 5b



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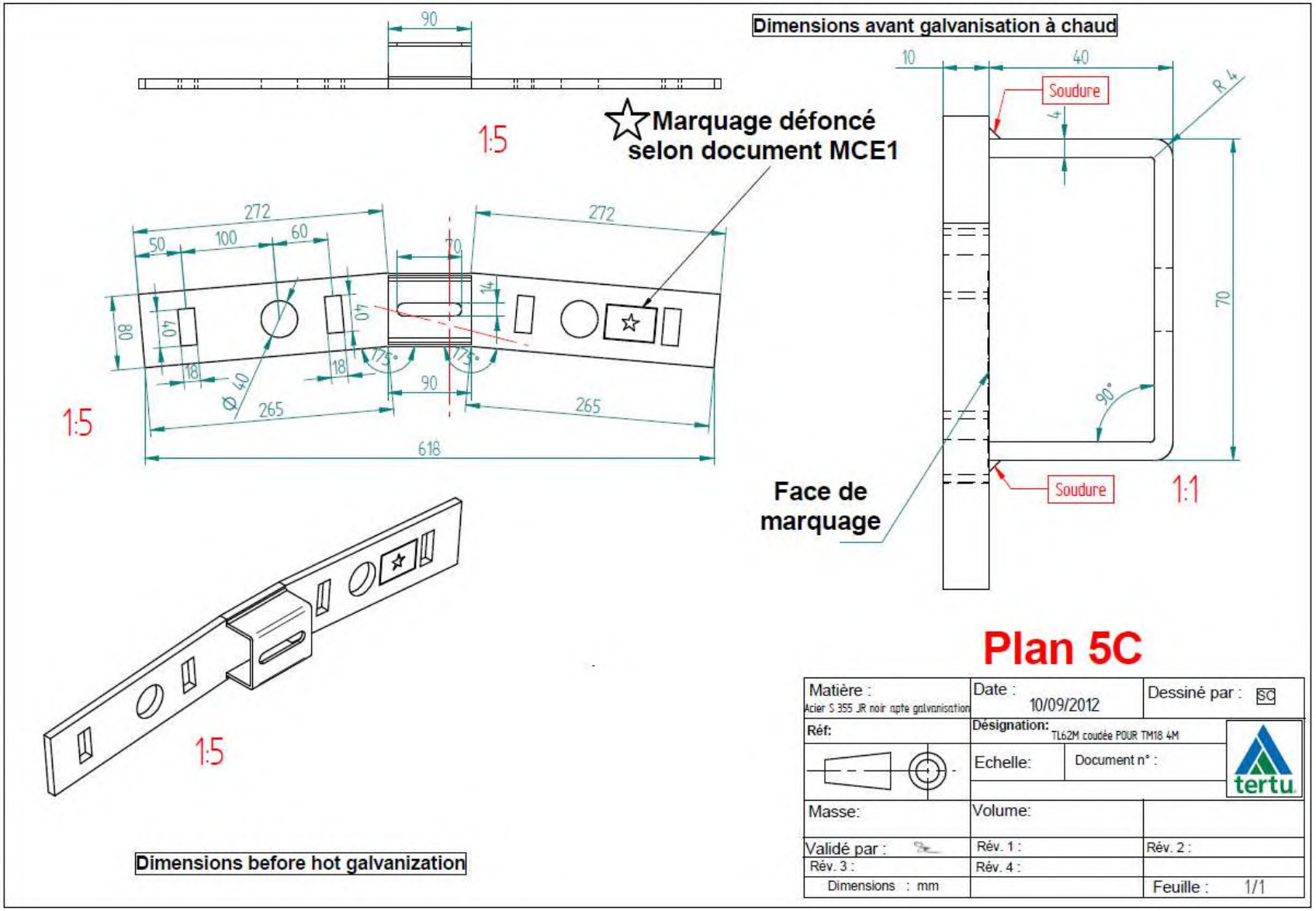
Dimensions avant galvanisation à chaud
90
1:5
Marquage défoncé
selon document MCE1
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272
50
100
60
70
80
40
40
4
18
18
175°
175°
Ø 40
265
265
90
618
1:5
10
40
Soudure
R 4
4
70
90°
Soudure
1:1
Face de
marquage
1:5
Dimensions before hot galvanization
Plan 5C
Matière :
Acier S 355 JR noir apte galvanisation
Date :
10/09/2012
Dessiné par :
SC
Réf:
Désignation:
TL62M coudée POUR TM18 4M
Echelle:
Document n° :
tertu
Masse:
Volume:
Validé par :
Rév. 1 :
Rév. 2 :
Rév. 3 :
Rév. 4 :
Dimensions : mm
Feuille : 1/1