Installation Manual

WOOD & STEEL GUARDRAIL

TM40 4MS2 Model

Containment level H2

Working width W5 (1.70 m)

Severity class : A

CE

N° : 1826 CPR 09 02 06 DR10

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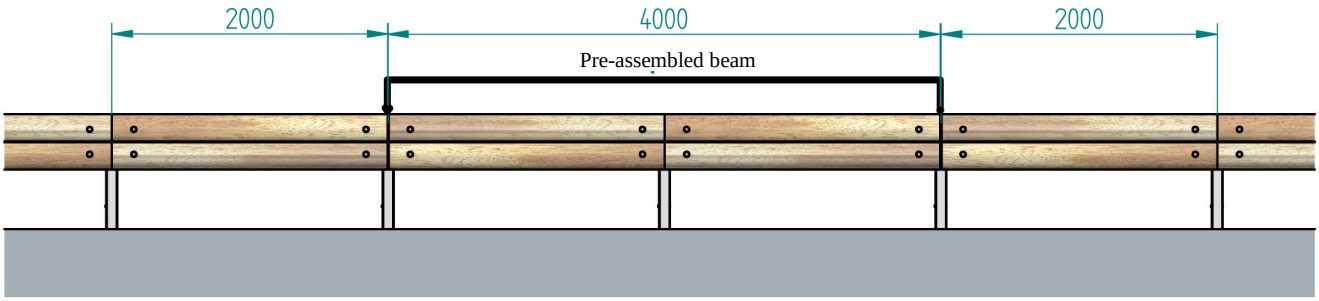
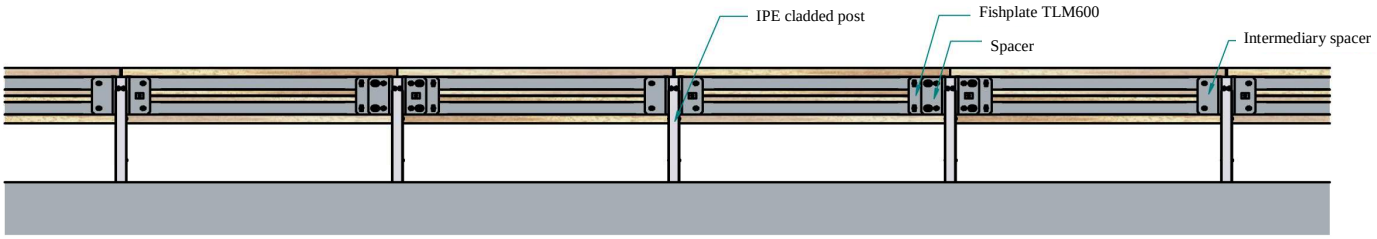
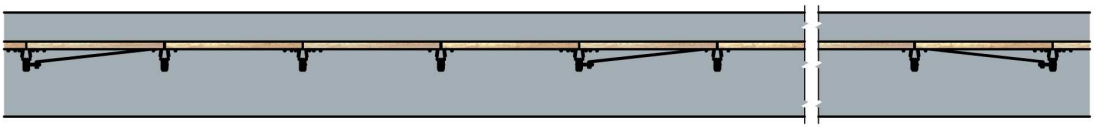
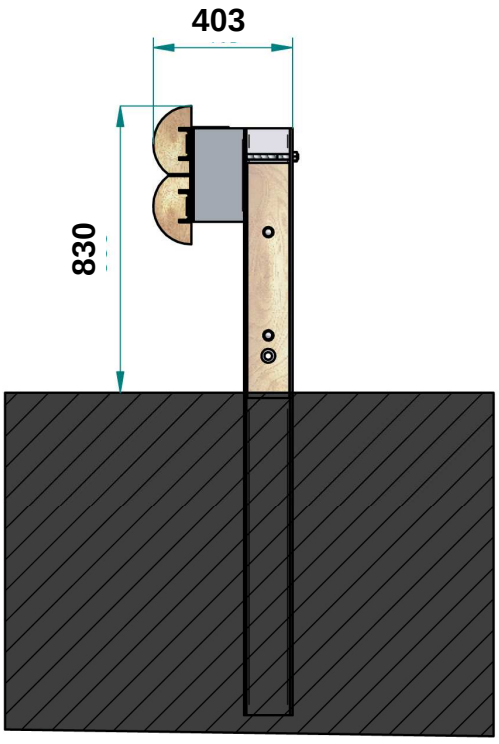
TM40 4MS2


2000
4000
2000
Pre-assembled beam


IPE cladded post
Fishplate TLM600
Spacer
Intermediary spacer




403
830

CE

TERTU SAS – FR 61160 VILLEDIEU LES BAILLEUL

1826-CPR 09 02 06 DR10

EN 1317-5

Barrière mixte bois-métal simple lisse (support tous les 2 mètres)
à utiliser dans les zones de circulation

Mixed wood-steel barrier simple beam (posts every 2 metres)
to be used in circulation areas

Glissière/Guardrail type TM40 4MS2

Performance au choc – Performance under impact :

a) Niveau de retenue : **H2** - Containment level : **H2**

b) Sévérité de choc : **A** - Impact severity level : **A**

c) Largeur de fonctionnement : W = 1.6 m (**W5**)
Working width: W = 1.6 m (**W5**)

d) Déflexion dynamique maximale : Dm = 1.5 m
Maximum dynamic deflection : Dm = 1.5 m

e) Intrusion de véhicule normalisée : VIN = 1.7 m (**VI5**)
Normalized vehicule intrusion : VIN = 1.7 m (**VI5**)

Durabilité – Durability:

S235JR, galvanisé selon EN ISO 1461
S235JR, galvanised according EN ISO 1461
Bois traité selon la norme EN 335
Wood treated according to the EN 335 standard
Substance dangereuse : aucune
Dangerous substance : none

WOOD & STEEL GUARDRAIL « TM40 4MS2» MODEL

Brief description :

The system does include :

- IPE steel posts 140 x 1.70 m wooden cladded, post spacing 2 m
- Steel connecting fishplates TM 40
- Intermediary steel fishplates TM40
- Steel fishplates TLM600 joining 2x2 rails at post locations
- Bended steel spacers for each terminal
- One bended fishplate for each terminal
- 2 m long steel-backed wooden rails, model TM40, built with 2 half round logs Ø22 cm placed on top of each other and reinforced with 2 steel chanel 4m length on the back of the rail.
- Wood and steel are pre-mounted on production site, and bolted with TRCC 16X140
- TRCC 16X40 bolts pre-mounted on production site, connecting the whole fishplate TLM600 system with two half-round log rails.
- Upstream and downstream tensioner with bearing plates and threaded rods.

BILL OF MATERIALS FOR 4M (*Dimensions in millimeters*)

Item	Tertu Code	Description	Quantity	Weight
Steel post	IPE 140	IPE 140x73 Length = 1700 With wooden cladding	2	27.50 Kg
Steel post	C125150	Post C125x50x25x5 with 1 hole Standard length= 1500		12.70 Kg
Steel spacer	Connecting spacer TM 40	Flat structural steel 420x270 x4mm drilled with 10 holes—box 147x120	1	6.4 Kg
Steel spacer	Intermediary spacer TMI40	Flat structural steel 420x270 x4mm drilled with 6 holes - box 147x120	1	6.4 Kg
Steel spacer	Bended connecting spacer TM 40	Flat structural steel 420x270 x4mm drilled with 10 holes—box 147x120		7 Kg
Steel fishplate	Connecting fishplate TLM600	Structural steel 600x270x6 mm drilled with 12 holes	1	7.7 Kg
Steel fishplate	Bended connecting fishplate TM40	Cranked structural steel 600x270x6 mm drilled with 12 holes		
Wooden rail	TM40 4MS2	Includes: Four 1/2 pressure treated log Ø 220, length 1995 with 2 holes + one steel U channel 90x30x5, length 3920 with four TRCC 16x40 bolts pre assembled to the U profile. The complete rail is assembled on production site with four TRCC 16x120 bolts	2	70 Kg
Terminal fish-plate	TME 41 EXTREMITY	Flat structural steel 370x260x6mm drilled with seven holes		7.1 Kg
Tensioner	TENSIONER	Flat structural steel 80x1637x5 drilled with 2 holes		6.6 Kg
TRCC	M16x40 M16x120	Class 6.8 Class 5.8	4 8 Pre mounted	0.22 kg 0.24 kg
TRCO	M16x160	Class 5.8	4	0.38 Kg
Threaded rod	M20x220	Class 8.8		0.18 kg
Nut	M16	Class 5.8 for TRCC 16X120 , TRCC 16X40, TRCO 16x160		0.03 kg
Nut	M20	Class 5.8 for threaded rod		

Weight per lm = 55 Kg including the steel post IPE 140 in 1.70 m

Installation method

Recommended tools:

The TM40 4MS2 can be installed with the same level of competency and tools as required for steel crash barrier in particular :
Post driving machine, torque wrenches, a socket wrench / nut spanner, compressor and lorry mounted lifting arm (if applicable)

1) Post installation (drawing 1)

Steel post IPE 140 in 1.7 m lenght shall be driven into the ground every 2m; service height above ground = 78.5 cm (+0/-5)

2) Connecting spacer installation (drawing 2)

Once the steel post IPE is installed, place the connecting spacer TM40 on the steel post with two TRC0 M16X160 (thightening torque 50Nm+/- 10Nm)

3) Intermediary spacer installation (drawing 3)

Once the following steel post IPE installed in 2 m from the precedent, set up the intermediary spacer TMI40 on the steel post IPE with two TRC0 16X160 (tightening torque 50Nm+/- 10Nm)

4) Rails installation (drawings 4-5-6-7)

In three steps :

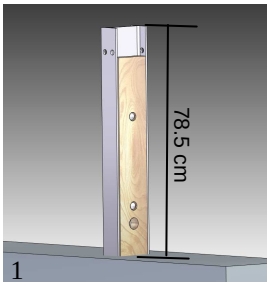
a) Once connecting and intermediary spacer installed, place the fishplate TLM600 facing the connecting spacer holes (drawing 4).

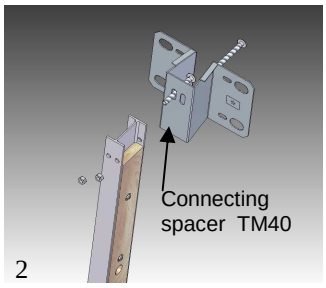
b) Line up the inferior rail 4m, threaded bolts Ø16x40 turned to the fishplate, and attach it with bolts through the TM40 spacer and the TM600 fishplate (drawing 4).

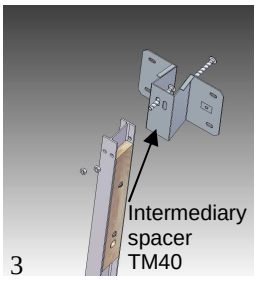
c) Place the middle of the rail directly on the intermediary spacer (drawings 5-6 &7), then place the rail extremity on the following steel post using the connecting fishplate TLM600 and connecting spacer. Repeat the operation for the up-rail and so on.

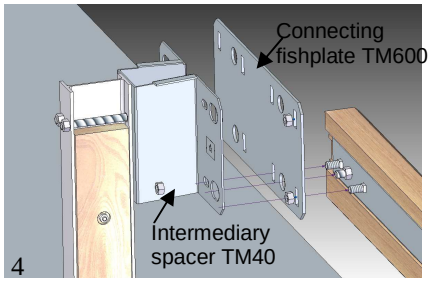
5) Settings

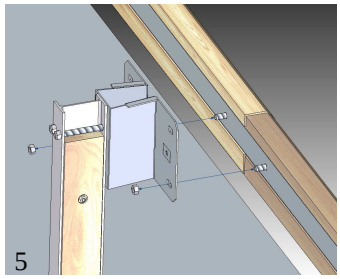
After having installed several elements, it is possible to improve height setting while slightly lowering the rails level thanks to the holes situated on the spacer.
Rails height above ground : 85 cm (+0/-5)



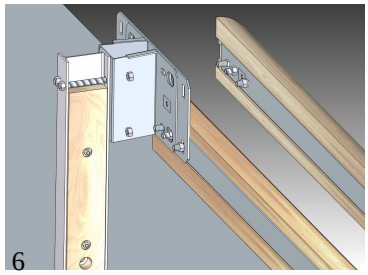




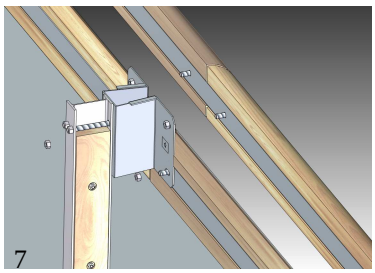




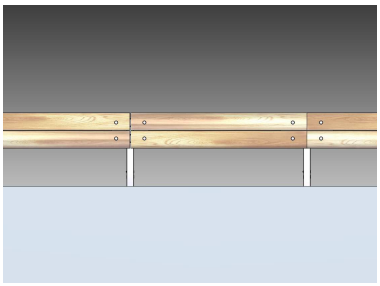
Lower rail installation



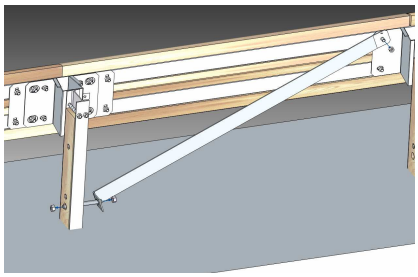
Upper rail installation



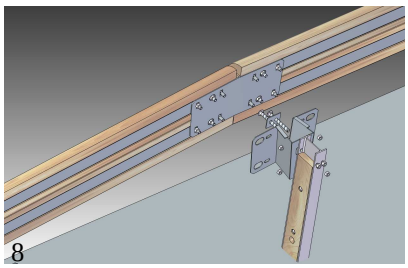
Upper intermediary rail installation

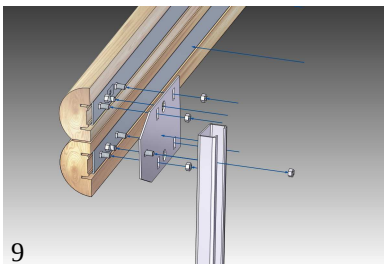


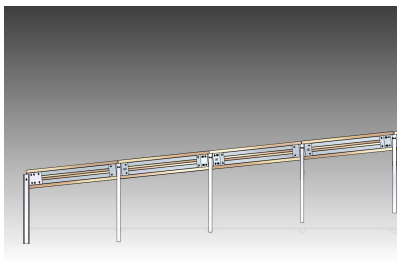
Front view

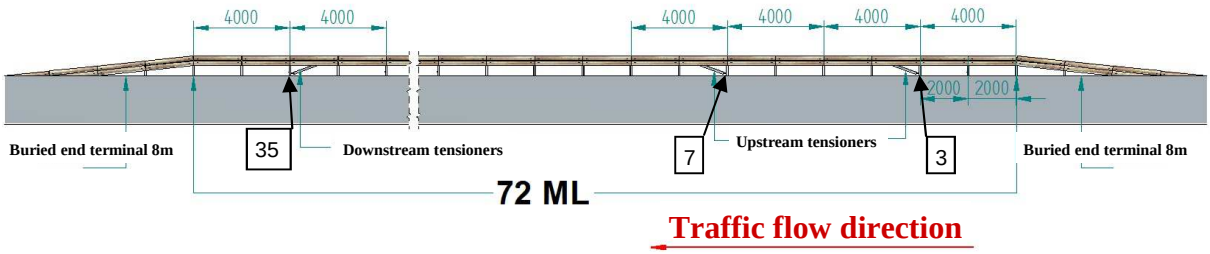


Tensioner system









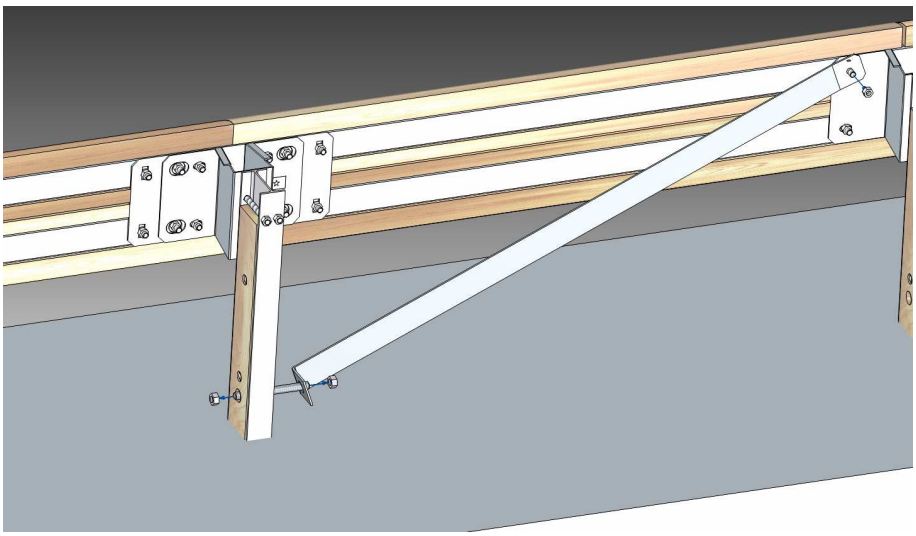
6) Upstream tensioners installation for a 72lm without end terminals

The first upstream tensioner connected on the steel post n°3 of the beam by a threaded rod 20x220 in the middle of the rail n°2
The 2nd upstream tensioner connected on the steel post n°7 of the beam by a threaded rod 20x220 in the middle of the rail n° 4.

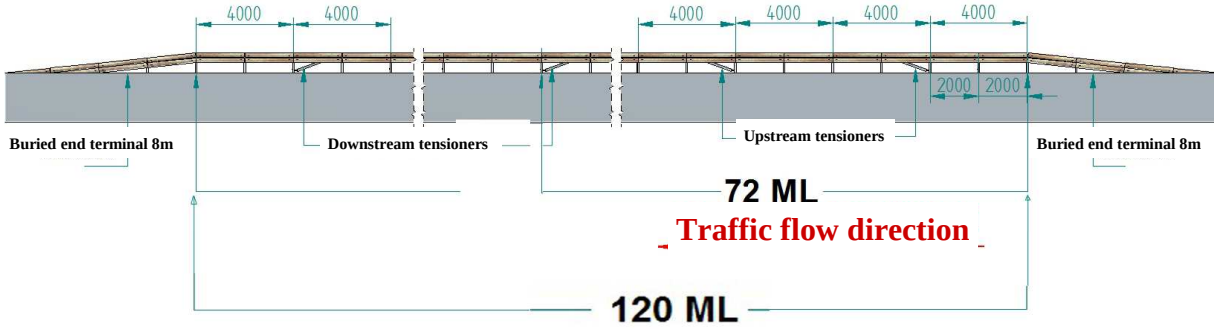
7) Downstream tensioner installation for a 72lm without end terminals

The downstream tensioner connected on the steel post n°35 of the beam by a threaded rod 20x220 in the middle of the rail n° 17.

On each steel post, there is a hole to allow the threaded rod Ø20mm to be fixed (rod tightening couple of 50Nm+/- 10Nm).



For a section superior to 72lm, without end terminals, and inferior to 144lm, a downstream tensioner should be added on the second last post.



Rail service height:

The center-line of the rail face should be 85 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

MINIMUM LENGTH

In order to ensure a proper anchorage , it is recommended to install a 72lm minimum length.
If the section is inferior to 72lm, it is recommended to refer to the manufacturer before the installation.

PARTICULAR SITUATIONS

Curvatures :
TM40 4MS2 is adapted to follow radii ≥ 30 m. For radii < 30m , it is recommended to use the TM40 2M.

Soil conditions :
The anchoiring system behavior depends on the soil quality. Therefore, it is important to evaluate on site the soil resistance which must be adequate to ensure the proper anchoring of the crash barriers section.
The TM40 4MS2 has been tested with steel post in 1.7 m. This length can be increased , according to the soil conditions measured during the ground testing procedure.

End terminal treatment :
The terminals may be dropped and buried into the ground on an 8m length, or horizontally inserted in the bank. In order to lower the first 4m rail, it is necessary to use the bended spacer TM40 and the bended fishplate TM600.

Installation in front of a drop
It is necessary to maintain a distance of 1.50m between the front side of the rail and the beginning of the slope.

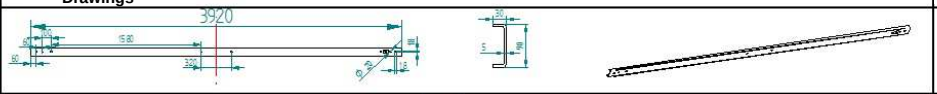
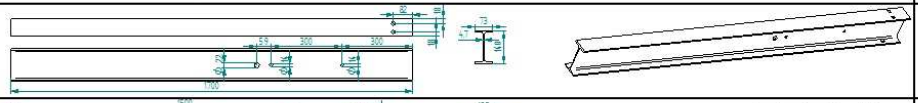
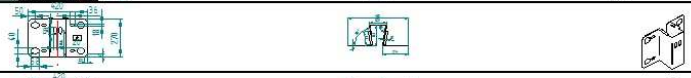
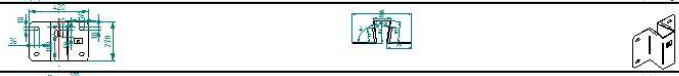
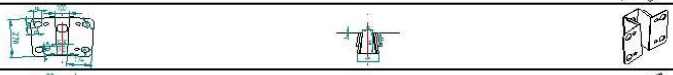
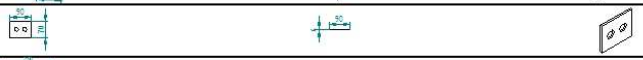
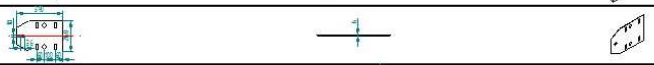
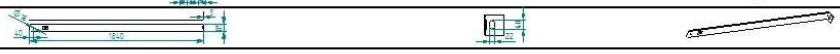
Repairs
All damaged parts must be systematically replaced according to the product installation instructions.

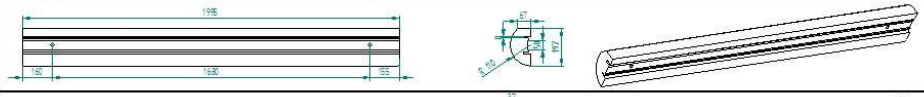
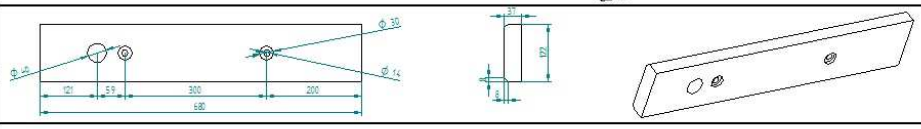
Remark
During an impact, components weighting more than 2kgs can be detached.

Traceability, components marking
Except the hardware, every single steel component is identified with a marking: Tertu logo manufacturer stamp, batch number and CE official logo

Packaging
Rails are delivered by packets of 16 units, wooden spacers are packed on pallets.

TM40 4MS2 GUARDRAIL

ITEM	Drawings	Drawing Ref.
U steel chanel 90x30x5 in 3920mm Squared holes for TM40BL 4MS2 S235 JR Steel		7C
IPE 140 in 1.70m For TM 40 BL 4MS2 S235 JR Steel		2
C125 in 1.50m S235 JR Steel		3
TLM600 for TM40 BL 4MS2 S235 JR Steel		8
Spacer for TM40 BL 4MS2 S235 JR Steel		4
Intermediary spacer for TM40 BL 4MS2. S235 JR Steel		5
Bended spacer for TM40 BL 4MS2. S235 JR Steel		6
Spacer tightening steel plate for dropped section for TM40 BL 4MS2. S235 JR Steel		"6"
Extremity fishplate TME41 for TM40 BL 4MS2. S235 JR Steel		10
Tensioner S235 JR Steel		11

ITEM	Drawings	Drawing Ref.
Right 1/2 round log in 1995mm for TM40 BL 4MS2		7A
Left 1/2 round log in 1995mm for TM40 BL 4MS2		7B
Wooden claddind for post IPE 140 for TM40 BL 4MS2		1
Bolts TRCO 16X160 Class 5-8		
Bolts TRCC 16X40 Class 6-8		
Bolts TRCC 16X120		
M16 Nut		
M20 Nut		
Threaded rod 20x220		
Washer M20 DIN 125		

September 2015