

# Steel back timber guardrail **T-MASH 18**

ROAD SAFETY



## T-MASH 18



- ▶ Level TL 2
- ▶ 2.2 T pick-up truck at 70 km/h
- ▶ 1.1 T compact car at 70 km/h
- ▶ 2.00 m post-spacing
- ▶ Environment friendly system

MASH  
Compliant



**tertu**  
EQUIPEMENTS

# Steel backed timber guardrail T-MASH 18

## ► Testing conditions & results

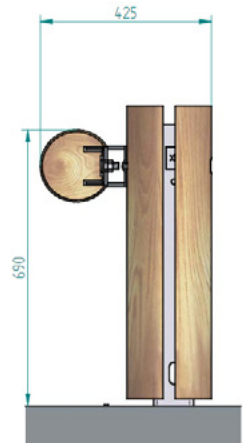
- Crash tested on July, 1<sup>st</sup> 2020 in accordance with the requirements of the AASHTO guidelines **MASH** (Manual for Assessing Safety Hardware) at **level TL 2**

<b>General Information</b>		<b>Post-impact Trajectory</b>	
Test agency.....	CSI S.p.A.	Vehicle Stability.....	Satisfactory
Test No. ....	0115/ME/HRB/20	Stopping Distance.....	10 m downstream
<b>Test Article</b>		<b>Occupant Risk Values</b>	
Type.....	T-MASH18 4MS2	Vehicle snagging.....	None
Installation length [m].....	80.0	Vehicle pocketing.....	None
Size and/or dimension and material of key Elements.....	See attached drawings	Impact Velocity [m/s]	
<b>Foundation type and condition</b> .....		X-direction.....	5.2
Compacted Soil		Y-direction.....	3.2
<b>Test Vehicle</b>		Ridedown Acceleration [g's]	
Type/ Designation.....	2270P	X-direction.....	-6.1
Model.....	Chevrolet Silverado 1500	Y-direction.....	-3.5
Mass [kg]		THIV .....	21.2
Curb.....	2239.0	PHD .....	6.3
Test Inertial.....	2308.8	ASI 2010.....	0.42
Gross static.....	2308.8	Test Article Damage .....	Moderate
<b>Impact Conditions</b>		<b>Test Article Deflections [m]</b>	
Speed [km/h].....	70.1	Permanent .....	0.83
Angle [deg].....	24.5	Dynamic .....	0.99
Impact Severity [kJ].....	78.2	Working Width Dynamic.....	1.49 (vehicle) – 2.35 (wood)
Impact Location.....	0.8 m before post	<b>Vehicle Damage</b>	
Exit Speed [km/h].....	N/A	See appendix A	
Exit Angle [deg].....	N/A	Maximum internal deformation.....	87 mm
		Maximum external deformation.....	390 mm

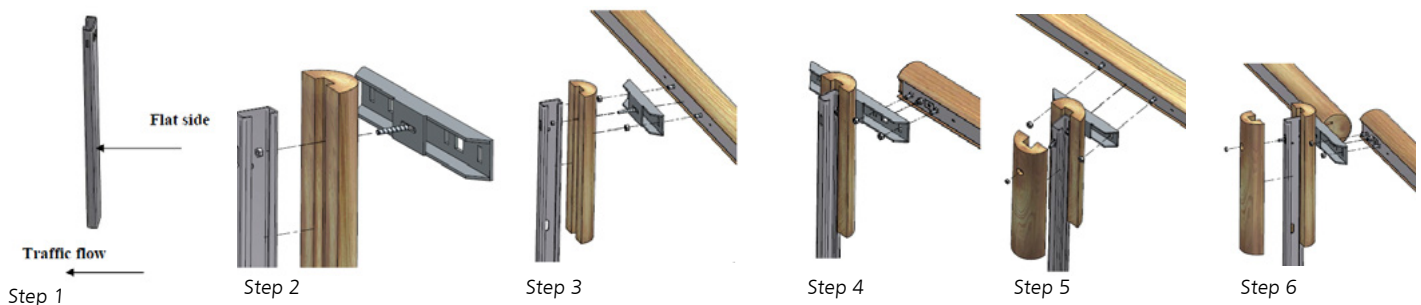
**All evaluation criteria successfully met**

## ► Technical information

- Rail made of a round log  $\varnothing$  18 cm backed with a steel U channel inserted in the wooden rail
- C100 steel posts in 1.50 m, with 2 m spacing, with wooden spacer
- Pressure-treated wood with chromium and arsenic-free preservatives



## ► Assembly



**NEW**

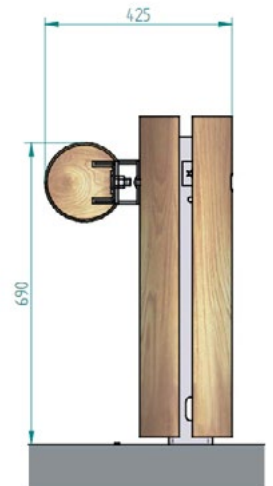


# T-MASH 18

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

## TECHNICAL INFORMATION

- Rail made of a round log  $\varnothing$  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 snagging	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



1 route de Tertu - 61160 Villedieu-Lès-Bailleul - FRANCE  
Tél. : 02 33 36 11 02 - [export@tertu.com](mailto:export@tertu.com)

[tertu.com](http://tertu.com)



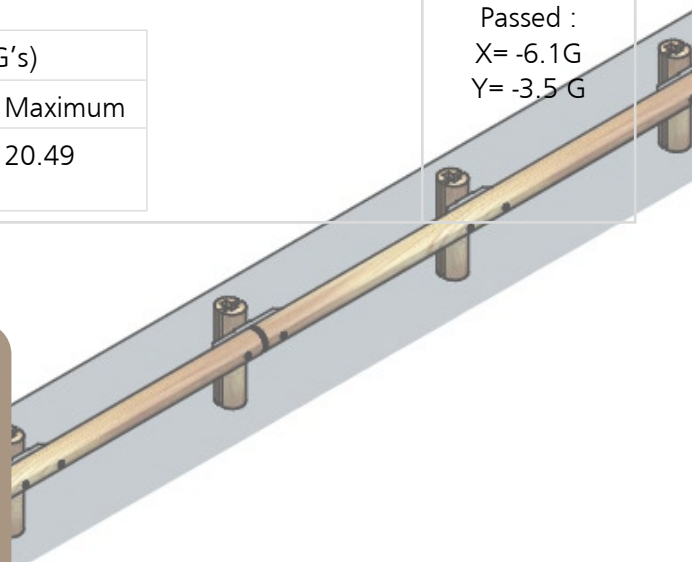
# T-MASH 18 steel backed timber guardrail

## OCCUPANT RISK VALUES

Evaluation factors	Evaluation criteria	Results									
<b>Structural adequacy</b>	Test article should contain and redirect the vehicle; the vehicle should not penetrate, underride, or override the installation, although controlled lateral deflection of the test article is acceptable.	Passed									
<b>Occupant risk</b>	Detached elements, fragments, or other debris from the test article should not penetrate or show potential for penetrating the occupant compartment, or present an undue hazard to other traffic, pedestrians, or personnel in a work zone. Deformations of, or intrusions into, the occupant compartment that could cause serious injuries should not be permitted.	Passed									
	The vehicle should remain upright during and after collision. The maximum roll and pitch angles are not exceed 75 degrees	Passed									
	Occupant impact velocities (see Appendix A, section A5.3 for calculation procedure) should satisfy the following :	Passed : X= 5.2 m/s Y= 3.2 m/s									
	<table border="1"> <thead> <tr> <th colspan="3">Occupant Impact Velocity Limits (m/s)</th> </tr> <tr> <th>Component</th> <th>Preferred</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>Longitudinal and lateral</td> <td>9.1</td> <td>12.2</td> </tr> </tbody> </table>		Occupant Impact Velocity Limits (m/s)			Component	Preferred	Maximum	Longitudinal and lateral	9.1	12.2
Occupant Impact Velocity Limits (m/s)											
Component	Preferred	Maximum									
Longitudinal and lateral	9.1	12.2									
Occupant ridedown accelerations (see Appendix A, section A5.3 for calculation procedure) should satisfy the following :	<table border="1"> <thead> <tr> <th colspan="3">Occupant ridedown acceleration limit (G's)</th> </tr> <tr> <th>Component</th> <th>Preferred</th> <th>Maximum</th> </tr> </thead> <tbody> <tr> <td>Longitudinal and lateral</td> <td>15.0</td> <td>20.49</td> </tr> </tbody> </table>	Occupant ridedown acceleration limit (G's)			Component	Preferred	Maximum	Longitudinal and lateral	15.0	20.49	Passed : X= -6.1G Y= -3.5 G
Occupant ridedown acceleration limit (G's)											
Component	Preferred	Maximum									
Longitudinal and lateral	15.0	20.49									

3 good reasons to select T-MASH 18 for your road safety projects :

- Meeting with all MASH standards requirements
- Crashworthy & environment friendly system
- Easy to install device



For more information, get in touch with Tertu international department :

**Philippe GIACOMETTI**  
+33 6 85 76 24 88 [phg@tertu.com](mailto:phg@tertu.com)

**tertu**  
EQUIPEMENTS