# Installation Manual

**WOOD & STEEL GUARDRAILS**

## Model TM18 4M

**Containment level N2**

**Working width W5 (1.70 m)**

**Severity class: A**

**N° : 1826 – CPD – 09 – 02 – 06 – DR6**

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CE

**TERTU SAS – FR 61160 VILLEDIEU LES BAILLEUL**

1826-CPD-09-02-06-DR6

**EN 1317-5**
**Barrière bois-métal simple lisse (support tous les 4 mètres)**
**à utiliser dans les zones de circulation**

**Wood-steel barrier simple beam (posts every 4 metres)**
**to be used in circulation areas**

**Glissière/Guardrail type TM18 4M**

**Performance au choc – Performance under impact :**

Niveau de retenue : **N2** - Containment level : **N2**

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

Largeur de fonctionnement : W=1.7 m (**W5**)
Working width: W=1.7 m (**W5**)

Déflexion dynamique maximale : Dm=1.2 m
Maximum dynamic deflection : Dm=1.2 m

Intrusion de véhicule normalisée : VIN = 1.3m (**V14**)

Normalized vehicule intrusion : VIN = 1.3m (**V14**)

**Durabilité – Durability:**
S235JR, S355 JR galvanisé selon EN ISO 1461
S235JR, S355 JR galvanised according to EN ISO 1461
S390 GD 600 galvanise selon EN 10 346
S390 GD 600 galvanised according to EN 10346
Bois traité selon la norme EN 335
Wood treated according to the EN 335 standard
**Substance dangereuse :** aucune
**Dangerous substance :** none

# WOOD & STEEL GUARDRAIL MODEL « TM18 4M »

**Brief description:**

**The system does include:**

- C100 steel posts with 4 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: TL62TM18
- a steel curved fishplate connecting 2 rails for terminal ends: TL62 TM18 EXTREMITE
- pre-installed TRCC 16x40 bolts securing the fishplate TL62 TM18 assembly with 2 rails
- upstream & downstream tensioners with bearing plate and threaded rod.

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

| Item | Tertu code | Description | Quantity | Weight |
|---|---|---|---|---|
| Steel post | C100150TM18 | Post C100x50x25x5<br>with 3 holes<br>Length = 1500 | 1 | 12.70 Kg |
| Wooden spacer | ECARTC100075TM18 | Spacer Ø180 drilled with notch, 2 elements, in 0.73 m | 1 | 8 Kg |
| Wooden spacer for tensioner | ECARTC100061TM18 | Spacer Ø180 drilled with notch, 2 Elements, in 0.61 m | Depends on job total length | 7 Kg |
| Rail | TM18PRM4M | Includes: 1 pressure treated log Ø 180, length 3980 with 4 holes + 1 steel U channel 90x45x4, 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 | TL62TM18 | Structural steel 80x10, length 620<br>1 steel fuse box welded | 1 | 3.88 Kg |
| Connecting fishplate for terminal | TL62TM18EXTREMITE | Structural curved steel 80x10, length 618<br>1 steel fuse box welded | According to terminals quantity | 4.10 Kg |
| Fishplate for terminal buried end | TL41TM18 | Structural curved steel 80x10, length 410 with 3 standard holes + one oblong hole | According to terminals quantity | 2.7 Kg |
| Upstream tensioner | TENDEUR AMONT | Structural steel folded at one end 80x5 length = 1637 drilled at each end | Depends on job total length | 6.6 Kg |
| Downstream tensioner | TENDEUR AVAL | Structural steel folded at one end 80x5 length = 1637 drilled at each end | Depends on job total length | 6.6 Kg |
| Bearing plate | PLAQUERENFORTTM18 | Structural steel 60x6<br>length = 200 with one hole | According to terminals quantity | 0.61 Kg |
| Bolt TRCC<br>Round head, square neck | TRCC16160<br>TRCC16040<br>TRCC12100GALVAFT<br>TRCC12040GALVA | Class 5.8<br>Class 6.8<br>Class 8.8<br>Class 5.8 | 4 pre-mounted<br>4 pre-mounted<br>1<br>1 | 0.28 Kg<br>0.10 Kg<br>0.18 Kg<br>0.10 Kg |
| Threaded rod | TIGE20220- | Class 8.8 | According to terminals quantity | 0.63 Kg |
| Nut | ECROUM16<br>ECROUM1632-<br>ECROUM20<br>ECROUM12 | Class 5.5 pour TRCC 16x160<br>Class 6.8 pour TRCC 16x40<br>Class 5.8 pour tige filetée<br>Class 8.8 pour TRCC 12x100 | 4 pre-mounted | 0.28 Kg<br>0.35 Kg<br>0.57 Kg<br>0.10 Kg |

**Weight per lm = 24 Kg including the C100 TM18 post in 1.50 m**

# Installation method

**Recommended tools:**

The TM18 4M can be installed with the same level of completency 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 (il applicable).

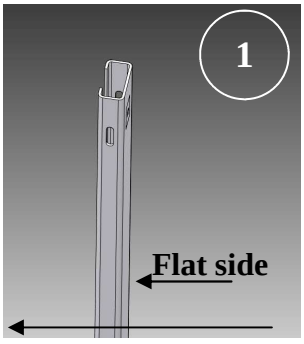
**1 - Post installation (figure 1)**
Posts C100150TM18 in 1.5 m shall be driven into the ground as shown according to direction of traffic; service height above ground = 700 mm.

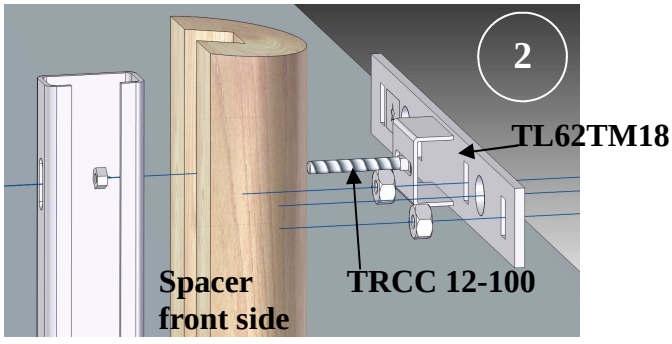
**Spacer & fishplates installation (figure 2)**
Place the front part of the spacer « SPACER TM18 » directly onto its corresponding C100 post, then arrange the connecting fishplate TL62TM18 having previously inserted bolt TRCC12-100 head inside the fuse box and finally screw the complete set onto the C100 posts.

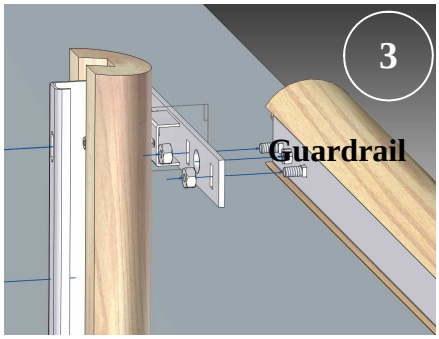
**2 - Rail TM18 4M installation (figure 3)**
Place the 4m-rails with the threaded bolts 16x40 facing the fishplate TL62TM18, introduce the said bolts inside the TL62TM18 corresponding openings, then tighten the complete set with the four nuts M16x32.

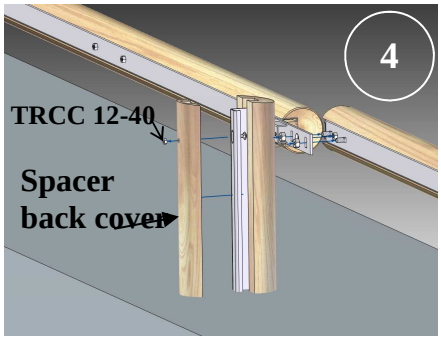
**3 - Spacer back cover installation (figure 4)**
Spacer back cover shall be placed on C100 post with a bolt TRCC 12x40 introduced inside post with oblong hole whose nut shall remain outside cover.

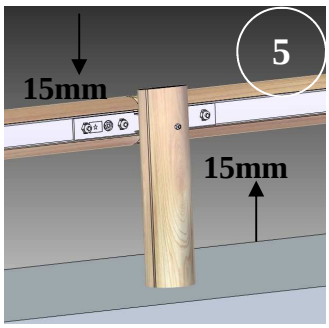
**4 - Adjustment (figure 5)**
After components installation, the height of the rails can be adjusted whilst using the C100 posts openings.



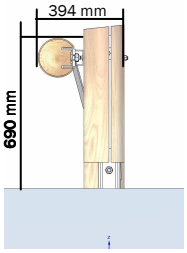



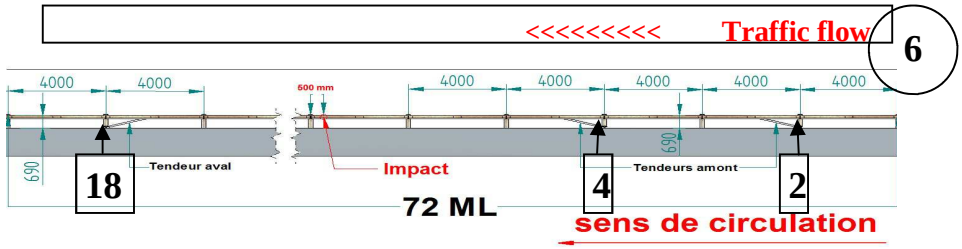



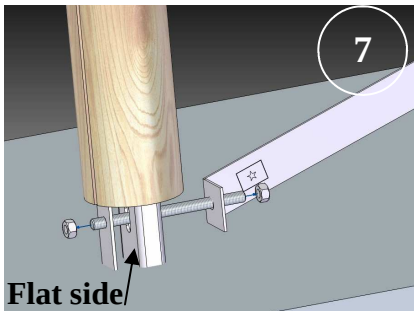



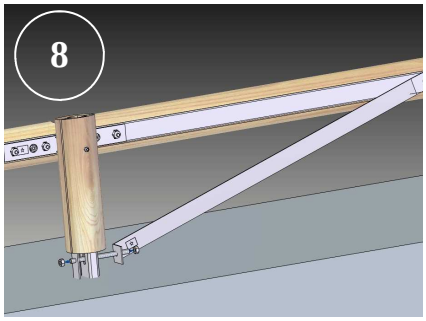
## 5 - Tensioners installation



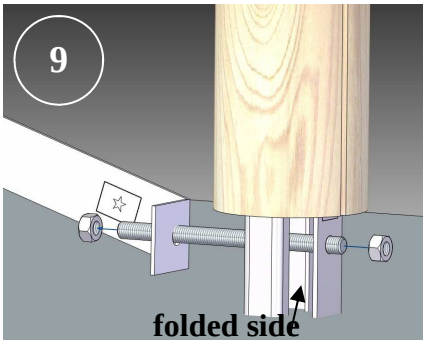



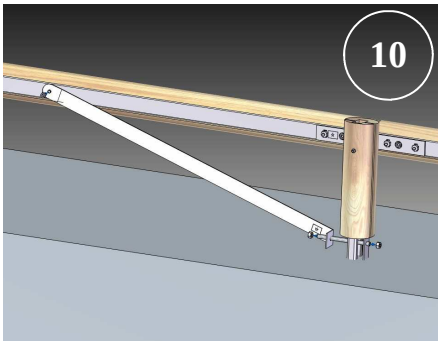

**Upstream *(amont)* tensioners *(tendeurs)* installation for a section of 72 lm, terminals not included (figure 6)**
The 1st upstream tensioner is mounted on post # 2 of the section and at center of rail # 2. The 2nd upstream tensioner is mounted on post # 4 and at center of rail # 4.
All posts C100150TM18 bottom section is equipped with an oblong hole through which the threaded rod Ø 20 mm can be introduced.
The bearing plate PLAQUE RENFORT TM18 is placed behind the flat side of C100 post **(figures 7 & 8)**.
When the tensioners are connected to posts, shorter wooden spacers are provided (ECARTEUR TM18



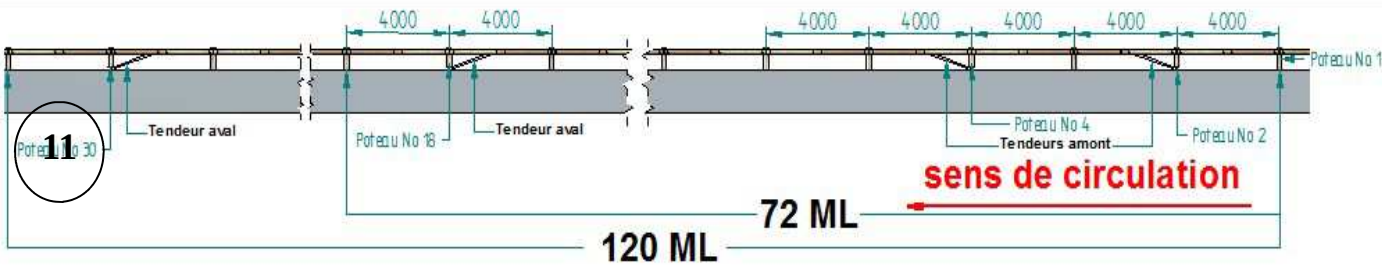




**Downstream *(aval)* tensioners *(tendeurs)* installation for a section of 72 lm, terminals not included (figure 6)**
The upstream tensioner is mounted on post # 18 of the section and at center of rail # 17.
All posts C100150TM18 inferior section are equipped with an oblong hole through which the threaded rod Ø 20 mm can be introduced.
The bearing plate PLAQUE RENFORT TM18 is placed behind the folded side of the C100 post **(figures 9 & 10)**.
Where the tensioners are connected to posts, shorter wooden spacers are provided: ECARTEUR




When the section of guardrails is above 72 lm but below 144 lm, terminals not included, one downstream tensioner shall be added to the penultimate post before the dropped terminal: see example for 120 lm **(figure 11).**



**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.

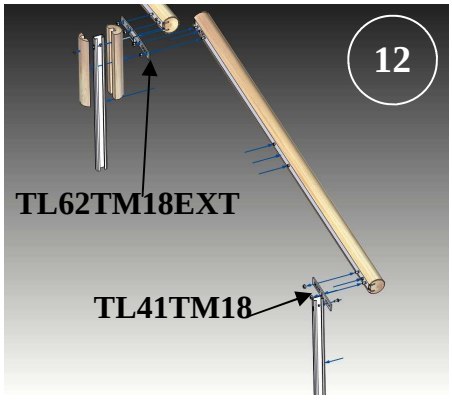
**MINIMAL LENGTH for Full Guardrail System Strength Development**
The minimum recommended length required is 80 lm, with 2x4 M end terminals included, in order to assure a proper correct anchorage of the system. For shorter lengths, it is recommended to contact our Export Department (cv@tertu.com) for a prior study.

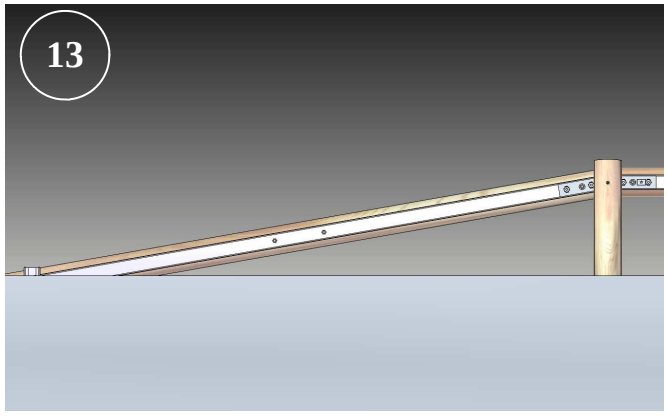
**PARTICULAR SITUATIONS**
**Curvatures**
The connecting fishplate is mounted on the post with only one bolt, which allows the system to follow the ground level in all circumstances. The TM18 4M can follow a radius ≥ 20 m.
For a radius < 20 m, it is recommended to use occasionally the TM18 2M with 2m rails.

**Soil conditions**
The anchoring system behavior depends on the soil quality. Therefore, it is important to evaluate on site the soil's capacity of resistance which must be adequate to insure a proper anchoring of the crash barriers section. The TM18 4M has been tested with C100 posts in 1.5 m. However, 2m-long posts can be used if necessary, according to the soil conditions measured during the ground testing procedure.

**End terminals treatment (figure 12 & 13)**

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 post. The TM18 4M can also be connected with our transition timber/steel TAT to the P4 energy absorbing end terminal Euro ET (according to ENV 1317-4) It is tested at containment level N2. Installation drawings are available on demand.



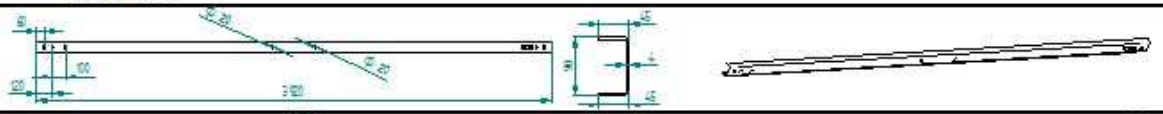
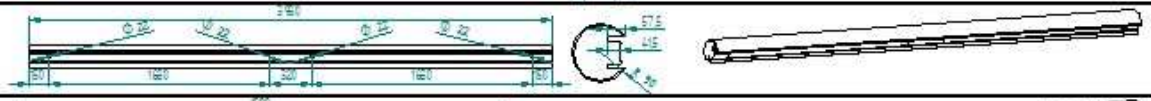
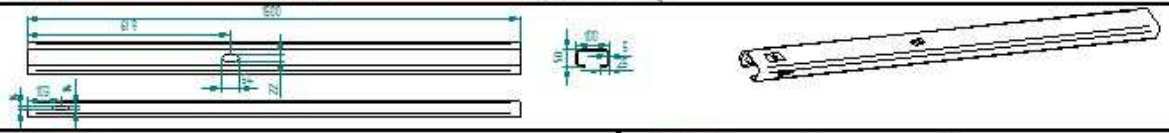
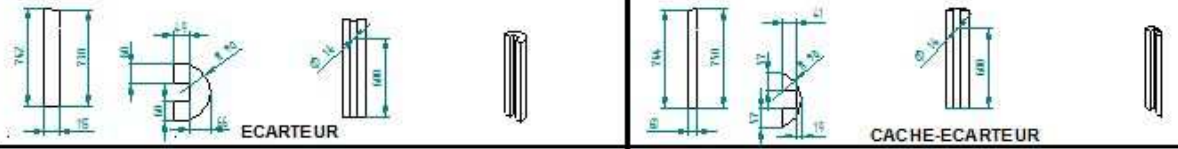
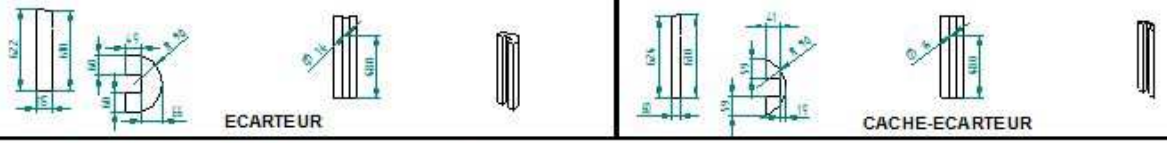




**Installation in front of a drop**
The dynamic deflection of the TM18 4M is 1.20 m. Consequently, it is necessary to maintain this distance between the front side of the rail and the beginning of the slope.

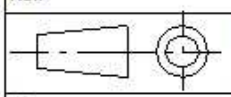
**Repairs**
All damaged parts must be systematically replaced according to the product installation instructions.

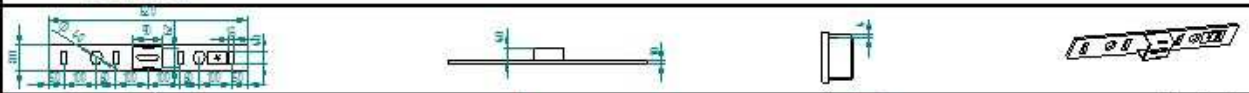
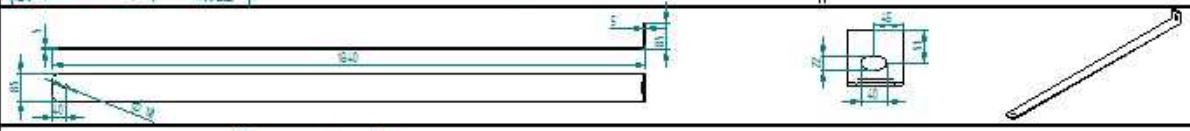
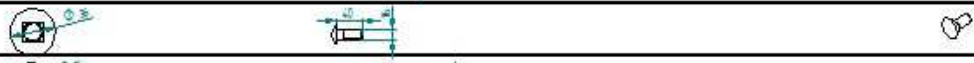
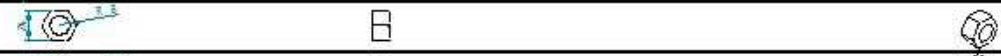
**Traceability, components marking**
Except the hardware, every single steel component is identified with a marking: Tertu logo (except for C100 post), manufacture stamp, batch number and CE official logo.

**Packaging**
Rails are delivered by packets of 12 units, wooden spacers are packed on pallets.
Upstream and downstream tensioners are packed separately.

| Désignation | Echelle: | No du plan |
|---|---|---|
| Fer U 45x90x4 en 3920 trous carrés pour TM 18 4M<br>Acier S355 galvanisé |  | Plan 1a |
| Rondin en 4M pour TM 18 4M |  | Plan 1b |
| C 100 en 1m50<br>Acier S355 galvanisé |  | Plan 4b |
| Ecarteur et Cache-Ecarteur pour Poteau courant |  | Plan 3 |
| Ecarteur et Cache-Ecarteur pour Poteau avec Tendeur |  | Plan 3bis |
| Eclisse TL41M Extrémité pour TM 18 4M<br>Acier S355 galvanisé |  | |
| Plaque de renfort |  | Plan 5 |

# Glissière TM18 4M

| | | | |
|---|---|---|---|
| Matière : | Date : 19/06/2013 | Dessiné par : RJ | |
| Réf: | Désignation: Nomenclature page 1 | | |
|  | Echelle: | Document n° : | tertu. |
| Masse: | Volume: | | |
| Validé par : | Rév. 1 : | Rév. 2 : | |
| Rév. 3 : | Rév. 4 : | | |
| Dimensions : mm<br>Côtes soler en noir | | Feuille : 1/2 | |

| Désignation | Echelle: | No du plan |
|---|---|---|
| Eclisse TL62M pour TM 18 4M<br>Acier S355 galvanisé |  | Plan 2a |
| Eclisse TL62M coudée pour TM18 4M (pour extrémité enterrée)<br>Acier S355 galvanisé |  | Plan 2b |
| Tendeur<br>Acier S355 galvanisé |  | Plan 6 |
| Tige filetée 20x300<br>( Classe 5.8 ) |  | |
| Boulon TRCC 12x40<br>( Classe 4.8 ) |  | |
| Boulon TRCC 12x100<br>( Classe 8.8 ) |  | |
| Boulon TRCC 16x40<br>( Classe 6.8 ) |  | |
| Boulon TRCC 16x140<br>( Classe 5.8 ) |  | |
| Ecrou M12<br>( Classe 4.8 ) |  | |
| Ecrou M12<br>( Classe 8.8 ) |  | |
| Ecrou M16(Classe :5.8 pour TRCC16x140 et 6.8 pour TRCC16x40 ) |  | |
| Ecrou M16x32<br>( Classe 5.8 ) |  | |
| Ecrou M20<br>( Classe 5.8 ) |  | |

# Glissière TM18 4M

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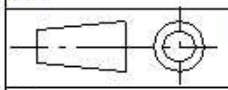
|---|---|---|---|
| Matière : | Date : 19/06/2013 | Dessiné par : RJ | |
| Réf: | Désignation: Nomenclature page 2 | | tertu. |
|  | Echelle: | Document n° : | |
| Masse: | Volume: | | |
| Validé par : | Rév. 1 : | Rév. 2 : | |
| Rév. 3 : | Rév. 4 : | | |
| Dimensions : mm<br>Côtes acier en noir | | Feuille : 2/2 | |