

LOAD RESTRAINT GUIDELINE

Circular Pipe: Non-bundled, nested

1. This guideline applies to:

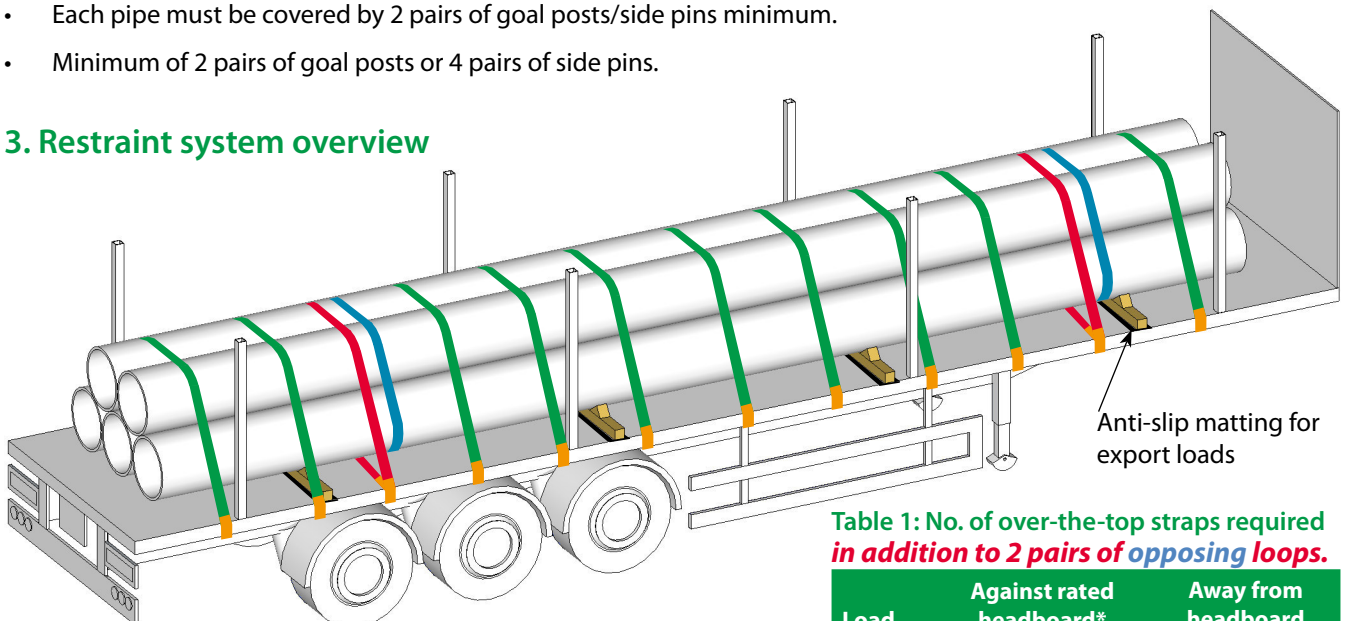
- Circular hollow section pipes, non-bundled.
- High and medium friction pipe: self-coloured, varnished, tempered through and glass flake epoxy coating ($\mu=0.38^*$).

* The friction factor for this product, determined as per EN 12195-1:2010 Annex B.1.2.

2. Essential requirements

- All restraints must be webbing straps with minimum lashing capacity of 2000 daN compliant with EN 12195-2.
- Edge protection must be fitted to all straps in contact with abrasive surfaces and sharp edges.
- Export loads must have anti-slip matting applied under base timbers.
- Minimum of 4 square section base timbers with minimum cross-section of 100 x 100 mm with chocks (see Section 7).
- When using steel goal posts anti-slip matting must be used under the bottom layer of product to prevent steel on steel contact with the goal post cross-member (see Section 7).
- Trailer headboard high enough to prevent product from sliding above it.
- Each pipe must be covered by 2 pairs of goal posts/side pins minimum.
- Minimum of 2 pairs of goal posts or 4 pairs of side pins.

3. Restraint system overview



Shown for a 25 tonne load, loaded away from the trailer headboard.

✓ **2 pairs of opposing loops** plus over-the-top straps as per Table 1.

Table 1: No. of over-the-top straps required in addition to 2 pairs of opposing loops.

Load	Against rated headboard*	Away from headboard
10 - 20 t	5	8
20 - 25 t	5	10
25 t +	5	12

* See section 4.

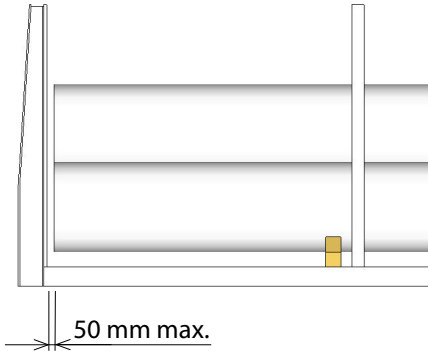
This Load Restraint Guideline is designed and tested to meet the forces for road and sea transport as stated in EN 12195-1:2010 and VDI 2700.

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4. Headboards

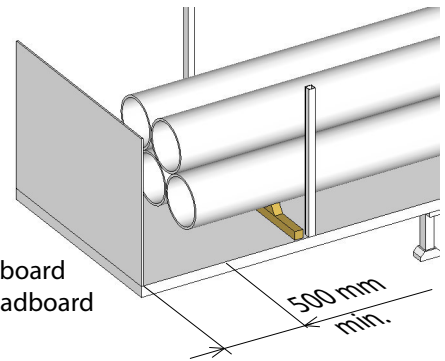
IMPORTANT NOTE: The restraint system has been designed to work either with, or without the trailer headboard, subject to the conditions below. When loaded away from the headboard a gap of at least 500 mm is required all allow the load restraint straps to tension up fully to their lashing capacity and thereby clamp the whole load securely to the trailer.



Typical plaque on a trailer with a headboard rated to EN 12642 Code XL.

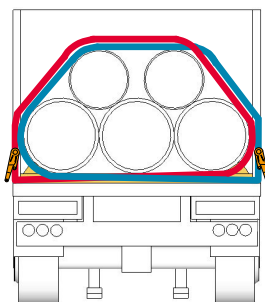
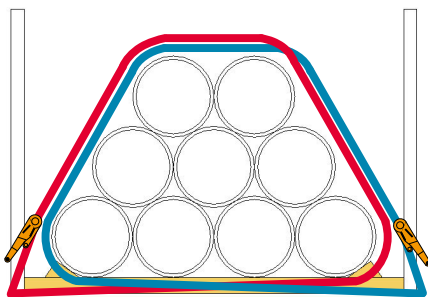
- ✓ When loaded against headboard maximum distance between the headboard and material must be 50 mm or less to avoid impact damage to the trailer in the event of an emergency braking incident.

- ✓ Trailers manufactured to EN 12642 Code XL, or rated to 10 tonnes, or approved by Tata Steel Load Restraint Engineers, can be loaded with full load against the trailer headboard to provide forward restraint (subject to axle weights).



- ✓ When loaded away from the headboard distance between material and headboard must be 500 mm or more.

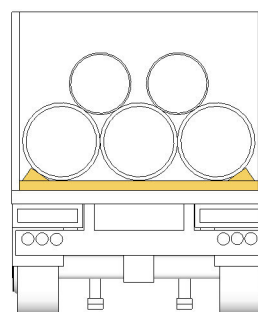
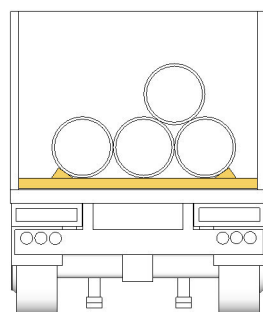
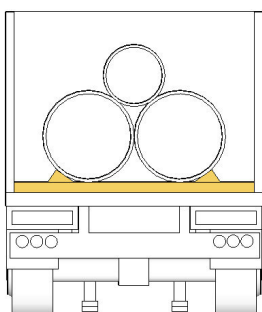
5. Opposing loops



Cross-sectional view of opposing loop restraint applied to the whole load. Edge protection and over-the-top straps omitted for clarity.

6. Examples of load build

6.1 Examples of typical load configurations

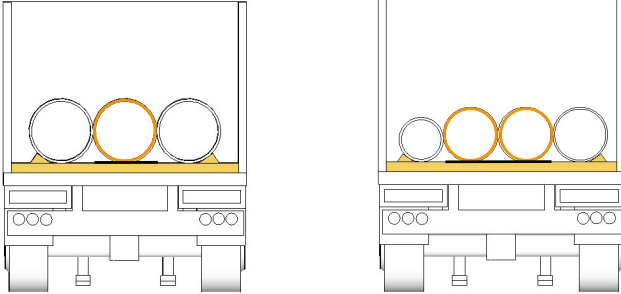


Caution: Be aware of rolling risk whilst loading and unloading pipe - apply temporary chocks as required.

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6.2 Example of non-standard loads



Note: Restraint straps omitted for clarity.



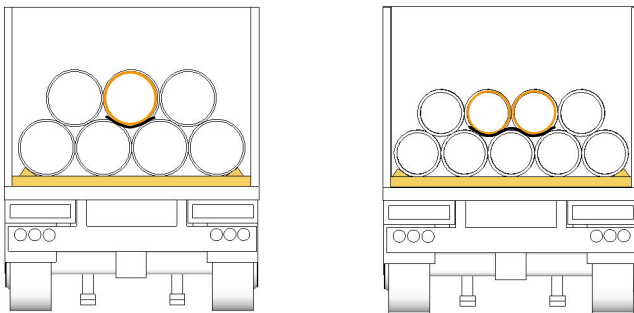
Caution: Risk of spearing. If loaded away from the headboard loading 3 or more pipes in single layer should be avoided where possible.

When loaded away from the headboard 4 over-the-top straps must be replaced with 2 pairs of opposing loops.

Anti-slip matting must be applied under middle pipes.



6.3 Other examples of loads where anti-slip matting must always be used



Note: Restraint straps omitted for clarity.

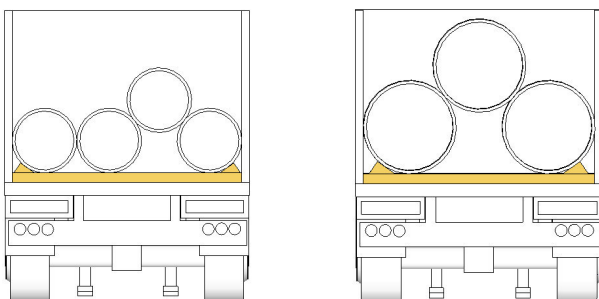


Caution: Risk of spearing. If loaded away from the headboard nesting 3 or more pipes in top layer should be avoided where possible.

Pipes positioned in the centre of the top layer are not clamped down. Anti-slip matting must be applied under middle pipes and maximum distance between middle pipes and the headboard must be reduced to 300 mm.

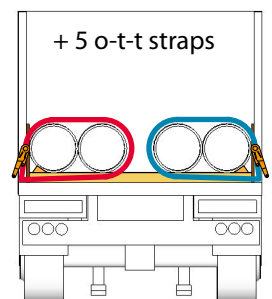
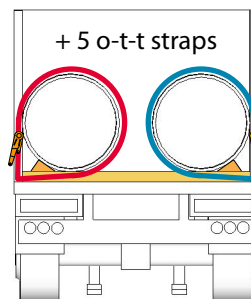
6.4 Alternative load build and securing method

- ✓ Minimum 3 pairs of purpose built goal posts with cross-section of 100 x 100 x 5 mm or greater, or
- ✓ Minimum 5 pairs of trailer side posts with cross-section of 80 x 80 x 5 mm or greater.



Note: Restraint straps omitted for clarity.

- ✓ Bottom pipes loaded against the side posts/goal posts and chocks.
- ✓ Chock requirements as per Section 7.
- ✓ Number of straps as per Section 3.

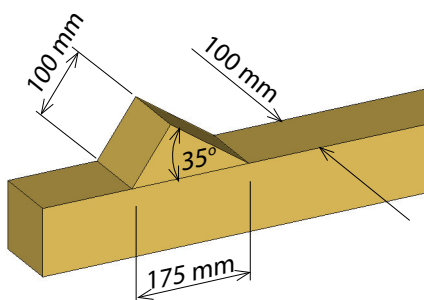


- ✓ Pipes loaded against the headboard.
- ✓ Load split evenly between each side of the trailer.
- ✓ 4 loops applied to each part of the load, pulling against the posts.
- ✓ Add 5 over-the-top straps.

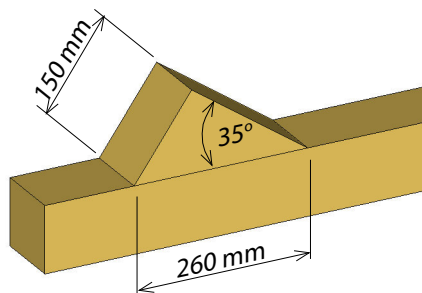
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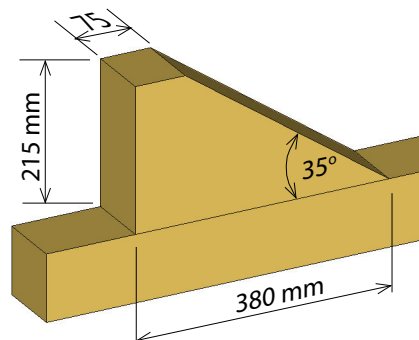
7. Chocks and goal posts



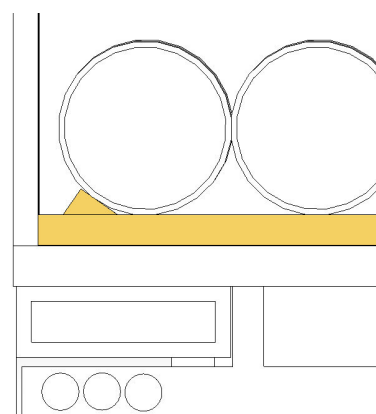
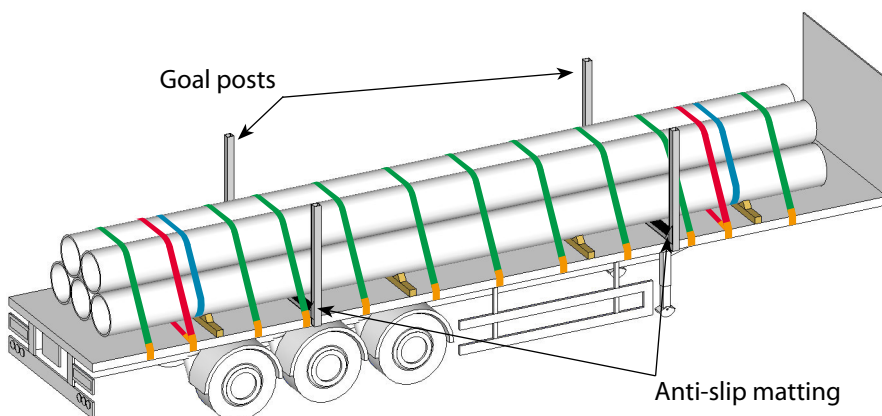
Small chocks for pipes up to and including 660 mm (26") diameter.



Large chocks for pipes up to and including 1220 mm (48") diameter.

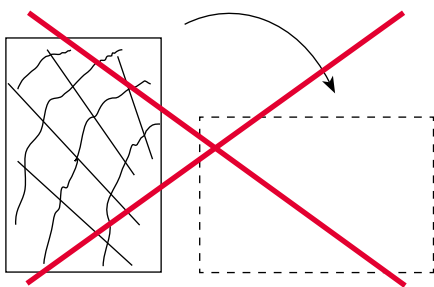


XL chocks for pipes up to and including 2134 mm (84") diameter.

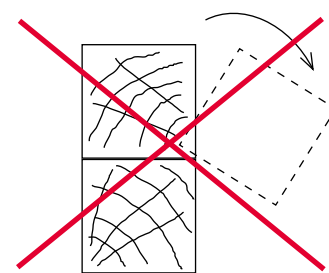


- ✓ When using goal posts anti-slip matting must be used under the bottom layer of product to prevent steel on steel contact with the cross member of the goal post.
- ✓ Material positioned against face cut at 35°.
- ✓ Chocks fixed with 2 nails minimum.

8. Timber dunnage

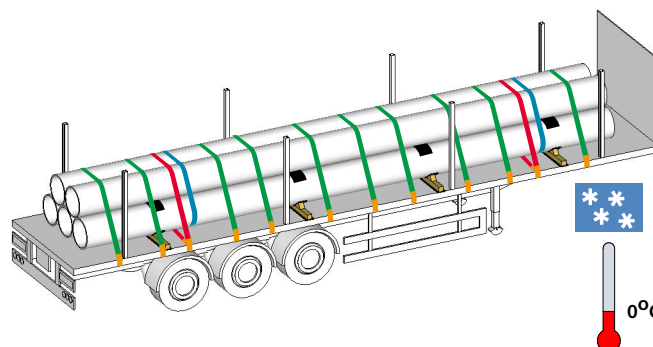


- ✗ Under heavy braking, rectangular dunnage on end will topple, thereby releasing tension in the restraints.
- ✗ Under heavy braking, upper dunnage will slide off the lower dunnage, and tension in the restraint will be lost.



9. Winter weather restraint

- ✓ Anti-slip matting applied under each pipe and to the both sides of the timbers.
- ✓ Other restraint requirements remain the same.
- ✓ Trailer deck must be clear of snow and ice before loading.



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