

LOAD RESTRAINT GUIDELINE

High friction sheet packs

1000 mm minimum length

700 mm minimum width

1. This guideline applies to:

- Road transport and ferry crossing of high friction, banded steel sheet packs.
- High friction sheet packs consist of hot rolled coil sheet with mill finish only, **not** pickled and oiled.

The lowest friction factor for these products, determined as per EN 12195:2010-1 Annex B.1.2, is $\mu = 0.5$.



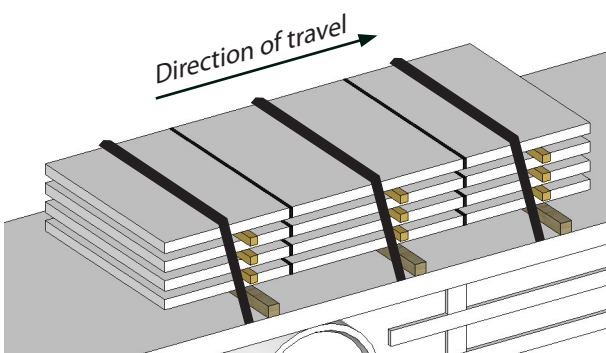
For mixed loads or where the load includes low friction material use LRG-0015-SP.

2. Essential requirements

- Transport chains must be compliant with EN 12195-3, minimum 8 mm Grade 8, LC 40 kN.
- Web lashings must be compliant with EN 12195-2, minimum lashing capacity LC 2000 daN.
- Web lashings must be protected from all sharp edges and abrasive surfaces, including trailer side rails.
- Packs must be banded with a minimum of 2 lateral bands.

3. Overview of tie down restraint system - road transport only

- ✓ Minimum of 2 over-the-top chains or 2 over-the-top web lashings per stack - see Table 1.
- ✓ Minimum lashing angle of 30° required (see Section 3.1), alternatively add front restraint as described in Section 5.



Shown for an 8 tonne stack with 3 over-the-top chains.

Table 1: Number of over-the-top lashings per stack

Stack weight	8 mm transport chains (LC 40 kN)	Web lashings (LC 2000 daN)	Web lashings (LC 2500 daN)
up to 4 t	2	2	2
4 - 6 t	2	3	3
6 - 8 t	3	4	4
8 - 12 t	4	6	5
12 - 16 t	5	8	7
16 - 22 t	6	9	9
22 - 28 t	7	11	11



Note: Timbers/timber blocks must be placed approximately 150 mm (6") away from edges of the material.

This Load Restraint Guideline has been 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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3.1 Tie down restraint - road transport only

✓ When lashing angle is less than 30° add front restraint as described in Section 5.



Diagram illustrating an over-the-top restraint with shallow lashing angle.



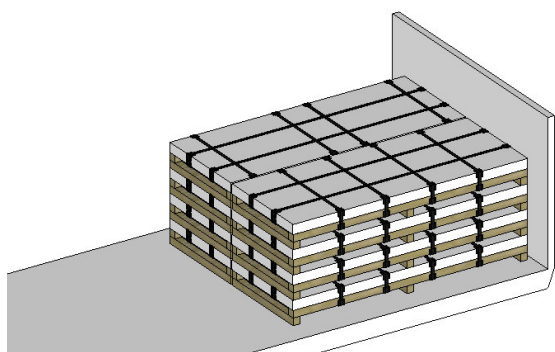
Note: For sea crossing loads must be secured using opposing loops (see Section 6) and additional forward restraints as described in Section 5 must be used.

4. Load configuration

4.1 Side by side stacks

Sheet packs can be stacked side by side:

- Gaps must be closed between different stacks, or secure vertical timbers must be inserted to chock gap.

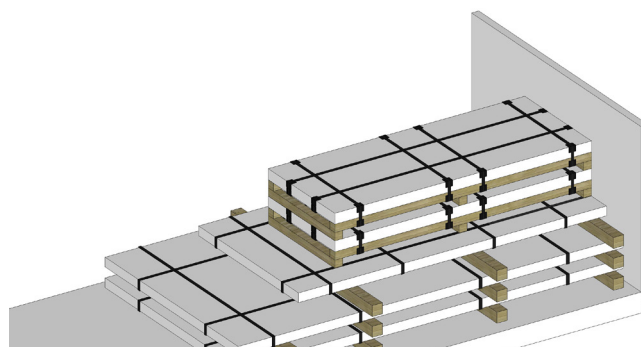


Side by side stacks loaded tight together to close gap.

4.2 Pyramid stacking

Sheet packs of different sizes can be stacked together:

- If using the restraint options in section 5 the front of the packs must be aligned to allow restraints to be applied.
- Apply additional straps to the longer packs if they are more than 1.5 times the length of the shorter packs (see illustration in Section 5.2).



Pyramid stack aligned at front and blocked to headboard.

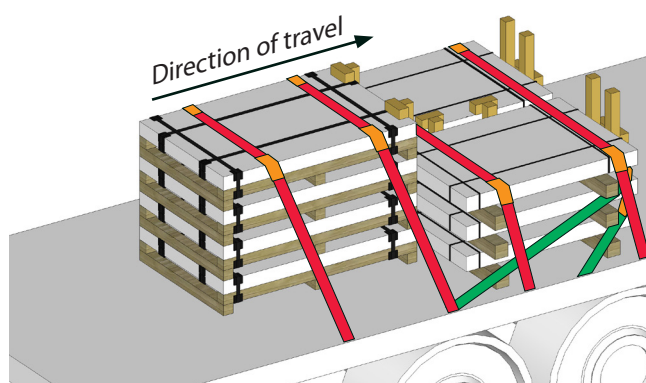
5. Forward restraint options

5.1 Timber 'H' frames option

Table 2: Timber 'H' frame

Quantity of restraints per stack	Permissible stack weight (forward restraint)	
	(LC 2000 daN)	(LC 2500 daN)
2	12 t	14 t
3	20 t	25 t

Timber 'H' frame used to restrain against forward forces are lashed back with a minimum of 2 straps.



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5.2 Cross-over straps option

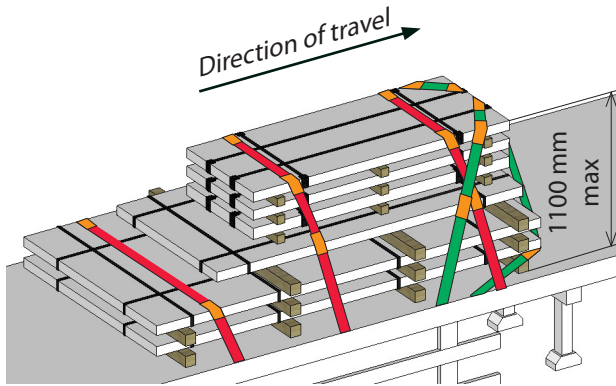


Table 3: Cross-over straps

Quantity of restraints per stack	Permissible stack weight (forward restraint)	
	(LC 2000 daN)	(LC 2500 daN)
1 pair	12 t*	14 t*

* For stacks heavier than permissible weight limits listed in Table 3 add 1 over the top strap for each 0.5 tonne above the limit.

Front of packs aligned with cross-over restraints covering all packs. Additional restraints to be added to longer sheet packs.



When using cross-over restraints maximum height of the stack must not exceed 1100 mm from bed of trailer.

5.3 Blocking to headboard option

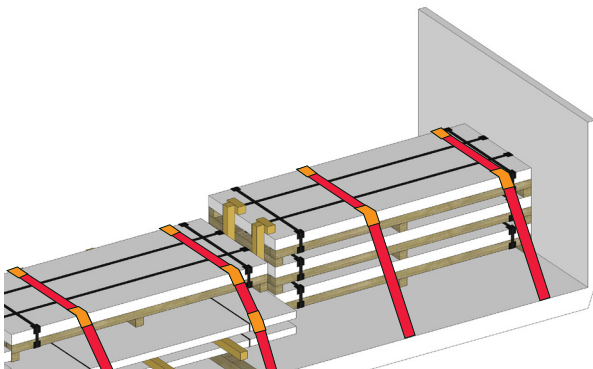


Table 4: Trailer headboard

Trailer type	Permissible payload (forward)
Code L or equivalent*	18 t*
Code XL or equivalent*	28 t**

Material blocked forward, gaps between stacks must be either closed or chocked with timbers.

For road only transport 2 over-the-top restraints per stack minimum. For sea crossing opposing loops must be applied as per Section 6.

* See Technical Information Sheet TIS-0010

** Full load can be blocked against headboard on code XL trailer (subject to axle weights). Gaps between stacks must be either closed or blocked with timbers.

5.4 Stanchion post option

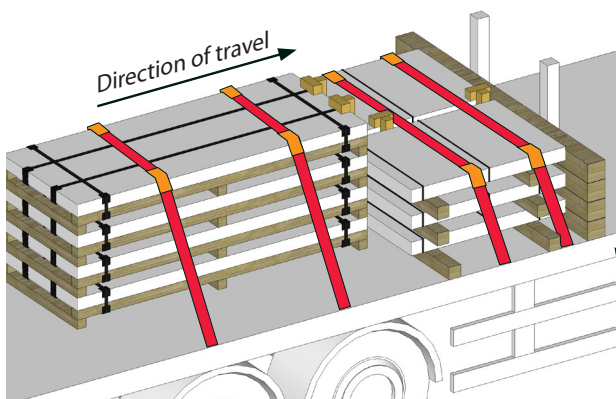


Table 5: Stanchion posts (pair)

Stanchions size	Permissible stack weight (forward restraint)
80 x 80 x 5 mm	16 t

Apply timbers if necessary to create suitable forward blocking

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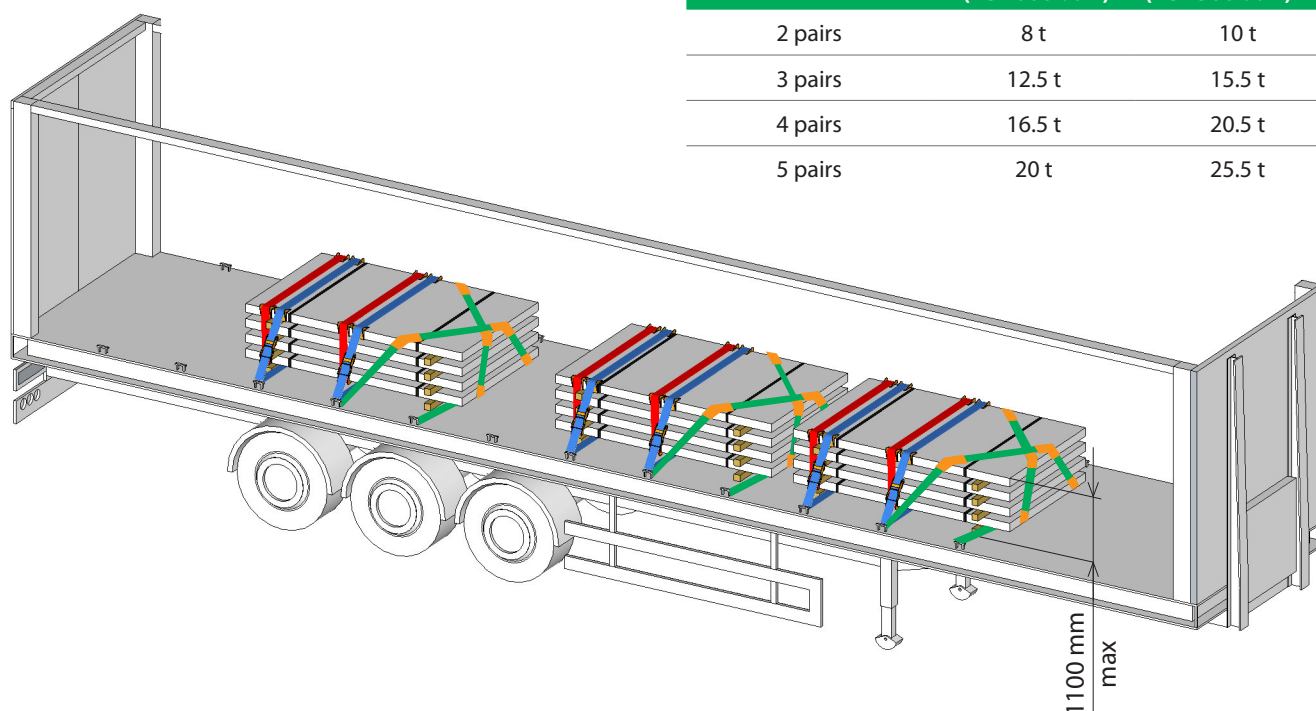
6. Overview of opposing loops restraint system - road transport and sea crossing

- ✓ Minimum 2 pairs of opposing loop straps ('barrel straps') - see Table 6.
- ✓ Maximum height of the stack must not exceed 1100 mm from bed of trailer.



Table 6: Opposing loops

Quantity of restraints per stack	Permissible stack weight (sideways)	
	(LC 2000 daN)	(LC 2500 daN)
2 pairs	8 t	10 t
3 pairs	12.5 t	15.5 t
4 pairs	16.5 t	20.5 t
5 pairs	20 t	25.5 t



- ✓ Each stack secured against forward movement, see Section 5 for alternative forward restraint options.

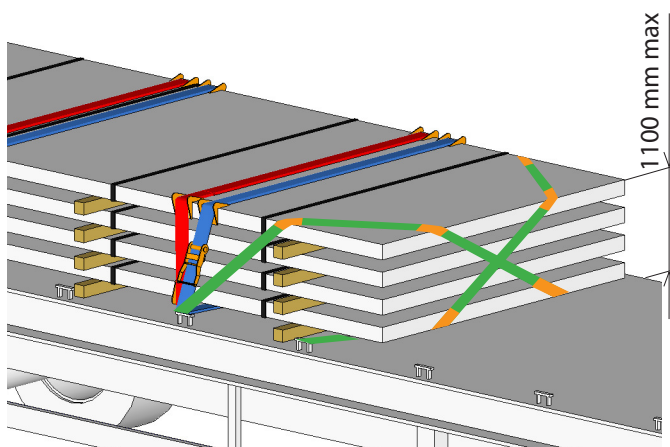


Table 7: Cross-over straps

Quantity of restraints per stack	Permissible stack weight (forward restraint)	
	(LC 2000 daN)	(LC 2500 daN)
1 pair	12 t*	14 t*

* For stacks heavier than permissible weight limits listed in Table 7 add 1 over the top strap for each 0.5 tonne above the limit.

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