Load Restraint Guideline
Mini Top Hats

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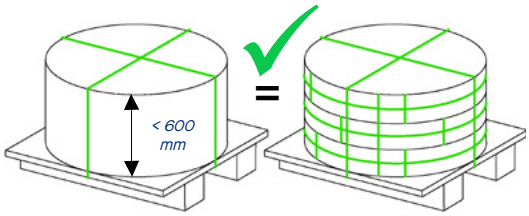
1. This Guideline applies for:

- Restraint of bore vertical, slit coils, less than 600 mm wide, strapped securely to timber pallets. These coils are commonly known as *"Mini Top Hats"*.
- Mini Top Hats may consist of a single slit coil or multiple slit coils strapped together on a pallet, with or without dunnage in-between.

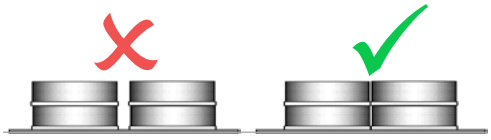


(Thin slits strapped together should be considered as one slit of equal width when palletised).

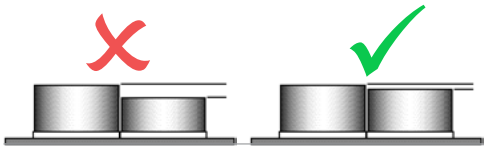
2. Essential Requirements

- The coil(s) must be strapped securely to the timber pallet and act as one unit.
- All restraints must be 8 mm transport chain, assumed 3.0 tonnes lashing capacity.
- Coils may be stacked two abreast, two high maximum (see Section 3.1), or any combination there under e.g. pyramid stacks (see Section 3.2); or two abreast, single high (see Section 3.3).
- **No stack is to exceed the maximum weights shown in Table 1** on page 2 (i.e. the total of all coils may be up to the weight shown).
- Coils must be positioned side by side over the centre of the trailer, with the pallets butted against each other.
- The height variation between adjacent, two abreast stacks must not exceed 100 mm. Both stacks should be similar in diameter and the coils on each side to be essentially equal in weight.
- For coils where the coil diameter is smaller than the pallet width (maximum 50 mm difference allowed), a polyurethane corner or other wedge should be placed between the top of the two coils. This will stop the coils moving together and the chains loosening, or the steel strapping from breaking.
- If two chains are required, they **must** be applied by the "2nd off 1st" chaining method, as per Figure 1 opposite. Refer also to the guideline *"Chaining - 2nd off 1st Method"*.
- Webbing lashings must NOT be used. Their stretch and the curved top of the coils make them unsuitable.
- *For additional essential requirements specific to each stack configuration see the relevant section on the following pages.*

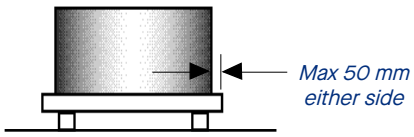
Two abreast, two high maximum! *Stacks above this are NOT suitable using this guideline and require special restraint methods.*



Bad Pallet Gap! *No Pallet Gap!*



Max. height difference 100 mm



Coil diameter/pallet width difference

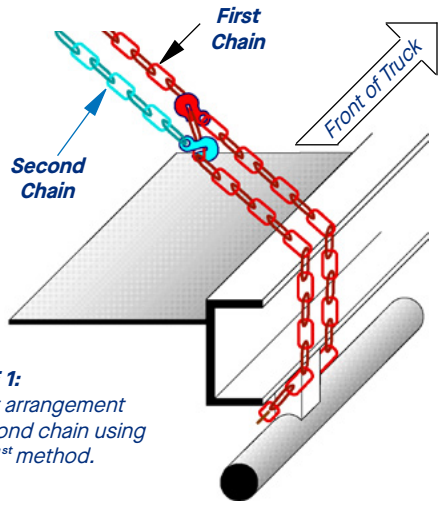


FIGURE 1:
Correct arrangement for second chain using 2nd off 1st method.

3. Restraint System

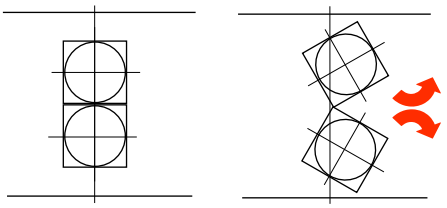
Table 1. Maximum Weight per Stack* (Sum of All Coils)

Number of Chains	Weight Limit# (Tonnes)
One (1) chain	0 to 3.4
Two (2) chains	3.4 to 6.8

** For key assumptions in Table 1 see page 3 opposite.*
Limits in Table 1 apply to all stack configurations in Sections 3.1, 3.2 and 3.3.
 # Limits for 8 mm chain of either 3.0 or 4.0 tonnes Lashing Capacity. If using 7.3 mm chain of 2.3 tonnes LC, all values should be 75% of those shown.

3.1 Two Abreast, Two High Stacks

- To stop the base coils "rotating out" during heavy forward braking, anti-slip material **must** be placed under the pallets between the trailer deck (see Figure 2 below). Conveyor belting is not suitable.
- To stop the top coils "diving under" chains or "rotating out" under force, **Galas corners with a front and rear horizontal chain must be used**. (See Figures 2 and 3).



Use anti-slip and Galas corners to stop rotation

Galas corners must be used with a horizontal chain to stop sliding and rotation

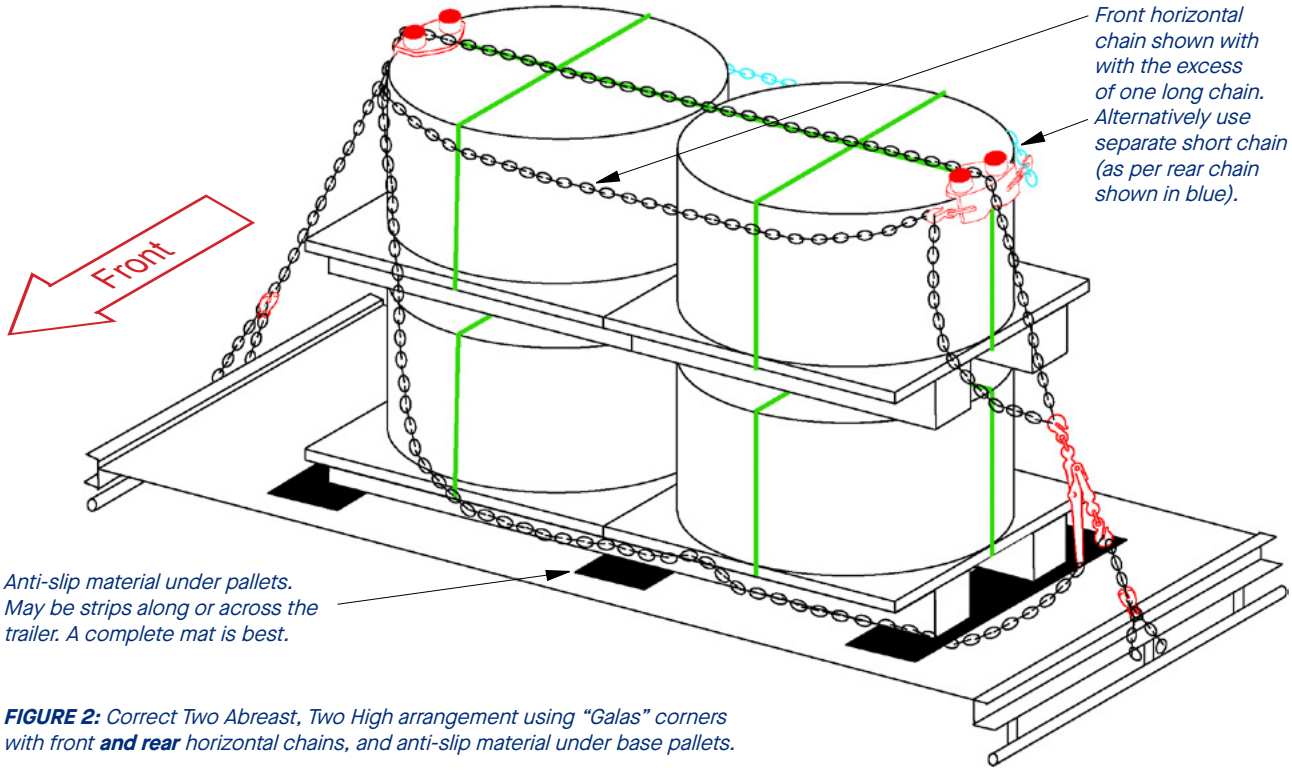


FIGURE 2: *Correct Two Abreast, Two High arrangement using "Galas" corners with front **and rear** horizontal chains, and anti-slip material under base pallets.*

Key Assumptions in Table 1

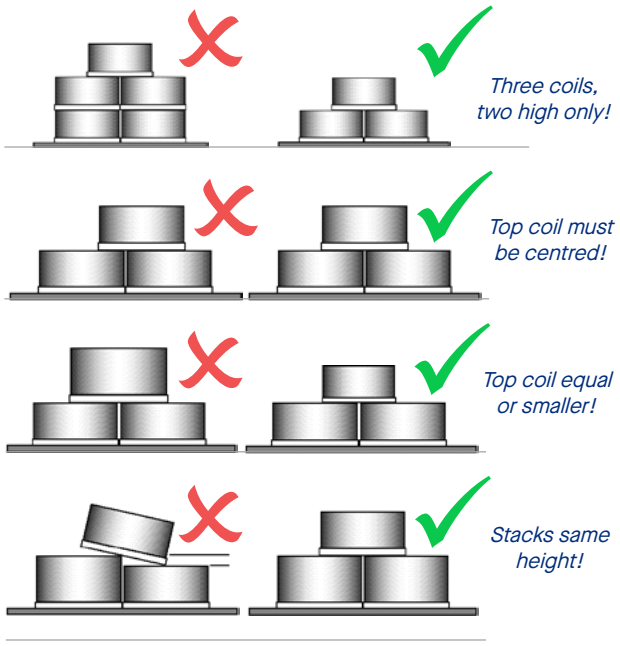
1. All coils are equal weight OR lightest coils on top, heaviest on bottom. Coils on each layer are the same size.
2. Tops of coils covered with corflute with low friction, under forward forces: dynamic μ = 0.32, under sideways forces: static μ = 0.40.
3. Base of pallet is raw hardwood, dynamic μ = 0.40.
4. All chains dogged to minimum 750 kgf (firm tension).

For two abreast, two high stacks:

5. Assumed lashing angle is 60° minimum.
6. Chain lashing capacities have been down rated by 50% under dynamic conditions to minimise movement of coils. Under braking up to 100 mm of forward movement is acceptable.
7. Allowable mass limits for 8 mm chain of either 3.0 or 4.0 tonnes lashing capacity are the same for the above reason.

3.2 Pyramid Stacks

- ✓ Three coils, two high i.e. two coils on the bottom side by side (two abreast) and one coil on top.
- ✓ To stop the top coil "diving under" the chains under force, **Galas corners with a front and rear horizontal chain must be used**. (See Figures 2 and 3).
- ✗ Ordinary polyurethane corner protectors without the horizontal chain do not comply and are NOT to be used in place of Galas corners.
- ✓ The top coil must be centred over the lower two abreast coils. And must be smaller than, or equal to, the coils underneath it.
- ✓ The height of adjacent two abreast stacks must be the same and both stacks should be similar in diameter.



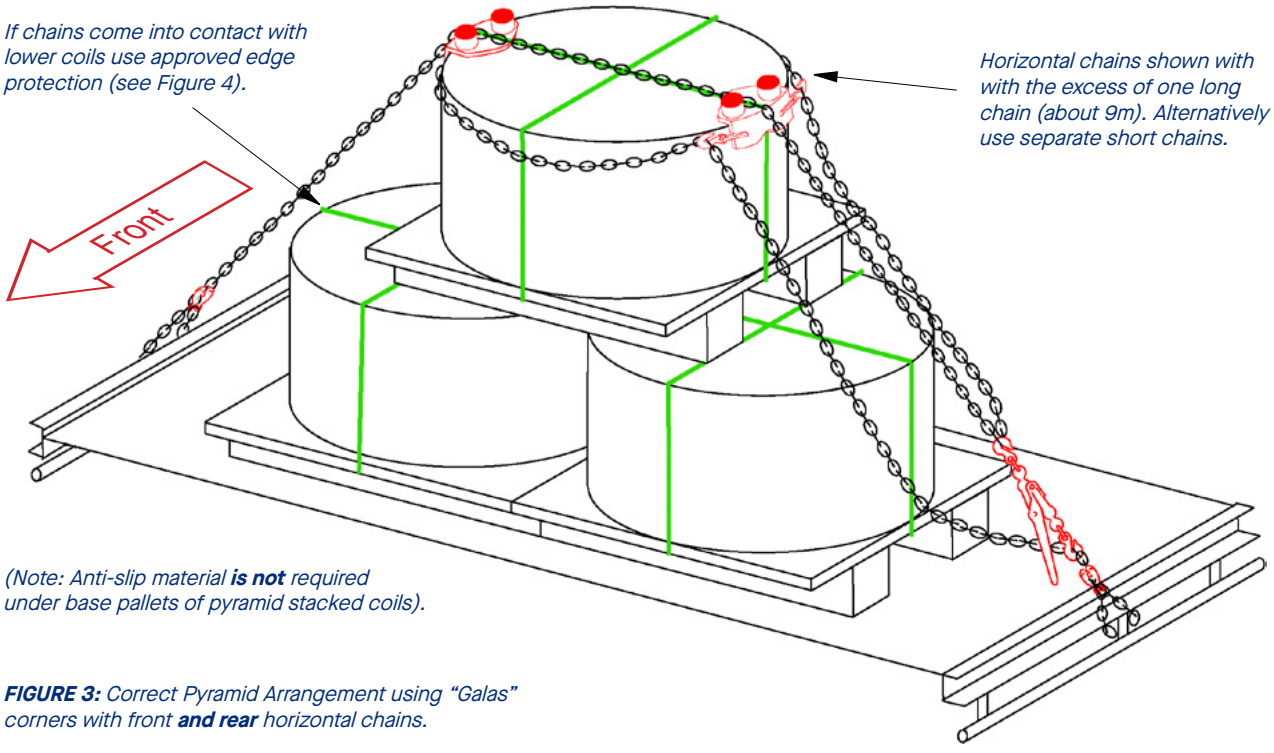
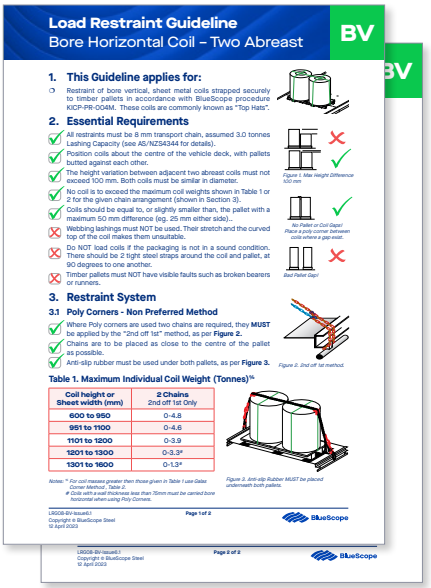


FIGURE 3: *Correct Pyramid Arrangement using "Galas" corners with front **and rear** horizontal chains.*

3.3 Two Abreast, Single High Coils

- **Mini Top Hats not secured with Galas corners**, as per sections 3.1 and 3.2, **must be loaded two abreast, single high only.**
- To stop the coils "rotating out" during heavy forward braking, anti-slip material **must** be placed under the pallets between the trailer deck (see Figure 4 below). Conveyor belting is not suitable.
- Approved corner protectors e.g. polyurethane corners, must be placed between the chains and the top of the coil.
- For more details refer to the BlueScope Steel Load Restraint Guideline for *'Two Abreast Bore Vertical Coil'*. (See picture opposite for example).



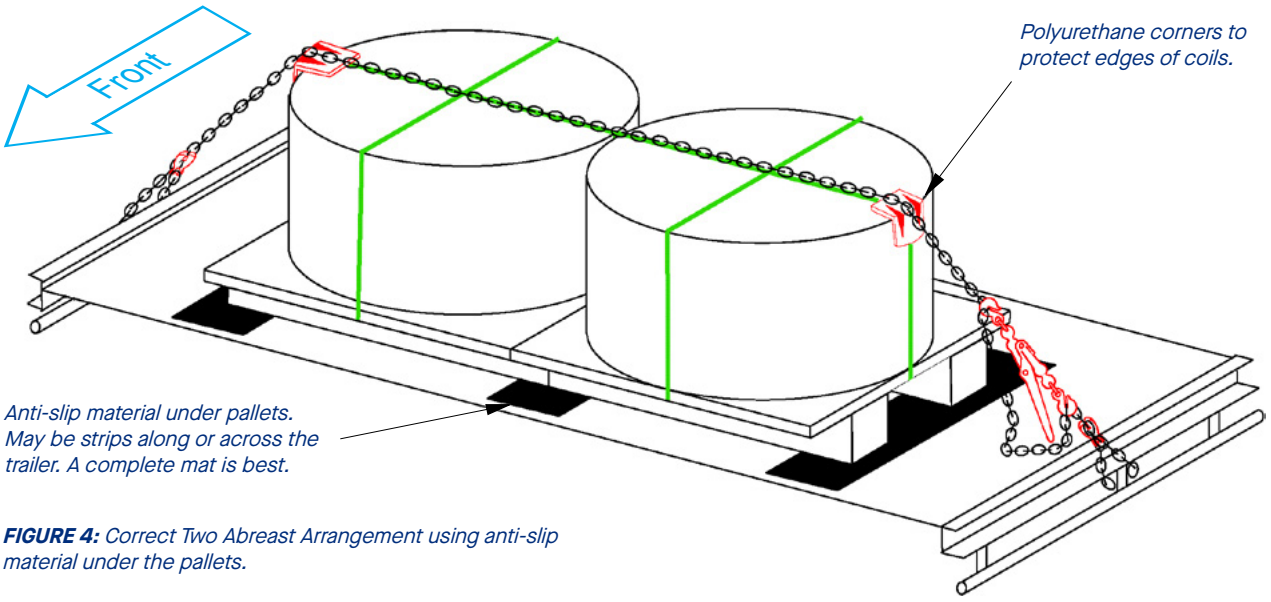


FIGURE 4: *Correct Two Abreast Arrangement using anti-slip material under the pallets.*

Warning!

- Coils greater than 600 mm wide or exceeding the specified weight limits in Table 1 are NOT suitable using this guideline. Larger coils as such, must be restrained according to the BlueScope Steel Load Restraint Guideline for *'Two Abreast Bore Vertical Coil'* or *'Single File Bore Vertical Coil'*.
- Coils stacked more than two abreast, two high, are NOT suitable using this guideline and require special restraint methods. For further information contact the Technical Services Group - Logistics, on +61 2 8707 2350.