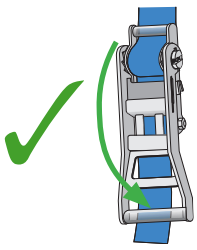
This Certification:

- Provides a certified engineering system for the restraint of bulk loads of CSR Lightweight Building Products, transported by road in Australia.
- Covers: loose and palletised sheet product with a minimum of 15 sheets, palletised cornice product, steel framing and palletised compounds (bags and buckets) packed to the standards applied by CSR.

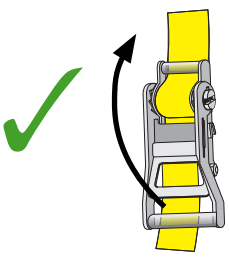
Load Restraint Equipment and Key Requirements:

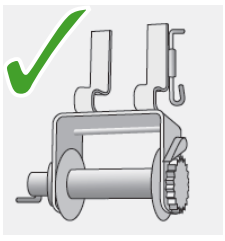
- ✓ All Webbing straps shall comply to AS/NZ 4380, with less than 10% wear.
- ✓ 50mm straps or larger, may be used for tie down over freight with **Push Up ratchets** (300kg resulting average pretension over the load)
- ✓ 50mm straps or larger, may be used for tie down over freight with **Drum winches** (300kg resulting average pretension over the load)
- ✓ 50mm straps may be used for **tie down** over freight with **Pull Down ratchets** (600kg resulting average pretension over the load)
- ✓ 50mm straps may be used for **cross over** lashings with **Pull Down ratchets** (600kg resulting average pretension over the load)
- ⚠ Stability of vehicles and product stacks can be impacted by high load heights: check stability requirements in ELRC253.
- ⚠ Drum winches are not suitable for tensioning of Cross over straps
- ⚠ Any single package must have a minimum of 15 sheets.
- ✘ Do not leave items loose on the vehicle. Always secure within a box or crate.
- ✘ Do not use chains.
- ⚠ Steel pallets must have Industrial rubber or rough sawn timber material placed under them to remove the steel on steel low friction surface contact
- ⚠ Dunnage must meet the CSR standard and should be aligned vertically when placed in multiple layers
- ⚠ Throwing webbing is a manual handling risk. Use caution when applying lashings and check the other side of the trailer is clear when throwing lashings.
- ✓ Loads should be blocked against a suitably engineered headboard/surface wherever possible or cross over lashings see page 7.
- ✓ Steel packs must be packaged to meet the Performance Standard Forces in the NTC Load Restraint Guide



Pull down ratchet

600kg average pretension over load.





Push up ratchet and common Drum Winch

300kg average pretension over load

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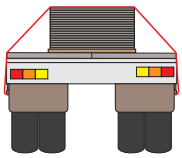
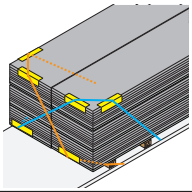
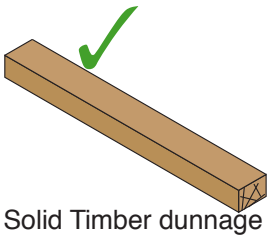
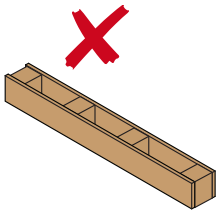
Tensioner Types and application for restraint

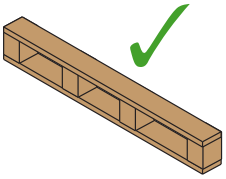
Lashing configuration		Tie Down 	Cross Over Strap 
Tensioner type	Drum Winch	✓	✗
	Push Up Hand Ratchet	✓	✗
	Pull Down Hand ratchet	✓	✓



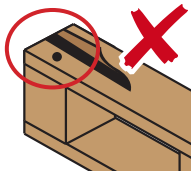
Solid Timber dunnage with a rough sawn surface is acceptable



Do not use fabricated timber dunnage with boards vertical

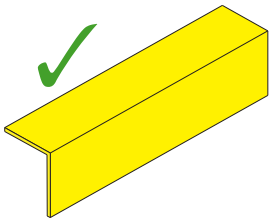


Fabricated timber dunnage must be used with boards horizontal tyne pockets open.



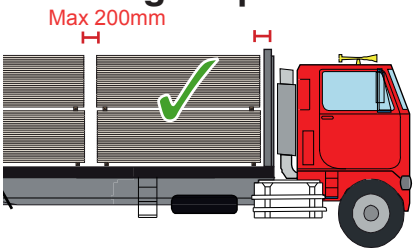
Fabricated timber dunnage must be in good condition, with no loose or damaged boards

Do not use Rectangular Dunnage on short edge

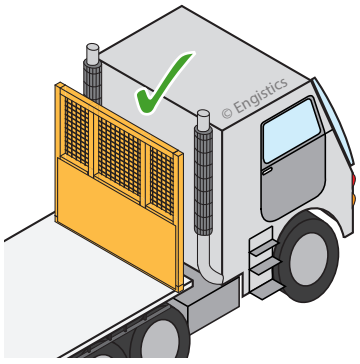


Corner Protectors shall be used under all webbing straps

Blocking Requirements - Headboards

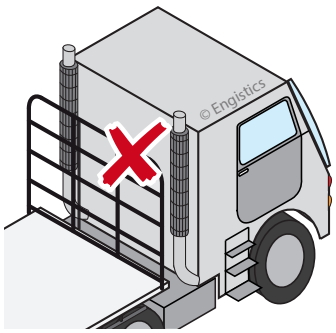


Blocking to headboard preferred. Max 200mm gap between packs and blocking surface



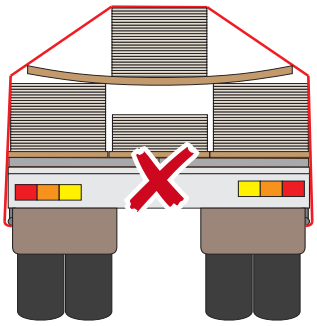
Pipe gates are not suitable for blocking for these product types

Headboards must be suitably engineered to 30% of payload

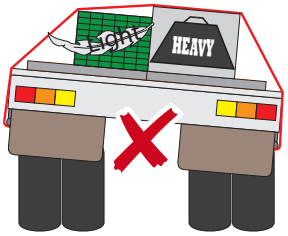


Load Configurations - Sheet Product

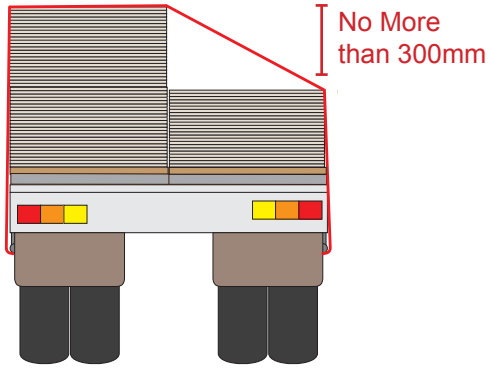
Do not bridge dunnage



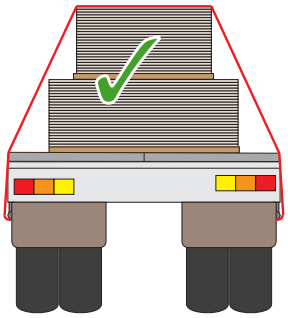
Avoid Imbalanced Loads



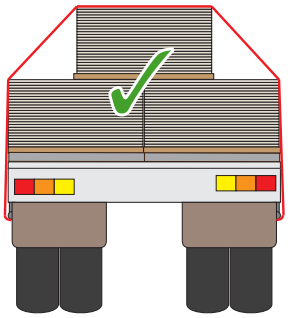
Two Abreast packs maximum height difference is 300mm



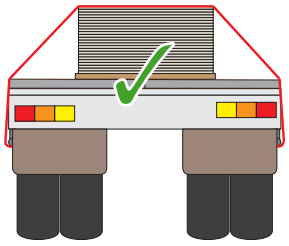
Stack narrow packs on top of wide packs



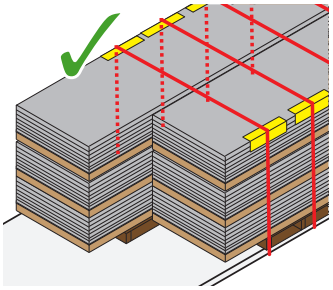
Pyramid stack loads of 3 bundles



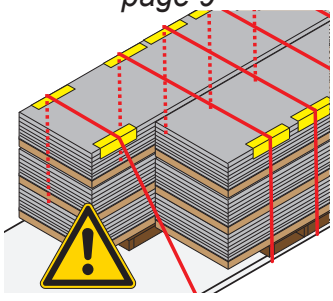
Load single packs centrally on the deck



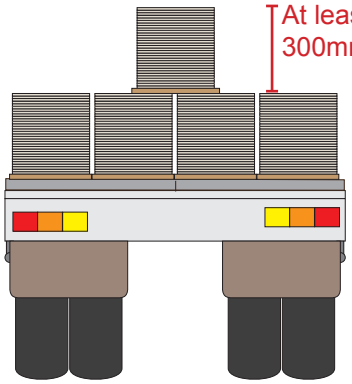
Lashings must be applied to all stacks across the deck



Lashings applied over part of the load are not counted in total lashing requirements in tables page 9



Top pack on 3 or more abreast must be at least 300mm high



Key Assumptions:
Static Friction of all materials of 0.4 or greater when packed or loose.
Webbing average tension of 300kg or 600kg over the load for standard or High Pretension ratchets respectively
Headboards are rated to 30% of total load mass or greater
Products are packed to CSR standards

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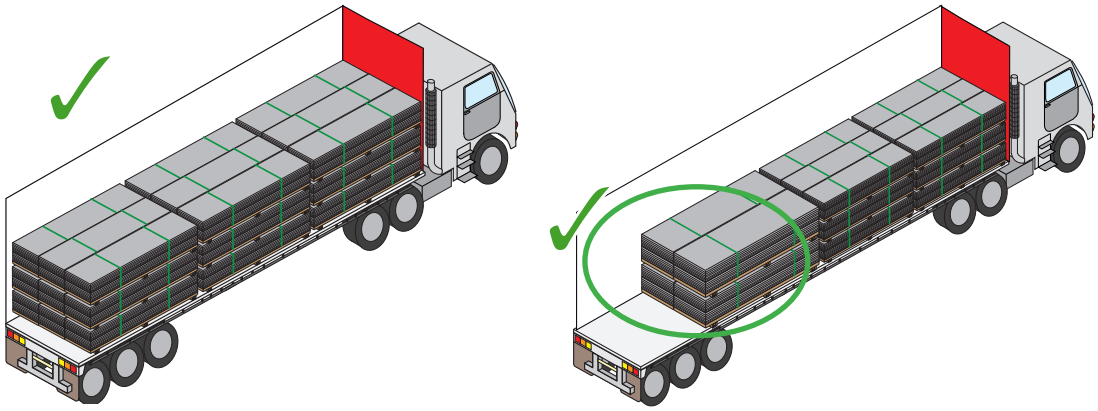
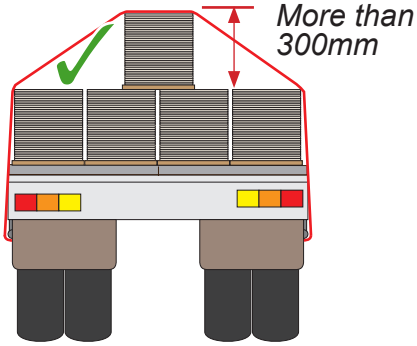
Load Configurations - Sheet Product : 3 or more across deck

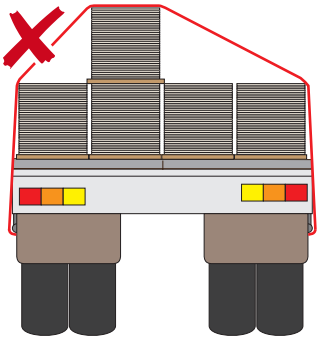
- ✓ All stacks more than 2 Abreast must be blocked to an Engineered Headboard
- ✓ All stackes more than 2 Abreast must be blocked rearward by a Rear wall of a Tautliner or a 2 abreast stack of product.
- ⚠ Maximum height limits apply to multi abreast product stacks.
- ⚠ Top pack of a pyramid stack must be at least 500mm high inclusive of pallet or dunnage.

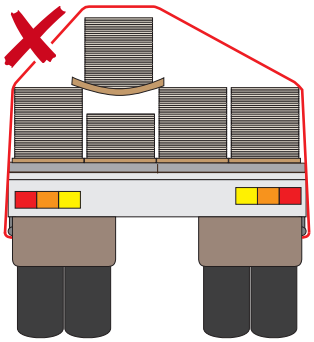


Multi abreast loads with more than 2 abreast must be blocked rearwards by 2 abreast stacks or Tautliner rear wall

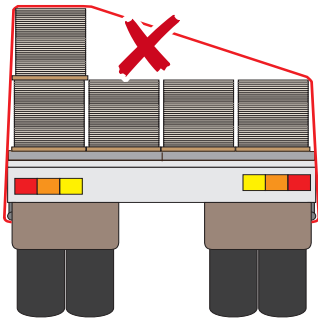


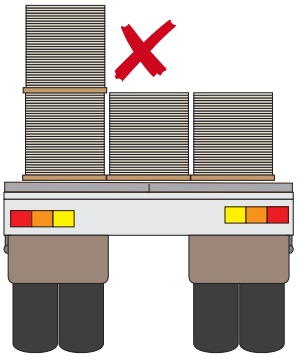
Center loads for pyramid stacks



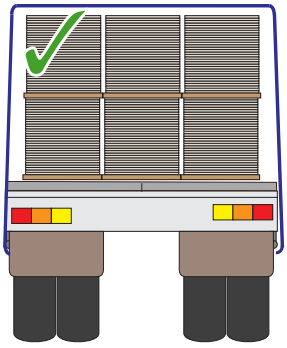


Do not bridge dunnage or pallets





Multi abreast Pyramid loads must be centrally loaded



3 or more packs across must be blocked front and rear

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- ✓ Multi abreast loads can be flat top or pyramid loaded.
- ✓ All stacks must be blocked to Engineered Headboard and lashed per the Tables 1 and 2.
- ✓ Pyramid stacks will require belly lashings and additional lashings over the top pack per table 1

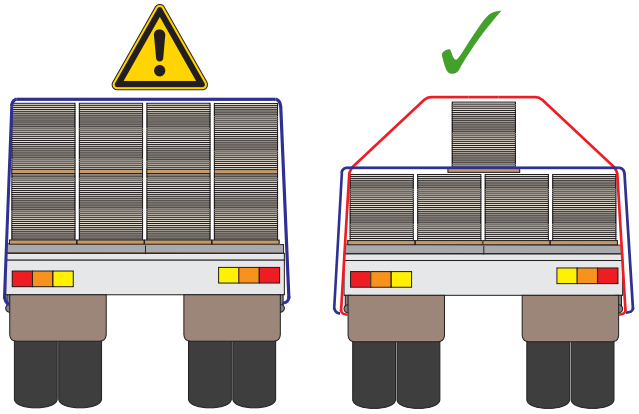


Table 1: Blocked (Headboard):

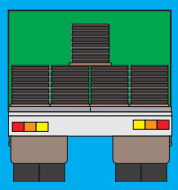
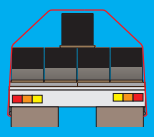
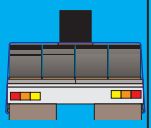
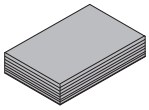
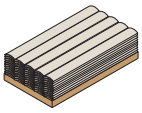
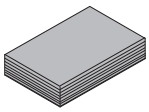
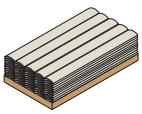
	Stack Mass Restrained 	Required Number of Tie Down Lashings per stack on the vehicle				
		Pyramid lashing 		Belly lashing 		
		Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Max stack height above deck
 Sheets	0 - 2,000 kg	2	2	2	2	0.9
 Cornice	2,001 - 4,000 kg	2	2	2	2	1
	4,001 - 6,000 kg	3	2	3	2	1.2
	6001 - 7000 kg	4	2	4	2	1.2
	7,001 - 9,000 kg	5	3	5	3	1.4
	9,001 - 11,000 kg	6	4	6	4	1.5

Table 2: Blocked (Headboard):

	Stack Mass Restrained 	Required Number of Tie Down Lashings per stack on the vehicle (Lashing Angle)		
		 (80 - 90°)		
		Push up ratchet / Drum winch	Pull Down Ratchet	Max stack height above deck
 Sheets	0 - 2,000 kg	2	2	0.9
	2,001 - 4,000 kg	2	2	1
	4,001 - 6,000 kg	3	2	1.2
	6001 - 7000 kg	4	2	1.2
 Cornice	7,001 - 9,000 kg	5	3	1.4
	9,001 - 11,000 kg	6	3	1.5
	11,001 - 13,000 kg	6	3	1.6

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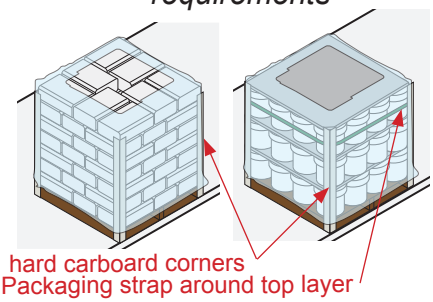
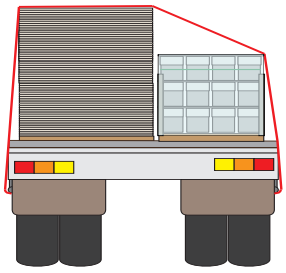
Load Configurations - Mixed loads

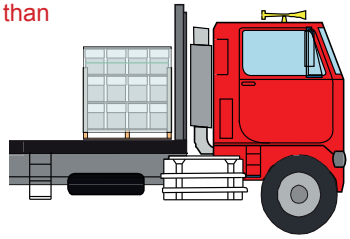
Compound product must be packed to meet CSR requirements



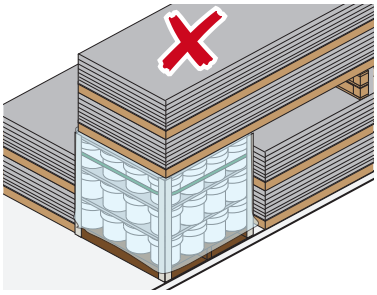
Maximum height difference across the truck is 300mm



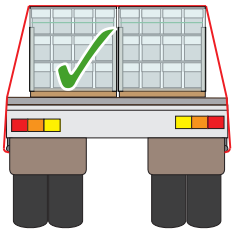
Block compound product wherever possible



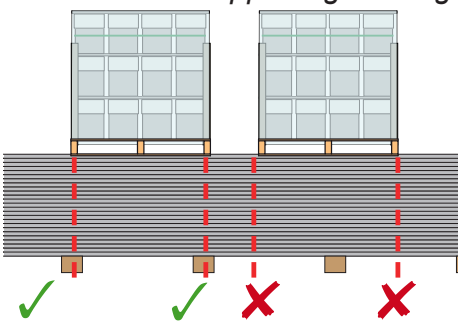
Do not stack sheet product on top of compound product



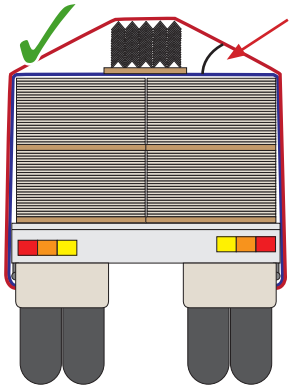
Load pallets maximum two abreast



Pallets stacked on loose sheet product - bearers must align with the supporting dunnage



Load Configurations - Palletised Cornice Product and steel packs

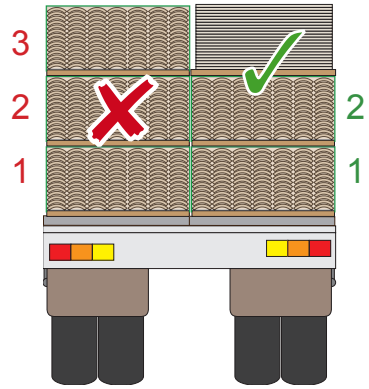


Angle for determining restraint lashings for steel packs

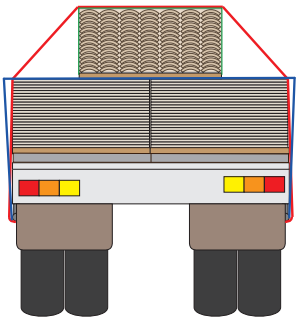
Steel packs should be blocked to Headboards loaded centrally and restrained with the tables on page 9 using the angle shown.

Flat product should be secured separately also using tables on page 9

Do not stack cornice more than two packs high
Palettised sheets on top of cornice are ok

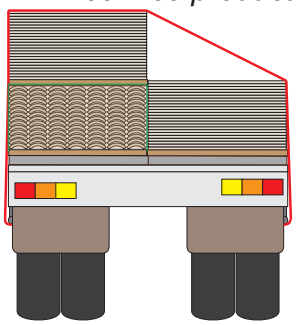


Stack cornice packs on top of sheet packs

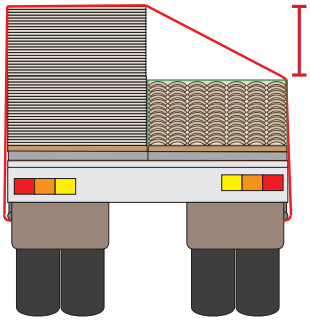


Crush Hazard

Do not stack sheet product on top of cornice product



Maximum height difference across the truck is 300mm



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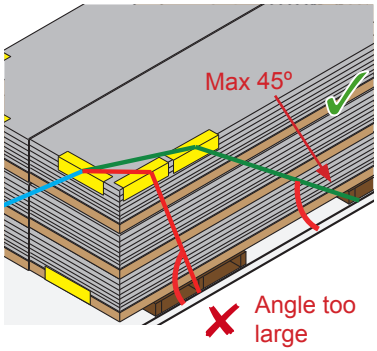
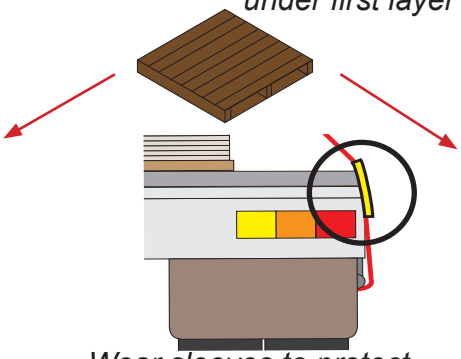
Blocking With Crossover Straps using Pull Down ratchets - Palletised Sheet Load

Key Elements:

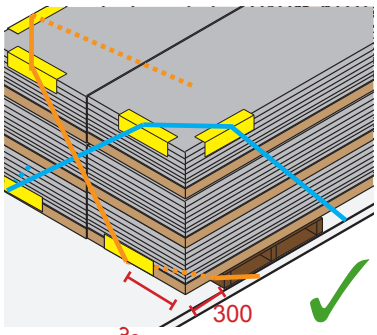


Maximum angle of crossover lashings to horizontal is 45º

Raise load by placing pallet under first layer

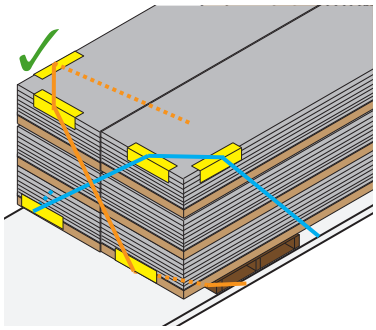


Wear sleeves to protect webbing on coaming rail

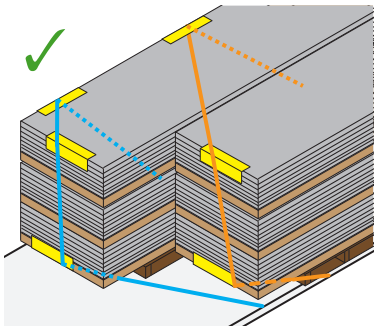


Set lower crossover strap approx. 300mm back and across from outer corner

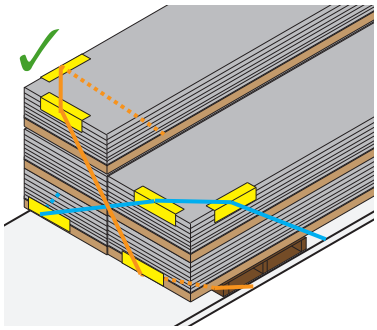
Permissible Arrangements:



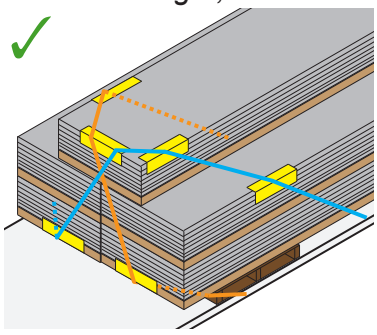
Same height, no offset



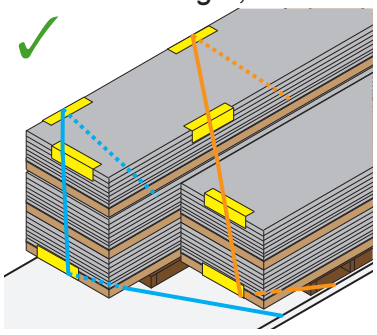
Same height, offset



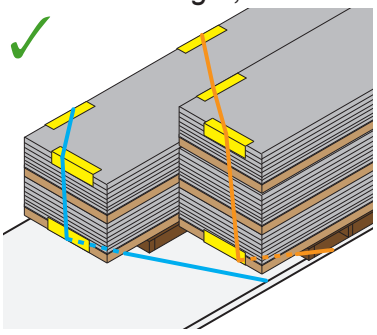
Different height, no offset



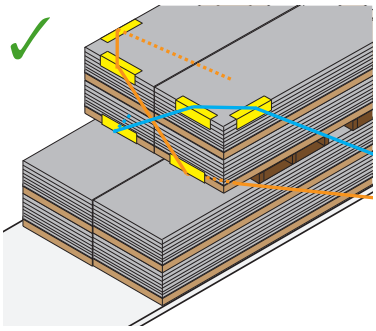
Pyramid stacked, no offset



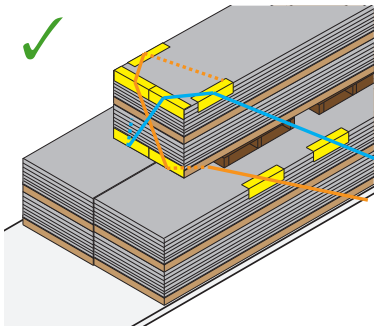
Different height, offset drivers side



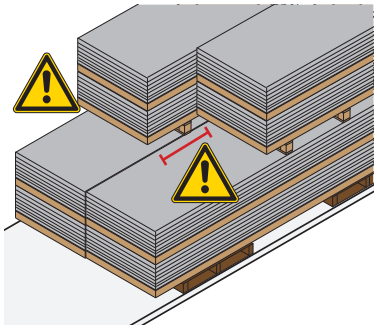
Different height, offset passenger side



Stacked, upper offset, flat face



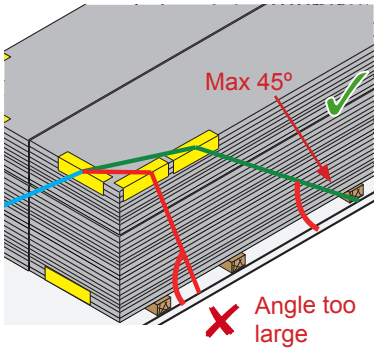
Stacked, single upper offset



Do not apply cross over lashings to this configuration. lash as an unblocked load table 3.

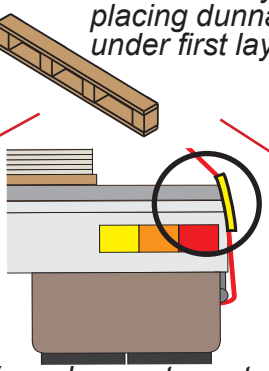
Blocking With Crossover Straps using Pull Down ratchets- Loose Sheet Load

Key Elements:

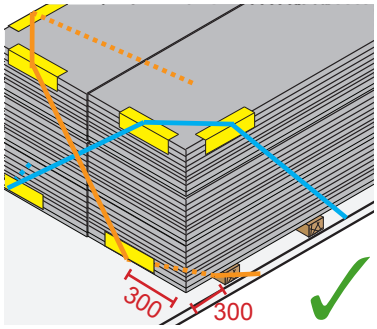


Maximum angle of crossover lashings to horizontal is 45º

Raise load by placing dunnage under first layer

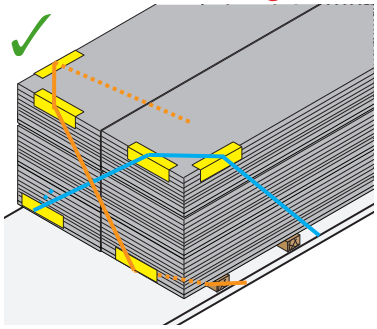


Wear sleeves to protect webbing on coaming rail

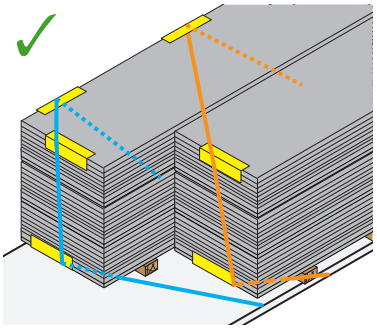


Set lower crossover strap approx. 300mm back and across from outer corner

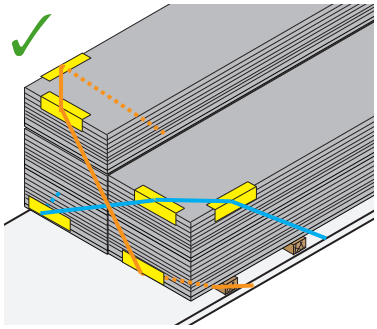
Permissible Arrangements:



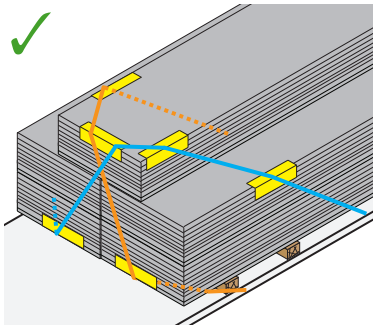
Same height, no offset



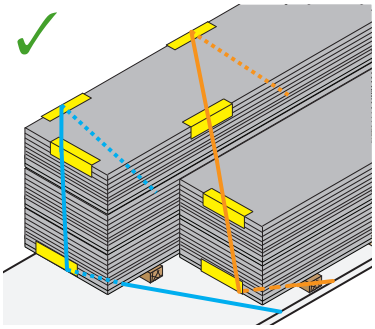
Same height, offset



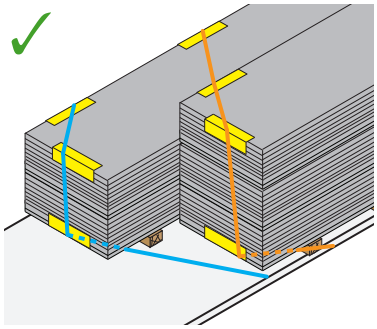
Different height, no offset



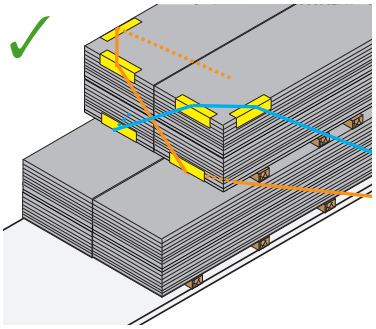
Pyramid stacked, no offset



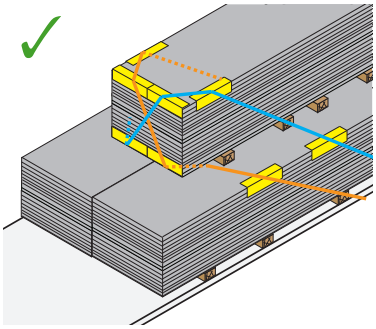
Different height, offset drivers side



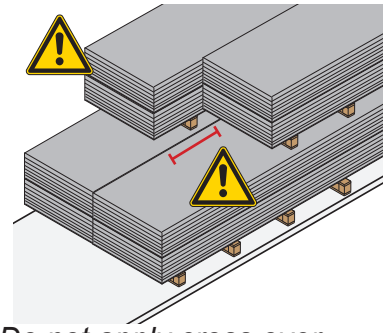
Different height, offset passenger side



Stacked, upper offset, flat face



Stacked, single upper offset



Do not apply cross over lashings to this configuration. lash as an unblocked load table 3.

Engistics Ref: ELRC302
Version: Issue 5
Date: 01/04/18

Tie Down Lashing Requirements

Note: Any single package must have a minimum of 15 sheets.

Lashing Angle

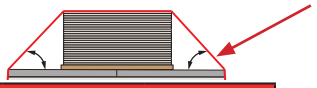


Table 3 : Unblocked Configuration (= impractical)*

Stack Mass restrained	Lashings per stack two Abreast loads		Lashings per stack single file loads					
	(81 - 90°)		(61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet
0 - 2,000 kg	4	2	4	3	5	3	7	4
2,001 - 4,000 kg	8	4	8	5	10	6	14*	8
4,001 - 6,000 kg	11	6	12*	7	15*	8	20*	11
6001 - 8000 kg	15*	8	16*	9	19*	11	27*	15*
8,001 - 10,000 kg	18*	10	20*	11	24*	13*	34*	19*
10,001 - 12,000 kg	22*	12*	22*	13*	Load Configuration not possible		Load Configuration not possible	
12,001 - 14,000 kg	25*	14*	24*	15*				
14,001-15,000kg	27*	15*	27*	16*				

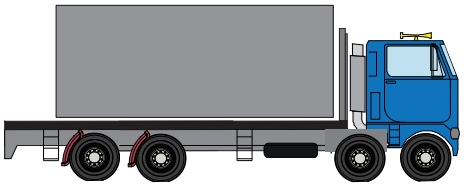
Table 4: Blocked Configuration (2 Crossover Straps): (=impractical)*

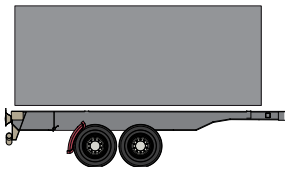
Stack Mass restrained	Lashings per stack two Abreast loads		Lashings per stack single file loads					
	(81 - 90°)		(61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet
0 - 2,000 kg	2	2	2	2	2	2	2	2
2,001 - 4,000 kg	3	2	3	2	4	2	2	2
4,001 - 6,000 kg	4	3	4	3	6	4	7	4
6001 - 8000 kg	6	4	6	4	9	5	14*	8
8,001 - 10,000 kg	9	5	9	6	13*	7	20*	11
10,001 - 12,000 kg	13*	7	13*	8	Load Configuration not possible		Load Configuration not possible	
12,001 - 14,000 kg	16*	9	16*	10				
14,001-15,000kg	18*	10	20*	11				

Table 5: Blocked Configuration (Headboard):

Stack Mass restrained	Lashings per stack two Abreast loads		Lashings per stack single file loads					
	(81 - 90°)		(61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet
0 - 2,000 kg	2	2	2	2	2	2	2	2
2,001 - 4,000 kg	2	2	2	2	2	2	4	2
4,001 - 6,000 kg	3	2	3	2	4	2	5	3
6001 - 8000 kg	4	3	4	3	5	3	7	4
8,001 - 10,000 kg	5	3	5	3	6	4	9	5
10,001 - 12,000 kg	6	3	6	4	Load Configuration not possible		Load Configuration not possible	
12,001 - 14,000 kg	7	4	7	4				
14,001-15,000kg	7	4	8	5				

Tie Down Lashing Requirements : Stacks greater than 15t mass





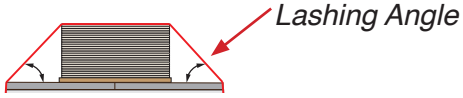


Table 7 : Unblocked Configuration (= impractical)*

Stack Mass restrained	Lashings per stack two Abreast loads (81 - 90°)		Lashings per stack single file loads (61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet
15001 - 16,000 kg	29*	16	31*	17*	Can't achieve this mass at 45 - 60 degree lashing angle		Can't achieve this mass at 30 - 45 degree lashing angle	
16,001 - 17,000 kg	30*	17*	33*	18*				
17,001 - 18,000 kg	32*	18*	35*	19*				
18001 - 19000 kg	34*	19*	37*	20*				
19001 - 20000 kg	36*	20*	39*	21*				

Table 8: Blocked Configuration (Crossover Straps): (=impractical)*

Stack Mass restrained	Lashings per stack two Abreast loads (81 - 90°)		Lashings per stack single file loads (61-80°)		(46-60°)		(30-45°)	
	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet
15001 - 16,000 kg	20*	11	22*	12	Can't achieve this mass at 45 - 60 degree lashing angle		Can't achieve this mass at 45 - 60 degree lashing angle	
16,001 - 17,000 kg	21*	12	24*	13				
17,001 - 18,000 kg	23*	13	26*	14				
18001 - 19000 kg	25*	14	28*	16				
19001 - 20000 kg	27*	15	30*	17				

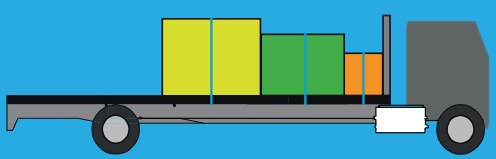
Table 9: Blocked Configuration (Headboard):

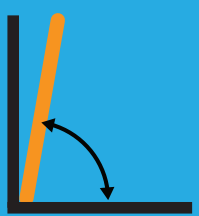
Stack Mass restrained	Lashings per stack two Abreast loads (80 - 90°)		Lashings per stack single file loads (60-80°)		(45-60°)		(30-45°)	
	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet	Push up ratchet / Drum winch	Pull Down Ratchet
15001 - 16,000 kg	8	4	8	5	Can't achieve this mass at 45 - 60 degree lashing angle		Can't achieve this mass at 45 - 60 degree lashing angle	
16,001 - 17,000 kg	8	5	9	5				
17,001 - 18,000 kg	8	5	9	5				
18001 - 19000 kg	9	5	10	6				
19001 - 20000 kg	9	5	10	6				

Chain of Responsibility – CoR in LWS

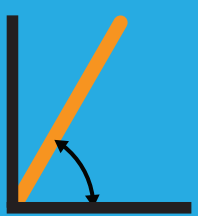
Know Your angles when loading @ CSR

Lashing angles

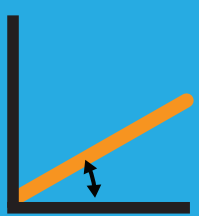




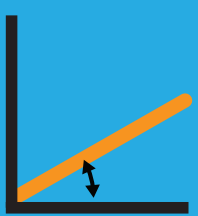
(80-90°)



(60-80°)



(45-60°)

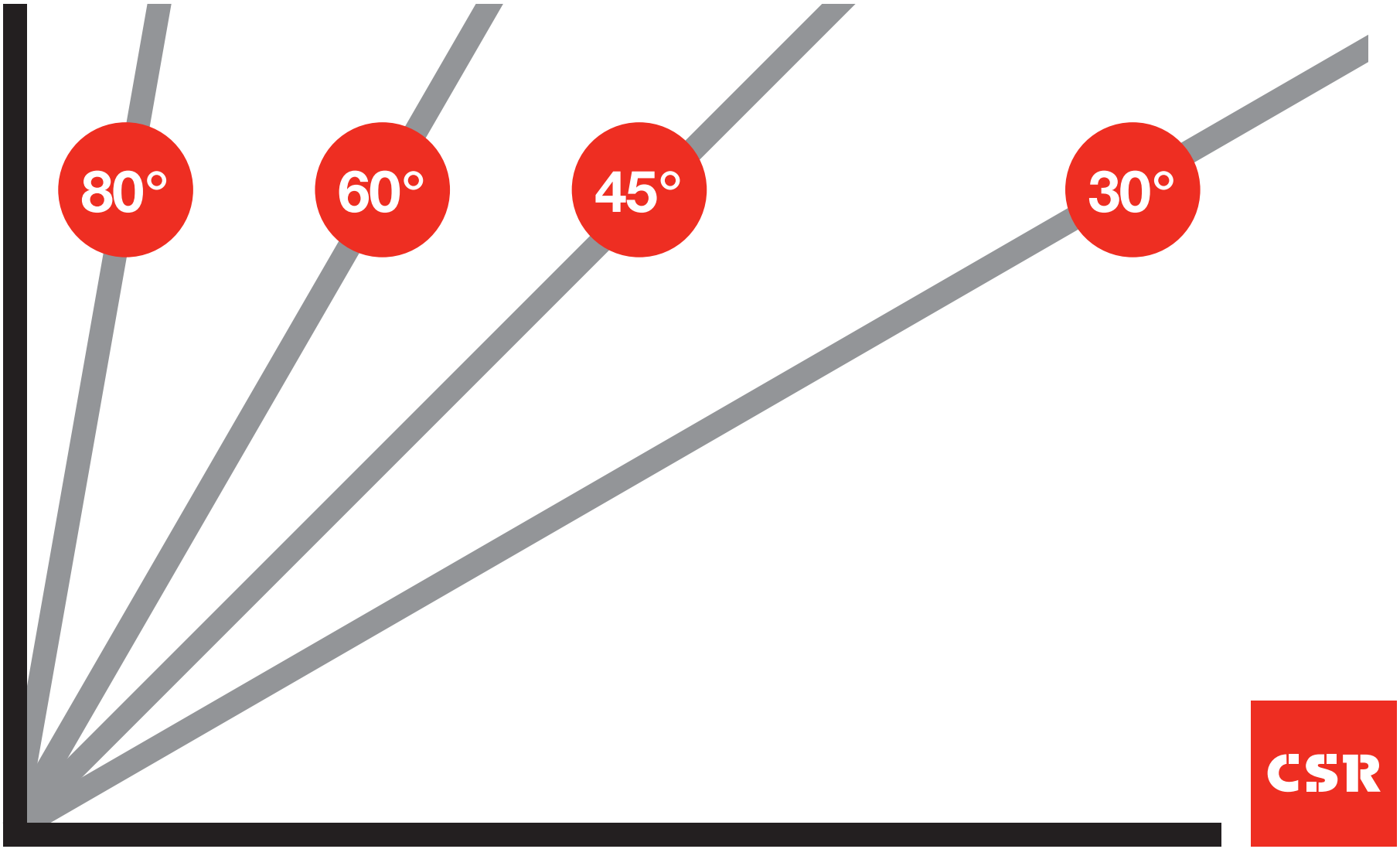


(30-45°)

GYPROCK®
Everything else is just plasterboard

CEMINTEL®

CSR


80°
60°
45°
30°
CSR