

# D-Connect Dunnage Bag Hand Book



***cordstrap***

## This handbook contains:

- Product Range
- Standard Container Applications Matrix
- How to measure to find the right size of Dunnage Bag
- Cargo Securing Forces Tables
- Rules and Regulations



# D-Connect Dunnage Bag Product Range

## D-Connect Dunnage Bags – Stabilizer / AAR Below Level 1

Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44286020	24" x 36"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	530
44286030	24" x 48"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	500
44286110	36" x 48"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	500
44286120	36" x 60"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	420
44286130	36" x 72"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	400
44286140	36" x 84"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	380
44286150	36" x 90"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	330
44286160	36" x 96"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	330
44286200	48" x 72"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	325
44286210	48" x 84"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	300
44286220	48" x 90"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	290
44286230	48" x 96"	0,2 Bar / 20 kPa / 2.90 Psi	0,3 Bar / 30 KPa / 4.35 Psi	FIV – Direct Connect	240

Dunnage Bags with a woven polypropylene outer layer and a polyethylene inner bag. These bags are not printed and have a yellow valve label.

**D-Connect Dunnage Bags – Level 1 Medium / AAR Level 1 / AAR-77**

Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44270010	24" x 24"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	560
44270020	24" x 36"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	530
44270030	24" x 48"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	500
44270100	36" x 36"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	500
44270110	36" x 48"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	500
44270120	36" x 60"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	420
44270130	36" x 72"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	400
44270140	36" x 84"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	380
44270150	36" x 90"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	330
44270160	36" x 96"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	330
44270210	48" x 48"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	350
44270220	48" x 60"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	350
44270230	48" x 72"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	325
44270240	48" x 84"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	300
44270250	48" x 90"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	290
44270260	48" x 96"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	240
44270320	60" x 60"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	200
44270330	60" x 96"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	190
44270340	60" x 120"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	140
44271010	24" X 24"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	50
44271020	24" X 36"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	42
44271030	24" X 48"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	36

**D-Connect Dunnage Bags – Level 1 Medium / AAR Level 1 / AAR-77**

Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44271100	36" X 36"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	35
44271110	36" X 48"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	30
44271120	36" X 60"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	24
44271130	36" X 72"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	24
44271140	36" X 84"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	20
44271150	36" X 90"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	16
44271160	36" X 96"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	12
44271210	48" X 48"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	24
44271220	48" X 60"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	18
44271230	48" X 72"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	16
44271240	48" X 84"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	14
44271250	48" X 90"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	12
44271260	48" X 96"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	12

Dunnage Bags with a woven polypropylene outer layer and a polyethylene inner bag. These bags are printed (Cordstrap Branded) and have an orange valve label.

**D-Connect Dunnage Bags – Level 2 Heavy / AAR Level 2 / AAR-77**

Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44290030	24" x 48"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	420
44290110	36" x 48"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	350
44290130	36" x 72"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	250
44290140	36" x 84"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	220
44290150	36" x 90"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	220
44290160	36" x 96"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	170
44290210	48" x 48"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	200
44290230	48" x 72"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	200
44290240	48" x 84"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	170
44290250	48" x 90"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	170
44290260	48" x 96"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	160
44290300	60" x 60"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	190
44290310	60" x 96"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	120
44290320	60" x 120"	0,4 Bar / 40 kPa / 5.80 Psi	1,2 Bar / 120 KPa / 17.40 Psi	FIV – Direct Connect	190

Dunnage Bags with a woven polypropylene outer layer and a polyethylene inner bag. These bags are printed (Cordstrap Branded) and have a green valve label.

**D-Connect Dunnage Bags – Level 4 Heavy / AAR Level 4 / AAR-77**

Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44260100	36" x 36"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	220
44260130	36" x 72"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	
44260170	36" x 108"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	<del>200</del>
44260210	48" x 48"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	140
44260230	48" x 72"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	110
44260240	48" x 84"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	90
44260260	48" x 96"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	85
44260270	48" x 108"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	80
44260280	48" x 120"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	70

Dunnage Bags with a woven polypropylene outer layer and a polyethylene inner bag. These bags are printed (Cordstrap Branded) and have a blue valve label.

CURRENTLY AWAITING AAR APPROVAL

**D-Connect Dunnage Bags – Level 5 Heavy Duty / AAR Level 5**

Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
TBD	TBD	0,7 Bar / 70 kPa / 10.15 Psi	1,5 Bar / 145 KPa / 21 Psi	FIV – Direct Connect	TBD

Dunnage Bags with a woven polypropylene outer layer and a polyethylene inner bag. These bags are printed (Cordstrap Branded) and have a red valve label.



# SUPERGRIP AND EASYFIX

D-Connect Dunnage Bags – EasyFix Medium / AAR Level 1 / AAR-77					
Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44270125	36" X 60"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	420
44270135	36" X 72"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	400
44270145	36" x 84"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	380

D-Connect Dunnage Bags – EasyFix Heavy / AAR Level 4 / AAR-77					
Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44260275	48" x 108"	0,7 Bar / 70 kPa / 10.15 Psi	2,1 Bar / 210 KPa / 30.45 Psi	FIV – Direct Connect	80

SuperGrip Dunnage Bags – Level 1 Medium					
Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44260060	48"x 96"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	225

Dunnage Bags with a woven polypropylene outer layer and a polyethylene inner bag. These bags are printed (Cordstrap Branded) and have a valve label – these bags are also equipped with stickers which make easy pre-positioning possible before inflation.

## CHALLENGE WHEN SECURING LARGE RECTANGULAR OBJECTS ON A-FRAMES

- Dunnage Bags don't remain in position between the A-frames during transport.
- Additional preparation is required before loading the containers, such as taping them into place, which adds time to preparing the load, decreasing output.

## SOLUTION SUPERGRIP AND EASYFIX TECHNOLOGY

- SuperGrip: Dunnage Bags with a surface treatment (SuperGrip formula) increasing friction and prevents the dunnage bags from moving.
- EasyFix: positioning stickers assist in positioning the dunnage bags before inflation.



# 3D DUNNAGE BAGS

3D Dunnage Bags – Level 1 Medium					
Product No	Dimensions	Working Pressure	Burst Pressure	Valve Type	Packaging / Pieces per Box
44230010	44x36x93"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	48
44230020	44x36x44"	0,2 Bar / 20 kPa / 2.90 Psi	0,6 Bar / 60 KPa / 8.70 Psi	FIV – Direct Connect	60

Dunnage Bags with a woven polypropylene outer layer and a polyethylene inner bag. These bags non printed and do not have a valve label. These bags are voluminous are specifically used in applications where big voids have to be filled (e.g. palletwide voids).

## CHALLENGE SECURING CONTAINERS WITH NON-STANDARD SIZES OF PALLETS AND CRATES OR LARGE VOIDS

- The widest dunnage bag can secure voids up to 70cm but for many loads this is not sufficient.
- Alternative options, such as wood, are required which takes time to prepare to secure the load, can increase costs and moisture damage risk.


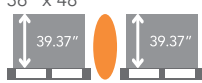
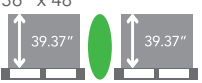
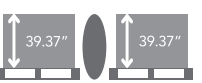







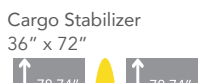




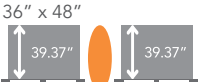
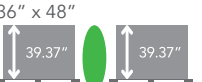
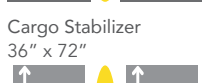


## SOLUTION 3D DUNNAGE BAGS

- Designed to secure extremely wide voids reducing load times and complexity, and increasing productivity.



D-Connect Dunnage Bags Inflators (Tools)					
Product No		Name	Input	Output	Description
44870000		D-Connect Fast Inflator	Fixed Airline	Max ~0,6 Bar (8.7 psi)	<ul style="list-style-type: none"> <li>- Unique venturi technology enables fast inflation and also able to deflate bag</li> <li>- Visual cue that clearly indicates when working pressure of ~0,17 Bar is achieved</li> <li>- The perfect tool for customers using &lt; ~650 bags per year</li> </ul>
44870051		D-Connect Fast Inflator HD N	Fixed Airline	Max ~0,6 Bar (8.7 psi)	<ul style="list-style-type: none"> <li>- Unique venturi technology enables fast inflation and also able to deflate bag</li> <li>- Visual cue that clearly indicates when working pressure of ~0,17 Bar is achieved</li> <li>- Equipped with HD steel collar for heavy use</li> <li>- The perfect tool for customers using &gt; ~650 bags per year</li> </ul>
4870054		D-Connect Battery Operated Inflator (Body & Metal Tip)	Battery	Max ~0,12 Bar (1.74 psi)	<ul style="list-style-type: none"> <li>- Equipped with powerful pump enabling Fast inflation</li> <li>- This light and ergonomic designed portable inflator can inflate dunnage bags anywhere at any time</li> <li>- The perfect tool for customers where fixed airlines or electricity is not available</li> </ul>
4SP00552		SP MetalTip – for 4870054			<ul style="list-style-type: none"> <li>- Metal Spare Tip for the battery operated inflator (4870053)</li> </ul>
4855900 & 4855903		D-Connect Digital Inflator	Fixed Airline	Max ~0,86 Bar (12.47 psi)	<ul style="list-style-type: none"> <li>- Digital pressure readout enables precise inflation</li> <li>- The perfect tool for customers with applications that require precise filling pressure</li> </ul>

# Standard Container Applications MATRIX


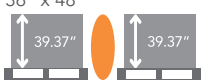
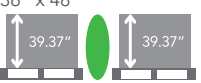
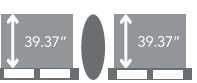



Transport Modality	Pallet Weight		
	1100 lbs	2200 lbs	3300lbs
<b>SEA</b> 	Cargo Secure Medium 36" x 48" 	Cargo Secure Heavy 36" x 48" 	
	Cargo Stabilizer 36" x 72" 	Cargo Secure Medium 36" x 72" 	Cargo Secure Heavy 36" x 72" 
<b>ROAD</b> 	Cargo Stabilizer 36" x 48" 	Cargo Secure Medium 36" x 48" 	Cargo Secure Heavy 36" x 48" 
	Cargo Stabilizer 36" x 72" 	Cargo Stabilizer 36" x 72" 	Cargo Secure Medium 36" x 72" 
<b>RAIL</b> 	Cargo Stabilizer 36" x 48" 	Cargo Secure Medium 36" x 48" 	Cargo Secure Heavy 36" x 48" 
	Cargo Stabilizer 36" x 72" 	Cargo Stabilizer 36" x 72" 	Cargo Secure Medium 36" x 72" 

D-CONNECT DUNNAGE BAGS KEY

-  Cargo Secure Medium
-  Cargo Secure Stabilizer
-  Cargo Secure Heavy

\*According to the AAR: a minimum of AAR Level 1 dunnage bags are required into applications over rail, cargo stabilizers (or dunnage bags specified below level 1) are not approved on rail applications within the US, outside of the US void fillers can be used.

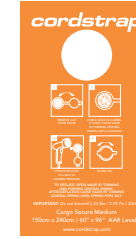
# Standard Container Applications SEA

Transport Modality	Pallet Weight		
	1100 lbs	2200 lbs	3300lbs
<b>SEA</b> 	Cargo Secure Medium 36" x 48" 	Cargo Secure Heavy 36" x 48" 	
	Cargo Stabilizer 36" x 72" 	Cargo Secure Medium 36" x 72" 	Cargo Secure Heavy 36" x 72" 

For SEA transport, the following dunnage bags are recommended:



D-Connect Cargo Stabilizer










D-Connect Cargo Secure Medium



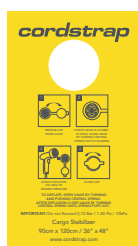
D-Connect Cargo Secure Heavy

# Standard Container Applications

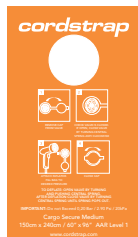
## ROAD

Transport Modality	Pallet Weight		
	1100 lbs	2200 lbs	3300lbs
<b>ROAD</b> 	<b>Cargo Stabilizer</b> 36" x 48" 	<b>Cargo Secure Medium</b> 36" x 48" 	<b>Cargo Secure Heavy</b> 36" x 48" 
	<b>Cargo Stabilizer</b> 36" x 72" 	<b>Cargo Stabilizer</b> 36" x 72" 	<b>Cargo Secure Medium</b> 36" x 72" 

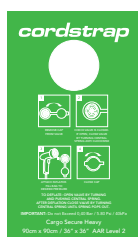
For ROAD transport, the following dunnage bags are recommended:



D-Connect Cargo Stabilizer










D-Connect Cargo Secure Medium



D-Connect Cargo Secure Heavy

# Standard Container Applications

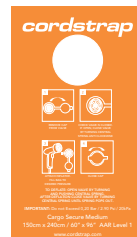
## RAIL

Transport Modality	Pallet Weight		
	1100 lbs	2200 lbs	3300lbs
<b>RAIL</b> 	<b>Cargo Stabilizer</b> 36" x 48" 	<b>Cargo Secure Medium</b> 36" x 48" 	<b>Cargo Secure Heavy</b> 36" x 48" 
	<b>Cargo Stabilizer</b> 36" x 72" 	<b>Cargo Stabilizer</b> 36" x 72" 	<b>Cargo Secure Medium</b> 36" x 72" 

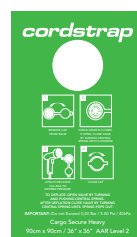
For RAIL transport, the following dunnage bags are recommended:



D-Connect Cargo Stabilizer



D-Connect Cargo Secure Medium



D-Connect Cargo Secure Heavy



# How to measure to find the right size of Dunnage Bag

- Measure the width of the goods on the pallet.
- Measure the height of the goods on the pallet (minus the pallet).
- What type of product or packaging is on the pallet?
- What are the dimensions of the product/packaging?
- Measure the space/void in between the pallets.



**Levels Available**  
 Stabilizer, Level 1, Level 2, Level 3/4, Level 5

24" Wide Dunnage Bag – Max Void 9.8"  
 36" Wide Dunnage Bag – Max Void 15.7"  
 48" Wide Dunnage Bag – Max Void 21.6"

**General Dunnage Bag Rules**

- When inflating the dunnage bag ensure it’s not touching the floor of the container or boxcar.
- Position the dunnage bag above the pallet (see red arrows).
- Do not exceed the width or height of the goods you’re securing.
- Don’t inflate a dunnage bag on the exterior wall of the container without using a barrier material between the wall and bag.
- When a dunnage bag is used as a secondary securing measure for machinery and equipment, place barrier material between the dunnage bag and the machinery and equipment.
- If the void exceeds the capabilities of the dunnage bag, don’t size up but include a corrugated void filler to eliminate the excess void.

# D-Connect Dunnage Bags Notes

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# Cargo Securing Forces Cargo Stabilizer

Force in lbf exerted from a Cargo Stabilizer dunnage bag at working pressure (0,12 bar = 1.74 PSI)

BAG (inches)		VOID (inches)										
Width	Length	2	4	6	8	10	12	14	16	18	20	22
24	36	1134	871	641	444	279						
24	48	1548	1223	930	671	443						
24	72	2376	1926	1509	1125	773						
36	48	2438	2051	1696	1374	1085	828	603	412			
36	60	3090	2641	2224	1839	1487	1168	992	628			
36	72	3743	3231	2751	2305	1890	1509	1160	844			
36	90	4721	4115	3543	3002	2495	2020	1577	1168			
48	72	5109	4535	3993	3484	3008	2564	2153	1774	1428	1115	834
48	90	6445	5777	5142	4539	3969	3432	2927	2455	2016	1609	1235

# Cargo Securing Forces Cargo Secure Medium – Level 1

Force in lbf exerted from a Cargo Secure Medium dunnage bag at working pressure (0,2 bar = 2.90 PSI)

BAG (inches)		VOID (inches)										
Width	Length	2	4	6	8	10	12	14	16	18	20	22
24	36	1890	1452	1068	739	464						
24	48	2580	2038	1551	1118	739						
24	72	3960	3210	2515	1875	1288						
36	48	4064	3418	2827	2290	1808	1379	1006	686			
36	60	5151	4401	3706	3065	2479	1947	1469	1046			
36	72	6238	5384	4585	3841	3151	2515	1933	1406			
36	90	7868	6859	5904	5004	4158	3366	2629	1946			
48	72	8516	7558	6656	5807	5013	4273	3588	2957	2380	1858	1390
48	90	10742	9629	8570	7566	6616	5720	4879	4092	3360	2682	2058

# Cargo Securing Forces Cargo Secure Heavy – Level 2

Force in lbf exerted from a Cargo Secure Heavy dunnage bag at working pressure (0,4 bar = 5.80 PSI)

BAG (inches)		VOID (inches)										
Width	Length	2	4	6	8	10	12	14	16	18	20	22
24	36	3779	2904	2137	1478	929						
24	48	5159	4076	3101	2235	1478						
24	72	7920	6421	5031	3749	2576						
36	48	8127	6836	5654	4580	3615	2759	2011	1372			
36	60	10301	8802	7412	6131	4958	3894	2939	2092			
36	72	12475	10769	9171	7682	6301	5029	3866	2812			
36	90	15737	13718	11809	10008	8316	6732	5258	3892			
48	72	17031	15117	13311	11614	10026	8547	7176	5914	4760	3716	2780
48	90	21483	19257	17140	15131	13231	11440	9758	8184	6719	5363	4116

# Cargo Securing Forces Cargo Secure Heavy – Level 4

Force in lbf exerted from a Cargo Secure Heavy dunnage bag at working pressure (0,4 bar = 5.80 PSI)

BAG (inches)		VOID (inches)										
Width	Length	2	4	6	8	10	12	14	16	18	20	22
24	36	6619	5084	3741	2587	1625						
24	48	9036	7137	5430	3912	2586						
24	72	13,870	11,243	8808	6562	4508						
36	48	14,234	11,971	9900	8019	6328	4828	3519	2400			
36	60	18,042	15,415	12,979	10,734	8680	6816	5142	3659			
36	72	21,849	18,859	16,059	13,450	11,031	8803	6776	4919			
36	90	27,561	24,024	20,678	17,523	14,558	11,784	9201	6808			
48	72	29,829	26,474	23,310	20,337	17,554	14,962	12,561	10,350	8330	6500	4861
48	90	37,626	33,725	30,015	26,496	23,167	20,029	17,082	14,325	11,758	9383	7198

# Rules and Regulations

## CTU Code

2.3.8  
If dunnage bags are used for filling gaps, the manufacturer's instructions on filling pressure and the maximum gap should be accurately observed.

Dunnage bags should not be used as a means of filling the space at the doorway, unless precautions are taken to ensure that they cannot cause the door to open violently when the doors are opened.

4.1.2  
The size and strength of the dunnage bag are to be adjusted to the cargo weight so that the permissible lashing capacity of the dunnage bag, without risk of breaking it, is larger than the force the cargo needs to be supported with:  $FDUNNAGE\ BAG \geq FCARGO$

4.5.1  
Upon application of the dunnage bag it is filled to a slight overpressure. If this pressure is too low there is a risk that the dunnage bag may come loose if the ambient pressure is rising or if the air temperature drops. Conversely, if the filling pressure is too high there is a risk of the dunnage bag bursting or damaging the cargo if the ambient pressure decreases, or if the air temperature rises.

4.5.2  
The bursting pressure ( $P_b$ ) of a dunnage bag depends on the quality and size of the bag and the gap that it is filling. The pressure exerted on a dunnage by the cargo forces should never be allowed to approach bursting pressure of the bag because of the risk of failure. A safety factor should, therefore, be incorporated and, if necessary, a dunnage bag with a higher bursting pressure selected.



# Rules and Regulations

## AAR

The Association of American Railroads have:  
Set the industry performance levels for dunnage bags: these performance specifications are required on the American railroads and are generally followed in countries outside of North America

Furthermore the AAR states:  
Non-hazmat: Dunnage bags accepted means of securing  
Hazmat: Dunnage bags not accepted!

The AAR has specified the following performance levels:

AAR Performance Level	Working Pressure (psi)	Burst Pressure (psi)	Application
Below Level 1*	1.45	4.35	Only Lateral
Level 1	2.9	8.7	Only Lateral
Level 2	4.93	14.79	Lateral and Longitudinal
Level 3	7.97	23.93	Lateral and Longitudinal
Level 4	10.0	30.02	Lateral and Longitudinal
Level 5	10.0	32.03	Horizontal orientation (Lateral and Longitudinal) between concave surfaces



# D Connect Dunnage Bags Notes

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