



DEKRA Automobil GmbH

Container Type Test Report

DEKRA No. 2020-10300

Document No.: DE-R-0001-1, Rev. No. 2
Date of Issue / Revision: 2011-09-20 / 2020-10-06

Container Type Test Report
according to
DEKRA Guidelines for the certification of containers
and on the basis of ISO Standards

Manufacturer	<u>S.Grabmeier</u>	Container type	<u>Bulk-Container</u>		
Manufacturer no.	<u>001</u>	ISO type (668)	<u>--</u>		
Maximum gross weight	<u>36000 kg</u>	Maximum Payload	<u>31800 kg</u>		
Tare weight	<u>4200 kg</u>	DEKRA reference no.	<u>2020-10300</u>		
General arrangement drawing no.	<u>20061 Abrollcontainer</u>	Specification no. (if available)	<u>--</u>		
Tested at	<u>Drehtainer GmbH</u>	From	<u>22.02</u>	To	<u>23.02.2021</u>
In attendance of	<u>Mr. Guido Hageböck, Company Dekra</u>				



Stamp/Signature

passed
Result

AIM OF THE TEST

To ascertain the performance of the freight container subject to the following tests

Test results exceeding DEKRA permissible values to be noted and advised

Tests according to ISO 1496 and DEKRA requirements

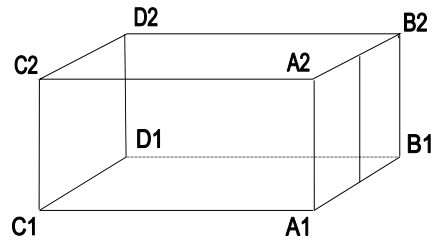
List of tests carried out	Sequence of tests	Result	Page
Dimensions	1	passed	3
Stacking test	2	passed	4
Lifting by top corner fittings	3	passed	5
Lifting by bottom corner fittings	4	passed	5
Longitudinal restraint test	6	passed	6
End wall strength test	10	passed	7
Side wall strength test	11	passed	8
Roof strength test			8
Floor strength test	9	passed	9
Transverse racking test	7	passed	10
Longitudinal racking test	8	passed	11
Lifting by forklift pockets	5	passed	12
Lifting at the grappler arm positions			12
Weatherproofness test			13

Additional test(s) (at owner request)	Sequence of tests	Result	Page
Cargo Securing System			14

Comments:

Category		
Design dimensions		$\pm \Delta$
Length	6058	+0/-4
Width	2500	+0/-4
Height	2591	+0/-2

CHECK OF DIMENSIONS



Position	Ref.	Diagonals			Position	Ref.	Length		
		Before	After	$\pm \Delta$			Before	After	$\pm \Delta$
End door (K2)	A ₂ B ₁	3324	3326		End door	A ₂ A ₁	2582	2577	
	A ₁ B ₂	3326	3324			B ₂ B ₁	2582	2576	
	Δ	2	2			Δ	0	1	
Front wall (K2)	C ₂ D ₁	3323	3323			A ₂ B ₂	2438	2438	
	C ₁ D ₂	3331	3331			A ₁ B ₁	2438	2438	
	Δ	8	8			Δ	0	0	
Side wall (K1)	A ₂ C ₁	6590	6590		Front wall	D ₂ D ₁	2582	2582	
	C ₂ A ₁	6591	6591			C ₂ C ₁	2582	2582	
	Δ	1	1			Δ	0	0	
	B ₂ D ₁	6589	6589			C ₂ D ₂	2437	2437	
	D ₂ B ₁	6590	6590			C ₁ D ₁	2437	2437	
	Δ	1	1			Δ	0	0	
Floor (K1)	B ₁ C ₁	6274	6274		Side walls	A ₂ C ₂	6057	6057	
	A ₁ D ₁	6274	6274			A ₁ C ₁	6054	6054	
	Δ	0	0			Δ	3	3	
Roof (K1)	A ₂ D ₂	6279	6279			B ₂ D ₂	6058	6058	
	B ₂ C ₂	6271	6271			B ₁ D ₁	6055	6055	
	Δ	8	8			Δ	3	3	

Container type / permissible values				
	1AAA / 1AA / 1A / 1AX 1EEE / 1EE	1BBB / 1BB / 1B / 1BX	1CC / 1C / 1CX	1D / 1DX
K1 _{max}	19	16	13	10
K2 _{max}	10	10	10	10

Comments: Measurements in line with the ISO tolerances

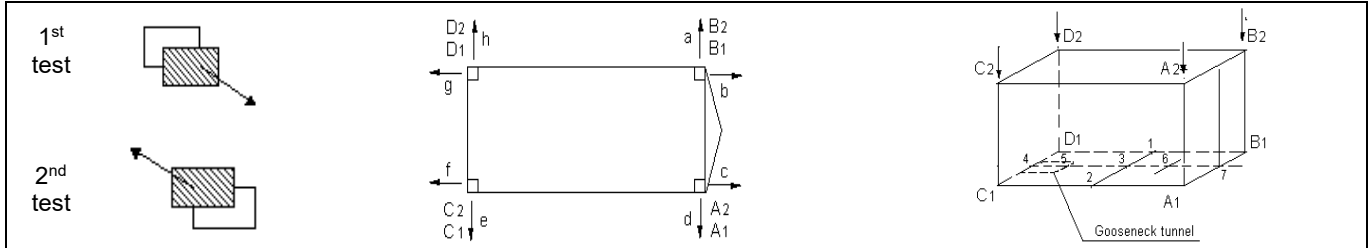
Stamp/Signature 

passed
Result

STACKING TEST

Test method:

The container shall be positioned on four level pads, then evenly loaded with weights equal to **1.8R – T**
 A vertical force shall be simultaneously applied to each of the four top corner fittings or on each pair of top end fittings via test plates offset in the same direction by 25mm laterally and 38mm longitudinally
 Measurements of deflections must be taken at points a to h the centre of and at half the height of corner posts also base frame points 1 to 7.



Test Results

Internal load: 1.8R-T= 60600 kg

Test load: 96000 kg/post

Condition	Corner post deflections A ₁ A ₂ , B ₁ B ₂ , C ₁ C ₂ , D ₁ D ₂								Change in length of corner posts			
	a	b	c	d	e	f	g	h	A ₁ A ₂	B ₁ B ₂	C ₁ C ₂	D ₁ D ₂
Before	5,0	5,0	5,0	5,0	5,0	5,0	5,0	5,0	2341	2339	2404	2406
1 st Test	7,0	5,5	6,1	5,0	4,2	6,1	6,3	4,9	2333	2329	2399	2400
After	5,4	6,4	5,9	5,8	5,0	5,7	5,6	5,0	2339	2337	2403	2403
2 nd Test	7,1	5,6	6,2	5,3	4,8	6,2	6,2	4,1	2332	2333	2399	2400
After	5,5	5,5	5,9	5,9	5,0	5,8	5,7	5,0	2339	2338	2402	2404
Permanent deflection	0,5	0,5	0,9	0,9	0,0	0,8	0,7	0,0	2	1	2	2

Condition	Base frame deflections						
	1	2	3	4	5	6	7
Empty	133	128	74	70	73	75	75
Loaded	131	126	58	70	56	57	70
1 st Test	131	126	58	70	56	57	70
Elastic deflection during 1 st test	0	0	0	0	0	0	0
2 nd Test	131	126	58	70	56	57	70
Elastic deflection during 2 nd test	0	0	0	0	0	0	0
Empty	130	126	71	70	70	72	72
Permanent deflection	1	2	3	0	3	3	3

Permissible values	Point	Elastic	Permanent deflection	
			20'	40'
	Corner post		---	2 mm
Transverse member		6 mm *	3 mm	
B.S.R. (Bottom Side Rail)		6 mm *	3 mm	4 mm

* Maximum permissible deflection below the lower bearing planes of bottom corner fittings.

Comments:

Stamp/Signature
 DEKRA Automobil GmbH



passed
 Result

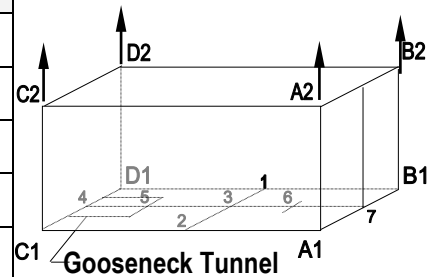
LIFTING BY TOP CORNER FITTINGS

Test method:

1. The container loaded to **2R - T**, shall be lifted during both tests in such a way that no significant acceleration or deceleration forces are applied be suspended for not less than 5 minutes and then lowered to the ground.
 2. Lifted at all four top corner fittings, for series 1A, 1AA, 1C and 1CC containers the lifting forces shall be applied vertically.
 3. Lifted at all four-bottom corner fittings, the lines of action of the lifting forces and the outer faces of the corner fittings are to be no farther apart than 38 mm.
- The lifting forces will be applied at an angle of 30° to the horizontal, for 1AA, 1A containers
45° to the horizontal, for 1CC,1C containers.

Test results Internal load: 2R-T= 67800 kg

Condition	1	2	3	4	5	6	7
Empty	133	128	74	70	73	75	75
Deflection before lifting	128	124	55	70	53	54	62
Deflection during lifting	128	124		69			62
After lifting	128	123	55	75	53	53	62
Empty	130	126	71	70	70	72	72
Permanent deflection	1	2	3	0	3	3	3



Comments:

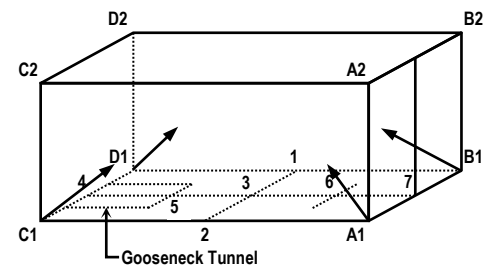
Stamp/Signature

passed Result



LIFTING BY BOTTOM CORNER FITTINGS

Condition	1	2	3	4	5	6	7
Empty							
Deflection before lifting							
Deflection during lifting							
After lifting							
Empty							
Permanent deflection							



Permissible values	Point	Permanent deflection	
		20'	40'
	Transverse member	3 mm	
B.S.R.	3 mm	4 mm	

Comments: Based on the position of the bottom corner castings this test is not possible

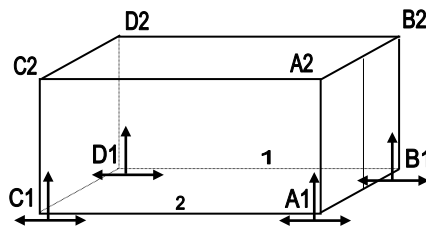
Stamp/Signature

Result

LONGITUDINAL RESTRAINT TEST

Test method:

The container, loaded to **R - T**, shall be anchored at one end through the bottom apertures of the bottom corner fittings. A force of **2 R** acting horizontally shall be applied and sustained for 5 minutes through the bottom apertures of the bottom corner fittings at the other end of the container, first towards and then away from the anchor points.



Test Results

Internal load R = 31800 kg

Proof load 2 R = 72000 kg

Loading R-T			Before test	During test	After test	Permanent deflection
Compression	Overall length	A ₁ C ₁	53	50	53	0
		B ₁ D ₁	51	49	53	2
	B.S.R.	1	60	59	60	0
		2	72	71	72	0
Tension	Overall length	A ₁ C ₁	53	56	54	1
		B ₁ D ₁	53	54	51	2
	B.S.R.	1	60	60	60	0
		2	72	72	72	0

Permissible values	Point	Permanent deflection			
		10'	20'	30'	40'
	B.S.R.	2 mm	3 mm	3 mm	4 mm
Overall length		2991 mm +0 / -5	6058 mm +0 / -6	9125 mm +0 / -10	12192 mm +0 / -10

Comments:



Stamp/Signature

passed
Result

END WALL STRENGTH TEST

Test method:

An internal load of **0.4 P*** is applied and sustained for at least 5 minutes uniformly distributed over the whole area of each end. Containers of symmetrical construction only one end need be tested.

* For dry bulk containers 1CC, 1C, 1CX, 1D and 1DX (ISO1496-4, box type only), a load of **0,6 P** is to be applied

** The permissible values for permanent set shall only be applied were standard external dimensions are not exceeded.

Maximum payload (R – T) P = 31800 kg

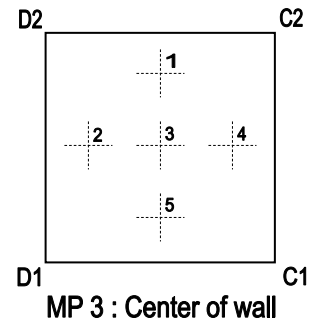
Test load 0.6 P = 19080 kg

FRONT WALL test results

Condition	1	2	3	4	5
Before test					
During proof load					
After test					
Permanent deflection					

Set measured after _____ minutes

Permissible value	Permanent deflection	7 mm **
--------------------------	----------------------	---------



Comments: Based on the stability of this wall this part was not tested and is covered by impact test.

Stamp/Signature

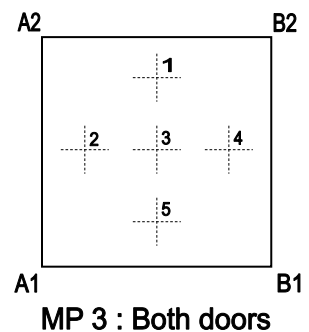
Result

REAR WALL test results

Condition	1	2	3	4	5	
Before test	79	90	71	89	60	100
During proof load	62	70	47	75	40	90
After test	75	87	65	85	55	99
Permanent deflection	4	3	6	4	5	1

Set measured after 5 minutes

Permissible value	Permanent deflection	6 mm **
--------------------------	----------------------	---------



Comments:



Stamp/Signature

passed
Result

SIDE WALL STRENGTH TEST

Test method:

An internal load of **0.6 P** shall be applied and sustained for at least 5 minutes uniformly distributed over the entire sidewall area. Containers of symmetrical construction only one side need to be tested.

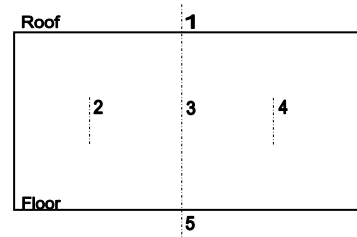
The load shall be applied in such a way to allow free deflection of the sidewall and longitudinal rails.

* The permissible values for permanent set shall only be applied were standard external dimensions are not exceeded.

** For dry bulk containers (box type only) the maximum allowable elastic deflection shall not exceed 40 mm over the plane formed by the side surfaces of the four corner fittings of each side

Maximum payload (R – T) = 31800 kg Test load 0.6 P = 19080 kg

Condition	1	2	3	4	5
Before test	97	91	108	101	88
During proof load **	50	90	57	99	88
After test	90	91	100	101	88
Permanent deflection	7	0	8	0	0



Set measured after 5 minutes

Permissible value	Permanent deflection	8 mm
--------------------------	----------------------	------

Comments:

Stamp/Signature _____

passed
Result



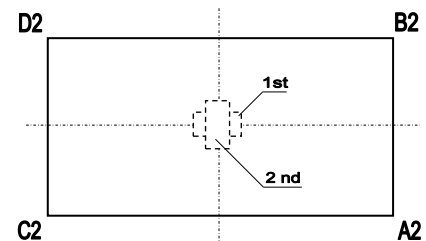
ROOF STRENGTH TEST

Test method:

A load of 300 kg shall be uniformly distributed over an area of 600 mm x 300 mm located at the centre or weakest part of the roof.

Test results

Test One	Before Test		Test Two	Before test	
	During Test			During test	
	After Test			After test	
	Permanent deflection			Permanent deflection	



Set measured after _____ minutes

Permissible value	Permanent deflection	3 mm
--------------------------	----------------------	------

Comments:

Stamp/Signature _____

Result _____

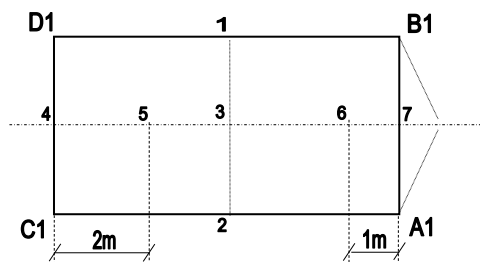
FLOOR STRENGTH TEST

Test method:

The test shall be made with the bottom corner fittings resting on level pads.

A single axle truck equipped with solid rubber tyres with an axle load of **7260 kg** (i.e. **3630 kg** on each of two wheels) shall be manoeuvred over the entire floor area of the container. The width of the wheels shall be nominally **180 mm** and the wheels vertical centre lines shall be nominally **760 mm**. Each wheel makes a contact area of not more than **142 cm²**. The width of the test load is limited to the overall width of the wheels. A minimum of 3 passes in and 3 passes out is recommended.

Test load 7260 kg



Test Results

Conditions	1	2	3	4	5	6	7
Before test	150	145	167	100	159	156	150
During test	149	144	162	100	155	152	145
After test	150	145	165	100	158	155	148
Permanent deflection	0	0	2	0	1	1	2

Permissible values	Point	Permanent deflection
	Transverse member	4 mm
	Gooseneck tunnel	5 mm

Comments:



Stamp/Signature

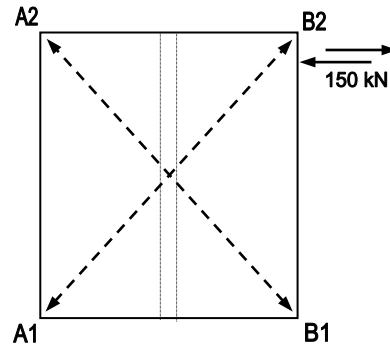
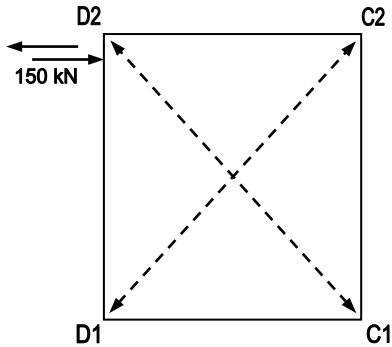
passed
Result

TRANSVERSE RACKING TEST

Test method:

The container in unladen (tare) condition shall be positioned on four level pads and be restrained against vertical movement only at the end frame being tested by anchor devices through the bottom apertures of the bottom corner fittings. Lateral restraint shall be provided only at the bottom corner fitting diagonally opposite and in the same end frame as the top corner fitting to which the force is applied.

A force of **150 kN** shall be applied to the top corner fittings on one side either separately or simultaneously to each end frame first pushing then pulling. Where the container has identical ends only one end need be tested.



Test results

Front end Frame Pushing	Condition	D ₂ C ₁	D ₁ C ₂	Deformation
	0 kN [a]	3285	3290	
	150 kN	3283	3292	
	Elastic	2	2	
	0 kN [b]	3285	3290	

Rear end Frame Pushing	Condition	A ₂ B ₁	A ₁ B ₂	Deformation
	0 kN [a]	3284	3292	
	150 kN	3266	3310	
	Elastic	18	18	
	0 kN [b]	3281	3295	

Front end Frame Pulling	Condition	D ₂ C ₁	D ₁ C ₂	Deformation
	0 kN [b]	3285	3290	
	150 kN	3287	3288	
	Elastic	2	2	
	0 kN [c]	3285	3290	
Permanent deflection [a-c]	0	0	0	

Rear end Frame Pulling	Condition	A ₂ B ₁	A ₁ B ₂	Deformation
	0 kN [b]	3281	3295	
	150 kN	3307	3270	
	Elastic	26	25	
	0 kN [c]	3286	3290	
Permanent deflection [a-c]	2	2	4	

Permissible values	Elastic	Permanent deflection
The sum of the changes in length in the two diagonals shall not exceed	60 mm	10 mm

Comments:



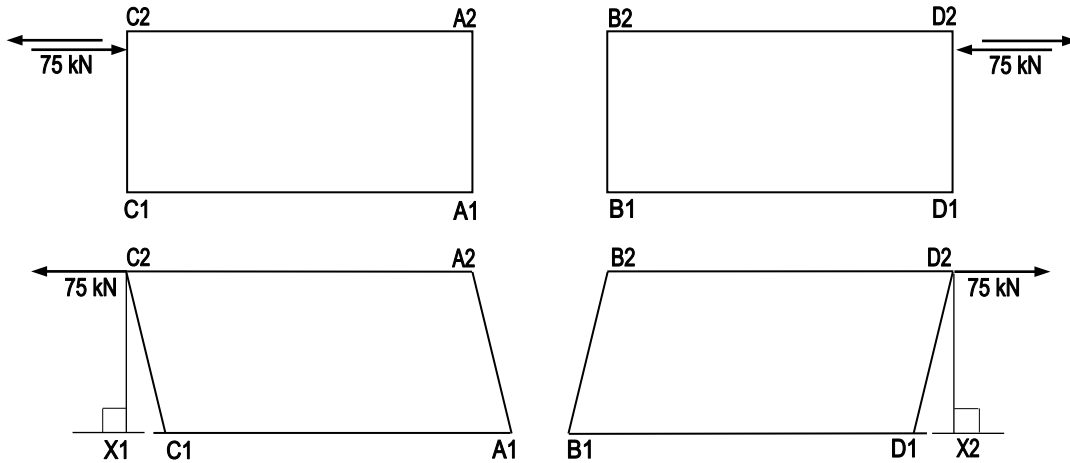
Stamp/Signature

passed
Result

LONGITUDINAL RACKING TEST

Test method:

The container in unladen (tare) condition shall be positioned on four level pads and be restrained against vertical movement by anchor devices through the bottom apertures of the bottom corner fittings. Longitudinal restraint shall be provided only at the bottom corner fitting diagonally opposite and on the same side as the top corner fitting to which the force is applied. A force of **75 kN** shall be applied to the top corner fitting on one end either separately or simultaneously to each side of the container first pushing then pulling. Where the container has identical sides only one side need be tested.



Test results

Pushing At side C ₂ A ₂ C ₁ A ₁	Condition	X ₁ C ₁	Deformation
	0 kN [a]	5,0	
	75 kN	5,1	
	Elastic	0,1	
	0 kN [b]	5,0	

Pushing At side B ₂ D ₂ B ₁ D ₁	Condition	D ₁ X ₂	Deformation
	0 kN [a]		
	75 kN		
	Elastic		
	0 kN [b]		

Pulling At side C ₂ A ₂ C ₁ A ₁	Condition	X ₁ C ₁	Deformation
	0 kN [b]	5,0	
	75 kN	4,9	
	Elastic	0,1	
	0 kN [c]	5,0	
Permanent deflection [a-c]	0		

Pulling At side B ₂ D ₂ B ₁ D ₁	Condition	D ₁ X ₂	Deformation
	0 kN [b]		
	75 kN		
	Elastic		
	0 kN [c]		
Permanent deflection [a-c]			

Permissible values	Elastic	Permanent deflection		
		20'	30'	40'
At points (X ₁ C ₁) - (D ₁ X ₂) deformation shall not exceed	25 mm	6 mm	8 mm	9 mm

Comments:



Stamp/Signature

passed
Result

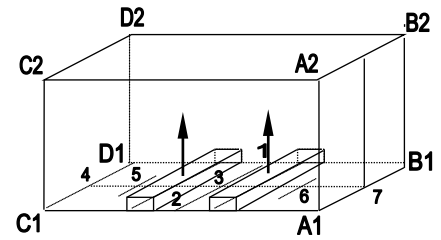
LIFTING BY FORKLIFT POCKETS

Test method:

The container under test shall be evenly loaded to **1.6 R - T**, and shall be supported on two horizontal bars, each 200 mm wide, projecting 1828±3 mm into the fork pocket, measured from the outside face of the container sidewall. The bars shall be placed centrally in the pockets. The container shall be supported for 5 minutes freely suspended on these bars.

Test Results

Condition	1	2	3	4	5	6	7
Before Test	129	125	57	70	55	55	65
During Test	131	127	----	71	----	----	67
After Test	129	125	55	70	54	55	65
Permanent deflection	0	0	2	0	1	0	0
Permissible values	Point		Permanent deflection				
	Transverse member		3 mm				
	B.S.R.		3 mm				



Comments:

Stamp/Signature

passed
Result



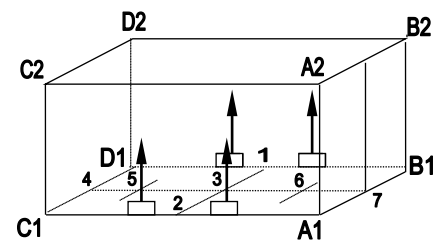
LIFTING AT THE GRAPPLER ARM POSITIONS

Test method:

The container under test shall be evenly loaded to **1.25 R - T**. It shall be supported at the four positions where provision has been made for the grapple arms or similar devices. Each of the support surfaces shall measure 32 mm x 254 mm and be located clear of the safety lip. The container shall be supported for 5 minutes.

Test Results

Condition	1	2	3	4	5	6	7
Before Test							
During Test							
After Test							
Permanent deflection							
Permissible values	Point		Permanent deflection				
	Transverse member		3 mm				
	B.S.R.		3 mm				



Comments:

Stamp/Signature

Result

WEATHERPROOFNESS TEST

Test method:

On completion of all tests, the container shall be passed through the factory water test station and shall be free from water penetration.

A stream of water shall be applied to all exterior joints and seams of the freight container from a nozzle of 12.5 mm (0.5 in) inside diameter, at a pressure of 1 bar. The nozzle shall be held at a distance of 1500mm (5 feet) away from the container under test.

After a duration of 15 minutes, the container shall be free from penetration by water.

In case of transverse stiffness test (cf. page 10) spray-water tightness for door sealing is required with 75 kN test load.

Notes: other methods, if proved to be equally effective, are allowed.

Comments:

Stamp/Signature

Result

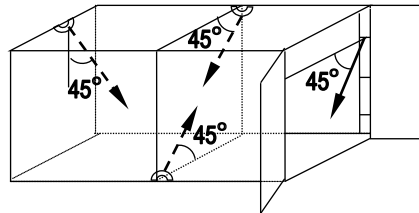
CARGO SECURING SYSTEM TEST

Test method:

To be carried out at owner's request

A tensile force equal to 1.5 times the rated load shall be applied, at an angle of about 45 degrees to the horizontal and maintained for at least 5 minutes using a hook or shackle having a maximum diameter of 20 mm.

On completion of the test, neither the cargo-securing devices, not their attachments to the container structure, nor the container structure itself shall show any permanent deformation or abnormality which will render it unsuitable for continuous service at full rated load.



Test results

Position & Type	Rated Load kg	Safety factor (1.5)	Test Load kg	Remarks
Bottom lashing ring				
Top lashing ring				
Front corner post bar				
Rear corner post bar				

Comments:

Stamp/Signature

Result

“ONE DOOR OFF” TEST

Test method:

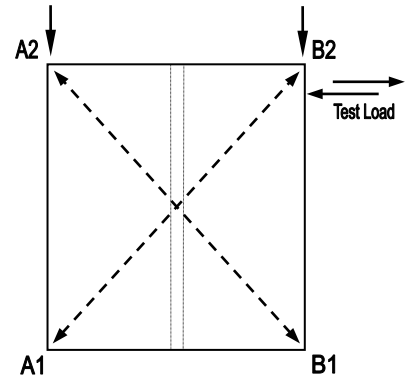
To be carried out at owner's request

1. The container shall be positioned on four level pads, evenly loaded with weights equal to **1.8R – T** then a stacking load applied of **72,000 kg** or as per owner specification requirement.
2. Still with internal load an independent racking test load applied of **75 kN** or as per owner specification requirement.
3. If required by owner end wall strength test @ **0.2 P**

Note! Test procedure and permissible values as per ISO 1496 and DEKRA requirements.

1. STACKING Test load: kg/post

Condition	Corner post deflections A ₁ A ₂ , B ₁ B ₂				Change in Length	
	a	b	c	d	A ₁ A ₂ ,	B ₁ B ₂ ,
Before						
1 st Test						
After						
2 nd Test						
After						
Set						



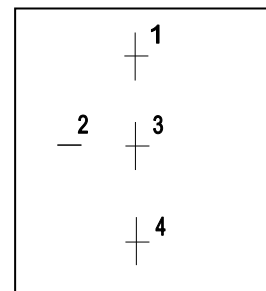
2. RACKING Test load kg

Pushing	Condition	A ₂ B ₁	A ₁ B ₂	Deformation
	0a			
	Pushing			
	Elastic			
	0			
	Set			

Pulling	Condition	A ₂ B ₁	A ₁ B ₂	Deformation
	0			
	Pulling			
	Elastic			
	0b			
	Permanent set (0a – 0b)			

3. REAR END WALL STRENGTH TEST (Optional, by owner's request)

Load	1	2	3	4
0				
0.2 P				
0				
Permanent Set				



Comments:

Stamp/Signature

Result