



TTCI is a subsidiary of the Association of American Railroads

IMPACT TEST REPORT

TY-GARD DS™ Securement System for 80 - 55 Gallon Steel Drums in a 20' Container – Walnut Industries

**NOTE: THIS TEST REPORT DOES NOT CONSTITUTE APPROVAL OR
DISAPPROVAL OF THE EQUIPMENT, METHOD OR MATERIAL TESTED**

TEST REPORT: FI 06-18

Test Date: April 6, 2018

Report by:

**Miles Benitez
Damage Prevention Specialist
Damage Prevention and Loading Services
AAR/TTCI
55500 DOT Road
Pueblo, CO 81001**



REPORT OF IMPACT TEST FI 06-18

April 6, 2018

SUBJECT: **TY-GARD DS™ Securement System for 80-55 Gallon Steel Drums in a 20' Container – Walnut Industries**

SYNOPSIS: An impact was conducted to evaluate TY-GARD DS™, a 24-inch wide flexible band reinforced with industrial strength fibers, to secure 80 steel drums in a 20' ISO container. The securement method performed as intended.

BACKGROUND: Mr. Matthew Bullock, Walnut Industries, requested an impact test be conducted to evaluate the performance of their TY-GARD DS™ securement system to secure 80-55 gallon drums in 20' long ISO type containers.

A similar method was tested, approved and published as Method B-3 in the Intermodal Loading Guide. Walnut Industries took the same count of fibers from the 32 inches total of Ty-Gard used originally and compressed it into 24 inches, to allow the user to use 1 strip instead of 2 and get the same result.

Testing was conducted the week of April 6, 2018 at the Transportation Technology Center, Pueblo, Colorado.

In attendance during testing were:

Mr. Matthew Bullock, Walnut Industries
Mr. Mike Yenkochic, Walnut Industries
Mr. RJ Wachter, Walnut Industries
Mr. Miles Benitez, AAR/TTCI
Mr. Rama Maram, AAR/TTCI

LOAD DESCRIPTION: The test load was prepared in container ACCU 206538, a standard 20 foot long ISO container. The load consisted of 80 - 55 gallon drums filled with water in a modified 4-3-4 load configuration for 2 layers, see Illustration 1.

The drums were separated with ½ inch OSB board. The first 25 drums on top and bottom were secured in place with one 24 inch strip of Ty-Gard DS and a ¾ inch piece of plywood that covered the 2 middle drums, see Photo 1. The remaining 15 drums on top and bottom were secured in place with one strip of TY-Gard DS and a ¾ inch piece of plywood that covered the front face of the drums, see Photo 2. The Ty-Gard had a 7 ft. long double faced adhesive to secure to the sidewalls, and conformed to the corrugation contours. The Ty-Gard barriers were tensioned using tools specifically designed for this purpose and secured with a 7 ft. long piece of Ty-Patch DS. No drum protectors were used.

20' CONTAINER : 80 DRUMS : **TY-GARD DS**® SECUREMENT METHOD

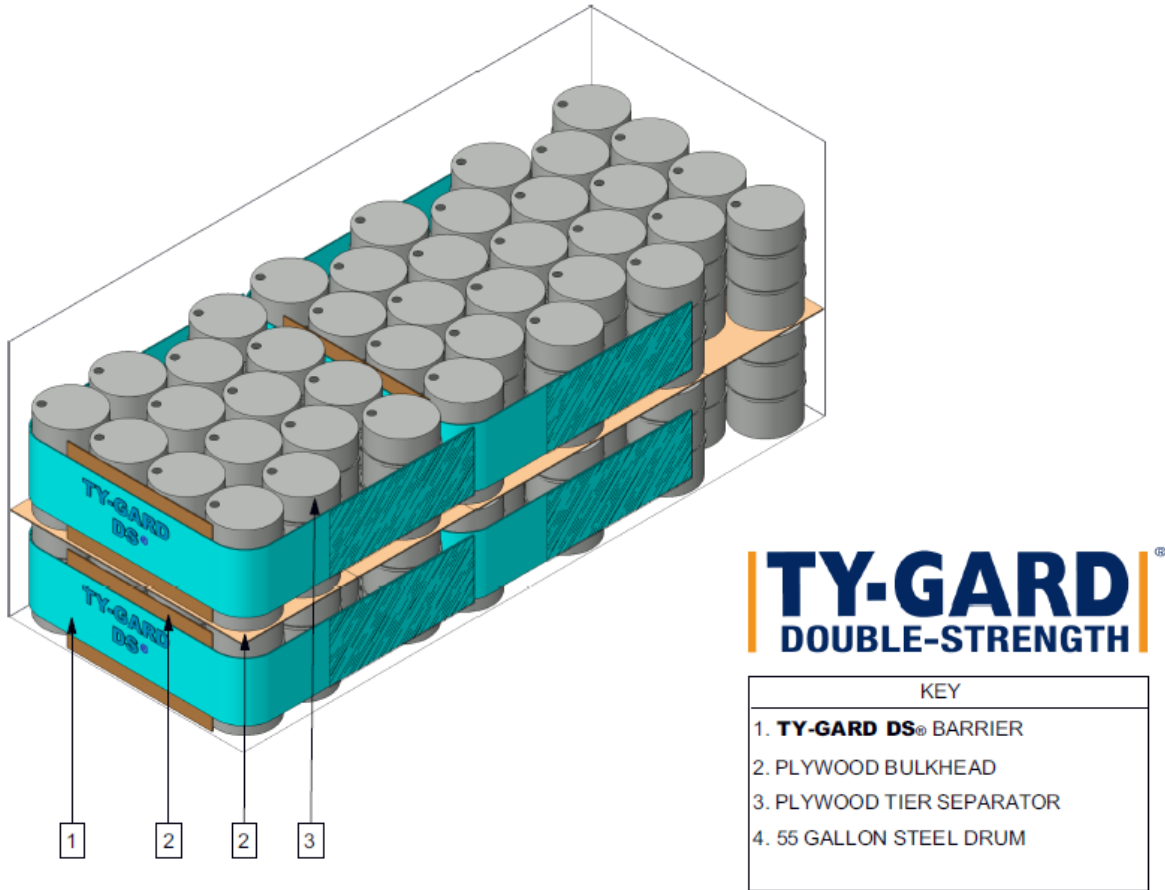


Illustration 1



Photo 1: First 50 drums secured with 24 inch Ty-Gard DS, and $\frac{3}{4}$ inch plywood.

The remaining 30 drums were again loaded in 2 layers and secured with one strip of 24 inch Ty-Gard DS per layer. See photo No. 2.



Photo 2: Doorway area showing the rear section of the load secured with Ty-Gard DS, and $\frac{3}{4}$ inch plywood.

TEST PARAMETERS: The test car was flat switched into a string of 4 empty railcars. The anvil string consisted of four empty cars, DRGW 60932 (80,500 lbs), DRGW 60971 (81,100 lbs), CR 433432 (49,600 lbs) and MP 252623 (57,900 lbs) for a combined weight of approximately 269,100 lbs.

A hand held RailMaster Radar Gun Model CR-1k was used for the speed measurement.

RESULTS: The following table shows measurements of the load to the container doors before and after each impact.

	<i>Right Side (in.)</i>	<i>Right Side Middle (in.)</i>	<i>Left Side Middle (in.)</i>	<i>Left Side (in.)</i>
Start				
Top Layer	7	6 1/2	6 1/2	7 1/2
Bottom Layer	4	3 3/4	3 7/8	4 3/4
1st Impact at 4.0 mph towards the doors:				
Top Layer	6 3/4	6	6 1/4	7 1/8
Bottom Layer	4	3 1/2	3 3/4	4 3/4
2nd Impact at 6.0 mph towards the doors:				
Top Layer	4 7/8	3	3 1/2	6 1/2
Bottom Layer	3	1 1/2	2	3 3/4
3rd Impact at 6.1 mph towards the doors:				
Top Layer	4	2 1/4	3	6
Bottom Layer	2 1/2	3/4	1 1/2	3 1/4
4th Impact at 5.9 mph towards the nose:				
Top Layer	10 1/2	8 1/4	9	11 3/4
Bottom Layer	5 1/2	4 1/8	4 7/8	6 1/4

The greatest movement towards the doors resulting from the first 3 impacts was 4 1/4 inches measured on the right side middle drum of the top layer.

CONCLUSION: The securement method performed as intended. The load had very minimal movement and no damage to the drums.

TTCI would like to thank Walnut Industries for conducting this test.

Miles Benitez
 Damage Prevention Specialist
 Damage Prevention and Loading Services