

# Nonmetallic Strap Substitution for Steel Strap as Doorway Protection in Boxcars

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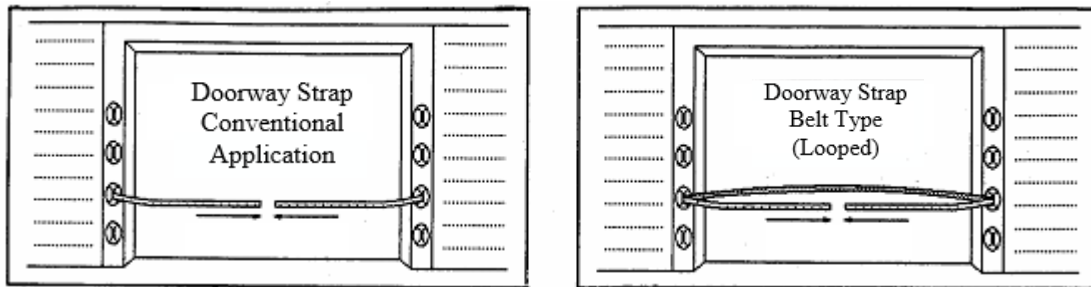
## Product Performance Profile For Boxcar

### Doorway Protection

Sliding doors on boxcars must be protected from outward pressure which may be caused by lateral load movement of unsecured loads. While the forces generated by freight can be highly variable and difficult to quantify, experience has yielded a number of means found to be suitable in preventing freight contact with the car doors.

In laboratory testing, one 1 ¼ in. x 0.029 in. high tension steel strap was found to consistently provide 825 lbs. force resistance to outward movement when tensioned across a standard 10-foot-wide door opening. This then provides the benchmark by which other types of doorway protection can be compared.

Doorway protection straps may be applied to rail cars by one of two common methods. A conventional strapping application utilizes 2 straps, secured to opposite doorpost anchors and brought together across the doorway, tensioned and sealed. In a belt type (looped) application, one strap is threaded through opposite doorpost anchors with the free ends being brought together across the doorway, tensioned, and sealed.



**Figure 1**

#### Convention versus Belt Type Doorway Strap Application

Typically, boxcar doorposts are 5 in. in depth. Thus, doorway protection must limit lateral load movement to less than 5 in. to be effective.



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## Verified Nonmetallic Strapping Products by Manufacturer

The following Type 1A nonmetallic straps have completed testing and are found acceptable for use as a substitute for 1 ¼ in. x 0.029 in. steel strap as doorway protection in boxcar applications using the following substitution requirements:

Company Name	Strap Size and Designation	Application	Substitution Rate
Avistrap	Grade 5, PW 120EH with wire buckle	Belt Type (Looped)	3 straps for each steel strap
Caristrap International Inc.	Grade 4, 105WGSD with wire buckle	Conventional	4 straps for each steel strap
Caristrap International Inc.	Grade 4, 105WGSD with wire buckle	Belt Type (Looped)	3 straps for each steel strap
Caristrap International Inc.	Grade 6, Carilash AG40 with ladder buckle	Belt Type (Looped)	2 straps for each steel strap
Caristrap International Inc.	Grade 7, Carilash AG50 with ladder buckle	Belt Type (Looped)	2 straps for each steel strap
Carolina Strapping and Buckles Company	Grade 4, CS-2040 with wire buckle CS9035	Belt Type (Looped)	3 straps for each steel strap
Carolina Strapping and Buckles Company	Grade 4, MakoStrap 5080 with wire buckle	Belt Type (Looped)	3 straps for each steel strap
Carolina Strapping and Buckles Company	Grade 5, CS-2055 with ladder buckle CS9090	Belt Type (Looped)	2 straps for each steel strap
Complete Packaging Systems, Inc.	Grade 4, CPS105 with ladder buckle HDB10C	Belt Type (Looped)	3 straps for each steel strap
Complete Packaging Systems, Inc.	Grade 5, CPS125 with ladder buckle HDB12C	Belt Type (Looped)	2 straps for each steel strap
Cordstrap USA Inc.	Grade 4, CC105 with wire buckle	Belt Type (Looped)	3 straps for each steel strap
Polychem/ R.C./ Boss Packaging Systems	Grade 4, RC 105 with wire buckle	Belt Type (Looped)	3 straps for each steel strap
Pacific Strapping Inc.	Grade 5, P-125W-AAR with ladder buckle B-125L-AAR	Belt Type (Looped)	2 straps for each steel strap
Southern Bracing Systems	Grade 4, TY2AW 105 with wire buckle	Belt Type (Looped)	3 straps for each steel strap
Southern Bracing Systems	Grade 5, SBS-125 strap with ladder buckle SBSLB-32DW	Belt Type (Looped)	2 straps for each steel strap
Tapex American Corporation	Grade 5, 125WXH with ladder buckle FCT-12	Belt Type (Looped)	2 straps for each steel strap

Notes: The application of nonmetallic straps as a substitute for 1 ¼ in. x 0.029 in. steel strap is restricted to a maximum of 12-foot-wide door opening.

All straps approved for a 3 to 1 substitution utilize a wire buckle; all straps approved for a 2 to 1 substitution utilize ladder buckles.

Belt-type application of doorway protection for the loading doorway may use 2 buckles.

