

# Personal energy absorbers and lanyards:

how upcoming changes on February 1, 2020 to CSA Standard Z259.11-17 affect you and your workers

Jobs change. Technology improves. Equipment evolves. All of these developments lead to changes in standards.

The CSA Group, one of the largest standards development organizations in North America and a leader in safety certification in Canada and the US, released updated standards in 2017 for personal energy absorbers and lanyards. Standard Z259.11-17 still focuses on industrial and commercial products for fall arrest, but has revisions from the previous version, published in 2005.

**What's changing and how do these changes affect workers?**

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## Updates to instructions for use

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The most important updates for users of fall protection equipment and their employers are in the instructions for use (section 7 in the 2017 standard). In addition to the information found in the previous standard, the updated standard includes new information on the selection, use and lifespan of fall protection gear, especially energy-absorbing lanyards and horizontal lifelines.

Manufacturers will now be required to include a table, chart or graphic in equipment manuals illustrating the use of energy absorbers based on the user's weight and free-fall distance; this illustration will specify the complete range of weights and distances permitted for the device (N.B. the free-fall distance is defined as the vertical distance travelled by a worker or test mass from the start of a free fall to the initiation of an arresting force).



These factors will be of paramount importance for selecting the correct products for the job. In addition to physical job requirements, the user will also have to consider weight and free-fall distance when selecting lanyard length, and factor them into the clearance requirements. It will be crucial for manufacturers to create user instructions and images that are clear and easy to understand.

Manufacturers must include a published value for maximum deployment ( $X_{max}$ ) and average arrest force ( $F_{avg}$ ). Parameters for these values are in the standard. The labels for energy absorbers must have performance factor data (discussed below).

Manufacturers will now be required to make end-of-service recommendations for their equipment.

The 2017 standard also includes updates to the design requirements for energy absorbers and lanyards.



## Energy absorber design and performance

Energy absorber performance (also referred to as “P factor”) is now calculated using the following factors:

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|--|--|---|---|
|  | <b>1</b> User's mass, which is based on a range of masses determined by the manufacturer |   | <b>3</b> An average deceleration of more than or equal to 2.3 g and less than or equal to 7 g |
|  | <b>2</b> Maximum deceleration of 10 g, where $g=9.81 \text{ m/s}^2$                      |  | <b>4</b> A range of 8-10 g for a total period of less than 0.1 s                              |

Minimum breaking strength has been reduced to 16 kN (3600 lbf) when tested per the standard. This new calculation significantly changes how an energy absorber can be tested and used. In the previous standard, the mass free fall was based on a maximum user mass. In the updated standard, the energy absorber's use is based on the user mass and the free-fall distance. The test mass is now constructed to meet the maximum-rated capacity of the energy absorber, and the upper range of testing temperature has been increased to 45°C.





The goal is to minimize users' potential risk, by exposing them to a tolerable force load for a very short time. This will help ensure that users of different masses will experience similar deceleration, ensuring a consistently lower exposure to peak forces over a shorter time. This is especially important for lighter users.

The new standard also covers additional scenarios including factor-2 falls, and tying off at the feet. This means that selecting lanyards with energy absorbers will be more complicated because free-fall distance and worker masses will be variable. Further complicating the issue, it will be users' responsibility to correctly select products suited to their mass and application.

Because of the P factor, energy absorbers will be marked with additional data to help ensure you make the correct product selection. This additional information will include:

- ① Warning to users to read and understand the instructions before use
- ② Maximum deployment  $X_{\max}$  (based on test data)
- ③ Maximum deployment factor  $D_m$  (based on tests in Section 6.1.2.3. of the standard)
- ④ Permitted user mass range

You can refer to manufacturers' data to determine the P factor for that item at free-fall range. Once the user mass is factored in, you will know if the product will safely arrest a fall. Users will still have to perform clearance calculations, but the P factor will allow the repurposing of many energy absorbers.



# Lanyard design and classification

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In the 2017 standard, lanyard classifications now include a new class named Class Y, bringing the total number of lanyard classes to seven. Class Y includes lanyards that are also often referred to as 100% tie-off lanyards or two-legged lanyards.

The Class Y lanyard has three connectors—two Class 1 connectors to the anchorage and one class connector or soft loop at the body—and, per the Standard, has an energy absorber. This update could cause an issue when a user integrates a Y-lanyard without an energy absorber into a harness equipped with an energy absorber attached to the dorsal D-ring on the harness.

Other changes to lanyard classification include the requirement that Class C—wire rope lanyards—have a clear covering on mechanical sleeves to allow for more accurate inspection. Class D lanyards are now better defined as lineman's pole straps.

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