

Why Crash Buffers?

As per the latest RID regulations, wagons transporting dangerous goods that are already in exploitation must be able to absorb at least 500 kJ per wagon end; while newly built wagons must be equipped to absorb no less than 800 kJ per wagon end. The purpose of these measures is to ensure adequate protection to accidental impacts at speeds over 12 km/h. To meet these regulations, existing wagons are fitted with crash buffers min. 250 kJ, and new wagons carry crash buffers min. 400 kJ.

Most wagons – over 90% - are currently fitted with standard 30 kJ A category buffers. Based on our extensive experience, we believe all wagons should be protected at accidental impacts at speeds over 12 km/h, and not just the ones transporting dangerous goods. Current prices for crash buffers, however, discourage wagon owners from utilizing crash buffers unless RID specifically requires to do so – which is the very issue addressed by INNOVA's revolutionary A^{plus} Crash Buffers.

The INNOVA A Category buffer (code IST-01.00.00), in its A^{plus} constructive variant, provides a cost-efficient solution to the dilemma whether all wagons should be upgraded to crash buffers.

The INNOVA A^{plus} Crash Buffer 150 kJ

INNOVA's A^{plus} buffer, developed by INNOVA Systems & Technologies and manufactured by AZOMA, has a storage capacity for mechanical work in excess of 150 kJ in dynamic regime: this translates to 5 times more than a standard A category buffer, and twice as much as a C category buffer. Live impact tests have, in fact, recorded **over 170 kJ** energy absorption per buffer.

The price of an A^{plus} buffer is, however, comparable to that of the standard A category.

The INNOVA A^{plus} buffer fully complies with all conditions imposed to A category buffers (UIC leaflets 526-1 ed. 3/2008, UIC 573 ed. 7/2007, and EN15551:2009). Since it has a plastic deformation element, testing with force F1 is not relevant or applicable (see EN15551:2009, pt. 5.4 and Annex B; UIC 526-1 ed. 3 pt. 3 and annex D and E).

The buffer is executed in a welded construction, with a removable plate.

Its standard variant includes a plate of steel type S355J2+N EN10025-2:2004, 450 mm in length. Upon request, the following extras are available:

- additional manganese steel wearing plate;
- extra long buffer plate, 550 mm.

The INNOVA A^{plus} crash buffers 150 kJ are equipped with A cat. thermoplastic shock absorbers (i.e. MINER TecsPak), or butyl shock absorbers (i.e. Spencer Moulton).

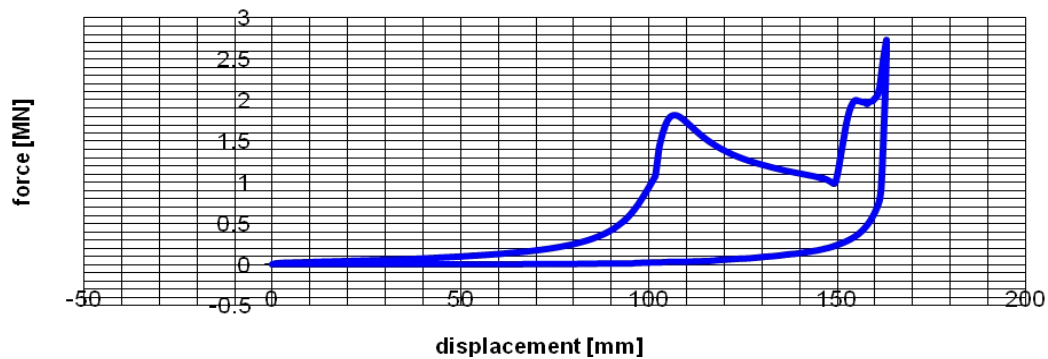
The buffer deformation comprises two phases:

- elastic deformation, observed at impact speeds under 12 km/h and forces not exceeding 1.5 MN;
- elastic + plastic deformation occurring at speeds exceeding 12 km/h and forces over 1.5 MN.

Drawing 1 illustrates an A^{plus} crash buffer in its initial state. Drawing 2 illustrates an A^{plus} crash buffer following elastic and plastic deformation. Drawing 3 illustrates a close-up of an A^{plus} crash buffer's plastic deformation zone.



Drawing 4 represents the typical static diagram recorded through elastic + plastic deformation of the buffer.



Drawing 4