

REACT 350® (60"/96"/120")
GENERAL SPECIFICATIONS

I. GENERAL

All REACT 350® (60"/96"/120")¹ (Reusable Energy Absorbing Crash Terminal 350) shall be produced by Energy Absorption Systems, Inc., of Chicago, Illinois.

II. DESCRIPTION OF SYSTEM

A. General

REACT 350 refers to a family of reusable crash cushions made up from arrays of cylinders that have the ability to recover a major portion of their shape, position, and capabilities after being impacted. Transitions are available and may be required depending on the site conditions.

The REACT 350 (60"/96"/120") for Test Level 3 (TL-3) conditions, as specified in NCHRP 350, is a 27/29/29² cylinder, 14/15/15³ row, redirective non-gating crash terminal. The system incorporates HMW/HDPE or "smart plastic" cylinders as the main energy absorbers, internal struts for lateral redirective performance, space frame diaphragms, and a single monorail.

B. Component Description

1. The cylinders shall be made of high molecular weight, high-density polyethylene (HMW/HDPE). Cylinders shall be nominally 610 mm [24"] in outside diameter except at the nose of the system. The nose cylinders shall be nominally 610 mm [24"] or 914 mm [36"] in outside diameter depending on the width of the system. Two distinct cylinder heights (813 mm [32"] and 1016 mm [40"]) are used. The wall thickness of the cylinders may vary from 19 mm [.738"] to 29 mm [1.14"]. Cylinder color shall be black.
2. The system is comprised of 27/29/29 cylinders. The cylinders are arranged in rows in which each row contains a single pair of cylinders. The exception is the nose cylinder, which is placed centrally at the front of the unit.

¹ The terminology 60"/96"/120" refers to nominal system widths of REACT systems contained within this specification.

² Referencing the total number of cylinders per system with respect to the specified system widths.

³ Referencing the total number of rows per system with respect to the specified system widths.

3. Cylinders may include “wheel deflectors” attached to the outboard sides. The wheel deflectors each include a flexible metallic sheet with a stiff plate attached on one side. The wheel deflectors are attached directly to the cylinders.
4. Cylinders may contain internal struts. The struts are a vertical steel framework and are fastened to the cylinder by means of a self-restoring HDPE hinge.
5. Space-frame diaphragms support the pairs of cylinders in each row.
6. A single monorail captures the diaphragms, provides lateral strength, and guides the system longitudinally during system stroke.
7. A mechanical “*trigger mechanism*” at the front of the system provides a predetermined positive fastening location for resetting the system after an impact.
8. The backup shall be a single concrete block or a steel back up as specified for use with this system.

C. Material Specifications

1. Metal work shall be fabricated from either M1020 Merchant Quality or ASTM A-36 steel. After fabrication, metal work shall be galvanized in accordance with ASTM A-123. All welding shall be done by or under the direction of a certified welder.
2. The system shall be assembled with galvanized fasteners. All bolts, nuts, and washers shall be Commercial Quality “American National Standard” unless otherwise specified.

III. TEST CRITERIA

- A. The REACT 350 (60”/96”/120”) with 27/29/29 cylinders and 14/15/15 rows are capable of passing the NCHRP 350 TL-3 tests with both the light car and pickup truck at speeds up to 100 km/h (62 mph) at angles up to 20 degrees. NCHRP 350 TL-3 specifies the following evaluation criteria:

NCHRP 350 Evaluation Criteria

1. For head-on impacts into the nose, a crash cushion should be capable of meeting the Occupant Risk Criteria as recommended in NCHRP 350. For vehicles weighing between 820 and 2000 kg [1810 and 4410 lbs.], the theoretical impact velocity of a hypothetical front seat passenger against the vehicle’s interior (calculated from vehicle acceleration and 610mm [24”]

forward displacement) should be less than 12 m/s [39.4 ft/sec]. The vehicle's highest 10-millisecond average acceleration subsequent to the instant of the hypothetical passenger impact should be less than 20 G's.

2. At angles up to 20 degrees, a crash cushion should be capable of redirecting 2000 kg [4,410 lb.] vehicles that impact the sides of the system at speeds up to 100 km/h [62 mph]. This criteria is for both right-way and wrong-way impacts (angles measured from system's longitudinal centerline) assuming appropriate transition hardware is properly installed. At angles up to 15 degrees, a crash cushion should be capable of redirecting 820 kg [1,810 lb.] vehicles that impact the sides of the system at speeds up to 100 km/h [62 mph].
 3. A crash cushion should be designed and constructed so no solid debris is present from the system that can create a hazard on the roadway after either head-on or side angle design impacts.
- B. Impact conditions that differ from those described in the NCHRP 350 test matrix for non-gating, redirective crash cushions may result in different crash results than those encountered in testing. Furthermore, impacts in excess of TL-3 impact severity or the existence of unusual impact conditions such as vehicle instability resulting from traversing curbs of excessive cross slopes prior to impact may compromise crash performance. Under these conditions, performance criteria relative to structural adequacy, occupant risk and vehicle trajectory may not meet NCHRP 350 evaluation criteria.

V. **DESIGN AND SELECTION CRITERIA**

- A. Design, selection and placement of crash cushions shall conform to The American Association of State and Highway and Transportation Officials (AASHTO) Publication, "Roadside Design Guide" 1996.
- B. Installation of the REACT 350 shall be accomplished in accordance with the recommendations of Energy Absorption Systems, Inc.