U.S. Department of Transportation
Federal Highway Administration

August 30, 2024

1200 New Jersey Ave., SE
Washington, D.C. 20590

In Reply Refer To:
HSST-1/B-387

Mathias Redlberger
REBLOC
Ziegelofen-Straβe 736
3571 Gars am Kamp
Austria

Dear Mr. Redlberger:

We received your initial correspondence on February 23, 2022 requesting issuance of a Federal-aid reimbursement eligibility letter under the Federal-aid highway program for the roadside safety system, device, design, product, or hardware (collectively "device") described below. On July 29, 2024, we received a complete set of files that addressed our comments and enabled us to complete the review. We write to inform you that the device REBLOC 80SAH_12 is eligible for Federal-aid reimbursement. This letter is assigned Federal Highway Administration (FHWA) control number B-387.

## ELIGIBILITY LETTERS

The FHWA issues Federal-aid reimbursement eligibility letters for new roadside safety devices that are crash tested in accordance with the industry standard of the American Association of State Highway and Transportation Officials (AASHTO) Manual for Assessing Safety Hardware (MASH).

FHWA, the Department of Transportation, and the United States (government) do not regulate roadside safety devices, crash test facilities, or the manufacturing industry. Issuance of eligibility letters is discretionary and provided only as a service to the states. FHWA may, at its discretion, decline to issue, revise, or rescind an eligibility letter. Eligibility letters are only issued by the FHWA headquarters Office of Safety.

Eligibility letters are issued only as notice to the states that a device is eligible for reimbursement under the Federal-aid highway program. They do not establish approval or certification for any other purpose. Issuance of an eligibility letter is not a prerequisite or requirement for state transportation agencies seeking to use Federal-aid funds for roadside safety devices. State agencies may use a device for which an eligibility letter has not been issued and seek Federal-aid reimbursement.

## FEDERAL-AID REIMBURSEMENT

The request for issuance of this letter certified the device was crash tested in accordance with the industry standard of AASHTO's MASH. This eligibility letter is based on that certification and

the material offered in support of its issuance. The device described below is eligible for reimbursement under the Federal-aid highway program.

Name of system: REBLOC 80SAH_12
Type of system: Barrier
Test Level: Test Level 4
Testing conducted by: Crashtest-service.com GmbH
Date of request: February 23, 2022

Information about the device, including material such as the eligibility request, crash test reports, drawings, or images are included in one or more attachment(s) to this letter.

Eligibility letter B-387 is inapplicable to devices, optional equipment, alternate materials, or other features that were not crash tested in accordance with AASHTO's MASH.

This letter is issued only for the subject device as crash tested under AASHTO's MASH. Later modification(s) of the device are not eligible for Federal-aid reimbursement under this letter. Notice of later modification(s) should be given to transportation agencies, facility owners, and operators (collectively "agencies").

Agencies should be provided appropriate information about the device's design, installation, maintenance, materials, and mechanical properties.

Issuance of this letter is discretionary, and it may be revised or rescinded at FHWA's discretion. This letter is not a determination of compliance with the Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) or ownership of any intellectual property rights.

This eligibility letter is not a determination by the government that a crash involving the subject device will result in any particular outcome. It is limited to only the device's eligibility for Federal-aid reimbursement.

## INTELLECTUAL PROPERTY

Issuance of this eligibility letter does not convey property rights of any sort nor any exclusive privilege. This letter is not authorization or consent by the government for the use, manufacture, or sale of any patented or proprietary system, device, design, product, or hardware for which the requester is not the patent owner. Eligibility letters are not an expression of any view, position, or determination by the government as to the validity, scope, or ownership of any intellectual property rights to a specific device. These letters do not grant, impute, suggest, or otherwise establish any ownership, distribution, or licensing rights to the requester. The government expresses no opinion about the intellectual property rights relating to any device for which this or any other eligibility letter is issued.

**PUBLIC DISCLOSURE**

To prevent any misunderstanding, and as discussed above, this Federal-aid eligibility letter is assigned FHWA control number B-387. It should only be reproduced in full with its attachment(s). This Federal-aid eligibility letter and the material offered by the requester supporting its issuance is public information. All eligibility letters and supporting material are subject to public disclosure under the Freedom of Information Act (FOIA). Eligibility letters are available to the public at https://safety.fhwa.dot.gov/roadway_dept/countermeasures/reduce_crash_severity/.

If you have any questions please contact Aimee Zhang at Aimee.Zhang@dot.gov.

Sincerely,

Amy S. Fox
Acting Director
Office of Safety Technologies
Office of Safety

Enclosures

# Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

| | | | |
|---|---|---|---|
| Submitter | Date of Request: | February 23,2022 | ◉ New ○ Resubmission |
| | Name: | Mathias Redlberger | |
| | Company: | REBLOC | |
| | Address: | Ziegelofen-Straße 736, 3571 Gars am Kamp | |
| | Country: | Austria | |
| | To: | Michael S. Griffith, Director<br>FHWA, Office of Safety Technologies | |

I request the following devices be considered eligible for reimbursement under the Federal-aid highway program.

**Device & Testing Criterion -** Enter from right to left starting with Test Level

! - ! - !

| System Type | Submission Type | Device Name / Variant | Testing Criterion | Test Level |
|---|---|---|---|---|
| 'B': Rigid/Semi-Rigid Barriers (Roadside, Median, Bridge Railings) | ◉ Physical Crash Testing<br>○ Engineering Analysis | REBLOC 80SAH_12 | AASHTO MASH | TL4 |

By submitting this request for review and evaluation by the Federal Highway Administration, I certify that the product(s) was (were) tested in conformity with the AASHTO Manual for Assessing Safety Hardware and that the evaluation results meet the appropriate evaluation criteria in the MASH.

**Individual or Organization responsible for the product:**

| | | |
|---|---|---|
| Contact Name: | Mathias Redlberger | Same as Submitter ☒ |
| Company Name: | REBLOC | Same as Submitter ☒ |
| Address: | Ziegelofen-Straße 736, 3571 Gars am Kamp | Same as Submitter ☒ |
| Country: | Austria | Same as Submitter ☒ |
| Enter below all disclosures of financial interests as required by the FHWA `Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices' document. | | |
| Crashtest-service.com GmbH (CTS) was contracted by REBLOC GmbH to perform full-scale testing of the REBLOC 80SAH_12 barrier. There are no shared financial interests in the REBLOC 80SAH_12 barrier by CTS, or between REBLOC GmbH and CTS, other than costs involved in the actual crash tests and reports for this submission to FHWA. | | |

# PRODUCT DESCRIPTION

(●) New Hardware or Significant Modification ( ) Modification to Existing Hardware

The vehicle restraint system with the system name REBLOC 80SAH_12 consists of factory produced precast elements. Each element is 12.0m (472.4 in) long, 0.3m (11.8 in) wide and 0.8m (31.5 in) high. The precast concrete elements have a cross section similar to an I-beam profile.

The safety barriers are free standing. There is no anchorage to the ground, only the two terminal elements have to be anchored to the asphalt surface by using anchor bolts.

The restraint function is achieved by connecting the individual elements to form a continuous chain. The connection between the elements is by the integrated tension bars, whose couplings, situated on the face side of each element, interlock. Steel shoes which are an integrated part of the element, have mating projections and indentations that form a double tongue/groove system. The concrete barriers stand on four support feet with integrated elastomer pads on the underside. Situated at the top side of each element there are two galvanised lifting anchors.

# CRASH TESTING

By signature below, the Engineer affiliated with the testing laboratory, agrees in support of this submission that all of the critical and relevant crash tests for this device listed above were conducted to meet the MASH test criteria. The Engineer has determined that no other crash tests are necessary to determine the device meets the MASH criteria.

| | | |
|---|---|---|
| Engineer Name: | Dipl.-Ing. Peter Schimmelpfennig | |
| Engineer Signature: | Peter Schimmelpfennig Digital unterschrieben von Peter Schimmelpfennig Datum: 2022.05.17 08:53:07 +02'00' | |
| Address: | Amelunxenstraße 30, 48167 Muenster | Same as Submitter ☐ |
| Country: | Germany | Same as Submitter ☐ |

A brief description of each crash test and its result:

| Required Test Number | Narrative Description | Evaluation Results |
|---|---|---|
| 4-10 (1100C) | CTS test no.: 19443<br>Test report no.: 12184-3272-19443-5-EN performed 25-AUG-2020 by crashtest-service.com GmbH (Germany)<br>The longitudinal concrete barrier contained and redirected the 1100C vehicle. The vehicle did not penetrate, underride or override the installation. Maximum dynamic deflection during the test was 0.92 m (36.2 in). No significant parts separated neither from the vehicle nor the barrier. No occupant compartment deformation or intrusion occurred. The vehicle remained upright during and after the impact. | PASS |

| Required Test Number | Narrative Description | Evaluation Results |
|---|---|---|
| 4-11 (2270P) | CTS test no.: 19445<br>Test report no.: 12184-3272-19445-5-EN performed 25-AUG-2020 by crashtest-service.com GmbH (Germany)<br>The longitudinal concrete barrier contained and redirected the 2270P vehicle. The vehicle did not penetrate, underride or override the installation. Maximum dynamic deflection during the test was 1.31 m (51.6 in). No significant parts separated neither from the vehicle nor the barrier. No occupant compartment deformation or intrusion occurred. The vehicle remained upright during and after the impact. | PASS |
| 4-12 (10000S) | CTS test no.: 19563<br>Test report no.: 12184-3272-19563-EN performed 18-NOV-2021 by crashtest-service.com GmbH (Germany)<br>The longitudinal concrete barrier contained and redirected the 10000S test vehicle. The vehicle did not penetrate, underride or override the installation. Maximum dynamic deflection during the test was 1.70 m (66.9 in). No significant parts separated neither from the vehicle nor the barrier. No occupant compartment deformation or intrusion occurred. The vehicle remained upright during and after the impact. | PASS |
| 4-20 (1100C) | ./. | Non-Relevant Test, not conducted |
| 4-21 (2270P) | ./. | Non-Relevant Test, not conducted |
| 4-22 (10000S) | ./. | Non-Relevant Test, not conducted |

Full Scale Crash Testing was done in compliance with MASH by the following accredited crash test laboratory (cite the laboratory's accreditation status as noted in the crash test reports.):

| | | |
|---|---|---|
| Laboratory Name: | crashtest-service.com GmbH | |
| Laboratory Signature: | Peter Schimmelpfennig Digital unterschrieben von Peter Schimmelpfennig Datum: 2022.05.17 08:53:24 +02'00' | |
| Address: | Amelunxenstraße 30, 48167 Muenster | Same as Submitter ☐ |
| Country: | Germany | Same as Submitter ☐ |
| Accreditation Certificate Number and Dates of current Accreditation period : | D-PL-17359-01<br>valid from: 10-FEB-2021 | |

Submitter Signature*: RE BLOC Concrete Barriers Rebloc GmbH 2022.05.18 10:07:49 +02'00'

Submit Form

# ATTACHMENTS

Attach to this form:

1) Additional disclosures of related financial interest as indicated above.
2) A copy of the full test report, video, and a Test Data Summary Sheet for each test conducted in support of this request.
3) A drawing or drawings of the device(s) that conform to the Task Force-13 Drawing Specifications [Hardware Guide Drawing Standards]. For proprietary products, a single isometric line drawing is usually acceptable to illustrate the product, with detailed specifications, intended use, and contact information provided on the reverse. Additional drawings (not in TF-13 format) showing details that are relevant to understanding the dimensions and performance of the device should also be submitted to facilitate our review.

FHWA Official Business Only:

| Eligibility Letter | | |
|---|---|---|
| Number | Date | Key Words |
| | | |

Summary 12184-3272-19443-2-EN, 29-JUL-2024 (Date of Summary)

**1. Sequential Photographs**


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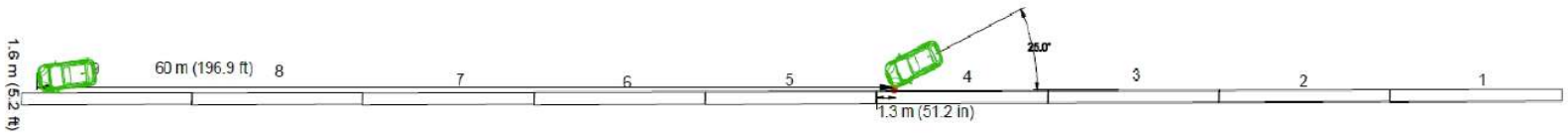
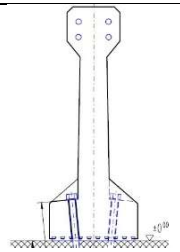
**2. Plan View**




**3. Cross-Sectional View**



| **4. General Information** | |
|---|---|
| Test Agency | crashtest-service.com GmbH (CTS) |
| Test Standard | MASH Test TL 4-10 |
| CTS-Test No | 19443 |
| Date | 25-AUG-2020 |
| **5. Test Article** | |
| Type | Concrete barrier |
| Name | “REBLOC 80SAH_12” |
| Installation Length | 108.00 m (4252.0 in) |
| Key Elements - Barrier | Length: 12.0 m (472 in)<br>Height: 0.8 m (12 in)<br>Base Width: 0.3 m (31 in) |
| **6. Soil Type and Condition** | |
| Type of Soil | Asphalt |
| Soil Strength | --- |
| Condition | Dry, cloudy, 22.8 °C (73.0 °F) |
| **7. Test Vehicle** | |
| Type/Designation | 1100C |
| Make and Model | KIA Rio III, MY2015 |
| Curb | 1157 kg (2551 lb) |
| Test Inertial | 1108 kg (2443 lb) |
| Dummy | 75 kg (165 lb) |
| Gross Static | 1183 kg (2608 lb) |
| | |
| | |

| **8. Impact Conditions** | |
|---|---|
| Speed | 99.5 km/h (61.8 mph) |
| Angle | 26.4° |
| Location/Orientation | 1.32 m (52.0 in)<br>Before transition of 4/5 |
| **9. Exit Conditions** | |
| Speed | 72 km/h (44.7 mph) |
| Angle | 7.1° |
| **10. Post-Impact Trajectory** | |
| Vehicle Stability | Satisfactory |
| Stopping Distance | 59.9 m (196.5 ft)<br>downstream of the impact point |
| | 1.6 m (5.2 in)<br>laterally in front the test article |
| Vehicle Snagging | No |
| Vehicle Pocketing | No |
| Maximum roll angle | - 6.0° |
| Maximum pitch angle | - 6.0° |
| **11. Occupant Risk** | |
| Impact Velocity | |
| Longitudinal | - 4.84 m/s (-15.9 ft/s) |
| Lateral | 6.49 m/s (21.3 ft/s) |
| Ridedown Accelerations (10 msec avg.) | |
| Longitudinal | - 3.10 g |
| Lateral | - 7.73 g |

| | |
|---|---|
| THIV | 7.5 m/s (24.6 ft/s) |
| PHD | 27.94 g |
| ASI | 1.65 |
| **12. Test Article Damage** | |
| Classification | Moderate |
| Particularities | None |
| **13. Test Article Deflections** | |
| Dynamic Deflection | 0.92 m (36.2 in) |
| Permanent Deflection | 0.83 m (32.7 in) |
| Dynamic Working Width | 1.21 m (47.6 in) |
| Height of Working Width | 0.80 m (31.5 in) |
| **14. Vehicle Damage** | |
| Classification | Moderate |
| VDS | 11-LFQ-3 |
| CDC | 11FDEW3 |
| Max. Exterior Deformation | 230 mm (9.06 in) |
| Location of max. exterior Deformation | Front left fender |
| Max. Interior Deformation | 5 mm (0.20 in) |
| Location of max. interior Deformation | Front left foot well |
| OCDI | ND0000000 |
| | |
| | |
| | |
| | |

Summary 12184-3272-19445-2-EN, 29-JUL-2024 (Date of Summary)

**1. Sequential Photographs**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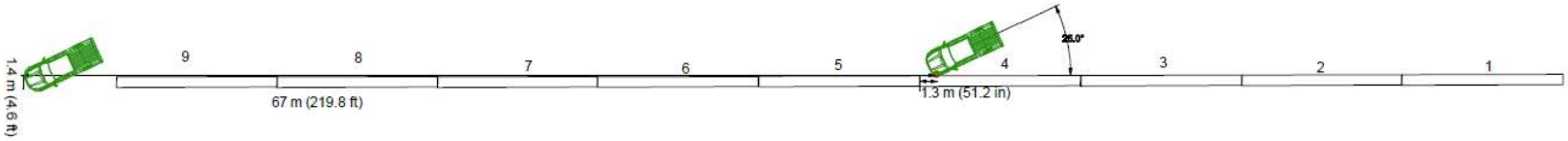
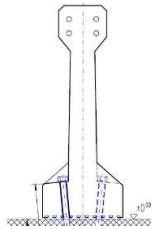
**2. Plan View**




**3. Cross-Sectional View**



| **4. General Information** | |
|---|---|
| Test Agency | crashtest-service.com GmbH (CTS) |
| Test Standard | MASH Test TL 4-11 |
| CTS-Test No | 19445 |
| Date | 25-AUG-2020 |
| **5. Test Article** | |
| Type | Concrete barrier |
| Name | "REBLOC 80SAH_12" |
| Installation Length | 108.00 m (4252.0 in) |
| Key Elements - Barrier | Length: 12.0 m (472 in)<br>Height: 0.8 m (12 in)<br>Base Width: 0.3 m (31 in) |
| **6. Soil Type and Condition** | |
| Type of Soil | Asphalt |
| Soil Strength | --- |
| Condition | Dry, cloudy, 20.5 °C (68.9 °F) |
| **7. Test Vehicle** | |
| Type/Designation | 2270P |
| Make and Model | Dodge Ram 1500 Pickup, MY2014 |
| Curb | 2243 kg (4945 lb) |
| Test Inertial | 2240 kg (4938 lb) |
| Dummy | --- kg (--- lb) |
| Gross Static | 2240 kg (4938 lb) |
| | |
| | |

| **8. Impact Conditions** | |
|---|---|
| Speed | 101.8 km/h (63.3 mph) |
| Angle | 25.3° |
| Location/Orientation | 1.30 m (51.2 in)<br>Before transition of 4/5 |
| **9. Exit Conditions** | |
| Speed | 78 km/h (48.5 mph) |
| Angle | 3.4° |
| **10. Post-Impact Trajectory** | |
| Vehicle Stability | Satisfactory |
| Stopping Distance | 67.0 m (219.8 ft)<br>downstream of the impact point |
| | -1.4 m (55.1 in)<br>laterally behind the test article |
| Vehicle Snagging | No |
| Vehicle Pocketing | No |
| Maximum roll angle | - 30.5° |
| Maximum pitch angle | - 9.7° |
| **11. Occupant Risk** | |
| Impact Velocity | |
| Longitudinal | - 4.01 m/s (-13.2 ft/s) |
| Lateral | 5.70 m/s (18.7 ft/s) |
| Ridedown Accelerations (10 msec avg.) | |
| Longitudinal | - 4.14 g |
| Lateral | 8.03 g |

| | |
|---|---|
| THIV | 6.9 m/s (22.6 ft/s) |
| PHD | 15.9 g |
| ASI | 1.27 |
| **12. Test Article Damage** | |
| Classification | Moderate |
| Particularities | None |
| **13. Test Article Deflections** | |
| Dynamic Deflection | 1.31 m (51.6 in) |
| Permanent Deflection | 1.05 m (41.3 in) |
| Dynamic Working Width | 1.56 m (61.4 in) |
| Height of Working Width | 0.78 m (30.7 in) |
| **14. Vehicle Damage** | |
| Classification | Moderate |
| VDS | 11-LFQ-3 |
| CDC | 11FDEW2 |
| Max. Exterior Deformation | 330 mm (12.99 in) |
| Location of max. exterior Deformation | Front left fender |
| Max. Interior Deformation | 13 mm (0.51 in) |
| Location of max. interior Deformation | Front left dashboard |
| OCDI | ND0000000 |
| | |
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| | |

## 1. Sequential Photographs


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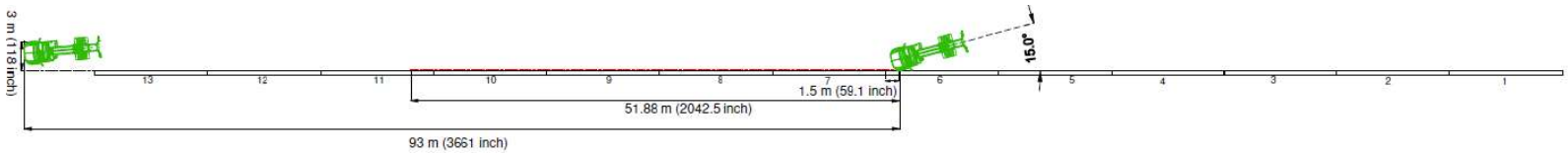
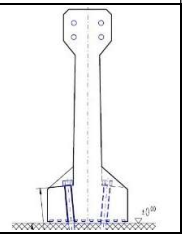
## 2. Plan View




## 3. Cross-Sectional View



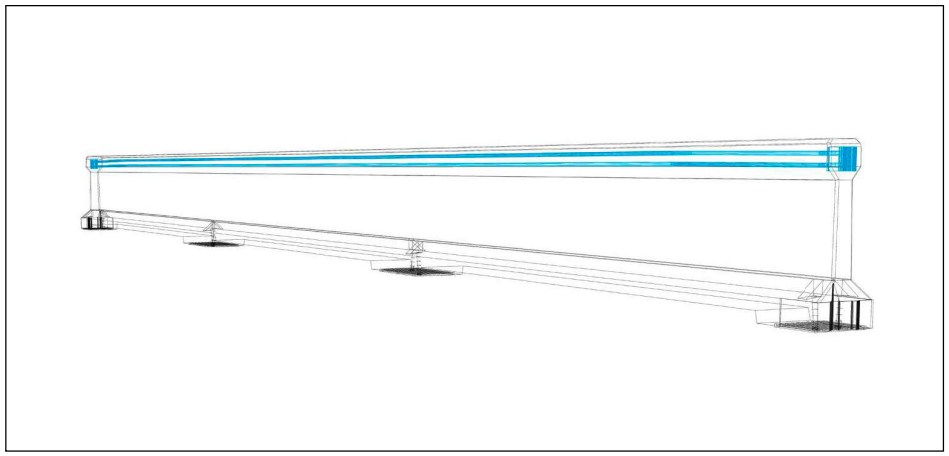
| 4. General Information | | |
|---|---|---|
| Test Agency | crashtest-service.com GmbH (CTS) | |
| Test Standard | MASH Test TL 4-12 | |
| CTS-Test No | 19563 | |
| Date | 18-NOV-2021 | |
| **5. Test Article** | | |
| Type | Precast Concrete barrier | |
| Name | "REBLOC 80SAH_12" | |
| Installation Length | 156.0 m (511.8 ft) | |
| Key Elements - Barrier | Length: | 12.0 m (472 in) |
| | Base Width: | 0.8 m (31 in) |
| | Height: | 0.3 m (12 in) |
| **6. Soil Type and Condition** | | |
| Type of Soil | Asphalt | |
| Soil Strength | --- | |
| Condition | Wet, cloudy, 8.7 °C (47.7°F) | |
| **7. Test Vehicle** | | |
| Type/Designation | 10000S | |
| Make and Model | Freightliner M2 106, MY 2010 | |
| Curb | 6930 kg (15278lb) | |
| Test Inertial | 10124 kg (22320 lb) | |
| Dummy | --- kg (--- lb) | |
| Gross Static | 10124 kg (22320 lb) | |

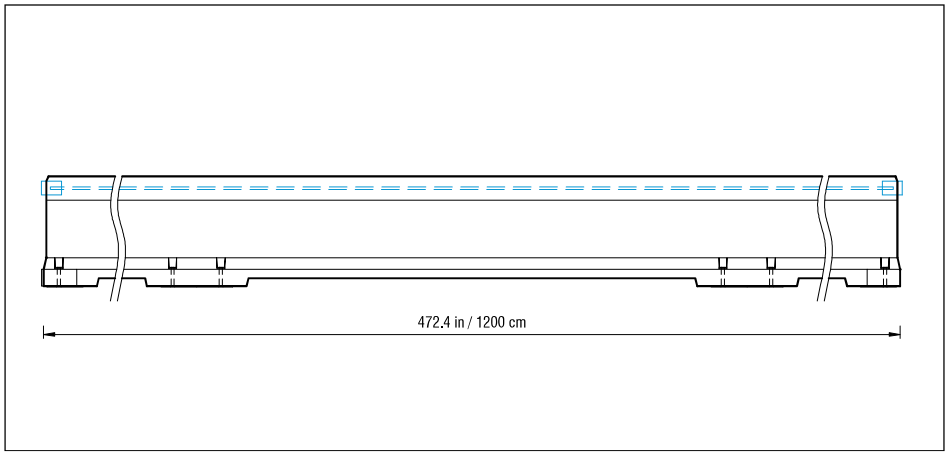
| 8. Impact Conditions | |
|---|---|
| Speed | 90.6 km/h (56.3 mph) |
| Angle | 15.0° |
| Location/Orientation | 1.5 m (59.1 in) before transition of 6/7 |
| **9. Exit Conditions** | |
| Speed | 74 km/h (46 mph) |
| Angle | 5° |
| **10. Post-Impact Trajectory** | |
| Vehicle Stability | Satisfactory |
| Stopping Distance | 93.0 m (305.1 ft) downstream |
| | 3.0 m (9.8 ft) laterally in front |
| Vehicle Snagging | No |
| Vehicle Pocketing | No |
| Maximum roll angle | ---° |
| Maximum pitch angle | ---° |
| **11. Occupant Risk** | |
| Impact Velocity | |
| Longitudinal | --- m/s (--- ft/s) |
| Lateral | --- m /s (--- ft/s) |
| Ridedown Accelerations (10 msec avg.) | |
| Longitudinal | --- g |
| Lateral | --- g |

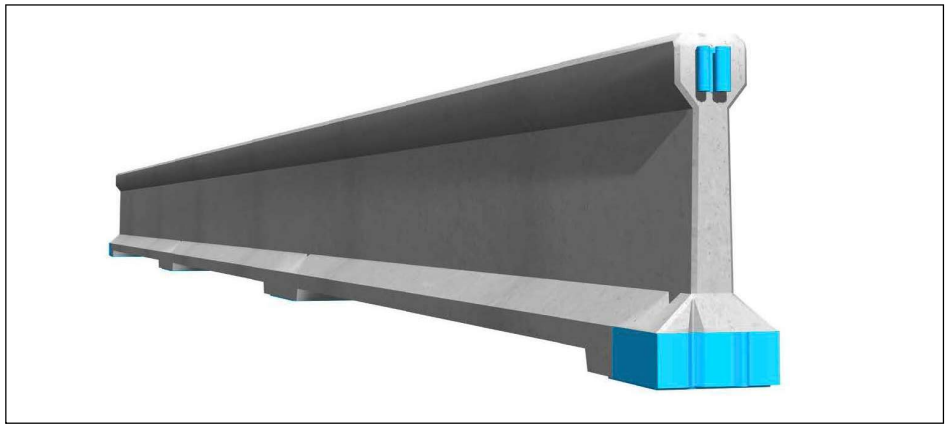
| | |
|---|---|
| THIV | --- m/s (--- ft/s) |
| PHD | --- g |
| ASI | --- |
| **12. Test Article Damage** | |
| Classification | Moderate |
| Particularities | None |
| **13. Test Article Deflections** | |
| Dynamic Deflection | 1.70 m (66.9 in) |
| Permanent Deflection | 1.61 m (63.4 in) |
| Dynamic Working Width | 3.23 m (127.2 in) |
| Height of Working Width | 3.06 m (120.5 in) |
| **14. Vehicle Damage** | |
| Classification | Moderate |
| VDS | 11FYEW3 |
| CDC | 11-LFQ-3 |
| Max. Exterior Deformation | no measurable deformation |
| Location of max. exterior Deformation | no measurable deformation |
| Max. Interior Deformation | no measurable deformation |
| OCDI | --- |

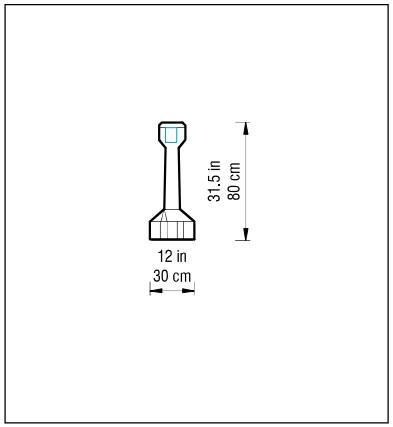
# REBLOC 80SAH_12

REBLOC®
Concrete Barriers








| | |
|---|---|
| **Element** | 80SAH_12 |
| **Dimensions** | 472 1/2" x 12" x 31 1/2" (1200 x 30 x 80 cm) |
| **Weight/element** | 7496 lb (3400 kg) |
| **Material** | Concrete 5000 psi |
| **Date** | 2022-02-28 |

The element is connected by the integrated coupling, located at the face of the element.

**REBLOC GmbH**
Ziegelofen-Straße 736 · 3571 Gars/Kamp · Austria
Tel.: +43 (0) 2985 30528 2900
Fax: +43 (0) 2985 30528 2901

office@rebloc.com | www.rebloc.com