Dear Mr. Binette:

This letter is in response to your October 13, 2020 request for the Federal Highway Administration (FHWA) to review a roadside safety device, hardware, or system for eligibility for reimbursement under the Federal-aid highway program. This FHWA letter of eligibility is assigned FHWA control number B-352 and is valid until a subsequent letter is issued by FHWA that expressly references this device.

**Decision**

The following device is eligible within the length-of-need, with details provided in the form which is attached as an integral part of this letter:

- Durisol Acrylite Soundstop TL4 Noise Barrier System

**Scope of this Letter**

To be found eligible for Federal-aid funding, new roadside safety devices should meet the crash test and evaluation criteria contained in the American Association of State Highway and Transportation Officials’ (AASHTO) Manual for Assessing Safety Hardware (MASH). However, the FHWA, the Department of Transportation, and the United States Government do not regulate the manufacture of roadside safety devices. Eligibility for reimbursement under the Federal-aid highway program does not establish approval, certification or endorsement of the device for any particular purpose or use.

This letter is not a determination by the FHWA, the Department of Transportation, or the United States Government that a vehicle crash involving the device will result in any particular outcome, nor is it a guarantee of the in-service performance of this device. Proper manufacturing, installation, and maintenance are required in order for this device to function as tested.

This finding of eligibility is limited to the crashworthiness of the system and does not cover other structural features, nor conformity with the Manual on Uniform Traffic Control Devices.
Eligibility for Reimbursement

Based solely on a review of crash test results and certifications submitted by the manufacturer, and the crash test laboratory, FHWA agrees that the device described herein meets the crash test and evaluation criteria of the AASHTO’s MASH. Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions.

Name of system: Durisol Acrylite Soundstop TL4 Noise Barrier System
Type of system: Longitudinal Barrier
Test Level: TL4
Testing conducted by: Texas A&M Transportation Institute
Date of request: October 13, 2020

FHWA concurs with the recommendation of the accredited crash testing laboratory on the attached form.

Full Description of the Eligible Device

The device and supporting documentation, including reports of the crash tests or other testing done, videos of any crash testing, and/or drawings of the device, are described in the attached form.

Notice

This eligibility letter is issued for the subject device as tested. Modifications made to the device are not covered by this letter. Any modifications to this device should be submitted to the user (i.e., state DOT) as per their requirements.

You are expected to supply potential users with sufficient information on design, installation and maintenance requirements to ensure proper performance.

You are expected to certify to potential users that the hardware furnished has the same chemistry, mechanical properties, and geometry as that submitted for review, and that it will meet the test and evaluation criteria of AASHTO’s MASH.

Issuance of this letter does not convey property rights of any sort or any exclusive privilege. This letter is based on the premise that information and reports submitted by you are accurate and correct. We reserve the right to modify or revoke this letter if: (1) there are any inaccuracies in the information submitted in support of your request for this letter, (2) the qualification testing was flawed, (3) in-service performance or other information reveals safety problems, (4) the system is significantly different from the version that was crash tested, or (5) any other information indicates that the letter was issued in error or otherwise does not reflect full and complete information about the crashworthiness of the system.
**Standard Provisions**

- To prevent misunderstanding by others, this letter of eligibility designated as FHWA control number B-352 shall not be reproduced except in full. This letter and the test documentation upon which it is based are public information. All such letters and documentation may be reviewed upon request.

- This letter shall not be construed as authorization or consent by the FHWA to use, manufacture, or sell any patented system for which the applicant is not the patent holder.

- This FHWA eligibility letter is not an expression of any Agency view, position, or determination of validity, scope, or ownership of any intellectual property rights to a specific device or design. Further, this letter does not impute any distribution or licensing rights to the requester. This FHWA eligibility letter determination is made based solely on the crash-testing information submitted by the requester. The FHWA reserves the right to review and revoke an earlier eligibility determination after receipt of subsequent information related to crash testing.

Sincerely,

Michael S. Griffith  
Director, Office of Safety Technologies  
Office of Safety

Enclosures
Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Date of Request: October 13, 2020  
Name: Nathan Binette  
Company: Durisol Ltd  
Address: 70 Frid Street, Suite 1 Hamilton, ON L8P 4M4  
Country: Canada  
To: Michael S. Griffith, Director  
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

<table>
<thead>
<tr>
<th>System Type</th>
<th>Submission Type</th>
<th>Device Name / Variant</th>
<th>Testing Criterion</th>
<th>Test Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>'B': Rigid/Semi-Rigid Barriers (Roadside, Median, Bridge Railings)</td>
<td>Physical Crash Testing, Engineering Analysis</td>
<td>Durisol® Acrylite® Soundstop TL4 Noise Barrier System</td>
<td>AASHTO MASH</td>
<td>TL4</td>
</tr>
</tbody>
</table>

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:**

<table>
<thead>
<tr>
<th>Contact Name:</th>
<th>Company Name:</th>
<th>Address:</th>
<th>Country:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nathan Binette</td>
<td>Durisol Ltd</td>
<td>70 Frid Street, Suite 1 Hamilton, ON L8P 4M4</td>
<td>Canada</td>
</tr>
</tbody>
</table>

Enter below all disclosures of financial interests as required by the FHWA ‘Federal-Aid Reimbursement Eligibility Process for Safety Hardware Devices’ document.

Durisol Ltd and Roehm America have collaborated to develop and test this noise barrier system. The University of Nebraska holds patent rights to US Patent 7,220,077 that they exclusively license to Roehm America. Roehm America exclusively sub-licenses patent rights to the same patent to Durisol Ltd. The design of the subject TL4 noise barrier system utilizes licensed patent rights.

Texas A&M Transportation Institute (TTI) was contracted by Durisol Ltd to perform full-scale crash testing of the Durisol® Acrylite® Soundstop TL4 Noise Barrier System. There are no shared financial interests in the Durisol® Acrylite® Soundstop TL4 Noise Barrier System by TTI, or between Durisol Ltd, Roehm America, University of Nebraska, and TTI, other than costs involved in the actual crash tests and reports for this submission to FHWA.

690902-DSL-1-2-3
PRODUCT DESCRIPTION

**Help**

- New Hardware or Modification to Existing Hardware
- Significant Modification Existing Hardware

The Durisol® Acrylite® Soundstop TL4 Noise Barrier installation consisted of 150 feet of 14-ft tall proprietary Durisol® Acrylite® noise barrier panel supported with W6×20 posts spaced at 10 ft and anchored on the field side of a 154-ft-long, 36 inch tall Texas Department of Transportation Single Slope Traffic Rail (TxDOT-STR). The TxDOT-STR is a single slope concrete barrier that has been successfully tested to MASH TL-4 specifications (2). The top of the noise barrier measured 17 ft above grade. The installation was constructed atop, and fixed to, a concrete strip footing that measured 2-ft thick by 6 ft-8 inches wide by 154 ft long.

The vertically mounted W6×20 posts support aluminum framed acrylic (tradename = Acrylite® Soundstop) noise barrier panels. Two (2) horizontal HSS8×4×¼-inch continuous rails, placed 4 ft-8 inches and 10-ft above grade, are connected to the W6×20 steel posts to help distribute the TL-4 Box crash loads and prevent zone of intrusion of impacting vehicles between posts. The Acrylite® Soundstop within the framed panels includes cast-in-place filaments to deter panel fragmentation, and each acrylic panel is secondarily secured between the flanges of two adjacent posts to further limit any material from falling away from the structure during an impact event.

The Durisol® Acrylite® Soundstop TL4 Noise Barrier, not inclusive of the concrete barrier to which it attaches, weighs approximately 80–140 lbs per lineal foot (10–14 lbs per square foot), depending upon the height of the noise barrier wall and post span.

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.

**Help**
<table>
<thead>
<tr>
<th>Required Test Number</th>
<th>Narrative Description</th>
<th>Evaluation Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-10 (1100C)</td>
<td>Test 4-10 involves an 1100C vehicle impacting the test article at a target impact speed of 62 mi/h ±2.5 mi/h and a target impact angle of 25° ±1.5°. The target CIP was determined using the information provided in MASH Section 2.2.1, Section 2.3.2, and Table 2-7 and was for the right corner of the front bumper to impact 3.6±1 ft upstream of the centerline of the first joint in the concrete barrier. The results of the test conducted on March 26, 2020 are found in TTI Test Report number 690902-DSL 1-3. The test vehicle was traveling at an impact speed of 63.0 mi/h as it made contact with the barrier 3.7 ft upstream of the barrier joint at an impact angle of 25.0°. After loss of contact with the barrier, the vehicle came to rest 213 ft downstream of the impact point and 83 ft towards the traffic side. The barrier contained and redirected the 1100C vehicle. The vehicle did not penetrate, underride, or override the installation. The 1100C vehicle exited within the exit box criteria. Working width was 21.5 inches to the field side of barrier. There was no measurable dynamic deflection during the test, or permanent deformation observed afterwards, for either the barrier or the wall. No detached elements, fragments, or other debris were present to penetrate or show potential for penetrating the occupant compartment, or present hazard to others in the area. Maximum exterior crush to the vehicle was 11.0 inches in the side plane at the right front corner at bumper height. Maximum occupant compartment deformation was 5.0 inches in the right front kick panel area. The 1100C vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 12° and 6°, respectively. Longitudinal OIV was 24.0 ft/s, and lateral OIV was 28.2 ft/s. Longitudinal occupant ride down acceleration was 4.7g, and lateral occupant ride down acceleration 5.1g. The occupant risk factors were within the MASH preferred limits. The Durisol® AcrylZ® Soundstop TL4 Noise Barrier System mounted on 36-inch Single Slope Barrier performed acceptably for MASH Test 4-10.</td>
<td>PASS</td>
</tr>
<tr>
<td>Required Test Number</td>
<td>Narrative Description</td>
<td>Evaluation Results</td>
</tr>
<tr>
<td>----------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------</td>
</tr>
<tr>
<td>4-11 (2270P)</td>
<td>Test 4-11 involves an 2270P vehicle impacting the test article at a target impact speed of 62 mi/h ±2.5 mi/h and a target impact angle of 25° ±1.5°. The target CIP was determined using the information provided in MASH Section 2.2.1, Section 2.3.2, and Table 2-7 and was for the right corner of the front bumper to impact 9.5±1 ft upstream of the centerline of the first joint in the concrete barrier. The results of the test conducted on March 24, 2020 are found in TTI Test Report number 690902-DSL 1-3. The test vehicle was traveling at an impact speed of 63.2 mi/h as it made contact with the barrier 10.2 ft upstream of the barrier joint at an impact angle of 24.7°. After loss of contact with the barrier, the vehicle came to rest 207 ft downstream of the impact point and 12 ft towards the field side. The barrier contained and redirected the 2270P vehicle. The vehicle did not penetrate, underride, or override the installation. The 2270P vehicle exited within the exit box criteria. Working width was 23.1 inches to the field side of barrier. Maximum dynamic deflection during the test was 1.6 inches at the top of the acrylic wall. No permanent deformation observed afterwards for either the concrete barrier or the acrylic wall. No detached elements, fragments, or other debris were present to penetrate or show potential for penetrating the occupant compartment, or present hazard to others in the area. Maximum exterior crush to the vehicle was 9.0 inches in the side plane at the right front corner at bumper height. Maximum occupant compartment deformation was 6.0 inches in the right front fire wall area. The 2270P vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 31° and 7°, respectively. Longitudinal OIV was 19.7 ft/s, and lateral OIV was 27.2 ft/s. Longitudinal occupant ride down acceleration was 4.7g, and lateral occupant ride down acceleration 9.7g. The occupant risk factors were within the MASH preferred limits. The Durisol® Acrylite® Soundstop TL4 Noise Barrier System mounted on 36-inch Single Slope Barrier performed acceptably for MASH Test 4-11.</td>
<td>PASS</td>
</tr>
</tbody>
</table>
Test 4-12 involves an 10000S vehicle weighing 22,000 lb ± 660 lb impacting the test article at a target impact speed of 56 mi/h ± 2.5 mi/h and a target impact angle of 15° ± 1.5°. The target CIP was determined using the information provided in MASH Section 2.2.1, Section 2.3.2, and Table 2-7 and was for the left corner of the front bumper to impact 5 ft ± 1 ft upstream of the concrete barrier joint.

The results of the test conducted on April 9, 2020 are found in TTI Test Report number 690902-DSL 1-3. The test vehicle was traveling at an impact speed of 58.5 mi/h as it made contact with the barrier 4 ft upstream of the concrete barrier joint at an impact angle of 15°. After loss of contact with the barrier, the vehicle came to rest 227 ft downstream of the impact point and 21 ft towards the field side.

The barrier contained and redirected the 10000S vehicle. The vehicle did not penetrate, underride, or override the installation. The 10000S vehicle exited within the exit box criteria.

Maximum dynamic deflection during the test was 8.1 inches; maximum permanent deformation was 1.9 inches; and working width was 29.6 inches, each at the top of the acrylic wall to the field side of barrier.

The upper Acrylite panel was cracked at post 5 but no fragments disengaged from the panel. No detached elements, fragments, or other debris were present to penetrate or show potential for penetrating the occupant compartment, or present hazard to others in the area.

Maximum exterior crush to the vehicle was 16 inches in the side plane at the left front corner at bumper height. Maximum occupant compartment deformation was 8.75 inches in the left side floor pan where the seam between the floor pan and the lower door frame parted. The separation of the seam between the floor pan and the lower door frame was not caused by any portion of the test article protruding into the cab.

The 10000S vehicle remained upright during and after the collision event. Maximum roll and pitch angles were 12° and 8°, respectively.

The Durisol®Acrylite®Soundstop TL4 Noise Barrier System mounted on 36-inch Single Slope Barrier performed acceptably for MASH Test 4-12.
4-20 (1100C)  This device is not a transition system  Non-Relevant Test, not conducted
4-21 (2270P)  This device is not a transition system  Non-Relevant Test, not conducted
4-22 (10000S) This device is not a transition system  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.):

<table>
<thead>
<tr>
<th>Laboratory Name:</th>
<th>Texas A&amp;M Transportation Institute</th>
</tr>
</thead>
</table>
| Laboratory Signature: | Digitally signed by Darrell L. Kuhn  
Date: 2020.10.13 16:34:41-05'00 |
| Address: | 1254 Avenue A, Bldg 7091, Bryan, Texas 77807  
Same as Submitter |
| Country: | USA  
Same as Submitter |
| Accreditation Certificate Number and Dates of current Accreditation period: | ISO 17025-2017 Laboratory  
A2LA Certificate Number: 2821.01  
Valid To: April 30, 2021 |

Submitter Signature*: Nathan Binette  
Digitally signed by Nathan Binette  
Date: 2020.10.19 14:12:08-04'00 |

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:

<table>
<thead>
<tr>
<th>Eligibility Letter</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Date</td>
</tr>
</tbody>
</table>
Figure 7.6. Summary of Results for MASH Test 4-10 on Durisol®-Acrylite® Soundstop TL-4 Noise Barrier System.
<table>
<thead>
<tr>
<th>Test Article</th>
<th>Test Article Deflections</th>
<th>Test Vehicle</th>
<th>Vehicle Stability</th>
<th>Vehicle Pocketing</th>
<th>Material or Key Elements</th>
<th>Impact Conditions</th>
<th>Post-Impact Trajectory</th>
<th>Test Article No.</th>
<th>Impact Severity</th>
<th>Exit Conditions</th>
<th>Occupant Risk Values</th>
<th>Vehicle Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Longitudinal Barrier – Bridge Rail</td>
<td>Dynamic.......................... 1.6 inches</td>
<td>2270P</td>
<td>Maximum Yaw Angle ...45°</td>
<td>No</td>
<td>Concrete barrier with 14-ft tall acrylic wall panels supported by W6x20 steel posts and 2 @ HSS 8 x 4 x ⅛ inch rails. 17 ft to top of noise barrier</td>
<td>Speed ......................... 63.2 mi/h</td>
<td>Stopping Distance ........207 ft downstream</td>
<td>MASH Test 4-11</td>
<td>Speed 50.0 mi/h</td>
<td>Trajectory/Heading Angle... 2.1° / 7.1°</td>
<td>Longitudinal OIV............ 19.7 ft/s</td>
<td>VDS......................... 01RFQ5</td>
</tr>
<tr>
<td>Durisol®-Acrylite® Soundstop TL-4 Noise Barrier System</td>
<td>Permanent.......................... None</td>
<td>2014 RAM 1500 pickup truck</td>
<td>Maximum Pitch Angle ...7°</td>
<td>No</td>
<td>36-inch tall concrete barrier on 154 ft barrier</td>
<td>Angle ......................... 24.7°</td>
<td>12 ft twd field side</td>
<td>TTI Test No. .......................... 690902-DSL2</td>
<td>Location/Orientation .......10.2 ft upstream of first joint in concrete</td>
<td>Speed 50.0 mi/h</td>
<td>Lateral OIV................... 27.2 ft/s</td>
<td>Maximum Roll Angle ........31°</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>2014 RAM 1500 pickup truck</td>
<td>Vehicle Snagging ........... No</td>
<td>No</td>
<td>150-ft long noise barrier on 154 ft barrier</td>
<td>Location/Orientation .......10.2 ft upstream of first joint in concrete</td>
<td>Vehicle Snagging ........... No</td>
<td>Test Date .............................. 2020-03-24</td>
<td>Maximum Roll Angle ........31°</td>
<td>Longitudinal Ridedown ....4.7 g</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Vehicle Type/Designation 2270P</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>2014 RAM 1500 pickup truck</td>
<td>Vehicle Pocketing ........... No</td>
<td>No</td>
<td>Exit Angle .................... 155°</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Article Type .................. Longitudinal Barrier – Bridge Rail</td>
<td>Test Vehicle Make and Model 2014 RAM 1500 pickup truck</td>
<td>occupants deformed 6.0 inches</td>
<td>Longitudinal Ridedown ....4.7 g</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Vehicle Make and Model 2014 RAM 1500 pickup truck</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>2014 RAM 1500 pickup truck</td>
<td>Vehicle Snagging ........... No</td>
<td>No</td>
<td>Head Angle .......................... 2.1°</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Vehicle Type .................. Longitudinal Barrier – Bridge Rail</td>
<td>Test Vehicle Make and Model 2014 RAM 1500 pickup truck</td>
<td>Vehicle Pocketing ........... No</td>
<td>Longitudinal Ridedown ....4.7 g</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Vehicle Make and Model 2014 RAM 1500 pickup truck</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>2014 RAM 1500 pickup truck</td>
<td>Vehicle Snagging ........... No</td>
<td>No</td>
<td>Longitudinal Ridedown ....4.7 g</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Vehicle Type .................. Longitudinal Barrier – Bridge Rail</td>
<td>Test Vehicle Make and Model 2014 RAM 1500 pickup truck</td>
<td>Vehicle Pocketing ........... No</td>
<td>Longitudinal Ridedown ....4.7 g</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Vehicle Make and Model 2014 RAM 1500 pickup truck</td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>2014 RAM 1500 pickup truck</td>
<td>Vehicle Snagging ........... No</td>
<td>No</td>
<td>Longitudinal Ridedown ....4.7 g</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Vehicle Type .................. Longitudinal Barrier – Bridge Rail</td>
<td>Test Vehicle Make and Model 2014 RAM 1500 pickup truck</td>
<td>Vehicle Pocketing ........... No</td>
<td>Longitudinal Ridedown ....4.7 g</td>
<td>Maximum Exterior Deformation 9.0 inches</td>
<td>Test Vehicle Make and Model 2014 RAM 1500 pickup truck</td>
</tr>
</tbody>
</table>
Figure 5.8. Summary of Results for MASH Test 4-12 on Durisol®-Acrylite® Soundstop TL-4 Noise Barrier System.