June 19, 2020

U.S. Department of Transportation
Federal Highway Administration

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

In Reply Refer To:
HSST-1/B-276A

Mr. Jesper Sorensen
Safence, Inc.
14570 Interurban Ave S, #C100
Tukwila, WA 98168

Dear Mr. Sorensen:

On February 14, 2017, the Federal Highway Administration's Office of Safety issued eligibility letter B-276 for the Safence 3RSC-16 Blue System 3 Cable Driven Post System. The Office of Safety has recently made modifications to its eligibility letter website to be more consistent with the 2nd Edition of American Association of State Highway and Transportation Officials'(AASHTO's) Manual for Assessing Safety Hardware (MASH) and the additional test matrices for cable barriers therein. These modifications have necessitated the update of certain eligibility letters including B-276. The update for letter B-276 consists of adding the phrase "2H:1V Slope, 200 mm Offset" after the original description of the device to indicate the as-tested conditions. Additionally, the language of this letter has been updated to be consistent with current Office of Safety policy for the issuance of eligibility letters.

Please note that this updated letter B-276A will in no way affect the eligibility for the associated device as was determined on February 14, 2017. This letter will supersede the original B-276 letter in full.

Decision

The following devices are eligible, with details provided in the form which is attached as an integral part of this letter:

- Safence 3RSC-16 Blue System 3 Cable Driven Post System, 2H:1V Slope, 200 mm Offset

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 Manual for Assessing Safety Hardware (MASH). Therefore, the device is eligible for reimbursement under the Federal-aid highway program if installed under the range of tested conditions as Length of Need (LON) barrier.

Name of system: Safence 3RSC-16 Blue System 3 Cable Driven Post System, 2H:1V Slope, 200 mm Offset
Type of system: Longitudinal Barrier
Test Level: MASH09 Test Level 3 (TL3)
Testing conducted by: Holmes Solutions
Date of request: December 15, 2016
Date of completed package: February 1, 2017

FHWA concurs with the recommendation of the accredited crash testing laboratory as stated within 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-276A 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

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

Enclosures

Request for Federal Aid Reimbursement Eligibility of Highway Safety Hardware

Submitter	Date of Request:	December 15, 2016	◯ New ◉ Resubmission
	Name:	Jesper Sorensen	
	Company:	Blue System AB	
	Address:	Fiskebäcks Hamn 16, S-426 58 Västra Frölunda	
	Country:	Sweden	
	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

!-!-!

System Type	Submission Type	Device Name / Variant	Testing Criterion	Test Level
'B': Rigid/Semi-Rigid Barriers (Roadside, Median, Bridge Railings)	◉ Physical Crash Testing ◯ Engineering Analysis	Safence 3RSC-16 Blue System 3 Cable Driven Post System	AASHTO MASH	TL3

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:	Jesper Sorensen	Same as Submitter ☒
Company Name:	Blue System AB	Same as Submitter ☒
Address:	Fiskebäcks Hamn 16, S-426 58 Västra Frölunda	Same as Submitter ☒
Country:	Sweden	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.

The test facility Holmes Solution or any its employees does not have any financial interest in Blue Systems AB or Safence, Inc.

PRODUCT DESCRIPTION

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

Safence 3RSC-16 Blue System 3 Cable Driven Post System:

The Safence driven post barrier consists of three, 19 mm 3x7 strand galvanized cables, supported on C-section steel post at 2m centers. The height to the top of the highest cable from ground level is specified as a nominal 900 mm (35.4"). The middle and lowest cables are 715 mm (28.1") and 530 mm (20.8") from the ground. Posts were driven into the AASHTO standard soil at 2m centers.

Along the length of the slope, all posts were placed 200 mm down the slope from the break point in a 2:1 slope. The cables were connected to the C posts section with 304 stainless steel rope hooks. The cables were terminated at a cable anchor bracket cast into an in-ground concrete foundation All cables were tensioned to a nominal 25.5 kN at an ambient temperature of 20 degrees Celsius. Tension was applied to the cable using a hydraulic tensioning unit. Cable termination and cable adjustment fittings are swaged fittings.

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:	Emerson Ryder	
Engineer Signature:	Emerson Ryder	Digitally signed by Emerson Ryder Date: 2017.01.26 09:22:06 +13'00'
Address:	L2, 254 Montreal St., Christchurch	Same as Submitter ☐
Country:	New Zealand	Same as Submitter ☐

A brief description of each crash test and its result:

Required Test Number	Narrative Description	Evaluation Results
3-10 (1100C)	The objective of the test reported herein was to evaluate the safety performance of the roadside 3 wire rope cable barrier system when installed on a 2:1 slope against the requirements of MASH 09 Test 3-10 in accordance with Test Level 3 (TL3). The Test 3-10 was performed using a 1100 kg car traveling at a nominal speed of 100 km/h impacting a test article at 25 degrees. The results indicate that the barrier satisfied the requirements of MASH for Test 3-10. The dynamic deflection was 1.41 meter and the working width 1.59 meter.	PASS

Required Test Number	Narrative Description	Evaluation Results
3-11 (2270P)	The objective of the test reported herein was to evaluate the safety performance of the roadside 3 wire rope cable barrier system when installed on a 2:1 slope against the requirements of MASH 09 Test 3-11 in accordance with Test Level 3 (TL3). The Test 3-11 was performed using a 2270 kg truck traveling at a nominal speed of 100 km/h impacting a test article at 25 degrees. The results indicate that the barrier satisfied the requirements of MASH for Test 3-11. The dynamic deflection was 2.01 meter and the working width 2.19 meter.	PASS
3-20 (1100C)	Test 20 is a test for transitions sections. Therefore it was not conducted.	Non-Relevant Test, not conducted
3-21 (2270P)	Test 20 is a test for transitions sections. Therefore it was not conducted.	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:	Holmes Solutions	
Laboratory Signature:	Emerson Ryder Digitally signed by Emerson Ryder Date: 2017.01.26 09:22:48 +13'00'	
Address:	Unit 5, 295 Blenheim Road, Christchurch	Same as Submitter ☐
Country:	New Zealand	Same as Submitter ☐
Accreditation Certificate Number and Dates of current Accreditation period :	ISO/IEC 17025:2055; IANZ Certificate Number: 1022 23 July 2009 to present day	

Submitter Signature*: Jesper Sorensen Digitally signed by Jesper Sorensen Date: 2017.02.01 09:47:47 -08'00'

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.

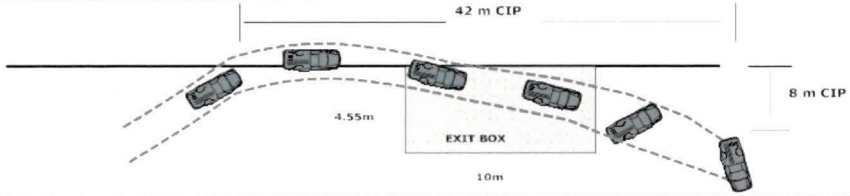
FHWA Official Business Only:

Eligibility Letter		
Number	Date	Key Words

Holmes Solutions

Level 2, 254 Montreal Street
Christchurch Central 8013
PO Box 6718
Upper Riccarton, Christchurch 8442
holmessolutions.com

0.00 sec	0.112 sec	0.225 sec	0.337 sec	0.450 sec



Test Article:	Safence 3 cable driven post in 2:1 slope
Total Length	176.4 m
Key Elements - Barrier	Wire cable safety barrier installed at 2.0 m
Description	4.2 m terminal ends sections
Length of Barrier Installation	168.0 m LoN
Cable Height	900 mm (35.4")
Post Spacing	2.0 m nominal
Test Vehicle	
Designation	1100C
Make/Model	Nissan Tiida
Dimensions (LxWxH)	4270 mm x 1695 mm x 1550 mm
Curb Wt	1141.5 kg
Test Inertial Wt	1110.0 kg
Gross Static	1185.0 kg
Impact Conditions	
Speed	101.0 km /h
Angle	25.0 degrees
Impact Point	870 mm Upstream of steel line post 19
Exit Conditions	
Exit Speed:	36.0 km/h
Exit Angle:	9.0 degrees

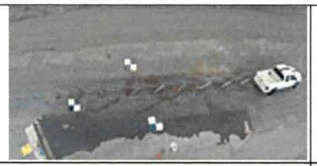
Post Impact Vehicle Behaviour	
Vehicle Stability	good
Stopping Distance	42.0 m from CIP
Vehicle Snagging	None
Vehicle Pocketing	None
Occupant Impact Velocity	At 0.1882 seconds
Longitudinal	-2.8 m/s
Lateral (optional)	3.7 m/s
Occupant Ride-down Deceleration	
X-direction	3.6 g
Y-direction	-5.3 g
THIV (optional) m/s	4.8
PHD (optional)	5.3 g
ASI (optional)	0.46
Test Article Damage	
Test Article Deflections	
Dynamic	1.41 m
Permanent	0.56 m
Working Width	1.59 m
Vehicle Damage Exterior	
VDS	11FL-2
CDC	11LFEE2
Maximum Deformation	150 mm

Level 2, 254 Montreal Street
Christchurch Central 8013
PO Box 6718
Upper Riccarton, Christchurch 8442
holmessolutions.com

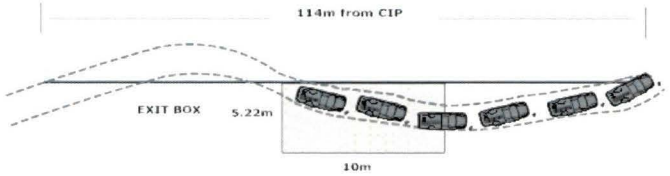
0.00 sec

0.275 sec

0.550 sec

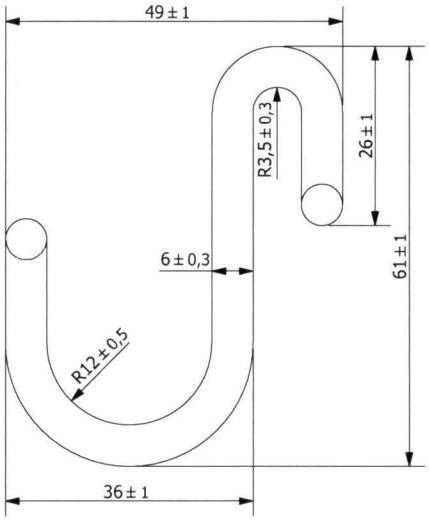

0.825 sec

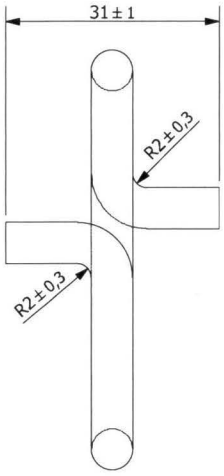
1.10 sec

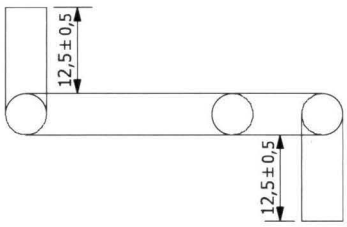


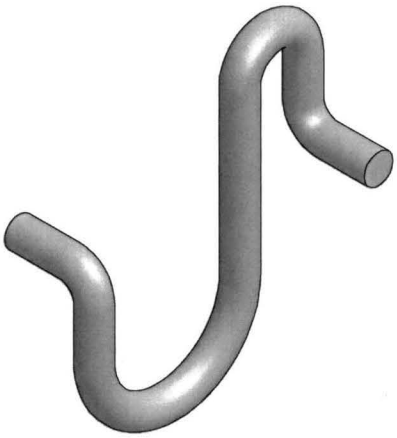
Test Article:	Safence 3 cable driven post in 2:1 slope
Total Length	172.4 m
Key Elements - Barrier	Wire cable safety barrier installed at 2.0 m
Description	4.2 m terminal ends sections
Length of Barrier Installation	158.0 m LoN
Cable Height	900 mm (35.4")
Post Spacing	2.0 m nominal
Test Vehicle	
Designation	2270P
Make/Model	2006 Dodge Ram 1500 Quad Cab
Dimensions (LxWxH)	5710 mm x 2030 mm x 1910 mm
Curb Wt	2319 kg
Test Inertial Wt	2274 kg
Gross Static	2274 kg
Impact Conditions	
Speed	100.8 km /h
Angle	25.7 degrees
Impact Point	370 mm Upstream of steel line post 20
Exit Conditions	
Exit Speed:	61.0 km/h
Exit Angle:	11.0 degrees

Post Impact Vehicle Behaviour	
Vehicle Stability	Fair
Stopping Distance	114 m from CIP
Vehicle Snagging	None
Vehicle Pocketing	None
Occupant Impact Velocity	At 0.1866 seconds
Longitudinal	-2.4 m/s
Lateral (optional)	3.7 m/s
Occupant Ride-down Deceleration	
X-direction	3.4 g
Y-direction	-5.1 g
THIV (optional) m/s	4.7
PHD (optional)	5.3 g
ASI (optional)	0.44
Test Article Damage	
Test Article Deflections	
Dynamic	2.01 m
Permanent	0.59 m
Working Width	2.19 m
Vehicle Damage Exterior	
VDS	11FL-2
CDC	11LFEE2
Maximum Deformation	110 mm









Drawn	Date	Material	Weight	Units	Sheet size
RDS	2016-04-15	AISI 304	0,03 kg	mm	A4

BLUE SYSTEMS

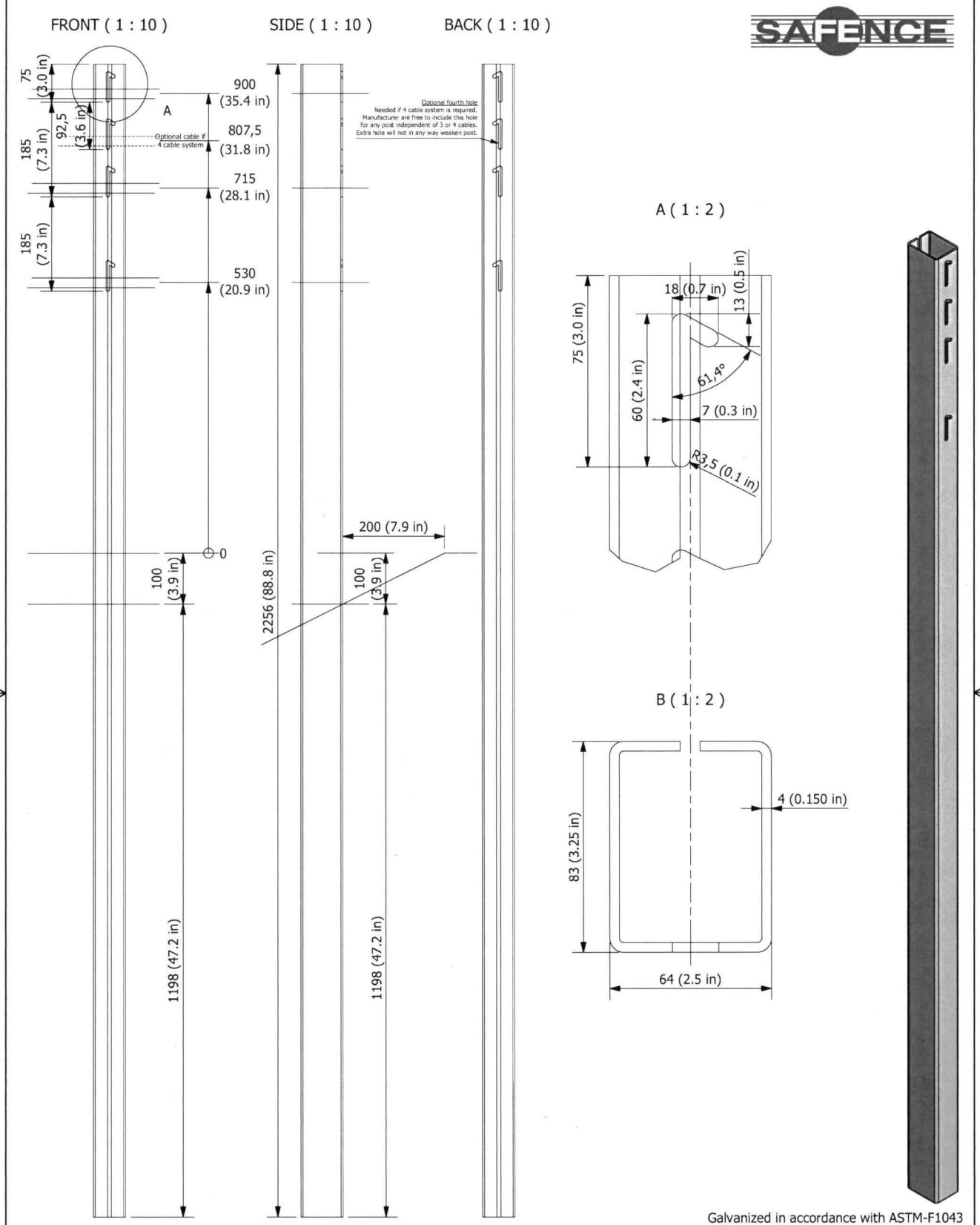
Fiskebäcks Hamn 16
SE-426 58 Västra Frölunda
Sweden

Tel: +46 31-29 72 16
Fax: +46 31-29 30 65
E-mail: info@bluesystems.se

Name: Slope Hook 6 mm

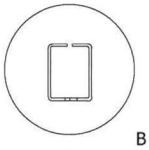
Drawing no.	Article no.	Rev
D-3032B	AVS26-6-HOOK	

This drawing is the property of BLUE SYSTEMS AB.
The content must not be copied or made available to any third party without our written permission.



Galvanized in accordance with ASTM-F1043

TOP (1 : 10)



Drawn	Date	Material	Weight	Units	Sheet size
RDS	2016-11-30	ASTM-A1011 grade 60	17,66 kg	mm	A4

BLUE SYSTEMS

Fiskebäcks Hamn 16
SE-426 58 Västra Frölunda
Sweden
Tel: +46 31-29 72 16
Fax: +46 31-29 30 65
E-mail: info@bluesystems.se

Name		
Super-C 2256 mm		
Drawing no.	Article no.	Rev
D-3067A		

This drawing is the property of BLUE SYSTEMS AB.
The content must not be copied or made available to any third party without our written permission.