



MANUALE DI PRESENTAZIONE
PRESENTATION MANUAL



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A LINDSAY TRANSPORTATION SOLUTIONS COMPANY



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INTRODUCTION

Improving road safety requires a combination of enforcement, education, and engineering initiatives. It has been well recognized that legislative and enforcement initiatives, such as seat-belt laws and impaired driving enforcement, have reduced the number of crashes on roads.

But also great importance has to be given to the increased safety level of roads ensured by national governments, which decided to take the ambitious step of ensuring their infrastructure is planned, built and maintained taking into consideration the needs and safety of all users.

Steel beam longitudinal barriers protect errant vehicles from roadside hazards; when impacted, they safely redirect the impacting vehicle and minimize the probability of serious injury. Guardrail end terminals are devices placed on the ends of longitudinal barriers and are frequently hit by vehicles that leave the roadway.

Since the late 1980s, there has been a sustained and continuing effort to improve the safety of barrier end treatments.

Energy-absorbing barrier end treatments are effective at reducing the severity of collisions. Fatalities can be reduced by up to 78 percent, and injuries by up to 68 percent, with the introduction of these devices.

An end terminal has two primary functions: 1) to render the end of the barrier safe when impacted head-on, and 2) to provide anchorage to the system, often with an anchor cable. It has to be tested according the ENV 1317-4 standard, which deals with impact tests acceptance criteria and test methods for terminals and transitions of safety barriers.

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PRODUCT DESCRIPTION

X-Tension 110[®] is a fully redirective guardrail end terminal.

The unique X-Tension 110[®] technology is a tension based solution rather than compression based. It offers exceptional vehicle control and energy absorbing capabilities in head on impacts. X-Tension 110[®] substantially consists of an impact head with a bake bar inside, a slider assembly and slider bracket, a cable anchor bracket, a foundation anchor assembly, two cable assemblies, a ground strut, steel breakaway posts and three posts and three 2-beam standard panels.

This exclusive technology features tangent end terminals with the length of need starting at post 1, rather than at post 3. X-Tension 110[®] is capable of redirecting vehicles of 900 to 1500 kg impacting the side of the system at an angle of up to 20° and 110 km/h when impacting from the length of need.

When impacted head on, the vehicle is brought to a controlled stop or allowed to penetrate to the back side, depending on the impact conditions. In all head on impacts, varying amounts of energy are dissipated depending on the length of time the vehicle remains in contact with the impact head.

During head on impacts, X-Tension 110[®] is energy absorbing with resistance at the impact head rather than being transferred down the rail as in other terminals. Even high angle (15° during testing) impacts on the nose resulted in the vehicle being redirected and controlled. The head, rail one and the slider telescope over rail two until rail two comes to rest in the back of the impact head. At this point, the V-notch bolts joining rails two and three are sheared allowing the entire rail one, head, slider and rail two assembly to slide over rail three. As the head is pushed down the two cables, the cables are pulled through the cable friction plate in a twisting path which dissipates the energy.

X-Tension 110[®] awarded in 2008 the first place "Innovation Award" from the American Traffic Safety Services Association (ATSSA) at their annual convention held in New Orleans for the X-Tension 110[®] Guardrail End Terminal.

The ATSSA Innovation Awards were developed to recognize companies that have created new, innovative, and cost effective products that can help to save lives on our roadways. The winners are chosen by public officials from the roadway safety industry.

It has also received a "Top Rollout" award from *Better Roads* magazine. The award is given to innovative products in the highway and bridge industry.

WHY CHOOSING X-TENSION 110[®]:

X-Tension 110[®] is suitable for all road types: Motorways, country roads, city streets for speed categories up to 110 km/h.

X-Tension 110[®] is very easy to install. With the use of proper tools and trained crew of 2 workers, the estimated time for installation is about 2 hours depending on site conditions, traffic, size and experience of work crew, and quality of tools. X-Tension 110[®] technology provides a greater length of protective barrier in every situation, therefore reducing the length and cost of installations.

X-Tension 110[®] is safe. The impact force held in tension therefore there is less chance of kinked rail.

X-Tension 110[®] is easy to transport.

X-Tension 110[®] is tested according ENV 1317-4 and NCHRP 350 at 110km/h.

X-Tension 110[®] is a tension based system.



SPECIFICATIONS

The device is a *Redirective end terminal*, as defined by the European Standard.

It can be used anywhere protection against impact is required for obstacles, including structures, and on any road surface.

The containment level is P4 in accordance with the standard ENV1317-4:2000 which is used to evaluate the *end terminals*.

It means that the X-Tension 110[®] was fully tested, performing all the 4 crash tests required for a single end terminal in this class, and listed in the table below:

TEST ¹⁾	APPROACH	TOTAL VEHICLE MASS KG	VELOCITY KM/H
TT 2.1.100	Head on nose 1/4	900	100
TT 1.3.110	Head-on centre	1500	110
TT 4.3.110	Side, 15° 2/3 L	1500	110
TT 5.1.100	Side, 165° 1/2 L	900	100

1) Test notation as follows:
TT test of the terminal
1 approach
2 test vehicle mass: 1 = 900 kg, 2 = 1300 kg, 3 = 1500 kg
100 impact speed
 NOTE 1 To avoid ambiguity, the numbering of the approach path in table 1 and in Figure 3 is the same as in EN 1317-3; approach 3 is present in EN 1317-3 as test 3 for crash cushions, but it is not required for Terminals.
 NOTE 2 Test 5 will not be run for a crash cushion of non-parallel from when, at the relevant impact point the angle (α) of the vehicle path the traffic face of the crash cushion is less than 5°.

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CRASH TESTS TABLE

**TERMINAL X-TENSION 110
IMPACT TEST**

KEY

- 1) - TEST 1
- 2) - TEST 2
- 3) - TEST 3
- 4) - TEST 4
- 5) - 1/4 VEHICLE WIDTH
- 6) - 1/2 VEHICLE WIDTH
- 7) - BARRIER
- 8) - TERMINAL

Test	Impact condition	Total vehicle mass kg	Velocity km/h	Test N°	ASI A ≤ 1.0 B ≤ 1.4	PHD ≤ 20 g	THIV km/h
TT 1.3.110	Head-on centre 0°	1500	110	1	0.9	14	23
TT 2.1.100	Head-on 1/4 vehicle offset	900	100	2	1.1	15	31
TT 4.3.110	Side impact at 15°	1500	110	3	0.8	8	19
TT 5.1.100	Side impact reverse at 165°	900	100	4	0.8	9	22

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REV. 0

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REUSABILITY

X-Tension 110[®] is a repairable device. Types of repair are divided into two categories: Traffic Face Impacts and Head on Impacts.

The key repair steps in traffic face impacts are:

1. Remove ropes
2. Remove damaged beam
3. Remove components from beams
4. Remove damaged posts
5. Assess damage
6. Reassemble

In traffic face impacts any part that cannot be reused must be replaced with a new part. **ALWAYS REPLACE THE YELLOW SHEAR BOLTS.** If undamaged ropes can be reused.

Generally, all the specialized components of the system such as the head and brackets should be undamaged.

Key repair steps in head on impacts are:

1. Remove the rope
2. Pull the beams back
3. Remove components from beams
4. Remove damaged posts
5. Assess damage
6. Reassemble

In head on impacts any part that cannot be reused must be replaced with a new part. In minor impacts (beams telescoped less than 3 meters) the ropes can be reused by turning them end for end. If additional damage has occurred, replace the ropes. Generally, all the specialized components of the system such as the head and brackets should be undamaged.

CARE MUST BE TAKEN WHEN REMOVING THE ROPES.

FAQ

1. What is an "End Terminal"?

An *End Terminal* is a treatment of the beginning and/or the end of a safety barrier so as to lessen the impact in the event of a collision. It is part of the family of safety fences.

2. What are the dangers involved in colliding with an obstacle?

When a collision occurs any unrestrained body in the vehicle continues to follow the trajectory of the vehicle and so smashes into the sides of the vehicle itself, causing fractures and in many cases irreparable damage to internal organs.

If the passenger is wearing a seatbelt, the body is restrained but the internal organs can suffer the effects of strong acceleration and be ruptured. Moreover, the head is not restrained and may suffer trauma to the cervical vertebrae (whiplash) or injury from banging against the inside of the vehicle. During the design stages, car manufacturers run crash impact tests at speeds of up to 50 km/h, even for top of the range models, so the injuries are probably very serious in traffic accidents occurring at speeds greater than 50 km/h.

3. How does a X-Tension 110[®] work?

For traffic face impacts, tension in the rail is transferred via the cables to the foundation anchor to provide containment and redirection. For head-on and angled impacts directly at the end, friction between the cables and the impact head dissipates crash energy and the slider/slider bracket assembly allows the first W-beam rail segment to slide back along the segment and away from the impacting vehicle.

4. What's the difference between a tension based system and a compression based system?

A tension based system relies solely on components contained in the impact head as it moves down the length of the system during an impact.

A typical compression based system relies on multiple components downstream from the impact head. Therefore, there is less component interactivity with a tension based system.

5. Energy Absorbing or Non-Energy Absorbing?

Some end treatments absorb energy from an impacting vehicle, and some do not. The X-Tension 110[®] End Terminal is an energy-absorbing system.

The conditions at a particular site may determine that an energy-absorbing terminal is more desirable than a non-energy-absorbing terminal because of the proximity of the end terminal hazard.

6. To what kind of barrier can the X-Tension 110[®] End Terminal be connected?

X-Tension can be directly connected to the existing barrier as long as its height, profile and dimension are the same of the barrier's one. On the contrary, it's necessary to study suitable connections, in order to avoid possible discontinuities. Snoline is able to realize connections to most type of barrier. Please contact the Commercial Department for more information.

7. Where should the X-Tension 110[®] be placed?

The end terminal has to be placed in front of a barrier in order to guarantee the continuity of the barrier lateral surface facing traffic. Therefore, as the barrier spacer blocks and posts could be different from the end terminal ones, during the installation the barrier line has to be traced with a rope (along which the terminal beams have to be placed) in order to place correctly the terminal posts. Compared to the beam, the posts from 2 to 7 have a setback of 200mm, and post 3 is placed at 240mm.

8. Where should the X-Tension 110[®] be placed (2)?

X-Tension 110[®] End Terminal has been designed to be installed in verge reserve locations, as terminal section (at the beginning or at the end) of a safety barrier.

Ensure that the area where the X-Tension 110[®] has to be installed is ready for the installation (the criteria are the same requested for the installation of the safety barrier). X-Tension 110[®] can be placed on stabilized ground, asphalt or concrete.

9. What is the X-Tension 110[®] Posts Behavior?

The terminal posts behave exactly like the barrier ones. Laterally, they react to the vehicle containment together with the beams traction.

Frontally, the system is dimensioned so that the energy is absorbed mainly by the deformation (and partially by friction) of the wire ropes.

The posts felling is caused by plastic hinge shaped some cm underneath the ground. To help the felling, in case of head-on impact, the posts have been weakened through localized deformation, without material removal. Moreover, the posts have been worked on the top in order to unhook easily from the beam in case of head-on impact, in order to avoid the system sticking.

10. Which are Advantages and Benefits?

X-Tension 110[®] is a redirective end terminal, it begins to redirect already at post 1. That means that there is no length of need.

X-Tension 110[®] is universal applicable. It can be installed in any location suitable for an end terminal.

The tension technology allows impact resistance at the impact head.

X-Tension 110[®] uses locally supplied materials with kit of X-Tension parts.

X-Tension 110[®] can be directly connected to all W profile beams and can be connect to all other guardrails through suitable connections.

11. What maintenance is required?

When not in use, the X-Tension 110[®] is a static system and does not require any maintenance in order to function. However, because it is exposed to the elements and to pollutants in the air, it is a good idea to carry out an annual cleaning, thorough inspection and protection of all the important parts.

The installation and maintenance manual provides details of these procedures and the necessary equipment.

12. What about X-Tension 110[®] transportation?

The X-Tension 110[®] terminal is very easy to be transported to site. It weights only 450kg.

13. How to get spare parts?

Spare parts are available at local distribution or through Snoline s.p.a. and can be shipped within 24 hours upon acceptance of an order.

ANNEXES



DRAWINGS

		Via F. Baracca, 19/23 - 20056 Trezzo s/Adda (MI) - Italia CODICE PRODOTTO: X-TENSION 110	
REV.	DIS./DISE.	DATA/DATE	DESCRIZIONE
	Bpv/ld CR	23.02.09	MATERIALE/MATERIAL
COMPITORE	SCALE/SCALE	VISTO/CHIO	FINITURA/FINISH
SIST. N. DIS. N°	//	SM	//
XTE A09		DESCRIZIONE	DATA
//		FINITURA/FINISH	REV

IL PRESENTE PRODOTTO È LE INFORMAZIONI IN ESSE CONTENUTE SONO IN ESCLUSIVA PROPRIETÀ DELLA SNOLINE E' VIETATA SENZA PREVENIVA AUTORIZZAZIONE SCRITTA, DONI RIPRODUZIONE ART.139-L.287/4/1941 - N.633

EN



PICTURES

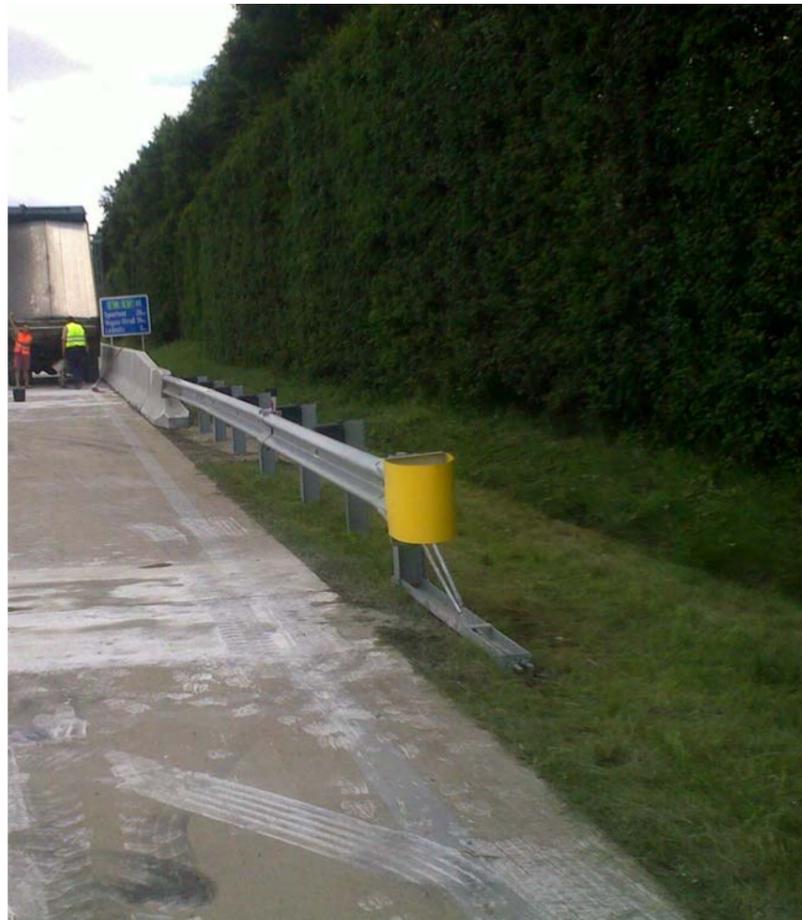


The nose is available in different shape, you can chose the one suitable for your country standards.



On October 18th, a motorists travelling at 140 km/h (87 mph) on the Monterrey-Cadereyta Highway lost control of his Trailblazer and impacted the first post of the X-Tension System on an angle. The X-Tension System redirected the vehicle back safely into traffic. None of the four occupants sustained any injuries and had the vehicle not had a flat tire, it would have been drivable after the impact.

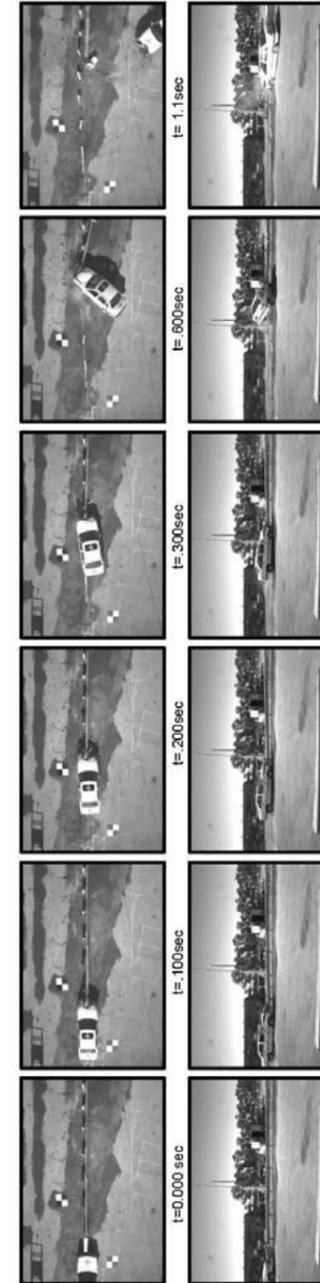
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CRASH TESTS RESULTS

Hereinafter the crash tests results. The complete crash tests reports are available at Snoline s.p.a.

<p>Safe Technologies, Inc. CRASH TEST SERVICES 170 River Road, Rio Vista, CA 94571</p>	X-Tension Terminal Barrier Systems, Inc.	Report #: XTSSP4	Page 13 of 98
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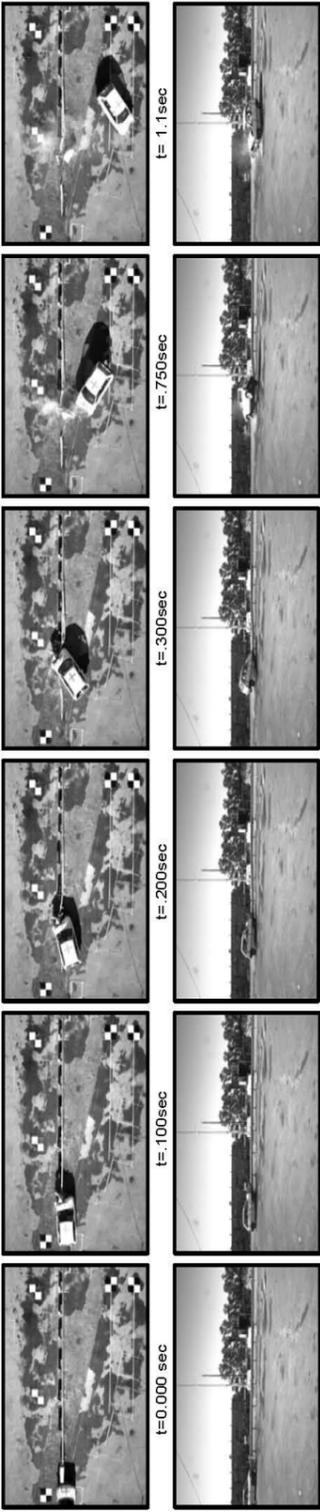


General Information	Test Agency..... SAFE TECHNOLOGIES, INC. Test Designation..... EN 1317-4, Test TT 1.3.110 Test No..... XTE16 Date..... Oct. 13, 2008 Test Article Type..... X-Tension 110 Terminal Barrier Systems, Inc. Installation Length..... 11.7 m system / 28.2 m Total Size and/or dimension and material of key elements..... Length 11.7 m, System Height 800 mm, Width 540 mm Test Vehicle Type..... Production Model Designation..... 1,500 kg Model..... 1996, Volvo 850 Mass (kg) Curb..... 1,403.5 Dummy(s)..... 0 Test Mass..... 1503
Exit Conditions	Speed at 6m Exit Box (km/h)..... 9.6 Occupant risk Values Impact Velocity (m/s) x-direction..... 6 y-direction..... -0.1 Rollover Acceleration (g's) x-direction..... -13 y-direction..... -9 THW (km/h)..... 23 PHD (g's)..... 14 ASI..... 0.9 Test Article Deflection (mm) Dynamic..... 581 Permanent..... 467 Permanent lateral Displacement Zone Impact Severity Class..... D1.1 Redirection Exit Box Class..... A Vehicle Damage Exterior..... Z2 Interior..... Z2 VDS..... FC-2 CDC..... 12FDEW2 Interior VCDI..... FS0000000
Impact Conditions	Speed (km/h)..... 111.7 Angle (deg)..... 0

Figure 2. Summary of Results Test #XTE16



<p>Safe Technologies, Inc. CRASH TEST SERVICES 170 River Road, Rio Vista, CA 94571</p>	X-Tension 110 Terminal Barrier Systems, Inc.	Report #: XTSSP4	Page 23 of 98
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General Information
 Test Agency..... SAFE TECHNOLOGIES, INC.
 Test Designation..... EN 1317-4, Test TT 2.1.100
 Test No..... XTE18
 Date..... Oct. 22, 2008

Test Article
 Type..... X-Tension 110 Terminal
 Barrier Systems, Inc.
 Installation Length..... 11.7 m system / 28.2 m Total
 Size and/or dimension and material
 of key elements..... Length 11.7 m, System Height 800 mm,
 Width 540 mm

Test Vehicle
 Type..... Production Model
 Designation..... 900 kg
 Model..... 1989,132 Ford Festiva

Mass (kg)
 Curb.....755.5
 Dummy(s).....75
 Test Mass..... 898

Impact Conditions
 Speed (km/h)..... 101.8
 Angle (deg)..... 0

Exit Conditions
 Speed at 6m Exit Box (km/h)..... 8.8

Occupant risk Values
 Impact Velocity (m/s)
 x-direction..... 9
 y-direction..... -0.3
 Ridedown Acceleration (g's)
 x-direction..... -15
 y-direction..... 7
 THIV (km/h)..... 31
 PHD (g's)..... 15
 ASI..... 1.1

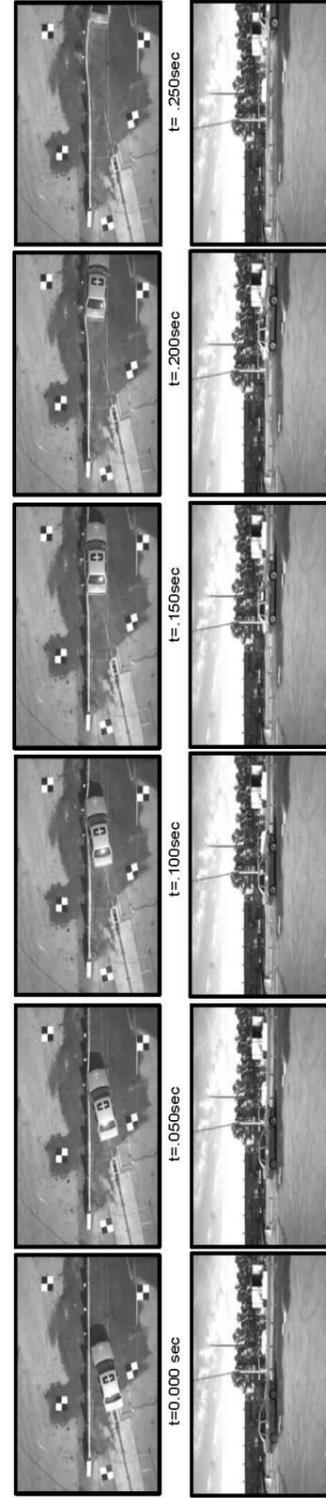
Test Article Deflection (mm)
 Dynamic..... 593
 Permanent..... 453
 D1.1

Permanent lateral Displacement Zone
 Impact Severity Class B
 Redirection Exit Box Class Z2

Vehicle Damage
 Exterior
 VDS..... FC-4
 CDC..... 12FDEW4
 Interior
 VCDI..... FS0000000

Figure 9. Summary of Results Test #XTE18

<p>Safe Technologies, Inc. CRASH TEST SERVICES 170 River Road, Rio Vista, CA 94571</p>	X-Tension 110 Terminal Barrier Systems, Inc.	Report #: XTSSP4	Page 33 of 98
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General Information
 Test Agency..... SAFE TECHNOLOGIES, INC.
 Test Designation..... EN 1317-4, Test TT 4.3.110
 Test No..... XTE17
 Date..... Oct. 17, 2008

Test Article
 Type..... X-Tension 110 Terminal
 Barrier Systems, Inc.
 Installation Length..... 11.7 m system / 39.2 m Total
 Size and/or dimension and material
 of key elements..... Length 11.7 m, System Height 800 mm,
 Width 540 mm

Test Vehicle
 Type..... Production Model
 Designation..... 1,500 kg
 Model..... 1996, Volvo 850

Mass (kg)
 Curb.....1438
 Dummy(s)..... 0
 Test Mass..... 1449.5

Impact Conditions
 Speed (km/h)..... 113.8
 Angle (deg)..... 15

Exit Conditions
 Speed (km/h)..... 95.8

Occupant risk Values
 Impact Velocity (m/s)
 x-direction..... 2
 y-direction..... -6
 Ridedown Acceleration (g's)
 x-direction..... -5
 y-direction..... 8
 THIV (km/h)..... 19
 PHD (g's)..... 8
 ASI..... 0.8

Test Article Deflection (mm)
 Dynamic..... 230
 Permanent..... 230
 D1.1

Permanent lateral Displacement Zone
 Impact Severity Class A
 Redirection Exit Box Class Z1

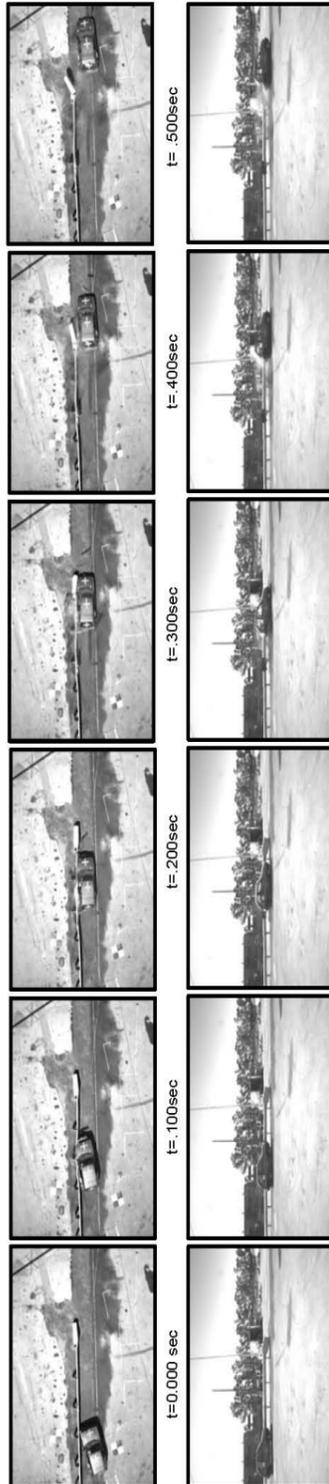
Vehicle Damage
 Exterior
 VDS..... LP-1
 CDC..... 11LDES1
 Interior
 VCDI..... AS0000000

Figure 16. Summary of Results Test #XTE17



APPROVALS

 Safe Technologies, Inc. CRASH TEST SERVICES 170 River Road, Rio Vista, CA 94571	X-Tension 110 Terminal Barrier Systems, Inc.	Report # XTSSP4	Page 43 of 98
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General Information Test Agency..... SAFE TECHNOLOGIES, INC. Test Designation..... EN 1317-4, Test TT 5.1.100 Test No..... XTE13 Date..... Sept, 19, 2008 Test Article Type..... X-Tension 110 Terminal Barrier Systems, Inc. Installation Length..... 11.7 m system / 39.2 m Total Size and/or dimension and material of key elements..... Length 11.7 m, System Height 800 mm, Width 540 mm		Exit Conditions Speed (km/h)..... 69.8 Occupant risk Values Impact Velocity (m/s) x-direction..... 4 y-direction..... -6 Ridedown Acceleration (g/s) x-direction..... -9 y-direction..... 8 THIV (km/h)..... 22 PHD (g/s)..... 9 ASI..... 0.8	
Test Vehicle Type..... Production Model Designation..... 900 kg Model..... 1990 Ford Festiva Mass (kg) Curb..... 752.5 Dummy(s)..... 75 Test Mass..... 882.5		Test Article Deflection (mm) Dynamic..... 120 Permanent..... 120 Permanent lateral Displacement Zone..... D1.1 Impact Severity Class..... A Redirection Exit Box Class..... Z1	
Impact Conditions Speed (km/h)..... 101.4 Angle (deg)..... 15		Vehicle Damage Exterior..... VDS..... LP-5 Interior..... CDC..... 10LYAS3 VCDI..... LS0002200	

Figure 23. Summary of Results Test #XTE13



Snoline s.p.a
Via F. Baracca 19/23
20056 Trezzo s/Adda (MI)

APPROVAL

1 (2)

1 August 2008

13984/2006/30/11

Request for approval

Terminal X-Tension for safety barriers

The Finnish Road Administration has inspected the following documents concerning X-Tension, a terminal for safety barriers:

1. Approval by US DOT Federal Highway Administration (HSSD-1/CC-102) for three modifications of X-Tension, known earlier as Armoflex350.
2. Intallation and Maintenance Manual (no date)
3. Drawing concerning the connection of X-Tension with the Finnish W-230/4 profile (29.05.08).

The US DOT Federal Highway Administration concluded that the following versions of X-tension: 1. Tangent, 2. Flared and 3. Median version fulfil the requirements of NCHRP 350 at speed level 3 (100 km/h). In all versions the following alternatives were accepted a) with wood posts and b) with steel posts.

In Finland energy absorbing terminals shall either fulfil ENV 1317-4 or NCHRP 350 at speed level 100 km/h. Therefore **The Finnish Road Administration approves the tangent version of X-Tension as energy absorbing terminal to be used with steel barriers. Post shall be steel when used with a barrier with steel posts.**

The possible use of the flared and median version requires additional specifications approved by the Finnish Road Administration. The specification shall include the following information:

- maximum slope at the flared version
- which barrier types can be used with the median version.

At this stage X-Tension is not approved to be used with a concrete barrier.

The distributor in Finland has to ensure personnel doing the installation understand the safety risk (e.g. tensioned rope) and their prevention during the installation.



APPROVAL 2 (2)

1 August 2008 13984/2006/30/11

The approval is valid as long as NCHRP 350 is used in Finland as an alternative requirement for ENV 1317-4.

Development manager
Road engineering

Kari Lehtonen

EN

FAHRZEUG - RÜCKHALTESYSTEME:
EINSATZFREIGABEN / VERLÄNGERUNGEN UND WICHTIGE ERLÄSSE

Antragsteller/ Hersteller	Produktname	Rückhalte- stufe	Mindest- aufstelllänge (*)	ASI [-]	Wirkungs- bereich, Stufe	Gz. der Einsatzfreigabe	Genehmigungs- datum	Laufzeit der EFG
ALPINA / Snoline s.p.a	X-Tension 110 (XT 110)	P4	-	-	-	328.040/0009-II/ST/2/09	in Bearbeitung	-

Terminals - provisorische Einsatzfreigaben gemäß prEN 1317-4:

Der aktuelle Stand der Einsatzfreigaben ist abrufbar unter:
<http://www.bmvit.gv.at> Verkehr, Straße, Verkehrstechnik, Rückhaltesysteme

Quelle:
<http://www.bmvit.gv.at/verkehr/strasse/verkehrstechnik/rueckhalt.html>

EN



Norwegian Public Roads Administration

SNOLINE Spa
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20056 Trezzo s/Adda (MI)

Italia

Behandlende enhet: vegdirektoratet Saksbehandler/innvalgsnr: Matteo Pezzucchi - 22073246 Vår referanse: Deres referanse: Vår dato: 19.05.2009

Attestation of conformity of X-Tension 110 Guardrail End Terminal, XT110

With reference to the application 2007028430-79 on the 11th march 2009 from SNOLINE Spa for approval of *X-Tension 110 Guardrail End Terminal*.

These documents follow the application:

- 1) From Safe Technologies, Inc.. Crash Test Report XTSSP4: *X-Tension 110 Guardrail End Terminal*, tests TT 1.3.110, TT 2.1.100, TT 4.3.110 and TT 5.1.
- 2) From Snoline Spa. Videos/pictures, presentations, reports and assembly system.

The tests reports are examined and checked for conformity to ENV 1317-4. The *X-Tension 110 Guardrail End Terminal*, satisfied the performance and severity requirement in the normative.

The *X-Tension 110 Guardrail End Terminal*, is given attestation of conformity for installation as follows:

- Performance class P4 and Impact severity class B, with lateral displacement class D1.1 and exit box class Z2

This attestation of conformity is valid until the Notified Body of Conformity is established in Norway. The acceptance is limited to use within Norwegian Public Roads Administration.

In case there are any point of distinction between the English letter and the Norwegian version the Norwegian version should be act as the original.

Bridge Section
Yours sincerely,

Børre Stensvold
Head of Section

Otto Kleppe

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Our ref: MIRA-0888-CPD-0159

9th April 2009



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CV10 0TU
UK

Snoline S.p.A
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20056 Trezzo s/Adda (MI)
Italy

Dear Ms Ferraris

X-TENSION 110 TERMINAL

I can confirm that I have reviewed the test reports, videos and still photographs and can confirm that the X-TENSION 110 Terminal system identified by Safe Technologies Inc Test Report Number XTSSP4, dated 17th December 2008 and has been approved for use on the Highways Agency road schemes subject to the restrictions given below.

The performance classes of the X-TENSION 110 Terminal shall be taken as follows:

- Performance class: P4
- Impact severity level class: B
- Lateral Displacement Class: X1 and Y1
- Exit Box Class: Z1
- Working Width Class: N/A (see note 1)

The performance classes listed above relate to a tested system length of 39.2m, which included a terminal length of 11.7m.

Note 1: Working width is not a required criterion when assessing a Terminal

Yours sincerely

Jenny Andrews

Certification and Inspection Technical Manager
MIRA