Jaybro

CONSIDER IT DONE.

SafeZone™

Standard / LDS / MDS

Installation Manual (Version 1.25)

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1. Introduction

1.1. General

SafeZone™ is a rapidly deployable Steel Safety Barrier conforming to AASHTO Manual for Assessing Safety Hardware (MASH).

The MASH specification is an update to and supersedes NCHRP Report 350 for the purposes of evaluating new safety hardware devices. MASH is also the basis of testing procedures for road safety systems as stated in AS/NZS 3845.1: 2015 Road Safety Barrier System and Devices. The introduction of MASH follows changes to the vehicle fleet, researching of real-life impact conditions and updated criteria for evaluating barrier performance.

SafeZone™ is a smooth faced modular vehicle restraint system, anchored to the ground at the end of each run or at intermediate anchor points along its length as required to meet site-specified performance requirements. The closed design feature of SafeZone™ eliminates snag points providing consideration for vulnerable road users.

SafeZone™ comprises single, prefabricated 5.8m elements. Two (2) elements are bolted together at the factory prior to deployment, providing 11.6m long sections with male and female Quick Mount connectors to facilitate rapid onsite assembly. Fast connection of the elements is achieved by lining up the barrier and locking the Quick Mount connectors together.

The symmetrical design of SafeZone™ enables it to be deployed as either a single- or double-sided barrier providing protection for verge and median applications. The barrier may be secured to concrete and asphalt road surfaces.

The maximum length of the system is unlimited as the barrier relies upon the combination of torsional rigidity, anchoring and system mass to provide safe vehicle containment and redirection.

The anchoring frequency of SafeZone™ may be adjusted to provide three (3) configuration options:

1. SafeZone™ Standard;
2. SafeZone™ LDS; and
3. SafeZone™ MDS.

1. 2. Deflection Chart

Model	Dynamic Deflection	Dynamic Working Width	Length of need	Anchorage
SafeZone TL3 Standard	1.70m	2.06m	69.63m	every 69.6m
SafeZone TL4 Standard	2.07m	2.96m	69.63m	every 69.6m
SafeZone TL3 Limited Deflection	0.42m	1.06m*	40.62m	every 11.6m
SafeZone TL4 Limited Deflection	0.45m	2.17m*	40.62m	every 11.6m
SafeZone TL3 MDS Deflection	169mm	808mm	40.62m	every 5.8m

1.3. Design Considerations

Pavement Grading

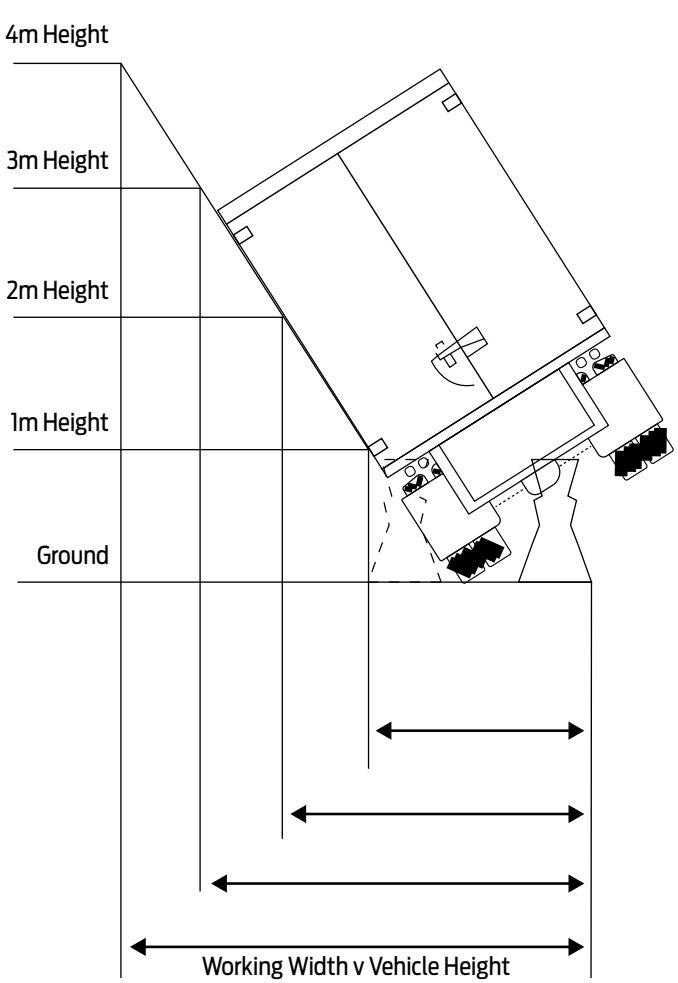
It is recommended that the slope of the pavement not exceed a grading of 8% to facilitate controlled vehicle containment and redirection.

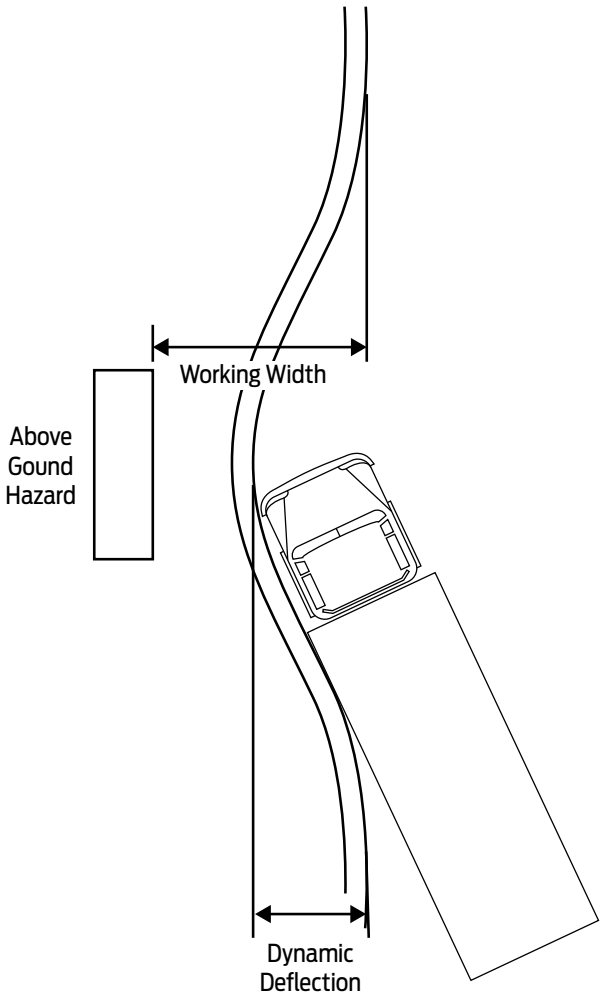
Dynamic Deflection

Dynamic deflection is the maximum lateral displacement of the barrier during a vehicle impact. When a vehicle strikes a barrier, the dynamic deflection varies according to the characteristics of the impacting vehicle, including vehicle mass, impact speed, angle of impact and the characteristics of the barrier system. Sufficient dynamic clearance should be provided between the face of the barrier and a hazard to accommodate the appropriate dynamic deflection.

Working Width

The working width is the minimum distance required to prevent an impacting design vehicle from colliding with an object behind a barrier system. This includes both the dynamic deflection of the barrier and the extra width to allow for the roll (vertical rotation) of an impacting vehicle. Working width is an important design consideration when shielding above-ground fixed hazards such as trees, sign supports or bridge piers.





1.4. SafeZone™ Standard

SafeZone™ Standard provides an economical solution for worksites with sufficient clearance behind the system to accommodate expected barrier deflection and working width. The spacing of the anchors is 69.6m allowing the system to be rapidly installed, reducing drilling frequency and subsequent disruption to traffic.

Crash Test Results

Containment Level	Dynamic Deflection	Working Width	Length of Need	Spacing of Anchors
MASH TL3	1.70m	2.06m	69.63m	69.6m
MASH TL4	2.07m	2.96m	69.63m	69.6m

MASH TL4 Working Widths – for Standard Deflection Test

Vehicle Height			
1m	2m	3m	4m
2.48	2.64	2.80	2.96

1.5. SafeZone™ LDS

SafeZone™ Low Deflection System (LDS) features a reduction in the spacing of anchors resulting in lower dynamic deflections and working widths. This is an import design consideration when workers or fixed hazards are located within close proximity to the barrier.

Crash Test Results

Containment Level	Dynamic Deflection	Working Width	Length of Need	Spacing of Anchors
MASH TL3	0.42m	1.06m	40.6m	11.6m
MASH TL4	0.45m	2.17m	40.6m	11.6m

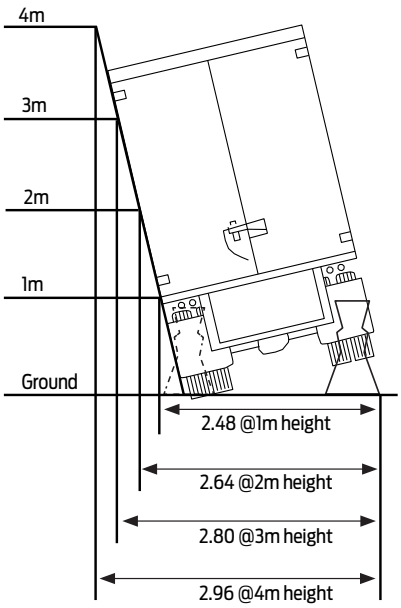
1.6. SafeZone™ MDS

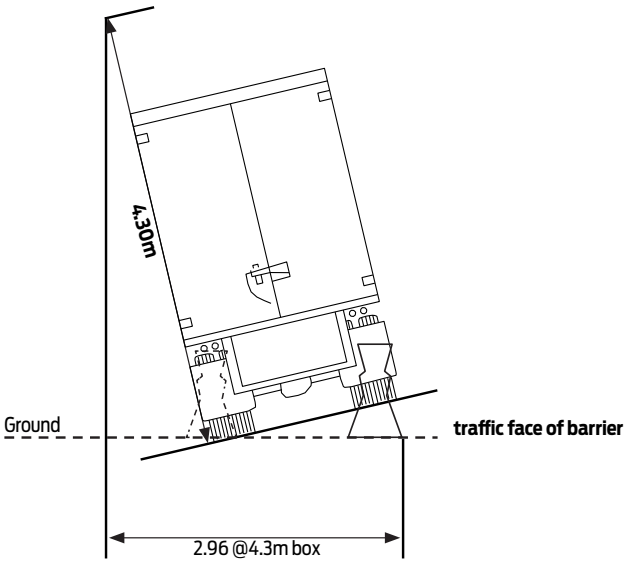
SafeZone™ Minimum Deflection System (MDS) is designed for constrained sites that cannot accommodate the deflections and working widths of SafeZone™ LDS. The spacing of the anchors is reduced to just 5.8m, increasing the stiffness of the system. While providing lower dynamic deflection results, a Minimum Deflection System (MDS) increases the potential for vehicle occupant risk during high-speed impacts due to the increased stiffness of the barrier. It is therefore recommended that MDS installations be limited to constrained sites and undergo risk assessment analysis when preferred to Low Deflection System (LDS) options. The frequency of anchoring throughout the installation may revert to the nominated spacings for SafeZone™ LDS or SafeZone™ Standard where there is sufficient hazard free clearance behind the barrier.

Crash Test Results

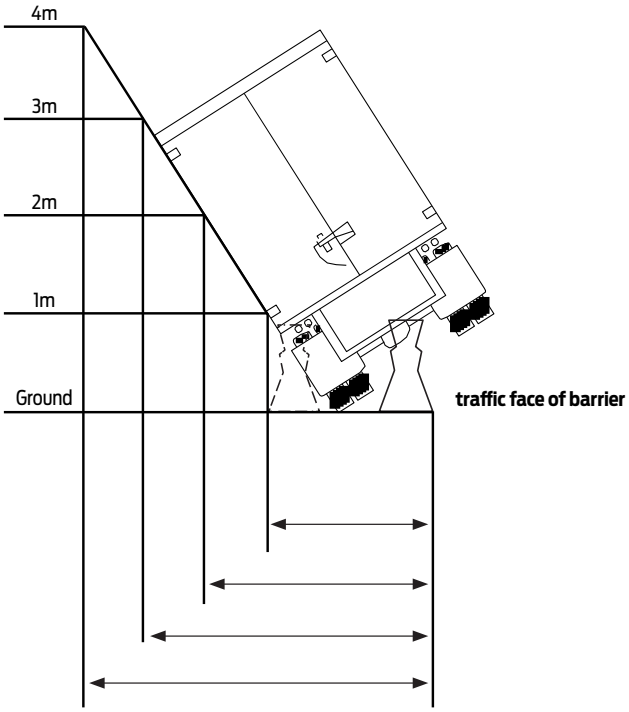
Containment Level	Dynamic Deflection	Working Width	Length of Need	Spacing of Anchors
MASH TL3	0.169m	0.808m	40.6m	5.8m

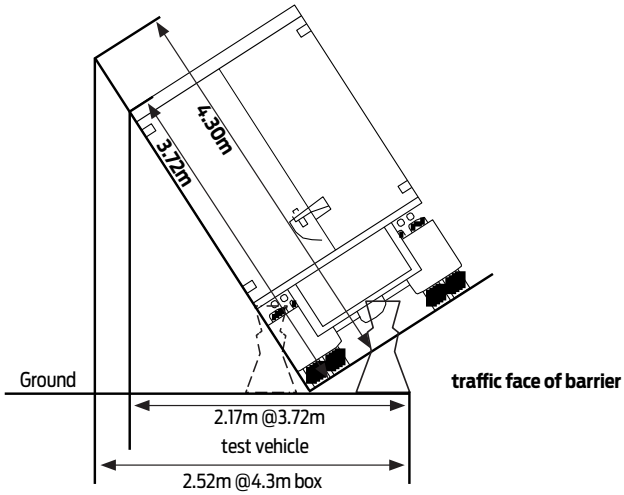
SafeZone TL4 Standard Installation





Safezone TL4 Limited Deflection Installation





1.7. Table of curvatures

Method	Description	Max. Angle º	Radius (comment)
1	Movement on Quick Connect	0.63	minimum radius using only standard barriers: 528.0m
2	5 degree angle piece	5.0	
3	10 degree angle piece	10.0	minimum radius achievable using only 10º angle pieces: 11.2 m

Depending on the arc length any radius between 11.2m – ∞ can be achieved using the parts in the table above For job specific analysis contact your supplier.

1.8. Delineators

Reflective delineators can be attached to the side wall of the SafeZone™ as required and at the relevant spacings. There are two options of delineators available, one a fixed reflector the second a reflector with a flexible joint which helps makes it resistant to breaking. Reflectors can be also attached on top of the barrier.

2. Safety Statements

2.1. Lifting Safe Zone

Use lifting equipment that apply to local regulations.

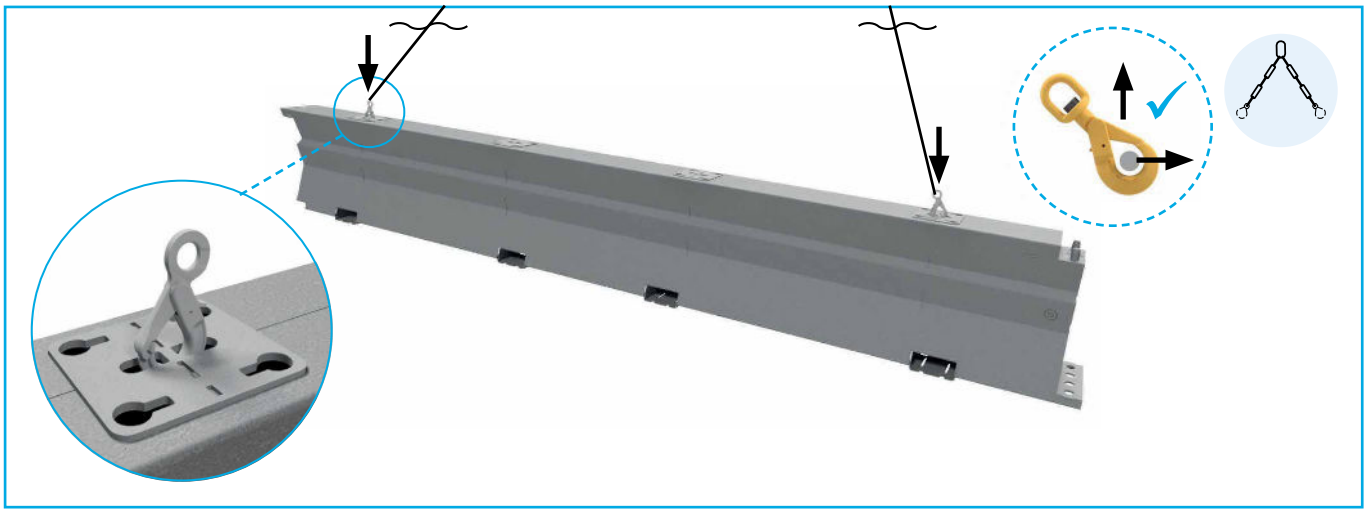
Each standard element of SafeZone is 5.8m long and weighs approx. 535kg. It is supplied with two elements bolted together to form one 11.6m unit. The connection of the elements was made by lowering one element over the other. These barrier sections are connected together with male to female pin joints and then locked with a single security bolt. The weight of one unit is approx. **1,070kg**. The standard barrier sections have 3 different lifting options, 1 position for lifting with a forklift and 2 positions for lifting with a crane using chains and hooks.

Make sure the chains are not twisted before hooking on. When hooking on to the barrier, make sure the hook is around the bar that runs across the slot. NEVER HOOK ON TO THE SHEET STEEL DIRECTLY. Make sure the hooks face outwards, i.e. the open side of the hook nearest the end of the barrier. Make sure the properly rated chain + hook for the load.

2.2. Turning the barrier over

In order to stack the barrier it is occasionally necessary to invert the barrier. Do not turn the barrier over by pulling it sideways with the crane. This can cause damage to the crane and chains, which could cause an accident due to failure during subsequent lifting operations. The following method can be used but note that the chain hooks are subject to side load when using this method. Always, therefore, use hooks that are rated at or above (typically 2,000 kg per hook)and use of the conventional type, not the type where the chain attaches to the extended latching bar.

Chapter 14/15/16 Lifting guide



2.3. Inverting the SafeZone

Lower the barrier onto a wooden block so that the barrier settles on the block near the center of the barrier clear of cross members and with only one side of the barrier supported by the block. Continue lowering the barrier until it lies on it's side. Transfer the chains from the lifting eyes on the top of the barrier to the lifting eyes on the bottom of the barrier and lift the inverted barrier.

2.4. Righting inverted SafeZone

Lower the barrier onto a timber wedge with approximately a one in three slope. The barrier will settle on it's side. Transfer the lifting chains from the bottom of the barrier to the top of the barrier and lift in the normal way.

2.5. General Safety

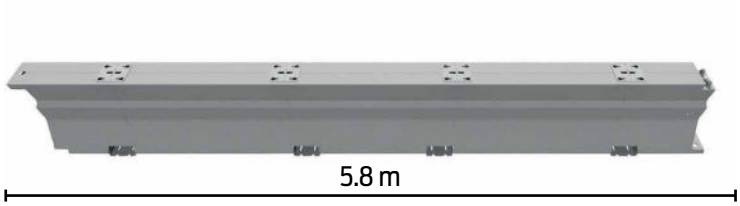
- All required traffic safety precautions should be followed. All workers should wear required Personal Protective Equipment (PPE)(OSHA approved vest, steel toed boots, eye protection, gloves).
- Only authorised trained personnel should operate any machinery. Where overhead machinery is used, care must be taken to avoid overhead hazards.
- There are no underground services, waterproof membranes etc. which could be damaged by drilling;
- There are no overhead cables that could be contacted by the lifting operation.
- There is adequate working room and safety zone.

3. Impact attenuators and transitions

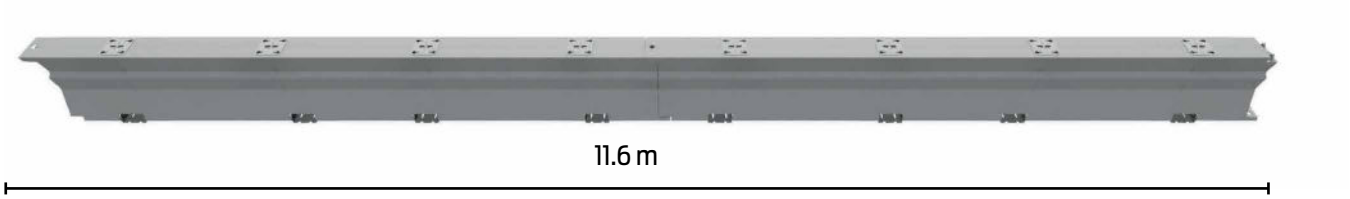
Depending on state installation requirements SafeZone must start and finish with an approved impact attenuator or end terminal. Details of Impact attenuator transitions and connections are available from the Impact attenuator supplier.

Refer to annex 2 for approved impact attenuators and transitions.

4. Common Components List



SafeZone 5.8m (19.0ft) section, male/female QuickLink(AS31840000)



SafeZone 11.6m section, male/female QuickLink, a unit

SafeZone anchor shoe (AS31840020)

SafeZone Flat top pin (AS31642592)

SafeZone Threaded rod 300mm (KE31840030)

SafeZone Threaded rod 175mm (KE31840031)

SafeZone Excalibur bolt 300mm

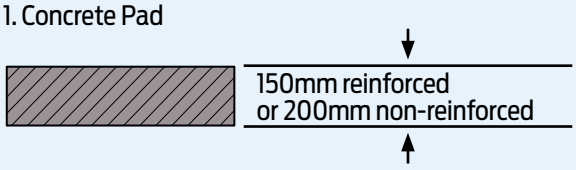
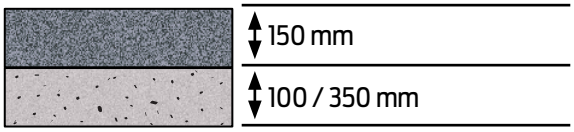
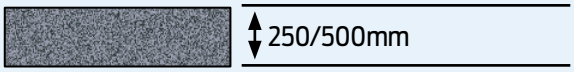
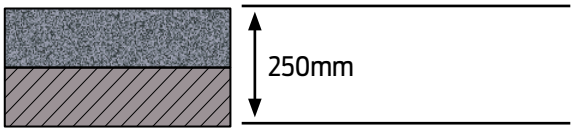
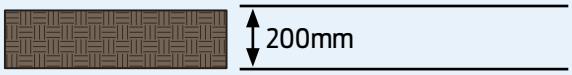
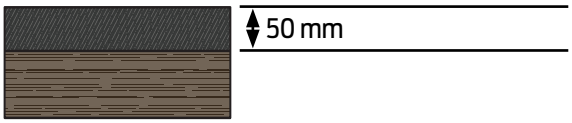
SafeZone™with a crash cushion end treatment. Transition should be fitted prior to the Crash Cushion installed. Per the manufacturer's guidelines.

All M20 bolts to be used for connecting sections of SafeZone together to be at least grade 8.8. torque:200Nm (148 ft - lb).

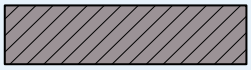
5. Anchor Foundation Specifications & Material Specifications

5.1. Anchor Foundation Specifications

The SafeZone system has been designed to attach to concrete or asphalt foundations. Use the anchorage specified on page 10, depending on the foundation at the specific job site. Other foundations than listed below are not allowed.

1. Concrete Pad 	**Foundation:** Min 150mm reinforced pad or 200mm non reinforced pad
2. Asphalt over Base 	**Foundation:** Min 150mm AC over 100 or 350mm compacted Base 100mm (anchor type B) 350mm (anchor type A)
3. Asphalt only 	**Foundation:** Min 250mm AC 250mm (anchor type B) 500mm (anchor type A)
4. Asphalt over Concrete 	**Foundation:** A Cover Concrete Total build up minimum 250mm
5. AASHTO Soil 	**Foundation:** Min 200mm AASHTO standard soil strength
6. Flush seal over granular pavement 	**Foundation:** 50mm flush seal over min AASHTO standard soil strength

5.2. Material Specifications

Portland Cement Concrete (PCC) 	Stone aggregate concrete mix, 25MPa minimum compressive strength. N25 per AS1379 sampling and testing per AS1012.
Asphaltic Concrete (AC) 	C450A.C. (Per AS2008) 19.0mm (AC20) maximum, coarse aggregate (per AS2891.3.1) **Sieve Size % Passing** 26.5mm — 100% 19.0mm — 80 – 98% 13.2mm — 65 – 93% 6.7mm — 45 – 70% 2.36mm — 20 – 40% 0.600mm — 5 – 25% 0.075mm — 2 – 8%
Compacted (Sub)Base (DGA) 	Densely Graded Base course as per local authority standards. 45mm aggregate maximum CBR≥80%

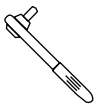
Note: in case of other pavement specifications please consult manufacturer for advice.

6. Required Tools


Tape measure

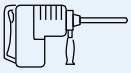

Socket wrench

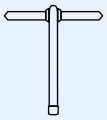

Mortar dispenser

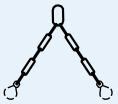

Torque wrench


Hammer


Thermometer


Drill

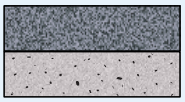
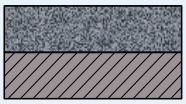
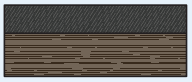

T-Wrench


Lifting Chain

7. Anchoring options on asphalt and concrete

7.1. Foundation Type

Suitable foundation type for Standard System

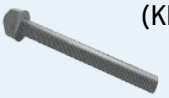
Foundation Type	Concrete Pad	Asphalt over subbase	Asphalt only	Asphalt over concrete	AASHTO Soil	Flush seal over granular pavement
						
Anchor shoe type	1	1	1	1	1	1
Anchor pin type	C	A/B/D	A/B	B	A	A

Note: in case of concrete decks thinner than 250mm please consult manufacturer for advice.

7.2. Choice of anchoring

Type 1	Anchor shoe standard (AS31840020)	

7.3. Anchor Pin

Anchor Pin Type		Diameter Drilled Hole	Anchor Shoe Type	Traffic Side	Non Traffic Side
Type A Flat top pin Ø 30mm Length: 520mm	 (AS31642592)	Ø30mm 500mm depth	Type 1		
Type B Threaded Rod Ø 30mm Length: 300mm	 (KE31840030)	Ø35mm 250mm depth	Type 1		
Type C Threaded Rod Ø 30mm Length: 175mm	 (KE31840031)	Ø35mm 125mm depth	Type 1		
Type D Excalibur Bolt Ø 20mm Length: 300mm	 (not known)	Ø20mm 280mm depth	Type 1		

NOTE:

- Type B anchor pin is a chemical set anchor. Please refer to chapter 10.8 - 10.18 for instructions how to install these chemical anchor pins. Follow the instructions of chapter 7 for anchor distance for the standard installation when using type B anchor pins.
- Type D anchor used for Standard SafeZone TL3 only

7.4. Alternative anchoring systems

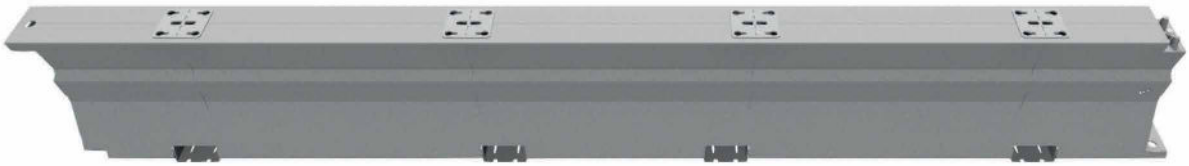
Alternative anchoring systems can be used to anchor SafeZone into concrete. Alternative anchoring systems need to comply with the required minimum pull and shear capacity as described below or need an individual approval from the barrier supplier. For the SafeZone Standard System and LDS System in concrete the following minimum anchor capacity is required:

- Pull force capacity, minimum, non-cracked concrete: NRk,c = 82kN (unfactored) or NRd,c = 55kN (factored) (concrete cone failure based on C25/30 EN206)
- Pull force capacity, minimum, cracked concrete: NRk,c = 58kN (unfactored) or NRd,c = 39kN (factored) (concrete cone failure based on C25/30 EN206)
- Shear force capacity, minimum: VRk,s = 225 kN (unfactored) or VRd,s = 180 kN (factored) (steel failure)

8. Standard installation on asphalt using pin type A

8.1. Start with standard SafeZone barrier section (AS31840000)

1

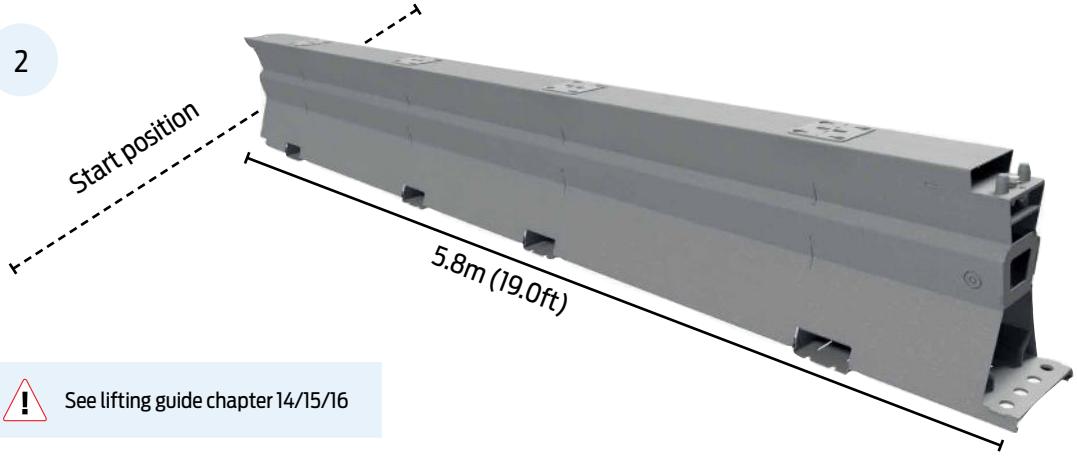


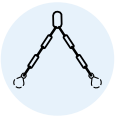
(AS31840000)

The standard installation is anchored on both ends by means of 4 anchors on each end. The minimum installation length of SafeZone Standard System is 69.63 m.

8.2. Beginning of first string of barriers

2

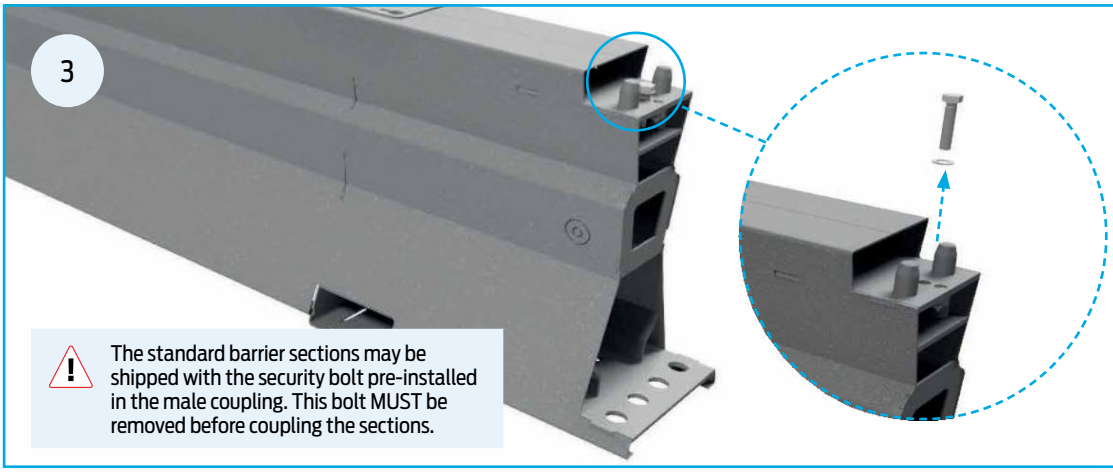




See lifting guide chapter 14/15/16

8.3. The male coupling including the security bolt must face down stream

3



size: m20

length: 80mm

socket size: 30mm

The standard barrier sections may be shipped with the security bolt pre-installed in the male coupling. This bolt MUST be removed before coupling the sections.

8.4. Lower one element over the other

4

8.5. Lock the sections together with the security bolt using the ratchet or T-wrench

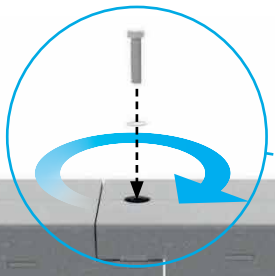
5

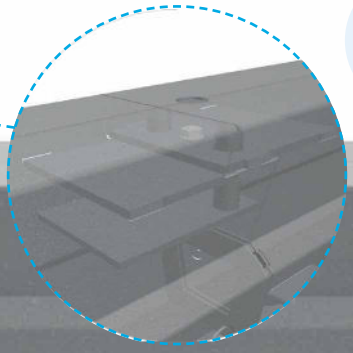
size: m20

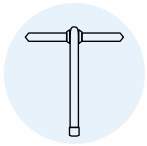
length: 80mm

socket size: 30mm

torque: 200 Nm (148 ft-lb







⚠ Uneven road conditions may make it difficult to get a proper alignment of the two sections which may result in a difficult installation of the security bolt. If needed, use the forklift truck or other onsite lifting equipment to raise one side of the barrier to attain a 'flush fit' before installing the security bolt.

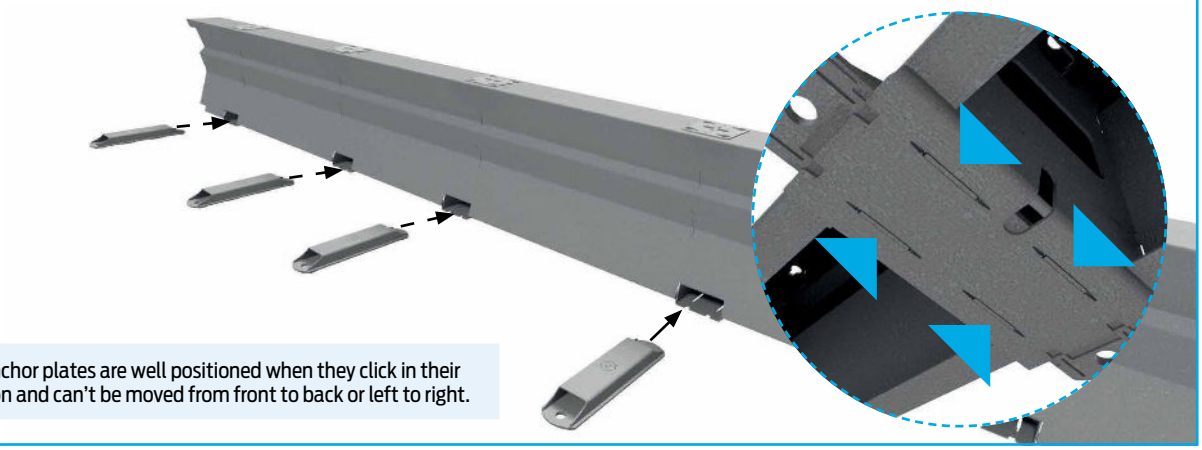
8.6. Finishing alignment of SafeZone and start anchoring first element

6

⚠ One last check. Before anchoring the first and last element to the foundation, ensure that the sections are positioned correctly.

8.7. Insert the anchor plates (AS31840020)

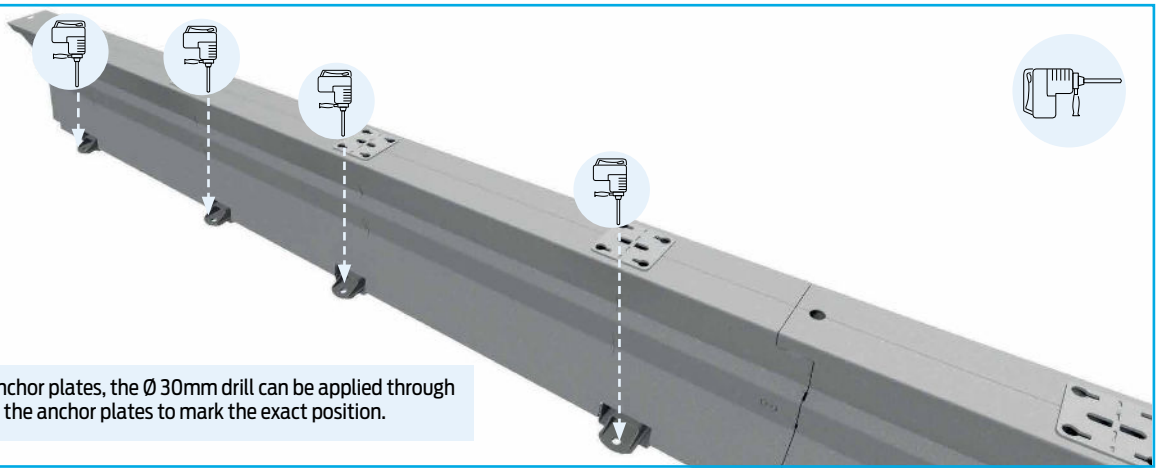
7



⚠ The anchor plates are well positioned when they click in their position and can't be moved from front to back or left to right.

8.8. Marking the drilling location (left and right side)

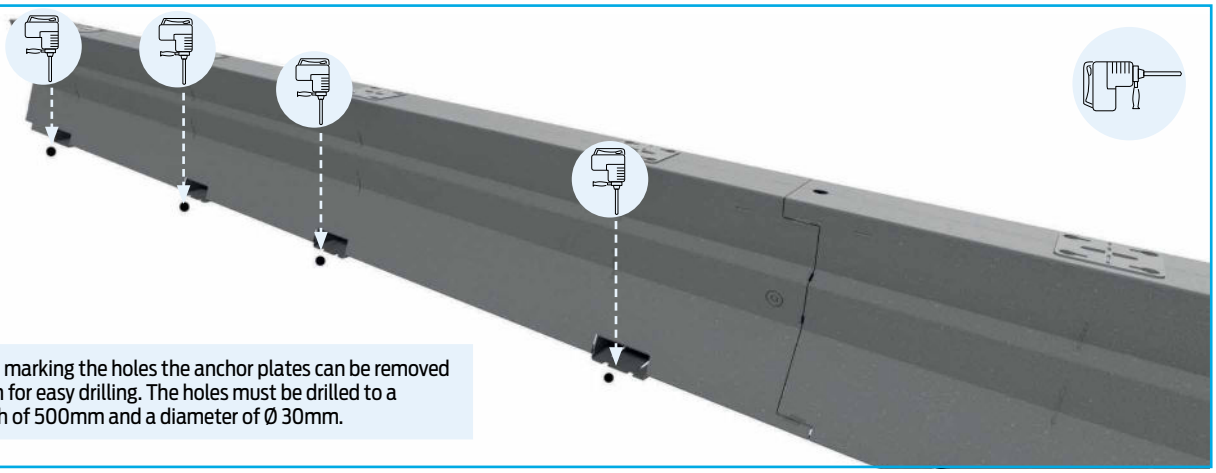
8



After placing the anchor plates, the Ø 30mm drill can be applied through the anchor holes in the anchor plates to mark the exact position.

8.9. Drilling the holes (left and right aside)

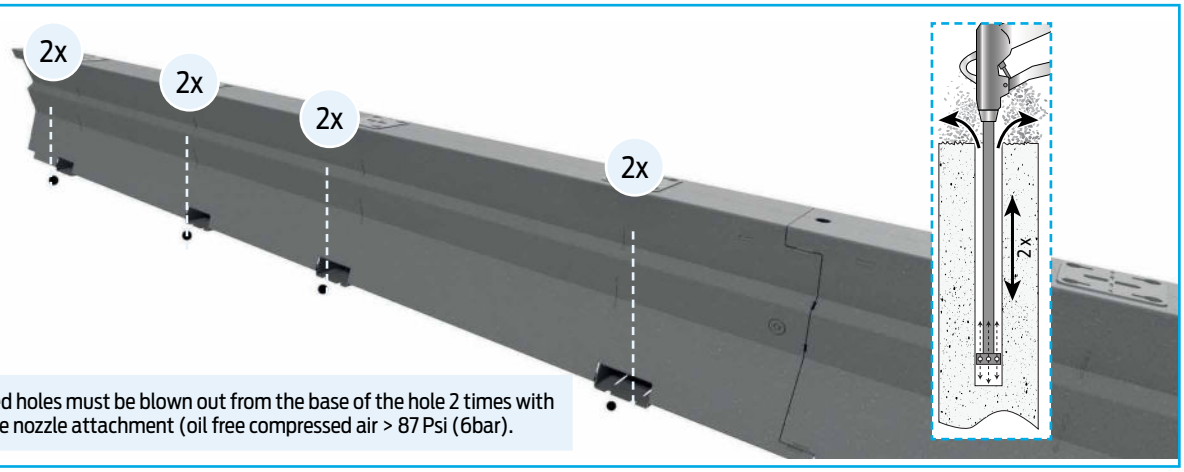
9



⚠ After marking the holes the anchor plates can be removed again for easy drilling. The holes must be drilled to a depth of 500mm and a diameter of Ø 30mm.

8.10. Clean the drilled holes (left and right side)

10



⚠ The drilled holes must be blown out from the base of the hole 2 times with a suitable nozzle attachment (oil free compressed air > 87 Psi (6bar).

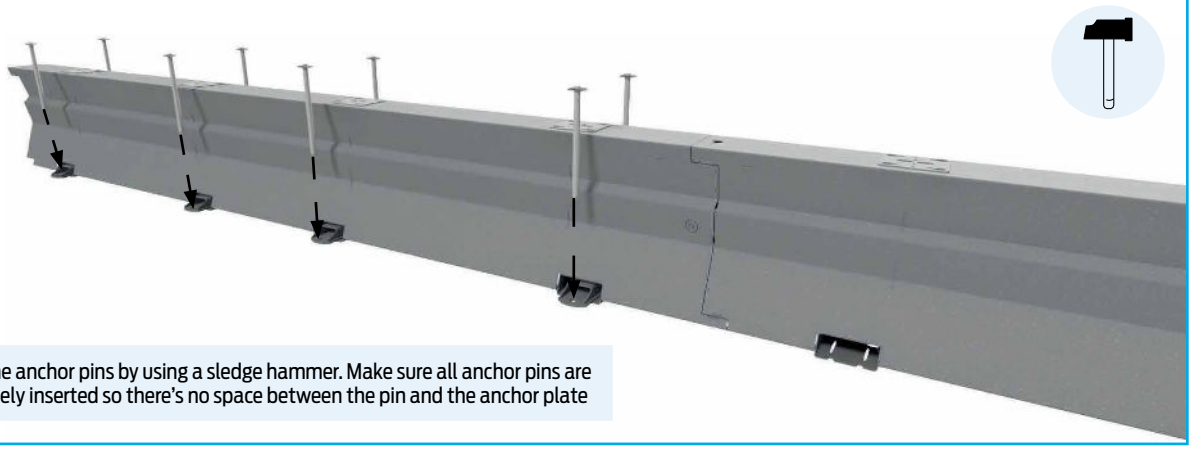
8.11. Placing anchor plates

11

⚠ After cleaning the holes the anchor plates must be placed in position again. The anchor plates are well positioned when they click in their position and can't be moved from front to back or left to right.

8.12. Insert pins (AS31642592)

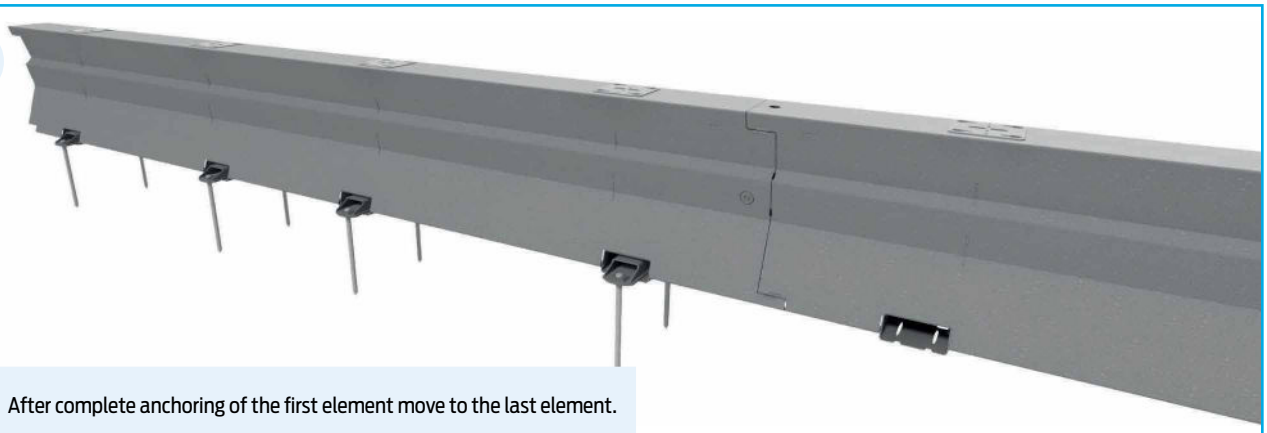
12



⚠ Insert the anchor pins by using a sledge hammer. Make sure all anchor pins are completely inserted so there's no space between the pin and the anchor plate

8.13. Finished first element

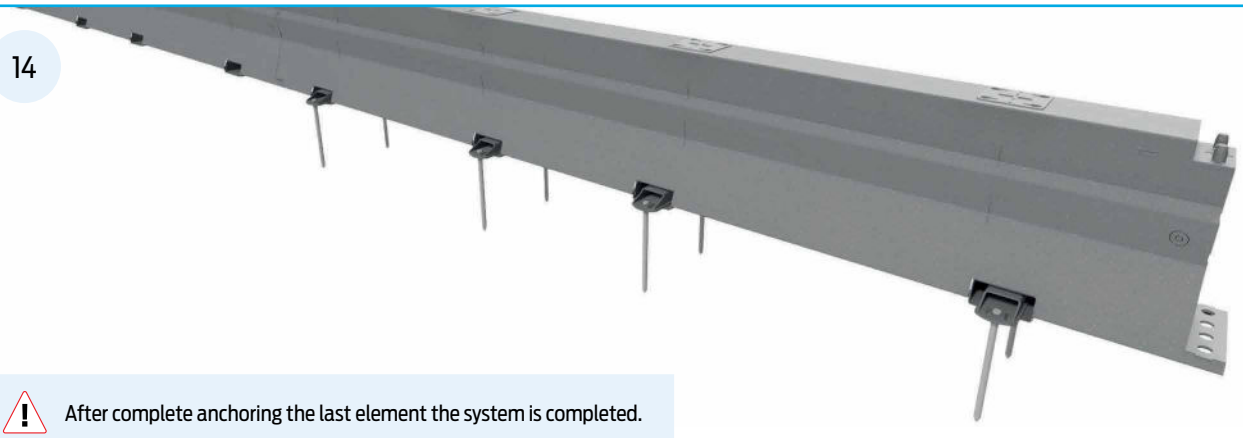
13



After complete anchoring of the first element move to the last element.

8.14. Anchor the last element as well

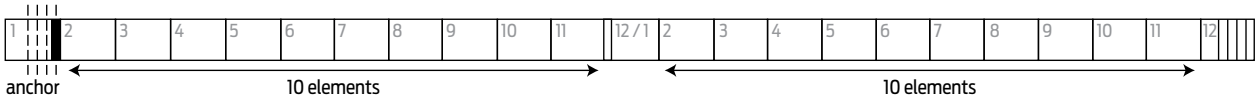
14



After complete anchoring the last element the system is completed.

8.15. Completed SafeZone system

15



The standard installation requires 4 anchors at the first and last element and 1 anchor every 69.6meter. Make sure there are always 10 unanchored elements in between. Use the second or third opening of the element for anchoring.

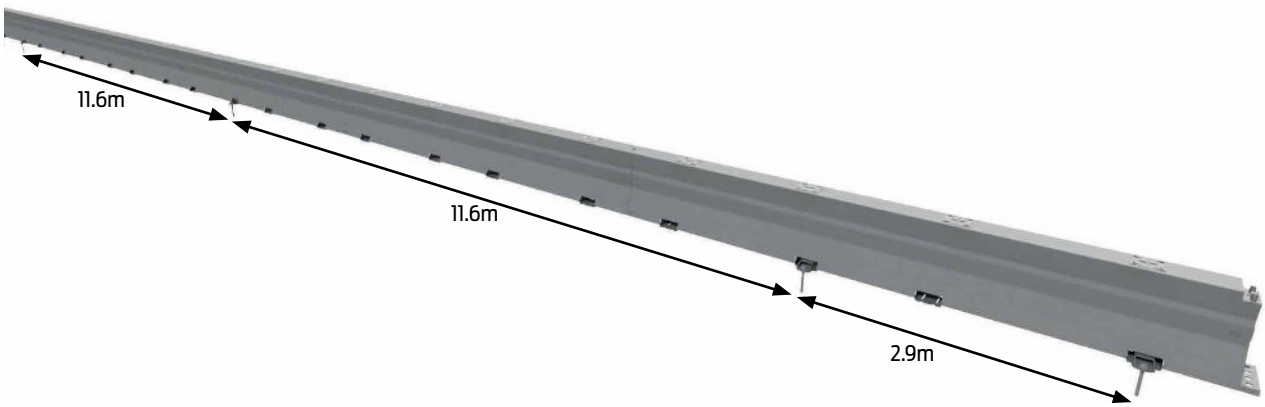
9. SafeZone Limited Deflection System

9.1. General

The SafeZone Limited Deflection System is a specially configured system with a decreased anchor distance, this system offers a very low working width. The SafeZone LDS configuration increases the usable workspace in which to carry out construction and maintenance work and still perform to a high containment level. It is particularly beneficial to contractors working on tight construction sites to allow maximum working space together with full safety guideline compliance.

9.2. Installation

A length of SafeZone Limited Deflection System is built up by standard Units of SafeZone with anchor plates every 11.6m.

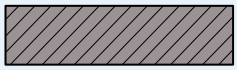
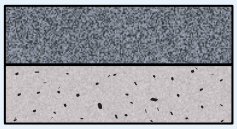
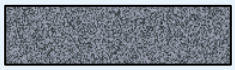
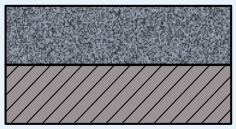


3 Rules for Anchoring:

1. Start with 2 anchor shoes / 4 anchors.
2. Install 1 anchor shoe / 2 anchors at 11.6m (38') center to center.
3. Install 2 anchor shoes /4 anchors in the last element of the string at the location of the 2nd and 4th opening as per image above.

10. Anchoring options on asphalt and concrete for Limited Deflection System

10.1. Foundation Type

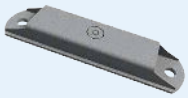
Suitable foundation type for Limited Deflection System:				
Foundation Type	Concrete Pad	Asphalt over subbase	Asphalt only	Asphalt over concrete
				
Anchor shoe type	1	1	1	1
Anchor pin type	C	B	B	B

Note: in case of concrete decks thinner than 300mm please consult manufacturer for advice.

10.2. Choice of anchoring

Type 1	Anchor shoe standard (AS31840020)	

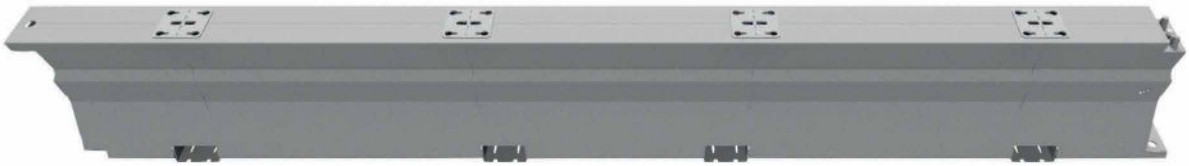
10.3. Anchor Pin

Anchor Pin Type		Diameter Drilled Hole	Anchor Shoe Type	Traffic Side	Non Traffic Side
Type B Threaded Rod Ø 30mm Length: 300mm	 (KE31840030)	Ø35mm 250mm depth	**Type 1** 	✓	✓
Type C Threaded Rod Ø 30mm Length: 175mm	 (KE31840031)	Ø35mm 125mm depth	**Type 1** 	✓	✓

11. SafeZone Limited Deflection System installation using pin type B

11.1. Start with standard SafeZone barrier section (AS150145-0421)

1

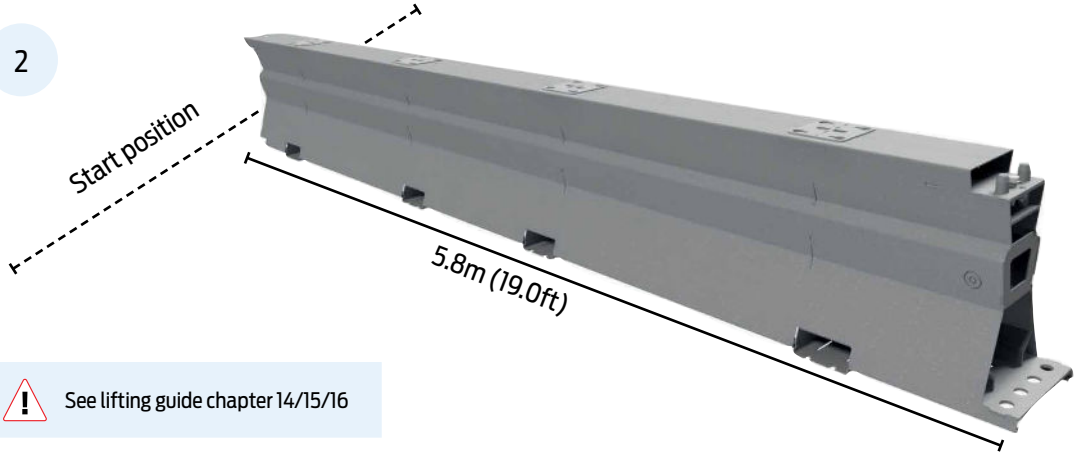


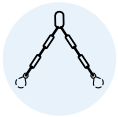
(AS31840000)

SafeZone Limited Deflection System is a standard installation of SafeZone with anchor plates postioned every 11.6m. The minimum installation length of SafeZone Limited Deflection System is 69.63 m.

11.2. Beginning of first string of barriers

2

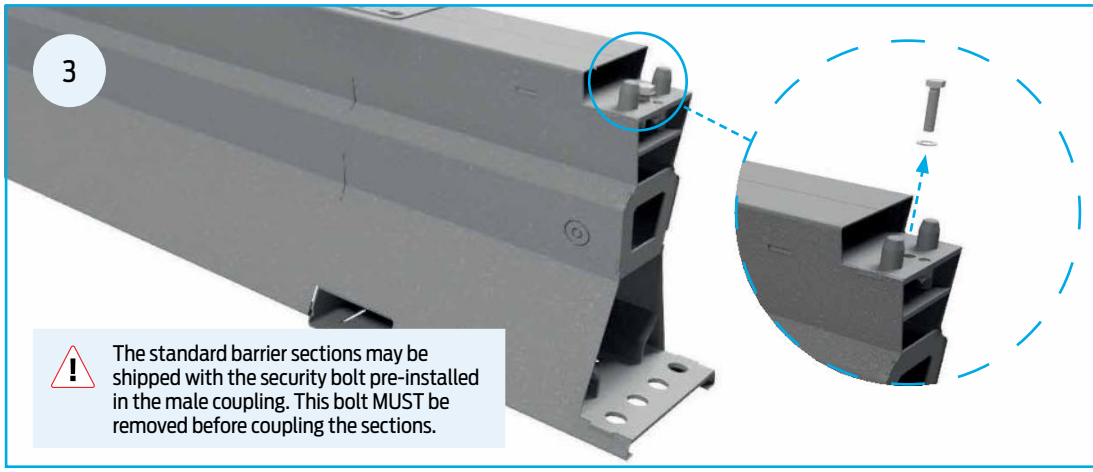




⚠ See lifting guide chapter 14/15/16

11.3. The male coupling including the security bolt must face down stream

3



⚠ The standard barrier sections may be shipped with the security bolt pre-installed in the male coupling. This bolt MUST be removed before coupling the sections.

size: m20

length: 80mm

socket size: 30mm

11.4. Lower one element over the other

4

11.5. Lock the sections together with the security bolt using the ratchet or T-wrench

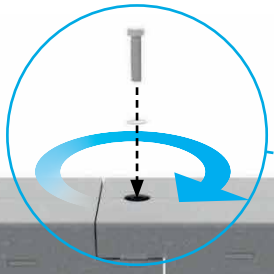
5

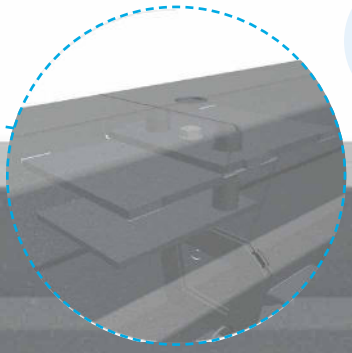
size: m20

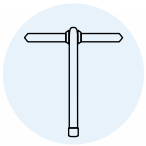
length: 80mm

socket size: 30mm

torque: 200 Nm (148 ft-lb







Uneven road conditions may make it difficult to get a proper alignment of the two sections which may result in a difficult installation of the security bolt. If needed, use the forklift truck or other onsite lifting equipment to raise one side of the barrier to attain a 'flush fit' before installing the security bolt.

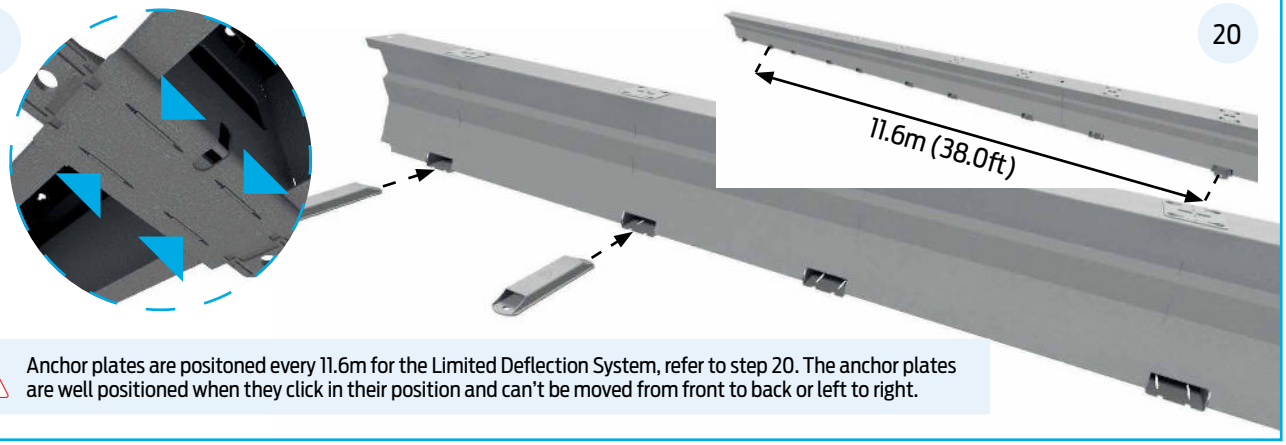
11.6. Finishing alignment of SafeZone and start anchoring first and last element

6

One last check. Before anchoring the first and last element to the foundation, ensure that the sections are positioned correctly.

11.7. Insert the anchor plates (AS31840020)

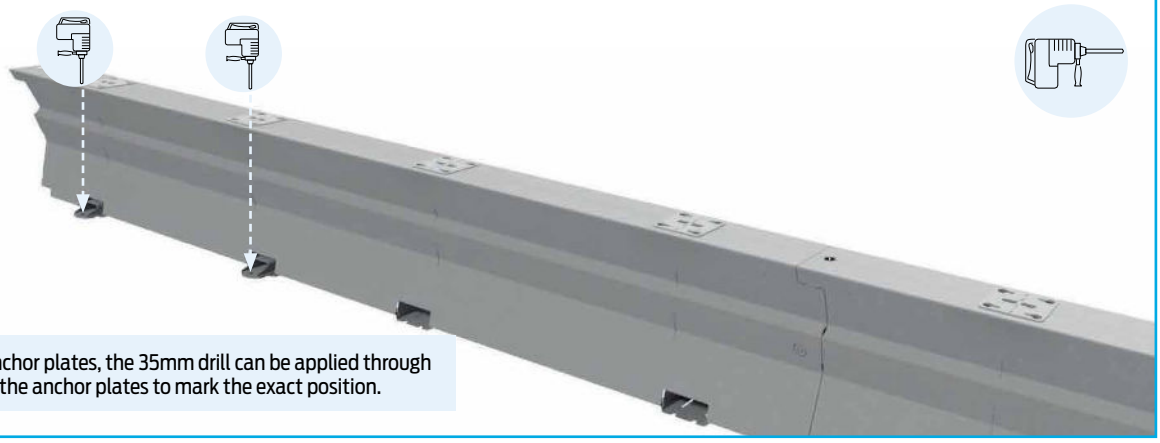
7



Anchor plates are positoned every 11.6m for the Limited Deflection System, refer to step 20. The anchor plates are well positioned when they click in their position and can't be moved from front to back or left to right.

11.8. Marking the drilling location

8



After placing the anchor plates, the 35mm drill can be applied through the anchor holes in the anchor plates to mark the exact position.

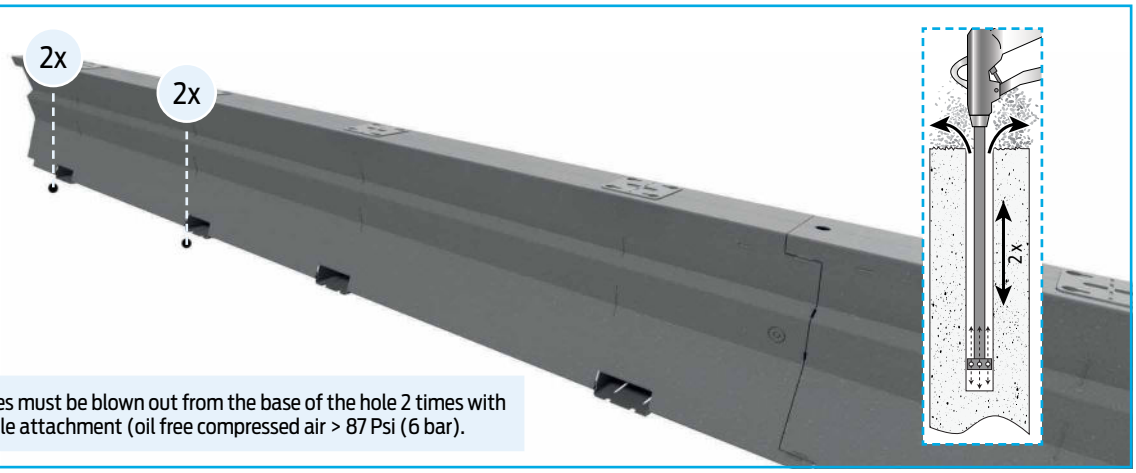
11.9. Drilling the holes

9

After marking the holes the anchor plates can be removed again for easy drilling. The holes must be drilled to a depth of 250mm and a diameter of Ø35mm.

11.10. Clean the drilled holes to ensure a good adhesion of the chemical mortar to the asphalt

10



⚠ The drilled holes must be blown out from the base of the hole 2 times with a suitable nozzle attachment (oil free compressed air > 87 Psi (6 bar).

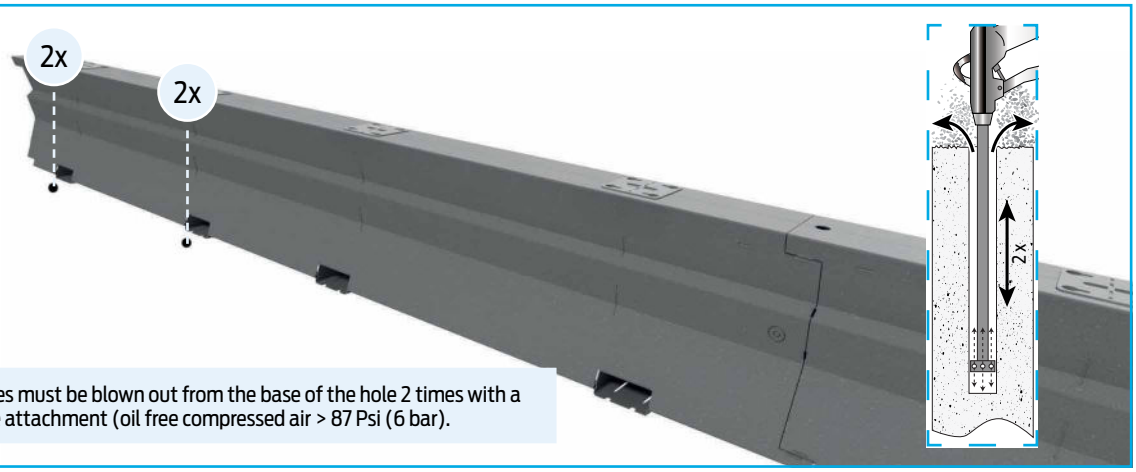
11.11. Brush the drilled hole twice with a special stee lbrush FIS BS Ø35mm in combination with a power tool

11

⚠ Brush the drilled holes twice.

11.12. Blow out the drilled hole twice again

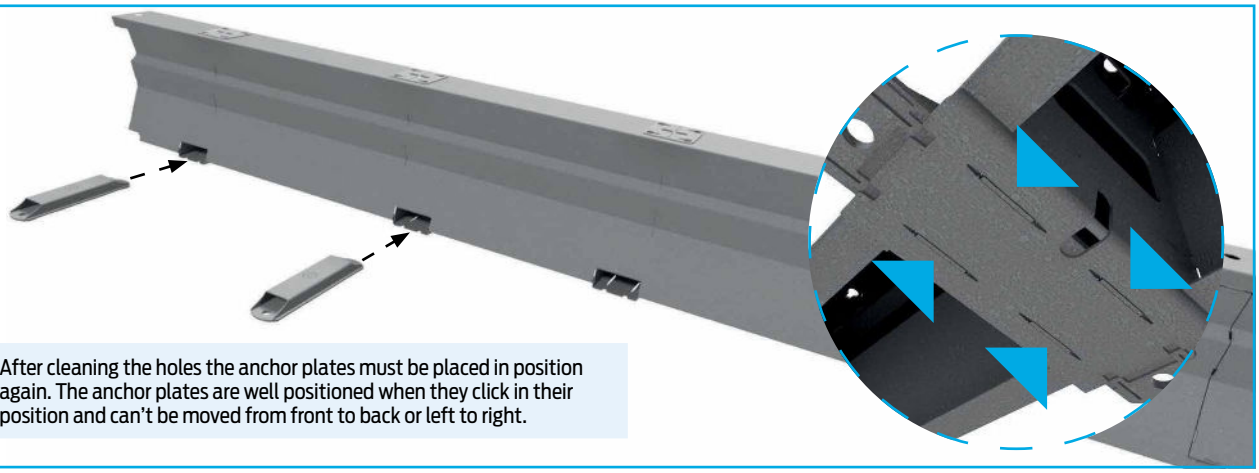
12



⚠ The drilled holes must be blown out from the base of the hole 2 times with a suitable nozzle attachment (oil free compressed air > 87 Psi (6 bar).

11.13. Placing anchor plates

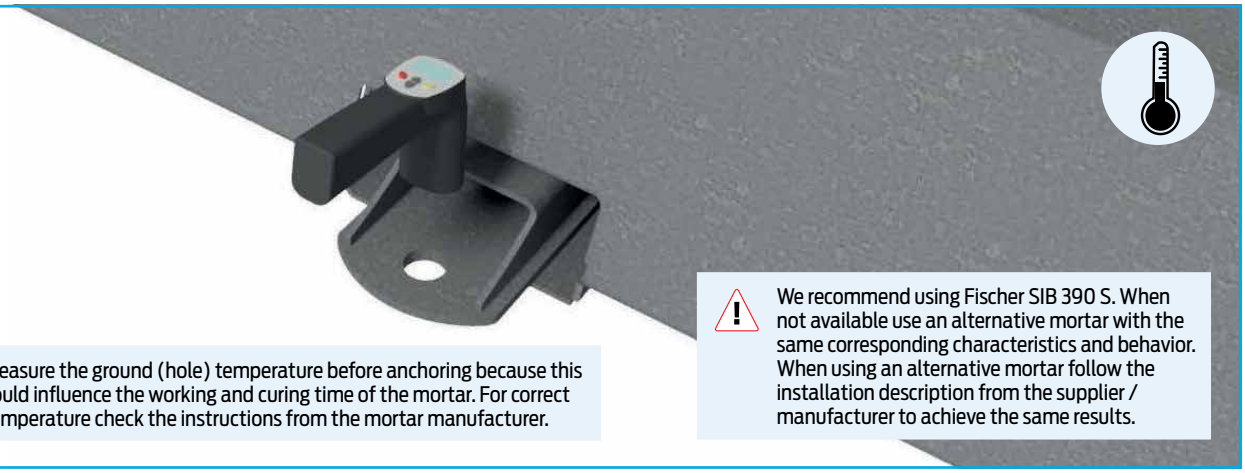
13



After cleaning the holes the anchor plates must be placed in position again. The anchor plates are well positioned when they click in their position and can't be moved from front to back or left to right.

11.14. Measure the ground (hole) temperature

14



Measure the ground (hole) temperature before anchoring because this could influence the working and curing time of the mortar. For correct temperature check the instructions from the mortar manufacturer.

We recommend using Fischer SIB 390 S. When not available use an alternative mortar with the same corresponding characteristics and behavior. When using an alternative mortar follow the installation description from the supplier / manufacturer to achieve the same results.

11.15. Prepare mortar cartridge

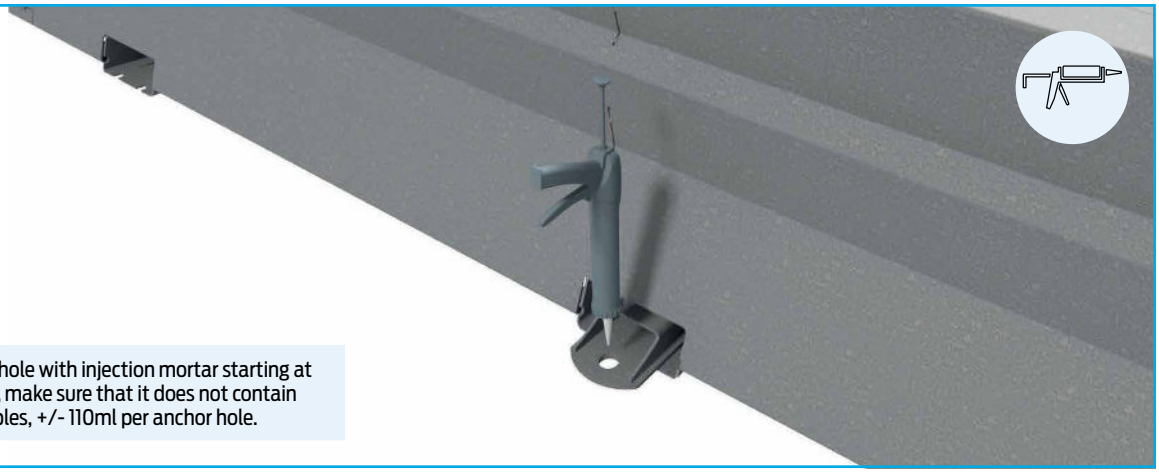
15

1. Remove the cap from the cartridge by turning and pulling it off.
2. Attach the static mixer, tighten it firmly and lock it in place (turn to right).
3. Place the cartridge in the dispenser.
4. Press approx. 10cm of material out until theres in mortar comes out in evenly grey colour. Mortar which is not grey colour will not cure and must be disposed of.

We recommend using Fischer SIB 390 S. When not available use an alternative mortar with the same corresponding characteristics and behavior. When using an alternative mortar follow the installation description from the supplier / manufacturer to achieve the same results.

11.16. Fill the hole with injection mortar

16

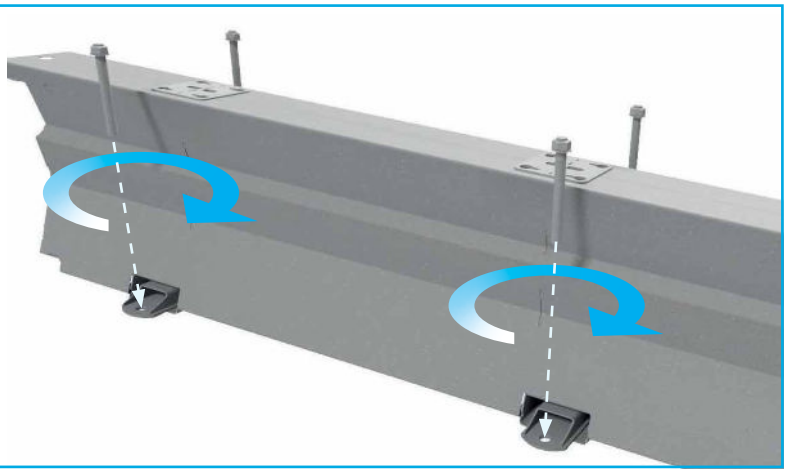


Fill the drill hole with injection mortar starting at the bottom, make sure that it does not contain any air bubbles, +/- 110ml per anchor hole.

11.17. Insert threaded rod (KE31840030)

17

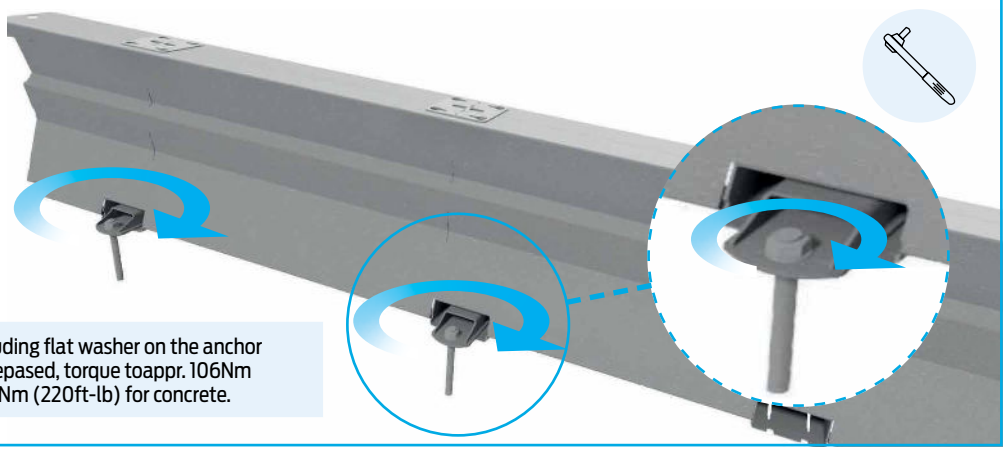
Anchoring pin must be straight and free of oil and other contaminants. Mark the anchor with correct embedment depth 250mm. Press the anchor pin down to the bottom of the hole, turning its lightly while pressing. After inserting the pin, excess mortar must emerge from the mouth of the hole. If no mortar appears at the surface of the hole, the anchoring pin must be removed immediately and mortar must be injected again. Do not disturb the anchoring element until cure time has elapsed.



11.18. Tighten nut after mortar has hardened

18

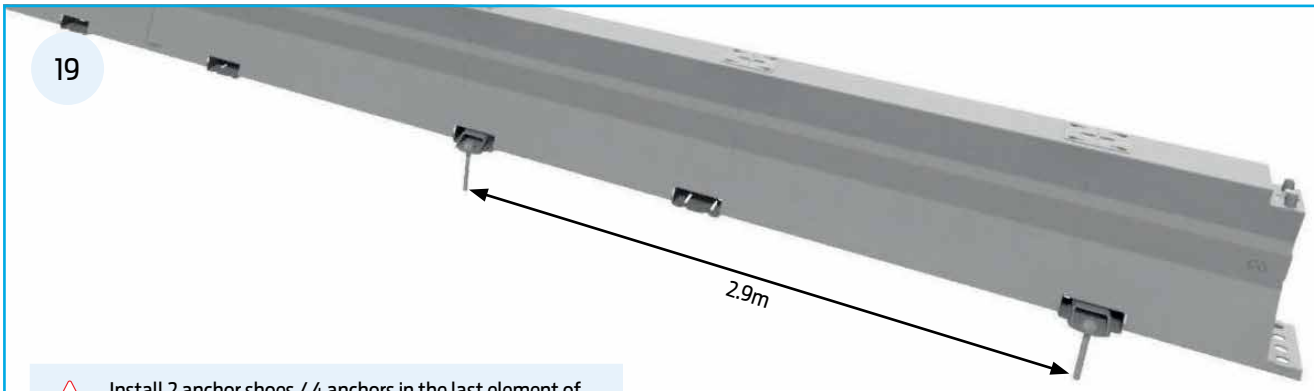
size: m30
socket size: 46mm
torque: 300Nm
(220ft-lb)



Torque the M30 hex nuts including flat washer on the anchor studs after curing time has elepased, torque toappr. 106Nm (78ft-lb) for asphalt and 300Nm (220ft-lb) for concrete.

11.19. Remember to anchor the last element as well

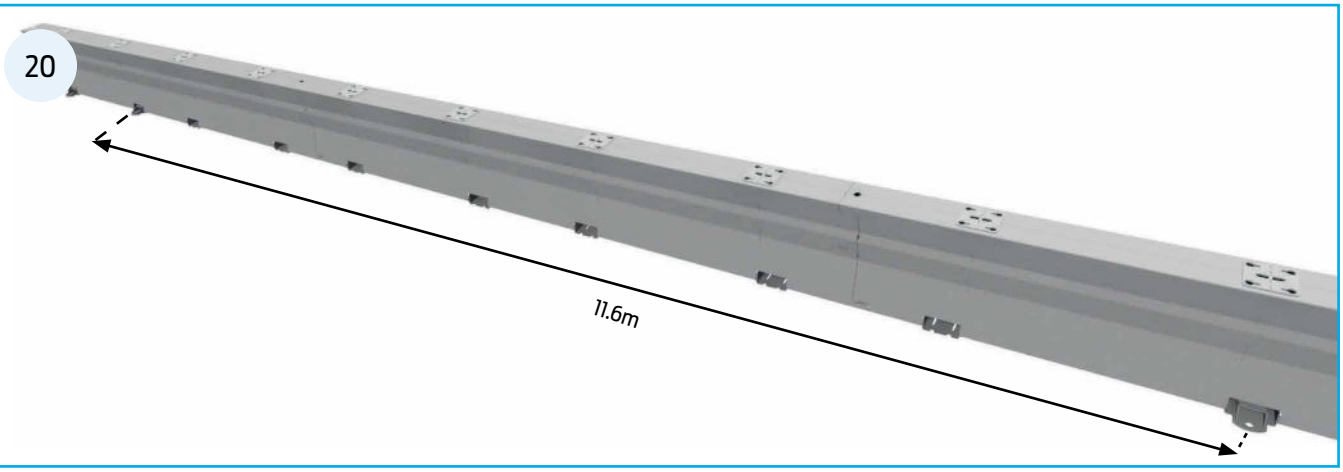
19



⚠ Install 2 anchor shoes / 4 anchors in the last element of the string at the location of the 2nd and 4th opening.

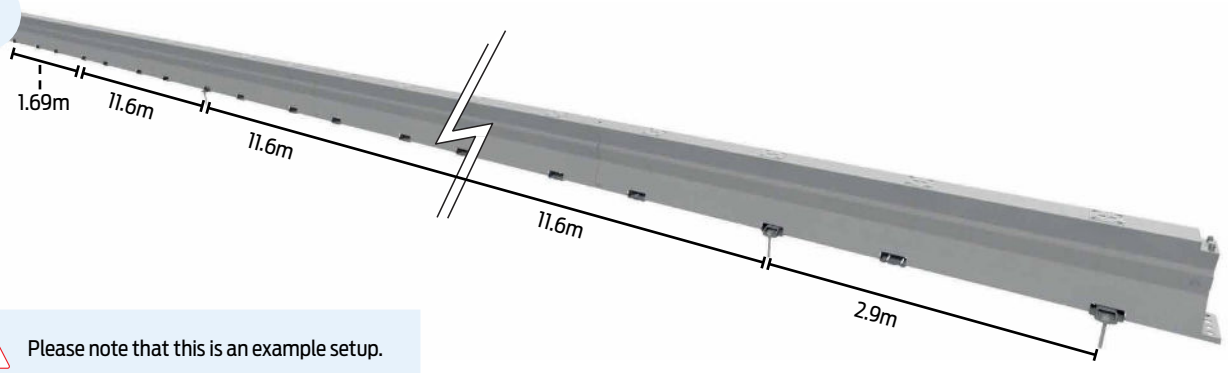
11.20. A length of SafeZone Limited Deflection Sytem is built up with anchor plates every 11.6m

20



11.21. Completed SafeZone Limited Deflection System

21



⚠ Please note that this is an example setup.

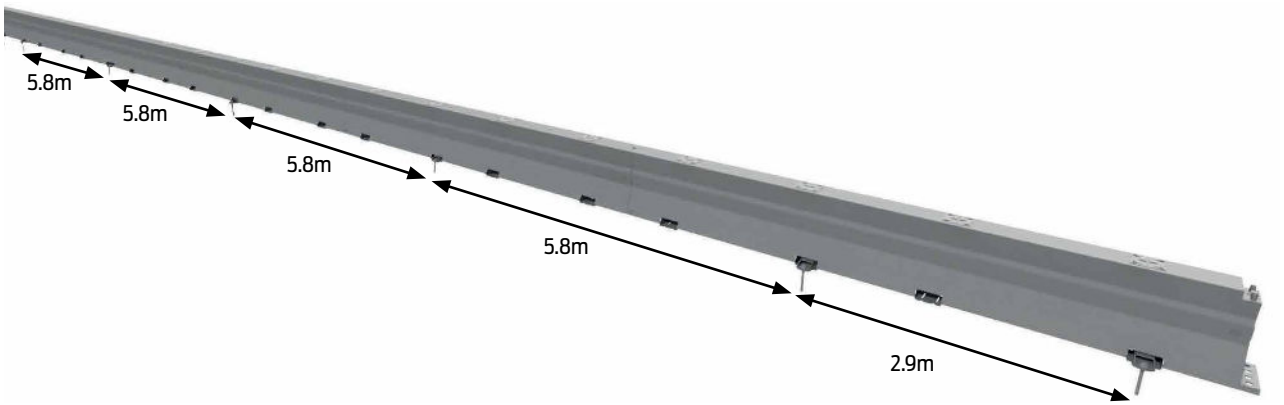
12. SafeZone Minimum Deflection System

12.1. General

The SafeZone Minimum Deflection System is a specially configured system with a decreased anchor distance, this system offers a very low working width. The SafeZone MDS configuration increases the usable workspace in which to carry out construction and maintenance work and still perform to a high containment level. It is particularly beneficial to contractors working on tight construction sites to allow maximum working space together with full safety guideline compliance.

12.2. Installation

A length of SafeZone Minimum Deflection System is built up by standard Units of SafeZone with anchor plates every 5.8m.

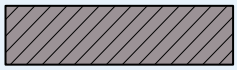
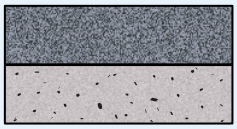
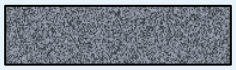
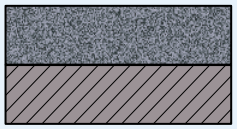


3 Rules for Anchoring:

1. Start with 2 anchor shoes / 4 anchors.
2. Install 1 anchor shoe / 2 anchors at 5.8m (19') center to center.
3. Install 2 anchor shoes /4 anchors in the last element of the string at the location of the 2nd and 4th opening as per image above.

13. Anchoring options on asphalt and concrete for Minimum Deflection System

13.1. Foundation Type

Suitable foundation type for Minimum Deflection System:				
Foundation Type	Concrete Pad	Asphalt over subbase	Asphalt only	Asphalt over concrete
				
Anchor shoe type	1	1	1	1
Anchor pin type	B	B	B	B

Note: in case of concrete decks thinner than 300mm please consult manufacturer for advice.

13.2. Choice of anchoring

Type 1	Anchor shoe standard (AS31840020)	

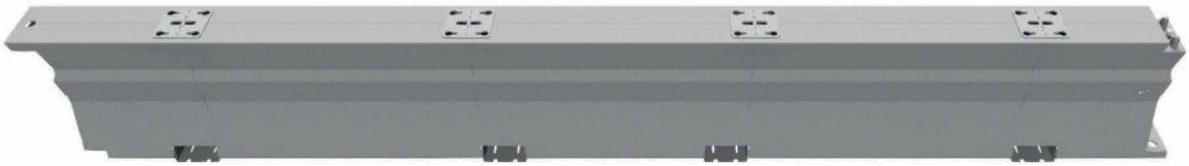
13.3. Anchor Pin

Anchor Pin Type		Diameter Drilled Hole	Anchor Shoe Type	Traffic Side	Non Traffic Side
Type B Threaded Rod Ø 30mm Length: 300mm	 (KE31840030)	Ø35mm 250mm depth	**Type 1** 	✓	✓

14. SafeZone Minimum Deflection System installation using pin type B

14.1. Start with standard SafeZone barrier section (AS150145-0421)

1

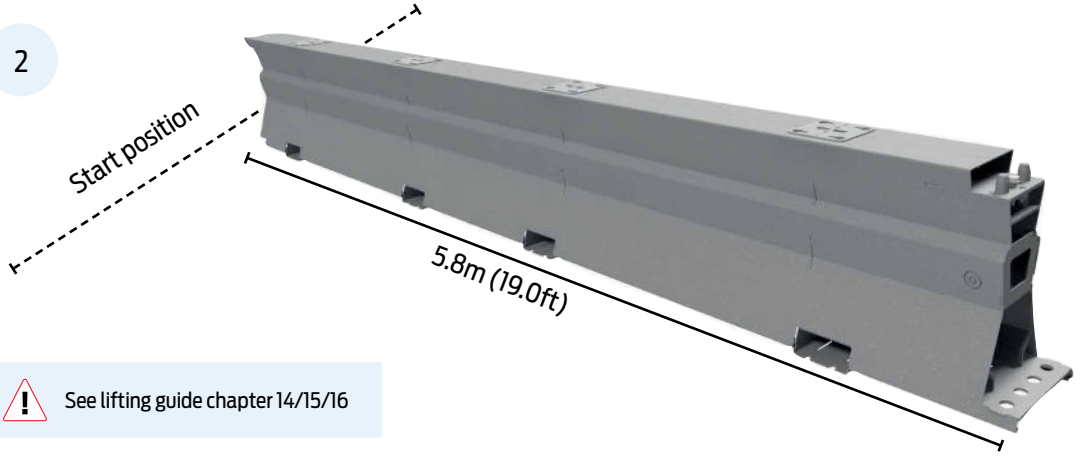


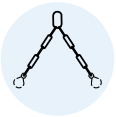
(AS31840000)

SafeZone Limited Deflection System is a standard installation of SafeZone with anchor plates postioned every 11.6m. The minimum installation length of SafeZone Limited Deflection System is 69.63 m.

14.2. Beginning of first string of barriers

2

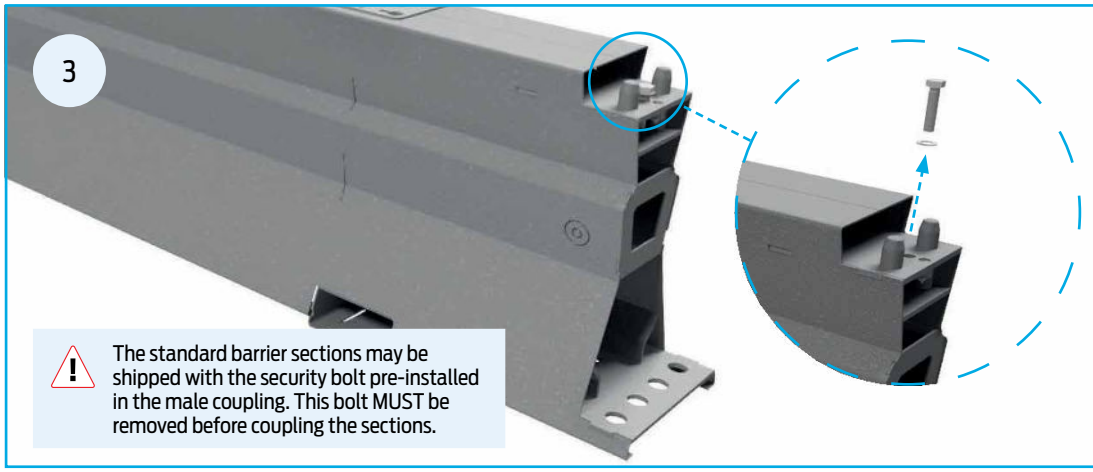




⚠ See lifting guide chapter 14/15/16

14.3. The male coupling including the security bolt must face down stream

3



size: m20

length: 80mm

socket size: 30mm

⚠ The standard barrier sections may be shipped with the security bolt pre-installed in the male coupling. This bolt MUST be removed before coupling the sections.

14.4. Lower one element over the other

4

14.5. Lock the sections together with the security bolt using the ratchet or T-wrench

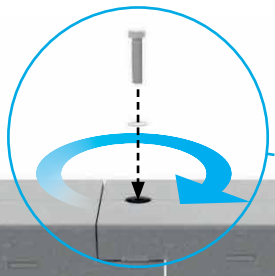
5

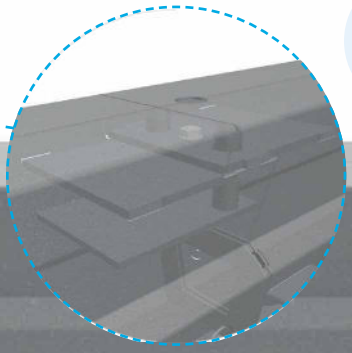
size: m20

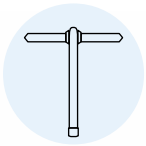
length: 80mm

socket size: 30mm

torque: 200 Nm (148 ft-lb







⚠ Uneven road conditions may make it difficult to get a proper alignment of the two sections which may result in a difficult installation of the security bolt. If needed, use the forklift truck or other onsite lifting equipment to raise one side of the barrier to attain a 'flush fit' before installing the security bolt.

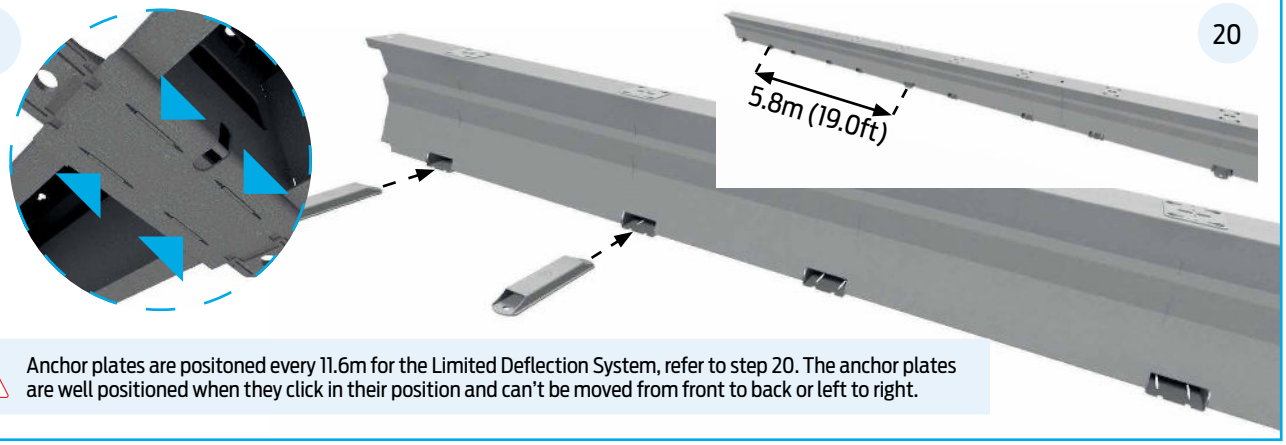
14.6. Finishing alignment of SafeZone and start anchoring first and last element

6

⚠ One last check. Before anchoring the first and last element to the foundation, ensure that the sections are positioned correctly.

14.7. Insert the anchor plates (AS31840020)

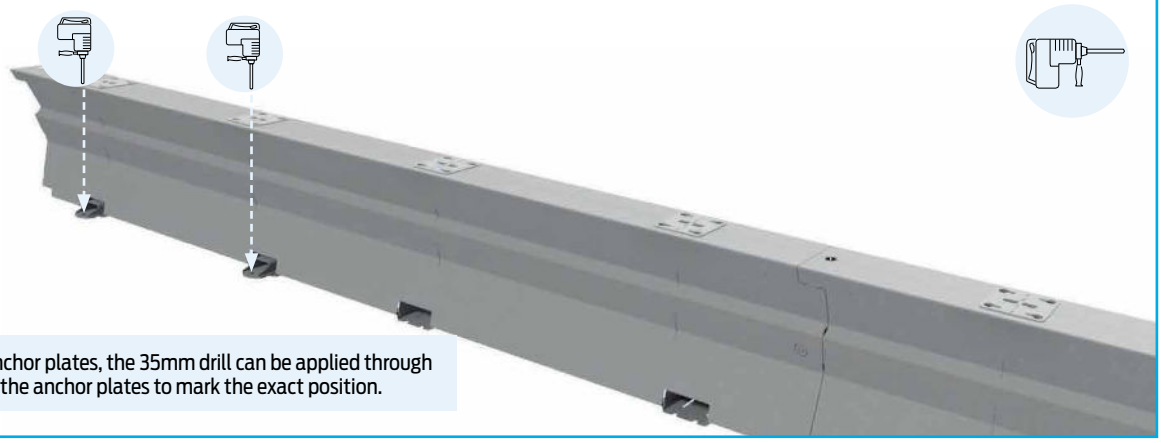
7



Anchor plates are positoned every 11.6m for the Limited Deflection System, refer to step 20. The anchor plates are well positioned when they click in their position and can't be moved from front to back or left to right.

14.8. Marking the drilling location

8



After placing the anchor plates, the 35mm drill can be applied through the anchor holes in the anchor plates to mark the exact position.

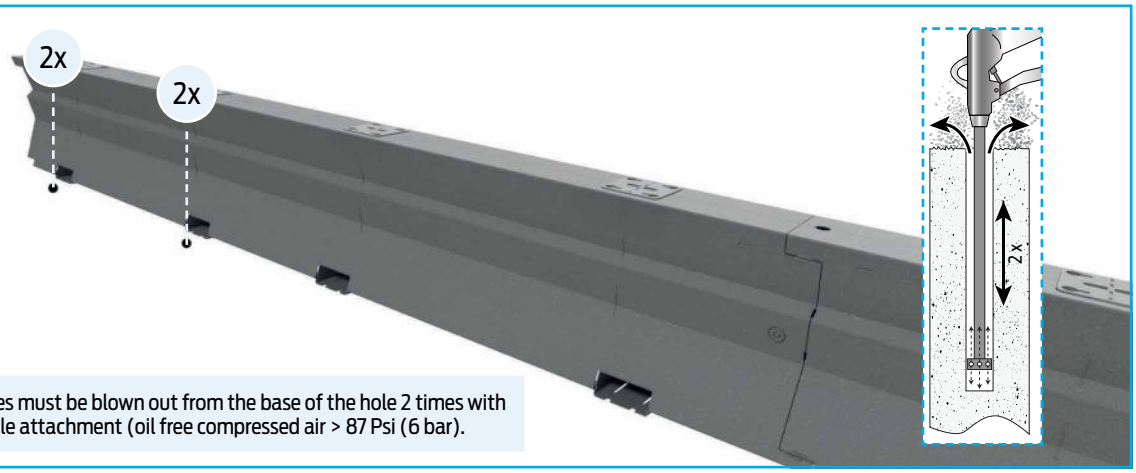
14.9. Drilling the holes

9

After marking the holes the anchor plates can be removed again for easy drilling. The holes must be drilled to a depth of 250mm and a diameter of Ø35mm.

14.10. Clean the drilled holes to ensure a good adhesion of the chemical mortar to the asphalt

10



The drilled holes must be blown out from the base of the hole 2 times with a suitable nozzle attachment (oil free compressed air > 87 Psi (6 bar).

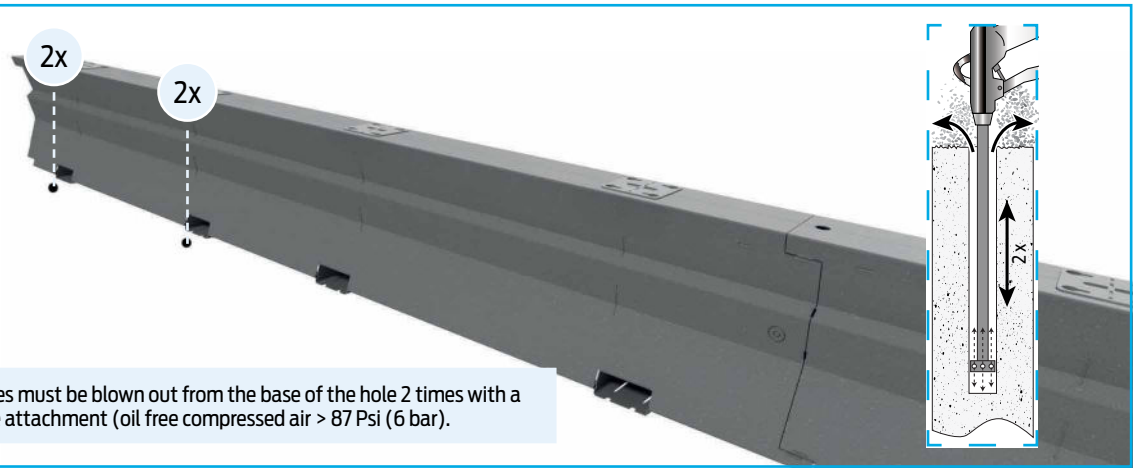
14.11. Brush the drilled hole twice with a special stee lbrush FIS BS Ø35mm in combination with a power tool

11

Brush the drilled holes twice.

14.12. Blow out the drilled hole twice again

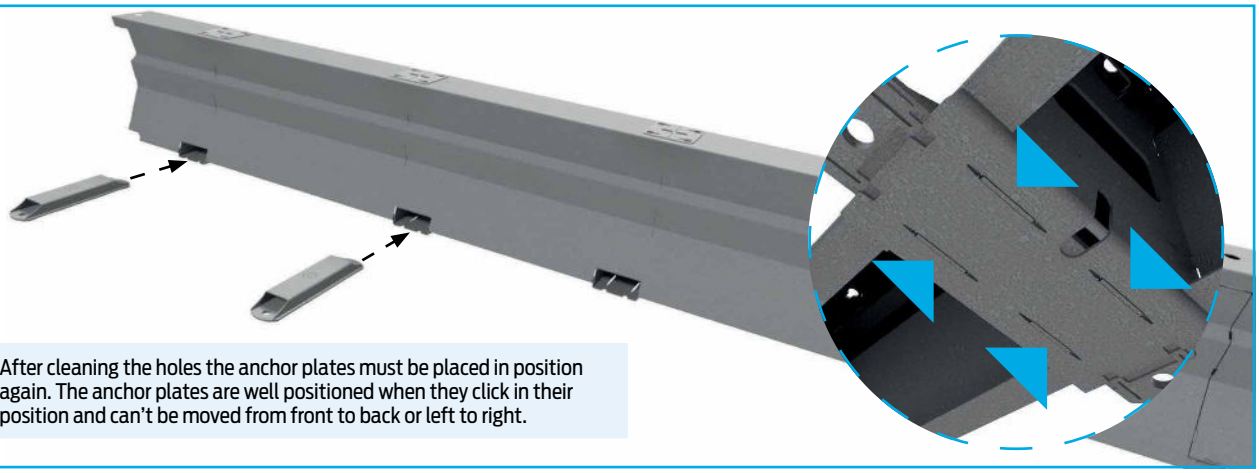
12



The drilled holes must be blown out from the base of the hole 2 times with a suitable nozzle attachment (oil free compressed air > 87 Psi (6 bar).

14.13. Placing anchor plates

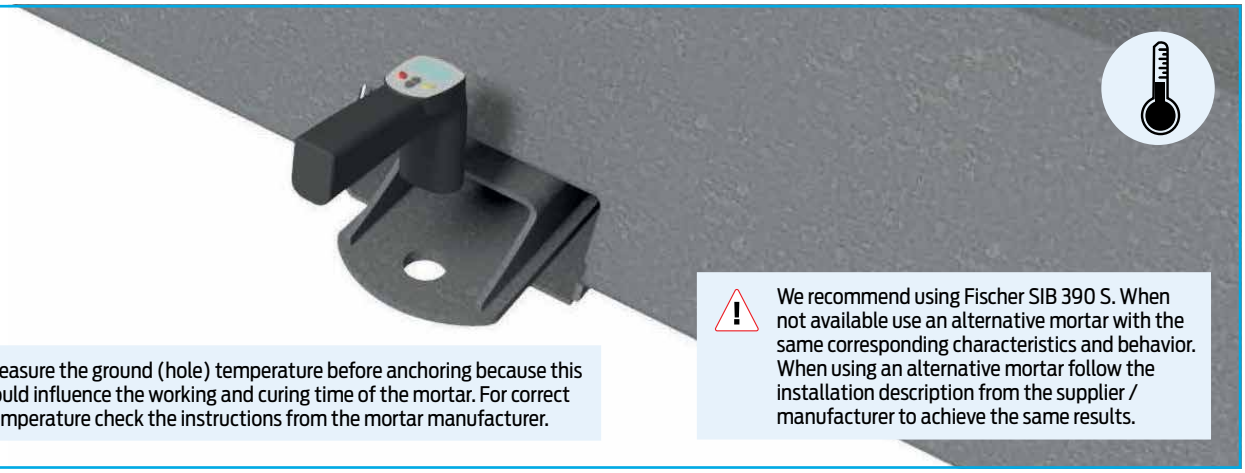
13



After cleaning the holes the anchor plates must be placed in position again. The anchor plates are well positioned when they click in their position and can't be moved from front to back or left to right.

14.14. Measure the ground (hole) temperature

14



Measure the ground (hole) temperature before anchoring because this could influence the working and curing time of the mortar. For correct temperature check the instructions from the mortar manufacturer.

We recommend using Fischer SIB 390 S. When not available use an alternative mortar with the same corresponding characteristics and behavior. When using an alternative mortar follow the installation description from the supplier / manufacturer to achieve the same results.

14.15. Prepare mortar cartridge

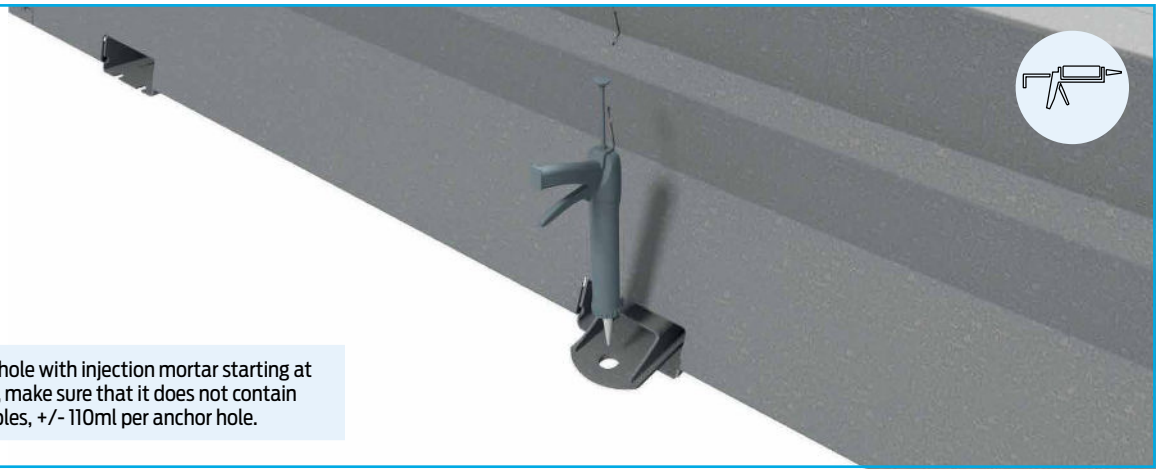
15

1. Remove the cap from the cartridge by turning and pulling it off.
2. Attach the static mixer, tighten it firmly and lock it in place (turn to right).
3. Place the cartridge in the dispenser.
4. Press approx. 10cm of material out until theres in mortar comes out in evenly grey colour. Mortar which is not grey colour will not cure and must be disposed of.

We recommend using Fischer SIB 390 S. When not available use an alternative mortar with the same corresponding characteristics and behavior. When using an alternative mortar follow the installation description from the supplier / manufacturer to achieve the same results.

14.16. Fill the hole with injection mortar

16

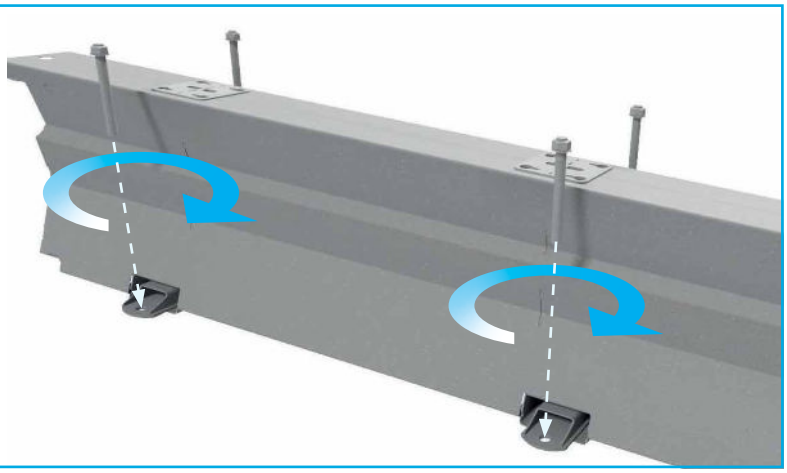


Fill the drill hole with injection mortar starting at the bottom, make sure that it does not contain any air bubbles, +/- 110ml per anchor hole.

14.17. Insert threaded rod (KE31840030)

17

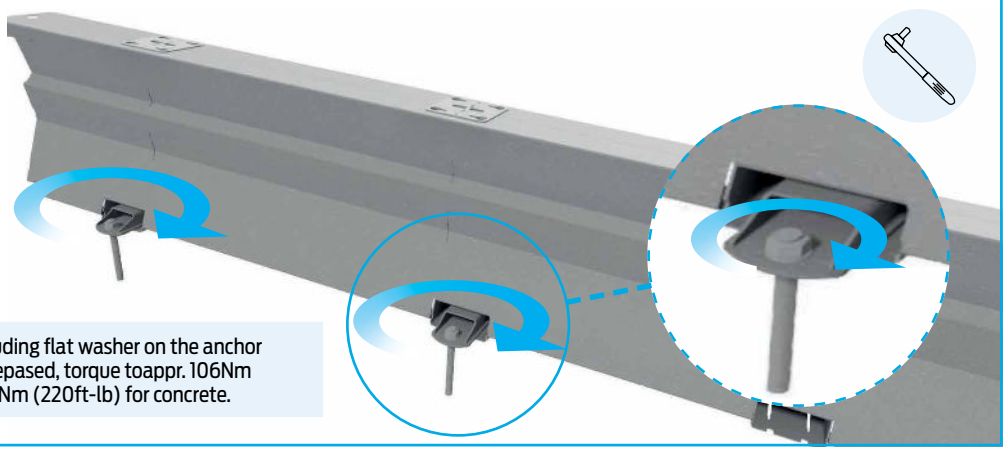
Anchoring pin must be straight and free of oil and other contaminants. Mark the anchor with correct embedment depth 250mm. Press the anchor pin down to the bottom of the hole, turning its lightly while pressing. After inserting the pin, excess mortar must emerge from the mouth of the hole. If no mortar appears at the surface of the hole, the anchoring pin must be removed immediately and mortar must be injected again. Do not disturb the anchoring element until cure time has elapsed.



14.18. Tighten nut after mortar has hardened

18

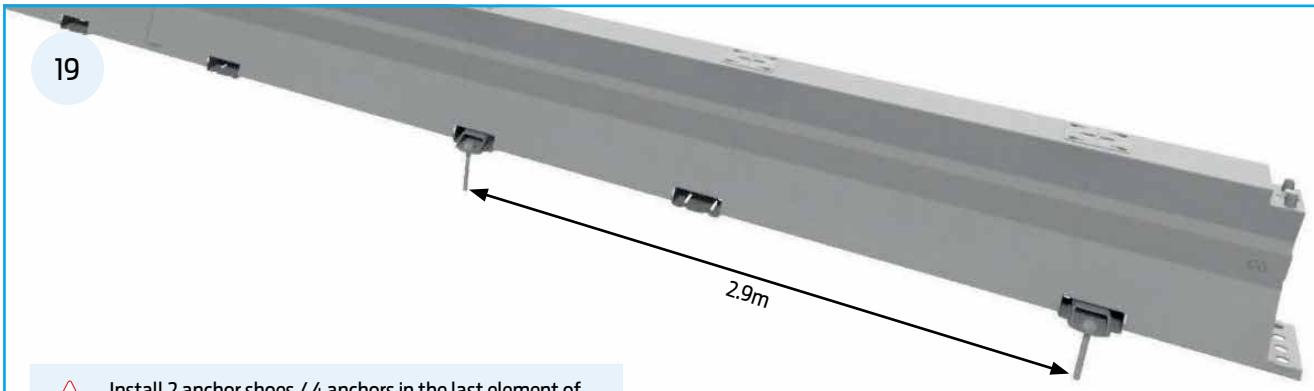
size: m30
socket size: 46mm
torque: 300Nm
(220ft-lb)



Torque the M30 hex nuts including flat washer on the anchor studs after curing time has elepased, torque toappr. 106Nm (78ft-lb) for asphalt and 300Nm (220ft-lb) for concrete.

14.19. Remember to anchor the last element as well

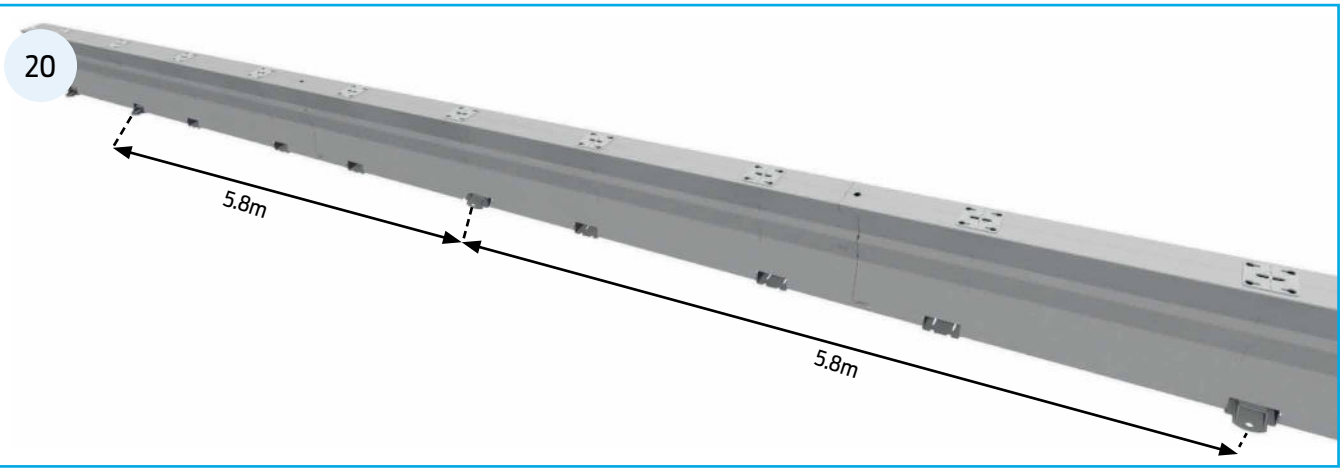
19



⚠ Install 2 anchor shoes / 4 anchors in the last element of the string at the location of the 2nd and 4th opening.

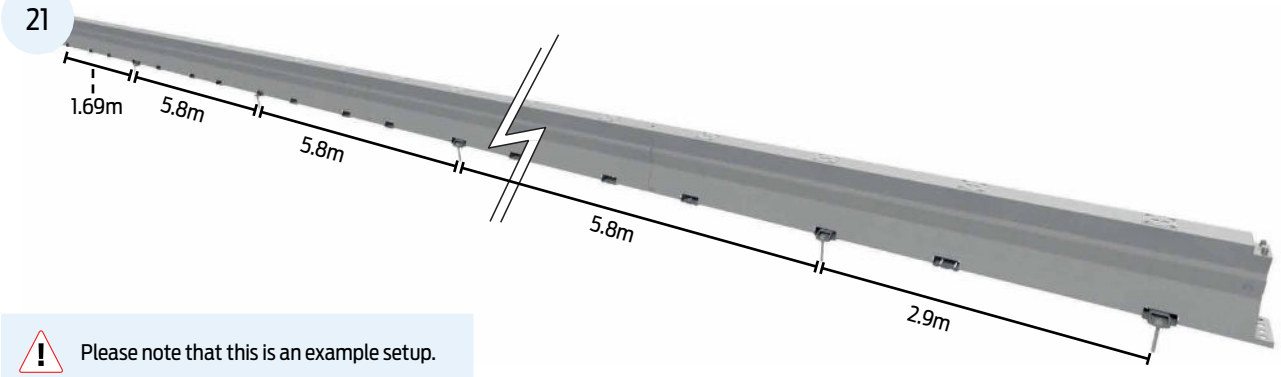
14.20. A length of SafeZone Minimum Deflection Sytem is built up with anchor plates every 11.6m

20



14.21. Completed SafeZone Minimum Deflection System

21



⚠ Please note that this is an example setup.

15. Maintenance and repair

SafeZone™ has an estimated 20-years life cycle. With years of experience with BarrierGuard 800 and through rigorous testing SafeZone sections have proven to be very robust and extremely hard wearing. We recommend some very basic maintenance schedules detailed below. SafeZone sections should be thoroughly inspected prior to dispatch to the job site, during the inspection make sure that all the fasteners are present, there is no sign of damage to the Quick Connect and that there is no creases or dents in the barrier that could prevent it connecting together during the installation. If any of the above faults are detected then the damaged section or sections of barrier should marked and put to one side for further assessments to take place and repairs made before the section of SafeZone is used again.

SafeZone is predominantly used for road work situations. There is usually personnel driving through the site, and also as the barrier is usually only installed for mediumor short term it can be regularly inspected as it is returned to storage and again inspected as it is dispatched to the next job site. The installer can determine a suitable detection interval in connection with accident rated and traffic flow on the relevant route.

The drive by inspection is usually achievable by driving fairly slowly along the length of the installed barrier, depending on the location and site conditions then this may require additional safety systems put in place for example traffic management. During this inspection checks should bemade for any damage to the barrier caused by an impact. If there are signs of an extreme impact then amore thorough inspection should be carried out as soon as possible. The barrier sections will need to be replaced in the installation and the damaged sections taken away for further analysis.

Any fasteners that need replacing must meet the correct specification and performance; the bolts must have an 8.8 strength classification (ASTM F1554 Grade 105) and be the correct type of fastener for the application.

Although tears and deep scratches normally do not affect the performance of the barrier system it should be remembe- red that this may introduce corrosion to the barrier units, so the application of a protective coat of zinc rich paint maybe necessary locally in the area of the damage. In case of deep scratches the barrier unit should be replaced. Do not use any sections of barrier that show signs of significant thinning of the barrier skin caused by corrosion.

16. Removal

Refer to below steps for barrier removal.

- Step 1a: Removal of anchor Type A can be achieved by lifting the barrier section itself with a crane or forklift, the anchor pins will come out with the barrier.
- Step 1b: Removal of anchor Type B and can be achieved by either adding a 2nd nut on top of the anchor rod and clamping it or spot welding the existing nut to the anchor rod and rotating the system counter clockwise with an impact wrench.
- Step 2: Remove the security sets
- Step 3: Removal of the individual barrier elements is a reversal of the installation procedure. To separate the barrier sections, start at the last installed element and lift the element keeping it in a horizontal position. The barrier element will separate from the adjacent element. If the section of barrier being removed also lifts the adjacent section with it, place a 50mm high block under the foot of the section being removed (next to the joint), and lower the barrier. It will then separate. The string of barrier elements can also be split anywhere within the string, to allow for another removal point. This can be achieved by lifting an intermediate barrier section and rotating the free end sideways, outside of the barrier string.
- Step 4: Make sure that the bolt on the security set is tightened before transportation.
- Step 5: After removing the barrier elements the remaining anchor holes should be filled. For quick repairs it is advisable to use a one application product like a cold asphalt mix without the need for application of a tack coat, suitable for all weather conditions and which is immediately trafficable. For details on materials and procedures for repairing the road deck surface contact local asphalt specialists. For regulations consult the local road authorities.

17. Permanent installations

Both SafeZone and SafeZone LDS are appropriate as a permanent solution using threaded rod Type B anchors only. Make sure only approved permanent crash cushions are installed for permanent use, do not use temporary crash cushions.

Inspection period for permanent installations

- We suggest that this inspection is carried out at 3 year intervals after the first inspection. Please check with your local jurisdiction if their routine inspection periods are different and go with the lesser period.

Maintenance and inpection

The same methodology would apply for the maintenance of permanent installations as to temporary installations however a number of extra steps should be taken during inspection of permanent installations.

- Inspect for damage.
- Please check anchor shoe housing of barrier if impact has taken place. Inspect the anchor shoe housing to make sure it's still intact and that there has been no tearing of the steel. If damaged replace barrier.
- Please check joint of barrier if impact has taken place. Check that the coupling of the barrier is not damaged. If coupling is damaged replace barrier as necessary.
- Check for alignment. Check that the barrier is in the correct location. Look along length of run and check that each barrier is not sticking out from the next one *(Visual check. Replace or re-install if required)*
- Check for joints connected correctly Inspect. Check that the M20 Nut is in place. Check that the M20 Nut is hand tight. *(Replace or re-install if required)*
- Check Anchored to ground Inspect. Check fixings to anchors are still in place. For threaded rod type anchors make sure that the nut is in place and is hand tight (Re-install if required)
- Check for debris around barrier *(remove if required)*
- Check delineation intact. Check that all delineators are still in place. Check that none are loose. *(Inspect and replace if required)*
- Check for graffiti. Use paint thinner or graffiti removal products if required? *(Clean if required)*
- Check for corrosion. If corrosion has formed on the outside of barrier it may be necessary to inspect the barrier internally. Please check with manufacturer for further instructions if this scenario occurs.

18. Limitations and warnings

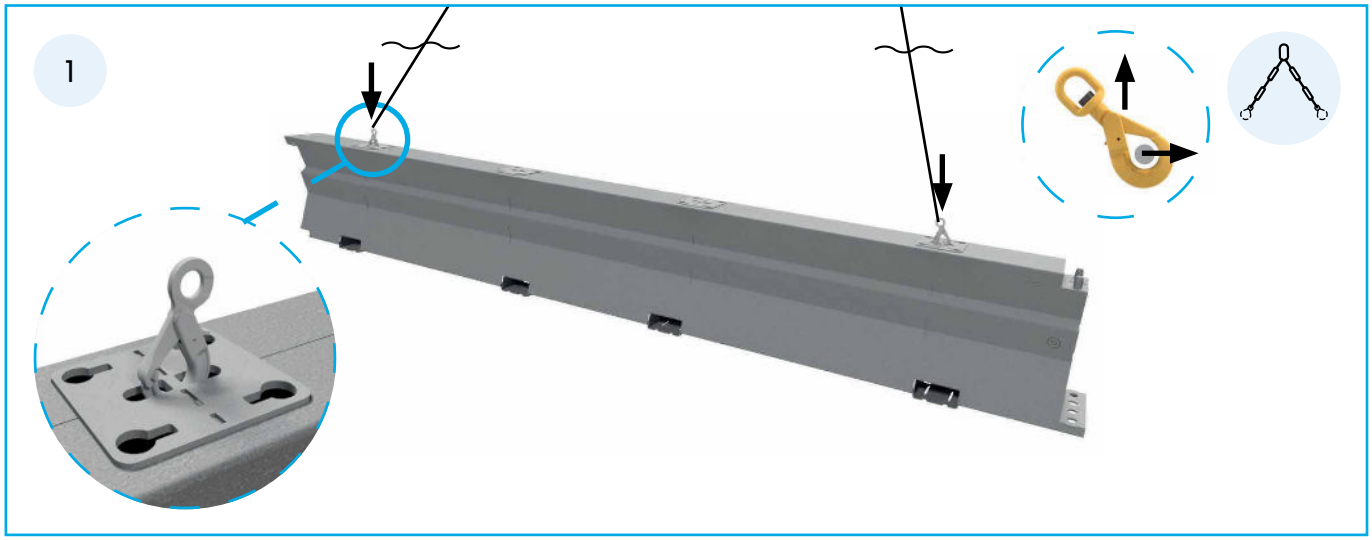
SafeZone™has been rigorously tested and evaluated per the evaluation criteria in the MASH guidelines for a longitudinal barrier. The impact conditions recommended in MASH are intended to address typical inservice collisions.

When properly installed and maintained SafeZone™allows an impacting vehicle to be contained or re-directed in a safe and predictable manner under the MASH impact conditions. Vehicle impacts that vary from the MASH impact conditions described for longitudinal barriers may result in significantly different results than those experienced in testing.

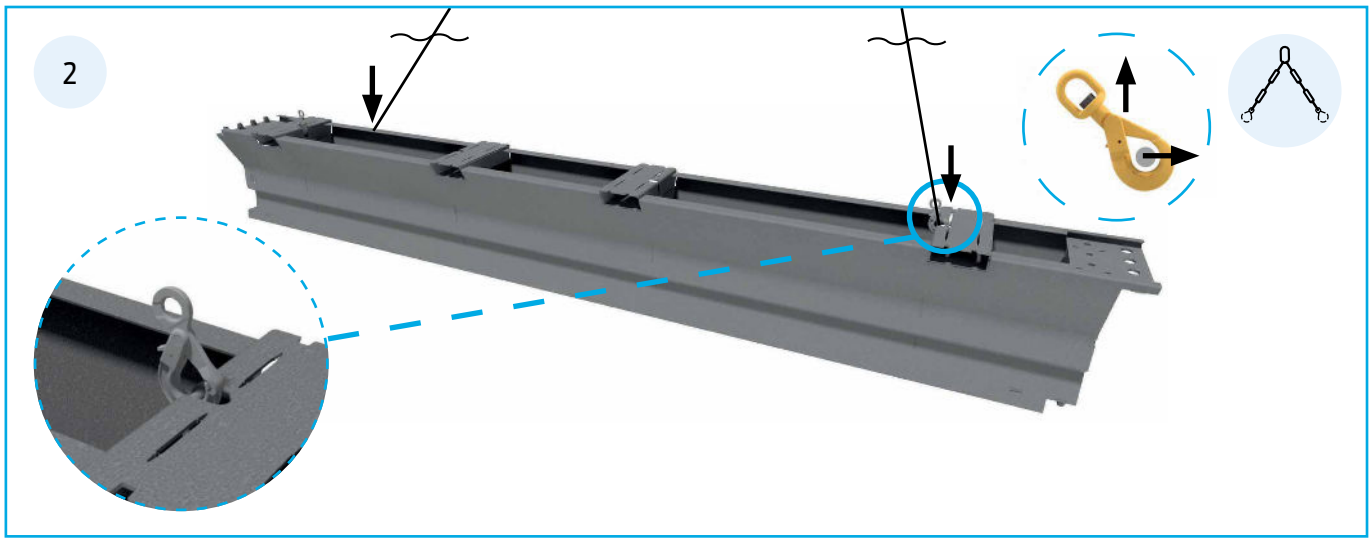
19. Lifting guide 5.8m barrier

Item	Liftig Chain Length	Max Weight (kg/lbs)	Lifting Capacity
5.8m barrier	Always follow the manufacturers instruction for correct use of the clutch. Shorten the chain using the clutch to ensure the load is level.	Single Element 535.0 kg	Use a suitable crane accorrding offical lifting capacity regulations.

19.1. Lifting the 5.8m barrier from the top



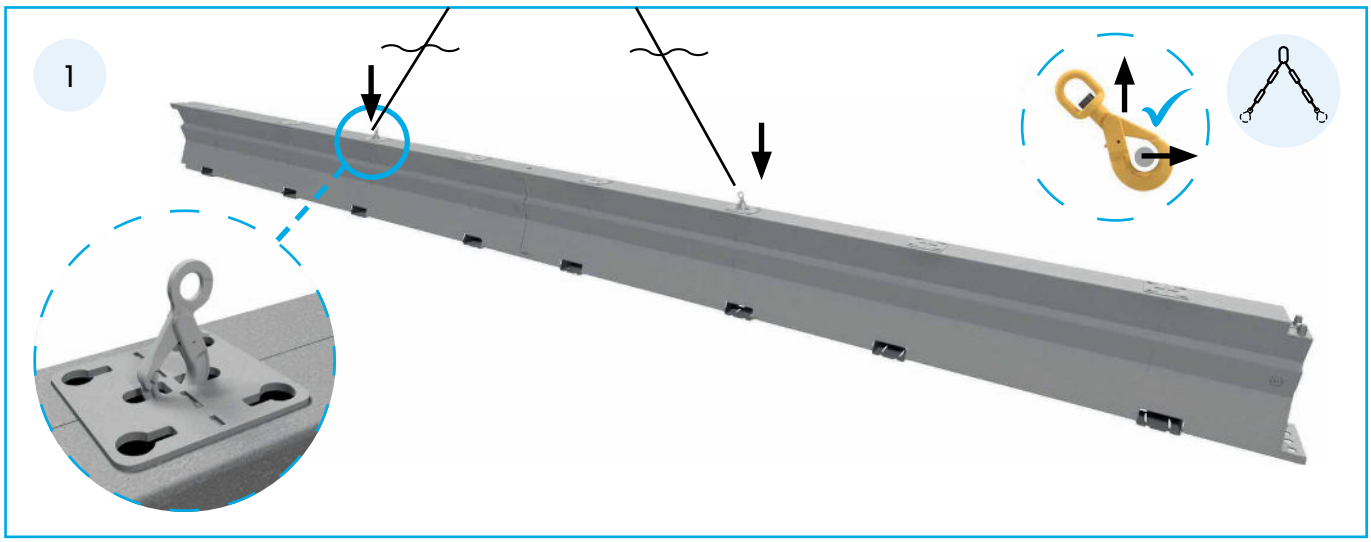
19.2. Lifting the 5.8m barrier from the bottom



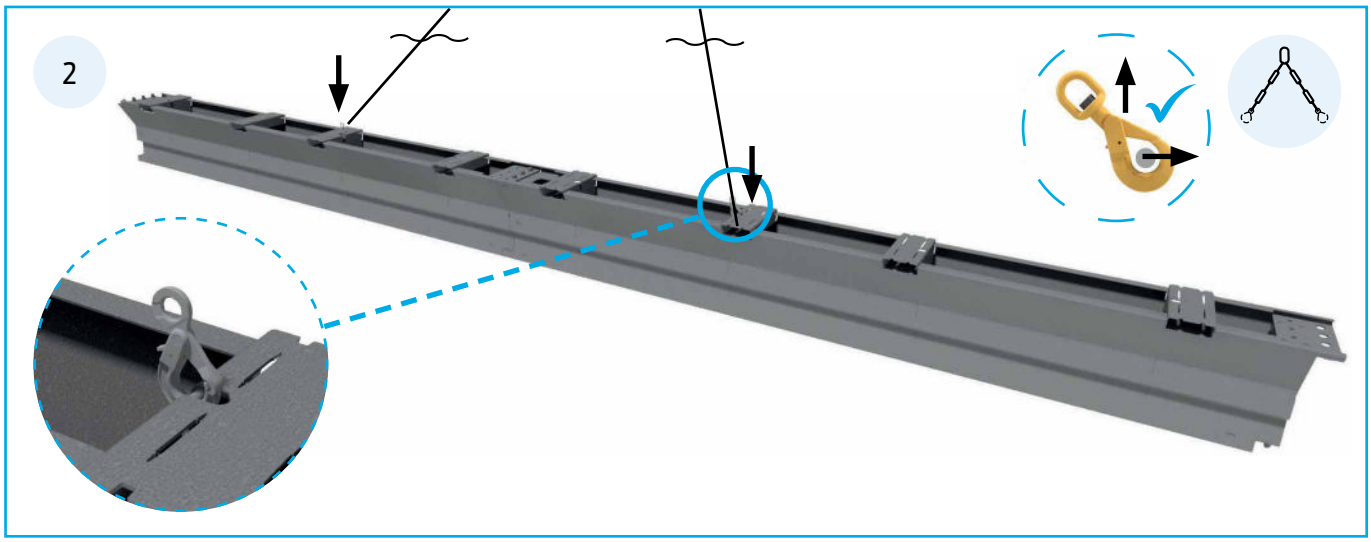
20. Lifting guide 11.6m barrier

Item	Liftig Chain Length	Max Weight (kg/lbs)	Lifting Capacity
11.6m barrier	Always follow the manufacturers instruction for correct use of the clutch. Shorten the chain using the clutch to ensure the load is level.	Doouble Element 1070.0 kg	Use a suitable crane accorrding offical lifting capacity regulations.

20.1. Lifting the 5.8m barrier from the top



20.2. Lifting the 5.8m barrier from the bottom



21. Lifting guide ForkLift

Item	Tool
5.8m barrier 11.6m barrier	Forklift

21.1. Lifting the 5.8m barrier with a forklift

1

21.2. Lifting the 11.6m barrier with a forklift

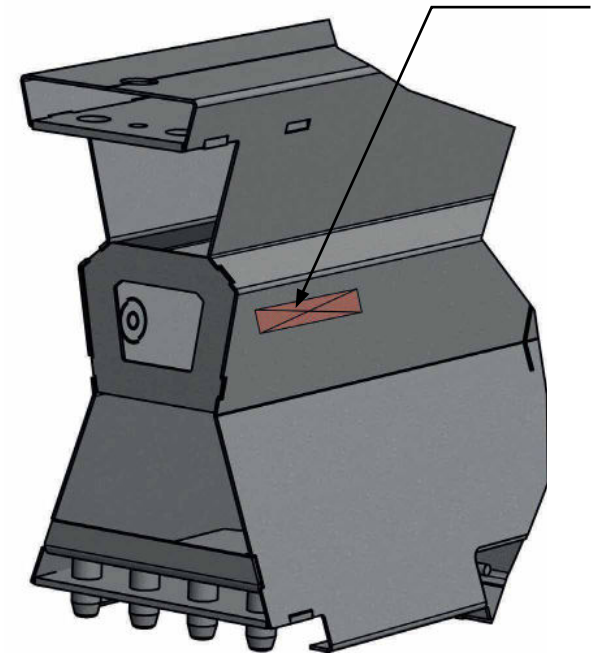
2

22. Marking

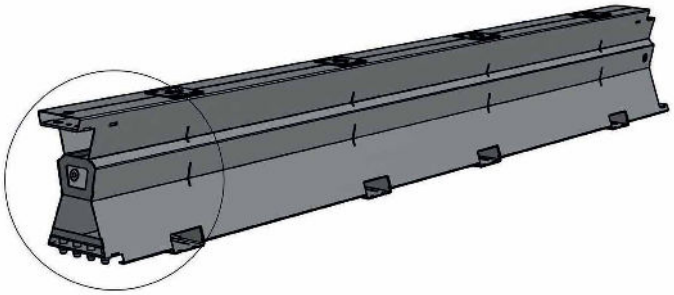
Use original SafeZone parts only. Barriers marked with this logo are SafeZone barriers.

(YY/MM/DD) - production number

The ingraving can be found here. See picture below



marking can be found here



Example Pre-installation checklist

SafeZone must be installed by a qualified installer, with written documentation signed at the end of the installation that it has been installed as per manufacturer manual.

The units are positioned on a cross fall of 8% / 3.60 or less.	
All security bolts on the Quick Connect are attached and tightened.	
Is an approved crash cushion required?	
Workers and equipment are located in the CoPTTM safety clear zone.	
Are all hazards located outside the clear zone?	
Are all tools removed from site when installation is complete.	
If delineation is required it is applied as per MoTSam Part 2.	
Clear any debris from under and between the units.	
Arrange maintenance inspections as appropriate for location.	

Location:			
Installed by:		Date:	
Installed by:		Date:	

Example Installation form

Please fill in and sign this form at the end of the installation.

Project name:	
Job site address:	
Time arrived:	
Time completed:	
Lengths of installs:	
Components installed on site:	
Anchoring:	
End treatments:	
Project manager/ site foreman:	
Traffic control company:	
Tool box meeting held:	
Installers on site:	
Installation checked by:	

Location:			
Installer certificate number:		Date:	
Signed by qualified installer:		Date:	

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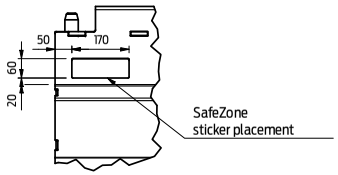

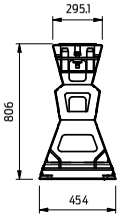

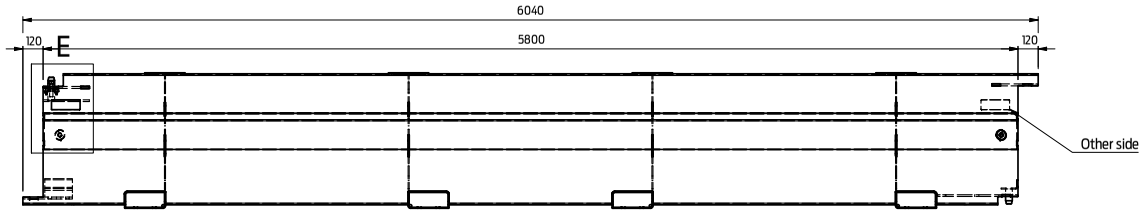

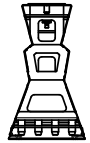

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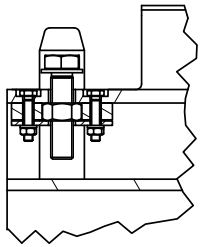

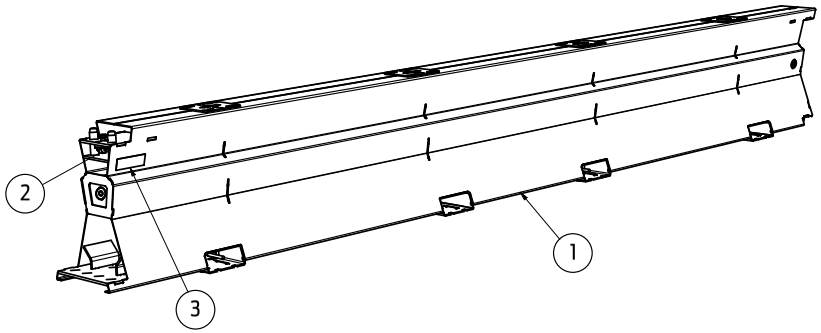

Pos	Qty	Part Number	Title	Description	Material
3	2	KE31840019	SafeZone; sticker	Sticker 170x60x0.2mm	Polyester
2	1	AS31840013	SafeZone; security set	Assembly	
1	1	AS31840001	SafeZone; standard barrier	Welding Assembly	

Revision		
Rev.	Date	Description
A	20-09-2017	Pos. 3 (sticker) fitted to assembly.

Jaybro SafeZone™ safer, simpler, smarter.

Material: | Mass: N/A

American Projection:

Part Number: AS31840000

Revision: A

Author: ramaekersn | Date: 23-1-2017

Checked: | Date:

Unit: mm

Title: SafeZone; standard barrier complete

Scale:

Comments:

Description: Assembly

Format: A2

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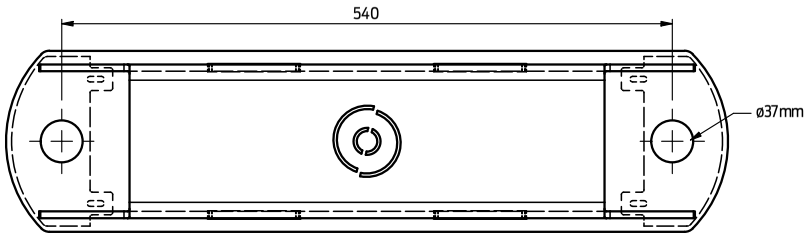

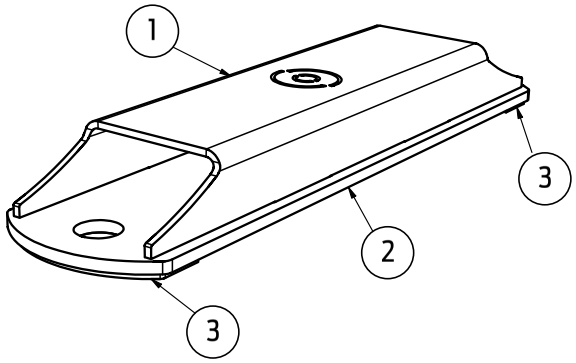

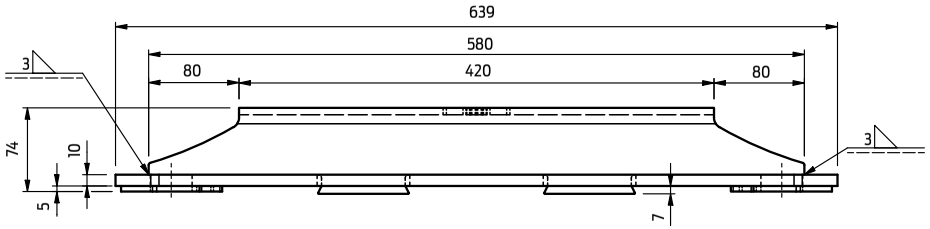

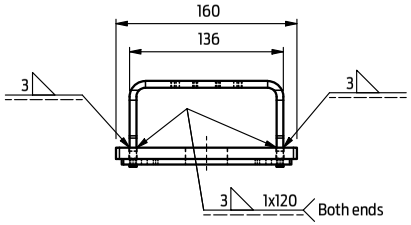

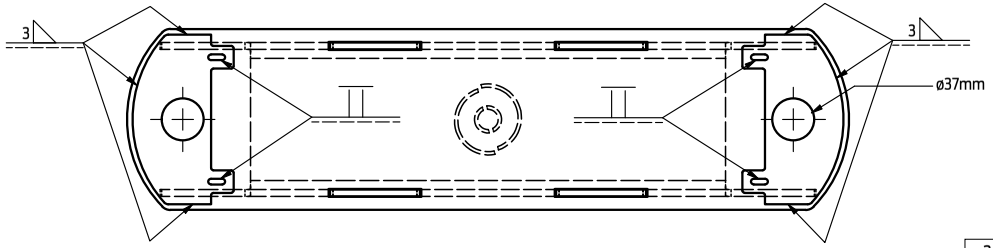

Pos	Qty	Part Number	Title	Description	Material
3	2	EP31840022	SafeZone; standard insert	150 x 89.4 x 5mm	S355MC
2	1	EP31840021	SafeZone; standard insert	638.6 x 160 x 10mm	S355MC
1	1	EP31840020	SafeZone; standard insert	590 x 263.4 x 6mm	S355MC

Revision		
Rev.	Date	Description
A	16-03-2020	Pos. 3 Slotted holes adjusted.

Jaybro CONSIDER IT DONE | SafeZone™ safer. simpler. smarter.

Material: | Mass: N/A

American Projection:

Part Number: AS31840020

Revision: A

Author: ramaekersn | Date: 23-1-2017

Checked: | Date:

Unit: mm

Title: SafeZone; standard insert

Scale:

Comments:

Description: Welding Composition

Format: A3

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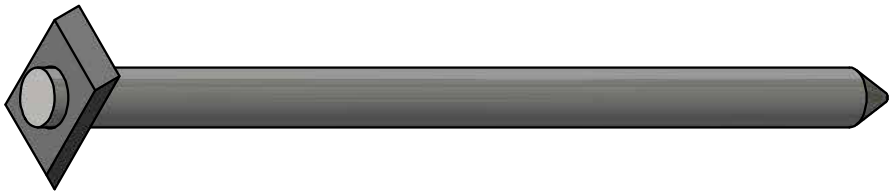

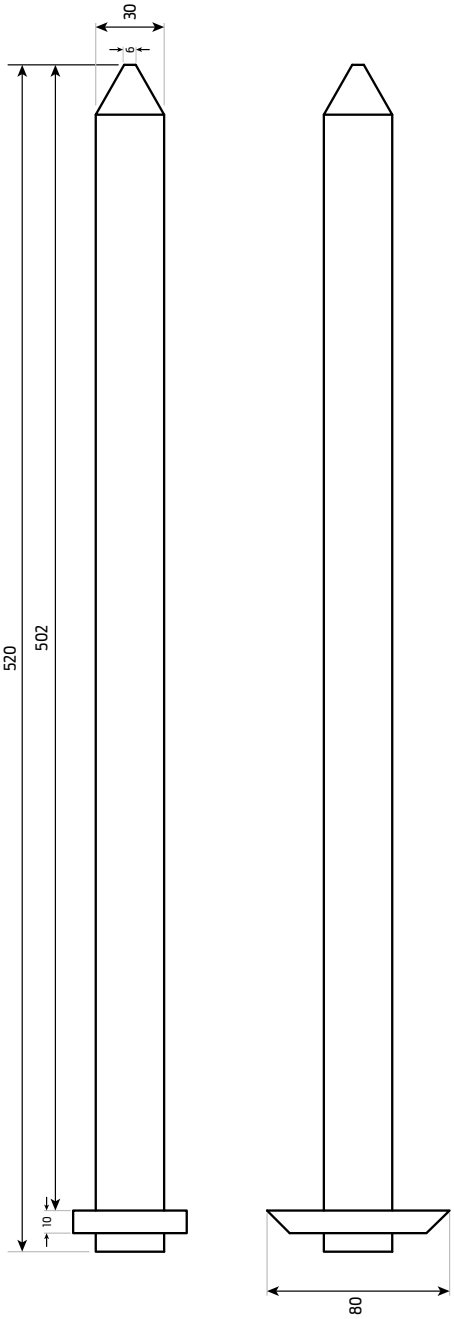

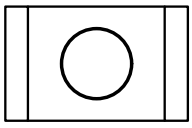

Material:	Mass: 3.03kg			Revision
American Projection:	Part Number: AS31642592			
Author: ramaekersn	Date: 15-3-2017	Unit: mm	Title: Flat Top Pin	Scale:
Checked:	Date:			Format A3
Comments: Hot-dip galvanise according to EN 1461.			Description:	

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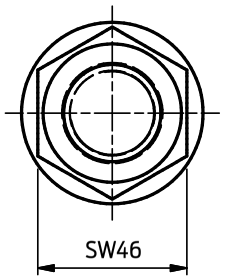

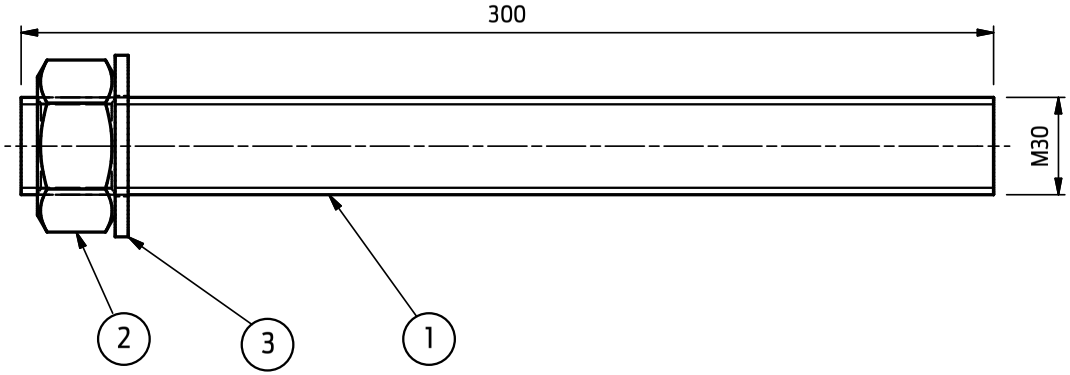

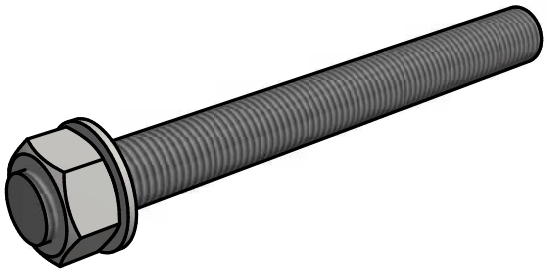

Pos	Qty	Part Number	Title	Description	Material
3	2		SafeZone; M30 Anchor Bolt	M30 Washer	DIN125
2	1		SafeZone; M30 Anchor Bolt	M30 Hex Nut	DIN934
1	1		SafeZone; M30 Anchor Bolt	M30 Stud x 300mm	DIN976

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Material: | Mass: 1.95 kg

American Projection:

Part Number: AS31840030

Revision

Author: ramaekersn | Date: 10-7-2017 | Unit: mm

Checked: | Date:

Title: SafeZone; M30 Anchoring

Scale:

Comments:

Description: Anchor Bolt M30 x 300mm

Format A4

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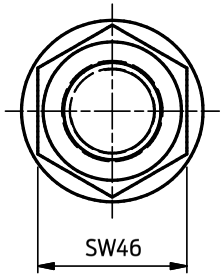

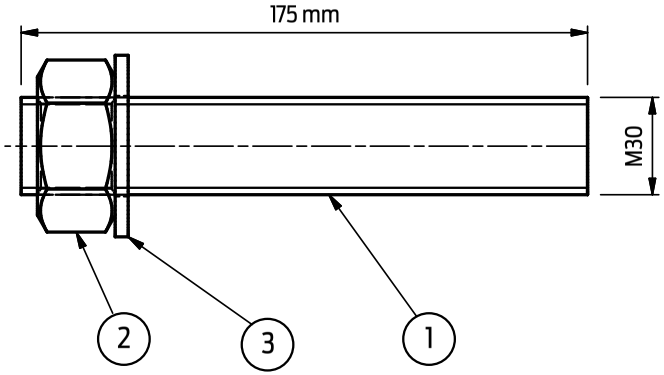

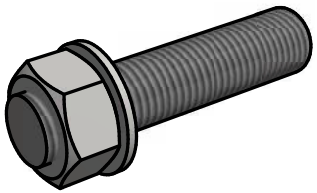

Pos	Qty	Part Number	Title	Description	Material
3	1		SafeZone; M30 Anchoring	M30 Stud x 175mm	DIN976
2	1		SafeZone; M30 Anchoring	M30 Washer	DIN125
1	1		SafeZone; M30 Anchoring	M30 Hex Nut	DIN934

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Material: | Mass: 1.95 kg

American Projection:

Part Number: AS31840031

Revision

Author: ramaekersn | Date: 10-7-2017 | Unit: mm

Checked: | Date:

Title: SafeZone; Anchoring

Scale:

Comments:

Description: Anchor Bolt M30 x 175mm

Format A4

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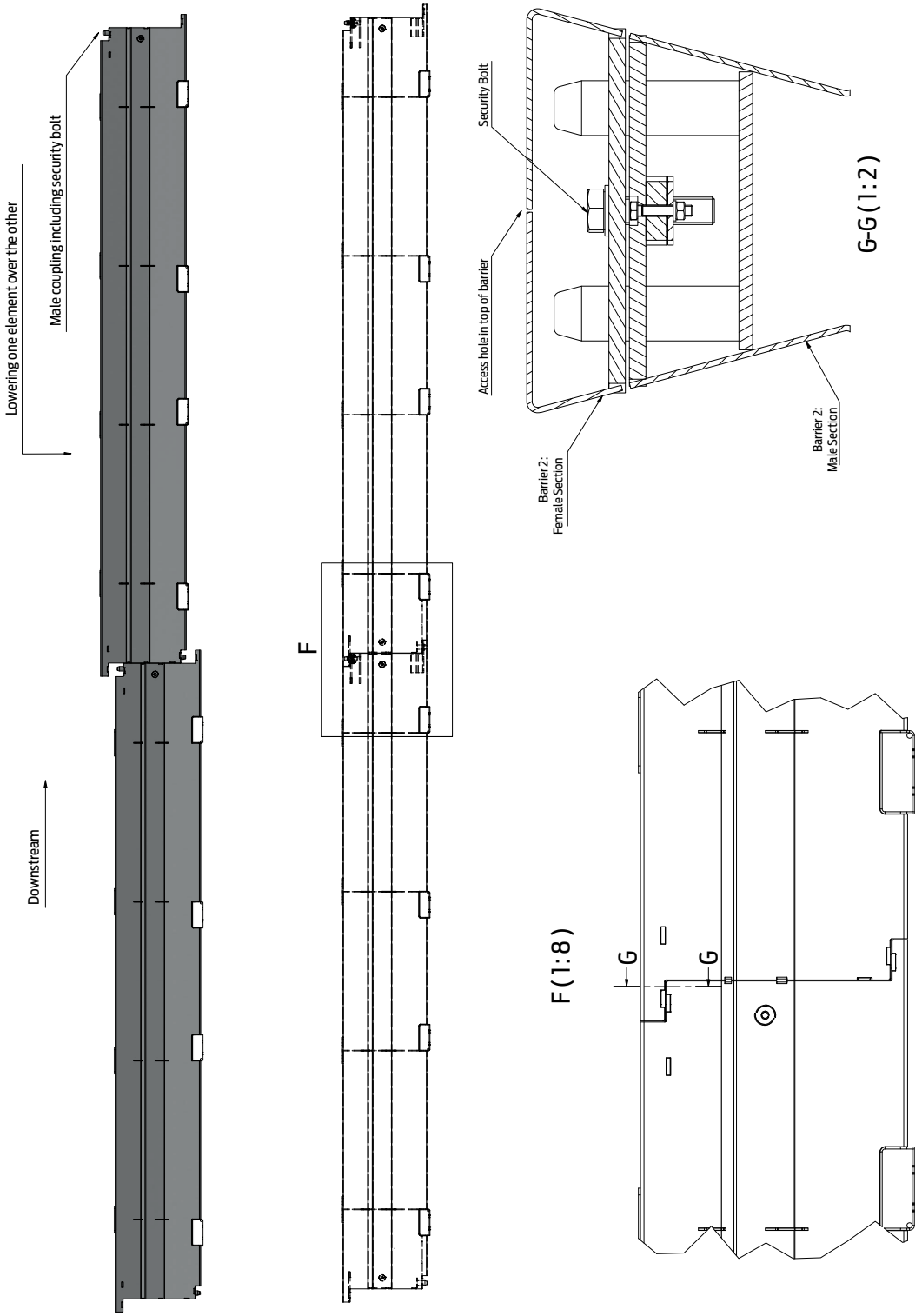
Lowering one element over the other
Male coupling including security bolt
Downstream
F
Security Bolt
Access hole in top of barrier
Barrier 2:
Female Section
Barrier 2:
Male Section
G-G (1:2)
F (1:8)
G
G
Material:
Mass: N/A
American Projection
Part Number:
SafeZone
Revision
Author: ramaileran
Date: 15-3-2017
Unit:
mm
Title:
Connecting 2 Barriers
Scale:
Checked:
Date:
Comments:
Description:
Security Set
Format
A2
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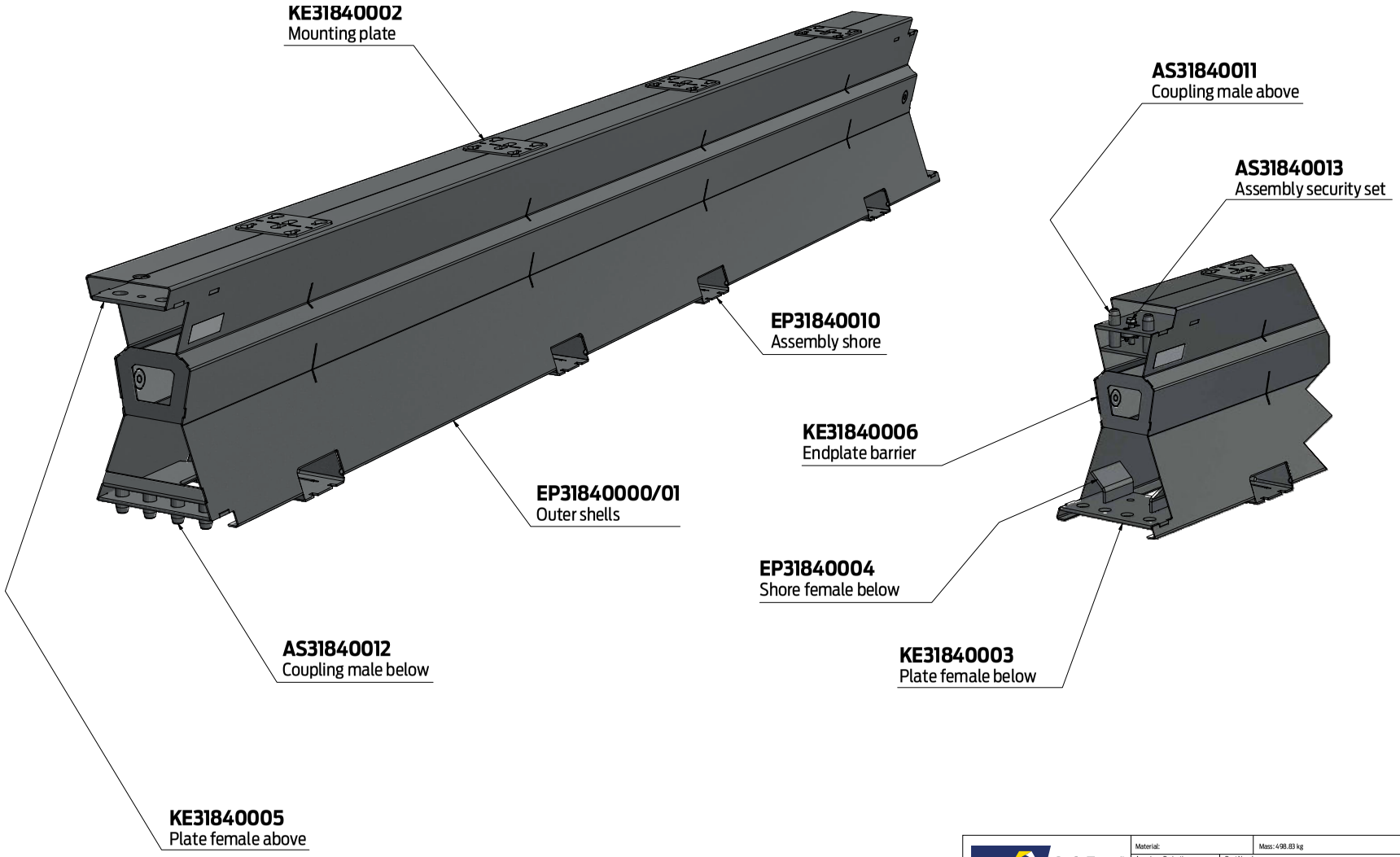
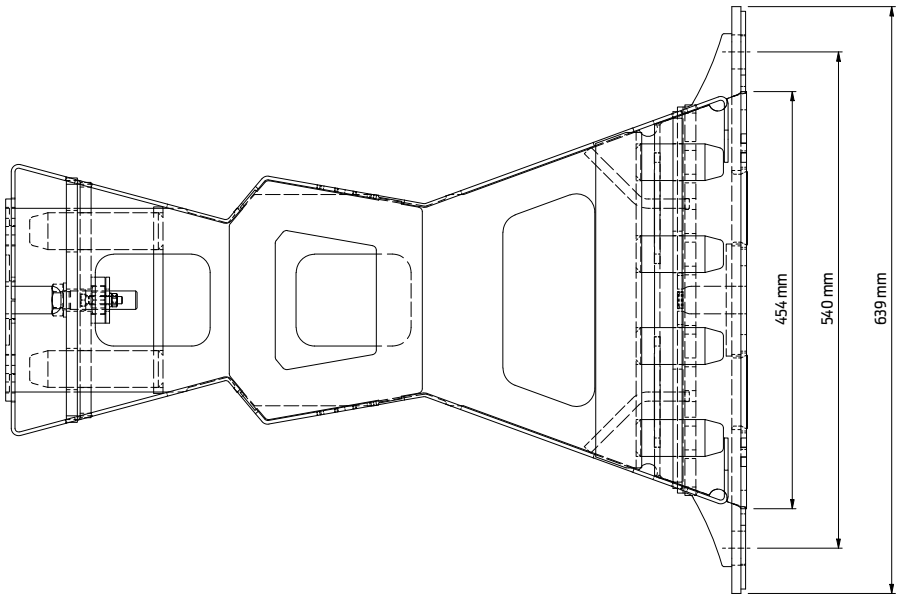


Jaybro SafeZone safer, simpler, smarter.	Material:	Mass: 498.83 kg	
	American Projection:	Part Number: SafeZone	Revision
Author: ramaekersn	Date: 15-3-2017	Unit: mm	Title: SafeZone; Standard Barrier Complete	Scale:
Checked:	Date:			
Comments:			Description: Security Set	Format A2



Material: | Mass: N/A
American Projection | Part Number: SafeZone | Revision
Author: ramaekers | Date: 15-3-2017 | Unit: mm | Title: SafeZone | Scale:
Checked: | Date: | Description: Including anchor unit | Format A2
Comments:

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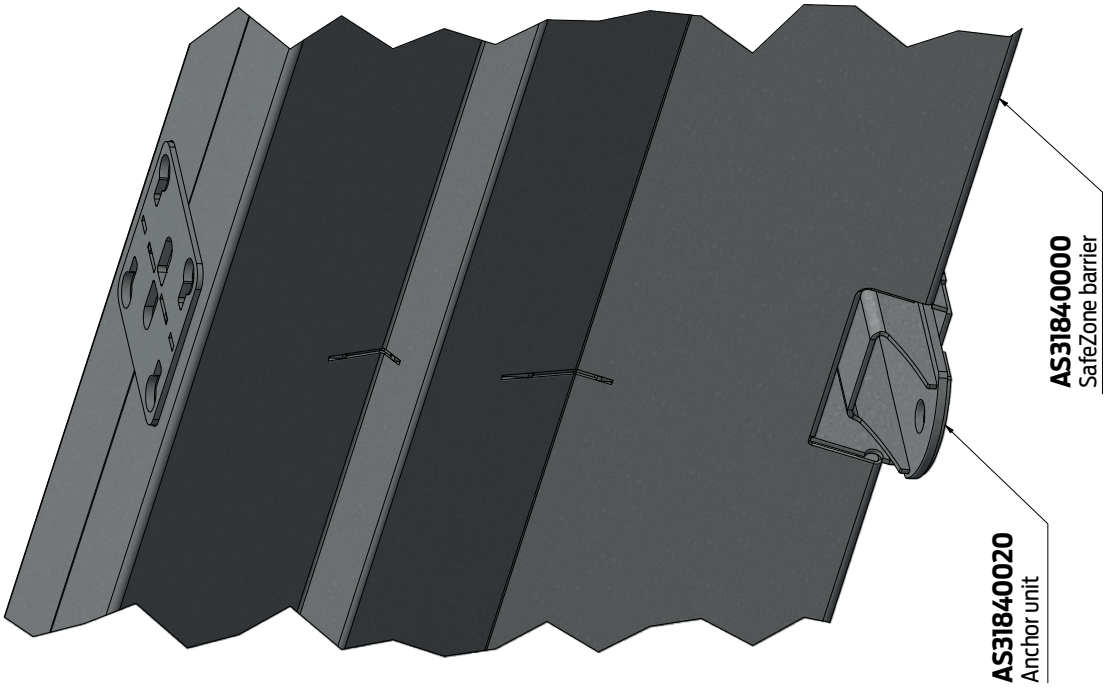
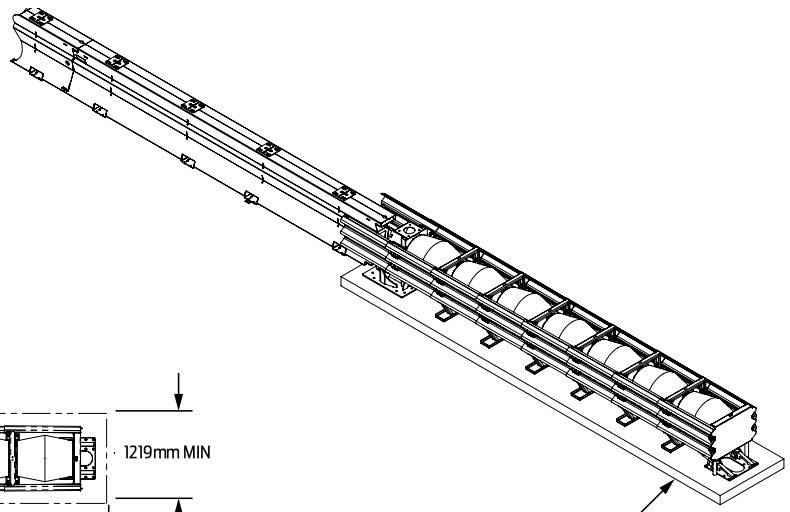
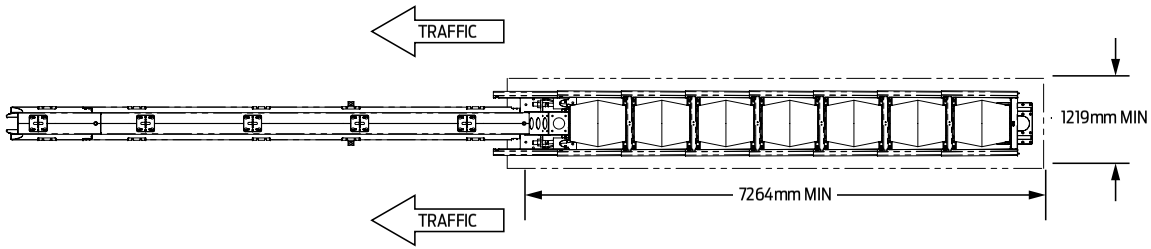
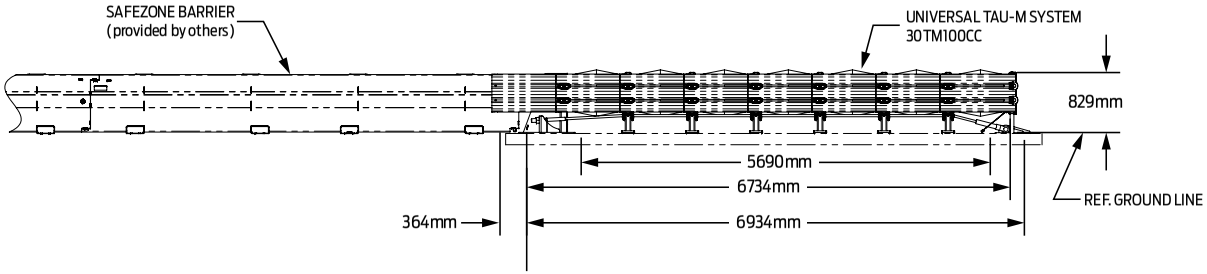


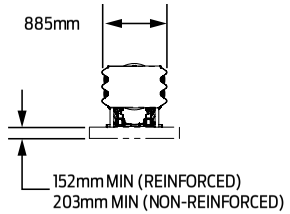
NOTES: UNLESS OTHERWISE SPECIFIED.

1. TAU-M to be installed per manufacturer's instructions. See assembly and installation manual for additional details. TL-3 Model 30TM100CC shown, TL-2 Model 30TM070CC may be installed in similar fashion.
2. SafeZone barrier to be installed per manufacturer's instructions, standard or limited deflection.
3. TAU-M foundation material, specifications and anchorage must be in accordance with LTS foundation specifications for concrete foundations. Reference LTS drawing A040113 & Installation Manual.









Revision		
Rev.	Date	ECN#
1	21-05-2019	AP 01437

Jaybro / SafeZone™ safer. simpler. smarter.	Material:	Mass: N/A	
	Third Angle Projection	DWG NO. BSI-1905024-AP	Revision 1
Drawn by: BRO	Date: 22/05/2019	Unit: mm	Title: Universal TAU-M transitioned to SafeZone Barrier, Concrete, UniDirectional
Approved by: JMT	Date: 22/05/2019		Scale:
Comments:			Size B

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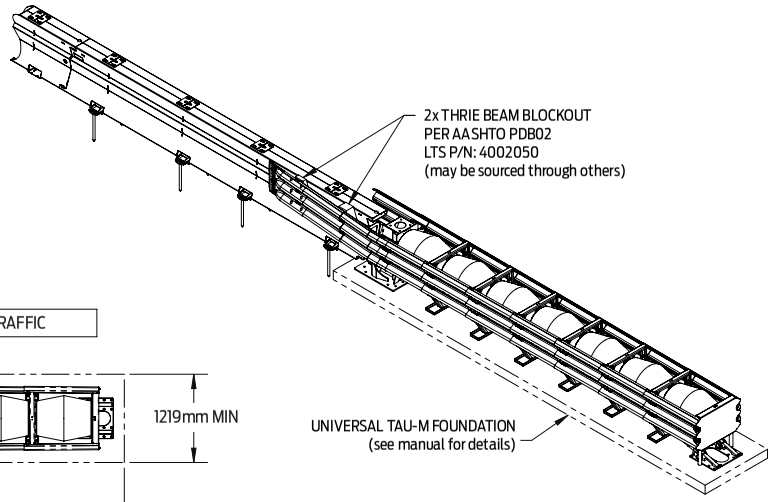
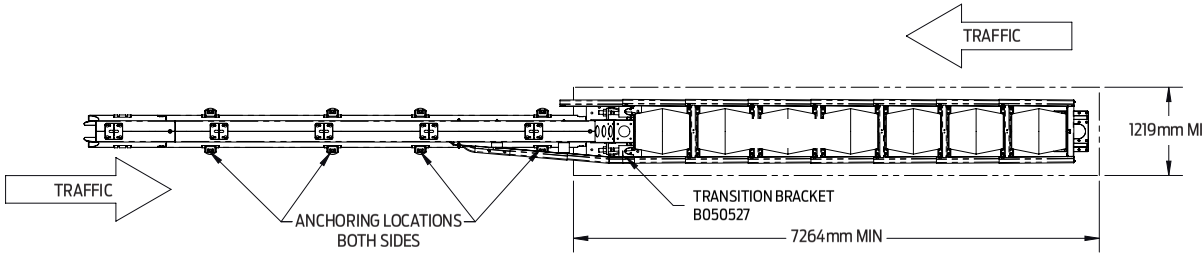
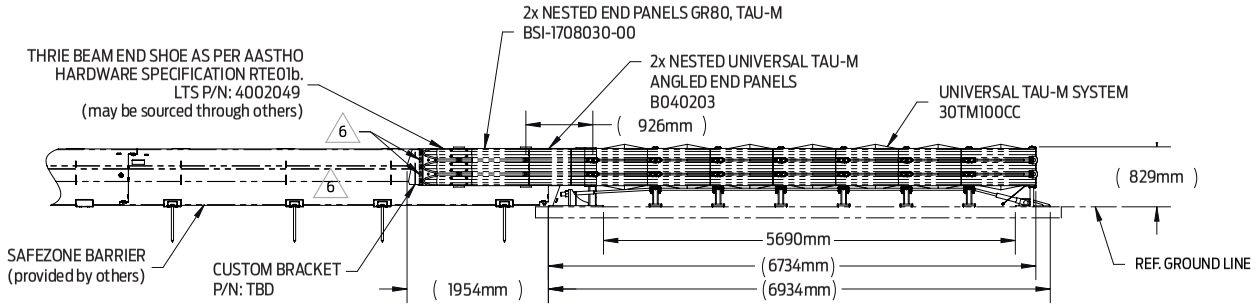
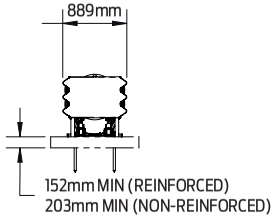
NOTES: UNLESS OTHERWISE SPECIFIED.

1. TAU-M to be installed per manufacturer's instructions. See assembly and installation manual for additional details. TL-3 Model 30TM100CC shown, TL-2 Model 30TM070CC may be installed in similar fashion.
2. SafeZone barrier to be installed per manufacturer's instructions, standard or limited deflection.
3. TAU-M foundation material, specifications and anchorage must be in accordance with LTS foundation specifications for concrete foundations. Reference LTS drawing A040113 & Installation Manual.
4. Blockouts per local standards. Blockout to be field trimmed to fit.
5. Transition panels, blockouts, custom bracket and thrie beam terminal connector attached through barrier with 16mm threaded rods (BSI-1309061-00) with beam washers (4002051), flat washers (2001636) and nuts (401116), threaded rod maybe field trimmed. Holes through barrier are 20mm.
6. Attach custom bracket to thrie beam terminal connector with 16mm x 50mm bolts (400115) with beam washers (4002051), flat washers (2001636) and nuts (4001116).









Revision		
Rev.	Date	ECN#
1	21-05-2019	AP 01437

Jaybro SafeZone safer, simpler, smarter.	Material:	Mass: N/A	
	Third Angle Projection	DWG NO. BSI-1905018-AP	Revision 1
Drawn by: BRO	Date: 21/05/2019	Unit: mm	Title: Universal TAU-M transitioned to SafeZone Barrier, Concrete, Bi-Directional
Approved by: JMT	Date: 21/05/2019		Scale:
Comments:			Size B

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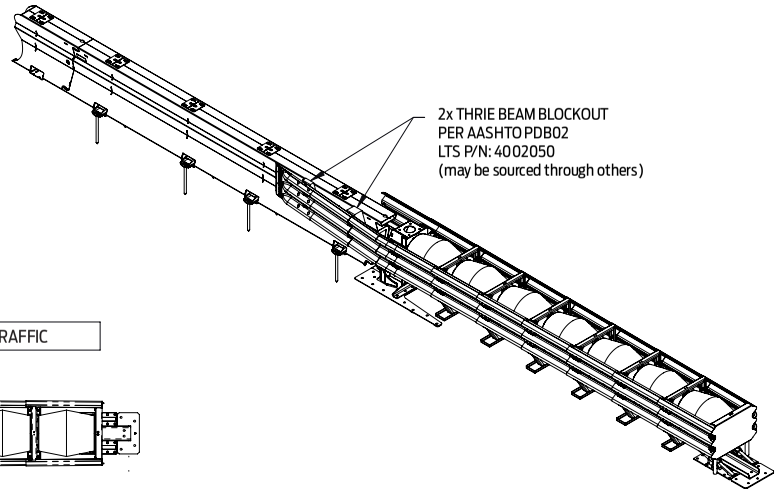
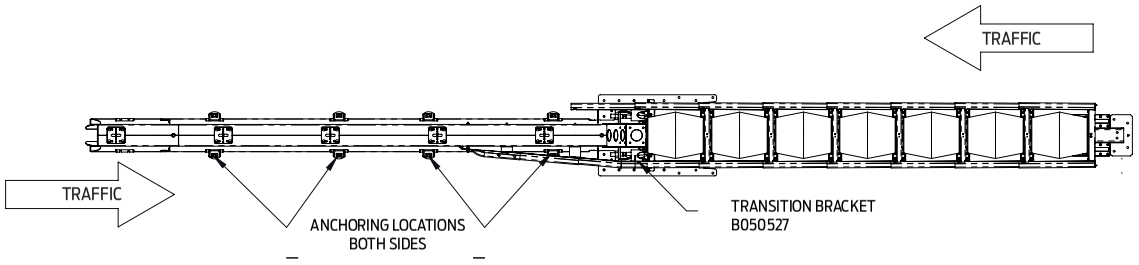
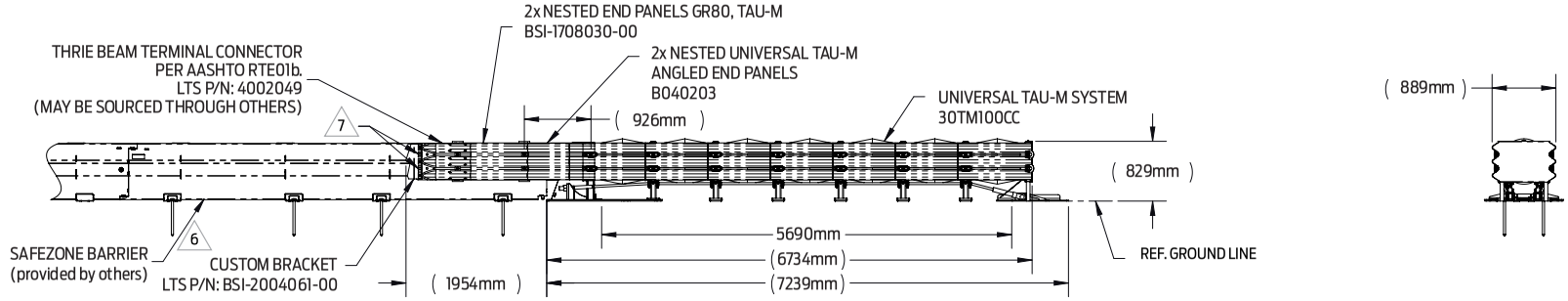
NOTES: UNLESS OTHERWISE SPECIFIED.

1. TAU-M to be installed per manufacturer's instructions. See assembly and installation manual for additional details. TL-3 Model 30TM100CC shown, TL-2 Model 30TM070CC may be installed in similar fashion.
2. SafeZone barrier to be installed per manufacturer's instructions, standard or limited deflection.
3. TAU-M foundation material, specifications and anchorage must be in accordance with LTS foundation specifications for asphalt foundations. Reference LTS drawing A040113 & Installation Manual.
4. Blockouts per local standards. Blockout to be field trimmed to fit.
5. Transition panels, blockouts, custom bracket and thrie beam terminal connector attached through barrier with 16mm threaded rods (BSI-1309061-00) with beam washers (4002051), flat washers (2001636) and nuts (401116), threaded rod maybe field trimmed. Holes through barrier are 20mm.
6. Attach custom bracket to thrie beam terminal connector with 16mm x 50mm bolts (400115) with beam washers (4002051), flat washers (2001636) and nuts (4001116).







Revision		
Rev.	Date	ECN#
1	21-05-2019	AP 01437

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		Third Angle Projection	DWG NO. BSI-1905023-AP	Revision 1
Drawn by: BRO	Date: 21/05/2019	Unit: mm	Title: Universal TAU-M transitioned to SafeZone Barrier, Ashphalt, Bi-Directional	Scale:
Approved by: JMT	Date: 21/05/2019			Size B
Comments:				

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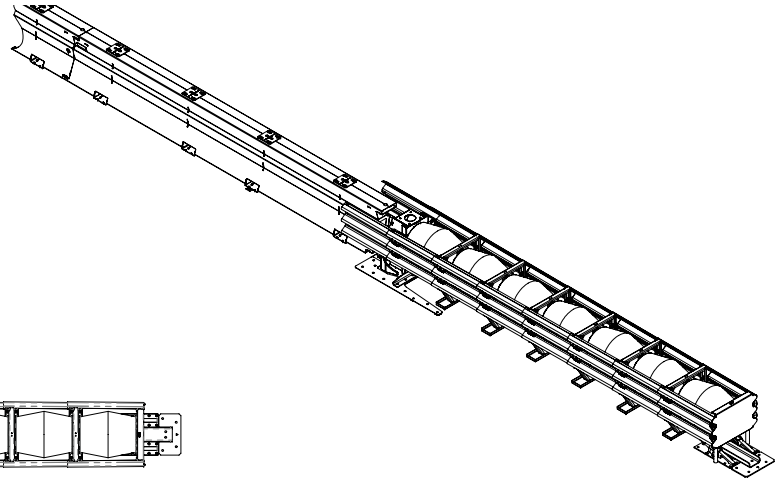
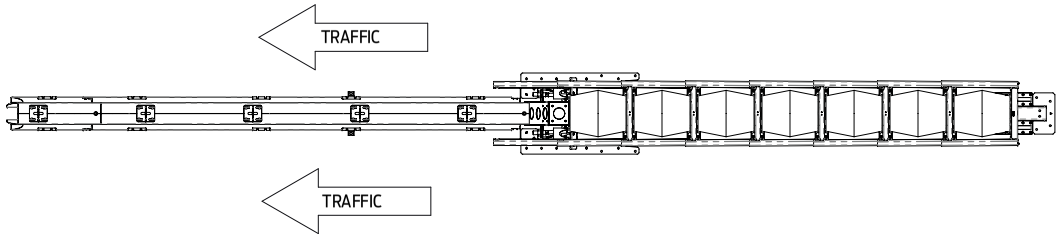
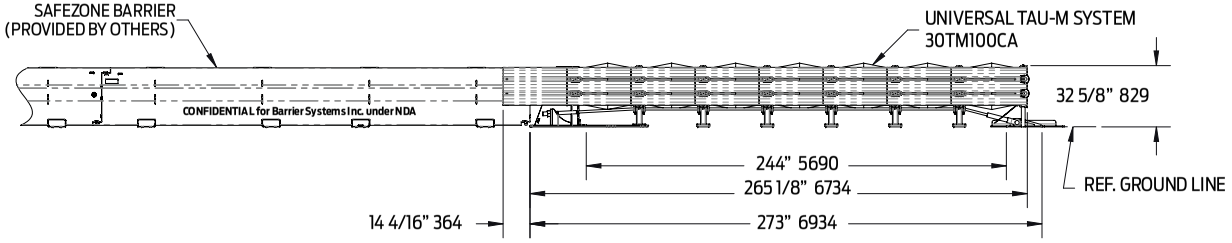
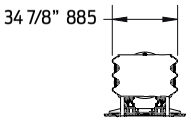
NOTES: UNLESS OTHERWISE SPECIFIED.

1. TAU-M TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. SEE ASSEMBLY AND INSTALLATION MANUAL FOR ADDITIONAL DETAILS. TL-3 MODEL 30TM100CA SHOWN, TL-2 MODEL 30TM070CA MAY BE INSTALLED IN SIMILAR FASHION.
2. SAFEZONE BARRIER TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS, STANDARD OR LIMIT DEFLECTION.
3. TAU-M FOUNDATION MATERIAL, SPECIFICATIOINS AND ANCHORAGE MUST BE IN ACCORDANCE WITH LTS FOUNDATION SPECIFICATIONS FOR ASPHALT FOUNDATIONS. REFRENCE LTS DRAWING A040113 & INSTALLATION MANUAL.









Revision		
Rev.	Date	ECN#
1	21-05-2019	AP 01437

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Material:		Mass: N/A	
Third Angle Projection		DWG NO. BSI-1905025-AP	Revision 1
Drawn by: BRO	Date: 22/05/2019	Unit: mm	Title: Universal TAU-M transitioned to SafeZone Barrier, Ashphalt, Unidirectional
Approved by: JMT	Date: 22/05/2019		Scale: 1:60
Comments:			Size B

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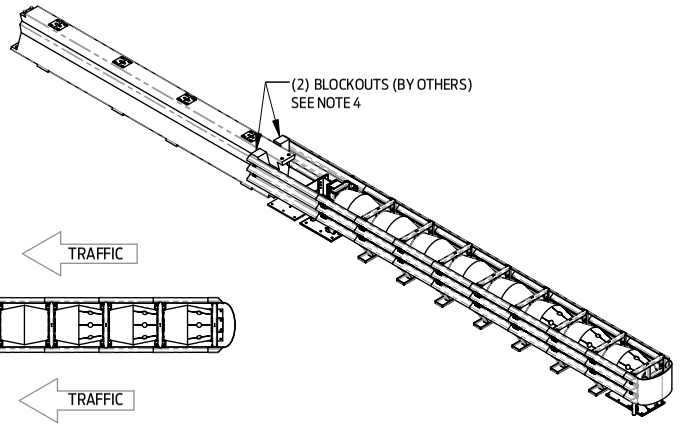
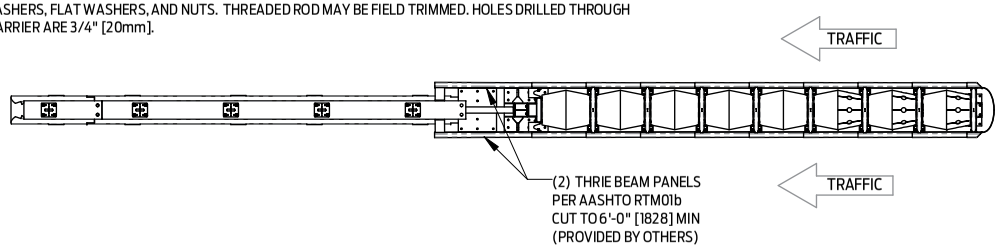
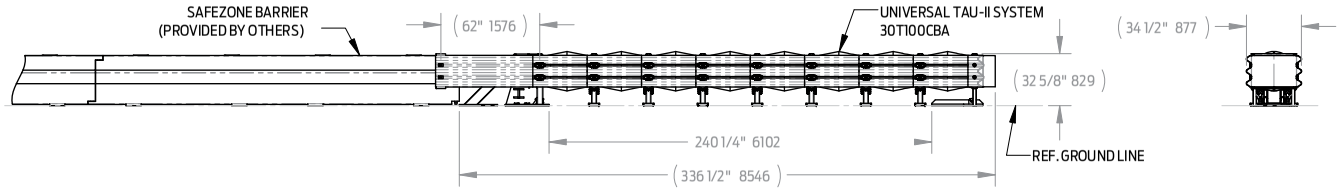
NOTES: UNLESS OTHERWISE SPECIFIED.

1. TAU-II SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. SEE ASSEMBLY AND INSTALLATION MANUAL FOR ADDITIONAL DETAILS. TL-3 MODEL 30T100CBA SHOWN, TL-2 MODEL 30T070CBA MAY BE INSTALLED IN SIMILAR FASHION.
2. SAFEZONE BARRIER INSTALLED PER MANUFACTURER'S INSTRUCTIONS, STANDARD OR LIMITED DEFLECTION.
3. TAU-II FOUNDATION MATERIAL, SPECIFICATIONS AND ANCHORAGE MUST BE IN ACCORDANCE WITH LTS FOUNDATION SPECIFICATIONS FOR ASPHALT FOUNDATIONS. REFERENCE LTS DRAWING A040113.
4. PANELS AND BLOCKOUTS PER LOCAL STANDARDS. BLOCKOUTS WILL NEED TO BE FIELD TRIMMED TO FIT.
5. PANELS AND BLOCKOUTS ATTACHED THROUGH BARRIER WITH 5/8" [16mm] THREADED ROD WITH BEAM WASHERS, FLAT WASHERS, AND NUTS. THREADED ROD MAY BE FIELD TRIMMED. HOLES DRILLED THROUGH BARRIER ARE 3/4" [20mm].







Revision		
Rev.	Date	ECN#
1	08-09-2018	AP 01367

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Material: | Mass: N/A

Third Angle Projection

DWG NO. BSI-1808051-AP

Revision 1

Drawn by: NMB	Date: 08-09-2018	Unit: mm	Title: Universal Tau-ii, Transitioned To Safezone Barrier, Asphalt, Undirectional
Approved by: GAD	Date: 08-09-2018		Scale: 1:60
Comments:			Size B

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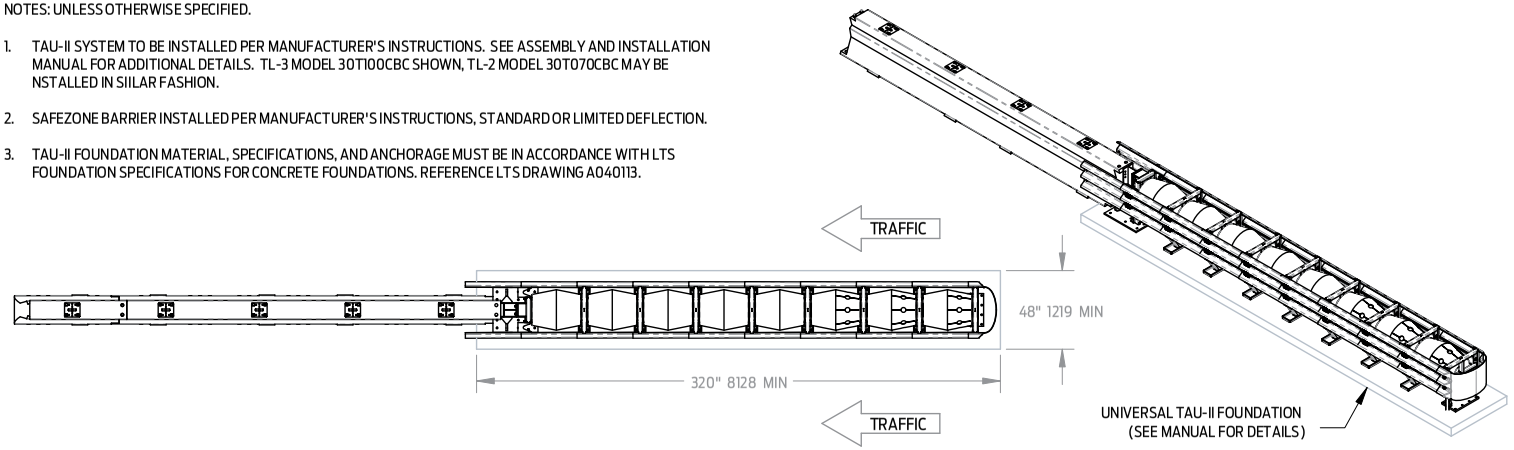
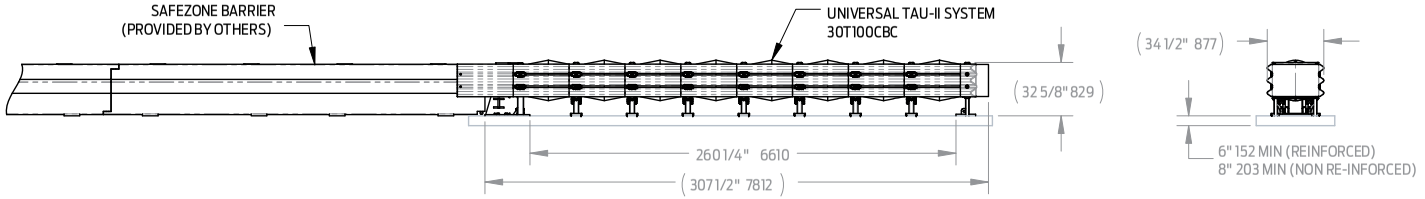
NOTES: UNLESS OTHERWISE SPECIFIED.

1. TAU-II SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. SEE ASSEMBLY AND INSTALLATION MANUAL FOR ADDITIONAL DETAILS. TL-3 MODEL 30T100CBC SHOWN, TL-2 MODEL 30T070CBC MAY BE NSTALLED IN SIILAR FASHION.
2. SAFEZONE BARRIER INSTALLED PER MANUFACTURER'S INSTRUCTIONS, STANDARD OR LIMITED DEFLECTION.
3. TAU-II FOUNDATION MATERIAL, SPECIFICATIONS, AND ANCHORAGE MUST BE IN ACCORDANCE WITH LTS FOUNDATION SPECIFICATIONS FOR CONCRETE FOUNDATIONS. REFERENCE LTS DRAWING A040113.





Revision		
Rev.	Date	ECN#
1	08-09-2018	AP 01367

Jaybro CONSIDER IT DONE / SafeZone™ safer. simpler. smarter.	Material:	Mass: N/A	
	Third Angle Projection	DWG NO. BSI-1808052-AP	Revision 1
Drawn by: NMB	Date: 08/09/2018	Unit: mm	Title: Universal Tau-ii, Transitioned To Safezone Barrier, Concrete, Unidirectional
Approved by: GAD	Date: 08/09/2018		Scale: 1:60
Comments:			Size B

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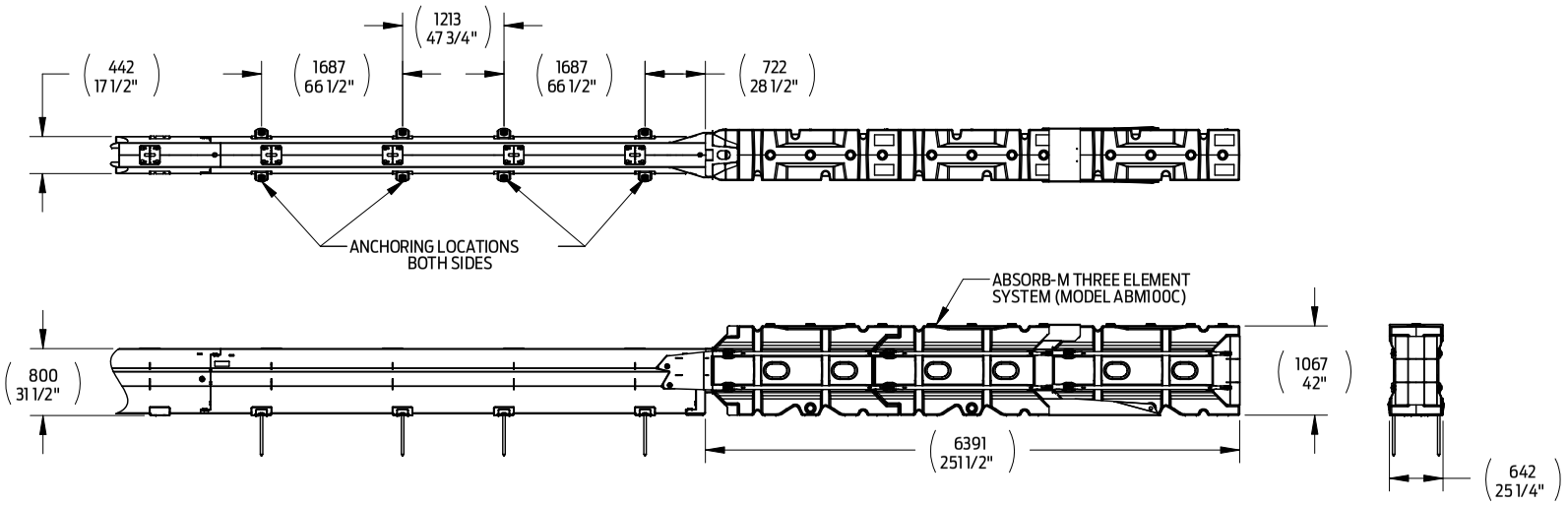
NOTES: UNLESS OTHERWISE SPECIFIED.

1. ABSORB-M SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. SEE ASSEMBLY AND INSTALLATION MANUAL FOR ADDITIONAL DETAILS.
2. SAFEZONE BARRIER TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
3. ABSORB-M TO SAFEZONE ADAPTER TO BE INSTALLED UTILIZING THE CONNECTING PINS AND HOLE ON THE SAFEZONE BARRIER AND 1 ∅22mm BOLT AT THE TOP CONNECTION PLATE.
4. ABSORB-M TRANSITION TO BUTT AGAINST THE ABSORB-M TO SAFEZONE ADAPTER.
5. ABSORB-M STRAPS REQUIRE 2 HOLES MATCH DRILLED THROUGH THE SAFEZONE BARRIER TO ACCOMODATE ∅5/8" [16mm] THREADED RODS. THREADED ROD TO BE SECURED WITH FLAT WASHERS & NUTS, THEN FIELD TRIMMED AS REQUIRED. THREADED ROD AND ATTACHMENT HARDWARE NOT INCLUDED IN ABSORB-M SYSTEM, TO BE PROVIDED BY OTHERS.
6. END SEGMENT OF SAFEZONE BARRIER TO BE FULLY ANCHORED IN 8 LOCATIONS.
7. REMAINING SAFEZONE BARRIER TO BE ANCHORED EVERY 11.6m PER MANUFACTURER'S INSTRUCTIONS FOR LIMITED DEFLECTION SYSTEMS.



Revision		
Rev.	Date	ECN#
1	24-07-2020	AP 01547
2	04-11-2020	AP 01547

Jaybro / SafeZone™ safer. simpler. smarter.		Material:	Mass: N/A	
		Third Angle Projection	DWG NO. BSI-2007024-AP	Revision 2
Drawn by: NDP	Date: 24-7-2020	Unit: mm	Title: Absorb-m Transition To Safezone Barrier Limited Deflection Configuration	Scale: 1:50
Approved by: JMT	Date: 24-7-2020			Size B
Comments:				

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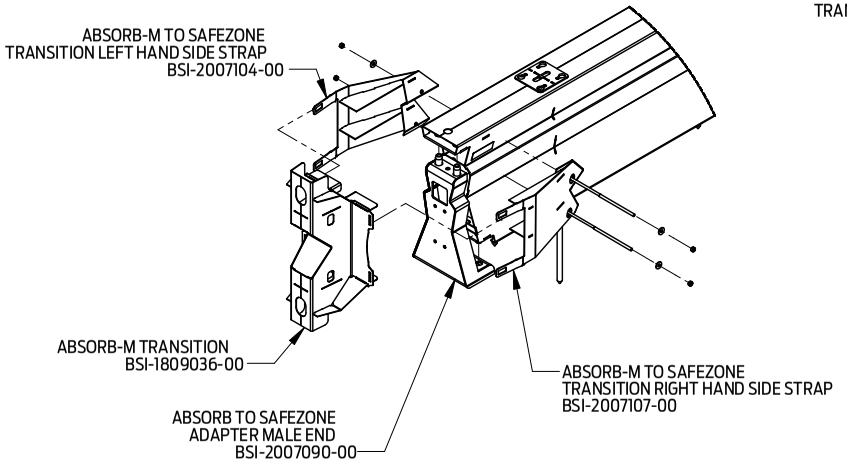

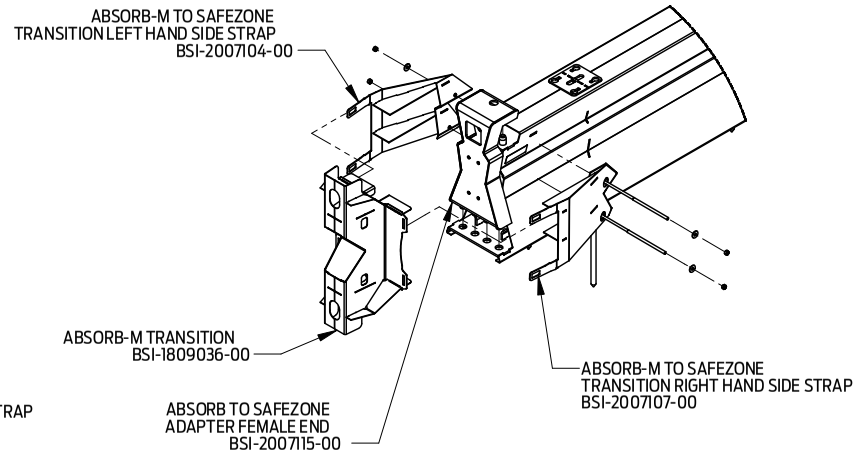

Jaybro CONSIDER IT DONE — SafeZone™ safer. simpler. smarter.	Size: B	DWG Number: BSI-2007024-AP	Revision: 2
		Sheet: 2 OF 2	Scale 1:25
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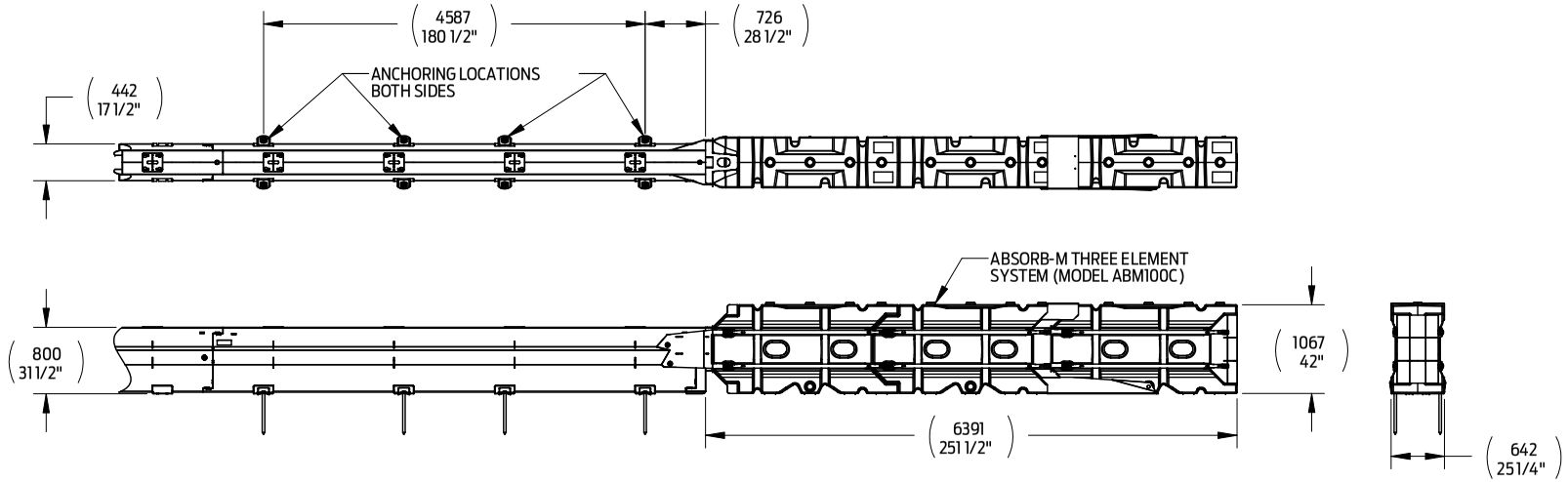
NOTES: UNLESS OTHERWISE SPECIFIED.

1. ABSORB-M SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. SEE ASSEMBLY AND INSTALLATION MANUAL FOR ADDITIONAL DETAILS.
2. SAFEZONE BARRIER TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS.
3. ABSORB-M TO SAFEZONE ADAPTER TO BE INSTALLED UTILIZING THE CONNECTING PINS AND HOLE ON THE SAFEZONE BARRIER AND 1 ∅22mm BOLT AT THE TOP CONNECTION PLATE.
4. ABSORB-M TRANSITION TO BUTT AGAINST THE ABSORB-M TO SAFEZONE ADAPTER.
5. ABSORB-M STRAPS REQUIRE 2 HOLES MATCH DRILLED THROUGH THE SAFEZONE BARRIER TO ACCOMODATE ∅5/8" [16mm] THREADED RODS. THREADED ROD TO BE SECURED WITH FLAT WASHERS & NUTS, THEN FIELD TRIMMED AS REQUIRED. THREADED ROD AND ATTACHMENT HARDWARE NOT INCLUDED IN ABSORB-M SYSTEM, TO BE PROVIDED BY OTHERS.
6. END SEGMENT OF SAFEZONE BARRIER TO BE FULLY ANCHORED IN 8 LOCATIONS.
7. REMAINING SAFEZONE BARRIER TO BE ANCHORED EVERY 69.6m PER MANUFACTURER'S INSTRUCTIONS FOR STANDARD DEFLECTION SYSTEMS.



Revision		
Rev.	Date	ECN#
1	24-07-2020	AP 01547

Jaybro / SafeZone safer, simpler, smarter.		Material:	Mass: N/A	
		Third Angle Projection	DWG NO. BSI-2007025-AP	Revision 1
Drawn by: NDP	Date: 24-7-2020	Unit: mm	Title: Absorb-m Transition To Safezone Barrier Standard Configuration	Scale: 1:50
Approved by: JMT	Date: 24-7-2020			Size B
Comments:				

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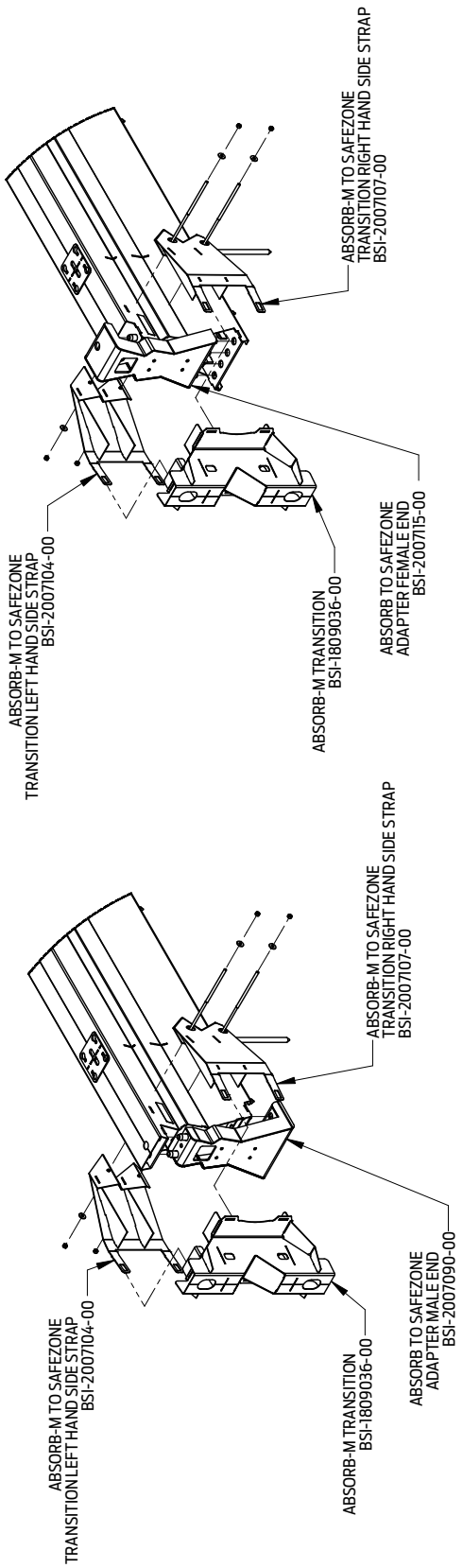

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Size: B
DWG Number: BSI-2007025-AP
Revision: 1

Sheet: 2 OF 2
Scale 1:25

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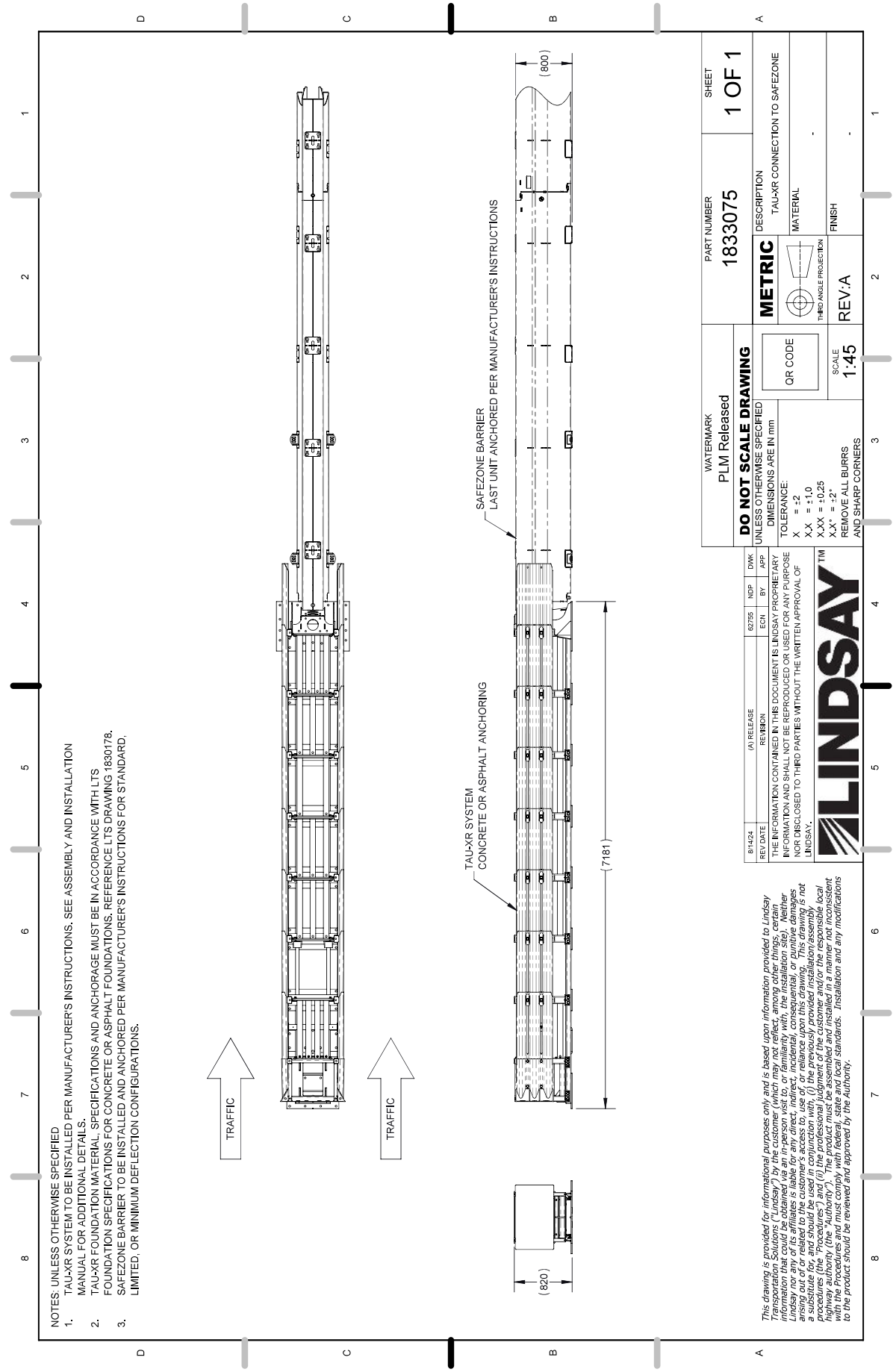
NOTES: UNLESS OTHERWISE SPECIFIED
1. TAU-XR SYSTEM TO BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. SEE ASSEMBLY AND INSTALLATION MANUAL FOR ADDITIONAL DETAILS.
2. TAU-XR FOUNDATION MATERIAL, SPECIFICATIONS AND ANCHORAGE MUST BE IN ACCORDANCE WITH LTS FOUNDATION SPECIFICATIONS FOR CONCRETE OR ASPHALT FOUNDATIONS. REFERENCE LTS DRAWING 1830178.
3. SAFEZONE BARRIER TO BE INSTALLED AND ANCHORED PER MANUFACTURER'S INSTRUCTIONS FOR STANDARD, LIMITED, OR MINIMUM DEFLECTION CONFIGURATIONS.
TRAFFIC
TRAFFIC
TAU-XR SYSTEM
CONCRETE OR ASPHALT ANCHORING
SAFEZONE BARRIER
LAST UNIT ANCHORED PER MANUFACTURER'S INSTRUCTIONS
(820)
(7181)
(800)
WATERMARK
PLM Released
DO NOT SCALE DRAWING
UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN mm
TOLERANCE:
X = ±2
X.X = ±1.0
X.XX = ±0.25
X.X° = ±2°
REMOVE ALL BURRS
AND SHARP CORNERS
QR CODE
SCALE
1:45
THIRD ANGLE PROJECTION
PART NUMBER
1833075
METRIC
DESCRIPTION
TAU-XR CONNECTION TO SAFEZONE
MATERIAL
-
FINISH
-
REV:A
SHEET
1 OF 1
B/1424
REV DATE
(A) RELEASE
REVISION
62755
ECN
NDP
BY
DWK
APP
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