

CRASH CUSHION, END TREATMENT AND BARRIER APPLICATION CHART

SUPPLIERS	DEVICE NAME and TYPE	APPLICATION				LOCATION				DIMENSIONS				1		2		3		4		REMARKS
		END TREATMENT	CRASH CUSHION	REDIRECTIVE	PERMANENT	WORKZONE (TEMP.)	ROADSIDE	GORE	MEDIAN (BI-DIRECTIONAL)	WIDTH OF DEVICE	LENGTH OF DEVICE	DISTANCE (FT.) BEYOND L.O.N	HAZARD WIDTH (WIDE OR NARROW)	FLARE OFFSET (FT.)	GATING	TRANSITION TO RIGID SYSTEM REQ'D	MAX CROSS SLOPE (%)	NGHRP 350 COMPLIANT	MASH COMPLIANT	PROPRIETARY M-STANDARD	APL	
Sand Barrel Arrays																						
PSS	CrashGard Sand Barrels	◆	X	-	X	X	X	X	X	7 FT. MIN	12 - 46 FT.	NA	W	-	X	-	5	TL-3	TL-3	-	-	Reference M-614-2
TRI	FITCH Universal Barrels	◆	X	-	X	X	X	X	X	7 FT. MIN	12 - 46 FT.	NA	W	-	X	-	6	TL-3	-	-	-	Reference M-614-2
TRI	ENERGITE III	X	X	-	X	X	X	X	X	-	-	-	-	-	-	-	-	TL-1,2,3	-	-	-	Reference M-614-2
TFX	Big Sandy Sand-Filled Plastic Barrels	◆	X	-	X	X	X	X	X	7 FT. MIN	12 - 46 FT.	NA	W	-	X	-	5	TL-2,3	TL-3	-	-	Reference M-614-2
Barrier End Treatments																						
RSI	FLEAT 350	X	-	X	X	-	X	-	-	2 FT.	37.5 FT.	16.3	-	2.5-4	X	X	10	TL-2,3	-	-	-	Reference M-606-1
RSI	SKT-350	X	-	X	X	-	X	-	-	21 IN.	50 FT.	12.5	-	0-1	X	X	10	TL-2,3	-	-	-	Reference M-606-1
RSI	MSKT	X	-	X	X	-	X	-	-	21 IN.	50 FT.	12.5	-	0-1	X	X	10	-	TL-2,3	X	X	Reference M-606-1
RSI	MFLEAT	X	-	X	X	-	X	-	-	2 FT.	39 FT. 7 IN.	25.0	-	0-3	X	X	10	-	TL-2,3	X	X	Reference M-606-1
LIN	MAX-TENSION MEDIAN	X	-	X	X	-	X	-	X	30 IN.	50 FT.	9.3	-	0-2	X	X	15	-	TL-3	X	X	Reference M-606-1
TRI	SRT-350	X	-	X	X	-	X	-	-	2 FT.	37.5 FT.	12.5	-	4	X	X	10	TL-3	-	-	-	Reference M-606-1
TRI	CAT 350	X	X	X	X	X	-	X	X	29 IN.	31 FT. 3 IN.	-	N	0	-	-	-	TL-3	-	-	-	Reference M-606-1
TRI	SoftStop	X	-	X	X	-	X	-	-	7 IN.	38.25, 50.75 FT.	16.5	-	0-2	X	X	-	-	TL-2, 3	X	X	Reference M-606-1
LIN	Max-Tension TL-2	X	-	X	X	-	X	-	-	17.5 IN.	15 FT.	10	-	0-2	X	X	-	-	TL-2	X	X	Reference M-606-1
LIN	Max-Tension TL-3	X	-	X	X	-	X	-	-	17.5 IN.	27 FT.	23	-	0-2	X	X	-	-	TL-3	X	X	Reference M-606-1
Impact Attenuators																						
TRI	QUADTREND 350	X	X	Y	X	-	X	-	-	15 IN.	20 FT.	10.0	N	0	X	X	8	TL-3	-	-	-	Reference M-606-1
TRI	REACT 350	X	X	X	X	X	X	X	X	3 FT.	16 - 31 FT.	3.0	N&W	0	-	X	8	TL-1,2,3	-	-	-	100% Reusable
TRI	REACT 350 II	X	X	X	X	X	X	X	X	4 FT.	21.75 FT.	3.0	-	0	-	X	8	TL-3	-	-	-	90% Reusable
TRI	QUADGUARD II	X	X	X	X	X	X	X	X	24 - 126 IN.	6-31 FT.	-	N&W	0	-	-	8	TL-2,3	-	-	-	Compatible with QUADGUARD
TRI	QUADGUARD ELITE M10	X	X	X	X	X	X	X	X	24, 69 IN.	27 FT.	-	N&W	0	-	X	8	-	TL-3	-	X	Reference M-606-1
TRI	QUADGUARD ELITE	X	X	X	X	X	X	X	X	24, 30, 36, 69, 90 IN.	23-44 FT.	2.67	N&W	0	-	-	8	TL-2,3	-	-	-	100% Reusable
TRI	QUADGUARD LMC	X	X	X	X	X	X	X	X	36, 69, 90 IN.	33 FT.	2.67	N&W	0	-	-	8	TL-3	-	-	-	Reference M-606-1
TRI	QUADGUARD M10	X	X	X	X	X	X	X	X	2 FT.	12-21 FT.	1	N	0	-	-	8	-	TL-2,3	-	X	Compatible with QUADGUARD
TRI	QUADGUARD HIGH SPEED	X	X	X	X	X	X	X	X	2 -3 FT.	31 FT.	-	N&W	0	-	-	-	TL-3	-	-	-	60% Reusable
H&S	SCI 70 GM SmartCushion	X	X	X	X	X	X	X	X	24-126 IN.	13.5 FT.	1	N&W	0	-	-	-	TL-2,3	-	-	X	100% Reusable
H&S	SCI 100 GM SmartCushion	X	X	X	X	X	X	X	X	24-126 IN.	21.5 FT.	1	N&W	0	-	-	-	TL-2,3	TL-2,3	-	X	100% Reusable Low Maint
TRI	TRACC	X	X	X	X	-	X	X	X	31 IN.	22 FT.	3	N	0	-	-	10	TL-3	-	-	-	Reference M-606-1
TRI	FASTRACC	X	X	X	X	-	X	X	X	31 IN.	26.5 FT.	3	N	0	-	-	10	TL-3	-	-	-	Reference M-606-1
TRI	SHORTRACC	X	X	X	X	X	X	X	X	31 IN.	14 FT.	-	N	0	-	-	10	TL-3	-	-	-	Reference M-606-1
TRI	WIDETRACC	X	X	X	X	X	X	X	X	24 -92 IN.	32.5 FT.	-	W	4-8	-	-	-	TL-3	-	-	-	Reference M-606-1
LIN	TAU-II AND TAU-II-R	X	X	X	X	X	X	X	X	3-8.5 FT.	27 FT.	-	N	0	-	-	-	TL-2,3	-	-	-	100% Reusable

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		END TREATMENT	CRASH CUSHION	REDIRECTIVE PERMANENT	WORKZONE (TEMP.)	ROADSIDE	GORE	MEDIAN (BI-DIRECTIONAL)	WIDTH OF DEVICE	LENGTH OF DEVICE	DISTANCE (FT) BEYOND L.O.N	HAZARD WIDTH (WIDE OR NARROW)	FLARE OFFSET						GATING	TRANSITION TO RIGID SYSTEM REQ'D	MAX CROSS SLOPE (%)	NCHRP 350 COMPLIANT
TRI	QUEST SYSTEM	X	X	X	X	X	X	X	X	24, 30, 36 IN.	18-30 FT	-	N	0	-	X	8	TL-2,3	-	-	-	
LIN	ABSORB 350	X	X	-	X	X	X	X	X	24 IN.	9-42 FT.	-	N	0	X	X	-	TL-1,2,3	-	-	-	Antifreeze needed <32°
LIN	ABSORB M	X	X	-	X	X	X	X	X	24 IN.	14-21 FT.	-	N	0	X	X	-	TL-2,3	-	-	-	Antifreeze needed <32°
LIN	TAU-M TL-2 AND 3	X	X	X	X	X	X	X	X	30 IN.	14.2, 22.75 FT.	-	N	0	-	-	-	TL-2,3	-	-	-	100% Reusable
TRI	ADIEM	X	X	X	-	X	X	X	X	2-3 FT.	30 FT.	15	N	0	X	-	10	TL-3	-	-	-	
LIN	X-TENUATOR	X	X	X	X	X	X	X	X	22 FT.	24.75 FT.	X	-	0	-	X	-	TL-3	-	-	-	
TFX	SLED	X	X	-	X	X	X	X	X	22.5 IN.	12 - 25 FT.	-	N	0	-	-	-	TL-1,2,3	-	-	-	Antifreeze needed <32°
Impact Attenuators (Construction Zone)																						
TRI	N.E.A.T.	X	X	X	-	X	X	X	-	22.5 IN.	9.62 FT.	-	N	0	X	X	8	TL-2	-	-	-	Portable System
TRI	TRITON BARRIER CET	X	X	-	-	X	X	X	X	21 IN.	39	-	N	0	X	X	-	TL-2,3	-	-	-	
TRI	QUADGUARD CZ	X	X	X	-	X	X	X	X	2-3 FT.	12-30 FT.	1-3	N	0	-	-	8	TL-3	-	-	-	
TRI	ACZ - 350	X	X	X	-	X	X	X	X	22 IN.	32 FT.	-	N	0	X	X	-	TL-2,3	-	-	-	
Cable Barrier																						
BRI	Briffen WRSE	-	-	X	X	-	X	-	X	5 IN.	10.5 FT.	-	-	-	-	X	17	TL-3,4	TL-3	-	X	
GRE	SAFENCE	-	-	X	X	-	X	-	X	5 IN.	6-20 FT.	-	-	-	-	X	17	TL-3,4	TL-3,4	-	-	
GIB	GIBRALTOR CBS	-	-	X	X	-	X	-	X	5 IN.	6-20 FT.	-	-	-	-	X	17	TL-3,4	TL-3,4	-	-	3 and 4 Cable available
TRI	TRINITY CASS	-	-	X	X	-	X	-	X	5 IN.	6-20 FT.	-	-	-	-	X	17	TL-3,4	-	-	-	3 and 4 Cable available
Temporary Barrier																						
LIN	ArmorGuard Steel Barrier	-	-	X	-	X	X	-	X	28 IN.	28 FT.	-	N	0	-	X	-	TL-3	TL-3	-	X	
LIN	Orion	-	-	X	-	X	X	-	X	18 IN.	38.6 FT.	-	N	-	-	-	-	TL-3	-	-	-	
H&S	Zoneguard Steel Barrier	-	-	X	-	X	X	-	X	32 IN.	50 FT.	-	N	-	-	X	-	TL-3	TL-3,4	-	X	
TRI	VULCAN Steel Barrier	-	-	X	-	X	X	-	X	22 IN.	13-39 FT.	-	N	-	-	X	-	TL-3	-	-	-	
ESI	J-J HOOKS Concrete Barrier	-	-	X	-	X	X	-	X	2 FT.	10 FT.	-	-	-	-	-	-	TL-3	TL-3	-	X	
TRI	Triton Water-Filled Barrier	X	-	X	-	X	X	X	X	21 IN.	6.5 FT.	65.0	N	-	X	-	5	TL-2	-	-	-	Antifreeze needed <32°
HWC	HighwayGuard	-	-	X	-	X	X	-	X	21.25 IN.	19.68 FT.	-	N	-	-	X	-	TL-3,4	-	-	-	
TRX	Lo-Ro Water-Cable Barrier	X	-	X	-	X	X	X	X	22.5 IN.	72 IN.	-	N	-	-	-	-	TL-2	-	-	-	Antifreeze needed <32°
TRX	Traffix Sentry Water-Cable Barrier	-	-	X	-	X	X	X	X	22 IN.	76 IN.	-	N	-	-	-	-	T-3	-	-	-	Antifreeze needed <32°
TRX	Traffix Water-Cable Barrier	-	-	X	-	X	X	X	X	18 IN.	72 IN.	-	N	-	-	-	-	TL-1,2,1	-	-	-	Antifreeze needed <32°
VHI	ArmorZone Water-Filled Barrier	-	-	X	-	X	X	-	X	18 IN.	6.6 FT.	-	N	-	X	-	X	TL-2	-	-	-	Antifreeze needed <32°
SCS	YODOCK BARRIER 2001	-	-	-	-	X	X	-	X	2 FT.	6 FT.	-	N	-	X	-	-	TL-2,3	-	-	-	Antifreeze needed <32°
SCS	YODOCK BARRIER 2001MB	-	-	-	-	X	X	-	X	18 IN.	6 FT.	-	N	-	X	-	-	TL-2,3	-	-	-	Antifreeze needed <32°
Barrier Gate																						
LIN	ArmorGuard Gate	-	-	X	X	X	X	-	X	28 IN.	26-52 FT.	-	N	0	-	X	-	TL-3	-	-	-	

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		END TREATMENT	CRASH CUSHION	REDIRECTIVE	PERMANENT	WORKZONE (TEMP.)	ROADSIDE	GORE	MEDIAN (BI-DIRECTIONAL)	WIDTH OF DEVICE						LENGTH OF DEVICE	DISTANCE (FT) BEYOND L.O.N	HAZARD WIDTH (WIDE OR NARROW)	FLARE OFFSET	GATING	TRANSITION TO RIGID SYSTEM REQ'D	MAX CROSS SLOPE (%)
TRI	VULCAN GATE	-	-	X	X	X	X	-	X	22 IN.	27-81 FT.	-	N	0	-	X	-	TL-3	-	-	-	
	Truck Mounted Attenuators																					
EAS	ALPHA 70K TMA	-	X	X	-	X	-	-	-	93 IN.	160 IN.	-	W	0	-	-	-	TL-2	-	-	-	
TRI	MPS – 350 III	-	X	X	-	X	-	-	-	92 IN.	82 IN.	-	W	0	-	-	-	TL-3	-	-	-	
TRI	SAFE –STOP 180 TMA	-	X	X	-	X	-	-	-	7.75 FT.	14.5 FT.	-	W	0	-	-	-	TL-2,3	-	-	-	
WPI	Vanderbilt TMA (VTMA)	-	X	X	-	X	-	-	-	114 IN.	150 IN.	-	W	0	-	-	-	TL-3	-	-	-	
REN	RAM-100K	-	X	X	-	X	-	-	-	90 IN.	82 IN.	-	W	0	-	-	-	TL-3	-	-	-	
DPI	U – MAD 100K TMA	-	X	X	-	X	-	-	-	7.5 FT.	13.3 FT.	-	W	0	-	-	-	TL-3	-	-	-	
DPI	Blade TMA	-	X	X	-	X	-	-	-	7.6 FT.	19.3 FT.	-	W	0	-	-	-	-	TL-3	-	-	
TRI	SS90 HD TMA	-	X	X	-	X	-	-	-	93 IN.	158 IN.	-	W	0	-	-	-	TL-3	-	-	-	
TFX	SCORPION Model A	-	X	X	-	X	-	-	-	96 IN.	104 IN.	-	W	0	-	-	-	TL-2	-	-	-	
TRX	SCORPION II TMA	-	X	X	-	X	-	-	-	96 IN.	154 IN.	-	W	-	-	-	-	-	TL-3	-	-	
TFX	SCORPION Model C-90	-	X	X	-	X	-	-	-	96 IN.	177 IN.	-	W	-	-	-	-	TL-3	-	-	-	
TRX	SCORPION Model C	-	X	X	-	X	-	-	-	96 IN.	166 IN.	-	W	-	-	-	-	TL-3	-	-	-	
	Trailer Mounted Attenuators																					
TRI	SAFE-STOP Trailer TMA	-	X	X	-	X	-	-	-	93 IN.	19 FT.	-	W	-	-	-	-					
TRI	VORTEQ TL3 Trailer TMA	-	X	X	-	X	-	-	-	92 IN.	23 FT.	-	W	-	-	-	-					
TFX	SCORPION Trailer Attenuators	-	X	X	-	X	-	-	-	96 IN.	17 FT.	-	W	-	-	-	-	TL-3	-	-	-	
TFX	SCORPION II Trailer Attenuator	-	X	X	-	X	-	-	-	96 IN.	17 FT.	-	W	-	-	-	-	TL-3	-	-	-	
TRI	MPS – 350 III	-	X	X	-	X	-	-	-	92 IN.	82 IN.	-	W	0	-	-	-	TL-3	-	-	-	
TRI	SAFE –STOP 180 TMA	-	X	X	-	X	-	-	-	7.75 FT.	14.5 FT.	-	W	0	-	-	-	TL-2,3	-	-	-	
WPI	Vanderbilt TMA (VTMA)	-	X	X	-	X	-	-	-	114 IN.	150 IN.	-	W	0	-	-	-	TL-3	-	-	-	
REN	RAM-100K	-	X	X	-	X	-	-	-	90 IN.	82 IN.	-	W	0	-	-	-	TL-3	-	-	-	
DPI	U – MAD 100K TMA	-	X	X	-	X	-	-	-	7.5 FT.	13.3 FT.	-	W	0	-	-	-	TL-3	-	-	-	
DPI	Blade TMA	-	X	X	-	X	-	-	-	7.6 FT.	19.3 FT.	-	W	0	-	-	-	-	TL-3	-	-	
TRI	SS90 HD TMA	-	X	X	-	X	-	-	-	93 IN.	158 IN.	-	W	0	-	-	-	TL-3	-	-	-	
TFX	SCORPION Model C-90	-	X	X	-	X	-	-	-	96 IN.	177 IN.	-	W	-	-	-	-	TL-3	-	-	-	
TRX	SCORPION Model C	-	X	X	-	X	-	-	-	96 IN.	166 IN.	-	W	-	-	-	-	TL-3	-	-	-	

CRASH CUSHION, END TREATMENT AND BARRIER APPLICATION CHART

<p>PSS TFX RSI TRI LIN BRI GRE GIB H&S ESI SCS WPI REN DPI HWC VHI</p>	<p><u>Manufacturer Key</u> Plastic Systems Inc. Trafix RoadSystems Inc. Trinity Lindsay Briffen Gregory GIBRALTOR Hill & Smith Easi-Set Industries SC Supply Co. Worcester Polytechnic Institute Renco Highway Control Products Dimensional Products Inc. Highway Care Valmont Highway Industries</p>	<p>◆ Sand barrels may be used as a roadside end terminal for rigid barrier in temporary construction applications.</p> <p>1 Wide Hazards > 3 FT Narrow Hazards < 3 FT.</p> <p>2 Gating = Allows a vehicle to enter a clear zone where it can safely decelerate before contacting a hazard</p> <p>3 MASH compliant devices must be used on projects added after the following dates: December 31, 2017 - Cast-in-place concrete barriers June 30, 2018 - W-beam terminals December 31, 2018 - Crash cushions December 31, 2019 - Bridge rails, transitions, cable barrier, cable barrier terminals, all other longitudinal barriers (including portable barriers installed permanently), all other terminals, sign supports and breakaway hardware.</p> <p>4 If 3 or more products are listed for any category then one of those products must be used. If the category is under-populated a COC will be required if the product actually used is not from the APL. If the category is unpopulated a COC will be required for the product actually used. CDOT's Subject Matter Expert (Guardrail or Standards Engineer) shall be contacted for assistance. The Project Engineer has ultimate authority over installed products.</p> <p>5 Environmentally friendly antifreeze should be used in water filled barrier in freezing conditions</p> <p><u>NCHRP 350 and MASH Design Speed</u> TL-1 = 31 MPH TL-2 = 44 MPH TL-3 = 62 MPH</p> <p>All of these safety devices shall be installed and used according to the manufacturer's instructions. Whenever possible, devices placed adjacent to the roadway should have the site grading similar to the roadway grading. Contact the Guardrail Engineer for additional information.</p> <p>Refer to the <i>2011 AASHTO Roadway Design Guide</i>, Chapter 8 and 9 for design considerations.</p>
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CRASH CUSHION, END TREATMENT AND BARRIER APPLICATION CHART



PSS CrashGard Sand Barrel System



RSI FLEAT 350



TRI SoftStop



EAS QuadGard Elite



EAS Fitch Universal Barrel



RSI SKT 350



EAS QuadTrend 350



EAS QuadGard LMC



EAS Energite III



RSI MSKT



EAS REACT 350



EAS QuadGard M10



TRX Big Sandy



BSI MAX-Tension Median



EAS REACT 350 II



EAS QuadGard High Speed



BSI MAX-Tension



TRI SRT 350



EAS QuadGard II



EAS Quest

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WAP SCI Smart Cushion



BSI TAU-II



BSI ABSORB 350



EAS Triton Barrier CET



TRI TRACC



BSI TAU-II R



TFX SLED



GIB CBS



TRI FASTRACC



BSI TAU-M



EAS QuadGard CZ



TRI CASS



TRI SHORTRACC



BSI X-TENUator



EAS ACZ-350



BRI WRSF



TRI WIDETRACC



TRI ADIEM



EAS N.E.A.T



GRE SAFENCE

CRASH CUSHION, END TREATMENT AND BARRIER APPLICATION CHART



H&S Zoneguard Steel Barrier



BSI ArmorGuard Gate



Lo-Ro Water-Cable Barrier



EAS SS90-HD TMA



EAS Vulcan Steel Barrier



EAS Vulcan Gate



Traffix Sentry Water-Cable Barrier



TFX Scorpion Model C-90



JJ Hooks Concrete Barrier



BSI ORION



Traffix Water-Cable Barrier



TFX Scorpion Model C



BSI ArmorGuard Steel Barrier



HighwayGuard Steel Barrier



DPI BLADE TMA



EAS SafeStop Trailer



SCS YODOCK 2001/2001MB



EAS Triton Water Filled Barrel



ArmorZone Temp. Barrier



EAS VORTEZ Trailer

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TFX Scorpion Trailer Attenuator



TRI MPS-350 II



TFX Scorpion II Trailer Attenuator



TFX Scorpion II TMA



EAS SafeStop 180 TMA



REN RAM-100K



EAS Alpha 70K TMA



DPI U-MAD 100K



TFX Scorpion Model A