

## 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 (%)
<b>Sand Barrel Arrays</b>																						
PSS	<a href="#">CrashGard Sand Barrels</a>	◆	X	-	X	X	X	X	X	7 FT. MIN	12 - 46 FT.	NA	W	-	X	-	5	TL-3	-	-	-	Reference M-614-2
EAS	<a href="#">FITCH Universal Barrels</a>	◆	X	-	X	X	X	X	X	7 FT. MIN	12 - 46 FT.	NA	W	-	X	-	6	TL-3	-	-	-	Reference M-614-2
EAS	<a href="#">ENERGITE III</a>	X	X	-	X	X	X	X	X	-	-	-	-	-	-	-	-	TL-1,2,3	-	-	-	Reference M-614-2
TFX	<a href="#">Big Sandy Sand-Filled Plastic Barrels</a>	◆	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
<b>Barrier End Treatments</b>																						
RSI	<a href="#">FLEAT 350</a>	X	-	X	X	-	X	-	-	2 FT.	37.5 FT.	16.3	-	2.5-4	X	X	10	TL-3	-	X	-	Reference M-606-1
RSI	<a href="#">SKT-350</a>	X	-	X	X	-	X	-	-	21 IN.	50 FT.	12.5	-	0-1	X	X	10	TL-2,3	-	X	-	Reference M-606-1
RSI	<a href="#">MSKT</a>	X	-	X	X	-	X	-	-	21 IN.	50 FT.	12.5	-	0-1	X	X	10	-	TL-2,3	X	-	Reference M-606-1
BSI	<a href="#">MAX-TENSION MEDIAN</a>	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	<a href="#">SRT-350</a>	X	-	X	X	-	X	-	-	2 FT.	37.5 FT.	12.5	-	4	X	X	10	TL-3	-	X	-	Reference M-606-1
TRI	<a href="#">SoftStop</a>	X	-	X	X	-	X	-	-	7 IN.	38.25, 50.75 FT.	16.5	-	0-2	X	X	-	-	TL-2, 3	X	-	Reference M-606-1
BSI	<a href="#">Max-Tension TL-2</a>	X	-	X	X	-	X	-	-	17.5 IN.	15 FT.	10	-	0-2	X	X	-	-	TL-2	X	-	Reference M-606-1
BSI	<a href="#">Max-Tension TL-3</a>	X	-	X	X	-	X	-	-	17.5 IN.	27 FT.	23	-	0-2	X	X	-	-	TL-3	X	-	Reference M-606-1
<b>Impact Attenuators</b>																						
EAS	<a href="#">QUADTREND 350</a>	X	X	Y	X	-	X	-	-	15 IN.	20 FT.	10.0	N	0	X	X	8	TL-3	-	-	-	
EAS	<a href="#">REACT 350</a>	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
EAS	<a href="#">REACT 350 II</a>	X	X	X	X	X	X	X	X	4 FT.	21.75 FT.	3.0	-	0	-	X	8	TL-3	-	-	-	90% Reusable
EAS	<a href="#">QUADGUARD II</a>	X	X	X	X	X	X	X	X	24 - 126 IN.	6-31 FT.	-	N&W	0	-	-	8	TL-2,3	-	-	-	Compatible with original QUADGUARD
EAS	<a href="#">QUADGUARD ELITE</a>	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	-	-	X	100% Reusable
EAS	<a href="#">QUADGUARD LMC</a>	X	X	X	X	X	X	X	X	36, 69, 90 IN.	33 FT.	2.67	N&W	0	-	-	8	TL-3	-	-	-	
EAS	<a href="#">QUADGUARD M10</a>	X	X	X	X	X	X	X	X	2 FT.	12-21 FT.	1	N	0	-	-	8	-	TL-2,3	-	X	Compatible with original QUADGUARD
EAS	<a href="#">QUADGUARD HIGH SPEED</a>	X	X	X	X	X	X	X	X	2-3 FT.	31 FT.	-	N&W	0	-	-	-	TL-3	-	-	-	60% Reusable
BSI	<a href="#">X-TENUATOR</a>	X	X	X	X	X	X	X	X	22 FT.	24.75 FT.	X	-	0	-	X	-	TL-3	-	-	-	
WAP	<a href="#">SCI 70 GM SmartCushion</a>	X	X	X	X	X	X	X	X	24-126 IN.	13.5 FT.	1	N&W	0	-	-	-	TL-2,3	-	-	X	100% Reusable
WAP	<a href="#">SCI 100 GM SmartCushion</a>	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	<a href="#">TRACC</a>	X	X	X	-	X	X	X	X	31 IN.	22 FT.	3	N	0	-	-	10	TL-3	-	-	-	
TRI	<a href="#">FASTRACC</a>	X	X	X	-	X	X	X	X	31 IN.	26.5 FT.	3	N	0	-	-	10	TL-3	-	-	-	
TRI	<a href="#">SHORTRACC</a>	X	X	X	X	X	X	X	X	31 IN.	14 FT.	-	N	0	-	-	10	TL-3	-	-	-	
TRI	<a href="#">WIDETRACC</a>	X	X	X	X	X	X	X	X	24-92 IN.	32.5 FT.	-	W	4-8	-	-	-	TL-3	-	-	-	
BSI	<a href="#">TAU-II AND TAU-II-R</a>	X	X	X	X	X	X	X	X	3-8.5 FT.	27 FT.	-	N	0	-	-	-	TL-2,3	-	-	-	100% Reusable
BSI	<a href="#">TAU-M TL-2 AND 3</a>	X	X	X	X	X	X	X	X	30 IN.	14.2, 22.75 FT.	-	N	0	-	-	-	-	TL-2,3	-	X	100% Reusable
BSI	<a href="#">ABSORB 350</a>	X	X	-	X	X	X	X	X	24 IN.	9-42 FT.	-	N	0	X	X	-	TL-1,2,3	-	-	-	Antifreeze needed <32°

## CRASH CUSHION, END TREATMENT AND BARRIER APPLICATION CHART

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		END TREATMENT	CRASH CUSHION	REDIRECTIVE	PERMANENT	WORKZONE (TEMP.)	ROADSIDE	GORE	MEDIAN (BI-DIRECTIONAL)	WIDTH OF DEVICE			LENGTH OF DEVICE	FLARE OFFSET	GATING	3							
EAS	<a href="#">QUEST SYSTEM</a>	X	X	X	X	X	X	X	24, 30, 36 IN.	18-30 FT	-	N	0	-	X	8	TL-2,3	-	-	-			
TRI	<a href="#">ADIEM</a>	X	X	X	-	X	X	X	2-3 FT.	30 FT.	15	N	0	X	-	10	TL-3	-	-	-			
TFX	<a href="#">SLED</a>	X	X	-	X	X	X	X	22.5 IN.	12 - 25 FT.	-	N	0	-	-	-	-	TL-1,2,3	-	X	Water Filled		
<b>Impact Attenuators (Construction Zone)</b>																							
EAS	<a href="#">N.E.A.T.</a>	X	X	X	-	X	X	X	22.5 IN.	9.62 FT.	-	N	0	X	X	8	TL-2	-	-	-	Portable System		
EAS	<a href="#">TRITON BARRIER CET</a>	X	X	-	-	X	X	X	21 IN.	39	-	N	0	X	X	-	TL-2,3	-	-	-			
EAS	<a href="#">QUADGUARD CZ</a>	X	X	X	-	X	X	X	2-3 FT.	12-30 FT.	1-3	N	0	-	-	8	TL-3	-	-	-			
EAS	<a href="#">ACZ - 350</a>	X	X	X	-	X	X	X	22 IN.	32 FT.	-	N	0	X	X	-	TL-2,3	-	-	-			
<b>Cable Barrier</b>																							
BRI	<a href="#">Briffen WRSE</a>	-	-	X	X	-	X	-	E	10.5 FT.	-	-	-	-	X	17	TL-3,4	-	-	-			
GRE	<a href="#">SAFENCE</a>	-	-	X	X	-	X	-	5 IN.	6-20 FT.	-	-	-	-	X	17	TL-3,4	TL-3,4	-	-			
GIB	<a href="#">GIBRALTOR CBS</a>	-	-	X	X	-	X	-	5 IN.	6-20 FT.	-	-	-	-	X	17	TL-3,4	-	-	-	3 and 4 Cable available		
TRI	<a href="#">TRINITY CASS</a>	-	-	X	X	-	X	-	5 IN.	6-20 FT.	-	-	-	-	X	17	TL-3,4	-	-	-	3 and 4 Cable available		
<b>Temporary Barrier</b>																							
BSI	<a href="#">ArmorGuard Steel Barrier</a>	-	-	X	-	X	X	-	28 IN.	28 FT.	-	N	0	-	X	-	TL-3	TL-3	-	X			
BSI	<a href="#">Orion</a>	-	-	X	-	X	X	-	18 IN.	38.6 FT.	-	N	-	-	-	-	TL-3	-	-	X			
H&S	<a href="#">Zoneguard Steel Barrier</a>	-	-	X	-	X	X	-	32 IN.	50 FT.	-	N	-	-	X	-	TL-3	TL-3,4	-	-			
EAS	<a href="#">VULCAN Steel Barrier</a>	-	-	X	-	X	X	-	22 IN.	13-39 FT.	-	N	-	-	X	-	TL-3	-	-	-			
ESI	<a href="#">J-J HOOKS Concrete Barrier</a>	-	-	X	-	X	X	-	2 FT.	10 FT.	-	-	-	-	-	-	TL-3	TL-3	-	-			
EAS	<a href="#">Triton Water-Filled Barrier</a>	X	-	X	-	X	X	X	21 IN.	6.5 FT.	65.0	N	-	X	-	5	TL-2	-	-	-			
SCS	<a href="#">YODOCK BARRIER 2001</a>	-	-	-	-	X	X	-	2 FT.	6 FT.	-	N	-	X	-	-	TL-2,3	-	-	-	Water Filled		
SCS	<a href="#">YODOCK BARRIER 2001MB</a>	-	-	-	-	X	X	-	18 IN.	6 FT.	-	N	-	X	-	-	TL-2,3	-	-	-	Water Filled		
<b>Barrier Gate</b>																							
BSI	<a href="#">ArmorGuard Gate</a>	-	-	X	X	X	X	-	28 IN.	26-52 FT.	-	N	0	-	X	-	TL-3	-	-	-			
EAS	<a href="#">VULCAN GATE</a>	-	-	X	X	X	X	-	22 IN.	27-81 FT.	-	N	0	-	X	-	TL-3	-	-	-			
<b>Truck Mounted Attenuators</b>																							
EAS	<a href="#">ALPHA 70K TMA</a>	-	X	X	-	X	-	-	93 IN.	160 IN.	-	W	0	-	-	-	TL-2	-	-	-			
TFX	<a href="#">SCORPION Model A</a>	-	X	X	-	X	-	-	96 IN.	104 IN.	-	W	0	-	-	-	TL-2	-	-	-			
EAS	<a href="#">SAFE -STOP 180 TMA</a>	-	X	X	-	X	-	-	7.75 FT.	14.5 FT.	-	W	0	-	-	-	TL-2,3	-	-	-			
WPI	<a href="#">Vanderbilt TMA (VTMA)</a>	-	X	X	-	X	-	-	114 IN.	150 IN.	-	W	0	-	-	-	TL-3	-	-	-			
TRI	<a href="#">MPS - 350 III</a>	-	X	X	-	X	-	-	92 IN.	82 IN.	-	W	0	-	-	-	TL-3	-	-	-			
TRX	<a href="#">SCORPION II TMA</a>	-	X	X	-	X	-	-	96 IN.	154 IN.	-	W	-	-	-	-	-	TL-3	-	-			
DPI	<a href="#">U - MAD 100K TMA</a>	-	X	X	-	X	-	-	7.5 FT.	13.3 FT.	-	W	0	-	-	-	TL-3	-	-	-			

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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	GATING	TRANSITION TO RIGID SYSTEM REQ'D	MAX CROSS SLOPE (%)		NCHRP 350 COMPLIANT	MASH COMPLIANT	PROPRIETARY M-STANDARD
REN	<a href="#">RAM-100K</a>	-	X	X	-	X	-	-	-	90 IN.	82 IN.	-	W	0	-	-	-	TL-3	-	-	-
DPI	<a href="#">Blade TMA</a>	-	X	X	-	X	-	-	-	7.6 FT.	19.3 FT.	-	W	0	-	-	-	-	TL-3	-	-
EAS	<a href="#">SS90 HD TMA</a>	-	X	X	-	X	-	-	-	93 IN.	158 IN.	-	W	0	-	-	-	TL-3	-	-	-
TFX	<a href="#">SCORPION Model C-90</a>	-	X	X	-	X	-	-	-	96 IN.	177 IN.	-	W	-	-	-	-	TL-3	-	-	-
TRX	<a href="#">SCORPION Model C</a>	-	X	X	-	X	-	-	-	96 IN.	166 IN.	-	W	-	-	-	-	TL-3	-	-	-
<b>Trailer Mounted Attenuators</b>																					
EAS	<a href="#">SAFE-STOP Trailer TMA</a>	-	X	X	-	X	-	-	-	93 IN.	19 FT.	-	W	-	-	-	-				
EAS	<a href="#">VORTEQ TL3 Trailer TMA</a>	-	X	X	-	X	-	-	-	92 IN.	23 FT.	-	W	-	-	-	-				
TFX	<a href="#">SCORPION Trailer Attenuators</a>	-	X	X	-	X	-	-	-	96 IN.	17 FT.	-	W	-	-	-	-	TL-3	-	-	-
TFX	<a href="#">SCORPION II Trailer Attenuator</a>	-	X	X	-	X	-	-	-	96 IN.	17 FT.	-	W	-	-	-	-	-	TL-3	-	-
<p><b>MANUFACTURER KEY</b></p> <p>PSS Plastic Systems Inc.  EAS Energy Absorption Systems  TFX Trafos  RSI RoadSystems Inc.  TRI Trinity  WAP Work Area Protection  BSI Barrier Systems Inc.  BRI Briffen  GRE Gregory  GIB GIBRALTOR  H&amp;S Hill &amp; Smith  ESI Easi-Set Industries  SCS SC Supply Co.  WPI Worcester Polytechnic Institute  REN Renco Highway Control Products  DPI Dimensional Products Inc.</p>		<p>◆ Sand barrels may be used as a roadside end terminal for rigid barrier in temporary construction applications.</p> <p><b>1</b> Wide Hazards &gt; 3 FT    Narrow Hazards &lt; 3 FT.</p> <p><b>2</b> Gating = Allows a vehicle to enter a clear zone where it can safely decelerate before contacting a hazard</p> <p><b>3</b> 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><b>4</b> 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><b>NCHRP 350 and MASH Design Speed</b>  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>																			



## 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



## CRASH CUSHION, END TREATMENT AND BARRIER APPLICATION CHART



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



TRI MPS-350 II



EAS SS90-HD TMA



EAS Vulcan Steel Barrier



EAS Vulcan Gate



TFX Scorpion II TMA



TFX Scorpion Model C-90



JJ Hooks Concrete Barrier



BSI ORION



REN RAM-100K



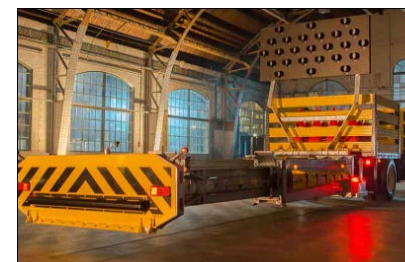
TFX Scorpion Model C



BSI ArmorGuard Steel Barrier



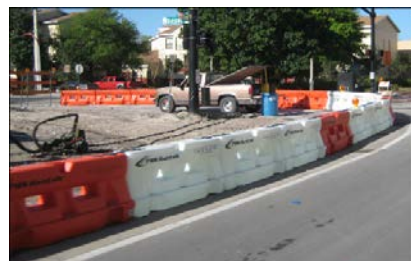
TFX Scorpion Model A



DPI BLADE TMA



EAS SafeStop Trailer



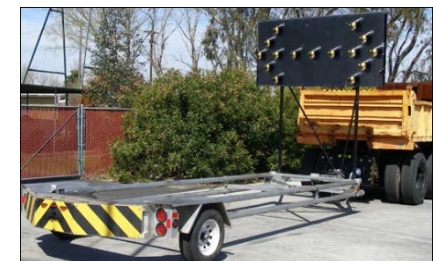
SCS YODOCK 2001/2001MB



EAS Triton Water Filled Barrel



DPI U-MAD 100K



EAS VORTEZ Trailer

## CRASH CUSHION, END TREATMENT AND BARRIER APPLICATION CHART



TFX Scorpion Trailer Attenuator



TFX Scorpion II Trailer Attenuator



EAS SafeStop 180 TMA



EAS Alpha 70K TMA