

NGT Non-Gating End Terminal

W-beam guardrail end terminal, MASH 2016 TL-3, FHWA eligible

TECHNICAL FEATURES

Description

Non-gating, re-directive W-beam guardrail end terminal tested to MASH 2016 TL-3 and FHWA eligible (CC-178). It brings errant vehicles to a controlled stop for end-on impacts up to 15°, with the length of need starting only 6'-3" (1.9 m) from the first post. Installs with standard guardrail equipment and few unique parts.

MASH TL-3
FHWA CC-178

Non-Gating
up to 15°

Length of Need
6'-3" (1.9 m)

High-Speed
tested to 77.5 mph

Tangent
no offset required

8 Unique
part types

PRODUCT FEATURES

Category	Guardrail end terminal for W-beam guardrail
System type	Tangent, re-directive, non-gating, tension-based terminal
Non-gating performance	Non-gating for end-on impacts up to 15°
Length of need	Begins at Post 2, 6'-3" (1.9 m) from Post 1
Compatible guardrail	Strong-post W-beam (MGS) with 8" or 12" blockouts, rail height 31" ± 1" (787 ± 25 mm)
Rigid barrier connection	Via a transition that gradually increases W-beam stiffness
Offset / flare	No offset required; 1-2 ft straight flare over 50 ft recommended, max. 25:1
Unique parts	8 unique part types, 22 parts in total (excl. fasteners)
Posts	Galvanised steel: W6x9 plug-welded posts 1-9, W8x15 anchor post
Blockouts	Wood (as tested); plastic blockouts also permitted
Installation	Standard guardrail equipment; approx. 45 minutes or less
Repair	Anchor rail, shelf bracket and hardware may be reused after impact

APPROVALS & TESTING

Test standard	AASHTO MASH 2016 (Manual for Assessing Safety Hardware)
Test level	TL-3 (100 km/h)
FHWA eligibility letter	CC-178, issued 15/03/2024
Tests conducted	3-30, 3-31, 3-32, 3-33, 3-34, 3-35, 3-37b: all PASS
Tests not applicable	3-36, 3-38, 3-40 to 3-45 (not relevant to this system type)
Test laboratory	Applus IDIADA KARCO Engineering (ISO 17025, IAS TL-371)
High-speed testing	Within all MASH preferred criteria at up to 77.5 mph (124.7 km/h)



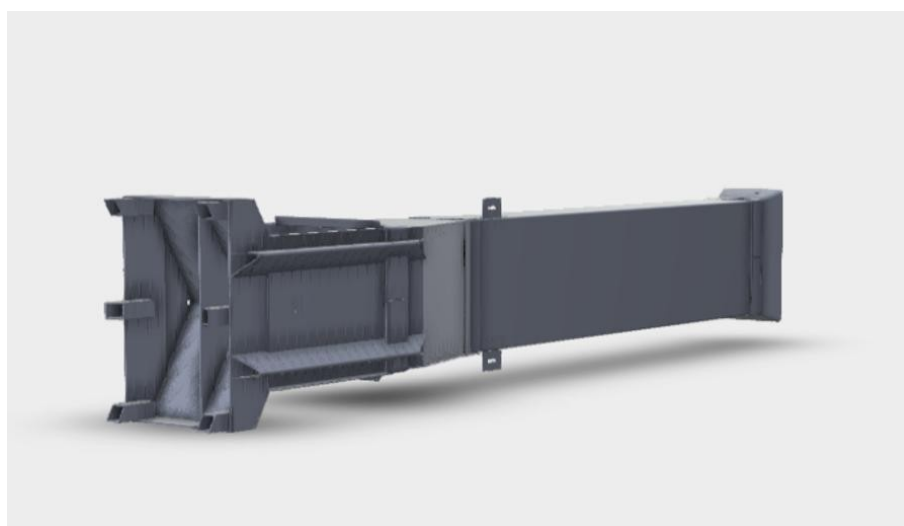
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WHY NON-GATING		
	Conventional gating terminal	NGT non-gating terminal
End-on impacts stopped	Only at shallow angles (approx. $\pm 3^\circ$)	Up to 15°
Above that angle	Vehicle gates behind the guardrail at speed, approx. 150 ft (46 m)	Vehicle is stopped or redirected
Length of need	12-18 ft (3.7-5.5 m), Post 3 or beyond	6'-3" (1.9 m), Post 2
Area behind the barrier	Traversable clear zone required	Less clear zone and earthwork needed
Rail spearing	Risk of guardrail spearing into vehicle	No spearing
Highest crash test speed	62 mph (100 km/h)	77.5 mph (124.7 km/h)

85% of off-road terminal crashes occur at angles of 15° or less. US FARS data (2018): approx. 1,000 fatal crashes involved a guardrail impact, approx. 250 of them with the most harmful event behind the barrier (fixed object, slope, water or rollover). Estimated US benefit: 200+ lives saved per year, societal cost of USD 2.36 billion annually (fatalities only); replacing all US terminals within one year would still give a benefit-cost ratio above 1.0.

MASH 2016 TL-3 CRASH TEST RESULTS							
Test	Vehicle	Speed (km/h)	Angle	Max. OIV (m/s)	Max. ridedown (g)	Working width	Result
3-30	1100C	106.99	1.0°	7.6	-10.8	n/a	PASS
3-31	2270P	99.96	0.3°	5.3	-6.8	n/a	PASS
3-32	1100C	99.49	14.9°	9.4	-9.7	0.7 m	PASS
3-33	2270P	99.56	14.5°	6.8	-5.8	1.3 m	PASS
3-34	1100C	97.91	15.4°	5.5	-8.3	0.4 m	PASS
3-35	2270P	98.89	26.4°	5.5	-12.2	0.9 m	PASS
3-37b	1100C	100.97	24.9°	8.6	-14.8	0.3 m	PASS

1100C: 1,100 kg passenger car · 2270P: 2,270 kg pickup truck. Values as reported in FHWA eligibility letter CC-178 and the crash test summary sheets.



Impact head (3D render).

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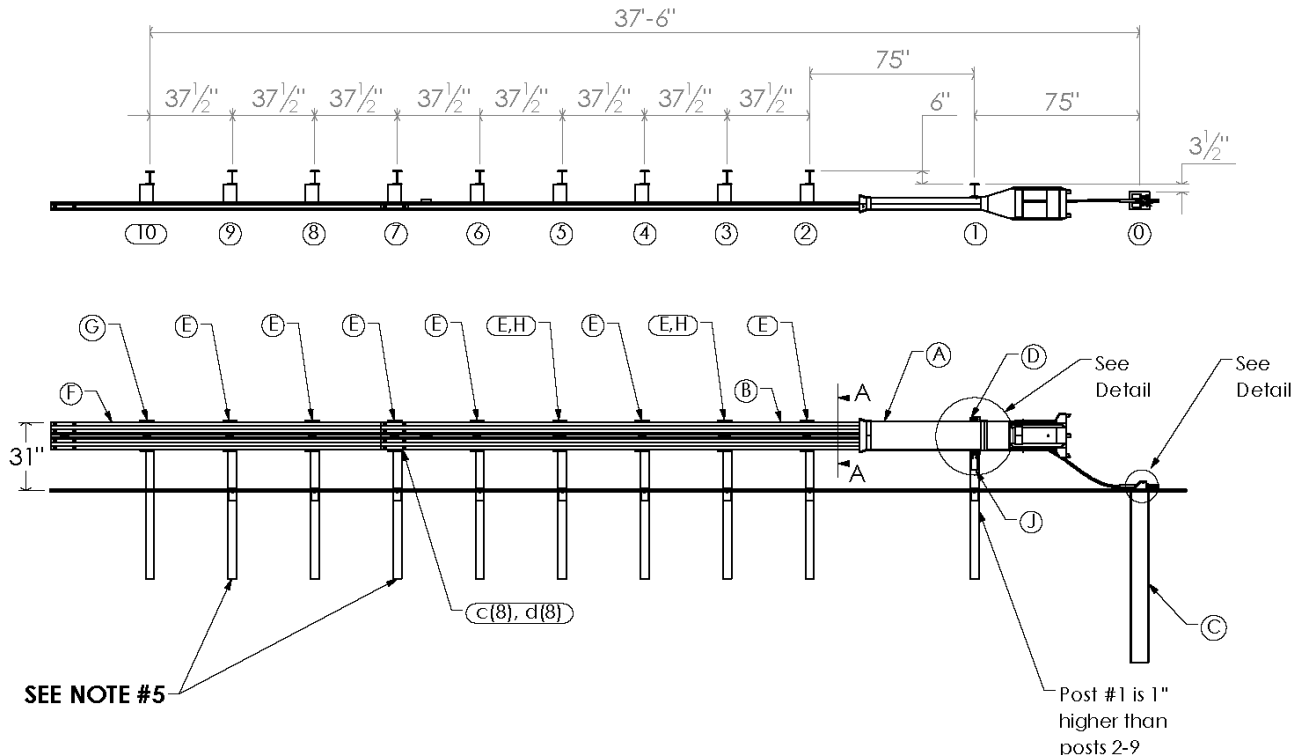
SYSTEM DIMENSIONS

Terminal length	37'-6" (11.4 m), anchor post to Post 10
Pay length options	37.5 ft (11.4 m) · 40 ft (12.2 m) · 50 ft (15.2 m)
Post spacing	Anchor post to Post 1 and Post 1 to Post 2: 6'-3" (1.9 m); Posts 2-9: 3'-1.5" (0.95 m); Post 9 to 10: 6'-3"
Rail height	31" ± 1" (787 ± 25 mm) above finished grade; Post 1 set 1" higher
First rail panel	23'-4" (7.1 m) edge to edge, spanning Post 1 to Post 7
Site grading	Min. 2 ft (0.6 m) level graded soil behind the posts

COMPONENTS (PER TERMINAL)

Component	Qty	Dimensions	Weight
Impact head	1	8 ft x 14-13/16" x 20" (2.44 m x 376 mm x 508 mm)	~200 lb (91 kg)
Anchor guardrail (first panel with cable)	1	~28'-2 7/8" (8.6 m)	~208 lb (94 kg)
Anchor post with anchor cap	1	~6'-10" (2.08 m)	~103 lb (47 kg)
First post (Post 1)	1	73" (1.85 m)	~52 lb (24 kg)
Plug-welded posts (Posts 2-9)	8	72" (1.83 m)	~51 lb (23 kg)
Notched blockouts	2	6" x 8" or 12" x 14"	10-20 lb (4.5-9 kg)
Shelf bracket	1	8-3/4" x 3-1/2" x 4-7/8"	~5 lb (2.3 kg)
Standard MGS W-beam panel 12'-6"	1	Standard part	
Standard blockouts	7	6" x 8" x 14" or 6" x 12" x 14"	

The bill of materials also includes all fasteners (splice bolts, post bolts, nuts, washers) and one object marker for the impact head face.



General layout, plan and elevation (8-inch blockouts), drawing dated 01/03/2024. Dimensions in inches.