

**TECHNICAL  
BRIEF**

180 River Road • Rio Vista, CA 94571 • Tel 707-374-6800 • Fax 707-374-6801  
Email: info@barriersystemsinc.com • Website: barriersystemsinc.com

## Product Specification

### ArmorGuard™ Barrier System

#### **I. General**

The ArmorGuard™ Barrier System is a longitudinal barrier, as defined in the AASHTO Roadside Design Guide, which can be provided in 8.5 (center pin to center pin) meter segments. The segments can be attached to form a longitudinal barrier that is capable of providing protection for both motorists and highway personnel in temporary work zone situations. The segments of the system can be disconnected and moved to reconfigure the barrier system, to bring materials or equipment into the work zone or to allow emergency vehicles access. The system provides positive barrier separation when in the attached and locked position. The ArmorGuard™ Barrier System performs to the criteria set forth for Longitudinal Barriers in the National Cooperative Highway Research Program Report 350 (NCHRP 350) at Test Levels 2 (70 km/h) and 3 (100 km/h).

#### **II. Performance**

The ArmorGuard™ Barrier System is a longitudinal barrier composed of segments, each segment having the ability to be disconnected from adjacent segments, each segment shall have the ability to pivot from either end to move segments of the barrier laterally and/or longitudinally without the use of heavy equipment. The system is designed to provide positive barrier separation and vehicle redirection characteristics in accordance with NCHRP 350 guidelines for longitudinal barriers.

A. When properly installed according to manufacturer's recommendations, the ArmorGuard™ Barrier System shall be able to meet the recommended structural adequacy, occupant risk, and vehicle trajectory criteria set forth in NCHRP 350 for Test Levels 2 (70 km/h) and 3 (100 km/h) Longitudinal Barriers:

1. An 820 kg vehicle at 20 degrees impacting the midpoint of the system (Test 2-10 and 3-10).
2. A 2000 kg vehicle at 25 degrees impacting the midpoint of the system (Test 2-11 and 3-11).

- a. The impact velocity of a hypothetical front seat passenger against the vehicle interior, as calculated from the longitudinal vehicle acceleration and 600 mm [23 5/8 in] forward displacement, and the lateral vehicle acceleration and 300 mm [12 in] lateral vehicle displacement, shall be less than 12 m/s (39.3 ft/s). The highest 10 ms average vehicle acceleration in the longitudinal and lateral directions subsequent to the instant of hypothetical occupant impact shall be less than 20 g's.
  - b. Detached debris shall not show potential for penetrating the vehicle occupant compartment or present a hazard to other traffic, pedestrians, or workers in a work zone. The vehicle shall remain upright during and after the collision although moderate roll, pitch, and yaw may occur.
3. The system shall meet the following maximum deflection criteria:
- a. The TL 2 system will have a minimum length of 4 eight meter sections.
    1. For NCHRP 350 Test Level 2 (Test 2-11) deflection shall be less than 3.8 ft. (1.2 m).
  - b. The TL3 system will have a minimum length of 8 eight meter sections.
    1. For NCHRP 350 Test Level 3 (Test 3-11) deflection shall be less than 7 ft. (2.1 m).
4. Each section shall be capable of being raised or lowered and pinned to a new section within 5 minutes.
  5. The wheels of the system shall be capable of allowing an 8 meter section to be rolled on any typical smooth, hard roadway surface capable of supporting at least 200 psi.

### **III. Description of System**

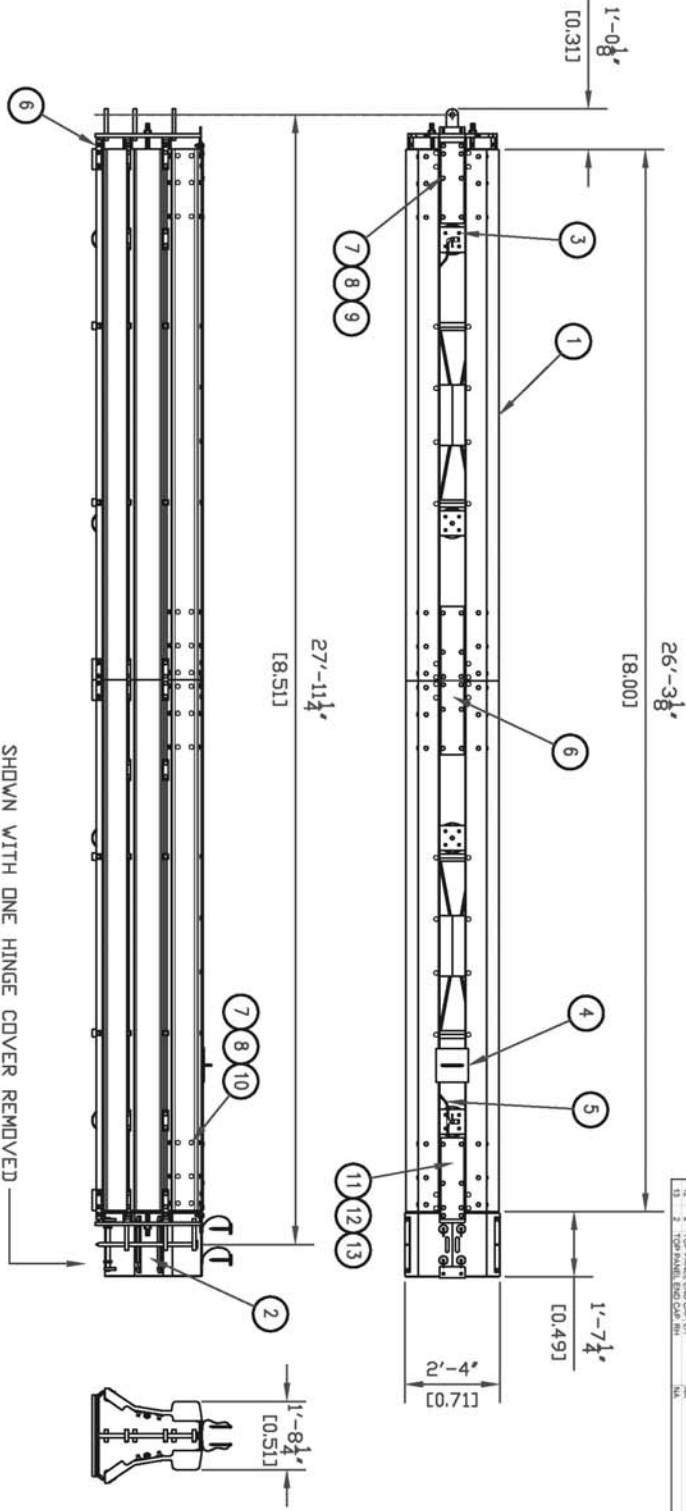
- A. An 8 Meter ArmorGuard™ Barrier System Segment is shown in Drawing DB020307. The systems consist of four key elements and shall be made from materials conforming to the following specifications:
1. The Link Assembly Section is 4 meters in length. Two of these are assembled together to create segments that are, 8 meters in length. Each Link Assembly Section shall be composed of end supports, center supports, diagonal braces, a shear plate, and longitudinal panels for the top, center, and bottom. These components are held together using clamp strips and a variety of fasteners.
    - a. All steel clamp strips, supports, braces, shear plates, and panels shall be fabricated from mild steel in conformance with ASTM A-36 specifications and galvanized in accordance with ASTM 123.
    - b. All fasteners shall be Class 4.6 (Grade 2) or greater and galvanized in accordance with ASTM 153. Washers shall be hardened and galvanized.

2. The Connecting Hardware is used to connect the 4 meter assemblies together. Connecting of the assembly sections is accomplished using upper and lower coupling strips, threaded rod, top panel connecting brackets, and a coupling shear plate. Fasteners and bolt strips hold the connection.
    - a. All steel coupling strips, connecting brackets, shear plates, and bolt strips shall be fabricated from mild steel in conformance with ASTM A-36 specifications and galvanized in accordance with ASTM 123.
    - b. Threaded Rods and fasteners shall be Class 4.6 (Grade 2) or greater and galvanized in accordance with ASTM 153. Washers shall be hardened and galvanized.
  3. A Manual Raise/Lower System is provided to lift and move Link segments. The manual system consists of at least two manually operated screw jacks for each Link segment. Each screw jack shall have a lifting capacity of at least 1500 kg (3300 lbs.).
    - a. All steel components such as mounting brackets and swing unit frames shall be fabricated from mild steel in conformance with ASTM A-36 specifications and galvanized in accordance with ASTM 123.
  4. An Optional Pneumatic Raise/Lower System can be selected to provide the lifting capacity and control functions for the Link segments. This installation consists of the control and filter units and all necessary air lines to facilitate independent lifting and lowering of the wheel assemblies.
    - a. All steel components such as mounting brackets and swing unit frames shall be fabricated from mild steel in conformance with ASTM A-36 specifications and galvanized in accordance with ASTM 123.
    - b. All control and filter units and corresponding air lines shall be specified for outdoor use.
  5. The Hinge Assembly (Drawing C010202) connects the ends of the gates. A hinge set contains two aluminum hinge covers with load carrying engagement rails and pivot rods, opposing hinges, and a master pin.
    - a. All aluminum components shall be made of 5052 H32 in conformance with ASTM B209.
    - b. All steel hinges and hinge cover rails shall be fabricated from mild steel in conformance with ASTM A-36 specifications and galvanized in accordance with ASTM 123.
    - c. The master hinge pin and hinge cover pivot rod shall be fabricated from C1018 CF steel and galvanized in accordance with ASTM 123.
- B. The ArmorGuard™ Barrier System is approximately 710 mm (28 in) wide and 830mm (32 5/8) tall.

- C. An 8.5 meter segment weighs approximately 1680 kg (3700 lb).
- D. The ArmorGuard™ Barrier System shall be assembled and installed in accordance with the manufacturer's instructions.

#### **IV. Application of Safety Appurtenances**

Highway safety appurtenances should be applied to hazardous sites in accordance with the guidelines and recommendations in the American Association of State Highway Transportation Officials (AASHTO), "Roadside Design Guide", and other Federal Highway Administration and State Department of Transportation requirements. Placement of the ArmorGuard™ Barrier System must comply with these specifications and guidelines as well as those of the manufacturer.



SHOWN WITH ONE HINGE COVER REMOVED

ITEM	QTY	PART DESCRIPTION	SPECIFICATION	DWG #
1	1	METER SECTION ASSEMBLY	NA	803208
2	1	HINGE ASSEMBLY	NA	803209
3	4	SEALING UNIT	NA (500) HC BR-206 PART NO. 050000	400331
4	1	FILTER AND MOUNTING BRACKET	PC (200) NO. BR-216 PART NO. 050000	400305
5	1	PNEUMATIC SYSTEM ASSEMBLY	NA	400333
6	2	OPTIONAL	NA	803210
7	64	NUT 1/8 DIA. GALVANIZED	PC (200) NO. NEN-891 PART NO. 050000	803210
8	204	WASHER 1/8 DIA. GALVANIZED	PC (200) NO. NEN-2096 PART NO. 050000	803210
9	8	WASHER 1/8 DIA. GALVANIZED	PC (200) NO. NEN-2096 PART NO. 050000	803210
10	24	ROUND HEAD BOL. 1 GALVANIZED	PC (200) NO. NEN-2096 PART NO. 050000	803210
11	2	HINGE (COUNT SEEN IN PLATE)	NA	803210
12	2	TOP PLATE (END CAP)	NA	803210
13	2	TOP PLATE (END CAP)	NA	803210

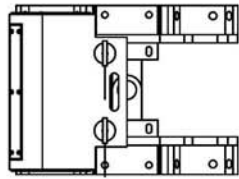
NOTE: THICKNESS OF WELD TO BE EQUAL TO THE THINNER OF 2 PIECES BEING JOINED. WELD TO BE ALL AROUND UNLESS OTHERWISE NOTED.

© 2002 Berne Systems, Inc. The information herein is the property of Berne Systems, Inc. and shall not be distributed, reproduced or used otherwise without the express written approval of Berne Systems, Inc.

REV.	CHANGES	DATE	BY	RECD	WRT ASSY.	TRM

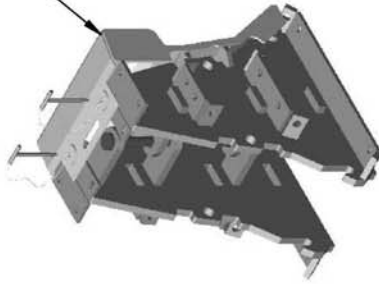
SCALE: 1:30  
 DATE: 07/05/02  
 DRAWN BY: [Signature]  
 CHECKED BY: [Signature]  
 TITLE: (8) METER SAFEGUARD LINK MODEL B020307

ITEM	QTY / DWS	PART DESCRIPTION	SPECIFICATION	PART #
1	1	HINGE, GATE SIDE, WELDMENT	NA	C010207
2	1	HINGE, STATIONARY SIDE, WELDMENT	NA	C010208
3	2	HINGE COVER ASSEMBLY	NA	B020808
4	1	MASTER HINGE PIN	NA	B010105

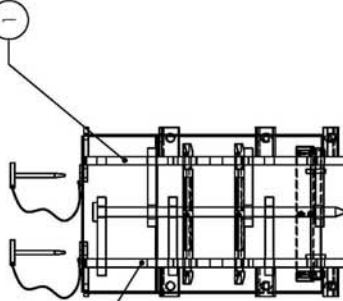


TOP VIEW

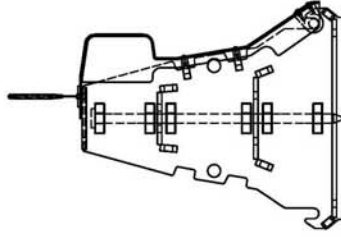
ISOMETRIC VIEW



NOTE: CLOSE SIDE HINGE COVER ASSEMBLY HIDDEN TO SHOW INTERNAL RELATIONSHIPS OF OTHER COMPONENTS



SIDE VIEW



END VIEW

SEE B020784 BOM FOR MATERIAL LIST

© 2002 Banner Systems Inc. The information herein is proprietary to Banner Systems Inc. and shall not be disclosed, duplicated or used otherwise without the express written approval of Banner Systems Inc.		Standard Tolerance: Dec: XXXX ± .010 Dia: .XX ± .005 Ang: .XX ± .005	SCALE: 1:12 DRAWN BY: B7007 DATE: 10/28/02 UNIT: I.S.P. 1038	SEE B020784 BOM FOR MATERIAL LIST
NOTE: THICKNESS OF WELD TO BE EQUAL TO THE THINNER OF 2 PIECES BEING JOINED. WELD TO BE FLAT AROUND UNLESS OTHERWISE SPECIFIED.	REV: 1 DATE BY: RECD CHANGES:	TITLE: ASSEMBLY, HINGE, SAFEGUARD LINK MODEL: B020784 DRAWING NUMBER: B020784 REV:	1 C020703 3	DATE BY: RECD CHANGES: