MESSENGER CHARACTERISTICS

Typical breaking strengths of messengers are presented in the following tables:

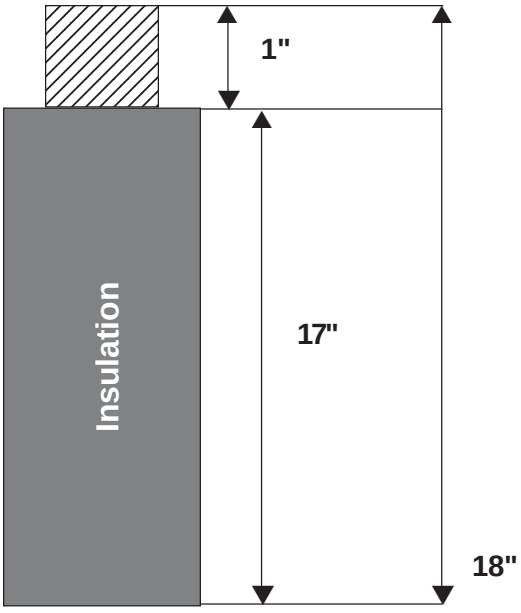
Nominal Messenger Size	EHS Galvanized Steel	
	Weight lb/kft	Breaking Strength (lbs)
1/4" 7 x	121	6650
5/16" 7 x	205	11200
3/8" 7 x	273	15400
7/16" 7 x	399	20800
1/2" 7 x	512	26900
9/16" 7 x	671	35000
9/16" 19 x	637	33700

D.C. HI-POT TESTING PROCEDURE

A. 600 to 5000 Volt Non-shielded Cables

Cable Preparation For Testing

1. Remove 18" of the overall jacket from the end of the cable.
2. Clean the insulation with a proper cable cleaner.
3. Remove 1" of the insulation from the end of the cable.
4. Repeat the procedure for each conductor end in the cable.



D.C. High Voltage Test

Note: If the cable to be tested is a multi-conductor cable, the conductor(s) not under test must be connected to each other and to the other metallic components (if applicable). The cable's grounding conductor must be connected to the metallic components of the cable.

1. The D.C. High Voltage Test is performed by increasing the voltage to the test voltage in steps and hold the test voltage for 5 minutes. The leakage current should be recorded at each step and during and after the 5 minute withstand.

   a. The test voltage is determined by the conductor size and the type of insulation, and is listed in Table I, II, or III.

TABLE I

For Types XHHW-2, RHH or RHW-2 or USE-2 Conductors

Conductor Size (AWG or KCMIL)	DC Test Voltage (KV)*		
	Cable Voltage Rating		
	600V	1000V	2000V
8 - 2	16.5	18.0	21.0
1 - 4/0	21.0	22.5	24.0
250 - 500	24.0	27.0	28.5
600 - 1000	30.0	33.0	34.5

*** - Test voltage per ICEA.**

TABLE II

For Types THHN or THWN-2 Conductors

Conductor Size (AWG or KCMIL)	DC Test Voltage (KV)*
8 - 2	6.0
1 - 4/0	7.5
250 - 500	9.0
600 - 1000	10.5

*** - Test voltage per ICEA.**

D.C. HI-POT TESTING PROCEDURE (con't)

TABLE III

(5000V) Non-shielded MV-90 Cable:

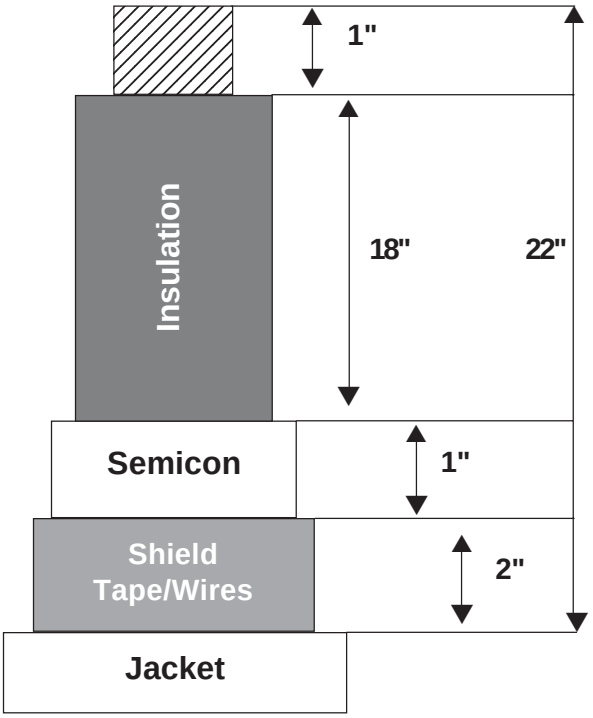
Conductor Size (AWG or KCMIL)	DC Test Voltage (KV)*
8 - 1000	25.0

*** - Test voltage per IEEE.**

B. Shielded MV-90 (or EPR MV-105) Cables

Cable Preparation For Testing

1. Remove 22" of the overall jacket from the end of the cable.
2. Remove the metallic shield to within 2" of the jacket.
3. Remove the semi-conducting insulation shield layer to within 1" of the metallic shield:
   a. Score the extuded semi-con around the cable to within 1" of the metallic shield.
   b. Score longitudinally 3/8" wide around the cable.
   c. Grasp the end of the semi-conducting layer with needle-nose pliers and peel back.
4. Clean the insulation with an appropriate cable cleaner.
5. Remove 1" of the insulation and conductor shield from the end of the cable.
6. Repeat the procedure for each conductor end in the cable.



D.C. High Voltage Test

Note: If the cable to be tested is a multi-conductor cable, the conductor(s) not under test must be connected to each other and to the other metallic components. The cable's grounding conductor must be connected to the metallic components of the cable.

1. Safety considerations are of prime importance before during and after testing. Tests should only be performed by trained personnel and should be done in keeping with the guidelines laid out in IEEE 400 Guide for making High-Direct-Voltage Tests.

2. The D.C. High Voltage Test is performed in steps of 5KV to reach the test voltage and the test voltage is then held for a period of 15 minutes. The leakage current is recorded at each 5KV step during and after the 15 minute withstand. See Table IV for the appropriate test voltage.

TABLE IV

MV Shielded Cable:

Voltage & Insulation Level	DC Test Voltage*
5KV 100% or 133%	28KV
8KV 100%	36KV
8KV 133%	44KV
15KV 100%	56KV
15KV 133%	64KV
25KV 100%	80KV
25KV 133%	96KV
28KV 100%	84KV
28KV 133%	100KV
35KV 100%	124KV

*** - Test voltage per ICEA.**

CABLE STORAGE PROCEDURE

The cable reel should be securely fastened to a suitable stationary object to prevent mechanical damages. A tarp or other equivalent protective covering should be used to protect cable that will be exposed to weather during storage. Aetna cable is shipped with end caps, which provide mechanical and moisture protection during shipment. The end caps on this cable should not be removed till the cable is tested according to the warranty requirements. Also, if the cable will not be installed shortly after testing is completed, the end should be resealed to avoid moisture accumulation in the ends of the cable. Moisture accumulation in the cable can be detrimental to cable performance, cable life and personnel. Any moisture which has accumulated in the cable, should be purged prior to energizing the cable.

PURGING WATER FROM CABLES

CABLES ON REELS: Position the inside end to its lowest possible elevation. Unlash the cable ends.

ALL CABLES: Purge the shield separately from the insulated strands; otherwise the gas will only flow through the path offering the least resistance.

CABLES NOT INSTALLED: Remove end seals. At the cable end having the highest elevation, apply two layers of half-lapped HV insulating tape to act as a sealing cushion. Interconnect the cable ends to the dry nitrogen gas supply by using hoses, valves, pipe fitting, and flow regulators as necessary.

Attach a one-gallon plastic bag to the exhaust end of the cable. Secure the bag with tape or clamps. Make a small vent hole by clipping one corner of the bag.

As shown in the Diagram A, several conductors may be manifolded to the gas supply. Apply 15-25 psig of dry nitrogen, which is available from a welding gas supplier. Maintain pressure for at least eight hours after all indications of moisture have stopped.

Water vapor may be readily detected by sprinkling one tablespoon of Anhydrous Calcium Sulfate in the plastic bag. The Calcium Sulfate will turn from blue to red as it absorbs water. It is available from scientific laboratory supply houses.

INSTALLED CABLES: The splices and terminations can be removed and the cable purged as described above.

To remove water from the strand, the cable can be lightly loaded to drive the vapor our one end of the cable, providing the cable's termination design has an open strand. Or a termination can be removed and low voltage and low current can be applied to drive out the water.

A shield system may be purged by attaching a truck air valve (having stem removed) over 1/2 inch holes cut into the jacket at both ends of the cable section. Then gas is applied and checked as before except to 15 psig maximum. Do not try to purge across or through splices.

PURGING WATER FROM CABLES (continued)

DIAGRAM A