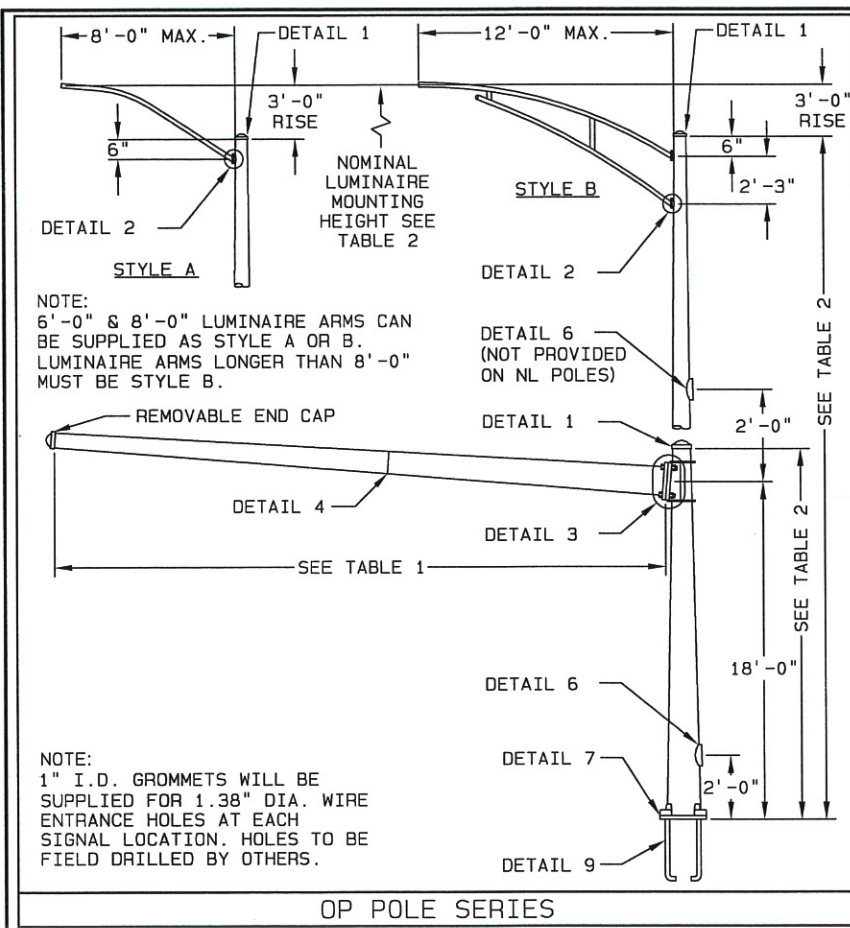


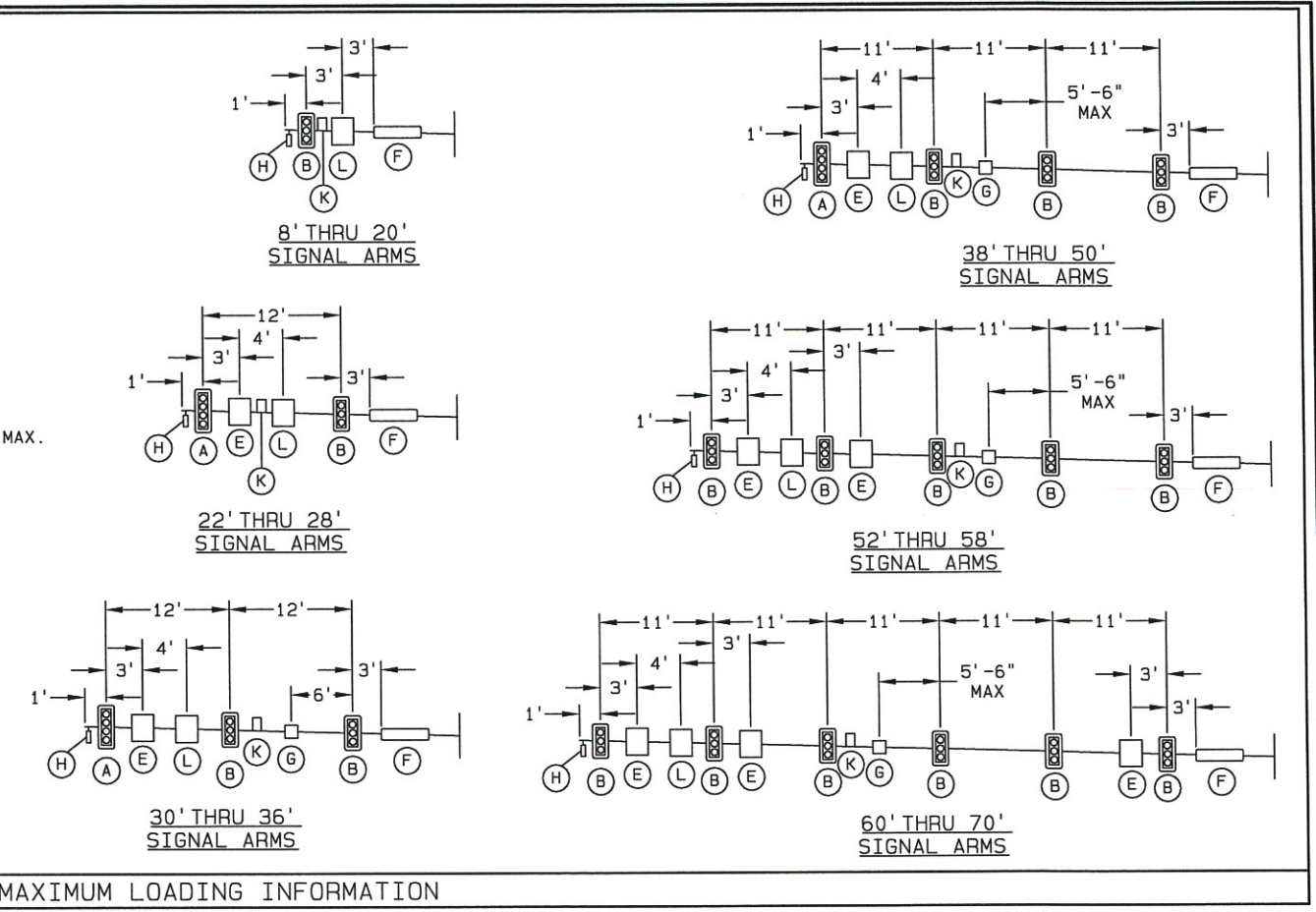


| DEVICE | DESCRIPTION                                | PROJ. AREA (FT <sup>2</sup> ) | WEIGHT (LBS) |
|--------|--------------------------------------------|-------------------------------|--------------|
| (A)    | 12"-4 SEC. SIGNAL HEAD W/ BACK PLATES      | 12.00                         | 54           |
| (B)    | 12"-3 SEC. SIGNAL HEAD W/ BACK PLATES      | 10.00                         | 42           |
| (C)    | 12"-4 SEC. SIGNAL HEAD W/ NO BACK PLATES   | 6.00                          | 40           |
| (D)    | 16"x18"-1 SEC. PEDESTRIAN SIGNAL           | 3.00                          | 20           |
| (E)    | 36"x36" FLATSHEET ALUMINUM SIGN (MAX)      | 9.00                          | 20           |
| (F)    | 24"x96" ILLUMINATED STREET NAME SIGN (MAX) | 16.00                         | 120          |
| (G)    | ADVANCE RADAR DETECTOR                     | 1.00                          | 15           |
| (H)    | PRESENCE RADAR DETECTOR                    | 1.00                          | 15           |
| (I)    | CCTV CAMERA                                | 1.00                          | 15           |
| (J)    | LUMINAIRE                                  | 1.00                          | 30           |
| (K)    | EMERGENCY VEHICLE PRE-EMPTION DETECTOR     | 0.50                          | 5            |
| (L)    | 36"x36" FLATSHEET ALUMINUM SIGN (MAX)      | 9.00                          | 20           |

THE MAST ARM TRAFFIC STRUCTURES SHOWN ON THIS DRAWING HAVE BEEN DESIGNED IN ACCORDANCE WITH THE LOADING AND THE ALLOWABLE STRESS REQUIREMENTS OF THE 2013 AASHTO "STANDARDS SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", SIXTH EDITION, LTS-6. THE WIND LOADS WERE CALCULATED FROM A BASIC WIND VELOCITY OF 90 MPH WITH A RECURRENCE INTERVAL OF 25 YEARS, AND A FATIGUE CATEGORY OF 2. THE FATIGUE LOADS WERE CALCULATED ON THE REQUIREMENTS OF SECTION 11 OF THE CODE, AND THE FOLLOWING DESIGN CONDITIONS.

- STRUCTURES ARE DESIGNED TO RESIST NATURAL WIND GUSTS BASED ON THE YEARLY MEAN WIND VELOCITY OF 11.2 MPH.
- STRUCTURES ARE NOT DESIGNED TO RESIST GALLOPING-INDUCED CYCLIC LOADS.
- TRUCK-INDUCED GUST LOADS ARE EXCLUDED PER THE REQUIREMENTS OF THE CODE

**TYPICAL POST LOADING**



| TABLE 1: POLE AND SIGNAL ARM DATA |                      |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           |                    |                   |                   |                      |                            |               |                    |                       |                      |
|-----------------------------------|----------------------|---------------|--------|-----------|--------|-----------|----------------|-------------|--------------------|-----------------|----------------------|---------------|----------------------|--------------------|------------------|-----------------|---------------|------------------------|-----------|--------------------|-------------------|-------------------|----------------------|----------------------------|---------------|--------------------|-----------------------|----------------------|
| DESIGNATION KEY                   |                      |               |        |           |        |           | POLE DATA      |             | BASE PLATE DATA    |                 |                      |               |                      |                    | ANCHOR BOLT DATA |                 |               |                        |           | SIGNAL ARM DATA    |                   |                   |                      | SIGNAL ARM ATTACHMENT DATA |               |                    |                       |                      |
| POLE SERIES                       | SIGNAL ARM SPAN (FT) | LUMINAIRE ARM |        |           |        |           | BASE DIA. (IN) | LENGTH      | WALL GAUGE OR THK. | SQUARE "S" (IN) | BOLT CIRCLE "F" (IN) | THK. "M" (IN) | CENTER HOLE "P" (IN) | BOLT HOLE "Z" (IN) | DIA. "K" (IN)    | LENGTH "J" (IN) | HOOK "H" (IN) | THREAD LENGTH "U" (IN) | BOLT QTY. | FIXED END DIA (IN) | FREE END DIA (IN) | GAUGE OF THK (IN) | SIGNAL ARM SPAN (FT) | SQUARE "A" (IN)            | THK. "D" (IN) | BOLT SIZE "N" (IN) | BOLT PATTERN "B" (IN) | CENTER HOLE "C" (IN) |
|                                   |                      | TYPE          | ARM 1  |           | ARM 2  |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           |                    |                   |                   |                      |                            |               |                    |                       |                      |
|                                   |                      |               | STYLE  | SPAN (FT) | STYLE  | SPAN (FT) |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           |                    |                   |                   |                      |                            |               |                    |                       |                      |
| OP                                | 20                   | NL,LR,MR,HR   | A OR B | 6-12      | A OR B | 6-12      | 12.00          | SEE TABLE 2 | 7                  | 17.00           | 16.00                | 2.00          | 10.50                | 1.75               | 1.50             | 54.00           | 6.00          | 8.00                   | 4         | 8.00               | 5.20              | 7                 | 20.00                | 17.25                      | 2.00          | 1.25 X 6.25        | 14.00                 | 7.00                 |
| OP                                | 22                   | NL,LR,MR,HR   | A OR B | 6-12      | A OR B | 6-12      | 12.50          |             | 5                  | 17.50           | 16.50                | 2.00          | 11.00                | 1.75               | 1.50             | 54.00           | 6.00          | 8.00                   | 4         | 9.00               | 5.92              | 7                 | 22.00                | 17.75                      | 2.00          | 1.25 X 6.25        | 14.50                 | 7.64                 |
|                                   | 24                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 9.00               | 5.64              | 7                 | 24.00                | 17.75                      | 2.00          | 1.25 X 6.25        | 14.50                 | 7.64                 |
|                                   | 26                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 9.00               | 5.36              | 7                 | 26.00                | 17.75                      | 2.00          | 1.25 X 6.25        | 14.50                 | 7.50                 |
|                                   | 28                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 9.00               | 5.08              | 7                 | 28.00                | 17.75                      | 2.00          | 1.25 X 6.25        | 14.50                 | 7.50                 |
| OP                                | 30                   | NL,LR,MR,HR   | A OR B | 6-12      | A OR B | 6-12      | 13.00          |             | 3                  | 18.50           | 17.50                | 2.00          | 11.50                | 2.00               | 1.75             | 84.00           | 6.00          | 8.00                   | 4         | 10.00              | 5.80              | 7                 | 30.00                | 18.25                      | 2.00          | 1.25 X 6.25        | 15.00                 | 8.50                 |
|                                   | 32                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 10.50              | 6.02              | 7                 | 32.00                | 18.25                      | 2.00          | 1.25 X 6.25        | 15.00                 | 8.75                 |
|                                   | 34                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 11.00              | 6.24              | 7                 | 34.00                | 18.25                      | 2.00          | 1.25 X 6.25        | 15.00                 | 9.00                 |
|                                   | 36                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 11.00              | 5.96              | 7                 | 36.00                | 18.25                      | 2.00          | 1.25 X 6.25        | 15.00                 | 9.00                 |
| OP                                | 38                   | NL,LR,MR,HR   | A OR B | 6-12      | A OR B | 6-12      | 16.00          |             | 0.250              | 22.00           | 21.00                | 2.25          | 14.00                | 2.00               | 1.75             | 84.00           | 6.00          | 8.00                   | 4         | 13.00              | 7.68              | 3                 | 38.00                | 21.25                      | 2.00          | 1.25 X 6.25        | 18.00                 | 11.50                |
|                                   | 40                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 13.00              | 7.76              | DET. 4            | 40.00                | 21.25                      | 2.00          | 1.25 X 6.25        | 18.00                 | 10.50                |
|                                   | 42                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 13.00              | 7.48              | DET. 4            | 42.00                | 21.25                      | 2.00          | 1.25 X 6.25        | 18.00                 | 10.50                |
|                                   | 44                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 13.00              | 7.20              | DET. 4            | 44.00                | 21.25                      | 2.00          | 1.25 X 6.25        | 18.00                 | 10.50                |
|                                   | 46                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 14.00              | 7.92              | DET. 4            | 46.00                | 21.25                      | 2.00          | 1.25 X 6.25        | 18.00                 | 11.25                |
|                                   | 48                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 14.00              | 7.64              | DET. 4            | 48.00                | 21.25                      | 2.00          | 1.25 X 6.25        | 18.00                 | 11.25                |
| OP                                | 50                   | NL,LR,MR,HR   | A OR B | 6-12      | A OR B | 6-12      | 17.00          |             | 0.250              | 23.00           | 22.00                | 2.25          | 14.75                | 2.25               | 2.00             | 84.00           | 6.00          | 10.00                  | 4         | 14.50              | 7.86              | DET. 4            | 50.00                | 21.25                      | 2.00          | 1.25 X 6.25        | 18.00                 | 11.75                |
|                                   | 52                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 14.00              | 7.08              | DET. 4            | 52.00                | 23.25                      | 2.50          | 1.50 X 7.50        | 19.50                 | 11.75                |
|                                   | 54                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 15.00              | 7.80              | DET. 4            | 54.00                | 23.25                      | 2.50          | 1.50 X 7.50        | 19.50                 | 12.50                |
|                                   | 56                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 15.00              | 7.52              | DET. 4            | 56.00                | 23.25                      | 2.50          | 1.50 X 7.50        | 19.50                 | 12.50                |
| OP                                | 58                   | NL,LR,MR,HR   | A OR B | 6-12      | A OR B | 6-12      | 20.00          |             | 0.250              | 28.00           | 27.00                | 2.25          | 14.25                | 2.25               | 2.00             | 84.00           | 6.00          | 10.00                  | 4         | 15.50              | 7.74              | DET. 4            | 58.00                | 23.25                      | 2.50          | 1.50 X 7.50        | 19.50                 | 13.00                |
|                                   | 60                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 16.00              | 7.98              | DET. 4            | 60.00                | 26.75                      | 2.50          | 1.50 X 7.50        | 23.00                 | 8.75                 |
|                                   | 62                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 16.50              | 8.20              | DET. 4            | 62.00                | 26.75                      | 2.50          | 1.50 X 7.50        | 23.00                 | 9.25                 |
|                                   | 64                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 17.00              | 8.42              | DET. 4            | 64.00                | 26.75                      | 2.50          | 1.50 X 7.50        | 23.00                 | 9.50                 |
|                                   | 66                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 17.50              | 8.64              | DET. 4            | 66.00                | 26.75                      | 2.50          | 1.50 X 7.50        | 23.00                 | 9.75                 |
|                                   | 68                   |               |        |           |        |           |                |             |                    |                 |                      |               |                      |                    |                  |                 |               |                        |           | 18.50              | 9.36              | DET. 4            | 68.00                | 26.75                      | 2.50          | 1.50 X 7.50        | 23.00                 | 10.50                |
| OP                                | 70                   | NL,LR,MR,HR   | A OR B | 6-12      | A OR B | 6-12      | 20.00          |             | 0.250              | 28.00           | 27.00                | 2.25          | 14.25                | 2.25               | 2.00             | 84.00           | 6.00          | 10.00                  | 4         | 18.50              | 9.08              | DET. 4            | 70.00                | 26.75                      | 2.50          | 1.50 X 7.50        | 23.00                 | 10.50                |

| TABLE 2: ELEVATIONS       |             |               |                  |                |
|---------------------------|-------------|---------------|------------------|----------------|
| ELEVATIONS                | TYPE        |               |                  |                |
|                           | NO LUM (NL) | LOW RISE (LR) | MEDIUM RISE (MR) | HIGH RISE (HR) |
| LUMINAIRE MOUNTING HEIGHT | N/A         | 30'-0"        | 35'-0"           | 40'-0"         |
| POLE LENGTH               | 20'-6"      | 27'-0"        | 32'-0"           | 37'-0"         |

| TABLE 3: MATERIAL DATA              |                                     |                  |
|-------------------------------------|-------------------------------------|------------------|
| COMPONENT                           | ASTM DESIGNATION                    | MIN. YIELD (KSI) |
| ALL TAPERED SHAFTS                  | A595 GR. A OR A572                  | 55               |
| BASE PLATE                          | A572 GR. 50                         | 50               |
| SIMPLEX PLATE                       | A572 GR. 50                         | 50               |
| LUM ARM ATTACHMENT                  | A27 GR. 65-35 OR A36                | 35               |
| LUMINAIRE ARM - 2" SCHEDULE 40 PIPE | ASTM A501, A513, A618 OR A500 GR. B | 36               |
| LUMINAIRE CONN. BOLTS               | SAE GR. 5                           | --               |
| ANCHOR BOLTS                        | F1554 GR. 55                        | 55               |
| GALVANIZING-STRUCTURES              | A123                                | --               |
| GALVANIZING-HARDWARE                | HOT DIP ZINC                        | --               |

|     |               |               |                                             |
|-----|---------------|---------------|---------------------------------------------|
| C   | AT7 08/30/16  | KJW5 09/01/16 | "NL" POLE LENGTH WAS 19'-0"                 |
| B   | JWK3 07/23/14 | NKL 07/25/14  | REVISED HANDHOLE SIZE                       |
| A   | JWK3 05/23/14 | BD4 05/28/14  | ADDED EXTRA HH/ AB DETAIL/ WELD SEAM DETAIL |
| REV | JWK3 05/02/14 | NKL 05/07/14  |                                             |
|     | DRAWN BY-DATE | CHECK BY-DATE | DESCRIPTION                                 |

TITLE CITY OF OVERLAND PARK, KANSAS  
2013 AASHTO DESIGNS  
TRAFFIC SIGNAL STRUCTURES

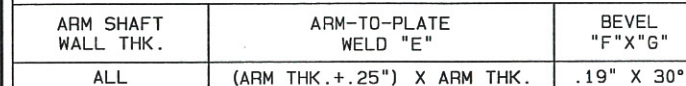
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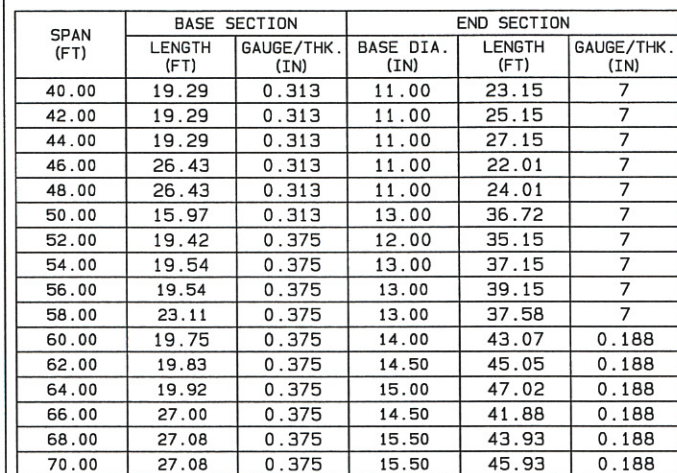
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DRAWING NUMBER: DB01086  
REV: C

PROFESSIONAL CIVIL ENGINEER  
BARRY N. SLADEK  
E-10357  
STATE OF NEBRASKA  
9/2/16

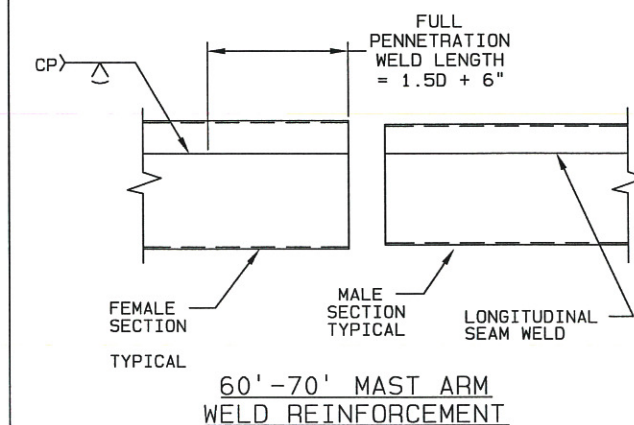




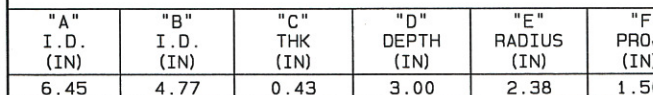
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| DETAIL 3 | SIGNAL ARM ATTACHMENT |
|----------|-----------------------|



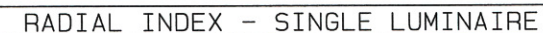
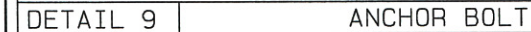
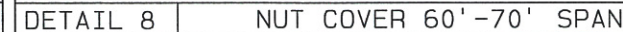
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| DETAIL 4 | 40'-70' SIGNAL ARM SLIP JOINT |
|----------|-------------------------------|



|          |                             |
|----------|-----------------------------|
| DETAIL 5 | MAST ARM WELD REINFORCEMENT |
|----------|-----------------------------|



|          |                        |
|----------|------------------------|
| DETAIL 6 | UPPER & LOWER HANDHOLE |
|----------|------------------------|



ALTHOUGH RARE, VIBRATIONS SEVERE ENOUGH TO CAUSE DAMAGE CAN OCCASIONALLY OCCUR IN STRUCTURES OF ALL TYPES. BECAUSE THEY ARE INFLUENCED BY MANY INTERACTING VARIABLES, VIBRATIONS ARE GENERALLY UNPREDICTABLE. THE USER'S MAINTENANCE PROGRAM SHOULD INCLUDE OBSERVATION FOR EXCESSIVE VIBRATION AND EXAMINATION FOR ANY STRUCTURAL DAMAGE OR BOLT LOOSENING. THE VALMONT WARRANTY SPECIFICALLY EXCLUDES FATIGUE FAILURE OR SIMILAR PHENOMENA RESULTING FROM INDUCED VIBRATION, HARMONIC OSCILLATION OR RESONANCE ASSOCIATED WITH MOVEMENT OF AIR CURRENTS AROUND THE PRODUCT.

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