

3.03 EXPOSED CONDUIT INSTALLATION NOTES (CONTD)

- R. SAFETY RELATED EXPOSED CONDUIT SHALL HAVE SELF ADHESIVE MARKERS ATTACHED AT INTERVALS NOT TO EXCEED 15' AND AT POINTS OF ENTRY TO AND EXIT FROM ENCLOSED AREAS. SEE PAR. 6.04 AND 6.06. EXCEPT IN THE RB WHERE CONDUIT SHALL BE STENCILED.
- S. NON-SAFETY RELATED EXPOSED CONDUIT (EXCEPT LIGHTING, RECEPTACLE, SECURITY, FIRE AND COMMUNICATION) SHALL HAVE SELF ADHESIVE MARKERS ATTACHED AT INTERVALS NOT TO EXCEED 50 FEET AND AT POINTS OF ENTRY TO AND EXIT FROM ENCLOSED AREAS. SEE PAR. 6.04 AND 6.06. EXCEPT IN THE RB WHERE CONDUIT SHALL BE STENCILED.
- T. TOLERANCE FOR PULL SLEEVE INSTALLATION SHALL BE  $\pm 10$  FEET ALONG THE AXIS OF THE CONDUIT, WITHOUT PASSING THROUGH ANY BENDS.
- U. ALL BENDS IN DIMENSIONED CONDUIT RUNS SHALL HAVE THE FOLLOWING BENDING RADIUS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

CONDUIT SIZE	BENDING RADIUS TO CENTER LINE OF BEND
3/4"	4 1/2"
1"	5 1/2"
1 1/2"	8"
2"	12"
3"	15"
3" (5KV & 15 KV)	24"
4"	20"
4" (5KV & 15KV)	24"
5"	30"
6"	35 1/2"

WHERE CONCENTRIC BENDING IS CONSIDERED BY THE CONTRACTOR, THE BENDING RADIUS OF THE INNER MOST CONDUIT SHALL BE AS INDICATED IN THE TABLE ABOVE.

- V. TO ESTABLISH THE MAX. FIELD ROUTED CONDUIT LENGTH PERMITTED BETWEEN TWO PULL POINTS, CONTRACTOR SHALL FOLLOW THE CRITERIA INDICATED IN PARAGRAPH 8.0 5H, 11, 11A, 11B, & 12.

W. PROCEDURE FOR USING CONDULETS & PULL SLEEVES

- I. CONDULET SHALL NOT BE USED IN ANY CONDUIT SYSTEMS WHICH CONTAIN 5KV OR 15KV POWER CABLES DESIGNATED AS CLASSES X & V RESPECTIVELY ON TABLE B.
- II. CONDULET SHALL NOT BE USED IN ANY CONDUIT SYSTEMS WHICH CONTAIN OVERALL SHIELDED (OAS) TYPE CABLES EXCEPT THOSE OAS CABLES HAVING B/M NO'S D61-01, D61-02, D64-01 & D66-01. IN SUCH CASES, PROCEDURE III BELOW SHALL BE FOLLOWED. ALL OAS CABLES ARE IDENTIFIED ON TABLE B.
- III. WHERE THE USE OF "LBD" CONDULET IS CONSIDERED, THE FOLLOWING PROCEDURE SHALL BE USED:
  - 1A. ONLY APPLETON TYPE "LBD" UNILETS OR APPROVED EQUIVALENT SHALL BE USED FOR 90° PULLS.
  - 1B. ONLY APPLETON TYPE "C" MOGUL UNILETS OR APPROVED EQUIVALENT SHALL BE USED FOR STRAIGHT PULLS.
  - 2. CLOSE SUPERVISION SHALL BE PROVIDED AT THE PLACE OF THE CONDULETS DURING CABLE PULLING TO ENSURE THAT CABLES BE PULLED ONLY FAR ENOUGH TO REINSTALL CONDULET COVERS TO PRECLUDE PULLING CABLES AGAINST THE INNER EDGE OF THE CONDULET.
  - 3. CONDULETS MAY BE USED IF TRAINING RADIUS SHOWN ON TABLE A BELOW FOR THE CONDUIT FILL IS EQUAL OF LARGER THAN THE CABLE MANUFACTURER RECOMMENDED MINIMUM TRAINING RADIUS (RT) FOR EVERY CABLE IN THIS CONDUIT. RT FOR ALL CABLES ARE SHOWN ON TABLE B.
- IV. WHERE THE USE OF A "C" CONDULET OR PULL SLEEVE IS NEEDED FOR CABLE PULLING PURPOSES THE FOLLOWING PROCEDURE SHALL BE USED:
  - 1. "C" CONDULETS AND PULL SLEEVES SHALL BE SIZED SO THAT THE LENGTH OF THE ACCESS OPENING IS AT LEAST 4 TIMES LARGER THAN THE CABLE MANUFACTURER'S RECOMMENDED MINIMUM TRAINING RADIUS (RT) FOR EVERY CABLE IN THE CONDUIT. RT FOR ALL CABLES ARE SHOWN ON TABLE B.
  - 2. CONDUITS WHICH REQUIRE SEISMIC CATEGORY I SUPPORTS SHALL UTILIZE ONLY APPLETON TYPE "C" MOGUL UNILETS OR CROUSE HINDS TYPE "C" CONDULET OR ENGINEER APPROVED EQUAL.

TABLE A  
TRAINING RADIUS PROVIDED BY "LBD" CONDULETS  
INSTALLATION CONDITIONS

CONDUIT SIZE	TRAINING RADIUS PROVIDED BY "LBD" CONDULETS	
	40% FILL TRAINING RADIUS	30% FILL OR LESS TRAINING RADIUS
3/4"	1.4"	1.5"
1"	1.4"	1.5"
1 1/2"	3.0"	3.2"
2"	3.1"	3.2"
3"	4.3"	4.5"
4"	5.5"	6.0"

EXAMPLE:  
CONDUIT NO. 33361E IS A 4" CONDUIT WHICH CONTAINS CABLES WITH THE FOLLOWING B/M NO'S D 50-20, D50-21, D50-16 AND D50-18. CONDUIT FILL IS 30%

TABLE B INDICATES MINIMUM TRAINING RADIUS FOR CABLES D 50-20, D 50-21, D 50-16 AND D 50-18 ARE 3", 3", 1.5" AND 2" RESPECTIVELY.

a) A 4" TYPE LBD UNILET CAN PROVIDE A 6" TRAINING RADIUS AS SHOWN ON TABLE A, THEREFORE 4" TYPE LBD UNILET IS PERMITTED.

b) MINIMUM ACCESS OPENING FOR "C" CONDULET OR PULL SLEEVE, IF USED, MUST BE 4x3=12 INCHES OR LARGER.

CABLE B/M NO.	CLASS	CABLE DESCRIPTION	OD (INCH)	AREA (IN <sup>2</sup> )	MIN. TRAINING RADIUS RT	REMARKS
D11-01	X	1/C 4/O	1.44	1.63	17	CONDULET NOT PERMITTED
02	X	1/C 350 MCM	1.59	1.98	19	
03	X	1/C 750 MCM	1.99	3.11	24	
D12-01	X	3/C 350 MCM	3.41	9.13	41*	DIRECT BURIAL
D15-01	V	1/C-1/O	1.18	1.09	14	
02	V	1/C-500 MCM	1.46	1.67	17.5	
03	V	1/C-750 MCM	1.70	2.27	20.5	
04	V	1/C-500 MCM	1.51	1.79	18	
D25-01	P	1/C-4/O	0.70	0.38	3	
02	P	1/C-500MCM	1.01	0.80	5	
03	P	3/C #10	0.52	0.21	2	
04	P	3/C #6 T	0.70	0.38	3	
05	P	3/C #2 T	0.93	0.68	4	
06	P	3/C 2/O T	1.28	1.29	6	
07	P	3/C #2 (D50-23)	0.43	0.15	2	
08	P	1/C 2/O	0.60	0.28	2.5	
09	P	1/C #6 (D50-24)	0.32	0.08	1.5	
10	P	8/C #8(D50-22)	1.02	0.82	4	
D26-01	P	1/C 4/O	0.78	0.48	3	
D99-20	P	1/C #4	0.39	0.12	2*	
D50-01	C	2/C #10	0.49	0.19	2	
02	C	3/C #10	0.52	0.21	2	
03	C	4/C #10	0.60	0.28	2.5	
04	C	2/C #12	0.44	0.15	2	
05	C	3/C #12	0.46	0.17	2	
06	C	5/C #12	0.55	0.24	2	
07	C	7/C #12	0.63	0.31	2.5	
08	C	9/C #12	0.73	0.42	3	
09	C	12/C #12	0.82	0.53	3	
10	C	2/C #14	0.40	0.13	1.5	
11	C	3/C #14	0.42	0.14	2	
12	C	5/C #14	0.50	0.20	2	
13	C	7/C #14	0.57	0.26	2	
14	C	12/C #14	0.74	0.43	3	
15	C	2/C #8	0.35	0.10	1.5	
16	C	3/C #16	0.37	0.11	1.5	
17	C	5/C #16	0.43	0.15	2	
18	C	7/C #16	0.50	0.20	2	
19	C	9/C #16	0.57	0.26	2.5	
20	C	12/C #16	0.64	0.32	3	
21	C	16/C #16	0.74	0.43	3	
22	C	8/C #8 (D25-10)	1.02	0.82	4	
23	C	1/C #2 (D25-07)	0.43	0.15	2	
24	C	1/C #6 (D25-09)	0.32	0.08	1.5	
D51-01	C	16/C #16	0.77	0.47	9.5	(OAS) CONDULET NOT PERMIT
02	C	6/C #16 (D60-17)	0.52	0.21	6.5	
03	C	48/C #16	1.26	1.25	15	
04	C	11/C #16	0.75	0.44	8.5	
D54-01	C	6-#14+3-#14	1.19	1.11	14	
D54-02	C	7-#16+2-#16	1.02	0.82	12	

PRC APERTURE CARD

PCP 35Q-1999, 2031, 2507, 4729  
5846, 6240, DCN-ED-78, 79  
INCORPORATED IN REV 4

TABLE B (CONTINUE ON SH. 5C)

NUCLEAR SAFETY RELATED WPPSS QUALITY CLASS 1, I & G

<table border="1"> <tr> <th>REV.</th> <th>DATE</th> <th>BY</th> <th>APPROVED</th> </tr> <tr> <td>5</td> <td>5-7-82</td> <td>S.P.</td> <td>[Signature]</td> </tr> <tr> <td>4</td> <td>7-21-81</td> <td>S.P.</td> <td>[Signature]</td> </tr> <tr> <td>3</td> <td>2-17-81</td> <td>S.P.</td> <td>[Signature]</td> </tr> <tr> <td>1</td> <td>8-22-80</td> <td>E.M.</td> <td>[Signature]</td> </tr> </table>	REV.	DATE	BY	APPROVED	5	5-7-82	S.P.	[Signature]	4	7-21-81	S.P.	[Signature]	3	2-17-81	S.P.	[Signature]	1	8-22-80	E.M.	[Signature]	<p>EBASCO SERVICES INCORPORATED</p> <p>DIV. ELEC. DR. E.M.</p> <p>CH. E. SENKUS</p> <p>DATE APR 10, 1979</p>	<p>WASHINGTON PUBLIC POWER SUPPLY SYSTEM</p> <p>NUCLEAR PROJECTS NO. 3 &amp; 5</p> <p>GENERAL NOTES, SYMBOLS AND REFERENCE DRAWINGS</p>	<p>WPPSS 3240</p> <p>D-3073</p> <p>SHEET 5D</p>
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