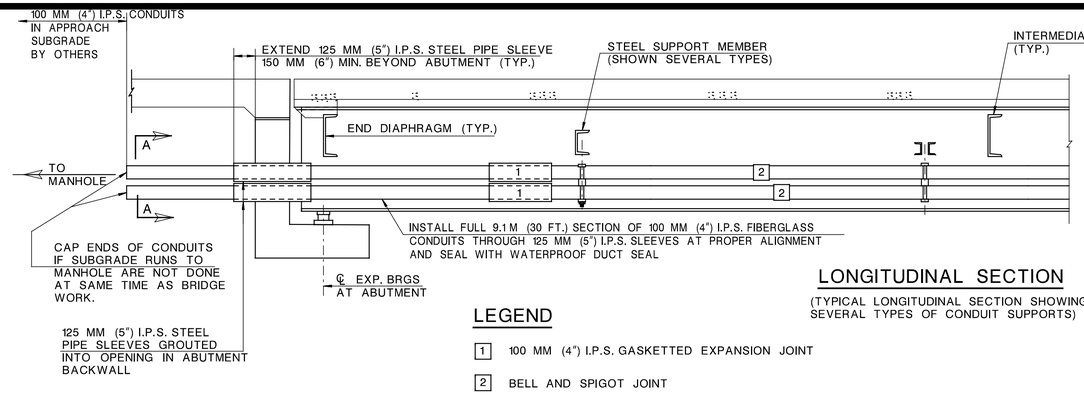
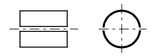


LONGITUDINAL SECTION

(TYPICAL LONGITUDINAL SECTION SHOWING SEVERAL TYPES OF CONDUIT SUPPORTS)

LEGEND

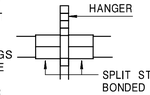
1. 100 MM (4") I.P.S. GASKETTED EXPANSION JOINT
2. BELL AND SPIGOT JOINT
3. ANCHOR POINT



SPLIT ANCHOR RING

NOTE: SUBJECT TO DESIGN, HANGER WHERE SPLIT ANCHOR RINGS ARE PLACED MAY NEED TO BE LONGITUDINALLY BRACED

NOTE: WHEN USING MORE THAN ONE EXPANSION JOINT, AN ANCHOR MUST POSITIVELY RESTRAIN THE MOVEMENT OF THE CONDUIT AGAINST ALL APPLIED FORCES. ANCHORING IS DONE BY BONDING SPLIT STOP RINGS ON THE EXTERIOR OF THE CONDUIT ON BOTH SIDES OF THE SUPPORT HANGER THAT ENDS OR COVERS THE DISTANCE OR LENGTH OF CONDUIT FOR THAT PARTICULAR EXPANSION JOINT.

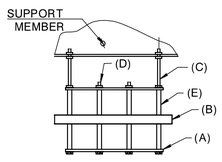


ANCHOR

STANDARD SUPPORT HANGERS IPS SIZE 100 MM (4") TEL

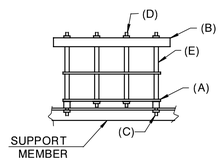
HANGING: HANGS DOWN FROM BRIDGE STRUCTURE. ATTACHMENT RODS (ITEM C) EXTEND AS REQUIRED ABOVE TOP HANGER PLATE. TWO ATTACHMENT RODS (C) ARE INCLUDED UP THRU 4 DUCTS WIDE WITH THREE INCLUDED FOR 5 AND 6 DUCTS WIDE.

BASE MOUNT: MOUNTS IN TOP TO STRUCTURAL MEMBER. THREADED ATTACHMENT RODS (C) EXTEND AS REQUIRED BELOW HANGER. TWO ATTACHMENT RODS ARE INCLUDED UP THRU 5 DUCTS WIDE WITH THREE INCLUDED FOR 6 DUCTS WIDE.



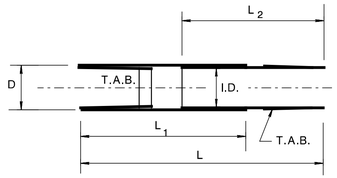
HANGING

3 WIDE x 2 HIGH



BASE

3 WIDE x 2 HIGH

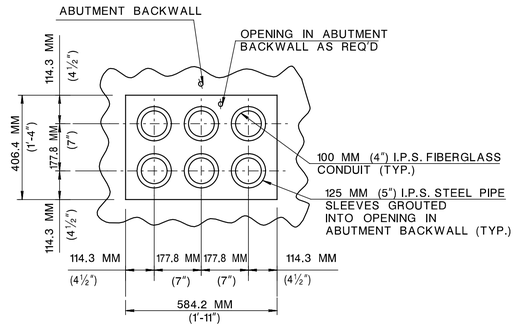


NOMINAL SIZE MM (in)	D MM (in)	L_1 MM (in)	L_2 MM (in)	$L_{min.}$ MM (in)	$L_{max.}$ MM (in)	I.D. MM (in)
100 (4)	126.24 (4.97)	318 (12.50)	279 (11)	381 (15)	533 (21)	110.74 (4.36)

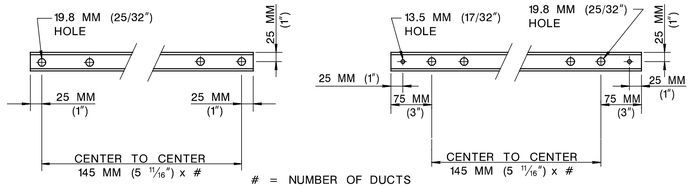
EXPANSION JOINT

FIBERGLASS HANGER

PART (A) 13 x 50 MM (1/2 " x 2") FIBERGLASS PLATE
PART (B) 50 x 50 MM (2" x 2") FIBERGLASS SQUARE TUBING.
PART (C) 19 MM (3/4 ") 10NC THREADED STEEL ATTACHMENT RODS, NUTS AND WASHERS (PLATED).
PART (D) SPACER RODS: 19 MM (3/4 ") 10NC THREADED STEEL RODS, NUTS AND WASHERS (PLATED)
PART (E) 19 MM (3/4") FIBERGLASS SPACER TUBES [25.4 MM O.D. x 19.2 MM I.D. x 119.13 MM LONG (1.0" O.D. x 0.755" I.D. x 4.69" LONG)]



SECTION A-A



PART (A)

PLATE 13 x 50 MM (1/2"x2")

PART (B)

SQ. TUBE 50 x 50 MM (2"x2")

CENTER TO CENTER HANGER ROD DIMENSIONS

TABLE 1

Support Spacing for Interior Spans at 24°C (75°F)

At 38°C (100° F) apply factor of 0.96 - Based on Midspan Deflection not exceeding 16 MM (5/8 ")

CONDUIT IPS SIZE	CABLE WT. KG/M (LBS. per ft.)	Moment of Inertia MM^4 (in^4)	Span M (Ft.)
100 MM (4 Inch)	4.46 (3) 11.91 (8)	9.88 x 10^5 (2.374)	6.5 (21.2) 5.2 (17.2)

For other cable Weights use formula below:

For 16 MM Deflection, Span = $\sqrt[4]{\frac{1.0367 \times 10^{13} \times \text{Moment of Inertia}}{(Wt_{Cable} + Wt_{Conduit}) / 1000}} = \frac{MM}{1000} = M$

(For 5/8" Deflection, Span = $\sqrt[4]{\frac{576\ 000\ 000 \times \text{Moment of Inertia}}{(Wt_{Cable} + Wt_{Conduit}) / 12}} = \frac{\text{inches}}{12} = \text{Ft.}$)

Property - Physical	Test Method	Value at 24° C	Value at 75° F
Ultimate Tensile Strength	ASTM-D2105	72.4 MPa	10,500 psi
Design Tensile Stress	-	18.1 MPa	2,625 psi
Tensile Modulus of Elasticity	ASTM-D2105	12203.7 MPa	1.77 X 10^6 psi
Ultimate Compressive Strength	ASTM-D695	122.7 MPa	17,800 psi
Design Compressive Stress	-	30.7 MPa	4,450 psi
Compressive Modulus of Elasticity	ASTM-D695	9652.7 MPa	1.4 X 10^6 psi
Ultimate Beam Bending Strength	AOSI-TM	115.1 MPa	16,700 psi
Design Beam Bending Stress	-	34.5 MPa	5,000 psi
Coefficient of Thermal Expansion	AOSI-TM 16-3	2.02 X 10^5 mm/mm/°C	1.12 X 10^5 in/in/°F
Thermal Conductivity	AOSI-TM 16-15	0.37 W/m*°K	2.6 Btu*in/ ft^2*°F*hr
Specific Gravity	ASTM-D792	1.85	1.85

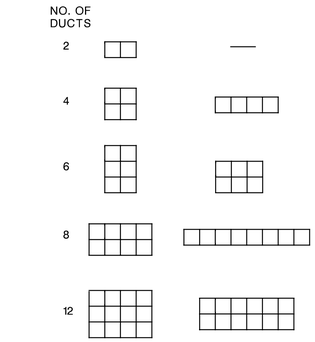
Property - Electrical	Test Method	Value at 24° C	Value at 75° F
Volume Resistivity	ASTM-D150	7.6 X 10^{15} ohm-cm	7.6 X 10^{15} ohm-cm
Surface Resistivity	ASTM-D257	2.4 X 10^8 megohm	2.4 X 10^8 megohm
Dielectric Constant	ASTM-D150	4.2 (at 10^3 cps)	4.2 (at 10^3 cps)
Dissipation Factor	ASTM-D150	0.06 (at 10^3 cps)	0.06 (at 10^3 cps)
Dielectric Strength	ASTM-D348	1800 volts/mm	440 volts/mil

TABLE 2

CONDUIT IPS SIZE	O.D. MM (in)	I.D. MM (in)	WALL MM (in)	LENGTHS ±150 MM (±6") M (Ft.)
100 MM (4 Inch)	114.3 (4.50)	110.74 (4.36)	1.78 (0.070)	9.1 (30)

DESIGN NOTES:

1. WEIGHT OF 100 MM (4") IPS DIAMETER FIBERGLASS CONDUIT/DUCT = 1.19 KG/M (0.80 LBS/FT).
2. STEEL SUPPORT MEMBERS AND STEEL PIPE: REFER TO APPROPRIATE DESIGN MANUALS AND SPECIFICATIONS AS DESIGNATED BY THE GOVERNING AGENCY.
3. FIBERGLASS DUCTS TO BE 100 MM (4") IPS - 114.3 MM (4.5") O.D. x 110.74 MM (4.36") I.D. x 1.78 MM (0.070") WALL - POLISHED BORE 9.14 M (30 FT.) LENGTHS WITH THREADED MALE AND FEMALE ENDS WITH 13.34 KN (3000 LBS.) UNBONDED PULLOUT STRENGTH.
4. SELECT CONDUIT LENGTHS SO THAT COUPLING LOCATIONS DO NOT COINCIDE WITH SUPPORT LOCATIONS.
5. THE NUT ON ALL HANGER BOLTS ARE TO BE TIGHTENED FOR A SNUG ASSEMBLY ONLY AND LOCKED.
6. SUBJECT TO DESIGN THE MAXIMUM DISTANCE BETWEEN GASKETED EXPANSION JOINTS CAN BE UP TO 91.4 M (300 FT.)
7. THE EXPANSION JOINTS ARE TO BE SET ACCORDING TO THE AMBIENT TEMPERATURE AT TIME OF INSTALLATION AS PER GAUGE ON EXPANSION JOINT.
8. FOR DIMENSIONS AND PROPERTIES OF DUCT, REFER TO TABLE 1.
9. ALL ATTACHMENT RODS, NUTS, LOCK AND FLAT WASHERS UTILIZED IN THE DUCT HANGERS ARE TO BE ZINC PLATED UNLESS OTHERWISE SPECIFIED.
10. WHEN CEMENTING FIBERGLASS TO FIBERGLASS, A FIBERGLASS ADHESIVE SHALL BE USED.
11. ONE DUCT EXPANSION JOINT TO BE PROVIDED BETWEEN ANCHOR POINTS.
12. EVERY BRIDGE REQUIRES AT LEAST 1 DUCT EXPANSION JOINT.
13. SPECIAL DUCT EXPANSION JOINTS AT THE BRIDGE EXPANSION JOINTS MAY BE REQUIRED.
14. DO NOT LOCATE DUCT EXPANSION JOINTS WITHIN DRIP ZONE OF BRIDGE EXPANSION JOINTS.
15. THIS DRAWING IS FOR A TYPICAL BRIDGE. SINCE BRIDGE DESIGNS VARY, CONTACT BELL ATLANTIC - N.J. FOR DESIGN APPROVAL ON EACH JOB. 908-390-9982, 83, OR 84. (908 CHANGES TO 732 AFTER 06-01-97)



SUGGESTED DUCT FORMATION

THIS SHEET FOR DESIGN INFORMATION ONLY. NOT TO BE INCLUDED IN CONTRACT PLATES

PLATE 2.7 - 3

DATE	REVISION	BY	DATE
A	REMOVE COPYRIGHT 1996	VV	12-18-96

BELL ATLANTIC - NJ STANDARD

TYPICAL INSTALLATION OF 100 MM (4") I.P.S. FIBERGLASS DUCTS ON BRIDGES

JOB NO: 9652

OWNER: BELL ATLANTIC - NJ

JOHN S. DEERKOSKI, P.E. AND ASSOCIATES
WARWICK, NEW YORK

CHECKED BY:	A.E.	DATE	11-26-96
DRAWN BY:	V.V.	DATE	11-19-96
DRAWING NO. 9652-1		SH	OF