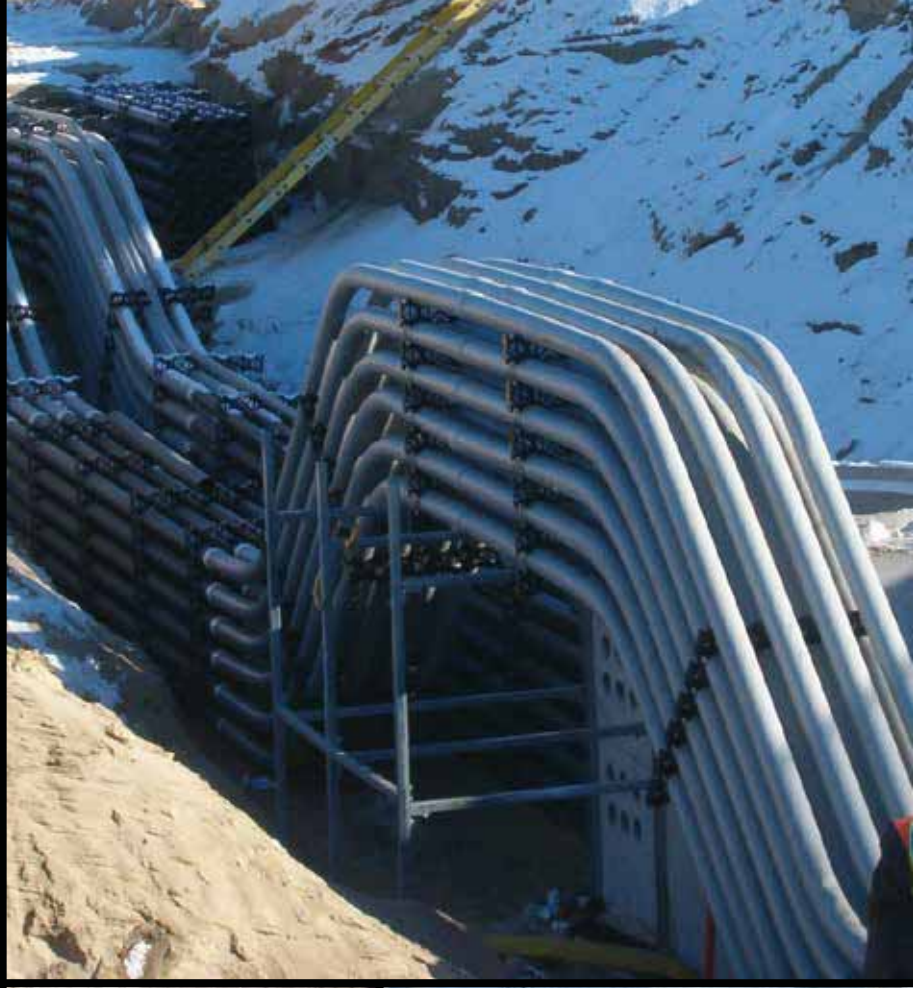
POWER & COMMUNICATIONS DUCT



ELECTRICAL SYSTEMS

SUPER DUCT®

POWER AND COMMUNICATIONS DUCT

- Light Weight
- Long Lengths with Bell Ends
- Flexible

IPEX by aliaxis

We build tough products for tough environments®

THE PREMIER DUCTING in the market

The premier ducting product on the market, IPEX Super Duct® is specifically engineered and quality manufactured to deliver the high-impact and crush strength demanded by today's utility companies, for underground ducting applications.

Made from a specially formulated compound, Super Duct can withstand high physical loads, while providing the natural flexibility for field bending to accommodate minor changes in elevation or direction. And Super Duct's smooth bore makes cable pulling easier.

Available in trade sizes from 2" to 6" and supplied in 10' or 20' lengths, Super Duct is bell ended for easy assembly in the field using IPEX solvent cement or polyethylene push-fit couplings. Super Duct conforms to the requirements of CSA Standard C22.2 No. 211.1 for encasement in concrete and direct burial.

SUPER DUCT DIMENSIONS

Dimension		Minimum ID		Nominal Wall		Average OD	
in	mm	in	mm	in	mm	in	mm
2	50	2.001	50.83	.082	2.08	2.250	57.15
3	75	3.000	76.20	.097	2.46	3.250	82.55
3-1/2	90	3.480	88.39	.109	2.77	3.730	94.74
4	100	3.941	100.10	.120	3.05	4.216	107.09
5	125	4.974	126.34	.153	3.89	5.299	134.60
6	150	5.896	149.76	.180	4.57	6.275	159.39

NS DUCT

MARKETS

- UTILITIES
- COMMUNICATIONS
- TELECOM
- CABLE
- HOSPITALS / MEDICAL COMPLEXES
- COMMERCIAL BUILDINGS

ADVANTAGES

LIGHT WEIGHT

Super Duct is easy to carry and install, reducing labour requirements and costs.

LONG LENGTHS

Super Duct is available in 10' (3m) and 20' (6.1m) lengths, minimizing the number of connections needed.

BELL ENDS

Super Duct is bell-ended, allowing for easy assembly in the field.

HIGH COMPRESSIVE STRENGTH

Super Duct's specially formulated compound is designed to withstand high loads.

LOW COEFFICIENT OF FRICTION

The smooth bore of Super Duct facilitates cable pulling and eliminates costly cable damage.

QUALITY CONTROL

Stringent, continuous testing ensures that Super Duct is a consistently high quality product.

FIELD BENDING

The natural flexibility of IPEX Super Duct allows field bending, to accommodate minor changes in elevation or direction.

SUPER DUCT PIPE

CSA Type II – 10' Length Belled

Dimension (in)	Product Code	Product Code B.C.	Ft/Crate	Weight/ 100' (lbs)
2	008220	*008225	2,460	33.7
3	008230	*008233	1,120	61.2
3-1/2	008235	*008235	810	77.3
4	008240	*008244	630	99.2
5	008250	*008253	430	159.6
6	008260	*008263	280	226.6

*Product Codes are for B.C. only.

CSA Type II – 20' Length Belled

2	008221	*008226	4,920	33.7
3	008231	*008234	2,240	61.2
3-1/2	008236	*008236	1,620	77.3
4	008241	*008245	1,260	99.2
5	008251	*008254	860	159.6
6	008261	*008264	560	226.6

*Product Codes are for B.C. only.

CSA Type II – Split Duct

Dimension (in)	Product Code	Ft/Crate	Weight/100' (lbs)
2	008222	2,460	33.7
3	008232	1,120	61.2
3-1/2	008237	810	77.3
4	008242	630	99.2
5	008252	430	159.6
6	008262	280	226.6

SUPER DUCT FITTINGS

90° Long Sweep Bend

Size (inches)	Part Number	Product Code	Product Code Prairies
2 x 24 R	902024	029091	*129091
2 x 36 R	902036	029092	*129092
2 x 60 R	902060	029036	*129036
3 x 24 R	903024	029055	*129055
3 x 36 R	903036	029093	*129093
3 x 60 R	903060	029134	*129134
3-1/2 x 24 R	903524	029123	*129123
3-1/2 x 36 R	903536	029094	*129094
3-1/2 x 60 R	903560	029135	*129135
4 x 24 R	904024	029047	*129047
4 x 36 R	904036	029095	*129095
4 x 60 R	904060	029096	*129096
5 x 42 R	905042	029097	*129097
5 x 60 R	905060	029037	*129037
6 x 60 R	906060	029098	*129098

*Product Codes are for the Prairie Provinces only.

45° Long Sweep Bend

2 x 24 R	452024	029111	*129111
2 x 36 R	452036	029112	*129112
3 x 24 R	453024	029082	*129082
3 x 36 R	453036	029113	*129113
3-1/2 x 36 R	453536	029114	*129114
4 x 24 R	454024	029128	*129128
4 x 36 R	454036	029115	*129115
4 x 60 R	454060	029116	*129116
5 x 42 R	455042	029117	*129117
6 x 60 R	456060	029118	*129118

*Product Codes are for the Prairie Provinces only.

22 1/2° Long Sweep Bend

3 x 36 R	223036	029085	*129085
4 x 36 R	224036	029204	*129204
5 x 42 R	225042	029249	*129249

*Product Codes are for the Prairie Provinces only.

Note: Special radius bends are available upon request.

SUPER DUCT FITTINGS

PVC Coupling - Solvent Weld

Size (inches)	Part Number	Product Code
2	SWC020	029001
2 (long)	SWC020L	029009
3	SWC030	029002
3-1/2	SWC035	029003
4	SWC040	029004
5	SWC050	029005
6	SWC060	029006

Polyethylene Coupling – Push Fit*

2	PFC020	029011
3	PFC030	029012
3-1/2	PFC035	029013
4	PFC040	029014
5	PFC050	029015
6	PFC060	029016

* Suitable for concrete-encased applications only

PVC 5° Coupling – Solvent Weld

2	5ACS20	029041
3	5ACS30	029042
3-1/2	5ACS35	029043
4	5ACS40	029044
5	5ACS50	029045
6	5ACS60	029046

Polyethylene 5° Coupling – Push Fit*

2	SAPF20	029020
3	5APF30	029030
3-1/2	5APF35	029502
4	5APF40	029998
5	5APF50	029050

* Suitable for concrete-encased applications only

Reducer Coupling – Solvent Weld

3 x 2	RC3020	029021
3-1/2 x 2	RC3520	029039
3-1/2 x 3	RC3530	029022
4 x 2	RC4020	029023
4 x 3	RC4030	029024
4 x 3-1/2	RC4035	029025
5 x 4	RC5040	029026
6 x 4	RC6040	029027

SUPER DUCT FITTINGS

Split Wye – Solvent Weld

Size (inches)	Part Number	Product Code
2	SPLY20	029051
3	SPLY30	029052
3-1/2	SPLY35	029053
4	SPLY40	029054

PVC Bell Ends

2	BELL20	029061
3	BELL30	029062
3-1/2	BELL35	029063
4	BELL40	029064
5	BELL50	029065
6	BELL60	029066

Terminator with Knock-Out Plugs

3	TERM30	029826
3 1/2	TERM35	029523
4 (with holes)	TERM40H	029822
4 (no holes)	TERM40W	029827

Cap – Solvent Weld

2	SWCA20	029071
3	SWCA30	029072
3-1/2	SWCA35	029073
4	SWCA40	029074
5	SWCA50	029075
6	SWCA60	029076

Expansion Joint

2	EXPJ20	029151
3	EXPJ30	029152
3-1/2	EXPJ35	029153
4	EXPJ40	029154

Tapered Plug

2	PLUG20	029131
3	PLUG30	029132
3-1/2	PLUG35	029133
4	PLUG40	029078
5	PLUG50	029079
6	PLUG60	029136

SUPER DUCT FITTINGS

Universal Pipe Plug

Size (inches)	Part Number	Product Code
2 & 2-1/2	UPP35	029386
3 & 3-1/2	UPP45	029387
4	UPP55	029388
5	UPP60	029389
6	UPP65	029390

Female Adapter

2	FEMA20	029141
3	FEMA30	029142
3-1/2	FEMA35	029143
4	FEMA40	029144
5	FEMA50	029145
6	FEMA60	029146

Reducing Adapter Coupling – Duct to PVC Conduit

3 x 2	ARIG3020	029191
4 x 2	ARIG4020	029192
4 x 3	ARIG4030	029187

PVC Adapter Coupling – Asbestos Cement or Bituminous Fibre

3-1/2	ACFB35	029163
4	ACFB40	029164

Conduit to Duct Adapter

2	ARIG20	029181
2 (long)	ARIG20L	029188
3	ARIG30	029182
3-1/2	ARIG35	029183
4	ARIG40	029184
5	ARIG50	029185
6	ARIG60	029186

Note: Duct to RTRC Conduit Adapters are available on request.

SUGGESTED SPECIFICATIONS

Product

Duct shall be IPEX Super Duct or approved equal. Duct, fittings, Monobloc spacers and solvent cement shall be provided by the same manufacturer to assure system integrity.

The duct is to be secured mechanically with IPEX Monobloc or vertical lock spacers to prevent disturbance to the alignment during installation.

Identification

Duct shall be identified for type and manufacturer and shall be traceable to plant location, date, shift and machine of manufacture. The markings shall be legible and permanent.

Material

Duct for use in underground, encased or direct burial applications shall be made from PVC compound that includes inert modifiers to give high modulus of elasticity, improved weatherability and deflection characteristics.

Standards

Type DB-2 Super Duct and Solvent Cement Fittings as manufactured by IPEX Inc. shall be used for direct burial and/or concrete encased applications. The duct and fittings must be certified to CSA Standard C22.2 No. 211.1 and be installed in accordance with the Canadian Electrical Code Part 1, Rule 12-1150 through 12-1166. Polyethylene push-fit couplings are only to be used in concrete-encased application.

% DEFLECTION OF IPEX SUPER DUCT IN DIRECT BURY APPLICATIONS SUBJECTED TO CAN/CSA S6-06 MAX. WHEEL LOAD OF 87.5 KN

Embedment Material	Density	Dia. (in)	Cover in Feet								
			2	3	4	5	6	7	8	9	10
Crushed Stone Class I	90% E′ = 3,000 psi	2	0.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		3	0.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		3.5	0.8	0.5	0.4	0.4		0.4	0.4	0.4	0.4
		4	0.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		5	0.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
		6	0.8	0.5	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Crushed Stone with Fines Class II	90% E′ = 2,000 psi	2	1.1	0.7	0.6	0.6	0.6	0.6	0.6	0.5	0.6
		3	1.1	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		3.5	1.1	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		4	1.1	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		5	1.1	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6
		6	1.1	0.8	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Sand and Gravel Class II	80% E′ = 1,000 psi	2	2	1.3	1.1	1	1	1	1.1	1	1.1
		3	2.2	1.5	1.2	1.1	1.1	1.1	1.2	1.1	1.2
		3.5	2.2	1.5	1.2	1.1	1.1	1.1	1.2	1.1	1.2
		4	2.2	1.5	1.2	1.1	1.1	1.1	1.2	1.1	1.2
		5	2.2	1.5	1.2	1.1	1.1	1.1	1.2	1.1	1.2
		6	2.2	1.5	1.2	1.1	1.1	1.1	1.2	1.1	1.2
Sand and Gravel with Fines Class III	85% E′ = 500 psi	2	3.3	2.2	1.8	1.7	1.7	1.7	1.8	1.6	1.8
		3	3.9	2.7	2.2	2	2	2	2.2	2	2.2
		3.5	3.9	2.7	2.2	2	2	2	2.2	2	2.2
		4	4	2.7	2.2	2	2	2	2.2	2	2.2
		5	4	2.7	2.2	2	2	2	2.2	2	2.2
		6	4	2.7	2.2	2	2	2	2.2	2	2.2
Silt and Clay Class IV	85% E′ = 400 psi	2	3.8	2.6	2.1	1.9	1.9	1.9	2.1	1.9	2.1
		3	4.7	3.2	2.6	2.4	2.4	2.4	2.6	2.3	2.6
		3.5	4.7	3.2	2.6	2.4	2.4	2.4	2.6	2.4	2.6
		4	4.8	3.2	2.7	2.5	2.5	2.5	2.7	2.4	2.7
		5	4.8	3.2	2.7	2.5	2.5	2.5	2.7	2.4	2.7
		6	4.8	3.2	2.7	2.5	2.5	2.5	2.7	2.4	2.7

SUPER DUCT (TYPE DB-2)

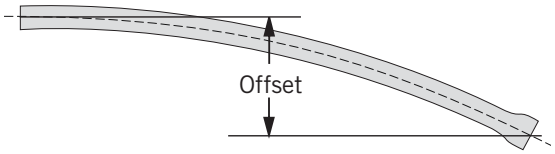
Description	CSA Requirements	Reference
Pipe Stiffness @ 5%	43.5 psi (300 kPa)	CSA C22.2 No. 211.1
Crush Resistance	198 lbs. @ 73°F (90 kg @ 23°C) 10% max. residual deflection	CSA C22.2 No. 211.1
Impact Resistance	45 ft. lbf @ 73°F (61J @ 23°C) 25 ft. lbf @ 0°F (34J @ -18°C)	CSA C22.2 No. 211.1
Residual Stress	149°F (65°C) for 4 hours. Allow to cool to 73°F (23°C). 0.5% shrinkage allowed.	CSA C22.2 No. 211.1
Joint Tightness	5 psi (35 kPa) internal water pressure applied for 24 hours.	CSA C22.2 No. 211.1

Note: Super Duct meets or exceeds all CSA requirements.

FIELD BENDING

Field bending can accommodate minor changes in elevation or direction without the use of special sweeps or fittings. The following table indicates typical maximum offset bends that can be achieved by cold bending.

ALLOWABLE OFFSET FOR SUPER DUCT



Size		Max Allowable Offset 10′ Length		Max Allowable Offset 20′ Length	
in.	mm	in.	mm	in.	mm
2	50	20	508	79	2 007
3	75	14	356	56	1 422
3-1/2	90	12	305	49	1 245
4	100	11	279	43	1 092
5	125	7	178	35	889
6	150	7	178	29	737

NOTES:
1. Axial deflection should not be attempted at the joints.
2. The above values were established for ambient temperatures above the freezing point. Increased radii may be desirable at below-freezing temperatures.

BENDS

Standard 90°, 45° and 22 1/2° bends are available from sizes 2" through to 6" in 24", 36", 42" and 60" radius. All bends are supplied with 6" (15.2cm) tangents. The centre line lay length (L) can be calculated using;

$$L = \left(\pi r \times \frac{\S}{180}\right) + 2 \text{ (tangent)}$$

Where: π = 3.14

L = centre line lay length

r = radius of bend

§ = angle of bend

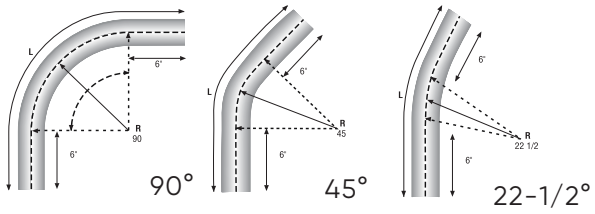
tangent = 6"

Example: for a 3" 90° bend with a 36" radius - calculate the lay length:

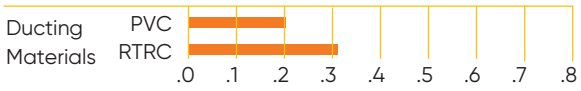
$$L = \left(3.14 \times 36 \times \frac{90°}{180°}\right) + 2\,(6)$$

$$L = 69 \text{ inches}$$

$$L \text{ (metres)} = \frac{L \text{ imperial}}{12 \times 3.281} = \frac{69"}{39.37} = 1.75\text{m}$$



STATIC FRICTION COEFFICIENT



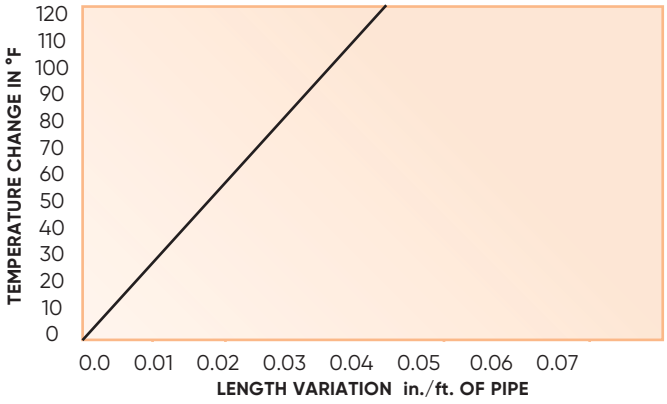
EXPANSION AND CONTRACTION

The following precautions should be exercised when extreme temperature variations are anticipated during the installation of IPEX Super Duct.

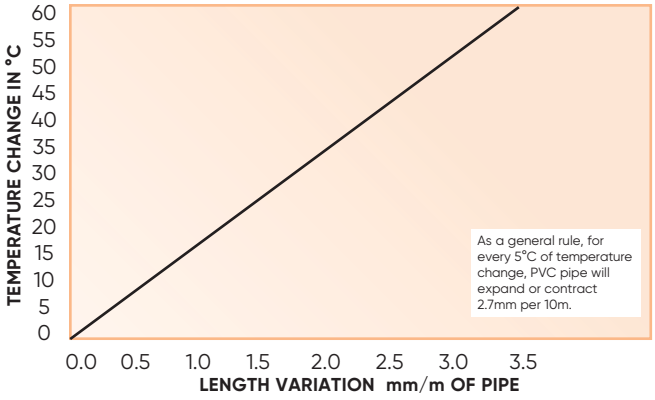
1. Allow extra duct footage at each tie-in for contraction when duct temperature is higher than soil temperature. Allow extra room for expansion if reverse condition exists.
2. Backfill from tie-in point toward end of duct run.

The coefficient of thermal expansion of IPEX Super Duct is 3 x 10^{-5} in./in./°F (5.4 x 10^{-5} mm/mm/°C). These charts show the expansion that can be expected at various temperature ranges for unburied (unrestrained) duct.

PVC Pipe Length Variation due to Temperature Change (°F) Coefficient = 3.6 x 10-4 in./ft./°F



PVC Pipe Length Variation due to Temperature Change (°C) Coefficient = .054 x 10-5 mm/m/°C



INSTALLATION

1 CONCRETE ENCASED DUCT INSTALLATION

For multipurpose power cable and communication duct banks, spacing between ducts is critical for optimum performance. IPEX has designed the Monobloc and Vertical Lok Spacer systems to accommodate all specification and field installations.

These light weight spacers provide the vertical and horizontal separation required in a trench.

With spacers in place on the trench bottom, lay the first tier of ducts. When using a concrete base, lay the bottom tier before the base has taken initial set. Place subsequent tiers of spacers on top of the tier until the required number of ducts are installed. Then tie the entire assembly together. It is not necessary to weight or brace the bank unless the concrete mix is very wet.

THE CONCRETE POUR

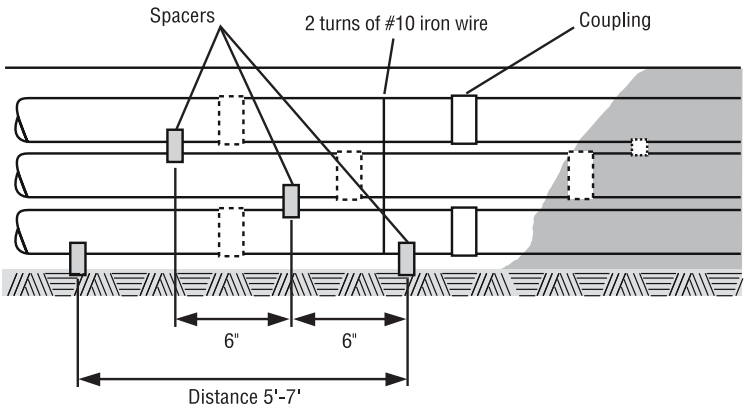
Do not allow a heavy mass of concrete to fall directly onto the duct. If this is a possibility, use a plank to direct the concrete down the sides of the bank assembly to the trench bottom. The concrete will flow to the centre of the bank and rise up in the middle, uniformly filling all open spaces. Voids can be eliminated by carefully working a long, flat slicing bar or spatula up and down between the vertical rows of ducts. Concrete should then flow between and under all of the ducts.

DUCT BANK ELEVATION

Monobloc spacers should be staggered. It is recommended that spacers be located approximately one-fifth of duct length from each end. Vertical Lok spacers should be located to a maximum of every 5.5 ft. (1.7m).

BACKFILLING

Backfill with regular excavated soil after the concrete has set.



2 CONCRETE ENCASED TIER-BY-TIER INSTALLATION

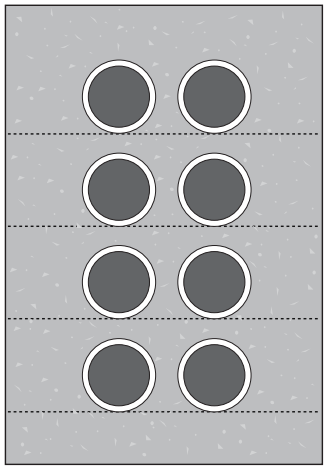
The advantage of this method is the production of a solid, void-free concrete envelope. Simply pour each tier independently.

TRENCH BOTTOM

After grading the trench, place a foundation of 3" of concrete on the bottom. It should be smooth and graded.

BANK ASSEMBLY

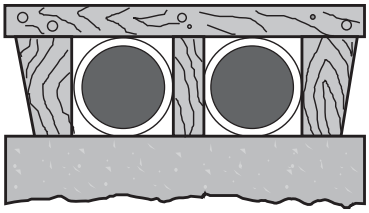
Lay the bottom tier of ducts on the concrete base. Ducts should be spaced with wooden combs (two per duct length). Concrete the first tier level to the top of the comb. Remove combs and fill the voids. Light tamping will ensure an even surface. Repeat this sequence until the bank is built up.



Cross-section of tier-by-tier method.

CONCRETING

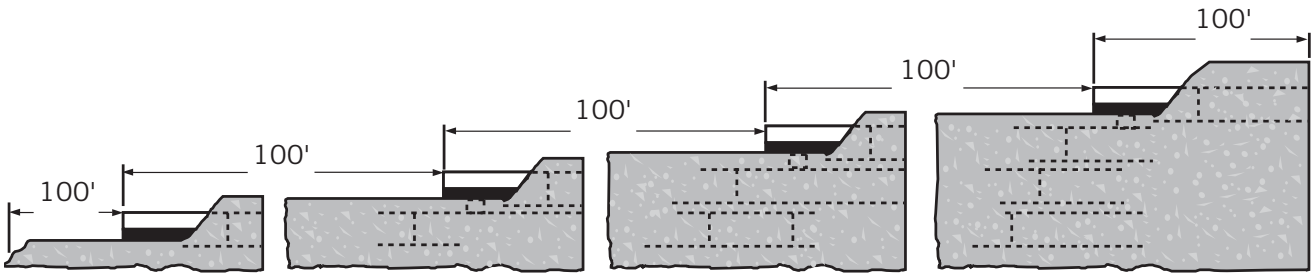
If the concrete is allowed to set before assembling the next tier, the concrete will be stronger and more dense and the ducts will be aligned straighter. One problem with this method is that the bank will be in a series of layers and therefore more likely to heave and separate under frost conditions. If successive tiers are laid before the concrete has set, a satisfactory bond will be achieved by tamping the dry concrete.



Type of wood comb used.

BACKFILLING

Backfill with regular excavated soil when the bank is complete.



Duct is usually laid in 100' sections once the trench is excavated. Therefore, concreting can be a continuous process.

3 DIRECT BURIAL INSTALLATION

TRENCH BOTTOM

The trench bottom should provide a continuous, firm and uniform support for the duct bank construction. Care should be taken to avoid lumps, ridges, depressions and stones causing "point" contacts or uneven bearing.

ROCK OR SHALE

Excavate 3" below the desired depth and bring the trench back to grade with selected tamped soil. This will provide the duct with a uniform bedding surface.

UNSTABLE SOILS

Tests should be conducted to establish the soil strength in marshy or swampy areas. It may be necessary in these conditions to dig deeper and refill with crushed stone or gravel, or to employ mats, timbers or a concrete base.

PLACEMENT OF DUCT

After the first tier of ducts is installed, backfill and compact as outlined below. If wood combs are employed for spacing, remove them as the backfill is placed and tamped. Then begin the next tier.

INITIAL BACKFILLING

1. Fit side and centre to the top of the ducts. Use a hand tamper only to tamp firmly.
2. Backfill over the duct to the required thickness (see note) and tamp firmly, using only a hand tamper.

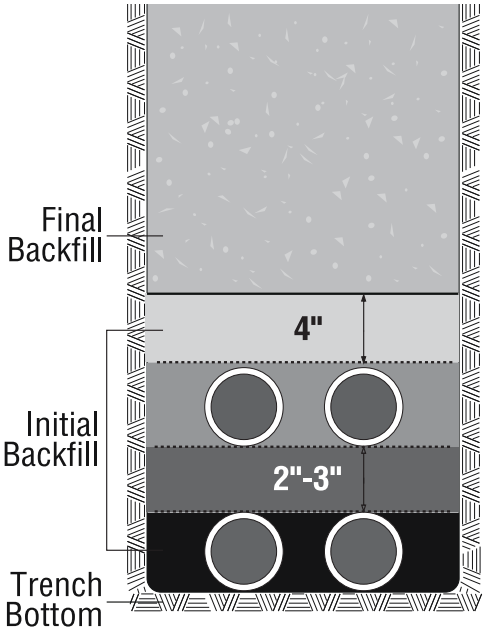
FINAL BACKFILLING

When the last tier is placed, hand-place the backfill to 4" over the duct with soil that does not contain stones larger than 3/8". Hand-tamping of this layer is optional, depending on the specifications.

From this point, backfill may be completed by hand or by pneumatic tamping in layers from 4" to 12" depending on the degree of compaction desired.

When placing backfill by machine, avoid the use of large rocks until a protective layer (minimum of 12") is established.

Note: In direct burial, no spacer should be used with Type 2; spacers provide "point" support instead of the continuous bed required. Backfill thickness between ducts is usually 2" to 3".



SOLVENT CEMENTING

After cutting IPEX Super Duct, sharp edges or burrs from inside the duct should be removed with a knife. Thoroughly clean the end of the pipe and inside the fitting with IPEX pipe cleaner. Apply a generous amount of solvent cement to both surfaces; slide together and give a quarter turn to ensure solvent is spread evenly on the material. Hold together for a few seconds until the joint is made.

Super Duct Size		# of Joints per Litre (2 gal)
in	mm	
2	50	80
3	75	60
3-1/2	90	50
4	100	40
5	125	16
6	150	14

POLYETHYLENE PUSH-FIT COUPLINGS

These couplings make it easy to rapidly assemble cut lengths of concrete-encased Super Duct. Push the spigot end of the duct into the fitting socket and hammer lightly against a piece of wood located at the end of the coupling or pipe until end of duct butts up against the inside shoulder of the fitting. Push-fit couplings are not watertight and are only recommended for use when encased in concrete.

SPLIT DUCT

IPEX Split Duct is the simple solution to installing duct around existing cables, and repairing existing duct without costly cutting and re-splicing of cables.

SALES AND CUSTOMER SERVICE

Customers call IPEX Electrical Inc.
Toll free: (866) 473-9462
www.ipexna.com

About the IPEX Group of Companies

As leading suppliers of thermoplastic piping systems, the IPEX Group of Companies provides our customers with some of the largest and most comprehensive product lines. All IPEX products are backed by more than 50 years of experience. With state-of-the-art manufacturing facilities and distribution centers across North America, we have earned a reputation for product innovation, quality, end-user focus and performance.

Markets served by IPEX group products are:

- Electrical systems
- Telecommunications and utility piping systems
- PVC, CPVC, PP, PVDF, PE, ABS, and PEX pipe and fittings
- Industrial process piping systems
- Municipal pressure and gravity piping systems
- Plumbing and mechanical piping systems
- Electrofusion systems for gas and water
- Industrial, plumbing and electrical cements
- Irrigation systems

Product is manufactured by IPEX Electrical Inc.

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