Standard Specification for ESB MV/LV Networks Ducting (Minimum Standards)

Note 1: ESB Networks reserves the right not to accept ducting which does not conform to these standards and dimensions
Note 2: Refer to ESB Networks for Specific Job Specification. These instructions do not apply to 38kV/110kV/220kV cable
Note 3: All materials (ducts, marker tapes/straps, duct surrounds, mandrels and brushes) must be ESB approved materials

1 MINIMUM depths below finished ground level

Depth is measured to top of duct
Max depth is 1m except at:
- service crossings where 1.5m is allowed
- short rail and road crossings where up to 2.5m is allowed

2A Minimum Standard Clearances to Other Services

- 300mm Clearance to Normal Services
- 600mm Clearance to: Large Pipelines High Pressure Pipes

To achieve these clearances see sections 3D and 3E below
Clearances less than the above at pinch points and crossings requires placement of additional mechanical protection (concrete slab/brick) and agreement of ESB
ESB ducts must never be laid over other services on parallel runs, except with the written prior agreement of the other utilities and ESB
Other Services must never be laid directly over ESB ducts on parallel runs

2B Trench Installation Sequence

Warning
Always agree trench route with ESB before excavation commences.
Unsuitable, insecure & poor access routes will not be acceptable to ESB.

Example of Unacceptable Routes

1. Roadway
2. Barren Roadway
3. Existing Services
4. Trees
5. Sensitive Areas

1. Lay & compact a layer of approved backfill to at least 2000/250mm above ground level
2. Install ESB approved red marker MM on top of approved compacted backfill
3. Lay in & compact a bedding layer of approved material to a minimum thickness of 50mm or as otherwise specified
4. Lay ducts and horizontal spacer on 50mm bedding layer, maintaining specified clearances
5. For multiple circuits ensure ducts are spaced as per section 3 below with a min. of 150mm duct spacing

3A Minimum Duct Spacings for ESB Ducts

- 75mm minimum duct spacing for up to two ducts in any layer
- Duct crossovers not allowed at any point along route.

3B Minimum Duct Spacings for ESB Ducts

- 150mm duct spacing required for more than 2 ducts in any layer
- Duct crossovers not allowed at any point along route.
9. Guidance on Correct Direction to Lay Spigot and Socket Ducting

Case 1: Duct run with all bends at one end
- Correct direction as cable duct will be located at bendy end

Case 2 (a): Bendy no matter which side route is looked at
- No laid direction to lay ducts

Case 2 (b): More bends at one end than the other
- Correct direction

Case 3: Trenching routes longer than 500m
- Joint Bay
- Treat any route as a series of lengths between joint bays at say 500m intervals and lay ducting as for Case 1 & 2 above
- If on large sloping route lay as shown

10. Approved ESB Ducting for MV/LV Cables
- Use only solid wall high impact resistance ESB approved PVC red ducting to IS 370 colour standard and ESB specification 16113 (3.8mm minimum wall thickness)
- Discoloured or unidentified ducting not acceptable. All duct material must be approved by ESB Networks.
- Lightweight flexible corrugated twinwall ducting is not acceptable to ESB irrespective of manufacturer.
- Current approved Duct and duct bend manufacturers are: Lypoplast (bend fittings only)
  Radius Systems, Wavin, Quality Plastics, MFP Plastics, Cork Plastics, Emtele

11. Specification for Duct Jointing for MV/LV Cables
- Mallet or hammer
- Timber block to protect end of duct from damage
- Fully jointed Duct Marks

All ducts to be securely jointed by tapping against timber board on each duct until the black depth insertion mark is reached

12. Repair of Existing Ducts
- Use only approved slip couplers from approved manufacturers in section 9

Damaged Duct Section
- Slip Coupler
- Cut out damaged section of duct and ensure all cut surfaces are square and free from sharp edges
- Slide, position and centre the repair couplers on the centering marks

13. Sealing of Ducts
- All ducts to be permanently sealed at both ends of duct run
- Ducts to be temporarily sealed during installation using endcaps provided with each bale

Endcap Plain End
- ESB Code 125mm: 0917583
- ESB Code 160mm: 0917566

14A. Cross-Sectional Drawing of Backfilling in Front of MV Substation
- Prefilled Earth mat
- SAFETY WARNING!!
- Earths are an essential safety system. Connection will not be made available until they are installed.

14B. Plan View of Ducting in Front of Substation
- Transformer
- 300mm Minimum
- 150mm Maximum
- 100mm - 3x ducts
- 50mm - 2x ducts
- 3.5m Minimum
- 1.5m Minimum
- 5m Opening Length
- New pipe/Sewer

17A. Supporting ESB Cables/Ducts During Trenching Works
- Stability beam to support exposed cable
- Secure beam with pegs or short pins
- Shore temporary trench against falling in on top of cable and damming prior to placing it
- Support cable with plastic rings or webbing to prevent sagging from the weight. Do not cover tension for long periods
- Overlap the cable with red clay pipes and cables to provide identification and provide improved resistance
- 0.3m minimum standard clearance or 100mm minimum but can be reduced in ESB manual

17B. Supporting ESB Cables/Ducts During Trenching Works
- Key in timber plank (150mm x 50mm)
- Firmly into trench wall above ESB cable to protect it from falling debris/accidental contact etc
- Remove plank prior to backfilling/reinstatement
- 0.3m minimum standard clearance or 100mm minimum but use protection as in Table 7 of ESB manual
- New pipe/Sewer

18. Avoidance of Cable Damage Due to Improper Backfilling at Cable Crossings
- Trench AFTER improper backfilling and Ramming
- Excessive deflection resulting in a shearing action at the trench walls and risk of cable or duct failure later
- Trench AFTER correct backfilling and Ramming
- Layers all round the cable to be hand tamped
- Cable to be well supported by firm bed of sand beneath the cable. No compaction machinery directly over cables for 300mm minimum distance
- Fiout - Very little cable deflection and shearing at edges of trench

See pg. 213 of MV/LV Manual
See pg. 212 of MV/LV Manual
See pg. 42 of MV/LV Manual
See pg. 44 of LV/MV Manual
**MV/LV Trench Dimensions & Duct Clearances for 125mm Ducting Layouts**

**Minimum Trench Widths for 1 & 2 Rows of Ducts**

<table>
<thead>
<tr>
<th>No. of Ducts</th>
<th>Minimum Trench Width</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>325</td>
</tr>
<tr>
<td>2</td>
<td>525</td>
</tr>
<tr>
<td>3</td>
<td>875</td>
</tr>
<tr>
<td>4</td>
<td>1150</td>
</tr>
<tr>
<td>5</td>
<td>1425</td>
</tr>
<tr>
<td>6</td>
<td>1700</td>
</tr>
</tbody>
</table>

**Minimum Trench & Duct Depths for 1 Horizontal Row of Ducts**

<table>
<thead>
<tr>
<th>Location of Trench</th>
<th>New Housing</th>
<th>Existing Wires 1 &amp; 2</th>
<th>Existing Open Ducts</th>
<th>Existing Ducts</th>
<th>Other Noted Ducts</th>
<th>Focused Field</th>
<th>600</th>
<th>750</th>
<th>900</th>
<th>1200</th>
<th>1500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Trench</td>
<td>775</td>
<td>625</td>
<td>925</td>
<td>925</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Depth of Duct</td>
<td>600</td>
<td>450</td>
<td>750</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Minimum Trench & Duct Depths for 2 Horizontal Rows of Ducts**

<table>
<thead>
<tr>
<th>Location of Trench</th>
<th>New Housing</th>
<th>Existing Wires 1 &amp; 2</th>
<th>Existing Open Ducts</th>
<th>Existing Ducts</th>
<th>Other Noted Ducts</th>
<th>Focused Field</th>
<th>875</th>
<th>1125</th>
<th>1125</th>
<th>1200</th>
<th>1200</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum Trench</td>
<td>1050</td>
<td>900</td>
<td>1200</td>
<td>1200</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Depth of Duct</td>
<td>600</td>
<td>450</td>
<td>750</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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**20A Bridge Crossings: Restricted Footpath Designs**

1. The design must be agreed with the bridge authority. Position in footpath is preferred.
2. Minimum cover over ducts on footpath 100mm.
3. Where duct cover is > 300mm, marker strip & surface marker plates can be used.
4. Red uPVC ducting is not suitable for cable run external to bridges.
5. Where possible galvanised steel/stainless steel piping should be used, all joints must be free of weld burns on inside. Alternatively heavy duty 10mm wall thickness black HDPE material with cast steel marker plates attached must be used to permanently warn of presence of electric cable.

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**21A River/Stream Crossings: Standard Where Burial/Drilling is possible**

1. Install on base of river or stream to be agreed with relevant authority if applicable
2. Heavy wall steel pipe to be used free of weld beads/flash. Minimum wall steel thickness to be used. Excor in CIWEM (7H 3 7) (7 mm) for corrosion protection, minimum 100mm surround.
3. Install an ESB marker post on both sides of the crossing - ESB code ES037555 or use stb pole minimum 2m above ground level & warning sign ED132139
4. Ensure a smooth connection using rubber coupling between crossing pipe size and ESB standard duct as the steel pipe size will usually differ from the standard ESB ducting. Alternatively run ESB ducting right through the steel pipe.
5. If crossing a tidal area, a forewarning licence will be required.

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**22A Minimum Standard Over Basements/Carparks**

Minimum depth of duct is 400mm.

Minimum thickness from bottom of duct to underside of slab is 200mm.

ESB surface marker plates are to be placed at approximate intervals of 3 metres on the top and bottom surfaces of the slab.

Marker plates are to be cast level with the surface and screwed down to to avoid lift off (ESB code: 3227172)

For ESB Ducts concrete surround - same strength for entire slab
MV/LV Trench Dimensions & Duct Clearances for 160mm Ducting

Minimum Trench Widths for 1 & 2 Rows of Ducts

<table>
<thead>
<tr>
<th>No. of Ducts</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth (mm)</td>
<td>360</td>
<td>595</td>
<td>980</td>
<td>1290</td>
<td>1600</td>
<td>1910</td>
</tr>
</tbody>
</table>

Minimum Trench & Duct Depths for Horizontal Row of Ducts

<table>
<thead>
<tr>
<th>Depth of Trench (mm)</th>
<th>810</th>
<th>660</th>
<th>960</th>
<th>960</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth of Duct (mm)</td>
<td>450</td>
<td>750</td>
<td>750</td>
<td>750</td>
</tr>
</tbody>
</table>

Minimum Trench & Duct Depths for 2 Horizontal Rows of Ducts

<table>
<thead>
<tr>
<th>Depth of Trench (mm)</th>
<th>1045</th>
<th>895</th>
<th>1195</th>
<th>1195</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depth of Duct (mm)</td>
<td>750</td>
<td>750</td>
<td>1270</td>
<td>1270</td>
</tr>
<tr>
<td>Minimum Depth (mm)</td>
<td>600</td>
<td>450</td>
<td>750</td>
<td>750</td>
</tr>
</tbody>
</table>

MV Cable End Pole Position - Elevation

Offset duct to line up with pole edge to facilitate cable pulling. Never install ducting right up to pole base with long radius bend attached. Both marker strip & warning tape to be used between duct & pole. Take precautions to prevent pole toppling.

MV Cable End Pole Position - Plan View

LV Cable End Pole Position - Plan View

LV Cable End Pole Position - Plan View

LV Ducting for Non Domestic Connections

Duct laid to Mains Cable
**25B**

**LV Ducting for Non Domestic Connections**

Duct laid to Mini Pillar Location

The new duct must only be put into the vault with an ESB Networks person present.

If no vault in front of minipillar, the limit of excavation must be agreed with ESB Networks personnel locally. Temporary and permanent reinstatement to Local Authority Standard.

- If the meter box is external then the cable is to follow:
  - **Route 1**
  - **Route 2**

- **Depth of duct:** 450 for existing footpath
- **600 for footpath being installed**
- **750 for duct in roadway**

**Warning tape** @ max depth of 300mm

External Wall

Internal location option (not >2m from external door, see "National Code of Practice for Customer Interface")

---

**26**

**Specification for Standard Non-Scheme Domestic Underground Service to an Outdoor Meter Cabinet (low-voltage service not exceeding 50m) from an Overhead Network**

**ESB Networks**

The Customer must ensure that:

- The service pole and the complete run of the duct are both within the site boundary. ESB's Engineering Officer will confirm the service pole position and the ducting route on-site.
- An outdoor meter cabinet, to ESB Standard 12-3 (1986), is installed in a suitable location, see overleaf.
- An ESB approved "hockey stick" is installed at the meter cabinet position.
- Red ESB approved 50mm service ducting is installed at a minimum depth of 600mm between the hockey stick position and the service pole. Yellow ESB cable warning tape must be installed at a maximum depth of 300mm below ground level along the full length of the duct.
- Corrugated ducting of any colour is not permitted.
- The duct shall be as straight as possible and free of sharp bends.
- A continuous and strong 10mm polypropylene draw rope is installed in the duct. It must be free of knots and secured at both ends of the duct.

Notes:

1. It is essential that the ESB cable does not come into contact with the cavity insulation. Allow a projection of 25mm of the hockey stick into the base of the cabinet.
2. There must be a minimum clearance of 100mm between the service duct and other services on the householder's property.
3. ESB will provide black UV light-resistant ducting from below the finished ground level to the top of the service pole.
4. For poles more than 5m away from the cabinet, 125mm red ESB approved ducting shall be used with an ESB approved service vault at the junction of the duct and the hockey stick.

Connection will only be made after all above requirements are met.