



GE-TGI-IG-0032

SUBSTATION SPECIFICATION

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1. GENERAL

It is incumbent upon the Constructor to comply with all relevant legislation, including future updates and publications in keeping with good industry practice.

Civil and building fabric in its entirety shall be constructed in accordance with the provisions of current, relevant and applicable, BS EN documents, British Standard Specifications and British Codes of Practice.

The Constructor shall ensure that civil engineering and building contractors engaged to carry out works are competent, qualified and experienced with respect to the nature of electricity substation construction.

Civil and building contractors should hold appropriate membership of the National Federation of Builders, Federation of Master Builders, Civil Engineering Contractors Association or similar professional trade body.

Operatives should hold appropriate Construction Skills Certification Scheme (CSCS) Cards or National Vocational Qualifications (NVQs).

The standard of workmanship shall be in keeping with best industry practices and not less than that specified by BS 8000.

The Constructor shall ensure that civil engineering and building contractors engaged to carry out works under this Specification take all reasonable precautions to ensure the safety of all parties concerned with or affected by operations associated with substation construction works.

The safety or operation of any existing utility plant must not be prejudiced; records of buried services must be obtained from all utilities and safe-digging practices must be adopted, including the use of a cable-locating tool.

The Constructor shall notify GTC prior to commencement of substation construction works.

Substation construction shall be such that no sprinkler systems, gas, water, drainage or other third party service pipes, cables or heating and ventilation ducts or are built within, through or under substations, both existing and proposed.

GTC reserve the right to defer the installation of equipment into built substation enclosures until all building works, except post-commissioning finishing works, are complete and are in accordance with these drawings.

Unless variation has been agreed in writing by GTC prior to construction, a delay in plant installation or energisation could result if works are not in accordance with these drawings:

Standard Substations

- | | | |
|-----------------------------------|--------------------------|-----------------|
| • Close coupled | Side gabled roof detail | GTC-E-SS-0010 |
| • Close coupled | Front gabled roof detail | GTC-E-SS-0011 |
| • Close coupled | Pyramid roof detail | GTC-E-SS-0012 |
| • Close coupled | Pyramid GRP roof detail | GTC-E-SS-0013 * |
| • Close coupled (being developed) | Flat roof detail | GTC-E-SS-0014 * |

Specialised Substations

- | | | |
|-------------------------------------|---------------------------|-----------------|
| • 11kV HV metered intake | Side gabled roof detail | GTC-E-SS-0015 |
| • 11kV HV metered intake | Front gabled roof detail | GTC-E-SS-0016 |
| • 11kV HV metered intake | Pyramid roof detail | GTC-E-SS-0017 |
| • Integral to building arrangements | Foundation detail only | GTC-E-SS-0018 * |
| • 20kV cable connected | One piece GRP roof detail | GTC-E-SS-0008 * |
| • 20kV cable connected | Side gabled roof detail | GTC-E-SS-0009 * |

* (these designs cannot be used unless sanctioned by the Electricity Network Asset Manager or the Electricity Networks Manager.

2. AS-BUILT INFORMATION

As-Built drawings shall be submitted to GTC in an approved electronic format.

Where applicable, Operating Manuals and CDM Health & Safety Files shall be submitted to GTC in an approved electronic format.

3. QUALITY ASSURANCE

All materials shall be of good quality, suitable for purpose, designed and manufactured such that they provide safe and continuous service and are capable of withstanding the various stresses and onerous conditions to which they may be subjected to on the site of installation without suffering any undue deterioration.

GTC shall have the right to inspect any aspect of the construction process. The Constructor shall ensure that all testing results are available for audit inspection by GTC.

This Clause shall not grant any right to the Constructor to vary the requirements of these drawings, nor shall it detract in any way from GTC rights.

4. PRE-ENGINEERING SITE INVESTIGATIONS

The Constructor shall carry out adequate appropriate desktop and site-based studies to provide the information necessary to ensure safe transfer of design loadings to ground and compliance with respect to waste handling and disposal.

Site investigation study records and reports shall be available for audit inspection by GTC, including confirmation that the substation operation would not be adversely affected during 1 in 75 year flood conditions.

The developer will be responsible for obtaining all planning consents and building regulation approvals before construction work commences.

5. SITE LAYOUT / ACCESS

Constructors shall note the requirement for unrestricted 24-hour access for GTC operatives to the substation enclosure; standard Company suited lock(s) must control this.

Constructors shall note that pedestrian safety barriers may be required where the site layout is such that emergency egress from the substation is towards a vehicular traffic route, and that these barriers would be required to be demountable if this were also a plant access route for the substation.

Constructors shall note that vehicular crash barrier protection may be required external to the substation where the site layout is such that there is a risk of impact from vehicular traffic.

6. SETTING OUT

It is essential that substations be set out in accordance with Land Acquisition drawings where the Company have or will subsequently take freehold or leasehold possession of the land on completion.

7. EARTHWORKS

All foundations shall be set on undisturbed inorganic strata that provide the required minimum design safe ground bearing capacity. The design presented on these drawings is based on a safe allowable bearing capacity of 50kN/m². In the event that such a bearing capacity cannot be achieved, the foundations may require piling. It is the constructors' responsibility to design the piling system and submit to GTC for advance approval.

The bottom of excavated areas shall be trimmed, levelled or graded and well rammed or otherwise compacted. The construction sequence shall be such that undue exposure of the formation level to excavations is avoided. Excavations shall be kept free from all water from whatever source.

The levels of foundations are not to be founded within non-engineered fill.

Weaker or more compressible ground at depth below the foundation that may impair the stability of the structure is to be removed.

In clay soils subject to volume change, foundations shall be taken to a depth where anticipated ground movements, caused by vegetation and trees, will not impair the stability of the structure

An adopted active soil drainage will be installed where the water table can rise within 250mm of the substation plinth.

8. DRAINAGE

Roof gutters to be uPVC 100dia half round or equivalent 'square section'.

Roof downpipes are to be 63mm dia or equivalent 'square section' uPVC.

All gutters, downpipes and fixings to be black, unless required otherwise to match adjacent buildings.

The discharge from the roof downpipes will be collected by an adopted surface water drainage system. The drainage systems shall meet the requirements of and be approved by relevant local authorities, utility companies and environment agencies as applicable.

The Constructor will ensure the hard standing access to the front of the enclosures is designed to ensure surface water drains away from the door threshold. If this cannot be achieved a heavy duty linear drainage channel will be installed for the full width of the door threshold. The linear drainage channel will discharge to an adopted surface water drainage system.

9. CONCRETE

9.1 General

Reinforced concrete forms will be constructed from RC28/35 concrete mix with a minimum strength class of C28/35, consistence class of S3, water cement ratio of 0.6 and a minimum cement content of 280kg/m³.

Where the ground investigation report identifies the presence of sulphates or other aggressive chemicals in the groundwater, the ground or any adjacent material the Constructor will be responsible for selecting the appropriate mix to suit the site conditions.

Concrete delivery tickets cross referenced to the point of application are to be included with the O&M manuals.

Specified characteristic strength shall be verified by concrete cube tests.

The standard of concrete finish shall not be less than that indicated below:

All concrete forms will be cast against undisturbed ground. Where this is not possible the finish to all formed surfaces shall be F2. Forms will be designed to produce a dense smooth finish free from voids greater than 10mm diameter. Minor defects will be made good as specified.

Pit walls shall be at least 200mm thick, constructed in situ concrete.

Base slab shall be 300mm in situ concrete on 1 layer of 1000 gauge polythene sheeting.

All in situ concrete shall be grade RC28/35, reinforced with 1 layer of A393 steel mesh to each face in walls and top and bottom faces in slabs.

Finish to exposed worked surfaces, such as floors and plinths will be W2 / W3. A steel or power float shall be used when the concrete has stiffened sufficiently to be properly worked to produce a smooth even finish free from float marks and abrupt irregularities.

The finish to all surfaces, other than the rebate which is cast to accept a GRP or Steel grating covering the cable pit which must be square to remove any potential trip hazard, will otherwise be flat, level with smooth surface finishes to the floor and plinth as this is essential for the installation of plant. Tolerances are expressed as a maximum permissible deviation under a straight edge with feet placed anywhere on the surface of floors and plinths shall not be more than 1mm over 1m or 3mm over 3m. Exposed rises to plinths shall be chamfered. Rises to ramp transitions onto floors, vertical corners within cable trenches and the like over or around which cables could pass shall be rounded.

The slab reinforcement mesh must be bonded to the Substation Earth. The earth conductor must be mechanically secured (or cadwelded) to both mesh layers. A minimum length of three metres of earth conductor must project from the face of the concrete in to the cable pit area. The earth conductor must be a minimum of 50mm² hard drawn stranded copper conductor (not copper wire rope) and connectors shall be non ferrous (copper or brass) U-bolt connectors. The pit shall be covered using 50mm thick GRP or Steel gratings with an anti-slip top surface.

The gratings shall be installed on completion of the floor construction – any cable cut-outs will be formed later following cable installation. Individual gratings may be no larger than 1.0 square metre.

Unless drawings show otherwise, all cable ducts shall be 125mm dia. twin wall HDPE.

All ducts must be sealed (at the time of installation) at the external end using a purpose made stop end. The use of rags, newspaper, timber boards, etc to seal the ducts is not acceptable.

Draw ropes will be required for ducts runs > 3.0m in length.

Ducts shall be surrounded by 100mm of 10mm gravel. Compacted granular fill shall be used to fill the space between the duct surround and the underside of the foundation slab. Mass concrete may be used in place of granular fill.

The cable pit is designed to act as a holding sump, in case of oil leakage from the transformer. It is essential therefore that all of the cable ducts be effectively sealed on completion of the cable installations, as specified in GTC's Substation Flood and Pollution Prevention – Contingency Planning Procedure EQP0057.

Where the use of expanding polyurethane foam is permitted by the above procedure, this shall be used to fill the pit end of the ducts, to a depth of 300mm. Where cables are present, these are to be centred in the duct before the foam is applied; measurements shall be taken to ensure that the cables are held in this position until the foam has cured sufficient to carry the weight of the cable.

Before all the cable ducts are sealed ensure any earth wires that GTC need to install are in position.

9.2 Re-inforcing Bar

Re-inforcing bar and or mesh used within the concrete base **Shall** be welded by the installer to ensure earth continuity throughout the foundation and approved methods of welding would include, Gas, Arc or Cadweld techniques. The use of twisted wire connections is not suitable and therefore **Not Approved** by GTC, as earth continuity cannot be assured and non-compliant installations will not be accepted. An inspection of this work by GTC or our Approved Contractor is recommended before pouring concrete, but where this is not possible evidence in the form of photographs of the completed welded concrete re-inforcement will be accepted.

10. SUBSTATION LOCKS

GTC will supply appropriate padlocks for all completed substations, including a dual-locking padlock for the outer doors.

Euro profile key operated locks on outer doors are not acceptable to GTC.

11. MASONRY

All masonry to be in accordance with BS5628-3: 2001 and walls shall be fair-faced plumb and smooth to the interior.

Masonry materials shall be selected to maximise durability consistent with the architectural or planning requirements for the substation.

The walls shall comprise an outer skin of facing brickwork or coursed stone to match adjacent properties, and an inner skin of solid fair-faced concrete blocks. Bricks may be used for the inner skin.

The minimum acceptable standard for belowground masonry will be High Density (HD) Category I clay brickwork of minimum 75N/mm^2 mean compressive strength, 7.0% maximum moisture absorption and durability designation F2 S2 (ex 'Engineering Class B' quality or equivalent).

External masonry shall be clay-facing brickwork of minimum 9N/mm^2 mean compressive strength and a durability designation F1 S2 or better.

Internal masonry shall be light coloured solid smooth fair-faced concrete facing blockwork with a minimum compressive strength of 3.6N/mm^2 and a dry density: 600 kg/m^3 .

Inner and outer skins shall both be laid in stretcher bond, and tied with stainless steel wall ties; minimum 4mm diameter 'double-triangle', vertical twist fishtail. Ties shall be evenly distributed at maximum 450mm centres vertically and 375mm horizontally, staggered in alternate courses with additional ties at openings.

The DPC, to both internal and external wall skins, shall comprise 2 courses of blue engineering bricks or proprietary DPC membrane.

Mortar shall be sand lime, mix 1:1:6, where required, the use of sulphate resisting cement (e.g. below ground) will be used.

External and internal mortar pointing to be 'bucket handle' finish. Other pointing styles, e.g. weather struck, recessed, etc may only be used where required to match adjacent buildings.

12. ROOF CONSTRUCTION

12.1 General

Roof materials shall be selected to maximise durability consistent with the architectural or planning requirements for the substation.

All timber to pitched roofs shall be vacuum process preservative treated.

The use of lead as part of waterproofing systems should be avoided unless essential

All works to comply with current editions of manufacturer's technical literature for products selected.

12.2 Basic Workmanship

Carry out all tiling work in accordance with BS 5534: 2003.

Set out to give true lines and regular appearance, fitting neatly at all edges, junctions and features.

Fix tiled roofing to make the whole sound and weathertight at the earliest opportunity.

Repair any defects as quickly as practicable to minimise damage and nuisance.

Keep gutters and pipes free of debris and clean out at completion.

12.3 Underlay

Handle carefully to prevent tears and punctures and repair with adhesive tape any which do occur.

Lay parallel to eaves, maintaining consistent tautness to minimise gaps.

Vertical laps not less than 150 mm wide, coinciding with supports. Fix with galvanized steel extra large head felt nails.

Ensure that underlay does not obstruct roof ventilation.

12.4 Battens/Counter Battens

Sawn softwood, species to BS 5534: 2003: Clause 4.12.1.

Grading: To BS 5534: 2003: Guidance on permissible characteristics and defects is provided in Annex C.

Preservative treatment: Guidance is provided in BS 5534: 2003: Annex D.

12.5 Battens on Timber Supports

To be in straight horizontal lines, aligned on adjacent areas, with no batten less than 1200mm long.

Joints to be square cut, butted centrally on supports and must not occur more than once in any group of four battens on any one support.

Provide an additional batten where an unsupported lap in the underlay occurs between battens.

Fix each batten to each support, splay nailing at ends.

12.6 Tile Fixing

Lay each course straight bond with tails aligned.

Fix tiles as specified by Manufacture, but in any case the last tile at the end of every course, and every tile in the course adjacent to both eaves and top edges must be fixed, using nailing and/or clipping as appropriate.

Nail tiles where specified using 80 x 3.75 mm aluminium nails.

Clip tiles to gables using Manufactures clips and clip nails.

12.7 Ventilated Eaves

Ensure that top of fascia board is at correct level.

Fascia ventilator grilles

Fix to top of fascia board. Ensure rear air grilles are not restricted.

Fix eaves trays continuously to support underlay at eaves to prevent water retaining troughs.

Fix rafter ventilator trays continuously to ensure free passage of air above insulation at wall plate level.

Fix bird comb eaves filler units to top of fascia board.

Fix all tiles in eaves course with eaves clips.

Fix all tiles in eaves course with tails projecting 50 mm over gutter.

12.8 Mortar Bedded Verge with Bedded Undercloak

Ensure that gable wall is brought up to correct level.

Ensure that rigid sarking terminates on final rafter.

Carry underlay 50 mm onto outer leaf of gable wall.

Bed undercloak of 6 mm fibre cement sheet of approved colour, sloping away from and projecting not more than 50 mm beyond face of wall on mortar identical to that used in gable walling, and point neatly.

Carry tiling battens over undercloak and finish 100 mm from verge edge.

Use standard tiles on right hand verge and treble roll tiles on left hand verge.

Fix verge tiles to every tiling batten with verge clips.

Bed edge of verge tiles flush with undercloak on 75 mm wide bed of mortar as clause 290, ensuring that mortar is not displaced or cracked by mechanical fixing of tiles.

12.9 Mortar Bedded Hip

Underlay from one side of the hip should overlap the underlay on the other side by not less than 150mm.

Hip irons: To BS 5534: 2003, fixed to hip rafters with galvanized steel screws.

Cut tiles to fit closely at junction. Make weather-tight with edges and joints of hip tiles solidly bedded in mortar as clause 290. Insert tile slips into solid bedding at butt joints.

Shape first hip tile neatly to align with corner of eaves and fill end with mortar and tile slips finished flush.

All hip tiles within 900 mm of rigid masonry support or abutment walls must be mechanically fixed.

12.10 Mortar Bedded Ridge:

Underlay from one side of the ridge should overlap the underlay on the other side by not less than 150mm.

Make weathertight with edges and joints of ridge tiles solidly bedded in mortar as clause 290. Insert tile slips into solid bedding at butt joints.

Fill ends of ridges at gables with mortar and tile slips finished flush.

Bed dentil slips in each roof tile pan to form dentil course projecting a consistent approved dimension.

All ridge tiles within 900 mm of rigid masonry support or abutment walls must be mechanically fixed.

Ridge terminals: Ensure roof timbers are trimmed around terminal positions. Cut and fit underlay neatly around terminals.

Roof space ventilators: Concealed air vent ridge fixed at not more than 2m centres.

12.11 Wall Plate:

To be 50mm x 100mm softwood, spiked and strapped to inner skin of blockwork with 30 x 5 x 1200mm long galvanized mild steel straps at maximum 1200mm centres. Strap to be twice bent over the wall plate and plugged & screwed to the blockwork with minimum 50mm penetration into the blockwork.

12.12 Lateral Support:

At rafter/gable wall positions the end three rafters shall be strapped to the wall at both roof and ceiling level. Straps shall be 30 x 5mm galvanized mild steel at max. 2m centres. Provide 100mm x 60mm S.W. strutting between trussed rafters to support straps. Note that a 50mm gap should be left between the end truss of any gable or separating wall.

12.13 Fire Resistance To Roof:

Under line ceiling trusses with supalux or similar ceiling board, to give a minimum of 1hr fire resistance.

12.14 GRP One-piece 'Lift Off' Roof

Where the substation design specifies a GRP roof this must be designed and built by an approved supplier. The following general notes apply to this type of roof:

- The roof shall comprise a one-piece structure
- Unless otherwise specified by the manufacturer, the roof structure shall be secured to 100 x 75 softwood wall plates. The wall plates shall be connected to the masonry using 50 x 3 galvanised mild steel flats, with M6 x 50mm galvanised coach screw fixings 2, 4 & 6 courses down from top of wall. There shall be a minimum of 3no equally spaced flats per wall plate.
- The roof shall be fixed to the wall plate with an approved method such that 'explosion relief' ventilation is provided.
- External roof finish – as required to match adjacent buildings.
- Wall plate timber shall be pressure treated to BS5268 part 5:1989.

13. WOODWORK

All timber should be sourced from plantations where accepted management systems are in operation that achieve sustainability of supply.

All structural timber in roof construction including trussed rafters, noggins and bracing should be preservative treated double vacuum method of preservative impregnation prior to delivery to site.

14. DOORS

14.1 General

All substation doors must be approved by GTC. Approved suppliers are listed in section 18 of this specification and on the relevant drawings.

Depending on the assessed security risk and in accordance with Electricity, Safety, Quality and Continuity Regulations (ESQCR) 2002, GTC reserve the right to specify the use of steel doors where there is a need for increased security.

Doors shall open outwards. Doors shall not open over public highway, including footways.

External doors will be required to open through a minimum of 170° to facilitate the installation of plant. Doors shall be fully weathered including appropriate seals to the external perimeter of frames.

14.2 External GRP Doors

External GRP doors shall be proprietary units of reinforced construction and exposed surfaces that meet the requirements of Class 2 to BS 476 with respect to surface spread of flame.

Doors shall comprise double-skinned GRP leaves, pre-hung in a suitable robust frame. The active leaf shall be fitted with a two point locking mechanism, suitable for padlock application.

Where timber is incorporated this shall be vacuum process preservative treated and fully encapsulated within GRP.

The doors shall have a finished colour 08B25 "Brown", however a different colour may be used if required to fit in with adjacent buildings.

Frames shall be built-in to all new work using galvanised fishtail or ragged right angle lugs. Frames shall be built-in to existing work using proprietary corrosion resistant frame fixings. Frame/masonry joints shall be sealed using suitably coloured 1 part polyurethane gun applied mastic, minimum depth 20mm.

14.3 External Steel Doors

Steel doors to GTC specifications will be fitted where there is a need for increased security. These doors are fully interchangeable with the GRP doors and will fit the same structural opening dimensions as specified on the drawings.

Anti-Graffiti finish can be factory applied to steel doors manufactured to GTC specification by Sunray engineering and an extensive range of RAL and BS colours are available.

14.4 Earthing and Bonding of Steel Doors and Frames

When steel doors are fitted the door leaves must be bonded to the steel door frame using a (minimum) 16mm² flexible insulated copper bonding strap and the steel door frame connected to the substation earthing system using 70mm² green/yellow pvc insulated stranded copper earthing conductor, as detailed in the Sunray Engineering drawing No. SQD 1002-1.

14.5 Ventilators

Approved ventilation panels are incorporated at high and low level in each leaf of the approved doors. Each ventilator shall have an area of at least 0.25m². Additional ventilation will normally be provided by an approved louvered ventilator size 550mm wide by 750mm high in the rear wall of the substation as shown on the drawings. In some circumstances additional ventilation may be required and in restricted areas the position of the ventilation units may need to be altered to suit the locality or circumstances. Any variations from the standard drawings must be agreed at the planning stage and approved by GTC before substation construction is commenced.

All ventilation units shall be of a robust vandal and corrosion resistant construction, offering a degree of protection not less than that of IP24 to EN60529 i.e. protection against fingers or other object not greater than 80mm in length and 12mm in diameter and protection from splashed water. Approved ventilators are available from the approved suppliers detailed in section 18 of this specification.

14.6 Door Furniture

The GTC approved doors, both GRP and Steel, are supplied complete with the approved door furniture and no variation from these agreed specifications are allowed unless approved in advance by GTC.

The following details specify the general requirements for door furniture:

Lock bracket or other mechanisms to receive padlocks shall be hardened galvanised or stainless steel high-security lock-brackets, tamper resistant and non-removable without access into the substation.

Doors shall be fitted with heavy duty galvanised or stainless steel cabin hooks systems to restrain doors in the fully open position.

Hinges shall be stainless steel construction.

2 No 250mm barrel bolts to top and bottom of passive leaf, either stainless steel or hot dip galvanised

Both the active and fixed GRP door panels to include high and low level louvered vents, each with an area of not less than 0.25m². The ventilation units shall be of a robust vandal and corrosion resistant construction, offering a degree of protection not less than that of IP24 to EN60529, i.e. protection against fingers or other object not greater than 80mm in length and 12mm in diameter and protection from splashed water.

15. TECHNICAL REQUIREMENTS FOR EXTERNAL SITE FINISHES

Proposals for external site finishes shall be submitted to GTC for comment.

Concrete surfaces shall be avoided over cable entry areas unless appropriate adequate proposals for ducting beneath or cable trenching through have been formally accepted in writing by GTC.

16. ELECTRICAL INSTALLATION

16.1 Substations with Combined HV And LV Earthing (Cold Earthing)

The supply for the substation power and lighting will be taken from the transformer mounted fuse cabinet auxiliary fuse way using 6mm² copper swa pvc cable to supply a single phase 100A consumer unit with a minimum of 4 mcb controlled ways (2x 16A for power and 1x 6A for lighting with a spare 16A way for special requirements e.g. Scada or Remote actuator units. Each outgoing way will be labelled to identify circuits.

All internal wiring to be contained in 20mm high impact black PVC conduit and all accessories will be non metallic high impact and fully insulated and weatherproof and sourced from a quality manufacturer (e.g. MEM or MK.)

Two 13A switched socket outlets with 30mA RCD protection will be provided in a convenient location on the left hand wall of the substation.

Two 1800mm fluorescent lamp units with polycarbonate covers to at least IP56 specification will be fitted to the ceiling and controlled by a non metallic fully insulated lighting switch fitted 1350mm above finished floor level adjacent to the first leaf opening door (normally the right hand leaf).

For GRP roofed substations wall mounted bulkhead lights will be fitted.

The sockets are to be wired in 2.5mm² copper cable and the lighting wired in 1.5mm² copper cable.

The electrical installation is to be in accordance with the current edition of BS7671 - IEE Wiring Regulations.

16.2 Substations with separate HV and LV Earthing (Hot Earthing)

Care must be taken with lighting and socket supplies to avoid the possibility of an operator making contact between different earthing systems.

AT HOT SITES:

All fittings, switches and conduit must be non metallic and fully insulated to the specification detailed in 16.1 above.

All 13A sockets (including socket outlets in the transformer mounted fuse cabinet) must be protected by a 30mA RCD with the earth terminal connected to the HV steelwork earth.

17. LIST OF APPROVED SUPPLIERS

Materials may be sourced from other suppliers, in which case full details must be submitted to GTC for technical approval.

GRP Substation Doors, Ventilators & Gratings:

Utility Power Systems, Carrwood Road, Chesterfield Trading Estate, Chesterfield S41 9QB

Tel: 01246 262860

Fax: 01246 455915

E-mail: sales@utilitypowersystems.co.uk

Contact: Jon Taylor

Steel Substation Doors, Ventilators & Gratings:

Sunray Engineering Ltd, Kingsnorth Industrial Estate, Wotton Road, Ashford, Kent TN23 6LL

Tel: 01233 656648 – Main contact

Tel: 01233 656647 – Alternative contact

Fax: 01233 625137

E-mail: melissa.woodall@sunraydoors.co.uk / kirk.davies@sunraydoors.co.uk

Contacts: Main contact Melissa Woodall / Alternative contact Kirk Davies

Earth/Reinforcement Connectors:

Erico, 52 Milford Rd, Reading, Berks, R1 8LJ

Tel: 01239 654666

Fax: 01239 654072

E-mail: rsmith@erico.com

Contact: Roger Smith

GRP Roofs: (for removable roof design only)

Stormking, Amington Point, Sandy Way, Tamworth, B77 4ED

Tel: 01827 311100

Fax: 01827 311200

E-mail: contact@stormking.co.uk

Contact: Gayle Perry