

DIFE Multi Tertiary Building Extension, Drogheda, Co Louth

Volume A.2.3 Electrical
Specification

Part 4 of 4: Equipment
Schedules

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1 SITE SERVICES (60)

1.1 EQUIPMENT SCHEDULES

Refer to all other schedules, Particular Specification and contract drawings.

2 ELECTRICAL SUPPLY (61)

2.1 EQUIPMENT SCHEDULES

Refer to all other schedules, Particular Specification and contract drawings.

Ref: Switchboard

TP&N Switchboard as per technical specification below.



Element	Specification	Proposal
Material	• Body: 2.5mm thick Electro-galvanised/ Iron-phosphated steel plate. • Covers and doors: 2mm minimum thickness.	
Colour	Light grey, RAL 7035, powder lacquered	
Busbar System	System 225, 2000, 7000	
Supply Systems	TN-C, TN-S, TN-C-S, TT & IT	
Internal Separations	Form 4b Type 2	
Multi Drawer	Up to 630Amps/ 220kW AC3, Icc up to 120kA	
Electro-magnetic Compatability	EMC Environment 1, 2 & #1 & 2	
Type Test	According to IEC/EN 60439-1	
Rated Current	Up to 8750 Amps	
Dielectric Properties	3.5kV	
Rated short-time withstand current	Up to 120KA	
Rated peak withstand current	Up to 264kA	
Rated Voltage, Insulation	1000V AC	
Rated Operational Voltage	Up to 1000V, 50Hz	
IP Rating	IP54	
Vibration Test	2G in frequency area 2.5-500Hz in three directions	
Shock Test	30G in 12.5ms in six directions	
Seismic Test	Earthquake test carried out with biaxial horizontal and vertical multi-frequency movements	

Archiving Test	Type B assembly according to IEC 61641 as well as to AS/NZS 3439.1	
Surface Treatment	Tropical test ISO 6270, class C2 high, according to ISO 12944	
Total Depth	No more than 408-500mm	
Total Frontal Access	Yes	
Doors C/W Lift off hinges	Yes	
Removable Lifting Eyes	Yes	
Main Isolator Location	Lower right corner of board	
Standards/Conformity	BS EN 61439-2, IEC 60439-1, EN 50051, EN 50001/2, BS EN 60 - 439-1:1994, BS 5846 Part 1, IEC 439-1	

Ref: Air Circuit Breaker (ACB)

ACB as per technical specification below. Withdrawable type.

Element	Specification	Proposal
Rated Current (In)	As stated on schematic (adjustable 630A)	
Poles	3	
Network Type	AC	
Network Frequency	50/60Hz	
Rated Insulation Voltage (Ui)	1000V	
Rated Operational Voltage (Ue)	690V AC 50/60Hz	
Impulse Withstand Voltage (Uimp)	12kV	
Breaking Capacity (Icu)	150kA at 400V AC	
Ics	= 100% Icu	
Rating and model number indicated clearly on the front of the housing and with clear "ON" and "OFF" indication	Yes	
Suitable for isolation	Yes	
Class II front face	Yes	
Trip Units Adjustable	Yes. Adjustable Ir threshold settings from 40% to 100%. Adjustable Isd threshold settings from 1.5xIr to 10xIr	
IP Rating		
Switching in the Up/Down operation?	Yes	
Traffolyte Labelled	Yes	
Protection Type	Overload and short circuit	
Terminal Capacity	Installation to cater for cables as per LV schematic	
Standards/ Conformity	EN /IEC 60947-1 & 2, IEC 60947-2, annex B, IEC 60947-2, annex F, IEC 60664-1, IEC 61000-4-1, IEC 61557-12, IEC 60068-2	
Manufacturer	Schneider "Masterpact NT 630-1600" model	

Ref: Moulded Case Circuit Breaker (Main Protective Device MCCB)		
 MCCB as main protective device as per technical specification below.		
Element	Specification	Proposal
Rated Current (In)	Electronic type adjustable with the adjustable settings as listed below. Rated current as stated in schematic.	
Poles	3	
Newtork Type	AC	
Newtork Frequency	50/60Hz	
Rated Insulation Voltage	800V AC 50/60Hz	
Rated Operational Voltage	690V AC 50/60Hz	
Breaking Capacity	50kA	
Ics	100%, Icu as per IEC 60947-2	
Rating and model number indicated clearly on the front of the housing and with clear	Yes	
“ON” and “OFF” indication		
Electronic Trip	Yes	
Shunt Trip Contacts	Yes, (link to fire fighter’s isolation switch)	
Suitable for isolation	Yes	
Class II front face	Yes	
Adjustable Overload	Yes, 0.36 – 1 x In	
Adjustable short-circuit	Yes, 1.5 – 10 x Ir	
Comes with rotary handle	Yes	
Front Indication LEDs	Yes, (Ready, Overload pre-alarm and overload)	
IP Rating	IP40	
Switching in the Up/Down operation?	Yes	
Traffolyte Labelled	Yes	
Protection Type	- Instantaneous short-circuit protection - Overload protection (long time) - Short time short-circuit protection	

Standards/ Conformity	EN 60947-2, IEC 60947-2, NEMA AB1, UL 508, BS 3871 Part 2, BS EN ISO9001, BS 4572, IEC 60529, EN 50102, IEC 60947-1	
Manufacturer	Schneider "Compact NSX LV430775" model or equivalent	

Ref: Moulded Case Circuit Breaker (Downstream MCCB)		
 Downstream MCCB as per technical specification below.		
Element	Specification	Proposal
Rated Current (In)	As stated on schematic (100-630A)	
Poles	3	
Newtork Type	AC	
Newtork Frequency	50/60Hz	
Rated Insulation Voltage	800V AC 50/60Hz	
Rated Operational Voltage	690V AC 50/60Hz	
Breaking Capacity	36kA	
Ics	100%, Icu as per IEC 60947-2	
Rating and model number indicated clearly on the front of the housing and with clear	Yes	
“ON” and “OFF” indication		
Complete with Thermal and Magnetic overload	Yes	
With thermal magnetic trip unit (TMD)	Yes	
Suitable for isolation	Yes	
Class II front face	Yes	
Adjustable thermal setting	Yes, 0.7 – 1 x In	
Adjustable short-circuit	Yes, 5 – 10 x Ir	
Comes with rotary handle	Yes	
IP Rating	IP40	
Switching in the Up/Down operation?	Yes	
Traffolyte Labelled	Yes	
Protection Type	Overload protection (thermal) Short-circuit protection (magnetic)	
Standards/ Conformity	EN 60947-2, IEC 60947-2, NEMA AB1, UL 508, BS 3871 Part 2, BS EN ISO9001, BS 4572, IEC 60529, EN 50102, IEC 60947-1	
Manufacturer	Schneider “Compact NSX” model or equivalent	

Ref: Distribution Board (TP&N)		
 TP&N distribution board as per technical specification below.		
Element	Specification	Proposal
Incomer Rating	As stated on schematic	
Busbar Rating	250A	
Voltage Rating	400/415V AC	
IP Rating	IP 31	
IP Rating with covers removed	IP2X	
Impact Strength	IK08	
Isobar Disconnection	Yes, ensures unused outgoing ways are isolated	
Option of switching outgoing neutral	Yes, using distributed neutral kit	
Removable insulated pan assembly	Yes	
Fully shrouded neutral	Yes	
Split neutral bars	Yes	
Removable gland plates	Yes	
Optional metering, dual supply, surge protection and contactor on incoming	Yes	
Split metering option	Yes	
DIN rail mounting with fully shrouded busbars	Yes	
Surface mounting	Yes	
Flush mounting available	Yes	
Fitted with deep dividing and insulated fillets between phase banks and the neutral bar	Yes	
Provided with an insulated neutral bar and earth bar with a separate terminal for each circuit	Yes	
Lockable	Yes, to enable access only to authorised personnel.	
Colour	RAL 9001 epoxy powder coated	

Enclosure	1.2mm sheet steel with covering door of 0.9mm sheet steel secured to the case with hinges and cylinder type lock.	
Cable capacity neutral and earth bar	35mm ²	
Manufacturer	Schneider "Load Centre KQII" or equivalent	

Ref: Miniature Circuit Breakers (MCBs)


MCBs as per technical specification below

Element	Specification	
Rated Current (In)	As stated on schematic	
Poles	1P or 3P as indicated	
Type	B unless otherwise stated in schematic or specification	
Tripping Curve	The magnetic trip units operate between 3 and 5 In	
Network Type	AC	
Network Frequency	50Hz	
Voltage Rating(Ue)	440 V AC	
Impulse voltage (Uimp)	6kV	
Insulation voltage (Ui)	500 V AC	
Breaking Capacity according to BS EN 60898	10kA (manufacturer guaranteed)	
Breaking Capacity according to BS EN 60947-2	15kA (manufacturer guaranteed)	
Rating and model number indicated clearly on the front of the housing and with clear	Yes, opening is indicated by a green strip on the device operating handle. This indicator shows opening contacts of all the poles.	
“ON” and “OFF” indication		
Suitable for isolation	Yes	
Fast Closing	Yes, allows the high inrush currents of loads to be better held.	
Suitable for protection of circuits against short-circuit current	Yes	
Suitable for protection of circuits against overload currents	Yes	
Switching in the Up/Down operation?	Yes	
Protection Type	Overload protection (thermal) Short-circuit protection (magnetic)	
Terminal Sizes	Up to 25 A ratings: 16 mm² flexible or 25 mm²	

	• For 32 to 63 A ratings: 25 mm² flexible or 35 mm² rigid	
Auxiliaries	Provide each lighting circuit with manufacturer proprietary electrical auxiliary contacts to facilitate remote indication link to emergency lighting I/O devices. See Phase 1 LV switchgear manufacturer shop drawings for information. Schneider A9A26924.	
Standards/ Conformity	BS EN 60898, BS EN 60947-2, IEC 60068-1	
Manufacturer	Schneider 'iC60N.'	

Ref: Residual-Current Circuit Breaker with Overload Protection (RCBO)

RCBO as per technical specification below

Element	Specification	Proposal
Rated Current (In)	As stated on schematic	
Poles	2P	
Type	30mA unless stated elsewhere	
Tripping Characteristic	The magnetic trip units operate between 5 and 10 In.	
Newtork Type	AC	
Newtork Frequency	50/60Hz	
Voltage Rating	240 V AC, +10 %,	
Breaking Capacity according to BS EN 60898	10kA (manufacturer guaranteed)	
Breaking Capacity according to BS EN 60947-2	15kA (manufacturer guaranteed)	
Tripping even when the handle is held or locked in the ON position.	Yes, trip-free handle through an over-centre toggle mechanism	
Rating and model number indicated clearly on the front of the housing and with clear "ON" and "OFF" indication	Yes	
Fault Indication	Overload, short circuit and earth fault currents are indicated by location of the handle in the OFF position.	
Test Button	Yes, a black push-test button "T" is positioned on the front of the device for testing that product is operational	
IP Rating	IP20 at the terminals	
Suitable for isolation	Yes	
Suitable for protection of circuits against short-circuit current	Yes	
Suitable for protection of circuits against overload currents	Yes	

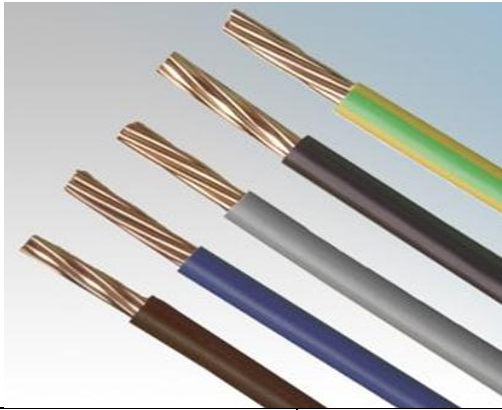
Switching in the Up/Down operation?	Yes	
Protection Type	• Overload protection (thermal) • Short-circuit protection (magnetic) • Protection of persons against direct and indirect contact (10 mA and 30 mA). • Protection of installations against fire hazard (100 mA)	
Terminal Sizes	• L in: tunnel terminals for 16 mm² flexible or 25 mm² rigid cables • L out and N out: tunnel terminals for 1 to 16 mm² flexible or rigid cables.	
Standards/ Conformity	IEC 61009-2-2, BSEN 61009-1.	
Manufacturer	Schneider 'Acti9 iDPN Vig.'	

3 ELECTRICAL POWER (62)

3.1 EQUIPMENT SCHEDULE

Ref: 4 Core Screened Cable		
 4 Core screened cable as per technical specification below.		
Element	Specification	Proposal
Conductor	28AWG high-conductivity silver-plated copper alloy conductors,	
Insulation	Polypropylene	
Outer Shield	Braided tinned copper	
Outer Sheath	Polyvinyl Chloride	
No. of Conductors	4	
Voltage Rating	100V	
Current Rating	2.9A	
Cable Type	Shielded	
Operating Temperature	-30°C to +60°C	
Standards/ Conformity	EU LVD (Low Voltage Directive 73/23/EEC), as amended by directive 93/68/EEC	

Ref: Flexible Cabling  Flexible cabling as per technical specification below.		
Element	Specification	Proposal
Conductors	Flexible plain copper conductors	
Insulation	Heat resisting LSF insulated and heat resisting LSF sheathed.	
Voltage Rating	300/500V	
Core Colours	• Two core: Blue and Brown. • Three core: Green/Yellow, Blue and Brown. • Four core: Green/Yellow, Brown, Black and Grey	
Sheath Colour	White	
Sheath Material	OHLS - Halogen Free Low Smoke	
Operating temperature	+90°C Maximum	
Minimum Bending Radius	3 x diameter (Fixed), 6 x diameter (Flexing).	
Basec Certified	Yes	
Conformity/standards	• Manufactured: BS6500/BS7919	
Manufacturer	Draka 309-Y or equivalent	

Ref: LSZH Single Core Cabling		
		LSZH single core cabling as per technical specification below.
Element	Specification	Proposal
Outer sheath colour	Brown, Black, Grey & Yellow/Green	
Conductors	Stranded plain copper conductor	
Insulation	Thermosetting zero halogen low smoke	
Voltage Rating	450/750V	
Operating temperature	+90°C Maximum	
Basec Certified	Yes	
Conformity/standards	• Manufactured: BS 7211 • Smoke emission: IEC 61034 , BS EN 50268 • Acid gas emission: IEC 60754-2, BS EN 50267-2 • Flame propagation: IEC 60332-1, BS EN 50265	
Manufacturer	Draka 6491 B or equivalent	

Ref: Steel Wire Armoured Cabling		
		Steel wire armoured cabling as per technical specification below.
Element	Specification	Proposal
Construction	Single, Two, Three, Four and Five core cables. Cores laid up, extruded Zero Halogen, Low Smoke bedding, galvanised SWA steel wire armoured (AWA, Aluminium wires for single cores)	
Conductors	Stranded plain copper conductors	
Insulation	XLPE (cross-linked polyethylene) insulated, Zero Halogen, Low Smoke sheathed.	
Voltage Rating	600/1000V	
Core Colours	• Single core cable: Brown or Blue. • Two core cable: Brown and Blue. • Three core cable: Brown, Black and Grey. • Four core cable: Brown, Black, Grey and Blue. • Five core cable: Brown, Black, Grey, Green/Yellow and Blue.	
Sheath Colour	Black	
Operating temperature	+90°C Maximum	
Minimum Bending Radius	6D circular conductors, 8D shaped conductors	
Basec Certified	Yes	
Conformity/standards	• Manufactured: BS 6724 • Smoke emission: IEC 61034, BS EN 50268 • Acid gas emission: IEC 60754-1, BS EN 50267 • Flame propagation: IEC 60332-1, IEC 60332-3, BS EN 50265, Categories C & A; BS EN 50266.	
Manufacturer	Draka 694-LSH or equivalent	

3.2 ACCESSORIES EQUIPMENT SCHEDULE

Ref: 1-Gang Light Switch (this range of accessories to be used on all dado trunkings, teaching spaces, offices, front of house etc.)		
 1-gang flush mounted light switch with white rocker. Part M range, anthracite-grey/graphite coloured front plate. All switch plates shall be modular to enable multi-gang configurations consisting of various interchangeable mechanisms.		
Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	10 amps	
Terminal Capacity	1 x 6mm ² stranded (max)	
Ambient operating temperature	–5°C to +40°C	
IP Rating	IP4X	
3mm minimum switch contact gap	Yes	
Rockers	White	
Conformity/standards	BS EN 60669-1: 2000, Part M	
Manufacturer Warranty	20-years	

Ref: 1-Gang Switched Socket Outlet (this range of accessories to be used on all dado trunkings)



1-gang flush mounted double-pole switched socket with white rocker and red ON indicator. Part M range, anthracite-grey/graphite coloured front plate.

Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	240V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility.	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2XD	
3 pin operated "child resistant" safety shutter	Yes	
3mm minimum switch contact gap	Yes	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995 + A4:2012, Part M	
Manufacturer Warranty	20-years	

Ref: 2-Gang Switched Socket Outlet (this range of accessories to be used on all dado trunkings)



2-gang flush mounted double pole switched socket with outboard white rockers and red ON indicators. Part M range, anthracite-grey/graphite coloured front plate.

Element	Specification	Proposal
Dimensions	86mm x 146mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	13A per socket outlet	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility.	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2XD	
3 pin operated "child resistant" safety shutter	Yes	
3mm minimum switch contact gap	Yes	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995+A4:2012,, Part M	
Manufacturer Warranty	20-years	

Ref: 2-Gang Light Switch (this range of accessories to be used on all dado trunkings)		
 2-gang flush mounted single pole 2-way light-switch white rockers. Part M range, anthracite-grey/graphite coloured front plate. All switch plates shall be modular to enable multi-gang configurations consisting of various interchangeable mechanisms.		
Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	13 amps	
Terminal Capacity	1 x 6mm ² stranded (max)	
Ambient operating temperature	–5°C to +40°C	
IP Rating	IP4X	
3mm minimum switch contact gap	Yes	
Inserts	White	
Conformity/standards	BS EN 60669-1: 2000, Part M	
Manufacturer Warranty	20-years	

Ref: 20A Double Pole Switch

Part M range, anthracite-grey/graphite coloured front plate. 20A Double pole switch as per technical specification below



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	20A	
Terminal Capacity	3 x 2.5 mm ² stranded (max)	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP20	
LED Indicator	Yes	
Conformity/standards	BS EN 60669-1	

Ref: 1-Gang Un-switched Socket Outlet

1-gang un-switched socket outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility for use when installations require a high integrity protective connection as specified within BS 7671 : 2008 .	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2XD	
3 pin operated “child resistant” safety shutter	Yes	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995	

Ref: 2 Gang Un-switched Socket Outlet

2 -gang un-switched socket outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 146mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility for use when installations require a high integrity protective connection as specified within BS 7671 : 2008 .	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP20	
3 pin operated “child resistant” safety shutter	Yes	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995	

Ref: 1-Gang Switched Socket Outlet

1-gang switched socket outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility for use when installations require a high integrity protective connection as specified within BS 7671 : 2008 .	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2XD	
3 pin operated “child resistant” safety shutter	Yes	
Offset Socket Switches	Yes	
LED Indicator	Optional	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995	

Ref: 2-Gang Switched Socket Outlet

2-gang Brushed Stainless Steel switched socket outlet as per technical specification below (outboard rockers).



Element	Specification	Proposal
Dimensions	86mm x 146mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility for use when installations require a high integrity protective connection as specified within BS 7671 : 2008 .	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2XD	
3 pin operated "child resistant" safety shutter	Yes	
Offset Socket Switches	Yes	
LED Indicator	Optional	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995	

Ref: 3-pole fan isolator

3-pole fan isolator as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	10 amps	
Terminal Capacity	1 x 6mm ² stranded (max)	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2X	
3mm minimum switch contact gap	Yes	
Inserts	White	
Conformity/standards	BS EN 60669-1: 2000	

Ref : 45A Cooker Switch

Cooker switch as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm or 86mm x 146mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	45A resistive	
Terminal Capacity	1 x 16mm ² (max)	
Double Pole switching	Yes	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2X	
3mm minimum switch contact gap	Yes	
Inserts	Red	
LED Indicator	Optional	
Replaceable LED indicator	Yes	
Conformity/standards	BS EN 60669-1: 2000	

Ref: Fused Spur Outlet- Switched with flex outlet

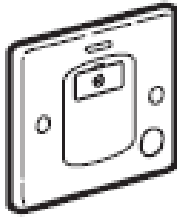
Switched fused spur with flex outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2X	
LED Indicator available	Yes	
Fuse Carrier	Screwdriver operated	
Fuse carrier able to be locked	Yes	
Conformity/standards	BS 1363: Part 4: 1995.	

Ref: Fused Spur Outlet- Unswitched with flex outlet

Unswitched fused spur with flex outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Urea moulded plastic with soft curved edge and chamfered top edge and 7mm rounded corners	
Finish	Made from high-grade thermoset material with inherent anti-bacterial property. Graphite colored front plate.	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2X	
LED Indicator available	Yes	
Fuse Carrier	Screwdriver operated	
Fuse carrier able to be locked	Yes	
Conformity/standards	BS 1363: Part 4: 1995.	

Ref: 1 & 2 Gang Metalclad Backboxes

1 & 2 Gang Metalclad Boxes as per technical specification below.



Element	Specification	Proposal
Dimensions	1 Gang: 86mm x 86mm	
	2 Gang: 86mm x 146mm	
Body	Heavy gauge steel	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Earth Terminal	Yes	
Knockouts	No knockouts on surface boxes	
Conformity/standards	BS 5733: 1995	
Manufacturer	Legrand Synergy Metalclad or Equivalent.	

Ref: 1-Gang Light Switch (this range to be used in plant room, external stores, switchroom etc.)

1 Gang Metalclad light switch as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Heavy Gauge Metal	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	10 or 20 amps	
Terminal Capacity	4 x 1 mm ² 4 x 1.5 mm ² 2 x 2.5 mm ²	
Ambient operating temperature	−5°C to +40°C	
IP Rating	IP2X	
3mm minimum switch contact gap	Yes	
Inserts	White	
Conformity/standards	BS EN 60669-1: 2000	
Manufacturer	Legrand Synergy Metalclad or Equivalent.	

Ref: 2-Gang Light Switch		
2 Gang Metalclad light switch as per technical specification below.		
		
Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Heavy Gauge Metal	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	10 or 20 amps	
Terminal Capacity	4 x 1 mm ² 4 x 1.5 mm ² 2 x 2.5 mm ²	
Ambient operating temperature	−5°C to +40°C	
IP Rating	IP2X	
3mm minimum switch contact gap	Yes	
Inserts	White	
Conformity/standards	BS EN 60669-1: 2000	
Manufacturer	Legrand Synergy Metalclad or Equivalent.	

Ref: 3-Gang Light Switch

3 Gang Metalclad light switch as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Heavy Gauge Metal	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	10 or 20 amps	
Terminal Capacity	4 x 1 mm ² 4 x 1.5 mm ² 2 x 2.5 mm ²	
Ambient operating temperature	−5°C to +40°C	
IP Rating	IP2X	
3mm minimum switch contact gap	Yes	
Inserts	White	
Conformity/standards	BS EN 60669-1: 2000	
Manufacturer	Legrand Synergy Metalclad or Equivalent.	

Ref: 20A Double Pole Switch

Metalclad 20A Double pole switch as per technical specification below



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Heavy Gauge Metal	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	20A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2X	
LED Indicator	Optional	
Conformity/standards	BS EN 60669-1	
Manufacturer	Legrand Synergy Metalclad or Equivalent.	

Ref: 1-Gang Un-switched Socket Outlet

1-gang Metalclad un-switched socket outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Heavy Gauge Steel	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility for use when installations require a high integrity protective connection as specified within BS 7671 : 2008 .	
Ambient operating temperature	−5°C to +40°C	
IP Rating	IP2XD	
3 pin operated “child resistant” safety shutter	Yes	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995	
Manufacturer	Legrand Synergy Metalclad or Equivalent	

Ref: 2-Gang Un-switched Socket Outlet

2-gang Metalclad un-switched socket outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 146mm	
Body	Heavy Gauge Steel	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility for use when installations require a high integrity protective connection as specified within BS 7671 : 2008 .	
Ambient operating temperature	–5°C to +40°C	
IP Rating	IP2XD	
3 pin operated “child resistant” safety shutter	Yes	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995	
Manufacturer	Legrand Synergy Metalclad or Equivalent	

Ref: 1-Gang Switched Socket Outlet

1-gang Metalclad switched socket outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Heavy Gauge Steel	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility for use when installations require a high integrity protective connection as specified within BS 7671 : 2008 .	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2XD	
3 pin operated "child resistant" safety shutter	Yes	
Offset Socket Switches	Yes	
LED Indicator	Optional	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995	
Manufacturer	Legrand Synergy Metalclad or Equivalent	

Ref: 2-Gang Switched Socket Outlet

2-gang Metalclad switched socket outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 146mm	
Body	Heavy Gauge Steel	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Earth Terminals	Two earth terminals to provide a double earth facility for use when installations require a high integrity protective connection as specified within BS 7671 : 2008 .	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	–5°C to +40°C	
IP Rating	IP2XD	
3 pin operated “child resistant” safety shutter	Yes	
Offset Socket Switches	Yes	
LED Indicator	Optional	
Socket Inserts	Tough thermoplastic	
Conformity/standards	BS 1363 Pt.2: 1995	
Manufacturer	Legrand Synergy Metalclad or Equivalent	

Ref : 45A Cooker Switch

Metalclad Cooker switch as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 146mm	
Body	Heavy Gauge Steel	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	45A resistive	
Terminal Capacity	1 x 16mm ² (max)	
Double Pole switching	Yes	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2X	
3mm minimum switch contact gap	Yes	
Inserts	Red	
LED Indicator	Optional	
Replaceable LED indicator	Yes	
Conformity/standards	BS EN 60669-1: 2000	
Manufacturer	Legrand Synergy Metalclad or Equivalent	

Ref: Fused Spur Outlet- Switched with flex outlet

Metalclad Switched fused spur with flex outlet as per technical specification below.



Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Heavy Gauge Steel	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2X	
LED Indicator available	Yes	
Fuse Carrier	Screwdriver operated	
Fuse carrier able to be locked	Yes	
Conformity/standards	BS 1363: Part 4: 1995.	
Manufacturer	Legrand Synergy Metalclad or Equivalent	

Ref: Fused Spur Outlet- Unswitched with flex outlet

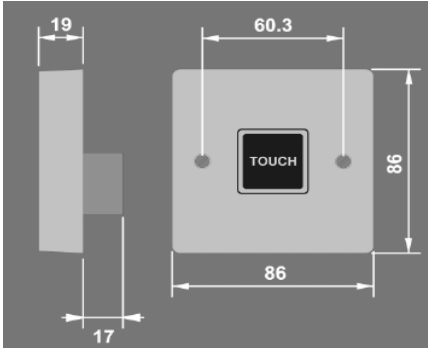
Metalclad Unswitched fused spur with flex outlet as per technical specification below.

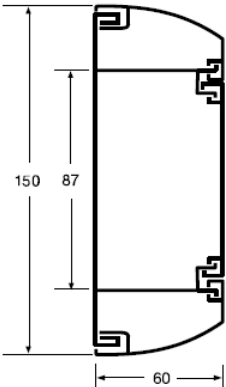


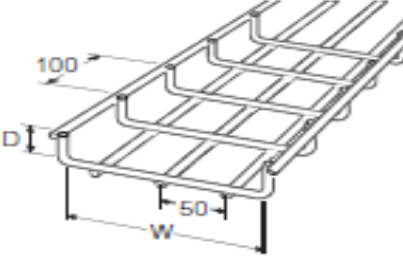
Element	Specification	Proposal
Dimensions	86mm x 86mm	
Body	Heavy Gauge Steel	
Finish	Grey epoxy coated steel as per Legrand Synergy Metalclad	
Voltage Rating	250V a.c.	
Current Rating	13A	
Terminal Capacity	2 x 6mm ² stranded (max)	
Double Pole Switching	Double pole switching (neutral makes first, breaks last).	
Ambient operating temperature	-5°C to +40°C	
IP Rating	IP2X	
LED Indicator available	Yes	
Fuse Carrier	Screwdriver operated	
Fuse carrier able to be locked	Yes	
Conformity/standards	BS 1363: Part 4: 1995.	
Manufacturer	Legrand Synergy Metalclad or Equivalent	

Ref: 1-Gang Time Delay Switch

1-gang time delay switch as per technical specification below. Shown as reference TDL on lighting drawing.

Element	Specification	Proposal
Dimensions	 86mm x 86mm	
Body	Flame retardant ABS	
Finish	White	
Voltage Rating	220-240 Volts AC 50 Hz	
Current Rating	10 amps	
Time Delay Period	20 seconds to 20 minutes	
Terminal Capacity	1 x 4mm ² (max)	
Ambient operating temperature	-10°C to +35°C	
Conformity/standards	EMC-89/336/EEC LVD-73/23/EEC	
Manufacturer	CP Electronics	

Ref: Dado Trunking		
 Dado trunking as per technical specification below.		
Element	Specification	Proposal
Dimensions	 150mm x 60mm	
Body	High impact self-extinguishing uPVC	
Finish	White (RAL)	
Body, lids and dividers included in 3m lengths	Yes	
Compartments	3	
Pre-drilled holes	Yes	
Fitting Allowances	End caps, Internal angles, External angle, Flat angle, Flat tee, Bridge for flat tee.	
Fittings movement allowance	External and internal angles shall allow for a movement of +/- 5° whilst allowing for a 50mm bend radius to be maintained	
Continuous 50mm bend radius?	External, Internal, Flat Bends and Tees shall provide for a 50mm bend radius with Tees having multi-configurable bridge inserts	
Internal angles, external angles and joint covers	Shall feature safe and secure fixing by way of recessed self drilling screws covered with "teardrop" caps	
Maximum box depth	50mm deep, one and two gang uPVC wiring accessory mounting boxes	
Conformity/standards	BS4678: Part 4, BS EN ISO9001, BS 7671, BS 6701 (2004), Cenelec (BSEN50173/EN50173), ANSI/TIA/EIA568B, TIA569B, ISO/IEC11801, Part M DDA	

Ref: Galvanised Steel Wire Cable Tray		
 Galvanised steel wire cable tray as per technical specification below.		
Element	Specification	Proposal
Dimensions	 Various Sizes	
Body	Heavy gauge steel hot dip galvanised after manufacture.	
Standard Lengths	3m	
Weight	100mm @ 0.713kg/m, 50mm @ 0.632kg/m	
Additional Fittings to be used	Multiple support mounting options and 90Deg mesh tray bends with 55mm side heights.	
Conformity/standards	BS EN 61537, BS EN ISO 1461	

4 LIGHTING (63)

4.1 NOTES

4.1.1 General

The contractor is strongly advised to read the following notes on light fittings as well as the notes following this schedule:

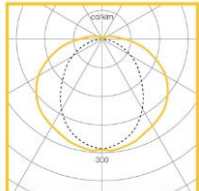
- Where names of manufacturers and types of equipment are stated, these are for the purposes of making clear the nature and quality of equipment that is required. Where no reason is given for the exclusive use of such equipment, the Contractor is at liberty to offer goods of equal quality, appearance, workmanship and design from any other manufacturers, provided that such alternatives are wholly compliant with the specification and schedules.
- Adjustable fixing brackets shall be used/supplied to fit all Surface Mounted Fluorescent Luminaire in order to clear ceiling tile.
- Where specific manufacturers are listed, these are provided purely to offer an indication of manufacturers that offer the products listed.
- Alternatives will be accepted if the alternatives comply with the technical requirements listed below and are of the same general appearance as the fittings shown within the photographic images included.
- The Contractor shall ensure that the light fittings offered have no more than a Maximum artificial lighting power consumption level of 2.5watt/m² per 100lux. It shall be the responsibility of the contractor to check and verify that equipment proposed fully meets the specification.
- Any items installed that do not meet the specification shall be removed and replaced at no cost to the contract.
- Approval in principle will only be given when the contractor has submitted a fully itemised comparison schedule for each proposed product set out clearly against the tender specification together with all necessary supporting relevant technical information to prove evidently that the product being proposed by the contractor meets the required specification.
- All luminaires to be complete with necessary lamps and of the quantities indicated. The contractor is advised to check and ensure that the correct lamps are included in the supply of fittings.
- All IP ratings shall be maintained and demonstrated if necessary.
- Fluorescent lamps shall be as per Philips Lighting Ltd (or equivalent) T5 colour temperature of 4000K and comply with EN 60081. All fluorescent lamps shall have a colour rating Ra not less than 80.
- All lamps shall be manufactured by Philips Lighting Ltd., GE or equivalent
- All light fittings used for emergency functions shall comply with thermal criteria established in BS 4533.T02.2. and EN60598.2.22
- Green LED indicators on all emergency fittings shall be provided.

4.1.2 Luminaires Proposals

The contractor shall submit to the Employer's Representative for approval the following information and luminaire details in order to demonstrate fully that the proposed luminaire meets the performance objectives and design parameters outlined within this specification, accompanying drawings and schedule of luminaires and lamps documented below:

- Samples of equivalent luminaires (and to be fully operational, lamped and wired)
- Full technical luminaire specifications, including:
 - a) Calculations for sample areas of the installation including details of the assumed maintenance factors, interior surface reflectance, lamp type and details, and lumen outputs.
 - b) Luminaire photometric performance including Light Output Ratios and Polar curves.
 - c) Technical specification including materials and construction information.
 - d) Lamp types Luminaire weights and required mounting details for operation and installation (including remote gear or battery pack information where applicable).
 - e) Luminaire dimensions including recess space requirements (including remote gear or battery pack information where applicable), are co-ordinated and suitable for all architectural details and ceiling designs.
- Demonstration of full co-ordination and compatibility with architect's installation details, available supporting and/or fixing elements, recess spaces and ceiling designers shall remain the responsibility of the contractor
- Proof of availability of spare parts in the Republic of Ireland.
- Photographic illustration - to demonstrate the proposed luminaires aesthetic coherence with the architecture and other luminaires.
- Proof of meeting all relevant standards and CE Marking, manufacturers Declaration of Conformity, proof of the manufacturer's CENELEC Agreement Licence / ENEC Certification
- Proof that proposed luminaires are fully compatible with the lighting controls.

4.1 LUMINAIRE SCHEDULES

Ref: A1		
 Surface mounted anti-corrosive luminaire.		
Element	Specification	Proposal
Lamp Position	Standard	
Lamp Colour temperature	4000k	
Luminaire luminous flux	4628lm	
Luminaire Efficacy	158lm/W	
Colour Rendering Index min	80	
UGR	<19	
Control Gear	Fixed output	
Total Connected Load	29W	
Chromaticity Tolerance	3	
Luminaire LOR	100%	
Luminaire ULOR	0%	
Luminaire DLOR	100%	
IP Rating	IP66 minimum	
Dimensions	1280 x 145 x 100 mm	
Impact Resistance	IK03	
Body	High impact polycarbonate	
Diffuser	High impact polycarbonate injection moulded opal diffuser	
Mounting	Surface	
Rated Median Useful Life	L90B50 52,000	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Whitcroft ACL Industry or equivalent and approved	

Ref: B1



Recessed LED modular fitting as per technical specification below.

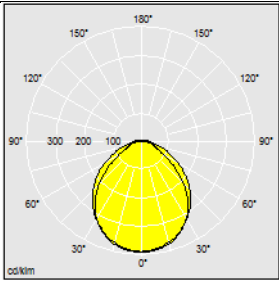
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	30W	
Lamp Colour temperature	4000k	
Luminaire luminous flux	4388lm	
Luminaire Efficacy	146lm/W	
Colour Rendering Index min	80	
UGR	<19	
Control Gear	Electronic DALI digital dimming control gear to 1%	
Total Connected Load	30W	
Chromaticity Tolerance	3	
Luminaire LOR	100%	
Luminaire ULOR	0%	
Luminaire DLOR	100%	
IP Rating	IP44 minimum	
Dimensions	597 x 597 x 57 mm	
Impact Resistance	IK03	
Body	White enamelled sheet steel	
Diffuser	Microprism louvre in UV stabil polystyrene	
Mounting	Recessed	
Rated Median Useful Life	L100B50 100,000hr	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Fagerhult Multilume Slim Delta 4400lm or equal and approved	

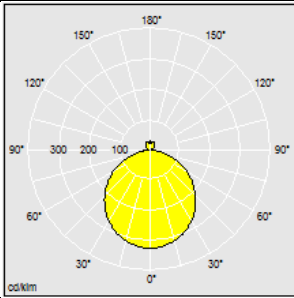
Ref: C1

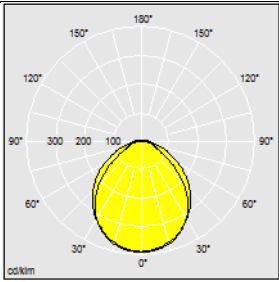


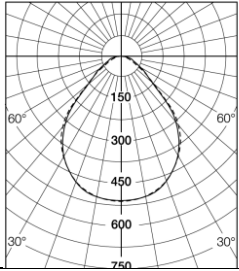
Recessed LED modular fitting as per technical specification below.

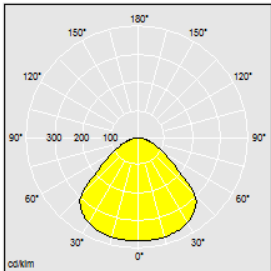
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	16W	
Lamp Colour temperature	4000k	
Luminaire luminous flux	1974lm	
Luminaire Efficacy	119lm/W	
Colour Rendering Index min	80	
UGR	<19	
Control Gear	Electronic DALI control gear	
Total Connected Load	16W	
Chromaticity Tolerance	3	
Luminaire LOR	100%	
Luminaire ULOR	0%	
Luminaire DLOR	100%	
IP Rating	IP44 minimum	
Dimensions	173mm dia	
Impact Resistance	IK03	
Body	Graphile embedded heatsink	
Diffuser	UV-stabilised polycarbonate microprismatic optic	
Mounting	Recessed	
Rated Median Useful Life	50000h L90 at 25°C	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Whitecroft Mirage 3 165 or equal and approved	

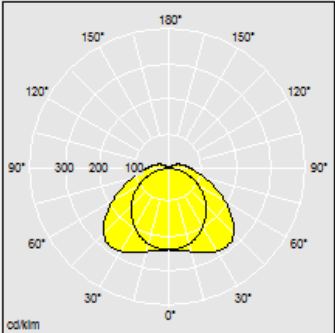
Ref: G3		
 Surface mounted LED modular fitting as per technical specification below.		
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	1 x 28W LED	
Lamp Colour temperature	4000k	
Luminaire luminous flux	4000lm	
Luminaire Efficacy	145lm/W	
Colour Rendering Index min	80	
UGR	<19	
Control Gear	Electronic DALI digital dimming control gear to 1%	
Total Connected Load	28W	
Chromaticity Tolerance	3	
Luminaire LOR	100%	
Luminaire ULOR	8%	
Luminaire DLOR	92%	
IP Rating	IP66 minimum	
Dimensions	735 x 180 x 95 mm	
Impact Resistance	IK10	
Body	White painted steel	
Diffuser	Clear prismatic polycarbonate diffuse	
Mounting	Surface	
Rated Median Useful Life	50000h L80 at 25°C	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Thorn ForceLED 4000 840 HF or equivalent	

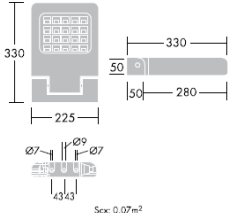
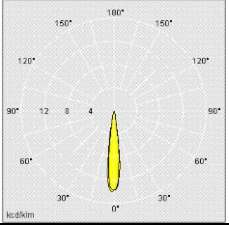
Ref: D		
 Surface mounted linear LED as per technical specification below. Emergency Version c/w 3Hr Battery Pack "E3"		
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	18W	
Total Luminous Flux	2652W	
Luminaire Efficacy	147lm/W	
Colour Rendering Index min	80	
Control Gear	fixed output control gear	
Total Connected Load	18W	
Luminaire LOR	100%	
Luminaire ULOR	9%	
Luminaire DLOR	91%	
IP Rating	IP44	
Dimensions	Ø400 mm	
Impact Resistance	IK08	
Body	White enamelled aluminium	
Diffuser	Opal polycarbonate diffuser	
Mounting	Surface	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Fagerhult Discovery EVO High or equal and approved	

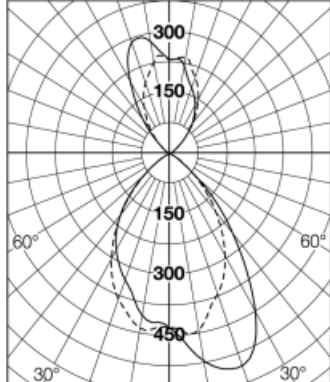
Ref: F		
		
Surface mounted LED modular fitting as per technical specification below. F* for emergency		
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	1 x 28W LED	
Lamp Colour temperature	4000k	
Luminaire luminous flux	4000lm	
Luminaire Efficacy	145lm/W	
Colour Rendering Index min	80	
UGR	<19	
Control Gear	Electronic DALI digital dimming control gear to 1%	
Total Connected Load	28W	
Chromaticity Tolerance	3	
Luminaire LOR	100%	
Luminaire ULOR	8%	
Luminaire DLOR	92%	
IP Rating	IP66 minimum	
Dimensions	735 x 180 x 95 mm	
Impact Resistance	IK10	
Body	White painted steel	
Diffuser	Clear prismatic polycarbonate diffuse	
Mounting	Surface	
Rated Median Useful Life	50000h L80 at 25°C	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Thorn ForceLED 4000 840 HF or equivalent	

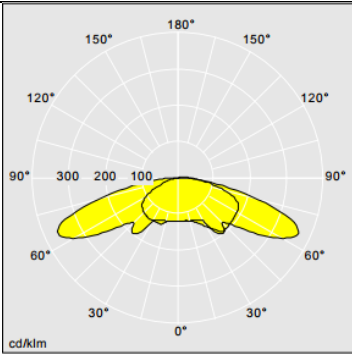
Ref: H		
 Surface mounted LED modular fitting as per technical specification below.		
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	32.5W	
Lamp Colour temperature	4000k	
Luminaire luminous flux	4508lm	
Luminaire Efficacy	150lm/W	
Colour Rendering Index min	80	
UGR	<19	
Control Gear	Electronic DALI digital dimming control gear	
Total Connected Load	35W	
Chromaticity Tolerance	3	
Luminaire LOR	100%	
Luminaire ULOR	5%	
Luminaire DLOR	95%	
IP Rating	IP20	
Dimensions	610 x 610 x 60 mm	
Impact Resistance	IK05	
Body	White enamelled sheet steel	
Diffuser	Microprism louvre in UV stabil polystyrene	
Mounting	Surface	
CLO	100,000hrs @ L100	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Fagerhult Multilume Slim Ceiling or equal and approved	

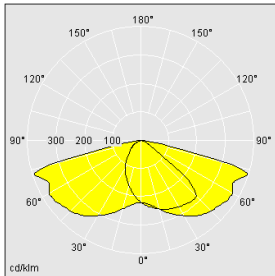
Ref: I		
 Recessed LED modular fitting as per technical specification below.		
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	30W	
Lamp Colour temperature	4000k	
Luminaire luminous flux	2390lm	
Luminaire Efficacy	115lm/W	
Colour Rendering Index min	80	
UGR	<19	
Control Gear	Electronic DALI digital dimming control gear to 1%	
Total Connected Load	30W	
Chromaticity Tolerance	3	
Luminaire LOR	100%	
Luminaire ULOR	0%	
Luminaire DLOR	100%	
IP Rating	IP44 minimum	
Dimensions	597 x 597 x 57 mm	
Impact Resistance	IK03	
Body	White enamelled sheet steel	
Diffuser	Microprism louvre in UV stabil polystyrene	
Mounting	Recessed	
Rated Median Useful Life	L100B50 100,000hr	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Fagerhult Multilume Slim Delta 2390lm or equal and approved	

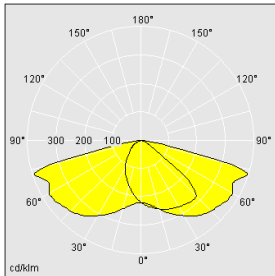
Ref: M		
 Surface mounted industrial luminaire as per technical specification below. Emergency Version c/w 3Hr Battery Pack "E3"		
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	32.6W LED	
Total Luminous Flux	4520lm	
Luminaire Efficacy	139lm/W	
Colour Rendering Index min	80	
Control Gear	HF Electronic	
Total Connected Load	32.6W	
Luminaire LOR	100%	
Luminaire ULOR	8%	
Luminaire DLOR	92%	
IP Rating	IP66	
Dimensions	1600 x 92 x 90 mm	
Impact Resistance	IK08	
Body	Light grey polycarbonate	
Diffuser	High transmission opal polycarbonate	
Mounting	Surface	
Gear Cover	Yes, to cover and protect all components	
Optics/ Photometrics		
Manufacturer	Thorn Aquaforce Pro / AQFPRO L LED4300-840 PC WB HF or equivalent	

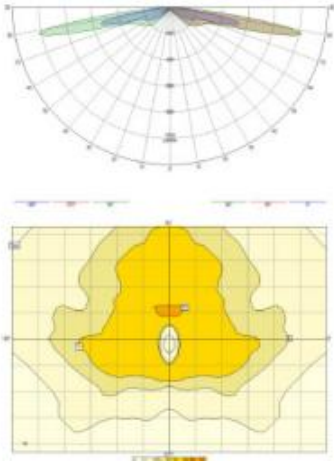
Ref: L		
		
Surface mounted LED luminaire as per technical specification below.		
Element	Specification	Proposal
Lamp Position	Surface	
Lamps	LED	
Colour temperture	4000k	
Total Luminous Flux	4710 lm	
Luminaire Efficacy	104lm/W	
Control Gear	HF	
Total Connected Load	45W	
Lambda	0.9	
Luminaire LOR	100%	
Luminaire ULOR	0%	
Luminaire DLOR	100%	
IP Rating	IP65	
Impact Resistance	IK08	
Dimensions		
Body	Die-cast aluminium	
Diffuser	Clear Polycarbonate (PC).	
Mounting	Surface	
Optics/ Photometrics		
Manufacturer	Thorn OLSYS or equivalent	

Ref: X		
 Surface mounted wall luminaire with up and down lights.		
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	26W	
Total Luminous Flux	2604lm	
Luminaire Efficacy	100lm/W	
Colour Rendering Index min	80	
Total Connected Load	26W	
Initial MacAdam	3	
IP Rating	IP66	
Dimensions	205x75x244	
Impact Resistance	IK10	
LED Failure rate	1000000/10	
Body	Die casted aluminium	
Diffuser/cover	Glass or PMMA	
Mounting	Surface	
Optics/ Photometrics		
Manufacturer	Fagerhult Rondo G3 Twin Wall or equal and approved	

Ref: Y		
 Wall mounted vandal resistant luminaire as per technical specification below.		
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	1 x 25W LED	
Total Luminous Flux	2900lm	
Luminaire Efficacy	116lm/W	
Colour Rendering Index min	80	
Total Connected Load	25W	
Initial MacAdam	5	
Luminaire LOR	100%	
Luminaire ULOR	3%	
Luminaire DLOR	97%	
IP Rating	IP65	
Dimensions	242 x 218 x 337 mm	
Impact Resistance	IK10	
Rated Median Useful Life	60000hrs @25 degrees C	
Body	Die cast aluminium with an anthracite finish	
Diffuser/cover	Prismatic polycarbonate diffuser, aluminium reflector.	
Mounting	Surface (Wall)	
Optics/ Photometrics		
Manufacturer	Thorn Piazza II LED or equivalent	

Ref: Type Z1		
		LED Road light for use in urban & residential streets, paths, car parks etc.
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	16 LED's	
Total Luminous Flux	3500 lm	
Luminaire Efficacy	139lm/W	
Colour Rendering Index min	>70	
Column Requirements	6M post top bracket & column power coated same RAL finish as luminaire	
Total Connected Load	44w	
Lambda	0.95	
LOR	1	
ULOR	0	
DLOR	1	
IK Rating	IK10	
IP Rating	IP66	
Body	Die cast aluminium	
Diffuser	Tempered flat glass	
Mounting	Ø60mm side entry with 0° tilt. Adjustable to -5° tilt or post-top with 5° or 10° tilt.	
Chromaticity tolerance	5	
Rated useful median life	100,000hrs L90, B10 @ 25°C	
Optics/ Photometrics		
Reference Manufacturer	Urbis Axia 3.1 5267 16 LED oslon square giant @480mA	

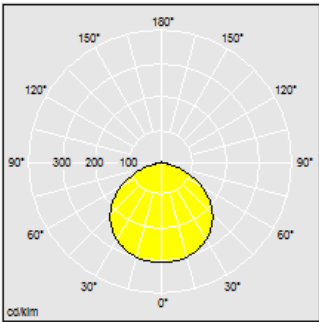
Ref: Type Z2		
		LED Road light for use in urban & residential streets, paths, car parks etc.
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	24 LED's	
Total Luminous Flux	3500 lm	
Luminaire Efficacy	139lm/W	
Colour Rendering Index min	>70	
Column Requirements	6M post top bracket & column power coated same RAL finish as luminaire	
Total Connected Load	52W	
Lambda	0.95	
LOR	1	
ULOR	0	
DLOR	1	
IK Rating	IK10	
IP Rating	IP66	
Body	Die cast aluminium	
Diffuser	Tempered flat glass	
Mounting	Ø60mm side entry with 0° tilt. Adjustable to -5° tilt or post-top with 5° or 10° tilt.	
Chromaticity tolerance	5	
Rated useful median life	100,000hrs L90, B10 @ 25°C	
Optics/ Photometrics		
Reference Manufacturer	Urbis Axia 3.2 5267 24 LED oslon square giant @480mA	

Ref: Type Z2		
		LED Bollard as per technical specification below
Element	Specification	Proposal
Lamp Position	Standard	
Lamps	8 LED's	
Total Luminous Flux	800 lm	
Luminaire Efficacy	70lm/W	
Column Requirements	1M bollard, galvanised steel base with cast aluminium housing and access door on column	
Total Connected Load	11W	
IK Rating	IK10	
IP Rating	IP66	
Dimensions	1000 x 224 mm	
Body	Die cast aluminium	
Diffuser	Tempered flat glass	
Mounting	Root / flange plate	
Optics/ Photometrics		
Reference Manufacturer	Schreder Pharos Bollard or equivalent	

Ref: Type EA & EB

Ultra slim, LED exit sign with 3 hour, non-maintained, manual test emergency lighting circuit. For ceiling or wall mounting. Body: aluminium. Blade: thin plastic. Class I electrical, IP30. Suitable for small area use with viewing distances up to 23m

Element	Specification	Proposal
Lamp Position	Standard	
Lamps	LED	
Total Luminous Flux	60 lm	
Luminaire Efficacy	N/A	
Colour Rendering Index min	N/A	
Control Gear		
Total Connected Load	2.2w	
Lambda	N/A	
LOR	0	
ULOR	0%	
DLOR	0	
IK Rating	N/A	
IP Rating	IP30	
Dimensions	268 x 42 x 192 mm	
Body	Aluminium, silver finish	
Diffuser	Perspex®	
Mounting	For ceiling or wall mounting	
End Caps	N/A	
Gear Tray	N/A	
Reference Manufacturer	Thorn VOYAGER BLADE EXIT E3NM MSF or Equivalent	

Ref: Type EX1		
 LED safety luminaire with antipanic optic for surface, wall or ceiling mounting.		
Element	Specification	Proposal
Colour Temp	6500k	
Lamp Position	Standard	
Lamps	LED	
Total Luminous Flux	165 lm	
Luminaire Efficacy	69 lm/W	
Colour Rendering Index min	6500k	
Total Connected Load	2.5w	
Lambda	N/A	
IK Rating	IK03	
IP Rating	IP65	
Dimensions	336 x 54 x 59 mm	
Body	White Polycarbonate	
Diffuser	Clear Polycarbonate®	
Mounting	External wall mounting	
End Caps	N/A	
Gear Tray	N/A	
Optics/ Photometrics		
Reference Manufacturer	96631598 VOYAGER One LED IP65 or Equivalent	

Ref: E3		
	Non-maintained emergency twin spot as per technical specification below.	
Element	Specification	Proposal
Max Dimensions	330 x 325 x 69 (mm)	
Lamps	2 x 50W Tungsten Halogen	
Battery Charger	Automatic, current limited, constant voltage	
Charging Monitor	High-intensity L.E.D	
Recharge Period	24-hours for full 3-hr recharge	
IP Rating	IP42	
Battery	12V 14Ah rechargeable high-temp	
Power Consumption	100VA	
Complies with EN 60598.2.22	Yes	
Base Colour	White	
Body	White powder coated sheet steel	
Mounting	Surface (wall)	
Warranty	3-years	

Ref: EM1		
		
3-hour non-maintained recessed self-contained LED emergency luminaire as per technical specification below.		
Element	Specification	Proposal
Dimensions	85ø x 28 (mm)	
Lamps	1x2.7W L.E.Ds	
Total power	5W	
Emergency lumens level	93 lm	
Luminaire LOR	90%	
Luminaire ULOR	1%	
Luminaire DLOR	89%	
Luminaire Efficacy	17 lm/W	
Lamp Efficacy	19 lm/W	
Optics	Open area	
Control Gear	DALI	
Testing	3-hour manual test	
Inverter	Solid state, constant current high-power LED driver	
Battery Charger	276mA current fast charger	
Charging Monitor	Green charge L.E.D	
Recharge Period	20-hours for full 3-hr recharge	
IP Rating	IP40	
Battery	Rechargeable high-temp Ni-Mh batteries	
Complies with EN 60598.2.22	Yes	
Body	Die-cast aluminium, powder-coated white.	
Base/body Colour	White	
Diffuser/cover	As per body.	
Mounting	Recessed	
Warranty	5-years (Battery 3 year)	
Manufacturer	Thorn VOYAGER STAR LED AREA MRE E3M WHI or Equivalent	

Ref: EM2		
	3-hour non-maintained recessed self-contained LED emergency luminaire as per technical specification below.	
Element	Specification	Proposal
Dimensions	Ø85 x 46 (mm)	
Lamps	1x2.7W L.E.Ds	
Total power	5W	
Emergency lumens level	93 lm	
Luminaire LOR	84%	
Luminaire ULOR	0%	
Luminaire DLOR	84%	
Luminaire Efficacy	16 lm/W	
Lamp Efficacy	19 lm/W	
Optics	Escape route	
Control Gear	DALI	
Testing	3-hour manual test	
Inverter	Solid state, constant current high-power LED driver	
Battery Charger	276mA current fast charger	
Charging Monitor	Green charge L.E.D	
Recharge Period	20-hours for full 3-hr recharge	
IP Rating	IP40	
Battery	Rechargeable high-temp Ni-Mh batteries	
Complies with EN 60598.2.22	Yes	
Body	Die-cast aluminium, powder-coated white.	
Base/body Colour	White	
Diffuser/cover	As per body.	
Mounting	Recessed. Suitable for mounting heights up to 7-metres.	
Warranty	5-years (Battery 3 year)	
Manufacturer	Thorn Voyager Star LED ROUTE MRE E3M WHI or Equivalent	

Ref: EM3		
	3-hour non-maintained recessed self-contained LED emergency luminaire as per technical specification below.	
Element	Specification	Proposal
Dimensions	Ø85 x 46 (mm)	
Lamps	1x2.7W L.E.Ds	
Total power	5W	
Emergency lumens level	93 lm	
Luminaire LOR	84%	
Luminaire ULOR	0%	
Luminaire DLOR	84%	
Luminaire Efficacy	16 lm/W	
Lamp Efficacy	19 lm/W	
Optics	Point of emphasis	
Control Gear	DALI	
Testing	3-hour manual test	
Inverter	Solid state, constant current high-power LED driver	
Battery Charger	276mA current fast charger	
Charging Monitor	Green charge L.E.D	
Recharge Period	20-hours for full 3-hr recharge	
IP Rating	IP40	
Battery	Rechargeable high-temp Ni-Mh batteries	
Complies with EN 60598.2.22	Yes	
Body	Die-cast aluminium, powder-coated white.	
Base/body Colour	White	
Diffuser/cover	As per body.	
Mounting	Recessed. Suitable for mounting heights up to 7-metres.	
Warranty	5-years (Battery 3 year)	
Manufacturer	Thorn Voyager Star LED ROUTE MRE E3M WHI or Equivalent	

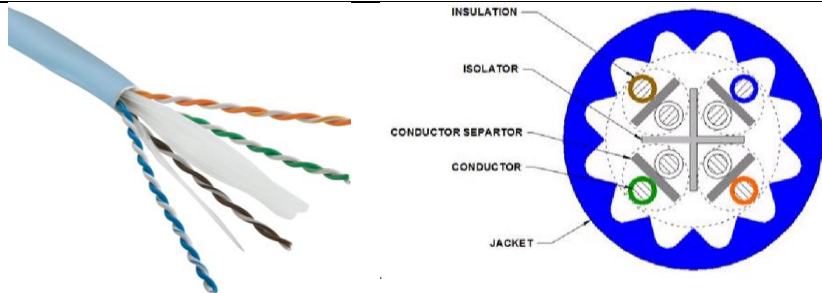
Ref: EM4		
		3-hour non-maintained surface self-contained LED emergency luminaire as per technical specification below.
Element	Specification	Proposal
Dimensions	Ø85 x 46 (mm)	
Lamps	1x2.7W L.E.Ds	
Total power	5W	
Emergency lumens level	93 lm	
Luminaire LOR	84%	
Luminaire ULOR	0%	
Luminaire DLOR	84%	
Luminaire Efficacy	16 lm/W	
Lamp Efficacy	19 lm/W	
Optics	Point of emphasis	
Control Gear	DALI	
Testing	3-hour manual test	
Inverter	Solid state, constant current high-power LED driver	
Battery Charger	276mA current fast charger	
Charging Monitor	Green charge L.E.D	
Recharge Period	20-hours for full 3-hr recharge	
IP Rating	IP40	
Battery	Rechargeable high-temp Ni-Mh batteries	
Complies with EN 60598.2.22	Yes	
Body	Die-cast aluminium, powder-coated white.	
Base/body Colour	White	
Diffuser/cover	As per body.	
Mounting	Surface	
Warranty	5-years (Battery 3 year)	
Manufacturer	Thorn Voyager Star LED or Equivalent	

4.2 LIGHTING CONTROLS

Ref: S1,S2,S3,S4		
 Ceiling mounted microwave presence detector as per technical specification below. The OccuSwitch DALI is a combined sensor and controller. It will dim and switch the lights in a room or area on occupancy and available daylight, with options for local override, parallel operation and network links to Building Management Systems (BMS)		
Element	Specification	Proposal
Voltage	230 VAC +/-10%; 50/60Hz	
Stand by Power	< 1W (Without Dali Load)	
Max Power	2.4 W (with 15 ballasts)	
Connector Screw Terminal	MRT3P7.62-3VE or GMVSTBW2.5/3-ST-7.62	
Wire Range	0.5 to 2.5 mm ²	
Mains Distribution System	TN-S, 16A max, with Neutral grounded	
Power Consumption	Stand-by 1.2 W Max. 1.2 W	
Parallel Interface	Up to 22 units in parallel Free Topology Wiring Polarity sensitive	
BMS Interface	Hardware DALI compatible Reduced DALI command set Up to 64 units in parallel (depending on control device used as master) Free Topology and polarity	
LED Indicator		
Switch off Delay	1,5,10,15,20,25,30,35* minutes * OmniProg only	
Light Levels	250 to 1000 Lux (30% reflection)	
Detector Range	The OccuSwitch DALI detection pattern is 4 by 5 meters for small movements (desk work) and 6 by 8 meters for larger movements like walking.	
Delay time occupancy control	With the rotary it is possible to select a delay time of either 70s, 5 till 30 min (in steps of 5 minutes).	
Operating Temperature	5 to 50 °C	
Operating Relative humidity	20% to 90%; no condensation	
Programming	Remote control handset	
Conformity/standards	EMC-89/336/EEC; LVD-73/23/EEC EN/IEC 60669-2-1 Electronic switches	
Manufacturer	Philips Occuswitch or equal & approved.	

5 COMMUNICATIONS (64)

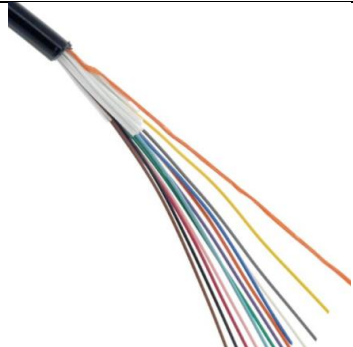
5.1 EQUIPMENT SCHEDULES

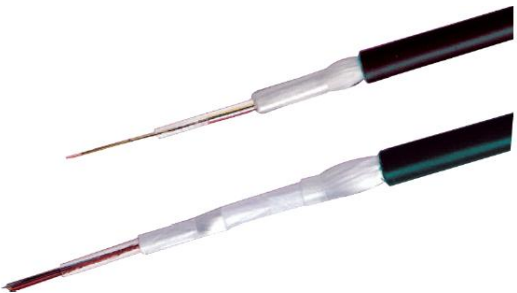
Ref: Cat6A Cabling  Cat6A U/UTP Cable as per technical specification below.		
Element	Specification	Proposal
Cable Type	U/UTP (unshielded)	
Pairs	4	
Jacket Material	(LSZH) Low Smoke Zero Halogen	
Jacket Colour	White	
Conductor	23 AWG Solid copper	
Insulation	Polyolefin	
Separator	Polyolefin	
Outer Diameter	7.239mm	
ANSI/TIA Category	6A	
Operating Frequency (Maximum)	550MHz	
Operating Voltage (Maximum)	80V	
Reel Length	305m	
Compliance/ Standards	ANSI/TIA568C.2 ISO/IEC 11801 Class EA IEC 607542 IEC 60332322 IEC 610342 RoHS 2002/95/EC Compliant ISO 9001:2008	
Manufacturer	"Commscope GigaSPEED®X10D 3091B" or equivalent	

Ref: 42U Communications Cabinet

42U Communications Cabinet as per technical specification below

Element	Specification	Proposal
Size	42U, 1000mm wide x 1000mm deep – DCC 42U, 800mm wide x 800mm deep – IDF	
Front Door	Glazed with security locking system	
Rear Door	Steel ventilated, wire mesh with security locking system	
Side Panels	Lockable side panels	
Top Cover	Ventilated	
Cable Tray	Yes	
Cable Management	1U for every 48 RJ45 ports installed	
19" Panel Mounts Front and Rear	Yes	
Cross Member Supports	Yes	
2No. Internal Shelves	Yes	
1 x 4 way low-noise fan	Yes	
Retractable Cabinet Feet	Yes, castors for transport only	
Power Unit	2 x 9-way 13-AMP power distribution unit – powered from dedicated 20A circuit	
Safety Earthing Kit	Yes	

Ref: Multimode Fibre Optic Cable		
 Multimode fibre optic cable as per technical specification below		
Element	Specification	Proposal
Grade	Internal/ External	
Type	62.5/125µm Multimode Fibre	
Bandwidth	200/ 600MHz.km	
Loose Tube	Ø 2.8 mm Jelly filled loose tube (≤ 16 fibres) Ø 3.5 mm Jelly filled loose tube (24 fibre)	
Strength member	Waterblocked E - Glass rovings	
Jacket	1.1 mm black, Halogen free, flame resistant thermoplastic sheathing compound acc. to EN 50290 - 2 - 27, UV stabilised	
Temperature Range	• Operation: -30°C to +60°C • Installation: -30°C to +60°C	
Water Penetration	No water on free end	
Nominal Diameter	• 4-16 Cores: 6mm • 24 Core: 6.5mm	
Standards/ Conformity	IEC 60793 - 2 - 10 Category A1b EN 50173 - 1 category OM1 IBMTM Fibre Optic Channel Links; ESCONTM ISO / IEC 11801 category OM1 IEEE 802.3 TIA / EIA - 492 AAAA EN 60793 - 2 - 10: type A1b ANSI / TIA / EIA - 568 - B.3	

Ref: Singlemode Fibre Optic Cable		
 Singlemode fibre optic cable as per technical specification below		
Element	Specification	Proposal
Grade	Internal/ External	
Type	9/125µm Multimode Fibre	
Bandwidth	200/ 600MHz.km	
G.652.D Compliant	Yes	
Loose Tube	Ø 2.8 mm Jelly filled loose tube (≤ 16 fibres) Ø 3.5 mm Jelly filled loose tube (24 fibre)	
Strength member	Waterblocked E - Glass rovings	
Jacket	1.1 mm black, Halogen free, flame resistant thermoplastic sheathing compound acc. to EN 50290 - 2 - 27, UV stabilised	
Temperature Range	• Operation: -30°C to +60°C • Installation: -30°C to +60°C	
Water Penetration	No water on free end	
Nominal Diameter	• 4-16 Cores: 6mm • 24 Core: 6.5mm	
Standards/ Conformity	IEC / EN 60793 - 2 - 50 Category B.1.3 EN 50 173 - 1:2007, cat. OS2 and OS1 ITU - T Recommendation G.652.D and C, B, A ISO / IEC 11801:2002, cat. OS1 IEEE 802.3 - 2002 incl. 802.3ae ISO / IEC 24702: 2006, cat. OS2 and OS1	

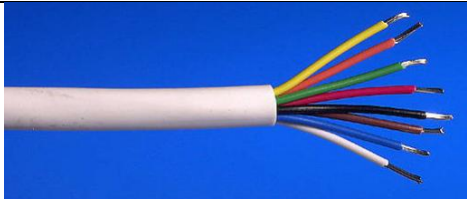
Ref: Multicore 50 Pair Telecom Cable		
 Multicore 50 pair telecom cable as per technical specification below		
Element	Specification	Proposal
Type	CW1308	
Construction	5 x 10PR + E(earth wire)	
Conductor	Class 1 solid annealed plain copper 0.5mm	
Insulation	PVC (Polyvinyl Chloride)	
Seperator	PETP (Polyethylene Terephthalate)	
Sheath	LSF (Low Smoke and Fume)	
Sheath Colour	White or grey	
Earth Conductor	Yes, 1.38mm plain copper	
Temperature Range	0°C to +70°C	
Operating Temperature Range	-20°C to +60°C	
Minimum Bend Radius	8 x Overall diameter	
Nominal/ Overall Diameter	14mm	
Standards/ Conformity	BS6746	
Manufacturer	"Excel Internal Grade LSF Cable CW1308" or equivalent	

Ref: Multicore External Telecom Cable		
 Multicore External telecom cable as per technical specification below		
Element	Specification	Proposal
Type	CW1128	
Construction	Twisted pair cable	
Conductor	Class 1 solid annealed plain copper 0.5mm	
Insulation	Foam Skin HDPE material	
Insulation Diameter	0.90 mm nominal	
Sheath	Polyethylene	
Sheath Colour	Black	
Petroleum Jelly Filled	Yes	
UV & Moisture Resistant	Yes	
Manufacturer	"Excel External Grade Cable CW1128" or equivalent	

6 SECURITY PROTECTION (66)

6.1 EQUIPMENT SCHEDULES

Refer to Project Particulars, electrical drawings all other schedules specification Parts.

Equipment Schedules Ref: 8 Core Alarm Cable		
		8 Core alarm cable as per technical specification below.
Element	Specification	Proposal
Cores	8	
Strands Per Core	7	
Strand Diameter	0.2mm	
Conduction Area	0.22mm	
Core Gauge	24 AWG	
Conductor Material	Annealed tinned copper	
Insulation Thickness	0.3mm	
Sheath Material	PVC	
Sheath Colour	White	
Max Voltage	50V RMS	
Max Current	1 Amp	
Max Operating Temperature	+70°C	
Core Resistance	92 Ω/km	
Standards/ Conformity	BS4737, Section 3.30.	

Ref: Anti-mask Dual Technology Detector		
Anti-mask Dual Technology Detector as per technical specification below.		
Element	Specification	Proposal
Power	2,5~16V DC, 25mA @ 12VDC	
Tamper Switch	Yes	
Operating Temperature	-10°C to 55°C	
Dimensions	119x71x42mm (h x w x d)	
K-Band technology, frequency	24, 125Ghz	
Range	15m x 18m	
Dual Technology	Yes, passive infrared and microwave technologies	
Concurrent diagnostics	Yes	
Digital fluorescent light interference filter	Yes	
Digital adaptive microwave threshold adaptive baselines	Yes	
Bi-directional Temperature Compensation	Yes	
Separate trouble Relay	Yes	

Ref: Intruder Alarm Control Panel		
Intruder alarm panel as per technical specification below.		
Element	Specification	Proposal
Power Supply & Communicator	Integral 2.5A (1.25A @ grade 3)	
Zones	16 Zones - Expandable up to facilitate quantity of zones indicated on drawings plus 30%.	
Outputs	8 outputs expandable up to 68 outputs	
Event Log	500+500 event log	
Users	250	
Groups	8	
Links	128	
Peripheral Support	2	
Remote Support	PC Applications for Remote Support	
Power Supply	Boxed 2.75A EN50131-1: 2004 security grade 2 intelligent Power Supply	
Report Status	Reports AC Battery & Fuse status to the control panels as well as tamper information over the RS485 interface.	
Standards/ Conformity	PD6662:2004 (EN50131-1:2004) security grade 2, Environmental Class II and EN50131-1:1997 security grade 2, Environmental Class II.	

Ref: Intruder Alarm Internal Sounder		
Intruder alarm internal sounder as per technical specification below.		
Element	Specification	Proposal
dB Level	120dB	
Sounder Level Setting	Sounder level can be set for progressive mode	
Multi-toned	Yes	
Status Reporting	Alert signal and status reporting (Set/Unset, delay...)	
Power Supply	4 batteries LIO3V	
Battery Life	2 years	
Tamper	Opening and wall mounted	
Diameter	165mm	

Ref: Intruder Alarm Internal Sounder		
Intruder alarm internal sounder as per technical specification below.		
Element	Specification	Proposal
Sound Output	116dB	
Body	High impact polycarbonate moulding	
Warning	2 Watt Xenon Strobe Tube, alternating assurance LEDs	
Battery Back-up	NiCad back-up battery	
Sounders	Dual piezo sounders	
Multi-colour Options	Yes	
Tamper	Front and rear	
Sweeper Sounder Sound	Yes	
Standards/ conformity	EN50131 security grade 2 Environmental Class IV	

Ref: Intruder Alarm Keypad		
Intruder alarm Keypad as per technical specification below.		
Element	Specification	Proposal
Backlit Rubber Buttons	Yes	
Full System Control	Yes	
Backlit Display	32 alphanumeric backlit display	
Piezo electric sounder	Yes, with audible beeps to indicate: • System status • Entry/exit delay • Other alarm situations	
Tamper Protection	Yes	
Set/Unset with PIN	Yes	
ASK format, card 'self-learn' capability	Yes	
Dual Action Functionality	Yes, simple set/unset operation removes the need for PIN entry.	
Supplied with Portable ACE	Yes, 10 portable ACE for the use of setting and/or unsetting the IAS.	
Standards/ Conformity	EN50131-1 security grade 2, Environmental Class II	

7 TRANSPORT (67)

7.1 EQUIPMENT SCHEDULES

Refer to volume A.2.5 Lifts Specification

8 FIRE SYSTEMS (68)

8.1 EQUIPMENT SCHEDULES

Ref: Addressable Beam Detector		
 Addressable beam detector as per technical specification below.		
Element	Specification	Proposal
Protocol	Apollo, Hochiki or equivalent. To be compatible with 'open' protocol panels.	
Supply Voltage	17 to 41 V dc	
Supply Current	3 mA (constant current) in all operational states	
Constant Current	17 mA (constant current) in fast commissioning	
Temperature Range	-10 °C to +55 °C	
IP Rating	IP65 (when suitably mounted and terminated)	
Comes complete with address card	Yes	
Detection Range	• 40m • 80m • 100m	
Complete with	Ground level controller & reflector	

Ref: Addressable Combined Sounder Beacon Base		
		
Addressable combined sounder beacon base as per technical specification below.		
Element	Specification	Proposal
Supply Wiring	Two-wire supply, polarity sensitive	
Protocol	Apollo, Hochiki or equivalent. To be compatible with 'open' protocol panels.	
Maximum Sound Output	90±3dB(A) Volume adjustable.	
Temperature Range	-20°C o+60°C	
IP Rating	IP21D	
Comes complete with address card	Yes	
Independant Control of Sounder and Beacon	Yes	
Materials	• Terminals: Nickel plated stainless steel	
Standards/Conformity	BS EN 60529, BS EN 54 part7:2001 including amendment A1:2002 & A2:2006 with LPCB, VdS, BOSEC, VNiPO	

Ref: Fire Alarm Cabling		
		Fire retardant alarm cabling as per technical specification below.
Element	Specification	Proposal
Classification	PH120 Enhanced grade	
Outer sheath colour	Red	
Conductors	Solid or stranded plain annealed copper wire.	
Insulation	Enhanced silicone rubber.	
Binder	Enhanced close weave glass tape.	
Earth Conductor	Solid or stranded tinned annealed copper.	
Electrostatic screen	Enhanced aluminium/polyester laminated tape.	
Sheath	Enhanced thermoplastic zero halogen, low smoke compound	
Voltage Rating	300/500V.	
Operating temperature	-40°C to +90°C	
Minimum bending radius	6 x overall diameter of cable	
Basec Certified	Yes	
Conformity/standards	• Manufactured: BS7629-1 • Circuit Integrity: BS 5839-1:2002 Clause 26.2e Enhanced. BS 8434-2:2003. BS EN 50200 PH120. BS 6387 C, W & Z. • Flame propagation: IEC 60332-3, IEC 60332-1, BS EN 50265, BS EN 50266. • Acid gas emission: IEC 60754, BS EN 50267. • Smoke emission: IEC 61034, BS EN 50268.	
Manufacturer	Draka FT120 or equivalent	

Ref: Fire Alarm Panel 4-Loop


4-Loop fire alarm panel as per technical specification below.

Element	Specification	Proposal
Base Technology	Dual Flash based Processors with Real Time Clock, 'Trace' diagnostics, 'Pulse' communications & programmable languages.	
Display	Backlit 240 x 64 Graphical LCD	
LED Indicators	3 Red (2 x Fire, 1 x Alarm), 1 Green (Power) & 12 Amber (Fault & System)	
Controls	Alpha Numeric Keypad, Navigation Keys & System Keys for Reset, Mute Silence/Resound & Evacuate	
Protocols	Apollo (S90, XP95, Xplorer and Discovery), Hochiki ESP, Nittan Evo & Argus Vega	
Number of fire zones	1000 'Dynamix'	
Number of loops	4 No. detection loop cards tested & fitted. Expandable via individual plug-in loop driver	
Devices per loop	Minimum 120 No.	
Loop Current	500mA	
On board sounder circuits	4 x 1 Amp Programmable	
On board relays	2 x 1 Amp 30v AC/DC Programmable	
Auxiliary supply	1 x 24v 500mA	
Open Collector / Logic Outputs	8 x Programmable	
Programmable Switch Inputs	8 Volt Free Digital Inputs	
On Board Power Supply	5 Amp High Efficiency Switched Mode	
Mains Supply	230 V Ac (+10%, -15% tolerance) 50 /60 Hz 1.7 Amp	
Battery Capacity	24V 18Ah Internal, 24V 48Ah external	

Charger Current	2.2 Amp DDP monitored, temperature compensated integral charger	
Serial ports	1 RS232 Onboard for PC, Modem or ExternalPrinter	
Programming	Via on-board Keypad or PC running Windows tools	
Event Log	1000 Fire & Event + Diagnostic	
Networking	Panel to be networkable and complete with Network cards	
Enclosure / Colour	Steel IP30 / Beige (textured)	
Cable Entry	200mm Knock outs. 18 x top / 9 x top rear and 2 x bottom	
Size H x W x D mm	475 x 450 x 100 (recessed flush mounted back box). Surface mounted where on fare-faced block-work.	
Metalwork	c/w Flushing Bezel	
Approvals	BS EN54-2 & 4:1998	
Manufacturer/Model	Advanced Electronics Four Loop Panel MX-4400 analogue addressable networkable control panel c/w 4 No. loop cards tested and fitted.	

Ref: Firemans Switch

Firemans switch as per technical specification below.

Element	Specification	Proposal
Cable Entry Position:	Top and bottom	
Colour	Red	
Terminal Capacity	10mm ²	
IP Rating	IP65	
Enclosure Material	Aluminium	
Handle Type	Side operated	
Number of poles	2	
Rated Current	25A	
Rated Insulation Voltage	690V	
Standards/Conformity	IEC 60947-1,-3, BS7671: 1992, type-tested to BSEN60947-3	

Ref: Adressable Heat Detector		
 Addressable heat detector as per technical specification below.		
Element	Specification	Proposal
Detection Principle	Heat sensitive resistance	
Protocol	Apollo, Hochiki or equivalent. To be compatible with 'open' protocol panels.	
Supply Wiring	Two-wire supply, polarity insensitive	
Operating Voltage	17-28V DC	
Remote Output Characteristics	Connects to positive line through 4.5K Ω (5mA maximum)	
Alarm level analogue value	55	
Alarm indicator	2 red Light Emitting Diodes (LEDs). Remote LED.	
Temperature Range	-40°C o+70°C	
Vibration, Impact and Shock	To EN54-7:2001	
IP Rating	IP54	
Materials	• Housing: White polycarbonate V-0 rated to UL94 • Terminals: Nickel plated stainless steel	
Comes complete with mounting base	Yes	
Standards/Conformity	BS EN 60529, BS EN 54 part7:2001 including amendment A1:2002 & A2:2006 with LPCB, VdS, BOSEC, VNiiPO	

Ref: Interface Unit		
 Interface unit as per technical specification below.		
Element	Specification	Proposal
Description	Input/output unit with isolator	
Operating Voltage	17-28V DC	
Switch Input monitoring voltage	9-11V	
Protocol Pulses	5-9V	
Opto-coupled input maximum voltage	35V DC	
Relay output contact rating	1A at 30V AC or DC	
Maximum continuous current	1A	
Maximum switching current	3A	
Maximum Load	20 detectors	
Operating temperature	-20°C to +70°C	
IP Rating	IP54	
Comes Complete with Back Box	Yes	
Materials	Moulded Polycarbonate	

Ref: Addressable Internal or External Sounder Beacon		
 Addressable Internal or External sounder beacon as per technical specification below.		
Element	Specification	Proposal
Supply Wiring	Two-wire supply, polarity sensitive	
Protocol	Apollo, Hochiki or equivalent. To be compatible with 'open' protocol panels.	
Maximum Sound Output	100dB(A) Volume adjustable.	
Temperature Range	-20°C o+60°C	
IP Rating	IP65	
Comes complete with address card	Yes	
Independant Control of Sounder and Beacon	Yes	
Materials	• Terminals: Nickel plated stainless steel	
Standards/Conformity	BS EN 60529, BS EN 54 part7:2001 including amendment A1:2002 & A2:2006 with LPCB, VdS, BOSEC, VNiiPO	

Ref: Addressable Manual Call Point

Addressable Manual call point as per technical specification below.

Element	Specification	Proposal
Call Point Type	Deformable element	
Call Point Principle	Operation of a switch	
Protocols	Apollo, Hochiki or equivalent. To be compatible with 'open' protocol panels.	
Alarm Indicator	Red Light Emitting Diode(LED)	
Fault Indicator	Amber/yellow Light Emitting Diode(LED)	
Supply Wiring	Two-wire supply, polarity sensitive	
Operating Voltage	17-28V DC	
Normal Analogue Value	16	
Alarm State Value	64	
Operating Temperature	-20°C to +60°C	
Protective Cover	Protective covers installed on all MCP's	
IP Rating	IP24 or IP67(weatherproof)	
Materials	Housing: Red self-coloured polycarbonate/ABS	
Standards/Conformity	EN54-11: 2001; EN54-17: 2005(isolated version)	

Ref: Active Repeater Panel

Active repeater panel as per technical specification below.



Element	Specification	Proposal
From same manufacturer as main panel	Yes	
Display	Backlit 240 x 64 Graphical LCD	
LED Indicators	Fire, Fault, Disables, Accepted, Silenced, Power, Communications, loss.	
Operating Voltage	18-32V DC and an RS485 card.	
Opeating Temperature	+5°C to +45°C	
Extra User Controls	Keyswitch activated - System Reset, Sound Alarms, Silence/Resound, Mute, Accept and Self Test	

Ref: Addressable Optical Smoke Detector		
 Addressable optical smoke detector as per technical specification below.		
Element	Specification	Proposal
Detection Principle	Photo-electric detection of light scattered in a forward direction by smoke particles	
Protocols	Apollo, Hochiki or equivalent. To be compatible with 'open' protocol panels.	
Chamber Configuration	Horizontal optical bench housing infra-red emitter and sensor, arranged radially to detect forward scattered light	
Sensor	Silicon PIN photo-diode	
Emitter	GaAIAs infra-red light emitting diode	
Sampling Frequency	1 per second	
Supply Wiring	Two-wire supply, polarity insensitive	
Operating Voltage	17-28V DC	
Remote Output Characteristics	Connects to positive line through 4.5K Ω (5mA maximum)	
Clean-air Analogue value	23 +4/-0	
Alarm level analogue value	55	
Alarm indicator	2 colourless Light Emitting Diodes (LEDs); illuminating red in alarm. Remote LED.	
Temperature Range	-40°C o+70°C	
Vibration, Impact and Shock	To EN54-7:2000	
IP Rating	IP44	
Comes complete with mounting base	Yes, and sounder / sounder-beacon bases where indicated.	
Materials	Housing: White polycarbonate V-0 rated to UL94 Terminals: Nickel plated stainless steel	
Standards/Conformity	BS EN 60529, BS EN 54 part7:2001 including amendment A1:2002 & A2:2006 with LPCB, VdS, BOSEC, VNiPO	

9 EARTHING (69)

9.1 EQUIPMENT SCHEDULES

Refer to Particular Specification