



# Snowy Technical Standards

**SHL-ELE-156 (Q)**

**Annexure Q - Preferred Suppliers  
General Low Voltage Electrical Requirements**

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This annexure forms part of the General Low Voltage Electrical Requirements Standard ([SHL-ELE-156](#)).

## 1. Scope

### 1.1. Applicable Standards

The design, manufacture and testing of equipment and components detailed in this annexure must comply with the requirements of all relevant Australian Standards or in the absence of appropriate Australian Standards, with relevant IEC, ISO or International Standard, together with the requirements of competent authorities having jurisdiction over all or part of the manufacture, installation or operation of the equipment, except where modified by this specification.

All works must comply with the requirements of the most recent releases of the regulations and standards noted in Snowy Standard [SHL-ELE-156](#). In the event of a conflict between different Codes, Standards or Regulations, the highest requirement must apply.

## 2. Technical Requirements

### 2.1. Switchrooms

#### 2.1.1. Fire detection and suppression systems

Manufacturer	Series	Commonly used	Details
			VESDA where specified in the project documents.
			FM200 where specified in the project documents.

#### 2.1.2. Air conditioning

Manufacturer	Series	Commonly used	Details
			Sized for the room and equipment load +20%. To have N+1 redundancy.

### 2.1.3. Luminaires

Manufacturer	Series	Commonly used	Details
Thorn	X-Force Range	Impact Force	LED lighting
Peirlite	BWP/T Range	TEL236	Fluorescent Light
Phillips	Vandalite	LED20/40	LED Light

### 2.1.4. Safety equipment

Manufacturer	Series	Commonly used	Details
Brady			AS 4836 compliant LV rescue kit
			9kG fire extinguisher
Accident Health & Safety		847687 847249	"Danger 415V" safety sign "No Entry Authorised Personnel Only" safety sign

## 2.2. Enclosures and cubicles

### 2.2.1. Switchboards - Indoor

Manufacturer	Series	Commonly used	Details
Siemens	Sivacon		Withdrawable units
CUBIC NHP			Fixed units
ABB	MNS		Withdrawable units
Schnieder			Withdrawable units
			2.0 mm zinc annealed steel

### 2.2.2. Switchboards – Outdoor

Manufacturer	Series	Commonly used	Details
			3.2mm marine-grade aluminum
			2.0mm 316 stainless steel

### 2.2.3. Control cubicles

Manufacturer	Series	Commonly used	Details
Rittal			Floor stand not custom built
			Floor stand custom built

### 2.2.4. Cubicle lighting

Manufacturer	Series	Commonly used	Details
Rittal	SZ	2500	LED
Phillips			
Thorn			

### 2.2.5. Junction boxes

Manufacturer	Series	Commonly used	Details
			1.5mm thick sheet metal

## 2.3. Cables, wires and termination

### 2.3.1. Low voltage cable

Manufacturer	Series	Commonly used	Details
Olex			Standard – PVC sheathed, V90, 0.6/1kV
			Protection - Copper screened PVC sheathed, V90, 0.6/1kV

### 2.3.2. Control cable

Manufacturer	Series	Commonly used	Details
Olex			Standard – PVC sheathed, V90, 0.6/1kV, multicore

### 2.3.3. Instrument Cable

Manufacturer	Series	Commonly used	Details
Olex			Instrolex (Dekoron), twisted pair, overall screened

### 2.3.4. Communication cable

Manufacturer	Series	Commonly used	Details
Rockwell Automation	1485C series		DeviceNet cable
Rockwell Automation	1786 series		ControlNet cable
			Fibre
			Ethernet

### 2.3.5. Glands

Manufacturer	Series	Commonly used	Details
			PVC for interior use Brass for exterior use

### 2.3.6. Terminals

Manufacturer	Series	Commonly used	Details
Weidmuller	W series	WTR 2.5	General purpose; current $\leq$ 10 Amps.
Weidmuller	W series	WDU 6	General purpose; 10 Amps < current $\leq$ 50 Amps.
Weidmuller	W series	WDU 10 to WDU 240	General purpose; 50 Amps < current.
Weidmuller	W series	WTL 6/1 WTL6/1/STB; Part number 1016900000	Current & voltage test - disconnect
Rockwell Automation	1492 series	1492-J4 1492-J10	DC protection AC protection

### 2.3.7. Test socket block

Manufacturer	Series	Commonly used	Details
RMS		MMLG 7XG222	Current and voltage test block
Reyrolle		2RMLG01 2RMLG02	Use for synchronising circuits Use for relay AC signals

### 2.3.8. Ties

Manufacturer	Series	Commonly used	Details
Panduit	PLT/ILT	PLT-0	UV resistant
			Must be UV stable

### 2.3.9. Markers

Manufacturer	Series	Commonly used	Details
Critchley			Cable markers: 'K' type markers and carriers
Allen Bradley		1492-M6X12 1492-M7X12	Terminal markers: DC protection Terminal markers: AC protection

### 2.3.10. Cable ladder

Manufacturer	Series	Commonly used	Details
Unistrut			
Ezystrut			

### 2.3.11. Cable tray

Manufacturer	Series	Commonly used	Details
Unistrut			
Ezystrut			

### 2.3.12. Cable duct

Manufacturer	Series	Commonly used	Details
NHP	IBOCO Duct System		Closed slotted of a suitable size (packed < 75%)

### 2.3.13. Wire connectors

Manufacturer	Series	Commonly used	Details
AMP			
JST			
Utilux			

**2.3.14. Wire markers**

Manufacturer	Series	Commonly used	Details
Grafoplast (or equivalent)			

**2.4. General hardware**

**2.4.1. Relays - general purpose industrial power**

Manufacturer	Series	Commonly used	Details
RMS			Must have silver contacts and plug-in
Mors Smitt			Must have silver contacts and plug-in
Releco			Must have silver contacts and plug-in
Finder		5534007424VDC	Must have silver contacts and plug-in
Omron			Must have silver contacts and plug-in
Allen Bradley	700-HC series 700-HF series 700-SK series		Must have silver contacts and plug-in
GE			Must have silver contacts and plug-in

**2.4.2. Relays - industrial timer**

Manufacturer	Series	Commonly used	Details
RMS			Must have silver contacts and plug-in
Mors Smitt			Must have silver contacts and plug-in
Releco			Must have silver contacts and plug-in
Finder			Must have silver contacts and plug-in
Omron			Must have silver contacts and plug-in
Allen Bradley			Must have silver contacts and plug-in
GE			Must have silver contacts and plug-in

### 2.4.3. Control switches

Manufacturer	Series	Commonly used	Details
Kraus & Naimer			Control switch and selector switch

### 2.4.4. Load break switches.

Manufacturer	Series	Commonly used	Details
Schneider Electric	LBSkit		
NHP	Socomec	Sirco SLB	
Siemens		5TE1 3KD	

### 2.4.5. Pushbuttons

Manufacturer	Series	Commonly used	Details
Allen Bradley	800T/H Operators	800TC	Push buttons
ABB			
NHP	D7		
Schneider Electric			

### 2.4.6. Emergency stop push buttons (ESPB)

Manufacturer	Series	Commonly used	Details
Allen Bradley	800 series	800TC	

### 2.4.7. Indicating lamps and stack lights

Manufacturer	Series	Commonly used	Details
ABB			Indicating lamp, globe(s) must be LED
NHP			Indicating lamp, globe(s) must be LED
Allen Bradley			Indicating lamp, globe(s) must be LED
Rockwell Automation	Series		Control tower stack light

#### 2.4.8. Distribution chassis with isolator

Manufacturer	Series	Commonly used	Details
Schneider Electric	Isobar		≤ 250A
NHP	Grizz-Bar		≤ 250A

#### 2.4.9. Isolators

Manufacturer	Series	Commonly used	Details
ABB			
Socomec			
NHP			
Schneider Electric			

#### 2.4.10. Air circuit breakers

Manufacturer	Series	Commonly used	Details
Schneider Electric	Masterpact	MTZ	Must have motor spring charge operating mechanism. Safety shutters must be pad-lockable
NHP	Tempower 2		Must have motor spring charge operating mechanism.
Siemens	3WL		Safety shutters must be pad-lockable
ABB	Sace Emax 2		Must have motor spring charge operating mechanism.
Eaton			



#### 2.4.11. Moulded case circuit breakers (MCCB)

Manufacturer	Series	Commonly used	Details
Schneider Electric (including Merlin Gerin)	ComPact	NSX NS	Must be lockable Electronic trip unit for nominal current rating above 250A
NHP	Tembreak 2		Must be lockable Electronic trip unit for nominal current rating above 250A.
Siemens	Sentron		Must be lockable Electronic trip unit for nominal current rating above 250A.
ABB	Sace Tmax		Must be lockable Electronic trip unit for nominal current rating above 250A.

#### 2.4.12. Miniature circuit breakers (MCBs) and earth leakage protection

Manufacturer	Series	Commonly used	Details
Schneider Electric (including Merlin Gerin)	Acti9		MCBs must be lockable. For control circuits – must be dual poles. 10kA fault withstand rating
NHP	Din-T		MCBs must be lockable. For control circuits – must be dual poles. 10kA fault withstand rating
Siemens	Sentron	5SY4	MCBs must be lockable. For control circuits – must be dual poles. 10kA fault withstand rating

#### 2.4.13. Earth bars

Manufacturer	Series	Commonly used	Details
IPD			
NHP			
Dore Electrics			

#### 2.4.14. Neutral bars

Manufacturer	Series	Commonly used	Details
IPD			
NHP			
Dore Electrics			

#### 2.4.15. Earth fault detection

Manufacturer	Series	Commonly used	Details
NHP	RD1G2		Residual current relay
NHP	ELR		Earth leakage relay

#### 2.4.16. General purpose outlet (GPO)

Manufacturer	Series	Commonly used	Details
Clipsal (Schneider Electric)		C2025RCD30WE	

#### 2.4.17. Contactors

Manufacturer	Series	Commonly used	Details
Allen Bradley			
ABB			
Cutler & Hammer			
Sprecher + Schuh	CA CEP7/ CT7		Contactors Overload
Schneider Electric			

#### 2.4.18. LV fuses, fittings and fuse switch units

Manufacturer	Series	Commonly used	Details
Alstom			White housing – SC32

#### 2.4.19. DIN rail

Manufacturer	Series	Commonly used	Details
IPD			TS35 open

#### 2.4.20. Analogue meters

Manufacturer	Series	Commonly used	Details
Crompton			Ammeter
Crompton			Frequency meter
Crompton			Kilowatt hour meter
			Multifunction meter Must be suitable for Modbus or DNP3 output with a minimum display of volts (line & phase), current (A), frequency (Hz), power factor (Pf), reactive power (kvar), Energy (kWh)
Crompton			Voltmeter

#### 2.4.21. Electrical transducers

Manufacturer	Series	Commonly used	Details
Rockwell Automation	PM5000 series		PQM

#### 2.4.22. Heaters and thermostats

Manufacturer	Series	Commonly used	Details
Rittal			Panel heater
Rittal			Thermostat (variable preferred)

## 2.5. Motors

### 2.5.1. AC motors

Manufacturer	Series	Commonly used	Details

### 2.5.2. DC motors

Manufacturer	Series	Commonly used	Details

### 2.5.3. Submersible motors

Manufacturer	Series	Commonly used	Details

### 2.5.4. Motor starters

Manufacturer	Series	Commonly used	Details
Allen Bradley	E3+ series		
ABB			
Sprecher + Schuh	N-Din		Motor overload relay
Schneider Electric			

## 2.6. Control systems

### 2.6.1. PLCs

Manufacturer	Series	Commonly used	Details
Rockwell Automation	1756 series		ControlLogix controller
Triconex			

### 2.6.2. Power supplies

Manufacturer	Series	Commonly used	Details
Allen Bradley	1756 series 1606 series		1756 - ControlLogix 24V power supply 1606 - Switched mode power supply
Phoenix			
Weidmuller			
Black Box			

### 2.6.3. DC/DC converters

Manufacturer	Series	Commonly used	Details
Powerbox	PBIH series		DC/DC single output converter
Amtex	APK series		DC/DC single output converter

### 2.6.4. Control relays

Manufacturer	Series	Commonly used	Details
Rockwell Automation	700 series	700-CF series	Relay
Mors Smitt	D-B series		High DC breaking capacity relays
Sprecher & Schuh	CS7		
Finder	46 series		Control relay

### 2.6.5. Network switches

Manufacturer	Series	Commonly used	Details
Cisco			
Moxa			
Siemens	Scalance		
Stratix			
Hirschmann			

## 2.7. Transformers

### 2.7.1. Current transformers

Manufacturer	Series	Commonly used	Details
			Metering class with 1 Amp secondary
			Protection

## 2.8. Instruments

### 2.8.1. Electric actuators

Manufacturer	Series	Commonly used	Details

### 2.8.2. Pneumatic actuators

Manufacturer	Series	Commonly used	Details

### 2.8.3. Hydraulic actuators

Manufacturer	Series	Commonly used	Details

### 2.8.4. Gauges

Manufacturer	Series	Commonly used	Details

### 2.8.5. Thermocouple

Manufacturer	Series	Commonly used	Details

**2.8.6. RTDs**

Manufacturer	Series	Commonly used	Details
Temperature Controls			RTD's from Temperature Controls are made to order.
Endress & Hauser			

**2.8.7. Temperature switches**

Manufacturer	Series	Commonly used	Details
Rockwell Automation	837E series		

**2.8.8. Temperature transmitters**

Manufacturer	Series	Commonly used	Details
Temperature Controls			Transmitters from Temperature Controls are made to order.

**2.8.9. Temperature modules**

Manufacturer	Series	Commonly used	Details
Rockwell Automation	XM-361 series		

**2.8.10. Limit switches**

Manufacturer	Series	Commonly used	Details
Siemens			
Schmersal			
Honeywell			

**2.8.11. Proximity probes**

Manufacturer	Series	Commonly used	Details
Rockwell Automation	871C series 872C series 875C series		

### 2.8.12. Position transmitter

Manufacturer	Series	Commonly used	Details
Balluff	BTL5 series		
Sick	DT20 series		High accuracy laser sensor displacement measurement

### 2.8.13. Pressure switches

Manufacturer	Series	Commonly used	Details
Endress & Hauser			
Rockwell Automation	836E series 836T series		Solid state pressure switch Externally adjustable electromechanical pressure controls (DP)

### 2.8.14. Pressure transmitters

Manufacturer	Series	Commonly used	Details
Endress & Hauser			

### 2.8.15. Level / float switches

Manufacturer	Series	Commonly used	Details
Mobrey		S424	Must be supplied with independent gold-plated contacts for protection

### 2.8.16. Differential pressure transmitters

Manufacturer	Series	Commonly used	Details
Endress & Hauser	PMD series	PMD75	

### 2.8.17. Radar and ultrasonic level transmitters

Manufacturer	Series	Commonly used	Details
Endress & Hauser			



**2.8.18. Humidity transmitters**

Manufacturer	Series	Commonly used	Details
Mamac		HU-224	

**2.8.19. Flow switches**

Manufacturer	Series	Commonly used	Details
Honeywell			

**2.8.20. Magnetic flow transmitters**

Manufacturer	Series	Commonly used	Details
Endress & Hauser			

**2.8.21. Annubar flow transmitters**

Manufacturer	Series	Commonly used	Details
Emerson / Rosemount			

**2.8.22. Coriolis flow transmitters**

Manufacturer	Series	Commonly used	Details
Endress & Hauser			
Foxboro			

**2.8.23. Current transmitters**

Manufacturer	Series	Commonly used	Details
APCS		ACD241	

**2.8.24. Speed measurement**

Manufacturer	Series	Commonly used	Details

## 2.9. DC supplies

### 2.9.1. Batteries

Manufacturer	Series	Commonly used	Details
Battery Energy			
Yuasa			
Hoppecke			

### 2.9.2. Battery chargers

Manufacturer	Series	Commonly used	Details
AEG			
Magellan			
Brodribb			
Codex			48V
Rectifier Technologies			
Benning			

## 2.10. UPS

### 2.10.1. Inverters

Manufacturer	Series	Commonly used	Details
AEG			
Benning			
Magellan			

### 2.10.2. Rectifiers

Manufacturer	Series	Commonly used	Details
AEG			
Benning			
Rectifier Technologies			

### 2.10.3. Transfer switches

Manufacturer	Series	Commonly used	Details
Schneider Electric			
NHP			