



TITLE	SPECIFICATION FOR MECHANICAL TORQUE SHEAR CONNECTORS	REFERENCE CP_TSSPEC_023	REV 6
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		PAGE: 1	OF 49

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**SPECIFICATION FOR MECHANICAL
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FOREWORD

This specification was prepared by the following Work Group Members:

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Technology Services

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2016

INTRODUCTION

To achieve standardization and rationalization in the jointing and termination of MV and LV cables, the use of mechanical connectors is essential in order to connect copper to aluminium, round and sector, solid and stranded with range taking ability, without the use of specialised lugs and ferrules which require special crimping tools.

1 SCOPE

This specification covers City Power's requirements for range taking, bimetallic mechanical torque shear connectors.

2 NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SANS 61238-1, Compression and mechanical connectors for power cables with copper or aluminium conductors – Part 1: Test methods and requirements.

NRS 075-1, Mechanical torque shear connectors for medium applications

ISO 9001- Quality management

ISO 14001, Environmental management

OHSAS 18001, Health and safety management

3 REQUIREMENTS

3.1 Type

3.1.1 The mechanical torque shear connectors shall be "class A" as per SANS 61238-1

3.1.2 The mechanical torque shear connector shall be capable of withstanding, without deterioration, the normal operating currents and short-circuit currents to which the electrical system may be subject to.

3.1.3 Mechanical torque shear connectors shall be bimetallic in order to connect copper and aluminium conductors together without galvanic reaction.

3.1.4 Mechanical torque shear connectors shall be free of surface and internal defects such as burrs, cracks, rolled seams, blisters, twists, press and chatter marks.

3.1.5 Mechanical torque shear connectors shall be of a tinned one-piece construction.

3.1.6 The bore of the barrel of connectors shall be profiled to facilitate easy conductor entry.

3.1.7 The inside of the connectors shall be ridged and the contact area greased for corrosion protection and improved contact resistance.

3.1.8 The mechanical torque shear connector shall be supplied with either centered PVC or aluminium alloy inserts to be used for conductors of smaller cross-sectional area.

3.1.9 The conductor size shall be clearly shown on the inserts.

3.1.10 The mechanical torque shear connector shall be rated for the current carrying capacity of the larger copper conductor.

- 3.1.11 The application diameter range for the relevant conductor sizes and conductor constructions shall be supplied with the joint kit instruction.

3.2 Compression technique

- 3.2.1 The mechanical torque shear compression technique shall be by means of torque shear bolts.
- 3.2.2 The torque shear bolt shall be constructed from brass or aluminium alloy, unless otherwise type tested.
- 3.2.3 The torque shear bolt shall shear-off no more than 2 mm proud off the connector barrel.
- 3.2.4 The number of torque shear bolts per connection shall be:
- a) One torque shear bolts up to 95 mm² for lugs.
 - b) Two torque shear bolts up to 240 mm² for lugs.
 - c) Three torque shear bolts up to 630 mm² for lugs.
 - d) Three torque shear bolts 1000 mm² for lugs.
 - e) Two torque shear bolts up 95 mm² for ferrules.
 - f) Four torque shear bolts up to 240 mm² for ferrules.
 - g) Six torque shear bolts up to 630 mm² for ferrules.
 - h) Six torque shear bolts up to 1000 mm² for ferrules.

- 3.2.5 The torque shear bolt shall not be removable once the bolt head has been sheared-off.

- 3.2.6 The use of torque bolts or grub-screws is not acceptable.

3.3 Mechanical torque shear lugs

- 3.3.1 The flat faces of the palms of lugs shall be parallel and straight.
- 3.3.2 The palms of the lugs shall either have an M12, M16 or M20 connecting hole, as specified in schedule A.
- 3.3.3 The mechanical torque shear lugs shall have a completely sealed construction to prevent moisture ingress (no inspection holes).

Note: Preference shall be given to torque shear lugs which do not have an offset between barrel and palm.

3.4 Mechanical torque shear ferrules

- 3.4.1 The mechanical torque shear ferrule shall be solid centered.
- 3.4.2 The mechanical torque shear ferrule shall have a completely sealed construction to prevent moisture ingress (no inspection holes).

3.5 Mechanical torque shear connector dimensions

- 3.5.1 Mechanical torque shear lugs shall connect to the following size conductors.

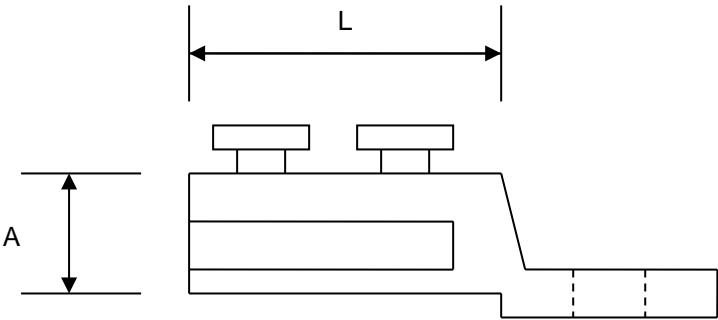


Figure 1: Typical arrangement of a mechanical torque shear connector lug

Table 1: Mechanical torque shear connector lug sizes.

SIZE RANGE	INNER DIAMETER(mm)	OUTER DIAMETER (mm) A	LENGTH (mm)
25 mm ² – 95 mm ²	13	24	65
95 mm ² – 240 mm ²	20	33	115
400 mm ²	26	42	137
630 mm ²	33	50	175
800 mm ²	33	50	175
1000 mm ²	33	50	175

3.5.2 Mechanical torque shear ferrules shall connect to the following size conductors.

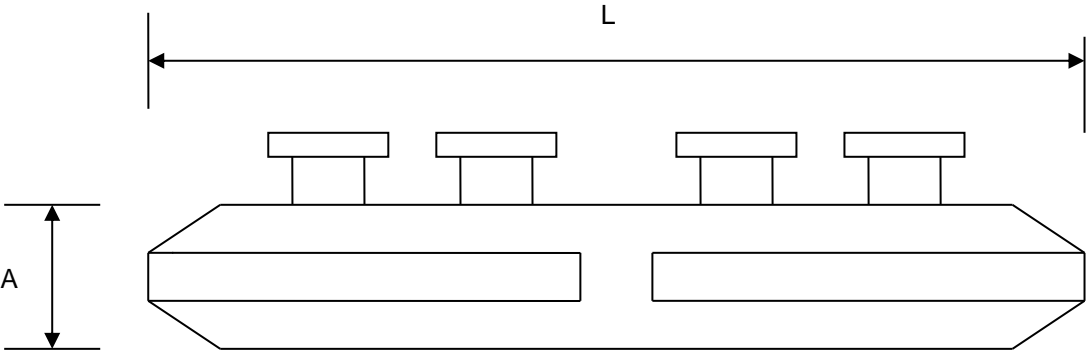


Figure 2: Typical arrangement of a mechanical torque shear connector ferrule

Table 2: Mechanical torque shear connector ferrule sizes

SIZE RANGE	INNER DIAMETER (mm)	OUTER DIAMETER (mm) A	LENGTH (mm)
16 mm ² – 35 mm ²	8,2	19	45
25 mm ² – 95 mm ²	13,2	24	65
95 mm ² – 240 mm ²	20	33	125
400 mm ²	25,5	42	170
630 mm ²	33	52	230
800 mm ²	33	52	230
1000 mm ²	33	52	230

3.5.3 The mechanical torque shear connector shall be capable of connecting to the following combinations of conductors:

- a) Al and Cu.
- b) Sector and Round.
- c) Solid and Stranded.

4 LOAD RATING

The mechanical torque shear connector shall be rated for the current carrying capacity (load rating) of the larger copper conductor.

Table 3: Current carrying capacity

Conductor size(mm ²)	Load rating (A)
16	94
35	170
95	290
240	470
300	520
630	1229
800	1366
1000	1486

5 TEST

5.1 Type test

5.1.1 Mechanical torque shear connectors shall be type tested as per SANS 61238-1.

5.1.2 The test report shall include the following information:

- connector class (see Clause 1);
- conductor used (see 5.1);
- connector and tooling (see 5.2);
- installation (for example see 6.1.1);
- current at equilibrium temperature (see 6.3.1);
- for Class A, the short-circuit parameters (see 6.3.4);
- electrical test results;
- mechanical test results.

5.1.3 Type tests shall be performed by an accredited laboratory and shall not be limited to the following:

- Electrical test and
- Mechanical test

5.2. Routine test

5.2.1 Checks for compliance with the manufacturer's standard dimensions shall be performed on each production batch comprising 1 000 identical mechanical torque shear connectors.

5.2.2 The number of items subjected to testing shall be 10 per 1 000 manufactured.

6 MARKING, LABELLING, PACKING AND DOCUMENTATION

6.1 Marking

6.1.1 All mechanical torque shear connectors shall have the size marked on the barrel.

6.1.2 The marking shall be indented into the barrel.

6.2 Labelling

6.2.1 The labelling shall indicate the sizes of the mechanical torque shear connectors.

6.2.2 The label shall contain the manufacturer's name, trademark and part number.

6.3 Packing

6.3.1 All mechanical torque shear connectors shall be individually sealed in a transparent packet.

6.3.2 An installation instruction shall be supplied with each mechanical torque shear connector.

6.3.3 The torque shear bolts shall be fitted in position.

6.3.4 The conductor centre inserts shall be in the same package.

6.4 Documentation

6.4.1 Documentation shall be provided for each type of mechanical torque shear connector supplied.

6.4.2 Documentation shall be submitted in a technical catalogue format.

6.4.3 The technical catalogue shall specify the sizes, dimensions, reference numbers, and the size range of the cables the mechanical torque shear connectors are compatible with.

7 SAMPLES

A sample of the mechanical torque shear connectors shall be supplied if requested in writing by City Power.

8 TRAINING

The supplier shall be required to provide training to City Power personnel

9 HOLDING TOOL

A holding tool that is capable of holding all sizes of mechanical torque shear connectors shall be supplied.

10 TOOL KIT

A tool kit comprising the ratchet and all the required sockets extensions and socket Allen keys, capable of fitting all the torque shear bolts, shall be supplied in a suitable tool bag.

Note: The Hex length of the Allen key socket shall not be less than 19 mm.

A basic mechanical torque shear tool kit shall comprise the following:

Table 4: Tool kit for mechanical torque shear connectors

NO.	ITEM	QUANTITY	SIZE
1	TOOL BAG	1	
2	RATCHET	1	½ INCH
3	SOCKET EXTENSION SHORT	1	½ INCH
4	SOCKET ALLEN KEY NO. 5	1	½ INCH
5	SOCKET ALLEN KEY NO. 6	1	½ INCH
6	SOCKET ALLEN KEY NO. 8	1	½ INCH
7	SOCKET NO. 10	1	½ INCH
8	SOCKET NO. 13	1	½ INCH
9	SOCKET NO. 17	1	½ INCH
10	SOCKET NO. 19	1	½ INCH
11	SOCKET NO. 22	1	½ INCH
12	SOCKET NO. 24	1	½ INCH

11 QUALITY MANAGEMENT

A quality management plan shall be set up in order to assure the proper quality management of the mechanical torque shear connectors during design, development, production, installation and servicing phases. Guidance on the requirements for a quality management plan may be found in the ISO 9001:2015. The details shall be subject to agreement between City Power and the Supplier.

12 ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to assure the proper environmental management of the mechanical torque shear connectors throughout its entire life cycle (i.e. during design, development, production, installation, operation and maintenance, decommissioning and disposal phases). Guidance on the requirements for an environmental management system may be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy

13 HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance of the mechanical torque shear connectors during installations operation, maintenance, and decommissioning phases. Guidance on the requirements of a health and safety plan may be found in OHSAS 18001:2007 standards. This is to ensure that the asset conforms to standard operating procedures and City Power SHERQ Policy. The details shall be subject to agreement between City Power and the Supplier.

ANNEX A - Bibliography

None

ANNEX B - Revision information

DATE	REV. NO.	NOTES
Oct. 2002	0	First issue
Sept. 2004	1	<p>2. Normative References SANS 61238-1</p> <p>3.1.1. SANS 61238-1</p> <p>3.3.2. Either have an M12 or an M16 connecting hole, as specified in schedule A.</p> <p>5.1.1. SANS 61238-1</p> <p>8. Tool kit</p> <p>Annex C – all items separate schedule</p> <p>Annex D – Add item 5 tool kit with long and short description</p> <p>Add items 9-11 with long and short descriptions</p>
Sep. 2006	2	<p>General workgroup update.</p> <p>Clause 3.2.3 Added (d)</p> <p>Clause 3.2.5 (c) changed 400 to 630</p> <p>Clause 3.2.6 Removed: may be either linear.</p> <p>Clause 3.2.8 Added entire sentence.</p> <p>Table 1 Added 400 mm² – 630 mm²</p> <p>Table 2 Added 400 mm² – 630 mm²</p> <p>Table 3 Added 630</p> <p>Annex C Added item 4</p> <p>Annex C Added item 10</p>

Feb 2010	3	<p>Removed section 3.2.3 – Bolt size irrelevant</p> <p>Removed section 3.2.6 - The torque shear bolts shall be off-set alignment along the connector. (linear arrangement is acceptable)</p> <p>Inclusion of new item 1 – 16 - 35 mm² torque shear ferrule</p> <p>Inclusion of new item 16 – 630 mm² torque shear lug with 16mm clearance hole</p> <p>Inclusion of item 13 - LUG 95-240 MECHANICAL M18 SAP 2411</p>
Sep 2014	4	<p>New committee members</p> <p>Range 630 sq mm</p> <p>Range 800 sq mm</p> <p>Range 1000 sq mm</p> <p>Inclusion of item 6 and 7 –ferrules</p> <p>Inclusion of item 14 and 15 –lugs</p> <p>Added Quality Management and Environmental Management</p>
April 2020	5	<p>Added new study committee</p> <p>Added clause 11 Health and Safety</p>
August 2021	6	<p>Added new study workgroup</p> <p>Listed type test</p>

ANNEX C – Item 1 - FERRULE 16-35 MECHANICAL – SAP NO. 2402

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.4.1	Are the connectors solid cantered?	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	150	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [✓, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

FERRULE 16-35 MECHANICAL – SAP NO. 2402

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 2 - FERRULE 35-95 MECHANICAL – SAP NO. 5348

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.4.1	Are the connectors solid cantered?	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	235	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [✓, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

FERRULE 35-95 MECHANICAL – SAP NO. 5348

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 3 - FERRULE 95-240 MECHANICAL – SAP NO. 5351

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.4.1	Are the connectors solid cantered?	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	385	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

FERRULE 95-240 MECHANICAL – SAP NO. 5351

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 4 - FERRULE 400 MECHANICAL – SAP NO. 5352

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.4.1	Are the connectors solid cantered?	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	435	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

FERRULE 400 MECHANICAL – SAP NO. 5352

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 5 - FERRULE 630 MECHANICAL – SAP NO. 1811

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description	Schedule A	Schedule B
1		Manufacturer	Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	
6	3.2	Material of torque shear bolt	Brass / aluminium alloy	
7	3.4.1	Are the connectors solid cantered?	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	1000
9	5.1	Type test report	Yes	Yes
10	6.1	Do the markings comply?	Yes	Yes
11	6.2	Does the labelling comply?	Yes	Yes
12	6.3	Do the packing of connectors comply?	Yes	Yes
13	6.4	Technical catalogue	Yes	Yes

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

FERRULE 630 MECHANICAL – SAP NO. 1811

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

ANNEX C – Item 6 - FERRULE 800 MECHANICAL – SAP NO. 3982

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description	Schedule A	Schedule B
1		Manufacturer	Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	
6	3.2	Material of torque shear bolt	Brass / aluminium alloy	
7	3.4.1	Are the connectors solid cantered?	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	1000
9	5.1	Type test report	Yes	Yes
10	6.1	Do the markings comply?	Yes	Yes
11	6.2	Does the labelling comply?	Yes	Yes
12	6.3	Do the packing of connectors comply?	Yes	Yes
13	6.4	Technical catalogue	Yes	Yes

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

FERRULE 800 MECHANICAL – SAP NO. 3982

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

ANNEX C – Item 7 - FERRULE 1000 MECHANICAL – SAP NO. 3981

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description	Schedule A	Schedule B
1		Manufacturer	Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	
6	3.2	Material of torque shear bolt	Brass / aluminium alloy	
7	3.4.1	Are the connectors solid cantered?	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	1000
9	5.1	Type test report	Yes	Yes
10	6.1	Do the markings comply?	Yes	Yes
11	6.2	Does the labelling comply?	Yes	Yes
12	6.3	Do the packing of connectors comply?	Yes	Yes
13	6.4	Technical catalogue	Yes	Yes

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

FERRULE 1000 MECHANICAL – SAP NO. 3981

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 8 – HOLDING TOOL MECH CONNECTOR – SAP N0. 394

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description	Schedule A	Schedule B
1		Manufacturer	Required	
2	7	Is the holding tool compatible for all the connector sizes? Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [∗], Word [Noted] or TBA [“To Be Advice”] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

HOLDING TOOL MECH CONNECTOR – SAP NO. 394

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 9 – TOOL KIT MECH CONNECTOR – SAP NO. 922

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description	Schedule A	Schedule B
1		Manufacturer/ Supplier	Required	
2	8	Does the tool kit comprise of all the necessary sockets? Yes	Yes	
3	8	Does the tool kit comprise of the necessary Allen key socket? Yes	Yes	
4	8	Does the tool kit comprise of a ratchet for the required sockets? Yes	Yes	
5	8	Are all the tools in a suitable tool bag? Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

TOOL KIT MECH CONNECTOR – SAP NO. 922

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 10 - LUG 35-95 MECHANICAL M12 – SAP NO. 393

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.3.2	Do the lugs shall have an M12 connecting hole	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	235	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

LUG 35-95 MECHANICAL M12 – SAP NO. 393

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

ANNEX C – Item 11 - LUG 95-240 MECHANICAL M12 – SAP NO. 5353

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.3.2	Do the lugs shall have an M12 connecting hole	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	385	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

LUG 95-240 MECHANICAL M12 – SAP NO. 5353

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

ANNEX C – Item 12 - LUG 400 MECHANICAL M12 – SAP NO. 5354

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.3.2	Do the lugs shall have an M12 connecting hole	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	435	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

LUG 400 MECHANICAL M12 – SAP NO. 5354

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 13 - LUG 35-95 MECHANICAL M16 – SAP NO. 1031

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.3.2	Do the lugs shall have an M16 connecting hole	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	235	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

LUG 35-95 MECHANICAL M16 – SAP NO. 1031

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 14 - LUG 95-240 MECHANICAL M16 – SAP NO. 1032

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.3.2	Do the lugs shall have an M16 connecting hole	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	385	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

LUG 95-240 MECHANICAL M16 – SAP NO. 1032

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 15 - LUG 630 MECHANICAL M16 – SAP NO. 1812

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.3.2	Do the lugs shall have an M16 connecting hole	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	1000	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

LUG 630 MECHANICAL M16 – SAP NO. 1812

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 16 - LUG 800 MECHANICAL M20 – SAP NO. 3983

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.3.2	Do the lugs shall have an M20 connecting hole	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	1000	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

LUG 800 MECHANICAL M20 – SAP NO. 3983

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX C – Item 17 - LUG 1000 MECHANICAL M20 – SAP NO. 3984

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item	Sub clause of CP_TSSPEC_023	Description		Schedule A	Schedule B
1		Manufacturer		Required	
2	3.1.1	Does the connector comply with SANS 61238-1?	Yes	Yes	
3	3.1.5	Is the mechanical torque shear connector a tinned one piece construction?	Yes	Yes	
4	3.1.7	Are the connectors ridged and the contact area greased?	Yes	Yes	
5	3.1.8	Are the connectors supplied with cantered PVC or aluminium alloy inserts?	Yes	Yes	
6	3.2	Material of torque shear bolt		Brass / aluminium alloy	
7	3.3.2	Do the lugs shall have an M20 connecting hole	Yes	Yes	
8	4	Full load current rating of Mechanical torque shear connector	A	1000	
9	5.1	Type test report	Yes	Yes	
10	6.1	Do the markings comply?	Yes	Yes	
11	6.2	Does the labelling comply?	Yes	Yes	
12	6.3	Do the packing of connectors comply?	Yes	Yes	
13	6.4	Technical catalogue	Yes	Yes	

Note: Ticks, Cross [√, X], Asterick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

LUG 1000 MECHANICAL M20 – SAP NO. 3984

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_023	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

ANNEX D – Stock Items

Material Group : CONT-FRL

Item	SAP No.	SAP Short Description	SAP Long Description
1	2402	FRL 16 - 35 MECH SC	FERRULE, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH SOLID CENTER, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 16 – 35 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
2	5348	FRL 35 - 95 MECH SC	FERRULE, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH SOLID CENTER, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 35 – 95 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
3	5351	FRL 95 - 240 MECH SC	FERRULE, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH SOLID CENTER, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 95 – 240 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
4	5352	FRL 400 MECH SC	FERRULE, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH SOLID CENTER, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 400 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
5	1811	FRL 630 MECH SC	FERRULE, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH SOLID CENTER, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 630 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
6	3982	FRL 800 MECH SC	FERRULE, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH SOLID CENTER, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 800 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
7	3981	FRL 1000 MECH SC	FERRULE, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH SOLID CENTER, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 1000 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
8	394	HOLDING TOOL MECH CONNECTOR	HOLDING TOOL, ADJUSTABLE, SUITABLE FOR HOLDING THE MECHANICAL TORQUE SHEAR CONNECTORS, ITEM SPECIFICATION NO. CP_TSSPEC_023
9	922	TOOL KIT MECH CONNECTOR	TOOL KIT, COMPLETE IN A TOOL BAG WITH ½ INCH RATCHET, SHORT EXTENSION, SOCKET NUMBER 10 - 13 – 17 – 19 – 22 - 24 AND ALLEN KEY SOCKET NUMBER 5 – 6 AND 8, SUITABLE FOR SHEARING THE MECHANICAL TORQUE SHEAR CONNECTOR BOLTS, ITEM SPECIFICATION NO. CP_TSSPEC_023

**SPECIFICATION FOR MECHANICAL
TORQUE SHEAR CONNECTORS**

REFERENCE
CP_TSSPEC_023

REV
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PAGE **49** OF **49**

Material Group: CONT-LUG

Item	SAP No.	SAP Short Description	SAP Long Description
10	393	LUG 35 – 95 MECH M12	LUG, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH AN M12 FIXING HOLE, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 35 – 95 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
11	5353	LUG 95 – 240 MECH M12	LUG, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH AN M12 FIXING HOLE, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 95 – 240 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
12	5354	LUG 400 MECH M12	LUG, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH AN M12 FIXING HOLE, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 400 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
13	1031	LUG 35 – 95 MECH M16	LUG, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH AN M16 FIXING HOLE, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 35 – 95 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
14	1032	LUG 95 – 240 MECH M16	LUG, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH AN M16 FIXING HOLE, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 95 – 240 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
15	1812	LUG 630 MECH M16	LUG, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH AN M16 FIXING HOLE, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 630 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
16	3983	LUG 800 MECH M20	LUG, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH AN M20 FIXING HOLE, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 800MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023
17	3984	LUG 1000 MECH M20	LUG, MECHANICAL TORQUE SHEAR, BIMETALLIC, WITH AN M20 FIXING HOLE, SUITABLE FOR CONNECTING THE FOLLOWING CONDUCTOR SIZES 1000 MM SQ ITEM SPECIFICATION NO. CP_TSSPEC_023