

NECA WA ELECTRICAL CONTRACTOR GUIDELINES



ELECTRICAL CONTRACTOR GUIDELINES



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Electrical worker competency

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PURPOSE

NECA is the peak industry association which exists to assist Electrical Contractors (EC's). This document has been developed to provide succinct guidance on effective ways to comply with the key industry and legal obligations imposed on Electrical Contractors and their workers.

The Electrical Contractor Guidelines document (ECG) is specifically aimed at small to medium sized electrical contracting companies and will:

- Remind EC's of their obligations
- Assist contractors in 'getting it right' from a compliance perspective
- Provide guidance, tips and advice
- Suggest suitable methods and processes to apply in implementing the requirements in this document
- Include appendices with checklists, forms, employee record examples etc

The ECG does not specifically deal with general safety requirements however if you require guidance in this area you should contact NECA's OSH Team on (08) 6241 6100.

The ECG is designed to be read in conjunction with the:

- Western Australian Electrical Requirements (WAER)
- Western Australian Distribution Connections Manual (WADCM)

INDUSTRY CONTEXT

- NECA WA's interaction with members reveals a number of common areas where electrical contractors often don't meet compliance requirements.
- NECA WA has also noticed that many members do not always know or understand the benefits of a systematic approach to compliance obligations.
- NECA aims to assist members with education and support, whilst aligning with EnergySafety's aim to improve the standard of electrical work completed.
- Analysis of EnergySafety prosecutions highlighted areas of improvement for contractors.
- NECA WA aims to be a positive and proactive industry association helping EC's achieve a safe, productive and prosperous industry.

SECTION 1: ELECTRICAL WORKER COMPETENCY

1.1 Licensing

1.2 Pre-employment

1.3 Competency/work experience

An electrical contractor must ensure a number of processes and controls are in place with regard to the qualifications, competence and supervision of their electrical workers.

1.1 Licensing

The *Electricity (Licensing) Regulations 1991* state that electrical work may only be carried out by persons with the appropriate electrical licence authorised in Western Australia.



Checkpoint

When hiring/contracting workers, determine if the applicant has a valid electrical licence
www.commerce.wa.gov.au/energysafety/licensing-search

Ascertain how the licence was obtained, examples of this are:

- Apprenticeship in Western Australia
- Apprenticeship interstate
- Mutual recognition interstate
- Mutual recognition overseas



Checkpoint

Applicants from interstate or overseas often use the South Australian (SA) licensing system to initially obtain an electrical licence, then apply for mutual recognition to get a Western Australian (WA) licence.

Caution: The requirements to get an SA licence are less stringent than those in WA.

Determining how a worker obtained their licence also gives you confidence, as an Electrical Contractor, that you know the skillsets of the individual undertaking the task and any gaps or supervisory requirements that may be required.

1.2 Pre-employment

During the interview process, identify the applicant's skill sets and nature of work they have conducted eg. residential, commercial, industrial, renewable energy, to ensure your key criteria are met.

- Confirm valid electrical worker's licence, noting any restrictions such as 'endorsed electrical fitting work only'. Sight the applicant's licence card which shows the expiry date.
- Ensure an understanding and application of relevant Australian Standards and local requirements.
- Check for demonstrated checking and testing capabilities.
- Check EnergySafety bulletins for non-compliances in the applicant's name.
- Ask whether the applicant has any additional qualifications, licences or courses completed and ask for visual evidence, eg. forklift licence. The applicant may have additional skills useful for your business.
- Conduct a reference check.

SECTION 1: ELECTRICAL WORKER COMPETENCY CONTINUED...

TIP:

NECA WA’s Technical Knowledge Base (TKB) has a complete archive of Energy Bulletins for your convenience.

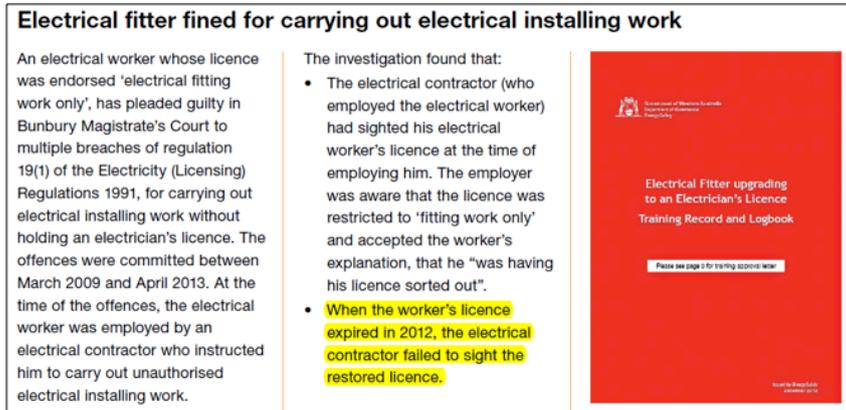


Figure 1: Excerpt from Energy Bulletin #70 April 2015

To capture this information, consider creating an **Employee Competency Record (ECR)** for successful applicants. This document can also be utilised to record details of training required or completed, providing a snapshot of your workforce skill set. The ability to quickly ascertain whether you have the necessary resources within your company, prior to tendering for a contract, can save you valuable time and avoid skill gaps.

Refer to Appendix A for an example Employee Competency Record

1.3 Competency – skills, experience, task allocation

Assess the worker’s competency on tasks related to the work the employee will be expected to perform. Methods of assessment could include a documented “buddy system” where the employee works with a known competent employee and feedback is given to the employer on their performance; or an initial focus on checking their work to ensure it is of an agreed standard.

Plan to provide increased supervision during the employee’s probation period and also to have some ongoing competency assessment in place. Capture this information via the Employee Competency Record.

Refer to Appendix A for an example Employee Competency Record

Why is this important?

Having non-competent or inexperienced employees working on a job puts not only them at risk but also the business in relation to ‘duty of care’. This can lead to non-compliances from the courts and risk to business reputation.



Checkpoint

Has the employee been assessed within your organisation to determine if they are competent to undertake the tasks required?

If a non-compliance is identified on an electrical installation, there is greater chance the focus would be placed on the worker for either referral to the Electrical Licensing Board or prosecution, if it can be demonstrated that due diligence was undertaken by the electrical contractor to ensure the Electrical Worker was suitably qualified for the work being undertaken.

Figure 2 documents the prosecution of an electrical worker under Regulation 49(1) of the *Electricity (Licensing) Regulations 1991*. The worker was fined \$7500 for ‘carrying out unsafe and substandard electrical work’ and ordered to pay \$649 in court costs.

NB: Bulletins published quarterly by EnergySafety provide a record of all prosecutions under E(L)R 1991, should you wish to refer to them. All Energy Bulletins are available to view via NECA WA’s Technical Knowledge Base (TKB).

Legislation and Breach	Offence	Date of offence	Fine (\$)	Court costs (\$)
E(L)R Regulation 49(1)	Carried out unsafe and substandard electrical work	26/06/09	\$7,500	\$649

Figure 2: Excerpt from Energy Bulletin #60 - Prosecutions for breaches of electrical legislation

SECTION 2: DESIGN REQUIREMENTS

2.1 Allocation of staff

2.2 Supply specifications

2.3 Design variations

2.1 Allocation of staff

When tendering or pricing work, understand the skill sets and limitations of your employees. Ascertain their involvement in jobs eg. what testing and recording have they been involved in and what training have they undertaken.

TIPS:

The use of an Employee Competency Record (ECR) can:

- Quickly determine what training/experience the employee has. [Refer to Appendix A for an example ECR.](#)
- Assist in forecasting what training an employee may require and help assist in their personal development.



Checkpoint

Consider which employees are going to be on the job.
Do they have sufficient experience?
Have you applied the correct labour component to your quotation?

2.2 Supply specifications

- Determine the electrical supply demand requirements and whether it is a standard or non-standard supply. (Section 9.2.1 of WAER)
- Decide who will make Design and Access Offer applications (DAO) to the network operator.

If, as the electrical contractor, you take on the responsibility it could be perceived by the client that you are delaying the pricing and timeframes to get the required supply, which could impact on your business. Whereas if the client (builder or end customer) is dealing with the process, they are fully aware of where the “sticking” points are and who the responsible party is.



Checkpoint

Who is going to take responsibility for any applications, you or the client?
Has this been considered in your quotation?

2.3 Design Variations

Changes to the design often occur during the construction of an installation. These changes can have both safety and cost implications, such as:

Safety

- Circuits missed out or cables remaining unterminated.
 - This can potentially lead to live energised cables at the commissioning stage because of the undocumented circuits being overlooked. [Refer to Section 4.3 for further tips.](#)

Cost

- Repairs, such as interior walls have to be chased or ceramic tiles have to be removed
- Expensive fines and court fees if prosecuted for non-compliance
- Additional work that cannot be invoiced as there is no documented evidence or approval by the client

SECTION 2: DESIGN REQUIREMENTS CONTINUED...

TIPS:

- Break the work down into manageable sections. Where practicable, work and complete sections within a building rather than having different electrical activities taking place all over a job site. This approach allows you to keep control and document what has been completed.
- Use a progress forecast chart to set milestones for the project - *Refer to Appendix B for an example forecast chart*
- Mark up drawings as work is completed. Check against the drawing that the correct conduit has been placed in the correct place. For example, if the drawing specifies 40mm sq conduit as per the quotation, but the worker has run 32mm sq conduit, you'll need to address this discrepancy as soon as identified.

SECTION 3: COMPLIANT PRODUCTS

3.1 Risks of non-compliance

3.2 Reputable wholesalers

3.1 Risks

It is critical for contractors to know the risks when purchasing and installing electrical products that are non-compliant, these include:

- Customer safety
- Livelihood and reputation of your business

While the liability for non-compliant products falls on the manufacturer or importer, if it can be found the contractor knew the product did not comply, some liability may fall on them.

TIPS:

- Purchase from a reputable wholesaler
- Choose well-known brands
- If customer supplied the product, determine where the product came from

Additional information can be found at: <http://www.commerce.wa.gov.au/energysafety/electrical-appliance-approval-marks>

TIPS:

If for example, the customer wants to supply their own light fittings, determine where they have come from. If the light fittings were purchased via eBay, for example, rather than from a reputable local supplier, they could be non-compliant.

Check whether the product is compliant, eg. if they are metal are they earthed? If not earth them, in other words make them compliant. Alternatively, don't fit them and advise the customer why they are non-compliant.

3.2 Reputable wholesalers

Using a reputable specialist electrical wholesaler can mitigate potential liability should a product be found to be sub-standard or non-compliant.

The liability for non-compliant products mainly falls on the manufacturer or importer. Wholesalers are less likely to carry the risk of introducing non-compliant products for resale, as they will want to protect their reputation.

An example of when non-compliant products can cause major safety concerns is the Infinity cable situation, which has been widely publicised throughout the country.

SECTION 4: DOCUMENT CONTROL

4.1 Purpose

4.2 Version Control

4.3 Documenting Variations

4.4 Payment claims

4.1 Purpose

The purpose of thorough document control is to ensure that the current job status (and history) can be referred to by the people who require it and any changes to the job are captured as they occur. Maintaining document control also demonstrates to auditors, prospective clients and employees, that your business is operating in a transparent and systematic way.

TIPS:

Ensure you:

- Work to the latest version of drawings
- Liaise with builders/architects and document decisions/changes
- Capture daily work progress of employees
- Conduct regular tool box meetings and document them
- Have workers complete detailed timesheets
- Allocate the correct materials to the job

Consider using an Inspection Test Plan (ITP). This can be used to document compliance via a third party throughout the project and protect you against claims and non-compliance. [Refer to Appendix C for an example ITP.](#)



Checkpoint

What document control is available?
Are the workers working with the current drawing version?

4.2 Version Control

It is recommended a version control system is introduced for electrical drawings so that if changes are made on the installation they can be captured and the previous drawing marked “superseded”.

A running job sheet (see Figure 3) can be used for the job on site, so that everyone accessing the folder knows which drawing they are working to. [Refer to Appendix D for an example Job sheet.](#)

SECTION 4: DOCUMENT CONTROL CONTINUED...

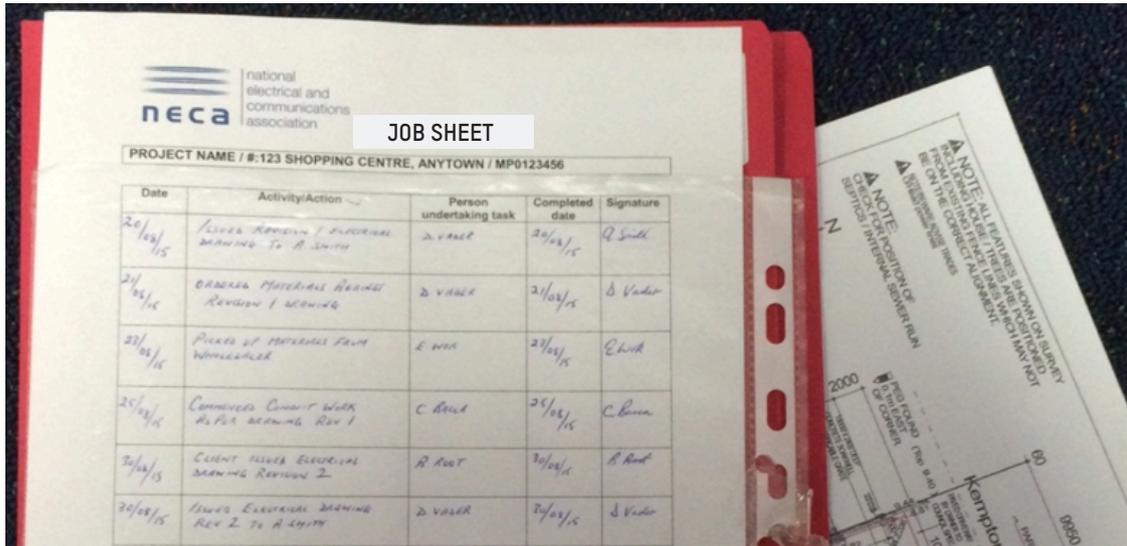


Figure 3: Example Job sheet in action

TIPS:

- When completing your checking and testing checklist, ensure you are checking against the latest drawing version to capture any additional work performed. As per Figure 4, the Notice of Completion submitted is inaccurate, this may result in a non-compliance.

Legislation and Breach	Offence	Date of offence	Fine (\$)	Court costs (\$)
E(L)R Regulation 52(3) 3 breaches	Submitting a Notice of Completion to the network operator for notifiable work that had not been completed	26/06/09 21/08/12	\$17,500	\$771

Figure 4: Excerpt from Energy Bulletin #67 – Prosecutions for breaches of electricity legislation

4.3 Documenting Variations

A practical method of capturing changes on the job is to carry a carbon copy book, smart phone or tablet and record whenever variations are required. The information from the variation can then be captured on the design drawing.

Ask the client/supervisor to authorise the variation by signing the documentation. This is an important step to verify variations have been authorised prior to submitting payment claims/invoices.



Checkpoint

How are you recording changes on a job?
Have they been signed off by the client?

4.4 Payment claims

Having documentation available and accessible in one place can also be beneficial if disputes arise for payments of works undertaken.

The correct documentation should demonstrate what materials, labour components and variations have been accounted for and whether any changes have been authorised by the client (to mitigate future disputes).

Whilst completing the job in a safe and compliant manner is the priority, getting paid for the work you perform is also crucial for the future of your business.

SECTION 4: DOCUMENT CONTROL CONTINUED...

TIPS:

NECA WA are conducting a series of **Contract Admin & Commercial Awareness seminars** specifically designed to take you from pre-contract through to final account. **Security of Payment and Construction Contracts Act Awareness seminars** are being run concurrently.

Refer to our website for full details and how to register www.neca.asn.au/wa/content/contract-admin-and-commercial-awareness-seminars

Practical tips in relation to document control are included in the below sessions:

- **Session 2a** – Deals with all aspects related to contract administration throughout the duration of the contract, from record keeping and administering payment provisions to ensure timely payments, to dealing with variations and similar contractual issues which, if not dealt with appropriately, invariably cost you time and money.
- **Session 2b** – Specific focus on contract administration related to programming, planning, delays, disruptions, extensions of time etc. Essentially if you 'fail to plan, then you plan to fail'. This session will demonstrate how to implement and maintain basic planning programmes to help preserve your rights to extensions of time and protection from levy of liquidated damages.



SECTION 5: CALIBRATION

5.1 Calibration methods

5.2 Portable appliance testing (PAT)

While it is not mandatory to have test equipment calibrated, it is good practice to either have a calibration laboratory undertake the calibrations, or use a system to ensure you can demonstrate the equipment is functioning correctly.

5.1 Calibration methods

Methods for testing the equipment include:

- Voltage – test equipment on a known supply, for example a socket outlet
- Continuity – short the leads out on ohms or use a fixed known resistance
- Insulation resistance – use a fixed known resistance

Tip:

Appreciate the importance of accurate measurements – accuracy requires calibrated test instruments. For critical applications such as working down to micro ohms, inaccuracy could result in a fine costing ten times the cost of calibration; or more seriously, potential injury or worse. On top of that, your reputation could also be put on the line.



Checkpoint

Do you have a system in place for calibrating test instruments?

SECTION 5: CALIBRATION CONTINUED...

5.2 Portable appliance testing (PAT)

A big area that is impacting the electrical industry is portable appliance testing (PAT), where calibration is crucial. As contractors conducting PAT testing are responsible for:

- Ensuring the equipment is safe and fit for purpose
- The safety of people using the equipment;

it is critical that they not only understand how to use the PAT testing instrument but also the nature and importance of what they are testing.

The College of Electrical Training runs regular Portable Appliance Testing courses - visit www.cet.asn.au to find out more.

SECTION 6: SAFETY INSPECTION AND TESTING

6.1 Competency

6.2 Test equipment

6.3 Checklists

The importance of checking and testing every electrical installation cannot be emphasised enough. Failure to do so may result in an electric shock or much worse.

Using a document control model assists in knowing what is being tested in an installation.

6.1 Competency

Ensure you have confidence in the person undertaking the task:

- Have they got the experience?
- Have they been trained?
- Is supervision required?
- Do you have evidence that you have assessed a worker's competency?

TIP:

- *Refer to Appendix A for an example Employee Competency Record (ECR)*

6.2 Test equipment

It is important that test equipment is fit for purpose; otherwise false readings could be obtained from the test equipment, resulting in unsafe installations being energised. Check whether the equipment is rated for the voltage or current being tested. Are the test instrument batteries charged?

In your document control process, incorporate sections to record which instruments were used to test the installation and have a system in place to periodically check test equipment.



Checkpoint

When was the last time your test instruments were checked?
Are the internal batteries charged?
What are the condition of the test leads?

SECTION 6: SAFETY INSPECTION AND TESTING CONTINUED...

6.3 Checklists

Use a testing and inspection checklist to ensure all steps are followed and the results are recorded.

Retaining completed checklists allows you to demonstrate that (a) checking and testing was completed and (b) the reading you recorded at the time of testing was acceptable.

TIP:

If an Inspector undertakes testing at a later date and finds the insulation resistance on a particular circuit to be less than 1 megohm, the checklist will show that you complied with requirements to test the installation and what the reading was at that time. The Inspector will then need to determine what caused the existing fault - for example, after you had checked the installation, was the cable then damaged by another tradesperson when performing their work?

TIP:

- Refer to Appendix E for example checklist or download a checklist template from NECA’s Technical Knowledge Base (TKB). Figure 5 depicts an excerpt from the checklist template.

 national electrical and communication association		Inspection Checklist Domestic		Reviewed: Aug 2014	Page 1 of 3
		Document reference:		Inspection Checklist Domestic_MML_Rev 01	
Electrician's name				Date and time of test	DD / MM / YYYY XX:XX
Site address					
Scope of work					
New connection	Yes / No	Means of connection			
Single Phase or Three phase	Single phase / Three phase	Phase sequence		___ / ___ / ___ or N/A	
Is dwelling occupied	Yes / No	Meter number		_____ or N/A	
VISUAL INSPECTION					
Items to be checked	Criteria	Relevant section of Wiring Rules		Pass / Fail / N/A	
Earthing	MEN connection / Earth electrode	5.3			
	Earthing conductors, e.g. size, identification	5.3.3 5.5.2	5.5.1		
	Connections, joints and terminations e.g. earth electrode	5.5.6			
Fire protection	Fire-retardant sealant for openings 5 mm or greater	2.9.7			
Labelling	Identification and labelling of electrical equipment	2.9.5			
Location	<ul style="list-style-type: none"> • Location of switchboard, e.g. access and egress, not in restricted location • Protection against external influences • Mechanical damage 	2.9.2 3.3.2.11 3.9.4			
Protection	Service Protective Device – fault current rating and let-through kA rating	WAER Clause 6.2.3			
	Isolating devices, e.g. main switches	1.5.2	2.3.3		
	Protective devices, e.g. selection and setting of adjustable protective devices	2.5.2 2.5.3 2.5.4	2.5.5 2.6		
	RCDs – quantity, type (e.g. combination circuit-breaker/RCD), trip current (e.g. 30mA)				

Figure 5: Excerpt of Inspection Checklist template – available from NECA (free of charge)

SECTION 6: SAFETY INSPECTION AND TESTING CONTINUED...

Legislation and Breach	Offence	Date of offence	Fine (\$)	Court costs (\$)
E(L)R Regulation 52C(1)(b)(i)	Failing to check and test the electrical work after completion to ensure it was safe and complied with AS/NZS 3000:2007 "Wiring Rules"	12/03/2014	\$6000	\$781

Figure 6: Excerpt from Energy Bulletin #66 – Prosecutions for breaches of electricity legislation



Checkpoint

Do you have a checklist?

SECTION 7: NOTICES OF COMPLETION AND SAFETY CERTIFICATES

7.1 Notices of Completion

7.2 Electrical Safety Certificates

7.1 Notices of Completion

While this is part of document control, it is an area which can easily get overlooked and therefore warrants its own section.

Under part 5 of the *Electricity (Licensing) Regulations 1991*, some of the offences related to Notices of Completion are as follows:

- Failing to deliver a Notice of Completion within the required time frame (see Figure 7)
 - Notices must be submitted to the relevant network operator within three days of the electrical work being carried out
- Submitting a Notice of Completion for installing work that had not been completed
- Submitting a Notice of Completion when the electrical work was defective and therefore incomplete
- Submitting a Notice of Completion when the completed electrical installing work had not been adequately checked and tested to ensure it was safe

TIPS:

- Determine who in your business is going to be responsible for the processing of notices.
- Have a system in place to ensure Notices are submitted correctly and on time.
- Refer to Section 8 of the WADCM for additional information on Notices.

Legislation and Breach	Offence	Date of offence	Fine (\$)	Court costs (\$)
E(L)R Regulation 52(1)	Failing to deliver a Notice of Completion to the network operator within the required time frame	26/05/2013	\$4000	\$667

Figure 7: Excerpt from Energy Bulletin #68 – Prosecutions for breaches of electricity legislation



Checkpoint

Who is submitting notices?

SECTION 7: NOTICES OF COMPLETION AND SAFETY CERTIFICATES CONTINUED...

7.2 Electrical Safety Certificates

Electricity (Licensing) Regulations 1991 – Reg 52B Electrical safety certificates, issue of for electrical installing work

(1) Subject to subregulations (3) and (5), an electrical contractor who carries out any electrical installing work, or causes any electrical installing work to be carried out, commits an offence unless, within the period of 28 days after the completion of the electrical installing work, an electrical safety certificate, in a form approved by the Director and duly completed, is prepared by the electrical contractor in respect of the electrical installing work and delivered to the person for whom the work was carried out.

A safety certificate must be issued to the person in charge of the installation **no later than 28 days from electrical work being carried out.**

TIPS:

- Always follow legislative requirements and submit the appropriate notices and certificates to the relevant parties. If a dispute arises with a client, it is recommended you do not hold notices or certificates back. In court, it will not be regarded as a defence that you 'intended to issue the safety certificate once the client had paid your invoice'.
- Utilise the services of NECA Legal to assist in resolving disputes.

NECA Legal is dedicated to assisting electrical contractors. NECA WA members are entitled to the benefits of legal assistance and representation for a fraction of the price when compared to private practices. General enquiries, phone advice and consultation relating to legal and industrial relations issues (30 minute maximum) are free of charge to NECA WA members - phone (08) 6241 6129 or email necalegal@necawa.asn.au.

SUMMARY

Whilst the intent of this document is not to cover every aspect of an electrical installation, the Electrical Contractor Guidelines are designed to offer guidance and promote a practical and systematic approach to completing tasks in a compliant and safe manner.

Recommended references

NECA recommends readers of this document also familiarise themselves with the:

- Western Australian Electrical Requirements (WAER)
- Western Australian Distribution Connections Manual (WADCM)

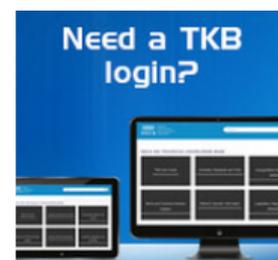
Access to these documents can also be made through NECA's Technical Knowledge Base (TKB).

NECA is here to assist you

If you require technical advice, please contact NECA Technical on (08) 6241 6100 or via email technical@necawa.asn.au.

TIP:

NECA WA's online Technical Knowledge Base (TKB) is available to all members and up to nine of their workers, free of charge. To request your free access, please visit our website www.neca.asn.au/wa and click on the 'Need a TKB login' button (see image above).



Technical Knowledge Base features

- Access the complete Wiring Rules and ten other common electrical standards
- WA Electrical Requirements (WAER)
- WA Distribution Connections Manual (WADCM)
- Product Recalls
- Entire archive of Energy Bulletins
- Network operator forms and updates
- Industry alerts
- Hundreds of FAQs based on questions from our industry members
- Inspection checklists (download a template to use in your business)

APPENDIX A

EMPLOYEE COMPETENCY RECORD

Employee Name: Luke Johnson
Date of employment: 9-Mar-15
Probation ends: 9-May-15
Date of next performance review: 9-Sep-15

By keeping employee records up to date you can:

- ensure licences/certificates are current
- before tendering for work, check you have appropriate resources
- easily assign jobs to appropriately skilled employees
- develop employees in the areas they require
- allocate training budget effectively

TIP: record key dates (eg. licence expiry or reassessment) in a diary as a reminder

MANDATORY REQUIREMENTS	✓			Expiry date	Acquire by? (agreed date)
Trade Certificate Grade A electrician	✓				
Current WA electrical worker's licence	✓				
Do any restrictions apply? eg. fitting work only	No			-	
Current first aid certificate	✓			1/07/2015	
Drivers licence (min. Class C)	C			19/11/2020	
White card	✓				
ADDITIONAL REQUIREMENTS					
Electrical contractors nominees certificate					
High risk work card - WP	x				1-Jul-15
SKILLS/EXPERIENCE					
				Needs experience or refresher	Development plan
Number of years post-trade experience	5 years				
Switchboard skills	✓				
Construction installation				✓	Buddy with John, reassess by 1 August
Construction wiring					
Sub mains					
Checking and testing				✓	Booked on CET's Checking and Testing course 20 April 2015
ATTRIBUTES (discuss at interview)					
	✓			Needs development	Development plan
High regard for safety requirements	✓				
Teamwork	✓				

Training						
Name of training	Cost	Provider	Date	Duration	Completed/certificate sighted	
Checking and Testing course	\$90	CET	20/04/2015	8 hours		1/05/2015
First Aid-Low Voltage Rescue and Provide CPR UETDRRF06B	\$150	St John	24/08/2015	6.25 hours		28/05/2015
Elevated Work Platform (EWP)	\$300	Site Skills	03/05/15	8 hours		15/05/15

APPENDIX B



Example forecast chart:

PROJECT NAME: _____

	ACTIVITY	WEEK#										
		1	2	3	4	5	6	7	8	9	10	
1	Site clearing										WORK COMPLETED DEADLINE	
2	Arrange for connection											
3	Install conduit		0									
4	Install wiring				0							
5	Terminate cables											
6	Check and test											
7	Submit paperwork											
8												
9												
10												
11												
12												

0 = Order to be placed for material

APPENDIX C

Inspection and Test Plan template notes

The employee preparing the ITP shall first establish the scope of the installation activities to establish the 'boundaries' of the ITP. Then develop the ITP considering the following:

- Inspection required upon receipt of goods and equipment;
- Products/services to be subcontracted and subcontractor inspection requirements;
- In-process inspection during manufacture/construction;
- Characteristics to be inspected and use of sampling plans;
- Applicable standards, e.g. AS/NZS 3000;
- Acceptance criteria, e.g. resistance, trip times etc;
- Client inspection points required and the type of client inspection points (witness, hold or surveillance);
- Responsibility for inspection, e.g. project engineer, electrician, supervisor etc;
- Details of client's procedures;
- Types and methods of testing required;
- Approval of special processes;
- Types of records eg. completed inspection sheet, meter print out, certification.

The ITP will provide a sequential listing of the inspections and tests required for the project activities.

ITP No. : 123/01 (Job # /ITP #)	INSPECTION AND TEST PLAN	Documentation Ref: (insert Contract #)
Revision: 0	ITP TITLE: Residential Electrical Install	Location/Lot: 23 Loop Cres, Midland

Approved By: (usually client representative)	Date: 13/08/15	Subcontractor's Name: (Use if you are contracting a sub contractor for some works on a job and require their works to be subject to checking via this ITP)	
Action Key:	W-Witness	H-Hold	S-Surveillance
Attach Dockets, Certificates, QA Documents to ITP			

Item No.	Activity (Including Necessary Inspections)	Applicable Standards (eg AS/NZS 3000)	Acceptance Criteria (eg >1 megaohm)	Verify or Test by								Remarks/Records (e.g. test frequency, reports, certificates, etc..)
				Electrical Contractor			Subcontractor			Client		
				Key	Resp.	Sign/Date	Key	Resp.	Sign/Date	Key	Sign/Date	
1	Drawing and Job Specifications	Contract Requirements	Current Revision/ Drawing Register	S	S/V	(Sign when checked)	S	S/V	(Sign when checked)	-	-	Checked prior to mobilisation to site
2	Materials/ Equipment Procurement	Contract Spec	Site check and signed delivery docket	S	S/V	(Sign when checked)	-	-	-	-	-	Checked by S/V when goods arrive on site
3	1st Fix (Rough-in)	AS/NZS 3000	Test Sheet 1	E		(Sign when checked)	-	-	-	-	-	Progressive check as job proceeds
4	2nd Fix (Fit off)	AS/NZS 3000	Test Sheet 2	E		(Sign when checked)	-	-	-	H	(Sign when checked)	Client requires 24 hr notice to inspect works and remove hold point
5	Subcontractor A/C Install	AS/NZS 3000/ Refrigeration Std	A/C Test Sheet 1	H	S/V	(Sign when checked)	S	RM	(Sign when checked)			S/V to check S/C work prior to signing off this part of works
6	Inspection, Test, Commission	AS/NZS 3000	Light & Power Test Sheet	E		(Sign when checked)	-	-	-	H	(Sign when checked)	One test sheet for each separable portion of work. Client requires 24 hr notice to inspect works and remove hold point

APPENDIX E



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Electrician's name		Date and time of test	DD / MM / YYYY XX:XX
Site address			
Scope of work			
New connection	Yes / No	Means of connection	
Single Phase or Three phase	Single phase / Three phase	Phase sequence	/ / or N/A
Is dwelling occupied	Yes / No	Meter number	or N/A

VISUAL INSPECTION

Items to be checked	Criteria	Relevant section of Wiring Rules		Pass / Fail / N/A
Earthing	MEN connection / Earth electrode	5.3		
	Earthing conductors, e.g. size, identification	5.3.3 5.5.2	5.5.1	
	Connections, joints and terminations e.g. earth electrode	5.5.6		
Fire protection	Fire-retardant sealant for openings 5 mm or greater	2.9.7		
Labelling	Identification and labelling of electrical equipment	2.9.5		
Location	<ul style="list-style-type: none"> Location of switchboard, e.g. access and egress, not in restricted location Protection against external influences Mechanical damage 	2.9.2 3.3.2.11 3.9.4		
Protection	Service Protective Device – fault current rating and let-through kA rating	WAER Clause 6.2.3		
	Isolating devices, e.g. main switches	1.5.2	2.3.3	
	Protective devices, e.g. selection and setting of adjustable protective devices	2.5.2 2.5.3 2.5.4	2.5.5 2.6	
	RCDs – quantity, type (e.g. combination circuit-breaker/RCD), trip current (e.g. 30 mA, 10 mA)	2.6		
Secure fixings / barriers	Connecting devices, e.g. neutral bars, earth bars and active links	2.9		
Systems	Wiring and protection device compatible	2.5.7	3.4.4	
	Labelling of board	2.9.5		
	Electrical connections and enclosures	3.7	3.10.2	
		3.9.9	3.10.3	
	Adequate support and fixing	3.9.3		
Segregation from other services and electric installations	3.9.8			
Cables	<ul style="list-style-type: none"> Adequately clipped or supported / secured Joints / junctions enclosed Connected and terminated 	3.9.3.1 3.7.3 3.9.4 3.9.9 1.5.11.4		
Damp situations – restricted zones	<ul style="list-style-type: none"> Swimming pools, spas Water features Hose-down areas 	6.3.2		
		6.4.2		
		6.7.2		
	<ul style="list-style-type: none"> Baths, showers (refer Table 6.1) Saunas, refrigeration and shower screens 	6.2.2		
		6.5.2 6.6.2		

APPENDIX E CONTINUED...



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VISUAL INSPECTION (continued)

Items to be checked	Criteria	Relevant section of Wiring Rules		Pass / Fail / N/A
Electrical equipment	<ul style="list-style-type: none"> • Connection - support and fixing • Fittings and accessories are adequately secured 	4.1.2		
Electrical protection	Correct wiring, secure mounting and location of socket outlets, lights, and appliances not obscured by plumbing etc. (Amendment 2)	4.4.1 4.4.2 4.4.3 4.4.4 4.19	4.5 4.6 4.7 4.8 4.9	
Exclusion zones	Requirements for gas appliances and cylinders complied with	4.18		
Lighting	Lamp holders, lamps, luminaires and recessed lighting, signage in place (Amendment 2)	4.5.1 4.5.2 Figure 4.7		
Mechanical protection	IP rating of equipment exposed to weather	4.1.3		
Thermal protection	Thermal rating of equipment and fire barriers	4.2.2 4.2.3		

ADDITIONAL COMMENTS / OBSERVATIONS

MANDATORY TESTING as per AS/NZS 3000:2007

Sequence per Figure 8.1	Relevant section of the standard	Serial number of test equipment used
1. Continuity of earthing system test	8.3.5	
2. Insulation resistance test	8.3.6	
3. Polarity test	8.3.7	
4. Correct circuit connections	8.3.8	
5. Earth loop impedance test	8.3.9	
6. Operation of RCDs (where energised)	8.3.10	

APPENDIX E CONTINUED...



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Continuity of earthing system		
Test (minimum value)	Actual result	Comment
Main earth conductor ($\leq 0.5 \Omega$)		
Equipotential bonding conductors ($\leq 0.5 \Omega$)		
Protective earths as per table 8.2 AS 3000		
Insulation resistance - Ensure all switches are on. (For 3 Ø record min phase reading only)		
Consumer mains ($\geq 1M\Omega$)		
Sub mains ($\geq 1M\Omega$)		
Equipment / socket outlet / lighting ($\geq 1M\Omega$)		
Heating Elements ($\geq 10 k\Omega$)		
POLARITY		
Check all active, neutral and earth connections are connected to the corresponding terminals of the electrical equipment		
CORRECT CIRCUIT CONNECTIONS		
No short circuit between conductors		
No interconnection of conductors between circuits		
Active conductors switched		
VERIFICATION OF EARTH LOOP IMPEDANCE TEST (refer to table 8.1 AS 3000)		
If an RCD operates during the test it is deemed as satisfactory – no trip record result		
OPERATION OF RCDs		
RCD operates to disconnect designated circuit		
RCD disconnection current and trip time		

ENSURE MEN CONNECTION IS RE-INSTALLED AFTER TESTING | TAKE A PHOTOGRAPH

DECLARATION

Tester/s

I certify this is a true and accurate record of the checking and testing undertaken at this installation.

EW Name	EW Licence #	Signature	Date

Return this form to the office for installation records.

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