



# Physical Demands Analysis



## Commercial Electrician

### Task 10: Installing Wall Plugs – Rough In & Finishing Phases

VIDEO CLIP

#### Acknowledgement

*The Alberta Construction Safety Association (ACSA) with the cooperation of member companies and their electrical contractors/workers, the Electrical Contractors Association of Alberta and Jason Shepherd Physical Therapy Inc. developed this electrical industry Physical Demands Analysis.*

#### Disclaimer

*The job tasks described in this report & related video footage may vary, please contact the company directly to confirm this job description is accurate.*

#### Purpose of Task Analysis

Job demands information that can be utilized for assistance in selecting suitable job candidates, developing proactive injury prevention interventions and effective, sustainable disability management programs.

#### General Description

The electrician is responsible for the installation of wall plug and associated electrical components as per the building's electrical blueprints.

#### Work Organization

Journeyman and Apprentice Electrician numbers vary by Work site and company  
Depending on the construction phase/type, an Electrician may be part of a crew performing this task for several weeks before rotating to another task

#### Work Schedule

8+ hour shifts

Regular breaks spaced throughout workday: Usually two 15-minute coffee breaks and one 30-minute lunch break per shift

### **Essential Job Functions**

- Splicing wires (rough-in phase)
- Terminating wires (finishing phase)
- Clean-up (Sweeping, picking up waste materials)
- Materials handling

### **Assessment Criteria Used**

<b>Frequency Key</b>		
<b>FREQUENCY</b>	<b>% OF WORKDAY</b>	<b>HOURS OF 8-HOUR WORKDAY</b>
<b>Not required (N/R)</b>	<b>0%</b>	<b>0</b>
<b>Seldom (S)</b>	<b>0 - 5%</b>	<b>Not performed on a daily basis</b>
<b>Rare (R)</b>	<b>1 – 5%</b>	<b>&lt; 29 min/day</b>
<b>Occasional (O)</b>	<b>6 - 33%</b>	<b>29 min to 2 hours 42 min per day or 1 rep/30 min</b>
<b>Frequent (F)</b>	<b>34 - 66%</b>	<b>2 hours 43 min to 5 hours 21 min per day or 1 rep/2 min</b>
<b>Constant (C)</b>	<b>67 – 100%</b>	<b>5 hours 22 min to 8 hours per day or 1 rep/30 sec</b>

**Equipment used to perform the job & frequency of use may include, but not exclusive to the following:**

#### **Frequent**

- Tool belt
- Tools (wire cutters, pliers, knives, drills, screwdrivers)

#### **Occasional**

- Voltmeter
- Ladders
- Tape measure
- Flashlight
- Level

#### **Rare**

- Broom

## **Personal Protective Equipment Recommended**

- ✓ Safety Glasses
- ✓ Hearing Protection
- ✓ Hard Hat
- ✓ Steel Toed Boots
- ✓ Gloves
- ✓ Overalls (Optional)
- ✓ Knee pads (Optional)
- ✓ Fall Protection Equipment (Task-specific)

## **Environment Conditions**

### **Inside/Outside Work:**

Inside 99%; Outside 1%

### **Working Temperature:**

Although the temperature varies, finishing job duties are generally completed within the confines of a temperature-regulated facility, while the roughing-in phase of the task may involve exposure to hot or cold weather conditions

### **Walking Surfaces:**

Rough-in Phase: Concrete with slippery areas (water puddles, mud, construction debris)

Finishing Phase: Concrete, hardwood, carpet

### **Dust:**

Rough-in Phase: Concrete dust – Mild; can be high during blow down or if jackhammer is being utilized nearby

Finishing Phase: Drywall dust – Mild/Moderate depending on proximity to Drywallers

### **Lighting:**

Rough-in Phase/ Finishing Phase: Adequate, indoor lighting in most areas; dark spots in basement/parkade

### **Vapour/Fumes:**

Rough-in Phase: Mild – Diesel fumes from mobile equipment

Mild-Moderate - solvent vapours from other trades

Finishing Phase: Mild-Moderate - Paint fumes

### **Noise Levels (measured with Audiometer):**

Rough-in Phase: Can exceed 100 dBA if heavy equipment, portable generators, power tools or hammers are being utilized nearby

Finishing Phase: 58-75 dBA in most areas

### **Vibration:**

Mild - Power tools

### **Moving Objects:**

Cranes, mobile equipment

**Risks/Hazards:**

Slips/Trips/Falls, skin punctures, muscle strains/soreness, pinch points, cuts/abrasions, electric shock

**Size of Work Space:**

Usually adequate, although the worker may have to maneuver into tight spots in order to complete task on the rare occasion

**Sensory Requirements**

All of the following are required to complete essential job functions and remain safe at all times:

**Hearing** (Conversation or Sounds)

**Vision** (Near/Far, Colour, and Depth)

**Feeling** (Tactile sensory discrimination)

**Reading** (English)

**Speech/Comprehension** (English)

**Other Work Factors****Traveling:**

Seldom – Leaving the work site for materials/supplies

**Working Alone:**

Worker may have to perform task at a work site without colleagues or other trades people on a rare basis

**Working Independently / in Group:**

Required to work independently for the majority of the shift, although he/she may be asked to assist a co-worker or request assistance for him-/herself when required

**Work Pace (self or machine):**

Self-Motivated – Moderate to Fast pace, depending on complexity

**Interacting with Others:**

Required to work with colleagues and other trades people

**Operation of Mobile Equipment:**

Aerial work platform

**Assessment Criteria Used**

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<b>FORCE LEVEL</b>	<b>WEIGHT HANDLED</b>
<b>Light</b>	<b>Less than 20 lbs.</b>
<b>Medium</b>	<b>20-49 lbs.</b>
<b>Heavy</b>	<b>50-99 lbs.</b>
<b>Very-Heavy</b>	<b>100<sup>+</sup> lbs.</b>

## Critical Job Demands

MANUAL HANDLING	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Lift: Floor to Waist	<b>Light force:</b> Tools, box of plugs/ electrical outlet components; <b>Medium force:</b> Tool box, ladder (up to 12 foot)			X			
Lift: Waist to Waist	<b>Light force:</b> Tools, box of plugs/ electrical outlet components; <b>Medium force:</b> Tool box, ladder (up to 12 foot)			X			
Lift: Waist to Chest	<b>Medium force:</b> Ladder (up to 12 foot); <b>Heavy force:</b> Ladder (12 <sup>+</sup> foot)			X			
Lift: Waist to Overhead	<b>Light force:</b> Electrical components, tools			X			
Front carry	<b>Light force:</b> Tools, box of plugs/ electrical outlet components; <b>Medium force:</b> Ladder (up to 12 foot)			X			
Right side carry	<b>Light force:</b> Tools, electrical components; <b>Medium force:</b> Tool box, ladder (up to 12 foot)				X		
Left side carry	<b>Light force:</b> Tools, electrical components; <b>Medium force:</b> Tool box, ladder (up to 12 foot)				X		
Static push	<b>Light force:</b> Installing electrical components				X		
Static pull	<b>Light force:</b> Splicing/terminating wires					X	
Dynamic push	<b>Light force:</b> Installing electrical components				X		
Dynamic pull	<b>Light force:</b> Splicing/terminating wires				X		

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Utilizing Tools, splicing/ terminating wires, installing wall plug components					X	
Repetitive use of dominant hand	Utilizing Tools, splicing/terminating wires						X
Repetitive use of non-dominant hand	Utilizing Tools, splicing/terminating wires					X	
Bilateral power grip	<b>Light force:</b> Box of plugs/electrical outlet components; <b>Medium force:</b> Ladder (up to 12 foot)				X		
Power grip with dominant hand	<b>Light force:</b> Tools, clean- up duties; <b>Medium force:</b> Ladder (up to 12 foot), tool box				X		
Power grip with non-dominant hand	<b>Light force:</b> Tools, clean- up duties; <b>Medium force:</b> Ladder (up to 12 foot), tool box			X			
Bilateral fine dexterity skills	Splicing/terminating wires, handling electrical components, installing wall plugs					X	
Fine dexterity with dominant hand	Splicing/terminating wires, handling electrical components, installing wall plugs					X	
Fine dexterity with non-dominant hand	Splicing/terminating wires, handling electrical components, installing wall plugs					X	
Bilateral manual handling	<b>Light force:</b> Box of plugs/ electrical outlet components; <b>Medium force:</b> Ladder (up to 12 foot)				X		
Manual handling with dominant hand	<b>Light force:</b> Plugs/electrical outlet components; <b>Medium force:</b> Ladder (up to 12 foot)				X		
Manual handling with non-dominant hand	<b>Light force:</b> Plugs/electrical outlet components; <b>Medium force:</b> Ladder (up to 12 foot)			X			
Tool usage bilaterally	<b>Light force:</b> Sweeping			X			
Tool usage with dominant hand	<b>Light force:</b> Tools used for splicing/terminating wires & installing wall plugs						X
Tool usage with non-dominant hand	<b>Light force:</b> Tools used for splicing/terminating wires & installing wall plugs				X		

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting (on ground, box or wire reel)	Splicing/terminating wires, installing wall plug components (rough-in/finishing phases)					X	
Standing	Splicing/terminating wires, installing wall plug components (rough-in/finishing phases)					X	
<b>Walking:</b> Level surfaces	Splicing/terminating wires, installing wall plug components (rough-in/finishing phases), clean-up duties				X		
Rough surfaces	Construction debris			X			
Slopes	Work site terrain		X				
<b>Climbing:</b> Regular stairs	Accessing designated work areas				X		
Ladders	Installing wall plug components				X		
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	Install wall plug components while on a ladder				X		
Static bending	Splicing/terminating wires, installing wall plug components					X	
Variable bending	Splicing/terminating wires, installing wall plug components				X		
Static twisting	Splicing/terminating wires, installing wall plug components				X		
Variable twisting	Splicing/terminating wires, installing wall plug components				X		
Kneeling	Splicing/terminating wires, installing wall plug components					X	
Crouching	Splicing/terminating wires, installing wall plug components			X			
Crawling	Splicing/terminating wires, installing wall plug components			X			
Repetitive squatting	Splicing/terminating wires, installing wall plug components		X				
<b>Reaching:</b> Above shoulder	Splicing/terminating wires, installing wall plug components				X		
<b>Reaching:</b> Below shoulder	Splicing/terminating wires, installing wall plug components					X	
Neck Postures/Movements	All neck positions required (180°, up, down, side-to-side)						X
Throwing	N/R	X					
Foot Action	N/R	X					
Forceful/Jerky movements	N/R	X					



## Psychosocial Demands

### Seldom/Rare/Occasional/ Frequent/Constant

#### **A. Understanding and memory:**

Remember locations and routine procedures	<b>Constant</b>
Understand and remember short and simple instructions	<b>Constant</b>
Understand and remember detailed instructions	<b>Constant</b>

#### **B. Sustained concentration and persistence:**

Carry out short and simple instructions	<b>Constant</b>
Carry out detailed instructions	<b>Constant</b>
Maintain attention and concentration for extended periods	<b>Constant</b>
Perform activities within a schedule	<b>Constant</b>
Sustain an ordinary routine without supervision	<b>Constant</b>
Make simple decisions	<b>Constant</b>
Solve simple straightforward problems	<b>Constant</b>
Solve complex problems	<b>Constant</b>

#### **C. Social interaction:**

Interact with the general public	<b>Seldom</b>
Ask questions or request assistance	<b>Occasional</b>
Accept instructions and feedback	<b>Occasional</b>
Get along well with others without distracting them	<b>Constant</b>
Get along well with others without being distracted by them	<b>Constant</b>

#### **D. Adaptation:**

Respond to changes in the environment or tasks	<b>Constant</b>
Aware of normal hazards and take appropriate precautions	<b>Constant</b>
Travel in unfamiliar places or use public transportation	<b>Seldom</b>
Set realistic goals or make plans independently of others	<b>Occasional</b>
Juggle tasks and prioritize	<b>Occasional</b>

### Yes/No

#### **E. Responsibility and accountability:**

Is work place without the pressure of deadlines?	<b>No</b>
Does the work involve occasional pressure to meet deadlines?	<b>Yes</b>
Does the work involve significant pressures?	<b>Yes</b>

#### **F. Language Requirements:**

Is English required for safety purposes?	<b>Yes</b>
Is English required for professional purposes?	<b>Yes</b>

#### **G. Educational Requirements:**

Is grade 12 diploma required?	<b>Yes</b>
Is post-secondary required?	<b>Yes</b>
Is additional skill training required?	<b>Yes*</b>

**\*(Fall Protection, Aerial Work Platform)**

## Injury Prevention Recommendations

1. Stretch regularly - used muscles throughout the shift – neck, shoulders, chest, elbows, forearms, wrists, hands, lower back, thighs and calves/ankles – paying particular attention to the postural muscles (low back and neck) to prevent risk of soft tissue injuries related to prolonged bending/twisting posture.
2. Warm-up exercises are recommended before undertaking manual handling tasks to reduce the chance of soft tissue injuries neck, back, upper and lower extremity
3. Incorporate proper manual handling techniques at all times to help prevent low back strain/sprain from incorrect manual handling techniques –utilize dolly, cart, hoist or forklift for all items over 50 lbs or of awkward shape whenever possible; maintain physical conditioning to a **Medium** manual handling level
4. To help prevent lower extremity joint/muscle pain due to general deconditioning, poor cushioning in footwear and spending extended periods weightbearing on concrete surfaces – ensure proper fitting footwear with adequate cushioning and take regular stretch breaks hourly
5. When wearing a tool belt for prolonged periods, it is recommended that workers utilize tool belts with shoulder straps/suspenders to better distribute/carry the weight
6. To prevent knee injuries, knee pads should be utilized when kneeling on hard and/or rough surfaces