

## Topic Skills Practice Cover Sheet

<b>Unit Name:</b>	UEEEL0012 Install low voltage wiring, appliances, switchgear and associated accessories
<b>Topic Title:</b>	Underground Cabling

<b>Skill Practice Number:</b>	7.2
<b>Skill Practice Name:</b>	Select Cables for Underground Consumer Mains

<b>Student Name:</b>	
<b>Student ID:</b>	
<b>College/Campus:</b>	
<b>Group:</b>	

Results	
<b>Planning:</b>	
<b>Carryout:</b>	
<b>Completion:</b>	
<b>Overall Results:</b>	
<b>Comments:</b>	

## Topic Skills Practice 7.2

UEEEL0012 Install low voltage wiring, appliances, switchgear and associated accessories

### Topic 7. Underground Cabling

#### Skills Practice 7.2: Select Cables for Underground Consumer Mains

##### Task:

To use Australian Standards, local service and installation rules (SIR) and manufacturer's catalogues to select suitable cables and wiring systems for given underground consumer mains installations.

##### Objectives:

At the completion of this skills practice, you should be able to:

- Select suitable underground wiring systems based on installation requirements
- Identify and apply derating factors based on installation conditions.
- Select minimum cable size based on required current carrying capacity.
- Select equipment from manufacturer's catalogues for underground cable installations.

## 1. Planning the Skills Practice

### 1.1 Standards and Equipment

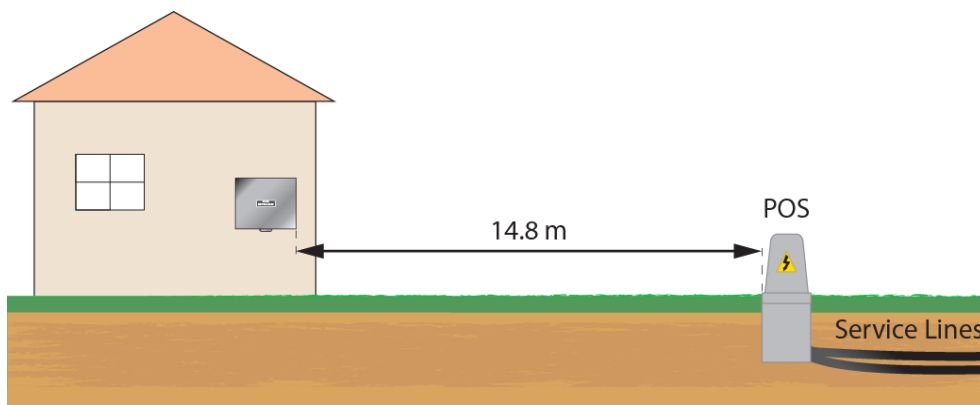
1.1.1 Obtain the following current Australian Standards, documents and equipment:

- AS/NZS 3000:2018 Wiring Rules.
- AS/NZS 3008.1.1:2017 Electrical installations - Selection of cables.
- Local Service and Installation Rules (SIR).
- Manufacturer’s catalogues.
- Pens/pencils.

## 2. Carrying Out the Skills Practice

### 2.1 Consumer Mains Cable Selection




2.1.1 A set of three phase unprotected consumer mains are required to be run underground between the point of supply (POS) and the main switchboard (MSB) of the installation pictured below.



2.1.2 Select a suitable wiring system for the installation in compliance with AS/NZS 3000:2018 and local service and installation rules (SIR), and record details in the spaces provided below:

Underground Wiring System	
Description:	Category A wiring system in which cables are enclosed in heavy duty
	Insulating conduct without further mechanical protection.
Applicable Requirements/Rules	

Wiring System Category:	A
AS/NZS 3000:2018 Clause(s):	3.11.3
Local SIR Clause(s):	2.4.1.1

	 Feedback	Have your teacher/trainer check your answers	Teacher/Trainer Initials and Date	

A set of 3 phase unprotected consumer mains - Three single core cables

Table 3(4) column (2)  $\xrightarrow{90^{\circ}\text{C}}$  Table B col 24-26  
 100A  $\xrightarrow{\text{Table (B) } 90^{\circ}\text{C}}$  25mm<sup>2</sup>  $\xrightarrow{90^{\circ}\text{C}}$  1.62  
 Derating Table 22, one circuit  $\therefore$  Derating factor = 1

Table 41 25mm<sup>2</sup>  $\rightarrow$  1.62

$$V_d = \frac{V_c L I}{1000} = \frac{1.62 \times 14.8 \times 100}{1000} = 2.397 \text{ V}$$

$$\therefore \% V_d = \frac{2.397}{400} \times 100 = 0.599\%$$

It is more than acceptable Limit 0.5%

Choose 35mm<sup>2</sup>  $\xrightarrow{90^{\circ}\text{C}}$  1.12

$$\therefore V_d = \frac{1.12 \times 14.8 \times 100}{1000} = 1.746 \text{ V}$$

$$\% V_d = \frac{1.746}{400} \times 100 = 0.4365\%$$




Choose 35mm<sup>2</sup> cable

2.1.3 Use AS/NZS 3008.1.1:2017 to select suitable cables for the installation and record details in the table provided below.

Installation Requirements and Conditions:

- Maximum Demand: 100 A per phase
- Ambient Soil Temperature: 20°C
- Soil Resistivity: 0.8°C.m/W

Cable			
Type/Cores:	3	Insulation:	XLPE
Installation			
Installation Method:	Wire in underground conduit		
AS/NZS 3008.1.1 Table:	8	Item No:	16
Rating/Derating			
Factor 1:	1		
AS/NZS 3008.1.1 Table:	22	Column:	.1
Factor 2:			
AS/NZS 3008.1.1 Table:		Column:	
Factor 3:			
AS/NZS 3008.1.1 Table:		Column:	
Conductor Size			
Conductor Size:	35mm <sup>2</sup>		
Current Carrying Capacity:	137 A		
AS/NZS 3008.1.1 Table:	4	Column:	8

	 <b>Feedback</b>	Have your teacher/trainer check your answers	Teacher/Trainer Initials and Date	

2.1.4 Use manufacturer's catalogues to select a suitable enclosure for the installation and record details in the table provided below.

Enclosure	
<b>Type:</b>	Rigid heavy duty orange conduit
<b>Manufacturer:</b>	Pipe makers
<b>Model No:</b>	RC 50 HD
<b>Quantity:</b>	15 m
Installation Details	
<b>Depth of Cover:</b>	50 mm
<b>AS/NZS 3000:2018 Clause(s):</b>	3.11.3.1
<b>Local SIR Clause(s):</b>	NSW SERVICE RULE 2.4.1.1

2.1.5 Use manufacturer's catalogues to select suitable mechanical protection for the installation (if necessary) and record details in the table provided below.




NIL

Additional Mechanical Protection			
<b>Type:</b>	Polymeric cable cover	<b>Manufacturer:</b>	JAUBRO
<b>Quantity:</b>	20 m (300mm)	<b>Model No:</b>	220-CC 300
Installation Details			
<b>Depth of Cover:</b>	75mm above conduit {Depth = 500 - 75 = 425mm}		
<b>AS/NZS 3000:2018 Clause(s):</b>	3.11.4.3		
<b>Local SIR Clause(s):</b>	2.4.1.1		

2.1.6 Use manufacturer's catalogues to select suitable marker tape for the installation and record

details in the table provided below.

Marker Tape			
<b>Type:</b>	Underground Electrical warning Tape	<b>Manufacturer:</b>	EBT
<b>Quantity:</b>	150mm x 100 mm 1 ROLL	<b>Model No:</b>	SKU-DUGWT-250
Installation Details			
<b>Depth of Cover:</b>	200mm {300mm from UG conduit}		
<b>AS/NZS 3000:2018 Clause(s):</b>	3.11.4.4 Table 3.6		
<b>Local SIR Clause(s):</b>	2.4.1.1		

	 <i>Feedback</i>	Have your teacher/trainer check your answers	Teacher/Trainer Initials and Date	

### 3. Completing the Skills Practice

#### 3.1 Skills Practice Review Questions

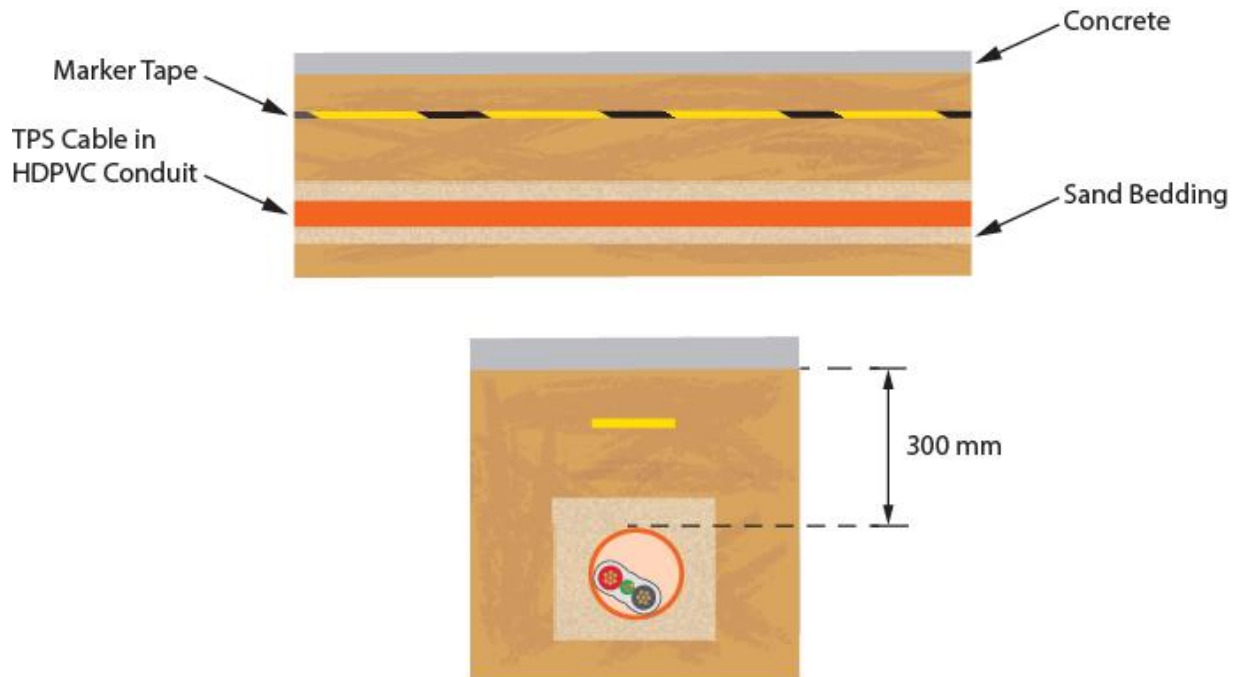
3.1.1 Complete the following questions after you have successfully completed section 2 of the skills practice.

1. Describe the AS/NZS 3000:2018 requirements for Category B underground wiring systems.

- Provide additional mechanical protections which are concrete, fibrous cements, UG cable

brick, polymeric cable cover

75mm above the conduit, Depth 425mm






1. What category is the underground wiring system pictured above? Provide AS/NZS 3000:2018 Clause(s) to support your answer.

A 3.11.3.1 (b) A system where cables are enclosed in insulating wiring enclosure encased in Concrete.

2. Explain how existing underground services can be located prior to commencing excavation works.

Details of exiting UG services can be obtained by contacting "Before you dig Australia" on 1100

	 <b>Feedback</b>	<b>Have your teacher/trainer check your answers</b>	<b>Teacher/Trainer Initials and Date</b>	
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