FLEXIBLE CORD and CABLE CALCULATIONS WORKBOOK 31

Student name

Percentage calculations

White board example

Calculate 15% of 162

Problems to calculate

Complete the following calculations. Show all workings

1. Calculate 10% of 400V

2. Calculate 10% OF 230V

3. Calculate 2% OF 230V

4. Calculate 2.5% OF 400V

Area and current calculations

White board discussion for method of calculation

1. Calculate the cross sectional area of one strand of copper conductor in a flexible cord if the diameter of the strand is

a) 0.2mm

b) 0.26mm

c) 0.29mm

2. Calculate the cross sectional area of one core of a three core flex cord if each conductor has 32 strands and each strand in the conductor has a diameter of 0.20mm

3. What is the nominal cross sectional area of this flexible cable

4. Calculate the cross sectional area of one core of a three core flex if one core has 28 strands each strand having a diameter of 0.26mm

5. What is the nominal cross sectional area of this flexible cable

6. What is the minimum current rating for a flexible cord supplying a 1000W toaster when connected to a 230V supply

7. What is the minimum current rating for a flexible cord supplying a 3kW water heater when connected to a 230V supply

Voltage drop calculations

White board example

Calculate the voltage drop along 26m of 2.5mm^2 flexible cord that has a load of 15A

Problems

1. Calculate the voltage drop along 12m of 1mm^2 flexible cord that has a load of 6.5A

2. Calculate the voltage drop along 40m of 4mm^2 flexible cord that has a load of 22A

Flexible cord size calculations

Example

Calculate the minimum size flexible cord that will meet both current and voltage drop requirements to supply a 230V load that draws 14A. The length of run is 1.5m and the maximum permissible volt drop is 2%

Step 1

Select cable size for current rating. Cable current rating must be greater than load current

From the cable data sheet 1,5mm^2 has a current rating of 15A this is greater than the load current of 14A

Step 2

Select a cable for voltage drop. The voltage drop must be less than the permissible volt drop of 2%

Permissible volt drop

Problems

1. Determine the minimum size flat TPS cable that would be suitable to supply a submersible pump down a well.

   The pump is supplied at 230V and draws 7.6A from the supply. The length of run for the cable is 45m and the maximum permissible volt drop is 2%

2. Determine the minimum size flexible cord that would be suitable to connect to a vacuum cleaner.

   The supply voltage is 230V and draws 5.3A from the supply. The length of run for the flex is 12m and the maximum permissible volt drop is 3%

PTO

3. Determine the minimum size flexible cord is that would be suitable to supply a water heater

   The water heater is supplied at 230V and draws 13A from the supply. The length of run for the flex is 0.8m and the maximum permissible volt drop is 2.5%

4. Determine the minimum size flat TPS cable that would be suitable to supply an arc welder

   The welder is supplied at 230V and draws 30A from the supply. The length of run for the cable is 8m and the maximum permissible volt drop is 2%

5. Determine the minimum size flat TPS cable that would be suitable to supply a sub mains cable to a garage from a house.

   The garage is supplied at 230V and draws a maximum load of 18A from the main switch board in the house. The length of run for the cable is 15m and the maximum permissible volt drop between the boards is 2%

   The sub mains cable is run through the roof space which reaches 40^0C in summer, clipped to the timber joists with thermal insulation against the cable.

   The cable is then run in conduit down the outside wall, underground to the garage distribution board.

   Show all working below.