

# UNIT 16

## Reading Electrical and Architectural Drawings (Prints)—Drugstore

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### OBJECTIVES

After completing the study of this unit, the student will be able to

- identify symbols associated with the reading of electrical drawings
  - determine the requirements of the electrical contract
  - calculate plan dimensions
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### THE DRUGSTORE PRINTS

Branch circuits are an important part of the electrical system in a building. Unit 4 presents the essential information on branch circuits. This information includes how to determine, according to the *C.E.C., Part I*, the number of branch circuits required and their correct size. The student should give close attention to the drugstore branch-circuit panelboard schedule on sheet E3. This schedule gives, in addition to other information, the branch-circuit numbers and a brief description of the loads served. These items provide important links between the panelboard schedule and the electrical drawings. See Fig. 16-1.

A feature of the drugstore wiring is the low-voltage remote-control system. See Unit 20 for a complete discussion. This system offers flexibility of control that is not available in the traditional control system. The switches used in this system

operate on 24 volts, and the power wiring, at 120 volts, goes directly to the electrical load. This reduces branch-circuit length and voltage drop. A switching schedule gives details on the system operation, and a wiring diagram provides valuable information to the installer.

The illumination system in each area of the drugstore is somewhat different. In the merchandise area, nine luminaires are installed in a continuous row. It is necessary to install electrical power to only one point of a continuous row of luminaires. From this point the conductors are installed in the wiring channel of the luminaire. In the pharmacy area, a luminous ceiling is shown. This illumination system consists of rows of strip fluorescents and a ceiling that will transmit light. The installation of the ceiling, in many jurisdictions, is the responsibility of the electrician. For this system to be efficient, the surfaces above the ceiling must be highly reflective (white).

### Drugstore Feeder Loading Schedule

The various fixtures and other loads are calculated on Table 16-1 to show the total demand watts on the feeders and the service. This will

require a 100-ampere switch with a 80-ampere fuse in the main switchgear. The No. 4 Type TWN75/T90 copper conductor will feed the 100-ampere panel located in the drugstore.

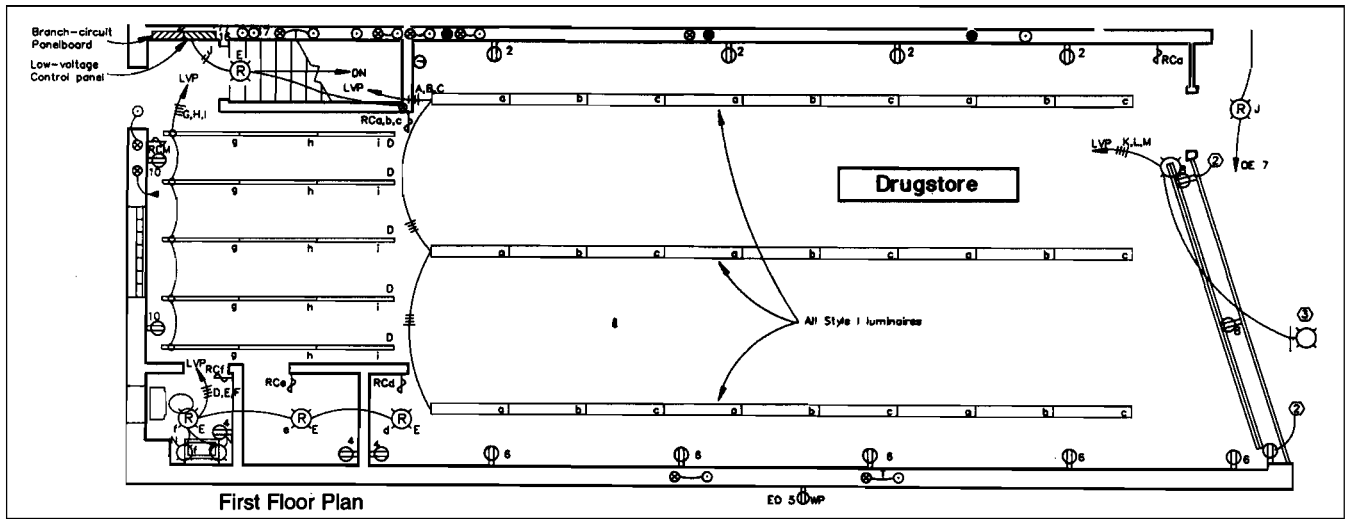


Fig. 16-1 Electrical drawing for a drugstore. Note: For complete blueprint, refer to blueprint E3 in back of text.

Table 16-1 Drug Store Service Calculation

Item	Count	VA/unit	Demand Load	Installed Load	Demand factor Feeder	Demand factor Service	Use Feeder	Use Service
<b>MINIMUM BASIC LOAD</b>								
(Rule 8-210)	225 m <sup>2</sup>	30 W/m <sup>2</sup>	6750		1	1	6750	6750
<b>INSTALLED BASIC LOADS</b>								
Style D luminaires	15	74		1110			1110	1110
Style E luminaires	4	144		576			576	576
Style I luminaires	27	87		2349			2349	2349
Style N luminaires	2	60		120			120	120
Style L luminaires	9	87		783			783	783
General receptacles	21	180		3780			<u>3780</u>	<u>3780</u>
Basic installed loads							8718	8718
<b>BASIC LOAD</b> (Use the greater of the demand or installed loads, Rule 8-106(2).)							8718	8718
<b>SPECIAL LOADS</b>								
Show window rec.	3	500		1500			1500	1500
Track lighting	15	110		1650			1650	1650
Sign	1	1200		1200			1200	1200
Roof receptacle	1	1440		1440			1440	1440
<b>Motors</b>								
	<b>Volts</b>	<b>FLA</b>	<b>Phase</b>					
Cooling unit								
• compressor	208	20.2	3	7269	1.25		9086	7269
• evaporator motor	208	3.2	1	666			666	666
• condenser motor	208	3.2	1	666			666	666
<b>Total load</b>							24 926	20 949

$$I = \frac{P}{E \times 1.73} = \frac{24\,926}{208 \times 1.73} = 69.2 \text{ A}$$

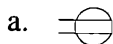
Assuming continuous loads, standard-rated equipment, and TWN75 copper conductors (Table 2), the ampere rating of the circuit would be:

$$\frac{63.27}{0.8} = 79.08 \text{ A}$$

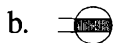
The feeder would be 4 #3 TWN75 copper conductors in a 1 1/4-in (35-mm) conduit, supplied by a 100 A disconnect c/w 100 A fuses.

## REVIEW

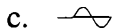
1. Identify the following symbols. Refer to Electrical Symbol Schedule Sheet E1.



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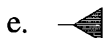
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In the following questions, fill in the blanks.

2. The elevation of the finished first floor is \_\_\_\_\_ m.
3. The drugstore ceiling material is \_\_\_\_\_.
4. The north wall of the drugstore is constructed of \_\_\_\_\_ and is \_\_\_\_\_ mm (\_\_\_\_\_ inches) plus finish material thick.
5. The south wall of the drugstore is constructed of \_\_\_\_\_ and is \_\_\_\_\_ mm (\_\_\_\_\_ inches) plus finish material thick.
6. The ceiling height of the drugstore is \_\_\_\_\_.
7. The outside dimensions of the building are \_\_\_\_\_ by \_\_\_\_\_.
8. The drugstore basement has an area of \_\_\_\_\_ m<sup>2</sup> (\_\_\_\_\_ ft<sup>2</sup>).
9. How many luminaires are controlled by switch RC<sub>a</sub>? \_\_\_\_\_.
10. How many receptacles are installed on branch circuit #2? \_\_\_\_\_.