Plumbing installation

Level-II

Learning Guide-27

Unit of Competence: Read plans and calculate plumbing quantities

Module Title: Reading plans and calculating plumbing quantities

LG Code: EISPLI2 M07 LO3-LG-27

TTLM Code: EISPLI2 M07 TTLM 0919v1

LO3: Recognize commonly used scales,

symbols and abbreviations

Instruction Sheet	Recognize commonly used scales, symbols and abbreviations – LG 27

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Applying Commonly used scales, symbols and abbreviations
- Identifying Function of legend

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Apply Commonly used scales, symbols and abbreviations
- Identify function of legend

Learning Instructions:

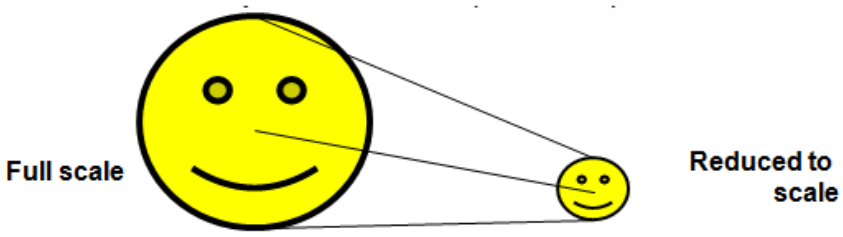
1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below 3 to 6.
3. Read the information written in the information “Sheet 1 and Sheet 2.
4. Accomplish the “Self-check 1 and Self-check t 2 respectively.
5. If you earned a satisfactory evaluation from the “Self-check” proceed to “Operation Sheet.
6. Do the “LAP test” (if you are ready).

Information Sheet-1	Applying Commonly used scales, symbols and abbreviations

1.1 Scale

Floor plans must accurately depict the sizes of real-world objects buildings, furniture, appliances in relation to each other. This requires scaling down the dimensions of all the objects by a common proportion, known as the floor plan's *scale*. Scales are used for drawing a large object on a smaller sheet of paper.

Scales are usually specified as a ratio, like 1:4. The first number represents units of measurement on the floor plan and the second number represents the equivalent measurement in the real world.



1.2 Types of scale

(a) Architect's flat scale

(c) Rolling ruler

(b) Architect's triangular scale

(d) Scalex PlanWheel

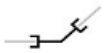
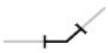
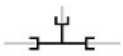
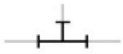
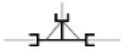
Applying scale

Learning to use the architect's scale is important to reading and interpreting working drawings. Follow the steps shown below and refer to practice with an architect's scale and develop accuracy and confidence in reading working drawings. But the technique can be used throughout any scaled set of plans using an architectural ruler.

A good plumber should be able to do:

- Look at your ruler.
- Understand each little mark. Find the appropriate fraction mark at the end of the scale that corresponds to the scale of plan sheet is used.
- Position your ruler carefully. Using the scale, set the architectural ruler on the zero mark and one corner of the garage front.
- Look directly down from "over the top" of the ruler for an accurate measurement
- Don't look at it from an angle
- Be precise!

ISO SYMBOLS – Fittings

Image	Fittings	Butt weld Symbol	Socket Weld Symbol	Threaded Symbol	Fittings	Image
	Elbow 90°				Elbow 90°	
	Elbow 45°				Elbow 45°	
	Tee equal				Tee equal	
	Tee reducing				Tee reducing	
	Cap				Cap	
	Reducer concentric		...	...	Reducer concentric	...
	Reducer eccentic		...	...	Reducer eccentic	...

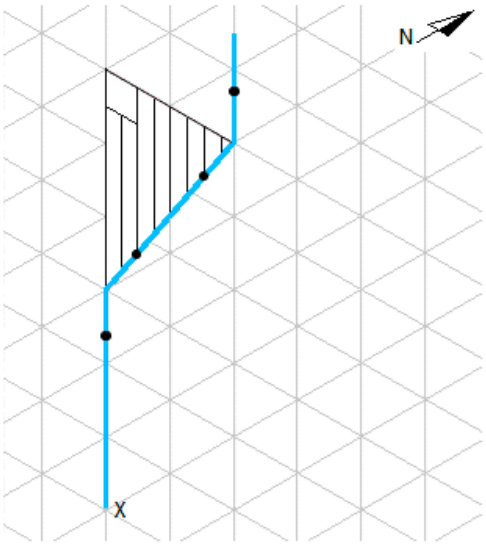
ISO symbols - Flanges

Flanges	Welding Neck	Socket Weld	Threaded	Slip-On	Lap-Joint	Blind	Flanges
Symbol							Symbol
Image							Image
Flanges	Welding Neck	Socket Weld	Threaded	Slip-On	Lap-Joint	Blind	Flanges

ISO SYMBOLS – Valves

Image	Valves	Butt weld Symbol	Flanged Symbol	Socket or Threaded Symbol	Valves	Image
	Gate				Gate	
	Globe				Globe	
	Ball				Ball	
	Plug				Plug	
	Butterfly			...	Butterfly	
	Needle				Needle	
	Diaphragm	...			Diaphragm	
	Y-type				Y-type	
	Three-way				Three-way	
	Check				Check	

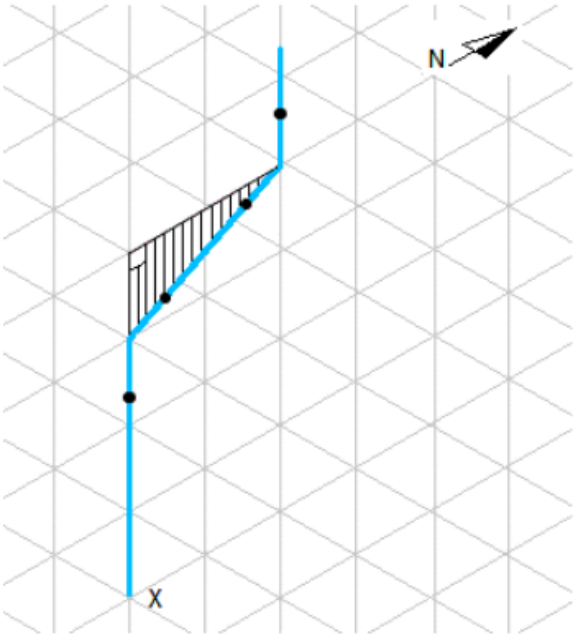
ISOMETRIC OFFSETS – Example 1



Routing starting point **X**

? Pipe runs up
? Pipe runs up and to the east
? Pipe runs up

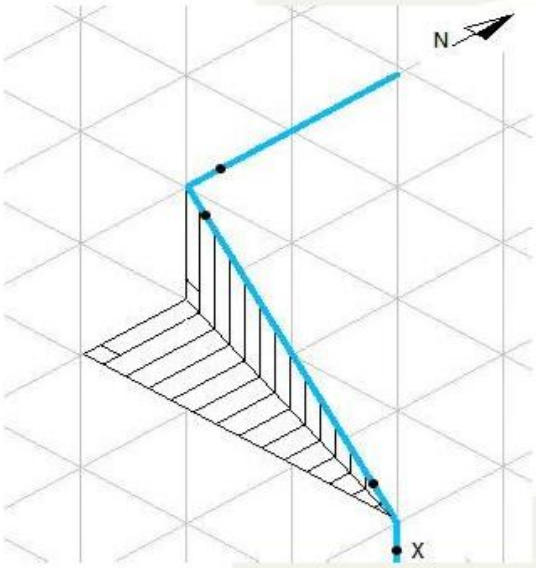
ISOMETRIC OFFSETS – Example 2



Routing starting point **X**

? Pipe runs up
? Pipe runs up and to the north
? Pipe runs up

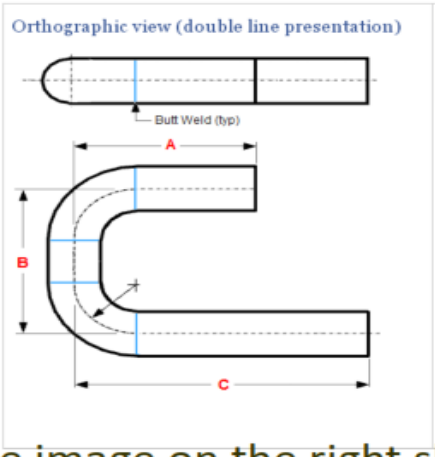
ISOMETRIC OFFSETS – Example 3

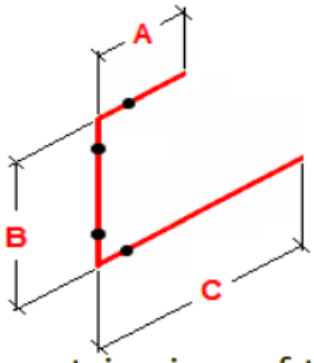


Routing starting point **X**

- ? Pipe runs up
- ? Pipe runs up and to the north-west
- ? Pipe runs to the north

ISO Vs ORTHOGRAPHIC



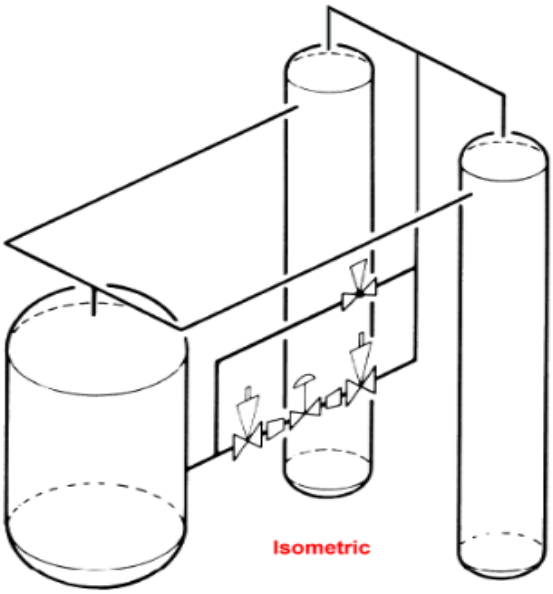


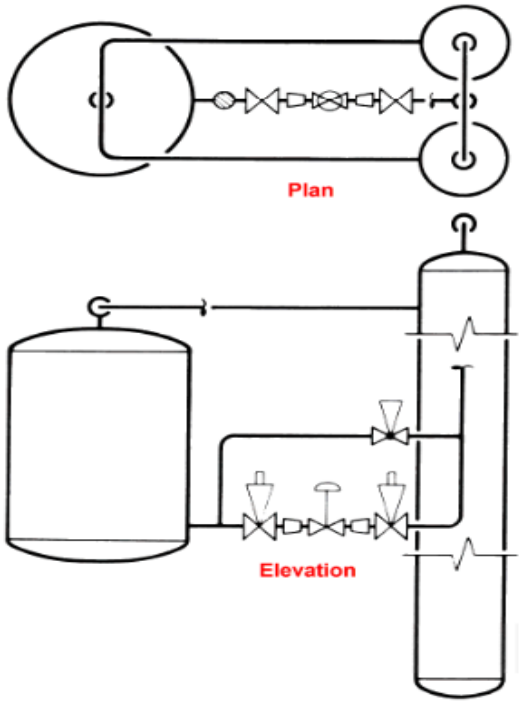
- ? The image on the right shows a isometric view of the same pipe as here on the left.
- ? The red lines show the pipe, the black dots are the butt welds and A, B & C are the dimensions of front to center line and center line to center line.

ISO Vs ORTHOGRAPHIC

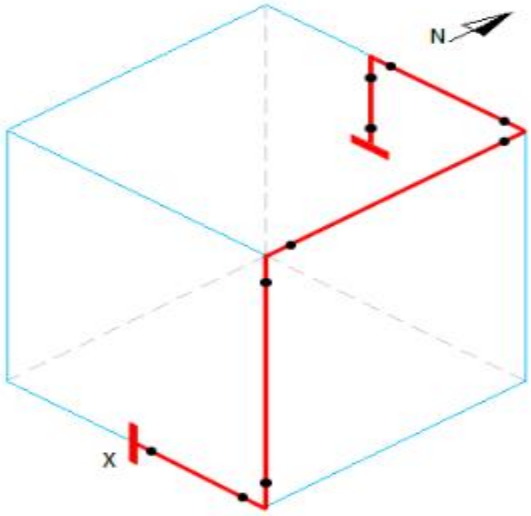
- Simplicity (Only one line drawn to represent a pipe)
- In a orthographic view it is not a problem if the pipe runs in one plane, but when a pipe in two or three planes (north to south, then down and then to the west, etc.) to be drawn, a orthographic view can be unclear.
- More number of drawings needed in orthographic views than ISO to represent the same piping system.
  - For example: for a complex pipeline system, 15 isometrics must be drawn. But in orthographic views maybe 50 drawings are needed to show the same as the ISO's.

ISOMETRIC Vs PLAN Vs ELEVATION





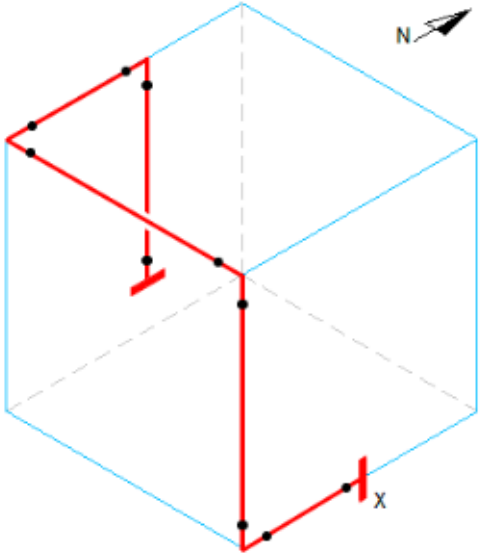
ISOMETRIC VIEWS – Example 1



Routing starting point X

- Pipe runs to the east
- Pipe runs up
- Pipe runs to the north
- Pipe runs to the west
- Pipe runs down

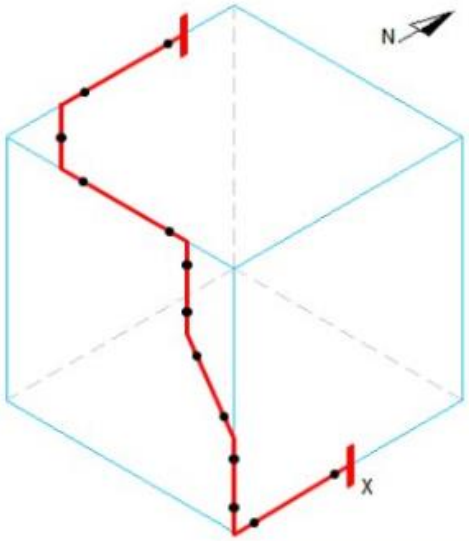
ISOMETRIC VIEWS – Example 2



Routing starting point X

- Pipe runs to the south
- Pipe runs up
- Pipe runs to the west
- Pipe runs to the north
- Pipe runs down

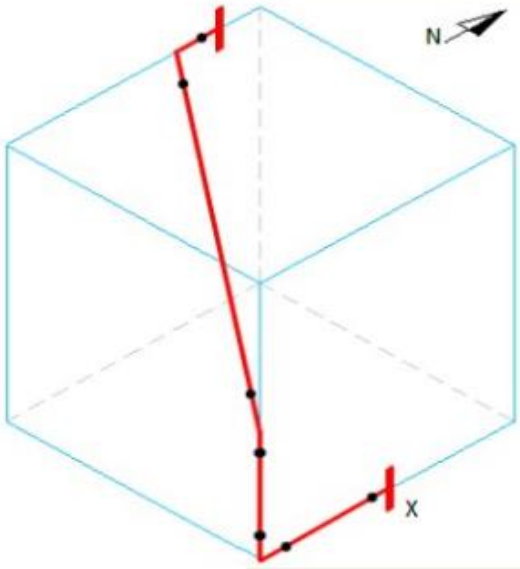
ISOMETRIC VIEWS – Example 3



Routing starting point X

- Pipe runs to the south
- Pipe runs up
- Pipe runs up and to the west
- Pipe runs up
- Pipe runs to the west
- Pipe runs to the north-west
- Pipe runs to the north

ISOMETRIC VIEWS – Example 4

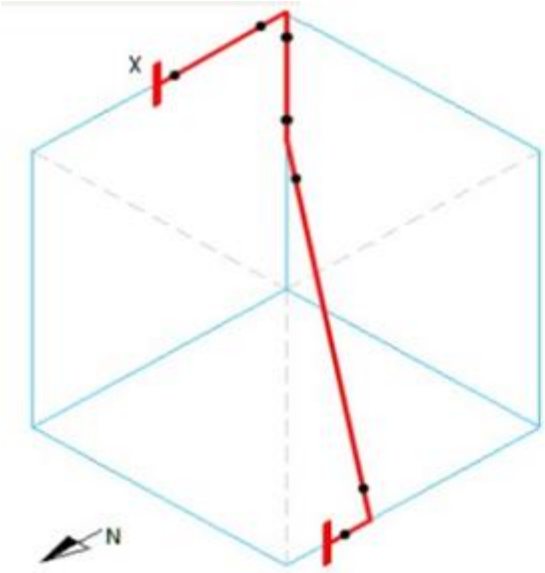


Routing starting point X

- Pipe runs to the south
- Pipe runs up
- Pipe runs up and to the north-west
- Pipe runs to the north

Self-Check - 1	Written Test

Direction: Match the riser diagram to the first pipe to the fourth pipe accordingly.



Routing starting point x

a. Pipe runs up

b. Pipe runs up and to the north-west

c. Pipe runs to the south

d. Pipe runs to the north

e. Pipe runs up and to the north-east

f. pipe runs down

Note: **Satisfactory rating - 2 and 4 points** **Unsatisfactory - below 2 and 4 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Name: _____ **Date:** _____

Answer sheet

1. _____ **2.** _____ **3.** _____ **4.** _____

Information Sheet- 2	Identifying function of legend

2.1 Function of legend

Legends used to identify the following:

- The name of the company, organization or design authority from which the drawing originates.
- The title or name of the drawing
- The drawing number
- A record of the orginator information:
  - ~ The names of the draftsperson
  - ~ A contractor's name
  - ~ Checker and approving authority
  - ~ Reference number
- A code number
- Division or department within the design authority responsible
- The drawing sheet size
- The predominant scale of the drawing
- Miscellaneous information
  - ~ Modification number
  - ~ The sheet number for multi sheet drawings
  - ~ The estimated mass of the item

- Additional blocks
    - ~ Dimensions
    - ~ Tolerances notes
    - ~ Material notes
    - ~ surface finish requirements

Self-Check - 2	Written Test

Directions: Match the construction element with its related job description for all the questions listed below. Use the Answer sheet provided in this page.

1. Legend information not include in a record of the originator information:

   A. Names of the draftsperson B. Name of the drawing

   C.Checker and approving authority D. A contractor's name

2. Legend information in Additional blocks

   A. Tolerances notes B. Material notes C. surface finish requirements D. All

Note: **Satisfactory rating - 3 and 5 points** **Unsatisfactory - below 3 and 5 points**

You can ask you teacher for the copy of the correct answers.

Score = _____

Rating: _____

Name: _____ **Date:** _____

Short Answer

1. _____ **2.** _____ **3.** _____ **4.** _____

LAP Test	Practical Demonstration

Name: _____ Date: _____

Time started: _____ Time finished: _____

Instructions: Given necessary templates, tools and materials you are required to perform the following tasks within 4 hours.

Task 1: Select plumbing drawing with its specification before demonstration days.

Task 2: identify scales, symbols and abbreviation used in drawing.

Task 3: Apply Commonly used scales, symbols and abbreviations by showing plumbing materials, fittings, fixtures and devices used if possible.

Task 4: Identify function of legend

List of Reference Materials

1. Construction drawings and details for interiors, W. Otie Kilmer and Rosemary Kilmer
2. Field piping engineering.www.seabirdgroups.com