

PLUMBING LESSON: HOW TO READ BLUEPRINTS



Project Summary:

For Certus, I wrote a lesson for plumbers about how to read blueprints. The following pages from the lesson provide an example of my work.

THE TERM BLUEPRINT

The term “blueprint” is frequently used when referring to a plan and/or architectural drawing for a building. Other names commonly used for the same thing are construction plan, technical drawing or drawing, schematic, and sheets. For this lesson, the term of blueprint is used.

IN THIS LESSON

This lesson is about how to read blueprints. It is a basic skill tradespeople must learn to do their job. Plumbers, carpenters, electricians, etc. are expected to exhibit proficiency in this skill when working on commercial and residential construction projects. Topics that will be covered include blueprint types, sections, and indicators such as symbols, abbreviations, and lines. Plus, where to find information and specifications for creating the required plumbing plan.

1 - INTRODUCTION TO BLUEPRINTS

1.1 - OVERVIEW

The construction industry creates and uses more blueprints than any other industry. Companies in the industry complete projects in six different categories, with the majority being commercial and residential. Examples of commercial projects are office buildings, retail centers, industrial properties, and healthcare facilities. In comparison, residential projects are single-family homes, multi-family homes, apartments, and condos.

For these projects, an architect creates a building design called a “blueprint”. Use of the term by architects began in the 1930’s because architectural designs were printed on blue paper. Today, white paper is used for blueprints as often as blue.

Blueprints are created to serve several purposes.

- To clearly communicate the same design, scope, plans, and specifications to everyone working on a construction project.
- To keep everyone involved, including owners, architects, project managers, contractors, subcontractors, suppliers, tradespeople, etc. On the same page during the entire construction project.
- To facilitate planning, scheduling, and acquiring required permits.
- To serve as a single source for all information about a building construction project including changes.

Blueprint shown the where (place), how (methods), and what (materials) for constructing a building’s foundation, walls, floors, ceilings, etc. Symbols are used to indicated where and how features are to be installed, such as doors, windows, sinks,

and appliances along with where to install them. Plus, a blueprint shows connection locations of city systems for public water, sewer discharge, and utilities.

1.2 – COMMERCIAL VS RESIDENTIAL

If you work in the construction industry as a plumber, you may work with both commercial and residential blueprints. There are differences between the two you need to be aware of when working with blueprints. Some are in the following list.

1. **Types**

As mentioned in the overview, the buildings constructed for commercial and residential are not the same types which is reflected in blueprints.

2. **Design & Size**

Residential project blueprints are simpler, and buildings are smaller so they can be constructed more quickly. Commercial blueprints are more complex and involve more outside companies who must follow what is in the blueprint.

3. **Permits & Codes**

The building codes for residential buildings are more flexible which makes more options available for blueprints. Those created for commercial buildings have a high level of limitations from building codes with rigid rules.

4. **Materials**

The materials specified in blueprints will be significantly different for residential buildings as compared to commercial. For residential buildings you will frequently see standard materials like wood framing, drywall, and basic electrical and plumbing systems. Instead, commercial blueprints will have a wider range of materials specified, a more extensive list, and large quantities.

5. **Costs**

Residential blueprints tend to be of simpler designs that cost less to build as compared to commercial. Commercial building projects have nuances and variations occurring that add changes and higher complexity that increases costs. In residential construction only the most extravagant houses incur high costs.

1.3 – BLUEPRINT TYPES

There are several additional types of blueprint an architect will create to provide further details. Therefore, construction projects will usually have a set of blueprints and reference documents. Other types of blueprints often created include the following:

- **Architecture/Design Blueprint or “A sheets”**

This blueprint shows how a building is supposed to look when completed. It includes a floor plan for each floor like in the example provided.

Floor Plan Example



- **Electrical Blueprint or “E sheets”**

The electrical blueprint shows where circuits, wiring, outlets, breakers, and panel boxes should be. Plus, where to install built-in ceiling fans, light fixtures, smoke alarms, and wiring for built-in appliances.

- **General Blueprint or “G sheet”**

This page is the cover sheet. It provides an index that lists all blueprints for the project. Plus, it shows boundaries, roads, driveways, power lines, public water, and sewer systems.

- **Mechanical Blueprint or “M sheets”**

A mechanical blueprint contains locations and details for the heating, ventilation and air conditioning system, refrigerant piping, control wiring and ductwork.

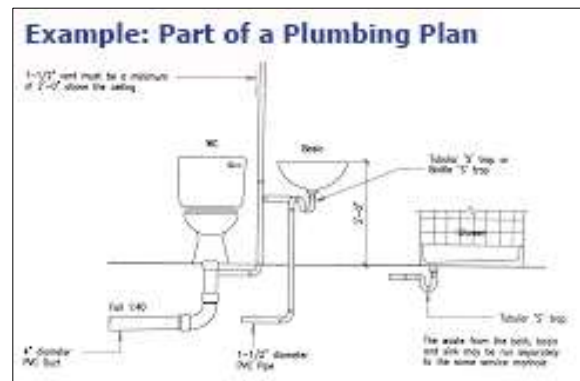
- **Plumbing Blueprint or “P sheets”**

The blueprint provides where the internal and external piping should be installed for hot and cold water, sewer, and storm drainage. Plus, the irrigation system if included in the plan.

- **Structural Blueprint or “S sheets”**

This blueprint shows how to construct the building.

The accompanying reference documents includes schedules that break the project into phases, technical specification, symbols, and abbreviation keys.



1.4 – BLUEPRINT SECTIONS

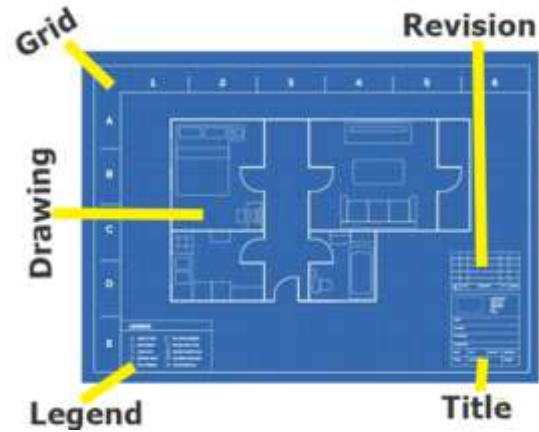
Blueprints have five main sections or components called the components. One is a box with the words “title block”, “revision block”, “legend”, “grid system” with each addressing a difference areas of the building design and construction.

1. **Grid Block**

The blueprint will have a grid system like longitude and latitude lines on a map for finding a location.

2. **Title Block (box)**

The title block is usually located at the bottom of a blueprint. It provides information on whom the building is being constructed for, the architect who created its design, site address, project name, date blueprint was approved and by whom.



3. **Revision Block (box)**

The revision block is usually in the same area as title block. In this section or box, you will find a list of any changes, dates made, and who authorized it.

4. **Legend Block (box)**

Inside this block or box, you will find symbols and abbreviations used on the blueprint.

Important fact: *symbols and abbreviations used will vary between blueprints and may not represent or mean the same thing. The construction industry does not have a standard uniform set of symbols or abbreviations. An architect will usually provide an additional sheet that explains what each symbol and abbreviation represent and mean.*

5. **Drawing Block**









This is the technical drawing of the building design and is usually in the pages center.

1.5 – BLUEPRINT INDICATORS

Blueprints have indicators to help a reader decipher, understand, and navigate a blueprint to find the information they need. It is done with lines, symbols, abbreviations, room labels, measurement numbers, directional arrows, etc. The following is a list and descriptions of those often used to help you read blueprints.

1.5.1 – LINES

A single blueprints will have several different types of lines, with each having its own design (i.e. Solid, dashes) and meaning. While there is not a universal set of lines, there are eight frequently used in the construction industry. Their names and what they mean are listed below.

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| <p>1. Object Lines
They are the thickest lines on a blueprint, continuous, and show the outer surfaces of an object that would normally be visible in a finished building.</p> | <p>Object Lines</p>  <p>thick</p> |
| <p>2. Hidden Lines
these lines represent surfaces that would be hidden or not visible in the finished building.</p> | <p>Hidden Lines</p>  <p>thin</p> |
| <p>3. Center Lines
center lines define the central axis of a symmetrical object. They're often used to distinguish circular features like holes, arcs, or cylindrical objects. The lines are fine with short and long dashes.</p> | <p>Center Lines</p>  <p>thin</p> |
| <p>4. Phantom Lines
phantom lines show different possible positions of a movable object or the "on" and "off" positions of a switch.</p> | <p>Phantom Lines</p>  <p>thin</p> |
| <p>5. Dimension Lines
Dimension lines indicate a distance in the middle and have an arrow on each end.</p> | <p>Dimension Lines</p>  |
| <p>6. Leader Lines
These are arrows point to features of a drawing that need more detail that can be found on other blueprints in the set.</p> | <p>Leader Lines</p>  <p>thin</p> |
| <p>7. Extension Lines
Extension lines mark the outer boundaries of dimension lines when greater clarity is needed. They do not touch the dimension lines, only indicating where they end.</p> | <p>Extension Lines</p>  <p>thin</p> |
| <p>8. Break Lines
Break lines are used to save space by shortening the drawing size. Depending on their length, they can look like wavy or sharp zigzags. Either way, they indicate that a section has been removed.</p> | <p>Break Lines</p>  <p>thin thick</p> |

Examples of Lines

