

BLUEPRINT  
READING

## INTRODUCTION

If the instructions for construction jobs were in written form, they would require a large volume of material. Also, it would be a difficult problem for anyone to visualize a job from such a set of written communications. In order to solve these problems and aid the builder in understanding the job, drawings are made of the structure to be built. Since these "original drawings" could not hold up under all the handling required during the course of a job, and since each contractor who bids on a job needs a set of drawings, copies called "blueprints" are made from the original drawings. The term blueprint originally described a reproduction of an original drawing which appeared as white lines on a deep blue background. Most reproduction processes used today produce a blue or black line on a white background.

Craftsmen, painters and drywall finishers included, need to know how to read blueprints so they know exactly:

1. What is to be done on the job
2. Where it is to be done
3. What materials and equipment are needed
4. Approximately how long the job will take
5. What types of safety problems exist, if any
6. Manpower requirements

### Reproduction of Original Drawings

Original drawings are made up of lines, symbols, and numbers depicting the size, shape, and location of one or more structures

The term blueprint, or print, is now used to describe all types of copies of original drawings.

## TECHNICAL INFORMATION

### Drafting as the Language of the Industry

All phases of construction require planning. Those individuals responsible for the planning and drawing, or drafting, of building plans are seldom the same ones doing the construction work. Engineers and architects generally do the planning and supervise the draftsmen who actually produce the drawings. Effective communication among designers, contractors, and craftsmen is an essential part of assuring the proper scope and quality of work will be done. In the construction industry, one form of communication is the "working drawing" which is known as the blueprint.

to be built. These drawings are usually made on "translucent paper or fabric"—material that allows light to pass through. Since many people involved with a construction job need copies of the drawings, methods of copying the original drawings are necessary. Most copying processes use a light sensitive copy paper like photographic film. A light shines through the original drawing and exposes the copy paper except in those areas where lines, symbols, and numbers are drawn.

### Blueprints and the Painting Trades

For the painting and decorating craftsman, the blueprint shows a picture of what surfaces are to be finished, or coated, and where they are located within the building. Dimensions are shown, therefore, estimates can be made of surface area, time, material, and equipment required for the job. Since the prints are drawings of the building shown in reduced size, the craftsman can visualize the entire structure and better plan the work necessary.

### Engineering Drawings

Engineering drawings include the following:

1. Structural drawings Generally cover the foundation work to be completed and the structural framing or reinforced concrete requirements of the building.
2. Mechanical drawings Provide information on the heating, ventilating, and air conditioning systems to be installed in the building. They show the equipment, pipe lines, ducts, and controls and their location.
3. Plumbing drawings Show the type of equipment and location for supply piping, faucets, and sanitary drains.
4. Electrical drawings Generally show the lighting layout and the circuits for electrical power for a building.

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Instructional Unit A: The Various Parts of a Set of Blueprints and Specifications

Study Topic A-3: WRITTEN SPECIFICATIONS AND SCHEDULES

#### LEARNING OBJECTIVES

After completing this topic you should have improved your ability to:

1. Describe both the purposes and uses of specifications and schedules.
2. Outline the contents of specifications and schedules.
3. Understand the importance of the different parts of a set of specifications and schedules to the painting, decorating, and drywall finishing craftsman.

#### INTRODUCTION

In addition to the set of blueprints produced from the drawings, the total set of building instructions will contain different types of written materials. Usually these materials include:

1. **Specifications** Written descriptions of the construction methods and the quality and types of materials and equipment to be used.

Specifications contain both general and specific information for the contractor and workers regarding what is to be done and how it is to be done. Information found in specifications cannot be placed on drawings because there is often a large amount of written detail necessary for the specifications.

For example, the specifications on doors may discuss the scope of work for the contractor installing the doors, the statement that drawings on each type of door must be

submitted to the customer for approval, information about the type of material the doors are made of, finishing instructions, shipping instructions, and so forth.

2. **Schedules** Information in charts or tables that provides the contractor and craftsman with concise, important facts concerning the types, size, capacity, and quantity of parts or equipment to be used on a job.

The schedule differs from specifications in that the primary purpose is to tell what goes where. Schedules are to be read along with the drawings to help locate the use of equipment and materials within the building.

For example, a schedule of doors would tell the type of door to be installed and give its identification number. The identification number can be found on the floor plan drawing near the location for the door.



## TECHNICAL INFORMATION

### Specifications

#### The Purpose of Specifications

Much as blueprints represent the construction project through pictures, specifications are word descriptions of the work to be done. They contain information not found in the drawings and describe the following:

1. The physical characteristics and quality of material
2. The quality of workmanship
3. The methods of doing the construction work

The amount of material in the formal specifications may vary from one job to another. On larger, more complex jobs, complete, extensive specifications become very important. For the many subcontractors and craftsmen involved, they provide the detailed information on which contracts, or agreements, are based.

#### The Format of Specifications

The Construction Specifications Institute (CSI) has established a standard format, or organization, around which specifications are written. Figure A-3.1 shows that format and the sixteen divisions contained in most sets of construction specifications. The different divisions of the specifications are often printed on papers of different colors to make it easy to locate each section. Often the total number of specifications in a set will contain several hundred sheets of legal size (8 1/2 x 14) paper and be 2 to 3 inches thick.

There are subdivisions within each technical division of a set of specifications. The exact information within these subdivisions may vary from one set of specifications to another, but generally they each include:

1. A first area or areas dealing with such information as official documents for the work to be done, extent of the work to be done, other work that relates to this particular job, use of the property on which the work is being done, etc.
2. A second area or areas containing information about submitting samples of the work to be done, the type of materials required, and where these materials are to be used
3. A third area or areas explaining how the materials required are to be used or applied
4. Possibly a fourth area or areas including such information as guarantees on the work to be done, changes or corrections on the specifications, etc.

#### The Painting Section of Specifications

It is important that the painting and decorating craftsman understand job specifications and how to read them, since they discuss such issues as how to prepare the surface of materials for finishing, the protection of other work in the area, the types of materials to be used, and the quality of the workmanship. Under the Construction Specifications Institute (CSI) format, the major part of the information about painting is found in Division 9—Finishes. Not all information, however, appears in Division 9. It may be necessary also to review the information provided in all other divisions.

These divisions may contain information related to the painting of structural steel, wood surfaces, doors, windows, mechanical equipment, piping, fences, parking lot striping, and other special parts of the structure being built.

## Schedules

### The Purpose and Content of Schedules

In addition to specifications, schedules such as that illustrated in Figure A-3.2 are generally included in a set of blueprints as well. They present notes and information in column, or tabular, form for the purpose of making the information easily available for the specification writer and painting craftsman. There are room finish schedules, door and window schedules, beam schedules, etc. Each is to be used when reading the drawings or blueprints to show the location of material or products that are to be included in the construction job.

### Schedules and Painting

Usually the most important schedule from a painter's point of view is the "room

finish schedule." It provides information on the types of finishes to be used on the walls, ceilings, and floors of each room in the building.

More detailed information about schedules and their value to the painting and decorating craftsman is included in the study topic on Room Finish Schedules and Opening Schedules.

### Revisions and Addenda

Attention should also be given to any revisions, changes, or additions that have been made to the working drawings, specifications, and room finish schedules. An example of a working drawing revision is shown on Drawing P-1 in the Appendix.

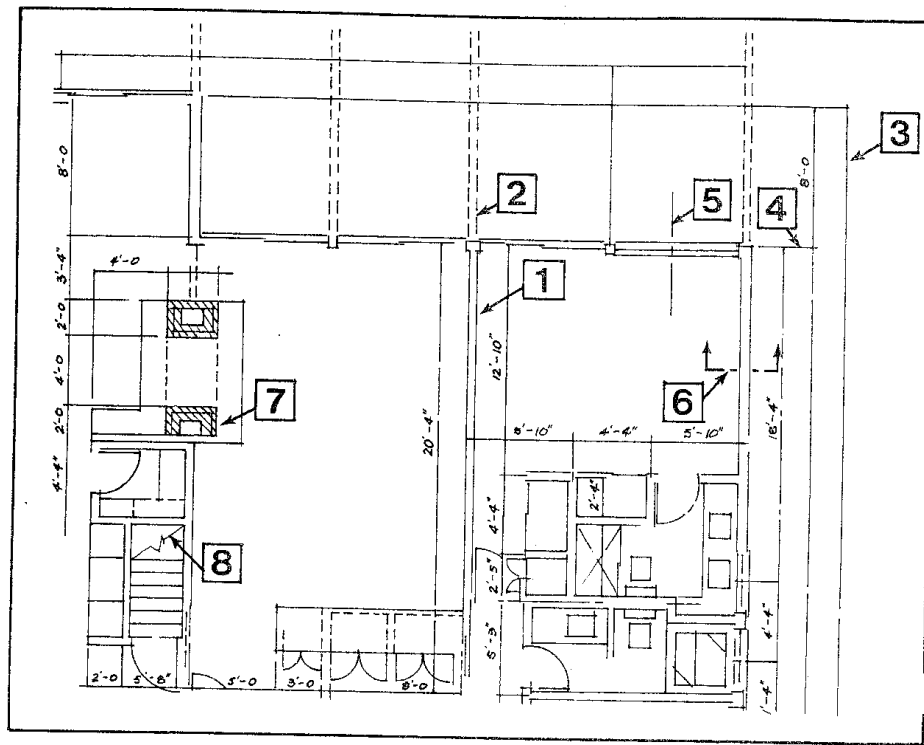
Architectural Drawings

As stated above, the set of architectural prints for most building construction jobs is usually the most extensive. The major kinds of drawings in the architectural set, as well as the purposes of each, are summarized in the table in Figure A-2.1.

NAME OF THE DRAWING	PURPOSE OR FUNCTION
Site Plan	To show the location and elevation of the building, roads, walks, utilities and landscaping.
Floor Plan	To show the arrangement and size of rooms, corridors, and openings in the building.
Exterior Elevation Views	To show the shape, size, and finish of the outside of the building. The elevation view shows walls as though the viewer were looking straight at the wall.
Interior Elevation Views	To illustrate the shape, size, and finish of the inside walls of the building.
Building Section Views	These section views are drawn as though the building, or a portion of it, were cut through, and the front portion removed. The viewer looks directly at the remaining portion. It displays the interior structural appearance of the building.
Detail Section Views	To present construction details of the building not shown in other drawings.

Figure A-2.1 The Kinds of Drawings Normally Included in a Set of Architectural Prints



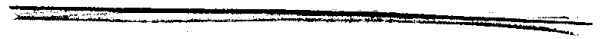


Key:

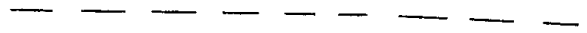
- 1 object line
- 2 hidden or invisible line
- 3 dimension line
- 4 extension line
- 5 center line
- 6 cutting plane line
- 7 section lines
- 8 break line

Figure B-1.1 Examples of the Types of Lines Used on Blueprints

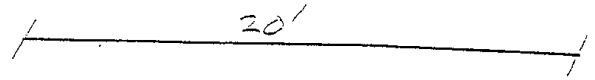
OBJECT LINES



HIDDEN LINES



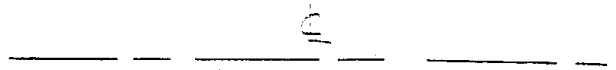
DIMENSION LINES



EXTENSION LINES



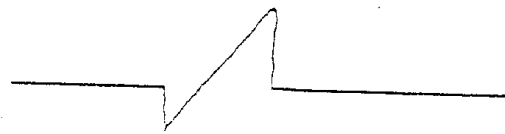
CENTER LINES







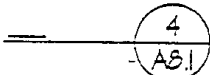
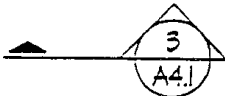

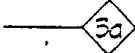


SECTION LINES



BREAK LINES



# SYMBOLS

- 
  - ROOM NAME & NUMBER
- 
  - EXTERIOR ELEVATION
- 
  - DOOR NUMBER
- 
  - KEY NOTE
- 
  - DETAIL NUMBER / SHEET NUMBER
- 
  - BLDG./WALL SECTION NUMBER / SHEET NUMBER
- 
  - INTERIOR ELEVATION  
(SHADED ARROWS INDICATES ELEVATION SHOWN)
- 
  - WALL TYPE
- 
  - GRID LINE
- 
  - EQUIPMENT TAG

## GLOSSARY OF TRADE-RELATED TERMS

- Architectural Drawings**—drawings that describe the landscaping, site planning, and nature of the building structure details for a construction project.
- Blueprint**—a reproduction of an original drawing. Also often referred to as plans, drawings, or prints.
- Break Line**—a line used on blueprints to indicate that a portion of the object drawn has been broken away and not shown.
- Center Line**—a line used to indicate the actual center of an object or opening shown on a drawing.
- Column**—a vertical support member of a structural frame.
- Contour Lines**—lines with measurements on the site plan or plot plan drawings that show the different levels or elevations of the ground around the building being constructed.
- Cutting Plane**—an imaginary cut through an object that exposes interior details of that object.
- Detail Drawing**—an enlarged drawing showing some particular complex feature of the construction job that is not clear in the regular drawing.
- Dimensioning**—a solid line used to indicate the size and direction of dimensions. They are generally terminated at an extension line with an arrowhead, slash, or dot.
- Draftsman**—one who works under the direction of an engineer or architect in the preparation or drafting original drawings.
- Electrical Drawings**—drawings that describe the lighting plan, power distribution, and other electrical service systems to be used in building.
- Elevation View**—the two dimensional view of any of the vertical sides of a building, or vertical view of interior or exterior walls.
- Extension Line**—thin solid line extending from but not touching the object. It is used to show the reference points of dimensions lines.
- Floor Plan**—a drawing of a building with its top cut away and viewed from above to show the arrangement of each floor. Shown is the location of exterior and interior walls, doors and windows, and special equipment.
- Foundation Plan**—a drawing depicting the size and shape of the building foundation as viewed from directly above.
- Framing Plan**—a structural drawing showing the layout of the supporting framework for each floor of the building.
- Hidden Line**—represented by short dashes, it depicts an object line that is behind another surface and not visible to the viewer.
- Joists**—a steel or wood structural member that is used as a beam in a floor, ceiling, or roof.
- Mechanical Drawings**—drawings designed by the mechanical engineer that show the heating, ventilating, and air-conditioning systems for the building being constructed.

**Object Lines**—solid lines on a drawing representing all visible edges or surfaces outlining objects.

**Paint Key**—a listing of finishing materials to be applied, located on the drawings or in the job specifications. It establishes a paint code and identifies these paints by number and color on the drawings.

**Pictorial Drawing**—a drawing of an object or mechanical system that shows all three dimensions—height, width, and depth in one drawing.

**Plan View**—a drawing showing an area as viewed from directly above. In architecture, this includes the floor plan, site plan, etc.

**Plumbing Drawing**—a drawing showing all the liquid piping systems, fixture location, and drains for a building.

**Reproductions**—copies of original drawings. In this workbook referred to as blueprints or prints.

**Scale**—on blueprints, to make a drawing proportionately smaller than the building or building part.

**Schedule**—a table found on drawings or in the specifications that identifies the location and type equipment or materials used in the building. There may be schedules for finishes, doors, windows, beams, columns, etc.

**Schematic Drawing**—a drawing that uses single lines to represent more complex shapes or building systems. The single line representations and use of symbols improve the clarity of the drawing.

**Section Lines**—section lining or crosshatching with uniformly spaced lines or other symbols to show an exposed cut surface of an object on a drawing. Used in section views to show different types of building materials involved.

**Section View**—a view made by passing a cutting plane through the building or building part.

**Site Plan**—a drawing showing the construction site as viewed from above. Shown are building location and grade of the ground around the building, driveways, walks, water mains, and sewers, etc. May also be referred to as plot plans or locations.

**Specifications**—written instructions containing information about types of materials, work procedures, standards of workmanship, and other conditions to be followed on the job. Includes all other detailed information that cannot be placed on the set of drawings.

**Structural Drawings**—drawings showing the foundation and steel and/or concrete “skeleton” that supports the building.

**Symbols**—shorthand graphic representations for materials or mechanical systems that are to be shown on drawings.

**Working Drawings**—a set of drawings which together with written specifications provide the complete information necessary to construct the building.

## A SAMPLE SET OF BLUEPRINTS

### INTRODUCTION

The drawings presented in the Appendix were selected for the purpose of instruction, and, as a result, may be slightly different from those used at another job site. In some places the drawings include more detailed information than normally would be in such a set. Generally, you will find that these drawings are fairly typical examples of what blueprints for a building of this size would be like.

In order to make best use of a set of blueprints it is necessary for the reader to work forward in a logical, organized manner so the reader will be able to see the individual parts of the prints and the prints as a whole to get the most out of them. With this in mind, it is recommended that when you begin to read the following, or any other set of blueprints, you use the following basic procedure:

1. If available, look at the architectural rendering of the building on the title page and study the site plan drawing to get a feel for type and size of building being described in the prints and specifications.
2. Review the exterior elevations and floor plan together to form a three-dimensional mental picture of the

building. Look for exterior materials that are likely to require finish work.

3. Next, study the floor plan and interior elevations together. Look at the location of windows and doors and try to form a mental picture of the interior of the building.
4. Examine the room finish schedule and look at this information together with the floor plan and interior elevations.
5. Look for a color key or color schedule of the prints. If it is not included, the architect will supply it later.
6. Refer to the specifications, Division 9, for details about the type of finish material and quality of work. Read information in other specification divisions that are appropriate for that type of building or structure.

Generally, this simple procedure will be helpful for almost any set of blueprints you happen to see and use.