

CHAPTER ONE

SPECIFICATIONS

1.1 Introduction

Specification is defined as the designation or statement by which written instructions are given distinguishing and / or limiting and describing the particular trade of work to be executed. In short specification is a statement of particular instructions of how to execute some task. Specification is one of the contract documents.

Specifications are written based on the prepared design, drawings, general and scientific trends of workmanship, quality expected, equipment involved and materials to be used for the particular trade of work. The specifications should clearly specify: -

- Design and drawing
- Labor employment
- Materials to be used
- Construction method
- Equipments used

Specifications should be clear, concise, and brief descriptions of what is required to execute the proposed trade of work. The information that is needed for building construction is usually conveyed by two basic communication lines. They are: -

- The drawings (pictorial)
- The specifications (written)

In so doing the methods of communication should compliment each other and neither should overlap or duplicate the other. Specifications are devices for organizing the information depicted on the drawings and they are written descriptions of the legal and technical requirements forming the contract documents.

Their difference is that the drawings should generally show the following:

1. Dimensions, extents, size, shape, and location of component parts
2. Location of materials, machineries, and fixtures
3. Interaction of furniture, equipments and space
4. Schedules of finishes, windows and doors

Specifications generally describe the following: -

1. Type and quality of materials, equipments, labor or workmanship
2. Methods of fabrication, installation and erection
3. Standards, codes and tests
4. Allowance, submittals and substitutions
5. Cost included, insurance and bonds
6. Project records and site facilities.

1.2 Purposes of specifications

1. Guide the bidder at the time of tendering to arrive at a reasonable cost for the work
2. Provide guidance for execution and supervision of works.
3. Guide the contractor for the purchase of materials
4. Serve as a part of contract document to limit and describe the rights and obligations of each contracting parties.
5. Guide the bidder to identify his capacity to execute the work.
6. Serve as fabrication and installation guide for temporary and permanent works.
7. Guide the contractor for the purchase and/or hiring of equipments.
8. Serve for the owner to know what he/she is entitled to receive
9. Serve for the manufacturers of construction materials, equipments, tools etc to grade, classify, and improve qualities of their produces.
10. Indirectly, the specifications are very much related to the legal considerations, insurance considerations, bidding requirements, alternates and options, rights, obligations and remedial measures for the contracting parties.
11. In the events of conflicts between specification and drawings, the specification governs.

1.3 Types of Specifications

In general, specifications can be broadly classified into four categories as follows

1. **Manufacturer's specification:** Manufacturers prepare specification of their product for the guidance of their users, which may include property description and installation guide lines.

2. **Guide Specification** : Specifications prepared by an individual or group of individuals based on manufacturer's specifications, established trends of workmanship, service and laboratory tests and research findings to be used as guide lines for preparation of contract specifications.
3. **Standard Specification**: Specifications which are intended to be used as a reference standard in the construction of a project. The guide specification which has been standardized by a recognized authority is considered as standard specification.
4. **Contract (Project) Specification**: the specification prepared for a particular project to accompany the drawings and other contract documents.

The specifications described above can be prepared following the format which has general and specific parts (general specification and specific specification)

In the general part of the standard specifications the following items are included:-

- Administrative and Procedural Requirements
- Scope, definitions
- Reference organizations and Standards
- Project description, site facilities
- Submittals and quality assurance
- Delivery, storage and handling
- Project records
- Insurances and other general requirements

In the specific part of the standard specifications, detailed description of the quality of items to be used is given. In addition to this, preparatory actions and methods of incorporating the items into the project are indicated.

Specifications could be written in several ways, with the prime emphasis given to either the producer company's brand or the performance capacity of the material and so on.

Accordingly, there are different types of **technical** specifications.

1. **Proprietary Specifications**: This specifications call for desired materials, producers, systems, and equipments by their trade names and model numbers. For detailed descriptions reference should be made to manufacturer's specifications. They are of two types; closed (sole) source and open or equal source.

2. **Performance Specifications:** specifications which define products based on desired end results which are performance oriented; most appropriate when new or unusual products or systems are required or when innovation is necessary. Describing the problems or conditions under which the products or systems must operate, and the parameters for the acceptable solutions is difficult and challenging. Testing methods and evaluation procedures for defining the required performances must be explicitly specified.
3. **Reference Specifications:** Specifications which refer to levels of quality established by recognized testing authority or standards set by quality control authorities. These specifications are also used in conjunction with other types of specifications.
4. **Descriptive Specifications :** Specifications which describe all components of products, their arrangements and methods of assembly, physical and chemical properties, arrangement and relationship of parts and numerous other details. The specifier shall take total responsibility for the function and performance of the product.
5. **Cash Allowance Specifications:** Specifications meant to direct bidders to set aside a specified amount of money to be applied to the construction work at the direction of the specifier.

1.4 Specification writing

Basically specifications are not to be created; they are prepared based on existing standards, codes, guidelines, and laws.

Specification writing embodies certain methods of presenting information and instructions. When specifications are to be written, the following shall be taken into consideration:-

- a) Specification writing require
 1. Visualization (having clear picture of the system)
 2. Research (to know the legal impact correctly)
 3. Clear thinking (understanding things directly without misleading)
 4. Organizing (organizing what we know to write the specification)
- b) Specification writing require professional ability to read drawings
- c) Specification writing require wide knowledge of the construction materials, various levels of workmanship, different construction equipments and method of construction to be employed
- d) Specifications use simple and clear language such that it can readily be understood.

- e) Specifications shall be brief and short as much as possible (avoid long sentences without punctuations)
- f) Specifications shall include all items affecting the cost of the work
- g) Specifications shall be fair and do not attempt to throw all risks and responsibilities on one of the parties signing the contract, the employer or the contractor.
- h) Specifications shall avoid repetition of information shown on drawings to avoid mistakes and duplications within the specifications and drawings
- i) Specifications shall not include inapplicable text and do not specify the impossible or anything not intended to be enforced.

1.5 Useful references in specification writing?

The following are useful references in Specification Writing: -

1. Codes and ordinances of governments, cities, or municipalities. For example, EBCSs
2. Standards prepared by distinct societies and government agents. For example, ACI standards, ASTM standards, BS, ES.
3. Standards or model specifications prepared by manufacturers, professional societies, and government bodies.
4. Master specifications and previously written specifications.
5. Information or experience acquired by personal observation and contact with trained or experienced people in the construction industry.

1.6 Specification language

The specification writer should present his instructions regarding the particular work under consideration in such a manner that: -

1. The drawings are more clearly interpreted, not duplicated.
2. Rights, obligations, and remedial measures shall be designated without ambiguity or prejudice.
3. Clearly express the extent of works under consideration; therefore, the phraseology used in this regard shall be: -
 - I. Judged by its quality not its length

- II. Should be concise and short and written with commonly used words
- III. Punctuations are important but their usage shall be limited to few
- IV. Capitalizing the first letters is mandatory for the following expressions: -

Parties to the contract; eg Employer/Client /Contractor/ Engineer /Architect

Space within the building; eg Bed Room, Toilet, Living Room

Contract documents; eg Bill of Quantity, Working Drawing, Specification

- V. Minimize pronouns, better to repeat nouns
- VI. Minimize the use of symbols
- VII. Do not use foot notes, do not underline within a sentence for emphasis
- VIII. Words shall be used as follows:-

a) Shall in place of must; use “shall” for the duties of the contractor or the consultant to represent the word “must”

b) “Will” is used for the duties of the employer to represent the word “must”

c) “Must” –avoid the use of the word “must” and substitute by the word shall to prevent the inference of different degrees of obligation

d) Avoid the use of words which have indefinite meanings or limitless and ambiguous in their meanings. For example, any, either, same, similar, etc.

1.7 Who checks the specifications??

When each job specification has been written, it must be checked carefully to detect possible discrepancies, deficiencies and errors. In doing so the consultant should pay attention to:-

- Does the scope extent and limits of the work clearly define in spec?
- Are the references complete & accurate to the relevant drawings?
- Are all the technical requirements clearly covered?
- Do the requirements stated comply with all statutory (or constitutional) rules and regulations?

- Is there any conflict or overlap with other job specifications, particularly those prepared for other disciplines?
- Does the bill of quantities prepared for tendering completely cover the work under the contract?

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