

# The Importance of Technical Specifications

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## Introduction

It is not sufficient for an audio-visual design consultant to simply design an audio-visual system, prepare a few drawings, and come up with an equipment list. The equipment must be purchased, installed, and commissioned – all without compromising that original design. Further, the system must come in on budget and in accordance with the project schedule. To accomplish this, the A/V consultant must prepare a technical specification. This technical specification performs many valuable functions over the life of the project:

- **prior to hiring a contractor**, the specification serves as a means of communicating to the owner or facility designer exactly what the system will do and what it will *not* do – this allows the project decision makers to sign-off on the design *before* the contractor is involved; fully informed, and with no surprises;
- **during bidding**, the specification provides sufficient detail to the various contractors so that they can each prepare an accurate bid; further it ensures that all contractors are bidding on the same basis, and that bids will be truly competitive and comparable;
- **during the construction phase**, the specification is the contractor’s “instruction manual” for assembling the system; it clearly defines administrative procedures, quality of equipment, workmanship standards, required training, and system documentation;
- **once the contractor has reached substantial completion**, acceptance procedures are clearly spelled out in the specification; using the specification, the audio visual consultant can prepare a deficiency list, and both the owner and contractor have a finite set of tasks that define when the project ends.

## Technical Specification Format

Audio-visual system installation is (or should be) done by an A/V contractor. Such a contractor (whether they realise it or not) is part of the construction industry – just like a roofing or glazing contractor. The construction industry has well defined (and expected) methods for presenting technical specifications – these have been honed and improved over decades. Technical specifications in the US and Canada are written and structured according to the CSI/CSC *MasterFormat*. This system divides a set of construction specifications into standardised *divisions* roughly based on the trades involved. Audio-visual technical specifications are written as a *section* of one of these divisions – typically in either **Division 11** (Equipment) or **Division 16** (Electrical). This is done in accordance with guidelines set out in the CSI/CSC *SectionFormat*. A special division, **Division 1**, is reserved for administrative and procedural issues *that affect all other sections equally* (as an aside: a common mistake made by contractors is reading the technical spec section that pertains to their trade, and ignoring Division 1).

Each technical specification section is written in three parts:

- Part 1 – General
- Part 2 – Products
- Part 3 – Execution

**Part 1** contains administrative, procedural, and temporary requirements that are unique to the section. An important part of this is the **Submittals** article. This defines documentation that must be submitted by the contractor: with the bid, prior to construction, during construction, and upon completion. These might consist of product data sheets, mock-ups, shop drawings, schedules, test reports, and system documentation. This section also defines the minimum acceptable qualifications of the contractor and its labour force, along with required compliance to various codes and workmanship standards. Other typical section items include: special instructions for delivery, storage, and handling of goods delivered to the site; insurance required by the contractor; special sequencing, phasing, or scheduling requirements; warranty requirements; and spare parts and maintenance supplies and agreements. This part supplements Division 1 (i.e.: the project-wide requirements) with the requirements that are unique to this one section.

**Part 2** describes equipment and systems requirements. Each major piece of equipment required for the project should have a paragraph that describes concisely, and in detail, the minimum acceptable specifications for the item. Unless it is a public project, there are usually two or three pre-accepted makes and models listed for each item. This gives the bidders a very clear idea of the expected quality. Additional makes and models can usually be submitted for acceptance during the bidding period. This part of the specification is very important in ensuring accurate and comparable bids.

**Part 3** describes installation, commissioning, training, and project wrap-up. This section gives the contractor a clear picture of the scope of the installation work. It may include such things as preparation, installation procedures and methods, special mounting considerations, minimum acceptable wiring methods, shop work vs. site work, special testing, adjustment and alignment of equipment, cleaning, training, and acceptance testing.

Each of these three parts must be written in a clear, concise, and explicit manner. This is important because of the many roles that the specification will serve:

- **during bidding**, the specs must convey all the administrative, hardware, and installation requirements to the contractor, alerting them to any conditions or requirements that may impact their cost – this allows them to prepare an accurate bid that can be fairly and easily compared with bids received from other contractors;
- **once the contractor has been selected**, the technical specifications form part of the contract between the contractor and the owner – if they are ambiguous or vague, this can lead to disastrous consequences;
- **during installation** the contractor and subcontractors will use the spec as a guide to perform the work; as well as detailing the equipment and how it interconnects as a system, the specification further defines the quality of the labour force, the workmanship, the materials used in the project, and any special sequencing or scheduling requirements; in addition, it specifies standards which must be met and any other special instructions or requirements;
- **after the contractor calls for a completion review**, the specification serves as a guideline to identify deficiencies in the work or the close-out submittals; this allows the audio-visual consultant to create a deficiency list to provide the contractor with a clear idea of what must be completed before they receive final payment; this protects both the owner and contractor from open-ended projects with shifting requirements.

Sometimes audio-visual systems are specified as a separate contract outside of the 16-division general construction documents. In this case, a stand-alone bid package and contract must be prepared by the consultant with a single A/V technical specification section as its core. Division 1 requirements are often contained within Part 1 of this stand-alone specification.

## Specifications and Turn-Key Systems

Some specialised audio-visual aspects of a project are complete systems, supplied turn-key from a manufacturer. Examples include special format projection systems, simulators, VR equipment, and large-screen display systems. It has been this writer's experience that the "specifications" supplied by the manufacturer often need considerable supplementing to adequately protect the owner (and, indeed, the manufacturer). The A/V design consultant should review the contract and specifications supplied by the manufacturer, and produce a supplementary document.

## Role of Specifications Before Bidding

Prior to writing a full specification, the A/V consultant should prepare preliminary specification documents during the design phase. Often a check list format is used to define the design criteria to ensure that all of the project needs will be met by the design, and to prepare preliminary budgets. If the systems are complex (e.g.: multiple exhibits, a or mixed-media theatre), a PDD (preliminary design document) will be prepared. This document should clearly communicate the major elements of the design in lay terms. Its main use is for review by all the decision makers to ensure that the intended design accurately reflects their needs, and to prepare more accurate working budgets.

In some cases, an outline specification is prepared. This is modified and circulated during the latter part of the design phase to keep all members of the team apprised of the ongoing design changes and their impact on other parts of the project.

Final technical specifications are written by the audio-visual design consultant once the design has been finalised. A draft of the technical specs is then circulated amongst the design team and, often, interested members of the owner's technical staff. The intent of this review is to ensure that the design accurately meets everyone's needs and expectations. Since the specification (in combination with the drawings) very clearly defines the system, there should be no surprises once the final draft is approved. Further, since the final budgets were prepared based on this design, the bids should come in within the expected range.

## Specifications and the Bid Process

The purpose of the bidding process is to select a qualified contractor to do a well-defined job to a known schedule for a known cost. This process ensures that there is competitive bidding for the work, and that the owner can reasonably and fairly compare contractors based on price, skills, and ability to meet the project schedule.

To fulfil this goal, the bid documents, of which the technical specifications are an integral part, must be clear, concise, fair, and, above all, unambiguous. To have a reasonable and fair basis for comparison, it is important that all bidders are basing their offers on the same set of criteria, and under the same conditions. If the specifications or requirements are vague, the contractors may be bidding on widely varying grades of equipment, and may be making invalid assumptions about the scope of work. This results not only in an unacceptable spread in bids, but makes it more likely that the successful bidder will not deliver what is intended or expected.

If, instead of a spec, the bidder is presented with an equipment list that simply says, for example, "*one only video camera*," some bidders may be including a \$1,000 unit, and others a \$10,000 unit. **These bids simply cannot be compared.** This is almost as bad as having solicited vendor proposals without any specifications – you get as many "solutions" and prices as there are proposal submitters, and none can be properly compared to any other. Proper and detailed specification of the equipment, coupled with examples of acceptable products, eliminates this problem. This same situation holds true for the installation aspects of the project. If the administrative requirements, scope of work, and close-out procedures are not clearly defined, the bidders will have to make assumptions, and the bids will be inaccurate.

## Summary

Good technical specifications benefit the owner, the facility designer, and the audio-visual contractor. The two-word phrase that best describe the importance of A/V specifications is, "**no surprises**." To this end, technical specifications perform the following functions within a project:

- **before hiring a contractor**, the specification allows the project team to sign-off on the design, with all members having a clear understanding of what the system can and cannot do, its anticipated cost, and its expected impact on other aspects of the facility design (e.g.: power and conduit requirements, heat loading, etc.);
- **during bidding** ensures that received bids: will be based on all the requirements of the system (including administrative issues, scheduling, equipment quality, workmanship, site conditions, standards, training, and documentation); will be accurate and competitive; will be within the budget range; will be within a reasonable range of each other; and can be easily and fairly compared;

- **once the contractor has been selected**, the technical specifications form part of the contract between the contractor and the owner, and must not be subject to interpretation; if the specs are non-existent, there is no guarantee that the owners will get the system or quality of workmanship they expect;
- **during installation**, the specification clearly defines the contractor's scope of work (including administrative procedures, workmanship, standards, training, and documentation); this benefits the owner by eliminating arguments about what was supposed to happen, and it protects the contractor from unreasonable "feature creep."
- **once the contractor has reached substantial completion**, the specification makes project close-out much more straightforward (this is where most of the disputes can take place); using the specification, both the owner and contractor have a finite set of tasks that define when the project ends.

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