

*info***Comm 2003**

Seminar S83 Specifications for AV Installations

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infoComm Seminar S83 – June 5, 2003

Specifications for AV Installations

Abstract: *Like it or not, A/V is part of the construction industry, and this is an industry driven by specifications. Learn the importance of specifications throughout the project life-cycle from design through bidding through sign-off. Learn how specifications benefit both the owner and the contractor. This session will also show you how to navigate the specification format, and where to look when preparing your bid to avoid unpleasant surprises later.*

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1.0 Introduction

It is important to recognize that an A/V contractor is part of the construction industry, and that this is an industry driven by specifications. Standardized specifications have been developed over decades, and are a fundamental part of the construction process.

Seminar Objectives

- Understand the need for and use of specifications.
- Understand the industry standard specification format.
- Learn where to look in a spec when bidding to avoid nasty surprises later.
- Overview of changes occurring in the specification format next year.

Spec Myths

Myth #1: Specs were invented by A/V consultants to make life miserable for contractors

Fact: Standardized specs have been part of the construction process for over 40 years – longer than A/V

Myth #2: Specs consist mostly of standard boiler-plate paragraphs that can be ignored – all you really need to do is pick out the equipment from the middle

Fact: Properly written specs are custom-tailored to unique project requirements, convey critical info, and every paragraph is legally binding

Myth #3: Consultants often bury “gotchas” in the specs

Fact: Specs follow a highly standardized format, all crucial information should be exactly where it is expected to be, and one reason all that stuff is there is to make you aware of factors that can affect your cost

2.0 Why Do We Need Specs?

Properly written technical specs benefit the owner, the design team, and the contractor over the entire life of the project. The two-word phrase that best describe the importance of specs is, “*no surprises.*”

Project Life-Cycle

Specs perform important functions in each of these major project phases:

1. **Design** – often further divided into three sub-phases:
 - A. **Concept Development** – define project scope, user needs, and working budget
 - B. **Design Development** – design systems to meet the approved needs and budget
 - C. **Construction Documents** – prepare specs and working drawings for bid
2. **Bidding** – invitation, bidding, evaluation, negotiation, and contract award
3. **Construction** – implementing the design
4. **Close-out** – adjusting and testing, commissioning, deficiency correction, training, and documentation

Function of Specs Over the Project Life-Cycle

Technical specifications perform important functions in each of these project phases:

1. Design

System design needs to take into account many factors – not the least of which are the needs of the system users and the available funds that the owner has to spend. Design involves more than just the AV designer – there is a design team.

The key to successful team-based system design is **communication**.

During **Concept Development**, the stakeholders must communicate their needs to the system designer, and the designer must reiterate these so that the users can see that the designer has truly captured their requirements. During this process, a preliminary form of spec called a **PDD** (preliminary design document) is created, reviewed, edited, and approved by the owners team. The PDD communicates the major functional elements of the design in lay terms. One of its main uses is for review by all the decision makers to ensure that the intended design accurately reflects their needs.

Once the requirements are documented and approved, the system designer must prepare a budget that reflects the cost of implementing the desired functions as defined by the PDD. If this budget is more than the owner can afford, an interactive process of paring the design to the required budget occurs. Communication with the stakeholders is vital during budget paring so that everyone understands and agrees on functionality or quality that has to be removed from the design to reduce the budget. The PDD is further refined during this process.

The PDD is also used to feed “heads up” info to the rest of the design team during this phase.

During **Design Development**, intensive communication and coordination must occur between the AV designer and the rest of the design team to ensure integration of the AV system components with the building, the furniture, and the electrical and mechanical infrastructure. An **outline specification** is often prepared, modified, and circulated during this phase to keep all members of the team apprised of the ongoing design changes and their impact on other parts of the project.

During the **Construction Documents** phase, draft specs and drawings are circulated for review by the entire design team for coordination.

Thus, during Design, the specification evolves from **PDD** to **outline spec** to **draft spec** to **final bid spec**.

2. Bidding

The purpose of the bidding process is to select a qualified contractor to perform a well-defined set of tasks to a known schedule for a known cost: **NO SURPRISES!**

The bid process must ensure that the owner can reasonably and fairly compare contractors based on price, skills, and ability to meet the project schedule. Except for certain public projects, price alone is not the sole deciding factor – this is why the lowest bid is not necessarily the winning bid.

To achieve this goal, the bid documents, of which the specs are an integral part, must be concise, fair, and, above all, **unambiguous**.

To have a reasonable and fair basis for comparison, all bidders must base their offers on the same set of criteria. If the specs are vague, contractors may be bidding on widely varying grades of equipment, and may be making invalid assumptions about the scope of work. Vague requirements result not only in an unacceptable spread in bids, but make it likely that the successful bidder will either not deliver what is intended, or will lose money on the job.

During bidding, the specs must convey all the administrative, hardware, and installation requirements to the bidder, alerting them to any and all conditions or requirements that may impact their cost.

3. Construction

During **construction**, specs form part of the contract between the contractor and the owner, and must not be subject to **interpretation**.

As well as equipment performance, the spec defines the scope of installation work, quality of workmanship and labor force, and any special sequencing or scheduling requirements.

The spec also outlines administrative procedures, standards, site conditions, coordination with other trades, and special instructions, procedures, or requirements.

4. Close-out

A good spec makes **project close-out** much more straightforward (this is the part of the project where most disputes take place). It protects both the owner and contractor from open-ended projects with shifting requirements. The goal is for both the owner and contractor to have a finite list of tasks and milestones that clearly define when the project ends.

3.0 The Specification Format

Introduction

Constructing a building is a complex task involving many people. Successful completion requires highly effective communication.

A huge amount of data and information must be shared. Information retrieval is nearly impossible without a **standardized** organization system familiar to each user.

An AV contractor 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 specs – these methods have been honed and improved over decades.

Technical specs in North America are written and structured according to the CSI/CSC *MasterFormat*TM. There are similar standards in other parts of the world.

Definition: “Master list of numbers and titles for the construction industry.”
Sometimes referred to as the Dewey Decimal System of the construction industry.

A set of specs outlining every aspect of constructing a building can be voluminous. *MasterFormat*TM divides a set of construction specs into standardized **divisions** roughly based on the construction processes involved – currently there are 16 of these.

Each division is further sub-divided into **sections**. Section numbering and titles within divisions is also defined by *MasterFormat*TM.

Spec sections are further divided into **articles** and **paragraphs**. Section article titles are set out in the CSI/CSC *SectionFormat*TM.

Even the page layout for a spec section is defined (numbering, indentation, etc.) – in a document called *PageFormat*TM.

AV specs are typically written as one or more sections of either **Division 11** (Equipment) or **Division 16** (Electrical).

11130 – Audio-Visual Equipment

16800 – Sound and Video

Today, MasterFormat™ is the only system of organizing construction specs that is in widespread use throughout North America. It is commonplace and expected in virtually every major construction project.

Apart from the private sector, MasterFormat™ is also widely used for public projects.

In the US, MasterFormat™ is the basis for numbering and titling **Federal Construction Guide** specs, and is also used at state and municipal levels. **In Canada**, MasterFormat™ is the basis for numbering and titling of the Federal Government's **National Master Specification (NMS)**, and is also used at provincial and municipal levels.

History of MasterFormat™

MasterFormat™ is a joint publication of both CSI and CSC.

CSI – Construction Specifications Institute is a society in the US, and **CSC – Construction Specifications Canada** is a non-profit association in Canada. Both are dedicated to the improvement of communication, contract documentation, and technical information in the construction industry.

1963: 16-division format first published by CSI as the “CSI Format for Construction Specifications.”

1966: similar effort in Canada produced the Building Construction Index (**BCI**).

1972: Canada's BCI was blended with CSI's index in a joint publication called the Uniform Construction Index (**UCI**). This provided both the US and Canada with standard formats for specs, filing, and cost analysis.

1978: UCI evolved into MasterFormat™. This document was revised in **1983**, **1988**, and **1995**.

The next revision is scheduled for **June/July 2004**.

The 16 Divisions

Division 1 General Requirements

Division 2 Site Construction

Division 3 Concrete

Division 4 Masonry

Division 5 Metals

Division 6 Wood and Plastics

Division 7 Thermal and Moisture Protection

Division 8 Doors & Windows

Division 9 Finishes

Division 10 Specialties

Division 11 Equipment

Division 12 Furnishings
Division 13 Special Construction
Division 14 Conveying Systems
Division 15 Mechanical
Division 16 Electrical

There is also a “**Division 0**”. This is not a true spec division, and is used primarily for the Project Manual during the **construction phase**. It contains title pages, contents, bidding requirements, and the contract.

Division 1 is a special division reserved for administrative and procedural issues *that affect all other divisions and sections equally*.

Stand-Alone AV Specs

A tender package for a new building will often go out a year or more before the building will be completed. Since AV equipment can change in only six months, and is always installed near base building completion, it is desirable to tender it much closer to the installation time. Due to the specialized nature of AV, **and this timing**, AV systems are often specified as a separate contract, and tendered outside of the general construction contract. In this case, a stand-alone bid package and contract are often prepared with a single A/V technical spec section as its core.

This may only have two divisions, or be a single document with Division 1-type requirements contained within it.

SectionFormat™

Each specification section (or stand-alone spec) is always written in three parts:

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

1. Part 1 – General

Part 1 contains administrative and procedural requirements that are unique to the section.

It defines the minimum acceptable qualifications of the contractor and its labor force, along with required compliance to various codes and workmanship standards.

Other typical items in this part 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.

2. Part 2 – Products

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 performance specs for the item.

Often two or three pre-accepted models listed for each item. This gives the bidders a very clear idea of the expected quality. Usually bidders are permitted to propose alternative products for acceptance during the bidding period.

A well-written Part 2 is very important in ensuring accurate and comparable bids.

3. Part 3 – Execution

Part 3 describes installation, commissioning, training, and project wrap-up.

This section should give 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, control programming requirements, training, and acceptance testing.

4.0 How to Avoid Surprises

The Construction Contract

An important thing to remember about the specs is that they will **ultimately form part of your contract**. The contract consists of an Agreement, various Terms and Conditions, **plus the specs and drawings**.

Bear this in mind when bidding. If there are terms, conditions, or requirements in the spec that you can't live with, consider either not responding or qualifying your bid. **Qualifying your bid** involves attaching a clear written notice to the bid form outlining the specific articles of the bid to which you take exception, and **your proposed alternative to each of these**.

WARNING: understand that qualifying your bid makes it conditional, and may cause it to be rejected outright. Here is a typical clause that is often inserted into a Bid Invitation:

Bids must be submitted as requested, and if they are unsigned, late, obscure, incomplete, or conditional, they may be rejected.

Also pay close attention the form of contract, as well as the specifications. The main contract is the Agreement. This is likely only one or two pages. It, however, usually incorporates the following documents by reference: definitions, general conditions, any supplementary conditions, the specification, drawings, and addenda.

In the event of a conflict, the following precedence order generally applies:

the Agreement,
the Definitions,
Supplementary Conditions,
the General Conditions,
Division 1 of the specifications,
remaining specification divisions,
drawings.

NOTE: details or drawings of a larger scale govern over those of a smaller scale, dimensions indicated on drawings govern over dimensions scaled from drawings, and later-dated documents govern over earlier documents of the same type.

Don't just look at the specs, but also review the drawings when preparing your bid. Specs and drawings are **complementary**, and you require both to get an accurate picture of the project. While the role of the specs is to establish the **quality of the materials and workmanship**, the role of the drawings is to show **quantity, form, and dimension**. Thus, a specification does not normally contain the quantity of items required: this must be determined by examining the drawings.

Bidding Don'ts

When bidding, **do not**:

1. Attach a response to your bid listing every article in the spec, with 90% of the responses being simply, "agreed."

The team evaluating your bid doesn't have the time to wade through pages of "agree" to find the two or three items with which you disagree.

Only respond to articles with which you **absolutely** require changes & **offer an alternative**. Don't be too picky – **know how to choose your issues**. A qualified bid is conditional, and may be rejected.

2. Attach a set of your standard Terms and Conditions to the bid.

A bid project is different from one where you are submitting a quotation. In the latter instance, your standard terms, in conjunction with the Owner's PO, form your contract. In a bid situation, the terms of the contract are the specifications.

Two key points to remember:

The act of bidding implies agreement with all terms and conditions of the contract (and the specs).

Nothing submitted with a bid ever forms part of the contract – from a contractual perspective the bid submission is discarded.

Once again, these attached Terms and Conditions can be perceived as making your bid **conditional**, and may cause it to be rejected outright.

Breakdown of a Bid

Let's look at some common articles in each part of a typical bid spec to see what each means, and what to watch out for when preparing a bid.

1. Part 1 – General

In general, this part describes system performance, submittals, administrative procedures, and contractor quality control requirements **that are specific to the spec section**. Remember that **Division 1** contains additional requirements that apply to the whole project. Make sure you are aware of the Division 1 requirements as well as those pertaining to the sections that apply to your work – you will be bound by them.

Section Includes

A generic summary of products and work. Gives a quick overview of the scope of work.

WARNING: this article is an overview only, and additional items may be listed elsewhere.

Some example paragraphs:

- E. Provision of personnel, access equipment, and test equipment for acceptance testing.*
- F. Provision of maintenance and operations training and manuals.*
- G. Supply, delivery, and installation of seismic restraints in accordance with local building codes and regulations.*
- H. Programming of control systems, including adjustments after one or two months of operation.*

System Description

A functional description of the system, generally extracted from the PDD. Important for technical systems – unfortunately, not always used. Very useful for AV, as this describes the expected functionality and the design intent of the system.

Allowances

Describes products and work covered by a cash allowance.

Alternate Prices

Lists optional products and work that are to be **priced separately** on the Bid Form. Note that these options may or may not be exercised. The price you submit should reflect the all-in additional costs for the products, labor, installation materials, etc. If the option is exercised by the owner, this price will be added to your base bid.

Payment Procedures

Special payment procedures. Be sure that these are acceptable.

If no Payment Procedure article is included, payments will be made under the terms of the contract. Be sure you understand these, and that they are acceptable to you. The typical payment structure in the construction industry is monthly progress payments based on a verifiable percentage of the work completed less a lien holdback.

Alternative Products

Describes procedures for submitting requests to bid a product not named in the spec. Be aware of these requirements. The most common procedure is to submit requests during the bid period, and usually x days prior to the bid period ending. This is so that the consultant can review the requests and publish their acceptance or rejection in an addendum sent to all bidders – so that everyone bidding is on an equal footing.

Pay attention to the required form of submission. You are generally asked to submit cut sheets with technical specs with each product request. Failure to do so may cause your request to be denied. The reason for this is that the consultant must evaluate the requested piece of gear against the requirements of the project.

References

Lists **standards** that are referenced in other parts of the spec. You should be aware of the contents of any of these that materially affect your work, as these are included in the spec by reference and, therefore, your contract, **as if they were physically attached to the spec.**

Here are some example standards which do not directly affect your work (you really must rely on the product manufacturer for compliance:

- A. *ANSI lumens: ANSI IT7.228-1997 - measurement method for light output of fixed resolution video projection devices.*
- B. *ANSI contrast ratio: ANSI IT7.228-1997 - measurement method for the contrast ratio of fixed resolution video projection devices.*
- C. *EIA 19 inch: ANSI/EIA 310-D-1992 - equipment racks and panels.*

Here are some example standards, however, which may directly affect your work and which you should be familiar with:

- G. *ASTM 580: ASTM E 580-2000 - standard practice for the application of ceiling suspension systems in areas requiring moderate seismic restraint.*
- H. *EIA 568: TIA/EIA 568-B-2001 - commercial building communications wiring.*

Submittals

One of the single most important articles in Part 1.

Describes items to be provided by the contractor before, during, and after construction. Might consist of product data sheets, mock-ups and samples, shop drawings, schedules, test reports, and system documentation.

Not complying with the portion that relates to submissions required with your bid may cause your bid to be rejected outright without being evaluated.

There can be additional submittals required to be made within a few weeks of contract award, a few weeks prior to start of construction, and during construction.

Be aware of **all** of these submittal requirements, and be sure to comply. In particular do not miss a submittal that requires approval prior to fabrication or construction (e.g.: custom plates or panels). If you ignore this, your work can be rejected.

Usually a set of submittals is required after completion of the work – referred to as **close-out submittals**. These typically consist of project documentation such as "as-built" drawings, programming documentation, & user and maintenance manuals. Close-out submittals are important enough to both the owner and consultant that they will generally hold up your final payment.

Quality Assurance

Describes requirements for the contractor's experience, general workmanship standards, and any codes and regulations that govern the work. Here are some example paragraphs:

- A. The Contractor must have been regularly engaged in the supply and installation of audio-visual equipment similar to that specified herein for a minimum of five years.*
- B. On request, demonstrate to the satisfaction of the Owner and Consultant that adequate facilities, equipment, staff, technical experience, and certifications are available to perform the specified Work properly and expeditiously.*
- C. Comply fully with the following acts, regulations and codes:*
 - 1. Uniform Building Code (UBC) and all local building codes in effect at the Place of the Work;*
 - 2. National Fire Protection Association (NFPA) and all local fire codes in effect at the Place of the Work;*
 - 3. National Electrical Code (NEC) and all local electrical codes in effect at the Place of the Work.*

Delivery Storage and Handling

Describes any unusual handling or loading requirements (e.g.: may require union labor). Insurance requirements will be listed here. May also describe conditions for acceptance of goods at the site.

Note any “time is of the essence” paragraphs that may require expedited shipping of goods to meet the schedule. These may be used for projects where the opening date is crucial (e.g.: an arena that must be open and operational for the first game of the season). Here is an example paragraph:

- G. Acknowledge that time is of the essence in the performance of the Contract, and agree to take whatever action is necessary, including air freight of equipment on an overnight basis, to ensure the completion of the Work to the key project milestones listed in the “SCHEDULING” article. Assume all costs incurred in expediting delivery of equipment.*

Sequencing

Describes requirements for coordinating work which must be done in a particular sequence or in a number of phases. This is important, as these requirements can affect your costs.

Scheduling

Describes expected milestone dates, hours of access to the site, etc. Here are some example paragraphs:

- A. *The earliest the site will be accessible for site work under the Contract will be Monday, July 14, 2003.*
- B. *Agree to meet the following key project milestones:*
 - 1. *Start pre-installation site work on or before Monday, July 21, 2003.*
 - 2. *Deliver all equipment to the site and start installation work on or before Monday, August 4, 2003.*
 - 3. *Achieve Substantial Performance of the Work by Friday, August 29, 2003.*
- C. *The Contractor will be granted access to the site from 0700H to 1600H, five days a week. Upon request, the Owner may grant the Contractor additional access as required.*

As with “Delivery, Storage & Handling,” look out for any “time is of the essence” paragraphs that require off-hours, overtime, and other extended work practices to meet the schedule. If you find one in one article, there should also be one in the other as this article applies to labor, while “Delivery, Storage and Handling” applies to equipment. Here is an example paragraph:

- H. *Acknowledge that time is of the essence in the performance of the Contract, and agree to take whatever action is necessary, including extra shift work, to ensure the completion of the Work within the Contract Time at no additional cost to the Owner.*

Warranty

Outlines special warranty conditions for materials and labor.

CAUTION: the absence of this article does not mean that there are no specific warranty requirements. Minimum warranty requirements are covered in most contracts. The typical warranty for construction projects is **one year parts and labor** on all equipment and installation work. The contractor is responsible for carrying this warranty whether supported by the manufacturer or not.

Watch out for a requirement to provide software updates and upgrades during the warranty period.

Extra Materials

Lists items to be supplied by the contractor for future maintenance and repair.

Watch out, as spare projector bulbs should be listed here (i.e.: **not** in Part 2).

2. Part 2 – Products

This part contains performance specifications for all materials, equipment, components, and accessories required for the project **except maintenance spares, as noted in Part 1.**

General

General conditions that apply to the supply of all equipment and materials. Scan these for any unusual requirements.

Substitutions

Describes the procedure for substituting equipment once the contract has been let.

Caution: there is typically a clause forbidding unauthorized substitutions. If you arbitrarily substitute one product for another without following the proper procedure, you may have to replace it with the original product.

Equipment

These are the detailed performance specs for each major piece of equipment required. Note that there may be equipment required for the project that is not listed here. These would be small items of an interface or conversion nature (such as unbalanced to balanced audio converters), mounting hardware, etc.

Equipment: Acceptable Cable

An equipment article that pertains specifically to the wire and cable to be used on the project. Note any requirements for electrical code ratings (usually must be printed on the cable jacket) – some generic cable & installation cable provided by AV equipment manufacturers is not rated, or may not be the correct rating.

Pay particular attention to plenum cable requirements (especially in false ceilings or under access floors). In many jurisdictions, these are considered plenum spaces **even though they do not normally form part of the HVAC distribution system**. This is because they may function as a plenum during a fire to carry smoke from one space to another.

Test and Inspection

Requirements for equipment to meet specific test or inspection criteria **at source** (i.e.: the manufacturer or the contractor's shop). These might include UL listing. Usually requires a visible label.

Contrasts with **Field Quality Control** in Part 3.

Here are some example paragraphs:

- C. All supplied equipment that connects to AC power must: be UL listed, or be ETL certified, or be approved by the governing electrical authority or acceptable equivalent.*
- D. Do not install equipment on site without bearing a clearly visible mark denoting this approval.*
- E. If certification by an accepted authority is required, assume all costs associated with such testing and certification, along with all required equipment modifications.*

3. Part 3 – Execution

This part describes requirements for installation, testing, adjusting, and workmanship standards.

General

General conditions that apply to the installation. Look for permits or licensing requirements and seismic requirements here.

Acceptable Installers

Describes requirements for the contractor's installers experience or certifications (e.g.: CTS-I or certified programmer).

Examination

Actions required to determine that the site conditions are acceptable to proceed with the installation. Be aware that if you install a piece of equipment before the site is ready, you may be liable for replacing it if damaged (e.g.: a DVD player damaged by drywall dust).

Identification Systems

Describes acceptable methods of labeling cables, equipment, panels, switches, etc. Be sure you are aware of these, as your work may be rejected if not in compliance.

Installation

Describes actions required to accomplish the installation of the equipment. Note that this is a general overview of the installation tasks, and is not intended to list every task or step in the installation. Scan these for any unusual requirements or procedures.

Installation: Programming

A special installation article unique to AV specs. Describes requirements for control programming. May include a description of each type of touchpanel page, and a functional description of the user's interaction with the system. May include a paragraph about ownership of source code and the right to modify it.

Methods

Describes unique procedures for specific classes of equipment. Examples in an AV spec might include: **Equipment Rack Methods** and **Wiring Methods**.

Adjusting

Final actions to be taken to prepare the installed equipment for use (e.g.: alignment of a video projector or adjustment and equalization of a sound system). Usually describes procedures, sequences, and tests to be performed. Note that many tests require recording the results for inclusion in the close-out submittals.

Field Quality Control

Defines **on site** tests and inspections. Includes any local permit inspections (such as electrical), special testing or certification (such as UL or CSA equivalency), and acceptance testing.

Pay attention to this during bidding, as costs of the inspections are usually borne by the contractor. The contractor must also typically provide personnel and test equipment for the acceptance tests. Contrasts with **Tests and Inspection** in Part 2.

Protection

Requirements for protecting your work and surrounding work (e.g.: seal racks in plastic wrap to protect them from drywall dust or paint, protect rear screens, etc.).

Demonstration

Requirements for the contractor to train the owner's personnel in operation and maintenance tasks. Don't overlook this requirement, as costs you money to do this, and it needs to be accounted for in your bid.

5.0 Future Directions for MasterFormat™

CSI/CSC are expanding MasterFormat™ to add new disciplines, and to provide additional scope to the existing ones. Historically, CSI/CSC has updated MasterFormat™ every five to seven years. The new edition, slated to be released in the summer of 2004, marks almost a nine-year run for the current edition.

The **MasterFormat™ Expansion Task Team** was organized to oversee this revision. Members are industry experts representing various construction disciplines and professions. They have spent the past two years gathering industry input and drafting the expanded MasterFormat™.

One of the team's mandates is to balance the need for change against the cost of significantly revamping a system with as wide-spread adoption and familiarity as the current MasterFormat™. The team has tried to develop a revision that will give users sufficient added benefits to compensate for the expense of adopting a significant new edition of MasterFormat™. They have tried to create a document with enough flexibility to add new information and topics long into the future, without the extensive changes in titles and numbers that will be seen in this new revision.

One goal of this expansion is to address two recent developments in the construction industry: rapid advances in the types and uses of construction materials, and the dramatic growth in the complexity and scope of communications, AV, and computer systems. The expansion also aims to provide improved spec formats for large civil engineering projects (e.g.: bridges and roads) and heavy industrial construction such as factories and power plants.

The team released the first draft of the expanded MasterFormat™ for comment in February of 2002. It is currently, in Draft 3. The fourth, and final, draft will appear this summer (2003), and be available for comment until early fall.

The primary changes are:

More topics are addressed by expanding the numbering scheme from four to five digits.

The number of divisions has increased from 16 to 89 – some are place-holders for information that can be added in future revisions.

Telecomm, data, and A/V sections have been expanded.

Heavy civil and industrial construction is addressed.

New architecture means that future rewrites of MasterFormat™ will be possible without changing the overall structure.

What about "Division 17"?

Over the last few years, telecommunications groups have called for adding a 17th division. This proposed Division 17 would cover communications, computer technology, audio-visual, and other low-voltage systems which are rapidly increasing in scope, diversity, and complexity. In the current draft of MasterFormat™ 04, these low-voltage systems are covered in **Division 67**.

New MasterFormat™ 04 Numbering Scheme

One of the most significant changes is the adoption of a six-digit numbering system in place of the five-digit system that has been used in MasterFormat™ throughout its 40-year history. This six-digit system provides an order of magnitude expansion per level over the five-digit system – all but eliminating concerns about future expansion.

The familiar five-digit numbers in MasterFormat™ 95 are divided in the following fashion:

11 1 3 0 – Audio Visual Equipment

First two digits are the division number (level 1).

Each of next three digits are taken **individually**, and represent one lower level (i.e.: levels 2, 3, and 4).

Level four numbers were not assigned to provide maximum flexibility for individual users.

The new six-digit MasterFormat™ 04 numbers work in a slightly different fashion:

67 50 40 – Portable Audio Video Equipment

The first two digits still represent the Division number.

The next **pair** of numbers represent level 2, and the third **pair** represents level 3.

Level 4 numbers have been dropped, but can be created by adopting a policy of always leaving the last digit as '0' and using this number only if a further level is required.

Since each level is represented by a **pair** of digits, there is room to address **ten times as** many subjects at each level.

New MasterFormat™ 04 Divisions

Divisions will be divided into nine groups:

1. Procurement And Contract Requirements

00 series – equivalent to the former Division 0. Consists of Introductory Information, Procurement Information, and Contract Information.

2. Common Requirements

10 series – equivalent to the former Division 1.

3. Site Construction

20 series – equivalent to Division 2.

4. Common Construction

30 series – equivalent to Divisions 3 through 6.

5. Facility Construction

40 series – equivalent to Divisions 7 through 10, and 12 and 13.

6. Equipment

50 series – equivalent to Divisions 11 and 14.

7. Facility Services Construction

60 series.

Division 61 “Mechanical” replaces Division 15.

Division 65 “Electrical” replaces Division 16.

Division 67 “Communications” is new, and addresses low-voltage systems.

Section 675000 “Integrated Audio Video Systems” is where A/V systems will now live.

8. Infrastructure Construction

70 series. Civil Engineering divisions for construction of utilities, roads, airports, railways, and waterways.

9. Process Construction

80 series. Heavy construction divisions for constructions of plants and factories.

Further Resources

CSI website: www.csinet.org

CSC website: www.csc-dcc.ca