

## TECHNICAL ARTICLE

## Using Master Format Construction Specifications for SCADA Projects

By Graham Nasby, OWWA Automation Committee

In the United States and Canada, Master Format is a commonly-used standard for organizing construction specifications. As a mature documentation standard that has evolved over the past 60 years, Master Format can be used for a wide range of construction projects.

It does, however, have some challenges due to its sheer size. With its hundreds of possible numbered specification sections, Master Format can be tough to navigate for some types of specialized projects. This is especially the case with SCADA projects, which need to include a lot of detail but usually don't fit into the traditional classifications associated with civil construction projects.

In 2016, the Automation Committee of the Ontario Water Works Association (OWWA) proposed the idea of writing a guideline that could be used in Ontario Canada about how best to apply the Master Format standard to projects that have a SCADA (supervisory control and data acquisition) component. This article provides an overview of what the committee came up with during this 2016-2017 initiative.

### Introduction to Master Format

Master Format is a documentation standard that is used to organize specifications and contract documents for construction projects, particularly in the United States and Canada. Provided as a set of templates, Master Format is a product of the Construction Specifications Institute (CSI, [www.csiresources.org](http://www.csiresources.org)) and Construction Specifications Canada (CSC, [www.csc-dcc.ca](http://www.csc-dcc.ca)). Both the CSI and CSC are non-profit organizations, and the Master Format documentation standard is provided by them on a cost-recovery basis as a service to the construction community.

In a nutshell, Master Format consists of two parts: The first is a set of specification titles – each with a unique number – (which can be downloaded as a list of titles at no cost). The second is a set of accompanying draft body text, with customized template text for each numbered specification (available for a nominal fee, currently \$199 USD).

Viewed as a package, Master Format consists of a set of specifications, organized into numbered chapters (called divisions), and the specifications themselves (called sections), which are used to specify the general conditions, acceptable products, and execution details for the various aspects of a construction project. A designer will select the Master Format sections that they need for their particular

project, and then edit those sections as required to clearly define what they want to have a contractor to build.

In practice, most design consultants will order a base set of Master Format specifications, and then customize them for use on each construction project. It is common practice for most design consultants to have their own customized base set of Master Format specifications, which they have spent years adapting into a set of templates, which they in turn use as a starting point for all their design projects.

Since it was first published in 1963, as a set of construction specifications organized into 16 divisions of work, the Master Format has undergone several revisions. Looked at as a whole, Master Format can be divided into two main styles: 16-division format (often referred to as Master Format 1995) and 50-division format (usually referred to as Master Format 2004). Several other editions do exist, but each is essentially a revision of either 16-division or 50-division format. In general, the Master Format templates that were published prior to 2004 consist of 16-divisions, and those published from 2004 onwards have 50-divisions. At the time of writing, the current version of the base 50-division style Master Format specifications template is the May 2018 edition.

### Master Format 1995 (16 Divisions)

For the first forty years that Master Format existed (from 1963 to 2004), it was divided into 16 divisions based on the type of work. This 16-division format is still frequently used to this day, and is as follows:

- 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 and Windows
- Division 9 — Finishes
- Division 10 — Specialties
- Division 11 — Equipment
- Division 12 — Furnishings
- Division 13 — Special Construction
- Division 14 — Conveying Systems
- Division 15 — Mechanical (including Plumbing/HVAC)
- Division 16 — Electrical

Master Format 1995 is the most recent edition of 16-division format. The difference between the original Master Format published in 1963 and this one in 1995 is

not the organization of the main division titles, but instead it is due to minor revisions to the assignment of the 5-digit numbered specifications that reside under each division. Within each division, specifications are then broken down into numbered chapters called sections, each with a 5 digit number. The first two digits identify the division, and the rest identify the individual section. Suffixes are sometimes also used to further break out specifications.

For example, Electrical specifications reside under Division 16, and are broken out into the following sections:

Section #16010 - Electrical General Requirements  
Section #16051 - Installation of Cables in Trenches and in Ducts  
Section #16053 - Metering and Switchboard Instruments  
Section #16061 - Grounding – Primary  
Section #16062 - Grounding - Secondary

Section #16071 - Fastenings and Supports  
Section #16113 - Underfloor Distribution System  
Section #16121 - Power Cable and Overhead Conductors  
Section #16122 - Wires and Cables (0 - 1000V)  
Section #16124 - Communication Cables - Inside Buildings

Section #16126 - Modular Wiring System  
Section #16131 - Splitters, Junction Pull Boxes and Cabinets  
Section #16132 - Outlet Boxes, Conduit Boxes and Fittings (13 KB)  
Section #16133 - Conduits, Conduit Fastenings and Conduit Fittings  
Section #16134 - Surface and Lighting Fixture Raceways

Etc.

For people who frequently work on SCADA projects, the specification section 16901 has traditionally been used as the location for specifying instrumentation and automation.

One of the drawbacks of the Division-16 format is that it does not have a good place to put all the details needed to specifying a SCADA system. SCADA systems require a myriad of details such as: instrumentation, field wiring, PLC panels, network equipment, servers, server configuration software, programming, templates/guidelines, screen designs, datalogging, alarm systems, etc. Trying to jam all of this into a single spec section – 16901 – is often very challenging.

What often results is a bit of the Wild West when it comes to SCADA specifications. One designer may create a very long 16901 specification. Another may attempt to subdivide the 16901 section into subsections, using suffixes, but this is non-standard and will vary from firm to firm. Others may create their own custom numbers 16xxx sections within division 16. Some will create a special division called division 17 for SCADA, or will create custom sections within Division 13 (special construction). Some firms will do a combination of these five approaches. Other firms will just leave the details up to the contractor (and we all know what happens then!)

The result is that when the traditional 16-division format is used to specify the SCADA aspects of projects, how the specifications are organized from project to project can vary widely – and this makes construction more difficult for everyone involved. Non-standard specifications make jobs harder to understand, harder to price, harder to build, harder to check, harder to enforce, and as a result drive up costs.

### Master Format 2004 (50 Divisions)

When it was released in 2004, Master Format 2004 signaled a major change, as it reorganized the traditional 16 divisions into a new set of 50 divisions. The motivation for this change was to make it easier to subdivide construction work into more clearly delineated specification sections. The result was a mass renumbering of all specification sections that would make the Master Format easier to use for everyone.

Since 2004, there have been a several updated editions of Master Format, including the most recent version in May 2018. However, this format is still referred to as Master Format 2004 because it continues to retain the 50-division structure. The updated editions since 2004 mostly incorporate small refinements and corrections to how individual 6-digit specification sections within the new 50-divisions are individually numbered. For example, the individual specification sections within division 7 “thermal and moisture protection” have been updated slightly due to new product/techniques being available.

Looked at as a whole, the new 50-division breakdown of Master Format 2004 does offer significant advantages over the old 16-division format. In the new format there are over a hundred individual specification sections that can be used to more clearly organize the details of the SCADA aspects of a construction project. The titles of the specification sections are also a lot clearer to both the designer and the contractor.

However, not all design firms have transitioned to the new 50-division format yet. For a firm to adapt their already highly customized 16-division specification templates to the new 50-division format represents a lot of work. This work could easily represent hundreds, if not thousands, of hours of labor, and depending on the type/complexity of projects they undertake, it may mean that updating the specifications for a project won't be feasible within a project's budget. Thus only some firms have taken the time to update their specification templates to the new 50-division format. As construction specifications act as contract documents, any updating of specifications must be done very carefully, and there are real costs for a firm to make the conversion.

What we are seeing in Ontario, Canada is that about a third of design firms have moved to the new 50-division format, while about two thirds continue to use the traditional 16-division format (at least until their clients force them to upgrade!)

A listing of the 50 new divisions that are used in Master Format 2004 specifications are as follows:

Procurement and contracting requirements group

- Division 00 — Procurement and Contracting Requirements

Specifications group*General Requirements Subgroup*

- Division 01 — General Requirements

*Facility Construction Subgroup*

- Division 02 — Existing Conditions
- Division 03 — Concrete
- Division 04 — Masonry
- Division 05 — Metals
- Division 06 — Wood, Plastics, and Composites
- Division 07 — Thermal and Moisture Protection
- Division 08 — Openings
- Division 09 — Finishes
- Division 10 — Specialties
- Division 11 — Equipment
- Division 12 — Furnishings
- Division 13 — Special Construction
- Division 14 — Conveying Equipment
- Division 15 — RESERVED FOR FUTURE EXPANSION
- Division 16 — RESERVED FOR FUTURE EXPANSION
- Division 17 — RESERVED FOR FUTURE EXPANSION
- Division 18 — RESERVED FOR FUTURE EXPANSION
- Division 19 — RESERVED FOR FUTURE EXPANSION

*Facility Services Subgroup:*

- Division 20 — RESERVED FOR FUTURE EXPANSION
- Division 21 — Fire Suppression
- Division 22 — Plumbing
- Division 23 — Heating, Ventilating, and Air Conditioning (HVAC)
- Division 24 — RESERVED FOR FUTURE EXPANSION
- Division 25 — Integrated Automation
- Division 26 — Electrical
- Division 27 — Communications
- Division 28 — Electronic Safety and Security
- Division 29 — RESERVED FOR FUTURE EXPANSION

*Site and Infrastructure Subgroup:*

- Division 30 — RESERVED FOR FUTURE EXPANSION
- Division 31 — Earthwork
- Division 32 — Exterior Improvements
- Division 33 — Utilities
- Division 34 — Transportation
- Division 35 — Waterway and Marine Construction
- Division 36 — RESERVED FOR FUTURE EXPANSION
- Division 37 — RESERVED FOR FUTURE EXPANSION
- Division 38 — RESERVED FOR FUTURE EXPANSION
- Division 39 — RESERVED FOR FUTURE EXPANSION

*Process Equipment Subgroup:*

- Division 40 — Process Interconnections
- Division 41 — Material Processing and Handling Equipment
- Division 42 — Process Heating, Cooling, and Drying Equip.
- Division 43 — Process Gas and Liquid Handling, Purification and Storage Equipment
- Division 44 — Pollution and Waste Control Equipment
- Division 45 — Industry-Specific Manufacturing Equipment
- Division 46 — Water and Wastewater Equipment
- Division 47 — RESERVED FOR FUTURE EXPANSION
- Division 48 — Electrical Power Generation
- Division 49 — RESERVED FOR FUTURE EXPANSION

Just like the old 16-division format, the new 50-division format divisions are subdivided into individual numbered specifications. However, unlike the 5 digit numbering of 16-division format, 50-division format uses 6 digits to number individual specifications. In 50-division format, suffix numbers are also used more frequently than the older 16-division organization.

For example, Master Format 2004 provides the following standardized specification numbers under Division 26: Electrical for the electrical details of a project:

Section #26 05 00 - Common Work Results – Electrical  
Section #26 05 14 - Power Cable and Overhead Conductors (1001V)  
Section #26 05 20 - Wire and Box Connectors (0 - 1000V)  
Section #26 05 21 - Wires and Cables (0 - 1000V)  
Section #26 05 22 - Connectors and Terminations

Section #26 05 27 - Grounding – Primary  
Section #26 05 28 - Grounding – Secondary  
Section #26 05 29 - Hangers and Supports for Electrical Systems  
Section #26 05 31 - Splitters, Junction, Pull Boxes and Cabinets  
Section #26 05 32 - Outlet Boxes, Conduit Boxes and Fittings

Section #26 05 33.01 - Surface and Lighting Fixture Raceways  
Section #26 05 34 - Conduits, Conduit Fastenings & Conduit Fittings  
Section #26 05 36 - Cable Trays for Electrical Systems  
Section #26 05 37 - Wireways and Auxiliary Gutters  
Section #26 05 38 - Cellular Metal Floor Raceway Fittings

Etc.

Unlike the old 16-division format, the new 50-division format offers a dedicated place for the SCADA aspects of construction projects to be located. This is in a new division called Division 40 Process Interconnections.

However, using the new Division 40 Process Interconnections grouping presents a new and different problem. Within the Master Format 2004 standard, there were now several hundred possible specification sections in division 40 which can be used for specifying the SCADA aspects of a project. It soon became clear that for a municipal water/wastewater project, not all of these sections would be needed. But which ones should be used? Could there be a standardized subset of sections be defined in a recommendation document?

## OWWA Automation Committee Project

Seeing a need to provide some guidance and clarity on how to apply the new Division 40 Process Interconnection specifications to the SCADA aspects of municipal water/wastewater construction projects, the OWWA Automation Committee took on a project in mid-2016 to develop a set of best practices and guidelines.

The OWWA Automation Committee is a technical committee of the Ontario Water Works Association, a section of the American Water Works Association. Its members consist of automation professionals who work for water/wastewater utilities, engineering consultants, general contractors, vendors, and system integrators. The purpose of the committee is to provide a venue to discuss common automation/SCADA issues that are unique to the municipal water/wastewater sector in Ontario Canada, and to provide SCADA-specific training opportunities for automation professionals in the municipal water/wastewater sector.

During its monthly meetings in 2016 and 2017, a working group of the OWWA Automation Committee went through the various standardized specification sections of Division 40 as defined in Master Format 2004, to create a recommended subset that could be used for the SCADA aspects of projects.

In addition to selecting a recommended subset of the Master Format 2004 specification sections, the committee also modified some sections, and added in some additional sections with the goal of providing a place within the numbered specifications for as many aspects of SCADA projects as possible. The result is the following list, which is now being used a number of municipal water/wastewater departments and engineering firms in Ontario Canada.

## Suggested Specification Sections for SCADA Projects

When using Master Format 2004, the following specification sections are recommended when specifying SCADA projects:

### 40 60 00 Process Control and Enterprise Management Systems

#### 40 61 00 Process Control and Enterprise Management Systems

##### General Provisions

- 40 61 13 Process Control System General Provisions
- 40 61 16 Enterprise Management System General Provisions
- 40 61 21 Process Control System Testing
- 40 61 26 Process Control System Training
- 40 61 93 Process Control System Input/Output List
- 40 61 96 Process Control Descriptions

#### 40 62 00 Computer System Hardware and Ancillaries

- 40 62 13 Server Computers
  - 40 62 13.1 SAN
  - 40 62 13.2 NAS
  - 40 62 13.3 Server Hosts
- 40 62 16 Operator Workstation Computers
- 40 62 19 Industrial Computers
- 40 62 21 Desktop Computers
- 40 62 26 Laptop Computers
- 40 62 29 Tablet Computers and Mobile Devices
- 40 62 33 Printers

- 40 62 43 Large Display Screens
  - 40 62 43.1 Display Controllers/Video
  - 40 62 43.2 Projectors
- 40 62 63 Operator Interface Terminals (OIT)

#### 40 63 00 Control System Equipment

- 40 63 13 Distributed Process Control Systems
- 40 63 43 Programmable Logic Controllers
- 40 63 53 Programmable Automation Controllers
  - 40 63 53.1 Redundant Processors
  - 40 63 53.2 Processors
  - 40 63 53.3 I/O
  - 40 63 53.4 Remote I/O
  - 40 63 53.5 Communications
  - 40 63 53.6 Specialty Modules (only if required)
- 40 63 63 Safety Controllers (only if required)
- 40 63 83 Remote Terminal Units

#### 40 66 00 Network and Communication Equipment

##### 40 66 13 Switches and Routers

- 40 66 13.1 Panel Switches
- 40 66 13.2 Distribution/Zone Switches
- 40 66 13.3 Server Room Switches
- 40 66 13.4 Distribution Zone Router
- 40 66 13.5 WAN Router
- 40 66 13.6 Third Party Equipment

##### 40 66 16 Firewall

- 40 66 16.1 Edge Firewall
- 40 66 16.2 Zone Firewall
- 40 66 16.3 DMZ Firewall
- 40 66 16.4 VPN

##### 40 66 19 Media Converters

- 40 66 19.1 Optical Pass-through Modules
- 40 66 19.2 Copper-to-Fibre
- 40 66 19.3 Protocol Converter/Gateway

##### 40 66 20 Modems

##### 40 66 21 Gateways

##### 40 66 23 Frame Relay Equipment

##### 40 66 26 Device Network Equipment

##### 40 66 33 Metallic and Fiber-Optic Communication Cabling and Connectors (coordinate with 27 10 00 Building Telecommunications Cabling Systems)

##### 40 66 36 Process Instrumentation Networks

- 40 66 36.1 HART
- 40 66 36.2 Foundation Fieldbus
- 40 66 36.3 AS-Interface
- 40 66 36.4 Device Net
- 40 66 36.5 ControlNet
- 40 66 36.6 Modbus
- 40 66 36.7 Profibus
- 40 66 36.8 EtherNet/IP
- 40 66 36.9 DNP3
- 40 66 36.10 CAN-bus
- 40 66 36.11 Lonworks
- 40 66 36.12 Z-Wave
- 40 66 36.13 ZigBee

##### 40 66 43 Wireless Network Systems

- 40 66 43.1 Cellular
- 40 66 43.2 Point-to-Point
- 40 66 43.3 Point-to-Multi-Point
- 40 66 43.4 Antennas
- 40 66 53 Multiple Address Radio Equipment (seldom used)
- 40 66 56 Point-to-Point Radio Equipment (seldom used)





40 66 63 Antennas (seldom used)

**40 66 66 Monopoles and Towers**

**40 66 73 Satellite Communications Equipment**

**40 67 00 Control System Equipment Panels and Racks**

40 67 13 Computer/Communication Equipment Racks

40 67 16 Free-Standing Panels

40 67 19 Wall-Mounted Panels

40 67 23 Control System Consoles

40 67 33 Panel Wiring

40 67 43 Panel components \*\* Include 40 78 00 Reference\*\*

**40 68 00 Process Control Software**

40 68 13 Process Control (HMI) Software [procurement of license only]

40 68 15 PLC Logic Programming Software [procurement of license only]

40 68 17 Data Historian Software [procurement of license only]

40 68 19 Alarm Management Software [procurement of license only]

40 68 23 Reporting Software [procurement of license only]

40 68 26 Online Performance Monitoring Systems Software

40 68 33 Maintenance Management Software

40 68 36 Laboratory Information System Software

40 68 39 Energy Management Software

40 68 43 Load Management Software

40 68 63 Configuration of Control Software

40 68 63.1 FAT Template

40 68 63.2 FIT Template

40 68 63.3 I/O Check Template

40 68 63.4 SAT Template

40 68 63.5 SIT Template

40 68 63.2.1 HMI

40 68 63.2.2 Historian

40 68 63.2.3 CWMS

40 68 63.2.4 Controller

40 68 63.2.5 Reporting

40 68 63.2.6 Performanxce

40 68 63.2.7 Energy

**40 69 00 Packaged Control Systems**

40 69 13 Control System Simulators (seldom used)

40 69 23 Burner Management Systems (only in sludge incinerators)

40 69 26 Safety Instrumented Control Systems (seldom used)

40 69 33 Fire and Gas Monitoring/Protection Systems (seldom used)

40 69 36 Package Process Control System

**40 70 00 Instrumentation for Process Systems**

**40 71 00 Flow Measurement**

40 71 13 Magnetic Flow Meters

40 71 13.13 Inline Magnetic Flow Meters

40 71 13.23 Insertion-Type Magnetic Flow Meters

40 71 23 Differential Pressure-Type Flow Meters

40 71 23.13 Venturi Flow Meters

40 71 23.16 Flow Tubes (seldom used)

40 71 23.19 Flow Nozzle-Type Flow Meters (seldom used)

40 71 23.23 Orifice Plate Flow Meters

40 71 23.26 Integral Orifice Flow Meters (seldom used)

40 71 23.29 Orifice Meter Runs (seldom used)

40 71 23.33 Elbow Flow Meters (seldom used)

40 71 23.36 Pitot Tube and Averaging Pitot Flow Meters

40 71 23.39 V-Cone Flow Meters (seldom used)

40 71 23.43 Differential Pressure-Type Flow Transmitters

40 71 23.46 Flow Computers (seldom used)

40 71 33 Propeller Flow Meters

40 71 36 Turbine Flow Meters

40 71 43 Variable Area Flow Meters

40 71 46 Target Flow Meters

40 71 49 Vortex-Shedding Flow Meters

40 71 53 Positive Displacement Flow Meters

40 71 63 Doppler Flow Meters

40 71 66 Transit Time Flow Meters

40 71 69 Open Channel Flow Meters

40 71 73 Coriolis Flow Meters

40 71 76 Thermal Flow Meters

40 71 79 Flow Switches

40 71 83 Sight Flow Indicators

**40 72 00 Level Measurement**

40 72 13 Ultrasonic Level Meters (Continuous and Point-Type)

40 72 23 Radar Level Meters

40 72 33 Capacitance Type Level Meters (Continuous and Point Type)

40 72 36 RF Admittance Level Meters (Continuous and Point Type)

40 72 43 Pressure and Differential Pressure Type Level Meters

40 72 46 Bubbler Systems

40 72 53 Magnetic and Magnetostrictive Level Meters

40 72 73 Sight Level Gauges

40 72 76 Level Switches

40 72 83 Leak Detection Systems

**40 73 00 Pressure, Strain, and Force Measurement**

40 73 13 Pressure and Differential Pressure Gauges

40 73 16 Manometers

40 73 23 Absolute-Pressure Transmitters

40 73 26 Gauge-Pressure Transmitters

40 73 29 Differential Pressure Transmitters

40 73 33 Multi-Variable Pressure/Temperature Transmitters

40 73 36 Pressure and Differential Pressure Switches

40 73 46 Load Cells

40 73 53 Torque Measurement Devices

40 73 63 Diaphragm Seals

**40 74 00 Temperature Measurement**

40 74 13 Resistance Temperature Devices

40 74 16 Thermocouples

40 74 23 Radiation Pyrometers

40 74 33 Thermistors

40 74 36 Diode Temperature Measurement Devices (seldom used)

40 74 43 Bimetallic Thermometers

40 74 46 Fluid Expansion Thermometers (seldom used)

40 74 49 Change-of-State Temperature Measurement Devices (seldom used)

40 74 53 Cryogenic Temperature Sensors (seldom used)

40 74 63 Temperature Transmitters

40 74 66 Temperature Switches

40 74 69 Thermowells, Protection Tubes, and Test Thermowells

**40 75 00 Process Liquid Analytical Measurement**

40 75 05 Multi-Parameter Analyzer Systems

40 75 13 pH/ORP Analyzers

40 75 16 Conductivity Analyzers

40 75 19 Moisture Analyzers

40 75 21 Chlorine Analyzers

40 75 29 Dissolved Ammonia Analyzers

40 75 33 Fluoride Analyzers

40 75 43 Dissolved Oxygen Analyzers

40 75 46 Dissolved Ozone Analyzers

40 75 53 Turbidity Analyzers

40 75 56 Suspended Solids/Sludge Density Analyzers

40 75 66 Nitrogen Analyzers [nitrate analyzer]

40 75 69 Phosphorous Analyzers [phosphate analyzer]

40 75 73 Particle Counters

40 75 76 Total Organic Carbon Analyzers

40 75 79 UV Analyzer

40 75 81 UV Absorbance

40 75 83 Hardness Analyzers

40 75 86 Alkalinity Analyzer

**40 76 00 Process Gas Analytical Measurement**

40 76 05 Continuous Emissions Monitoring Systems  
40 76 13 Oxygen Gas Analyzers  
40 76 16 Ozone Analyzers  
40 76 23 Combustible Gas Monitors  
40 76 26 Chlorine Gas Analyzers  
40 76 29 Ammonia Gas Analyzers  
40 76 33 Hydrogen Sulfide Monitors  
40 76 36 Sulfur Dioxide Analyzers  
40 76 39 Carbon Dioxide Analyzers  
40 76 43 Carbon Monoxide Analyzers  
40 76 53 Dewpoint/Moisture Analyzers  
40 76 56 Gas Density Analyzers (seldom used)  
40 76 63 Flue Gas Analyzers  
40 76 66 NO/NOX Analyzers  
40 76 73 Hydrocarbon Analyzers  
40 76 76 Gas Chromatograph Analyzers  
40 76 79 Vapor Pressure Analyzers (seldom used)  
40 76 83 Mass Spectrometers (seldom used)

**40 77 00 Position and Motion Measurement**

40 77 13 Acceleration Measurement Devices  
40 77 16 Proximity Measurement Devices  
40 77 19 Vibration Velocity Measurement Devices  
40 77 23 Vibration Monitoring Systems  
40 77 26 Position, Speed, and Motion Measurement Devices

**40 78 00 Panel Mounted Instruments**

40 78 13 Indicators and Meters  
40 78 16 Indicating Lights  
40 78 19 Switches and Push Buttons  
40 78 23 Potentiometers and Manual Controllers  
40 78 26 Chart Recorders Paperless  
40 78 33 Annunciators  
40 78 43 Single-Loop Controllers  
40 78 53 Relays  
40 78 56 Isolators, Intrinsic-Safe Barriers, and Surge Suppressors  
40 78 59 Power Supplies  
40 78 63 Alarm Dialers

**40 79 00 Miscellaneous Instruments, Calibration Equipment, Instrument Valves, and Fittings**

40 79 23 Instrument Calibration Equipment  
40 79 26 Instrument Programming Equipment  
40 79 39 Signal Conditioners and Converters  
40 79 43 Deadweight Testers  
40 79 46 Flame Scanners  
40 79 63 Instrument Tubing  
40 79 66 Instrument Valve Manifolds, Valves, and Fittings

**Applying Specification Sections to 16-Division Format**

Though the above specification sections are designed to be used with the 50-division format of Master Format 2004, it is also possible to apply them to the older 16-division format. To do so, the above grouping can be used in one of two possible ways: first to create a new custom Division 17 in which to put them, or the second way is to use this as a set of specification subdivisions within the older 16901 instrumentation section.

With that said, to properly define the scope of a construction project requires both a high quality set of a specifications and an equally high quality set of drawings, which have been both carefully coordinated to ensure they work together to clearly define the contractor's scope and the owner's expectations.

Master Format, whether it be the traditional 16-division format or the new 50-division format, has proved itself to be a reliable method of organizing construction specifications.

**Summary**

Because of the size of the Master Format 2004 specification standard, the OWWA Automation Committee felt it was worth taking the time to select a set of standardized specification sections that could be used for specifying the SCADA aspects of municipal water/wastewater projects in Ontario Canada. The result was the list that is in this article.

This listing of standardized Master Format specification sections is now being actively used by several consultants and municipal water/wastewater departments in the Ontario, Canada area. The consultants, end-users and contractors who have been using this new set of standardized specification sections have noted that the process of designing, specifying, bidding, and building projects has been much easier and cost effective. The committee looks forward to continuing to facilitate the use of standardized best practices and guidelines that can be used for specifying the SCADA aspects of construction projects.

**Acknowledgements**

During the period of 2016-2017, the following members of the OWWA Automation Committee contributed their time and expertise to this project:

Steve Batson (2018 Chair) — Rockwell Automation  
Richard Walker (2017 Chair) — Regional Municipality of York  
Tim Sutherns (2016 Chair) — Eramosa  
Dale Barker — OCWA, Ontario Clean Water Agency  
Cameron Chong — Summa Engineering  
Frank Cosentino — Summa Engineering  
Jason Little — Regional Municipality of Peel  
Scott McCook — Regional Municipality of Halton  
Sandy Moore — Lexsan  
Andreas Musing — AECOM  
Graham Nasby — City of Guelph  
Kevin Nyman — City of Toronto  
Kevin Quigley — City of Barrie  
Brian Sahely (OWWA Liaison Director) — AECOM  
Brian Sudic — CIMA+  
Eric Zhang — OCWA, Ontario Clean Water Agency  
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