COMMISSIONING GUIDE SPECIFICATIONS

SECTION 15999
SAMPLE FUNCTIONAL TEST PROCEDURES

MECHANICAL

Spec writer:

The following example functional test procedures are provided for reference and do not necessarily reflect equipment or conditions in this project. The commissioning agent will write specific functional test procedures for this project.

SECTION 15999

SAMPLE FUNCTIONAL TEST PROCEDURES

MECHANICAL

A. GENERAL

This section contains sample Functional performance Test procedures in a form format (FT).

The sample FT procedures displayed in a form format here, are to provide contractors and CA with an example of a format and an indication of the rigor of the required testing and documentation for various equipment types. **They were not developed for this project.** Other forms and formats are acceptable if they comply with the rigor, clarity and intent of all the commissioning specifications. The CA will use the functional testing requirements in Sections 15997 and 16997 and the testing protocols specified in Section 17100 for developing site-specific functional test procedures and forms for this project. For illustrative purposes, sequences of operation associated with a few pieces of the equipment for which tests are included are also provided.

B. SAMPLE FUNCTIONAL TESTS (Examples only, not for this project)

Spec Writer: Select one or two sample checklists and include in this specifications section for reference.

The sample functional tests referred to in this section are found later in the document under the "Functional Test Forms" tab.

The tests are provided in electronic file format (Word 6.0 for Windows 3.1). The file name is at the bottom of each page. The file name extension "ft__" stands for Functional Test and the last digit is the version number.

Any MS Excel spreadsheet files are noted with their usual .xls extension. Some of the equipment also has a file with full sequences of operation, for reference when viewing the test procedures, and to illustrate the desired rigor of sequences of operation.

Division 16 functional test examples are found in Section 16999.

SYSTEM	ELECTRONIC FILE NAME
Air handler unit (cooling only)	ahu_cool.ft_
Air compressor (smoke damper)	aircompr.ft_
Boiler (packaged for heating water)	boilerhw.ft_
Boiler system sequences	boilerseq.004
Boiler system (multiple HW)	boilersys.ft_
Cabinet unit heater	cabunhtr.ft_
Chiller system	chiller.ft_
Chiller system sequences	chiller.seq
Economizer (airside)	econtest.ft_
Fin tube radiator	fintube.ft_
Heating fan coil unit	htfncoil.ft_
Packaged rooftop AC unit	pkg_rtu.ft_
Small service water circ. pump	smlcpump.ft_
Split air conditioner (small)	split_ac.ft_
Service water heater	srvc_wh.ft_
TAB spot check	tab.ft_
Terminal unit (with HW reheat, 1-duct)	tu_rehet.ft_
Terminal unit (cooling only 1-duct)	tu_clg.ft_
Terminal unit (dual duct VAV)	tu_ddvav.ft_
Terminal unit (dual duct fan series)	tu_ddfan.ft_
Unit heater	unit_htr.ft_
Variable speed drive (fan)	vfdfan.ft_
Variable speed drive (pump)	vfdpump.ft_

See section 16999 for functional tests of electrical equipment.

C. SUGGESTED NUMBERING KEY FOR COMMISSIONING PROCEDURES

The checklists, functional tests, documentation and training use the following identification numbering:

At the beginning of the identification number is a text abbreviation for the following:

Document or Event Abbreviations

DOC = Documentation
PC = Prefunctional Checklist
SP = Startup Plan
SR = Startup Report
FT = Functional Test

R = Review
TR = Training Record

Numbering Key

FT-0102.3: The first four digits uniquely identify the piece of equipment to the component level. The first 2 digits are the System Type, the second 2 digits are an arbitrary component number (not necessarily the same as the specified ID number). The number after the decimal is the test number. For example, FT-0102.3 = Functional Test 3 of system Type 1, component number 2 (e.g., 0102.3 = Chiller #2, FT #3, because chillers are system Type 1). Other components under chillers are: additional chillers, pumps, valves, piping, VFDs. The component number of 00 means "general" or "all" components, as with the entire system. All tests, procedures, trainings and records should have the same first 4 digits for any given equipment component.

Another example is TUs. If there was only 1 TU type, then tests would be numbered FT-0500.1, 0500.2, etc. If there were 2 types of TUs: FT-0501.1, 0501.2, etc and 0502.1, 0502.2, etc.

An *example* of the number system follows:

0100 Chilled Water System
- 0101 Chiller 1
- 0102 Chiller 2
- 0103 Cooling tower 1
- 0104 Cooling tower 2
- 0105 Pump CHWP-1
- 0106 Pump CHWP-2
- 0107 CHW piping
- 0108 CDW piping
- 0109 Sensor calibration

0200 Boiler System
- 0201 Boiler 1
- 0202 Boiler 2
- 0203 Pump HWP-1
- 0204 Pump HWP-2
- 0205 HW piping
- 0206 Sensor calibration

etc.

Numbers for Primary System Types and Components

Components are in parentheses.

01 Chilled water system (chillers, cooling towers, pumps, condensers, piping, valves)
02 Hot water system (boilers, hot water pumps, valves, piping)
03 Air handler units (SF, RF, coils, valves, VFD, ducts, dampers)
04 Packaged, AC or HP units (SF, RF, coils, valves, VFD, ducts, dampers, compressors, condensers)
05 Terminal units
06 Computer room AC units
07 Unit heaters or AC spot coolers
08 Heat exchangers
09 Service water system
10 Test and balance (TAB)
11 Building automation system (controls)
12 Lighting controls
13 Specialty fans
14 Fume hoods

END OF SECTION