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INSTRUMENTATION FLOW PLAN SYMBOLS
AND RECOMMENDED DRAWINGS
A STANDARD SYSTEM FOR ORNL
INSTRUMENTATION APPLICATION WORK

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INSTRUMENTATION AND CONTROLS DIVISION

INSTRUMENTATION FLOW PLAN SYMBOLS AND RECOMMENDED DRAWINGS

A Standard System for ORNL Instrumentation Application Work

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D. G. Davis
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FOREWORD

This report is an extension and revision of ORNL CF-54-6-72 and supersedes that report.

It has been prepared by a committee made up of a representative from each of the ORNL Instrument Application Groups (X-10, REED, RPD).

The committee is particularly grateful for the assistance of F. C. Zapp of the REED Division and W. R. Winsbro of the Chemical Technology Division in formulating a recommendation for pipe line designations and flow sheet definitions.

INSTRUMENTATION FLOW PLAN SYMBOLS AND RECOMMENDED DRAWINGS

R. K. Adams D. G. Davis R. F. Hyland

1. PURPOSE

This report is presented in order to provide a satisfactory system of symbols and identifications for process-instrumentation equipment and to promote a uniformity of practice that will simplify and expedite instrumentation work.

2. INTRODUCTION

This report is the result of an extensive survey of ORNL practices. In an attempt to arrive at a uniform system to be used by all ORNL instrument groups, numerous necessary compromises were made. It is anticipated that as future usage irregularities arise, periodic revision of this report may be necessary.

3. SCOPE

It is intended that the system presented here should be capable of designating and identifying the multitude of instrumentation items which are used for control and operation of conventional processes, as well as for specialized work peculiar to ORNL. Instrument Society of America standards have been adhered to whenever practical.

4. OUTLINE OF SYSTEM

This system is for the following uses:

- (a) designation and identification of instruments on flow plans,
- (b) recording in specifications, listings, requisitions, and purchase orders,
- (c) indication of items on piping diagrams and other construction drawings,
- (d) identification tagging of equipment,
- (e) description in technical and trade literature.

4.1 - General Identification. - The general identification shall consist of letters as listed

in Table 1. They shall be used in the combinations shown in Table 2.

Table 1 shows the letters that shall be employed, the definition or significance of each, and the position in which they shall be used. Table 2 shows the combinations of these letters of identification and defines the meaning of each letter group.

In the use of the letters or their combinations, the following rules and instructions apply:

- (a) first, second, and third identifying letters shall be written in upper case,
- (b) the maximum number of identifying letters in any combination shall be three (3), except as noted in item (c) below,
- (c) the specific identification letter shall be lower case and shall be applied as a subscript to the first identification letter,
- (d) no hyphens shall be used between letters or combinations of letters.

4.2 - Numbering System. - A numerical system of identification to supplement the letter identification shall be used in order to establish specific identity. A recommended numbering system is detailed in Appendix A.

4.3 - Application. - Typical flow-plan symbols are illustrated on pages 5 through 24. These show the flow-plan symbols as used on Engineering and Instrument Flow Sheets defined in Appendix B.

4.4 - Drawings. - Drawing scope and recommended usage are defined in Appendix B.

4.5 - Line Identification. - A recommended line identification code is shown in Appendix C.

4.6 - Piping and Tubing Symbols. - The American Standard for *Graphical Symbols for Pipe Fittings, Valves, and Piping* (Z32.2.3-1949) is recommended where the symbols do not conflict with those specifically recommended in other sections of this report.

Table 1. Letters of Identification*

The definitions and permissible positions in any combination are given

Upper Case Letter	First Letter Process Variable or Actuation ¹	Second Letter Instrument Function	Third Letter Instrument Function	Specific Identification Letter(s) ² (lower case)
A ³	Analysis	Alarm	Alarm	Average (av)
C	Conductivity	Control	Control	
D	Density			Difference (d)
E ^{4,5}	Electric	Element		
F	Flow			Frequency (f)
G		Glass (noncalibrated devices, bulls eye, gauge glass)		
H	Manual (hand actuated)			
I	Interval (time)	Indicator		Current (i) Interface (if)
L	Level			
M ⁷		Modifier	Modifier	Moisture (m)
O ⁸			Operator	
P	Pressure			Power factor (pf) Concentration (pH)
Q		Quantity (totalizer)	Quantity (totalizer)	
R	Radiation	Recorder		Ratio (r)
S	Speed	Switch Safety (when used with third letter only)	Switch	
T ⁶	Temperature	Transmitter	Transmitter	
V	Viscosity	Valve	Valve	Volts (v)
W	Weight	Well		Power (w) (watts)
X	Special	Special	Special	
Z	Position (zone)			

*Superscripts refer to notes on the opposite page.

TABLE 1 NOTES

1. Control loops should carry a first-letter designation which is determined by the primary process variable to be measured or controlled (except in the case of manual actuation, as described below). For example, in a heat-exchanger process in which steam flow is used to maintain a desired temperature, the loop should carry the first-letter designation "T," indicating that the primary process variable is temperature. Another example is the first-letter designation "F" for a thermal element used to measure flow.

If the actuating means is manual, the control loop carries the designation "H" for all symbols. An example is remote-manual control of steam flow to a process, whether for the purpose of flow or temperature control.

2. The following illustrates the usage of the specific identification letter(s):

When considered necessary, the specific identification letter(s) may be shown as a lower case subscript following the first letter, such as P_dR and A_mCV , for pressure differential and moisture analysis, respectively. The use of readily recognized self-defining chemical symbols such as CO_2 , O_2 , etc., falls in this same category. An alternate method of identification is to define the specific variable by means of a note on the flow sheet.

3. The letter "A" is used as first letter for all analysis and physical-property variables, except where there is a first-position identification letter for the physical property or analysis. The first letter "A" is commonly used in combination with a specific identification-letter subscript.

4. The letter "E" should be used as a first letter only where the process variable is electrical. Instruments using electrical principles to adjust

other variables should be designated by the primary process-variable letter; for example, a solenoid valve actuated by a level switch to control the level in a vessel should carry the designation "L" as the first letter. An example of correct usage of the letter "E" as a first letter is the use of E_wR for recording wattmeter. Detailed electrical control circuits and components such as relays, solenoids, etc., should not be shown on the flow sheets; however, they should be referred to by note.

5. An element is a primary measuring device by means of which the process variable, namely pressure, temperature, flow, etc., is converted to a strain, emf, force, change in electrical resistance or impedance, differential pressure, etc., and which has no amplifying device to provide signal transmission.

6. A transmitter is a device which receives a signal, either directly from the process variable or indirectly through a primary element, amplifies the signal in power or amplitude for remote transmission, and transmits the signal.

7. A modifier is a device (not used primarily for remote transmission) which receives one or more signals and performs amplification or mathematical operations on them. It may also be used to convert one type of signal transmission to another (e.g., electric to pneumatic).

8. An operator is a device which receives a signal from a controller and/or which adjusts a variable to effect the control action. An operator may be a saturable reactor, a pneumatic-electric interrupter, a pneumatic or hydraulic operator on a pump or speed changer, a pneumatic cylinder operating a Variac, or other such device which does not readily reduce to the case of a control valve. Typical applications are shown on pages 10, 19, 20, 21, and 22.

Table 2. Instrument Identification

Second and Third Letters*

Process Variable or Actuation																					
	Alarm	Control	Element	Glass	Indicator	Modifier	Quantity (Totalizer)	Recorder	Switch	Transmitter	Self or Manually Operated Valve	Well	Control Operator	Remote Control Valve	Indicator Controller	Indicator Modifier	Indicator Transmitter	Recorder Controller	Safety Switch	Safety Valve	
	A	C	E	G	I	M	Q	R	S	T	V	W	CO	CV	IC	IM	IT	RC	SS	SV	
Analysis	A	AA	AC	AE	--	AI	AM	--	AR	AS	AT	--	--	ACO	ACV	AIC	AIM	AIT	ARC	ASS	ASV
Conductivity	C	CA	CC	CE	--	CI	CM	--	CR	CS	CT	--	--	CCO	CCV	CIC	CIM	CIT	CRC	CSS	CSV
Density	D	DA	DC	DE	--	DI	DM	--	DR	DS	DT	--	--	DCO	DCV	DIC	DIM	DIT	DRC	DSS	DSV
Electric	E	EA	EC	EE	--	EI	EM	EQ	ER	ES	ET	--	--	ECO	ECV	EIC	EIM	EIT	ERC	ESS	ESV
Flow	F	FA	FC	FE	FG	FI	FM	FQ	FR	FS	FT	FV	--	FCO	FCV	FIC	FIM	FIT	FRC	FSS	FSV
Hand (manual)	H	HA	HC	--	--	--	--	--	--	HS	--	HV	--	HCO	HCV	HIC	HIM	HIT	--	HSS	HSV
Interval (time)	I	IA	IC	--	--	II	--	IQ	IR	IS	--	--	--	--	--	--	--	--	--	ISS	--
Level	L	LA	LC	LE	LG	LI	LM	--	LR	LS	LT	LV	--	LCO	LCV	LIC	LIM	LIT	LRC	LSS	LSV
Pressure	P	PA	PC	PE	--	PI	PM	--	PR	PS	PT	PV	--	PCO	PCV	PIC	PIM	PIT	PRC	PSS	PSV
Radiation	R	RA	RC	RE	--	RI	RM	RQ	RR	RS	RT	--	--	RCO	RCV	RIC	RIM	RIT	RRC	RSS	RSV
Speed	S	SA	SC	SE	--	SI	SM	--	SR	SS	ST	SV	--	SCO	SCV	SIC	SIM	SIT	SRC	SSS	SSV
Temperature	T	TA	TC	TE	--	TI	TM	--	TR	TS	TT	TV	TW	TCO	TCV	TIC	TIM	TIT	TRC	TSS	TSV
Viscosity	V	VA	VC	VE	--	VI	VM	--	VR	VS	VT	--	--	VCO	VCV	VIC	VIM	VIT	VRC	VSS	VSV
Weight	W	WA	WC	WE	--	WI	WM	WQ	WR	WS	WT	--	--	WCO	WCV	WIC	WIM	WIT	WRC	WSS	WSV
Special**	X	XA	XC	XE	--	XI	XM	XQ	XR	XS	XT	XV	XW	XCO	XCV	XIC	XIM	XIT	XRC	XSS	XSV
Position	Z	ZA	ZC	ZE	--	ZI	--	--	ZR	ZS	ZT	--	--	ZCO	ZCV	ZIC	ZIM	ZIT	ZRC	ZSS	ZSV

*The symbol (--) indicates improbable or impossible combinations.

**The letter "X" (Special) may also be used as a second or third letter identification.

INSTRUMENT APPLICATION SYMBOLS

LOCALLY MOUNTED (AT OR NEAR PROCESS)

PANEL MOUNTED (ON PANEL NO. XX)

MECHANICALLY COUPLED (PLUG-IN CONTROL, THERMOCOUPLE AND WELL, etc.)

DESIGNATION OF ANNUNCIATOR (UNIT NO. XX-POINT NO. X)

INTERMEDIATE MOUNTED (BETWEEN MAIN PANEL AND PROCESS)
(ON AUXILIARY PANEL NO. X, IF PANEL MOUNTED)

PURGE STATION NUMBER XX ($\frac{3}{8}$ -in. DIA SEE APPENDIX A FOR RECOMMENDED NUMBERING SYSTEM)

LEADS TO ELECTRICAL CONTROL CIRCUIT (ON DRAWING NO. XX) ———<ECC XX

LINE IDENTIFICATION

PROCESS LINES

PRIMARY LIQUID LINE
SECONDARY LIQUID LINE
PRIMARY GAS OR VAPOR LINE
SECONDARY GAS OR VAPOR LINE
ELECTRICAL POWER LINE

INSTRUMENT LINES

CONNECTION TO PROCESS
AIR OR PNEUMATIC SIGNAL LINE
HYDRAULIC LINE
(FILLED SYSTEM) CAPILLARY TUBING
ELECTRICAL SIGNAL OR CONTROL LINE

VALVE SYMBOLS

TWO-WAY		ELECTRIC MOTOR OPERATED	
THREE-WAY		SOLENOID	
FOUR-WAY		NORMALLY CLOSED (OPERATING POSITION)	
RELIEF OR SAFETY		THREE-WAY VALVE WITH NORMALLY CLOSED PORT (OPERATING POSITION)	
CHECK		NORMALLY OPEN (OPERATING POSITION)	
MANUALLY OPERATED		THROTTLING	
MANUALLY OPERATED EXTENSION HANDLE		THREE-WAY VALVE THROTTLING	
SELF OPERATED		(X) INDICATES VALVE FAILS CLOSED (ACTUATING MEDIUM FAILURE)	
(DIAPHRAGM OR BELLOWS) OPERATED		(O) INDICATES VALVE FAILS OPEN (ACTUATING MEDIUM FAILURE)	
PISTON OPERATED		(X) PLACED AT ONE PORT OF THREE-WAY VALVE INDICATES PORT FAILS CLOSED (ACTUATING MEDIUM FAILURE)	
VALVE OPERATOR WITH POSITIONER

Analysis (Oxygen) Element and Indicator with Safety Switch and Normally Open, Fail Closed Safety Valve.

Analysis (pH) Controller, Indicator and Switch (for Electric Control Circuit) Board Mounted, with Modifier (Electric to Pneumatic Relay) Control Valve, Transmitter and Element.

Conductivity Controller, Switch and Alarm, Board Mounted, with Control Valve. Element (Conductivity Cell) with Electric Transmission to Modifier (Electric to Pneumatic).

Density Controller, Indicator and Switch (for Electrical Circuit), Board Mounted, with Control Valve and Transmitter Locally Mounted with Purged Dip Tubes.

Self Actuated Density Valve, Transmitter and Indicator with Safety Switch and Safety Valve.

Density Recording Controller, Switch and Alarm, Board Mounted, with Control Valve. Element (Load Cell) with Electric Transmission to Modifier (Electric to Pneumatic).

Electrical Power Measurement Showing Locally Mounted Electrical Elements (Current and Potential Transformers) and Board Mounted Totalizing Wattmeter, Modifier (Thermal Converter), Recording Wattmeter, Switch in Recorder Case and Alarm.

The diagram shows three circular units arranged in a horizontal line. The first unit is labeled 'FR' with '12' below it. A dashed line connects it to the second unit, labeled 'FM' with '12' below it. Another dashed line connects the second unit to the third unit, labeled 'FE' with '12' below it. The third unit is also connected to a solid horizontal line passing through its center.

FI
13

The diagram shows three circles. The top-left circle is labeled 'FR' and '14'. A horizontal line with a break (two parallel diagonal slashes) connects it to the top-right circle, which is labeled 'FT' and '14'. Below the 'FT' circle is another circle labeled 'FI' and '14'. A horizontal line connects the 'FI' circle to the right edge of the diagram.

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Pneumatic Flow Control Showing Element, Local Transmitter, Fail Closed Valve with Positioner and Board Mounted Integral Recorder-Controller (Could be Indicator) and Totalizer.

Flow Control Showing Element, Local Transmitter Fail-Closed Control Valve with Board Mounted Recorder, Controller, Locally Mounted Modifier (Electro-Pneumatic Relay) and Safety Valve, and In-Line Mounted Safety Switch.

Manually (hand) Operated Valve (Globe, Gate, Needle, etc.).

Manual Indicator Controller, Alarm and Safety Switch (Board Mounted) with Control Valve and Safety Valve.

Board Mounted Manual Indicator Controller and Air Switch for Actuating One of Two Control Valves.

Time Controller (Repeat Cycle, Cam Operated, etc.) Locally Mounted
with Board Mounted Recorder (Operational Recorder).

Running Time Totalizer with Alarm Switch and Safety Switch Actuating an Alarm
and Control Circuit.

Self Controlling Level Valve, Level Glass, Level Safety Switch and Safety Valve.

Level Controller, Recorder and Switch, Board Mounted, with Level Control Valve and Pneumatic Level Transmitter (on Intermediate Panel XX) with Purged Dip Tubes.

Level Control with Electrical Level Element, Intermediate Mounted Modifier (emf to Pneumatic), and Valve with Board Mounted Indicator, Plug-in Controller, Switch and Alarm.

Pressure Control Showing Local Valve and Transmitter, Board Mounted Integral (Full Case) Recorder-Controller and Separate Pressure Indicator.

Pressure Regulating Valve, Self Operated, Manually Set, Locally Mounted.

Differential Pressure Indicator

Pressure Control Showing Local Transmitter, Valve and Controller with Board Mounted Recorder.

2 Pen Pneumatic Recorder, Board Mounted, Receiving Two Independent Pressure Inputs from Pressure Transmitters. Board Mounted Pressure Switch and Alarm On One Signal.

Pressure Control Showing Board Mounted Plug-in Recorder-Controller with Local Valve and Transmitter

Pressure Element, Output Modified to Drive a Standard Recorder (Typical Application Would be a Strain Gage Type Transducer Fed Into a Strain Gage Bridge and Millivolt Recorder); Also Local Safety Switch Actuating Solenoid Safety Valve.

Board Mounted Radiation Counter (Scaler) with Integral Switch, Indicating Controller and Motor Operated Valve Receiving Signal from Radiation Element (Geiger Tube, Fission Chamber, etc.) and Radiation Transmitter (pre-amp).

Radiation Safety Circuit with Element, Indicator with Integral Safety Switch, Alarm (Board Mounted) and Safety Valve.

Speed Control Showing Element and Modifier. Modifier with Integral Switch
Drives Local Speed Indicator and Board Mounted Recorder-Controller which
Positions Variable Speed Drive Through Speed Control Operator.

Differential Temperature Elements
(Two Surface Mounted Elements),
Connected to Temperature Differ-
ential Recorder.

Temperature Control Showing In-Line Well, Local Element, Safety Valve,
Control Valve and Board Mounted Integral Recorder-Controller.

TE 1--TRXX-X
TE 2--TRX-X
TE 3--TRXXX-X
TE 4--TRXX-X
TE 5--TRX-X
TE 6--TRX-X

Experimental Installation Showing Arbitrary Thermo-
couple Numbering and Random Assignment to Recorders.
Schedule May be Shown Either on Flow Plan or Sepa-
rately. Thermocouple Numbers are Never Changed.

PT. NO.
TE 42-1--
TE 42-2--
TE 42-3--
TE 42-4--
TE 42-5--
TE 42-6--

Permanent Installation Showing Thermocouple Connected
to Multipoint Instrument. Thermocouples Carry Recorder
Number and Input Number. All Information Should Be
Shown on Flow Plan.

Self-actuated Temperature Valve. (Bulb in Well)

Temperature Control Showing Locally Mounted Well and Transmitter with Board Mounted Recorder, Plug-in Controller, Control Operator (Pneumatic Variac, Electro-Pneumatic Operator, etc.), Switch and Alarm.

Board Mounted Temperature Recorder (Filled System Type) Showing Capillary and Well in Vessel.

Temperature Indicator (Industrial Glass or Dial Type) in Well in Vessel.

Temperature Control Showing Well, Element, Fail Closed Control Valve with Positioner, Board Mounted Modifier (Electro-Pneumatic), Recorder, Plug-in Controller, Switch and Alarm.

Temperature Control Showing Well, Element, Modifier, Recorder (with Integral Switches for Alarm and ECC) and Separate Controller Driving Control Operator. Safety Circuit Provides Heater Protection.

Weight System Showing Transmitter, Board Mounted Indicator Controller (With Integral Alarm Switch) and Locally Mounted Control Valve.

Weight System Showing Element, Board Mounted emf to Pneumatic Modifier (With Integral Safety Switch), Indicator and Controller Actuating Control Valve. Control Valve is Interlocked Through Safety Valve Actuated by Safety Switch.

Illustration of a Special Measuring System in Which Flow and Pressure are Multiplied to Obtain Power Measurement. The System Shows a Modifier (Multiplier), Recorder and Totalizer, Board Mounted.

Valve Position Systems Showing Two Limit Switches, an Alarm and a Continuous Position Transmitter and Indicator.

APPENDIX A

RECOMMENDED NUMERICAL IDENTIFICATION

A system in which symbols or groups of symbols are numbered consecutively, regardless of instrument first-letter identification or process identification, has been found to be the most suitable for the wide variety of instrumentation applications at ORNL. This is illustrated by the typical application of symbol numbering shown on pages 8 through 24, considering them as one process. Note that all instruments in a measuring or control system carry the same number, and that these numbers are never duplicated in the same process except as noted in (5) below.

If desired, blocks of numbers, related to specific portions of the process, may be assigned. For example, numbers 100-199 may designate the primary-coolant portion of the process, 200-299 the fuel-preparation portion, etc.

An extension of this numbering system is required for the following:

1. Two or more primary elements which are used with one receiving instrument should be designated by the receiving instrument number and then a dash followed by a number. See System 41, page 20.

2. Spare elements should be designated by the letter "S" following the last number. Where

one element is installed as the spare for another, it should have the same number followed by "S".

3. All items, other than primary elements, which have duplicate letter designations in a common measuring or control system should be identified by an upper case letter following the number. See System 20, page 13.

4. For relatively permanent installations, it is desirable that the thermocouples or other elements bear numbers corresponding to the multipoint receiver number followed by a dash and an individual identifying number. For example, TR-42 (on page 20) has thermocouples TE-42-1, TE-42-2, TE-42-3, etc., connected to points 1, 2, 3, etc.

5. For experimental installations where the thermocouples or other elements are subject to assignment to any receiver, a more flexible system than is indicated in (4) above should be used. In this case, a system in which the thermocouples are assigned arbitrary, permanent numbers, and which uses a connection schedule listing the recorders and their associated thermocouples, has been found to work well (see page 20).

6. Purge stations should be identified by the same number as the control loop or measuring system with which they are used.

APPENDIX B

RECOMMENDED DRAWINGS

Flow Plans

The flow plans listed below are recommended. For projects such as simple test facilities, etc., combinations of these flow plans may be used.

1. The *Schematic Flow Sheet* (chemical or physical) shows the basic process, without auxiliaries, giving temperatures, pressures, flows, concentrations, per cent constituents, etc. It is originated by process development groups, chemists, etc. Specific instrument application is not shown on the Schematic Flow Sheet.

2. The *Process Flow Sheet* (also called Equipment Flow Sheet), originated by the process design group, shows the points in the process where instrumentation is to be applied for measurement, control, alarms, etc., of temperature, flow, pressure, etc. It also shows the expected operating point, range of operation, and maximum and minimum design conditions for each variable. Although the Process Flow Sheet is schematic in form, the process is shown in more detail than on the Schematic Flow Sheet, and the auxiliaries to the process should be included. The following illustration shows System 44, page 21, as it would appear on a Process Flow Sheet. It should be noted that the instrumentation is shown on the Process Flow Sheet in an abbreviated form, using the nomenclature of Table 2.

3. The *Instrument Flow Sheet* shows a simplification of the process, showing only those portions of the process which are instrumented. It should show sufficient detail when used in combination with the Process and/or Engineering Flow Sheets to facilitate complete specification, procurement, and installation. It is especially recommended because it provides a clear picture of the control and measurement instrumentation without the cluttering effects of process engineering details. The *Instrument Flow Sheet* is originated by the instrument group concerned and is used primarily on large projects.

4. The *Engineering Flow Sheet* shows all equipment, piping, and instruments in detail, giving line, equipment, and instrument numbers, etc. It may or may not give values of variables, but it gives sufficient information, used in conjunction with vessel drawings, equipment layout, etc., to enable a piping draftsman to lay out the piping. Electrical motors, pumps, heaters, etc., are shown with their power requirements in order to enable electrical schematics to be drawn. The instrumentation shown on this flow sheet should show sufficient detail when used in combination with the Process and/or Instrument Flow Sheets to facilitate the complete specification, procurement, and installation of the instrumentation. The *Engineering Flow Sheet* is a result of the collaboration of all the engineering groups responsible for the process. It may be originated by any of the groups.

5. The *Operating Flow Sheet* gives a simplification of the Engineering Flow Sheet in order to provide information for operation of the process. It is usually originated by the operating group.

Other Drawings

The following drawings are recommended as containing the minimum information necessary to adequately document a project. On smaller projects, one or more of these drawings may be combined.

The following drawings should be provided by the Instrumentation and Controls Division:

1. panel layout and cutout drawings,
2. elementary pneumatic and electrical control diagrams,
3. specification and tabulation sheets,
4. detailed installation drawings,
5. electrical interconnection diagrams,
6. pneumatic interconnection diagrams,
7. schematic diagrams of electronic equipment.

The following drawings should be provided by the Process Designer:

1. piping schedule,
2. equipment schedule,
3. assembly specifications,
4. equipment and material specifications.

Photographs

Photographs are recommended as an invaluable and inexpensive means of project documentation.

APPENDIX C

LINE IDENTIFICATION CODE FOR FLOW SHEETS

The following code is recommended for identification of process and instrument lines on Engineering Flow Sheets.

The line number may include the number of the equipment piece which the line enters, the type of service, etc. Line number convention should be defined at the start of each project.

Nominal size shall designate IPS in the case of pipe and OD in the case of tubing.

Material and assembly specification may give material (347 SS, copper, 309 ELC, pipe weight or tubing thickness, etc.), and may also designate assembly procedure (Swagelok fittings, metal arc, Heliarc, etc.). Convention should be defined at the start of each project.