SECTION 1

PRESSURE-MEASURING INSTRUMENTS

Indicating 1-1
Helicoid Gage Division, American Chain & Cable Company, Inc. 1-1
Bailey Meter Company 1-3
The Hays Corporation 1-6
Manning, Maxwell and Moore Incorporated 1-6
Republic Flow Meters Company 1-10
Recording 1-12
Bailey Meter Company 1-12
Minneapolis-Honeywell Regulator Company 1-12
Taylor Instrument Companies 1-14
Transmitting Pneumatic 1-16
The Bristol Company 1-16
Fischer and Porter Company 1-18
The Foxboro Company (Model B) 1-21
The Foxboro Company (Model 42) 1-24
Manning, Maxwell and Moore Incorporated 1-27
Mason-Neilan 1-30
Moore Products Company 1-33
Republic Flow Meters Company 1-34
Taylor Instrument Companies (Model 229R) 1-36
Taylor Instrument Companies (Transaire) 1-37
Transmitting Electrical 1-41
The Foxboro Company 1-41
Manning, Maxwell and Moore Incorporated 1-43
The Swartwout Company 1-48
Receiving Pneumatic 1-50
The Bristol Company (Recorder) 1-50
The Bristol Company (Indicator) 1-52
Fischer and Porter Company (Recorder) 1-53
Fischer and Porter Company (Indicator) 1-55
The Foxboro Company 1-57
Minneapolis-Honeywell Regulator Company 1-58
Taylor Instrument Companies 1-59

SECTION 2

DIFFERENTIAL PRESSURE-MEASURING INSTRUMENTS

Mechanical 2-2
Mercuryless 2-2
American Meter Company 2-2
The Bristol Company 2-5
Industrial Instrument Corporation 2-7
Taylor Instrument Companies 2-11
Mercury Manometer 2-15
American Meter Company 2-15
The Bristol Company 2-16
Fischer and Porter Company 2-19
The Foxboro Company 2-21
Hagan Chemicals & Controls, Incorporated 2-24
Minneapolis-Honeywell Regulator Company (Controller) . 2-25
Minneapolis-Honeywell Regulator Company (Meter) 2-26
Taylor Instrument Companies 2-28
Bell Type 2-29
American Meter Company 2-29
Bailey Meter Company (Ledoux Bell Type) 2-30
Bailey Meter Company (Types D-35 and D-36) 2-37
The Foxboro Company 2-42
Minneapolis-Honeywell Regulator Company 2-44
Taylor Instrument Companies 2-47
Transmitting 2-49
Pneumatic 2-49
Bailey Meter Company 2-49
Fischer and Porter Company 2-52
The Foxboro Company (Model 13A) 2-54
The Foxboro Company (Model 3-AH) 2-57
Hagan Chemicals & Controls, Incorporated 2-60
Minneapolis-Honeywell Regulator Company 2-63
Moore Products Company 2-68
Republic Flow Meters Company 2-72
Taylor Instrument Companies (Model 333-R) 2-75
Taylor Instrument Companies (Model 339-R) 2-79
Taylor Instrument Companies (Model 200TD111) 2-85
Electrical 2-88
Bailey Meter Company 2-88
Manning, Maxwell and Moore Incorporated 2-91
Minneapolis-Honeywell Regulator Company (Model 293E1) 2-96
Minneapolis-Honeywell Regulator Company (Model 293D2) 2-96

SECTION 3

VELOCITY AND VOLUMETRIC MEASURING INSTRUMENTS

Velocity Fluid-measuring Instruments 3-1
Turbine 3-1
Potter Aeronautical Corp. (Model 11-B) 3-1
Potter Aeronautical Corp. [Model 3C-(N)] 3-9
Electromagnetic Type 3-14
The Foxboro Company 3-14
Variable-area Fluid-measuring Instruments 3-21
Transmitting, Pneumatic 3-21
Brooks Rotameter Company 3-21
Fischer and Porter Company 3-23
Transmitting, Electrical 3-26
Minneapolis-Honeywell Regulator Company 3-26
Indicating and Recording 3-27
Fischer and Porter Company 3-27
Kinetic Manometer 3-29
Fischer and Porter Company 3-29
Positive-displacement Meters 3-31
Gas Meters 3-31
American Meter Company 3-31
Integrator 3-32
American Meter Company 3-32
Rockwell Manufacturing Company 3-35
Integrations 3-37
Rockwell Manufacturing Company 3-37

SECTION 4

LIQUID-LEVEL-MEASURING INSTRUMENTS

Differential Pressure Instruments 4-1
Mercuryless 4-1
Fisher Governor Company 4-1
Mercury Manometer 4-3
Bailey Meter Company (Type LU) 4-3
Bailey Meter Company (Type LS) 4-4
Pneumatic, Force Balance 4-6
The Foxboro Company 4-6
Tubular-float-displacement Instruments 4-9
Black, Sivalls and Bryson, Incorporated 4-9
Fisher Governor Company 4-12
Hagan Chemicals & Controls, Incorporated 4-16
Capacitance-electrode Instrument 4-19
Robertshaw Fulton Controls Company 4-19
Gamma-ray Instruments 4-23
Instruments, Incorporated 4-23
Ohmart Company 4-35

SECTION 5

TEMPERATURE-MEASURING INSTRUMENTS

Bimetallic Indicating Instruments 5-2
Rochester Manufacturing Company 5-2
Taylor Instrument Companies 5-2
Weston Instrument Division of Daystrom, Incorporated 5-3
Thermal-filled Indicating Instruments 5-4
Moeller Instrument Company 5-4
Taylor Instrument Companies 5-5
Weston Instrument Division of Daystrom, Incorporated 5-6
Filled-thermal-system Pneumatic Transmitting Instruments 5-7
The Foxboro Company 5-7
Mason Neilan 5-11
Minneapolis-Honeywell Regulator Company 5-11
Moore Products Company 5-16
Republic Meter Company 5-18
Taylor Instrument Companies 5-18
Thermal-filled-system Recording Instruments 5-22
Minneapolis-Honeywell Regulator Company 5-22
Taylor Instrument Companies 5-23
Weston Instrument Division of Daystrom, Incorporated 5-25
Thermocouple-type Continuous-balance Potentiometer Instruments 5-26
Barber-Colman Company 5-26
The Bristol Company (Strip Chart) 5-37
The Bristol Company (Round Chart) 5-43
The Foxboro Company 5-44
Leeds and Northrup Company 5-52
Manning, Maxwell and Moore Incorporated (Type 150) 5-68
Manning, Maxwell and Moore Incorporated (Type 146) 5-73
Minneapolis-Honeywell Regulator Company 5-78
Taylor Instrument Companies 5-104
Weston Instrument Division of Daystrom, Incorporated 5-112
Resistance-thermometer-type Continuous-balance Wheatstone-bridge Instruments 5-117
The Bristol Company 5-117
The Foxboro Company 5-117
Leeds and Northrup Company 5-125
Minneapolis-Honeywell Regulator Company 5-127
Electrical Temperature-transmitting Instruments 5-128
Manning, Maxwell and Moore Incorporated 5-128
Minneapolis-Honeywell Regulator Company 5-133

SECTION 6

VISCOSITY AND SPECIFIC-GRAVITY INSTRUMENTS

Viscosity 6-1
Rotating Vane 6-1
Brookfield Engineering Laboratories, Incorporated (Viscometer) 6-1
Brookfield Engineering Laboratories, Incorporated (Viscometran) 6-2
Specific Gravity—Liquid 6-4
Gamma Ray 6-4
Beckman Instruments Incorporated 6-4
Instruments, Incorporated 6-15
Ohmart Company 6-16
Tubular-float-displacement Type 6-25
Fisher Governor Company 6-25
Specific Gravity—Gas 6-28
Refinery Supply Company 6-28

SECTION 7

pH AND REDOX MEASURING INSTRUMENT

Beckman Instruments Incorporated (Model W) 7-1
Beckman Instruments Incorporated (Model H-2) 7-11
Leeds and Northrup Company 7-17

SECTION 8

GAS ANALYZERS

Thermal-conductivity-type Analyzers 8-1
Bailey Meter Company 8-1
Paramagnetic-type Oxygen Analyzers 8-11
Beckman Instruments Incorporated 8-11
Leeds and Northrup Company 8-17
Infrared-type Analyzers 8-24
Leeds and Northrup Company 8-24
Perkin-Elmer Corporation (Tri-Non) 8-43
Perkin-Elmer Corporation (Bichromator) 8-75
Mass-spectrometer-type Analyzer 8-97
Consolidated Electrodynamics Corporation 8-97

SECTION 9

CONTROL VALVES AND VALVE POSITIONERS

Externally Mounted Positioners 9-1
Bailey Meter Company 9-1
Fisher Governor Company 9-4
The Foxboro Company (Valve Positioner) 9-6
The Foxboro Company (Power Positioner) 9-9
Hills-McCanna Company 9-10
Mason Neilan 9-11
Moore Products Company 9-12
Taylor Instrument Companies 9-13
Integrally Mounted Positioners 9-16
The Annin Company 9-16
Conoflow Corporation 9-21
Electropneumatic Positioners 9-24
Manning, Maxwell and Moore Incorporated 9-24
Single-port Valves 9-27
Fisher Governor Company (Self-contained) 9-27
Fisher Governor Company (Split Body) 9-29
Fisher Governor Company (Type 16530) 9-30
Hagan Chemicals & Controls, Incorporated 9-31
Double-port Valves 9-31
Fisher Governor Company 9-31
Mason Neilan 9-33

SECTION 10

SPEED MEASUREMENT AND CONTROL

Speed Transmitters 10-1
Pneumatic Type 10-1
The Foxboro Company 10-1
Taylor Instrument Companies 10-5
Reciprocating Pump, Piston-stroke Controllers 10-9
Hills-McCanna Company (Type U) 10-9
Hills-McCanna Company (Type K) 10-11
Hills-McCanna Company (Positive Displacement) 10-14
Link-Belt Company 10-16
Milton Roy Company 10-17
Proportioneers, Incorporated 10-23

SECTION 11

REPAIRING AND CALIBRATING CONTROLLERS

Case-mounted Type 11-2
One-variable Controllers 11-2
Bailey Meter Company (Pilotrol) 11-2
Bailey Meter Company (Standatrol) 11-4
Black, Sivalls and Bryson, Incorporated 11-7
The Bristol Company 11-8
Fisher Governor Company 11-11
Fischer and Porter Co. 11-13
The Foxboro Company (Model 40) 11-17
The Foxboro Company (Model 40 Control) 11-18
The Foxboro Company (Model 52) 11-21
The Foxboro Company (Model 58) 11-25
The Foxboro Company (Model 59) 11-28
Hagan Chemicals & Controls, Incorporated 11-33
Minneapolis-Honeywell Regulator Company 11-34
Taylor Instrument Companies (Transcope) 11-36
Taylor Instrument Companies 11-40
Ratio Controllers 11-43
The Foxboro Company (Model 40) 11-43
The Foxboro Company (Model 57ZSR) 11-44
Minneapolis-Honeywell Regulator Company 11-45
Moore Products Company 11-50
Stacked Type 11-50
One-variable Controllers 11-50
Minneapolis-Honeywell Regulator Company 11-50
Moore Products Company 11-64
Taylor Instrument Companies 11-70
Pneumatic Relays 11-74
Bailey Meter Company (Type AS1) 11-74
Bailey Meter Company (Type AS3) 11-75
Black, Sivalls and Bryson, Incorporated (Delayed Action) 11-76
Black, Sivalls and Bryson, Incorporated (Fixed) 11-78
Hagan Chemicals & Controls, Incorporated (Ratio) 11-79
Hagan Chemicals & Controls, Incorporated (Totalizing) 11-80
Minneapolis-Honeywell Regulator Company (Reversing) 11-81
Minneapolis-Honeywell Regulator Company (Selector) . 11-82
Moore Products Company (Amplifying or Reducing) .. 11-82
Moore Products Company (Constant Differential Pressure) 11-84
Moore Products Company (Booster) 11-84
Moore Products Company (Nullmatic) 11-86
Moore Products Company (Model 66) 11-88
Moore Products Company (Model 69) 11-88
Moore Products Company (Model 680) 11-89
Moore Products Company (Low Limit) 11-92
Moore Products Company (Precision Regulator) 11-93

Electrical Controllers 11-96
Manning, Maxwell and Moore Incorporated (Type 163) 11-96
Manning, Maxwell and Moore Incorporated (Type 162) 11-102
Manning, Maxwell and Moore Incorporated (Type 153) 11-109
Manning, Maxwell and Moore Incorporated (Type 160) 11-111

SECTION 12

ORGANIZATION OF INSTRUMENT DEPARTMENT FOR PROCESSING PLANTS

Responsibilities of Department to Management 12-1
Consulting Services for Other Departments 12-2
Process-control Engineers 12-3
Process-control Research 12-5
Selecting Personnel for Instrument Work 12-5
Training Personnel for Instrument Work 12-6
Labor Relations 12-7
Preventive Maintenance 12-8

SECTION 13

THERMOCOUPLE TEMPERATURE-MILLIVOLT EQUIVALENTS

Centigrade and Fahrenheit Scales 13-2
Fahrenheit Section 13-6
Copper-Constantan Thermocouple 13-6
Special (B.S.) Iron-Constantan Thermocouple 13-8
Iron-Constantan Thermocouple 13-12
Chromel-Alumel Thermocouple 13-16
Plat.-Plat. + 13% Rhodium Thermocouple 13-19
Plat.-Plat. + 10% Rhodium Thermocouple 13-22
Centigrade Section 13-25
Copper-Constantan Thermocouple 13-25
Special (B.S.) Iron-Constantan Thermocouple 13-28
Iron-Constantan Thermocouple 13-31
Chromel-Alumel Thermocouple 13-34
Plat.-Plat. + 13% Rhodium Thermocouple 13-37
Plat.-Plat. + 10% Rhodium Thermocouple 13-40