Draft

Stationary Source Enforcement Series

ENFORCEMENT WORKSHOP ON PLANT INSPECTION AND EVALUATION

VOLUME ~~VI~~ IV
CONTROL ENGINEERING LITERATURE REVIEW

February 1979

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
OFFICE OF GENERAL ENFORCEMENT
WASHINGTON, D.C. 20460

INON
02-00-79.

ENFORCEMENT WORKSHOP ON

PLANT INSPECTION AND EVALUATION

VOLUME IV

CONTROL ENGINEERING LITERATURE REVIEW

Prepared by

John R. Richards
PEDCo Environmental, Inc.
505 S. Duke Street
Durham, North Carolina 27701

Contract No. 68-01-4147
PN3470-3-B

Prepared for

U. S. ENVIRONMENTAL PROTECTION AGENCY
Office of Enforcement
Division of Stationary Source Enforcement
Washington, D. C. 20460

February 1979

Air Pollution Control Engineering Literature Review For Application in Pre-Construction and Operating Evaluations of Control Systems Performance

1. Purpose and Description

Control agency personnel who routinely evaluate the adequacy of proposed control systems and the performance of existing units are faced with an unique challenge. The job inherently requires a thorough understanding of control equipment performance, design procedures, sampling methodology, and process characteristics. The technical literature with respect to all of these complex subject areas is rapidly expanding and changing.

The Division of Stationary Source Enforcement (DSSE) has concluded that a limited bibliography designed specifically for source inspectors would be a useful supplement to the already available computerized literature search services. The technical information cited in this bibliography has been purposely limited to approximately 500 references to minimize difficulty in locating desired material. Three different accessing techniques are used to facilitate rapid search of the literature citations.

2. Scope

The literature included in this bibliography has been selected from the various EPA libraries located in the Research Triangle Park, N. C. area and from a recent series of computerized searches of reference files of NTIS and APTIC. Articles which were too basic to be of interest to control agency personnel were screened out. Theoretical material concerning novel, undeveloped control devices was generally excluded. Patent summaries and trade literature were also deleted in most cases. To the maximum extent possible, only documents and articles offering practical information of proven field use were included.

Inevitably, some worthy articles were missed in the compilation of the lists and many will be published in the future. The bibliography should, therefore, be periodically revised and updated to reflect current information. Control agency personnel are strongly encouraged to modify and add articles they consider valuable. Hopefully, the format used in this list will serve as a convenient starting point in the development of personal air pollution control libraries. DSSE would appreciate suggestions for improvements and revisions of the bibliography.

The documents and journal articles listed in this report are generally available at the libraries of major universities having engineering programs and at most of the headquarters and regional libraries of the U. S. Environmental Protection Agency. Persons having difficulty in locating any of the references may contact the following EPA library for assistance:

Library Service (MD-35)
Office of Administration
Environmental Research Center
U. S. Environmental Protection Agency
Research Triangle Park, North Carolina 27711

Telephone (919) 541-2777

The EPA library staff will assist in locating copies, if available, or sources where copies can be obtained.

3. Organization of the Bibliography

The references have been divided into the four major headings listed below:

Topic Index

1.0 General Information

2.0 General Air Pollution Control Manuals

3.0 Control Equipment
- 3.1 General Information
- 3.2 Theory
- 3.3 Design
- 3.4 Installation
- 3.5 Operation and Maintenance
- 3.6 Performance Optimization
- 3.7 Process Monitoring
- 3.8 Inspection
- 3.9 Compliance Monitoring
- 3.10 Energy Requirements
- 3.11 Cost
- 3.12 Miscellaneous

4.0 Industrial Applications
- 4.1 Selection of Control Techniques
- 4.2 Process Operating Conditions
- 4.3 Effluent Characteristics
- 4.4 Control System Design
- 4.5 Control System Installation
- 4.6 Control System Operation and Maintenance
- 4.7 Control System Performance Optimization
- 4.8 Monitoring
- 4.9 Control System Inspection
- 4.10 Control System Corrosion
- 4.11 Control System Cost

The first category includes materials covering a wide variety of subject areas and technical disciplines. It would be cumbersome to cross index all of the specific topics covered in these particular documents. Most of the items cited in Section 1.0 are published books which are available at technical libraries. Documents listed in Section 2.0 are also comprehensive in nature, however, these are devoted entirely to air pollution control technology.

Category three concerns specific types of air pollution control equipment. Materials in these articles and journals are generally oriented toward the characteristics of the equipment for one or more process applications. Due to the large number of entries in this category, it was subdivided into 12 groups.

3.1 General Information
3.2 Theory
3.3 Design
3.4 Installation
3.5 Operation and Maintenance
3.6 Performance Optimization
3.7 Process Monitoring
3.8 Inspection
3.9 Compliance Monitoring
3.10 Energy Requirements
3.11 Cost
3.12 Miscellaneous

These subheadings are self-explanatory. This grouping system was used so that, when a question is being researched, all the pertinent articles would be listed in the same area of the bibliography. In fact, a user can generally go directly to the appropriate sub-category and search article listings without prior check of subject or author indices.

The fourth category includes those articles specific to a particular industrial application. One or more different control techniques may be discussed in these articles. This category has also been subdivided into the groups indicated below.

4.1 Selection of Control Techniques
4.2 Process Operating Conditions
4.3 Effluent Characteristics
4.4 Control System Design
4.5 Control System Installation
4.6 Control System Operation and Maintenance
4.7 Control System Performance Optimization
4.8 Monitoring
4.9 Control System Inspection
4.10 Control System Corrosion
4.11 Control System Cost

In addition to the subject categorizations discussed above, each document has been given a unique number as shown in the left margin. This number is used to identify the article in the subject and author indices. For example, if a user is interested in design of absorption columns, five possible articles would be recommended: 2.0-13, 2.0-21, 2.0-22, 3.3-31, and 4.1-297. The first number specifies the category and the number after the dash lists the article identification number. The author index uses the same code.

A number of keyphrases have been specified under each listing to aid the user in evaluating the available information in the document. Highly specific keyphrases have been used to maximize usefulness in selecting articles. In certain cases the title is self-explanatory and the keyphrases are omitted.

SUBJECT INDEX

A

Absorption
- Equipment Design 2.0-13; 2.0-21; 2.0-22; 3.3-311, 4.1-297
- Fundamentals 2.0-13; 2.0-21
- General Information 2.0-14; 2.0-24; 2.0-28; 3.1-298
- Materials of Construction 2.0-16
- Operation and Maintenance 2.0-16
- Patent Summaries 2.0-16
- SO_2 Absorption (see SO_2 Control)

Activated Charcoal 1.0-5; 2.0-12, 3.1-64; 3.3-79

Adsorption
- Acrylic Odors 4.1-297
- Equipment Design 2.0-21; 2.0-22; 3.3-79
- Fundamentals 2.0-21; 3.1-64
- General Information 2.0-15; 2.0-16; 2.0-24; 2.0-28
- Materials of Construction 2.0-21
- Operation and Maintenance 2.0-21
- Patent Summaries 2.0-21

Aerosol Theory 2.0-22; 2.0-28; 3.1-57; 3.2-30

Alfalfa Dryers 4.3-301; 4.4-116

Aluminum Plants
- Primary 4.0-94
- Secondary 4.3-179; 4.4-157; 4.6-163

Ammonia
- NO_x Control 4.0-350
- Resistivity Modification 3.5-372; 4.4-210; 4.6-287

Asbestos Manufacturing 3.5-171; 4.1-155

Asphalt Plants 4.0-94; 4.1-189; 4.2-296; 4.6-97; 4.9-103

Asphalt Saturators 4.1-224

B

Baffle Chambers 1.0-4

Bagasse Fired Boilers 4.4-35

Beryllium Control 4.1-152

Boilers (see Industrial Boilers, Utility Boilers SO_2 Control, Electrostatic Precipitators, Fabric Filters, Scrubbers)

Borax Dust Control 4.6-389

Brass and Bronze 4.0-94

C

Carbon Baking 4.4-111

Carbon Monoxide
- Boilers 3.1-222
- Measurement 3.9-72

Catalytic Cracker 4.4-210; 4.6-285

Cascade Impactors
- Calibration 3.6-453; 3.9-460
- General Information 2.0-26; 3.5-76; 3.6-62; 3.9-460; 4.4-448; 4.6-462

Cement Industry 2.0-26; 3.1-124; 3.2-223; 3.3-128; 3.3-167; 3.4-53; 3.5-282; 3.6-446; 4.0-85; 4.0-94; 4.4-120; 4.5-272; 4.9-105

Centrifugal Collectors
- Bagasse Fired Boiler 4.4-359
- Collection Efficiency 3.2-375
- Design 2.0-22, 3.2-377; 3.12-343
- General Information 1.0-4; 1.0-2; 1.0-5; 2.0-24; 2.0-28; 3.1-63
- Operation and Maintenance 3.5-76; 4.1-338

Chain-of-Custody 1.0-11

Charcoal Reactors, Fluorine Control 4.1-310

Chemical Industry, ESP 4.0-85

Chemical Properties 1.0-10; 1.0-1

Clinker Cooler 3.3-167; 3.4-182

Coal Washing 4.11-499
Gasification 4.1-160
Liquidification 4.1-160
Low Sulfur 3.1-131; 3.5-226
Refuse Piles 4.0-94
Conversion 4.12-498

Coke Ovens 4.1-255; 4.1-300; 4.1-294; 4.4-113

Computers 1.1-6; 4.1-109; 4.1-382

Condensation 2.0-27; 3.5-129

Continuous Monitors 3.9-38; 3.9-69; 3.9-72; 3.9-73; 3.9-74

Control Efficiency Calculation Methods 3.1-240; 3.1-376; 3.9-198

Control Equipment
Cost 1.0-4; 2.0-28; 3.1-251
Design 1.0-12; 1.0-3; 2.0-24
General Information 3.0-29
Legal Requirements 1.0-6
Performance Testing 3.0-29
Sampling 1.0-4; 1.0-2
Selection 1.0-7; 2.0-19; 2.0-24; 3.1-279, 3.1-280; 3.1-298; 4.1-119; 4.1-274; 4.1-348; 4.1-355
Specifications 1.0-4; 1.0-2; 1.0-5

Copper Smelters, SO_2 Control 3.1-402; 3.5-421; 4.9-98

Cost Estimation 1.0-3

Cupolas 3.3-167; 3.5-129; 4.1-121; 4.1-338; 4.2-187; 4.6-122

D

Demisters
Design 3.12-367; 3.3-493
Emission Measurement 3.9-71
General Information 3.1-63; 3.2-252; 3.2-396; 3.3-394
Operation and Maintenance 3.3-83; 3.3-394; 4.4-365
Patent Summaries 2.0-18
Pressure Drop 3.2-43; 3.2-396; 3.3-83; 3.3-366
SO_2 Scrubbers 3.5-392
Theory 3.2-43; 3.2-252; 3.2-396; 3.3-83; 3.3-366
Types 3.2-396; 3.3-394; 3.5-392

Differential Pressure Indicators 1.0-9

Double Alkali Process 3.1-393

Dross Reprocessing 4.11-337

Dust Properties 3.1-44 (see also aerosol theory)

Dyeing and Finishing Works 4.1-220

E

Electric Arc Furnaces 3.3-167; 4.0-94; 4.4-137; 4.6-180; 4.6-423; 4.6-186; 4.7-139; 4.8-236

Electrostatic Precipitators
- Agglomeration 4.6-209
- Ammonia Injection 3.5-372; 4.4-210; 4.6-287; 3.5-283
- Ammonium Sulfate and Bisulfate Injection 3.5-372
- Applications 3.1-234; 3.1-235; 3.2-135; 3.5-31
- Ash Removal 3.3-132; 3.4-31; 3.5-35; 3.5-36; 4.4-290
- Aspect Ratio 4.4-95
- Bid Preparation and Evaluation 3.1-70; 3.1-211; 3.1-266; 3.3-245; 4.3-286
- Cement Industry Applications 3.5-282
- Charged Droplet Precipitation 3.1-201; 3.1-411; 3.1-444
- Collection Electrodes 3.5-36; 3.5-67; 3.6-204; 4.4-210; 4.6-93; 4.6-346; 4.6-287
- Corona 3.5-31; 3.6-403
- Corrosion 3.1-285; 3.5-31; 3.5-36; 3.12-49; 3.12-215; 3.12-238; 3.12-242; 4.6-276
- Cost 3.5-133; 3.5-282; 3.12-238; 4.6-208
- Design 2.0-22; 3.1-50; 3.1-54; 3.1-70; 3.1-211; 3.1-222; 3.1-234; 3.1-235; 3.1-243; 3.1-267; 3.1-285; 3.1-411; 3.2-225; 3.2-229; 3.2-260; 3.2-289; 3.2-291; 3.3-33; 3.3-55; 3.3-61; 3.3-126; 3.3-132; 3.3-218; 3.3-227; 3.3-237; 3.3-241; 3.3-245; 3.3-264; 3.3-292; 3.3-416; 3.3-414; 3.5-31; 3.5-413; 3.6-232; 3.12-49; 4.1-134; 4.4-91; 4.4-95; 4.4-120; 4.4-210; 4.4-212; 4.4-261; 4.4-278; 4.4-450; 4.6-96; 4.6-208; 4.6-263
- Deutsch-Anderson Equation 3.1-235; 3.2-56; 3.2-144; 3.2-197; 3.2-239; 3.3-61; 3.5-31; 4.1-217; 4.4-92
- Discharge Electrodes 3.3-288; 3.5-31; 3.5-35; 3.5-36; 3.5-67; 3.6-213; 4.4-212
- Electrical Characteristics 3.3-68; 3.3-264; 3.5-31; 3.5-283; 3.5-426; 3.6-125; 3.6-232; 3.6-441; 3.9-199
- Fabrication and Erection 3.5-36
- Fractional Efficiency Curves 3.2-223; 3.5-31; 4.1-217; 4.6-452; 4.6-462
- Fuel Characteristics Related to Performance 3.2-202; 3.3-55; 3.3-227; 3.3-417; 4.7-93
- Gas Flow Distribution 3.2-225; 3.2-233; 3.2-239; 3.2-260; 3.3-33; 3.3-68; 3.3-227; 3.3-241; 3.3-246; 3.5-31; 3.5-415; 3.6-125; 4.6-257
- General Information 1.0-4; 2.0-15; 2.0-28; 3.1-63; 3.5-31
- Guarantees 3.5-265
- High Temperature/High Pressure Application 3.2-303

Electrostatic Precipitators (continued)
History 3.3-68; 3.5-31
Hoppers 3.3-132; 3.5-31; 3.5-35; 3.5-36; 3.5-67; 4.4-91; 4.4-212
Hot Side Precipitation 3.1-222; 3.1-411; 3.2-268; 3.3-207; 3.3-237; 3.6-458; 4.4-347
Inspection 3.1-234; 3.5-31; 3.8-269
Instrumentation 3.5-66; 3.5-247; 3.5-31; 3.6-232; 3.9-38
Materials of Construction 3.3-241; 3.3-288; 3.5-31; 3.5-36; 3.12-215
Metallurgical Applications 3.5-426; 4.1-422; 3.5-421; 3.6-425
Model Studies 3.5-415; 4.4-278; 4.4-290
Odor Control Applications 2.0-12; 2.0-14
Operation and Maintenance 2.0-16; 3.1-50; 3.1-54; 3.1-70; 3.1-235; 3.1-285; 3.2-144; 3.2-223; 3.3-68; 3.3-214; 3.3-245; 3.3-246; 3.3-288; 3.5-31; 3.5-35; 3.5-36; 3.5-65; 3.5-66; 4.4-212; 4.6-276; 3.5-282; 3.5-426; 3.5-421; 3.5-415; 3.5-418; 3.5-412; 3.5-406; 3.6-441; 3.6-466; 3.6-458; 3.8-269; 3.9-199; 4.6-96; 4.6-122; 4.6-208; 4.6-209; 4.6-216; 4.6-249; 4.6-257; 4.6-270; 4.6-287; 4.6-346; 4.6-423; 4.6-459; 4.7-93; 3.3-423
Optimization 3.6-60; 3.6-125
Organic Aerosol Control Applicators 3.3-214
Ozone Generation 3.3-288
Performance Evaluation and Models 3.2-202; 3.2-225; 3.2-23; 3.2-233; 3.2-260; 3.6-403; 3.6-446
Performance Variability 3.1-205
Pilot Testing 3.12-21
Power Density 3.3-237; 3.5-31; 4.6-459
Power Requirements 3.1-235; 3.3-61; 3.5-31; 3.10-221; 4.4-95
Power Supply 3.3-68; 3.3-264; 3.3-414; 3.5-31; 3.6-232; 4.4-261
Radiation Charging 3.2-420
Rappers 3.3-284; 3.3-293; 3.5-31; 3.5-36; 3.5-67; 3.5-239; 3.6-213; 3.6-425; 3.6-440; 4.4-212; 4.6-216
Record Keeping 3.5-31; 3.5-247
Rectifiers 3.3-241; 3.3-264; 3.5-31
Redundancy 3.3-227
Reentrainment 3.1-141; 3.2-197; 3.2-225; 3.2-233; 3.3-246; 3.5-31; 3.6-425; 3.6-440
Reliability 3.1-211; 3.3-55; 3.3-227; 3.3-246; 3.5-31; 3.5-413; 4.6-249; 4.6-257
Resistivity 3.1-50; 3.1-313; 3.1-228; 3.1-411; 3.2-438; 3.3-61; 3.3-68; 3.3-207; 3.2-218; 3.3-219; 3.3-416; 3.3-417; 3.4-53; 3.5-31; 3.5-226; 3.5-265; 3.5-283; 3.5-418; 3.5-373; 3.5-372; 3.6-204; 3.6-403; 4.6-441; 3.6-458; 3.9-75; 4.4-347; 4.6-346; 4.7-93
Safety 3.3-214; 3.5-31; 3.12-140; 4.6-270
Saturation Charge 3.2-197; 3.5-71

Electrostatic Precipitators (continued)
Sectionalizaton 3.1-70; 3.1-211; 3.1-267; 3.1-279; 3.1-280; 3.3-245; 3.5-265; 4.4-143; 4.6-122
Silicon Controlled Rectifiers 3.2-289; 4.6-257
Snowing 4.6-263; 4.6-276
Specific Collection Areas 3.3-218; 3.3-237
Sulfur Trioxide Injection 3.5-418; 3.5-373; 3.6-204
Theory 3.1-50; 3.3-285; 3.2-225; 3.2-229; 3.2-231; 3.2-260; 3.2-291; 3.3-206; 3.5-31; 3.5-406; 3.6-403; 3.6-441; 4.7-349
Thyristors 3.3-264
Turbulence 3.2-291
Vortex Enhancement 3.1-144; 3.3-126
Wet Precipitators 3.1-235; 3.1-411; 3.1-442; 3.3-61; 4.1-422; 4.4-203; 4.4-450; 4.6-443

Energy Requirement for Air Pollution Control Devices 3.10-221; 3.10-502

F

Fabric Filters
Abrasiveness 4.3-164
Acid Gases 3.3-149; 4.4-157
Air-to-Cloth Ratio 3.1-78; 4.4-162; 3.3-172; 3.5-173; 3.5-185; 4.1-159; 4.1-390; 4.2-176; 4.4-137; 4.4-147; 4.4-154; 4.6-180
Antistatic Ratings 3.1-45
Applications 3.1-47; 3.1-58; 3.1-170; 3.3-410; 3.5-185; 4.2-176; 4.4-261
Asbestos Mining and Manufacturing 3.8-171
Boiler Flyash Control 2.0-26; 4.1-87; 4.1-390; 4.4-151; 4.4-155
Chromatographic Baghouses 4.1-177; 4.3-179; 4.4-157
Cleaning Techniques 3.1-44; 3.1-46; 3.1-169; 3.1-175; 3.3-168; 3.3-172; 3.3-188; 3.3-198; 3.3-410; 3.8-195; 4.1-88
Cleaning Energy Curves 4.4-89
Cost 3.1-41; 3.1-58; 3.1-169; 3.2-161; 3.3-181; 3.5-185; 3.5-404; 4.1-177; 4.6-186; 4.6-191
Cyclones as Precleaners 4.4-154
Design 2.0-22; 3.1-46; 3.1-58; 3.1-78; 3.1-175; 3.2-174; 3.3-148; 3.3-149; 3.3-162; 3.3-167; 3.3-172; 3.3-188; 3.3-193; 3.3-407; 3.5-158; 3.5-165; 3.5-404; 4.1-87; 3.6-409; 4.1-88; 4.1-134; 4.1-159; 4.1-177; 4.1-302; 4.1-390; 4.1-419; 4.4-89; 4.6-163
Dust Loading 3.2-174
Electric Air Applications 4.6-180
Electrostatic Charge Effects 3.1-45; 3.1-46; 3.1-444
Energy Requirements 3.10-221
Explosions 3.3-148

Fabric Filters (continued)
Fiber and Fabric Selection 3.1-37; 3.1-166; 3.3-128; 3.3-149; 3.3-188; 3.3-193; 3.3-410; 3.5-158; 3.5-189; 3.5-404; 4.0-87; 4.1-390; 4.3-164; 4.4-89; 4.4-154
Fiber and Fabric Properties 3.1-44; 3.1-45; 3.1-46; 3.1-47; 3.1-58; 3.3-193; 3.5-189; 4.3-164; 4.4-89
Fractional Efficiencies 3.1-41; 4.4-155
Gas Pretreatment 3.3-167; 4.1-88; 4.2-176; 4.4-154
General Information 1.0-4; 1.0-2; 1.0-5; 2.0-15; 2.0-24; 2.0-28; 3.1-37; 3.1-42; 3.1-63; 3.1-78; 3.3-128; 3.5-404
Grain Industry Applications 3.5-177
High Temperature Applications 3.1-46; 3.1-58; 3.7-194
Inspection Procedures 3.5-165; 3.8-195; 3.8-262
Instrumentation 3.9-38
Interface Phenomena 3.2-145
Moisture Effects 3.1-45; 3.3-149; 3.5-173; 4.3-164
Operation and Maintenance 2.0-16; 3.1-58; 3.1-166; 6.1-169; 3.1-170; 3.1-442; 3.3-168; 3.3-172; 3.3-188; 3.5-52; 3.5-76; 3.5-158; 3.5-165; 3.5-173; 3.5-185; 3.5-158; 3.6-60; 3.6-409; 3.6-405; 3.7-194; 3.8-262; 4.1-177; 4.1-302; 4.3-153; 4.4-130; 4.4-137; 4.4-147; 4.4-154; 4.6-183; 4.6-186; 4.6-191
Optimization 3.2-161; 3.6-60; 3.6-409
Performance Models 3.2-156; 3.2-196
Pressure Bahouses 3.1-175
Pressure Drop 3.2-156; 3.2-174; 3.3-172; 3.5-192; 4.6-183
Pulse Jets 3.1-47; 3.1-170; 3.6-60; 3.6-405
Reverse Air Baghouses 3.3-190
Reverse Jet Baghouses 3.3-168
Safety 3.3-148; 4.6-270
Selection 3.1-279; 3.1-280; 3.2-174
Shaker Bahouses 3.1-167; 3.8-195; 4.1-88
Theory 3.2-145; 3.5-192; 3.5-404
Troubleshooting 3.5-52

Fabrication of Control Equipment 1.0-3

Fair Selection 1.0-27; 3.12-335; 3.12-343

Ferroallogy Plants 4.1-88; 4.1-224; 4.3-497

Fertilizer Plants 4.0-94; 4.1-110

Fiber Filters 2.0-27; 3.1-444; 3.1-461

Fine Particulate Control
Electrostatic Augmentation for 3.1-444
Electrostatic Precipitators 3.1-228; 3.1-225; 3.1-442; 3.2-420; 3.3-61; 3.3-416; 3.3-417; 3.5-415; 3.5-418; 3.5-412; 3.5-413; 4.1-419
Fabric Filters 3.1-32; 3.1-41; 3.1-47; 4.3-161; 3.3-405; 3.3-407; 3.5-406; 3.5-404; 3.6-405
Fiber Filters 3.1-461
Foam Scrubbers 3.1-455
Glass Furnaces 4.4-114
Measurement of 3.7-62; 3.8-408; 3.8-400
Predicting Collection Efficiencies 3.1-248
Scrubbers 3.1-340; 3.2-39; 3.2-84; 3.2-296; 3.3-295; 3.3-391; 4.3-352
Thermal Agglomeration 3.2-443

Flowmeters 1.0-9

Fluoride Control 4.1-110

Fly Ash 3.2-438; 3.3-146; 3.3-218; 3.3-219; 3.3-416; 3.3-417; 3.5-192; 3.6-441; 3.6-446; 3.5-458; 4.3-286; 4.4-92; 4.4-95; 4.4-108

Foam Scrubbers 3.1-455

Foundries 4.1-142; 4.1-338; 4.1-348; 4.8-178

Fugitive Dust 4.1-160; 3.12-495

G

Galvanic Series of Metals 3.12-49

Gas Stream Temperature Control 1.0-271; 3.1-228; 4.1-134

Gases, Properties 1.0-1

Gasification 4.1-160; 4.1-361; 4.1-451; 4.1-439

Glass Manufacturing 4.1-177; 3.1-224; 4.4-114

Grain Industry 3.5-173; 4.1-224; 4.4-354

Graphic Arts Industry 4.1-305

Gravity Settling chambers 1.1-4; 3.1-63

Guarantees 3.1-257

H

Hogged Fuel Fired Boilers 4.1-307; 4.4-364

Hot Mix Asphalt Plant (see Asphalt Plants)

Hydrogen Peroxide for Odor Control 2.1-12

I

Incineration
- Carbon Baking Applications 4.4-111
- General Information 2.0-12; 2.0-15; 2.0-24; 3.1-63
- Industrial Boilers 4.1-136
- Metal Decorating Ovens 4.1-305; 4.4-112
- Odor Control 2.0-12; 2.0-14; 4.1-316

Indicators, Process 1.0-8

Industrial Boilers
- General Information 4.1-127; 4.1-244; 4.1-339; 4.1-345; 4.1-451; 4.3-136; 4.3-286; 4.4-138; 4.6-107
- Nitrogen Oxides Control 3.5-379; 4.6-107

Infrared Analyzers 3.9-72; 3.9-69

Inspection Reports 1.0-6; 2.0-20

J

K

Kraft Pulp Mills 2.0-26; 3.1-124; 4.0-85; 4.0-94; 4.1-224; 4.1-419; 4.4-91; 4.6-208; 4.6-216; 4.6-263; 4.6-276; 4.6-462; 4.7-139

L

Lead Smelters 4.9-98; 4.9_100

Legal Requirements 1.0-10

Level Indicators 1.0-8

Lime Kilns 4.2-176; 4.4-89

Linings for Scrubbers 3.12-77

Liquids, Properties 1.0-1

Liquidification 4.1-161; 4.1-451

M

Maintenance of Control Equipment
Cyclones 2.0-16; 3.12-343
Electrostatic Precipitators 2.0-16; 3.0-29; 3.0-50; 3.3-245; 3.3-246; 3.5-31; 3.5-36; 3.5-133; 3.5-413; 3.8-262; 3.8-269; 3.12-140; 3.12-215; 4.2-212; 4.6-96; 4.6-208; 4.6-249; 4.6-257
Fabric Filters 2.0-16; 3.0-29; 3.1-37; 3.1-166; 3.1-285; 3.3-172; 3.3-188; 3.5-165; 3.5-185; 3.5-247; 3.5-282; 2.8-262; 4.1-88; 4.2-153; 4.2-164; 4.6-180; 4.6-183; 4.6-186
Scrubbers 2.0-16; 3.0-29; 3.1-32; 3.5-387; 3.5-384; 3.5-386; 3.12-343

Material Balances 1.0-1

Mercury Air Pollution Control 4.1-299

Metal Decorating Ovens 4.1-305; 4.4-112

Metallurgical Furnaces 4.4-154

Mist Eliminators (see Demisters)

Molecular Sieves 4.1-454

Municipal Incinerators 4.0-85; 4.1-119; 4.6-281; 4.6-356

N

Nitrogen Oxides
Control 2.1-27; 4.0-350
Generation 2.0-27
Monitoring 3.9-69
Relationship to ESP Performance 3.1-124; 4.6-102

Noise 3.12-80

Nonferrous Smelters 3.5-421; 4.6-424; 4.9-98

Nuclear Radiation 3.1-444

O

Odor Control 2.0-26; 3.1-298; 3.3-81; 3.3-312; 4.1-316; 4.1-321; 4.1-322; 4.1-449; 4.4-354; 4.4-362; 4.5-253

Odor Panels 4.1-449

Oil
ESP Performance 3.1-131
Fabric Filters 3.3-146; 4.6-191
Hydrodesulfurization 4.1-439
Mag O_x SO_2 Control 3.5-401
Particulate Control 4.6-102

Opacity Monitoring 3.9-74; 3.9-457

Optimization 1.0-3; 4.7-139

Oxygen 3.9-72

Ozone
Odor Control 2.0-12; 2.0-14
Generation in ESP 3.3-288

P

Particle Size Measurement 3.8-400; 3.8-408; 3.9-74; 3.9-75

Particulate Mass Measurement 3.9-38; 3.9-74; 3.9-75

Patent Summaries, Control Equipment 2.0-17; 2.0-18

Performance Tests 3.0-29

Perlite Manufacturing 3.9-457

Petroleum Industry 4.0-85; 4.4-210; 4.6-258

Phosphoric Acid Plants 4.1-110

Physical Coal Cleaning 4.1-383; 4.1-457

Plastics Manufacturing 4.0-94

Potassium Permanganate, for Odor Control 2.0-12; 4.1-322; 4.4-362

Precipitators (see Electrostatic Precipitators)

Pressure Indicators 1.0-8; 1.0-9; 4.8-236

Pretreatment of Effluent Gas Streams 2.0-24

Prilling Towers 4.1-306

Pulp Mills (see Kraft Pulp Mills)

Q

Quality Control 3.1-251

R

Radiation Charging 3.2-420

Radiation Indicators 1.0-8

Rendering Plants 4.1-321; 4.1-322; 4.1-449

Resistivity (see Electrostatic Precipitators - Resistivity)

S

Sampling
- Chain-of-Custody 3.12-10
- Errors 3.9-374
- Source Sampling 2.0-26; 3.9-75; 3.7-496

Scrubbers
- Accessories 3.2-30; 3.3-250; 3.12-335
- Alfalfa Dryers 4.3-301
- Bagasse Fired Boilers 4.4-353
- Centrifugal Scrubbers 3.2-377
- Charged Particle Collection 3.2-39; 3.2-89
- Condensation Effects 3.2-304
- Corrosion 3.12-242; 3.12-254; 3.12-343; 3.12-367; 4.1-355; 4.10-352; 4.10-357
- Cost 3.3-34; 4.4-365
- Cross Flow Scrubbers 3.1-319
- Design 2.0-22; 3.2-30; 3.3-33; 3.3-34; 3.3-81; 3.3-312; 3.3-395; 3.5-388; 3.12-48; 3.12-342; 3.12-367; 4.1-110; 4.1-308; 4.1-355; 4.6-371
- Dynactor Scrubber 3.3-369
- Energy Requirements 3.10-221
- Entrainment Separators (see Demisters)
- Flux Force/Condensation Scrubber 3.2-427; 3.3-34; 3.3-368; 3.3-395; 4.1-449; 3.6-371
- Foam Bed Scrubbers 3.2-358; 3.3-341
- General 2.0-12; 2.0-24; 2.0-27; 2.0-28; 3.1-63; 3.3-128; 3.3-391
- Hogged Fuel Boilers 4.4-364
- Hydrosonic Process 4.3-353
- Instrumentation 3.9-38; 3.9-69
- Materials of Construction 3.2-30; 3.12-48; 3.12-77; 3.12-242; 3.12-343; 3.12-367; 4.1-355; 4.10-35: 4.10-357
- Operation and Maintenance 2.0-16; 3.1-340; 3.3-33; 3.5-76; 3.5-388; 3.12-267; 4.1-307; 4.1-308; 4.2-296; 4.6-371; 4.6-389
- Packed Towers 3.1-57; 3.3-312; 3.3-317; 4.1-449
- Performance Evaluation 3.1-370; 3.2-304
- Plumes 3.12-342
- Reheating 3.12-342
- Selection 3.1-279; 3.1-288; 3.1-370; 4.1-383; 4.2-276; 4.6-313; 4.10-352

Scrubbers (continued)
Spray Nozzles 3.3-250
Spray Scrubbers 3.1-57; 4.1-306
TCA 4.4-365; 4.6-448
Venturi Scrubbers 3.1-57; 3.1-318; 3.2-334; 3.2-39; 3.2-378; 3.2-456; 3.3-81; 3.3-315; 3.3-333; 3.3-363; 4.11-337

Sludge Incinerators 3.9-457; 4.9-106

Sulfur Dioxide Control
Cat O_x Process 3.5-388; 3.5-387
Chioyoda Throughbred 101 Process 3.5-387; 3.5-388; 4.1-439
Citrate Process 3.5-380
Corrosion 4.6-115; 4.10-86; 4.10-351
Double Alkali Process 3.1-393; 3.5-388; 3.5-397; 4.4-360
General 3.5-397; 4.1-439; 4.6-115
Lime/Limestone Processes 3.5-388; 3.5-384; 3.5-381; 3.5-387; 3.5-386; 3.5-382; 3.5-385; 3.5-397; 3.12-254; 4.1-339; 4.1-345; 4.1-439; 4.1-295; 4.4-360
Mag O_x Process 3.5-388; 3.5-387; 3.5-401; 4.4-360
Mist Eliminators 3.5-392
Monitoring 3.9-69; 3.9-72; 3.9-73; 4.8-399
Nonferrous Smelters 3.1-402; 4.4-360
Retrofit Applicators 4.4-117; 4.4-756
Secondary Zinc Applicators 4.1-389
Sludge Disposal 3.5-387; 3.5-384; 3.5-381; 3.5-382; 3.5-386; 3.5-397

Standards 3.0-29

Start-Up Procedures 3.0-29; 3.5-129; 3.7-194; 4.6-101; 4.6-163; 4.9-99; 4.9-100; 4.9-103; 4.9-104; 4.9-105; 4.9-106

Steel Industry
Basic Oxygen Furnaces 4.9-98
Electric Arc Furnaces 4.4-137; 4.6-180; 4.6-423; 4.6-186; 4.7-139; 4.8-236
Electrostatic Precipitators 3.2-135; 3.5-421; 4.4-278; 4.4-290
Fabric Filters 4.1-302
Inspection 4.9-98
Nitrogen Oxides 3.1-124
Open Hearth Furnaces 4.1-277; 4.4-123
Particulate Control 2.0-26; 4.0-85; 4.0-94
Scarfing 4.6-445
Sintering 4.2-153; 4.4-123; 4.4-130; 4.4-203; 4.4-450; 4.6-370

Stone Production 4.0-94

Sulfuric Acid Production 4.1-336; 4.1-454; 4.6-101; 4.6-452

Sulfur Recovery Plants 4.8-399

Surface Coating Operations 3.3-214; 4.1-224

T

Temperature Indicators 1.0-8; 1.1-9; 4.8-236

Textile Plants 3.3-214

Thermal Agglomeration 3.2-443

Toxicity Ratings 1.0-10

Tracer Techniques 3.9-71

Transmissometers 3.6-51; 3.9-457

Troubleshooting 2.0-16

U

Ultraviolet Analyzers 3.9-69; 3.9-73; 4.8-399; 4.9-104

Ultraviolet Light for Odor Control 2.0-14

Utilities
- Electrostatic Precipitators 3.2-223; 3.3-55; 3.6-446; 4.0-85; 4.0-94; 4.4-92; 4.4-95; 4.4-108; 4.6-96; 4.6-287; 4.6-346
- Fabric Filters 4.4-151
- NO_x Control 4.0-350
- Scrubbers for Particulate 4.4-365
- Stratification 4.8-428
- Transient Conditions 4.6-429

V

Vapors, Properties 1.0-1

Ventilation 1.0-10; 1.2-271; 4.1-150; 4.4-137; 4.7-139

Veneer Dryer Emissions 4.4-118

W

Wet Scrubbers (see Scrubbers)

Woodworking Plants 4.1-150

X

Y

Z

Zinc, Secondary 4.1-389

Zinc Smelters 4.9-89

AUTHOR INDEX

A

Adams, A. B., Jr. 3.12-48
Adams, R. L. 3.1-169; 3.3-407
Adolf, H. R. 4.1-322
Akhtor, S. 4.1-160
Alexeiff, P. W. 3.12-486
American Foundrymen's Society 4.1-348
American Industrial Hygiene Assoc. 2.0-28
Ananth, K. P. 3.2-443
Anastas, M. Y. 4.1-451
Anderson, C. E. 4.1-322
Anderson, D. P. 3.3-369
Ando, J. 4.1-439
Archer, S. R. 4.3-476
Archibold, J. J. 3.6-125
Arrandale, R. S. 4.4-114
Atiksune, K. 4.1-306
Atkins, R. S. 3.6-206; 4.1-339

B

Baesel, H. D. 3.12-487
Bagwell, F. A. 4.6-191
Baker, R. A. 4.2-471; 4.11-471; 4.1-471
Bakke, E. 3.6-60; 3.3-61; 3.1-235; 3.2-334; 3.6-405
Ballantyne 4.1-451
Bangel, E. R. 4.1-336
Banks, S. M. 3.5-426
Barbarika, H. 3.2-396; 3.3-394; 3.2-456; 3.2-473; 3.6-473; 3.2-500
Barker, J. L. 3.10-502
Barron, A. J., Jr. 4.4-138; 3.12-335
Barrett, D. F. 3.9-69
Barrett, A. A. 3.1-267
Bartok, W. 4.8-428
Beach, G. H. 4.4-151
Beizoie 3.3-81
Berby, R. H. 3.3-128
Bellegia, F. L. 4.4-360; 3.1-402
Bergman, L. 3.1-47; 3.3-410
Bernardin, F. E., Jr. 3.1-64
Bernstein, R. H. 4.1-127
Bertrand, R. R. 4.1-361
Beutner, H. P. 4.4-154
Bibbo, P. P. 3.5-65; 3.1-222
Bickelhaupt, R. E. 3.3-417; 3.2-438; 3.5-494
Big, S. A. 3.3-81
Billings, C. E. 3.1-58; 3.2-145; 3.5-185
Birks, L. S. 3.12-467
Blackwood, T. R. 4.3-476; 4.3-478
Blaszak, T. P. 4.1-159
Bloomfield, B. D. 4.1-338
Bohn, K. 4.3-472

Boll, R. H. 3.2-378
Bond, R. G. 2.0-19
Boothroyd, R. G. 3.3-190
Borgwordt, R. H. 3.5-192; 3.5-384
Bornstein, L. J. 3.5-385
Boshma, W. 4.5-253; 4.1-449
Boubel, L. J. 3.5-385
Bowerman, G. W. 3.3-148
Bradway, R. M. 4.4-155; 3.5-491
Brink, J. A., Jr. 4.1-299
Brooks, E. F. 4.8-437
Browne, L. M. 3.1-461
Budrow, W. F. 3.1-166
Bumb, R. L. 3.5-67
Bundy, R. P. 3.1-78; 4.1-87
Buonicore, A. J. 2.0-13; 3.2-375
Burbank, D. A. 3.5-392
Burton, C. L. 3.5-415
Burns, J. A. 3.5-401
Busby, H. G. 4.6-346

C

Cahill, T. A. 4.4-366; 4.6-448
Cahill, W. J., Jr. 3.2-268
Calvert. S. 3.2-30; 3.3-40; 3.2-43; 3.1-57; 3.3-83; 3.2-252; 3.1-318; 3.3-333; 4.4-365; 3.3-366; 4.6-371; 3.2-427; 3.2-398; 3.2-396; 3.3-394; 3.3-395; 3.2-473; 3.6-473; 3.2-490; 3.2-500
Calvin, E. L. 4.6-101; 4.6-452
Campbell, K. S. 4.4-101; 4.6-452
Carlisle, S. T. 3.3-368
Carpenter, B. H. 3.12-495
Carroll, G. C. 1.0-9
Cavanaugh, P. R. 3.7-496; 3.9-496
Celonza, G. J. 1.0-273
Chalekode, P. K. 4.3-476
Chapman, R. L. 4.8-399
Cherimisinoff, P. N. 2.0-12; 3.3-82; 3.3-172
Christman, R. C. 3.5-397
Choi, P. S. K. 4.1-451
Clark, D. G. 4.3-164
Coats, G. S. 3.6-51
Coe, El L., Jr. 3.1-124
Conkle, H. N. 3.3-493
Conover, R. E. 4.2-187
Cook, R. E. 4.7-90; 3.5-418
Cooper, J. 3.1-211
Cooperman, P. 3.2-144
Cote, W. A. 4.4-344
Cowherd, C., Jr. 4.3-301; 4.3-472
Cox, L. F. 4.6-191

Coys, D. W. 3.3-55; 3.3-227; 4.4-278; 4.4-290; 3.5-413
Crawford, A. R. 4.8-428
Creason, R. L. 4.8-399
Creason, S. C. 3.9-480; 3.12-480
Cross, F. L. 2.0-16; 4.6-309; 4.1-314
Crowe, C. T. 3.2-239
Culhane, F. R. 4.1-142
Cuscino, T., Jr. 4.3-472
Cushing, K. M. 3.9-75; 3.8-400

D

Darby, D. 4.1-119; 3.1-131
Darby, K. 3.8-269; 4.6-346
Davis, W. T. 2.0-26; 3.3-146; 3.2-174
Dealow, R. P. 4.6-270; 3.5-282
Dean, A. H. 3.1-447
Dennis, R. 3.1-44; 3.5-406
Devitt, T. 4.10-104; 4.10-106
Dickerson, R. C. 3.1-298
DiNovo, S. T. 3.3-493
Dismukes, E. B. 3.5-372; 3.5-373; 3.6-489
Dorsey, J. A. 3.9-38
Draemel, D. C. 3.1-59
Duling, O. E. 3.5-36
Duncan, J. R. 2.0-26
Duzy, A. F. 4.11-499
Euros, D. R. 4.4-483; 4.10-483
Dykema, O. W. 4.2-463

E

Earley, D. E. 4.3-478
Eckert, J. S. 3.3-312
Edger, W. D. 4.1-255; 4.1-300
Edwards, J. A. 4.1-109
Effenberger, H. K. 4.1-307
Ehrenfeld, J. R. 4.1-127
Elder, H. W. 3.5-388
Elliott, A. C. 4.4-123
Ellison, W. 4.7-139; 3.12-342
Engdahl, R. B. 4.11-352
Engelbrecht, H. L. 4.6-216
Engineering Sciences, Inc. 4.10-98; 4.10-99; 4.10-100
Ensor, D. S. 4.4-365; 4.6-448
Environmental Protection Agency (U. S.) 3.1-63; 4.1-152; 4.1-224
Epstein, M. 3.5-392
Epure, S. 4.4-137
Ewald, G. W. 3.3-193
Ewan, T. 4.3-353

F

Faure, F. 4.6-209
Feazel, C. E. 3.1-411; 3.5-421
Felix, C. E. 4.6-459; 4.6-462
Fernandes, J. H. 4.6-281
Fernandez, R. 4.4-359
Ferrari. L. 4.12-337
Fielk, K. J. 4.4-362
Fife, J. A. 4.6-356
Fiore, M. E. 4.1-314
First, M. W. 4.6-276; 4.1-297; 4.4-354; 3.6-492
Fjeld, R. H. 3.2-420
Flegal, C. A. 4.8-437
Florchini 4.4-365; 4.6-445
Formica, P. N. 1.0-6
Forsten, H. H. 3.3-149
Fox, E. B. 4.1-314
Francis, N. L. 3.2-233
Franconeri, P. 3.12-215
Franza, M. E. 4.4-157
Fraser. M. D. 3.2-156
Frauenfelder, A. 3.3-241
Fredrick. E. R. 3.1-45; 4.1-381; 4.1-390
Frenkel, D. I. 3.6-484
Frey, R. E. 3.1-42
Frezel, C. E. 3.1-228; 3.1-243
Friedrick, H. E. 4.6-276
Frisch, N. W. 3.3-55; 3.3-227; 3.5-413

G

Gabrielson, J. E. 4.2-470
Gadomski, R. R. 4.4-112
Gage, J. R. 4.4-89
Gandhi, S. 4.6-371; 3.3-395
Gardenier, H. E. 3.1-32
Gelfand, P. 3.12-140
Geminder, G. 4.2-153
Genton, R. G. 4.4-130
Gerstein, S. M. 4.4-157
Gerstle, R. 4.6-96; 4.3-497; 4.6-497
Gibbs, E. R. 4.4-120
Gibson, D. D. 3.6-492
Gilbert, U. 3.12-77
Goel, K. C. 3.3-363
Goldfield, J. 3.5-171
Goldshild, J. 3.2-30
Gooch, J. P. 4.1-225; 3.2-233; 3.5-412; 3.6-425; 3.6-402; 3.1-442; 4.6-459; 4.6-462; 3.6-488
Gooding, C. H. 4.4-360; 3.1-402; 3.6-458
Gottschlich, E. F. 3.1-50; 3.1-285
Govan, J. H. 4.4-354
Gradle, D. D. 4.1-307

Greco, J. 3.5-35; 4.4-212; 3.3-246; 4.6-257; 3.5-283; 4.6-287
Green, G. P. 4.7-93; 3.5-226
Greenberg, J. H. 4.2-187
Gregory, M. W. 4.8-399
Guffnell, G. W. 4.11-351
Guilloud 4.6-163

H

Hall, H. J. 3.12-49; 3.6-232; 3.3-292; 3.3-414
Hanf, E. B. 3.3-315; 4.1-355
Harman, D. L. 4.6-371; 3.2-396
Harper, H. E. 3.3-146
Harrington, R. E. 3.5-192; 3.2-196
Harris, D. B. 3.9-460
Harnett. C. N. 4.8-437
Harvey. R. N. 4.8-399
Harwick, D. M. 3.12-343
Harwood, C. F. 4.1-159
Head, H. N. 3.5-392
Heinsohn, R. J. 3.2-420
Helfritch, D. L. 4.4-151
Heller, F. 3.1-170
Hemsath, K. H. 4.4-111
Henderson, J. S. 4.6-202; 4.6-249
Henke, W. G. 4.4-389
Herring, W. O. 4.1-389
Hesketh, H. E. 2.0-16; 3.2-39
Hess, L. L. 3.3-219
Heyman, G. A. 4.8-399
Hicks, R. E. 3.5-189
High, M. D. 4.1-321
Himmelbraw, D. M. 1.2-1
Hissong, D. W. 4.1-454; 4.1-452
Hollands, K. G. T. 3.3-363
Hollenden, G. A. 3.5-388
Homolya, J. B. 3.9-73
Hopson, M. J. 4.4-147
Horie, E. C. 4.11-86
Horzella, T. I. 3.1-211
Howe, G. C. 4.2-296
Hoxie, E. C. 4.11-351; 3.12-482
Hubbard, R. F. 3.5-173
Hubbert, G. 3.3-33
Hudson, J. A. 4.4-212
Huff, J. H. 4.5-253; 4.1-449
Hughes, T. W. 4.3-464; 4.3-477
Hughson, R. V. 1.0-5
Hutchins, R. A. 3.3-74

I

Ifeadi, C. N. 3.5-386
Industrial Gas Cleaning Institute 3.5-265; 3.1-266
Inove, M. 3.3-181
Issacs, C. A. 4.1-43

J

Jaasund, S. A. 4.1-422
JACA Corp. 4.10-103
Jacks, R. B. 4.6-209
Jackson, B. S. 4.4-365; 4.6-448
Jackson, R. M. 4.4-210
Jahnig, C. E. 4.1-361
Jamison, A. E. 4.1-308
Javorsky. B. S. 3.3-341; 3.2-358
Jashnani, I. L. 3.2-43; 3.3-83; 3.2-252
Jhaveri, N. C. 3.3-40
Johansson, R. 4.1-121
Johnson, J. M. 3.3-368
Johnson, L. D. 3.9-71
Jones, A. H. 3.5-129
Jones, D. G. 3.3-368
Jones, J. W. 3.5-385
Jones, P. W. 3.12-466

K

Kahane, R. 3.2-202
Kaplan, N. 3.1-393
Katz, J. 3.12-49; 3.2-135
Kelley, G. W. 3.3-146
Kelly, W. J. 3.5-501
Kennedy, E. D. 4.1-299; 4.4-483; 4.10-483
Kesselring, K. 4.6-102
Klipstein, D. H. 3.6-204
Klodt, D. T. 3.12-242
Kockler, G. 3.5-401
Kodras, F. D. 4.6-101; 4.6-452
Kohn, H. 3.7-194
Kolpin, M. A. 4.8-437
Kopita, R. 3.1-340
Koppang, R. R. 3.1-201
Koschang, E. M. 3.3-284
Kosvic, T. C. 4.2-470
Krause, H. H. 3.5-379
Kreith, F. 4.1-295
Krockta, H. 3.1-320
Kulujian, N. J. 4.10-104; 4.10-105; 4.10-106

L

Lacey, G. E. 3.8-400
Lafreniere, A. J. 4.4-123
Lagarias, A. J. 3.3-288
Lake, C. 4.4-365; 4.6-448; 3.6-453
LaMantia, C. R. 4.1-336
Lamb, A. N. 3.1-205
Lancaster, B. W. 3.2-303; 3.2-304
Landers, W. S. 4.7-93
Landis, D. E. 3.12-487
Langsjoen. P. L. 4.2-470
Lee, K. 4.6-102
Lehmann, L. D. 4.1-316
Leith, D. 3.2-30; 3.2-377; 3.6-492
Lemon, E. D. 4.6-389
Leung, J. 3.3-366; 3.2-398
Levine, S. H. 3.2-420
Lewandowski, G. A. 3.3-485
Lieberstein, M. 3.6-213
Light, W. 3.2-377
Linero, A. A. 4.2-471; 4.11-471; 4.1-471
Lipscomb 3.1-41
Locklin, D. W. 3.5-379
Loch, T. 4.4-465
Lord, H. C., III. 3.9-475
Lou, S. C. 3.12-30
Lowry, W. P. 2.0-23
Lucas, R. L. 3.5-158; 3.1-320
Luciana, D. J. 4.8-437
Lund, H. F. 3.0-29
Lundgren, D. A. 4.1-316; 3.1-318

M

Ma, J. L. 3.1-124
Maddox, K. 3.0-30
Malamud, G. W. 3.2-420
Mandersloot, G. B. 3.5-189
Manny, E. H. 4.8-428
Marchant, G. H., Jr. 4.6-459; 4.6-462
Marinak, P. P. 4.8-236
Marino, J. 3.9-199
Mark, R. M. 3.12-342
Mashat, S. 3.2-289
Mathews, J. C. 4.4-360; 3.1-402
Matts, S. 3.3-416
McCain, J. 3.9-75; 3.2-223; 3.5-412; 3.8-400; 3.8-408; 3.6-441
3.6-458
McDonald, J. R. 3.2-225; 3.5-426; 4.6424
McElroy, M. W. 4.6-107
McKenna, J. D. 3.1-41; 4.1-339
McKibbon, J. H. 4.4-143
McKnight 4.6-429

McLeod, J. 4.12-337
Mehta, D. S. 3.1-318
Melcher, J. R. 3.2-84
Mequire, K. U. 1.0-271
Mercando, A. 3.2-231
Mezqr, M. R. 4.1-422
Michels, H. T. 3.12-482
Mills, J. 3.12-200
Mitsch. G. L. 4.6-122
Monahan, G. M. 3.2-473; 3.6-473
Mullen, T. C. 4.1-300
Muller, J. M. 4.1-255
Mumford, R. G. 4.1-314
Murthy, B. N. 3.1-298
Murthry, K. S. 4.11-342
Mutchler, J. 4.4-465
Mycock, J. C. 3.1-41

N

Nadar, J. S. 3.9-74
Nanner, L. W. 4.1-295
National Asphalt Paving Asson. 4.6-96
Netzer, W. D. 4.1-310
Newton, L. R. 4.4-359
Nichols, G. B. 3.5-31; 4.0-85; 3.2-197; 3.2-273; 3.6-402; 3.6-446
Nicklin, G. T. 4.6-313
Nilan, R. E. 4.4-365; 4.6-448
Noll, K. E. 2.0-26; 4.0-94; 3.3-146; 3.2-174
Nonhebell, G. 2.0-21
Norman, J. 3.12-11

O

O'Connell, W. L. 1.1-7
Offen, G. R. 4.6-102
Oglesby, S., Jr. 3.5-31; 3.3-34; 4.0-85; 3.2-147; 3.2-225; 3.1-243
Oliver, E. D. 4.1-345
Olsen, R. W. 4.4-278
Osborne, M. 3.9-374

P

Palumbo, R. R. 3.3-317
Parder 3.5-387; 3.5-397
Pardini, J. 3.2-260
Parker, R. 3.3-391; 3.6-453
Parks, T. R. 4.1-127
Paul, J. E. 4.4-91; 4.4-419
Paulson, C. A. 3.2-202; 3.3-206; 4.7-349
Payton, R. N. 4.1-88
Pazar, C. 2.0-18

Peacos, M. M. 3.5-65; 3.1-222
Pearson, W. R. 4.8-399
Peacy, J. 3.3-207
PEDCo Environmental, Inc. 4.4-113; 4.1-383
Pengidore, D. A. 4.2-294
Penney, G. W. 3.2-56; 3.5-283
Peters, J. A. 4.3-476
Peters, J. M. 3.1-248
Peters, M. S. 1.0-3
Pfoutz, B. D. 3.12-238
Phillips, J. N. 4.1-220
Phillips, R. 4.1-336
Pinheirs, G. 4.4-261
Pilat, M. 3.7-62
Pinlle, W. 3.6-425
Pirsh. E. A. 4.6-191
Plyler, E. L. 3.5-387
Poe, G. 4.6-102
Potter, E. C. 3.2-202; 3.3-206
Princiotta, F. T. 3.5-388; 3.5-381
Pring. R. T. 4.1-134; 3.1-175
Pulle, W. 3.5-66
Puri, R. 4.1-150; 3.6-481
Putnam, A. A. 3.5-379; 4.1-451

Q

Quillman, B. 4.1-244
Quinby, A. H. 4.4-354
Quinlan, J. 3.2-231

R

Radian Corp. 4.4-117
Radway, J. E. 4.3-474
Ramsdell, R. G., Jr. 4.4-92; 3.2-229; 3.3-230; 3.2-268
Ramsden, A. R. 4.7-349
Ramsey, G. H. 3.1-445
Read, G. W., Jr. 3.12-485
Reed, W. C. 4.4-155
Rees, L. W. 4.1-316
Reese, J. T. 3.5-283; 4.6-287
Rei, M. T. 3.1-444
Reid, D. L. 3.1-461
Reigel, S. A. 3.1-78; 4.1-87
Reiter, S. H. 3.2-334
Reynolds, J. 3.9-199; 3.2-231
Rhodes, T. J. 1.0-9
Richards, C. L. 4.2-498; 4.4-998; 4.6-498
Rigo, H. G. 3.10-221
Roberson, J. 4.6-208; 4.6-249
Robinson, J. W. 3.2-196; 4.4-364
Robinson, N. 3.2-291

Rosenberg, H. S. 3.5-386; 3.3-493
Ross, R. D. 2.0-24
Rossi. R. C. 3.5-385; 3.5-382
Rossnagel, W. B. 3.3-214; 3.1-251
Rossoff, J. 3.5-385; 3.5-382
Rounds, G. L. 4.2-153
Rullnum, D. H. 3.5-52; 3.3-167

S

Sableski, J. J. 4.4-344
Sachan, K. S. 3.2-84
Sakol, S. L. 4.11-351
Salems, A. A. 4.3-275
Sallie, E. D. 4.1-305
Sargent, G. D. 1.0-4
Sax, H. J. 1.0-10
Schiller, M. 3.5-247
Schelteman, H. 4.12-337
Schneider, G. G. 3.1-211
Schilling, W. 4.4-354
Schroeck, V. E. 3.1-37
Schubert, H. V. 4.6-180
Schummer, H. 3.3-264
Schwartz, L. B. 3.6-213
Schwartz, R. A. 4.11-357
Schweizer, R. G. 4.6-115
Sckwap, M. J. 3.3-168
Seale, L. M. 3.2-161; 3.5-505
Selle, S. J. 3.3-219
Serth, R. W. 4.3-464; 4.3-477
Shannon, L. J. 3.2-443
Shelton, S. P. 3.2-174
Sheppard, S. V. 3.1-319
Sheppard, W. L., Jr. 3.12-479; 4.10-479
Shore, D. E. 4.6-107
Siebert, P. 4.1-159
Simon, H. 4.1-217
Sittig, M. 2.0-17
Small, J. R. 3.9-69
Smith, D. A. 3.5-415
Smith, E. M. 3.5-158; 3.8-262
Smith, K. D. 4.4-116; 4.3-301
Smith, K. J. C. 4.3-468
Smith, M. C. 4.3-275
Smith, W. B. 3.9-75; 3.5-412; 3.8-400; 3.7-496; 3.9-496
Smith, W. M. 4.4-278; 4.4-290
Snow, R. H. 4.1-449; 4.5-233
Soisson, H. E. 1.1-8
Sommerer, 3.6-458
Sondreal, E. A. 3.3-219

Spaite, P. W. 3.5-192; 3.8-195; 3.2-196
Sparks, L. E. 4.6-371; 3.2-396; 3.3-394; 3.5-426; 3.12-469; 4.6-424; 3.6-488; 3.2-500
Spencer, H. W., III 3.6-440; 3.6-441
Sproull, W. T. 3.5-259
Squires, B. J. 4.1-302
Squires, R. 4.6-209
Stairmund, C. J. 3.1-279
Stastny, E. P. 3.3-245; 4.3-286
Statnich. R. M. 3.9-71
Staub. C. P. 2.0-71
Stein, A. 1.0-6
Steinbauer, W. 3.3-264
Steiner, B. A. 4.6-370
Stern, A. C. 1.0-2; 2.0-23
Stern, R. D. 3.5-397
Stewart, L. L. 3.12-238
Stock, D. E. 3.2-239
Stone, R. C. 3.3-218
Strauss, W. 2.0-22; 2.0-27; 4.1-277; 3.2-303
Strup, P. E. 3.12-466
Stukel, J. J. 3.10-221
Summer, W. 2.0-14
Sundberg, R. E. 3.1-376
Suprenant, N. F. 4.4-155
Suydam, C. D., Jr. 4.11-499
Szabo, M. 4.6-96; 4.3-497; 4.6-497

T

Tackett, K. M. 4.3-478
Taheri, M. 3.3-81
Takoe, T. 4.1-306
Tassicker, O. J. 3.6-488
Tate, R. W. 3.3-250
Tearle, K. A. 4.3-136
Teixeiru, D. P. 4.0-350
Teller, A. J. 4.1-110; 4.1-177
Thekdi, A. C. 4.4-111
Theodore, L. 2.0-13; 3.9-198; 3.9-199; 3.2-321; 3.2-260; 3.2-375
Thom, N. G. 4.2-296
Thomas, T. J. 4.1-451
Thompson, R. J. 4.6-370
Tice, A. E. 3.12-254
Tierney, D. R. 4.3-477
Tomaides, M. 3.9-457
Tomany, J. P. 2.0-15; 4.1-274; 4.1-307
Tretter, N. J., Jr. 4.4-118
Truebold, R. C. 3.3-218
Truebold, R. C. 3.3-218
Tuffmandl, G. W. 4.11-86
Turner, J. H. 3.1-46; 3.6-409

V

Vander Lyn, A. 4.5-272
Van De Wouver, R. 3.4-182
Varga, J., Jr. 4.4-203; 4.4-450; 4.6-445
Vatavuk, W. M. 3.9-198; 3.1-240
Vecchio, J. 4.4-465
Venturini, J. L. 4.6-186
Velzy, C. O. 4.4-367
Vincent, J. H. 3.3-126; 3.1-141

W

Wagner, A. J. 4.8-178
Walker, A. B. 3.3-237; 3.1-280
Walker, B. L. 4.8-236
Wallan, D. V. 4.6-448
Walling, J. C. 4.6-183; 4.1-184; 3.3-188
Wallon, D. V. 4.4-365
Walton, P. J. 3.3-190
Walsh, G. W. 3.8-195
Wang, S. C. 3.5-392
Warren, R. P. 4.6-276
Watkins, E. R. 3.8-269
Weant, G. E., III 3.1-402; 3.12-495
Weir, A., Jr. 3.3-368
Weisbud, J. 2.0-20
West, R. E. 4.1-295
Westfield, J. D. 3.10-502
Wheeler, D. 4.4-278
White, H. J. 3.4-53; 3.1-54; 3.3-68; 4.4-95; 4.4-108; 3.1-234
Whitehead, C. 4.1-119; 3.1-131; 4.6-346; 4.6-423
Whitlock, R. G. 3.5-165
Wilcock, D. 3.10-502
Wilder, J. E. 3.1-58; 3.5-185
Wilkinson, J. E. 3.12-466
Williams, R. L. 4.8-437
Williamson, J. E. 4.1-217
Wilson, R. R. 3.7-496; 3.9-496
Windelman, F. W. 3.3-132
Wohlers, H. C. 2.0-23
Wolf, D. C. 3.7-72
Wright, R. A. 4.6-122
Wynot, W. A. 4.6-257

Y

Yavorsky, P. M. 4.1-160
Young, D. G. 3.3-218
Young, R. A. 2.0-12; 3.3-82
Yung, S. 3.2-43; 3.3-366; 3.2-427; 3.2-398; 3.2-396; 3.3-394;
3.2-456; 3.2-500

Z

Zarfoss, J. R. 4.6-263
Zenz, F. A. 3.3-311

1.0

GENERAL INFORMATION

2. Stern, A. C. Air Pollution. 2nd ed. Vol. I, II, III, (Part VII), Academic Press, 1968.

4. Sargent, G. D. Dust Collection Equipment. Chem. Eng. January 27, 1969.
   Keyphrases: gravity settling, baffle chambers, cyclones, scrubbers, fabric filters, precipitators, collector specifications, sampling, costs.

5. Hughson, R. V. Controlling Air Pollution. Chem. Eng. August 29, 1966. pp. 1-20.
   Keyphrases: specifications, efficiency, mechanical collectors, fabric filters, precipitators, demisters, activated charcoal, stacks.

6. Stein, A. Guide to Engineering Permit Processing, EPA No. APTD-1164, July 1972. p. 400.
   Keyphrases: legal requirements, inspection reports, use of computers for engineering calculations, examples of problems.

7. O'Connell, W. L. How to Attack Air Pollution Control Problems. Chem. Eng. 83, (22):97-106, October 1976.
   Keyphrases: selecting a system, general control techniques.

8. Soisson, H. E. Instrumentation in Industry. Wiley Intersciences, 1975.
   Keyphrases: pressure, temperature, level indicators, automatic control, radiation estimate.

9. Rhodes, T. J. Industrial Instruments for Measurement and Control. Revised by G. C. Carroll. 2nd ed. McGraw Hill, 1977.
   Keyphrases: pressure, differential pressure, temperature, flowmeters, automatic control.

10. Sax, H. J. Dangerous Properties of Industrial Materials. 3rd ed. Van Nostrand Reinhold Company, 1968.
    Keyphrases: ventilation, air pollution control.

273. Celenza, G. J. Designing Air Pollution Control Systems. Presented at the Air Pollution Seminar, Harrisburg, Pa., March 24, 1970.
     Keyphrases: key factors, sample project scheme.

1. Himmelbrau, D. M. Basic Principles and Calculations in Chemical Engineering. Prentice Hall, Inc., 1962. p. 400.
Keyphrases: material balances, energy balances, properties of gases, vapors, liquids and solids.

3. Peters, M. S. Plant Design and Economics for Chemical Engineers. McGraw-Hill, 1958. p. 500.
Keyphrases: general design considerations, optimal design, cost estimation, equipment design and fabrication.

271. Meguire, K. U. Equipment for Air Quality Control. Pacer. 1 (5): 15-39, 1970.
Keyphrases: ventilation system design, gas temperature control, fan selection.

2.0

GENERAL AIR POLLUTION CONTROL MANUALS

12. Cheremisinoff, P. N., and R. A. Young, (editors). Industrial Odor Technology Assessment. Ann Arbor Science Publishers, 1975.
    Keyphrases: incineration, wet scrubbing, activated carbon, precipitators, ozone, hydrogen peroxide, potassium permanganate, case histories.

13. Buonicore, A. J., and L. Theodore. Industrial Control Equipment for Gaseous Pollutants. CRC Press, 1975. Vol. I.
    Keyphrases: absorption fundamentals, absorption equipment design, adsorption, adsorption equipment design.

14. Summer, W. Methods of Air Deodorization. Elsevier Publishing, 1963.
    Keyphrases: absorption, wet scrubbers, precipitators, incineration, ozonization, UV irradiation.

15. Tomany, J. P. Air Pollution: The Emissions, The Regulations and The Control. American Elsevier, 1975.
    Keyphrases: sampling, mechanics, scrubbers, fabric filters, incineration, adsorption, example problems.

16. Cross, F. L., Jr., and H. E. Hesketh. Handbook for the Operation and Maintenance of Air Pollution Control Equipment. Technomic Publishing, Inc., 1975. p. 280.
    Keyphrases: scrubbers, electrostatic precipitators, fabric filters, absorption, adsorption, incineration, troubleshooting, maintenance, fan selection.

17. Sittig, M. Air Pollution Control Processes and Equipment. Noyes Development Company Publication.
    Keyphrases: patent summaries.

18. Pazar, C. Air and Gas Cleanup Equipment. Noyes Data Corporation, 1970.
    Keyphrases: adsorption, absorption, stripping, demisters.

19. Bond. R. G., and C. P. Staub (editors). Handbook of Environmental Control. Air Pollution. CRC Press. Vol. I.
Keyphrases: emission sources, control techniques.

20. Weisbud, J. Field Operations and Enforcement Manual for Air Pollution Control. EPA No. APTD-1101, August 1977.
Keyphrases: process descriptions, control methods, inspection.

21. Nonhebel, G. Gas Purification Processes. George Newness L.J.D., 1964.
Keyphrases: absorption, adsorption, theory, design, materials of construction.

22. Strauss, W. Industrial Gas Cleaning. Pergamon Press, 1966.
Keyphrases: design data requirements, absorption, adsorption, combustion, aerosol physics, centrifugal collectors, fabric filters, scrubbers, precipitators.

23. Stern, A., H. C. Wohlers, R. W. Boubel, and W. P. Lowry. Fundamentals of Air Pollution. Academic Press, 1973. pp. 385-425.
Keyphrases: source sampling, process change, fuel changes.

24. Ross, R. D. Air Pollution and Industry. Van Nostrand Reinhold Company, 1972. pp. 230-479.
Keyphrases: data collection, design criteria, pretreament of exhaust, selecting systems, optimization of control systems, mechanical collectors, cyclones, fabric filters, scrubbers, precipitators, absorption, adsorption, incinerator.

26. Noll, K. E., W. T. Davis, and J. R. Duncan, (editors). Air Pollution Control and Industrial Energy Production. Ann Arbor Science Publishers, Inc., 1975.
Keyphrases: source sampling, cascade impactors, steel industry particulate control, pulp industry precipitators, cement industry, fabric filters for boilers, odor control, high efficiency precipitators.

27. Strauss, W., (editor) Air Pollution Control. Wiley Intersciences, 1971. p. 500.
Keyphrases: NO_x generation and control, SO_2 control precipitator, fiber filters, condensation, scrubbers.

28. American Industrial Hygiene Assoc. Air Pollution Manual: Part II-Control Equipment. Petrol, Michigan, 1968.
Keyphrases: aerosol properties, process factors, mechanicals, filtration, scrubbers, precitators, adsorption, absorption, incineration, performance, cost.

3.1

CONTROL EQUIPMENT - GENERAL INFORMATION

32. Gardenier, H. E. A Manufacturer's View of Scrubber Collectors. Presented at Specialty Conference on Design, Operation, and Maintenance of High Efficiency Particulate Control Equipment, St. Louis, March 29-30, 1973.
Keyphrases: types of scrubbers, submicron, particulate.

37. Schroeck, V. E. Fabric Filter - The Heart of the System. Presented at Specialty Conference on Design, Operation, and Maintenance of High Efficiency Particulate Control Equipment, St. Louis, March 29-30, 1973.
Keyphrases: types of fibers, properties, general selection criteria.

41. McKenna, J. D., J. C., Mycock, and W. O. Lipscomb. Performance and Cost Comparisons Between Fabric Filters and Alternate Particulate Control Techniques. JAPCA 24 (12):1144-1148, December 1974.
Keyphrases: fine particulate, efficiency related to particle size, cost related to efficiency, electrostatic precipitators, venturi scrubbers.

42. Frey, R. E. Types of Fabric Filter Installations. JAPCA 24, (12):1148-1150, December 1974.
Keyphrases: evaluation of systems.

44. Dennis, R. Collection Efficiency as a Function of Particle Size, Shape, and Density: Theory and Experience. JAPCA 24, (12):1156-1163, December 1974.
Keyphrases: dust properties, filter properties, filter cleaning.

45. Fredrick, R. R. Some Effects of Electrostatic Charges in Fabric Filtration. JAPCA 24, (12):1164-1168, December 1974.
Keyphrases: properties of fabrics, agglomeration, antistatic ratings, moisture effects, artificial charging, case histories.

46. Turner, J. H. Extending Fabric Filter Capabilities. JAPCA 24, (12):1182-1187, December 1974.
Keyphrases: fabric filter development trends, high temperature processes, chemical resistance, electrostatics, cleaning.

47. Bergman, L. New Fabrics and their Potential Application. JAPCA 24, (12):1187-1192, December 1974.
Keyphrases: submicron particulate, surface modifications, pulse jet filters, neddled fabrics, industrial summaries.

50. Gottschlich, E. F. Electrostatic Precipitators. American Petroleum Institute, New York, 1961. p. 40.
Keyphrases: theory, collection efficiency, dust resistivity, gas distribution, operating problems, maintenance, design, glossary.

54. White, H. J. Role of Electrostatic Precipitators in Particulate Control: A Retrospective and Prospective View. JAPCA 25, (2):102-107, February 1975.
Keyphrases: growth, design concepts, ranges of basic design parameters for fly ash control, operating problems, high resistivity.

57. Calvert, S. Scrubber Performance for Particle Collection. Proceedings of the Symposium on Control of Fine Particulate Emissions from Industrial Sources. January 15-18, 1974. pp. 193-212.
Keyphrases: unit mechanisms, basic concepts of penetration, spray chambers, venturi, packed columns.

58. Billings, C. E., and J. E. Wilder. Major Applicators of Fabric Filters and Associated Problems. Proceedings of the Symposium on Control of Fine Particulate Emissions from Industrial Sources. January 15-18, 1974. pp. 329-372.
Keyphrases: fabric filter survey results, manufacturers engineering parameter, design parameter for various industries, costs, operating problems.

59. Draemel, D. C. The State of the Art of High Temperature Filtration and Current Technology Developments. Proceedings of the Symposium on Control of Fine Particulate Emissions from Industrial Sources. January 15-18, 1974. pp. 425-452.
Keyphrases: glass fibers, mineral fibers, aluminum silicate, boron nitride, teflon, organic fibers, nomex, metal fibers.

63. Control Techniques for Particulate Air Pollutants. EPA No. AP-51, January 1969.
Keyphrases: settling chambers, centrifugal collectors, scrubbers, demisters, precipitators, fabric filter, incinerators, cost.

64. Bernardin, F. E., Jr. Selecting and Specifying Activated-Carbon-Adsorption Systems. Chem. Eng. 83, (22):77-82, October 18, 1976.
Keyphrases: adsorption isotherms, adsorbers, pilot tests.

70. Information Required for the Selection and Application of Electrostatic Precipitators for the Collection of Dry Particulate Material. JAPCA 25, (4):362-368, April 1975.
Keyphrases: definitions, ESP arrangement, operation. process variables, specifications, bibliography, bid preparation.

78. Reigel, S. A., R. P. Bundy, and C. D. Doyle. Baghouses - What to Know Before You Buy. Pollution Engineering. May 1973. pp. 32-34.
Keyphrases: air-to-cloth ratio.

124. Coe, E. L., Jr., and J. L. Ma. Electrostatic Precipitation and Nitrogen Oxides in Flue Gases. Presented at the Air Pollution Control Association Meeting. Miami, June 18-22, 1972. Paper 72-106. p. 28.
Keyphrases: power, steel, cement, kraft pulp mills.

131. Darby, K., and C. Whitehead. The Performance of Electrostatic Precipitators in Relation to Low Sulfur Fuels. Proceedings: International Union of Air Pollution Prevention Assoc., Washington, 1970. pp. 911-922.
Keyphrases: coal fired boilers, oil fired boilers, conditioning, precipitator operation.

141. Vincent, J. H. Electrostatic Precipitation of Airborne Charged Dust Particles Trapped in Stationary or Quasi-stationary Vortices. Atmos. Environ. 5, (9):791-799, 1971.
Keyphrases: vortex enhancement, reentrainment.

166. Budrow, W. F. Filtration Fabrics Ability to Perform. Proceedings: Spec. Conf. User Fabric Filter. Equip. Buffalo, October 14-16, 1973. pp. 113-121.
Keyphrases: fabric selection, maintenance.

169. Adams, R. L. Shaker Type Baghouses. Proceedings: Spec. Conf. User Fabric Filter. Equip. Buffalo, October 14-16, 1973. pp. 49-53.
Keyphrases: operation description, shaker mechanisms, advantages, cost.

170. Heller, F. Baghouse Dust Collectors - Pulse Jet Cleaning. Proceedings: Spec. Conf. User Fabric Filter. Equip., Buffalo, October 14-16, 1973. pp. 38-41.
Keyphrases: operation description, applications, advantages, disadvantages.

175. Pring, R. T. Specification Considerations for Fabric Collectors. Pollution Engineering. 4, (9):22-24, December 1972.
Keyphrases: filter bag design factors, pressure baghouses, fabrics cleaning.

201. Koppang, R. R. Pollution Control Equipment and Technology, Broader Availability of Electrostatic Precipitators: A New Hybrid EP Concept, the TRW Charged Droplet Scrubber. Presented at the International Pollution Engineering Congress, Ohio, October 20-23, 1975.
Keyphrases: operating principles, advantages, cost.

205. Lamb, A. N. Variations in the Performance of Electrostatic Precipitators Collectoing Fly Ash from Large Boilers. Proceedings of the Clean Air Society of Australia and New Zealand, February 17-21, 1975. pp. 176-198.
Keyphrases: emission variations, ESP conditions.

211. Schneider, G. G., T. I. Horzella, J. Cooper, and P. J. Striegl. Selecting and Specifying Electrostatic Precipitators. Chemical Engineering 82, (11):94-108, May 26, 1975.
Keyphrases: design concepts, bid preparation.

222. Bibbo, P. P. and M. M. Peacos. Use Hot-side Precipitator with CO Boiler Waste Heat Recovery. Hydrocarbon Process, 1975:149-150, September 1975.
Keyphrases: collecting area requirements, reliability, collection efficiency.

228. Feazel, C. E. (editor). Symposium on Electrostatic Precipitators for the Control of Fine Particles. EPA-650/2-75-016, January 1975.
Keyphrases: resistivity, gas conditioning.

234. White, H. J. Electrostatic Precipitators - Major Fields of Application, Technology, and Problem Areas. US-USSR Working Group, Stationary Source Air Pollution Control Technology, Control Fine-part, Emis. Inc. Sources Symposium. Proc., San Francisco, 1974. pp. 55-78.
Keyphrases: design trends, inspecting problems.

235. Bakke, E. The Application of Wet Electrostatic Precipitators for Solid Particulates, Organic Condensables, and Gaseous Emission Control. Environmental Engineering Science Conference Annual Meeting, Louisville, March 4-5, 1974. pp. 275-294.
Keyphrases: operation, design, applications, power requirements, Deutsch-Anderson equation, particle size.

240. Vatavuk, W. M. A Technique for Calculating Overall Efficiencies of Particulate Control Devices. EPA-450/2-73-002, August 1973. p. 22.
Keyphrases: mathematicl techniques, single and multiple control system.

243. Feazel, C. E. and S. Oglesby, Jr. Evolution of the Electrostatic Precipitator; Seventy Years of Research and Development. Bull. S. Res. Inst. 26, (1):14-18, 1973.
Keyphrases: empirical design methods.

248. Peters, J. M. Predicting Efficiency of Fine-particle Collectors. Chemical Engineering 80, (9):99-102, April 16, 1973.
Keyphrases: graphical calculations.

251. Rossangel, W. B. The Need for Q. C. in the Air Pollution Control Equipment Industry. Presented at the American Society for Quality Control, Washington Section, Arlington, W. Va., March 14, 1973.
Keyphrases: quality control, guarantees, costs.

266. Bid Evaluation Form for Electrostatic Precipitators. Ind. Gas Cleaning Inst. Publication No. EP 4, Rype, N. Y., 1968.
Keyphrases: comparison of bid responses.

267. Barrett, A. A. Electrostatic Precipitators: Guidance for Designers and Purchasers. Filtration Separation, 8, (1):67-69, 71-73, January - February 1971.
Keyphrases: migration velocity, other factors in design.

279. Stairmand, C. J. Selection of Gas Cleaning Equipment: A Study of Basic Concepts. Presented at the Filtration Society's Conference on Choosing the Right Equipment for Dust Control and Air Cleaning at the Dust Control and Air Cleaning Exhibition, London, September 23-25.
Keyphrases: selection criteria.

280. Walker, A. B. Operating Principles of Air Pollution Control Equipment. Guidelines for Their Application Proceedings, MECAR Symp., Design and Operation for Air Pollution Control, New York, 1968. pp. 49-74.
Keyphrases: selection criteria.

285. Gottschlich, C. F. Removal of Particulate Matter from Gaseous Wastes. Electrostatic Precipitators. Cincinnati Univ., Ohio, Dept. of Chemical Engineering, American Petroleum Institute, 1961. p. 42.
Keyphrases: operating principles, corrosion, maintenance problems, design criteria.

298. Dickerson, R. C. and B. N. Murthy. Scope of Wet Scrubbers of Odor Control. Preprint, EPA, RTP, N. C., National Environmental Research Center, 1973.
Keyphrases: selection of control equipment, absorbants.

318. Calvert, S., D. Lundgren, and D. S. Mehta. Venturi Scrubber Performance. JAPCA 22, (7):529-532, July 1972.
Keyphrases: theory, performance models.

319. Sheppard, S. V. Particle Collection with Packed Cross-flow Scrubbers. JAPCA 22, (4):278-281, April 1972.
Keyphrases: design, efficiency, pressure drop, reliability.

370. Drockta, H., and R. L. Lucas. Information Required for the Selection and Performance Evaluation of Wet Scrubbers. JAPCA 22, (6):459-462, June 1972.
Keyphrases: self-explanatory.

340. Lopita, R. Role of Wet Scrubbers in Industries. American Institute of Plant Engineers, Cincinnati, Ohio, West. Plant Eng. Maint. Conf., Proc., San Francisco, Calif., November 3-5, 1970. pp. 3/2-3/6.
Keyphrases: particle size, limitations, types of scrubbers.

411. Feazel, C. E., (editor). Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1975.
Keyphrases: design, resistivity, control, performance, optimization, wet ESPS, electrostatic proplet spray scrubbers, cold and hot side ESP's.

402. Mathews, J. C., F. L. Bellegin, C. H. Gooding, and G. E. Weant. SO_2 Control Processes for Nonferrous Smelters. EPA-600/2-76-008 January 1976.
Keyphrases: primary copper smelters, capital and operating costs, sulfuric acid, liquid SO_2, elemental sulfur.

393. Kaplan, N. Introduction to Double Alkali Flue Gas Desulfurization Technology. Proceedings: Symposium on Flue Gas Desulfurization, New Orleans, Mary 1976. Vol. I, EPA-600/2-76-136a. pp. 387-422.
Keyphrases: process chemistry, design.

376. Sundberg, R. E. The Prediction of Overall Collection Efficiency of Air Pollution Control Devices from Fractional Efficiency Curves. Presented at the 66th Annual Meeting of APCA, Paper 73-298. Chicago, Ill, June 24-28, 1973.
keyphrases:

442. Gooch, J. P., and A. H. Dean. Wet Electrostatic Precipitator System Study. EPA-600/2-76-142, May 1976.
Keyphrases: collective efficiency related to particle size and ESP electrical characteristics, SO_2 collection, cost.

444. Cooper, D. W. and M. T. Rei. Evaluation of Electrostatic Augmentation for Fine Particle Control. EPA-600/2-76-055, March 1976.
Keyphrases: evaluation of electrostatic forces for various geometrics, fiber beds, scrubbers, fabric filters, charged droplet scrubbings, nuclear radiation.

455. Ramsey, G. H. Evaluation of Foam Scrubbing as a Method for Collecting Fine Particulate. EPA-600/2-77-197, September 1977.
Keyphrases: iron oxide aerosols, fractional efficiency, collection efficiency, cost projections.

461. Reid, D. L. and L. M. Browne. Electrostatic Capture of Fine Particles in Fiber Beds. EPA-600/2-76-132, May 1976.
Keyphrases: fiber material, bed, face velocity, collection efficiency, pressure drop.

3.2

CONTROL EQUIPMENT - THEORY

30. Calvert, S., J. Goldshihd, D. Leith, and D. Mehtor. Wet Scrubber System Study, Vol. I, Scrubber Handbook. EPA-R2-7s-118a (PB-213-016), August 1972.
Keyphrases: wet scrubbers, particulate removal, gaseous removal, aerosol fundamentals, design methodologies, design of accessories, materials of construction.

39. Hesketh, H. E. Fine Particle Collection Efficiency Related to Pressure Drop, Scrubbant and Particle Properties, and Contact Mechanism. JAPCA 24, (10):939-942, October 1974.
Keyphrases: venturi scrubbers, charged particle collection, wetting agents.

43. Calvert, S., I. L. Jashnani, and S. Yung. Entrainment Separators for Scrubbers. JAPCA 24, (19):971-975, October 1974.
Keyphrases: theory, pressure drop.

56. Penney, G. W. Some Problems in the Application of the Deutsch Equation to Industrial Electrostatic Precipitator. JAPCA 19, (8):596-600, August 1969.
Keyphrases: drift velocities, changes in particle size distributes.

84. Melcher, J. R., and K. S. Sachar. Charged Proplet Scrubbing of Submicron Particulate. Mass. Inst. of Tech. EPA-650/2-74-075, August 1974.
Keyphrases: theory, comparison with inertial scrubbers, costs.

135. Katz, J. Electrostatic Precipitator Primer. Iron Steel Engineering 41, (5):124-130, May 1964.
Keyphrases: steel industry, operating principles.

144. Cooperman, P. Note on a Factor Affecting the Efficiency of Electrostatic Precipitators. JAPCA 20, (12):828, December 1970.
Keyphrases: turbulent diffusion, Deutsch equation.

145. Billings, C. E. Aerosol Filtration Technology for Source Emission Control. AICHE Symp Ser. 70, (137):341-350, 1974.
Keyphrases: theory, interface phenomena, macroscopic processes.

156. Fraser, M. D. A Predictive Performance Model for Fabric Filter Systems. II. Multicompartment Systems. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, June 15-20, 1975. Paper 75-77.
Keyphrases: pressure drop, cycle efficiency calculations.

161. Seale, Leonard M., (editor). Proceedings: Symposium on the Use of Fabric Filters for the Control of Submicron Particulates. Boston, April 8-10, 1974.
Keyphrases: optimizing filter design, particle size, shape and density, cost comparisons.

174. Noll, E. E., W. T. Davis, and S. P. Shelton. NewCriteria for the Selection of Fabric Filters for Industrial Application. Presented at the Air Pollution Control Assoc., Chicago, June 24-28, 1973. Paper 73-301.
Keyphrases: design equations, particle size, dust loading, filter weight, pressure drop, cleaning cycle.

196. Robinson, J. W., R. E. Harrington, and P. W. Spaite. A New Method for Analysis of Multicompartmented Fabric Filtration. Atmos. Environ. London, 1, (4):499-508, July 1967.
Keyphrases: mathematical model.

197. Oglesby, D., Jr., and G. B. Nichols. Electrostatic Precipitator Technology for Source Emission Control. AICHE Symp. Ser. 70, (137):351-356, 1974.
Keyphrases: Deutsch-Anderson equation, influence of particle size, saturation charge, reentrainment.

202. Paulson, C. A. J., E. C. Potter, and R. Kahane. New Ideas on Precipitation Technology from the Csiro Combustion Rig. Presented at the Changing Technology of Electrostatic Precipitation Symp., 1974.
Keyphrases: predicting precipitator performance, affects of fuel additives.

223. Nichols, G. B., and J. D. McCain. Particulate Collection Efficiency Measurements on Three Electrostatic Precipitators. (Final Report). EPA-600/2-75-056, October 1975.
Keyphrases: fractional efficiency curves, mass removal measurements, ESP performance parameters, comparison of performance with theory, power plants, cement plant.

225. Gooch, J. P., J. R. McDonald, and S. Oglesby, Jr. A Mathematical Model of Electrostatic Precipitation. (Final Report). EPA-650/2-75-037, April 1975.
Keyphrases: precipitator size, operating variables, non-uniform gas distribution, gas bypass, particle reentrainment, empirical design concepts.

229. Ramsdell, R. G., Jr. Design Criteria for Precipitators for Modern Central Station Power Plants. Presented at the American Power Conference Annual Meeting, Chicago, April 23-25, 1968.
Keyphrases: collector plate area, gas velocity, design curves.

231. Reynolds, J. P., L. Theodore, J. Quinlan, and A. Mercando. A Study of Fine Particle Collection in Electrostatic Precipitators Using a New Model for Calculating Collection Efficiencies. Presented at Environmental and Science Conf., Louisville, March 3-4, 1975.
Keyphrases: ESP geometry, particle charging, comparison with field data.

233. Gooch, J. P., and N. L. Francis. Theoretically Based Mathematical Model for Calculation of Electrostatic Precipitator Performance. JAPCA 25, (2);108-113, February 1975.
Keyphrases: particle charging, electric field nonuniform flow distribution, reentrainment.

239. Stock, D. E., and C. T. Crowe. Analysis of the Flow Field in Electrostatic Precipitators. Presented at the Combustion Institute, Central States Sec. Spring Meeting, Champaing, Ill., 1973.
Keyphrases: Deutsch equation, particle loading.

252. Jashnani, I. L. and S. Calvert. Wet Scrubber Entrainment Separators. Presented at the Air Pollution Control Assoc. Annual Meeting, Denver, June 9-13, 1974. Paper 74-230.
Keyphrases: theoretical models, pilot plant tests, collection efficiency, flue gas desulfurization system.

260. Theodore, L., and J. Pardini. Design of an Electrostatic Precipitator Using Modeling and Simulation Techniques. Proceedings: North Eastern Regional Antipollution Conf., Kingston, R.I., July 22-25, 1969.
Keyphrases: mathematical models, flow characteristics, aerosol properties, electrical conditions.

473. Calvert, S., H. F. Barbarika, and G. M. Monahan. Evaluation of Three Industrial Particulate Scrubbers. EPA-600/2-78-032, February 1978.
Keyphrases: penetration as a function of particle size, comparison of performance with mathematical models.

490. Calvert, S. State-of-Art Survey of Mist Elimination in the U. S. A. EPA-600/7-78-037, March 1978. pp. 180-193.
Keyphrases: principles, efficiency, reentrainment.

500. Yung, S., S. Calvert, H. F. Barbarika, and L. E. Sparks. Venturi Scrubber Performance Model. Environmental Science and Technology 12, (4): 456-459, April 1978.
Keyphrases: model to calculate penetration.

3.3

CONTROL EQUIPMENT - DESIGN

33. Hubbert, G. Wet Collector Design, Operation and Maintenance. Presented at Specialty Conference on Design, Operation, and Maintenance of High Efficiency Particulate Control Equipment, St. Louis, March 29-30, 1973.
Keyphrases: general design concepts, operating problems.

34. Oglesby, S. Jr. Design Considerations for Electrostatic Precipitators. Presentd at Specialty Conference on Design, Operation, and Maintenance of High Efficiency Particulate Control Equipment. St. Louis, March 29-30, 1973.
Keyphrases: sizing, gas flow, electrification.

40. Calvert. S., and N. C. Jhaveri. Flux Force/Condensation Scrubbing. JAPCA 24, (10):946-951, October 1974.
Keyphrases: design, cost.

55. Coys, D. W., and N. W. Frisch. Specifying Precipitators for High Reliability. JAPCA 25, (2):128-131, February 1975.
Keyphrases: utility applications, fuel characteristics. worst case approach, redundancy.

61. Bakke, E. J. The Application of Wet Electrostatic Precipitators for Control of Fine Particulate Matter. Proceeding of the Symposium on Control of Fine Particulate Emissions form Industrial Sources, January 15-18, 1974. pp. 489-519.
Keyphrases: theory, Deutsch equation, applications, primary aluminum, energy consumption, particle parameters of importance.

268. Cahill, W. J., Jr., and R. G. Ramsdell, Jr. Low Sulfur Coal Cuts Precipitator Efficiency. Elec. World 168, (20):111-112, November 13, 1967.
Keyphrases: sectionalization, corona power, hot electrostatic precipitator.

303. Strauss, W., and B. Lancaster. Prediction of Effectiveness of Gas Cleaning Methods at High Temperatures and Pressures. Atmos. Environ. 22, 135-144, March 1968.
Keyphrases: removal mechanisms, electrostatic precipitators.

289. Machat. S. How Solid-state Devices Improve Electrostatic Precipitator Performance. Power 3, (2):64-67, February 1967.
Keyphrases: self-explanatory.

291. Robinson, M. The Role of Turbulence in Electrostatic Precipitation. Presented at the Annual Meeting of the Air Pollution Control Assoc., Cleveland, Ohio, June 11-16, 1967. Paper 67-34.
Keyphrases: theory, electric wind.

334. Bakke, E. and S. Reiter. An Economic Optimization of a Venturi Scrubber with a Cyclonic Water Separator. Presented at the Air Pollution Control Assoc. Annual Meeting, St. Louis, MO., June 14-18, 1970. Paper 70-7.
Keyphrases: mathematical models, power demand, cost, design.

358. Javorsky, B. Fume Control and Gas Cleaning with an Industrial Scale Foam Bed Scrubber. Filtration Separation (Purley) 11, (4): 395-396, 398, 400-401, July/August 1974.
Keyphrases: operating variables, particle size.

304. Lancaster, B. W., and W. Strauss. Condensation Effects in Scrubbers. Air Pollution Control, Part I. W. Strauss (editor), New York, Wiley-Interscience, 1971. pp. 377-427.
Keyphrases: fine particulate control, theory scrubber performance model.

427. Calvert, S., and S. C. Yung. Study of Horizontal Spray Flux Force?Condensation Scrubber. EPA-600/2-76-200, July 1976.
Keyphrases: pilot scale tests, fractional efficiency curves based on cascade impaction tests, optimal conditions.

420. Hernsohn, R., S. H. Levine, R. A. Field, and G. W. Malamud. Radiation Charging: A Novel Way to Electrically Charge Fine Particles. Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1975. pp. 409-445.
Keyphrases: self-explanatory.

398. Calvert. S., S. Yung, and J. Leung. Entrainment Separators for Scrubbers - Final Report. EPA-650/2-74-1196,b. August 1975.
Keyphrases: zigzag baffles, knitted mesh, tube bank, packed beds, cyclones, collection efficiency, pressure drops, mathematical models.

396. Calvert, S., S. C. Yung, H. Barbarika, G. Monahan, L. E. Sparks, and D. L. Harmon. A.P.T. Field Evaluation of Fine Particle Scrubbers. Second EPA Fine Particle Scrubber Symposium, May 2-3, 1977. pp. 221-254.
Keyphrases: cut/power relationships, thirteen types of scrubbers, comparison of theoretical and experimental results.

378. Boll, R. H. Particle Collection and Pressure Drop in Venturi Scrubbers. Presented at 69th National AICHE Meeting, Cincinnati, Ohio, 1971.
Keyphrases: self-explanatory.

377. Leith, D., and W. Licht. The Collection Efficiency of Cyclone Type Particle Collectors: A New Theoretical Approach. AICHE Symposium Series 68,196, 1972.
Keyphrases: self-explanatory.

375. Buonicore, A. J. and L. Theodore. Monte Carlo Simulation to Predict Collection Efficiencies of Centrifugal Separations. 74th National AICHE Meeting, New Orleans, March 11-15, 1973. Paper 60d.
Keyphrases: self-explanatory.

438. Bickelhaupt, R. E. Effect of Chemical Composition on Surface Resistivity of Fly Ash. EPA-600/2-75-017, August 1975.
Keyphrases: self-explanatory.

443. Ananth, K. P., and L. J. Shannon. Evaluation of Thermal Agglomeration for Fine Particle Control. EPA-600/2-76-067, March 1976.
Keyphrases: self-explanatory.

456. Yung, Shui-Chow, S. Calvert, and H. F. Barbarika. Venturi Scrubber Performance Model. EPA-600/2-77-172, August 1977.
Keyphrases: theoretical equations for collection efficiency and pressure drop, comparison with performance data.

68. White, H. J. Industrial Electrostatic Precipitators. Addison-Wesley Publishing Co., Inc., 1963.
Keyphrases: history, properties of aerosols, basic design, corona discharge particle changing, collection, power supplies, gas flow, resistivity, operations.

79. Hutchins, R. A. Activated-Carbon Systems. Chemical Engineering, August 20, 1973. pp. 133-138.
Keyphrases: design parameters, cample calculations.

81. Taheri, M., S. A. Big, and Beizaie. The Effect of Scale-up on the Performance of High Energy Scrubbers. JAPCA 23, (11):963-966, November 1973.
Keyphrases: venturi scrubbers, pilot scale tests.

82. Young, M. Y., and R. N. Cheremisinoff. Wet Scrubbing for Odor Control. Industrial Odor Technology Assessment, Chapter 18. Ann Arbor Science Publishers, 1974.
Keyphrases: scrubber operation, materials of construction.

83. Jashnani, I. L., and S. Calvert. Wet Scrubber Entrainment Separators. Presented at Air Pollution Control Assoc. Meeting June 9-13, 1974. Paper 74-230.

126. Vincent, J. H. Note on the Grid-type Electrostatic Precipitator. JAPCA 22, (3):200-201, March 1972.
Keyphrases: vortex enhancement.

128. Berby, R. H. Dust Collector Applications Experience. Part V (Inst. Elec. Electron. Engrs.) Trans. Ind. Appl. 8, (1):17, January-February 1972.
Keyphrases: kilns, fabric filters, scrubbers, design considerations, fabric selection.

132. Windelman, F. W. Systems Available for Removing Oil Soot from Precipitator Hoppers. Power 116, (6):57-59, June 1972.
Keyphrases: air-educator pressure systems, vacuum systems, rotary star feeders, advantages and disadvantages.

146. Noll, K. E., W. T. Davis, G. W. Kelley, and H. E. Harper. Study of Fiberglass Fabrics for the Collection of Flyash. Preprint, Tennessee Univ., Knoxville, Dept. of Civil Engineering and Carborundum Co., Knoxville,, Tenn., Pollution Control Div., June 1975.
Keyphrases: oil and coal fired boilers, fabric selection.

148. Bowerman, G. W. Experiences in Preventing, Detecting, and Venting Explosions in Fabric Collectors. Presented at the Air Pollution Control Assoc. Specialty Conf. on the User and Fabric Filtration Equipment, Buffalo, October 5-7, 1975.
Keyphrases: use of magnet for spark suppression, grounding of bags, fire detectors, relief systems.

149. Forsten, H. H. Importance of Gas Stream Analysis in Selecting Baghouse Fabric. Presented at the Air Pollution Control Association Specialty Conference on the User and Fabric Filtration Equipment, Buffalo, October 5-7, 1975.
Keyphrases: acid gases, moisture levels, gas temperature bag life.

162. Determining Correct Baghouse Air-to-Cloth Ratios. Road Streets 117, (3):169-172, March 1974.
Keyphrases: maximum and average air-to-cloth ratios, example calculations.

167. Rullman, D. H. System Design Considerations for Proper Application of Fabric Collectors. Proceedings: Special Conf. User Fabric Filter Equipment, Buffalo, October 14-16, 1973.
Keyphrases: gas treatment, process hooding, electric arc furnaces, cupolas, clinker coolers.

168. Schwab, M. J. Reverse Jet Type Fabric Rilter. Proceedings: Special Conference User Fabric Filter Equipment, Buffalo, October 14-16, 1973. pp. 54-59.
Keyphrases: operation description, installation, case histories.

172. Cheremisinoff, R. N., and N. P. Cheremisinoff. Fabric Filters for Dust Collection. Part IV - Design and Operation. Plant Eng. 27, (15):68-70, July 26, 1973.
Keyphrases: design, maintenance design consideration, air-to-cloth ratio, pressure drop, cleaning intervals.

181. Inoue, M. Dry Dust Collection Principles and High Pressure Expansion Cleaning. Presented at the Technical Conference on New Technology in the Solution of Practical Problems in Air and Water Pollution Control, Tokyo, December 8, 1971.
Keyphrases: power requirements, applications, costs.

188. Walling, J. C. Ins and Outs of Gas Filter Bags. Chem. Eng. 77, (23):162, 164, 166, 167, October 19, 1970.
Keyphrases: maintenance design considerations, cleaning, fabric selection.

190. Walton, P. J., and R. G. Boothroyd. A Pulsation-Free Filter for High Solids-Gas Loadings Using Reverse-Flow and Mechanical Cleaning. Filtration Separation (Purley) 7, 144-149, March-April 1970.
Keyphrases: cleaning techniques.

193. Ewald, G. W. Synthetic Fabrics May Solve Your Special Dust Control Problems. Air Eng. 7, (9):22-26, September 1965.
Keyphrases: fabric selection, properties.

206. Potter, E. C., and C. A. J. Paulson. What size Precipitator? A New Basis for Designing Plant to Specified Dust Extraction Performance. Proceedings of the Clean Air Society of Australia and New Zealand, Clean Air Conf., Rotorua, New Zealand, February 17-21, 1975.

207. Peacy, J. Design Criteria for a Hot Precipitator. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, June 15-20, 1975. Paper 75-02.4.
Keyphrases: low sulfur fuel resistivity, desing.

214. Rossnagel, W. B. Safety Requirements and Performance Considerations for Electrostatic Precipitators Installed on Organic Emissions. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, June 15-20, 1975.
Keyphrases: organic acid, ketones, alcohols, aldehydes, textile plants surface coating operations.

218. Stone, R. C., R. C. Truebold, and D. G. Young. A Pilot Plant Approach to Sepcifying Electrostatic Precipitators on Low Sulfur Western Coal. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, June 15-20, 1975.
Keyphrases: resistivity, precipitator sizing, specific collection areas, pilot plant test data.

219. Selle, S. J., L. L. Hess, and E. A. Sondreal. Western Fly Ash Composition as an Indicator of Resistivity and Pilot ESP Removal Efficiency. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, June 15-20, 1975.
Keyphrases: resistivity, sodium oxide relationships.

227. Frisch, N. W., and D. W. Coy. Specifying Electrostatic Precipitators for High Reliability. EPA-650/2-75-016. pp. 131-157.
Keyphrases: redundancey, gas flow distribution, gas temperature, fuel analysis.

230. Ramsdell, R. G., Jr. Practical Design Parameters for Hot and Cold Electrostatic Precipitators. Presented at the American Power Conference Annual Meeting, Chicago, May 8-10, 1973.
Keyphrases: resistivity, cost comparisons.

237. Walker, A. B. Experience with Hot Electrostatic Precipitators for Fly Ash Collection in Electric Utilities. Combustion 46, (5):14-17, November 1974.
Keyphrases: specific collection area, power density reliability, mechanical design, comparison of hot and cold systems.

241. Frauenfelder, A. Overcoming Special Problems in Electrical Precipitation. Filtration Separation (Purley) 11, (1):52, 56, January-February 1974.
Keyphrases: gas flow distribution, gas conditioning, corrosion, materials of construction, rectifiers, design.

245. Stastny, E. P. Electrostatic Precipitators: A Manufacturers View. Air Pollution Control Assoc., Pittsburgh. Proceedings Special Conference Design Operation Maintenance High Efficiency Control Equipment, St. Louis, March 29-30, 1973. pp. 93-97.
Keyphrases: selection, application and maintenance, bid specification and evaluation.

246. Greco, J. Electrostatic Precipitators: A Manufacturers View. Air Pollution Control Assoc., Pittsburgh. Proceedings Special Conference Design, Operation, Maintenance, of High Efficiency Control Equipment, St. Louis, March 29-30, 1973. pp. 53-69.
Keyphrases: performance, reliability, gas velocity, gas temperature, maintenance.

250. Tate, R. W. Spray Nozzles for Pollution Control. Pollution Engineering 5, (4):42-44, April 1973.
Keyphrases: scrubbers, applications, design, performance.

264. Schummer, H., and W. Steinbauer. Voltage Converting Plants for Electrostatic Precipitators. Siemens Rev 34, (12):458-463, December 1967.
Keyphrases: thyristors, power supply, electrical control.

284. Koschany, E. M. Basic Investigations Concerning the Cleaning of Collection Electrodes in Electrostatic Precipitators. Staub (Eng. trans.) 28, (7):5-10, July 1968.
Keyphrases: rapping direction and intensity.

288. Lagarias, J. S. Discharge Electrodes and Electrostatic Precipitators. JAPCA 10, (4):271-274, August 1960.
Keyphrases: ozone generation, corrosion, efficiency.

292. Hall, H. J. New Precipitator Designs Cope with Stricter Air Pollution Controls. Power Engr. 70, (1):44-47, January 1966.
Keyphrases: design trends.

293. Typical Improvements in Design of Equipment and Systems for Factory Air Pollution Control. Air Eng. 8, (6):18-20, June 1966.
Keyphrases: magnetic-impulse, gravity-impact, rappers, rapping intensity.

311. Zenz, F. A. Designing Gas Absorption Towers. Chem. Eng. 79, (25):120-138, November 13, 1972.
Keyphrases: sizing, stage calculations, efficiency.

312. Eckert, J. S. Wet Packed Gas Scrubbers. Australian Chem. Process. Eng. (Sydney) 25, (9):13-18, September 1972.
Keyphrases: design, sizing, efficiency odor control.

315. Hanf, E. B. Design Considerations for Venturi Entrainment Separators. Presented at the American Institute of Chemical Engineering National Meeting, Cincinnati, Ohio, May 16-19, 1971.
Keyphrases: pressure drop, liquid introduction, diverging sectors, relaibility.

317. Palumbo, R. R. Facts on Wet-Packed Towers. Preprint, Norton Co., Tallmadge, Ohio, 1971.
Keyphrases: design criteria, evaluation.

333. Calvert, S. Venturi and other Atomizing Scrubbbers: Efficiency and Pressure Drop. American Institute of Chemical Engineers 16, (3):392-396, May 1970.
Keyphrases: prediction of efficiency and pressure drop, design method.

341. Javorsky, B. S. Gas Cleaning with the Foam Scrubber. Filtration Separation (Purley) 9, (2):173-175, March-April 1972.
Keyphrases: operating principles, design, application.

366. Calvert, S., S. Yung, and J. Leung. Entrainment Separators for Scurbbers - Final Report. EPA-650/2-74-119-b, August 1975.
Keyphrases: design and operating problems, mathematical models.

368. Weir, A., Jr., J. M. Johnson, D. G. Jones, and S. T. Carlisle. The Horizontal Cross Flow Scrubber. Presented at the Symposium on Flue Gas Desulfurization, Atlanta, Georgia, 1974.
Keyphrases: operating experience, availability, SO_2 removal.

416. Matts, S. "Cold Side" Electrostatic Precipitators for High-Resitivity Fly Ash Require Different Design Philosophy. Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1976. pp. 237-256.
Keyphrases:

417. Bickelhaupt, R. E. Surface Resistivity and the Chemical Composition of Fly Ash. Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1975. pp. 237-256.
Keyphrases: self-explanatory.

414. Hall, H. J. Design and Application of High Voltage Power Supplies in Electrostatic Precipitation. Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1975. pp. 159-190.
Keyphrases: self-explanatory.

410. Bergmann, L. New Fabrics and their Potential Application. Proceedings Symposium on the Use of Fabric Filters for the Control of Fine Particulates. EPA-650/2-74--43, May 1974. pp. 261-282.
Keyphrases: surface modifications, cleaning techniques, new fabrics.

407. Adams, R. L. Designing a Filter System to Meet Specified Efficiency and Emissions Levels. Proceedings Symposium on the Use of Fabric Filters for the Control of Submicron Particulates. EPA-650/2-74-043, May 1974. pp. 161-168.
Keyphrases: self-explanatory.

394. Calvert, S., S. C. Yung, H. F. Barbrika, and L. E. Sparks. Entrainment Separators for Scrubbers. Second EPA Fine Particle Scrubber Symposium. EPA-600/2-77-193, May 2-3, 1977. pp. 75-95.
Keyphrases: knitted mesh, packed bed, tube bank, zigzag baffles, design methods based on cut diameter versus pressure drop, solid deposition.

395. Calvert, S., and S. A. Gandhi. Improved Design Method for F/C Scrubbing. Second EPA Fine Particle Scrubber Symposium. EPA-600/2-77-193, May 2-3, 1977. pp. 141-162.
Keyphrases: fine particulate collection, design method.

391. Parker, R., and S. Calvert (editors). Second EPA Fine Particle Scrubber Symposium. EPA-600/2-77-193, September 1977.
Keyphrases: compilation of 16 papers, noval scrubbers, industrial applications.

369. Cooper, D. W., and D. P. Anderson. Dynactor Scrubber Evaluation (Final Report). EPA-650/2-74-083-z, June 1975.
Keyphrases: power requirements, particle size effects.

363. Hollands, K. G. T., and K. C. Goel. A General Method for Predicting Pressure Loss in Venturi Scrubbers. Ind. Eng. Chem. Fundamentals 14, (1):16-22, February 1975.
Keyphrases: theory, design.

485. Lewandowski, G. A. Specifying Mechanical Design of Electrostatic Precipitators. Chemical Engineering, June 19, 1978. pp. 108-110.
Keyphrases: hoppers, insulators, discharge electrodes.

593. Conkle, H. N., H. S. Rosenberg, and S. T. DiNovo. Guidelines for the Design of Mist Eliminators for Lime/Limestone Scrubbing Systems. (Final Report). EPRI FP-327, December 1976.
Keyphrases: self-explanatory.

3.4

CONTROL EQUIPMENT - INSTALLATION

53. White, H. J. Resistivity Problems in Electrostatic Precipitation. JAPCA 24, (4):315-338, April 1974.
Keyphrases: resistivity measurement, volume conduction, surface conduction, back corona, effects on performance, methods for overcoming high resistivity.

182. Wouwer, Raymond van de. Clinker Cooler Dust Collector Recovers 60 TPD at Inland Winniped Plant. Pit Quarry 64, (7):104-105, January 1972.
Keyphrases: installations, gas cooling, design.

3.5

CONTROL EQUIPMENT - OPERATION AND MAINTENANCE

31. Oglesby, S., Jr., and G. B. Nichols. A Manual of Electrostatic Precipitators Technology, Part I, Fundamentals. EPA No. APTD 0610, August 1970.
Keyphrases: particle charging, gas flow in ESP, rapping, resistivity, design methodology, ESP mechanical components, power supplies, maintenance.

35. Greco, J. Electrostatic Precipitators: An Operator's View. Presented at Specialty Conference on Design Operation and Maintenance of High Efficiency Particulate Control Equipment, St. Louis, March 29-30, 1973.
Keyphrases: performance expreince, gas velocity distribution, ash removal, gas temperature, acceptance tests, discharge wire failure.

36. Duling, O. E. Getting the Bugs out of Electrostatic Precipitators. Presented at Specialty Conference on Design, Operation, and Maintenance of High Efficiency Particulate Control Equipment, St. Louis, March 29-30, 1973.
Keyphrases: electrodes, rappers, corrosion, maintenance, dust removal, fabrication and erection.

52. Rullnum, D. H. Baghouse Technology: A Perspective Maintenance Task for Electrostatic Precipitator. Power, August 1975. pp. 56-58.
Keyphrases: daily, monthly, quarterly procedures.

66. Pulle, W. Precipitator Performance Hinges on Control. Power 119, (1):24-28, January 1975.
Keyphrases: dlectrical control instrumentation.

67. Bump, R. L. Electrostatic Precipitator Maintenance Survey. JAPCA 26, (11):1061-1064, November 1976.
Keyphrases: industry surveys, discharge electrodes, rapper/vibrators, collecting plates, hoppers.

76. Various authors (12 separate articles). Operation and Maintenance of Dust Collectors. Staub Reinhaltung der Luft 26, (4):1-41, April 1966.
Keyphrases: mechanical collectors, wet scrubber, precipitators, fabric filter, cascade impactors.

129. Jones, A. H. Air Pollution Control for High Temperature Industrial Process. Proceedings Institute Environmental Science. Annual Technology Meeting, New York, 1972. pp. 581-585.
Keyphrases: start-up and shut-down, condensation, corrosion, dosts, boilers, cupolas.

133. Survey of Electrostatic Precipitator Operating and Maintenance Costs. Water Sewage Works 18, R236-R237, August 31, 1971.
Keyphrases: useful life, maintenance costs, operating problems.

158. Smith, Elbridge M., and R. L. Lucas. Information Required for the Specification, Purchase, and Performance Evaluation of Industrial Baghouses (Fabric Filters). JAPCA 25, (7):715-720, July 1975.
Keyphrases: selection of fabrics, selection of cleaning technique.

165. Whitlock, R. G. System Design for Today and Tomorrow. Proceedings Specialty Conference User Fabric Filter Equipment, Buffalo, October 14-16, 1973. pp. 113 121.
Keyphrases: maintenance, fabric filter design, inspection procedures.

171. Goldfield, J. Fabric Filters in Asbestos Mining and Asbestos Manufacturing. Presented at the Air Pollution Control Assoc. Annual Meeting, Denver, June 9-13, 1974. Paper 74-275.
Keyphrases: bag life, monitoring outlet concentration, pressure drop.

173. Hubbard, R. F. Fabric Filters: Another Operator's View. Proceedings: Spec. Conf. Design, Operation, Maintenance High Efficiency Control Equip., St. Louis, March 29-30, 1973. pp. 123-127.
Keyphrases: air-to-cloth ratio, grain industry, humidity, particle size distribution, bag attachment.

185. Billings, C. E., and J. E. Wilder. Engineering Analysis of the Field Performance of Fabric Filter Systems. Presented at the Air Pollution Control Assoc. Annual Meeting, St. Louis, June 14-18, 1970. Paper 70-129.

189. Hicks, R. E., and W. G. B. Mandersloot. Flexing Fatique of Glass-Fiber Filter Cloth. Textile Res. J. 38, (9):942-950, September 1968.
Keyphrases: flexing endurance test, effects of heat, bag-to-bag variations.

192. Borgwardt, R. H., R. E. Harrington, and P. W. Spaite. Filtration Characteristics of Fly Ash from a Pulverized Coal-Fired Power Plant. JAPCA 18, (6):387-390, June 1968.
Keyphrases: permeability of dust cake, pressure drop.

226. Green, G. P. Operating Experience with Particulate Control Devices. Presented at the Am. Soc. of Mech. Eng., Air Pollution Control Div., National Symposium, Philadelphia, April 1973.
Keyphrases: low sulfur western coals, conditioning to reduce resistivity, collection efficiencies.

247. Schiller, M. Electrostatic Precipitators: How Well Do You Protect Your Investment. Proc. Spec. Conf. Des. Oper. Maintenance High Efficiency Control Equipment, St. Louis, March 29-30, 1973. pp. 71-77.
Keyphrases: operating problems, instrumentation, record keeping, maintenance.

259. Sproull, W. T. Minimizing Rapping Loss in Precipitators at a 2000 Megawatt Coal-Fired Power Station. Presented at the Air Pollution Control Association Annual Meeting, Atlantic City, June 27 - July 2, 1971. Paper 71-125.
Keyphrases: rapping strategies, intensity, duration, effect on emissions.

265. Criteria for Performance Guarantee Determinations. Ind. Gas Cleaning Inst. Pub. No. E-P 3., 1965.
Keyphrases: electrostatic precipitators, gas flow distribution, gas conditioning, emissions.

282. Dedlow, R. P. Maintenance and Safety of Electrostatic Precipitators. Minerals Process 10, (8):8-12, 22, August 1969.
Keyphrases: cement industry, collection area, cost, preventive maintenance.

283. Penny, G. W., J. T. Reese, and J. Greco. Electrostatic Precipitation in Theory and Practice. Eng. Digest 29, (12):61-65, December 1968.
Keyphrases: resistivity, spark-over, ammonia injection.

387. Plyler, E. L. (chairman), and W. H. Ponder (vice-chairman). Symposium on Flue Gas Desulfurization. Vol. I. Atlanta, EPA-650/2-74-126-a, December 1974.
Keyphrases: compilations of technical papers, status of FGD systems, cost comparisons, pilot plant studies, Cholla plant, LaCyque plant, Phillips plant, Paddy's Run plant, double alkali system. Mag O_x system, Willman Lord, cat-O_x, shell process, Chiyoda thoroughbred 101 process, sludge disposal, second generation processes.

388. Elder, H. W., F. T. Princiotta, G. A. Hollinder, and S. J. Gage. Sulfur Oxide Control Technology. Visits in Japan, August 1972. U. S. Government Interagency Report, Muscle Shoals, Alabama, October 1972.
Keyphrases: lime scrubbing, limestone scrubbings, magnesium based process, sodium based process, double alkali process, Chiyoda thoroughbred 101 process.

384. Borgwordt, R. H. EPA/RTP Pilot Studies Related to Unsaturated Operation of Lime and Limestone Scrubbers. Symposium on Flue Gas Desulfurization, Vol. I. Atlanta, November 1974. EPA-650/2-74-126-a, December 1974. pp. 225-240.
Keyphrases: self-explanatory.

381. Princiotta, F. T., (chairman). Sulfur Oxide Throwaway Sludge Evaluation Panel (SOTSEP). Vol. II. Final Report - Tehcnical Discussion. EPA-650/2-75-010-b, April 1975.
Keyphrases: sludge quantity projections, utilities, coal gasifications, environmental problems, ponding, landfill, EPA R&D.

385. Rosoff, J., R. C. Rossi, L. J. Bornstein, and J. W. Jones. Disposal of by Products from Non-Regenerable Flue Gas Desulfurization Systems. Proceedings on Flue Gas Desulfurization. Vol. I., Atlanta, November 1974. EPA-650/2-74-126-a, December 1974. pp. 399-444.
Keyphrases: self-explanatory.

386. Ifeadi, C. N., and H. S. Rosenberg. Lime/Limestone Sludge Disposal: Trends in the Utility Industry. Symposium on Flue Gas Desulfurization. Vol. I. Atlanta, November 1974. EPA-650/2-74-126-a, December 1974. pp. 865-886.
Keyphrases: self-explanatory.

382. Rosoff, J., and R. C. Rossi. Disposal of By-Products form Non-Regenerable Flue Gas Desulfurization Systems: Initial Report. EPA-650/2-74-037-a, 1974.
Keyphrases: self-explanatory.

426. Banks, S. M., J. R. McDonald, and L. E. Sparks. Voltage: Current Data from Electrostatic Precipitators Under Normal and Abnormal Conditions. Proceedings Particulate Control Problems Using ESP's in the Metallurgical Industry. EPA-600/2-77-208, October 1977. pp. 129-153.
Keyphrases: self-explanatory.

421. Feazel, C. E. (editor). Proceedings Particulate Collection Problems Using ESP's in the Metallurgical Industry. EPA-600/2-77-208, October 1977.
Keyphrases: compilation of 13 technical papers, steel industry, non-ferrous smelters, copper smelters, precipitators operating problems.

415. Burton, C. L., and D. A. Smith. Precipitation Gas Flow Distribution. Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1975. pp. 191-218.
Keyphrases: relationship of gas flow to precipitation performance, model studies.

418. Cook, R. E. Sulfulr Trioxide Conditioning. Symposium on Electrostatic Precipitators for the Control of Fine Particulate. EPA-650/2-75-016, January 1975. pp. 315-326.
Keyphrases: self-explanatory.

412. McCain, J. D., J. P. Gooch, and W. B. Smith. Results of Field Measurements of Industrial Particulate Sources and Electrostatic Precipitator Performance. Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1975. pp. 79-100.
Keyphrases: self-explanatory.

413. Frisch, N. W., and D. W. Coy. Specifying Electrostatic Precipitators for High Reliability. Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1975. pp. 131-158.
Keyphrases: self-explanatory.

406. Dennis, R. Collection Efficiency as a Function of Particle Size, Shape, and Density: Theory and Experience. Proceedings Symposium on the Use of Fabric Filters for the Control of Submicron Particulates. EPA-650/2-74-043, May 1974. pp. 95-139.
Keyphrases: self-explanatory.

404. Selae, L. M. (editor). Symposium on the Use of Fabric Filters for the Control of Submicron Particulates. EPA-650/2-74-043, May 1974.
Keyphrases: compilation of 16 technical papers, fabric development, capabilities of fabrics, optimization, favric filter design and cost, theory.

401. Kochler, G., and J. A. Burns. The Magnesia Scrubbing Process as Applied to an Oil Furid Power Plant. EPA-600/2-75-057, October 1975.
Keyphrases: system design, performance, SO_2 removal as related to boiler load and fuel sulfur content.

397. Stern, R. D. (chairman), W. H. Ponder, and R. C. Christman (vice-chairman). Symposium on Flue Gas Desulfurization, New Orleans, March 1976. EPA-600/2-76-136-a, and EPA-600/2-76-136-b, May 1976.
Keyphrases: status of FGD processes, operating experience with various degenerable and non-degenerable processes, pilot plant tests, waste disposal, R&D programs.

392. Epstein, M. H. N., S. C. Wang, and D. A. Burbank. Results of Mist Elimination and Alkali Uitlization Testing at the EPA Alkali Scrubbing Test Facility. Symposium on Flue Gas Desulfurization, New Orleans. Vol. I. March 1976. EPA-600/2-76-136-a. pp. 145-204.
Keyphrases: chevron mist eliminator, alkali utilization, washing requirements.

379. Locklin, D. W., H. H. Krause,A. A. Putnam, et al. Design Trends and Operating Problems in Combustion Modification of Industrial Boilers. Battelli Institute. Annual Report to EPA, Grant No. 802402, 1973.
Keyphrases: self-explanatory.

373. Dismukes, E. B. Conditioning of Fly Ash with Sulfuric Acid, Ammonium Sulfate, and Ammonium Bisulfate. Southern Research Institute, Contract No. 68-020-1303, U. S. Environmental Protection Agency, October 1974.
Keyphrases: self-explanatory.

372. Dismukes, E. B. Conditioning of Fly Ash with Ammonia. Southern Research Institute. Presented at the Symposium on Electrostatic Precipitators for the Control of Fine Particles, Pensacola, Florida, September 30 - October 2, 1974.
Keyphrases: self-explanatory.

491. Bradway, R. M. Baghouse Performance on a Small Electric Air Furnace. Presented at the Third Symposium on Fabric Filters for Particulate Collection. Paper 7. EPA-600/7-78-087, June 1978. pp. 155-166.
Keyphrases: penetration as a function of particle size, mass emissions.

494. Bickelhaupt, R. E. Corona Electrode Failure Study. (Final Report). FP-792, Vol. I, Research Project 413-1, June 1978.
Keyphrases: self-explanatory.

501. Kelly, W. J. Maintaining Venturi - Tray Scrubbers. Chemical Engineering, December 1978. pp. 133-137.
Keyphrases: preventive maintenance, troubleshooting, accessibility, temperature problems.

3.6

CONTROL EQUIPMENT - PERFORMANCE OPTIMIZATION

60. Bakke, E. Optimizing Filtration Parameters. JAPCA 24, (12):1150-1154, December 1974.
Keyphrases: pulse jet units, fine particulate, cleaning energy curves.

51. Coats, G. S. Optimization of Electrostatic Precipitation Operation Through a Computerized Monitoring Program. Presented at the 64th Annual Meeting of the Air Pollution Control Association, June 27-July 2, 1971. Paper 71-88.
Keyphrases: kraft recovery furnace, transmissometer.

125. Archibold, J. J. Observations and Experiences Resulting from a Precipitator Improvement Program. Proc. Am. Power Conf. 23, 371-390, 1961.
Keyphrases: automatic voltage control, sparking rate, gas distribution.

204. Atkins, R. S., and D. H. Klipstein. Improved Precipitator Performance by SO_3 Gas Conditioning. Nat. Eng. 79, (11):5-8, November 1975.
Keyphrases: SO_3 and other conditioning agents.

213. Schwartz, L. B., and M. Lieberstein. Effects of Rapping Frequency on the Efficiency of an Electrostatic Precipitator. Water Air Soil Pollution 4, (3/4):343-353, July - August 1975.
Keyphrases: discharge wire, collection plates, particulate emissions.

232. Hall, H. J. Design and Application of High Voltage Power Supplies in Electrostatic Precipitation. JAPCA 25, (2):132, 138, February 1975.
Keyphrases: reliability, sparking rate control, voltage and current waveforms.

425. Gooch, J. P., and W. Pinlle. Studies of Particle Re-entrainment Resulting from Electrode Rapping. Proceedings, Particulate Control Problems Using ESP's in the Metallurgical Industry. EPA-600/2-77-208, October 1977. pp. 103-128.
Keyphrases: self-explanatory.

409. Turner, J. H. Extending Fabric Filter Capabilities. Proceedings Symposium on the Use of Fabric Filters for the Control of Fine Particulates. EPA-650/2-74-043, May 1974. pp. 233-260.
Keyphrases: self-explanatory.

403. Nichols, G. B., and J. P. Gooch. An Electrostatic Precipitator Performance Model. EPA-650/2-74-132, July 1972.
Keyphrases: use of computer model to optimize performance, resistivity effects, measurement of resistivity, back corona.

405. Bakke, E. Optimizing Filtration Parameters. Proceedings Symposium on the Use of Fabric Filters for the Control of Submicron Particulates. EPA-650/2-74-043, May 1974. pp. 59-84.
Keyphrases: pulse jet filter, operating conditons.

440. Spencer, H. W., III. Rapping Re-entrainment in a Nearly Full-Scale Pilot Electrostatic Precipitator. EPA-600/2-76-140, May 1976.
Keyphrases: contribution of re-entrainment to total emission, minimizing losses, size distribution of reentrained particles.

441. Spender, H. W., III. Electrostatic Precipitators: Relationship Between Resistivity, Particle Size, and Sparkover. EPA-600/2-76-144, May 1976.
Keyphrases: fly ash, electrical characteristics of ESP performance, operating currents.

446. Nichols, G. B., and J. D. McCain. Particulate Collection Efficiency Measurements on Three Electrostatic Precipitators. EPA-600/2-75-036, October 1975.
Keyphrases: comparison of model with emissions data, particle size distribution, precipitator performance data, power plants, cement kiln.

453. Calver, S., C. Lake, and R. Parker. Cascade Impactor Calibration Guidelines. EPA-600/2-76-118, April 1976.
Keyphrases: comparison of techniques.

458. Gooding, C. H., J. D. McCain, and D. K. Sommerer. Comparative U.S./U.S.S.R. Tests of a Hot-Side Electrostatic Precipitator. EPA-600/2-77-002, January 1977.
Keyphrases: total mass emission, particle size distribution, fly ash composition, resistivity of SO_2 and SO_3 emissions.

473. Calvert, S., H. F. Barbarika, and G. M. Monahan. Evaluation of Three Industrial Particulate Scrubbers. EPA-600/2-78-032, February 1978.
Keyphrases: penetration as a function of particle size, comparison of performance with mathematical models.

481. Puri, R. Automatic Control of Reagent Feed Boosts Wet - Scrubber Efficiency. Chemical Engineering, October 23, 1978. pp. 157-159.
Keyphrases: self-explanatory.

484. Frenkel, D. I. Tuning Electrostatic Precipitators. Chemical Engineering, June 19, 1978. pp. 105-110.
Keyphrases: use of transmissometers, rapping intensities and patterns.

488. Sparks, L. E., O. J. Tassicker, and J. P. Gooch. Studies of Particle Reentrainment Resulting From Electrode Rapping. EPA-600/7-78-037, March 1978. pp. 30-46.
Keyphrases: rapping sequence and timing, particle size distributions, collection of particulate in last field, pilot study.

489. Dismukes, E. B. Flue Gas Conditioning in Coal-Fired Power Plants in the United States. EPA-600/7-78-037, March 1978. pp. 113-123.
Keyphrases: self-explanatory.

492. Leith, D., M. W. First, and D. D. Gibson. Effect of Modified Cleaning Pulses on Pulse Jet Filter Performance. Presented at the Third Symposium on Fabric Filters for Particulate Collection. Paper 11. EPA-600/7-78-087, June 1978. pp. 205-228.
Keyphrases: self-explanatory.

3.7

CONTROL EQUIPMENT - PROCESS MONITORING

62. Pilat, M. Measurement of Particle Size Distributors at Emission Sources with Cascade Impactors. Proceedings of the Symposium on Control of Fine Particulate Emissions from Industrial Sources, January 15-18, 1974. pp. 709-730.
Keyphrases: calibration, sampling procedures.

194. Kohn, H. Operation and Maintenance of Fabric Filters. Staub (English Trans.) 26, (4):22-24, April 1966.
Keyphrases: start-up, high temperature control.

496. Smith, W. B., P. R. Cavanaugh, and R. R. Wilson. Technical Manual: A Survey of Equipment and Methods for Particulate Sampling in Industrial Process Streams. EPA-600/7-78-043, March 1978.
Keyphrases: self-explanatory.

3.8

CONTROL EQUIPMENT - INSPECTION

195. Walsh, G. W., and P. W. Spaite. An Analysis of Mechanical Shaking in Air Filtration. JAPCA 12, 57-61, February 1962.
Keyphrases: shaker amplitude and frequency.

262. Smith, E. M. Preventive Maintenance Helps Prevent Pollution. Pollution Eng. 3, (2):19-23, March - April 1971.
Keyphrases: maintenance programs.

269. Watkins, E. R., and K. Darby. Electrostatic Precipitation for Large Boilers. Proc. Inst. Mech. Engrs. (London) 181, (3N):78-89, 1966-1967.
Keyphrases: operation and maintenance, repair design consideration.

400. Smith, W. B., K. M. Cushing, G. E. Lacey, and J. D. McCain. Particulate Sizing Techniques for Control Device Evaluation. EPA-650/2-74-102-a, August 1975.
Keyphrases: impactors, cyclones, electrostatic effects in impactors, field tests.

408. McCain, J. D. Methods for Determining Particulate Mass and Size Properties Laboratory and Field Measurements. Proceedings Symposium on the Use of Fabric Filters for the Control of Submicron Particulates. EPA-650/2-74-043, May 1974. pp. 179-198.
Keyphrases: self-explanatory.

3.9

CONTROL EQUIPMENT - COMPLAINCE MONITORING

38. Dorsey, J. A., and W. B. Kuykendal. Monitoring Systems for Particulate Control Equipment Evaluations. Presented at Specialty Conference on Design, Operation, and Maintenance of High Efficiency Particulate Control Equipment, St. Louis, March 29-30, 1973.
Keyphrases:

69. Barrett, D. F., and J. R. Small. Emission Monitoring of SO_2 and NO_x. Chem. Eng. Prog. 69, (12):33-38, December 1975.
Keyphrases: Dupong 460 analyzer, photomatic principles, calibration, field performance.

71. Johnson, L. D., and R. M. Statnick. Measurement of Entrained Liquid Levels in Effluent Gases from Scrubber Demist rs. Industrial Environmental Research Lab, EPA, RTP, N. C., September 1973.
Keyphrases: SO_2 scrubbers, tracer techniques.

73. Wolf, D. C. Systems for Continuous Monitoring. Power. pp. 76-78, October 1974.
Keyphrases: combustion gases, infrared design types O_2 analyzer, CO analyzer.

73. Homolya, J. B. Current Technology for Continuous Monitoring of Gaseous Emissions. JAPCA 25, (8):809-814, August 1975.
Keyphrases: extractive and in-situ systems, pulsed fluorescent SO_2 and NO_x monitoring.

74. Nadar, J. S. Current Technology for Continuous Monitoring of Particulate Emissions. JAPCA 25, (8):814-820, August 1975.
Keyphrases: visible emissions, mass concentration, size distribution.

75. Smith, W. B., K. M. Cushing, and J. McCain. Procedures Manual for Electrostatic Precipitator Evaluation. EPA-600/7-77-059, June 1977.
Keyphrases: sampling mass emission measurement, particle resistivity measurement, particle sizing techniques, gas analysis.

198. Vatavuk, W. M., and L. Theodore. A Comprehensive Technique for Calculating Particulate Control Device Efficiencies Utilizing Particle Size Distributions. Am. Inst. of Chem. Eng., New York, Dayton and Ohio Valley Sections and Air Pollution Control Assoc., Pittsburgh, Pa., Technical Committee on Energy-Environmental Interactions, Energy Environ. National Conf., 2nd Oxford, Ohio, November 13-15, 1974. pp. 181-189.
Keyphrases: series of control devices, mechanical collectors, scrubbers.

199. Reynolds, J. P., L. Theodore, and J. Marino. Calculating Collection Efficiencies for Electrostatic Precipitators. JAPCA 25, (6):610-616, June 1975.
Keyphrases: field strength, plate-to-plate spacing, precipitator length, particle size distributioj.

457. Tomaides, M. Instrumentation for Monitoring the Opacity of Particulate Emissions Containing Condensed Water. EPA-600/2-77-124, August 1977.
Keyphrases: perlite manufacturing, sludge incinerator, comparison of new techniques with conventional transmissometer.

460. Harris, D. B. Procedures for Cascade Impactor Calibration and Operation in Process Streams. EPA-600/2-77-004, January 1977.
Keyphrases: self-explanatory.

475. Lord, H. C., III. In-Stack Monitoring of Gaseous Pollutants. Environmental Science and Technology 12, (3):264-269, March 1978.
Keyphrases: general coverage of in-stack continuous monitors of numerous pollutants.

480. Creason, S. G. Selection and Care of pH Electrodes. Chemical Engineering, October 23, 1978. pp. 161-163.
Keyphrases: self-explanatory.

496. Smith, W. B., P. R. Cavanuagh, and R. R. Wilson. Technical Manual: A Survey of Equipment and Methods for Particulate Sampling in Industrial Process Streams. EPA-600/7-78-043, March 1978.
Keyphrases: self-explanatory.

3.10

CONTROL EQUIPMENT - ENERGY REQUIREMENTS

221. Stukel, J. J., and H. G. Rigo. Energy Efficiencies of Air Pollution Control Devices. Atmos. Environ. 9, (5):529-535, May 1975.
Keyphrases: theory, power consumption, operating costs.

502. Barker, J. L. K. Maddox, J. D. Westfield, and D. Wilcock. First Order Estimates of Energy Requirements for Pollution Control. EPA-600/7-78-022, February 1978.
Keyphrases: self-explanatory.

3.11

CONTROL EQUIPMENT - COST

3.12

CONTROL EQUIPMENT - MISCELLANEOUS

11. Norman, J. Chain-of-Custody and Handling of Samples: Legal Considerations. U. S. Environmental Protection Agency, Office of Air Porgrams, Research Triangle Park, N. C., November 1972.
Keyphrases: self-explanatory.

48. Adams, A. B., Jr. Corrosion Problems with Wet Scrubbing Equipment. JAPCA 26, (4):303-307, April 1976.
Keyphrases: design features to reduce corrosion, materials of construction, scrubber, operating conditions.

49. Hall, H. J., and J. Katz. Corrosion Problems and Solutions for Electrostatic Precipitators. JAPCA 26, (4):312-317 April 1976.
Keyphrases: galvanic series of metals, types of corrosion, critical areas of corrosion, operating conditions, case histories.

77. Gilbert, U. Selecting Materials for Wet Scrubbing Systems. Pollution Engineering, August 1973. pp. 28-29.
Keyphrases: laws, design criteria, allowable noise levels, combining sound levels.

140. Gelfand, P. Safety Procedures in Air Pollution Control Equipment Electrostatic Precipitators and other Devices. Inst. of Elec. Electron. Engrs., New York, Ind. Gen. Appl. Group, 5th Conf. Rec., Chicago, 1970. pp. 319-322.

200. Mills, J. Pilot Electrostatic Precipitator Testing Preprint. Carborundum Encironmental Systems, Inc., Knoxville, Tenn., Pollution Control Div., 1975.
Keyphrases: length of test period, determination of design values.

215. Franconeri, P. Electrostatic Precipitator Corrosion on Incinerator Applications. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, June 15-20, 1975. Paper 75-66.1.
Keyphrases: comparison of two installations, insulation and sealing requirements, types of steel.

238. Pfoutz, B. D., and L. L. Stewart. Materials of Construction for Electrostatic Precipitators. Presented at the Am. Inst. of Chem. Engr. Annual National Meeting, Tulsa, March 10-13, 1974.
Keyphrases: life, cost.

242. Klody, D. T. Corrosion of Air Pollution Control Equipment in the Mineral Industries. Mineral Industrial Bulletin 16, (19):1-14, January 1973.
Keyphrases: cyclones, fabric filters, precipitators, scrubbers, case histories, corrosion control.

254. Tice, A. E. Test Show Worth of Alloys in Scrubber Environment. Elec. Light Power 52, (21):EG7-ER9, December 1974.
Keyphrases: lime/limestone, Wellman-Lord.

335. Barron, A. V., Jr. Fan Application for High Energy Scrubbers. Technical Assoc. of the Pulp and Paper Industry, New York, Tappi Eng. Conf., 26th, Proc., November 18, 1971. pp. 609-622.
Keyphrases: design, selection.

342. Ellison, W., and R. M. Mark. Designing Large Wet Scrubber Systems. Power 116, (2):67-69, February 1972.
Keyphrases: plume appearance, reheating.

343. Harwick, D. M. Reinforced Plastics: A Boom to Air Pollution Control and Maintenance. Factory 5, (3):39-41, March 1972.
Keyphrases: scrubbers, mechanical collectors, fans.

367. Velzy, C. O. Materials of Construction for Wet Scrubbers for Incinerator Applications. Air Pollution Control Association, NACE, and Ind. Gas Cleaning Assoc. Resolving Corros. Probl. in Air Pollut. Cont. Equip., 1976. pp. 34-45.
Keyphrases: operating experience, demisters, materials of construction.

466. Jones, P. W., J. E. Wilkinson, and P. E. Strup. Measurement of Polycyclic Organic Materials and Other Hazardous Organic Compounds in Stack Gases - State of the Art. EPA-600/2-77-202, October 1977.
Keyphrases: organic compounds, polycyclic compounds, combustion products, gas analysis, sampling.

467. Birks, L. S. Pinpointing Airborne Pollutants. Environmental Science and Technology 12, (2):150-153, February 1978.
Keyphrases: x-ray fluorescence, sulfur measurement.

469. Sparks, L. E. SR-52 Programmable Calculator Programs for Venturi Scrubbers and Electrostatic Precipitators. EPA-600/7-78-026, March 1978.
Keyphrases: predict penetration, mathematical models, user's guide.

479. Sheppard, W. L., Jr. Using Chemical-Resistant Masonry in Air Pollution Control Equipment. Chemical Engineering, November 20, 1978. pp. 203-210.
Keyphrases: self-explanatory.

480. Creason, S. C. Selection and Care of pH Electrodes. Chemical Engineering, October 23, 1978. pp. 161-163.
Keyphrases: self-explanatory.

482. Michels, H. T., and E. C. Hoxie. How to Rate Alloys for SO_2 Scrubbers. Chemical Engineering, June 5, 1978. pp. 161-164.
Keyphrases: locations of various common materials problems, alloy compositions, pH, chlorides, alloy tests.

485. Read, G. W., Jr. You can Prolong the Life of Your Plant Chimney. Combustion, July 1978. pp. 24-26.
Keyphrases: liners, corrosion, coatings.

486. Alexieff, P. W. Factors to be Considered When Evaluating Axial Flow Fans. Combustion, July 1978. pp. 7-10.
Keyphrases: hub-construction, maintenance, performance.

487. Landis, D. E., and H. D. Baesel. Axial Flow Fans for Utility Service. Combustion, July 1978. pp. 16-23.
Keyphrases: selection, maintenance.

495. Carpenter, B. H., and G. E. Weant, III. Particulate Control for Fugitive Dust. EPA-600/7-78-071, April 1978.
Keyphrases: sources, wet suppression, chemical stabilization, vegetation stabilization.

4.0

APPLICATIONS - GENERAL INFORMATION

APPLICATIONS - SELECTION OF CONTROL TECHNIQUE

87. Reigel, S. A., and R. P. Bundy. Why the Swing to Baghouses? Power, January 1977. pp. 68-73.
Keyphrases: basic design concepts, power plant effluent, types of fabrics, summary of boiler installations, glossary.

88. Payton, R. N. Innovations in Ferroalloy Baghouse System Design. JAPCA 26, (1):18-22, January 1976.
Keyphrases: shaker cleaning, Nomex fabrics, performance assessment, ventilations systems, heat recovery and gas cooling, maintenance.

109. Edwards, J. A. EDP: Using Computers to Evaluate the Feasibility of Pollution Control Projects. Pollution Engineering Techniques. Ann Arbor Science, 1974. pp. 53-71.
Keyphrases: computerized techniques.

110. Teller, A. J. Control of Gaseous Flouride Emissions. Chem. Eng. Prog. 63, (3):75-79, March 1967.
Keyphrases: design problems, characteristics of equipment, pressure drop requirements, fertilizer industry, phosphoric acid industry.

119. Darby, D., and C. Whitehead. Cleaning Gases from Municipal Incinerators. Filtration Separation (Purley) 9, (6):697, 699-706, 709, December 1972.
Keyphrases: cooling, selection of control techniques.

121. Johansson, R. Collecting Dust from Small and Medium Size Cupolas. Int. Air Pollut. Control Noise Abatement Exhib. Conf. Proc., Jonkoping, Sweden, 1971. pp. 6:18-6;30.

127. Bernstein, R. H., J. R. Ehrenfeld, and T. R. Parks. Cost Effectiveness Measurements of Emission Control Equipment for Intermediate Size Boilers. Presente at the Air Pollution Control Assoc. 65th Annual Meeting, Miami, June 18-22, 1972. Paper 72-74.
Keyphrases:

134. Pring, R. T. Control of Fume from Electric Steel Melting Furnaces. Air Cond. Heat. Vent. 58, 121-125, February 1961.
Keyphrases: fabric filters, electrostatic precipitator, effluent cooling.

142. Culhane, F. R. Dust Collectors for Effluent Control. Presented at the Total Environmental Control Conf., Ann Arbor, November 16-19, 1970.

150. Puri, R. System Design for Particulate Control in Woodworking Plants. Heating, Piping, Air Conditioning 46, (9):54-58, August 1974.
Keyphrases: design of hoods and ventilation systems. baghouses, air recirculation.

152. Control Techniques for Beryllium Air Pollutants. EPA No. AP-116, February 1973.
Keyphrases: general control approaches.

159. Harwood, C. F., P. Siebert, and T. P. Blaszak. Assessment of Particle Control Technology for Enclosed Asbestos Sources. EPA Contract 68-02-1353, October 1974.
Keyphrases: baghouses, air-to-cloth ratios, collection efficiencies.

160. Yavorsky, P. M., and S. Akhtar. Environmental Aspects of Coal Liquifaction. Symposium Proceedings Environmental Aspects of Fuel Conversion Technology, St. Louis, May 1974.
Keyphrases: sources of emissions, possible control techniques, fugitive dusts.

177. Teller, A. J. Control of Emissions from Glass Manufacture. Presented at the American Ceramic Socity, Ceramic-Metal Systems, Div., St. Louis, September 13, 1971. Paper 3-C-71F.
Keyphrases: emission characteristics, wet scrubber tests, chromatographic baghous tests, energy demand, comparative costs.

184. Walling, J. C. Pollution Control Systems for Asphalt Plants. Roads Streets 114, (5):114-118, May 1971.
Keyphrases: source description, advantages and disadvantages of control techniques maintenance.

217. Simon, H., and J. E. Williamson. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, June 15-20, 1975.
Keyphrases: modified Deutsch equation, particle charging, particle migration, fractional efficiency curves.

220. Phipps, J. N. Environmental Problems Inside and Outside the Dyeing and Finishing Works. Intern. Dyer, Text Printer, Bleacher Finish. 153, (11):563-570, 573, May 1975.
Keyphrases: emission, maintenance of process, control technique.

224. Air Pollution Control Technology and Costs: Seven Selected Emission Sources, Kraft Mill Recovery Boilers, Ferroalloy Furnaces, Feed and Gran Processing, Glass Melting Furnaces. Crushed Stone and Aggregate Industry, Asphalt Saturators, Industrial Surface Coatings (Final Report). EPA-450/3-74-060, December 1974.
Keyphrases: process variables, capital and opeating costs, control efficiency.

244. Quillman, B., and C. W. Vogelsang. Control of Particulate SO_2 Emissions from an Industrial Boiler Plant. Presented at the Am. Soc. of Mech. Engr. Industrial Power Conference, Louisville, May 14-20, 1973. Paper 73-IPWR-5.
Keyphrases: fuel switching, flue gas desulfurization.

255. Edgar, W. D., and J. M. Muller. The Status of Coke Oven Pollution Control. Ironmaking Proc. AIME 32, (76-84, 1973.
Keyphrases: charging, pushing, oven modification, quenching.

274. Tomany, J. P. A Guide to the Selection of Air Pollution Control Equipment. UOP Air Correction Div., Darlen, Conn, 1969.
Keyphrases: general operating characteristics, costs.

277. Strauss, W. Cleaning Waste Gases from Open-Hearth Steel Processes. Chem. Process Eng. 41, (8):339, 341, 351, August 1960.
Keyphrases: selection of control technique, cists.

295. Nannen, L. W., R. E. West, and F. Kreith. Removal of SO_2 from Low Sulfur Coal Combustion Gases by Limestone Scrubbing. JAPCA 24, (1):29-39, January 1974.
Keyphrases: scrubber selection, process chemistry, control processes.

297. First, M. W. Control of Acrylic Odors in Processing Industries. Proc. Int. Clean Air Congress, Duesseldorf, W. Germany, 1973. pp. E112-E114.
Keyphrases: adsorption, caustic absorption, process modicators.

299. Brink, J. A., Jr., and E. D. Kennedy. Mercury Air Pollution Control. Clean Air Society of Australia and New Zealand, Proc. Int. Clean Air Conf., Melbourne, Australia, May 15-18, 1972. pp. 221-226.
Keyphrases: theoretical analysis, bench scale tests, design considerations.

300. Edgar, W. D., and T. C. Muellen. Cokemaking: Progress and Development in Atmospheric Pollution Control Equipment, Part II. Steel Times (London) 201, (8):591-595, August 1973.
Keyphrases: hoods, pushing, quenching.

302. Squires, B. J. Growing Use of Fabric Filter Dust Collectors in the Steel Industru, Part I. Steel Times (London) 201, (5):380-387, May 1973.
Keyphrases: descriptions of design concepts.

305. Sallee, E. D. The Use of Afterburners on Metal Decorating Ovens. Proceedings of Graphic Arts Technial Foundation Conference, Air Quality Control Print. Ind., Chicago, Ill., 1970. pp. 75-81.
Keyphrases: efficiency, operating problems, cost.

306. Akistsune, K., and T. Takae. Abatement of Prilling Tower Effluent. Chem. Eng. Progr. 69, (6):73-78, June 1973.
Keyphrases: spray scrubber/filter system, design and operating variables.

307. Effenberger, H. K., D. D. Gradle, and J. P. Tomany. Control of Hogged-Fuel Boiler Emissions, A Case History. TAPPI, 56, (2):111-115, February 1973.
Keyphrases: emissions, scrubber performance.

308. Jamison, A. E. Case Study in Design, Installation, and Prove-in of Plater Fume Scrubbing Systems. Presented at the National Plant Engineering and Maintenance Conference, Chicago, March 12-15, 1973. Paper 39a.
Keyphrases: self-explanatory.

310. Netzer, W. D. Fluorine Disposal Methods. Atomic Energy Commission, Div. of Operational Safety, Proc. AEC Pollut. Contr. Conf., Oak Ridge, Tenn., October 25-27, 1977.
Keyphrases: caustic scrubbing, charcoal reactors.

314. Cross, F. L., E. B. Rox, R. G. Mumford, and M. E. Fiore. Updating Incinerators to Meet Current Criteria. Waste Age 3, (1):28-35, January-February 1972.
Keyphrases: apartment house incinerators, cost, operating personnel.

316. Lundgren, D. A., L. W. Rees, and L. D. Lehmann. Odor Control by Chemical Oxidation: Costs, Efficiency, and Basis for Selection. Presented at the Air Pollution Control Assoc. Annual Meeting, Miami, Florida, June 18-22, 1972. Paper 72-116.
Keyphrases: self-explanatory.

321. High, M. D., and T. L. Puma. Control of Odors from a Rendering Plant. Presented at the Air Pollution Control Assoc. Annual Meeting, Atlantic City, N. J., June 27-July 2, 1971. Paper 71-20.
Keyphrases: scrubber absorbents, operation.

322. Anderson, C. E., and H. R. Adolf. Odor Control in the Rendering and Food Processing Industries. Presented at the Air Pollution Control Assoc. Annual Meeting, Atlantic City, N. J., June 27-July 2, 1971. Paper 71-22.
Keyphrases: potassium permanganate, organic compounds, control efficiencies.

336. LaMantia, C. R., E. R. Bangel, R. Phillips, and T. J. Lamb. Sulfur, Sulfuric Acid and Pollution Problems, Part I. Presented at the Am. Inst. of Chem. Engr. Annual Meeting, Chicago, Ill., November 29-December 3, 1970.
Keyphrases: emissions, cost, reliability, comparison of four control techniques.

338. Bloomfield, B. D. Experience with Cupola Control for Jobbing and Low Production Rate Grey Iron Foundries. Presented at the Total Environmental Control Conf., Ann Arbor, Mich., November 16-19, 1970. Paper IV-1.
Keyphrases: centrifugal control systems, wet cap control systems.

339. Atkins, R. S., J. D. McKenna. Scrubbing of SO_2 and Particulates Demonstrated on Inudstrial Boiler. Power Eng. 76, (5):50-51, May 1972.
Keyphrases: alkaline scrubbing, annualized costs, performance.

345. Oliver, E. D. Control of Emissions from Relatively Small Boilers and Furnaces. Presented at the Am. Inst. of Chem. Engr. National Meeting, Atlantic City, N. J., August 29-September 1, 1971. Paper 39b.
Keyphrases: SO_2, NO_x, particulate, control techniques, cost.

348. Dust Collectors. American Foundrymen's Society, Des Plaines, Ill., Plant and Plant Equipment Committee 10-G, 1967.
Keyphrases: selection guide, operating variables of control equipment.

355. Hanf. E. B., and J. W. McDonald. Wet Scrubbers for Corrosive Environments: An Economic Evaluation. Presented at the American Institute of Chemical Engineers, National Meeting, Pittsburgh, Pa, June 2-5, 1974.
Keyphrases: selection guides, particle size, methods of constructions.

361. Jahnig, C. E., and R. R. Bertrand. Environmental Aspects of Coal Gasification. Presented at the Am. Inst. of Chem. Engr. Meeting, Boston, September 8, 1975.
Keyphrases: trace elements, sulfur balances, acid gas removal.

389. Herring, W. O. Secondary Zinc Industry Emission Control Problem Definition Study, U. S. Environmental Protection Agency, May 1971.
Keyphrases: process characteristics, emission measurement, control method.

383. PEDCo Environmental. Linear Programming Derived Optimization Strategies for Control of SO_x from Coal Fired Power Plants. Contract 68-02-145z, Task, 12, November 1977.
Keyphrases: use of coal cleaning and FGD in utility network, economic impact of regulation changes, SO_2 compliance costs.

422. Jaasund, S. A., and M. R. Mazar. The Application of Wet Electrostatic Precipitators for the Control of Emission from Three Metallurgical Processes. Proceedings, Particulate Collection Problems Using ESP's in the Metallurgical Industry. EPA-600/2-77-208, October 1977. pp. 1-22.
Keyphrases:

390. Frederick, E. R. Electric Utility Applications of Fabric Filters. JAPCA 27, (11):1086-1089, November 1977.
Keyphrases: compartmentation, optimion air-to-cloth ratio, bag failure rates.

419. Paul, J. E. Application of Electrostatic Precipitators for the Control of Fumes from Low Odor Pulp Mill Recovery Boilers. Symposium on Electrostatic Precipitators for the Control of Fine Particulates. EPA-650/2-75-016, January 1975. pp. 327-348.
Keyphrases: low odor process, precipitator design, cost.

454. Hissong, D. W. Molecular Sieve Control Process in Sulfuric Acid Plants. EPA-600/2-75-066, October 1975.
Keyphrases engineering assessment of technical feasibility and cost of full scale plant emission data, comparison with other techniques.

451. Choi, P. S. K., E. L. Kropp, W. E. Ballantyne, M. Y. Anasta, A. A. Putnam, D. W. Hissong, and T. J. Thomas. SO_2 Reduction in Non-utility Combustion Sources Technical and Economic Comparison of Alternatives. Contract No. 68-02-1323, Task 13, October 1975.
Keyphrases: physical coal cleanings, coal gasification, coal liquidfaction, fluidized bed combustion, flue gas desulfurization, boiler population characterizations.

449. Snow, R. H., J. E. Huff, and W. Boehme. Odor Control by Scrubbing in the Rendering Industry. Contract No. 68-02-1087, January 1976.
Keyphrases: alkaline hypochlorte scrubbing, laboratory and full scale tests, horizontal spray scrubber, packed bed scrubber, odor panes. gas chromotographic analysis.

439. Ando, J., and G. A. Isaacs. SO_2 Abatement for Stationary Sources in Japan. EPA-600/2-76-013a, January 1976.
Keyphrases: flue gas desulfurization processes, hydrodesulfurization of oil, gasification, byproducts, costs, applications.

471. Linero, A. A., and R. A. Baker. Evaluation of Emissions and Control Techniques for Reducing Fluoride Emissions from Gypsum Ponds in the Phosphoric Acid Industry. EPA-600/2-78-124, June 1978.
Keyphrases: mathematical models, ponds as sources of fluorides, costs, ambient fluoride concentration.

4.2

APPLICATIONS - PROCESS OPERATING CONDITIONS

153. Rounds, G. L., and G. Geminder. Problems of Recycling Waste Oxides Through the Sinter Strand. (Baghouse Experience). Preprint, Kaiser Steel Corp., Fontana, Calif., 1974.
Keyphrases: maintenance, feed characteristics, fugitive dust.

176. Part II--Selecting Equipment for Dust Collection from Rotary Lime Kilns. Rock Prod. 75, (8):66-69, 93-94, August 1972.
Keyphrases: specifications, costs, air-to-cloth ratios, gas treatment, insulation, fabric filter, wet scrubbers.

187. Greenberg, J. H., and R. E. Conover. Report on Systems Analysis of Emissions and Emissions Control in the Iron Foundry Industry in the U. S. A. Presented at the International Clean Air Congress, Washington, D. C., December 6-11, 1970. Paper EN-22D.
Keyphrases: mathematical model of cupola operations, identification of design variables, raw materials.

294. Pengidore, D. A. Enclosed Coke Pushing and Quenching System Design Manual (Final Report). National Steel Corp., Weirton, W. Va., Weirton Steel Div., EPA-650/2-73-028, September 1973.
Keyphrases: self-explanatory.

296. Thom, N. G., and G. C. Howe. Experience with Air Pollution from Hot Mix Asphalt Plants in New Zealand. Clean Air Society of Australia and New Zealand, Proc. Int. Clean Air Conf., Melbourne, Australia, May 15-18, 1972. pp. 227-232.
Keyphrases: process characteristics, scrubber performance, operating problems.

463. Dykema, O. W. Effects of Combustion Modification for NO_x Control on Utility Boiler Efficiency and Combustion Stability. EPA-600/2-77-190, September 1977.
Keyphrases: performance evaluation, efficiency, stability, numerical analysis.

470. Gabrielson, J. E., P. L. Langsjoen, and T. C. Kosvic. Field Tests of Industrial Stoker Coal-Fired Boilers for Emissions Control and Efficiency Improvement--Site A. EPA-600/7-78-136a, July 1978.
Keyphrases: effect of various parameters on boiler emissions, particulate emissions, particle size distribution of flyash.

498. Richards, C. L. Conversion to Coal - Fact or Fiction. Combustion, April 1978. pp. 7-13.
Keyphrases: market trends, furnace characteristics.

4.3

APPLICATIONS - EFFLUENT CHARACTERISTICS

85. Oglesby, S., Jr., and G. B. Nichols. A Manual of Electrostatic Precipitator Technology, Part II, Application Areas. EPA No. APTD-0611, August 1970.
Keyphrases: utilities, pulp and paper, iron and steel, rock products, chemical industry, municipal incinerators, petroleum, nonferrous metals, high temp-high pressure applications.

94. Noll, K., and J. Duncan. Industrial Air Pollution Control. Ann Arbor Science Publishers, Inc.,
Keyphrases: utilities, primary aluminum, electric arcs, iron foundries, steel, brass and brazing, stone production, portland cement, hot mix asphalt, coal refuse piles, plastics, fertilizer, Kraft pulp mills.

136. Tearle, K. A. Reducing Pollution by Catalytic Oxidation. Ind. Process Heat. 1970, 32-33, November 1970.
Keyphrases: industrial boilers, reheater.

164. Clark, D. G. Factors Influencing the Use of Fabric Filters in the Cement Industry. Proceedings Spec. Conf. User Fabric Filter Equip., Buffalo, October 14-16, 1973. pp. 140-145.
Keyphrases: dewpoint, particle abrasiveness, maintenance, safety.

179. Secondary Aluminum Smelter Air Pollution Control Using a Chromatographic Coated Bashouse -- A Technically New and Economic Solution. Presented at the Air Pollution Control Association Annual Meeting, Miami, June 18-22, 1972. Paper 72-79.
Keyphrases: secondary aluminum smelter emissions, test results for chromatographic baghouse, operating costs, comparison of costs with other techniques.

275. Smith, M. C., and A. A. Salerno. Engineering for Low Sulfur Fuels. Combustion 41, (11):6-12, May 1970.
Keyphrases: oil fired boilers, poiur point, electrical heating.

286. Stastny, E. P. Specifications for Electrostatic Precipitator Collectors for Fly Ash Collection on Industrial Steam Plants. Presented at the Industrial Coal Conference, Purdue University, Lafayette, Ind., October 12, 1966.
Keyphrases: vendor bid evaluation.

301. Cowherd, C. Jr., and K. D. Smith. The Control of Particulate Emissions from Alfalfa Dryers. Presented at the Air Pollution Control Assoc. Annual Meeting, June 24-28, 1973.
Keyphrases: bench scale and full scale performance data, cost.

350. Teixeira, D. P. Status of Utility Application of Homogeneous NO_x Reduction. NO_x Control Technology Semin. Proc., San Francisco, Calif., 1976.
Keyphrases: ammonia, cost, energy requirements.

353. Ewan, T. K. Recent Advances in Liquid Scrubbing for Fine Particulate Collection. Presented at the Air Pollution and Industrial Hygiene Conference, Air Quality Management in the Electric Power Industry, Austin, Texas, January 28-30, 1976.
Keyphrases: hydro-sonic process.

464. Serth, R. W., and T. W. Hughes. Source Assessment: Carbon Black Manufacture. EPA-600/2-77-107k, October 1977.
Keyphrases: thermal and furnace processes, model plant definition, affected population.

468. Smith, K. J. C. Nonferrous Smelter Studies: Investigation of Importance of 12 Operating Factors on SO_2 Concentration of Exit Gases from Multihearth Roasting of Copper Concentrates. Environmental Science and Technology 12, (1):62-66, January 1978.
Keyphrases: self-explanatory.

472. Bohn, R., T. Cuscino, Jr., and C. Cowherd, Jr. Fugitive Emissions from Integrated Iron and Steel Plants. EPA-600/2-78-050, March 1978.
Keyphrases: coke ovens, basic oxygen furnace charging, field testing of particulate emissions from materials handling operations, ranking of sources with respect to <5 micron fraction.

474. Radway, J. E. How More Ash Makes Less. Environmental Science and Technology 12, (4):388-391, April 1978.
Keyphrases: control of acid smut from oil-fired boilers, addition of dispersed magnesium oxide, effect on emissions.

476. Chalekode, P. L., J. A. Peters, T. R. Blackwood, and S. R. Archer. Emissions from the Crushed Granite Industry - State-of-the-Art. EPA-600/2-78-021, February 1978.
Keyphrases: sources, emission factors, potential environmental effects of emissions, respirable particulate, free silica.

4.4

APPLICATIONS - CONTROL SYSTEM DESIGN

89. Gage, J. R. Glass Bag Filters for Lime Kiln Exhaust. JAPCA 26, (1):26-31, January 1976.
Keyphrases: bag lives, performance monitoring, corrosion, fiberglass bags.

91. Paul, J. E. Application of Electrostatic Precipitators for the Control of Fumes from Low Odor Pulp Mill Recovery Boilers. JAPCA 25, (2):158-162, February 1975.
Keyphrases: inlet particle size distribution, outlet size distributions, hopper design, effluent characteristics, design criteria, photographs.

92. Ramsdell, R. G., Jr. Design Criteria for Precipitators for Modern Control Station Power Plants. Consolidated Edison Co., New York, April 1968.
Keyphrases: Deutsch equation, bus section, gas velocity.

95. White, H. J. Electrostatic Precipitator of Fly Ash. JAPCA 27, (3):206-215, March 1977.
Keyphrases: design, resistivity, particle size distribution, collecting area, gas velocities, aspect ratio, power, bus section.

108. White, H. J. Electrostatic Precipitation of Fly Ash. JAPCA 27, (4):308-318, April 1977.
Keyphrases: electrodes, high voltage equipment, rappers, gas flow distribution, operating problems, case histories.

111. Hemsath, K. H., and A. C. Thekdi. Air Pollution Control in the Carbon Baking Process. JAPCA 24, (1):60-63, January 1974.
Keyphrases: design requirements, incinerators.

112. Gadomski, R. R., et . al. An Evaluation of Emissions and Control Technologies for the Metal Decorating Process. JAPCA 24, (5):484-490, May 1974.
Keyphrases: web offset printing, total organics, CO_2, CO and CH_4, emission rates, catalytic incinerators, thermal incinerators.

113. PEDCo Environmental. Control of Atmospheric Emissions from Pusinhing and Quenching Operations in Metallurgical Coke Manufacture. EPA contract No. 68-02-0044, July 1973.
Keyphrases: process description, emissions, smokeless pushing, hooded quench car system.

114. Arrandale, R. S. Pollution Control in Fuel Fired Tanks. Glass Ind. 56, (6):12-13, June 1975.
Keyphrases: sub-micron particulate, plugging, materials of construction, glass furnaces.

116. Smith, K. D. Particulate Emissions from Alfalfa Dehydrating Plants - Control Costs and Effectiveness. Am. Dehydration Assoc. EPA-650/2-74-007, January 1974.
Keyphrases: field tests, drier emissions, recycle systems.

117. Radian Corporation. Factos Affecting Ability to Retrofit Flue Gas Desulfurization Systems. EPA-450/3-74-015, December 1973.
Keyphrases: vendor capability, space requirements, labor availability

118. Tretter, N. J., Jr. Development of a Veneer Dryer Emission Control System. Presented at Air Pollution Control Assoc. Meeting, Boise, November 19, 1974.
Keyphrases: design, operation, pilot scale tests, prototype tests.

120. Gibbs, E. R. Theory and Application of Electrostatic Precipitators. Pit Quarry 65, (3):118-119, 123, September 1972.

123. Elliott, A. C., and A. J. Lafreniere. Metallurgical Dust Collection in the Open Hearth and the Sinter Plant. Can. Inst. Mining Met., Trans. 65, 362-370, 1962.
Keyphrases: operating problems, selection of control technique, process emission characteristics.

130. Genton, R. G. Steel Mill Sinter Plant. Presented at the Air Pollution Control Assoc. 65th Annual Meeting, Miami, June 18-22, 1972. Paper 72-81.
Keyphrases: bag life, pressure drop, process emissions, fabric filters.

137. Epure, S. Design Consideration of Bag Houses for Use in Electric Furnace Operations. Iron Steel Engr. 37, (12):173-177, September 1960.
Keyphrases: furnace operating cycle, ventilation, system consideration, air-to-cloth ratio.

138. Barron, A. V., Jr. Particulate and SO_2 Control Technology for the Small and Medium Coal-Fired Boiler. Combustion 43, (4):44-56, October 1971.
Keyphrases: design criteria, operating variables, operating problems.

143. McKibbon, J. H. Selection of Electrostatic Precipitators to Meet New Pollution Codes. PResented at the Canadian Institute of Mining and Metallurgy Annual General Meeting, Quebec, April 1971.
Keyphrases: migration velocity, design procedures.

147. Hobson, M. J. Review of Baghouse Systems for Boiler Plants. JAPCA 26, (1):22-25, January 1976.
Keyphrases: baglife, air-to-cloth ratios, operation experience..

151. Helfritch, D. J., and G. H. Beach. Coal Fired Boiler Flyash Control by Bag Filters. Presented at the Energy and the Environment National Conference, September 29-October 1, 1975.
Keyphrases: baglife, outlet dust concentration fabric.

154. Beutner, Heinz P. A New Technology for Particulate Emission Control on Metallurgical Furnaces. Presented at the Air Pollution Control Assoc. Annual Meet., Boston, June 15-20, 1975. Paper 75-65.5.
Keyphrases: use of cyclone as precleaners, gas cooling, fabric selection, air-to-cloth ratios.

155. Bradway, R. M., W. C. Reed, and N. F. Supernant. Fractional Efficiency of a Utility Boiler Baghouse. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, June 15-20, 1975. Paper 75-66.3.
Keyphrases: control of acid gases, chromatographic baghouse, cost, bag life.

203. Varga, J., Jr. Control of Reclamation (Sinter) Plant Emissions Using Electrostatic Precipitators (Final Report). U. S. Environmental Protection Agency Report No. EPA-650/2-76-002, January 1976.
Keyphrases: sinter basicity, wet precipitator design specifications.

210. Jackson, R. M. Design, Installation, and Operation of Electrostatic Precipitators of Fluid Catalytic Cracker Flue Gas Applications. Presented at the IEEE Petroleum and Chemical Industry Conference, Houston, September 10-12, 1973. Paper TOD-74-55.
Keyphrases: operating problems, ammonia addition.

212. Greco, J., and J. A. Hudson. Specifications for High Efficiency Electrostatic Precipitators for Coal-Fired Steam-Electric Generating Plants. Air Pollution Control and Industrial Energy Production, Ann Arbor Science, 1974. pp. 307-319.
Keyphrases: electrode, hopper rappers, maintenance.

256. Factors Affecting Ability to Retrofit Flue Gas Desulfurization Systems (Final Report). EPA-450/3-74-015, December 1973.
Keyphrases: vendor limitations, plant space, labor, cost.

261. Pinheiro, G. Precipitators for Oil-Fired Boilers. Power Eng. 75, (4):52-54, April 1971.
Keyphrases: modifications to improve efficiency, power supply, ash characteristics.

278. Smith, W. M., D. Wheeler, R. W. Olson, and D. W. Coy. The Use of a Flow Model in the Design of an Electrostatic Precipitator. Blast Furnace Steel Plant 55, (12):1097-1102, December 1967.
Keyphrases: open hearth emissions, particle size.

290. Smith, W. M., and D. W. Coy. Fume Collection in a Steel Plant. Chem. Eng. Progr. 62, (7):119-123, July 1966.
Keyphrases: flow distribution model, ash removal.

344. Sableski, J. J., and W. A. Cote. Air Pollutant Emissions from Apratment House Incinerators. JAPCA 22, (4):239-247, April 1972.
Keyphrases: operating characteristics, emissions, design requirement.

347. Kenke, W. G. The New 'Hot' Electrostatic Precipitator. Combustion 42, (4):50-53, October 1970.
Keyphrases: resistivity, advantages, performance.

354. First, M. W., W. Schilling, J. H. Govan, and A. H. Quinby. Control of Odors and Aerosols from Spent Grain Dryers. Air Pollution Control Assoc., Pittsburgh, Pa. Southern Section and Technical Council, Control Technology, Agric., Air Pollut., Memphis, Tennessee, March 18-19, 1974. pp. 133-146.
Keyphrases: methods of construction, pilot scale and full scale tests.

359. Newton, L. R., and R. Fernandez. Dust Collection for Bagasse-Fired Boilers. HawaiiSugar Tech, , 1973, 99-103, November 1973.
Keyphrases: mechanical collectors, low energy scrubbers.

360. Matthews, J. C., F. L. Bellegia, C. H. Gooding, and G. E. Weant. SO_2 Control Processed for Non-Ferrous Smelters (Final Report). EPA-600/2-76-008, January 1976.
Keyphrases: lime/limestone, Wellman-Lord, magnesium oxide, double alkali, citrate, ammonia.

364. Robinson, J. W. Wet Scrubber Application to Hogged Fuel Boilers. Presented at the Air Pollution Control Assoc. Meeting, Boston, June 15-20, 1975. Paper 73-34.2.

365. Ensor, D. S., B. S. Jackson, S. Calvert, C. Lake, D. V. Wallon, R. E. Nilan, K. S. Campbell, T. A. Cahill, and R. G. Glocchini. Evaluation of a Particulate Scrubber on a Coal-Fired Utility Boiler (Final Report). EPA-600/1-75-074, November 1975. Keyphrases: TCA scrubber, mist entrainment, cost.

362. Ficek, K. J. Potassium Permanganate for Odor Control. Paul N. Cjeremisinoff and R. A. Young (editors). Industrial Odor Technology Assessment, Ann Arbor, Michigan, Ann Arbor Science Publishers, Inc., 1974. pp. 409-417. Keyphrases: applications, residence time.

450. Varga, J., Jr. Control of Reclamation (Sinter) Plant Emissions Using Electrostatic Precipitators. Contract No. 68-02-1323, Task 32, January 1976. Keyphrases: emission characteristics, dry precipitattor design characteristics, wet precipitators.

483. Duros, D. R., and E. D. Kennedy. Acid Mist Control. CEP, September 1978. pp. 70-77. Keyphrases: particle size distributions, typical operating parameters, applications.

465. Cooper. F., T. Lock, J. Mutchler, and J. Vecchio. Emission Testing and Evaluation of Ford/Koppers Coke Pushing Control System, Vol. I. (Final Report). EPA-600/2-77-187a. Keyphrases: mobile hood, venturi scrubber, emission factors.

498. Richards, C. L. Conversion to Coal - Fact or Fiction. Combustion, April 1978. pp. 7-13. Keyphrases: market trends, furnace characteristics.

4.5

APPLICATIONS - CONTROL SYSTEM INSTALLATION

253, Snow, R. H., J. H. Huff, and W. Boehme. Optimizing Wet Scrubber Systems for Odor Control in the Rendering Industry. Presented at the Purdue Air Quality Conference, Indianapolis, November 12, 1975.
Keyphrases: scrubber performance models, field tests, alkaline scrubbing.

272. Van der Lyn, A. Prescription for Cement Plant Dust Control. Rock Prod. 73, 73, 76-78, 80, 86-87, August 1970.
Keyphrases: conveying lines, ventilation systems, selection of control system.

4.6

APPLICATIONS - CONTROL SYSTEM OPERATION AND MAINTENANCE

96. Szabo, M., and R. Gerstle. Electrostatic Precipitator Malfunction in the Electric Utility Industry, EPA-600/2-77-006, January 1977.
Keyphrases: design, types of malfunctions, maintenance, inspection.

97. The Operation of Exhaust Systems in the Hot Mix Plant. NAPA Information Series 52, 1975.
Keyphrases: aggregate dryer, types of control equipment, general design and operating concepts, glossary.

101. Calvin, E. L., and F. D. Kodras. Sulfuric Acid Plant Emissions During Start-up, Shutdown, and Malfunctions. EPA-600/2-76-010. January 1976.
Keyphrases: process description, emissions and aerosols, glossary.

102. Offen, G. R., J. P. Kesselring, K. Lee, G. Poe, and K. Wolfe. Control of Particulate Matter from Oil Burners and Boilers. EPA-450/3-76-005, April 1976.
Keyphrases: equipment descriptions, emissions, impact of NO_x control techniques, oil pretreatment and oil additives, control methods.

107. Shore, D. E., and M. W. McElroy. Guidelines for Industrial Boiler Performance Improvement. EPA-600/8-77-003-a, January 1977.
Keyphrases: fundamentals of combustion, boiler inspection, stack instruments, NO_x reduction, boiler adjustment, fuel efficiency.

115. Schweiger, R. G. SO_2 Removal Systems Can Work. Power 119, (44):46, May 1975.
Keyphrases: operating problems, corrosion.

122. Mitsch, G. L., and R. A. Wright. The Electrostatic Precipitator and the Cupola. Trans. Am. Foundrymens Soc. 79, 257-260, 1971.
Keyphrases: selection, operating variables, costs.

163. Guilloud, R. L. Fabric Filters in the Aluminum Industry. Proceedings: Spec. Conf. User Fabric Filter. Equip. Buffalo, October 14-16, 1973. pp. 146-149.
Keyphrases: bag life, design, start-up.

180. Schubert, H. V. The Baghouse Operation at the Seattle Plant. Proceedings: Pacific Northwest Ind. Waste Conf. Pullman, Washington, May 25-26, 1961. pp. 41-61.
Keyphrases: electric arc furnaces, bag cleaning, air-to-cloth ratios, maintenance requirements.

183. Walling, J. C. Cement Plant Dust Collectors. Operations and Maintenance, Part III -- Bag Filters. Pit Quarry 64, (2):72-76, August 1971.
Keyphrases: pressure drop, operational problems, start-up, maintenance.

186. Venturini, J. L. Operating Experience with a Large Baghouse in the Electric Arc Furnace Steelmaking Shop at Bethlehem Steel Corporation's Los Angeles Plant. Presented at the Air Pollution Control Assoc. Annual Meeting, St. Louis. June 14-18, 1970. Paper 70-28.
Keyphrases: five years operating experience, maintenance cost, emission levels.

191. Bagwell, F. A., L. F. Cox, and E. A. Prixh. Design and Operating Experience with a Filterhouse Installed on an Oil-Fired Boiler. Presented at the Air Pollution Control Assoc. Annual Meeting, St. Paul, June 24, 1968.
Keyphrases: operating problems, capital and operating costs.

208. Henderson, J. S., and J. E. Roberson. The Pulp and Paper Industry Precipitator Survey. Air Pollution Control and Industrial Energy Production. K E. Noll, W. T. Davis, and J. R. Duncan (editors). Ann Arbor, Michigan, Ann Arbor Science, 1974. pp. 161-172.
Keyphrases: design data, performance, maintenance costs, downtime.

209. Faure, F., R. B. Jacko, and R. Squires. The Collection Efficiency of an Electrostatic Precipitator for Trace Metals from an Open Hearth Furnace. National Science Foundation, Washington, D. C., Research Applied to National Needs, Trace Cont. Conf. Proc., Pacific Grove, California, August 29-31, 1974 pp. 64-68.
Keyphrases: particle size influence, agglomeration, emission quantity.

216. Engelbrecht, H. L., and N. D. Graves. Electrostatic Precipitator Installation for a Low Odor Recovery Boiler. Presented at the Air Pollution Control Assoc. Annual Meeting, Boston, Mass., June 15-20, 1975.
Keyphrases: field test results, efficiency, rapping requirements.

249. Kenderson, J. S., and J. E. Roberson. Nineteen-hundred and seventy-one Precipitator Survey. TAPPI 56, (4):91-94, April 1973.
Keyphrases: reliability, maintenance costs, emissions.

257. Greco, J., and W. A. Wynot. Operating and Maintenace Problems Encountered with Electrostatic Precipitators. Presented at the American Power Conference Annual Meeting, Chicago, Ill., April 20, 1971.
Keyphrases: reliability, maintenance, sizing, flow distribution, summary of TVA experience.

258. Jones, B. G. Refinery Improves Particulate Control. Oil Gas J. 69, (26):60-62, June 28, 1971.
Keyphrases: silicon control rectifier, catalytic cracker.

263. Zarfoss, J. R. Operating Characteristics that Influence Precipitator 'Snowing': An Interim Report. TAPPI 54, (4):546-548, April 1971.
Keyphrases: kraft recovery boiler, rapping, ESP design considerations.

270. Dedlow, R. P. Maintenance and Safety in Connection with Dust Collection Equipment. Presented at the Institute of Electrical and Electronics Engineers (IEEE) Cement Industry Technical Conference, Toronto, May 13, 1969.
Keyphrases: safety lock-out, electrical characteristics.

276. First, M. W., H. E. Friedrich, and R. P. Warren. Reduction of Emissions from a Recovery Boiler. TAPPI 43, 96):182A-185A, June 1960.
Keyphrases: snowing, precipitator operation, corrosion.

281. Fernandes, J. H. Incinerator Air Pollution Control. American Society of Mechanical Engineers, New York, Incinerator Div., Proc. National Incinerator Conf., New York, May 5-8, 1968, pp. 101-116.
Keyphrases: emissions, control equipment performance.

287. Reese, J. T., and J. Greco. Experience with Electrostatic Fly-Ash Collection Equipment Serving Steam-Electric Generating Plants. JAPCA 18, (8):523-528, August 1968.
Keyphrases: operating temperature, fuel sulfur content, ammonia injection.

309. Cross, F. L. Air Pollution Control -- Apartment House Incinerators. Waste Age 4, (1):40, 42, 44, January-February 1973.
Keyphrases: apartment house incinerators, operator of scrubbers, maintenance.

313. Nicklin, G. T. Theory and Application of Wet Scrubbers. Pit Quarry 65, (3):115-117, 120, September 1972.
Keyphrases: comparison of scrubber types, cost, use of sensible heat condensation.

346. Busby, H. G. T., C. Whitehead, and K. Darby. High Efficiency Precipitator Performance on Modern Power Stations Firing Fuel Oil and Low Sulphur Coals. Presented at the International Clean Air Congress, Washington, D. C., 1970. Paper EN-34H.
Keyphrases: resistivity, gas conditioning.

356. Fife, J. A. Techniques for Air Pollution Control in Municipal Incineration. AICHE Symp. Ser. 70, (137):465-473, 1974.
Keyphrases: general review.

429. McKnight. Effect of Transient Operating Conditions on Steam-Electric Generator Emissions. EPA-600/2-75-022, August 1975.
Keyphrases: load variation, fuel characteristics, SO_z NO, particulates, visible emissions.

424. McDonald, J. R. and L. E. Sparks. A Precipitator Performance Model: Application to the Non-Ferrous Metals Industy. Proceedings, Particulate Control Problems Using ESP's in the Metallurgical Industry. EPA-600/2-77-208, October 1977. pp. 72-102.

423. Whitehead, C. Design and Operating Experience with Electrostatic Precipitators on Electric Air Furnaces. Proceedings, Particulate Control Problems Using ESP's in the Metallurgical Industries. EPA-600/2-77-208, October 1977. pp. 23-39.

389. Lemon, E. D. Wet Scrubbing Experience with Fine Borax Dust. JAPCA 27, (11):1020-1052, November 1977.
Keyphrases: borax fusion furnaces and claciners, case history of control efforts, upgrading existing scrubbers, emission versus pressure drop.

370. Steiner, B. A., and R. J. Thompson. Wet Scrubbing Experience for Steel Mill Applications. JAPCA 27, (1):1069-1975, November 1977.
Keyphrases: sinter plants, blast furnaces, boilers, open hearth, case histories, comparison of performance and design values.

371. Calvert, S., S. Ganahi, D. L. Harmon, and L. E. Sparks. FF/C Scrubber Demonstration on a Secondary Metal Recovery Furnace. JAPCA 27, (11):1076-1080, November 1977.
Keyphrases: fractional penetration curves, control efficiency for fine particulate, pressure drop, design description,cost.

445. Varga, J., Jr. Control of Steel Plant Scarfing Emissions Using Wet Electrostatic Precipitators. EPA-600/2-76-o54, March 1976.
Keyphrases: wet electrostatic precipitators, characteristics of scarfing emissions.

448. Ensor, D. S., B. S. Jackson, S. Calvert, C. Lake, D. V. Wallon, R. E. Nilan, K. S. Campbell, T. A. Cahill, and R. G. Flocchini. Evaluation of a Particulate Scrubber on a Coal-Fired Utility Boiler. Contract No. 68-02-1802, November 1975.
Keyphrases: full scale mobile bed scrubber, reentrainment, submicron particulate, cost, design, cascade impactor tests, diffusion battery test.

452. Calvin, E. L., and F. D. Kodras. Effect of Equipment Maintenance and Age on Sulfuric Acid Plant Emissions. EPA-600/2-76-119, April 1976.
Keyphrases: single and dual absorption plants, various feedstocks, history of malfunctions, recommended preventive maintenance, inspection checklist.

459. Gooch, J. P., G. H. Marchant, Jr., and L. G. Felix. Particulate Collection Efficiency Measurements on an ESP Installed on a Coal-Fired Utility Boiler. EPA-600/2-77-011, January 1977.
Keyphrases: fractional efficiencies at two current densities, comparison with model predictions.

462. Gooch, J. P., and G. H. Marchant, Jr. Particulate Collection Efficiency Measurements on an Electrostatic Precipitator Installed on a Paper Mill Recovery Boiler. EPA-600/2-76-141, May 1976.
Keyphrases: fractional collection efficiencies, comparison of cascade impaction data in mass sampling train, electric aerosol analyzer.

497. Szabo, M. F., and R. W. gerstle. Operation and Maintenance of Particulate Control Devices on Selected Steel and Ferroalloy Processes. EPA-600/2-78-037, March 1978.
Keyphrases: fine particulate emissions, electrostatic precipitators, wet scrubbers, fabric filters, selection, operation, expected performance.

498. Richards, C. L. Conversion to Coal - Fact or Fiction. Combustion, April 1978. pp. 7-13.
Keyphrases: market trends, furnace characteristics.

4.7

APPLICATION - PERFORMANCE OPTIMIZATION

93. Green, G. P., and W. S. Landers. Operating Experience with Gas Conditioned Electrostatic Precipitators. Proceedings of the Symposium on Control of Fine Particulate Emission from Industrial Sources, January 15-18, 1974. pp. 169-188.
Keyphrases: utilities, low sulfur western coals, SO_3 coal and ash analyses, acid system flowback, conditioning system problems, before and after conditioning performance data.

90. Cook, R. E. Sulfur Trioxide Conditioning. JAPCA 25, (2):156-158, February 1975.
Keyphrases: utilities, western low sulfur coals, power density as function of SO_3, collection efficiency as function of SO_3, SO_3 generation, system flowsheets.

139. Ellison, W. Process Optimization in Control of Air Pollution. Presented at the Am. Society of Mech. Engr., New Yor, November 29 - December 3, 1970. Paper 70-WA/APC-2.
Keyphrases: hooding, electric furnaces, combustion equipment, kraft pulp mills, cupolas.

349. Paulson, C. A. J., and A. R. Ramsden. Some Microscopic Features of Fly-Ash Particles and their Significance in Relation to Electrostatic Precipitation. Atmos. Environ 4, (2):175-185, 1970.
Keyphrases: pilot scale and field samples, gas humidity.

4.8

APPLICATIONS - MONITORING

178. Wagner, A. J. Monitoring Operation of a Multiple-Collection Pollution Control Installation. Mod. Casting 62, (2):36-37, August 1972.
Keyphrases: monitoring.

236. Walker, R. L., and P. P. Marinak. Pressure and Temperature Controls on Electric Furnace Fume Collection Systems. Instr. Metals Ind. 21, (3):3-1 to 3.3-4, 1971.
Keyphrases: gas treatment, fabric filter, combustion, cooling, spray towers.

428. Crawford, A. R., M. W. Gregory, E. H. Manny, and W. Bartok. Magnitude of SO_2, NO, CO_2, and O_2 Stratification in Power Plant Ducts. EPA-600/2-75-053, September 1975.
Keyphrases: utility boilers.

399. Greene, M. W., R. L. Chapman, S. C. Creason, R. N. Harvey, G. A. Heyman, and W. R. Pearson. Evaluation of Monitoring Systems for Power Plant and Sulfur Recovery Plant Emissions. EPA-600/2-76-171, June 1976.
Keyphrases: evaluation of commercial instruments, SO_2, H_2S, comparison of performance with EPA criteria.

4.9

APPLICATIONS - CONTROL SYSTEM INSPECTION

98. Engineering Sciences, Inc. Field Surveillance and Enforcement Guide for Primary Metallurgical Industries. EPA-450/3-73-002, December 1973.
Keyphrases: iron and steel, primary aluminum, copper smelter, lead smelters, zinc smelter, general enforcement procedures.

99. Engineering Sciences, Inc. Inspection Manual for Enforcement of New Source Performance Standards - Basic Oxygen Process Furnaces. EPA Contract No. 68-02-1086, November 1975.
Keyphrases: process description, inspection procedures, performance testing, start-up, shutdown and malfunctions.

100. Engineering Sciences, Inc. Inspection Manual for Enforcement of New Source Performance Standards - Secondary Lead Smelters. EPA Contract NO. 68-02-1082, November 1975.
Keyphrases: process description, inspection procedures, performance testing, start-up, shutdown and malfunctions.

103. Engineering Sciences, Inc. Inspection Manual for Enforcement of New Source Performance Standards - Asphalt Concrete Plants. JACA Corporation. EPA-340/1-76-003, March 1976.
Keyphrases: process description, raw materials emissions, particulate control, inspection procedures, performance tests.

104. Devitt, T., and N. J. Kulujian. Inspection Manual for the Enforcement of New Source Performance Standards - Fossil Fuel Fired Steam Generators. EPA-340/1-75-002.
Keyphrases: process description, emissions, control methods, instrumentation, record keeping, start-up, shutdown, maintenance, performance tests, inspection procedures.

105. Kulujiian, N. J. Inspection Manual for the Enforcement of New Source Performance Standards - Portland Cement Plants. EPA-340/1-75-001, September 1975.
Keyphrases: process description, emissions, control methods, instrumentation, record keeping, start-up, slowdown, malfunctions, performance tests, inspection procedures.

106. Devitt, T., and N. J. Kulujian. Inspection Manual for the Enforcement of New Source Performance Standards - Sewage Sludge Incinerators. EPA-340/1-75-004, February 1975.
Keyphrases: process description, emissions, control, instrumentation, record keeping, start-up, shutdown, malfunctions, performance tests, inspection procedures.

4.10

APPLICATION - CONTROL SYSTEM CORROSION

86. Horie, E. C., and G. W. Tuffmell. A Summary of Corrosion Tests in Flue Gas Desulfurization Processes. JAPCA 26, (4):307-312, April 1976.
Keyphrases: composition of alloys, carbon steels, stainless steels, nickel alloys.

351. Hoxie, E. C., and G. W. Guffnell. A Summary of Inco Corrosion Tests in Power Plant Flue Gas Scrubbing Processes. Resolving Corrosion Problems in Air Pollution Control Equipment. Houston, National Assoc. of Corrosion Engineers, 1976. pp. 65-71.

352. Engdahl, R. B., and K. S. Murphy. Updating the Applicability of Scrubbers. Presented at the Pollution Control Congress, Cleveland, October 20-23, 1975.

357. Sakol, S. L., and R. A. Schwartz. Construction Materials for Wet Scrubbers. Chem. Eng. Progr. 70, (8):63-68, August 1974.
Keyphrases: selection criteria.

479. Sheppard. W. L., Jr. Using Chemical Resistant Masonry in Air Pollution Control Equipment. Chemical Engineering, November 20, 1978. pp. 203-210.
Keyphrases: self-explanatory.

483. Duros, D. R., and E. D. Kennedy, Acid Mist Control. Chemical Engineering, September 1978. pp. 70-77.
Keyphrases: particle size distributions, typical operating parameters, applications.

4.11

APPLICATIONS - CONTROL SYSTEM COST

337. McLeod, J., L. Ferrari, and H. Scheltema. Control of Acid Fume from Dross Reprocessing. Australian Chem. Process. Eng. (Sydney) 25, (2):13-16, February 1972.
Keyphrases: venturi scrubbers, construction factors, chloride control.

471. Linero, A. A., and R. A. Baker. Evaluation of Emissions and Control Techniques for Reducing Fluoride Emissions from Gypsum Ponds in the Phosphoric Acid Industry. EPA-600/2-78-124, June 1978.
Keyphrases: mathematical models, ponds as sources of fluorides, costs, ambient fluoride concentrations.

499. Suydam, C. D., Jr., and A. F. Duey. An Economic Evaluation of Washed Coal for the Four Corners Generating Station. Combustion, April 1978. pp. 38-42.
Keyphrases: O&M, cost impact, capital costs.