

905 - 453 - 5330

Liquid/Solid Separation and Drying Products Instruction Manual

Komline-Sanderson Avery Filter Press

**Giles Chemical Corporation
K-S Job # I-2314
Customer Reference No.: 114374
Model # 1200-100 LS/50-64/32
Waynesville, NC 28786**

KOMLINE-SANDERSON

12 Holland Av, Box 257, Peapack, NJ 07977
Phone # To Order Parts: (800) 572-3457
To Order Fabrics & Belts: (800) 572-3456
FAX for Pricing and Orders: (908) 234-9047
(For Technical Assistance) Customer Service:
Main# (908) 234-1000

**K-S AVERY FILTER PRODUCTS
KOMLINE-SANDERSON ENGINEERING CORP.
12 HOLLAND AVENUE
PEAPACK, NEW JERSEY 07977
USA
(908) 234-1000**

**FILTER PRESS IDENTIFICATION
GILES CHEMICAL CORP.
WAYNESVILLE, NC 28786**

******* GENERAL SPECIFICATIONS *******

DATE:	August, 2001
K-S AVERY JOB NO.:	I-2314
CUSTOMER PO NO.:	114374
MACHINE:	Filter Press
MACHINE MODEL NO.:	1200-100 LS/50-64/32
SERIAL NO.:	AF0228
HYDRAULIC OPERATING PRESSURE:	3900 psig
MAX. FILTRATION PRESSURE:	74 psig @ 75° C 30 psig @ 85° C
MAX. SQUEEZE PRESSURE:	195 psig @ 60° C 90 psig @ 85° C
FILTRATION AREA:	1210 sq ft expandable to 1550 sq ft
FILTRATION VOLUME:	61.4 cu ft expandable to 78.5 cu ft

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Table of Contents

Safety Instruction	S-1
1 Introduction	1-1
1.1 History	1-2
1.2 Terminology	1-3
2 Receiving, Handling, and Installation	2-1
2.1 Claims	2-1
2.2 Care of Equipment	2-1
2.3 Moving the K-S Avery Filter Press	2-1
2.4 K-S Avery Filter Press Lifting Instructions	2-2
2.4.1 Steps to Lift the Filter Press	2-2
2.5 Setting and Installation Instructions for the Filter Press	2-3
2.5.1 Placement Considerations	2-3
2.5.2 Setting of the K-S Avery Filter Press	2-4
2.5.3 Skeleton Installation	2-5
2.5.4 Air and Electrical Component Installation	2-5
2.5.4.1 Air Installation	2-6
2.5.4.2 Electrical Installation	2-6
2.5.5 Process Connection Installation	2-6
2.6 Paint	2-6
2.7 Electrical Equipment and Control Panel	2-7
2.8 Miscellaneous Parts	2-7
3 Storage	3-1
3.1 Long Term Storage (Field Storage* or Storage Over 30 Days)	3-1
3.1.1 Effects of Long Term Storage	3-1
3.1.2 Need for Proper Protection	3-1
3.1.3 Basis of Recommendations	3-1
3.2 Standard Pre-Shipment Preparation	3-2
3.3 Maintenance During Storage by the Contractor or Owner	3-2
3.3.1 Location	3-2
3.3.1.1 Indoors	3-2
3.3.1.2 Outdoors	3-2
3.3.2 Equipment Support	3-3
3.3.3 Surface Protection	3-3
3.3.3.1 Painted Surfaces	3-3
3.3.3.2 Rubber or Rubber-Coated Surfaces	3-3
3.3.3.3 Unpainted or Machined Metal Surfaces:	3-3
3.3.4 Electrical Equipment and Control Panels	3-3
3.4 Supplementary Instructions	3-4
3.4.1 Plate Storage	3-4
3.4.2 Long Term Cloth Storage	3-4
3.5 Storage of the K-S Avery Filter Press After Start-up	3-5

3.5.1	Less Than One Month	3-5
3.5.2	One to Six Months	3-5
3.5.3	Over Six Months	3-5
3.5.4	Bringing the Press into Service	3-6
4	K-S Avery Filter Press Filter Plates	4-1
4.1	Description of K-S Avery Filter Plates	4-1
4.1.1	Membrane (Diaphragm) Filter Plates	4-2
4.1.2	Handling of Polypropylene Filter Plates	4-2
4.1.3	Installation of the Filter Plates	4-3
4.2	Filtration Cycle Optimization	4-3
4.3	Filter Plates During Operation	4-5
4.3.1	Process Feed Material Recommendations	4-5
4.3.2	Filter Medium Maintenance	4-6
4.3.3	Filter Plate Maintenance	4-6
5	K-S Avery Hydraulic Power Unit	5-1
5.1	Description (Electric driven double gear pump)	5-1
5.2	Hydraulic Power Unit Components	5-2
5.2.1	Pressure Relief Valve	5-2
5.2.2	Hydraulic Pressure Accumulator	5-2
5.2.3	Hydraulic Counterbalance Valve	5-2
5.2.4	Hydraulic Unloading Valve	5-2
5.2.5	Hydraulic Pressure Switches	5-3
5.2.6	Hydraulic Fluid	5-3
5.2.6.1	Fluid Level	5-3
5.2.6.2	Fluid Change Interval	5-3
5.2.7	Oil Filter	5-4
5.2.8	Hydraulic Pressure Accumulator	5-4
5.3	Hydraulic Power Unit System Adjustments	5-5
5.3.1	Pressure Settings	5-5
5.3.1.1	Hydraulic Counterbalance Valve Adjustment	5-5
5.3.1.2	Hydraulic Unloading Valve Adjustment	5-6
5.4	Troubleshooting the Hydraulic Power Unit	5-7
5.4.1	Hydraulic Pump Not Operating	5-7
5.4.2	Hydraulic Pump Not Pumping	5-7
5.4.3	Pumps Cycling Excessively	5-8
5.4.4	High Hydraulic Pressure	5-8
5.5	Hydraulic Cylinder	5-9
5.5.1	Hydraulic Cylinder Maintenance	5-9
6	Plate Shifter Operation	6-1
6.1	Plate Shifter Operation	6-1
6.1.1	Semi-Automated Operation	6-1
6.1.2	Automated, PLC Controlled Operation	6-2
6.2	Plate Shifter Maintenance	6-2
6.3	Shuttle Car Maintenance	6-3
6.3.1	Horizontal Shuttle Car Adjustment	6-3

6.3.2	Vertical Shuttle Car Adjustment	6-3
6.4	Torque Clutch Adjustment	6-4
6.5	Plate Shifter Troubleshooting	6-4
6.5.1	Plates not being Picked-up	6-4
6.5.2	Plate Shifter Dragging.	6-4
6.5.3	Plates not Moving.	6-5
6.5.4	Plate Shifter not Operating.	6-5
6.5.5	Plate Shifter will not Start.	6-5
6.5.6	Shifter will not Stop at End of Cycle.	6-5
7	K-S Avery Squeeze System	7-1
7.1	Description	7-1
7.1.1	Squeeze Components	7-1
7.2	Operation	7-2
7.2.1	Sequence of Operation	7-2
7.2.2	Operational Warnings	7-3
7.3	Maintenance	7-3
8	Drip Tray	8-1
8.1	Description	8-1
8.2	Maintenance	8-1
9	Filter Media	9-1
9.1	Filter Cloth	9-1
9.1.1	Types of Fibers Used in Woven Fabrics	9-2
9.1.2	Types of Weaves in Woven Fabrics	9-2
9.1.3	Non-Woven Filter Fabrics	9-3
9.1.4	Additional Cloth Terminology	9-3
9.1.4.1	Cloth Styles	9-3
9.1.4.2	Cloth Coatings	9-4
9.1.4.3	Fastening Devices	9-4
9.2	Filter Aid	9-5
9.2.1	Types of Filter Aid	9-5
9.2.2	Filter Aid Application Instructions	9-6
9.2.2.1	Precoat Application	9-6
9.2.2.2	Body Feed Application	9-6
9.3	Installation Procedure for Fold Over (Drape Over) Filter Media	9-7
9.4	Installation Procedure for Filter Media with Barrel Necks	9-8
9.5	Filter Media Cleaning Procedure	9-9
10	Operation	10-1
10.1	Getting Started	10-2
10.1.1	Pre Start-Up Check List	10-2
10.1.2	Filter Press Controls	10-2
10.2	Batch Filtration Operational Sequence	10-3
10.2.1	Opening and Closing the Filter Press	10-4
10.2.1.1	Opening the Filter Press	10-4
10.2.1.2	Closing the Filter Press	10-4
10.2.2	Preheat Stage	10-5

10.2.3	Automatic Sequence	10-5
10.2.3.1	Precoat Stage	10-5
10.2.3.2	Filtration Stage	10-6
10.2.3.3	Water Flush	10-6
10.2.3.4	Pre-Squeezing Stage	10-6
10.2.3.5	Cake-Washing Stage	10-7
10.2.3.6	Final High Pressure Squeeze Stage	10-7
10.2.3.7	Wash Liquor Stage	10-7
10.2.3.8	Core-Blow Stage	10-8
10.2.3.9	Air or Nitrogen Blow Stage	10-8
10.2.3.10	End of Cycle	10-8
10.2.4	Cake Discharge Stage	10-8
10.2.4.1	Lower Drip Trays	10-8
10.2.4.2	Open the Filter Press	10-8
10.2.4.3	Conveyor	10-9
10.2.4.4	Plate Shifting	10-9
10.3	Troubleshooting Guide	10-10
11	Programmable Logic Controller and OIT	11-1
11.1	Control Overview	11-1
11.2	Installation and Startup	11-2
11.3	Filter Press Operation with PLC Control	11-2
11.3.1	Operation Screens	11-3
11.3.1.1	Overview Screen	11-3
11.3.1.2	Auxiliary Screen	11-3
11.3.2	Set Point Entry	11-4
11.3.2.1	Process Setpoints	11-4
11.3.2.2	Sequence Times	11-4
11.3.2.3	Filter Setup	11-5
11.3.3	Manual Stages	11-5
11.3.4	Plate Shifting Operation	11-6
11.4	Manual Operation	11-7
11.5	Alarms	11-8
11.6	Diagnostics	11-8
11.7	Hold Feature	11-8
12	Spare Parts Information and Lists	12-1
12.1	Filter Media	12-1
12.2	Recommended Spare Parts List	12-1
12.3	K-S Avery Parts Sales	12-2

Certified Specifications

Commercial Components

Reference Drawings

SAFETY INSTRUCTIONS

BE SAFETY CONSCIOUS - Observe all local safety codes and O.S.H.A. regulations. Do not operate equipment under unsafe conditions.

READ INSTRUCTION MANUAL - The instruction manual must be read and thoroughly understood by those responsible for the installation, operation, and maintenance of this equipment.

OPERATOR TRAINING - Operators must be trained in the proper and safe use of equipment.

SAFETY GUARDS MUST BE IN PLACE - All guards must be in place while equipment is running to protect against bodily injury.

STOP EQUIPMENT - The equipment should always be stopped before any attempt is made to repair, maintain, climb on, or remove tramp material.

STAY CLEAR OF MOVING MACHINERY - Do not put your hands, feet, or any part of your body in the equipment while it is running.

DRESS PROPERLY - Do not operate equipment while wearing jewelry, loose fitting clothing, ties, shirt sleeves or unprotected long hair.

STAY ALERT - Do not operate equipment while under the influence of medication, drugs or alcohol.

MAINTAIN EQUIPMENT - Do not operate equipment in need of repair or service. Proper maintenance will help avoid equipment downtime, loss of production and injury to personnel.

ELECTRICAL REPAIR - Electrical power must be turned off before attempting any repairs to electrical components. Lock out control panel and all starting switches so that another person cannot accidentally start the equipment.

PNEUMATIC/HYDRAULIC REPAIR - Do not repair or service pneumatic or hydraulic components while equipment remains connected to the pneumatic/hydraulic power supply or is under pressure.

HANDLE CHEMICALS WITH CARE - Always consult vendor safety data sheets before handling chemicals. Do not handle or inhale chemicals for process conditioning, cleaning or any other purpose without the proper eye, skin, and respiratory protection.

SAFETY INSTRUCTIONS

ALWAYS -

1. Observe safe operating procedures as described in this manual.
2. Follow correct filter press operating procedures.
3. Wear safety glasses with side shields when operating equipment.
4. Water-Test Equipment prior to introducing process fluid and commissioning.
5. Develop feed pressure slowly.
6. Open and close valves slowly to minimize shock effects.

NEVER -

1. Operate any component of the filter press system while workers are servicing any part of the machine.
2. Exceed feed pressure indicated on the name plate.
3. Change a small percentage of filter media without thoroughly cleaning all other media.
4. Exceed hydraulic pressures indicated on the name plate.
5. Exceed the maximum allowable operating temperature (90°C).
6. Stand in the close proximity of the filter while it or its components are in operation.
7. Use sharp objects for cleaning filter press, plates, or cloths. Use plastic cake scrapers.
8. Begin feeding product to filter until the prescribed hydraulic closing pressure has been reached.
9. Open the filter until the internal chamber pressure has dropped to 0 psi.
10. Run products that are not compatible with the materials of construction utilized to manufacture the filter press.
11. Open the filter until the internal membrane plate pressure has dropped to 0 psi.

SAFETY INSTRUCTIONS

IMPORTANT - If you have any questions pertaining to the safe operation of the equipment, contact:

KOMLINE-SANDERSON CUSTOMER SERVICE MANAGER

P.O. Box 257

PEAPACK NEW JERSEY 07977

Phone Number: 800-CALL-4KS

Phone Number: 800-225-5457

1 Introduction

This manual is provided for use in the installation, operation, and maintenance of the Komline-Sanderson Avery Filter Press. The manual is necessarily general and should be used in conjunction with the drawings and specifications for a given installation. A set of such drawings can be found in the Reference Drawing Section.

A study of the manual will assist in understanding the installation, function, and operation of the K-S Avery Filter Press. A copy of the manual should be readily available to all concerned with either operation or maintenance of the filter press and its accessories.

Filter press dewatering is a liquid/solid separation system that utilizes pressure and, in some cases, mechanical dewatering to remove solids from a process or waste slurry. Filter presses consist of a series of horizontally designed chambers arranged in parallel as illustrated below. The filter press also consists of a skeleton to support the filter plates and a closure mechanism to provide the necessary force on the sealing faces of the plates to counteract the applied force of filtration.

To begin the filtration cycle, the closing force is applied to the filter plates. Process material is introduced under pressure into each filtration chamber. Filter medium, placed over each filter plate face, retains suspended solids forming a filter cake in each filter chamber. Liquid or filtrate flows through the filter cake and filter medium and is collected through drainage outlets. When the filtration cycle is completed the closing force is released, and the filter plates are separated permitting each filter cake to be discharged from the chambers.

1.1 History

The filter press was first utilized more than 160 years ago and consisted of wooden flush plates and wooden distance frame assemblies. This was the technology utilized in filter press filtration for many years. The plate and frame plate stack design is now used for clarifying process slurry filtrations.

As technology advanced, filter press plate manufacturing improved and filter press plates with recessed chambers were developed. The recesses of two plates form the chamber to collect solids in place of the original flush plates and distance frames. This design originated after the turn of the century when most plates were cast from iron permitting the recesses to be made. The recessed chamber design permitted easier cake discharge and made possible plate shifting devices to automate cake discharge. It was also possible to gasket the plate to reduce or eliminate leakage.

Polypropylene filter plates were later developed to replace the heavy and expensive cast iron plates. Although some applications still require metal plates, polypropylene is used almost exclusively in process filtration applications and sludge dewatering. The first molded plates were the center feed recessed chamber design.

The next innovation in filter press plate technology was the corner feed recessed chamber plate. The integrity and strength of the corner feed chamber plate increased 30% and the durability also significantly increased. Corner feed provided more uniform solids distribution in the chamber and easier cake discharge.

In 1964, the next revolutionary design in filter plate development was the diaphragm or membrane plate. The membrane or diaphragm consists of an impermeable, flexible, polypropylene sheet that is fused to the body of a filter press plate at the edges. Compressed air or pressurized water is introduced into the space between the plate and membrane to inflate the membrane (diaphragm). The mechanical force pressurizing the membrane (squeeze pressure) compresses the filter cake within the chamber.

Significant operating advantages are obtained with membrane plate technology. A membrane filter press has much shorter filtration cycles compared to conventional filter press technology. Application of squeeze pressure to a filter cake achieves a higher final solids content.

The K-S Avery filter press utilizes a mixed-pack filter plate stack, which comprises alternating membrane plates with companion recessed chamber plates. This enables squeezing of the filter cake to provide the same high cake solids as with standard membrane plate stacks, but permits squeezing of the cake into partially filled chambers. This innovation provides an important safeguard against operator error and prolongs filter plate life.

Utilizing the various types of plate stack designs developed over the past 160 years, K-S Avery Filter Presses are selected as one of the most economical methods of dewatering in the industrial market. The K-S Avery Filter Press has been utilized in a variety of industries to attain high cake solids, filtrate clarity, and a thoroughly washed cake. Several applications are clarification of syrup, juice, wine, and oil; dewatering of minerals, precipitates, and waste water slurries; and dewatering and washing of pigments, inorganic salt slurries, and pharmaceutical products.

Each installation of the K-S Avery Filter Press may vary according to process requirements. Please refer to the site-specific manufacturing drawings for your filter press design.

1.2 Terminology

Terms used have the following meanings:

- Feed Slurry: A combination of solids and liquids resulting from a production or waste process that will be dewatered.
- Filter Press: The equipment or machine used for dewatering or filtration.
- Filter Cake: The solids separated from the liquid within the filter chamber.
- Filter Medium: The medium covering the face of the filter plates that permits passage of filtrate and retains particulate material to form a cake. The medium may be a wire screen, a natural or synthetic cloth, or a filter aid such as diatomaceous earth.
- Filtrate: The liquid portion of the slurry passing through the filter medium.
- Filtration: The process by which solids are mechanically separated from liquids by means of a pervious medium. When the purpose is to remove most but not necessarily all of the suspended solids, the operation is generally referred to as dewatering.
- Membrane: Synonymous with diaphragm. The expandable and impermeable polypropylene sheet fused to the body of a filter press plate at the edges. Membranes filter plates are utilized to increase solids content and improve washing efficiency of the filter cake.