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NSWC PANAMA CITY
5090.3a

ENVIRONMENTAL ENGINEERING SURVEY

NAVAL COASTAL SYSTEMS LABORATORY
PANAMA CITY, FL

JUNE 1976

SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA

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SUMMARY AND RECOMMENDATIONS

1. Potable Water service is satisfactory and the water is of excellent quality meeting PHS Drinking Water Standards.

2. Cooling tower water treatment is apparently effective in protecting the systems. Control of bleedoff with conductivity controlled solenoid valves is recommended. Sodium pentachlorophenate is used as an algaecide. Use of this material is not permitted when discharge is to natural drainage systems. Federal Supply Schedule polyphosphates are less costly than commercial components for cooling water treatment.

3. Boiler water treatment is not practiced at the activity. Two old steam generators will be replaced shortly. The water sides of these units should be inspected on dismantling to determine the effects of non treatment. Polyphosphate with tannin can protect the new steam generators from internal corrosion.

4. Swimming pool water treatment is under commercial contract and is apparently satisfactory. Circulation pump life may be increased and filter runs extended by the proper addition of diatomite "body feed".

5. Wastewater treatment is excellent, producing an effluent with the clarity of potable water. Minor changes in procedures have been discussed with operator. The flow meter remains inoperative and should be repaired. Plant improvements are planned under MILCON P-255. // QC

6. The wastewater collection system apparently is subject to excessive infiltration judging from old flow records. A flow versus rainfall comparison with the old flow meter indicated high infiltration. Certain lines known to be in poor condition may be repaired by pulling a liner pipe through the existing lines. If infiltration is a continuing problem, a pollution abatement project should be submitted for TV inspection and pressure grouting repair or relining of the sewer system.

I. INTRODUCTION

In accordance with NAVFACINST 5450.19B of 15 October 1974, an Environmental Engineering Survey was conducted at the Naval Coastal Systems Laboratory, Panama City, Florida on 8-9 June 1976. The survey was performed as a follow-up to a similar survey performed on 26-27 March 1975.

II. PERSONS CONTACTED

Lt. G. L. Law	Public Works Officer
Mr. M. Southall	Supervisory Engineer
Mr. Don Good	Engineer
Mr. Ivan Holmes	Environmental Coordinator
Mr. E. Coleman	Utilities Superintendent
Mr. J. Hutto	Utilities Foreman
Mr. R. Ward	Sewage Treatment Plant Operator
Mr. J. Moore	H & A/C Plant Operator
Mr. T. Peak	Transportation Superintendent

III. WATER TREATMENT

A. Potable Water

The potable water is furnished to the laboratory by the Bay County Water System under contract. The water is delivered at service pressure therefore the laboratory elevated tank rides on the system pressure. The existing water production facilities are maintained in a standby status. The water is of excellent quality, low in solids, palatable and in conformance with PHS Drinking Water Standards.

B. Cooling Towers Water Treatment

The stations cooling towers were inspected and generally found to be in excellent condition. It was also determined in discussion with operations personnel that maintenance of the water sides of cooling system condenser coils was minimal. This is indicative of a satisfactory cooling water treatment program.

Cooling water treatment consists of constant, manually adjusted bleedoff and the addition of a proprietary cooling water treatment compound called Hydrophene to the cooling water at the rate recommended by the manufacturer. Periodically an algaecide containing sodium pentachlorophenate is added to control algae. The algaecide is purchased from the same supplier as is the water treatment compound (Lester Laboratories). This type of algaecide is not permitted where bleedoff is directed to natural drainage courses. An algaecide registered with the Environmental Protection Agency should be used. Our report of 26-27 March furnished guidance on a cooling tower treatment system based on water treatment chemicals available through federal supply schedules. This source of chemicals has cost advantages over

commercial procurement.

Bleedoff control by conductivity sensor should be provided for all towers of 100 ton capacity or greater. Suitable equipment is available from a number of manufacturers. Catalog data for such a unit is enclosed as Appendix A.

C. Boiler Water Treatment

The activity has a number of small steam and hot water boilers which have been operated for years without water treatment. Two small systems are planned to be replaced due to age. On replacement the water sides of these boilers may be fully checked to determine the effect of long term operation without water treatment. The new units should be protected with a polyphosphate-tannin treatment program using the BUMINES boiler water treatment check service, as explained by Appendix B, for guidance.

D. Swimming Pool Water Treatment

The swimming pool and treatment system, which is operated under contract, were described in our 26-27 March report. A flow meter has been installed on the circulating pump discharge since the last report and it indicated a flow rate of 375 GPM. This circulation rate is adequate.

It was noted that the diatomaceous earth filtering system was not receiving a metered body feed at the time of this visit. Body feed will extend filter runs and increase the allowable loading rate. In that the filter loading rate is less than that considered acceptable, body feed is not required unless indicated by other operating conditions. The circulation pump suction pressure guage should be replaced and periodically observed. If the guage indicates that suction pressures fall below the pump rating on short filter runs, body feed can be implemented to improve suction conditions. Inadequate diatomite body feed can result in suction conditions which are damaging to centrifugal pumps. If improper suction conditions exist, the slurry feeder should be repaired and placed back in service or replaced and a slurry mixing tank provided for the diatomite. Body feed should be prepared by mixing 20 pounds of D.E. to 50 gallons of water in a slurry tank. The feeder should be adjusted to feed at a rate of approximately 2 GPH during circulation pump operation. Appendix C furnished information on a typical system.

IV. WATER POLLUTION CONTROL

A. Wastewater Treatment

Operating reports for the sewage treatment plant indicate a well operated plant producing a high quality effluent which was confirmed by visual observation during this survey. A sample of the final

effluent taken during the survey had the clarity of drinking water which is unusually good for the type of treatment provided. The operator was found to be highly conscientious in his duties, operating a clean plant.

Prior to the survey an inadvertent discharge of fuel oil to the sewer system had resulted in a digester upset. Reports indicated poor digester conditions in March. At this visit the digester had largely recovered from the sick condition, though the odor of fuel oil was still present in freshly drawn supernatant. The supernatant was reasonably clean, however, and the operator indicated that the condition of the sludge was much improved. The operator performed his sludge drawoff technique and thereby demonstrated his knowledge and concern for minimizing the discharge of excess water to the digester.

The plant operator follows a procedure in cleaning the filter head box and filter surface at a frequency which may be more than necessary and unduly affect plant performance during these periods. It was suggested to the operator that the automatic samplers be used one cycle per month during a typical filter system cleaning operation to determine the effect on plant performance over a 24 hour period. Analytical tests from these samples can then furnish guidance on the required frequency of the cleaning cycles.

The existing flow metering system is inoperative. The primary device, a Kennison nozzle, appears to be in satisfactory condition and new equipment for sensing the flow depth through the nozzle is available from BIF division of General Signal. The Taulman Co. represents BIF and the representative serving the Panama City area is located in Atlanta, Ga. The address is The Taulman Co., P.O. Box 11988, Atlanta, GA 30355 ATTN: Mr. Aubrey Neighbors Phone (404) 262-3131.

The new 3 inch Foxboro Magnetic Flow Meter which has been purchased is not suitable for direct replacement for the existing Kennison nozzle. The unit may be adopted for use by installing it in a box at the head of the plant taking flow from a manifold which receives flow from the three lift stations. A sketch showing the general arrangement necessary is attached as Appendix D. The material required will cost approximately $1200 not including concrete, miscellaneous steel or excavation and about 6 foot of operating head will be added to raw sewage pumps.

Improvements required at the plant to accomodate future flows have been identified in previous correspondence and MILCON project P-255 has been prepared to accomplish the needed work. Validation of the population increase has been requested.

This project includes a new sludge digester, sludge drying bed, chlorine contact chamber and recirculation facility improvements to increase the capacity of the plant. A sludge drying bed pump station and auxiliary power source are included to satisfy EPA recommendations

and provide for emergency operation. Also the project includes an improved influent structure, a primary clarifier telescoping sludge draw-off valve and general improvements which are necessary to improve plant operations.

The latter items are proposed to meet operational requirements which are independent of the facility improvements necessary to increase plant capacity.

B. Oily Waste

An oil water separator has been installed to receive waste from the transportation shop area. The system appears to satisfactorily collect oily waste. A new fueling system is under construction which includes a storage tank and diversion facilities to collect accidental spills.

A 10,000 gallon tank is used to collect waste oily products from pierside users. Often the wastes are principally composed of water which compromises the informal relationship with the contractor who removes oil wastes. The waste can be concentrated by pumping it through a coalescing filter of the type illustrated by Appendix E at a procurement cost of about $6000 for a unit of 25 GPM capacity. Alternatively a manually operated skimmer of the telescoping type, such as are used at sewage treatment plants, could be fitted to the existing tank and connected to a separate concentrated oil holding tank. Literature describing a typical unit which may be modified to suit the purpose is enclosed as Appendix F.

C. Wastewater Collection System

The existing flow meter is inoperative, however on review of flow charts for the period 1970 to 1972, when the meter is presumed to be reasonably accurate, flow variations suggestive of high infiltration were noted. Data on local weather conditions at the time of indicated sudden flow variations were not available to verify the conditions, but, it is understood that rainfall versus sewage flow comparisons were performed some time ago and infiltration was indicated at that time. Certain sections of the piping system may be corrected by internal lining of the lines between manholes. Information relative to this method is enclosed as Appendix G. Relining will still require considerable excavation, as indicated in the appended enclosure, and will not be appropriate for very short runs. If continued observation of system flows indicate a persistent major problem, a program for TV inspection and pressure injection repair or relining of the sewer system should be initiated.

The ship to shore system is available for service but no ship's are currently being serviced. Appendix H provides background

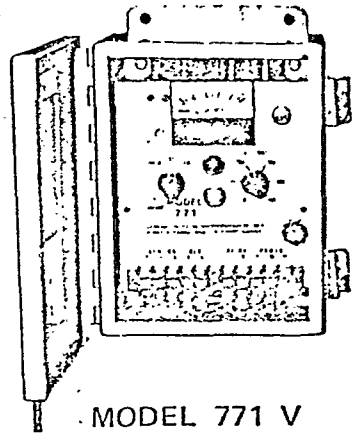
information and operational guidance on the ships CHT system and handling of sewage transfer hoses.

Prepared by:

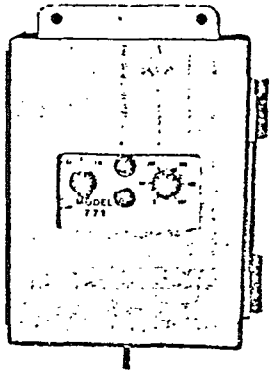
GLENN BRADLEY, P.E.

uniloc

SPECIFICATIONS
MODEL 771
CONDUCTIVITY CONTROLLER



MODEL 771 V



MODEL 771

LIST #375
5/76

GENERAL DESCRIPTION

The Model 771 is a low cost linear conductivity controller. It is available with different sensor configuration for various application requirements.

The Model 771 is supplied with conductivity sensor, so it is necessary to specify the desired type when ordering. Specify whether visual meter indication of the value of the conductivity of the solution being measured is desired by adding the suffix "V" for visual.

APPLICATIONS

The Model 771 is the ideal instrument for use as a rinse tank controller in the plating and metal finishing industries. It can be used to control the level of total dissolved solids in small cooling towers.

ACCESSORIES

A Model 779 sensor selector may be used with the 771 to manually select a second sensor location if two points in a system require monitoring.

FEATURES

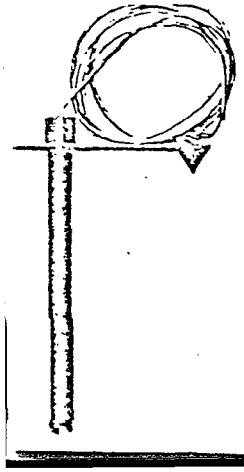
Linear Circuitry and Indication
Nema 12 (Industrial Use) Enclosure
Recorder Output 0-5VDC up to 2 ma Max.
Choice of five sensors:

117 - 0.2	Submersion
117 - 1.0	Submersion
118 - 0.2	Insertion
118 - 1.0	Insertion
119 - 1.0	Flow

Choice of Two Ranges:
0 - 100 or 0 - 1000 Micromhos/cm
0 - 500 or 0 - 5000 Micromhos/cm

Adjustable Control Deadband 0-5% of fullscale
Control Contact Rating 5 amps
Pilot Light Status Indication
Carbon Electrodes (no Platinizing)

ODEL 117 SENSOR
ITH SS BRACKET

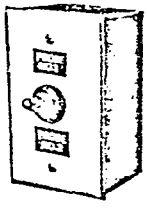


MODEL 118 SENSOR

MODEL 119 SENSOR

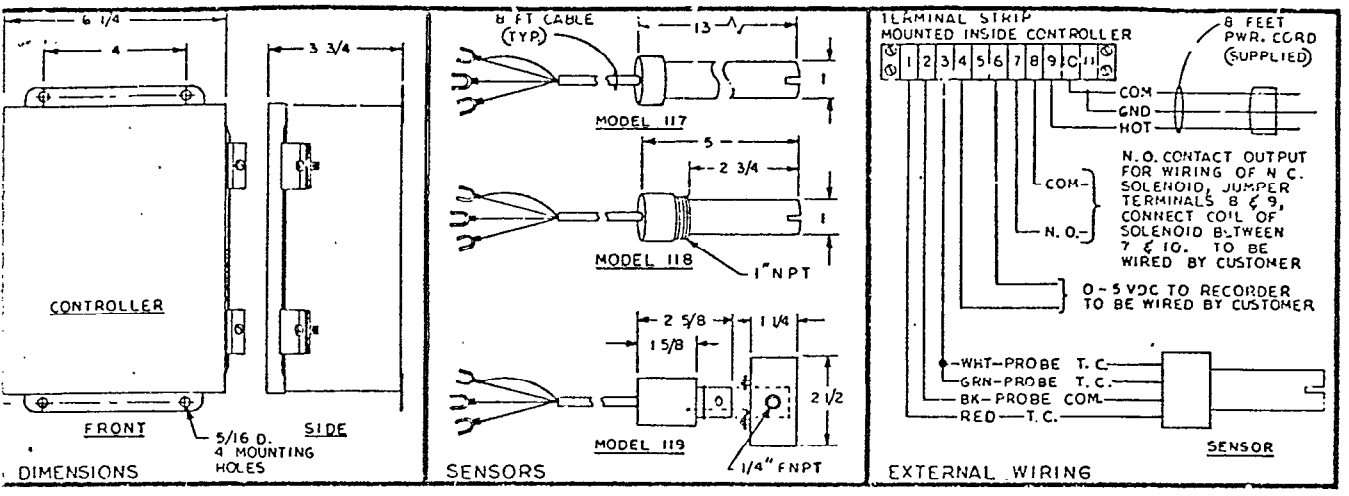
LIST #105
5/76

MODEL 779 SENSOR SELECTOR



APPENDIX A

DIMENSIONAL DATA



SPECIFICATIONS

CONTROL CONTACTS

24 - 28 VDC 5 amp resistive 2 amp inductive
115 VAC 3 amp resistive 1.5 amp inductive
Adjustable Deadband 0 - 5% Full Scale

ENCLOSURE

NEMA 12 (Industrial Use)
Size 6¼ W x 8¼ H x 3-3/4 D

Finish: Blue Textured Baked Enamel

INDICATOR LIGHTS

Amber (Process at or Higher than Set Point)
Red (Process Lower than Set Point)

METER INDICATION (Model 771V Only)

0- 500 Linear

RANGE SELECTION

X1 Range Fullscale = 100 mmhos
For Sensors having 0.2 Constant

X10 Range Fullscale = 1000 mmhos
For Sensors having 0.2 Constant

X1 Range Fullscale = 500 mmhos
For Sensors having 1.0 Constant

X10 Range Fullscale = 5000 mmhos
For Sensors having 1.0 Constant

WEIGHT / SHIPPING WT.

8 lbs. / 15 lbs.

RECORDER OUTPUT

0 - 5 Volts (up to 2 ma Max.)

POWER REQUIREMENT

117 VAC ± 15% 50 - 60 Hz 5 amps
8 feet Power Cord supplied

AUTOMATIC TEMPERATURE COMPENSATION

5° - 70°C, 41° - 158°F

HUMIDITY

0 to 100% without desiccation

STABILITY

± 1%/mo

ACCURACY

± 2% of fullscale

SENSITIVITY

± 0.1% of fullscale

TRANSMITTER CALIBRATION

Internal Resistor selected in place of Sensor by Front Panel Switch

SENSORS

Max. Temp. 158°F
Carbon Electrodes, 8 feet of cable supplied

117 (Submersion) Sensor-Constants 0.2 or 1.0
PVC & Epoxy Construction

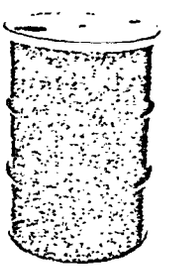
Mounts in 304 SS Corner Bracket 12" long furnished with Probe

118 (Insertion) Sensor-Constants 0.2 or 1.0
Noryl & Epoxy Construction
Mounts into one inch coupling welded onto tank or line

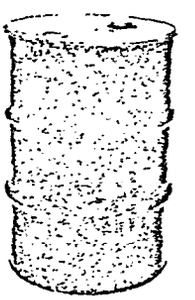
119 (Flow) Sensor-Constant 1.0
PVC, & Epoxy Construction with Buna N "O" Ring
Mounts into Sample Stream by connection to ¼" F NPT.

UNI-LOC
SANTA ANA, CALIFORNIA 92705

SPECIFICATIONS
PRE-FAB ACCESSORIES

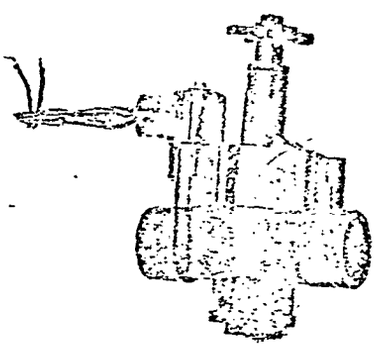


TOR TANK: The Inhibitor Storage Tank consists of rical, 55 gallon, 18 gauge steel drum. This drum is diameter, 3 feet high, and is provided with a 1/8" lene liner. Also included is a 3/16" fiberglass cover nt splash from moving the tank or agitation of its



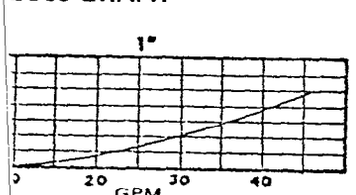
ANK: The Acid Storage Tank consists of a cylin- gallon, 18 gauge steel drum. This drum is 2 feet in 3 feet high, and is provided with a 40 mil. blow olyethylene liner having two 2 inch openings in A steel lid and protective polyethylene cover are ded for safety purposes, to guard against spills ht occur while the drum is being filled.

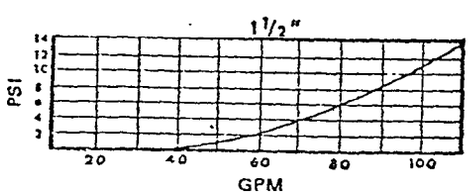
D BLEED VALVE: The UNI-LOC/CLP Blow- e is made from Zytel 33% glass reinforced nylon. ure rated at 200 psi and will withstand tempera- 180°F. Electrical input is 110V, 60 cycles A.C. ight epoxy molded solenoid coil. It is of the slow e and has a manual flow rate adjustment. The ailable in 1" and 1-1/2" NPT sizes. The fol- vs. pressure graphs may be helpful in determin- valve for a particular application.



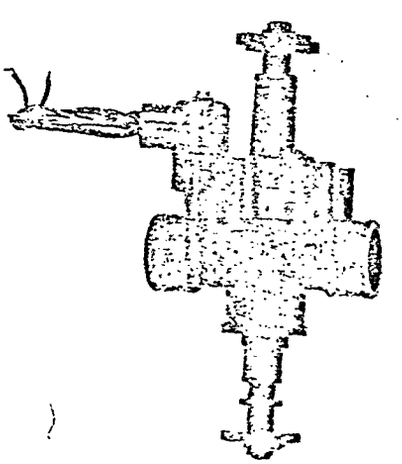
LOSS GRAPH

#90 LIST
5/76





L ED VALVE ASSEMBLY: The Solenoid ssembly consists of the same features as the valve with the addition of the manual over- his feature allows the valve to be operated e event that the solenoid fails. This feature is re is a chance of incorrect installation loca- ld prevent the valve from operating due to d pressure. One could manually bleed the is feature until piping corrections could be piping changes would be at least 5 psig head. option to be inexpensive start-up insurance ly operating feature.



SANITARY ENGINEERING GUIDE FOR
BOILER WATER TREATMENT CHECK SERVICE

1. Information. NAVFACINST 11330.9 provides information concerning services furnished by the Bureau of Mines (BUMINES) including monthly boiler water and condensate sample testing. This service is being used by most boiler plant operators at naval activities to compare results of their tests with those obtained under controlled conditions by another laboratory. This type of service is similar to that used by public and private utilities. Differences between plant and laboratory results usually indicate need for modification of the operators' test procedures and/or updating of test reagents. This verification of local test results is essential to insure the adequacy of local treatment. Experience has shown several instances of major tube failures in spite of local test results indicating no chemical problems with the water. Utilization of the BUMINES laboratories to confirm local testing is prudent and most strongly recommended. Upon request from an activity, BUMINES will provide sample bottles, pipe tests sections and testing at no cost to the activity.

2. Procedures. Addressees should collect and submit boiler water and condensate check samples and condensate line corrosion test sections to BUMINES as follows:

a. Procuring and shipping of sample bottles. Request the number of bottles necessary from BUMINES to implement boiler water testing program. One pint bottle is required for each sample (boiler water and condensate). The bottles require no special packing and should be returned to BUMINES in the container as received, after sampling, to:

U. S. Department of the Interior
Bureau of Mines, Boiler Water Service
College Park, Maryland 20740

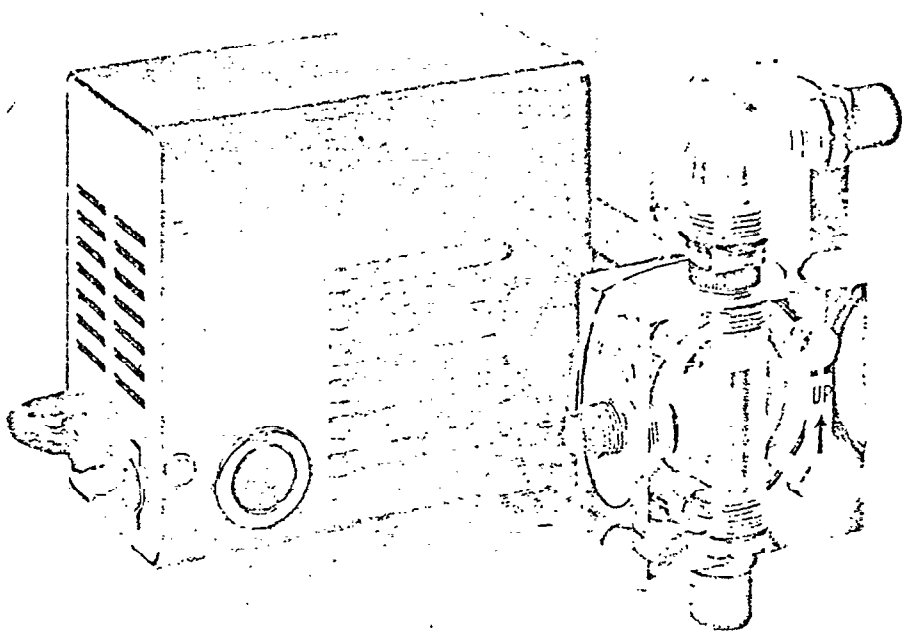
b. Sampling. One sample of boiler water and one sample of condensate should be submitted monthly for one shore-based steam boiler plant operating over 15 psig pressure. Activities having steam boilers operating under 15 psig and who are treating the boiler water should submit one sample semiannually. Activities using contract boiler water testing and treatment services or any other testing service approved by SOUTHNAVFACENGCOM should submit samples to BUMINES quarterly.

c. Procuring and installing of corrosion test sections. Condensate line corrosion test sections should be requested from BUMINES and installed at the start of each heating season. The test sections come with installation instructions which should be followed very closely. A corrosion test section should be placed in each major condensate return system. The number of test sections installed should be based on size of system, the number of return runs, and previous corrosion problems.

Acrylyte Corporation
The Mac-O-Matic Company

H-M Series
BULLETIN NO. [illegible]

Slurry Feeder



e H-M Series, companion to the popular H-J Series of ution feeders, provides the ultimate in a low-cost slurry* der. The many exclusive features include a ball-sleeve valve tem which cleans itself with each stroke of the diaphragm, l a unique standpipe valve design which prevents drainage the pump cavity during standby periods. To facilitate per routing of the feeder discharge line, a swivel turret orporates the upper valve, thus the possibility of slurry ldup and subsequent damage to the pump is substantially uced. The head is equipped to accept the "Auto-Flush," utomatic flushing device which is offered as an option.

By definition, slurry is the suspension of solids in a liquid. Often it is desirable to introduce the solids to a water treatment system. The solids are kept in suspension in a mixing tank by means of an electric agitator.

The slurry pump feeds this combination of solids and liquids through a special valve system designed specifically for this purpose.

Filter Size		Water Through Filter In		Amount of D.E. in 50 gal. of water	
SQ. FEET	SQ. METER	G.P.M.	LITERS/MIN	OZ.	KG.
10	.93	20	75.7	10	.28
15	1.39	30	113.55	15	.42
20	1.86	40	151.4	20	.56
25	2.32	50	189.25	25	.71
30	2.79	60	227.1	30	.85
35	3.25	70	264.95	35	.99
40	3.72	80	302.8	40	1.13
45	4.18	90	340.65	45	1.27
50	4.65	100	378.5	50	1.42

Note: Above chart shown for model H60M1 feeder. For H30M1 model use twice as much D.E. (Diatomaceous Earth) as shown.

APPENDIX C

R: Thermal overload protected, fan cooled with ubricated all-metal gear train. Built to U.L. ds.

SYSTEM: Cam arrangement with a connecting . vides positive control of the diaphragm. Feed rate ed by controlling slurry mixture.

LLATION KIT: Two mounting screws, one slurry n fitting, 20 feet of 3/8" tubing, instruction and iance manual.

IS: Motor available in 230 volt, 50 cycle or on special order.

SPECIAL MODELS: Maximum feed rates can be increased or lowered by a change in the motor speed. Pumps can be painted in a special color with your label. We would welcome an opportunity to quote on your specific requirements should those listed here not meet your needs.

SHROUD: Pump and motor cover are constructed of steel and heavy aluminum and finished in a chemical resistant lacquer. Fastened to the shroud is a specification plate with complete information on the unit's feed rate capacity, pressure rating, voltage requirements and serial number.

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE.

E LINE FREQUENCY) | METRIC UNITS (50 CYCLE LINE FREQUENCY)

AX. FEED GALLONS		CC/MIN.	MAX. Op. PRESS P.S.I.	SHIPPING WEIGHT LBS.	PUMP WEIGHT LBS.	AMPS REQ'D		FEEDER DIMENSIONS INCHES			MAXIMUM FEED		MAX. Op. PRESS Kg/CM2	SHIPPING WEIGHT Kg	AMPS REQ'D		FEEDER DIMENSIONS CM		
4 HOURS	1 HOUR					115V	230V	HEIGHT	WIDTH	DEPTH	LITERS 24 HOURS	CC/MIN.			115V	230V	HEIGHT	WIDTH	DEPTH
39	1 63	102 5	40	9	7 1/4	1 30	42	6 3 8	8 3.4	6	122.5	86 08	2 8	4 08		54	16 2	22 2	15 2
79	3 29	207 64	40	9	7 1/4	1 30	80	6 3/4	8 3.4	6	244 2	172 35	2 8	4 08		56	16 2	22 2	15 2

duct patent under the following patent number 3,298,319

erial Specifications

OTOR:

115 volt/60 cycle; 1.67 amps. Option: olt/60 cycle and 230 volt/50 cycle.

115 volt/60 cycle; 1.67 amps. Option: olt/60 cycle and 230 volt/50 cycle.

m: Teflon

achined acrylic.

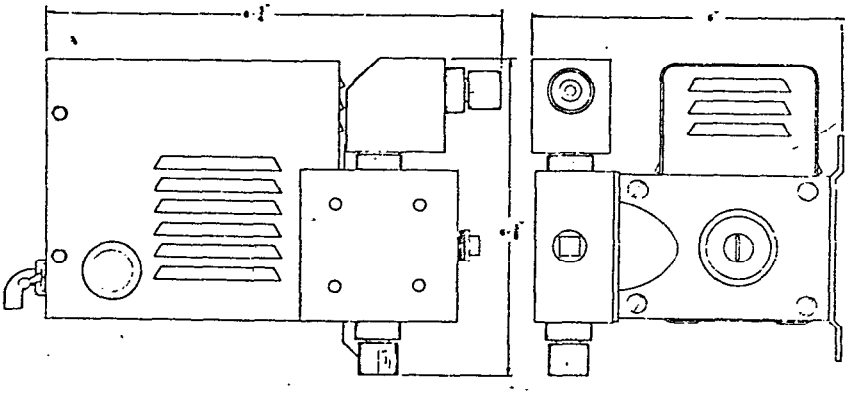
Machined PVC.

3/8" O.D., polyethylene.

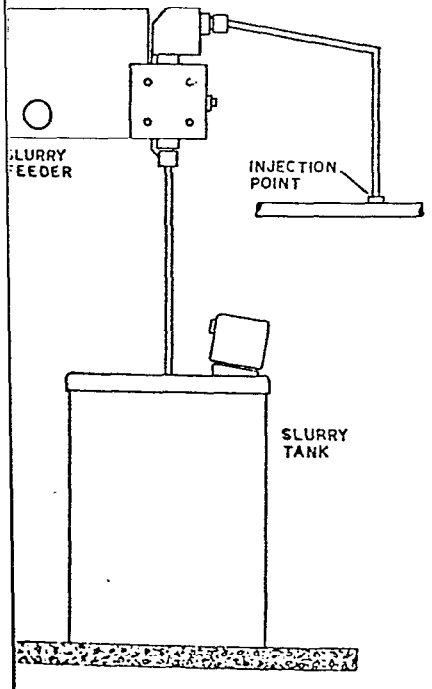
xclusive Mec-O-Matic self-wiping ball sleeve

ec-O-Matic metallic blue.

PART NUMBER	MODEL	RPM	VOLTAGE	HEAD MATERIAL	DIAPHRAGM	SEAL MATERIAL
800097	H30M1	30	115,60Hz	ACRYLIC	TEFLON	VITON
800098	H30M1	30	230,50/60Hz	ACRYLIC	TEFLON	VITON
800099	H60M1	60	115,60Hz	ACRYLIC	TEFLON	VITON
800100	H60M1	60	230,50/60Hz	ACRYLIC	TEFLON	VITON



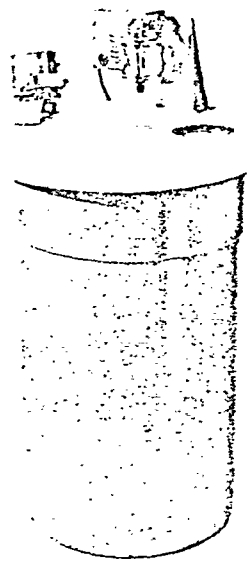
H60 M1 (115 Volt) #262 70 3/76



Ecodyne Corporation

The Mec-O-Matic Company, 455 Woodlane Drive, • St. Paul, Minnesota, 55165

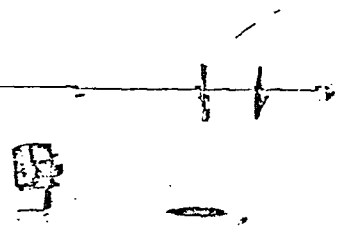
Tank Accessories



SLURRY FEED SYSTEM

Combine a Mec-O-Matic slurry feeder with a high quality polyethylene tank and agitator for a compact, reliable feed system. The chemical pump is mounted on the tank cover with a custom-designed support bracket. The suction line is directed down through the tank cover for a neat, tangle-free installation. The cover is also fitted with a covered fill hole which allows refilling the tank without disturbing the pump or lines. Tanks are available in both 32 gallon and 55 gallon capacities. NOTE: Photograph shown with H-M slurry feeder and agitator. When ordering a Slurry Feed System, specify slurry feeder part numbers separately. The correct cover mounting with agitator will be supplied automatically.

Part No. 32 gal.—8800450
55 gal.—8800451



UNIVERSAL AGITATOR

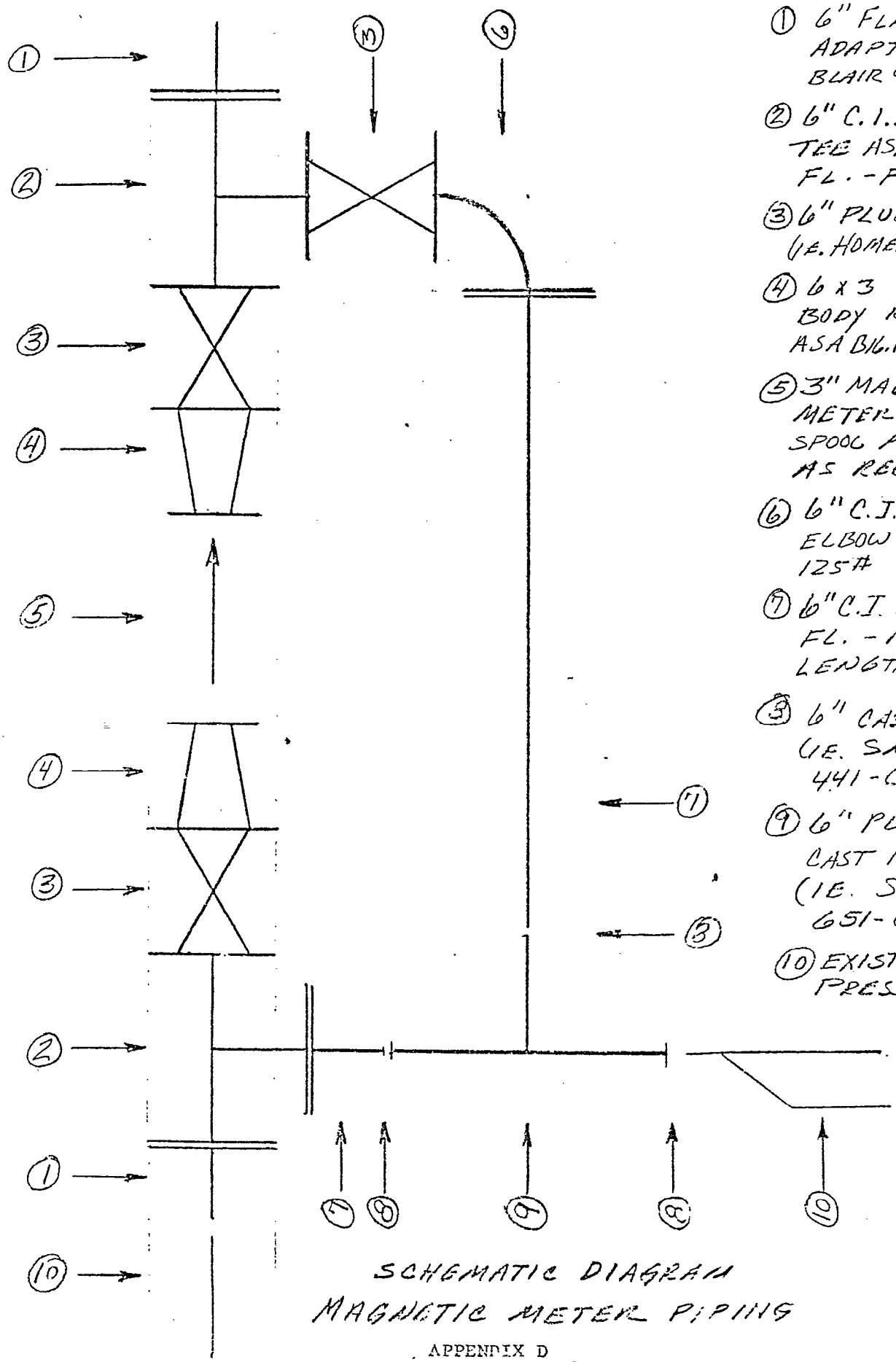
The Mec-O-Matic Universal Agitator is an ideal accessory for slurries or those chemicals which require agitation to remain in solution. The shaft length is adjustable from 26 to 40 inches, allowing a custom fit on virtually any tank. The unit features a high performance 1/20th H.P. totally enclosed motor, stainless steel shaft and Mec-O-Matic's exclusive plastic covered impellers. Tank mounting brackets are supplied with the agitator. Part No. 8800425

BULKHEAD FITTING

In some cases it may be desirable to equip your chemical container with a bulkhead fitting to draw the chemical through the side of the tank rather than the top. This is particularly useful if the tank is to be located immediately over the chemical pump for flooded suction.

The bulkhead fitting can be installed on the wall of any plastic tank by simply drilling a hole. All seals are provided to ensure a leakproof installation. The bulkhead fitting is designed to accept our strainer on the inside of the drum so that chemical supplied to the feeder will be clean and free of solids. The fitting is constructed of PVC to withstand most chemicals.

Part No. 8800407



1. 6" FLANGED COUPLING ADAPTER (IE. SMITH-BLAIR 912-00069006)
2. 6" C.I. SHORT BODY TEE ASA B16.1-125# FL.-FL.-FL.
3. 6" PLUG VALVE (IE. HOMESTEAD 1132)
4. 6 x 3 C.I. SHORT BODY REDUCER ASA B16.1 125# FL.-FL.
5. 3" MAGNETIC FLOW METER AND UPSTREAM SPOOL PIECE - LENGTH AS REQ'D.
6. 6" C.I. SHORT BODY ELBOW ASA B16.1-125# FL.-FL.
7. 6" C.I. NIPPLES FL.-PLAIN END LENGTH AS REQ'D.
8. 6" CAST COUPLING (IE. SMITH-BLAIR 441-690-710)
9. 6" PLAIN END CAST IRON TEE (IE. SMITH-BLAIR 651-0690-000)
10. EXIST. INFLUENT PRESSURE LINES.

SCHEMATIC DIAGRAM
MAGNETIC METER PIPING

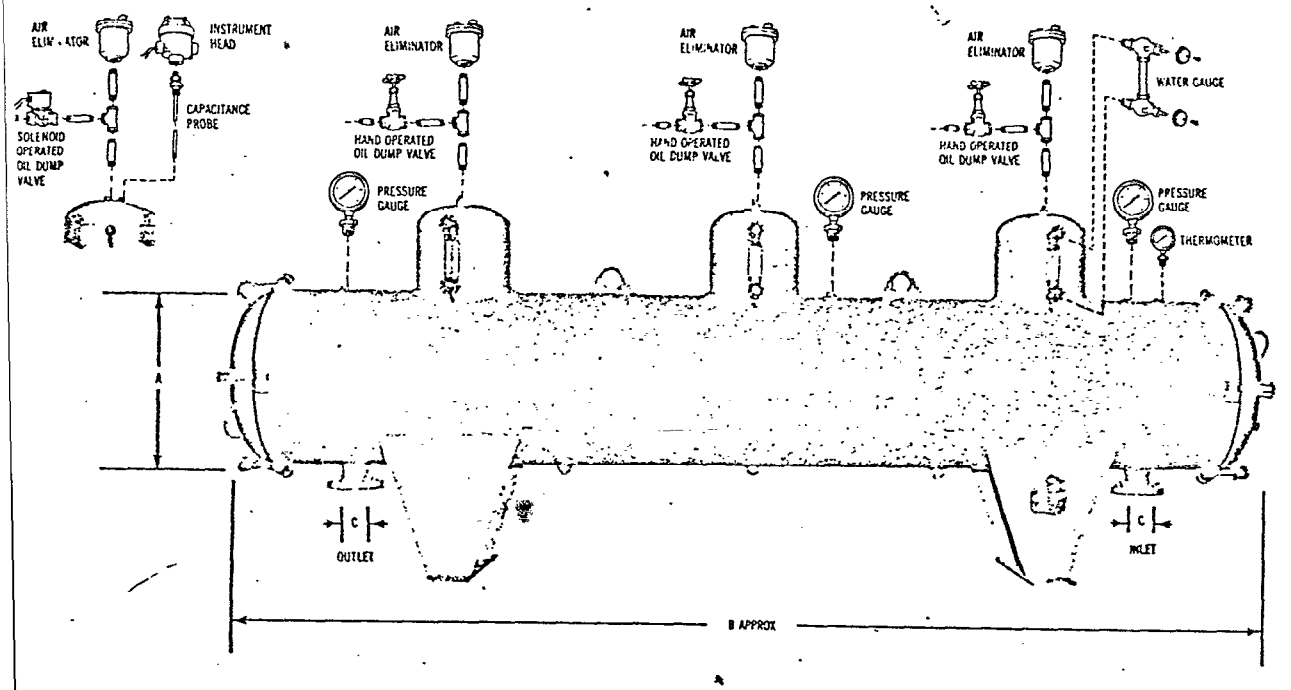
G.C. BRADLEY
16 JUNE 71

IE RPC SEPARATOR
Standard Capacities and Dimension

SEPARATOR HI-LITES

~~S CORPORATION R.P.C. Division P.O. BOX 498, ROXBORO, N.C. 27573 • TELEPHONE (919) 599-3141~~
DIV. SMITH JONES INC. DANVILLE, ILL. (217) 442-6100

utomatic Oil Dumping
rrangement Available



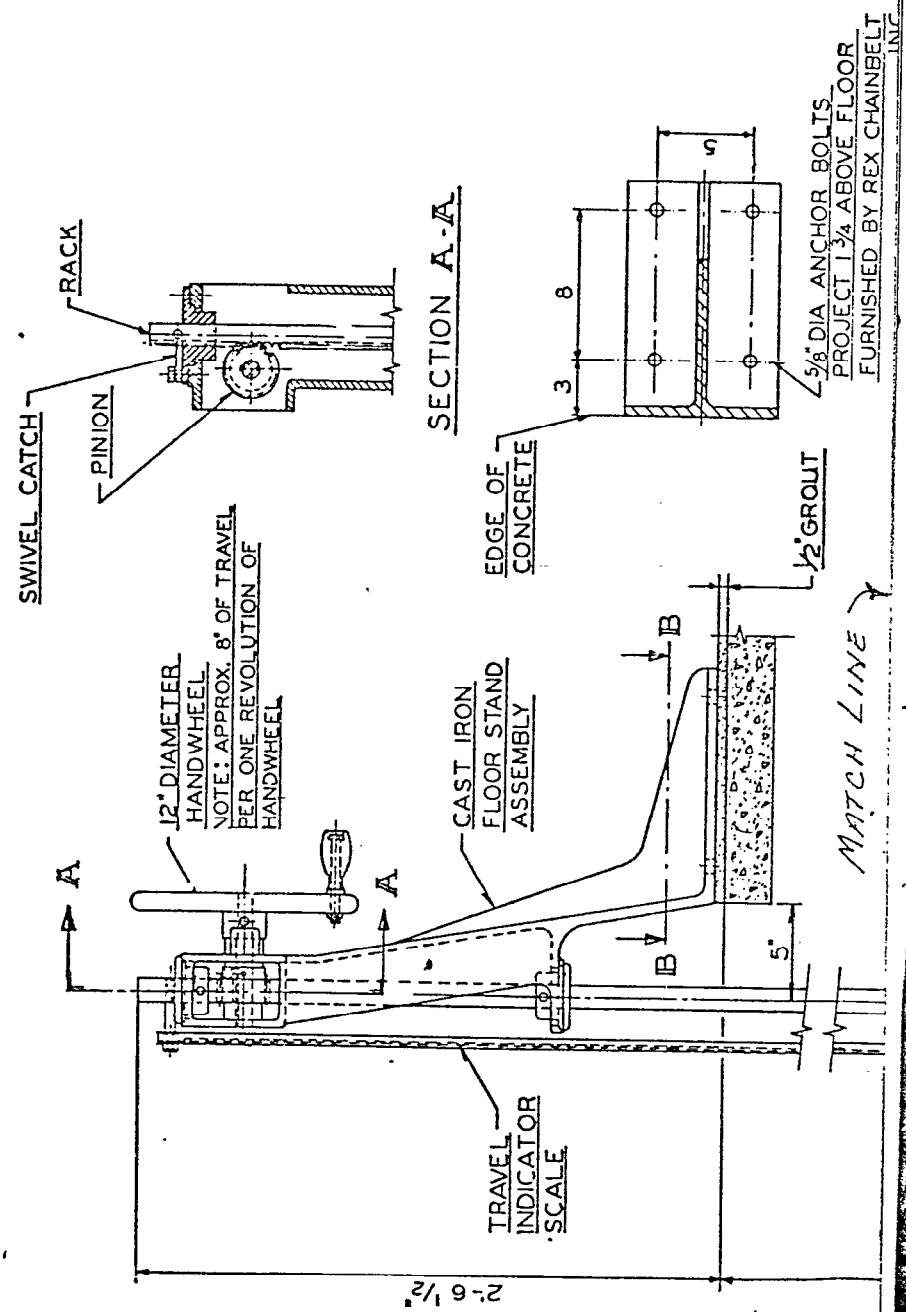
STANDARD CAPACITIES AND APPROXIMATE DIMENSIONS

odel[1]	Flow,[2] GPM Min. - Max. With Glass Fiber	Flow,[2] GPM Min. - Max. With Polypropylene	Shell Diameter A (Inches)	Length B (Inches)	Connection C (Inches)	Approximate Dry Weight Lbs.
10	8-12	5-15	10	65	2	500
-20 - $5,970	16-24	12-36	18	70	2	800
-40 $	32-48	24-72	18	110	2	1,100
-50 - 8,658	40-60	30-90	24	80	3	1,800
-100	80-120	60-180	24	120	3	2,300
80	65-95	50-140	30	100	4	2,800
160	125-190	100-290	30	141	4	3,300
240	190-290	140-430	30	181	4	3,800
420S	340-500	250-750	42	125	6	6,500
630S	500-750	380-1130	42	175	6	7,200
740S	600-890	440-1330	50	185	8	10,000
1100S	880-1320	530-1580	50	205	8	11,000

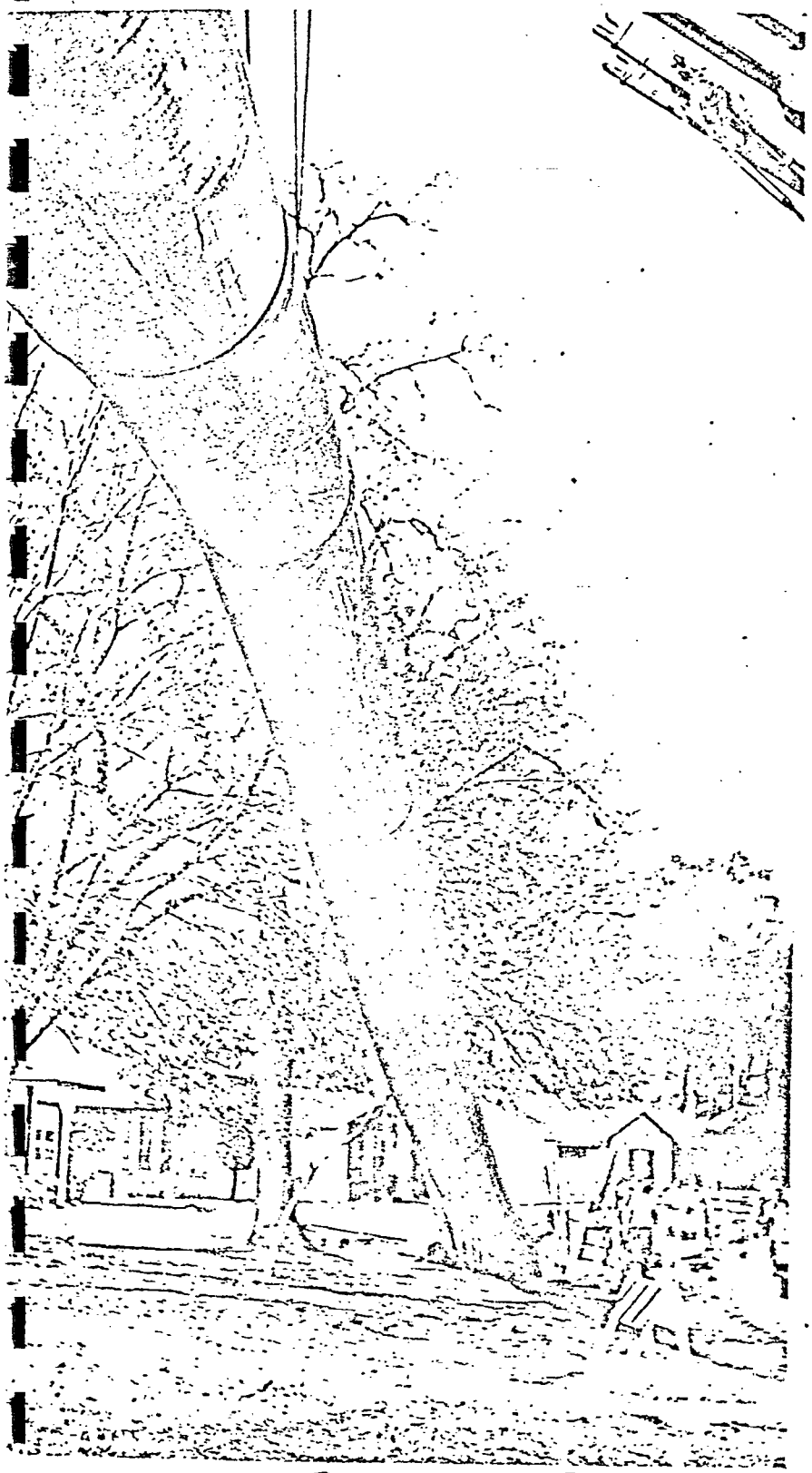
LETTER "S" AFTER MODEL NO. DESIGNATES SINGLE STAGE UNIT.
EXTREME VALUES, ACTUAL VALUES WILL VARY WITH APPLICATION.

OIL SEPARATOR

PRODUCT MANUAL - SANITATION EQUIPMENT CONVEYOR and PROCESS EQUIPMENT DIVISION REX CHAINBELT INC. MILWAUKEE, WISCONSIN 53201	Data Sheet No. 315. 22. 109 Page 1 of 1
SECTION (22) ACCESSORIES	Issued February 1969
SUBJECT GENERAL ARRANGEMENT - Rack and Pinion Type Telescopic Sludge Valve with Indicator	Supersedes



TELESCOPING VALVE



SEWER RELINING

Relining with MONO-LINE® pipe

STOPS INFILTRATION

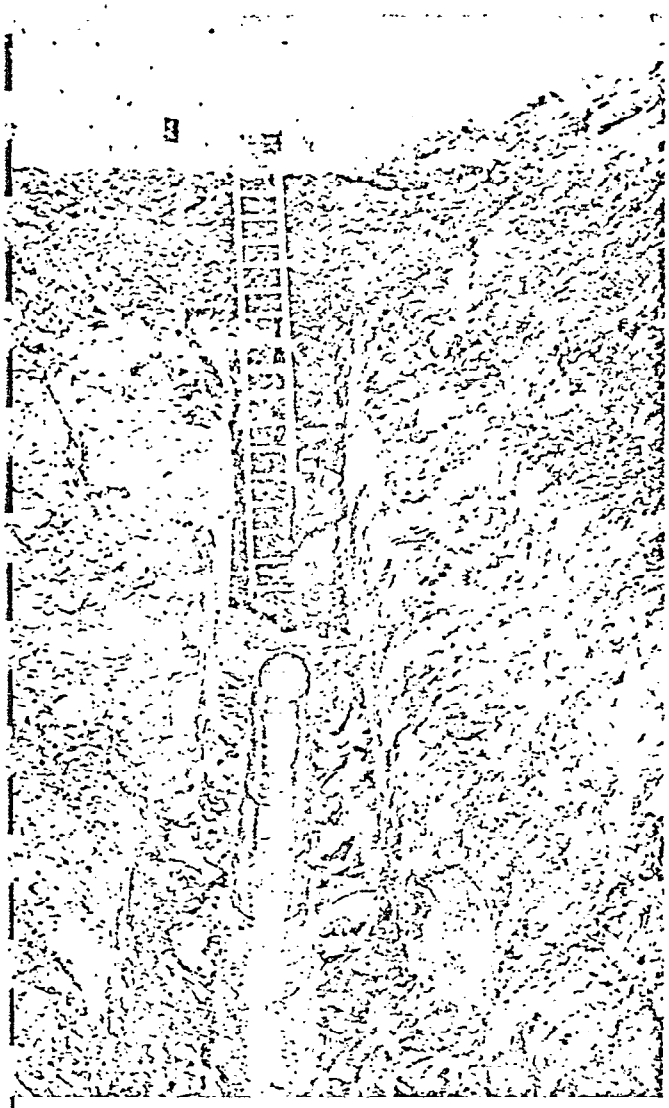
SALVAGES OLD SEWER SYSTEMS

APPENDIX G

RYERSON
PLASTICS DIVISION

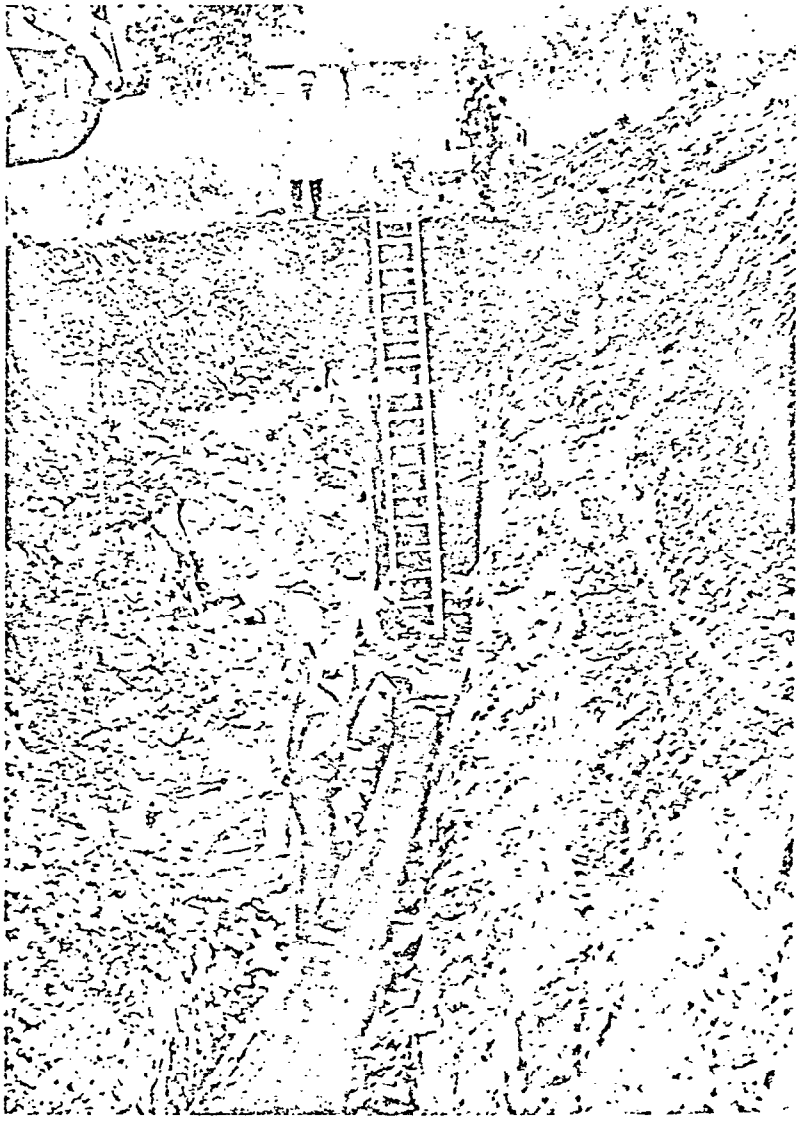
Details of relining projects using MONO-LINE pipe

Old sewer systems—taxed to capacity because of leaking or mis-aligned joints—become new sewers when leak-proof Mono-Line® Pipe is specified for relining purposes. Troublesome, costly excavation is held to a minimum. The long, fused lengths of Mono-Line are simply pulled through the old sewer with small winches. Pipe and sewer cleaning crews handle the entire job. The savings in costs and inconvenience can be major.

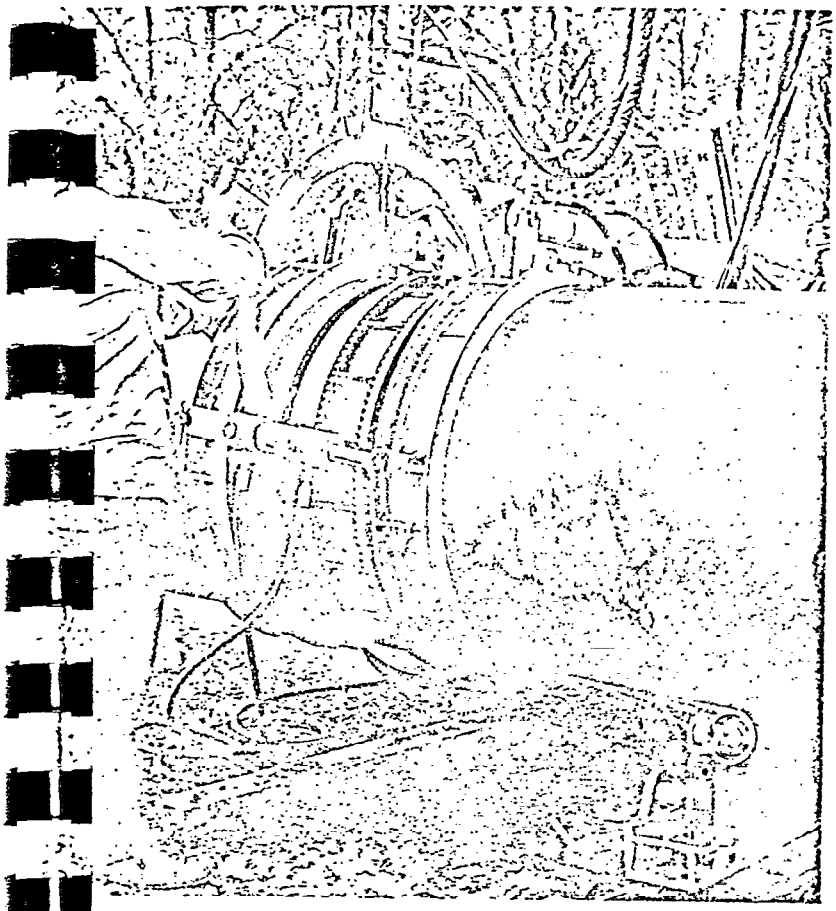


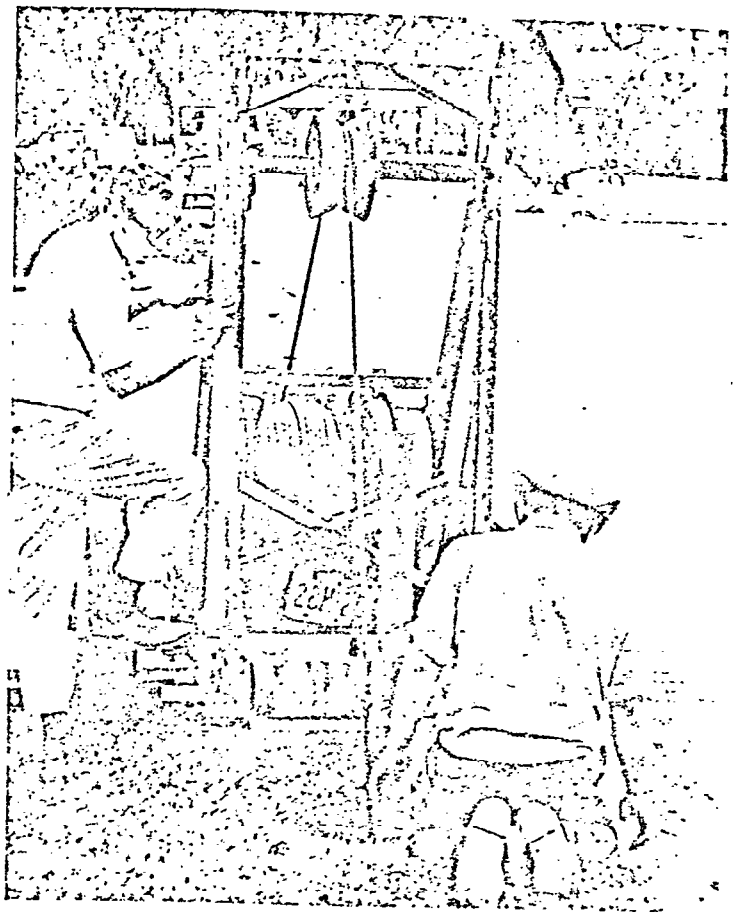
kcavated just enough to allow entry of 5" flexible Mono-Line Pipe into old sewer ır City of Houston. Top half of concrete clay tile is broken off for easy insertion Mono-Line. Sewers can remain operaonal during most installations.

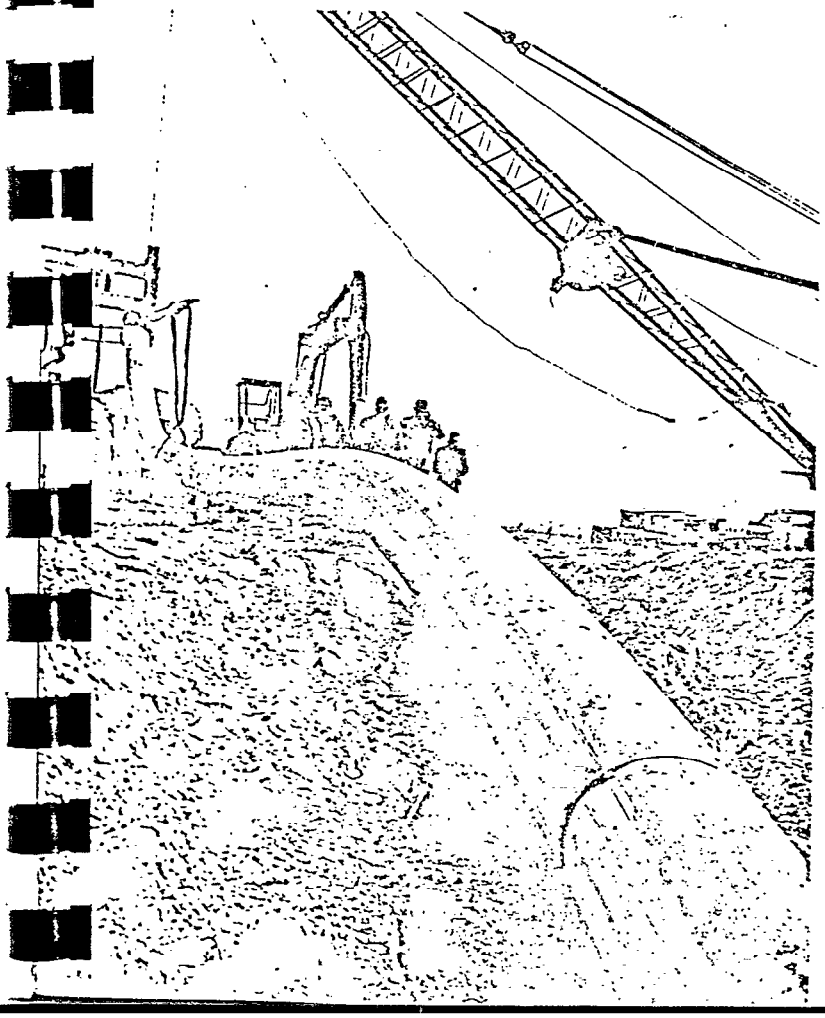
ono-Line Pipe—with steel pulling head olted to it—is eased into old sewer openg. Winch cable, fastened to pulling head, ovides the pulling force.



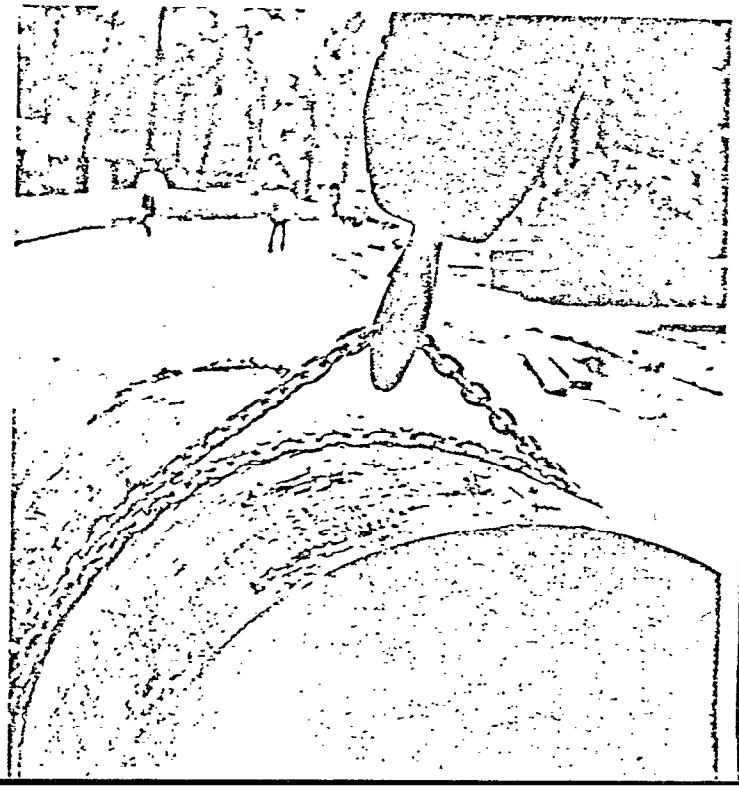
There it goes—210 feet of pre-welded Mono-Line Pipe at a time—winched into position to make old sewer leak-proof.







40 foot lengths of Mono-Line Pipe are butt-fused in minutes at the job site (above left). After fusion, pipe is monolithic, yet flexible—can be moved easily to excavated point of entry for insertion into existing old sewer lines. Photo above shows simple drilling operation required for connection of service lines to main sewer line.



Plastic Pipe—Solution to Old and New Sewer Problems

By RALPH MASKELL, Technical Specialist, Joseph T. Ryerson & Sons, Inc., Chicago, IL

terioration of water and wastewater lines laid many ars ago, the need for expanded systems, and meeting new pollution control standards are just a few of the reasons municipalities and industries are ning to high-density polyethylene pipe. This pipe ould not be confused with the thin wall plastics commonly used for pipe liners. It is an engineered pipe with wall thicknesses that make it self-supporting. s extruded from high-density polyethylene resins in ndard outside diameters as small as one inch and as large as 48 in. Outside diameters up to 80 in. are fabricated to order.

One of the most significant benefits of polyethylene pipe is its inherent resistance to most chemicals. For st applications, it can be considered inert. This kes it ideal for carrying wastewater as well as for ater supply or drainage. Inside diameters are not reduced over long periods of use, so capacities are intained.

ce enactment of new FWPCA standards on July 1, 1973, sewer collection systems must be free of excessive infiltration as well as leakage. High-density polyylene pipe meets this requirement because nventional joints—the weakest link in any piping system—are completely eliminated. Sections of pipe are joined by butt fusing. Pipe ends are heated to melting point and then joined together under ssure. The resultant joint is as strong as the body of the pipe itself and entirely leakproof.

pical polyethylene pipe weighs only 1/3 to 1/9 as ch as other pipe materials. This simplifies handling and substantially reduces the number of cranes and other heavy equipment needed for installation. ight saving doesn't, however, sacrifice ruggedness. yethylene pipe won't break or crack during shipment or handling. It is not necessary to add a breakage factor when estimating total pipe needs.

other plastics, high-density polyethylene pipe is ible. Although it cannot be bent to a right angle, it can be cold bent to a radius of 20 times the outside meter. Contouring the pipe around obstacles can minate the use of fittings.

herent flexibility also plays a key role in off-setting the effects of water hammer and transient overssure cycles. Instead of propagating the pressure es, polyethylene pipe tends to expand and dampen shock waves. There is less need to plan the design to three times rated pressure when selecting ethylene pipe. The designer can stick to basics—, temperature, pressure, chemical resistance and expectancy.

ethylene pipe is basically non-wetting and has a or 10 to 25 percent greater than concrete, cast or other rigid pipes per cross-sectional inch. ch an increase in flow capacity allows the pollution ncer to consider smaller diameter pipe than ded with other materials.

The specific gravity of polyethylene is less than unity, a feature which makes it particularly applicable for water installations. Lengths of prejoined pipe, even lengths of a ¼-mile or more, can be floated across a waterway and submerged to their resting place on the bottom. Such systems have saved installers thousands of dollars in equipment and services while limiting the disruption of commercial traffic as well.

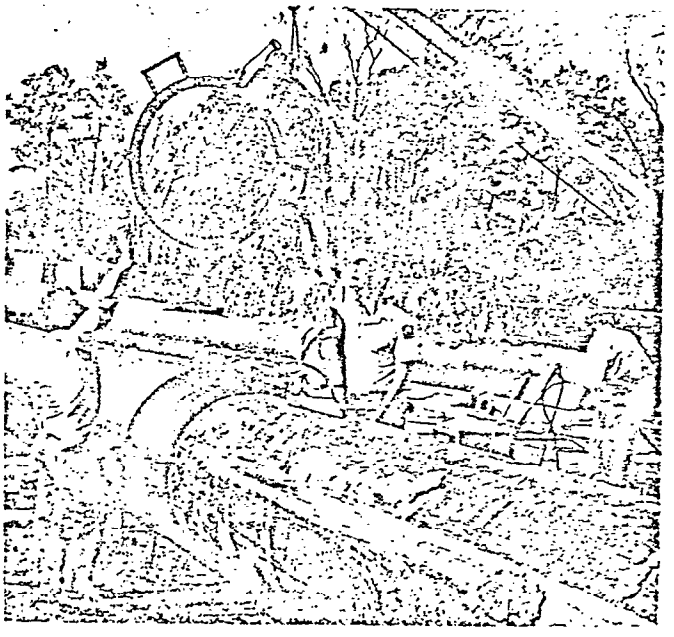
Limitations

Polyethylene pipe's biggest enemy is temperature. As the pipe body temperature rises above 70 F, strength decreases. Therefore, the pressure which can be tolerated on a long term basis (50 years) must be reduced for higher temperatures. Slight variations within temperature limits will not affect longevity. Polyethylene pipe will not break if its contents freeze. Normal functions, without degradation, will resume upon thawing.

Polyethylene pipe should be stored and handled in an area relatively free from jagged rocks or ledges. Deep radial scratches are particularly damaging to pipe strength under stress conditions.

Pipe Joining

The recommended method of joining lengths of polyethylene pipe is butt fusion. Mechanical joints defeat the pipe's leakproof properties, and joining with



Even large diameter polyethylene pipes require only a few workmen to butt fuse weld joints into a monolithic leakproof structure.

ivents is not possible. The fusion process is simple d can be done by two men. No special skills are quired, so joining can be done by personnel with ry little training.

e usual practice is to deliver standard 40 ft lengths pipe to the job site. The most practical approach o join all of the lengths of pipe into a monolithic ucture prior to installation. Continuous lengths of e 1,000 ft long or longer are not uncommon. But cause of the pipe's lightweight properties, they are y to handle with a minimum of equipment.

joining operation takes only four basic steps using ipment supplied by the pipe manufacturer. First, pipe ends are aligned and a collar is attached to n. Often, V-rollers are used to simplify alignment handling. A trimmer is inserted between the two s which cleans and trues both edges for perfect ng. The trimmer is removed and replaced by a ing ring matching the diameter of the pipe.

of the pipe are then heated above the crystal point. The heat ring is removed and the ends of ipe are quickly forced together under hydraulic ure and held immobile until completely cooled. ime required for each joint is short. Even large ter pipes require less than 30 min from start to . Because each joint adds 40 ft to the finished , big jobs go quickly and time required is far an for conventional installations.

t testing is a standard operating procedure, brief ure under two times normal rated pressure is ate to verify the integrity of the joints. However, ng is done while the pipe is subjected to hot ht, or if the ambient in the test area is otherwise r than the expected temperature load, reduce t pressure proportionally.

Relining

ensity polyethylene pipe provides an econom- actical method for the relining of deteriorated Its principal benefit lies in the fact that it can e whole city blocks of sewer excavation that e required if the deteriorated sewer were dug replaced. In most relining jobs involving poly- pipe, excavation is required only at entrance, service hookup points. Disruption of traffic age to landscaping is minimal. Excavating ten many times the price of sewer pipe, are

er of polyethylene pipe is selected that is maller in outside diameter than the existing pipe inside diameter. Because of the non-wetting characteristics of polyethylene, predetermined flow factors are often increased.

While excavation takes place at the entrance and exit points, the pipe is assembled into a continuous length at the construction site. When excavations and assembly are completed, a cone-shaped drawing collar is fitted to the head end of the pipe to prevent snagging. A drawing cable is run through the existing sewer and pulling begins. Polyethylene pipe is flexible enough to follow common contours in the original sewer line. In some installations, it is easier to pull manhole-to-manhole, in stages, rather than attempt a single draw the full length of the sewer line.

Continuous lengths of polyethylene pipe exceeding a quarter mile are not unusual although it obviously draws some amazed glances from passers-by as this leviathan begins making its way under the earth. Once the new liner is in place and hookup is completed, refilling and resurfacing at each end of the line is a simple job. Relining sewer pipe instead of replacing it can result in savings of 20 to 40 percent.

New Installations

There are many reasons for using high-density polyethylene pipe in new installations, even though the initial cost of poly pipe exceeds that of conventional pipe material.

1. The waste effluent may affect the life of conventional pipe, whereas polyethylene may be totally immune.

2. Transportation charges for shipping conventional pipe may exceed the cost differential. Polyethylene pipe can weigh as little as 1/3 to 1/9 that of other types of pipe.

3. The gain in flow factor from polyethylene pipe may allow the selection of a smaller diameter. Over the years, encrustation problems (and ID reduction) will be far less with poly pipe than with other materials.

4. Monolithic systems reduce infiltration and exfiltration. This requirement for Federal funding is easy to prove.

5. No allowances for breakage or damage are needed.

6. Light weight and longer working length save on manpower and equipment.

For a copy of this article circle 654 on Reader Service Card

GENERAL DESIGN AND OPERATIONAL GUIDANCE FOR
SURFACE SHIP SEWAGE COLLECTION, HOLDING
AND TRANSFER SYSTEMS

1. As described herein, sewage means wastes of human origin from water closets and urinals which are transported by the ship soil drain system. One solution to the surface ship sewage disposal problem is the stategic location of sewage collection, holding, and transfer (CHT) systems within the ship in such a manner as to ensure the greatest economy of space, the least disruption of habitability, and the optimum functional arrangement. Each CHT shall consist of a holding tank, non-clog ejection pumps, comminutor, flushing system, air supply, fittings, piping, and controls. Two types of collection, holding, and transfer systems are possible as follows:

a. Primary CHT — No sewage treatment in the form of a marine sanitation device (MSD) is available. Unless otherwise specified, each primary CHT should provide a 12 hour minimum holding time for sewage provided existing tanks, voids, and spaces are available such that there is no un cost increase or impact on the military characteristics of the ship. If a 12 hour holding capacity cannot be supplied within these constraints, reduction in holding is acceptable. The normal shipboard flush from water closets and urinals provides a sewage flow of 30 gallons/man/day. Therefore, unless a reduced flush system has been installed aboard the ship, 12 hours holding time for sewage requires 15 gallons/man storage capacity. Soil drains should be collected in such a manner as to provide sewage discharge either overboard when navigating unrestricted waters or into the CHT when in restricted waters. In addition, the waste drains carrying wastewater from showers, laundry, galley, lavatories, etc. should be fo ed and installed to have the capability of discharging both to the CHT overboard. The collection and transfer of wastes from both waste drains and soil drains is to be used when the ship is connected to a shore or barge receiving station.

b. Secondary CHT — Sewage treatment in the form of a marine sanitation device (MSD) is available. Soil drains should discharge to the MSD to the CHT, and overboard; waste drains should discharge to the CHT and board. Sewage will normally be processed through the MSD when the ship in restricted waters and should be directed to the CHT only when the ship is in restricted waters and the MSD is not operating. The secondary CHT should provide sufficient holding capacity to withstand surge loadings from both soil and waste drains, i.e. at least 3 gallons/man. The primary function of the secondary CHT is to collect and transfer wastewater from waste drains when the ship is connected to a shore or barge receiving station.

ENCLOSURE 1 to NAVSEC Ser 225-6159

SHIP TO SHORE - OPERATIONAL GUIDANCE

APPENDIX H

2. Design and operational recommendations applicable to the majority of sewage collection, holding, and transfer systems for surface ships are presented in the following paragraphs. It should be noted that the operational format of the secondary CHT requires the independent drainage of soil drains and waste drains to the CHT. The installation of plumbing drains leading to the primary CHT should also be such that soil drains and waste drains are independent. This installation format allows for the option of holding only sewage when the ship is transiting restricted waters. This option is important if the holding tanks has less than 12 hours holding capacity for sewage (6 hours holding capacity for sewage and wastewater). Independent soil and waste drainage also facilitates the future installation of a marine sanitation device (MSD) to treat sewage. This condition is not required, however, where the installation of independent soil and waste mains is exorbitantly expensive and/or impacts unduely upon the military characteristics of the ship.

a. Each holding tank should be constructed of medium steel according to the requirements of 9110-0 and 9290-8 of the General Specifications. Wherever feasible the tank should be shop fabricated and tested and be installed as a complete unit independent of the ship's hull.

b. Each tank should have inside surfaces that are free of structural members, e.g. stiffeners, headers, and brackets. Very large tanks, however, may require swash bulkheads to dampen the movement of the tank contents.

c. All internal tank surfaces should be coated to prevent corrosion from sewage and from wastewater of domestic and industrial-chemical origin. The flushing medium can be salt water, brackish water, or fresh water. Unless otherwise specified, tank coating should be as specified for Sanitary Tanks in NAVSHIPS TECH MANUAL Chapter 9190.

d. Each tank should have a rectangular horizontal cross section with a depth of at least full deck height, i.e. 6 to 8 feet. Very large tanks will require greater depth. The tank bottom should be sloped, e.g. 1.5 inches depth per 1.0 foot length, towards a sump basin at the pump suction.

e. Each tank should have maintenance access and should be equipped with a vent and an overflow. Vents and overflows should be in accordance with 9480-8 and 9450-9 of the General Specifications. Vents should terminate in such a manner that no deck spaces are subjected to offensive odors.

f. A comminutor should be installed to comminute sewage solids prior to entering the holding tank with the additional capability of by-passing the comminutor. A tapped and plugged disinfectant access should be provided in the line just prior to the comminutor. The comminutor should meet the following minimum requirements:

(1) A processing rate equal to the maximum flow rate of the connected pipe system. Pipe sizes will be 4 inch and 6 inch;

(2) Rugged, corrosion-resistant material which is galvanically compatible with copper-nickel and bronze;

(3) Cutting teeth which exhibit high hardness to maintain a sharp cutting edge, a tough core material to withstand the impact of cutting hard substances without fracture of the cutters, and corrosion resistance to prevent deterioration of the cutting edge;

(4) Comminution of sewage solids to 0.25 inches particle size;

(5) Continuous operation even at zero flows;

(6) Capable of intermittent start-stop operation when required;

(7) No backup of solids and fluids;

(8) Shreds solids flowing in sewage such as towels, rages, linens, paper, etc.;

(9) Liquid, gas, and odor tight;

(10) Can be mounted to the pipe system in any position or attitude;

(11) Not damaged by the presence of durable objects;

(12) Easily cleaned and maintained;

(13) Motor driven using ship's electrical power.

Unless otherwise specified, the motor for the comminutor should be in accordance with Specification MIL-M-17060D and should have the following characteristics:

Voltage 440 A.C.
Enclosure TEFC
Service C
Insulation B
Duty Continuous
Ambient 50°C
Bearing Ball
E.P. Is Required

The motor shall be non-overloading throughout the operating range of the comminutor. The controller for the above motor shall be furnished in accordance with Specification MIL-C-2212D and shall have the following characteristics:

Voltage 440 A.C.
Enclosure Dripproof
Protection LVP

g. Air should be supplied to the holding tank to prevent the contents from becoming anaerobic and to keep the solids in suspension. Air should enter the tank through non-clog air diffusers located in the tank bottom. Air pressures within the diffusers shall be sufficient to overcome the maximum hydrostatic head of the overlying wastewater. The estimated air requirements are 25-75 SCFM per 1000 ft^3 of sewage as follows:

(1) Tank depth > 15'
Air delivered = 25-50 SCFM per 1000 ft^3 of sewage;

(2) Tank depth = 6' - 15'
Air delivered = 50 SCFM per 1000 ft^3 of sewage

(3) Tank depth < 6'
Air delivered = 50-75 SCFM per 1000 ft^3 of sewage.

Recommended operating pressures at the diffusers are 5 to 15 psig with 10 psig satisfying most configurations.

(NOTE: Diffusers are clogged on the water side by suspended solids and growths of microorganisms. Clogging on the water side is reduced if air pressures are maintained above the hydrostatic head of the overlying wastewater.)

h. A connection from the firemain should be provided to each tank for flushing and cleaning of the tank and the discharge piping and hoses. Seawater from the firemain should be delivered to the holding tank through spray nozzles which thoroughly spray the interior of the tank. The system design should be such that under no circumstances will the tank be subjected to pressures greater than the hydrostatic pressure to which the tank was tested. The system should be designed and installed such that flow into the tank will not equal or exceed 100 percent of the discharge capacity of one discharge pump as specified herein.

(NOTE: When flushing and cleaning the system, the discharge pumps should be set to discharge automatically.)

i. Each tank should be equipped with two 150 gpm non-clog marine sewage pumps connected in parallel which discharge the sewage to shore or barge receiving facilities through discharge connections on the lowest weather deck. The pumps should be arranged to take suction from the lowest portion of the tank. Each pump should have suction and discharge full port plug valves and a discharge swing check valve. The two pumps should operate alternately except where inflow exceeds single pump capacity. Each pump should be capable of providing a slight positive pressure head at the discharge connection. For small ships, which may be discharging against a positive head at the discharge connection, a pressure of at least 3 to 5

psig should be provided at the connection. The pumping system should be designed to start and stop both manually and automatically. The option to manually operate either one pump or both pumps should be provided. In addition, the system should be fitted with a pump controller for automatic pump actuation as follows:

(1) Pump alternation,

(2) Low water level pump cut out,

(3) Duty pump cut in elevation,

(4) Standly pump cut in elevation (emergency),

(5) High level alarm cut in elevation.

The high water level alarm associated with the level controls of each tank should be installed to operate when the pumps are in either the manual or the automatic mode of operation. The alarm should be wired to signal upon activation in a permanently manned station and at the CHT system compartment. The system should provide an audible and visual alarm when the water level rises to approximately 85 percent tank capacity. The pump materials should be as follows:

Shafts — nickel-copper alloy QQ-N-281 or nickel-copper-aluminum alloy QQ-N-286,

Shaft sleeves (if required) — nickel copper-aluminum alloy QQ-N-286,

Impellers — nickel-copper alloy QQ-N-288,

Pump casings and pedestal — gun metal QQ-C-390 alloy D5.

All other parts coming into contact with the fluid handled should be constructed of nickel-copper alloy or copper-nickel alloy (70-30), MIL-C-20159. The pump design should be such that the pump rotating element may be removed without disturbing the suction and discharge piping. The impeller should be designed and statically balanced for all hydraulic loads throughout the operating range of the pumps. The impeller should be balanced by means other than add-on-weights. Each pump motor shall be furnished in accordance with Specification MIL-M-27[illegible] and shall have the following characteristics:

Voltage	440 A. C.
Enclosure	[illegible]
Insulation	B
Service	C
Duty	Continuous

Ambient	50°C
Bearing	Ball
H. P.	As Required

The motor shall be non-overloading throughout the operating range of the pump impeller. The controller for the pump motor shall be furnished in accordance with Specification MIL-C-2212D and shall have the following characteristics:

Voltage	440 A.C.
Enclosure	Dripproof
Protection	LVP

j. Each set of sewage pumps should discharge via a discharge line leading to a common header that connects port and starboard discharge assemblies on the lowest weather deck. A three way, two port, full port, plug cock valve should be installed to permit diversion of the sewage to either discharge assembly. The sewage discharge line should be pitched to the maximum extent practicable towards the sewage pumps and, under no circumstances, should it have pockets formed by the run of piping. Each discharge connection should be as specified by NAVSHIPS Dwg 810-4444650, Surface Ship to Shore Sewage Discharge Connection. The sewage discharge connection should be so designed and installed that a resultant force of 3000 pounds applied at the discharge nozzle will not over stress the piping or bolting. The sewage hose with a female quick disconnect cam-locking type hose connection (coupler) and safety lock will be furnished by shore/barge receiving activities.

k. A telephone connected to the ship's internal communications should be located in the general vicinity of each CHT.

l. For sewage discharge from the holding tank overboard into unrestricted waters, the sewage pumping system should be arranged as follows:

(1) The sewage flow is diverted from the discharge line leading to the cross-connected discharge connections on the weather deck via a three way, two port, full port, plug cock valve.

(2) The sewage flows through a line which discharges above the waterline.

(3) The overboard discharge is fitted with a gag scupper valve.

m. Each discharge station should be clearly labeled to indicate the sewage discharge connection.

n. Each CHT compartment should have a sump. The compartment sump should be connected to the respective CHT pump suctions between each pump suction plug valve and each pump.. Sump suction valves should be installed to isolate the sump from each pump suction.

3. The primary CHT is primarily, but not exclusively, intended for the following modes of pollution abatement operation based upon the operational status of the ship:

a. Transiting restricted waters to port:

The system is being used for sewage holding. All sewage is directed through the comminutor to the holding tank. The sewage is aerated and solids are maintained in suspension within the holding tank. When the discharge connection has been hooked-up to a shore or barge receiving facility, the sewage pumps are started manually, and the tank contents are discharged via the discharge connection.

(NOTE: Aeration of sewage during the entire transiting operation is recommended but is not mandatory. As a minimum requirement, aeration for at least one hour is mandatory prior to discharging the sewage to a receiving station. The aeration system is designed to prevent the biochemical production of malodorous and/or dangerous gases and compounds, e.g. hydrogen sulfide, methane, nitrogen- and sulfur-bearing organics, etc.).

b. Permanently connected to a shore or barge receiving station:

The system is being used for the collection of sewage and wastewater and the transfer of these wastes to a receiving facility. Levels are maintained within the tank by the liquid level automatic controller. The pumps are controlled automatically to discharge sewage and wastewater when the tank is filled to approximately 90 percent capacity.

(NOTE: If the discharge cycle is frequent, i.e. several hours or less, the air supply may be secured. Intermittent aeration may be required, however, to resuspend residual solids which may be collecting away from the pump suction and to clear the air diffusers.)

c. Intermittently connected to a shore or barge receiving station:

The system is being used for sewage holding or sewage and wastewater holding. The mode of operation is similar to that described by paragraph 3a above.

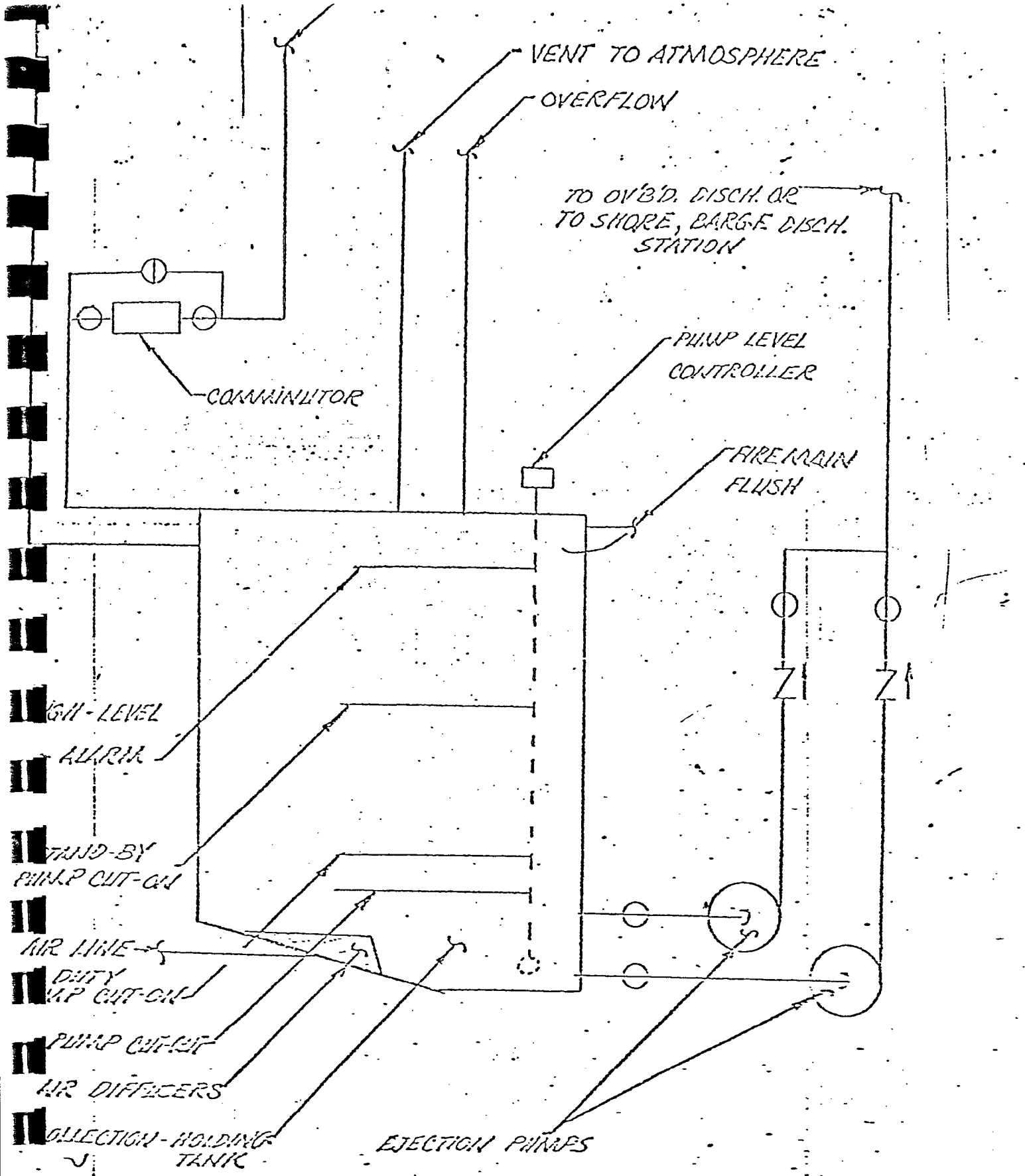
(NOTE: The time interval between disconnection and connection to a receiving facility determines whether sewage or both sewage and wastewater are held.)

d. Transiting restricted waters to unrestricted waters:

The system is being used for sewage holding. All sewage is directed through the comminutor to the holding tank. The sewage is aerated and the solids are maintained in suspension within the holding tank. When the ship reaches unrestricted waters, the pumps are manually started, and evacuation of the tank is accomplished via the line discharging above the waterline.

c. Operating in unrestricted waters:

Sewage and wastewater are discharged overboard via the ship's drainage system. The collecting, holding, and transfer system is secured.



TYPICAL CHT SYSTEM

DESIGN TECH NOTE NO. 147

1 November 1973

Sewage Transfer Hose, Handling and Storage

Ref: (a) NAVFAC DM-5, Civil Engineering

1. Provisions for the chlorination of hoses used for transfer of sewage from ship-to-shore should be eliminated from the design of hose handling and storage facilities. Information obtained from the Bureau of Medicine and Surgery indicates that flushing of the hose with salt water by the ship before disconnecting is sufficient. No additional disinfection is required.

2. Facilities should be provided for washing the end couplings and the exterior of the hose with hot potable water containing a standard stock detergent. Caps for each end of the hose should be provided and installed after washing. Clean hose should be stored dry in racks.

3. This is new criteria not included in the current issue of reference (a). The above criteria will be included in the next revision of DM-5, in Chapter 11.

George G. White, 0415A, Sanitary Engineer, NAVFACHQ

WASHINGTON, D.C. 20372

IN REPLY REFER TO
BUMED-722-PAT:clb
6240.6
7 September 1973

From: Chief, Bureau of Medicine and Surgery
To: Commander, Naval Facilities Engineering Command

Subj: Handling of Ship to Shore Sewage Transfer Hose

Ref: (a) NAVFAC ltr 0415A of 23 August 1973, s/subject

1. Reference (a) contained a proposed procedure for handling ship to shore sewage transfer hoses. It is recommended that the following comments be incorporated into instructions for this procedure:

a. Personnel

(1) Training:

(a) Any training program should include a segment on preventive medicine. Training in this subject would involve brief discussions on the types of illness associated with human waste, including infectious hepatitis, bacillary and amoebic dysenteries, typhoid and paratyphoid fevers, and more importantly, measures to employ to prevent contracting these diseases. These preventive measures would include emphasis of good personal hygiene. For example, they would stress the importance of not smoking, eating, or drinking while actually involved in hose-handling unless the hands are thoroughly washed with soap and hot water prior to engaging in these activities.

(2) Personal Protection:

(a) Required Protection

(i) Rubber gloves
(ii) Rubber boots
(iii) Coveralls

(Boots and coveralls are recommended primarily for aesthetic reasons to prevent development of undesirable odors in berthing or duty spaces resulting from sewage spilling or splattering on clothes or shoes.)

(b) Immunizations

(i) Current— no additional protective immunizations such as gamma globulin are necessary.

(c) Personnel

(i) Personnel, when actually engaged in connecting/disconnecting sewage transfer hoses, shall not also connect or disconnect potable water hoses.

BUMED-722-PAT:clb
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b. Sewage Transfer Hoses

(1) Should be clearly marked by stencil and color coded.

(2) May not be used for making potable water connections.

(3) Shall be flushed thoroughly with salt water prior to being disconnected and then be completely drained prior to storage.

(4) End couplings shall be washed in hot potable water containing a standard stock detergent using a brush and then each shall be capped.

(5) Visible soil on the outside of the hose shall be physically removed by scrubbing with hot potable water containing a standard stock detergent.

(6) Clean hoses should be stored dry preferably on racks rather than in a container in which liquid leaking from the hoses might accumulate resulting in the production of objectionable odors and creation of a highly contaminated breeding site for roaches, other insects, and even rodents.

c. Spills

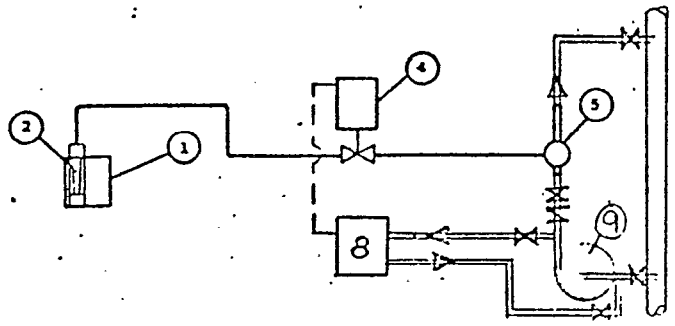
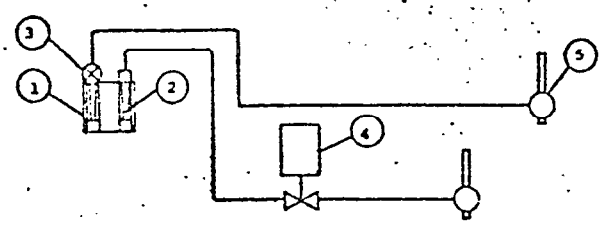
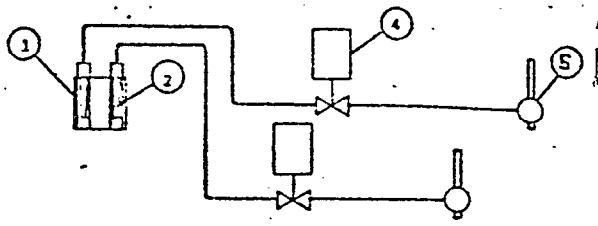
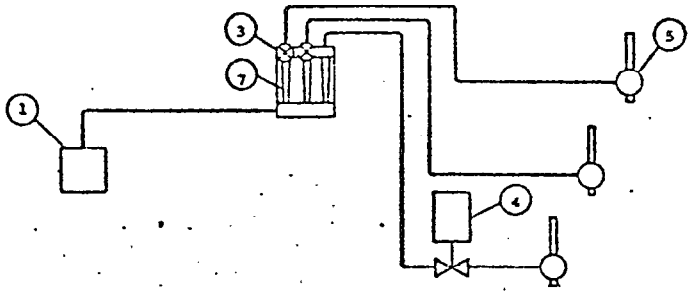
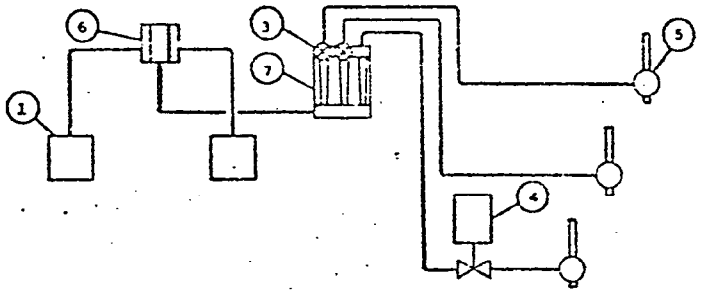
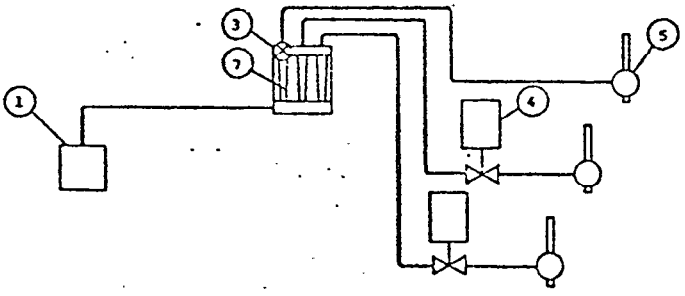
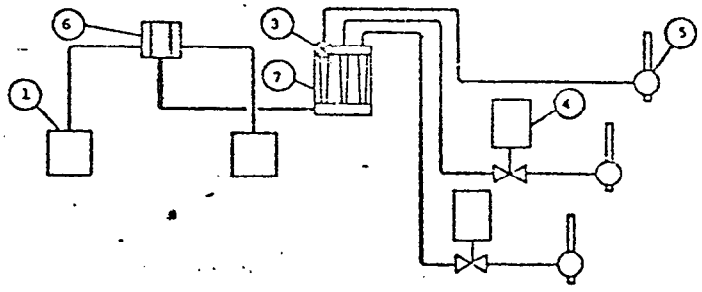
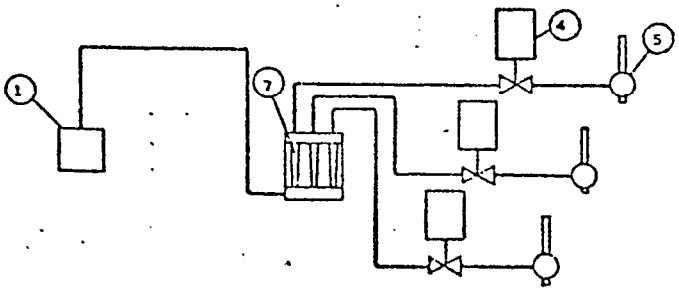
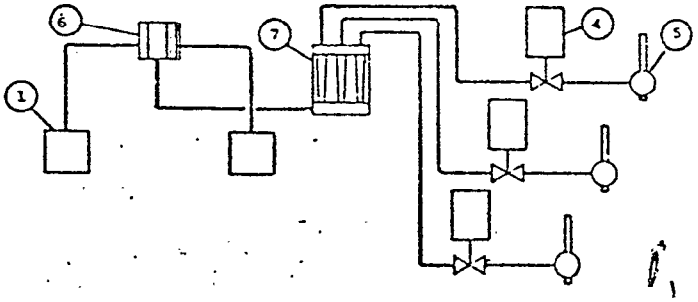
(1) When hoses are either intentionally disconnected after salt water flushing or accidently disconnected, some spillage will occur. Such spillage can be removed by thoroughly flushing the area with salt water. Minor spills may be cleaned up using a swab and bucket containing hot water and detergent; however, swabs used for this purpose shall be thoroughly washed and completely air dried after each use. Furthermore, it is recommended that these swabs be kept separate from other swabs. It is anticipated that maintenance of clean sanitary swabs will be difficult based on current shipboard practice and will have to be continually emphasized to preclude the development of objectionable odors or even the use of these swabs to clean the decks of such spaces as sick bay or the galley.

C. E. Alexander

C. E. ALEXANDER
By direction

Copy to:
NAVSHIPS (044P)
NAVSEC (6159)
CNO (OP-45)

TYPICAL ARRANGEMENTS



1. Vacuum regulator
2. Vacuum regulator mounted flowmeter
3. Manual rate valve
4. Chloromatic Valve
5. Ejector
6. Automatic changeover valve
7. Wall mounted flowmeter(s)
8. Chlorine Analyzer
9. Circulation Pump