Effluent Clarification
Water Treatment
Papermill Equipment

KROFTA® ENGINEERING CORPORATION

LENOX, Massachusetts 01240
P.O. Box 972
101 Yokun Avenue USA
Phone : (413) 637 - 0740
Cable : Krofta - Lenox
Telex : 92 - 6443 krofta-leno
Fax : (413) 637 - 0768

February 1, 1995

SBCCS Constructors, Joint Venture
P.O. Box 1286
Atlanta, GA 30301-1286
Attn: Mr. Russ Bowlin, Project Engineer

Subject: Krofta Job No. 19503 "Certified for Construction" Drawings.
For: Two (2) KROFTA 62 Foot SUPRACELL CLARIFIERS.
Ref: Hagerstown Fiber Project No. 9506
Customer P.O. #00303-8180

Dear Mr. Bowlin:

We are pleased to submit one (1) sepia, five (5) prints and one (1) disc copy of the attached "Certified for Construction" drawings and data listed for the Krofta 62 foot SUPRACELL Clarifiers referenced above.

We appreciate the opportunity to work with you on this project and look forward to a timely and successful installation.

Sincerely,

KROFTA ENGINEERING CORPORATION

John K. Herzig
Purchasing Manager

JKH/cml
Encl: As noted.
CC: Letter with one (1) set of prints to:
KEC Job File, Job 19503
KEC Engineering Department
CC: Letter with one (1) set of prints to:
Wilson & Poll
P. R. Bradley Associates
Tate Engineering
CC: Letter only to:
AM, JH, MA, Accounting.

SBCCS Constructors, Joint Venture
Certified for Construction Drawing List

KROFTA®

February 1, 1995

DRAWINGS:

1. SUPRACELL Equipment Specification List, dated ..... Jan. 25, 1995.
2. SUPRACELL 62 Flow Schematic ..... U4-SPC-1925.
3. SUPRACELL 62 Outline and Pipe Locations, Rev. A ..... U3-SPC-1926.
4. Motor Drive Equipment Schematic ..... U4-SPC-1846.
5. Rotary Slip Ring Installation ..... U4-SPC-1772.
6. Suggested Wiring Electrical Slip Ring ..... U4-SPC-1847.
7. Automatic Bottom Purge Schematic, Rev. 19503 ..... U4-SPC-1771.
8. Automatic Level Control System Schematic ..... U4-SPC-1743.
9. Type 2500 Air Dissolving Tube Outline Drawing, Rev. 19503 ..... U3-DT-252.
10. Type 2500 Air Dissolving Tube Installation ..... U3-DT-253.

DATA:

11. Aeromotive Slip Ring Data.
12. Falk Gear Reducer #WBHQM 525 Data for Rotating Carriage.
13. Falk Gear Reducer #WBHQM 600 Data for Sludge Scoop.
14. Westinghouse Motor Data.
15. Allen Bradley 1305-BA06A Controller Data.
16. RKL 4" Pinch Valve Data.
17. ATC Flip Flop Timer Data.
18. ASCO 3-way Solenoid Valve Data for Purge Valve.
19. Velan Globe Valve Data.
20. Ametek Pressure Gauge and Diaphragm Data.
21. ESKO 4-tube Airmeter Data.
22. Combraco Stainless Steel Check Valve Data.
23. 20" DeZurik Butterfly Valve Data.
24. Fisher 4195 Series Pressure Indicating Controller Data.
25. Fisher 115C Liquid Level Transmitter Data.
26. Fiber Detector Data.

KROFTA SUPRACELL EQUIPMENT SPECIFICATION LIST

9/10/92

KROFTA JOB NO: 19503 PREPARED BY: F. Sang DATE: 25 Jan. 95
CUSTOMER: SBCCS Constructors P.O.# 00303-8180
NOTES: "Certified for Construction" drawings and data.

SUPRACELL QTY: 2 MAT'L: 304L
SPC TYPE: 62, Double Joint type with manual pressure release
NOTES: Total raw inlet flow 9200 GPM per unit.
Pressurized portion of recycled flow 1900 GPM per unit.

SUPRACELL ACCESSORY EQUIPMENT:
[K] = SUPPLIED BY KROFTA [C] = BY CUSTOMER [N] = NOT REQUIRED

[K] CARRIAGE QTY: 2 TYPE: Falk: WBHQM 525
GEAR MOTOR: RATIO: 1:125 FRAME: 182TC
HP: 3.0 RPM: 1750 PHASE: 3 VOLT: 480
NOTES: with bushing kit HOSBK-250

[K] SCOOP QTY: 2 TYPE: Falk: WBHQM 600
GEAR MOTOR: RATIO: 1:250 FRAME: 182TC
HP: 3.0 RPM: 1750 PHASE: 3 VOLT: 480
NOTES:

[K] MOTOR: QTY: 4 TYPE: Westinghouse
HP: 3.0 RPM: 1800 PHASE: 3 VOLT: 460

[K] MOTOR CONTROLLER: QTY: 4 TYPE: Allen Bradley 1305
V-OUT: V-IN: 480 PHASE: 3 HZ: 60
MAX H.P.: 3.0 NOTES:

[K] ROTARY SLIP RING: QTY: 2 NOTES: Aeromotive ISRP-39
[K] PINCH/PURGE VALVE: QTY: 2 NOTES: RKL 4" flanged pinch type
[K] PURGE TIMER, CASE: QTY: 2 NOTES: ATC 342
[K] SOLENOID VALVE: QTY: 2 NOTES: ASCO 8320-A6
[K] LEVEL CONTROL: TYPE: Automatic level control system.
NOTES: 20" DeZurik butterfly valve, Actuator and Positioner.

AIR DISSOLVING TUBE (ADT): QTY: 6
ADT TYPE: ADT 2500 MAT'L: 304L S.S. with M.S. flanges
NOTES:
[C] PRESSURE PUMP(S): 2
PUMP FLOW REQUIRED: 1900 GPM
NOTES: Goulds type 3196 or equivalent

AIR DISSOLVING TUBE (ADT) ACCESSORY EQUIPMENT

[K] PRESSURE GAUGE, SEAL: QTY: 8 NOTES: Ametek type
[K] AIR METER: QTY: 6 No. TUBES: 4 NOTES: ESKO EK4-7114-N
[K] CHECK VALVE: QTY: 24 NOTES: Combraco
[K] BLEED-OFF, SITE TUBE: QTY: 6 NOTES: Krofta

ADDITIONAL ITEMS, NOTES: 3 Fiber detectors. 6 O&M manuals.

THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

KROFTA®

OPERATION AND MAINTENANCE MANUAL

for the

KROFTA SUPRACELL
TYPE SPC 62

SBCCS Constructors
Decatur, GA

KROFTA ENGINEERING CORPORATION
101 YOKUN AVENUE
LENOX, MA 01240
Job No. 19503

KROFTA

KROFTA SUPRACELL

OPERATION AND MAINTENANCE MANUAL

TABLE OF CONTENTS

1) THE KROFTA SUPRACELL 'ZERO VELOCITY' PRINCIPLE OF OPERATION

The **KROFTA SUPRACELL** removes solids by means of air flotation and sedimentation. Turbulence caused by water movement is a very important factor in flotation and greatly reduces the efficiency of other types of flotation units. In conventional, stationary units, there must always be water movement in order for the water to flow from inlet to outlet. With the **SUPRACELL**, the inlet and outlet are not stationary but are rotating about the center. The rotation is synchronized so that the water in the tank achieves **'ZERO VELOCITY'** during flotation. This means that the efficiency of the flotation is greatly increased to near the maximum theoretical limits. In practical terms, this allows better clarification in smaller surface areas and in a much shallower tank. The open tank has an approximate depth of 18 inches. Water is processed from inlet to outlet in two to three minutes.

2) KROFTA SUPRACELL - SAFETY REQUIREMENTS

KROFTA SUPRACELL units are equipped with equipment safety guards for operator protection from outside the unit. **SUPRACELL** units size **SPC 27** and larger are equipped with walkways allowing limited operator access onto the **SPC** unit. For operator access to the **SUPRACELL** walkway, wait until the walkway is in the best access position before stopping both the Carriage and Spiral Scoop gearmotor. At no time should any adjustment, inspection, or maintenance be undertaken on or in the **SUPRACELL** unit without the entire unit being completely shut down with the main power switch to the electrical equipment shut off. It is required that a lock be put on the main power switch in the "off" position at times when personnel are working on or in the **SUPRACELL** unit. The manufacturer **(KROFTA ENGINEERING CORPORATION)** will not accept any responsibility for claims resulting from injuries caused by failure to follow the above guidelines.

3) MAINTENANCE SCHEDULE

GENERAL

SUPRACELL units should receive a "walk around" visual inspection at least once weekly, a thorough item-by-item inspection monthly, and lubrication and adjustment on a three-month schedule minimum with continuous operation, or on a six-month schedule maximum with intermittent operation.

AUTOMATIC LUBRICANT INJECTORS

NOTE: See the PERMA Automatic Lubricant Injector Brochure attached.

Bearings on KROFTA equipment are provided with PERMA Automatic Lubricant Injectors. The canister type injectors originally provided with the KROFTA unit (PERMA "12") are designed to provide the required amount of lubricant for a one (1) year period. When the canister is nearly empty, an internal metal ring becomes visible through the clear plastic cap, indicating that the canister should be replaced.

Note that temperature can change the performance of the PERMA canister. High temperature can increase the amount of lubricant released, therefore reducing the effective life of the injector. Conversly, low temperature decreases the rate but increases the effective life. See the Temperature and Discharge Rate chart provided in the PERMA brochure.

The PERMA injector MUST be activated to begin working. A nylon activating screw is provided on the top of the injector. It must be fully screwed in to activate the injector. See the PERMA brochure for more detailed instructions.

PERMA injectors can be ordered from KROFTA or direct from your local PERMA supplier.

ROTARY JOINT MAINTENANCE

The KROFTA Rotary Joint in the center of the unit often requires a greater amount of grease than that provided with the PERMA "12" due to harsh operating conditions or due to the nature of the water being treated. A thorough inspection of the Rotary Joint should scheduled monthly. Many units are provided with manual lubrication fittings. These can be lubricated as often as necessary for smooth rotation of the Rotary Joint, but at least once every 3 months.

If originally supplied with PERMA "12" injectors, changing to a PERMA "6" or "3" will increase the greasing rate but cut the effective life of the canister.

If water begins to leak at an increasing rate (some leakage is normal) the packing seals may require compression adjustment as well as increased lubrication. The two piece top seal ring has a number of small compression adjustment bolts that are to be carefully adjusted in sequence around the joint. Tighten with a small wrench approximately one turn after the point where light to moderate resistance is felt. If tightening does not decrease leakage, replacement of the packing seals is required.

CARRIAGE FRAME (Movable Part Support)

Visual inspection of the carriage and equipment on the carriage should be done on a daily to weekly basis. Signs of wear or misalignment of wheels or other components should be looked for and corrected before any major damage is done. The carriage structure should be cleaned periodically to remove accumulated dust, dirt, and grease, preferably during shutdown. The carriage wheels should be inspected monthly, and the carriage wheel bearings should be lubricated on a three to six month schedule. Lubrication should be increased if signs of wear or moisture contamination are present. Some support wheels have sealed bearings with no grease fittings or are of self-lubricating material, and therefore require no lubrication.

The gearboxes require periodic oil changes as detailed on the enclosed manufacturer's literature. Note that the Initial oil change may be required soon after start of operation.

TANKS (Non-Rotating Parts)

Paint wear and light rusting on the rim is allowable as it serves to improve traction of the drive wheel. The rim should be brushed or hosed off periodically and always be kept cleaned of dirt, grease, and oil. Periodic touch-up painting of mild steel parts is recommended if signs of wear, chipping, or rusting become apparent on the unit. Only routine cleaning is required for stainless steel.

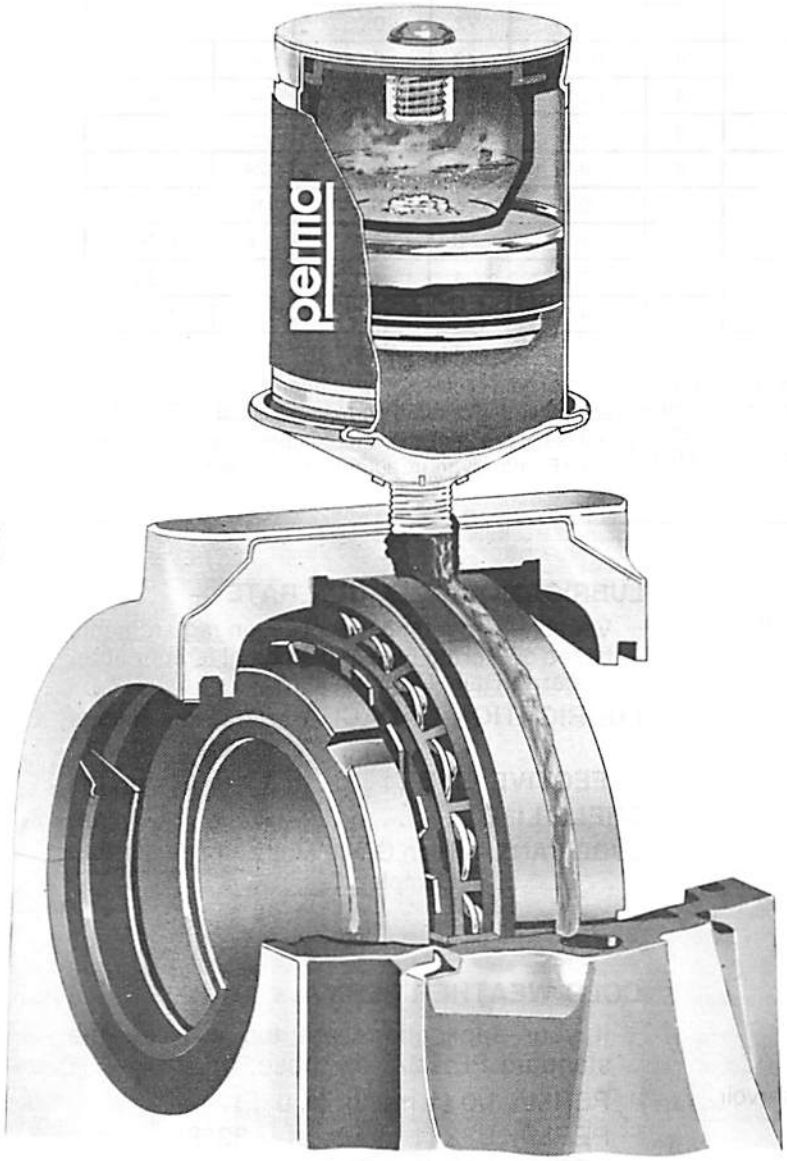
ROTATING TANK PARTS (Movable Part)

Only routine cleaning is required for stainless steel. Rubber seals should be inspected for wear and replaced if their function become impaired.

SPIRAL SCOOP

Only routine cleaning is required for stainless steel. Support wheels and bearings are to follow the same schedule as for Carriage Frame components.

perma® AUTOMATIC LUBRICANT INJECTOR

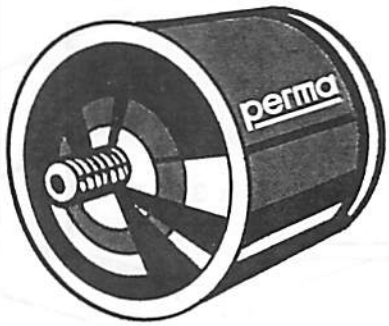


AN AUTOMATIC SELF-CONTAINED LUBE SYSTEM...

The **PERMA** Automatic Lubricator is a breakthrough in modern industrial lubrication and has proved itself over several years in Europe, Australia, Japan, the U.S.A. and Canada, in many types of industry and thousands of different applications. The **PERMA** provides bearings and bushings with positive lubrication, 24 hours a day, every day. It is entirely self-contained and needs no pump, motor or electric power. Start it once — and forget it until its allotted lifespan is finished (from 1 to 24 months, depending on type of injector in use). SAVE LABOR COSTS AND DOWN-TIME THROUGH THE PREVENTIVE MAINTENANCE WORK OF THE **PERMA** AUTOMATIC LUBRICATOR.

VISUAL SAFETY CHECK

As the **PERMA** nears the end of its effective life, an internal metal ring becomes clearly visible through the clear plastic cap, indicating that the **PERMA** should be replaced.



perma®

MOLECULAR SYSTEMS OF NEW ENGLAND, INC.

25 E OLYMPIA AVE.
WOBURN, MA 01801
(617) 933-8311 (617) 932-4124 FAX

perma®

TECHNICAL DATA

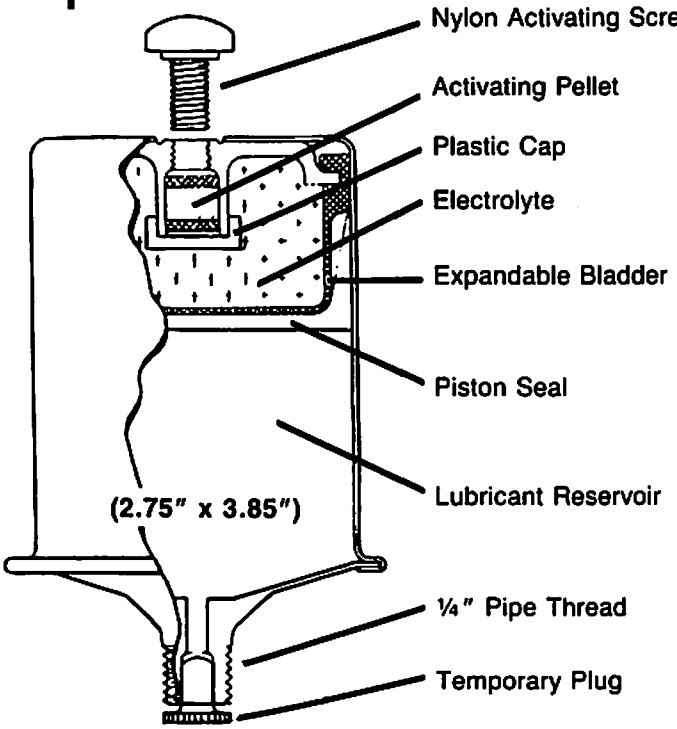
TEMPERATURE and DISCHARGE RATES in Cu. Cms.

Ambient Temperature		PERMA "1" 1 month at 77°F.		PERMA "3" 3 months at 77°F.		PERMA "6" 6 months at 77°F.		PERMA "12" 12 months at 77°F.		PERMA "24" 24 months at 77°F.	
°F.	°C.	Month Life	Appr. Daily Discharge in cu. cm.	Month Life	Appr. Daily Discharge in cu. cm.	Month Life	Appr. Daily Discharge in cu. cm.	Month Life	Appr. Daily Discharge in cu. cm.	Month Life	Appr. Daily Discharge in cu. cm.
—12.5°	—25°	9	0.4	27	0.13	58	0.06	116	0.03	—	—
—4.7°	—15°	6	0.6	18	0.2	36	0.11)	72	0.05	—	—
+23°	—5°	4	1.0	12	0.3	24	0.16)	48	0.08	—	—
+41°	+5°	2	2.0	6	0.6	14	0.28	28	0.14	—	—
+59°	+15°	1½	2.5	4½	0.8	9	0.4	18	0.2	—	—
+77°	+25°	1	4.0	3	1.2	6	0.6	12	0.3	24	0.166
+95°	+35°	2/3	5.0	2½	1.5	4½	0.8	9	0.4	12	0.332
+113°	+45°	1/2	8.0	1½	2.5	3	1.2	6	0.6	6	0.66
+131°	+55°	1/3	12.0	1	4.0	2	2.0	4	1.0	3	1.33
+149°	+65°	1/6	24.0	1/2	8.0	1	4.0	2	2.0	2	1.5
		YELLOW		GREEN		RED		GRAY		BLUE	

Note: One cubic centimeter of lubricant is equal to 1¼ strokes from a standard grease gun. The **PERMA** lubricator holds approximately 120 cubic centimeters of lubricant, equivalent to 4.8 ounces or 7.3 cubic inches. As a rule of thumb, 20 strokes are needed with a normal hand lube gun to discharge 1 ounce of lubricant.

For cold climates, low temperature lubricants are recommended and are normally stocked. E.P. 2 lubricant is not recommended for temperatures lower than +50°F., not even in automatic lube systems.

Specifications



LUBRICATION INJECTION RATE —
Variable to meet most application requirements based on **Perma** type and ambient temperature. (Refer to Daily Output Chart).

LUBRICATION CAPACITY . 7.32 cu. inches (120 cu. cm.)

EFFECTIVE LIFE ..... 1 to 24 months

SHELF LIFE ..... 3 years

LUBRICANT — High Grade Multipurpose, Lithium Complex Grease.

COLD WEATHER PERMA:

If your applications are too cold for the standard PERMA, try these:

PERMA 1/0 (1 month at 0°F)

PERMA 1/32 (1 month at +32°F)

PERMA 1/55 (1 month at +55°F)

Each of these PERMA's will give the daily equivalent of approximately 5 strokes from a standard grease gun, for the period shown, or use - - -

perma®

INSTALLATION INSTRUCTIONS

PERMA Automatic Lubricators discharge lubricant at a constant rate 24 hours a day. The **PERMA** generates its own power, increasing its output pressure up to 136 p.s.i. and will not blow the seal on any bearing. The **PERMA** Automatic Lubricator holds approximately 4.8 ounces of lubricant, equivalent to 7.3 cu. in. (120 cu. cm.).

WHAT TYPE OF INJECTOR SHOULD YOU USE?

AS A RULE OF THUMB, 20 strokes are needed with a normal hand lube gun to discharge 1 oz. of lubricant.

1. Use **TYPE "1" PERMA** where a normal lubrication of 3 - 4 strokes (4 cu. cm.) per day is required.
2. Use **TYPE "3" PERMA** where a normal lubrication of 8 - 10 strokes (10 cu. cm.) is required once a week.
3. Use **TYPE "6" PERMA** where a normal lubrication of 8 - 10 strokes (10 cu. cm.) every 2 - 3 weeks is required.
4. Use **TYPE "12" PERMA** where a normal lubrication of 10 - 12 strokes (10 cu. cm.) once a month is required.
5. Use **TYPE "24" PERMA** where a normal lubrication of 18 - 20 strokes (20 cu. cm.) every 3 - 4 months is required.

TYPE "24" PERMAS are recommended for electric motors from 25 h.p. up to 400 h.p.

NOTE: — If more lubrication is required, use **PERMA** Automatic Lubricators in multiples.

For technical assistance contact your PERMA Representative.

ORDERING PERMA AUTOMATIC LUBRICATORS —

When ordering **PERMA** Lubricators, please specify the **PERMA** Type.

Be certain to use proper Type **PERMA** Lubricator for operating environment involved in the application. Refer to Daily Output Chart for operating temperature ranges of **PERMA** Types and related lubricant output rates.

Do not install **PERMA** Lubricators on systems requiring an initial line pressure of more than 100 p.s.i.

Using a hand-pressure gun, make sure lubricant lines flow freely before first installation.

Screw activating screw all the way into **PERMA** Lubricator. Important: rubber washer must be used with activating screw. Remove the plug and mount the **PERMA** Lubricator hand-tight only.

Allow sufficient time for pressure development (approximately 30 hours) within the **PERMA** Lubricator. Always pre-grease fittings before first installation.

Enter installation date and replacement date in space provided. DO NOT REMOVE lubricator until it expires. If lubricator is removed it takes considerably longer to regenerate pressure once the **PERMA** has been activated.

NEVER REMOVE OR LOOSEN activating screw during operation as this will destroy the effectiveness of the pressurizing chamber.

For remote installation use tubing NOT LESS THAN 5/8" O.D. or 1/4" I.D. Maximum distances (at normal temperatures of 50°F. to 150°F.):

Vertical — 9 feet
Horizontal — 12 feet

For oil filled **PERMA** Lubricators the above distances may be longer.

PERMA Lubricators filled with grease can be mounted in any position. LUBRICATORS FILLED WITH OIL MUST BE MOUNTED WITH OUTLET IN UPWARD POSITION.

perma®

Using PERMA Lubricators

Proper lubrication is important to trouble-free bearing operation. The continuous injection of controlled volume of lubricant into a bearing helps to eject dirt, water and wear products from the bearing by maintaining a constant flow of lubrication outward...

This motion keeps foreign materials from entering and also keeps seals lubricated.

The PERMA Lubricator continuously supplied the bearing with new grease. With the proper PERMA *type* installed, it will save grease and should result in cleaner machinery.

The PERMA can be attached to vibrating and moving elements of equipment and will operate under water.

The PERMA Lubricator will develop sufficient pressure to permit its use in situations where it must be mounted remote from the bearing, due to the inaccessibility of the lubrication point.

Some of the countless places PERMA Lubricators are being successfully used include:

Bridge Cranes
Stacker Loaders
Fans
Blowers
Heat Treat Furnaces
Conveyors
(Drives, Take-ups and Idlers)
Pumps
Electric Motors
Hoists
Heaters
Mixers
Elevators
Shakers
Bulk Handling Equipment
Air Conditioners
Ways
Presses
Automatic Welders
Mining Equipment
Production Equipment of all kinds.
Robots
Food Processing Equipment

Cost Analysis

Extended bearing life and reduced down-time are only part of the reason progressive maintenance operations are switching to Perma Automatic Lubricators. Perma offers attractive savings in lubrication labor. This analysis illustrates the high cost of manual lubrication.

ESTIMATED COST TO SERVICE ONE FITTING OVER SIX-MONTH PERIOD:

LABOR COST
8 hours at $7.50 = $60.00 per day.

PRODUCTIVE TIME:
8 hours - ½ hr. (non-productive) = 7½ hrs. reduced to 80% efficiency = 6 hrs. X 60 minutes = 360 minutes productive time.

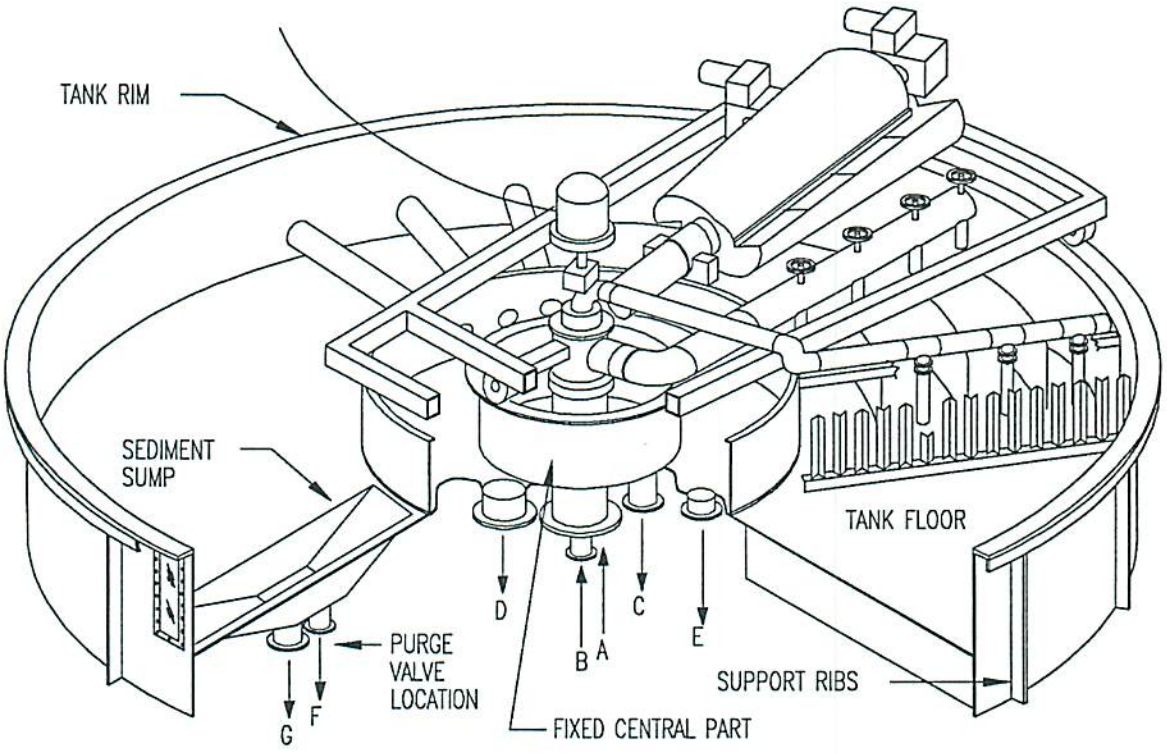
LABOR COST PER MINUTE:
$60.00 ÷ 360 minutes = 16.7¢ per minute.

SIX-MONTH COST:
(26 weeks) X 5 work days = 130 days X 2 min. X 16.7¢ per day = $43.42 per fitting.

SIX MONTH COST TO SERVICE ONE FITTING				
If your $/hour labor, average Cost is...		Average time to grease fittings		
		2 MIN.	3 MIN.	5 MIN.
per hr.	per min.	Grease Once A Day		
$ 7.50	16.7¢	43.42	65.13	108.55
$10.00	22.2¢	57.72	86.58	144.30
$12.50	27.2¢	72.28	108.42	180.70
		Grease Once A Week		
$ 7.50	16.7¢	8.68	13.03	21.71
$10.00	22.2¢	11.54	17.32	28.86
$12.50	27.2¢	14.46	21.68	35.36

perma®

Perma North East
John MacRae (603) 735-5021
Taunton Hill Road; RFD 1, Box 2170 Andover, NH 03216



PIPE CONNECTIONS	
A – UNCLARIFIED WATER INLET	D – CLARIFED WATER OUTLET
B – PRESSURIZED WATER INLET	E – CLARIFED RECYCLE OUTLET
C – FLOATED SLUDGE OUTLET	F – SEDIMENT PURGE OUTLET
	G – DRAIN OUTLET

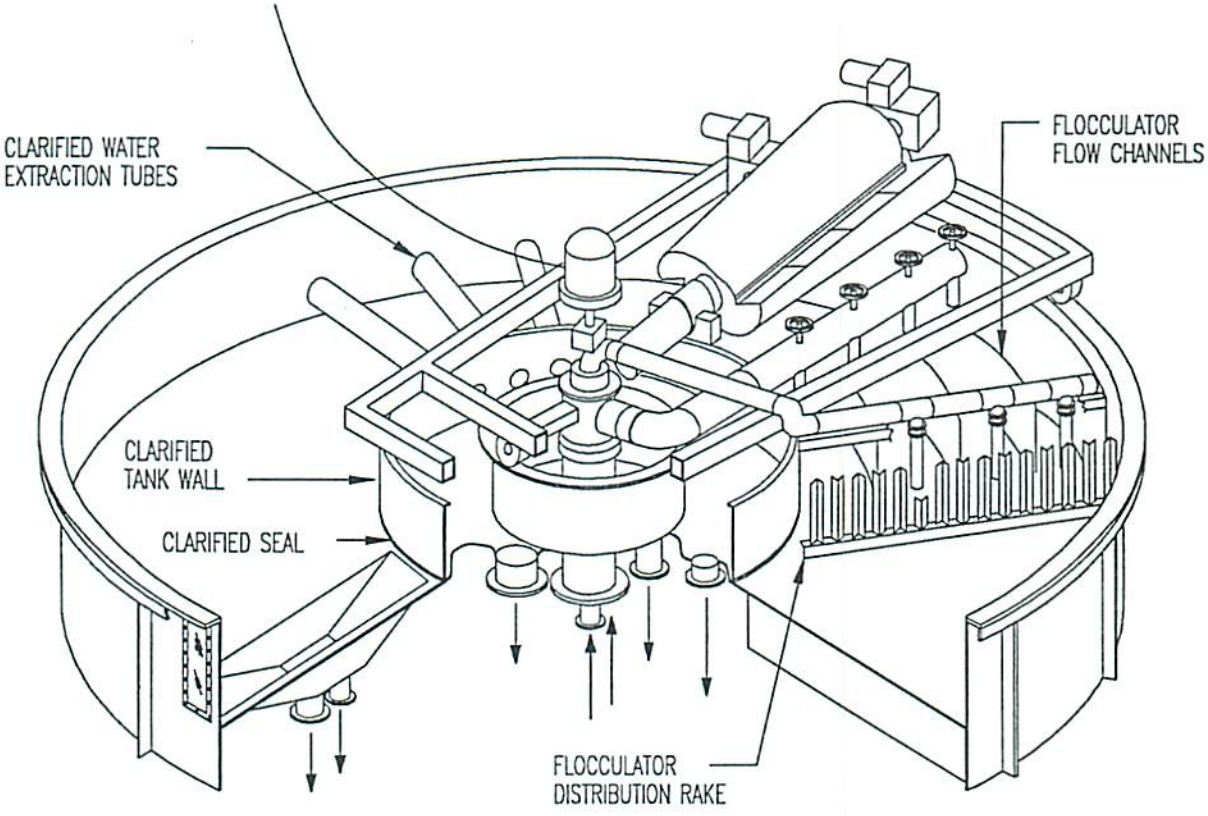
4) SUPRACELL GENERAL DESCRIPTION - DOUBLE ROTARY JOINT

TANK COMPONENTS (Non-Rotating Parts)

SUPRACELL wetted tank parts are standard in stainless steel. Some non-wetted parts such as the tank rim and sub-floor support structure are standard in epoxy coated mild steel. Customer pipe connections are at flanges located under the unit as shown. A sump well in the tank floor is provided to collect sediment pushed in by a rotating bottom scraper. A purge valve with automatic controls is available for timed sediment removal. A window located on the tank wall is provided for visual verification of floated sludge thickness and water level. The outer tank rim supports the rotating carriage drive and support wheel. An inner tank supports the inner support and centering wheels and receives floated sludge drained from the Spiral Scoop. Optional configurations include concrete floor and outer tank wall, or all mild steel units, epoxy painted.

LEVEL CONTROL

SUPRACELL units have two options for maintaining a constant level during operation. One option utilizes a height adjustable circular overflow weir internal to the clarifier. It maintains a constant water level in the unit necessary for controlling the scooping depth and therefore the sludge removal rate of the Spiral Scoop. The other level control option utilizes a tank side wall mounted level sensor controlling an automatic valve to achieve a constant water level.



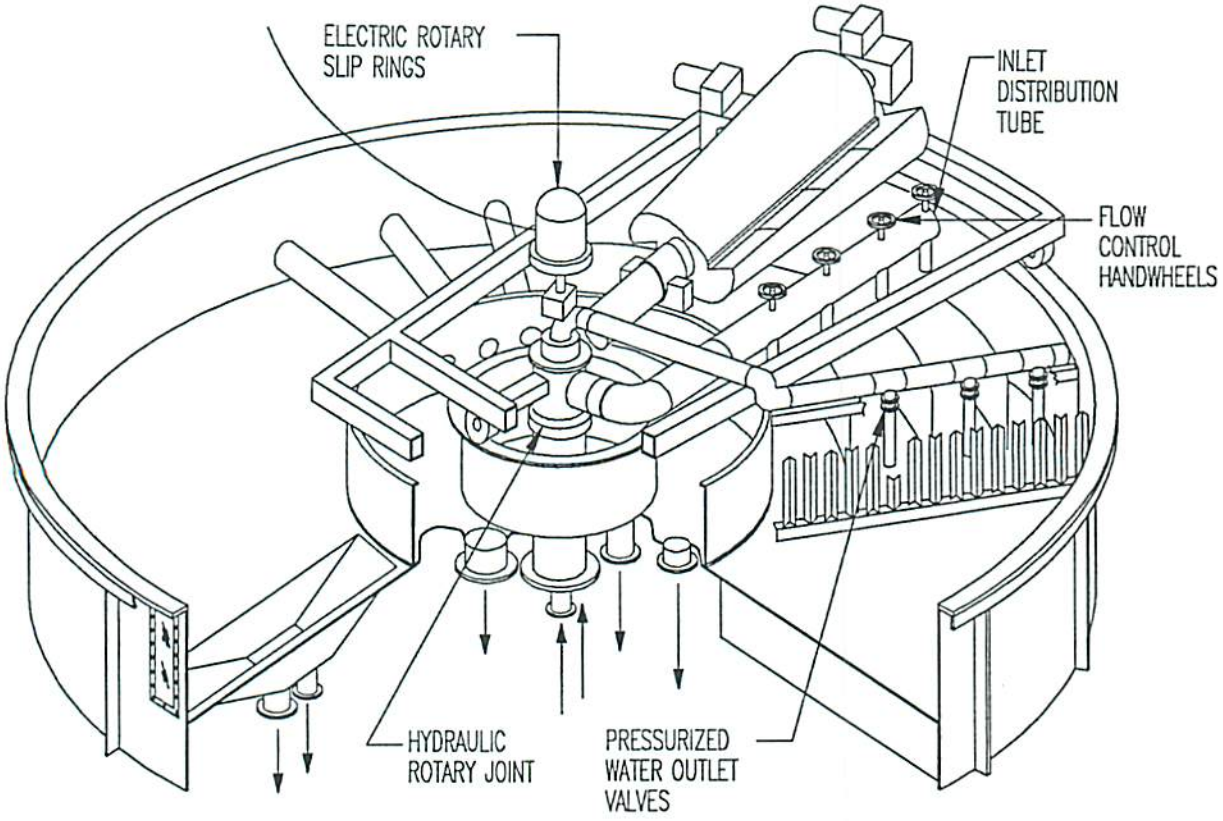
4) SUPRACELL GENERAL DESCRIPTION (Cont.)

ROTATING TANK COMPONENTS (Movable Part)

Clarified water is drawn off above the floor of the main tank into slots in the Clarified Water Extraction Tubes then into the clearwell area within the Clarified Tank Wall. The rotating Clarified Tank Wall is provided with a circular wiper, the Clarified Water Seal to separate the contained clarified water from the surrounding unclarified water.

Other components of the Movable Part include the Flocculator Channels, the back-splash for the Spiral Scoop, and the structure supporting the Inlet Distribution Tube. A bottom wiper under the spiral scoop back-splash scrapes sediment into the sediment sump. A rotating side scraper adjacent to the scoop cleans sludge from the tank wall.

The Flocculator Distribution Rake has an operator adjustable mechanism for height adjustment. Rake adjustment criteria is to allow minimum water flow over the top while still allowing sludge overflow. Too high an adjustment can dam up sludge behind the Rake, causing an inconsistent sludge blanket and possible sludge overflow onto the rim.



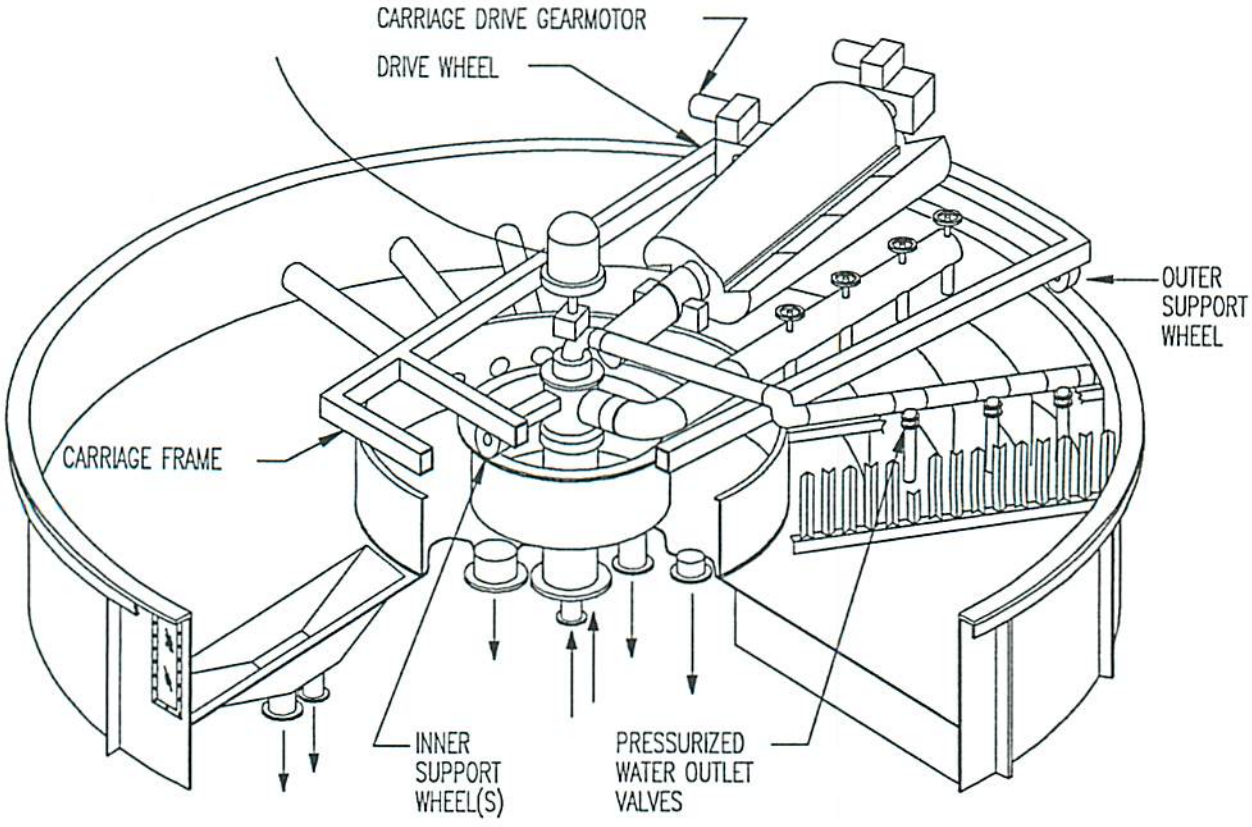
4) SUPRACELL GENERAL DESCRIPTION (Cont.)

CARRIAGE FRAME (Movable Part Support)

The Carriage Frame rotates the Movable Central Part, the Inlet Distribution Tube, the Spiral Scoop, and other parts around the tank. The Carriage is supported by the Drive Wheel, Movable Part Outer Support Wheel(s), and the Movable Part Inner Support Wheel(s).

The Drive Wheel has a polyurethane tire with a conical taper and is mounted at an inward tilted angle to minimize rotating resistance and subsequent wear as it rotates around the outer tank rim. The Drive Wheel Shaft is supported at each end by pillow block or flange bearings. The Carriage Drive Gearmotor connects to the Drive Wheel shaft.

The support wheels typically have internal bearings and are supported on a vertical, rigid frame. Wheel material is steel, Polyurethane or UHMWP, crowned or beveled for lower rolling resistance. Some **SUPRACELL** units are provided with self-lubricating UHMWP material wheels without bearings.

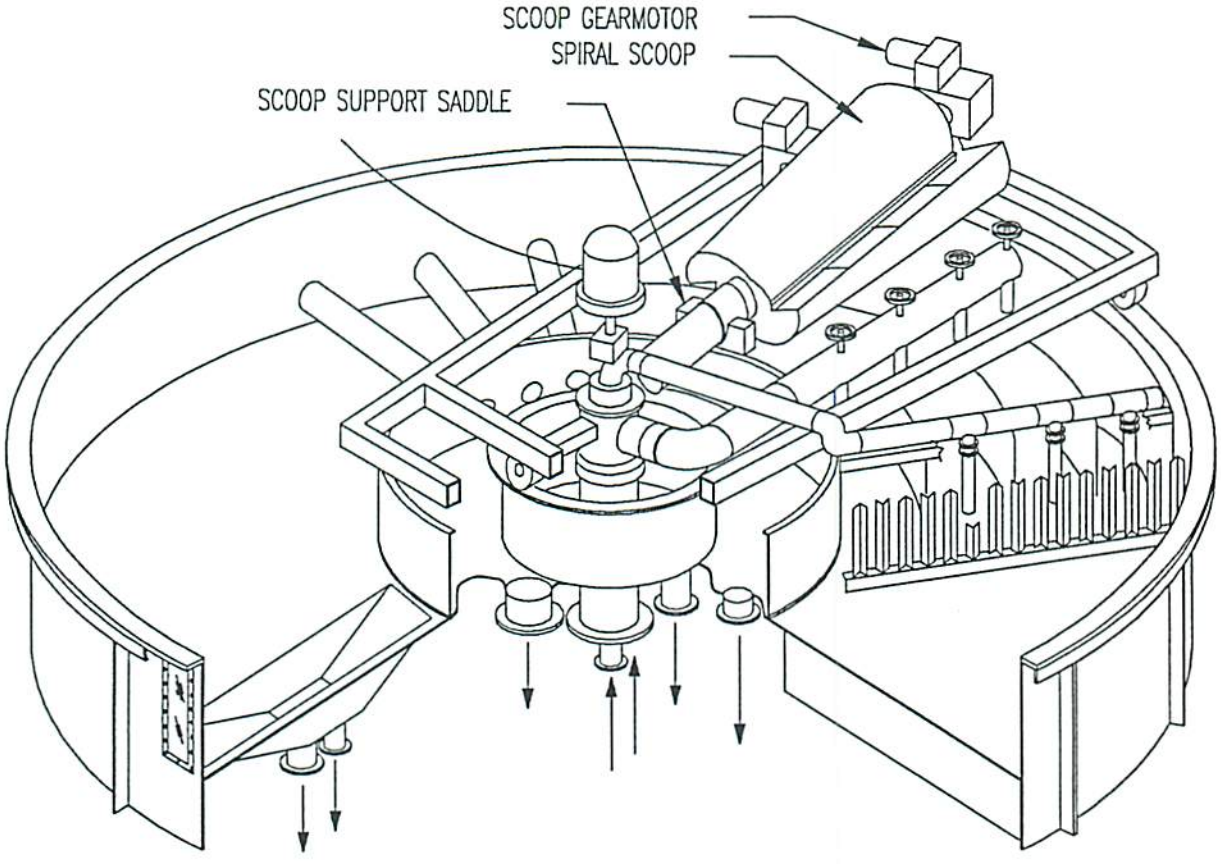


4) SUPRACELL GENERAL DESCRIPTION (Cont.)

SPIRAL SCOOP

The **KROFTA** Spiral Scoop, standard in stainless steel, removes floated material from the top surface of the water for discharge into the Fixed Central Part Tank for removal from the unit. It is supported on the outer end by a bearing that is mounted to the Carriage Frame. The inner end of the Scoop outlet pipe is supported by a saddle type or dual wheel support.

The Spiral Scoop is driven by a gearmotor connected to the Scoop outer end shaft. Primary control of the Spiral Scoop sludge removal rate is by water level adjustment, as explained in the Level Control section. For fine adjustment of scoop removal rate, the speed of the Scoop rotation can be adjusted by the motor's variable speed motor controller.

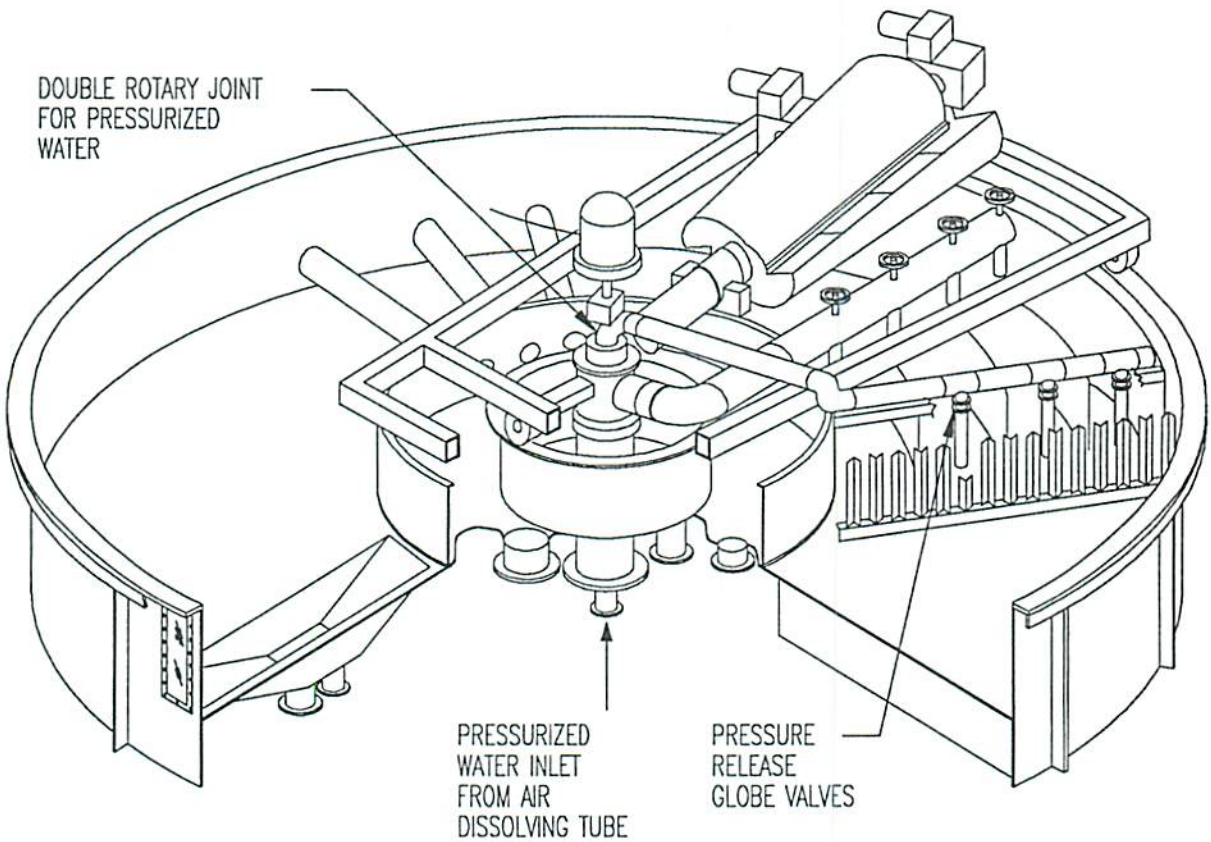


4) SUPRACELL GENERAL DESCRIPTION (Cont.)

ROTARY JOINT AND INLET DISTRIBUTION TUBE

The Rotary Joint allows raw inlet water to enter the rotating Inlet Distribution Tube for rotary distribution into the **SUPRACELL** tank. The Rubber Pipe Connection provides a flexible connection between the two components. The Inlet Distribution Tube serves as a header box for a number of smaller outlet tubes which feed into the channels formed by the flocculation baffle walls. The outlet tubes are spaced to provide the correct distribution of water into the tank. Handwheels on top of the Distribution Tube vary the distance of valve disc plates from the end of the outlet tubes. By rotating clockwise (screwed downward) the tubes are opened. Small **SUPRACELL** units have pivoting slide plates attached to the outlets for adjustment. Balancing the flow rate across the Distribution Tube is important to minimize turbulence at the flocculator outlet.

For initial flow adjustment, before start-up, open all valves equally. After start-up, adjust all valves an equal number of turns until flow appears even. Avoid too small a valve opening which can over pressurize and rupture the Distribution Tube flexible connection during operation.



4) SUPRACELL GENERAL DESCRIPTION - DOUBLE ROTARY JOINT

DOUBLE ROTARY JOINT TYPE PRESSURIZED WATER RELEASE

Some larger **SUPRACELL** units, depending on process requirements, are equipped with an alternate pressurized water release point. Instead of releasing the pressurized water into the raw water line ahead of the **SUPRACELL**, the flow from the **KROFTA** Air Dissolving Tube(s) is piped through a smaller rotary joint within the main rotary joint to outlet valves inside the **SUPRACELL**.

In operation, pressurized water enters the unit at the recycle inlet pipe before passing through the rotary joint. Exiting the rotary joint, the pressurized water is piped to the Pressurized Water Outlet Header. Water is released under pressure from valves spaced along the length of the header. A cover over the valve outlet serves to decrease turbulence.

5) SUPRACELL OPERATION AND TROUBLESHOOTING PROCEDURES

A. INITIAL START-UP PROCEDURES

1. Close all drain, sampling, automatic bottom purge and air inlet valves to the **KROFTA SUPRACELL** and **AIR DISSOLVING TUBE**.

2. Open all Inlet Distribution Tube outlet handwheels an equal number of turns clockwise adjusted from their fully closed position to give uniform valve openings of at least 1 1/2".

3. Check the level control weir or automatic valve for proper operation (whichever is provided). Turn on the raw water feed pump, or open the inlet valve if gravity fed. Allow water level to stabilize.

4. Start the drive motors for the carriage and scoop. Adjust the drive speed so that the **SUPRACELL** carriage revolves approximately once every three minutes. Set the Scoop speed to mid range.

5. Adjust the level control so that the Scoop is removing surface sludge and adjust the Scoop speed so that the complete surface is lifted without overlap. (Adjustments require at least 30 minutes to stabilize before another adjustment is made).

6. Open any isolation valves to the **AIR DISSOLVING TUBE** and provide air to the ADT air panels. Adjust the air pressure regulator to 85 - 90 PSIG. Start the recycle pressure pump. Open the ADT globe valve about 1/2 way and adjust the air flow meter valves until the flow reading is about 1/2 scale or approximately 30 SCFH. Note that the air pressure must always be higher than water pressure to prevent backing of water into the air lines. Note also that the air supply should be isolated from the system whenever the pressure pump is not operating.

7. Start the chemical flocculent pumps. Check the Inlet Distribution Tubes for even flow thru each, adjust the handwheels accordingly for an even flow.

B. ADJUSTMENT PROCEDURES DURING OPERATION

1. See **AIR DISSOLVING TUBE** operation instructions for flow and performance adjustments.

B. ADJUSTMENT PROCEDURES DURING OPERATION

2. Adjust the Inlet Distribution Tube outlet handwheels an equal number of turns each until flow into the **SUPRACELL** appears even. It is important to close the valves enough to create about six inches of water "head" in the Distribution Tube necessary for even flow from the outlet tubes. Avoid too small a valve opening which can pressurize and damage the Distribution Tube during operation. Attempts to balance the flow by unequal valve openings should be avoided if possible.

3. The exact speed setting of the carriage drive motor should be calculated or set by observing the water in the tank. The water in the tank must have 'Zero Velocity.' In other words, the speed at which the water enters the unit should equal the speed at which it is discharged. This will yield the least amount of turbulence in the flotation tank. A change in flow rate will require adjustment of rotation speed. To calculate, add the raw flow to the recycle flow to establish total GPM flow into the unit. Calculate the volume of the **SUPRACELL** flotation zone in gallons. The time the carriage takes to make one tank revolution should equal the retention time of water in the unit. For example, 300 GPM flow into a **SUPRACELL** with a volume of 900 gallons has a retention time of three minutes. Therefore, the carriage should be adjusted to revolve once every three minutes.

4. The water level in the **SUPRACELL** should be adjusted for optimum floated sludge collection by the Spiral Scoop. Lowering the water level reduces sludge collection, allowing a thicker, dryer layer of sludge to form on the surface. Raising the level increases collection and thins out the sludge layer. It will take up to an hour after a level change before the sludge thickness reaches equilibrium. The sludge layer becomes too thick when it begins to break up in pieces and/or settle out.

   Adjustment of the Spiral Scoop rotation speed is important for fine tuning the sludge removal rate after the water level is established.

5. The settled sludge purge should be set depending on how much and at what rate settled material collects in the system. Typical purge valve time open duration would be 5 to 10 seconds or until clear water flows out. The interval between valve openings should initially be set between 15 minutes to one hour and then adjusted based on operating experience.

C. SHUT-DOWN PROCEDURES

1. Turn off the chemical pumps.

2. Turn off the **AIR DISSOLVING TUBE** pressure pump after closing the isolation valve from the compressor.

C. SHUT-DOWN PROCEDURES (Cont.)

3. Turn off the power to the Purge Valve Timer (if equipped) leaving air pressure on to maintain valve in closed position if water is to remain in the **SUPRACELL**.

4. Continue to operate the Spiral Scoop and Carriage drive until any remaining sludge has been removed. Clean-up is easier if the **SUPRACELL** is allowed to run after the process flow has stopped. Clarified water will recirculate and most of the solids will be flushed from the system.

5. Valve and control settings previously established should not be changed.

6. The water does not have to be drained out unless the shut-down is for a long period or complete wash-up is necessary.

7. If the **SUPRACELL** is drained, hose down all parts thoroughly; dried-on sludge can be very difficult to remove.

D. NORMAL START-UP AND OPERATION PROCEDURES

1. Follow the same sequence as for initial start-up, except that previously established valve and control settings should be maintained and unchanged.

2. Check that the **AIR DISSOLVING TUBE** pressures and pressure drop valves are as previously set and that the clarified water is clear. If not, follow the procedure in Part E (Trouble Shooting Procedures).

3. If the **SUPRACELL** is started up before process start-up, the **SUPRACELL** will operate and continuously recirculate and clean the clarified water. This will help prevent solids build-up in the clarified water during start-ups.

E. TROUBLE SHOOTING PROCEDURES

Poor water clarification in the **SUPRACELL** can be a result of problems caused by solids overloading, poor flotation resulting from **AIR DISSOLVING TUBE** problems, or inadequate/improper chemical addition. A water sample taken from the inlet area of the **SUPRACELL**, preferably in a graduated cylinder, provides many clues for diagnosing problems.

E. TROUBLE SHOOTING PROCEDURES (Cont.)

The following are some common areas to check if there are clarification problems:

1. SOLIDS OVERLOADING PROBLEMS

Overloading is a result of unusually heavy solids loads on the **SUPRACELL**, as can occur at washups or at times of heavy solids loading from the process. Overloading can cause unclear water and in extreme cases physically clog parts of the system. The most effective solution is to simply decrease the solids loading if at all possible. If the overload clogs the system with sludge, the system will unclog itself when the overload stops, unless the thick sludge is allowed to block the clarified water pipes. Overloads can sometimes be compensated for by adding more chemical. **NOTE: Do not run the SUPRACELL when it is completely filled with heavy sludge**. This can cause strain and possibly damage rotating parts.

2. CHEMICAL ADDITION PROBLEMS

NOTE: Chemical addition should not require day-to-day adjustments.

a. Not enough chemical. Symptoms include very small particles remaining in the clarified water, slow flotation, or thin floated sludge, Check the following items:

* Chemical pump or lines plugged?
* Out of chemical?
* Have pump settings been changed?
* If the concentration of solids in the incoming water has changed or there is some change in the pH, defoamer addition, etc., this may change the chemical demand requiring higher amounts.

b. Too much chemical. Symptoms of chemical overdosing include a very "greasy" sludge, a watery or "flat" sludge, and very large particles in the water to which the air will not stick. This could also indicate the presence of defoamer in the system. A slippery or greasy feel in the clarified water can also indicate overdosing resulting in chemical carry-over into the clarified water.

NOTE: All chemical adjustment should be made slowly, as changes can take from 3 to 20 minutes to take full effect. If the clean water is recycled, changes can take hours to be fully observed.

E. TROUBLE SHOOTING PROCEDURES (Cont.)

3. AERATED RECYCLE WATER ADDITION PROBLEMS

NOTE: See also **AIR DISSOLVING TUBE SYSTEM** for additional information.

a. Too much "air" in system. This is indicated by foaming or frothing at the **SUPRACELL** water surface, excessive and large turbulent bubbles at the inlet, and by foamy sludge. Before changing settings, check the following:

* Dissolving tube air bleed-off plugged? (This can cause large bubbles in the inlet).
* Have air addition settings to the **AIR DISSOLVING TUBE** changed?
* Is the feed pump pulling in air or cavitating?
* Has detergent, caustic, or other foaming agent been added to the water?
* Are solids in the feed water unusually low?

b. Not enough "air" in system. This is indicated by watery sludge, sludge not floating or floating slowly, and by a very "flat" appearance of the inlet water.

* Has the air line plugged or has air pressure dropped lower than pressure in **AIR DISSOLVING TUBE**?
* Has the air pressure decreased, causing reduced air flow?
* Check for chemical problems such as defoamer in system, chemical overdose.
* Very reduced water flow caused by a plugged valve or cavitating of the feed pump may greatly reduce dissolving efficiency.
* Unusually high solids in the incoming water may also cause the above symptoms. This can sometimes be corrected by increasing air addition.

F. TROUBLE SHOOTING PROCEDURES - MECHANICAL

1. DRIVE WHEEL SLIPPING

Spinning or stalling of the Drive Wheel is usually a symptom of other problems in the system. The friction drive is a torque overload control. If there is a heavy load on the system, the wheel should slip before any serious mechanical damage is done. Typical causes of slipping are:

* Check if the drive wheel is worn down or damaged. If so, that usually indicates the presence of other problems mentioned. (Regularly scheduled tire replacement is recommended).

F. TROUBLE SHOOTING PROCEDURES - MECHANICAL (Cont.)

* Proper wheel alignment of the Drive Wheel and support wheels is important for wheel life and to reduce resistance.
* Excessive loads of solids in the Clarifier. If the Clarifier is allowed to fill with floated sludge, the force required to move the rotating parts is much higher. The overload condition should be fixed by draining the sludge out and starting over again if possible, or by raising the level and speeding up the Scoop. If the sludge is very thick, water dilution may be necessary at first. This kind of condition should be corrected as soon as possible to avoid damage of the rotating parts.
* Excessive settled sludge in the Clarifier. This usually is the result of non-function of the bottom purge or of some upset in the Clarifier which has caused excessive settling. The bottom purge should be operated frequently until the condition is cleared. A sample scraped from the bottom of the unit or taken from the bottom purge line can help identify this problem.
* Foam or polymer on edge. Excessive foaming can result from chemical problems in the process or improper air addition. Foam can carry a high load of flocculent polymer which is very slippery. This should be thoroughly washed off.
* Mechanical malfunction. The general cleanliness of the unit and the function of the wheels, especially the centering wheels, should be checked thoroughly. The unit should be emptied and cleaned thoroughly and operated empty with all mechanical clearances (especially on the outside edge) checked.

6) KROFTA AIR DISSOLVING TUBE SYSTEM

A. GENERAL PRINCIPLES

The **KROFTA** Flotation System removes solid impurities from the water by floating them to the surface. The reason that the impurities will float, even when they are heavier than water, is that microscopic air bubbles attach themselves to the impurities, or flocks, and make them buoyant.

B. OPERATIONAL DESCRIPTION

The process for forming the air bubbles is as follows:

1. Water pressurized to 180 ft. head (78 PSI nominal) enters the **AIR DISSOLVING TUBE** (ADT) through the inlet. The water enters tangentially and spirals through the length of the tube. See Drawing U4-DT-205 and U4-DT-209.

2. Compressed air is injected through special air dispersion panels, Item 4.

3. The water and air are mixed rapidly within the tube for 10 seconds before exiting the tube outlet. Any undissolved air accumulates in the center and is separated out by the bleed-off line in the center of the tube.

4. The pressure is released into the clarifier. When the pressure is released, the water can no longer hold the dissolved air in solution. This causes microscopic air bubbles to spontaneously form throughout the liquid. If clear water is used, it will take on a milky white appearance. This can be seen by taking a sample of the mixture in a clear container. This rise rate of the proper sized air bubbles should be no faster than approximately 8 - 12 inches per minute. (For proper operation, the bubbles formed should be smaller than the particles, or flocculated material they are removing).

C. ADT COMPONENT DESCRIPTION

1. AIR DISSOLVING TUBE

The tube, Item 1, Drawing U4-DT-205, is designed to retain water and air under pressure. The inlet nozzle, Item 3, increases the velocity of the water entering the tube and directs it tangentially, causing a spiraling motion. The pressure and swirling in the tube cause the air to become dissolved in the water. The ADT requires a minimum flow and pressure drop to work properly, similar to the operation of a centrifugal cleaner. The nozzle also provides a pressure drop, nominally 8 PSI at design flow, which is used to calculate the flow rate.

6) KROFTA AIR DISSOLVING TUBE SYSTEM (Cont.)

Any undesirable, large undissolved air bubbles tend to collect along the central axis of the ADT. This air is continually removed to prevent the tank from filling with air.

2. AIR METER

The amount of air needed by the ADT depends on the water flow through the unit and the amount required to properly float the solids. The amount added is a small percentage of the amount of water required. The air quantity is precisely metered by an Airmeter, Item 5.

The compressed air supplied to the ADT must be pressure regulated and filtered of any oil or moisture. Minimum gauge pressure should be 85 - 90 PSI or at least 10 PSI higher than the internal ADT pressure. The air meter needle valve(s) require adjustment for the proper air flow reading, initially set at 30 SCFH each. The air enters the ADT into internal dispersion panels and is mixed and dissolved into the water.

3. PRESSURE RELEASE VALVE(S)

The pressure release valve is the point at which the small air bubbles necessary for flotation are formed. The pressure release valve also functions to control the flow and pressure through the ADT. (See attached pressurized water release system data).

4. PRESSURE GAUGES

A pressure gauge is provided at the ADT with one connection to the inlet piping before the entrance into the ADT and another connection to the main body of the ADT. Isolation valves are used to allow pressure readings from one connection at a time. The ADT contains a nozzle in the inlet connection which directs the water flow into a spiraling motion and which also causes a pressure drop. By noting the pressure difference between the two pressure gauge connection points, the rate of flow through the tube can be determined. At design flow, the pressure drop should be approximately 8 PSI. The minimum pressure drop should be at least 4 PSI or 70% of the rated flow. A drop over 10 PSI would indicate a higher than rated flow which may in turn decrease the efficiency of the ADT. An ADT Flow Measurement Chart is included in this manual showing specific flow readings for the particular ADT supplied.

An additional pressure gauge is provided near the pressure release valve to help monitor the system pressure when the valve is adjusted.

6) KROFTA AIR DISSOLVING TUBE SYSTEM (Cont.)

5. SAMPLE VALVE

The sampling valve is used to determine if the air dissolving system is operating properly. Samples are drawn off to observe the flotation characteristics before the air/water solution enters the clarifier. This sample point is an important tool for monitoring the ADT operation.

D. ADT ADJUSTMENTS

Under normal circumstances, no adjustment should be needed after the initial set up. If a problem should occur, make the following checks:

1. TAKE A SAMPLE FROM THE SAMPLING POINT

This is the best indication of the ADT operation. The sample should be drawn off into a graduated cylinder or other glass container. By looking closely, the air can be observed in the water. The air bubbles should be very small, giving the water a "milky" appearance. Larger bubbles should not be present. If enough air is present, the "flocks" should rise to the surface at a rate of one foot per minute, leaving clear water underneath. The ADT is functioning properly and requires no adjustment if this is what is observed.

If the sample shows large air bubbles and/or poor flotation, then check Items 3 and 4.

If there appears to be plenty of the proper size bubbles, but the "flocks" appear weak and the water underneath does not become clear, then check the chemical addition, Item 2 below.

If there is not enough air, then check Items 3 and 4 below.

2. CHEMICAL ADDITION

Check to be sure that the chemical pump is functioning properly. A clear piece of pipe in the chemical feed line is useful to allow a visual check of chemical addition into the clarifier.

Increasing the amount of chemical added will often improve the flotation. If chemical addition is increased, it should be accomplished in small increments with at least a 5 to 10 minute wait between increases to allow for stabilization of the process.

6) KROFTA AIR DISSOLVING TUBE SYSTEM (Cont.)

D) ADT ADJUSTMENTS (Cont.)

Generally, if the solid loading is increased to the clarifier, then the amount of chemicals needed should also be increased in proportion.

Overdosing with chemicals can sometimes cause "slippery" flocks which do not stick to the air and thus sink. This also causes the sludge to appear wet and "greasy" and it would be very slippery to the touch.

3. THE BLEED-OFF SIGHT TUBE

The Bleed-off Sight Tube, Item 10, is an integral component of the ADT. It controls the proper amount of bleed-off from the system and also provides a good indication of the air/water solution from the ADT.

If there is not enough air being added to the system, only water will discharge from the tube. First check the system to make sure that it is operating at proper pressure and flow. Increase air into the system in small quantities until proper air/water solution is discharged, or until flotation improves in the clarifier.

If air is only discharged form the bleed-off, reduce the air meter settings. Excess air may cause turbulence in the clarifier or excessive foaming.

4. PRESSURE AND FLOW ADJUSTMENTS

The pressure can be checked at three points in the system:

a. Air should be regulated at 85 - 90 PSI, Item 5, or at least 10 PSI higher than internal tube pressure.

b. The pressure gauge at the inlet connection is used for readings of water flow into the ADT and for pressure in the ADT. See Section C, Item 4, on Pressure Gauges.

c. Pressure gauge at the outlet monitors the system pressure when the pressure release valve is adjusted.

Always check the pressure gauges to be sure that the pressures have not changed. If B and C increases, this usually means the pressure release valve is plugging, the valve should be cleaned and reset to the correct pressure.

6) KROFTA AIR DISSOLVING TUBE SYSTEM (Cont.)

D) ADT ADJUSTMENTS (Cont.)

5. SHUT-DOWN AND START-UP PROCEDURES

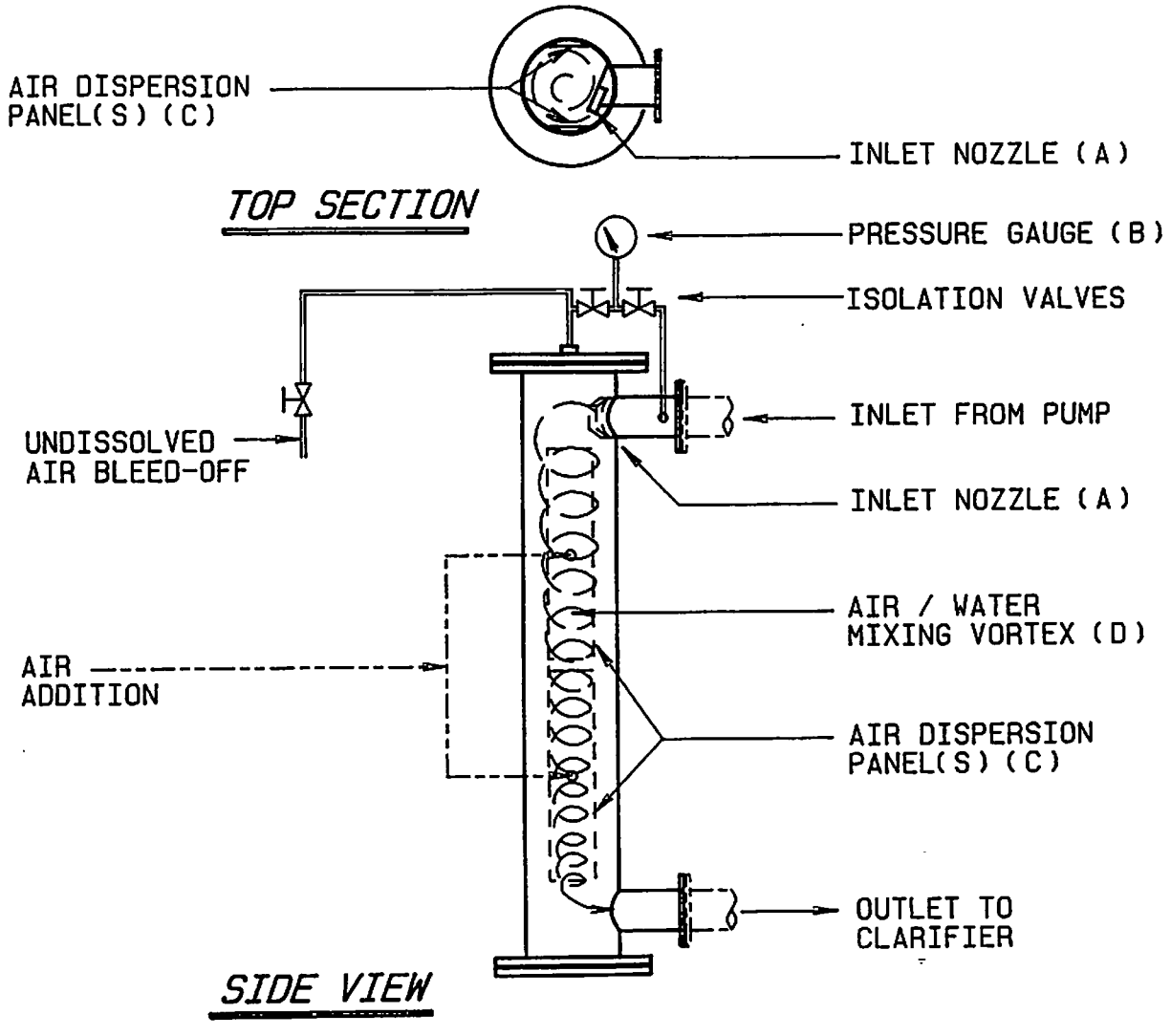
For short term shut-down, the pressure pump and air supply must both be shut-off, preferably the air supply before the pressure pump.

It is recommended that an isolation valve be provided on the air line to shut off the air supply. If the ADT is filled with air because the air supply was left on, it may take several minutes or longer after start-up to purge the air from the system.

For longer period shut-downs or for maintenance, the pump and compressed air should both be turned off as described above. The water remaining in the ADT should be drained off from the drain plug provided or from a low point in the piping or at the pump. All connecting pipe lines should also be drained.

At start-up, close all drain valves, start the pump and turn on the air compressor. The pressure gauges should be checked and a sample of the air/water solution should be taken after the system stabilizes.

MAINTENANCE NOTE: If more than 15 PSI is required to push air into the ADT with the pressure pump off, the dispersion panels have clogged from oil and other contaminants and must be replaced. Pressure drop on the panels should be checked monthly.

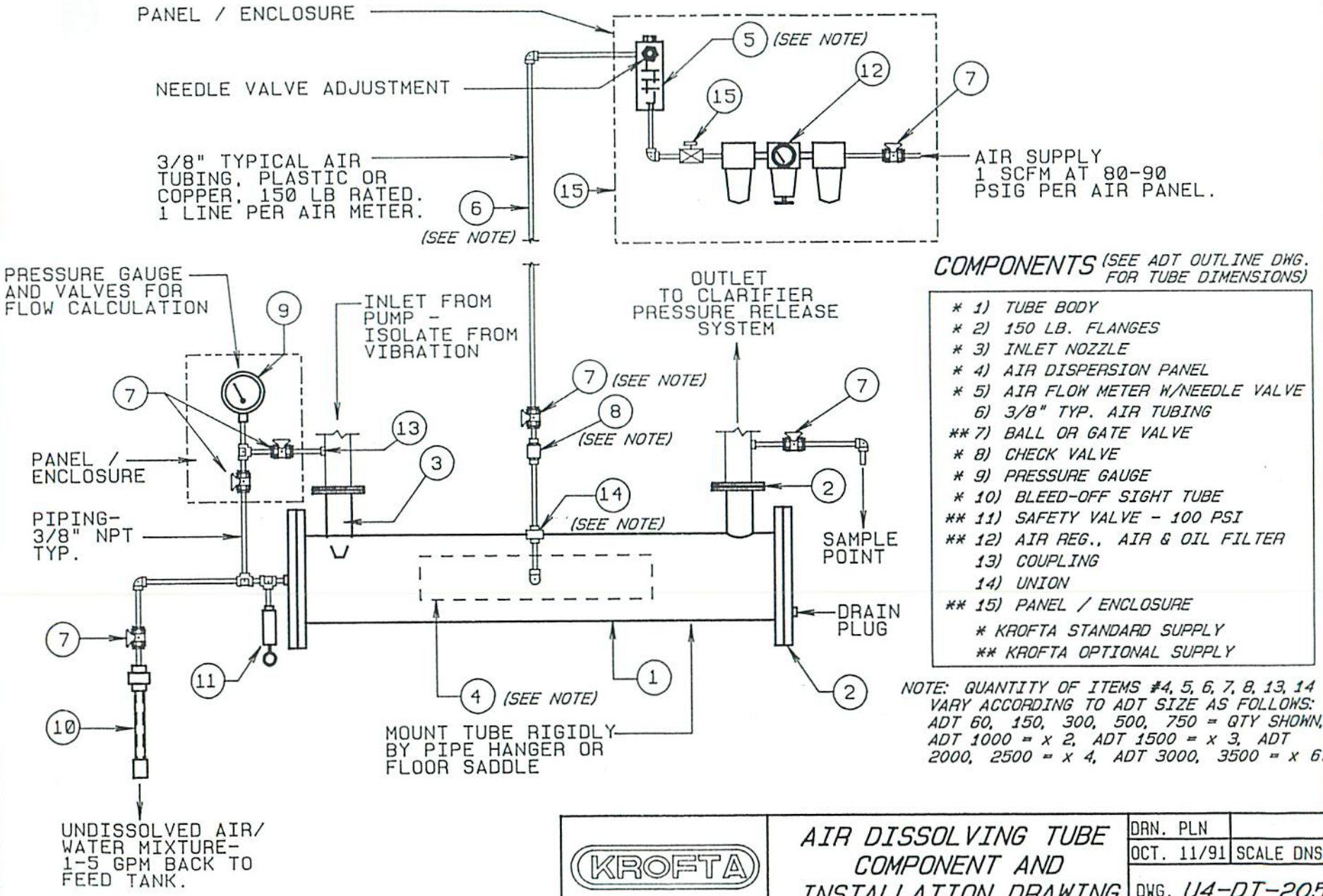


THE UNIQUE KROFTA AIR DISSOLVING TUBE (PATENT PENDING) IS A COMPACT DEVICE WHICH RAPIDLY MIXES AND DISSOLVES AIR INTO PRESSURIZED WATER. WATER ENTERS THE TUBE THROUGH AN INLET NOZZLE (A) WHICH INCREASES THE WATER VELOCITY WHILE DIRECTING IT TANGENTIALLY TO SPIRAL INSIDE THE TUBE. THE INLET NOZZLE SIZE IS CALIBRATED FOR THE REQUIRED FLOW ALLOWING FLOW RATE MEASUREMENT BY DIFFERENTIAL PRESSURE THROUGH THE TUBE USING A PRESSURE GAUGE (B). REPLACEABLE POROUS PLASTIC PANELS (C) THAT ARE INSTALLED INSIDE THE TUBE DISTRIBUTE THE AIR OVER A LARGE SURFACE AREA FOR CONTACT WITH THE SPIRALING WATER. THE RAPID MIXING OF THE AIR AND WATER UNDER PRESSURE DISSOLVES THE AIR INTO THE WATER. ANY AIR WHICH IS NOT DISSOLVED COLLECTS IN THE AIR POCKET OR CENTER VORTEX IN THE TUBE (D) AND EXCESS AIR IS REMOVED BY THE "BLEED-OFF" VENT (E). THE DISSOLVING TUBE CAN BE INSTALLED IN EITHER THE HORIZONTAL OR VERTICAL POSITION. THE TUBE SIZE AND QUANTITY OF PANELS VARY IN ORDER PROVIDE A RANGE OF ADT SIZES TO MEET SPECIFIC FLOW REQUIREMENTS.

KROFTA

AIR DISSOLVING TUBE FUNCTIONAL DESCRIPTION

DATE: OCTOBER 17, 1991	
DWN: PLN	NO SCALE
DWG: U4-DT-209	



COMPONENTS (SEE ADT OUTLINE DWG. FOR TUBE DIMENSIONS)

*	1) TUBE BODY
*	2) 150 LB. FLANGES
*	3) INLET NOZZLE
*	4) AIR DISPERSION PANEL
*	5) AIR FLOW METER W/NEEDLE VALVE
	6) 3/8" TYP. AIR TUBING
**	7) BALL OR GATE VALVE
*	8) CHECK VALVE
*	9) PRESSURE GAUGE
*	10) BLEED-OFF SIGHT TUBE
**	11) SAFETY VALVE - 100 PSI
**	12) AIR REG., AIR & OIL FILTER
	13) COUPLING
	14) UNION
**	15) PANEL / ENCLOSURE

* KROFTA STANDARD SUPPLY

** KROFTA OPTIONAL SUPPLY

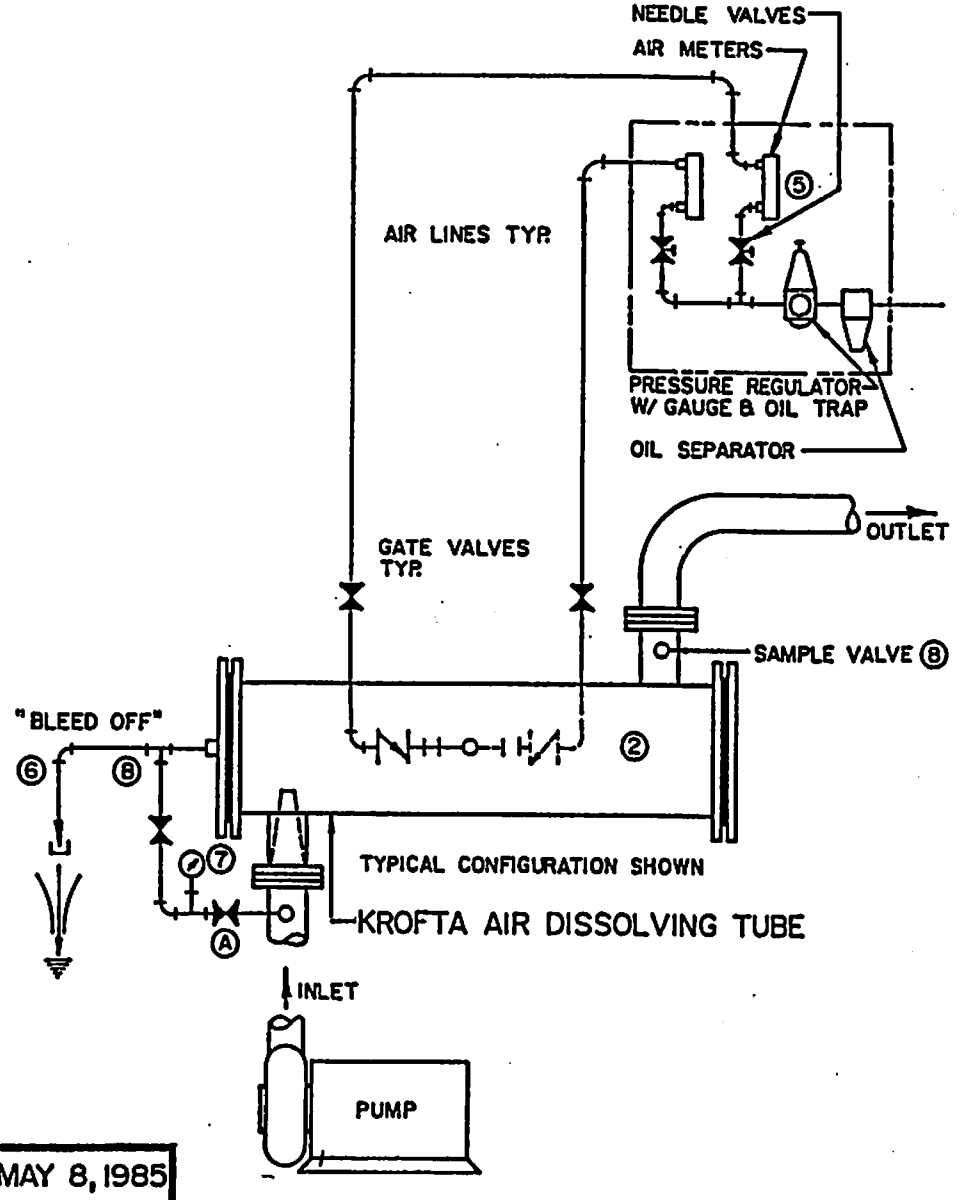
NOTE: QUANTITY OF ITEMS #4, 5, 6, 7, 8, 13, 14 VARY ACCORDING TO ADT SIZE AS FOLLOWS: ADT 60, 150, 300, 500, 750 = QTY SHOWN, ADT 1000 = x 2, ADT 1500 = x 3, ADT 2000, 2500 = x 4, ADT 3000, 3500 = x 6.

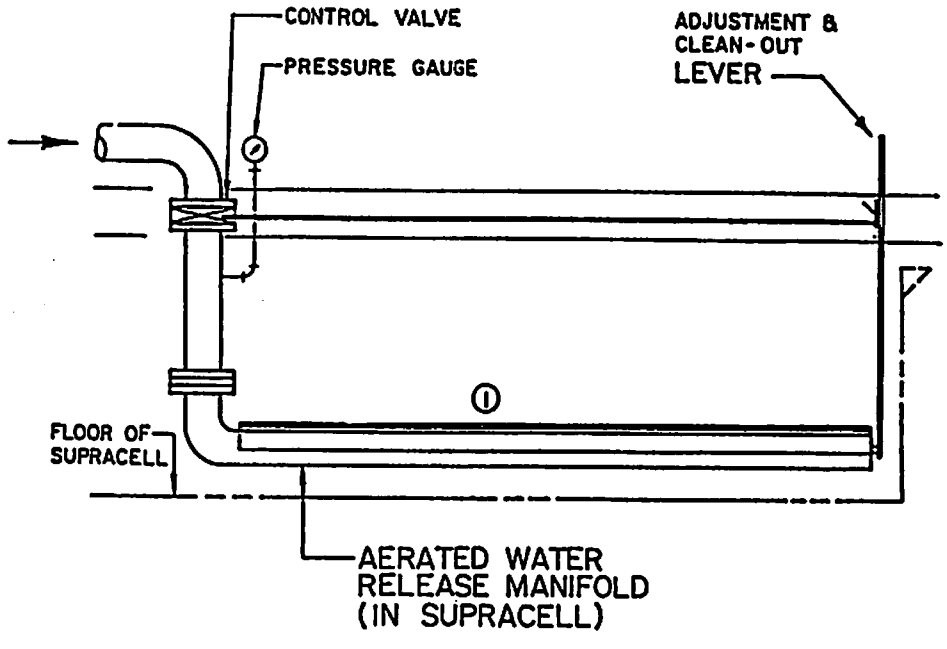
KROFTA

AIR DISSOLVING TUBE COMPONENT AND INSTALLATION DRAWING

DRN. PLN	
OCT. 11/91	SCALE DNS
DWG. U4-DT-205	

KROFTA®

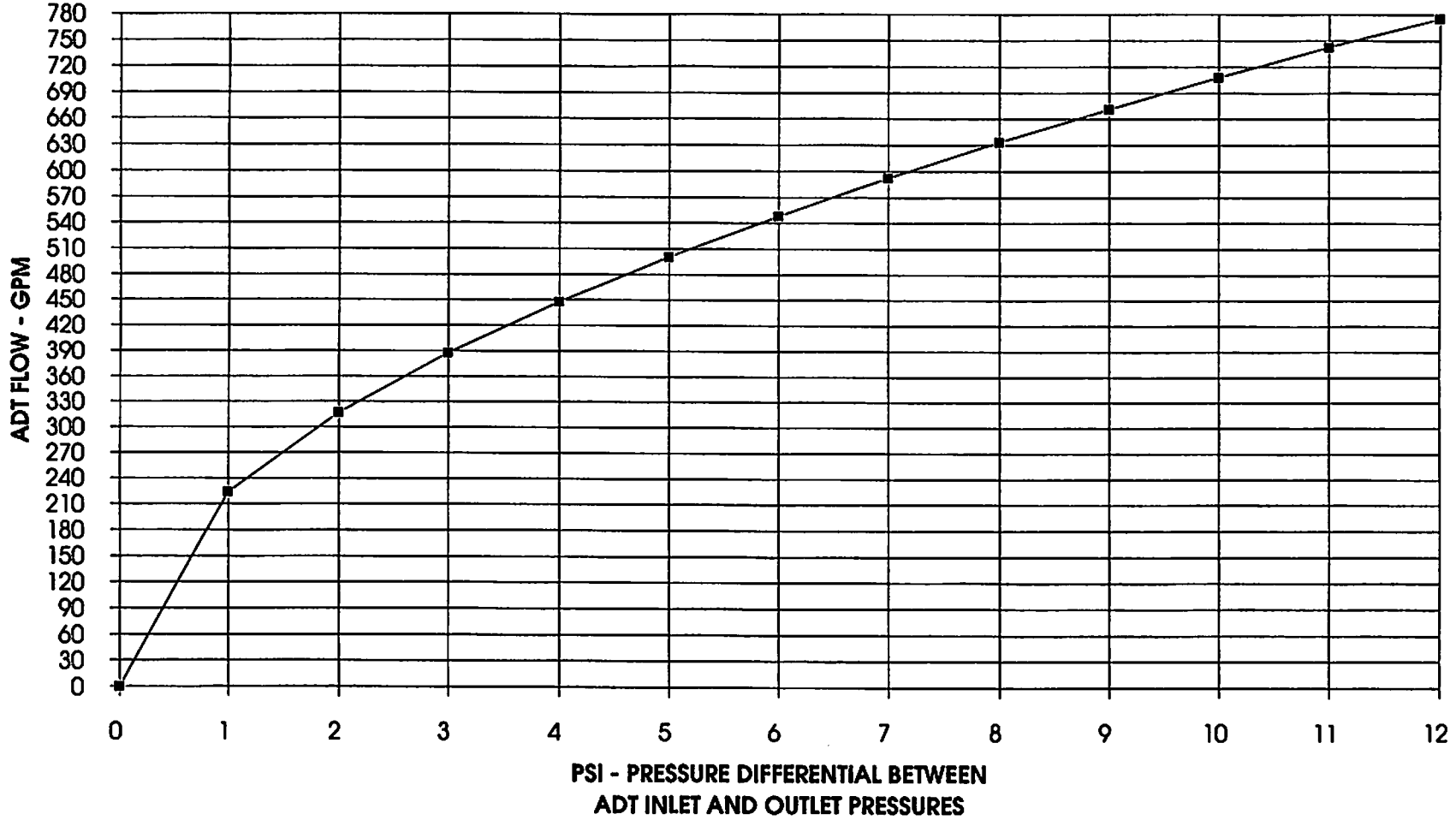




MAY 8, 1985

L-1184/A

AIR DISSOLVING TUBE TYPE 2500
DESIGN FLOW - 633 GPM @ 8 PSI DIFFERENTIAL

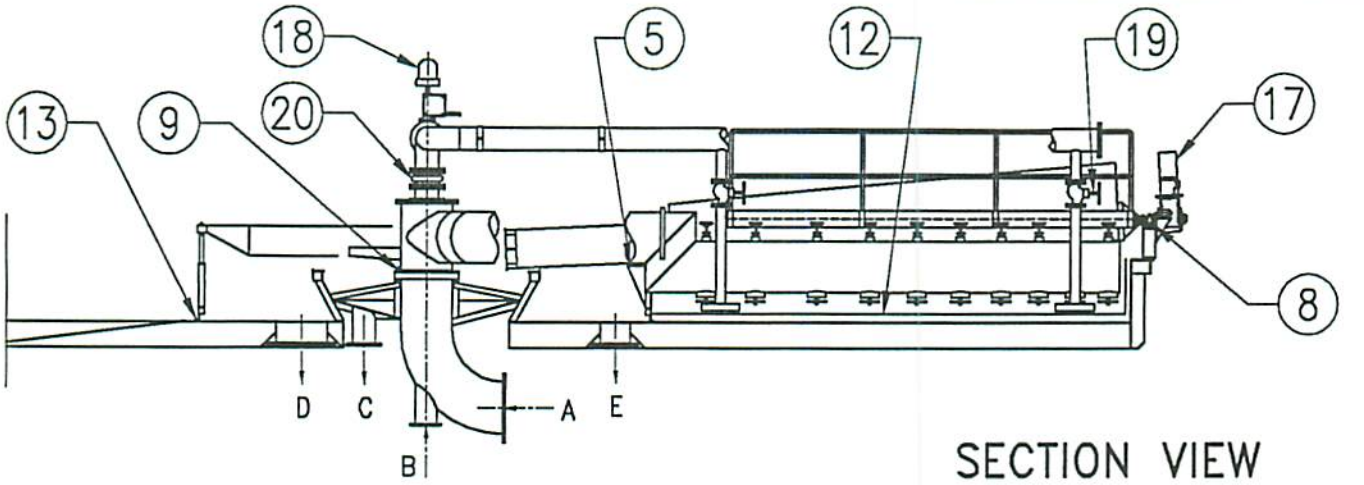


Krofta Job #19503

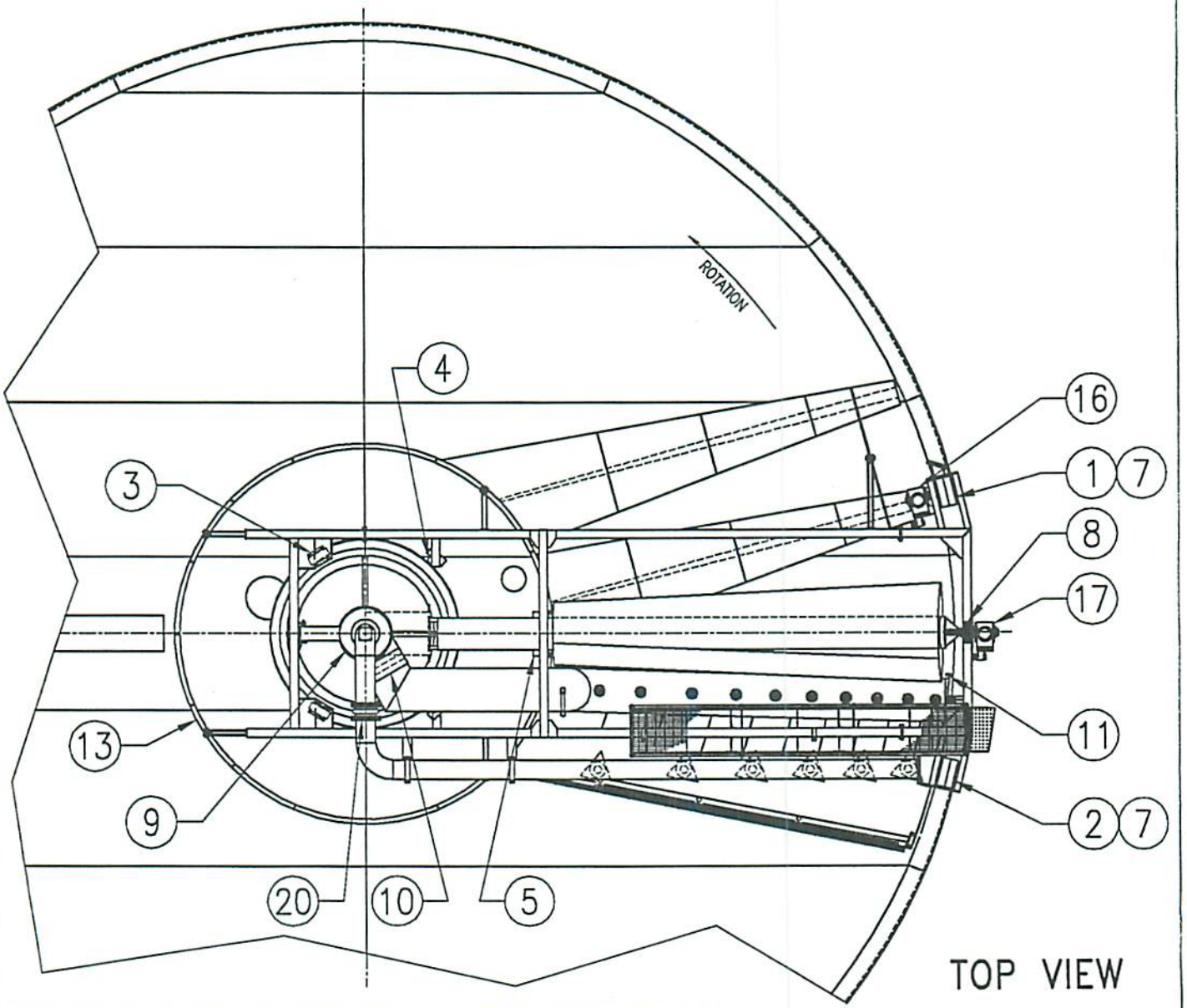
KROFTA SPARE PART LIST - Jan. 26, 1995, F. Sang. Chk. PLN
Unit Type: (2) **SPC 62** Fab. Dwg.; **U1-SPC-1940, SBCCS Constructors, Job 19503**
See Supracell drawing **O&M-147** for item no. locations.

NOTE: Items 6, 14 & 15 are not required for this unit. Quantities shown for one (1) unit.

No	PART NAME	FAB.DWG	QTY
1	Drive Wheel	U-1944#7,8	1 pr.
2	Outer Support Wheel	U-1944#7,8	1 pr.
3	Center Support Wheel	U1-1732/A #5	2
4	Centering Wheels	U-1695#1,7	4
5	Scoop Support Saddle	U1-1738#1	1
7	Drive & Outer Support Wheel Bearings	U1-1944#9	2/ea
8	Scoop Outer Bearing.	U1-1946#7	1
9	Rotary Joint Seal (rope).	U1-1673#11	1
10	Rubber Pipe Connection	U1-1598#1	1
11	Rubber Wiper (side)	U1-1726#12	2
12	Rubber Wiper (bottom)	U1-1382#2	1
13	Rubber Clarified Seal	U1-1942/1 #8	1
16	Carriage Drive Gearmotor	U1-1943 #18,20	1
17	Scoop Drive Gearmotor	U1-1946 #11,12	1
18	Rotary Electric Contact	U1-1694#1	1
19	Pressure Release Valve	U1-1947#24	6
20	Expansion Joint	U1-1947#19	2
21	(3) ADT 2500 (not shown)	DT-222/A	12



SECTION VIEW



TOP VIEW

SEE SPARE PART LIST FOR ITEM NUMBER DESCRIPTIONS.

JOB 19503

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL SPARE PART LOCATIONS (MANUAL LEVEL CONTROL TYPE)

DRN: FSS	CHK: PLN
10 APR. 95	SCALE: DNS
DWG. O&M-147	

KROFTA

ASSEMBLY INSTRUCTION MANUAL

for

KROFTA SUPRACELL TYPE 62

DOUBLE ROTARY JOINT TYPE

SBCCS CONSTRUCTORS
HAGERSTOWN, MD

Krofta Job No. 19503

KROFTA ENGINEERING CORPORATION

KROFTA

ASSEMBLY INSTRUCTIONS FOR THE KROFTA SUPRACELL, TYPE SPC 62 DOUBLE ROTARY JOINT TYPE - MANUAL VALVES

The following pages contain instructions and drawings needed to assemble the **KROFTA SUPRACELL**. Drawings follow the text for each section.

Tank Assembly;

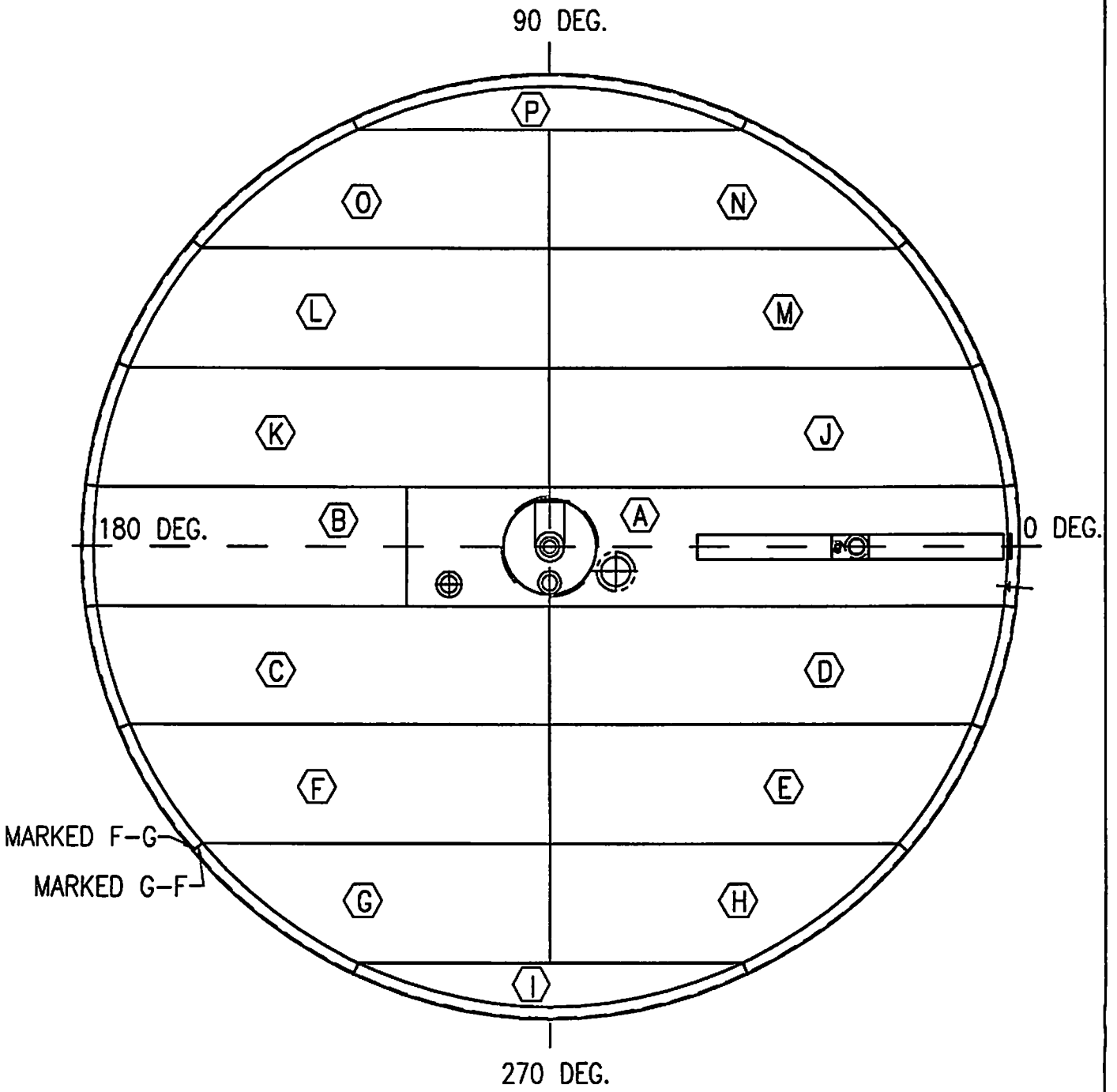
See Tank Assembly Dwg O&M 148.

Before starting make sure that the surface on which the unit will be placed is level and free of debris.

Place the center section(s) of the tank with piping connections oriented as shown on the pipe location drawings of the Certified for Construction section. Note the indicated tank match marks while placing the remaining tank sections.

Loosely install all bolts, washers and nuts. Place 1/4" thick temporary spacers between the tank joints. Caulk all joints thoroughly with silicone or other recommended sealant from the inside of the tank to at least one inch deep from the tank floor surface. Remove spacers and tighten all bolts before the sealant has cured. Clean excess sealant that comes out of the joints flush to the tank floor.

After assembly, it is recommended that attachment angles be bolted or welded between the tank and the customer supplied support structure to prevent movement of the tank.



TANK SECTIONS & JOINTS ARE MARKED AS SHOWN

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL, SPC 62
TANK ASSEMBLY
HAGERSTOWN, JOB 19503

DRN: FSS, 10 APR. 95
CHK: PLN, 12 APR. 95
DWG. O&M-148

KROFTA

Movable Part Assembly Instructions;

Movable Part Components

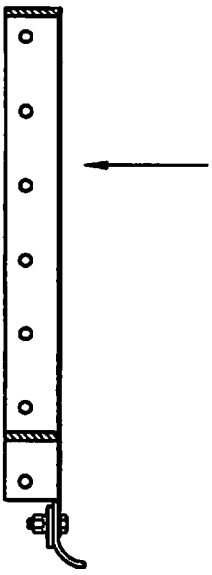
The Movable Central Part Wall, Movable Part Bottom with attached Distribution Tube and the Clarified Water Extraction Tubes are to be connected at flanged connections as shown on the Movable Part Assembly drawing.

Set the parts in place on the Supracell floor, blocked up so that the bottom stainless steel edge of the circular Movable Central Part Wall is 1-1/2" off the floor surface. Assemble the circular Movable Central Part Wall sections, applying sealant between the section joints. It is recommended that all parts be preassembled and adjusted before applying the sealant, then loosen the connection bolts, add temporary 1/4" thick spacers between the joints, apply sealant, then remove the spacers and tighten the bolts before the sealant cures.

NOTE: The following components should only be installed after the Movable Central Part has been attached to the Movable Part Support with blocking removed.

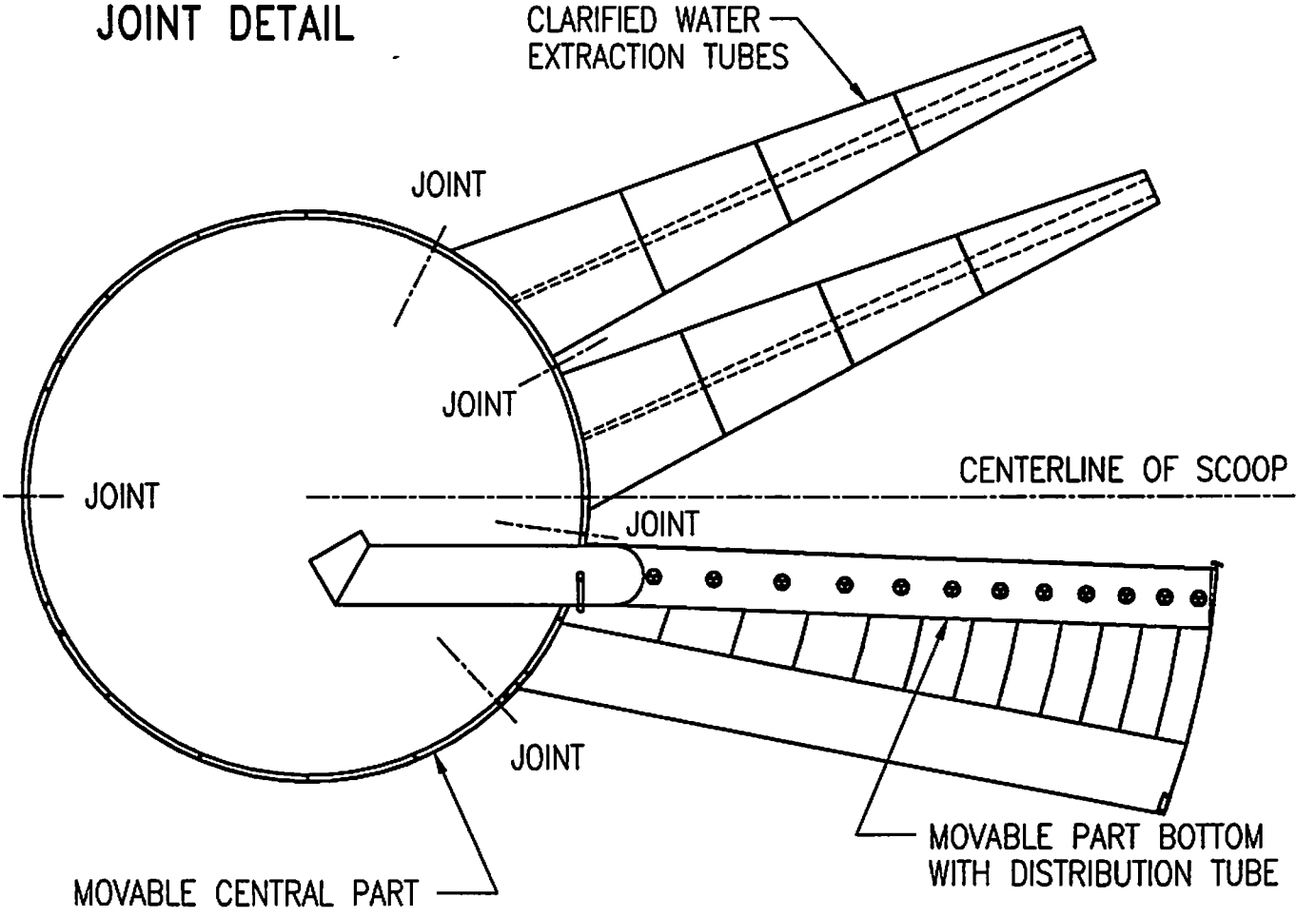
Install the Clarified Water Seal Wiper and backing strip to the dimensions shown. If holes are not provided in the Clarified Seal Wiper, mark and punch them, taking care to leave enough of the seal in contact with the floor to ensure that the water pressure will not push it inward during operation. Match all seal joints carefully to minimize leakage. Re-check that the clearance is 1-1/2" (plus or minus 1/4") from the rotating steel wall to the tank floor.

The Bottom Sediment Wiper attaches to the leading edge of the Movable Part Bottom under the sludge removal scoop. Clearance off the floor is to the dimensions shown. For avoid premature wear or failure of the wiper it should be adjusted for minimal contact with the floor.



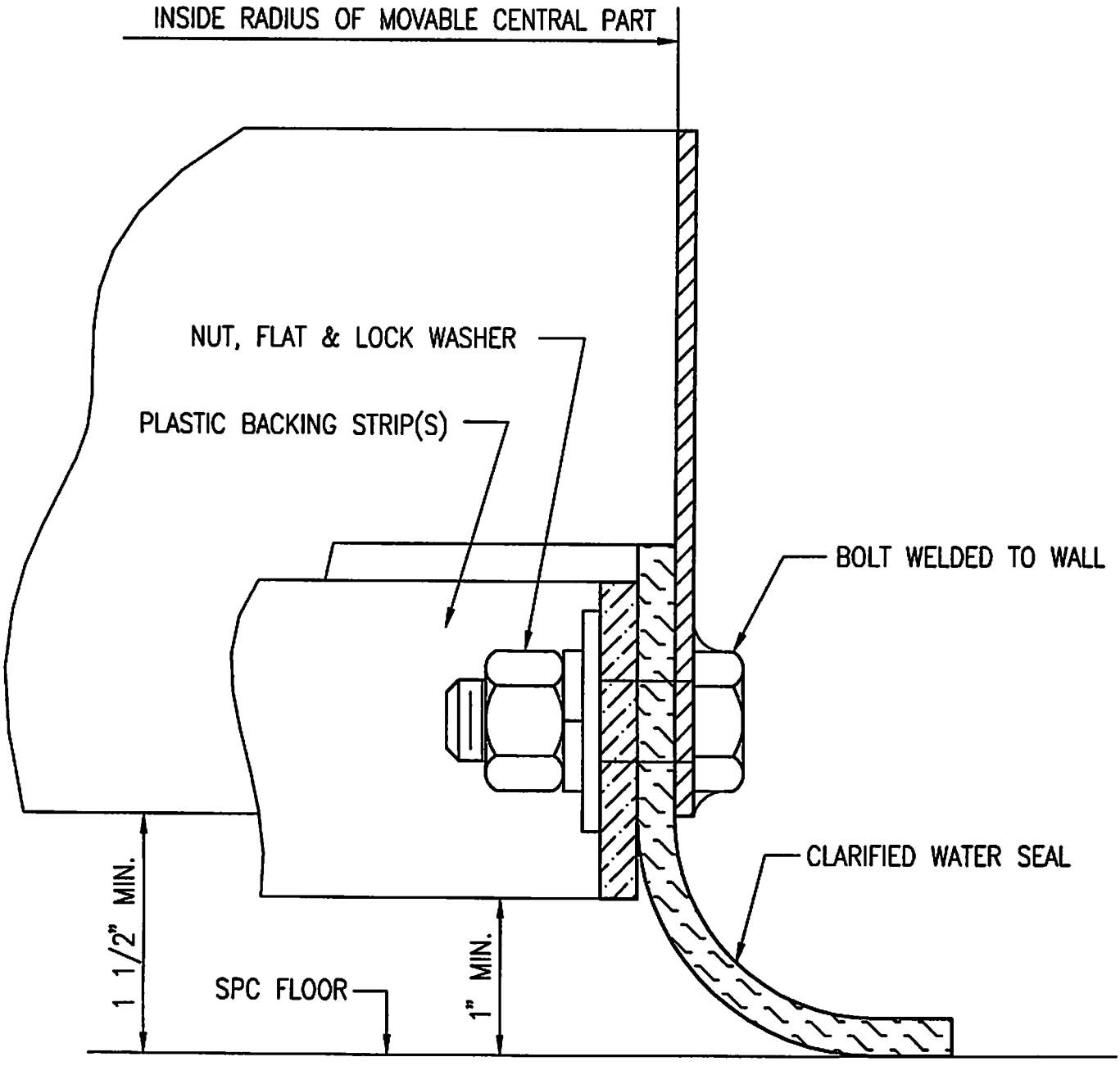
JOINT DETAIL – 5 PLACES
SEVEN (7) ø9/16" (14mm) HOLES
FOR S.S. BOLTS PROVIDED.

JOINT DETAIL



TOP VIEW

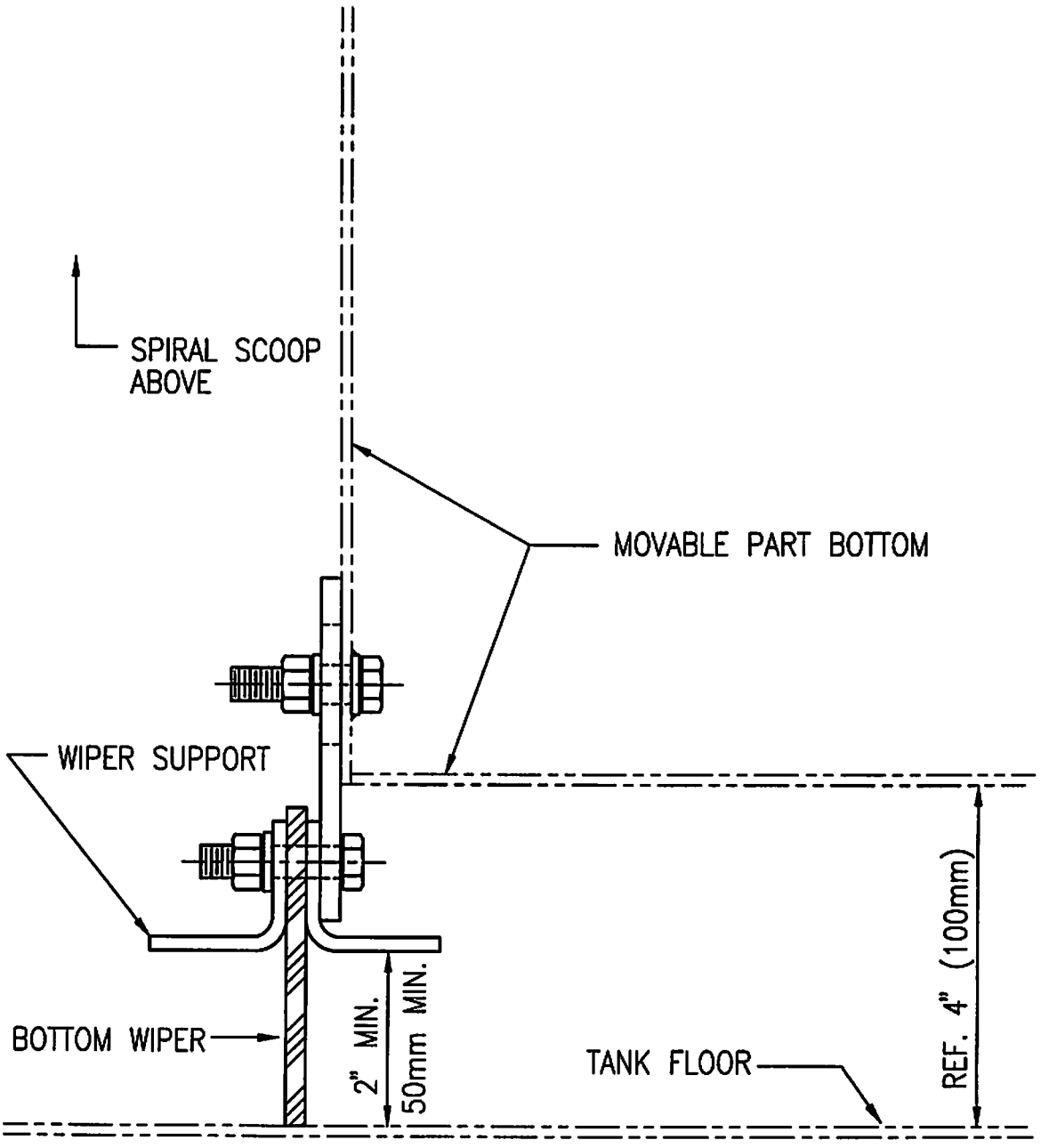
KROFTA® ENGINEERING CORP. LENOX, MA. 01240	KROFTA SUPRACELL MOVABLE PART ASSEMBLY	DRN: FSS, 10 APR. 95 CHK: PLD, 12 APR. 95 DWG. O&M-149



KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL MOVABLE PART CLARIFIED WATER SEAL

DRN: PLN 17 OCT 94
CHK: ~~JF~~ 29 Nov. 94
DWG. O&M-090



KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL MOVABLE PART BOTTOM WIPER ATTACHMENT

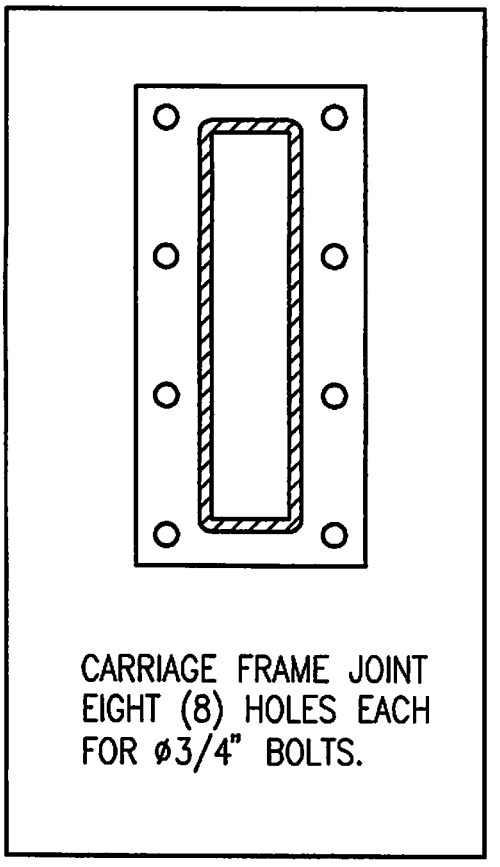
DRN: FSS, 1 FEB. 95
CHK: PLN 2 FEB. 95
DWG. O&M-135

Movable Part Support Components (Carriage) Assembly Instructions:

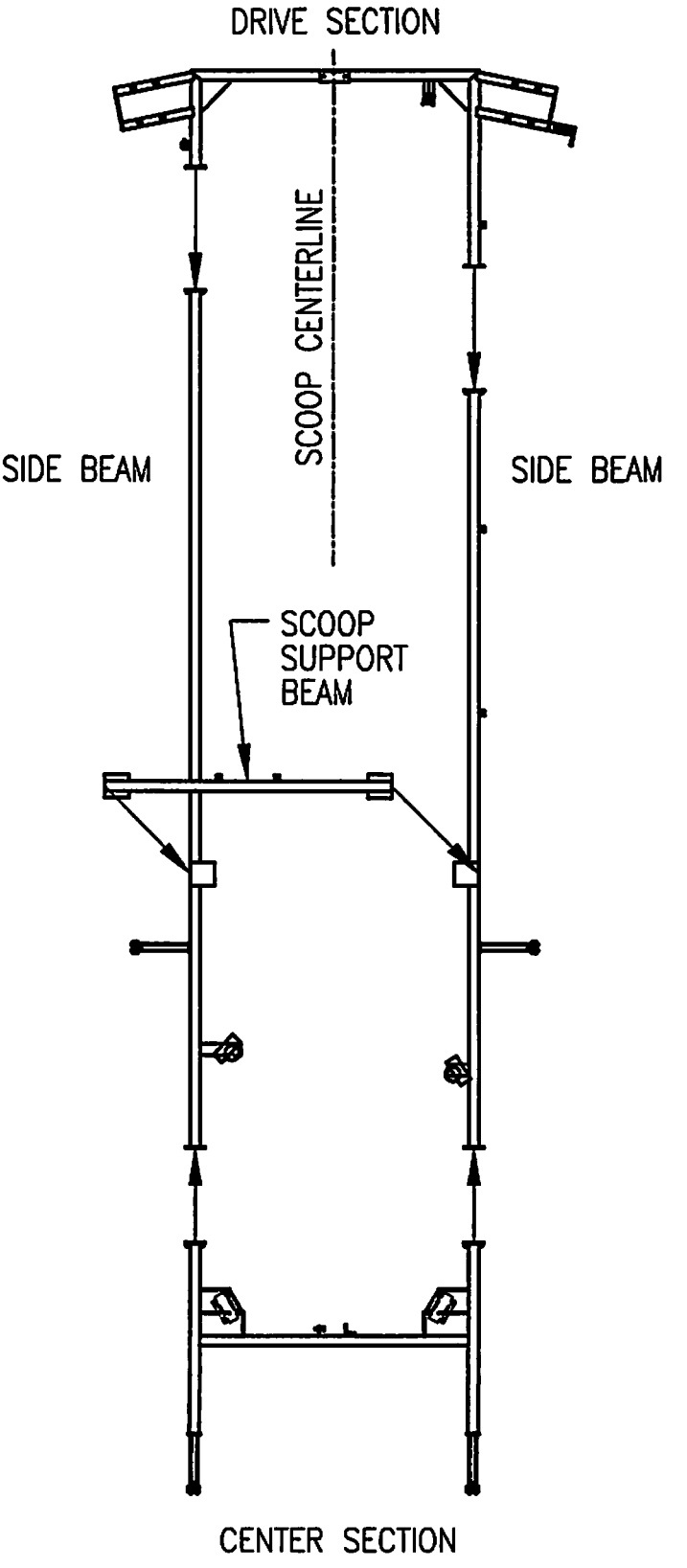
The Movable Part Support, also referred to as the Rotating Carriage, supports the rotating components of the Supracell. The main assembly is supplied in sections as shown. Bolted connections join the sections.

Place the carriage parts above the already installed Movable Part Components, lining up with the connection brackets. Block up so that the top of the main frame is level and as high or slightly higher than the design height off the Supracell interior floor surface. When assembled, the wheels can be attached and the blocking removed. Check that the main frame is level and than any wheel shims provided are in place. Attach the Movable Part Components with threaded rods and related hardware at this time, readjusting all Movable Part Component elevations off the floor.

The wheel shimming and alignment details for this unit are shown on drawings U4-SPC-1038A, B and C at the end of this section. The following wheels are supplied;
One Drive Wheel, one Outer Support Wheel, two Center Support Wheels, four Centering Wheels, two Scoop support wheels and one Clarified Tube Support Wheel.



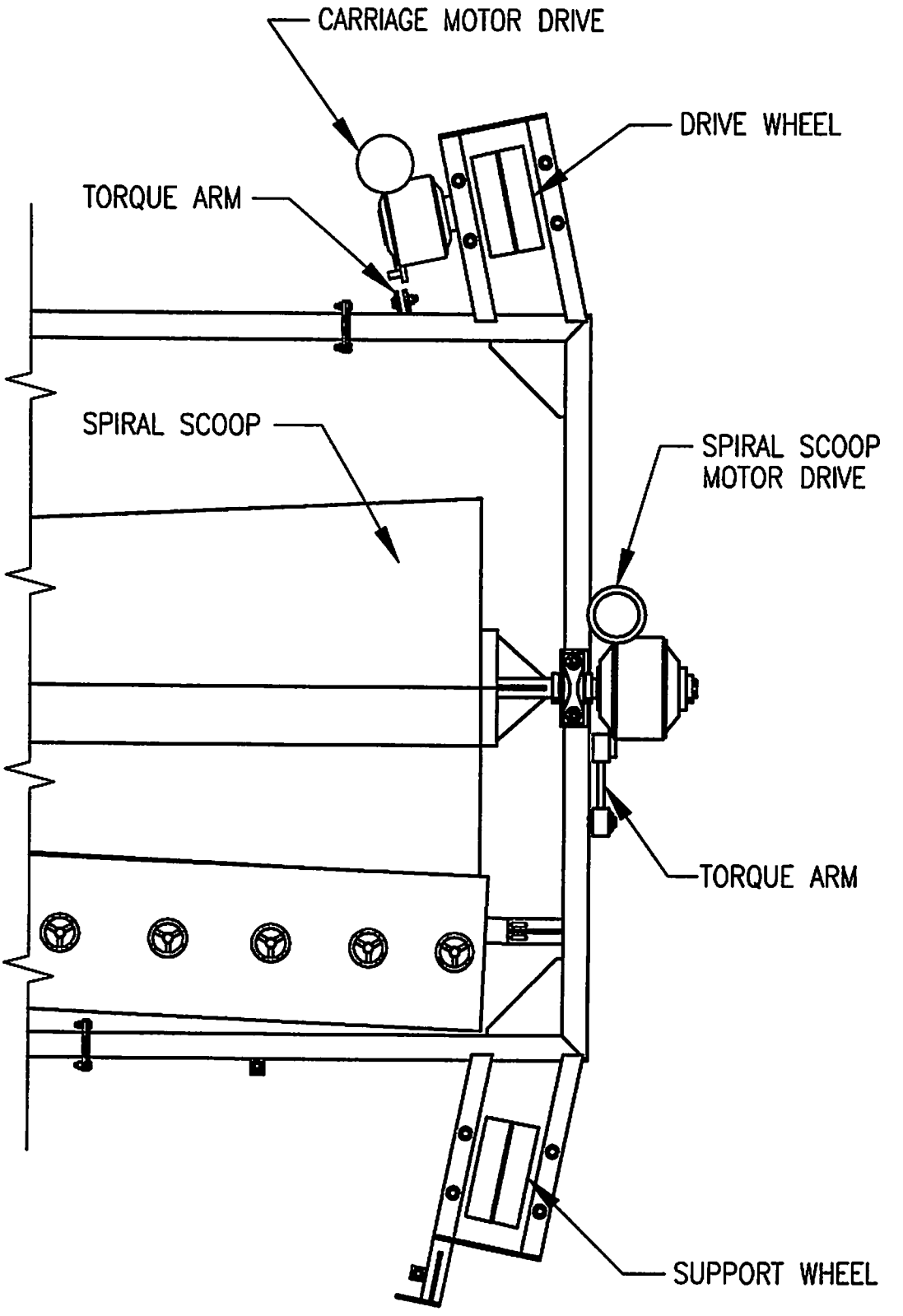
CARRIAGE FRAME JOINT
EIGHT (8) HOLES EACH
FOR ø3/4" BOLTS.



ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL MOVABLE PART SUPPORT (CARRIAGE) ASSEMBLY

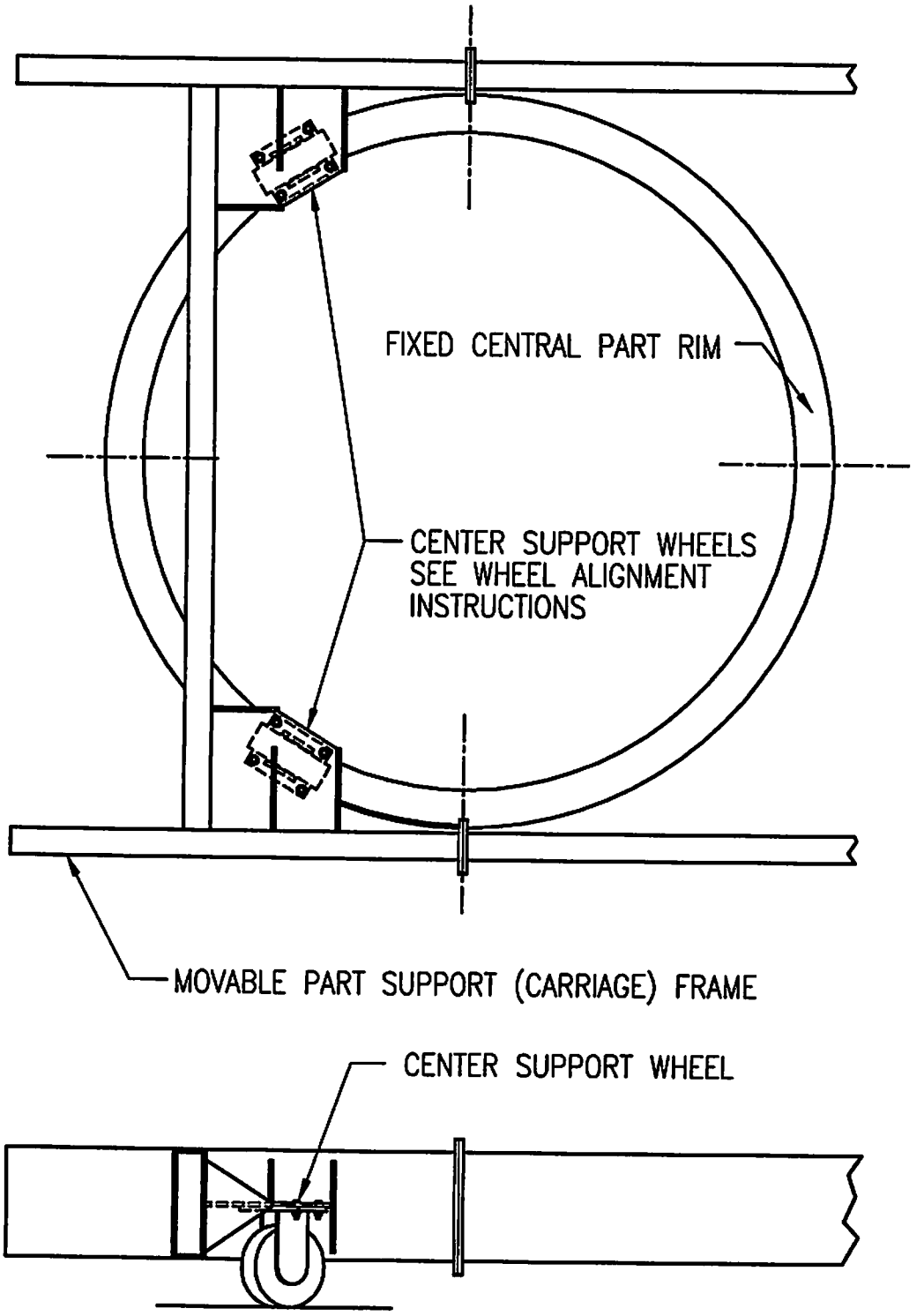
DRN: PLN 12 OCT 94
CHK: [illegible] 29 Nov. 94
DWG. O&M-087



KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL MOTOR DRIVE INSTALLATION

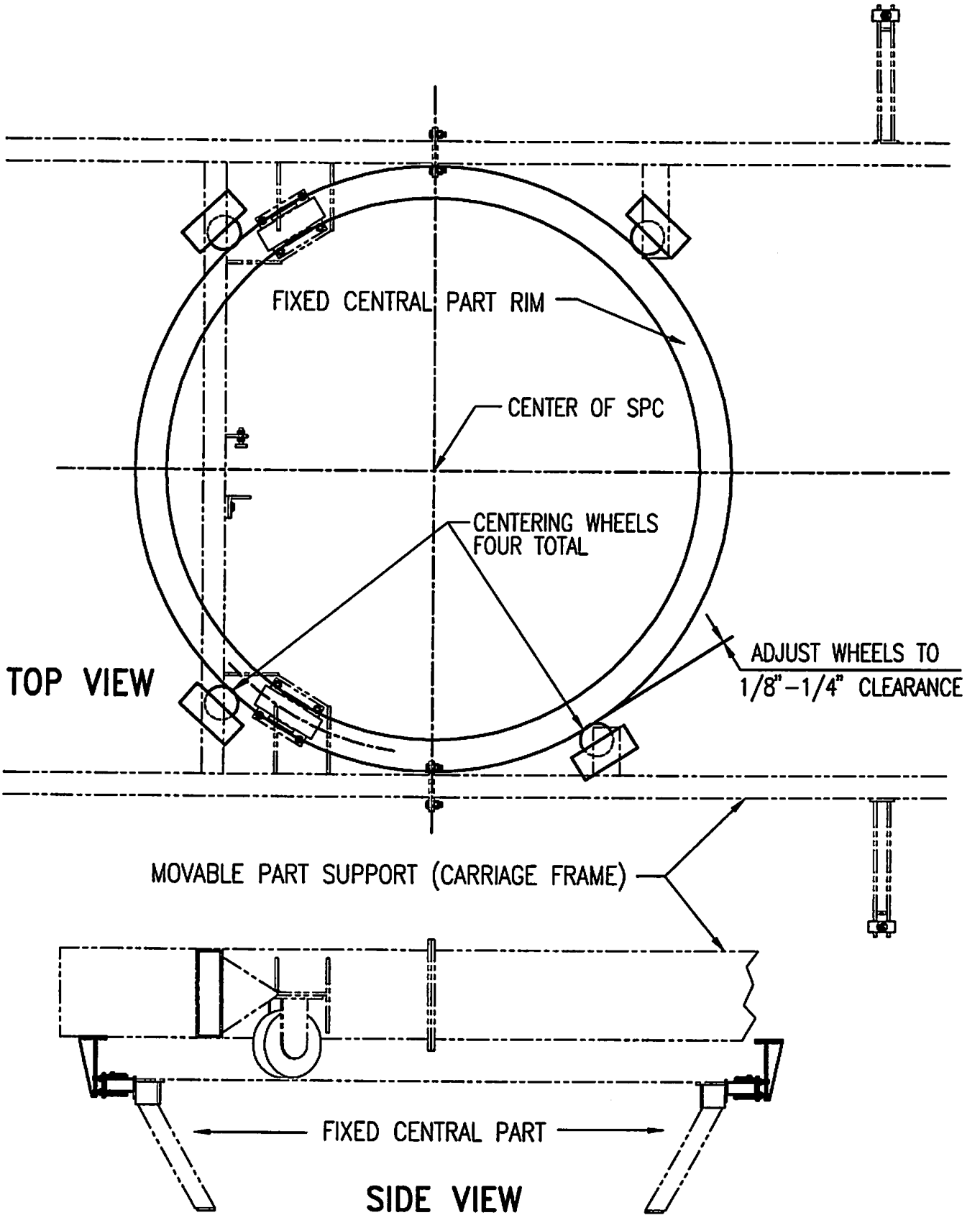
DRN: PLN 14 OCT 94
CHK: ~~JT~~ 28 Nov. 94
DWG.
O&M-088



KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL CENTER SUPPORT WHEEL ASSEMBLY

DRN: PLN 17 OCT 94
CHK: JP Nov. 94
DWG. O&M-091



KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

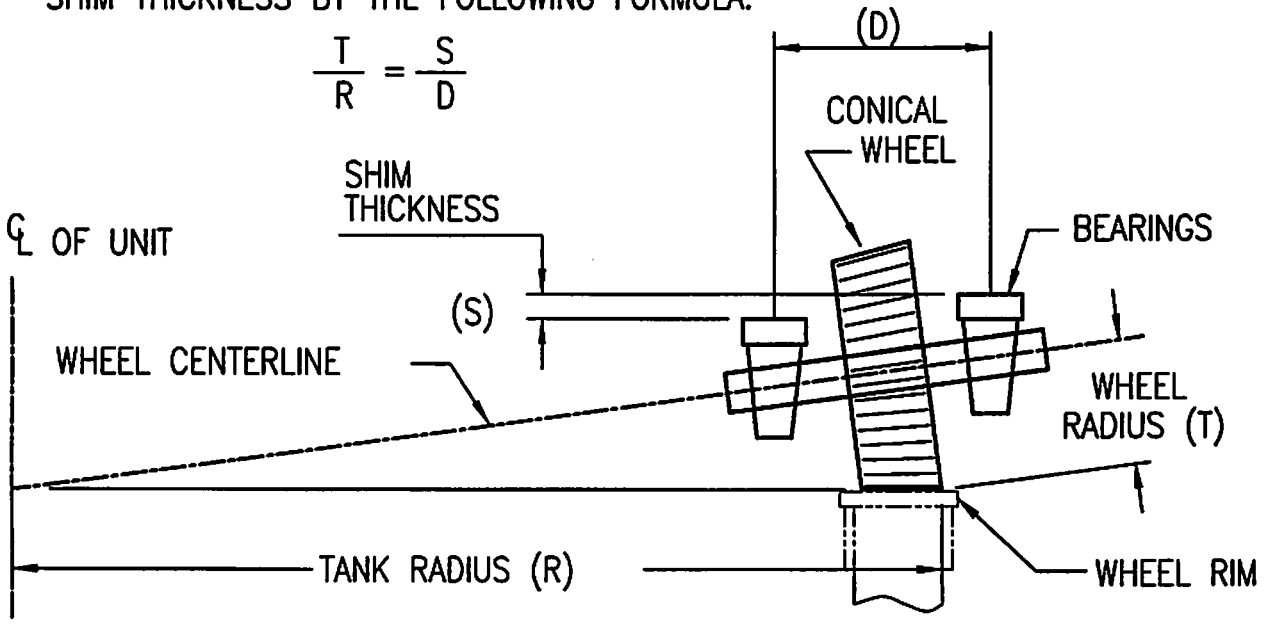
KROFTA SUPRACELL CENTERING WHEELS ASSEMBLY

DRN: PLN 18 OCT 94
CHK: 29 Nov. 94
DWG. O&M-092

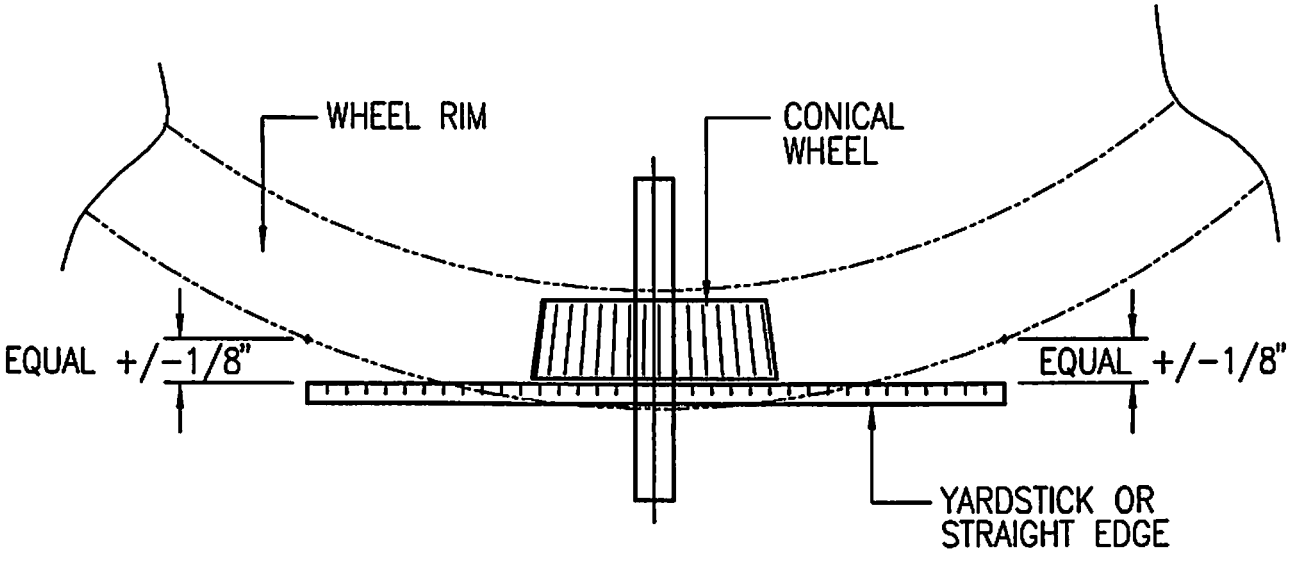
PROPER WHEEL ALIGNMENT IS CRITICAL FOR LONG WHEEL LIFE, LOWER POWER CONSUMPTION AND QUIET OPERATION. THE MEASUREMENTS SHOWN SHOULD BE CHECKED BEFORE A UNIT IS PUT INTO SERVICE AND WHENEVER A WHEEL IS REPLACED.

TO ADJUST WHEEL CONICAL ALIGNMENT, DETERMINE BEARING SHIM THICKNESS BY THE FOLLOWING FORMULA:

$$\frac{T}{R} = \frac{S}{D}$$



SIDE VIEW – CONICAL ALIGNMENT



TOP VIEW – TANGENTAL ALIGNMENT

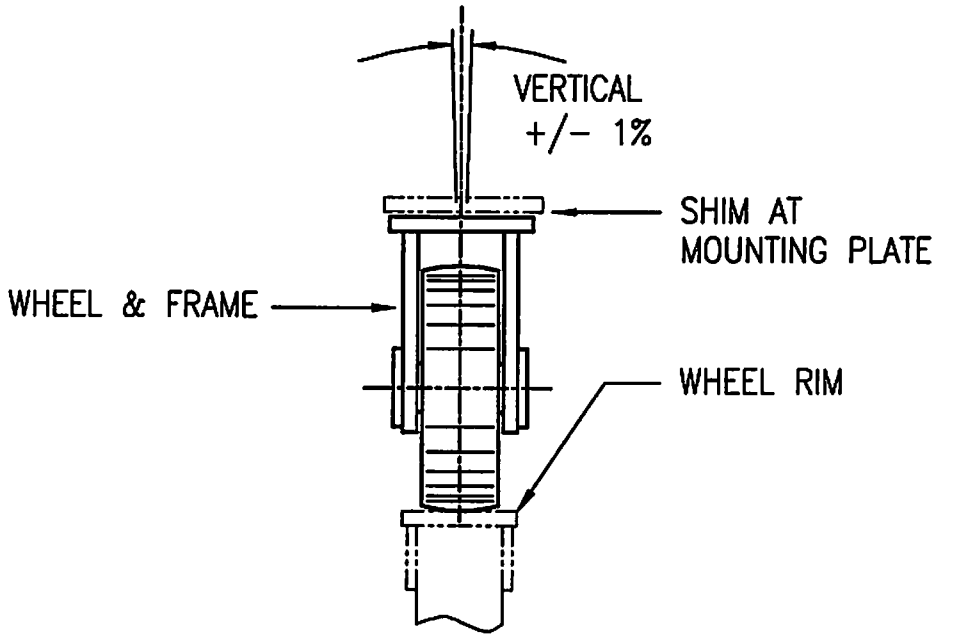
REV.A–PLN–18 OCT 94

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

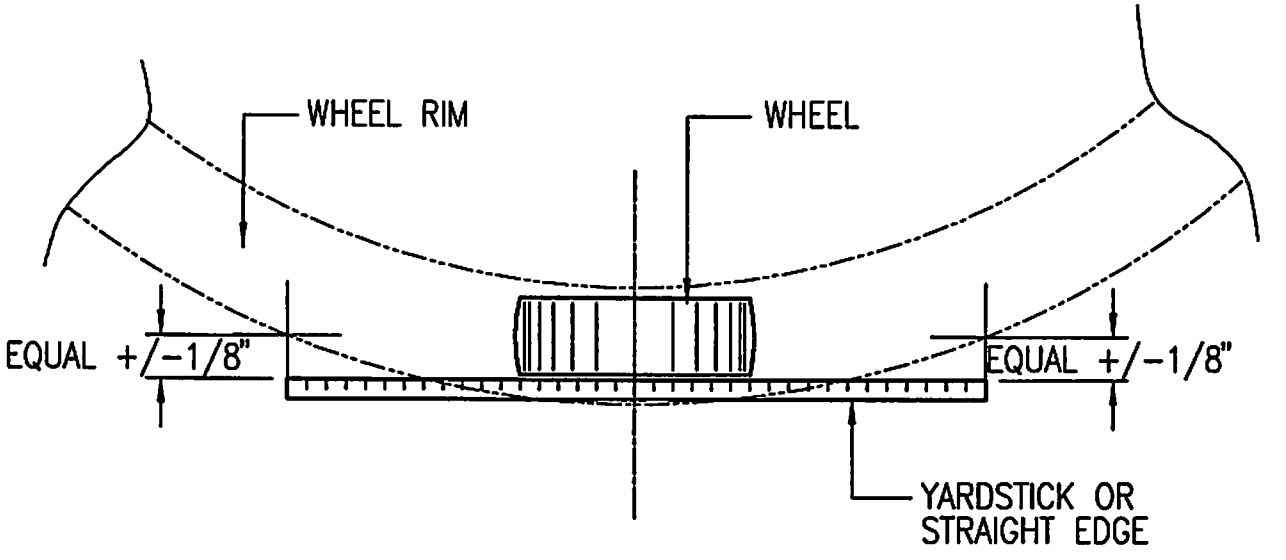
WHEEL ALIGNMENT REQUIREMENTS FOR CONICAL WHEELS

DRN: PLN 07 JUL 91
CHK: ~~SF~~ JP Nov. 94
DWG. REV.A
U4–SPC–1038/A

PROPER WHEEL ALIGNMENT IS CRITICAL FOR LONG WHEEL LIFE, LOWER POWER CONSUMPTION AND QUIET OPERATION. THE MEASUREMENTS SHOWN SHOULD BE CHECKED BEFORE A UNIT IS PUT INTO SERVICE AND WHENEVER A WHEEL IS REPLACED.



SIDE VIEW – VERTICAL ALIGNMENT



TOP VIEW – TANGENTAL ALIGNMENT

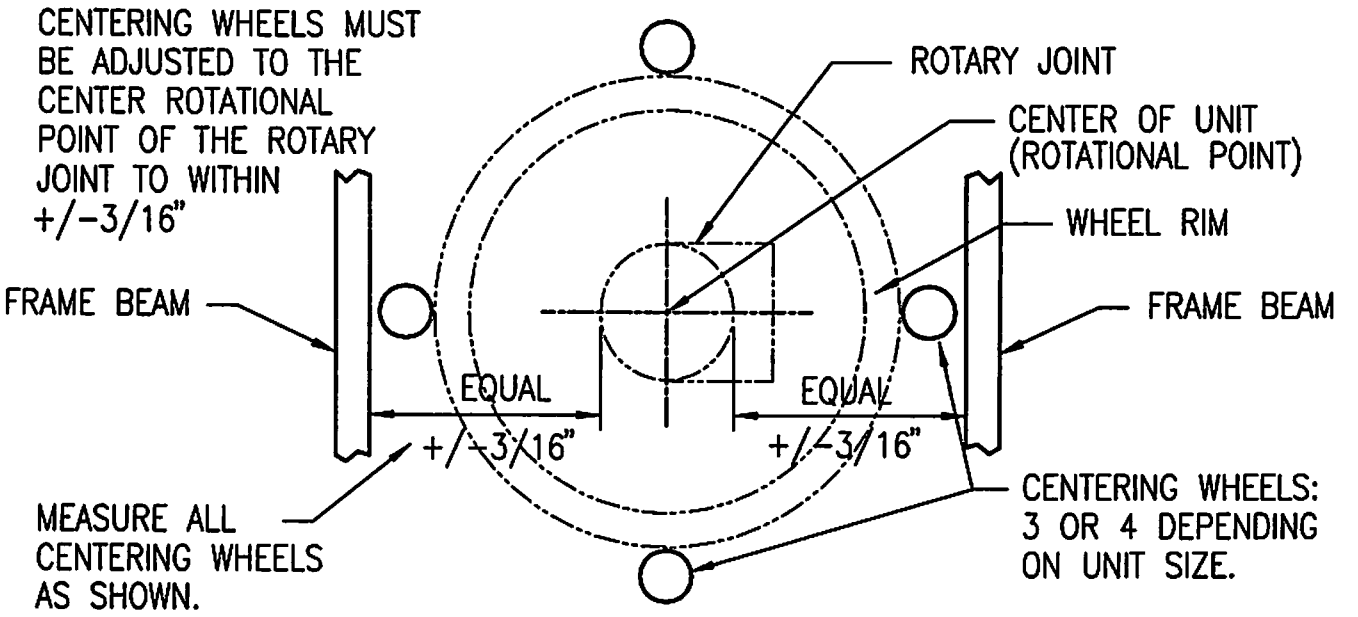
REV.A–PLN–18 OCT 94

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

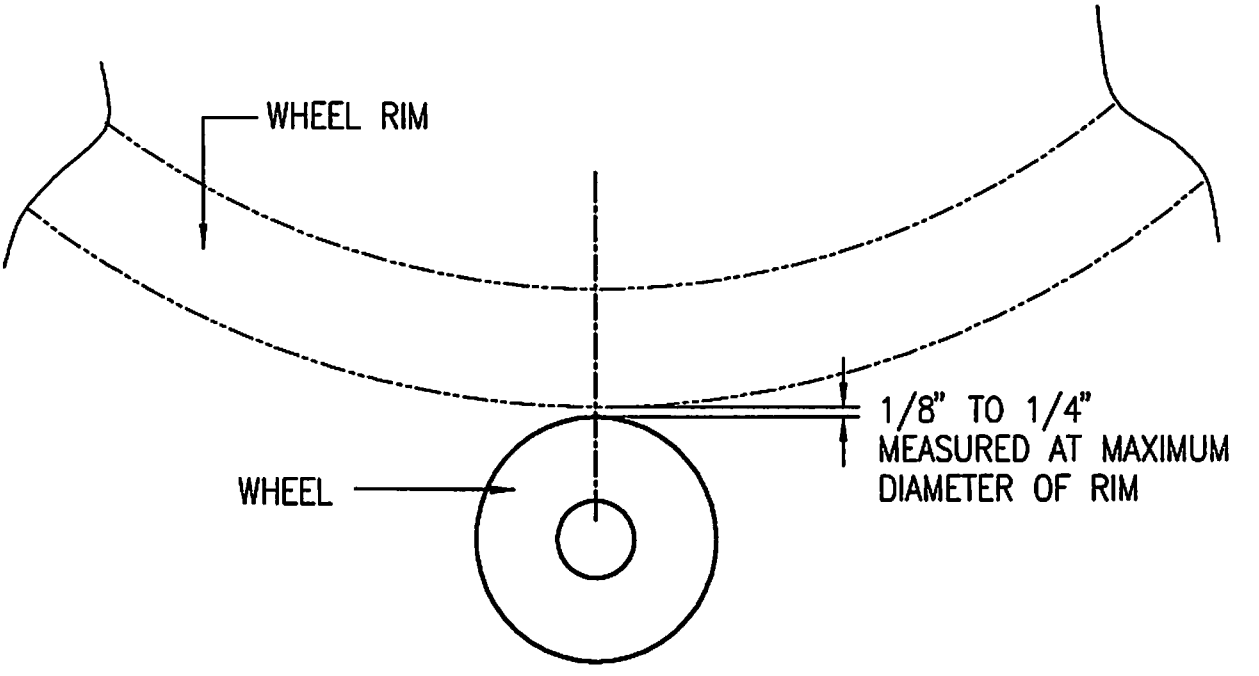
WHEEL ALIGNMENT REQUIREMENTS FOR VERTICAL WHEELS

DRN: PLN 07 JUL 91
CHK: [signature] 28 Nov. 94
DWG. REV.A
U4-SPC-1038/B

PROPER WHEEL ALIGNMENT IS CRITICAL FOR LONG WHEEL LIFE, LOWER POWER CONSUMPTION AND QUIET OPERATION. THE MEASUREMENTS SHOWN SHOULD BE CHECKED BEFORE A UNIT IS PUT INTO SERVICE AND WHENEVER A WHEEL IS REPLACED.



TOP VIEW – CENTERING ALIGNMENT



TOP VIEW – CLEARANCE ADJUSTMENT

REV.B–PLN–29 NOV 94

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

WHEEL ALIGNMENT REQUIREMENTS FOR CENTERING WHEELS

DRN: PLN 07 JUL 91
CHK: 29 Nov. 94
DWG. REV.B
U4–SPC–1038/C

Spiral Scoop Assembly Instructions:

Position the Scoop Support Saddle (may be in one or two pieces) into the bracket provided on the Movable Part Support.

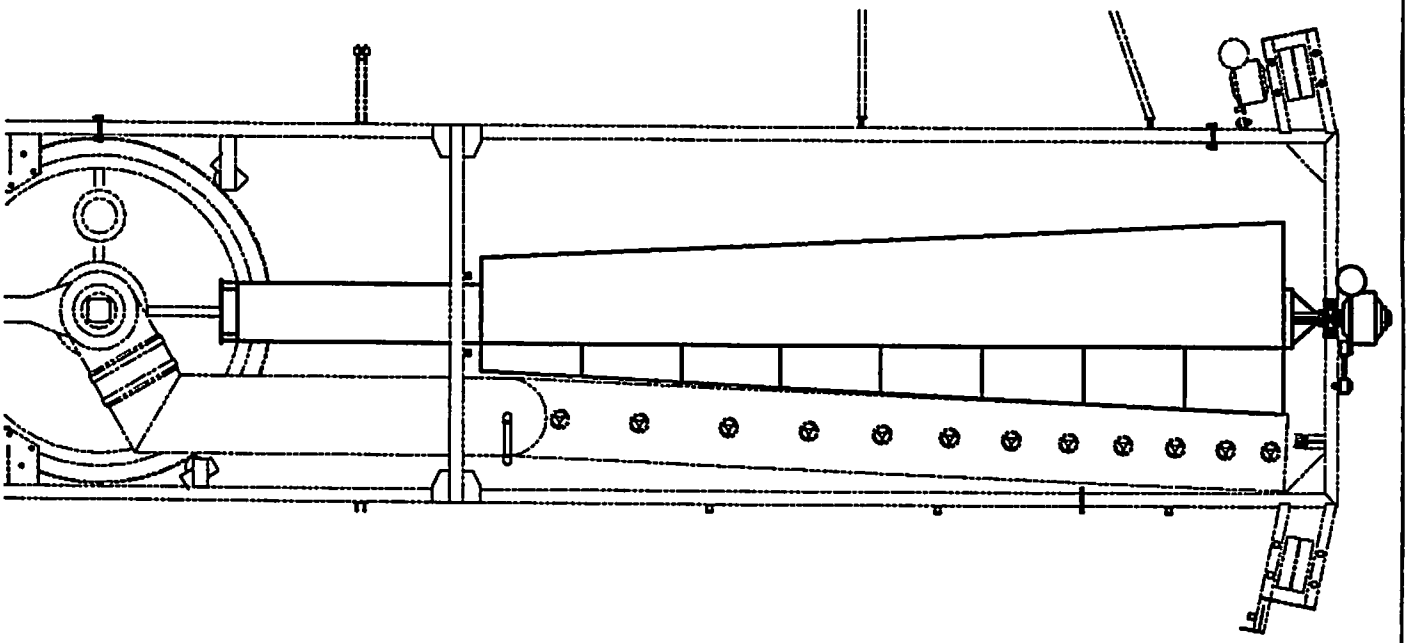
Attach the Pillow Block Bearing to the Spiral Scoop outer end shaft.

Place the scoop in the proper position with the Pillow Block Bearing on its attachment bracket on the Movable Part Support and the scoop outlet tube on the Scoop Support Saddle.

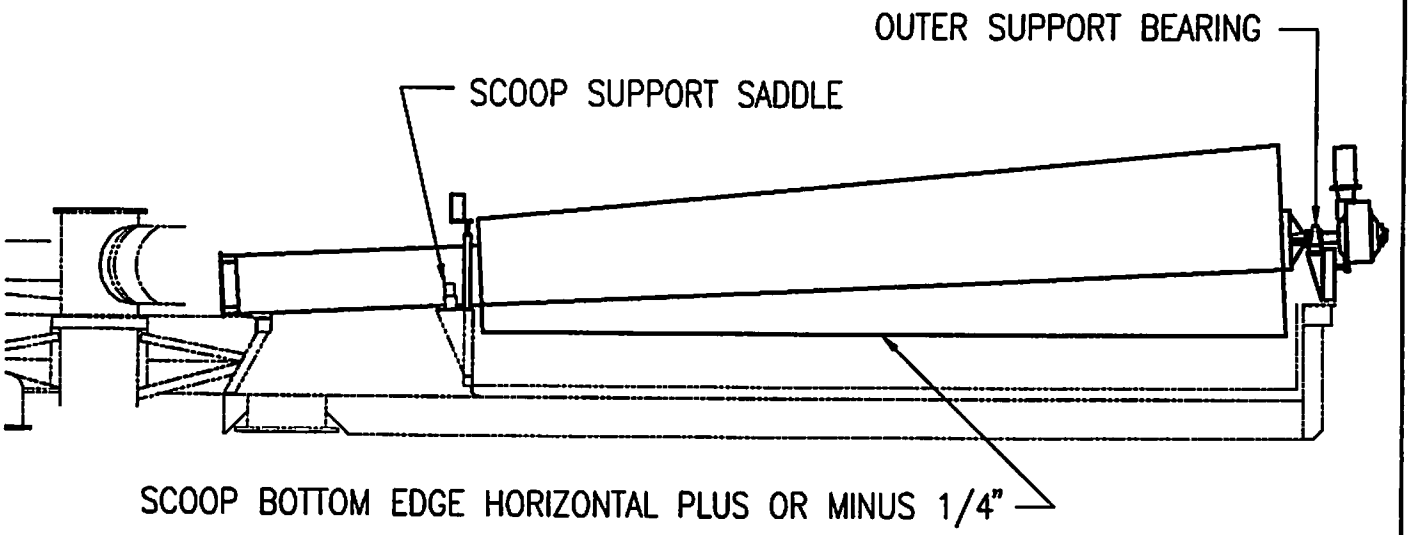
Mount the Pillow Block Bearing to the outside frame with hardware provided, but do not tighten.

When the lower edge of the Spiral Scoop is placed in the perpendicular position the edge should be level and parallel to the tank bottom. If not, shims can be placed (or removed from) under the support bearing or wheels. The wheels can also be adjusted toward or away from each other to raise or lower the scoop. The outer bearing can also be moved from side to side if necessary to align the spiral scoop on the correct axis.

When in place, tighten all bolts. Check for free rotation of the scoop.



TOP VIEW



SIDE VIEW

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL SPIRAL SCOOP INSTALLATION

DRN: PLN 19 OCT 94
CHK: SF 29 NOV. 94
DWG. O&M-097

Rotary Joint Assembly (Double Type):

Refer to Drawing O & M 095/1 for component locations, drawings O&M 095/2 and O&M 095/3 for assembly:

The Rotary Joint is assembled on the Main inlet pipe in the center of the Supracell.

Main Inlet Assembly- Dwg.O & M 095/2:

Lay the Plastic Bearing Ring (Item 2) on the flange of the Main Inlet Pipe, then set the Outer Clamp Ring (Item 3) in place making sure the attachment holes line up.

Pre-install the Packing Compression Ring (Item 5) over the bottom end of the Rotary Joint body (Item 1). Apply a heavy coat of grease to the bottom, side and top face of the machined rotary joint surfaces of Item 1. Lower the Rotary Joint onto the Plastic Bearing Ring (Item 2). Install the layers of Packing (Item 4) as shown, carefully cutting each layer so that the ends meet together without a gap. Position each of the layers so that the cut joints are at least 90 degrees apart. Lower the Packing Compression Ring (Item 5) into the groove over the the Packing layers (Item 4). Attach the two piece UHMWP Bearing Ring (Item 6) over the packing assembly then the two piece Retaining Ring (Item 7) over it and bolt securely in place with Bolts (Item 8). Check that the inside diameter of the UHMWP Bearing Ring is tight against the rotating Rotary Joint body while still allowing rotation. Applying force with a pry bar against the Rotary Joint lever arm can be used to check for rotation.

Gentle tightening of the screws (Item 9) provides compression of the packing. Do not over-tighten the packing adjustment bolts. Decreased packing life and binding of the Rotary Joint may result. Minor leakage of water is acceptable during operation. Tighten down the lock nuts after adjusting.

The Rotary Joint is provided with a 1/4" pipe connection for greasing (Item 10).

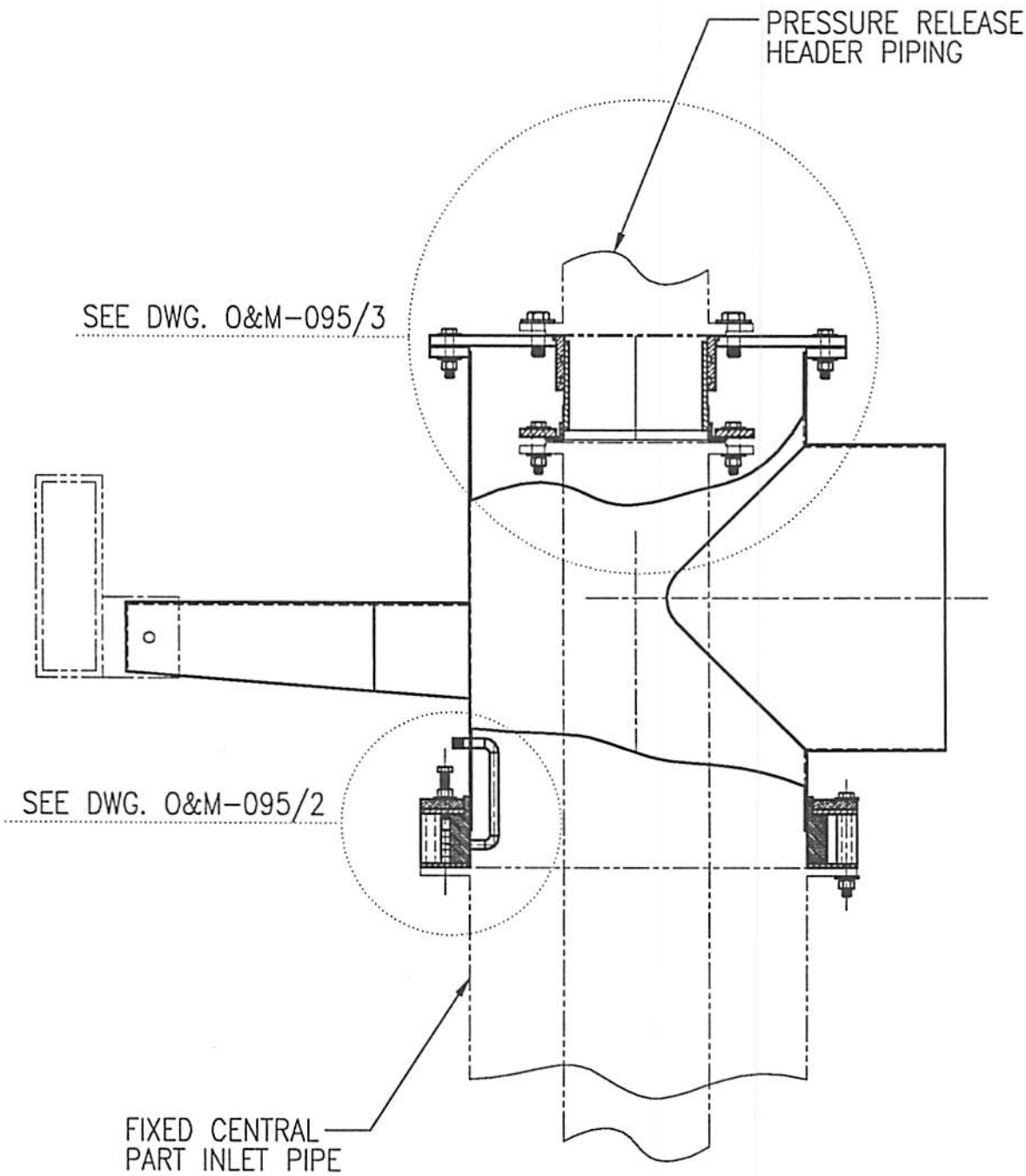
Rotary Joint Assembly (Double Type) continued:

Pressurized Water Inlet Joint Details- Dwg.O & M 095/3:

Position the machined pipe with face ring, (item 2) over the pipe from the Fixed Central Part Tank, with sealing gasket between. Set the loose stainless steel flange ring in place and loosely install stainless steel bolts, nuts & washers provided. Lower the top plate of the Rotary Joint into position to check the centering of item 2. Adjust item 2 side to side as required within its outer flange until the Bronze Bearing Ring (item 1) installed without O-rings, will fit without force. At correct adjustment tighten flange bolts of item 2 and install and fasten the Top Plate. Grease inside of item 1 and install O-rings before setting into position.
in the center hole

Rubber Pipe Connection & Clamp Assembly- Dwg.O & M 096:

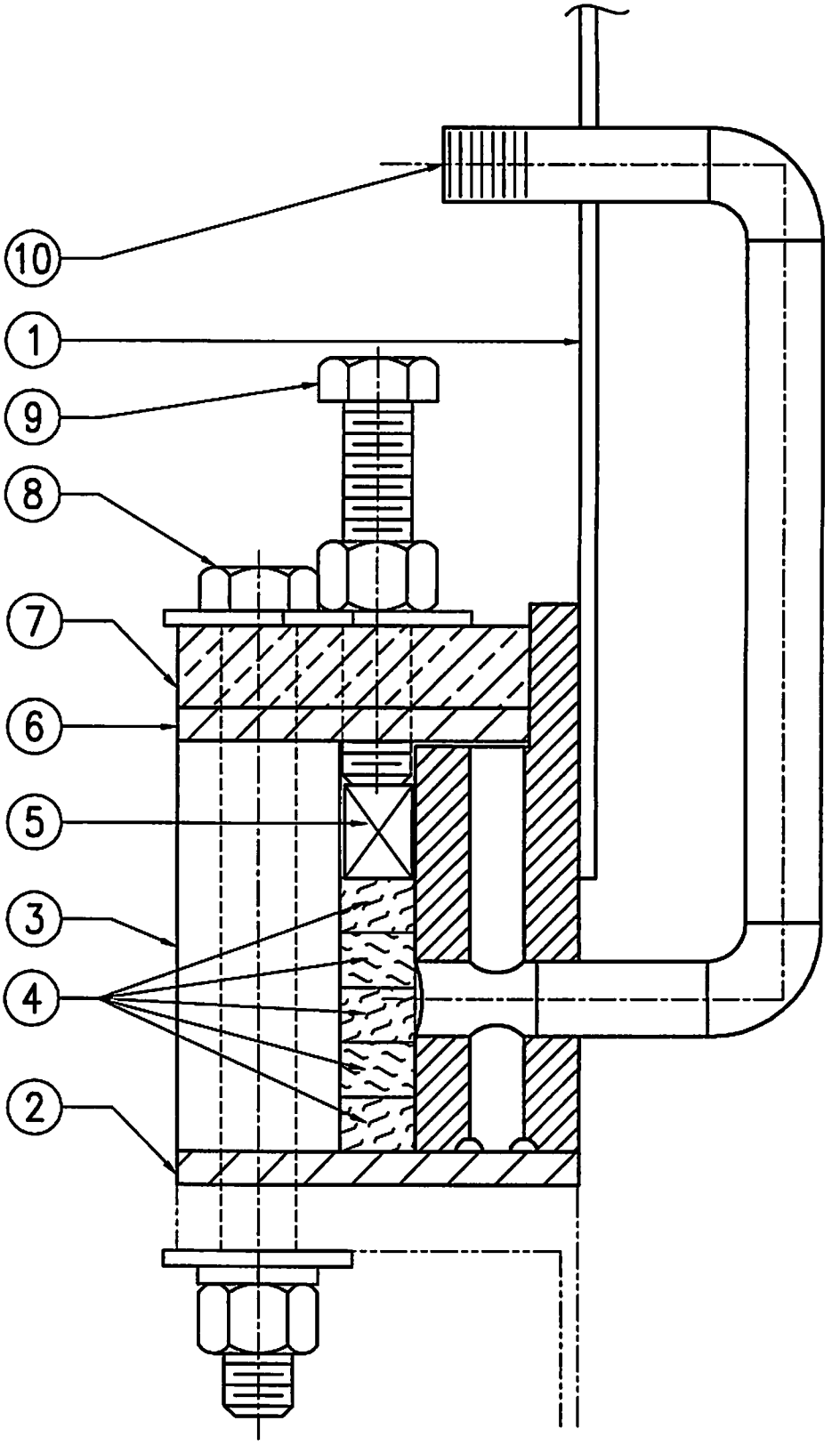
The Rubber Pipe Connection, also called the Elastic Joint, connects the Rotary Joint to the Distribution Inlet Tube. Before attaching, adjust the alignment of the Rotary joint to the Distribution Inlet Tube. The alignment is determined by the position of the Rotary Joint rotation arm against an adjustable bracket on the rotating carriage. Install the Elastic Joint clamps loosely over the pipe ends before installing the Elastic Joint. Position and tighten the clamps taking care not to pinch or distort the rubber.



KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL DOUBLE ROTARY JOINT COMPONENTS

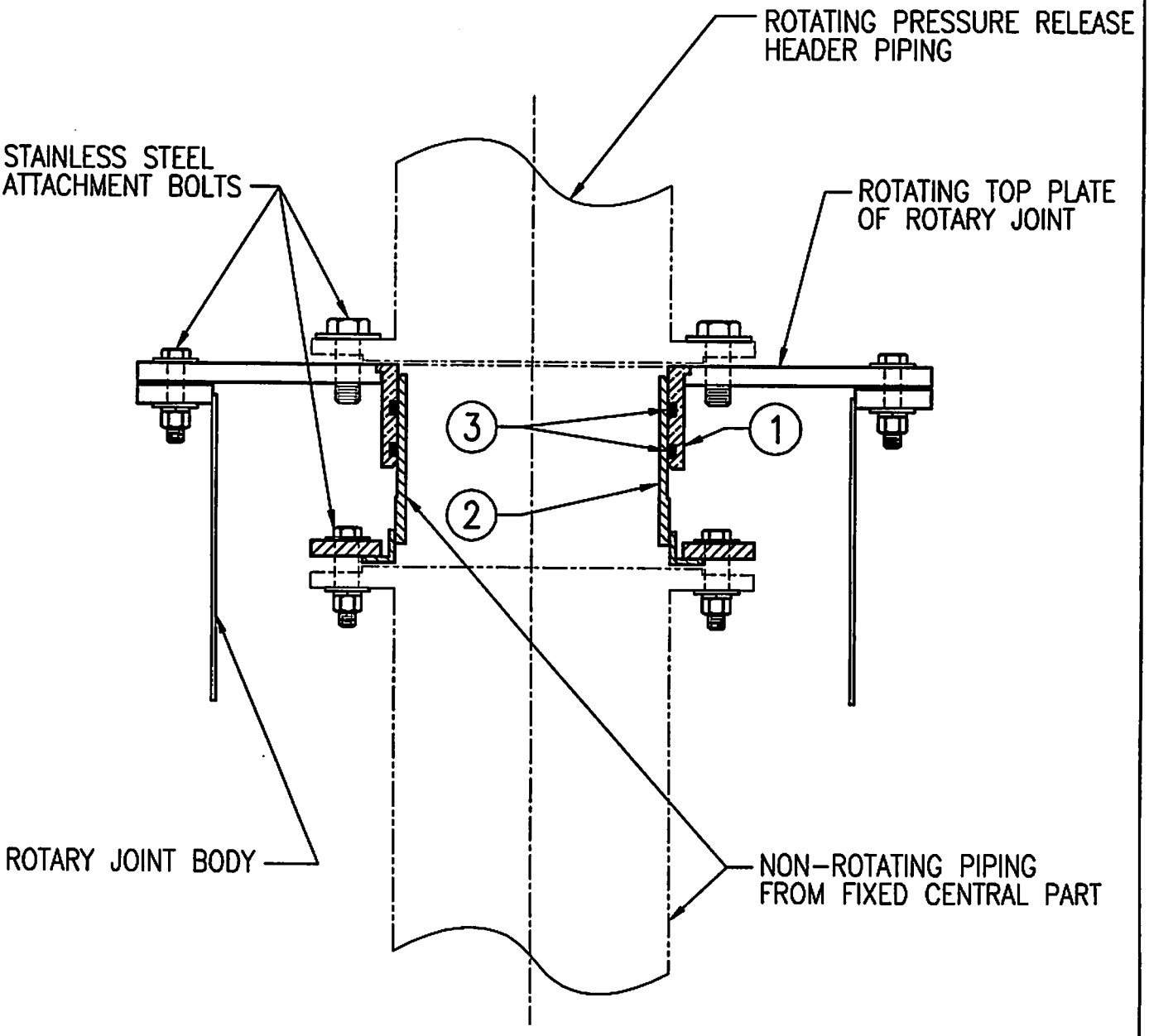
DRN: PLN 18 OCT 94
CHK: FS 5 JAN 95
DWG. O&M-095/1



KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL ROTARY JOINT MAIN INLET ASSEMBLY

DRN: PLN	18 OCT 94
CHK: FS	5 JAN 95
DWG.	O&M-095/2



(1) BRASS BEARING WITH O-RING RECESS

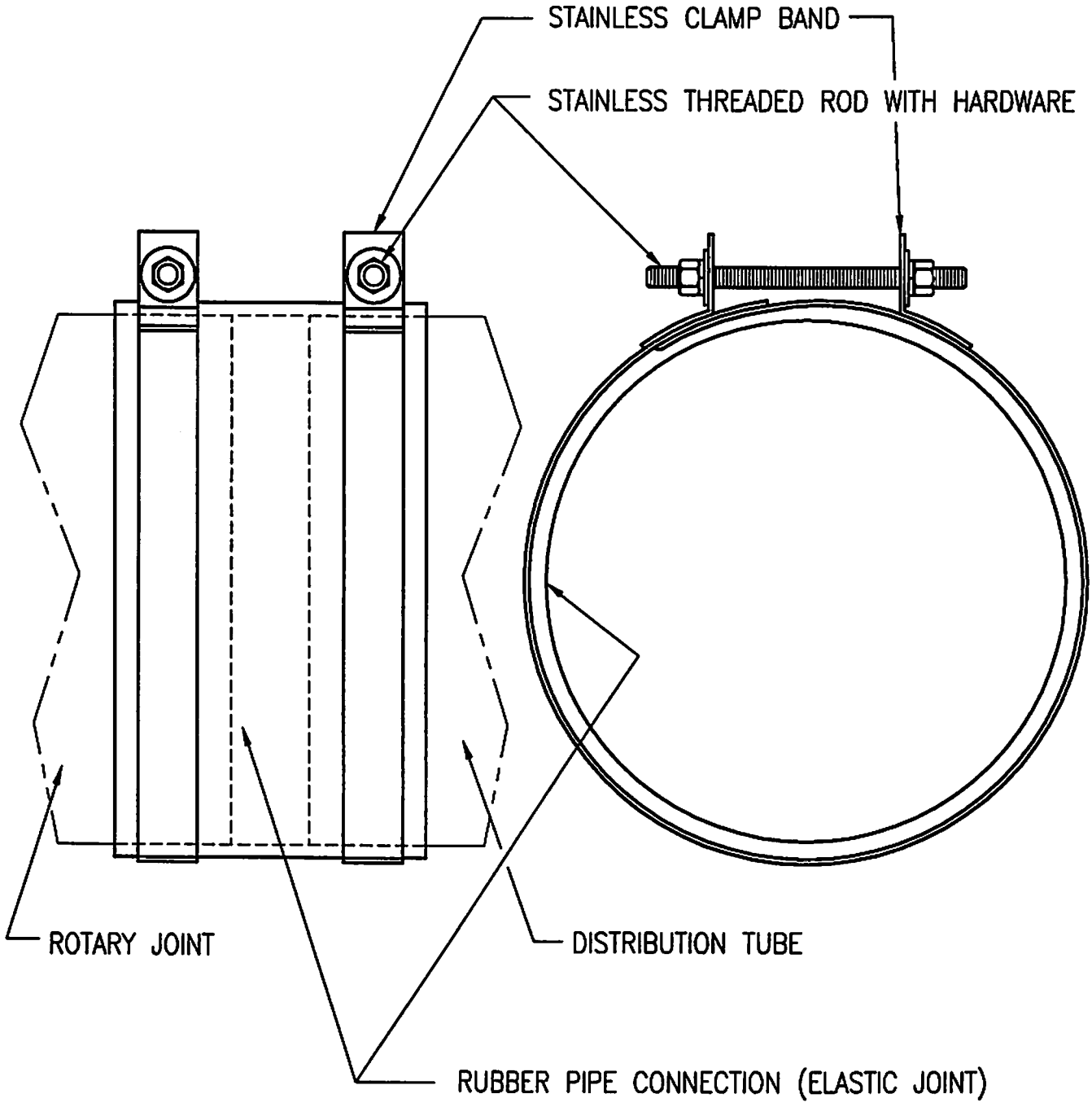
(2) STAINLESS PIPE, WITH FLANGE.

(3) O-RING SEALS.

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL DOUBLE ROTARY JOINT PRESSURIZED JOINT ASSEMBLY

DRN: PLN	18 OCT 94
CHK: FS	5 JAN 95
DWG.	O&M-095/3



KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL RUBBER PIPE CONNECTION & CLAMPS

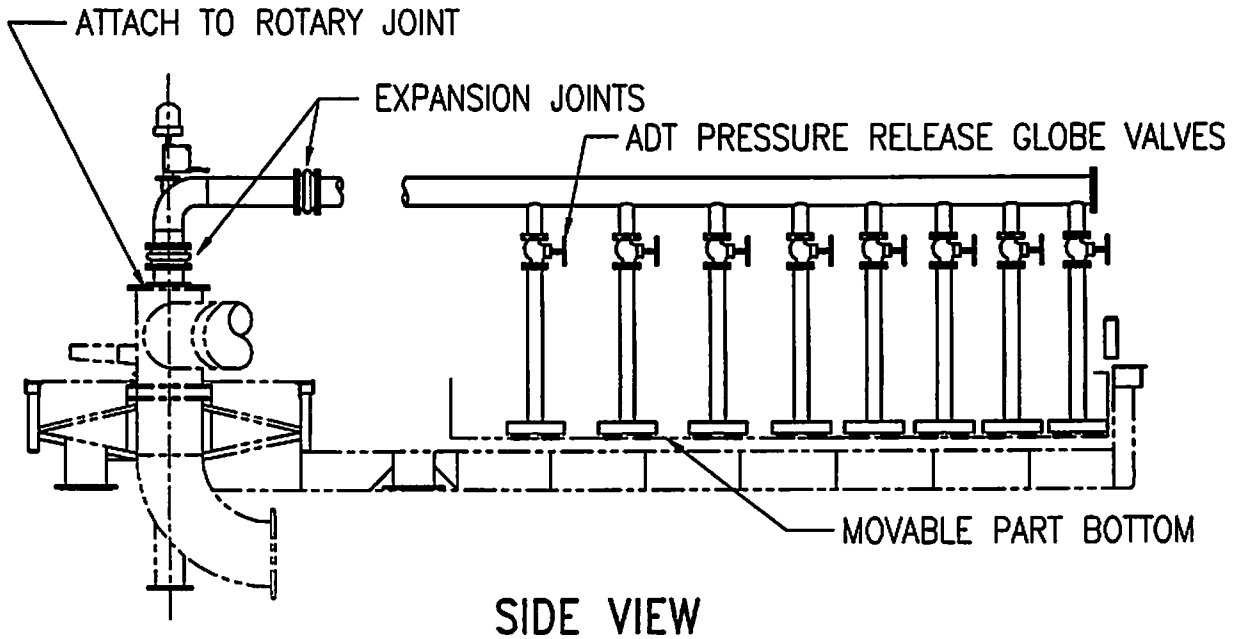
DRN: PLN 18 OCT 94
CHK: ~~JF~~ JP Nov. 94
DWG. O&M-096

KROFTA

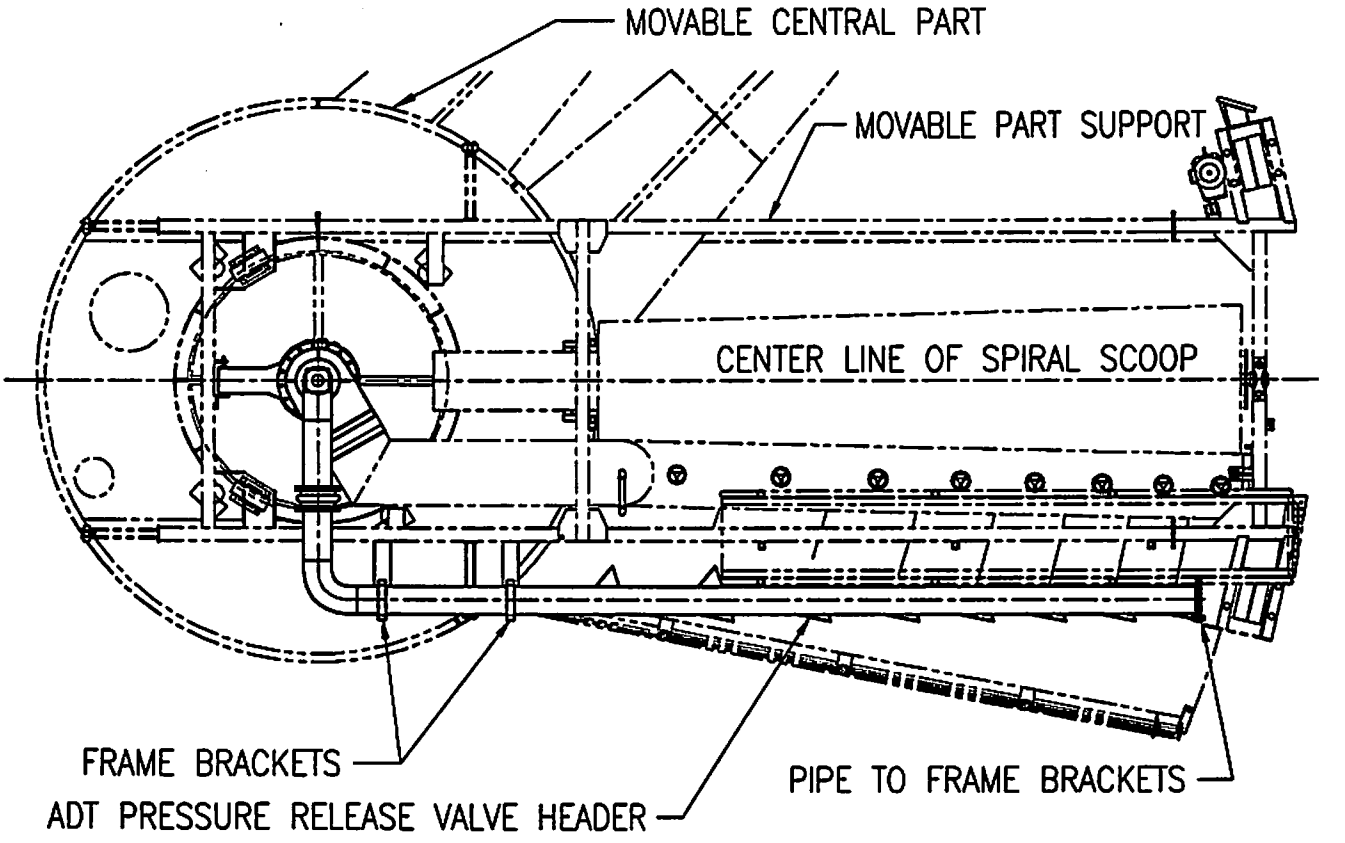
Pressure Release Header Assembly Instructions - Manual Valves

Install the Pressure Release and support components into position as shown on the following drawing. Leave the attachment brackets loose until the Movable Part Support (Carriage) has been aligned and the Centering Wheels have been adjusted to center the unit. Unless this centering is properly done, the Rotary Joint will be misaligned with the Pressurized Water Piping. Excessive force used to align parts may result in wear or failure of parts placed under stress.

The Globe Valves should be turned for best access from the walkway. For initial adjustment, all valves should be opened an equal amount, approximately two turns, with final adjustment when in operation. See Sections 6 & 7 for Aerated Water Pressure Release adjustment criteria.



SIDE VIEW

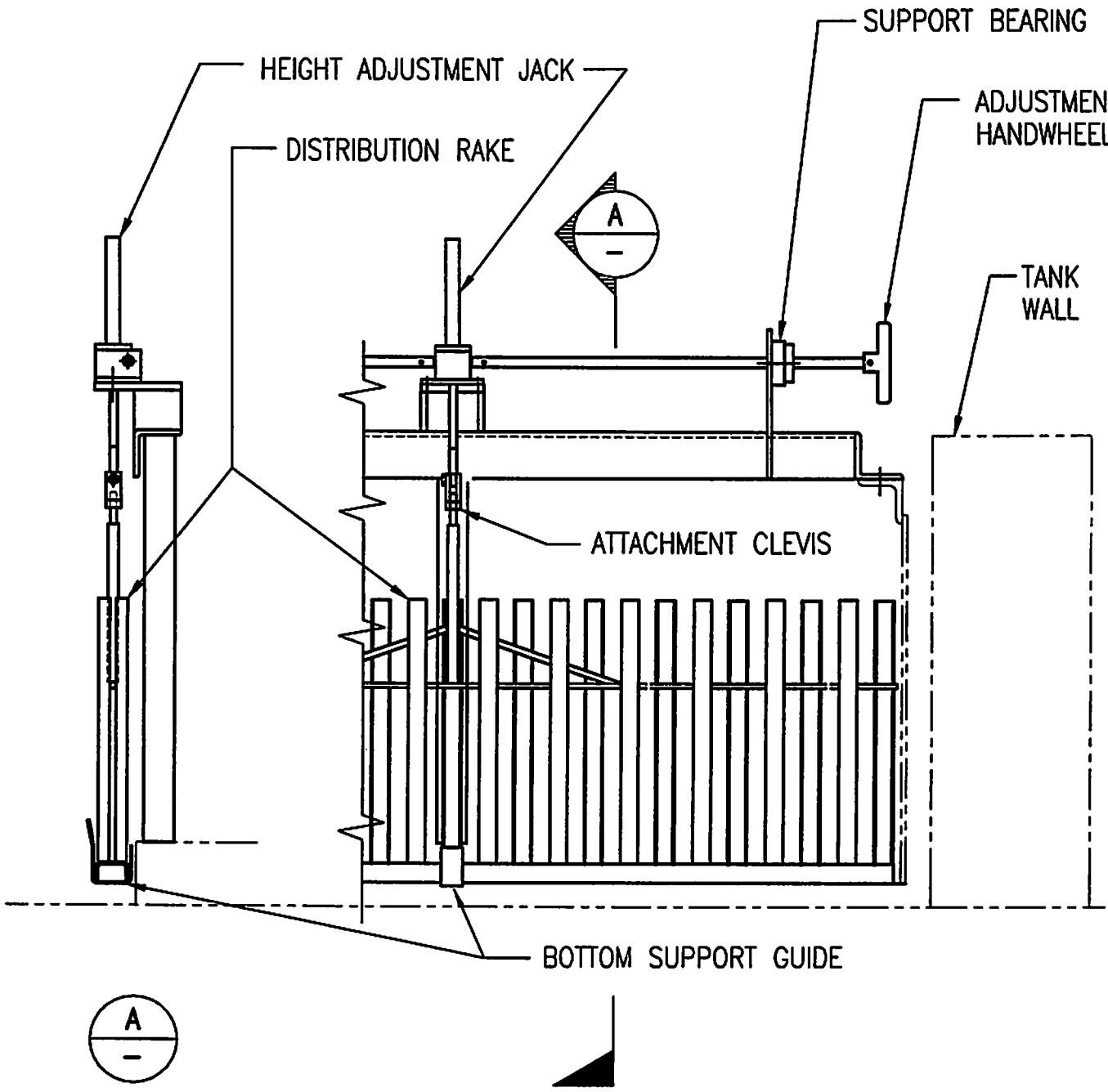


TOP VIEW

KROFTA® ENGINEERING CORP. LENOX, MA. 01240	KROFTA SUPRACELL PRESSURE RELEASE HEADER WITH MANUAL GLOBE VALVES	DRN: FSS, 10 APR. 95 CHK: PLN 12 APR 95 DWG. O&M-150

Distribution Rake Assembly Instructions:

Install the Distribution Rake and support components into position as shown on the following drawing. Check and adjust the assembly for level and height adjustment range.



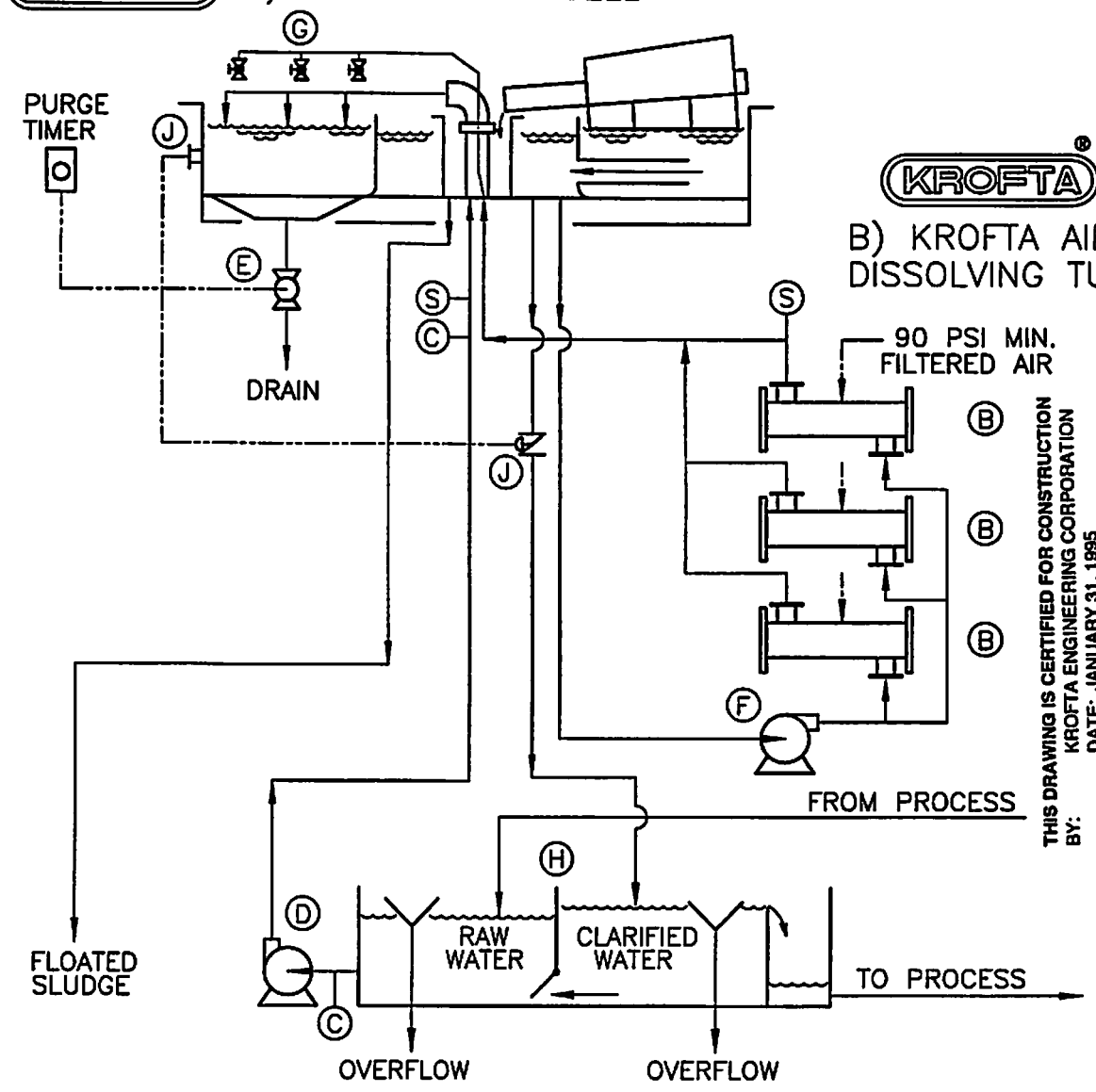
SIDE VIEW

FRONT VIEW

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL DISTRIBUTION RAKE INSTALLATION

DRN: PLN 18 NOV 94
CHK: SP 18 NOV. 94
DWG. O&M-098



THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
FOR: KROFTA JOB #19503, SPC-62
SBCCS CONTRACTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180
EQUIPMENT #45-00-005-001

A) KROFTA SUPRACELL, TYPE SPC 62.
B) THREE KROFTA AIR DISSOLVING TUBES, TYPE 2500.
C) CHEMICAL FEED POINT.
D) FEED PUMP: 35190 CMD MAX. (6455 GPM) AT 2.5 M (8 FT) TDH MIN. ABOVE SPC BASE LEVEL.
E) AUTOMATIC BOTTOM PURGE VALVE: 4" VALVE WITH TIMER AND SOLENOID.
F) PRESSURE PUMP; 9810 CMD (1800 GPM) AT 55 M (180 FT) TDH AT ADT INLET FLANGE.
G) PRESSURE RELEASE GLOBE VALVES LOCATED ON UNIT.
H) AUTOMATIC CLARIFIED WATER MAKE-UP. RECOMMENDED TO MAINTAIN CONSTANT FLOW RATE TO UNIT AS PROCESS FLOW VARIES. BY EQUALIZATION TANK AS SHOWN OR ALTERNATE SYSTEM WITH AUTOMATIC VALVE (NOT SHOWN).
J) AUTOMATIC LEVEL CONTROL SENSOR, CONTROLLER AND BUTTERFLY VALVE ASSEMBLY.
S) SAMPLE POINT.

SEE EQUIPMENT SPECIFICATION LIST FOR COMPONENTS SUPPLIED BY KROFTA.

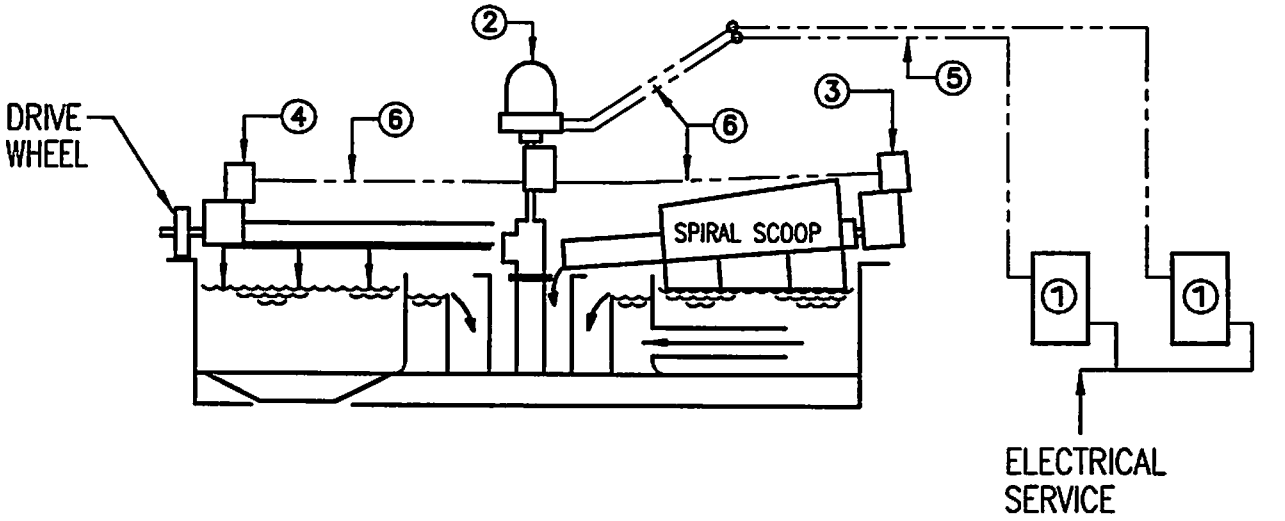
JOB 19503, SBCCS CONSTRUCTORS
RECYCLE FLOW – DOUBLE ROTARY JOINT

KROFTA ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL TYPE SPC 62 FLOW SCHEMATIC

DRN: FS	CHK: G ʊ G
14 DEC. 94	SCALE: DNS
DWG. U4-SPC-1925	

KROFTA SUPRACELL



1. VARIABLE SPEED MOTOR DRIVES WITH OPERATOR CONTROLS.
2. ROTARY ELECTRICAL SLIP RING
3. SPIRAL SCOOP GEARMOTOR.
4. ROTATING CARRIAGE GEARMOTOR.
5. RIGID CONDUIT ATTACHED TO CEILING OR OVERHEAD BEAM.
6. WATERTIGHT FLEXIBLE CONDUIT.

NOTE: SEE JOB SPECIFICATION LIST FOR EQUIPMENT SUPPLIED BY KROFTA.

NOTE: ALL WIRING BY CUSTOMER ACCORDING TO EQUIPMENT SPECIFICATIONS AND LOCAL ELECTRICAL CODES. SEE SPECIFICATION SHEET AND EQUIPMENT DATA FOR SPECIFIC COMPONENTS SUPPLIED AND FOR INSTALLATION AND WIRING REQUIREMENTS.

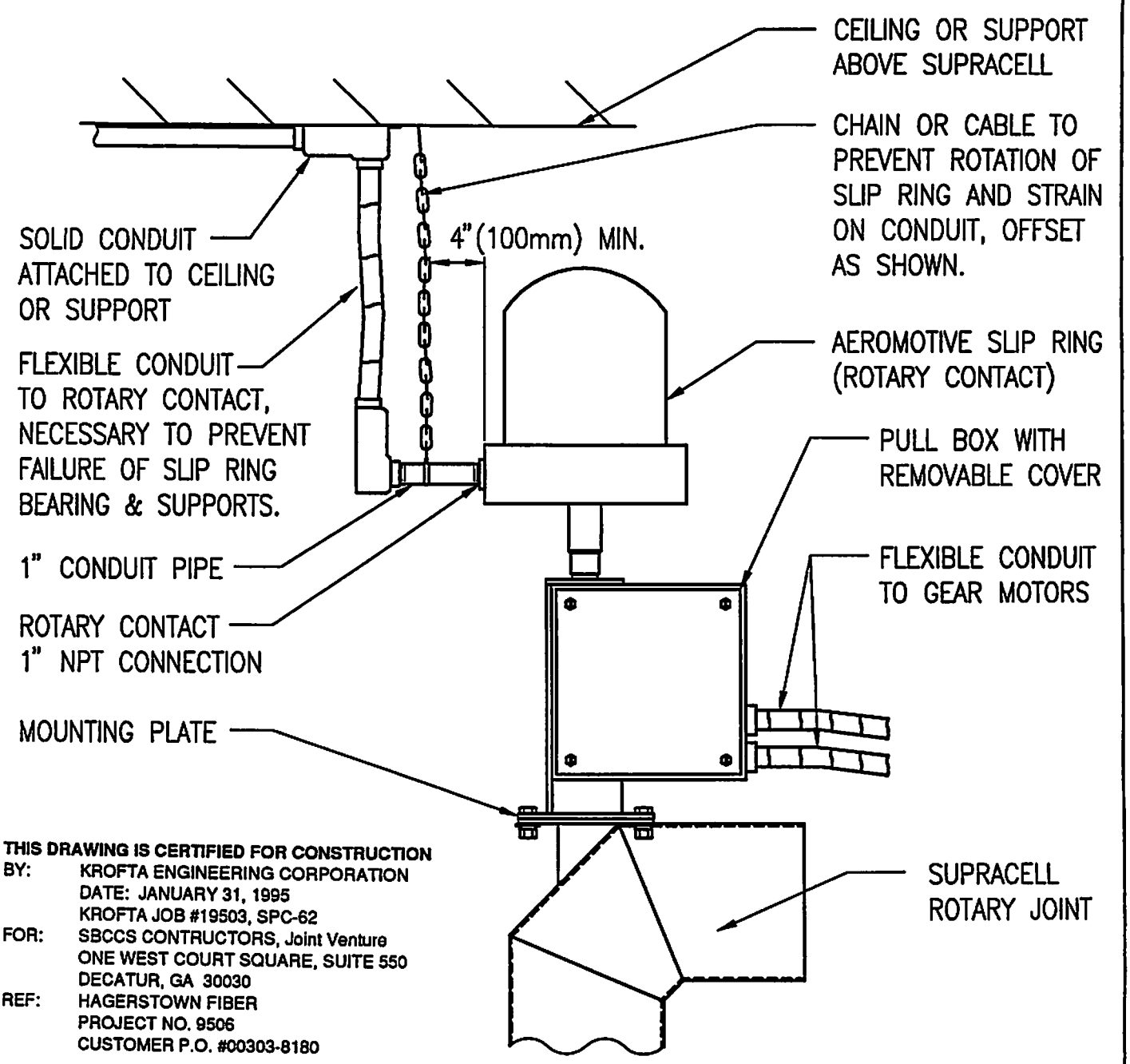
THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL MOTOR DRIVE EQUIPMENT SCHEMATIC

DRN: PLN	CHK: GJO 13 OCT 94
30 SEP 94	SCALE: DNS
DWG. U1-SPC-1846	



THIS DRAWING IS CERTIFIED FOR CONSTRUCTION

BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62

FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030

REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001

IN ADDITION TO INFORMATION PROVIDED, ALL LOCAL ELECTRICAL AND SAFETY CODES MUST BE OBSERVED.
KROFTA ASSUMES NO RESPONSIBILITY FOR FAILURE TO OBSERVE THESE CODES.

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL ROTARY CONTACT INSTALLATION

DRN: PLN	CHK: 5-30-94
AUG.18/94	SCALE: DNS
DWG. U4-SPC-1772	

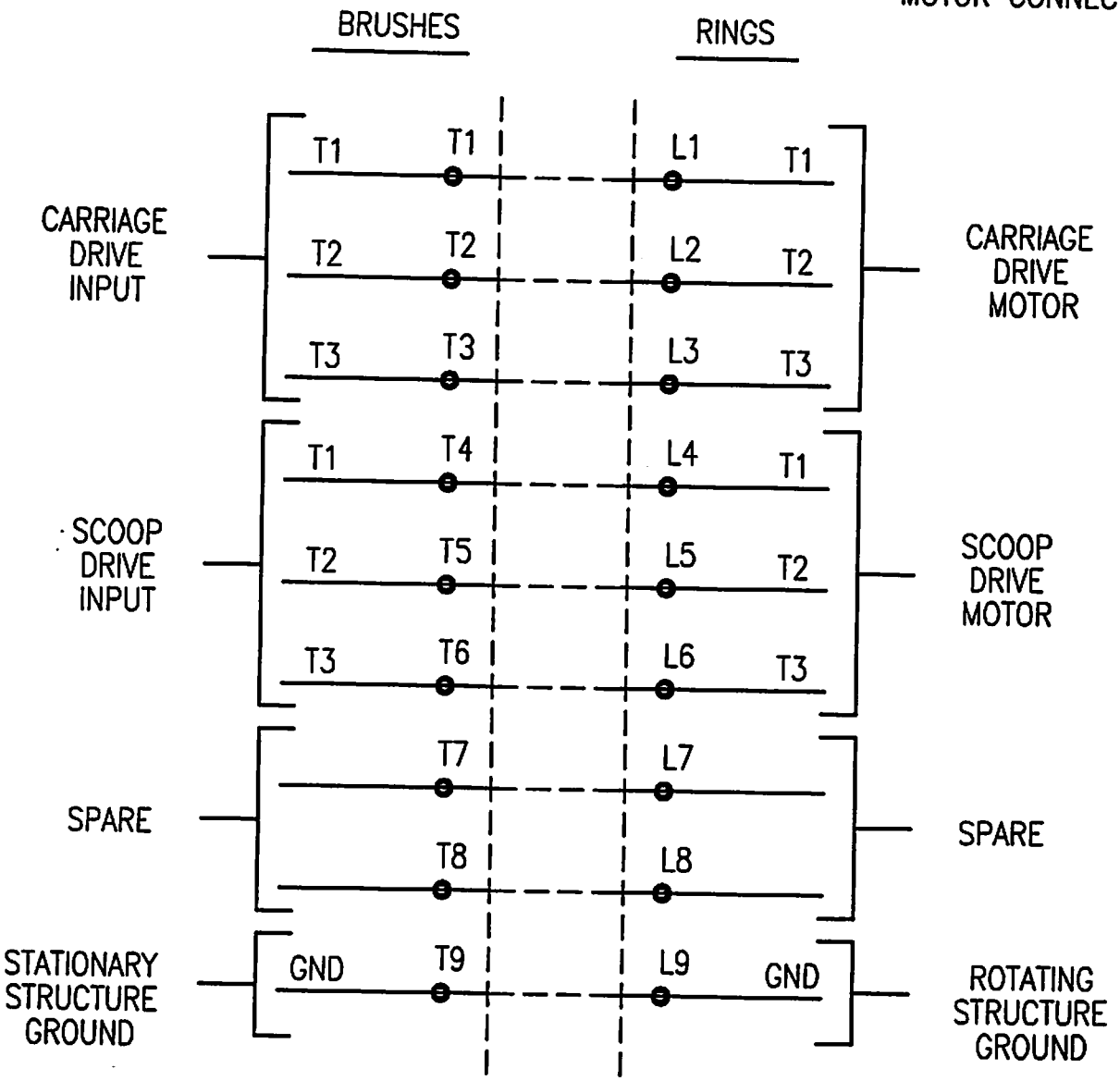
THIS DRAWING IS CERTIFIED FOR CONSTRUCTIO
BY: KROFTA ENGINEERING CORPORATIO
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 55
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001

SUGGESTED WIRING ARRANGEMENT
AC THREE PHASE INPUT
FOR ROTARY SLIP RINGS
TYPE AEROMOTIVE – ISRP 39
9 CONTACT

POWER CONNECTIONS

MOTOR CONNECTIONS

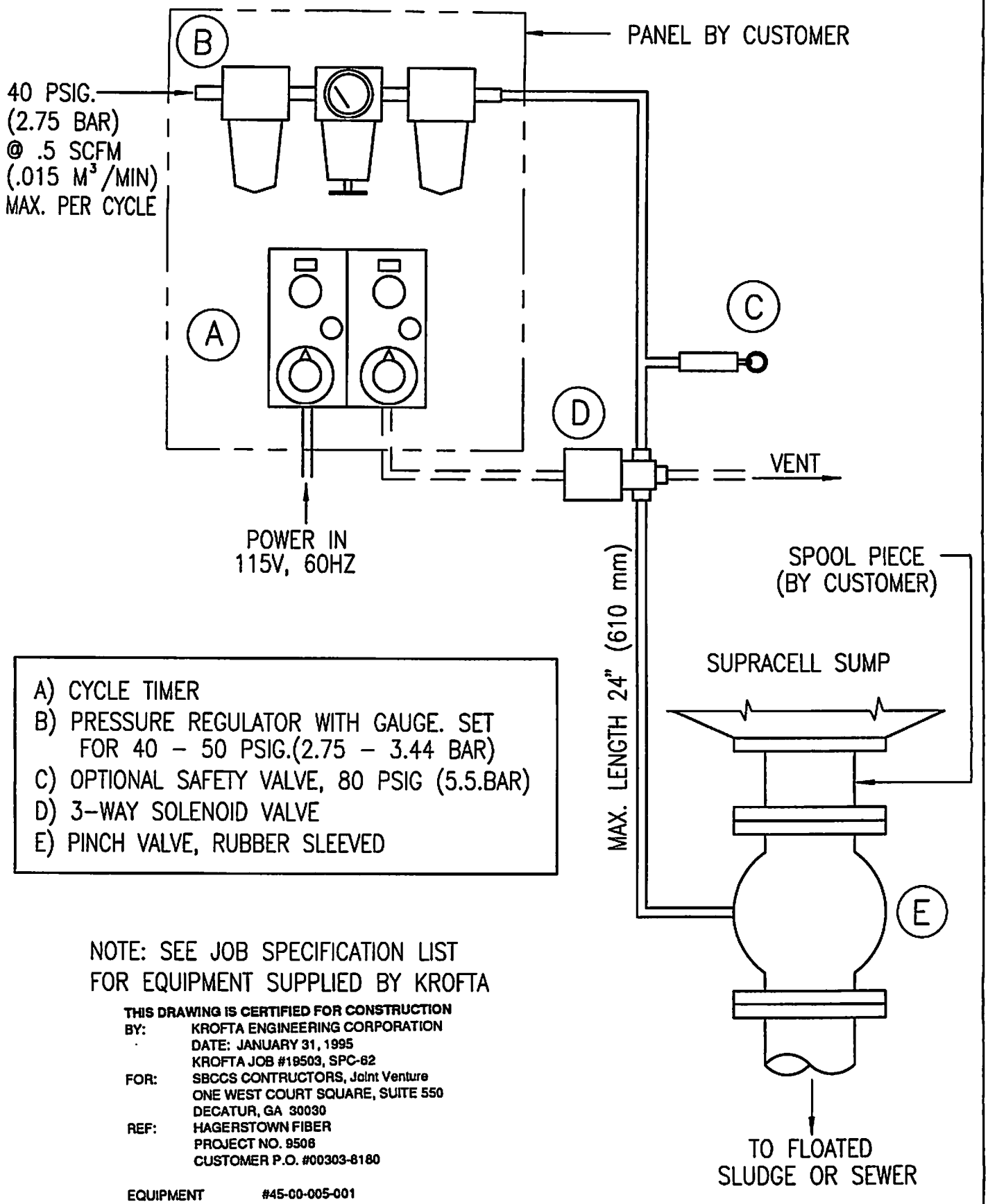


NOTE: WIRE PER LOCAL AND NEC CODES

KROFTA® ENGINEERING CORP.

KROFTA SUPRACELL
SUGGESTED WIRING
ELECTRICAL SLIP RINGS

DRN: PLN	CHK: 6 B 13/19
3 OCT 94	SCALE: NTS
DWG. U4-SPC-1847	



A) CYCLE TIMER
B) PRESSURE REGULATOR WITH GAUGE. SET FOR 40 – 50 PSIG.(2.75 – 3.44 BAR)
C) OPTIONAL SAFETY VALVE, 80 PSIG (5.5.BAR)
D) 3-WAY SOLENOID VALVE
E) PINCH VALVE, RUBBER SLEEVED

NOTE: SEE JOB SPECIFICATION LIST
FOR EQUIPMENT SUPPLIED BY KROFTA

THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001

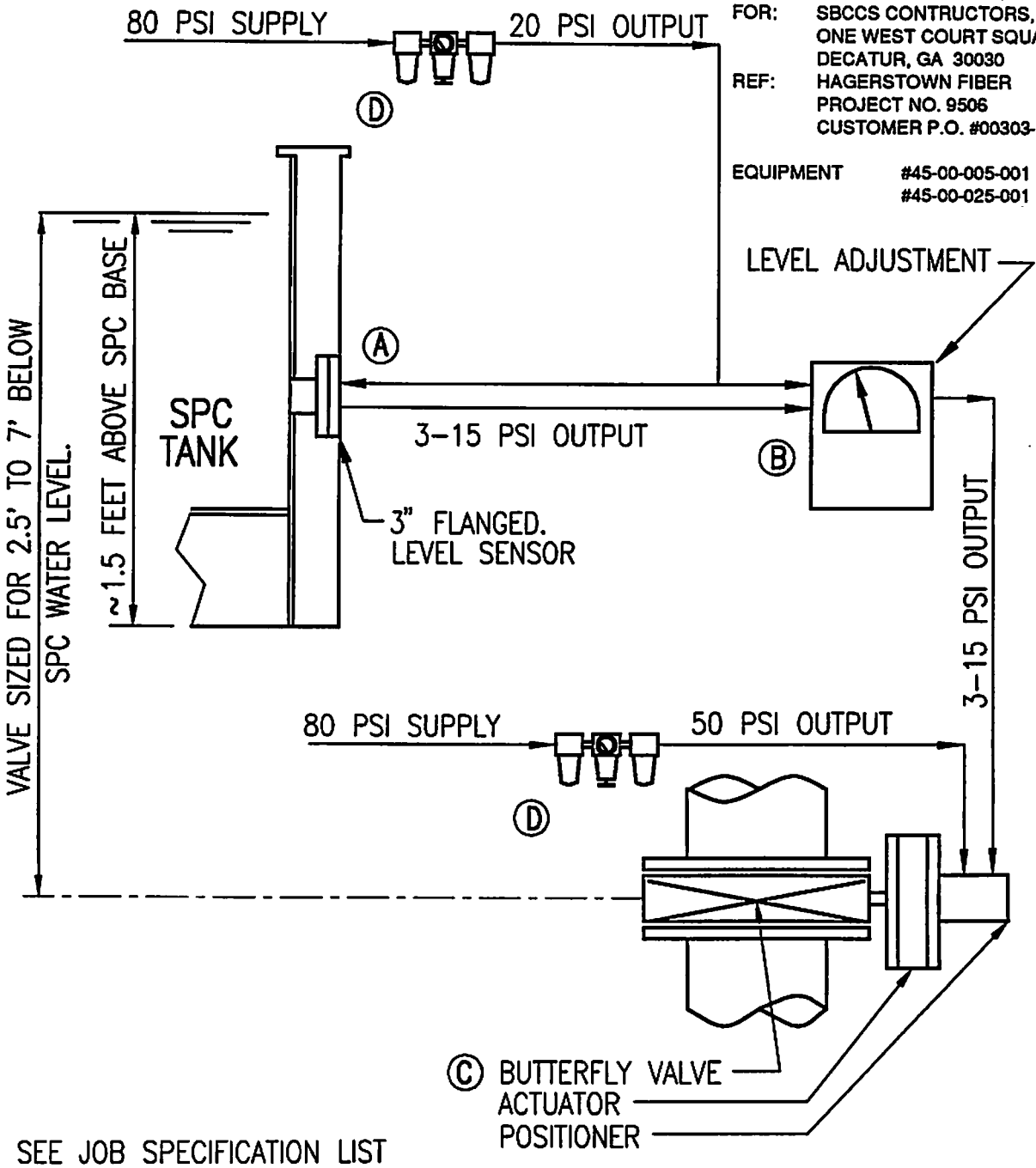
KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL AUTOMATIC BOTTOM PURGE SCHEMATIC

DRN: PAW	CHK:
DEC. 14/94	SCALE: NTS
DWG.	REV. 19503
U4-SPC-1771	

THIS DRAWING IS CERTIFIED FOR CONSTRUCTIO
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001



NOTE: SEE JOB SPECIFICATION LIST
FOR EQUIPMENT SUPPLIED BY KROFTA

PNEUMATIC LEVEL CONTROL COMPONENTS:
A) LEVEL TRANSMITTER.
B) LEVEL CONTROLLER.
C) LEVEL CONTROL VALVE ASSEMBLY
D) AIR REGULATORS WITH AIR & OIL FILTERS.

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL PNEUMATIC LEVEL CONTROL SYSTEM SCHEMATIC

DRN: PLN	CHK: DJF
JULY 12/94	SCALE: DNS
DWG. U4-SPC-1743	

Effluent Clarification
Water Treatment
Papermill Equipment

KROFTA® ENGINEERING CORPORATION

LENOX, Massachusetts 01240
P.O. Box 972
101 Yokun Avenue USA
Phone : (413) 637 - 0740
Cable : Krofta - Lenox
Telex : 92 - 6443 krofta-leno
Fax : (413) 637 - 0768

February 1, 1995

SBCCS Constructors, Joint Venture
P.O. Box 1286
Atlanta, GA 30301-1286
Attn: Mr. Russ Bowlin, Project Engineer

Subject: Krofta Job No. 19503 "Certified for Construction" Drawings.
For: Two (2) KROFTA 62 Foot SUPRACELL CLARIFIERS.
Ref: Hagerstown Fiber Project No. 9506
Customer P.O. #00303-8180

Dear Mr. Bowlin:

We are pleased to submit one (1) sepia, five (5) prints and one (1) disc copy of the attached "Certified for Construction" drawings and data listed for the Krofta 62 foot SUPRACELL Clarifiers referenced above.

We appreciate the opportunity to work with you on this project and look forward to a timely and successful installation.

Sincerely,

KROFTA ENGINEERING CORPORATION

John K. Herzig
Purchasing Manager

JKH/cml
Encl: As noted.
CC: Letter with one (1) set of prints to:
KEC Job File, Job 19503
KEC Engineering Department
CC: Letter with one (1) set of prints to:
Wilson & Poll
P. R. Bradley Associates
Tate Engineering
CC: Letter only to:
AM, JH, MA, Accounting.

SBCCS Constructors, Joint Venture
Certified for Construction Drawing List

KROFTA®

February 1, 1995

DRAWINGS:

1. SUPRACELL Equipment Specification List, dated ..... Jan. 25, 1995.
2. SUPRACELL 62 Flow Schematic ..... U4-SPC-1925.
3. SUPRACELL 62 Outline and Pipe Locations, Rev. A ..... U3-SPC-1926.
4. Motor Drive Equipment Schematic ..... U4-SPC-1846.
5. Rotary Slip Ring Installation ..... U4-SPC-1772.
6. Suggested Wiring Electrical Slip Ring ..... U4-SPC-1847.
7. Automatic Bottom Purge Schematic, Rev. 19503 ..... U4-SPC-1771.
8. Automatic Level Control System Schematic ..... U4-SPC-1743.
9. Type 2500 Air Dissolving Tube Outline Drawing, Rev. 19503 ..... U3-DT-252.
10. Type 2500 Air Dissolving Tube Installation ..... U3-DT-253.

DATA:

11. Aeromotive Slip Ring Data.
12. Falk Gear Reducer #WBHQM 525 Data for Rotating Carriage.
13. Falk Gear Reducer #WBHQM 600 Data for Sludge Scoop.
14. Westinghouse Motor Data.
15. Allen Bradley 1305-BA06A Controller Data.
16. RKL 4" Pinch Valve Data.
17. ATC Flip Flop Timer Data.
18. ASCO 3-way Solenoid Valve Data for Purge Valve.
19. Velan Globe Valve Data.
20. Ametek Pressure Gauge and Diaphragm Data.
21. ESKO 4-tube Airmeter Data.
22. Combraco Stainless Steel Check Valve Data.
23. 20" DeZurik Butterfly Valve Data.
24. Fisher 4195 Series Pressure Indicating Controller Data.
25. Fisher 115C Liquid Level Transmitter Data.
26. Fiber Detector Data.

KROFTA SUPRACELL EQUIPMENT SPECIFICATION LIST

9/10/92

KROFTA JOB NO: 19503 PREPARED BY: F. Sang DATE: 25 Jan. 95
CUSTOMER: SBCCS Constructors P.O.# 00303-8180
NOTES: "Certified for Construction" drawings and data.

SUPRACELL QTY: 2 MAT'L: 304L
SPC TYPE: 62, Double Joint type with manual pressure release
NOTES: Total raw inlet flow 9200 GPM per unit.
Pressurized portion of recycled flow 1900 GPM per unit.

SUPRACELL ACCESSORY EQUIPMENT:
[K] = SUPPLIED BY KROFTA [C] = BY CUSTOMER [N] = NOT REQUIRED

[K] CARRIAGE QTY: 2 TYPE: Falk: WBHQM 525
GEAR MOTOR: RATIO: 1:125 FRAME: 182TC
HP: 3.0 RPM: 1750 PHASE: 3 VOLT: 480
NOTES: with bushing kit HOSBK-250

[K] SCOOP QTY: 2 TYPE: Falk: WBHQM 600
GEAR MOTOR: RATIO: 1:250 FRAME: 182TC
HP: 3.0 RPM: 1750 PHASE: 3 VOLT: 480
NOTES:

[K] MOTOR: QTY: 4 TYPE: Westinghouse
HP: 3.0 RPM: 1800 PHASE: 3 VOLT: 460

[K] MOTOR CONTROLLER: QTY: 4 TYPE: Allen Bradley 1305
V-OUT: V-IN: 480 PHASE: 3 HZ: 60
MAX H.P.: 3.0 NOTES:

[K] ROTARY SLIP RING: QTY: 2 NOTES: Aeromotive ISRP-39
[K] PINCH/PURGE VALVE: QTY: 2 NOTES: RKL 4" flanged pinch type
[K] PURGE TIMER, CASE: QTY: 2 NOTES: ATC 342
[K] SOLENOID VALVE: QTY: 2 NOTES: ASCO 8320-A6
[K] LEVEL CONTROL: TYPE: Automatic level control system.
NOTES: 20" DeZurik butterfly valve, Actuator and Positioner.

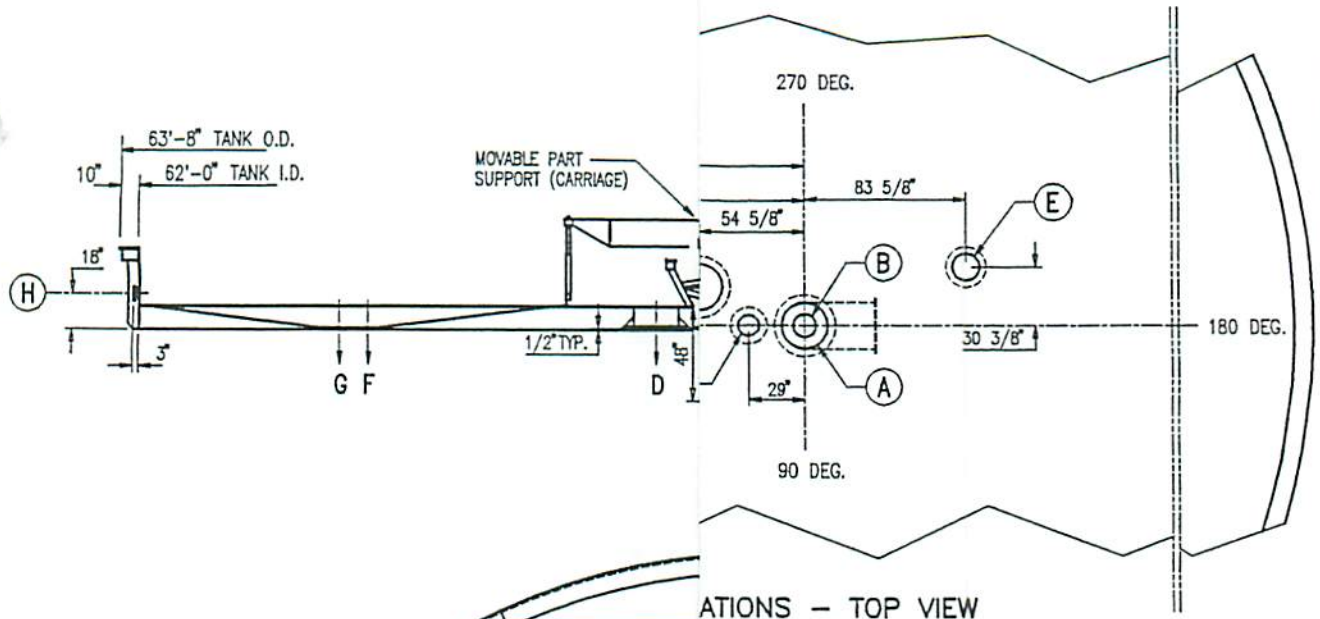
AIR DISSOLVING TUBE (ADT): QTY: 6
ADT TYPE: ADT 2500 MAT'L: 304L S.S. with M.S. flanges
NOTES:
[C] PRESSURE PUMP(S): 2
PUMP FLOW REQUIRED: 1900 GPM
NOTES: Goulds type 3196 or equivalent

AIR DISSOLVING TUBE (ADT) ACCESSORY EQUIPMENT

[K] PRESSURE GAUGE, SEAL: QTY: 8 NOTES: Ametek type
[K] AIR METER: QTY: 6 No. TUBES: 4 NOTES: ESKO EK4-7114-N
[K] CHECK VALVE: QTY: 24 NOTES: Combraco
[K] BLEED-OFF, SITE TUBE: QTY: 6 NOTES: Krofta

ADDITIONAL ITEMS, NOTES: 3 Fiber detectors. 6 O&M manuals.

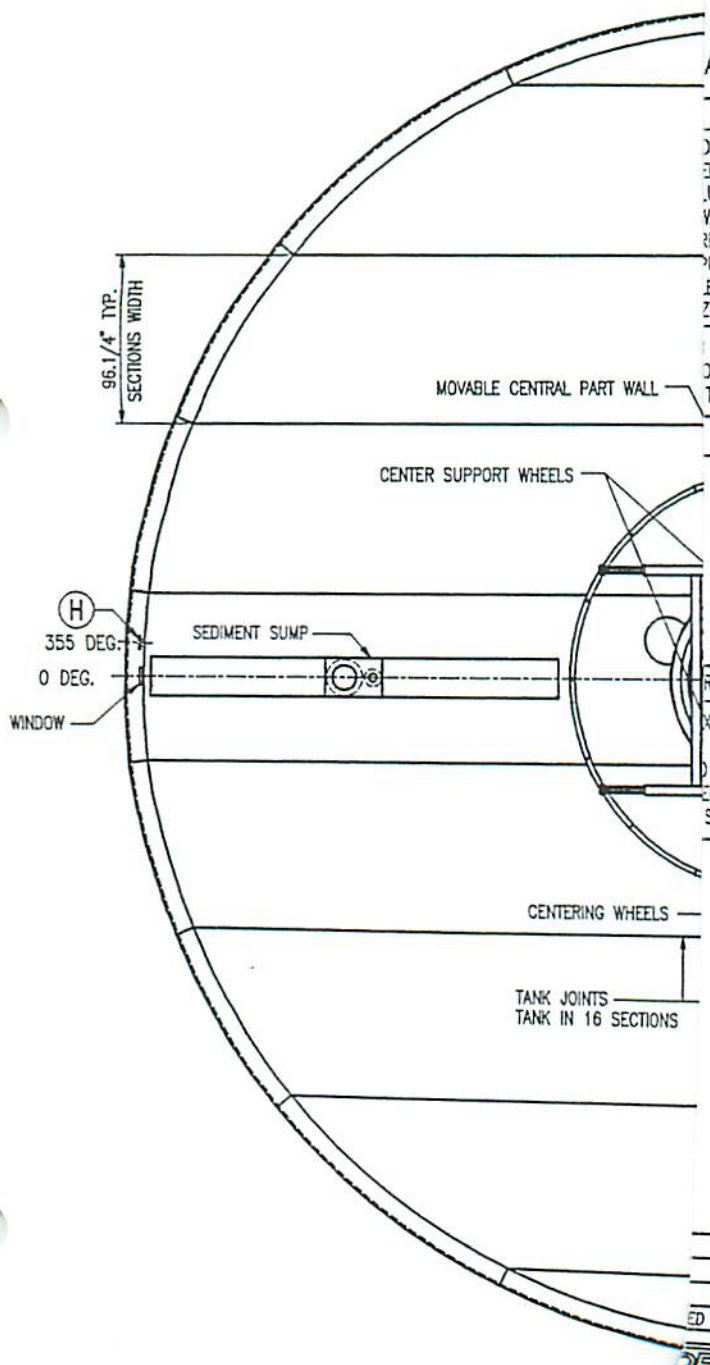
THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180



ATIONS – TOP VIEW

	RAD. FROM CENTER
) WATER INLET	SEE DRAWING
ED WATER INLET	0
LUDGE OUTLET	29"
VATER OUTLET	58"
RECYCLE OUTLET	89"
URGE OUTLET	235"
ET	250"
ZLE	SEE DRAWING

ANSI #150 LB. FLANGE DIMENSIONS.
ONE TYPE WITH STEEL BACKING
TAPPED HOLES INTO STEEL PLATE.



MATERIALS OF CONSTRUCTION:
WETTED PARTS IN 304L STAINLESS STEEL. NON-WETTED PARTS IN EPOXY PRIMED MILD STEEL.

RUCTURE REQUIREMENTS:
XIMUM 8 FT. TO 9 FT. CENTERS, 4 FT., NON-DIRECTIONAL.) DEFLECTION OF 1:360 OVERALL. EPARATELY FROM SUPRACELL. SUPPORT WITH ANGLE BRACKETS.

THIS DRAWING IS CERTIFIED FOR CONSTRUCTION

BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62

FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030

REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

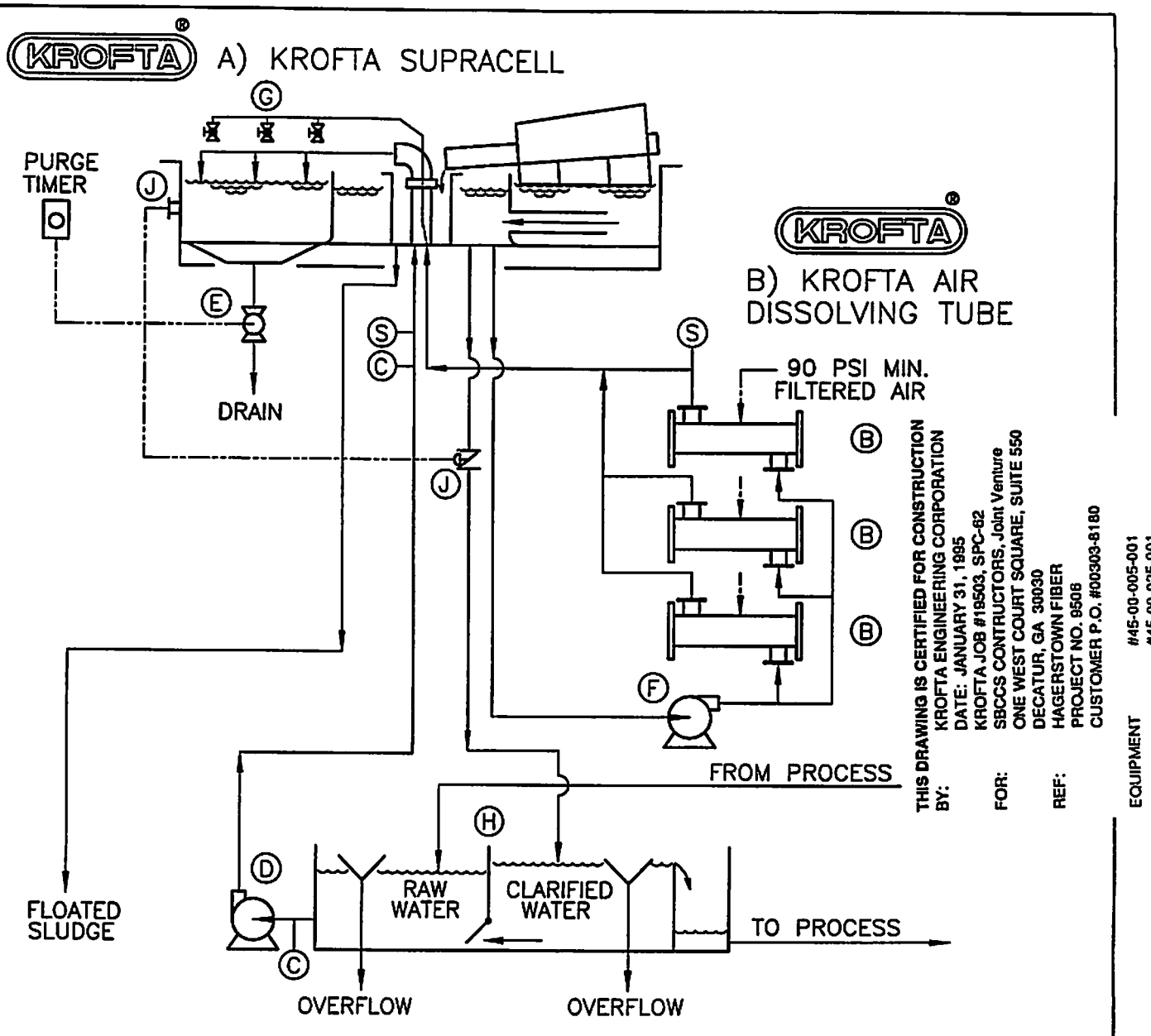
EQUIPMENT #45-00-005-001
#45-00-025-001

REVISIONS	DATE	DRN.	WEIGHT
ED DIM. & CORR.	27 JAN. 95	F.S.	

KROFTA ENGINEERING CORP. MA. 01240

KROFTA SUPRACELL, SPC 62
DOUBLE JOINT UNIT
OUTLINE & PIPE LOCATIONS DRAWING

DRN: F. SANG
CHK: MPN
APP:
DATE: 14 DEC. 94
DWG. U3-SPC-1926



THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRACTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180
EQUIPMENT #45-00-005-001

A) KROFTA SUPRACELL, TYPE SPC 62.
B) THREE KROFTA AIR DISSOLVING TUBES, TYPE 2500.
C) CHEMICAL FEED POINT.
D) FEED PUMP: 35190 CMD MAX. (6455 GPM) AT 2.5 M (8 FT) TDH MIN. ABOVE SPC BASE LEVEL.
E) AUTOMATIC BOTTOM PURGE VALVE: 4" VALVE WITH TIMER AND SOLENOID.
F) PRESSURE PUMP; 9810 CMD (1800 GPM) AT 55 M (180 FT) TDH AT ADT INLET FLANGE.
G) PRESSURE RELEASE GLOBE VALVES LOCATED ON UNIT.
H) AUTOMATIC CLARIFIED WATER MAKE-UP. RECOMMENDED TO MAINTAIN CONSTANT FLOW RATE TO UNIT AS PROCESS FLOW VARIES. BY EQUALIZATION TANK AS SHOWN OR ALTERNATE SYSTEM WITH AUTOMATIC VALVE (NOT SHOWN).
J) AUTOMATIC LEVEL CONTROL SENSOR, CONTROLLER AND BUTTERFLY VALVE ASSEMBLY.
S) SAMPLE POINT.

SEE EQUIPMENT SPECIFICATION LIST FOR COMPONENTS SUPPLIED BY KROFTA.

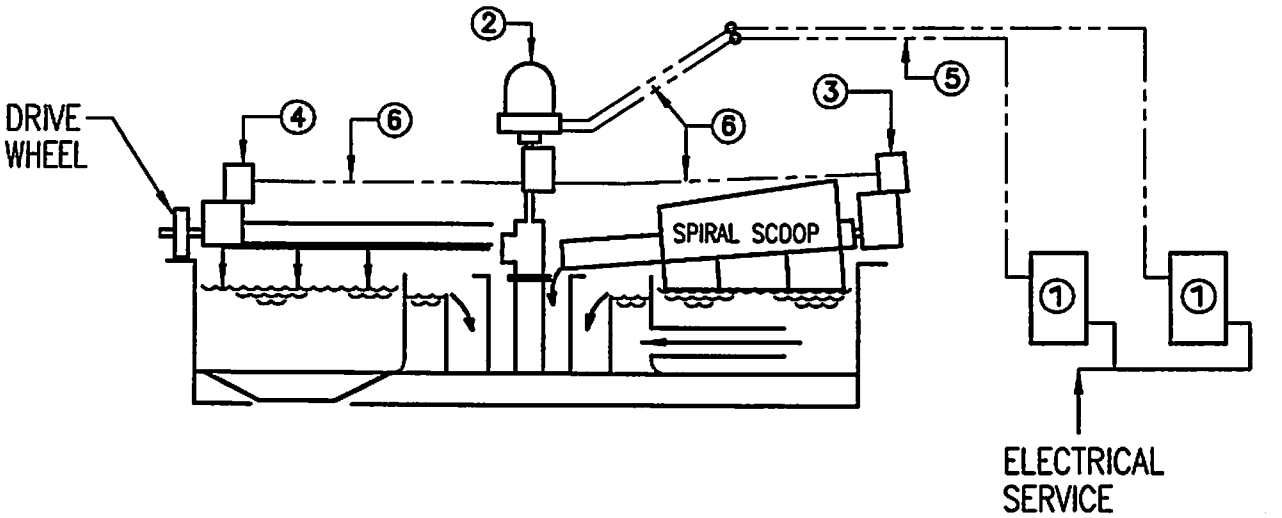
JOB 19503, SBCCS CONSTRUCTORS
RECYCLE FLOW – DOUBLE ROTARY JOINT

KROFTA ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL TYPE SPC 62 FLOW SCHEMATIC

DRN: FS	CHK: GJG
14 DEC. 94	SCALE: DNS
DWG. U4-SPC-1925	

KROFTA SUPRACELL



1. VARIABLE SPEED MOTOR DRIVES WITH OPERATOR CONTROLS.
2. ROTARY ELECTRICAL SLIP RING
3. SPIRAL SCOOP GEARMOTOR.
4. ROTATING CARRIAGE GEARMOTOR.
5. RIGID CONDUIT ATTACHED TO CEILING OR OVERHEAD BEAM.
6. WATERTIGHT FLEXIBLE CONDUIT.

NOTE: SEE JOB SPECIFICATION LIST FOR EQUIPMENT SUPPLIED BY KROFTA.

NOTE: ALL WIRING BY CUSTOMER ACCORDING TO EQUIPMENT SPECIFICATIONS AND LOCAL ELECTRICAL CODES. SEE SPECIFICATION SHEET AND EQUIPMENT DATA FOR SPECIFIC COMPONENTS SUPPLIED AND FOR INSTALLATION AND WIRING REQUIREMENTS.

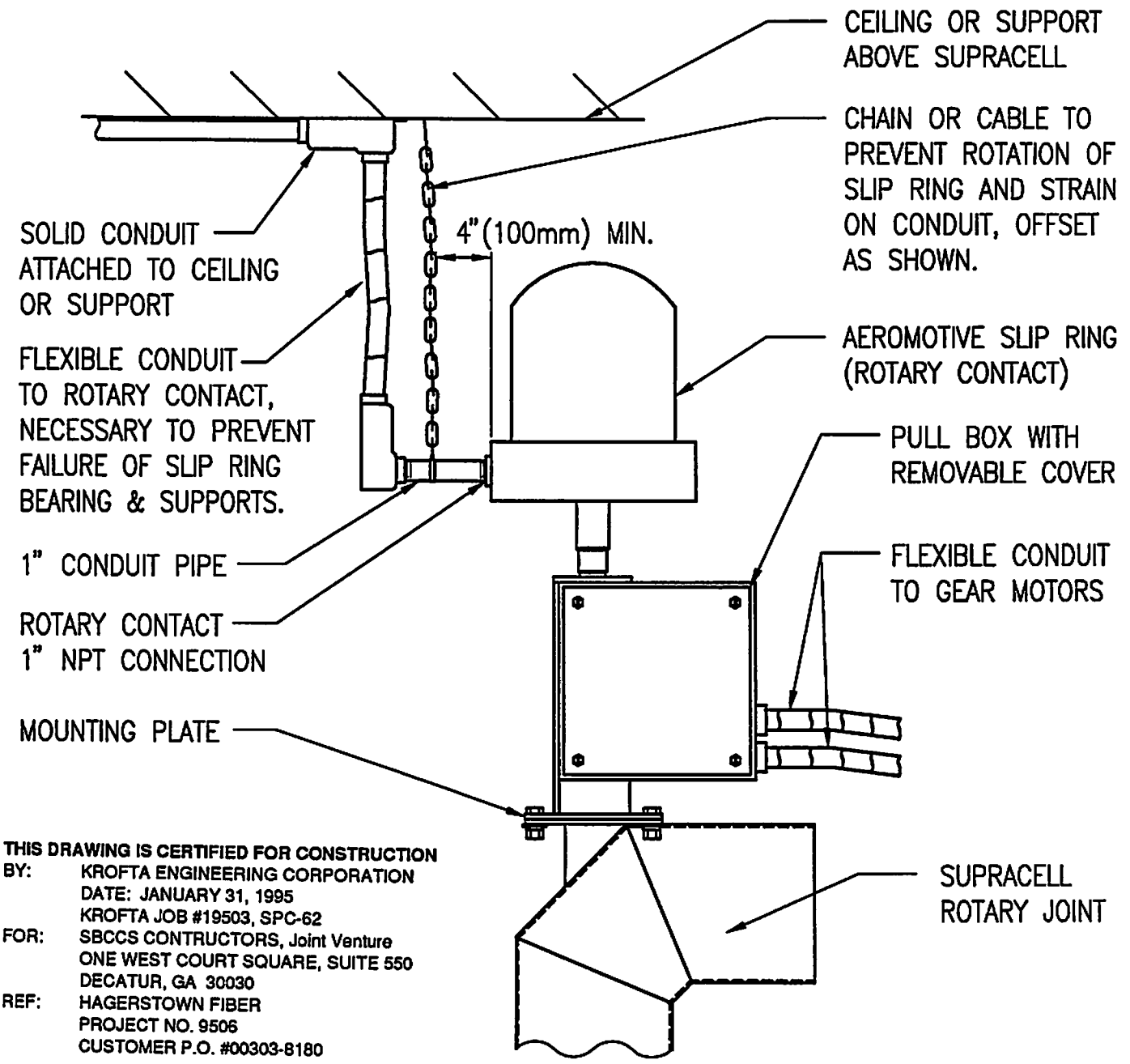
THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL MOTOR DRIVE EQUIPMENT SCHEMATIC

DRN: PLN	CHK: GJO 130-TSN
30 SEP 94	SCALE: DNS
DWG. U1-SPC-1846	



THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001

IN ADDITION TO INFORMATION PROVIDED, ALL LOCAL ELECTRICAL AND SAFETY CODES MUST BE OBSERVED.
KROFTA ASSUMES NO RESPONSIBILITY FOR FAILURE TO OBSERVE THESE CODES.

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

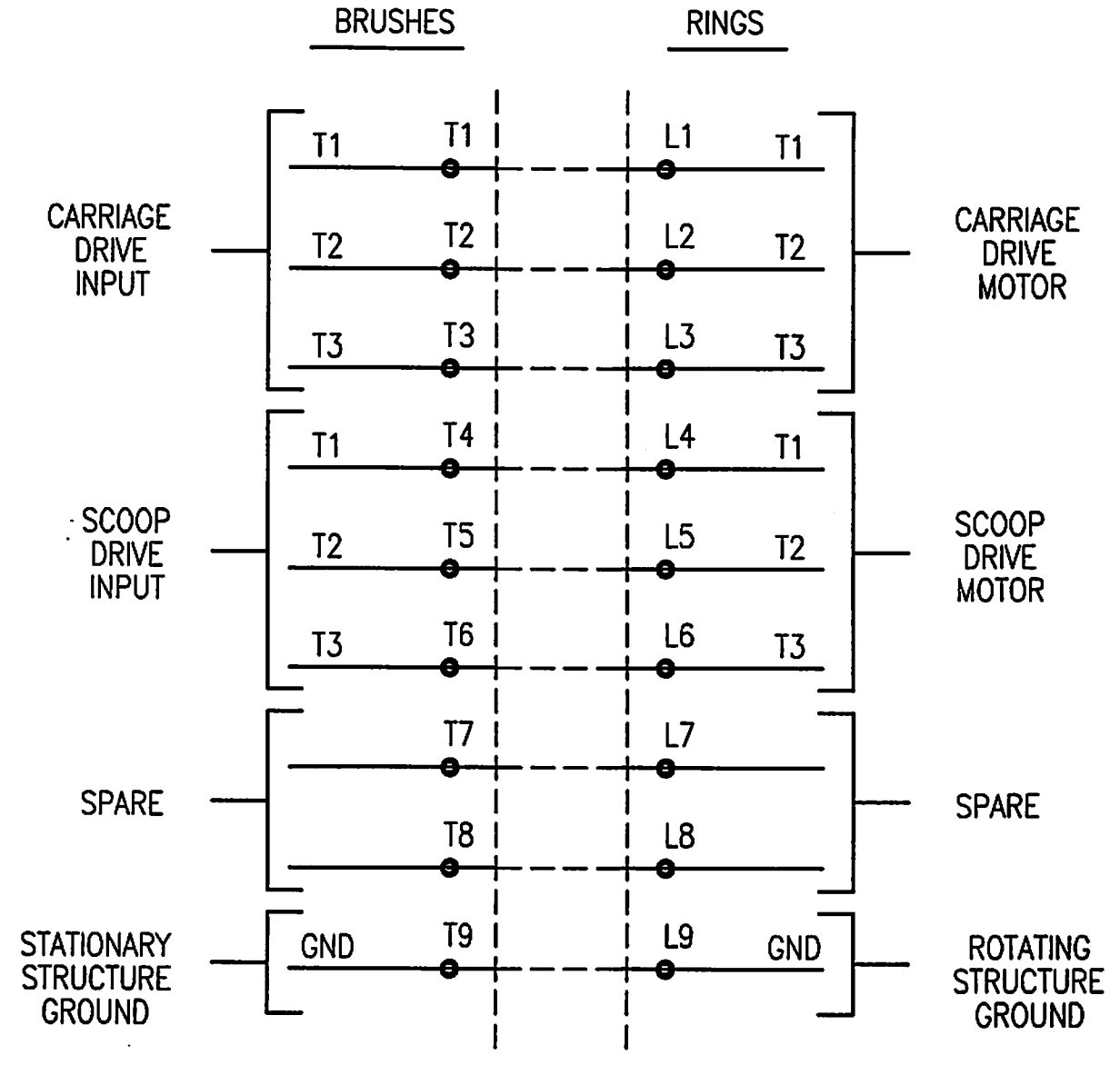
KROFTA SUPRACELL ROTARY CONTACT INSTALLATION

DRN: PLN	CHK: PAW 8-30-94
AUG.18/94	SCALE: DNS
DWG. U4-SPC-1772	

THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRACTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001

SUGGESTED WIRING ARRANGEMENT
AC THREE PHASE INPUT
FOR ROTARY SLIP RINGS
TYPE AEROMOTIVE – ISRP 39
9 CONTACT

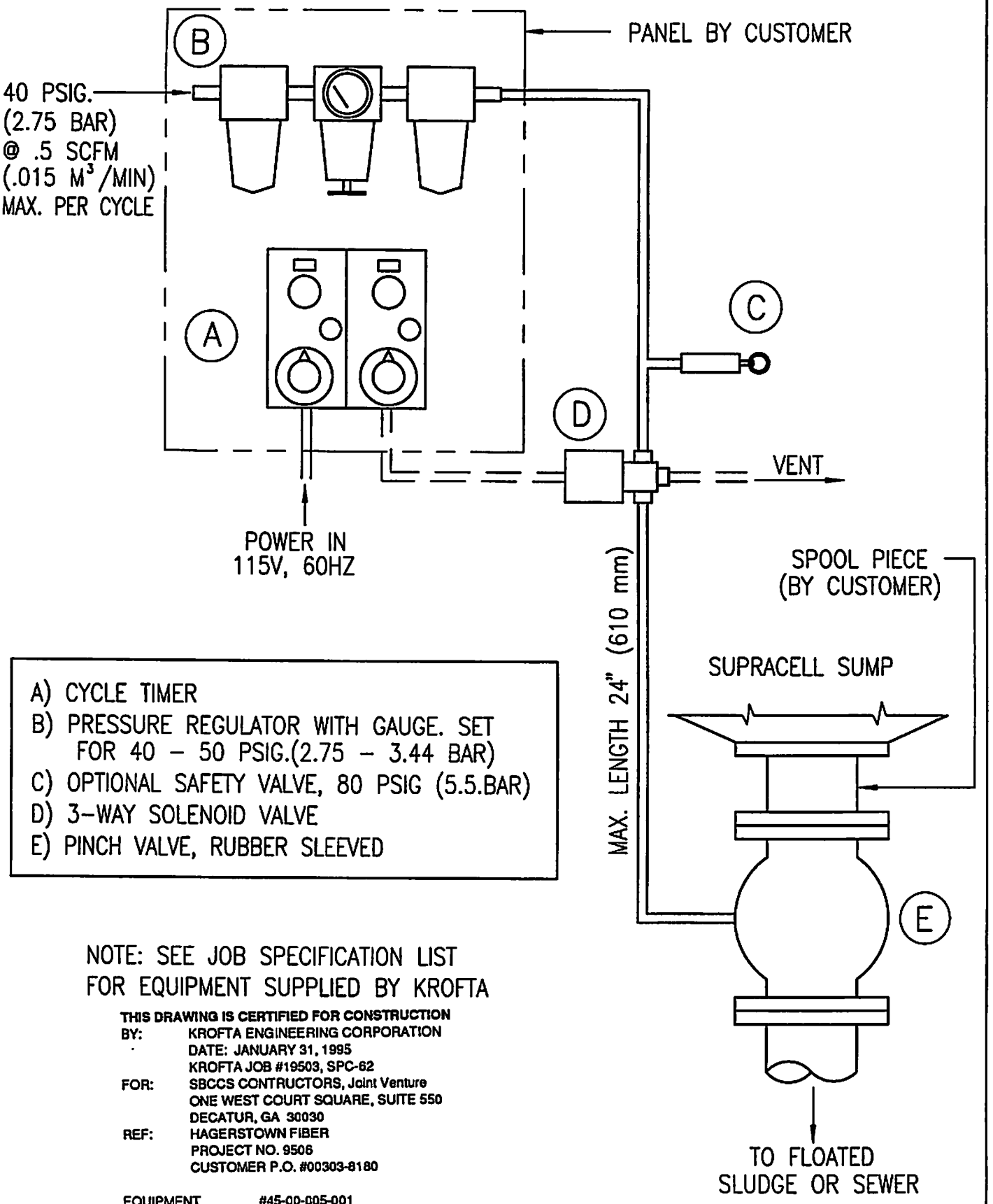


NOTE: WIRE PER LOCAL AND NEC CODES

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL
SUGGESTED WIRING
ELECTRICAL SLIP RINGS

DRN: PLN	CHK: 6 B 13/19
3 OCT 94	SCALE: NTS
DWG. U4-SPC-1847	



A) CYCLE TIMER
B) PRESSURE REGULATOR WITH GAUGE. SET FOR 40 – 50 PSIG.(2.75 – 3.44 BAR)
C) OPTIONAL SAFETY VALVE, 80 PSIG (5.5.BAR)
D) 3-WAY SOLENOID VALVE
E) PINCH VALVE, RUBBER SLEEVED

NOTE: SEE JOB SPECIFICATION LIST
FOR EQUIPMENT SUPPLIED BY KROFTA

THIS DRAWING IS CERTIFIED FOR CONSTRUCTION
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001

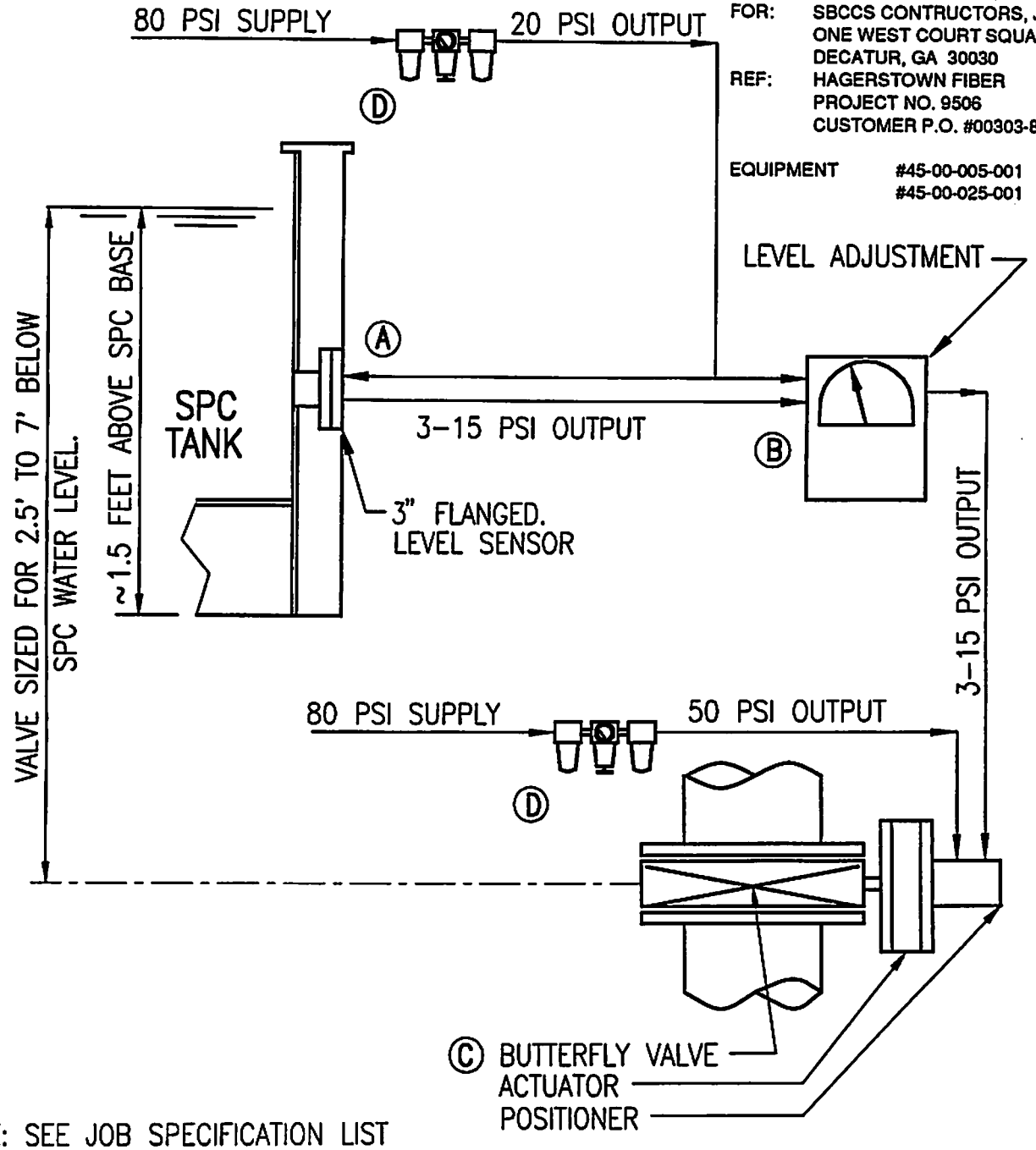
KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL AUTOMATIC BOTTOM PURGE SCHEMATIC

DRN: PAW	CHK:
DEC. 14/94	SCALE: NTS
DWG.	REV. 19503
U4-SPC-1771	

THIS DRAWING IS CERTIFIED FOR CONSTRUCTIO
BY: KROFTA ENGINEERING CORPORATION
DATE: JANUARY 31, 1995
KROFTA JOB #19503, SPC-62
FOR: SBCCS CONTRUCTORS, Joint Venture
ONE WEST COURT SQUARE, SUITE 550
DECATUR, GA 30030
REF: HAGERSTOWN FIBER
PROJECT NO. 9506
CUSTOMER P.O. #00303-8180

EQUIPMENT #45-00-005-001
#45-00-025-001



NOTE: SEE JOB SPECIFICATION LIST
FOR EQUIPMENT SUPPLIED BY KROFTA

PNEUMATIC LEVEL CONTROL COMPONENTS:
A) LEVEL TRANSMITTER.
B) LEVEL CONTROLLER.
C) LEVEL CONTROL VALVE ASSEMBLY
D) AIR REGULATORS WITH AIR & OIL FILTERS.

KROFTA®
ENGINEERING CORP.
LENOX, MA. 01240

KROFTA SUPRACELL PNEUMATIC LEVEL CONTROL SYSTEM SCHEMATIC

DRN: PLN	CHK: DJF
JULY 12/94	SCALE: DNS
DWG. U4-SPC-1743	