

**KOCH MEMBRANE SYSTEMS INC.
WILMINGTON, MA.**

EQUIPMENT SPECIFICATION

RO 2 X 14/5 4" SW SYSTEM

OCEAN SPRAY - KENOSHA, WI

KM907372

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1.0 GENERAL

1.1 Purpose

To provide an Engineering Specification for control of all equipment involved in the design and manufacture of a custom RO 2 x 14/5 4" SW sub-system (60 HZ) for the Ocean Spray - Kenosha, WI plant.

1.2 Scope of Work

This specification covers all components referenced in the system flow schematic drawing D7302-5002, and is intended to be read in conjunction with that drawing. While this specification references specific manufacturers' name and part numbers, this does not preclude the use of approved equal components. Engineering approval must be obtained prior to any substitution.

1.3 Testing

This system is to be tested prior to shipment, to insure proper operation of mechanical and electrical components, and to insure proper adjustment of all safety devices. Certain system components cannot be operated until modules are loaded, and so will be verified in the field.

1.4 Purchasing

Vendors are required to send certified drawings, performance curves and maintenance instructions to KMS upon receipt of purchase orders issued for equipment contained in this specification.

2.0 STRUCTURAL AND PIPING

2.1 Fabrication Specification

Fabrication will be done per KMS specification A5099-8063, Fabrication Specification Food Grade Systems. Except that tube and fittings will be 180 grit polished.

2.2 Electrical Specification

Fabrication will be done per KMS specification A5099-8078, Fabrication Specification Basic Sanitary Systems.

2.3 Equipment Frames

To be fabricated from 304 SST mill finish tubing and structural shapes.

2.4 Piping

Piping, tubing and fittings to be 304 or 316L SST 180 grit finish. All tube butt weld fittings to be standard wall. All threaded fittings to be 150#. All welds to be TIG method with inert back-up gas used to control interior weld surface. All welds to be chemically treated to remove weld discoloration.

2.5 Connections

Connections are TriClamp or Flanged 316L SST. Flange hardware to be 304 SST threaded studs, bolts and nuts. All joints having greater than 250 psig internal pressure to be TriClover #13MHP clamp.

2.6 Gaskets and Seals

Gaskets and seals are TFE, Food Grade Buna, Silicone or EPDM.

3.0 PUMPS

3.1 Feed/CIP Pump P-1

0121130 Fristam FPX 742 3A Sanitary centrifugal pump
Close coupled design
15 HP 254TC frame TEFC 3500 RPM motor
Single mechanical seal (no flush water)
Supplied with S/S base with adjustable legs

Capacity 70 gpm at 250 ft-hd

Refer to Appendix 1 for complete details

3.2 Booster Pumps P-2, P-3

0121121 Fristam FM342 3A Sanitary multistage high pressure centrifugal pump
Base plate mounted design
Supplied with S/S base with adjustable legs
Woods SC spacer coupling
40 HP 324TS frame TEFC 3500 RPM motor
Double mechanical seal requires 1/3 gpm at 20 psig seal flush

Capacity 70 gpm at 575 ft hd

Refer to Appendix 2 for complete details

3.3 Stage Circulation Pumps P-101, P-201

0121131 Fristam FM 312CC 3A Sanitary centrifugal pump
Close Coupled Design
15 HP 256LPZ frame TEFC 3500 RPM motor (Motor supplied by Fristam)
Double mechanical seal requires 1/3 gpm at 20 psig seal flush
KMS supplies S/S base with adjustable legs

Capacity 200 gpm at 120 ft hd

Refer to Appendix 3 for complete details

4.0 VALVES

4.1 Concentrate Control Valves V-2A, V-2B

Flow-Tek model V7503-15, micropure, 3 piece, v-port (15 deg. port) ball valve. 1/2" size with TriClamp ends, 316L S/S body, ball, stem and pipe ends. PTFE seals, seats, and cavity fillers. Supplied assembled to a model SR-B0834 air to close, spring to open actuator and a model VRC VE700-G electro-pneumatic positioner. Valve operates on a 4-20 mA signal and 80 psig air supply.

1002504 Valve #: V7503-15
Actuator #: SR-B0834
Positioner #: VRC VE700-G

4.2 Concentrate CIP By-Pass V-3

Flow-Tek model 7505, micropure, 3 piece ball valve. 1" size with TriClamp ends, 316L S/S body, ball, stem and pipe ends. PTFE seals, seats, and backing. Supplied assembled to a model SR-B0834 air to open spring to close actuator. Speed controls are S66 and S77.

1002506 Valve #: 7505
Actuator #: SR-B0834
Speed Controls #: S66 and S77

4.3 Concentrate Divert Valves V-4, V-5

TriClover 761 series 3A sanitary divert valve, 2" OD size with 316 S/S construction, PTFE replaceable stem seats, Buna-N seals, normally closed (bottom port) actuator, TriClamp connections.

0131484 Valve #: TriClover #761TR-21M-20S-2"-316L

4.4 Concentrate Divert Valve V-6

TriClover 761 series 3A sanitary divert valve, 2" OD size with 316 S/S construction, PTFE replaceable stem seats, Buna-N seals, normally open (bottom port) actuator, TriClamp connections.

0131493 Valve #: TriClover #761TR-21M-10S-2"-316L

4.5 Permeate Divert Valve V-7

TriClover 761 series 3A sanitary divert valve, 3" OD size with 316 S/S construction, PTFE replaceable stem seats, Buna-N seals, normally closed (bottom port) actuator, TriClamp connections.

0131483 Valve #: TriClover # 761TR-21M-20S-3"-316L

4.6 Feed/CIP Tank Drain V-10

TriClover 761 series 3A sanitary 3" shut-off valve, 316 stainless steel construction, PTFE replaceable stem seats, Buna-N seals, normally closed (bottom port) actuator, TriClamp connections.

0131482 Valve #: TriClover # 761TR-10M-20S-3"-316L

4.0 VALVES4.7 CIP Water Supply Valve V-8

Flowtech Series 43 butterfly valve. 304 stainless steel construction, TriClamp connections, Air to open-spring to close actuator, Food Grade Silicone seats and seals.

0131249 Valve #: 3" Flowtech #43-2-P-30-4-S-AS

4.8 Cooling Water Supply Valve V-9

ACSO 2 way normally closed solenoid valve, 1" NPTF connections, brass construction, max. pressure drop 100 psi, NEMA 4 enclosure, 120V 50/60 HZ coil.

0138010 Valve #: ASCO # 8211B54

4.9 Cooling Water Shut-Off Valve V-11

Jenkins 1" NPT gate valve, bronze construction, round handle.

0130005 Valve #: Jenkins #360-1"

4.10 Seal Water Shut-Off Valves V-12, V-13, V-101, V-201

Jenkins 1/4" NPT gate valve, bronze construction, round handle.

0130001 Valve #: Jenkins #360-1/4"

4.11 Sample Valves V-14, V-15, V-102, V-202

Sanitary Sample Valve, 1/2" tube size, 304 S/S construction, 1 1/2" TriClamp connection.

0136260 Valve #: Waukesha #K30KW-90 1 1/2" TriClamp Ends 304 S/S

4.12 Feed Check Valve V-16

TriClover 2" ball type Y-body check valve, 304 S/S, Buna ball, TriClamp connections.

0131297 Valve #: Model BY45MP-2"

4.13 Chemical Block and Bleed Valves V-17, V-18, V-19

Asahi 1/2" IPS socket end true union ball valve, CPVC construction, Teflon seat and Viton seals, supplied with a series AP79PN air x spring pneumatic actuator.

0130189 Valve #: Ashai #1013005-2302005

5.0 INSTRUMENTATION

5.1 Feed Flow Transmitter FT-1, Retentate Flow Transmitter FT-2
Permeate Flow Transmitters FT-101, FT-201

ABB miniMAG electromagnetic flowtube and integrally mounted transmitter.
Model DM21WP505POCM52EAA13
Liner Material: PFA Teflon
Mating Flange: ANSI Class 150, 2 1/2"
316 SS electrode material
Electrode type: Flush
Wafer design, 3A Sanitary
PTFE Gasket Material
Safety classification: FM Approved
Power requirement: 120 VAC, 60 HZ
Enclosure rating: NEMA 4X
Temperature Range with integral converter: 200 °F maximum Process, 131 °F Maximum Ambient
Output Signal: 4 - 20 mA DC
Scaler (pulse) Output Signal: 50 mS, 0-10 HZ
Customer Information language: English
Coil Drive frequency at 50/60 HZ: 3.125/3.75 HZ
Grounding Ring: Not Required
Flow Direction: Unidirectional
Mounting Hardware: Required
Calibration Class: 0.5% of rate (Standard)

2" Size, Range 0-264 gpm

0200220 ABB #: DM21WP505POCM52EAA13
Converter #: 50XM13NXKD10AABC229
30 ft. of Interconnecting Cable P/N: 677B963U03

5.2 Feed Pressure Transmitter PT-1

Anderson Pressure Transmitter, Range 0-1,000 PSIG, 4-20mA output, 1 1/2" TriClamp connection, Direct mount, conduit housing.

0102393 Anderson #SP-120-A-1

5.3 Temperature Transmitters TT-1, TT-101, TT-201

Anderson temperature transmitter, Range 0-200°F, 4-20 mA output, 1 1/2" TriClamp connection, direct mount, conduit housing.

0102378 Anderson #ST-150-A-1

5.0 INSTRUMENTATION

5.4 Feed/CIP Tank Level Transmitter LT-1

Anderson Instruments series SL-160 level transmitter for open tank application supplied with 2" TriClamp process connection and electrical conduit connection. Output 4-20 mA
Spanned by KMS to 0 - 100% tank level.

0140405 Anderson #SL-160-E

5.5 Feed Filter Pressure Gauges PI-2, PI-3

Anderson Instruments 3 5/8" sanitary pressure gauge 1 1/2" TriClamp connection, glycerin filled case and capillary, with rezero feature, range 0-160 psig, Bottom mount connection.

0140005 Cat. #29-15-1-04-G-R

5.6 Permeate Pressure Gauge PI-4

Anderson Instruments 3 5/8" sanitary pressure gauge 1 1/2" TriClamp connection, glycerin filled case and capillary, with rezero feature, range 0-30 psig, back mount connection.

0140002 Anderson #26-15-4-04-G-R

5.7 Feed and Stage Inlet Pressure Gauges PI-1, PI-101, PI-201

Anderson Instruments 5" sanitary pressure gauge 1 1/2" TriClamp back mount connection, glycerin filled case and capillary, range 0-1000 psig.

0140108 Anderson #ECO8040100441200

5.8 Low Feed Pressure Switch PSL-2

TriClover adjustable pipeline pressure switch, 2" OD TriClamp connection, 0-30 psi pressure range, proof pressure 240 psi, set at 20 psig decreasing pressure.

0211474 TriClover Cat. #74-42A-2-2

5.9 High Retentate Pressure, High Permeate Pressure Switches PSH-2, PSH-3

TriClover adjustable pipeline pressure switch, 2" OD TriClamp connection, 40-120 psi pressure range, proof pressure 800 psi, set at 50 psig increasing pressure.

0211475 TriClover #74-42B-4A-G-2

5.0 INSTRUMENTATION5.10 Solids Indicating Transmitter AT-1, AIT-1

0104185 Mesa Labs - Nusonics Model 86SCA sonic velocity concentration analyzer
NEMA 4X enclosure with window.
Separate sound velocity and temperature transducers with 25 foot long cables.
2" TriClamp mounting connections
316L S/S process contact material
115 VAC 60 HZ power requirement
Separate 4-20 mA DC non-isolated outputs for concentration and temperature
Temperature compensation range: 0 - 100 °C
Sound velocity range: 500 - 2500 meters/sec
Process fluid: Cranberry Juice Concentrate 0 - 25 °Brix, 55 - 120 °F

6.0 ANCILLARY

6.1 Feed Filter F-1

TriClover Mainstream basket strainer, short model, 1.7 sq. ft., 2" TriClamp connections, EPDM cover gasket and o-ring, 100 mesh, 316 SS, relief cover, scotchbrite OD, 150 grit ID.

0131511 TriClover # SESR-1-2-K-EPDM-1-P

6.2 Permeate Transfer/CIP Tank TK-1

0211507 300 gallon, vertical, cylindrical, well bottom tank with dished top with hinged manway and adjustable legs per KMS drawing D7107-3002, 316 stainless steel construction, internal surface #4 with welds ground and polished, external surface 2B with welds scotchbrite cleaned. All surfaces and welds acid cleaned to remove weld discoloration.

6.3 RO 4" SW Sanitary Housing Assemblies

Koch RO 4" SW sanitary RO housing assembly comprised of:

Housing Weldment S-5 RO 4" SW Sanitary

0251015 Per KMS drawing C6910-3001-5

Internals Assembly S-5 RO 4" SW Sanitary

0251009 Per KMS drawing C6910-5001

Common Parts Assembly RO 4" SW Sanitary

0251024 Per KMS drawing C6910-5001

6.4 Heat Exchanger HE-1

0213202 Allegheny Bradford Topline heat exchanger per quote #4129/70, 304 SS construction, Buna seals, 2" OD TriClamp eccentric tube side inlet and outlet connections, 1 1/2" female NPT shell side connections, 6" IPS sch 5 shell, 63 each 0.5" OD x 0.035" wall tubes, O.A. length 59.75".

6.5 Permeate Sightglass SG-101, SG-201

TriClover sanitary sightglass, 3A design, 2" OD TriClamp connections, 316 SS construction.

0200240 TriClover D54MP-2"

APPENDIX 1 FEED/CIP PUMP P-1**I. REQUIREMENTS**

1.1 Liquid	JUICE
1.2 Temperature (°F)	60 - 80
1.3 Capacity (GPM)	70
1.4 Total Dynamic Head (FT)	250
1.5 Suction conditions	FLOODED
1.6 Specific Gravity	1.05
1.7 Viscosity (Centipoise)	1.0

2. PUMP DATA**SEE SECTION 3.1**

2.1 Pump Manufacturer	FRISTAM
2.2 Number of pump stages	1
2.3 Pump type	HORIZONTAL END SUCTION
2.4 Model and size	FPX 742/205
2.5 Discharge Size	2" OD
2.6 Suction Size	2 1/2" OD
2.7 Type of Connection	TRICLAMP
2.8 Capacity (gpm)	70
2.9 Total Dynamic Head (FT)	250
2.10 Impeller Diameter (rating)	205 mm
2.11 Impeller Diameter (min./max.)	170 - 205 mm
2.12 Pump Speed - RPM	3500
2.13 Drive BHP (rating/max.)	15 / 20
2.14 Type of drive	DIRECT
2.15 NPSH required	4 FT
2.16 Performance Curve	FPX-742-3500 RPM
2.17 Discharge Position/Rotation	VERT UP / CW FROM MOTOR
2.18 Efficiency	
2.19 Bedplate Type	S/S ADJUSTABLE LEGS SUPPLIED BY FRISTAM

3. MATERIALS OF CONSTRUCTION

3.1 Casing	316 SST
3.2 Impeller	316 SST
3.3 Shaft	316 SST
3.4 Shaft Sleeve	
3.5 Gland	
3.6 Bearing type	STEEL BALL
3.7 Mechanical Seal	SINGLE MECH SEAL #66502784
3.8 Lubrication	GREASE

4. MOTOR

4.1 Type	HIGH EFFICIENCY, 1.15 SERVICE FACTOR
4.2 Enclosure	TEFC
4.3 Frame Size	254TC
4.4 HP Rating	15 HP
4.5 Speed RPM	3500
4.6 Specification	DESIGN B
4.7 Electricity Supply	230/460V, 3 PH, 60 HZ
4.8 Terminal box position	F-1
4.9 F.L. current (Amps)	54/27 AMPS @ 230/460V

APPENDIX 2 BOOSTER PUMPS P-2, P-3**I. REQUIREMENTS**

1.1 Liquid	JUICE
1.2 Temperature (°F)	60 - 80
1.3 Capacity (GPM)	70
1.4 Total Dynamic Head (FT)	575
1.5 Suction conditions	100 - 350 PSIG
1.6 Specific Gravity	1.05
1.7 Viscosity (Centipoise)	1.0

2. PUMP DATA**SEE SECTION 3.2**

2.1 Pump Manufacturer	FRISTAM
2.2 Number of pump stages	4
2.3 Pump type	HORIZONTAL END SUCTION
2.4 Model and size	FM342/175
2.5 Discharge Size	2 1/2" OD
2.6 Suction Size	2 1/2" OD
2.7 Type of Connection	TRICLAMP
2.8 Capacity (gpm)	70
2.9 Total Dynamic Head (FT)	575
2.10 Impeller Diameter (rating)	4 @ 175 MM
2.11 Impeller Diameter (min./max.)	155/175 MM
2.12 Pump Speed - RPM	3500
2.13 Drive BHP (rating/max.)	40 / 60
2.14 Type of drive	DIRECT, WOODS COUPLING
2.15 NPSH required	9 FT
2.16 Performance Curve	FM342-2500 RPM
2.17 Discharge Position/Rotation	VERT UP / CW FROM MOTOR SAME
2.18 Efficiency	30%
2.19 Bedplate Type	S/S BASE W/ ADJ LEGS, WOODS COUPLING AND GUARD

3. MATERIALS OF CONSTRUCTION

3.1 Casing	316 SST
3.2 Impeller	316 SST
3.3 Shaft	316 SST
3.4 Shaft Sleeve	
3.5 Gland	
3.6 Bearing type	STEEL BALL
3.7 Mechanical Seal	DOUBLE #66502119
3.8 Lubrication	GREASE

4. MOTOR

4.1 Type	HIGH EFFICIENCY, 1.15 SERVICE FACTOR
4.2 Enclosure	TEFC
4.3 Frame Size	324TS
4.4 HP Rating	40 HP
4.5 Speed RPM	3500
4.6 Specification	DESIGN B
4.7 Electricity Supply	230/460V, 3 PH, 60 HZ
4.8 Terminal box position	F-1
4.9 F.L. current (Amps)	104/52 @ 230/460V

APPENDIX 3 STAGE CIRCULATION PUMPS P-100, P-200**I. REQUIREMENTS**

1.1 Liquid	JUICE
1.2 Temperature (°F)	60 - 80
1.3 Capacity (GPM)	200
1.4 Total Dynamic Head (FT)	124
1.5 Suction conditions	20 - 600 PSIG
1.6 Specific Gravity	1.05
1.7 Viscosity (Centipoise)	1.0

2. PUMP DATA**SEE SECTION 3.3**

2.1 Pump Manufacturer	FRISTAM
2.2 Number of pump stages	1
2.3 Pump type	HORIZONTAL END SUCTION
2.4 Model and size	FM312CC
2.5 Discharge Size	2 1/2" OD
2.6 Suction Size	2 1/2" OD
2.7 Type of Connection	TRICLAMP
2.8 Capacity (gpm)	200
2.9 Total Dynamic Head (FT)	124
2.10 Impeller Diameter (rating)	155 MM
2.11 Impeller Diameter (min./max.)	155 - 175 MM
2.12 Pump Speed - RPM	3500
2.13 Drive BHP (rating/max.)	20 / 25
2.14 Type of drive	DIRECT
2.15 NPSH required	14 FT
2.16 Performance Curve	FM312 3500 RPM
2.17 Discharge Position/Rotation	HORIZONTAL 3 O'CLOCK, CW ROTATION VIEWED FROM MOTOR END
2.18 Efficiency	60%
2.19 Bedplate Type	ADJUSTABLE LEGS SUPPLIED BY KMS

3. MATERIALS OF CONSTRUCTION

3.1 Casing	316 SST
3.2 Impeller	316 SST
3.3 Shaft	316 SST
3.4 Shaft Sleeve	
3.5 Gland	
3.6 Bearing type	STEEL BALL
3.7 Mechanical Seal	DOUBLE MECH #66502119
3.8 Lubrication	GREASE

4. MOTOR

4.1 Type	HIGH EFFICIENCY, 1.15 SERVICE FACTOR
4.2 Enclosure	TEFC
4.3 Frame Size	256LPZ (SPECIAL, FRISTAM #40503493)
4.4 HP Rating	20 HP
4.5 Speed RPM	3500
4.6 Specification	DESIGN B
4.7 Electricity Supply	230/460V, 3 PH, 60 HZ
4.8 Terminal box position	F-1
4.9 F.L. current (Amps)	33.6/16.8 @ 230/460V