



RELIABILITY WORLDWIDE

080211.ODT

January 1, 2008



RYCO RED CAVIAR PRODUCTION NOTES

Red Caviar can be made from all species of Salmon and Trout.

Making Caviar is easy, and anyone can do it with simple cookbook instructions.

Making consistent, high quality Caviar with high recovery from many different conditions of green roe is an art. Good Caviar Technicians spend many years learning their art, and not everyone can learn this. Like fine wine, it requires an ability to discern slight differences in aroma, taste and texture, and adjust the process to produce consistent high quality final products from a widely varying range of raw products.

The following is a simple tutorial for a typical process. The precise times, temperatures and concentrations must be determined by experience. Each Technician has special techniques to improve the value of the final product.

1. RUB ROE SKEINS TO SEPARATE MEMBRANES FROM EGGS.

When feeding the Ryco #723 Roe Rubber, the skeins must be opened up with the eggs touching the conveyor and the membrane above the eggs, placing eggs next to the screen. The skeins must be in the center of the conveyor so that they do not go around the ends of the rubber roll. The #723 Roe Rubber will do approximately 1000 pounds of green roe in an hour, depending upon the roe characteristics. A brine solution must be supplied to the rubber at about 5gpm, 25psig. This brine is used to flush the eggs from the rubber collection pan out the discharge chute.

2. WASH EGGS IN ROTARY WASHER.

A brine solution must be pumped into the center brine tube at about 5gpm, 25psig.

3. AGITATE IN BRINE.

Water is pumped into the Agitator tank to about 24" depth, which is about 150 gallons or about 1500 pounds.

About 350 pounds of salt is put into the agitator, raising the water level about 6". This is about 2.4 pounds of salt per gallon, or about 22.5% salt by weight. This will produce a saturated salt solution at about 40 degrees F.

Some roe technicians will add other chemicals to enhance color or other properties.



Eggs are collected in 25 pound egg baskets as they come out of the Rotary Washer and held on a table until an agitator batch of

about 120 to 150 pounds is accumulated. The eggs are then dumped into the agitator and mixed with the brine for a period of 10 to 20 minutes, depending upon the judgement of the roe technician.

If the eggs agitated without washing then the brine must be changed after about 800 pounds of eggs. If the eggs are washed prior to the agitation then the brine can be used for up to 2400 pounds of cavier.

4. REMOVE ROE FROM AGITATER

The roe is dipped out of the brine quickly when complete by hand with roe baskets.

5. DRY EGGS:

Excess water is removed from the eggs either with centrifuges or vibrating screens. Centrifuges are batch operations while the vibrating dryers can be used as a continuous process.

6. INSPECT EGGS:

Eggs are spread onto a picking table or conveyor with a back light and debris and shells are removed manually.

7. PACKAGE:

The finished cavier is packaged in one, two or 3 kg plastic tubs. It may also be packed in small cans or larger buckets.

WATER:

Water should be about 40 degrees F. Colder water requires longer time for salt uptake in the agitator, and takes longer to go into solution. Warmer water may cause bacterial problems and reduce egg quality. Some plants use ozonated water. Most plants use chlorinated water from the city water system, which is usually in the range 0.5 ppm. Some plants increase this to 2ppm. We are told chlorine does not cause problems with roe quality.

Many companies are now treating all their process water with Ozone, and Ryco can supply this equipment. Some companies also use Ultraviolet light systems which Ryco can also supply.

BRINE:

Concentration of salt (NaCl) in water is usually measured by a floating air filled and lead weighted glass tube called a

"Salometer". This device floats vertically in the brine, and the height it extends above the brine surface is calibrated in "Degrees Sal" or "Salometer Degree". Degrees Sal is also the Percent of a saturated solution at 60 degrees F.

There are electronic devices available to read Sal Degrees electronically.

Brine for washing and conveying eggs is about 5 degrees Sal which is about 1.5% salt by weight.

Brine in the agitator is about 84 degrees Sal which is about 22% salt by weight.

Saturated brine at 60 degrees F is 100 degrees Sal and about 26% salt by weight. Saturated brine at 40 degrees F is about 85 degrees Sal and about 22.5% salt by weight.

For brine measurement and makeup see 080245.pdf, written by Ken Hildebrand of the Sea Grant Program, University of Oregon.



ROE RUBBER SYSTEM SHOWN WITH #723 ROE RUBBER AND #724 ROE WASHER

THE RYCO #723 AUTOMATIC SALMON ROE RUBBING SYSTEM

gently and quickly separates roe from the membrane. Four Roe Rubbing Plates progressively ease the roe through the mesh drum, after which the individual eggs are removed from the membrane with a gentle balanced press roll and scraper mechanism. Some customers report recovery equal or higher than manual rubbing.

FEATURES:

- Over 800kg of green roe per hour
- All stainless steel construction
- Powered infeed conveyor
- Standard 3/8" crimped stainless mesh drum
- Water manifold system
- Tri-Clamp sanitary fittings
- Designed for hygiene and ease of sanitation

- Construction suitable for salt water operation
- 220 or 440 volt, 3 phase, 60 hertz
- Electronic variable speed drive
- All thread bolt mounting

OPTIONS:

- Different screen dimensions
- Rotary Roe washer attachment
- Brine pump recirculation system
- Work stands

RYCO ADVANTAGES:

- Enhanced for recovery
- Elimination of injury compensation claims from hand rubbing
- Local manufacturing with local support
- Clean straight forward design
- Easy to maintain and keep sanitary
- Legendary RYCO reliability and toughness
- Dedicated service and response

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SPECIFICATIONS MAY CHANGE, CONTACT RYCO FOR SPECIFIC APPLICATIONS

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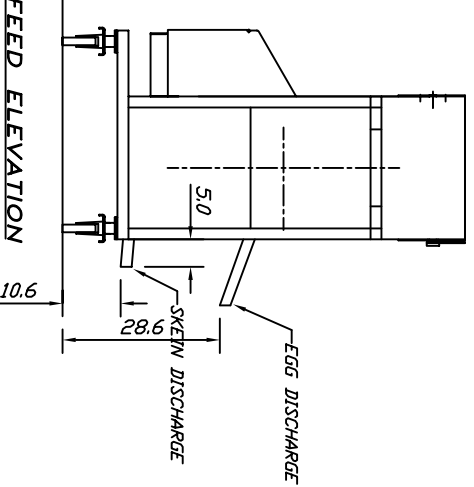
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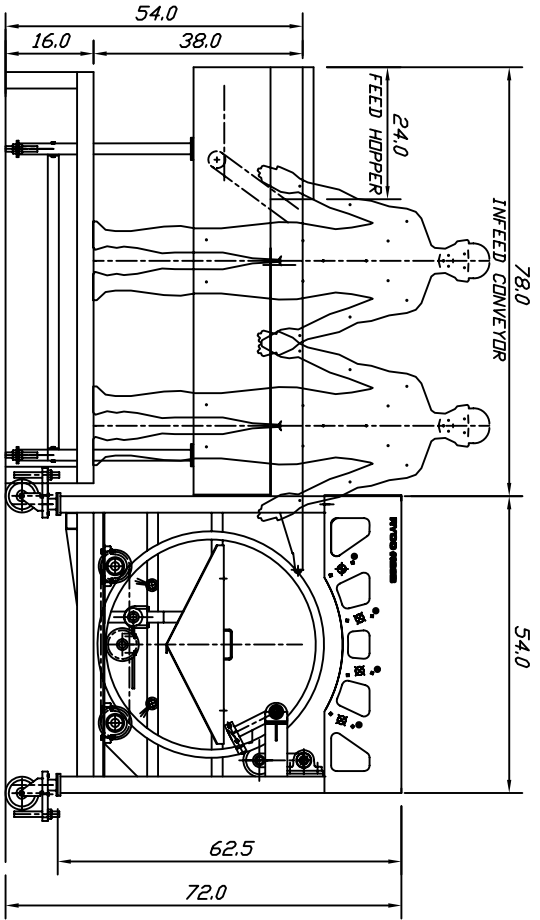
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RYCO INCORPORATED
 SEATTLE WASHINGTON
 ARRANGEMENT
 #723B EGG SEPARATOR
 D4197-A1 090304

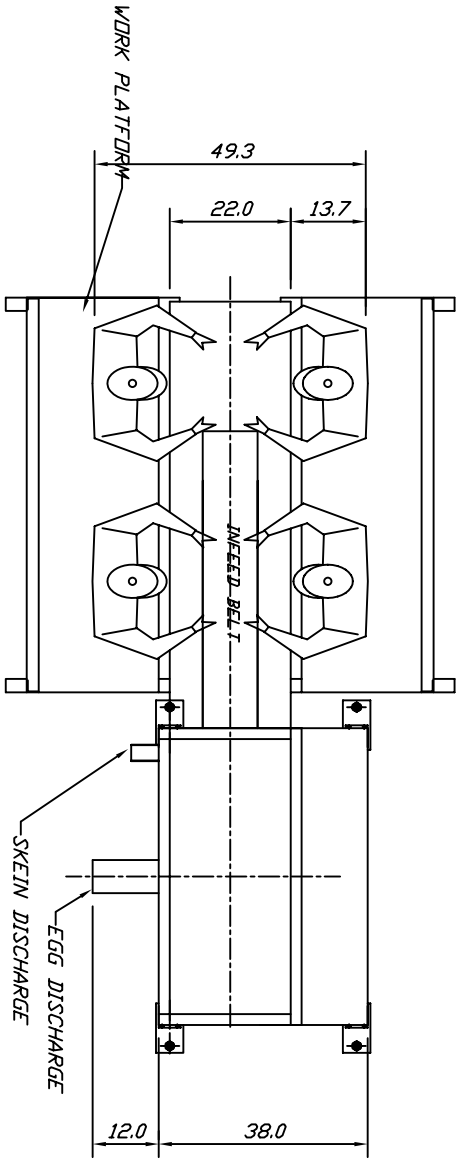
INFEEED ELEVATION



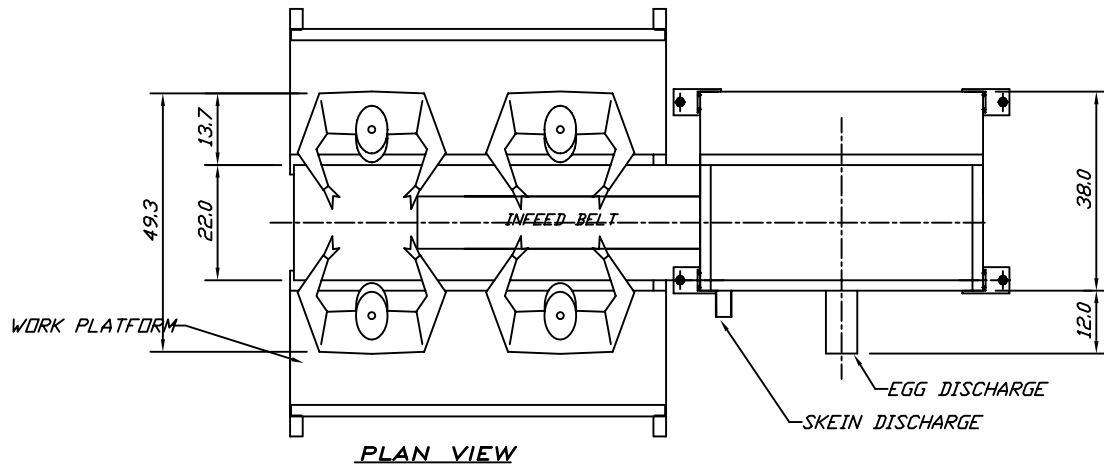
SIDE ELEVATION



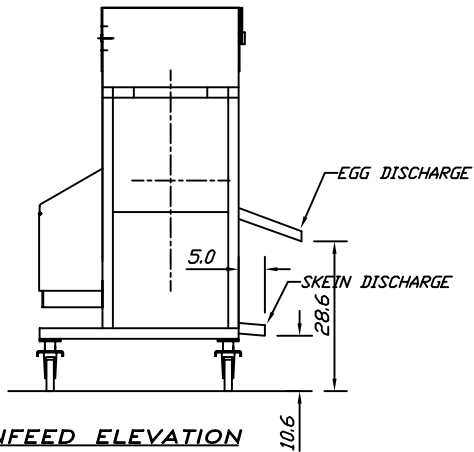
PLAN VIEW



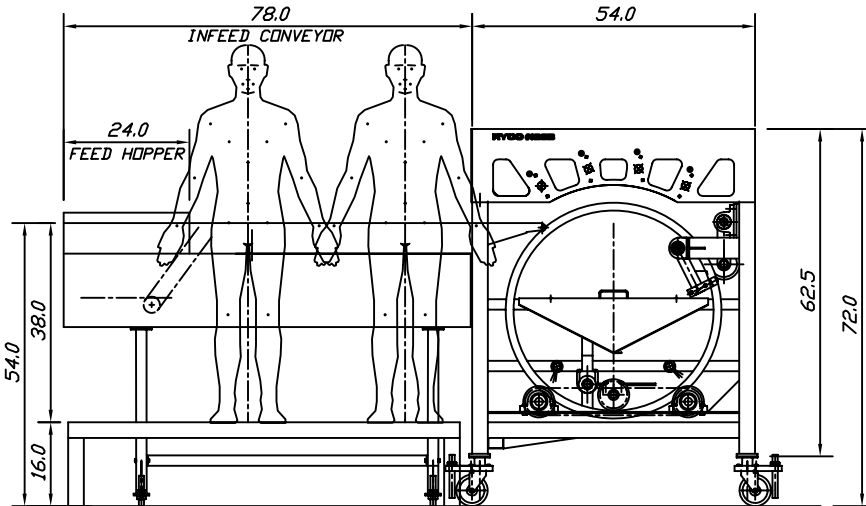
- NOTE:
 1. LEGS SHOWN FOR LOW DISCHARGE
 2. POWER FOR INFEEED DRIVE FROM MAIN MACHINE VARSPEED
 3. DRIVE GUARDS NOT SHOWN



PLAN VIEW



INFEED ELEVATION



SIDE ELEVATION

- NOTE:**
1. LEGS SHOWN FOR LOW DISCHARGE
 2. POWER FOR INFEED DRIVE FROM MAIN MACHINE VARISPEED
 3. DRIVE GUARDS NOT SHOWN

RYCO INCORPORATED SEATTLE WASHINGTON	
ARRANGEMENT	
#723B EGG SEPARATOR	
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THE RYCO #724 ROTARY ROE WASHER

gently sprays water over the eggs as they roll down to the bottom of the drum to separate and wash out broken shells and debris.

A water spray pipe is mounted on quick release mount in the center of the drum with wide angle spray nozzles to wash the eggs.

A water collection pan is mounted under the drum to collect the wash water and rejected material, which may be removed from the water with a screen.

The drum utilizes cut slots to precisely control the size of the reject material.

FEATURES:

- Easily fed automatically from the RYCO #723
- Roe Rubber
- All stainless steel construction
- Reliable traction drum drive

- Water manifold system
- Tri-clamp sanitary fittings
- Designed for hygiene and ease of sanitation
- Construction suitable for salt water operation
- 220 or 440 volt, 3 phase, 60 hertz
- Electronic variable speed drive
- All thread bolt mounting

OPTIONS:

- Different screen dimensions
- Brine pump recirculation system

RYCO ADVANTAGES:

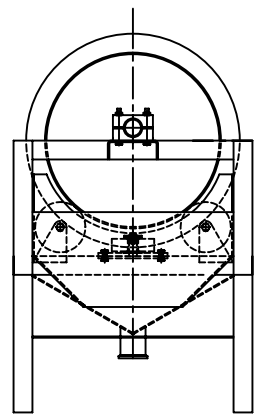
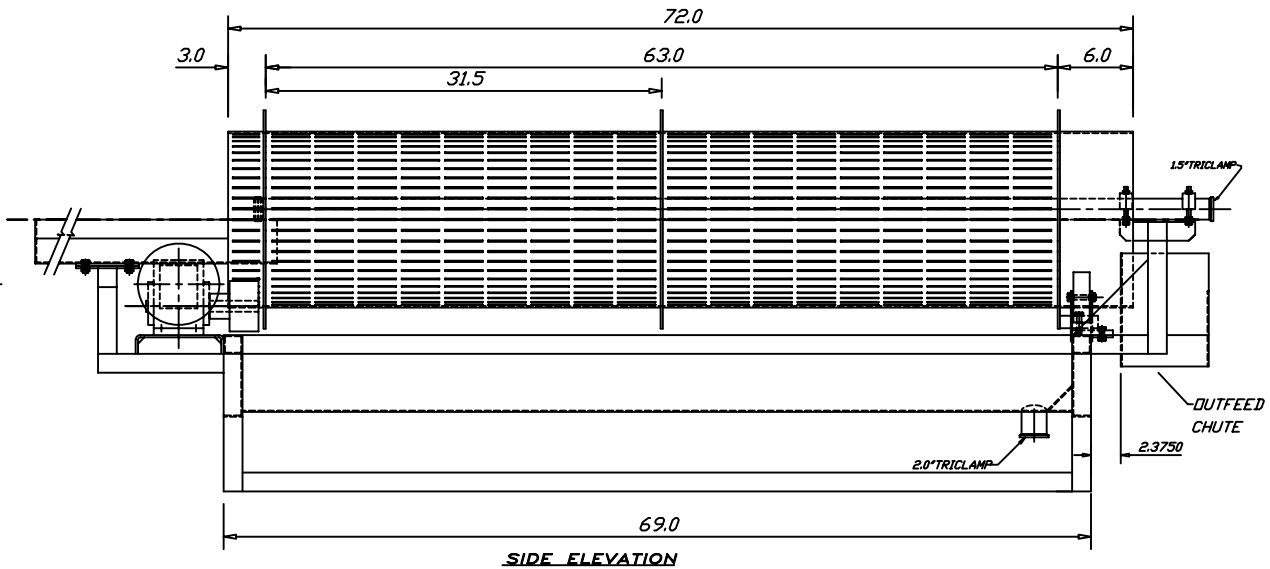
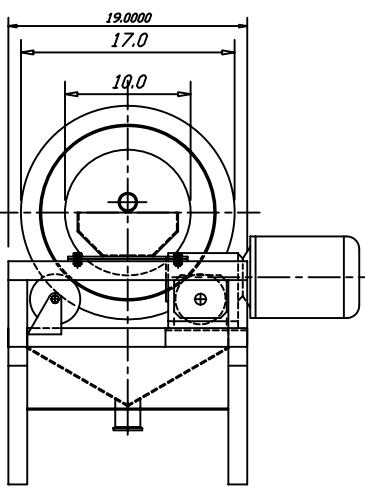
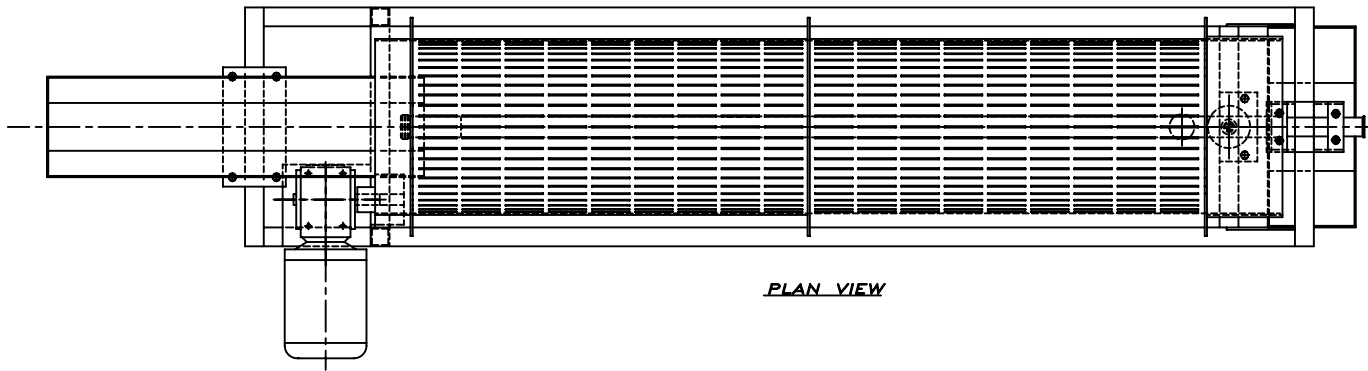
- Enhanced roe recovery
- Automatic operation
- Local manufacturing with local support
- Clean straight forward design
- Easy to maintain and keep sanitary
- Legendary RYCO reliability and toughness
- Dedicated service and response

SPECIFICATIONS MAY CHANGE, CONTACT RYCO FOR SPECIFIC APPLICATIONS

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RYCO EQUIPMENT
SEATTLE WASHINGTON

ARRANGEMENT

#724B EGG WASHER

J:D4195-A1 070312

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NOTE:
1. DRUM SPEED = 10RPM



#725 ROE AGITATOR TANK JAPANESE STANDARD

Food Processing Systems and Equipment

RYCO SALMON ROE AGITATOR TANKS

are designed specifically to satisfy Japanese technician requirements for an easily cleaned, gentle agitator for Sujiko production.

The agitator paddle shaft has two low angle vanes at mid tank, and two bottom scraping perpendicular vanes. An adjustable vane for counter current motion is mounted on the interior tank wall.

The paddle shaft is supported by a food grade UHMW bearing at the bottom, and a bronze slip coupling at the top. The shaft is easily removed within minutes for complete cleaning.

The drive is mounted above the tank on a heavy channel structure, with the flanges located to prevent oil or other foreign material from dropping on the product below. The electric motor drives the agitator shaft through a worm gear reducer and a LinkBelt variable speed drive. All drive components are designed for food processing applications.

The heavy stainless steel tank is fabricated from AISC type 402 stainless with all welds ground smooth.

Features:

- Low Profile design.
- Variable speed agitator shaft 12 to 60 rpm
- Tank Volume = 31CuFt [886liters].
- Stainless steel motor shafts.
- Designed for shipboard installation.
- Electric motor is wash-down, food grade with stainless shaft.
- Requires .5kw electrical power.
- Wired for 220/440 3 phase. 60cycle. Other voltages and frequencies available from stock.
- Installed dry weight 700 lbs [318kg].





#726A DRYER FOR SALMON ROE



THE RYCO #726 SALMON ROE DRYER dries salmon eggs by gently moving them down a vibration screen.

The vertical motion accelerates the eggs, stripping off the water without damage to the eggs, and without change to their physical characteristics.

The two stage screen system insures that all the eggs undergo precisely the same motion, other vibrating systems which have widely different actions on different portions of the screen resulting in some eggs over and some eggs under dried.

The machine is designed to sanitary requirements of FDA and USDA, and is easy to clean and maintain.

This machine utilizes SubCritical frequency vibration modes. Other vibrating roe dryers use vibration frequencies over the natural



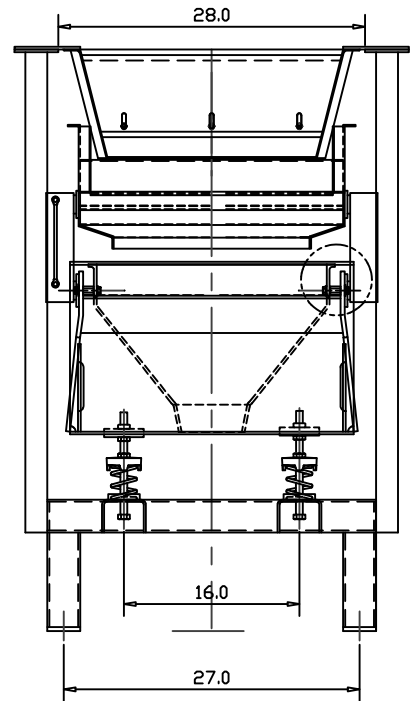
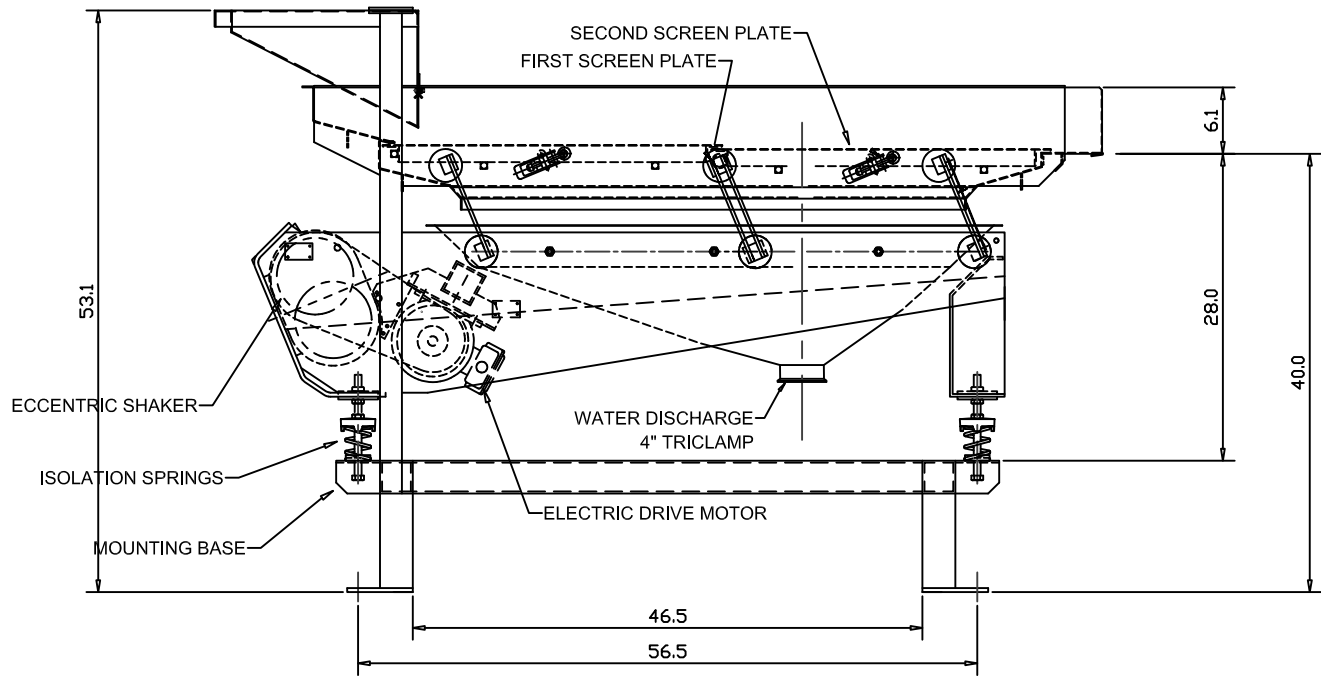
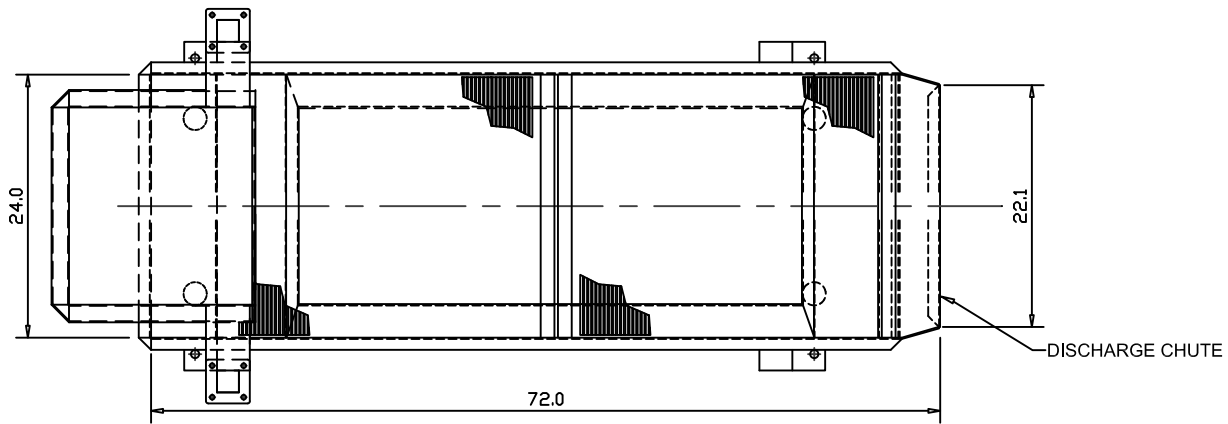
frequency, resulting in structural damage to the machine frame, and requiring continuous rewelding. SubCritical vibration also avoids vibration transmitted to adjacent equipment.

FEATURES:

- Production rate 3000+ pounds/hour
- All stainless steel construction
- Easily removed screen plates
- Sanitary construction to USDA and FDA
- Tri-Clamp sanitary fittings
- Construction suitable for salt water operation
- Standard Industrial Components
- 220 or 440 volt, 3 phase, 60 hertz
- Electronic variable speed drive

RYCO ADVANTAGES:

- Enhanced roe recovery
- Local manufacturing with local support
- Clean straight forward design
- Easy to maintain and deep sanitary
- Legendary RYCO reliability and toughness
- Dedicated service and response





#727A CENTRIFUGE FOR SALMON ROE

THE RYCO #727 CENTRIFUGAL ROE DRYER

drys Salmon eggs gently with centrifugal force.

The Variable Frequency Drive allows adjustment to acceleration, deceleration, and maximum speed. A cycle control automatically times the complete drying cycle for a standard plastic roe basket, the machine can be designed for any reasonable basket.

The Machine is designed to sanitary requirements of FDA and USDA, and is easy to clean and maintain.

FEATURES:

- Production rate up to 1000 pounds/hour
- All stainless steel construction
- easily removable
- Sanitary construction to USDA and FDA
- Designed for hygiene and ease of use
- Construction suitable for salt water operation
- Enhanced roe recovery
- Easy to maintain
- Legendary RYCO reliability and toughness
- Dedicated service and response
- 220 or 440 volt, 3 phase, 60 hertz
- Variable speed drive



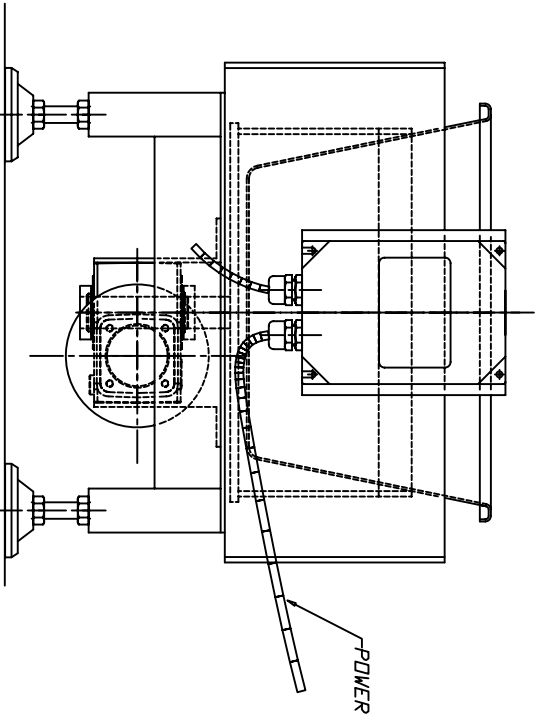
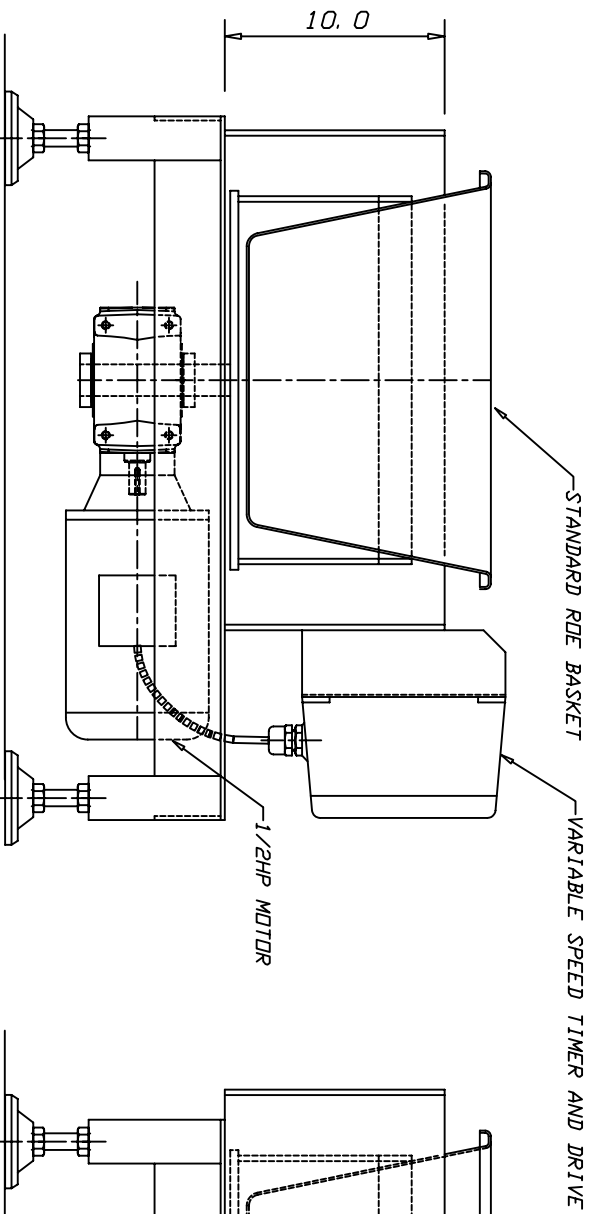
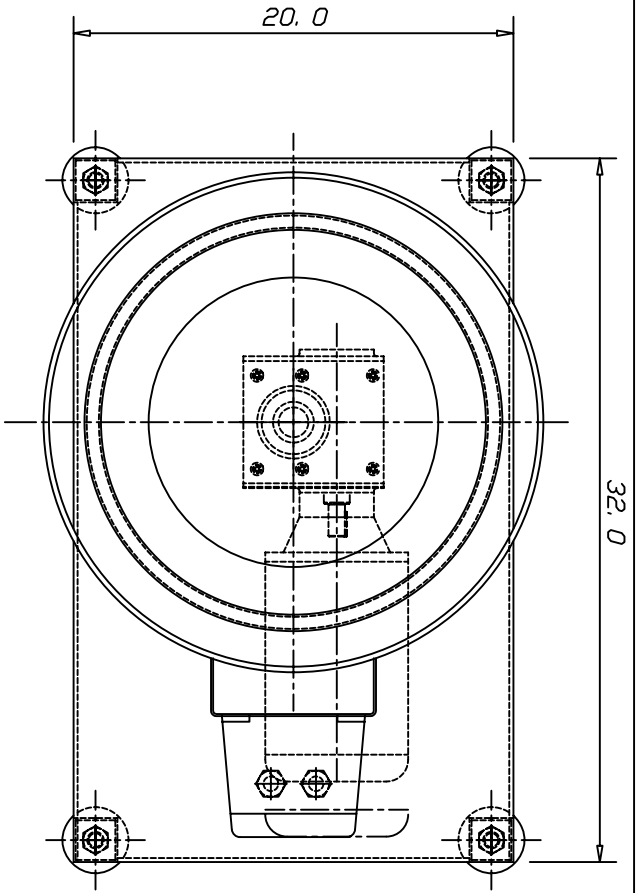
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3. RYCO EQUIPMENT
SEATTLE WASHINGTON

#7274 CENTRIFUGE

ARRANGEMENT



#728 BRINE TANK

Food Processing Systems and Equipment

MAKE UP, FILTER AND CIRCULATE BRINE FOR ROE PROCESSING

Tank with baffles, Salmeter and Thermometer well, sanitary circulation pump and return brine screens.

FEATURES:

Pump delivers 60 at 30psig maximum.
Variable speed drive allows Pump delivery from Bypass piping to adjust flow and pressure.
Internal baffles reduce turbulence.
Easy to clean with removable grate and baffles.
Sanitary stainless construction,

Designed to be used with Ryco Roe Processing system incorporating Roe Rubber, Washer and Dryer.

OPTIONAL PUMPS:

-BRASS AND STAINLESS CENTRIFUGAL
-ALFA LAVAL "SOLID C" SANITARY CENTRIFUGAL

UTILITIES:

Electric: 220vac 3phase, 1hp
Water: Clean, filtered, 60psi min.

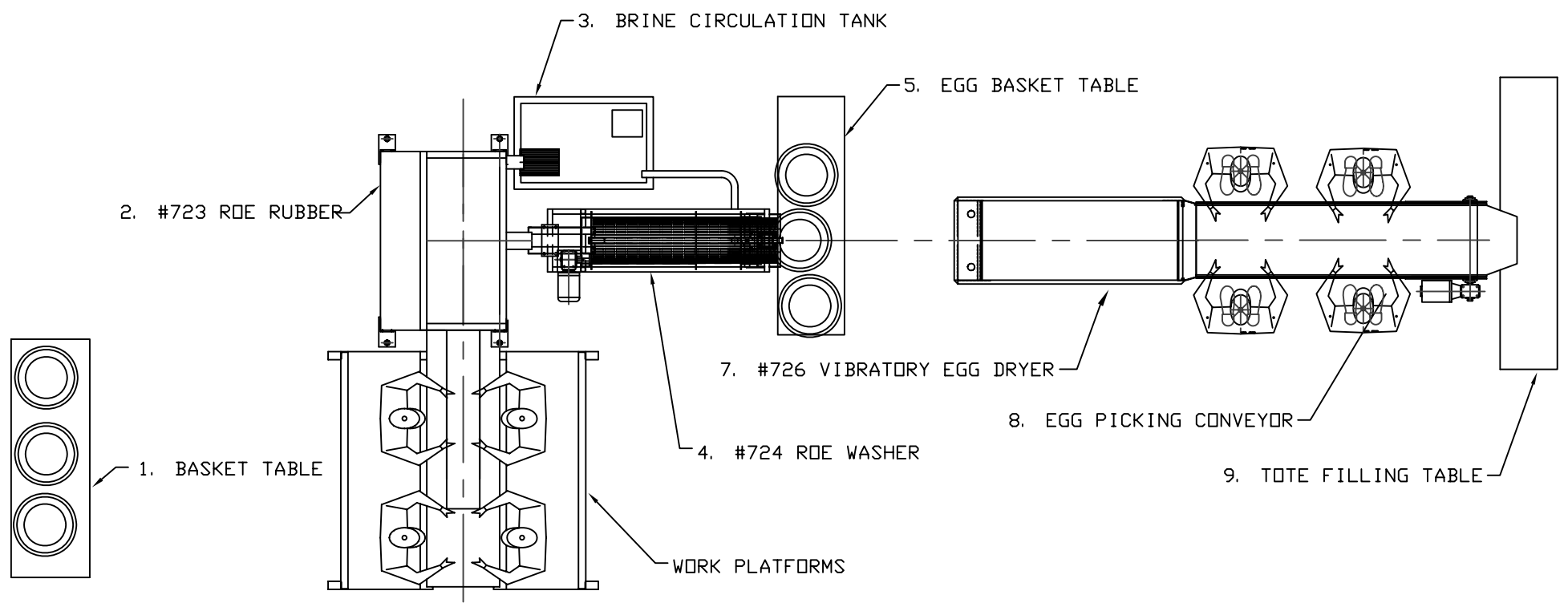
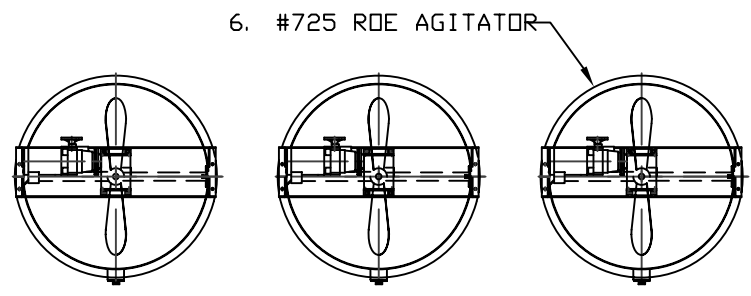


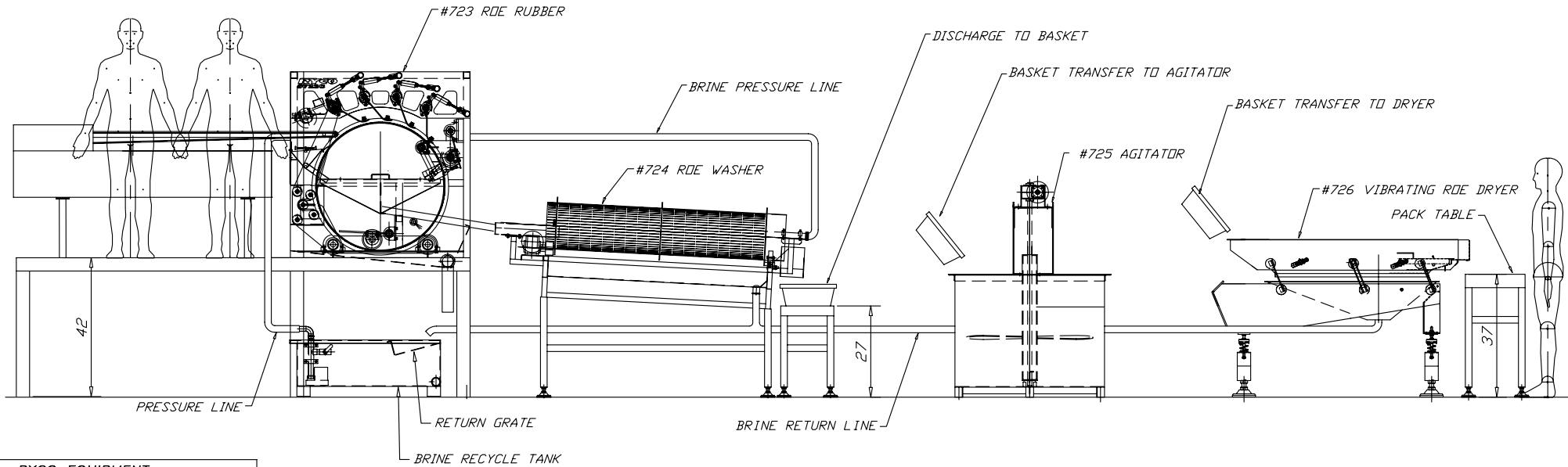
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Reliability World Wide



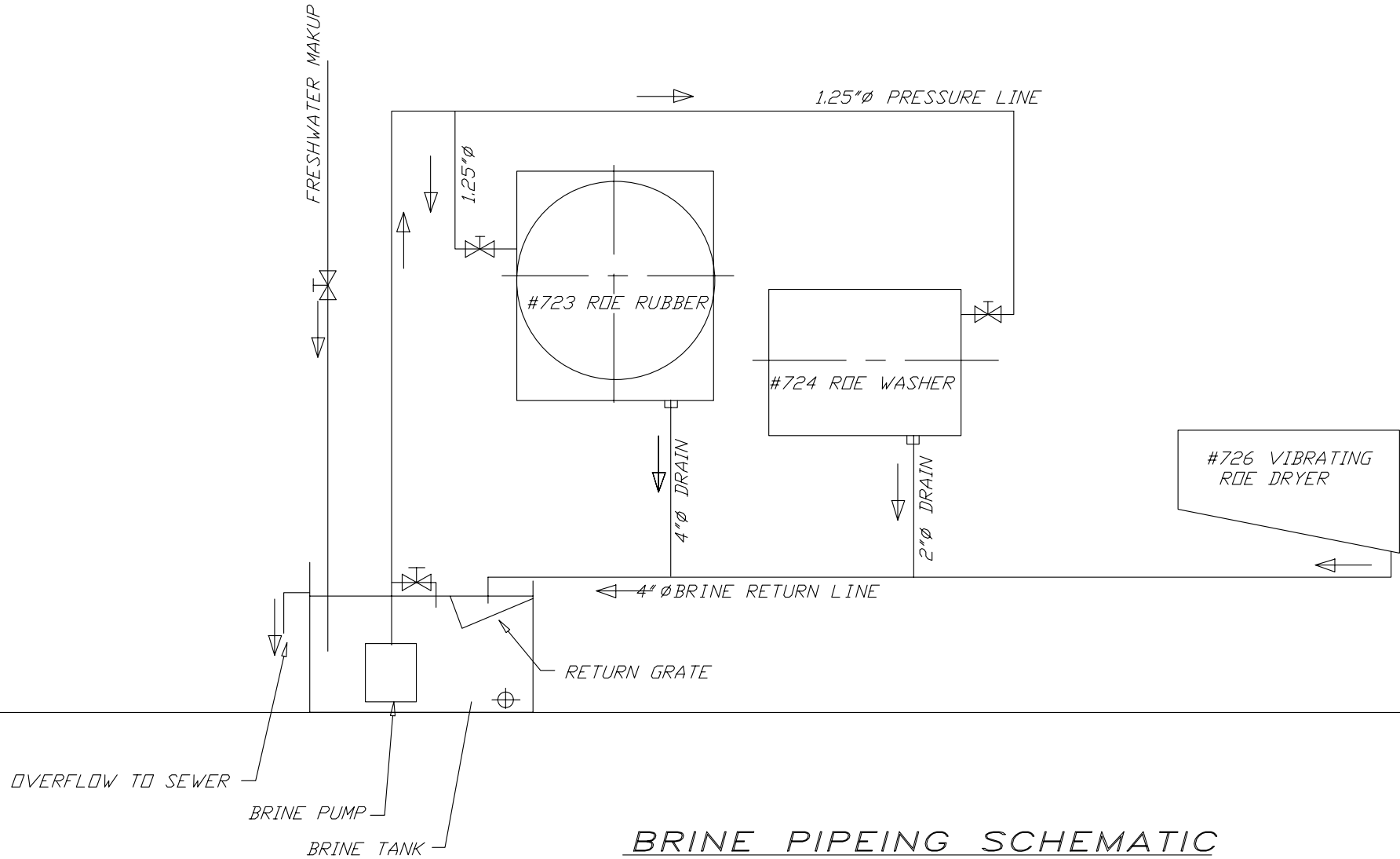


RYCO EQUIPMENT
SEATTLE WASHINGTON

SCHEMATIC
BRINE SYSTEM PIPING
#724A BRINE TANK

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BRINE PIPEING SCHEMATIC