

# DEWAXING SOLVENT OIL FILTERS



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# EQUIPMENT SPECIFICATION FOR ROTARY VACUUM DEWAXING FILTER

## GENERAL

MEK (Methyl Ethyl Ketone) dewaxing is a complex process for physically removing wax, by crystallization and (rotary vacuum) filtration. A rotary vacuum filter consists of a hollow drum that sits in a vat, which is covered by a sealed hood and is maintained at a slightly positive pressure. The drum is rotated allowing the wax cake to be washed with chilled solvent (to reduce the amount of oil trapped in the wax cake) before it is discharged, via a scraper blade, to the wax boot. The filter is designed for an application involving the use of a solvent mix such as MEK and Toluene and inside inert gas atmosphere.

## Filter Characteristic

- ⦿ The filter is designed for 50% circumferential drum submergence
- ⦿ The filters will be right or left hand as required by the Purchaser.
- ⦿ Design Temperature range -22 F + 194 F
- ⦿ Design Pressure 0.07 barg
- ⦿ Drum Speed 0.11 to 2 RPM
- ⦿ Scroll speed 45 RPM



# Filter Construction

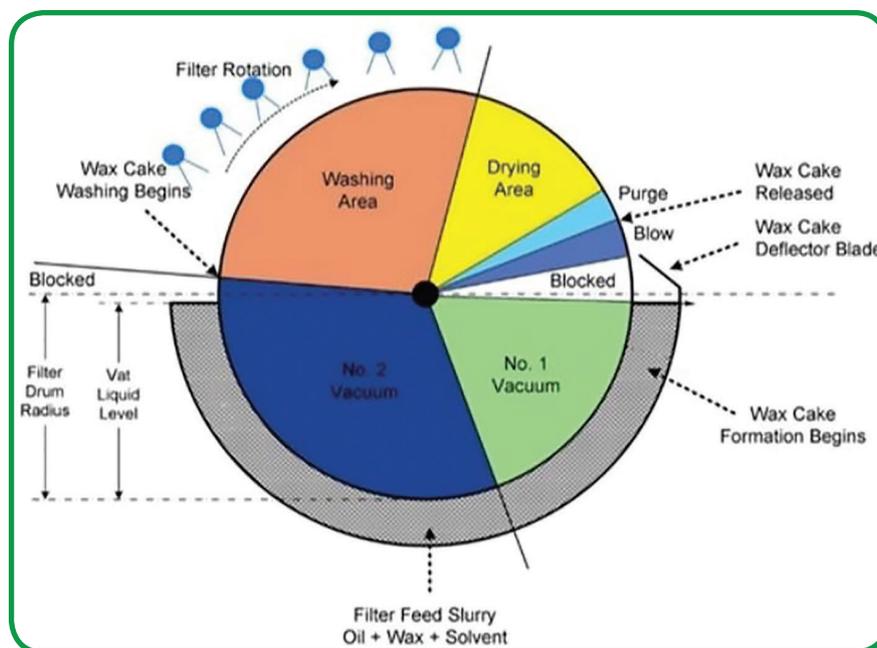
Heavy-duty construction of special low carbon steel for low temperature service is used throughout the tank, hood, and drum. Where corrosion can take place, corrosion-resistance stainless steel is used to provide long, durable service. The tank is designed for mineral floor space with integral drives. The rigid construction is reinforced to allow easy and quick field installation. The internal, rotating drum is segmented into circumferential compartments, with the leading and trailing edges of each compartment connected to headers at the valve end trunnion by drainage pipes. Each compartment is arranged to receive nylon drainage grids supporting the filter media, which is secured to the drum by caulking bars and winding wire. Caulking bars and fabric are wedged into the grooved division strips separating each compartment. A winding wire is wrapped under high tension helically around the drum. Tension devices, located at the non-drive end of drum, maintain wire tension automatically at all operating temperatures. At the ends of the drum, the filter media is secured by lead caulking rods into circumferential grooves.

## Operating Principle

Drum filters have been specifically designed and constructed for the most efficient method of processing petroleum to produce wax-free oil and oil-free wax. The filters consist of several major components:

- ⊙ Vapor tight tank and hood
- ⊙ Internal rotating drum
- ⊙ Master control valve
- ⊙ Cake wash piping
- ⊙ Wax deflector
- ⊙ Wax Discharge scroll

Each revolution of the internal rotating drum comprises four distinct stages and intercompartment purge. All of the operations are controlled by precision machined, adjustable bridge blocks located inside the master control valve, providing sharp separation for each operating stage. A chilled oil and solvent solution is introduced into the filter at the tank bottom and is automatically controlled to maintain a constant level. As the drum rotates, the solution is drawn by vacuum through the filter media, through the vacuum piping, and exits the filter through the master control valve to the receiver.



Crystallized-wax accumulates on the outer surface of the filter media during this cycle, forming a filter cake. Chilled solvent wash is evenly distributed over the filter cake by spray pipes in order to remove as much oil as possible while the solvent is drawn by vacuum through the wax. Prior to cake discharge, each drum compartment and associated piping is purged of lingering liquid to prevent rewetting of the wax cake during blow discharge. After purging, pressurized flue gas blown through the trailing pipes of the drum compartment to lift the cake from the filter media. The cake is then guided over a spring loaded Teflon deflector blade into a discharge scroll. Additional solvent may be applied to the scroll to increase pumpability of the cake.

Stage	Function	Operation Method
1	Pick-Up	Vacuum
2	Solvent Wash	Vacuum
3	Drying	Vacuum
4	Intercompartment Purge	Inert Gas & Vacuum
5	Blow Discharge	Inert Gas

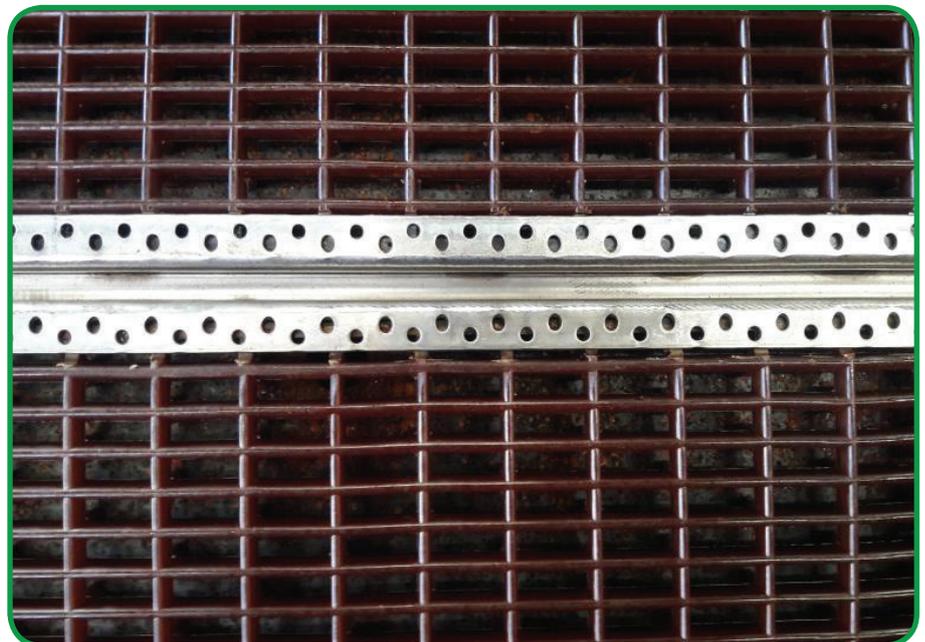
# Filter Features

## Undercut, Interlocking Filter Grids

A smooth, continuous filter media support is provided over each filter section compartment. Under cut grids slip easily under division strips, providing a flush surface at the interfaces, eliminating point contact on the filter media. Grid sections also interlock, providing complete support to all cloth surfaces.

Benefits

- ⊙ Eliminate excessive cloth flexing
- ⊙ Extends filter media life
- ⊙ Reduced maintenance



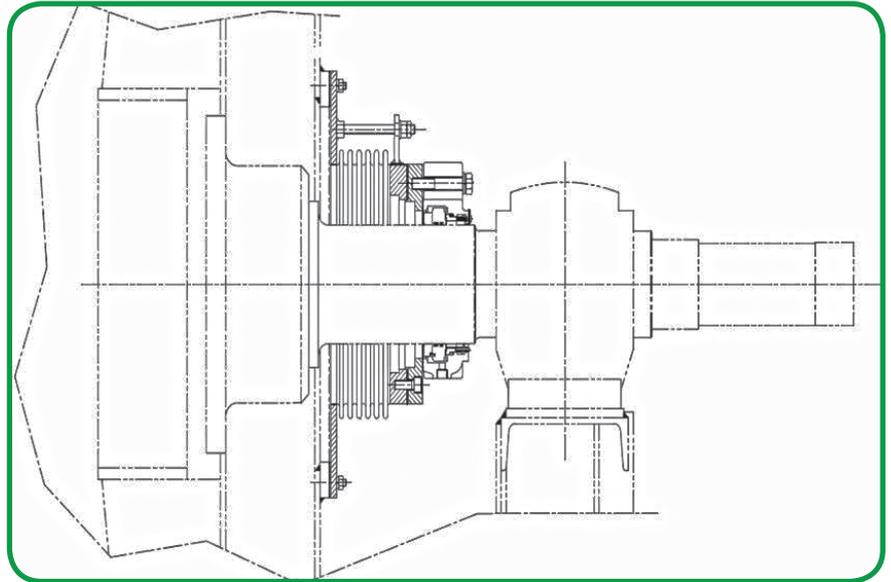
## Filter and Scroll Drives

Rotational power for the drum is supplied by a hydraulic motor through a shaft-mounted gear reducer. Diameter of the drive trunnion is substantially reduced by using a shaft-mounted reducer, making it possible to replace the sleeve bearing with a roller bearing.

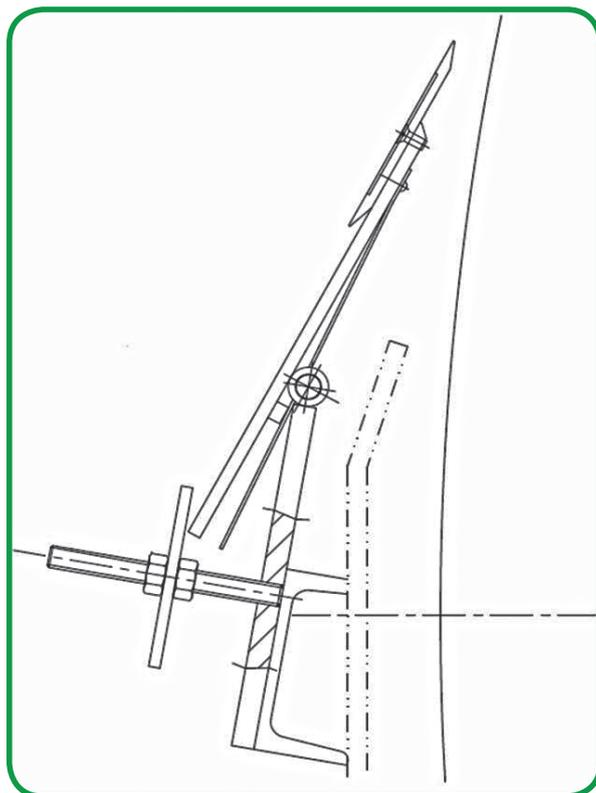
Power for the discharge scroll is supplied by second hydraulic motor through a foot-mounted gear reducer. Both hydraulic motors are powered by a single, common hydraulic power-pumping unit.

Benefits

- ⦿ Increase efficiency
- ⦿ Less torque required
- ⦿ Less horsepower required
- ⦿ Improved seal at stuffing box
- ⦿ Provides wider speed range



## Cake Discharge Deflector and Clean Out Flush System



A double edged, non-abrasive beveled Teflon blade is used to guide cake into the discharge scroll. The blade can be turned to the second edge when the first edge is worn, doubling the effective life of the blade. A wash header flush system is mounted behind the deflector blade to clean wax which may build up under the blade. If left uncleaned, wax accumulation may push the blade away from the drum surface, decreasing production or forcing unscheduled downtime.

Benefits

- ⦿ Increase Blade Life
- ⦿ Maximum Performance
- ⦿ Extended Filter Media Life
- ⦿ Reduced Maintenance
- ⦿ Less Downtime

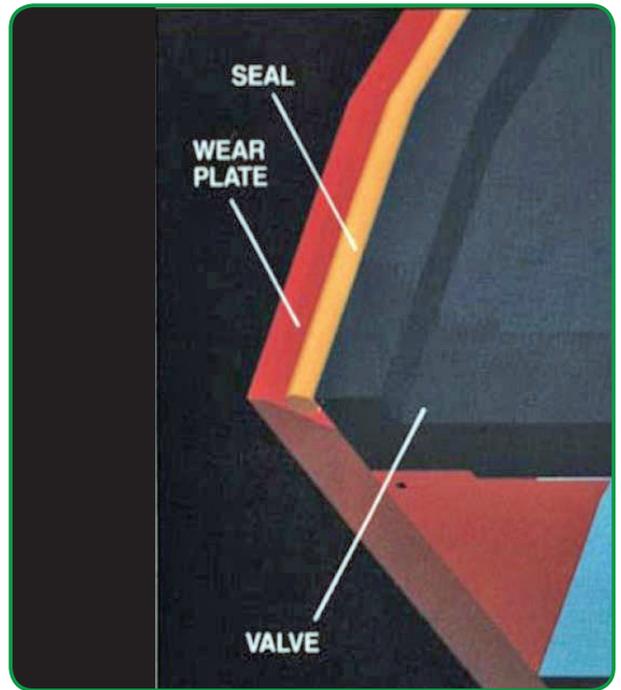
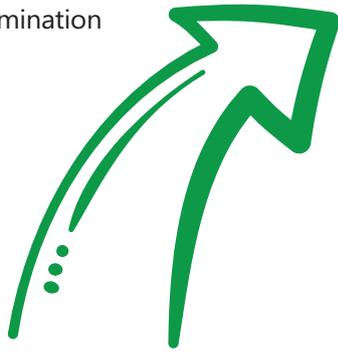


## Valve seal

A special peripheral seal is used between the wear plate and the valve to eliminate filtrate contamination. The seal is self-adjusting to maintain proper tension during operation.

Benefits

- ⊙ Eliminate filtrate contamination
- ⊙ Improves product



## EPDM Flange Gasket and Self-Aligning Swing Bolts

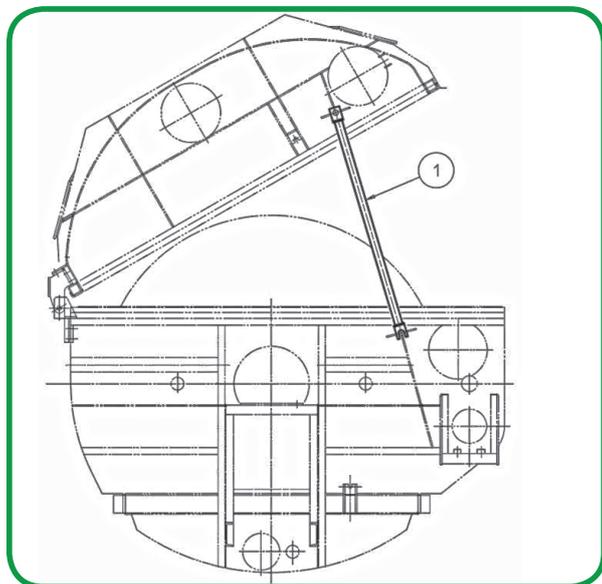
Single splice, continuous "O" ring gasket does not have to be replaced every time the hood is opened, as is usually required with flat gaskets or packing.

When closing the hood, self-aligning swing bolts eliminate miss-alignment. With the fixed stud design, stud deformation will occur if any misalignment exists, creating uneven sealing pressures and reduced gasket life.

Benefits

- ⊙ Positive sealing
- ⊙ Reduced Maintenance
- ⊙ Less Downtime

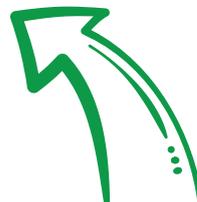
## Hydraulic Hood Lifting Mechanism



The hydraulic hood lifting mechanism accurately aligns the hood on the tank gasket quickly and easily during closing. This mechanism eliminates the necessity of using cranes to suspend the hood and the extra space near the filter to set the hood on the floor.

Benefits

- ⊙ Positive alignment of hood tank
- ⊙ Reduced Maintenance and Downtime
- ⊙ Eliminates Chance of Damage to drum, hood, gasket, or tank
- ⊙ Reduced Space Requirements
- ⊙ Increased Safety

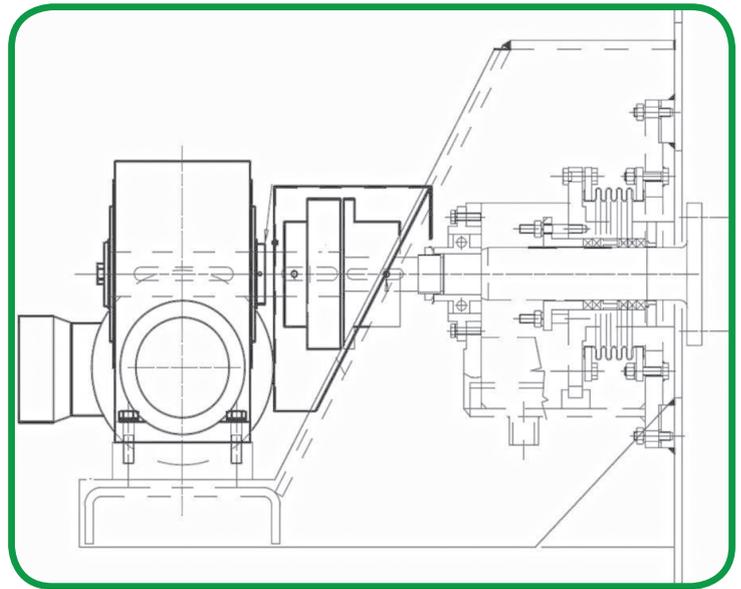


## Floating Stuffing Box

Packing life is greatly extended since the packing is not stressed when the drum is alternately buoyed up and down with changes in the liquid level of the tank. The stuffing box is always concentric with the trunnion/shaft position, eliminating leakage.

Benefits

- ⊙ Eliminates Leakage
- ⊙ Reduced Maintenance
- ⊙ Increase Safety
- ⊙ Extends Packing Life



## Scroll Bearing System

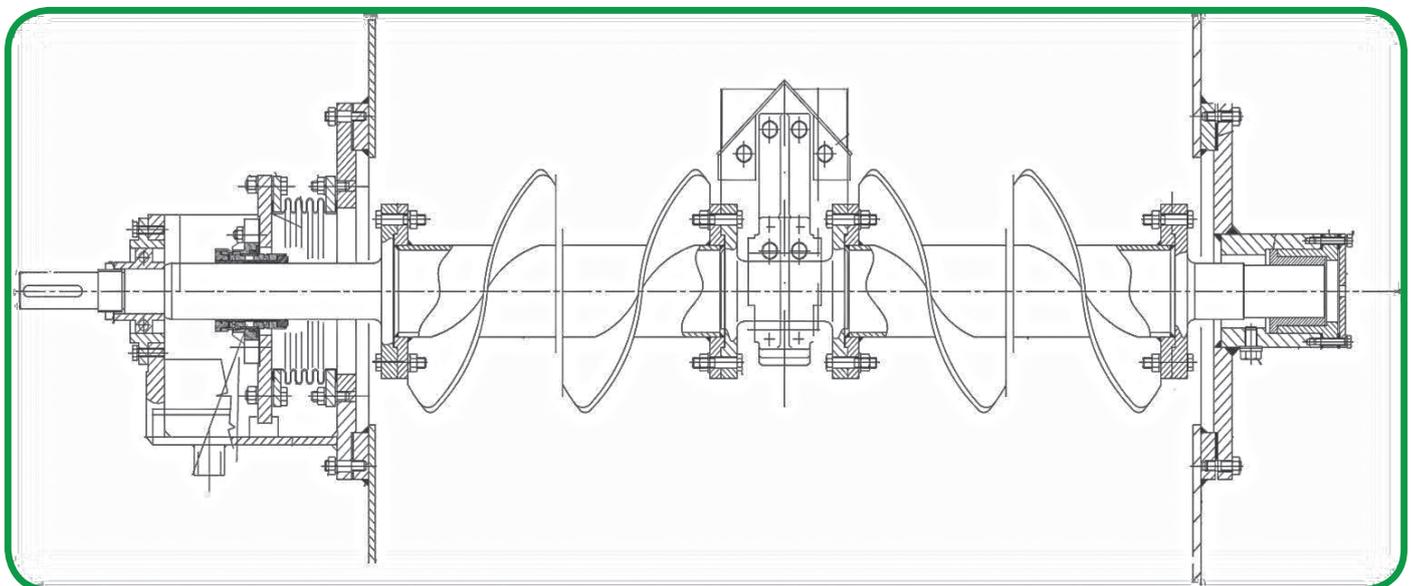
For ease of maintenance and reduction of downtime, scroll bearing have been designed for quick and easy replacement. The non-drive end bearing is internal, eliminating a stuffing box.

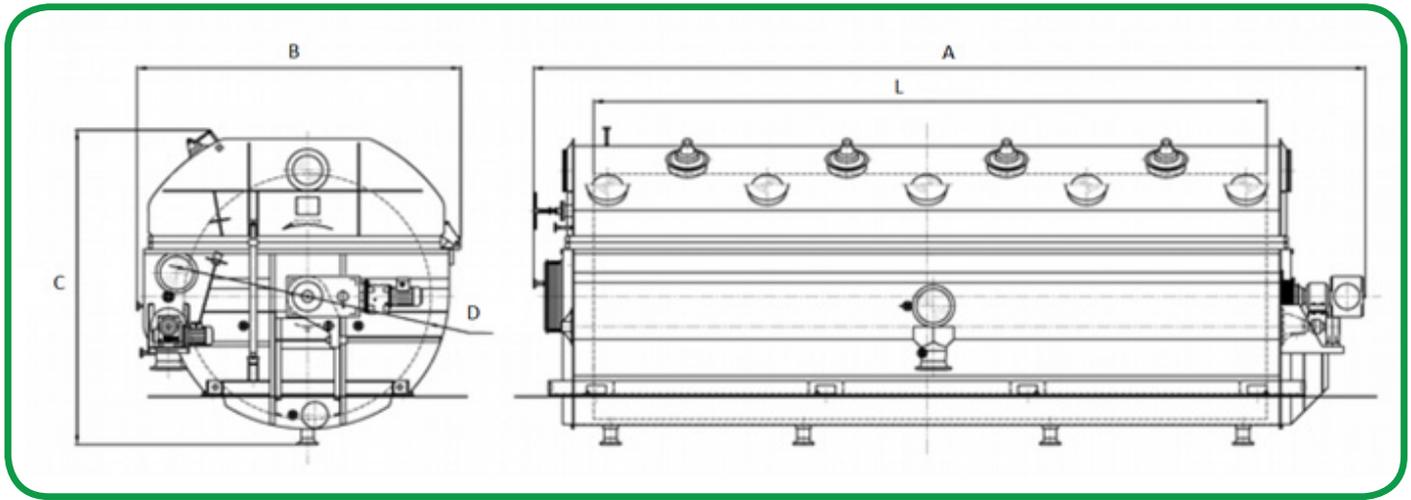
All bearings may be replaced without opening the hood. All bearings mounts have been aligned and doweled at the factory to avoid aligning the scroll each time bearings are replaced. The center support bearing is of a unique slit design to allow easy bearing replacement. By removing the bearing cap and rotating the used bearing-half outward, the new bearing-half can be simultaneously rotated inward.

Access ports allow for inspection and maintenance of the scroll center support bearing removing the vessel hood.

Benefits

- ⊙ Eliminates the need to realign the scroll
- ⊙ Less Maintenance
- ⊙ Reduced Downtime
- ⊙ Easy Access





<b>FILTER AREA (m<sup>2</sup>)</b>	<b>DRUM (Ø) DxL (mm)</b>	<b>A (mm)</b>	<b>B (mm)</b>	<b>C (mm)</b>
38	3352 x 3650	5730	4200	4120
45	3352 x 4250	6330	4200	4120
48	3352 x 4600	6680	4200	4120
51	3352 x 4900	6980	4200	4120
58	3352 x 5490	7570	4200	4120
65	3352 x 6175	8250	4200	4120
70	3352 x 6705	8780	4200	4120
77	3352 x 7320	9380	4200	4120
84	3352 x 7945	10000	4200	4120
90	3352 x 8535	10600	4200	4120
96	3352 x 9145	11200	4200	4120
102	3352 x 9750	11850	4200	4120
106	3352 x 10065	12150	4200	4120
110	3352 x 10500	12600	4200	4120
112	3352 x 10650	12800	4200	4120
115	3352 x 11000	13150	4200	4120