

**The**



**T O R E**

*Turbine Oil Reclamation Equipment*

**Advantage**

*TORE-70/35 Dual Speed*

***High Performance***

***Pressure/Coalescence Turbine Oil Conditioner***

# **COST ADVANTAGE**

*Gulfgate Equipment Won't be Beat by Price on Similarly Equipped Models*

- More Flow at Less Cost than the Competition
- Lower Capital Equipment Costs
- Highly Efficient Low Cost Replacement Elements
- More Standard Features Included in Base Price



**TORE-2**



**TORE-6**

# **FEATURES ADVANTAGE**

## Standard System Features Include:

*(TORE-10 & above)*

- *Central Nema 4 Electrical Control Panel*
- *Graphic Display Panel Depicting System Flow*
- *Central Gauge Panel with Inlet & Outlet Temperature, Inlet Oil Pressure & Differential Pressure Gauges for Each Vessel*
- *Filter Vessel Dirty Filter Switches with Indicating Lights*
- *Close Coupled Blackmer Sliding Vane Design Pump/Motor*
- *Pressure Coalescence Vessel*
- *Pre & Post Particulate Filter Vessels*
- *Low Watt Density Finned Tube Heaters, Thermostatically Controlled & Flow Permissive*
- *All Vessels are ASME Code Labeled*
- *Loss of Flow Heater Shutdown with Alarm Light/Manual Reset*
- *Dirty Strainer Shutdown with Alarm Light/Manual Reset*
- *Electric Automatic Water Drain with Manual Bypass & Totalizing Meter*
- *Automatic Air Releases*
- *25 PISD Automatic Bypass & Common Oil Drain*
- *Inlet & Outlet Flow Sights*

**WE BUILD TO YOUR SPECIFICATIONS AND YOUR RESERVOIR SIZE. ONE OF OUR STANDARD MODELS IS MORE/LESS THAN YOU NEED? NO PROBLEM, WE BUILD EVERYTHING IN-BETWEEN.**

# PERFORMANCE ADVANTAGE

## THREE PART PARTICULATE REMOVAL

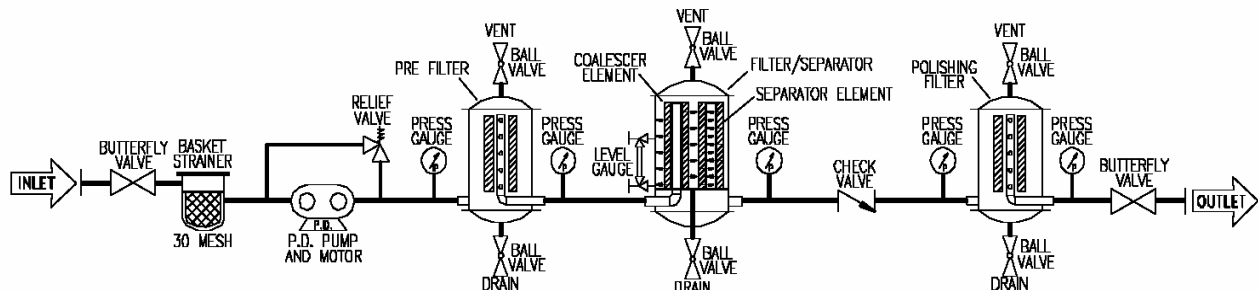
1. 60 Mesh Cleanable Strainer to Protect Inlet Pump
2. 6 Micron Absolute Micro-glass Pre-Filter
3. 3 Micron Absolute Micro-glass Post-Filter

## WATER REMOVAL

- The TORE removes Free, Emulsified, and Some Dissolved Water. Based on an Influent of 5000 PPM (0.5%) Concentration of Water the TORE will Reduce the Free and Emulsified Water Content in the Reservoir to Less than 25 PPM and a Total Water Content Less than 150 PPM with Oil Viscosity of 200 SSU.

## PRINCIPLE OF OPERATION

- The Inlet Pump draws oil into the System. The oil then enters an optional Pre-Filter. The oil then enters the Two-Stage Filter Separator Vessel through the Inlet Nozzle, passes into the Chamber and then flows through the Coalescer Element Assembly. It passes through the Filter and Separating Medium of the Coalescer Element Assembly where the water is coalesced as the oil passes. The solid contaminants are retained by the Filter Medium and the water settles to the bottom of the Filter above the Deck Plate.
- The oil then passes through the Separator Element where any remaining water is removed. The dry oil exits the filter separator.
- After exiting the filter separator, the oil enters the polishing filter for final filtration to 0.5-micron nominal, (2.8 absolute).



# **SERVICE ADVANTAGE**

- Backed by More Than 40 Years of Engineering & Design Expertise.
- 24/7 On Call Service Department.
- No Hassle Service/Warranty Policy.



**TORE-10**



**TORE-20**



**TORE-35/17 Dual Speed**

# OPTIONAL FEATURE

## Oil Detection & Safety Shut Down System

An oil detection and safety shut down system has been engineered to address a single point failure with regard to the automatic water drain on the filter separator vessel. The automatic water drain compartment utilizes an electronic float type design in which the float ball is weight at a specific gravity to float in water and sink in oil. When the float ball reaches its contact point, a solenoid actuated valve opens, allowing water to pass. The water makes its way to the oil detection compartment where another specially weighted float is located. If any oil reached the contact point of this float ball, a normally closed motorized valve is de-energized and automatically closes the ball valve and will shut the entire system down indicating a red warning light on the control panel.



**Note:** Other manufacturers recommend an oily water separator be installed to catch any oil that has been discharged; however this does not stop the oil if it floods out with total oil when the automatic float valve sticks open. Other systems do not address the single point failure issue.

# 7 TORE SIZES

**\* TOPS - 130/LV960**

(130 GPM COALESCER)  
(960 GPH VACUUM)  
UP TO 15,600 GALLON  
RESERVOIR CAPACITY

**\* TORE - 100 (100 GPM)**

UP TO 12,000 GALLON  
RESERVOIR CAPACITY

**\* TORE - 60 (60 GPM)**

UP TO 7,200 GALLON  
RESERVOIR CAPACITY

**\* TORE - 30 (30 GPM)**

UP TO 3,600 GALLON  
RESERVOIR CAPACITY

**\* TORE - 10 (10 GPM)**

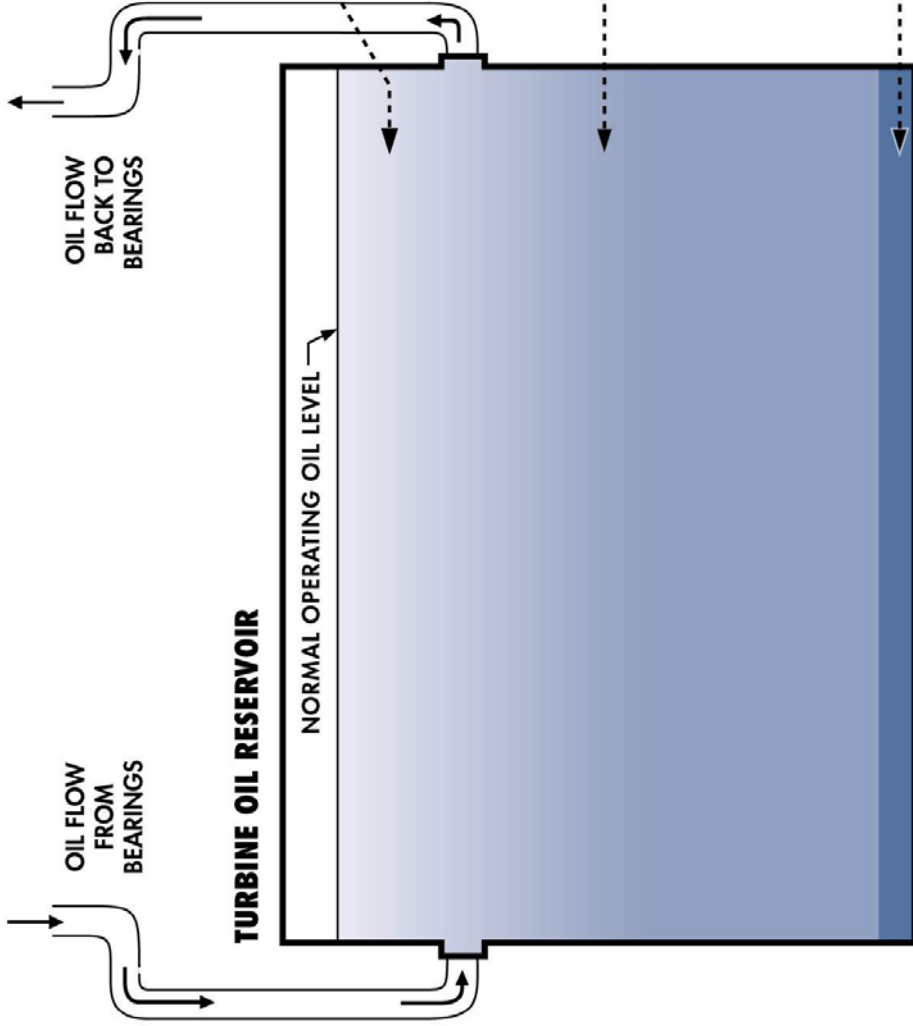
UP TO 1,200 GALLON  
RESERVOIR CAPACITY

**\* TORE - 6 (6 GPM)**

UP TO 720 GALLON  
RESERVOIR CAPACITY

**\* TORE - 2 (2 GPM)**

UP TO 240 GALLON  
RESERVOIR CAPACITY



## H<sub>2</sub>O - WATER CAN EXIST IN RESERVOIRS IN 3 FORMS...

**DISSOLVED WATER...** CONTAMINATION IS THE LEAST HARMFUL OF THE 3 TYPES. DISSOLVED WATER CONTENT IS SO SLIGHT THAT IT IS NOT CAPABLE OF DISPLACING LUBRICATION. DISSOLVED WATER EXISTS IN TURBINE OIL MERELY BY BEING OPEN TO ATMOSPHERE IN NORMAL PLANT CONDITIONS.

**EMULSIFIED WATER...** CONTAMINATION IS WATER THAT HAS BEEN MIXED, HOMOGENIZED, AND/OR MECHANICALLY EMULSIFIED INTO THE LUBE OIL TO FORM EXTREMELY STRONG EMULSIONS, STRONG IN THE SENSE THAT GRAVITY OR OTHER MECHANICAL DEVICES WILL NOT WORK IN SEPARATING THE TWO PHASES. EMULSIFIED WATER IS CAPABLE OF DISPLACING LUBRICITY.

**FREE WATER...** CONTAMINATION IS WATER THAT IS FREE TO SEPARATE AND SETTLE TO THE BASE OF THE RESERVOIR. FREE WATER IS ALSO CAPABLE OF DISPLACING LUBRICITY.

### SIZING THE TORE for "PERFORMANCE"

GULFGATE RECOMMENDS THAT THE TURBINE OIL CONDITIONER PROCESS THE TURBINE OIL AT A RATE OF 50% PER HOUR, OR AT LEAST ONE COMPLETE RESERVOIR TURN EVERY TWO HOURS. IF THESE SIZING GUIDELINES ARE MET...

**GULFGATE GUARANTEES PERFORMANCE!**

**PARTICULATE CONTENT  
ISO 16/13 (SAE CLASS 4)  
OR BETTER**

**WATER CONTENT < 150 PPM  
OR BETTER  
(BASED ON INFLUENT OF 5000 PPM WATER)**

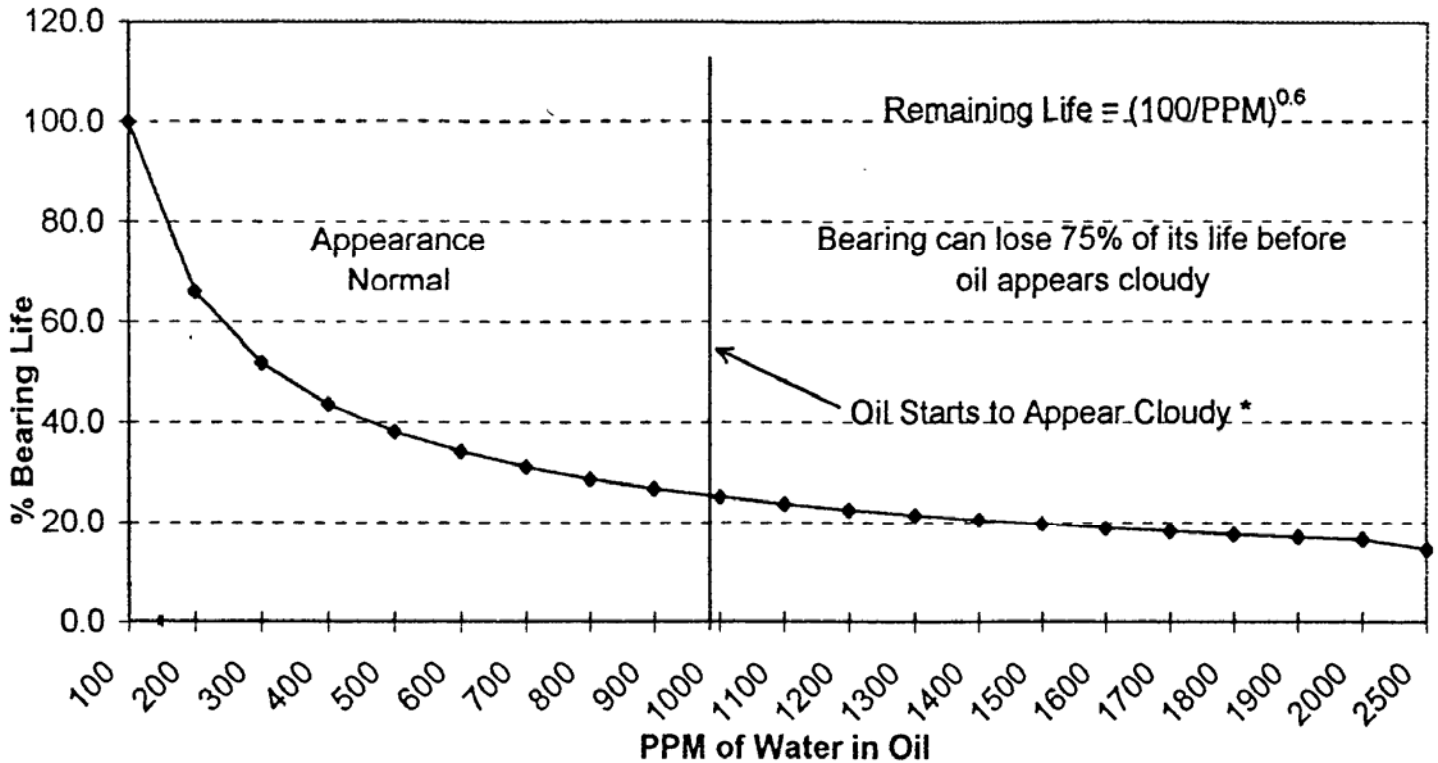
* RESERVOIR SIZE	_____	GALLONS
* FLOW RATE OF TURBINE OIL TO BEARINGS	_____	GPM
* RESIDENCE TIME OF OIL IN RESERVOIR	_____	MINUTES

\*\*\*\*\*

# FYI

\*\*\*\*\*

## Effect of Water in Oil on Bearing Life



% Water	PPM Water	Life Factor	% Life Decrease	% Life Remaining
0.0025	25	2.297	-129.74	230.0
0.010	100	1.000	0.0	100.0
0.020	200	0.660	34.0	66.0
0.030	300	0.517	48.3	51.7
0.040	400	0.435	56.5	43.5
0.050	500	0.381	61.9	38.1
0.060	600	0.341	65.9	34.1
0.070	700	0.311	68.9	31.1
0.080	800	0.287	71.3	28.7
0.090	900	0.268	73.2	26.8
0.100	1000	0.251	74.9	25.1
0.150	1500	0.197	80.3	19.7
0.200	2000	0.166	83.4	16.6
0.250	2500	0.145	85.5	14.5
0.500	5000	0.096	90.4	9.6
1.000	10000	0.063	93.7	6.3
2.000	20000	0.042	95.8	4.2

Effect of water in oil on bearing life based on 100% life at 100 PPM in oil.

\* Note Bearings can lose 75% of its life before oil becomes cloudy.

Ref: Machine Design, "How Dirt and Water Effect Bearing Life" July 1996

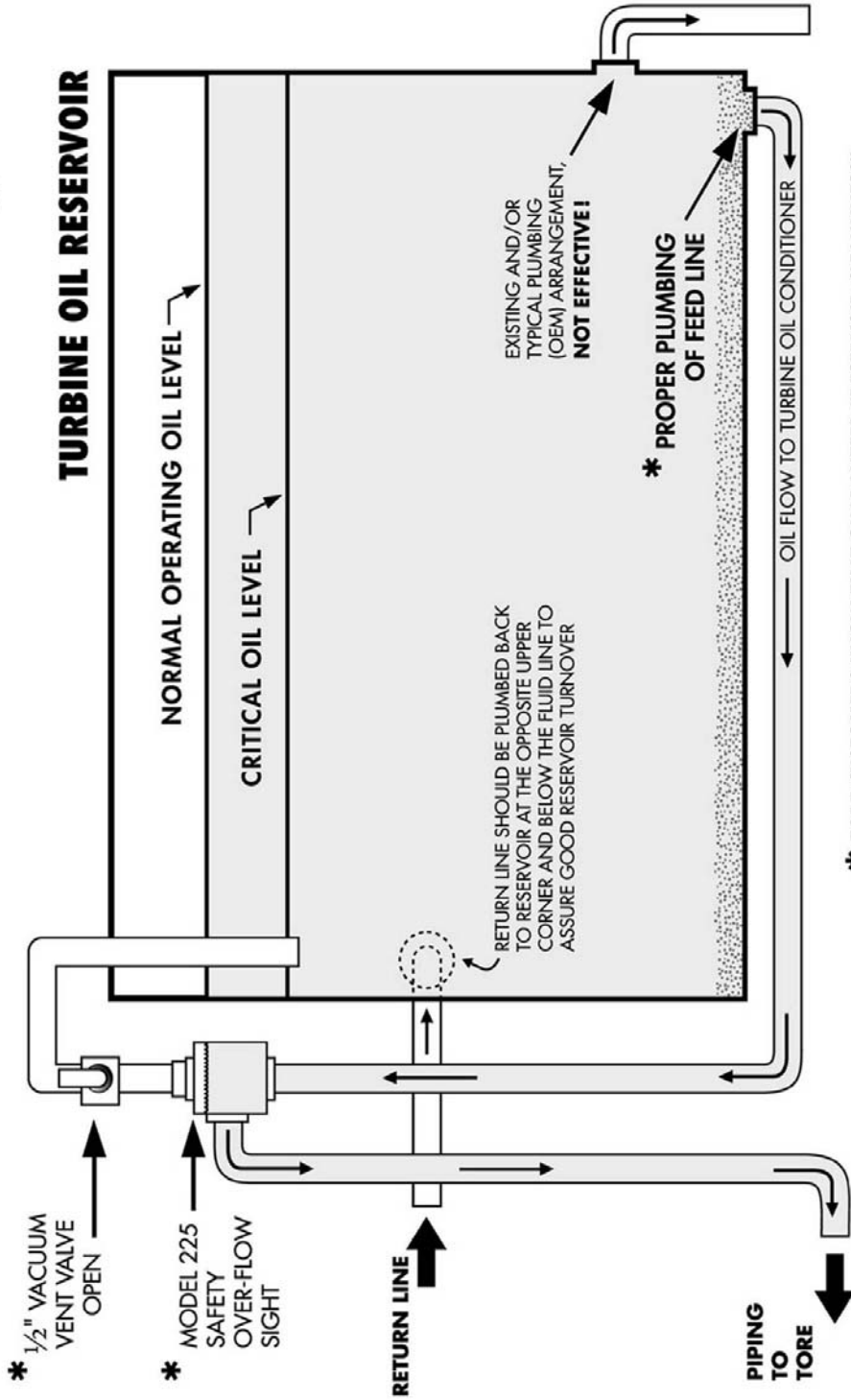
Ref: Cantley, "The Effect of Water in Lubricating Oil on Bearing Life"

# GULFGATE-TORE

## Guaranteed Performance & The Big 3

### GULFGATE RECOMMENDED SIPHON BRAKE SAFETY FEATURE

DESIGNED FOR OBSERVATION OF LIQUID FLOW & MAINTAINING A FIXED LEVEL IN A RESERVOIR.



### ① PROPER PLUMBING...

PRIMARY OBJECTIVE HERE IS TO PLUMB THE FEED LINE TO THE TORE AT THE ABSOLUTE LOW POINT IN THE RESERVOIR. THE KEY TO EXCELLENT "RESERVOIR CLEANLINESS" LEVELS STARTS WITH GETTING ALL OF THE CONTAMINANT IN THE RESERVOIR TO THE TURBINE OIL CONDITIONER.

### ② FILTER MEDIA PERFORMANCE...

MARKET TESTED MEDIA THAT GUARANTEES PERFORMANCE. PARTICULATE CONTAMINANT LEVEL OF ISO 16/13 (SAE CLASS 4) OR BETTER. WATER CONTENT LESS THAN 1.50 PPM OF TOTAL WATER OR BETTER (BASED ON A INFLUENT OF 5000 PPM WATER).

### ③ PROCESS RATE...

GULFGATE RECOMMENDS THAT THE TURBINE OIL CONDITIONER PROCESS THE TURBINE OIL AT A RATE OF 50% PER HOUR, OR AT LEAST ONE COMPLETE RESERVOIR TURN EVERY TWO HOURS. THIS 50% PROCESS RATE PER HOUR SETS US APART FROM COMPETITOR TECHNOLOGIES THAT UTILIZE A MUCH LOWER PROCESS RATE OF APPROXIMATELY 10%.

### \* TORE CUSTOMERS KNOW THAT GUARANTEED "RESERVOIR CLEANLINESS" GUARANTEES THE BENEFITS OF CLEAN/DRY TURBINE OIL...

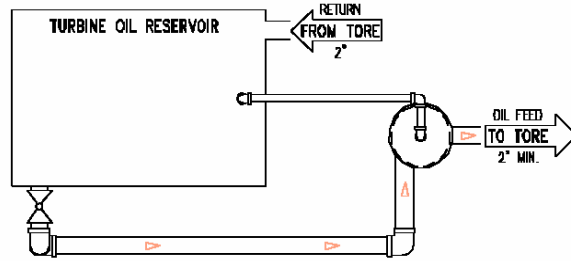
- LONGER TURBINE LIFE
- REDUCED BEARING FAILURES
- ACCURATE HYDRAULIC VALVE OPERATION
- FEWER FORCED OUTAGES
- FASTER OIL FLUSH CYCLES AND TRANSFER
- LESS COSTLY TURBINE REBUILDS

\* 1/2" VACUUM VENT VALVE IS NORMALLY OPEN, AND IS CLOSED ONLY FOR DRAINING THE TANK. THE VENT LINE INLET MUST BE AT CRITICAL OIL LEVEL INSIDE TANK.

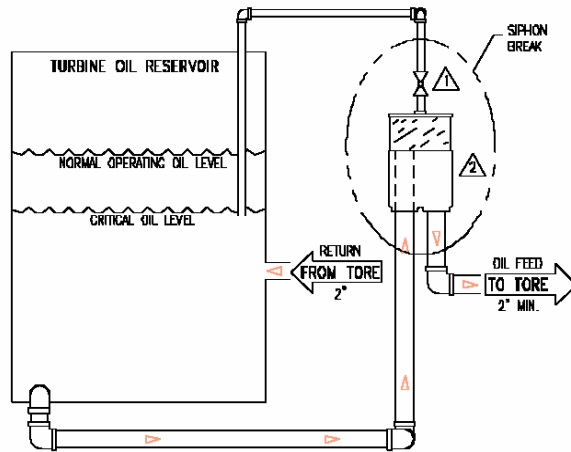
\* MODEL 225 OVER FLOW SIGHT (TOP OF INLET PIPE/ BOTTOM OF GLASS) MUST BE INSTALLED AT CRITICAL OIL LEVEL OR SLIGHTLY HIGHER (NO HIGHER THAN 6")

# Safety Over Flow Sight

## TYPICAL TURBINE OIL CONDITIONER INSTALLATION



TOP VIEW



ELEVATION

**NOTES:**

- ① 1/2" VACUUM VENT VALVE SHOULD BE OPEN FOR NORMAL OPERATION AND CLOSED ONLY FOR DRAINING THE RESERVOIR. VENT LINE INLET MUST BE AT THE CRITICAL OIL LEVEL INSIDE THE TANK.
- ② OVER FLOW SIGHT (TOP OF INLET PIPE/BOTTOM OF GLASS) SHOULD BE INSTALLED 6" ABOVE THE CRITICAL OIL LEVEL.

THIS DESIGN DRAWING AND SPECIFICATION IS THE EXCLUSIVE PROPERTY OF GULFGATE EQUIPMENT, INC. IT AND/OR THE DESIGN THEREIN ARE NOT TO BE COPIED, SOLD, TRANSFERRED, OR REPRODUCED IN ANY WAY AND IS SUBJECT TO RETURN ON DEMAND. THE ITEMS DESCRIBED MAY NOT BE ASSEMBLED OR ITS DESIGN CRITERIA DISCLOSED TO OTHER PARTIES WITHOUT THE WRITTEN PERMISSION OF GULFGATE EQUIPMENT, INC.



**GULFGATE EQUIPMENT, INC.**

REV	BY	DATE	DESCRIPTION
A	JB	08/24/00	REVISED PER MARK-UP

CLIENT:	DRW. EYE: J. BURBACK	CHK. BY:	APP. BY:
TITLE: <b>3560 - TORE INSTALLATION DIAGRAM</b>	DATE: 07/21/00	SCALE: NONE	REV. A
	DWG. NO.: 20021D-1		