

# Kube Engineering Industry Guide

## PETROCHEMICAL



REFINERIES



TANK FARMS



OIL PRODUCTION

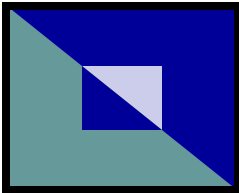


OFF-SHORE



PIPELINE CONTROL

30298 Trois Valley Street  
Murrieta, CA 92563  
951-926-0675 P  
951-926-2562F  
Quinn@kubengineering.com  
www.kubengineering.com



# Intro and General Plant Diagram

Kube Engineering

It is the goal of Kube Engineering and our Principals and suppliers are to provide top rated equipment in order to make sure the production system is optimal, Minimize Operation Expenditures (downtime, and maintenance or the time it takes), enhance safety and provide a high return of investment.

OPEC controls the majority of feedstock crude oils, and the price-driven commodity demands cross-the-board cost-cutting measures. Refineries often look to areas which they can increase margins and reduce cost. With the trend in American refineries to product more highly acidic oils corrosion control becomes a major focus which we work diligently together in order to extend the economic life of existing refineries.

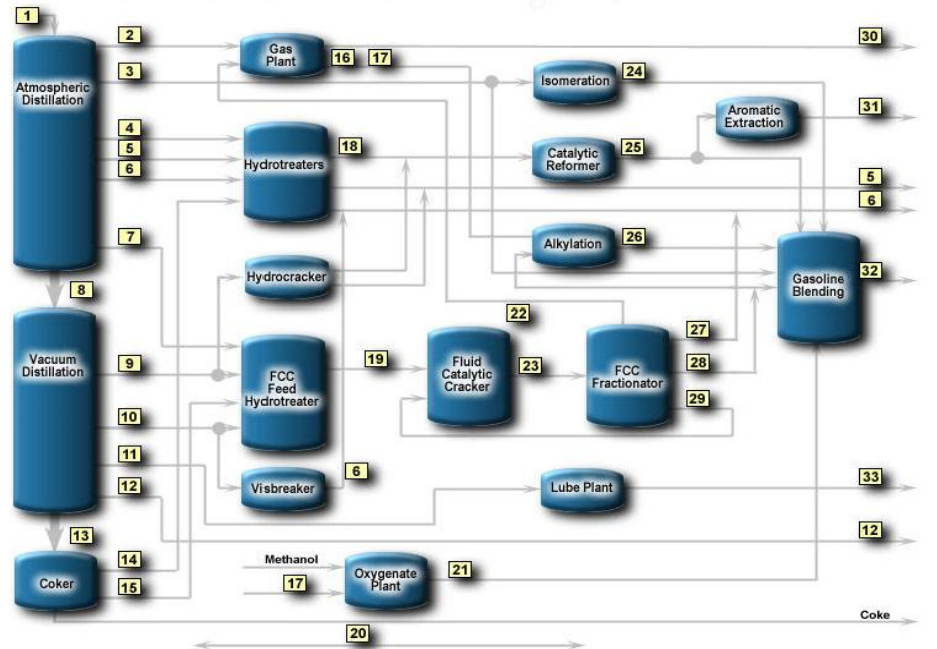
The following application guide will assist with products, applications and services which Kube Engineering may assist in order to meet your needs and demands.



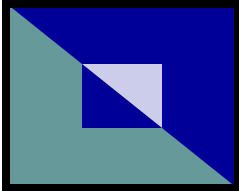
## Petroleum Refining Process

### Refining Value Added Process

Numbers in the process map correspond to the compounds listed in the [table below](#).



1	Crude Oil	7	Atmospheric Gasoil	13	Vacuum Bottoms	19	Desulfurized Gasoil	25	Reformate	31	Aromatics
2	Gas	8	Atmospheric Bottoms	14	Coker Naptha	20	Other Streams	26	Alkylate	32	Gasoline
3	Light Naptha	9	Light Vacuum Gasoil	15	Coker Gasoil	21	Oxygenates	27	Light Cycle Oil	33	Lubricants
4	Heavy Naptha	10	Heavy Vacuum Gasoil	16	L-C4	22	FCC Overhead	28	FCC Gasoline		
5	Kerosene	11	Lubes	17	Light Olefins	23	Cat Cracked Product	29	Heavy Cycle Oil		
6	Diesel	12	Asphalt	18	Desulfurized Naptha	24	Isomerate	30	LPG		



# Corrosion and 3rd generation pH sensors

**Kube Engineering**

Corrosion

## **Areas of Corrosion Impact:**

A standard refinery may have upwards of 3000 processing vessels of different sizes, shapes, forms, and function. In addition, there could be 2000 miles of pipeline, ranging from 4" diameter to 30" diameter, of which a great share is inaccessible.

## **Water-related Corrosion:**

A generated wastewater, Crude oil desalting and distillation processes create a considerable amount of wastewater. Within the water, you can find accelerative corrosive components such as H<sub>2</sub>S, CO<sub>2</sub>, chlorides, and high levels of dissolved solids.

Another area of concern is cooling water. Corrosivity varies greatly on the process, but is dependent on the dissolved solids and gases in the cooling water, including chlorides, oxygen, dissolved gases and microbes. Lastly temperatures of the water can affect corrosivity.

## **Processing-Related Corrosion:**

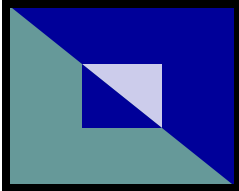
The top portion of crude unit has Hydrochloric acid, formed by the hydrolysis of calcium and magnesium chloride. When crudes release Carbon Dioxide, it usually contains a high content of naphthenic acid. Sour crudes release Hydrogen Sulfide.

## **Naphthenic Acid Corrosion:**

The high temperature in the distillation units have Naphthenic acid and sulfur compounds. Other applications which can be affected are crude feedstock heaters, furnaces, transfer lines, feed and reflux sections of columns, atmospheric and vacuum columns, heat exchangers, and condensers.

## **Sulfur:**

At high temperatures like the furnaces and transfer lines, the presence of naphthenic acids increase the severity of sulfidic corrosion. Usually at a 0.2 percent and higher level can be corrosive to carbon and low-alloy steels from 450deg F to 850 degF.



# Application Guide

Kube Engineering

Analytical

## Cooling Water Control:

Monitoring the continuous water recirculation via pH and conductivity in order to minimize corrosion and protect the equipment. When the conductivity becomes too high, the controller initiates the opening of a blowdown valve. A small amount of sulfuric acid is added to increase the pH so calcium carbonate is less soluble. For high levels of suspended solids, a toroidal conductivity sensor is used. Warm water and air provides the opportunity for biological growth, thus chlorine or bromine are added. Ozone is a powerful alternative treatment to chemical addition. We use a dissolved oxygen sensor for continuous measurement between 0 and 10 ppm.

## Leak Detection with pH

Leakage of the cooling water in to the process is a source of contamination. An application is the cooling water into the stream condensate. This can be done by utilizing a differential pH. One before the potential leak source and one after. For high sensitivity pH we use an optical ppb sensor; samples with low conductivity below 10 us/cm. Whereas a normal pH level detection can utilize our industrial standard sensor.

## Leak Detection within Heat Exchangers:

Heat exchangers are used throughout a refinery to capture waste heat for reuse. These can be found in the desalting process, waste water treatment, desulphurization process and boiler water. The bare carbon steel tubes found in heat exchangers, condensers and other heat transfer equipment can be corroded. Each corrosion cell creates a pit for bacterial buildup and fouling. Utilize the differential process by one pH sensor at the inlet of the heat exchanger and a second at the outlet. We can measure process conditions via acid or base conditions and isolate possible leaks. Toroidal conductivity can be used between the steam tram off the heat exchangers and before the condensate hold tank.

## pH Control reducing corrosion in crude unit overhead:

Distillation columns used to separate light components and heavy components produce a high acidic water which is dropped out in a separator vessel. This water is passed through a condenser. This corrosive water can attack metal process equipment, especially in the upper portion of the crude tower, overhead piping, condensers and accumulators.



## Waste water from Separators:

Waste water may contain insoluble oil, sludge and soluble components. pH control is applied at the outlet of the separator to enhance the efficiency of secondary treatment. We use a easy change system or a self cleaning process in case the sensor is coated with emulsified oil.

## Micro Organism (oxygen scavengers) water injection

This application is monitoring the Oxygen content (or lack of) in water which is used as a return in deep well drilling to prevent explosive atmospheres. The 4401 monitors TRACE level oxygen LLD Dissolved 1.0 ppb +/- 0.4ppb and gas 500 ppb. Utilizes a stable decay based method and minimal calibration requirements: 3 to 12 months. Unaffected by pressure or flow and does not consume local oxygen.

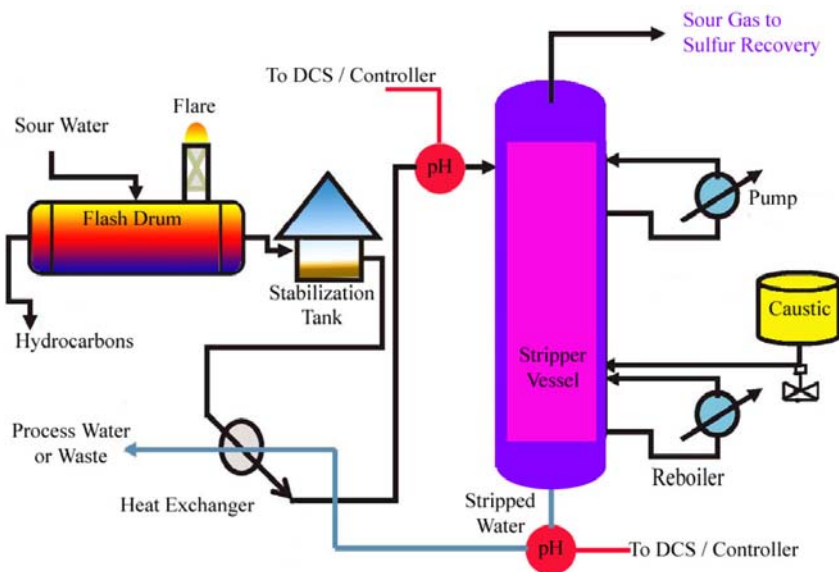
## Turbidity in Water/Wastewater:

Turbidity is a measure of the clarity of a liquid, which is impacted by microscopic particles suspended in the liquid. Turbidity is a primary measurement in wastewater treatment and is used to control of ameliorate both organic and inorganic pollution elements discharged by industrial waste streams. Industrial applications would include:

- sulfur compounds in scrubber discharge and solvents
- Particles in cooling towers
- Suspended inorganic in distillation units
- Suspended material including brine and lead compounds in oil

## Sour Water Strippers:

Stripping H<sub>2</sub>S from water utilizes a gas stream to force the H<sub>2</sub>S and NH<sub>3</sub> out of a solution and into the gas phase. This stream is process by a sulfur recovery unit allowing the water to be reused as process water or released to waste. pH in sour water is a problem for most sensors as the temperatures must be maintained at high levels to insure gas removal and the presence of H<sub>2</sub>S can poison and plug most reference cells. Historically the double junction references would die within a day or less when the sulfide, cyanide or ammonia levels are too high.



## Sodium Bisulfite Absorber:

pH is utilized to monitor the value on a Sulfur Dioxide absorber. The chemical composition is approximately 20-30% Sodium Bisulfite, 4% Sodium Sulfite and the balance is water. In most cases, pH sensors are used to catastrophic failure. We utilize an industrial BAT pH cartridge with a hot tap sheath for ease of probe replacement.

# Application Guide

Kube Engineering

Analytical Applications

**Direct Replacement Sensors**

- BAT (Barben)
- ABB/TBI
- Sorex
- Rosemount
- YONDAWA
- Ingold/Mettler
- Great Lakes Inc.
- E & H
- Foxboro
- Custom Designs

6103 Glenmont Drive  
Houston, Texas 77081  
Local: (713) 772-6641  
Toll Free: (800) 522-7920  
Web: www.VL-PC.com  
e-mail: info@vl-pc.com

**SBA** **Made in the USA**

**pH - ORP - ISE - DO - Conductivity - Custom Designs**

## Z-GEL Hi Performance Reference Fill

Van Londen-pHoenix Co. proudly introduces a new innovation in pH electrode technology, Z-Gel.

Z-Gel provides a more stable matrix compared to other gelled electrode reference systems, providing reliability in contaminated samples. The Z-Gel allows for lower maintenance and extended life, thus reducing overall cost.

Z-Gel also allows Van Londen-pHoenix to incorporate new designs for existing products, such as the Open Aperture Junction featuring here....

A variety of Van Londen- pHoenix sensors are available with Z-Gel, please contact our sales team for details at (713) 772-6641 or e-mail us at info@vl-pc.com

Open Aperture

6103 Glenmont Drive  
Houston, Texas 77081  
Local: (713) 772-6641  
Toll Free: (800) 522-7920  
Web: www.VL-PC.com  
e-mail: info@vl-pc.com

**SBA** **Made in the USA**

**We Speak Spanish & Vietnamese**

## GXV

Introducing the new pH/ORP/Conductivity sensors with superior performance. The new GXV series features a new design for the electrode housing and a new design for the process connections. The GXV series is designed for long life and low maintenance. The GXV series is designed for long life and low maintenance. The GXV series is designed for long life and low maintenance.

**Low Cost Replacements**

**Safe Operation**

**Housing Features**

**O-ring Arrangement**

**Quality "Built In"**

**Solid Polymer Reference**

**GXV**

**Multiple Sensor Options available**

6103 Glenmont Drive  
Houston, Texas 77081  
Local: (713) 772-6641  
Toll Free: (800) 522-7920  
Web: www.VL-PC.com  
e-mail: info@vl-pc.com

**SBA** **Made in the USA**

**We Speak Spanish & Vietnamese**

## Twist-Lock™

pH / ORP / Conductivity

Pressure Rating: 150 PSI  
Temperature Range: 130 °C (266 °F)  
Process Connections: ½", ¾", 1" and 1½"  
Conduit Connection: ¾" MPT  
O-Ring Seals: Viton™ (standard)  
pH Range: 0-14  
Housing Material: Ryton™

**Low Cost Replacements**

**Safe Operation**

**Housing Features**

**O-ring Arrangement**

**Quality "Built In"**

**Solid Polymer Reference**

**GXV**

**Multiple Sensor Options available**

**Optional Guarded Twist-Lock™ Adapter**

6103 Glenmont Drive  
Houston, Texas 77081  
Local: (713) 772-6641  
Toll Free: (800) 522-7920  
Web: www.VL-PC.com  
e-mail: info@vl-pc.com

**SBA** **Made in the USA**

**We Speak Spanish & Vietnamese**

# Application Guide

Kube Engineering

Analytical Applications



Portamess® 913(X) pH Class 1 Div 1 Rating

Providing the functional abundance of high-quality benchtop meters with easy, icon-guided operation. Compact construction. Comfortable handling.

Robust enclosure, protected against strong jets of water. Appealing design. Extremely flat. Constructed for a firm grip.

Fit for digital communication. Pioneering. Remote-controllable.



The perfectly designed Protos® 3400 (X) measuring system is based on a modular hardware and software concept for liquid analysis and offers flexible solutions precisely tailored to the measuring task. It is also possible to easily measure several process variables such as pH/Cond, pH/pH, Cond/Oxy etc. with the appropriate configuration. The device is fitted with 3 slots and, similar to a PC, it can be simply retrofitted or modified at any time. With all these advantages, the Protos® 3400 (X) offers a previously unknown level of functionality and reliability, and with an extraordinarily high level of user comfort.

A razor-sharp display guarantees superb legibility in the most diverse of light conditions. The integrated SMARTMEDIA card allows for the trouble-free saving of configurations, software updates, and measurement data.

The Protos® 3400 (X) can easily be integrated into PROFIBUS PA or FOUNDATION Fieldbus networks. The measuring system also supports all common analog and digital sensors.

## Facts

- Protos® 3400 (X) S: tightly sealed stainless steel enclosure with hygienic design
- Protos® 3400 (X) C: sturdy, corrosion-resistant coated steel enclosure
- plain-text user interface according to NAMUR – simple and intuitive
- great flexibility provided by modular technology
- modular hardware and software concept permits retrofitting at any time
- 5 process variables simultaneously
- SMARTMEDIA card for saving and transmission of parameter settings, software updates, and measuring data
- high-resolution, transreflective display, white backlighting
- perfect legibility in all light conditions
- operator guidance icon-led
- 6 languages as standard
- global usability thanks to VariPower® power supply, 20 ... 265 V AC/DC
- measuring circuits, galvanically isolated
- 2 current outputs and 4 relay contacts in the basic model
- 2-channel measurement recorder, time and event-controlled, with increased resolution on quick changes
- parameter-set switchover, also remotely
- HOLD function, can be remotecontrolled
- KI recorder detects abnormalities in processes
- Sensocheck® sensor monitoring
- connection possibilities for almost all typical analog and digital sensors available in the world
- optional ComFu® wireless set for wireless data transmission
- ServiceScope® – noise level monitoring of the pH input
- sensor network diagram – synchronoptic representation of the sensor data
- sensor wear monitor
- sensor load matrix
- adaptive calibration timer – automatic standardization
- lightning protection
- explosion protection: II 2(1) GD Ex me ib [ia] IIC T4 T 70 °C
- control of the fully automatic Unical® 9000 (X) calibration system
- control of the fully automatic Unclean® 900 (X) cleaning system
- PROFIBUS PA
- FOUNDATION Fieldbus
- 3-year warranty

# Application Guide

Kube Engineering

Analytical Applications

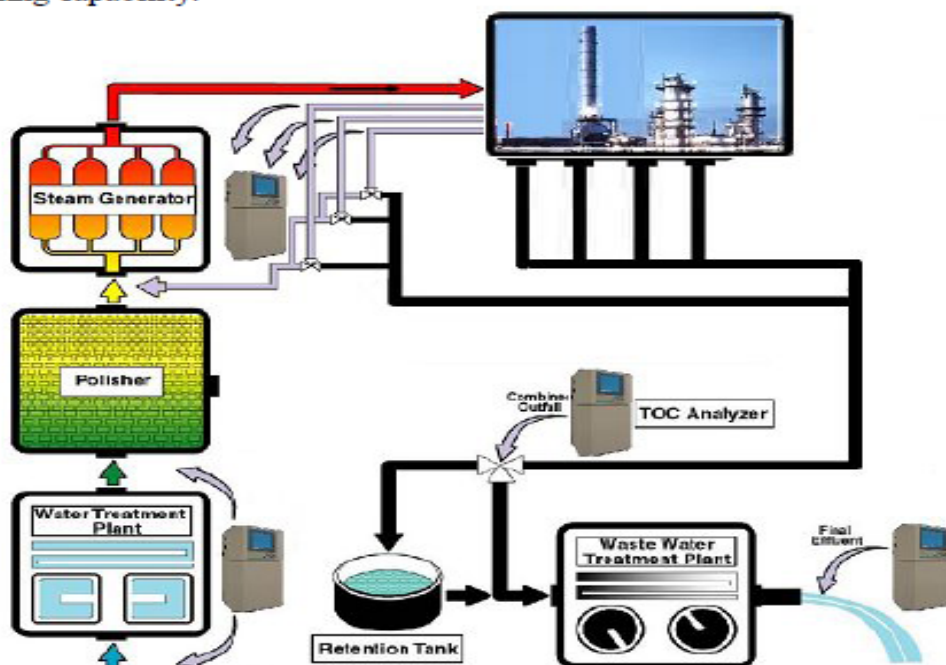


O-I Analytical 

## Breakthrough Monitoring

### Condensate return

Chemical and petrochemical facilities consume large amounts of energy and require significant volumes of water for producing electrical power and providing a source of process heating/cooling capability.



In the production of electrical power, water is heated in a boiler to create high pressure steam. Once used in turbines for power production, the remaining saturated steam is made available for heating throughout a production facility. The considerable heat energy remaining in the steam is made available for heating in the production processes prior to return to the condensate well for reuse. The steam is condensed and the TOC level is measured. The TOC concentration determines if the water is "clean enough" to be reused in the steam cycle. By using TOC data generated from analysis of heat exchanger condensate, a pinhole leak in an exchanger can be detected prior to a catastrophic breakdown occurring. The user can prevent excessive operating costs by minimizing heat exchanger downtime through scheduled repairs.

These sensors ensure that utility water is free from contamination so that water from evaporator condensate can now be reused for boiler feed. This has proven to be an extremely beneficial process improvement, reducing plant water usage as well as reducing wastewater costs.



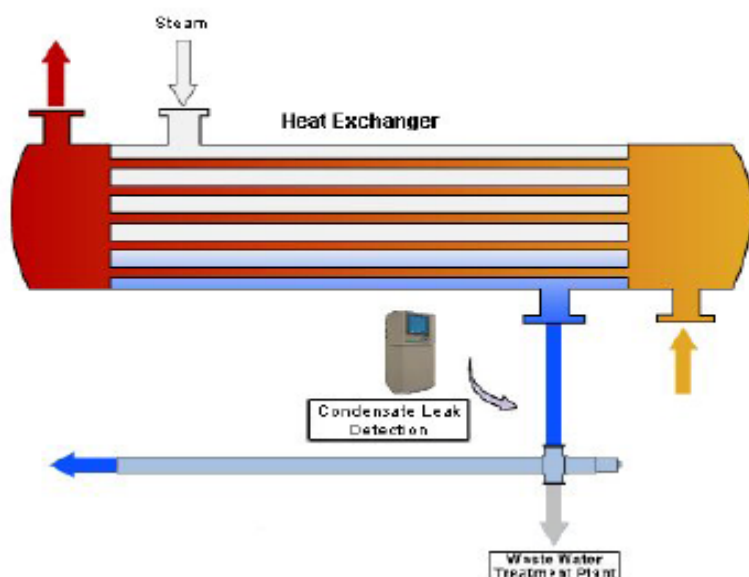
# Application Guide

Kube Engineering

Analytical Applications



Any area where water is used to heat or cool the process stream, there is a chance of product leakage or carryover. The use of



continuous in-line TOC monitoring allows for exchanger leakage to be caught and isolated before complete failure is experienced. Easy to install and implement, process TOC analyzers will provide a rapid return on investment.

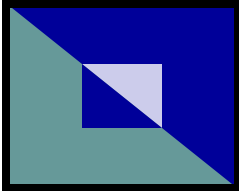
If the event steam condensate can not be reused, then it is sent to the outfall or waste. When steam condensate has been sent (dumped) to the outfall, it is considered consumed, and the operating unit bears the cost of both makeup water to replenish the steam condensate that was lost and the treatment of the generated waste.

## Benefits

- Immediate Detection of Seal Leakage or Failure
- Protection From Accidental Environmental Emissions
- Reduced Manual Sampling and Lab Analysis
- Equipment Protection – Avoid Leakage Damage
- Lower Maintenance Costs

## TOC Applications

- a. Source water
- b. Source water treatment monitoring
- c. Condensate monitoring
- d. Cooling water monitoring



# Special Actuation/valves

Kube Engineering



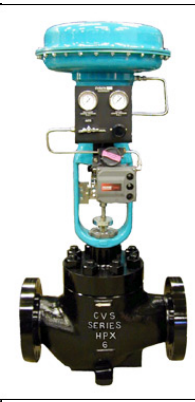
**HIGH PRESSURE  
WELDED END BALL VALVES  
HTV SERIES  
1500# Through 2500#**

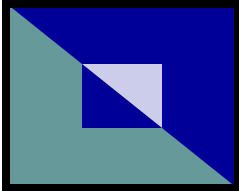


**2000 SERIES  
WELD END  
SOCKET WELD, BUTT WELD, NPT  
600# THROUGH 2500#**



Full line of control valves for drop-in replacements. V100 full port control valve. E-Body, D-Body as well as HPS/HPAX high pressure applications.





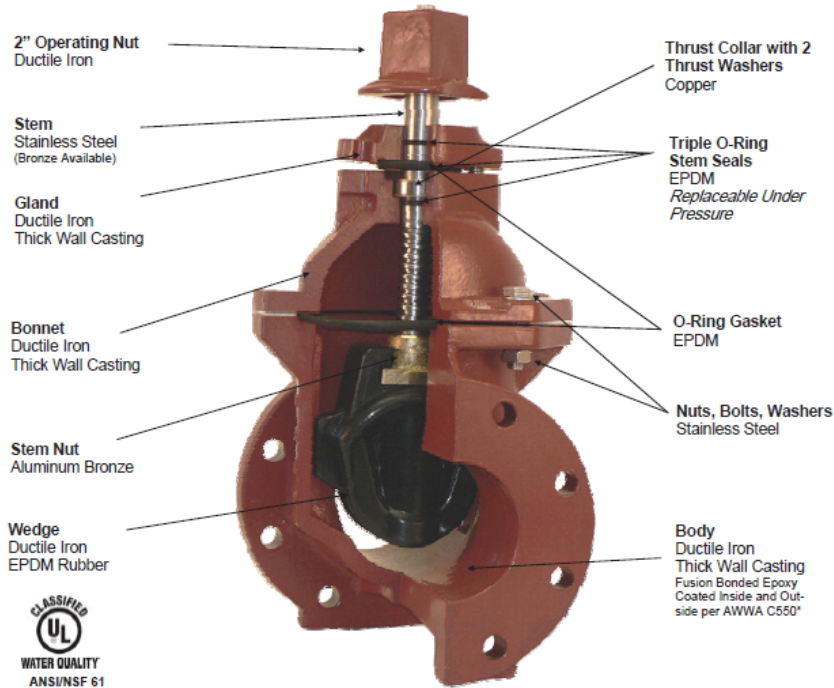
# Application Guide

Kube Engineering

Misc Equipment

## Miscellaneous Equipment

### AWWA C509 & C515 Resilient Seated Solid Wedge Gate Valve Materials of Construction



ANSI/NSF 61 - Certified by U/L



FL X FL, NRS  
Resilient Seated  
Sizes: 2" - 72"  
Series 6800



MJ X MJ, NRS  
Resilient Seated  
Sizes: 2" - 48"  
Series 6900



FL X MJ, NRS  
Resilient Seated  
Sizes: 2" - 48"  
Series 6600



FL X FL, OS&Y  
Resilient Seated  
Sizes: 2" - 36"  
Series 6700



PO X PO, NRS  
Resilient Seated  
Sizes: 4" - 12"  
Series 6500



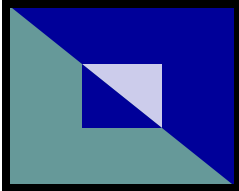
FL X PO, NRS  
Resilient Seated  
Sizes: 4" - 12"  
Series 6400



FLXFL, NRS  
Metal Seated  
Sizes: 2" - 48"  
Series 3800



FLXFL, OS&Y  
Metal Seated  
Sizes: 2" - 48"  
Series 3700



# Actuation and Valves

**Kube Engineering**

Well Head

**Actuation:**

A combination of electric (explosion proof) and pneumatic actuators which go on various valves throughout the plant. We offer high temperature (450 degF) pneumatic actuators, explosion proof electric actuators and electric explosion proof spring return actuators.



**Applications:**

- 1) Well Head tester, operates the valve for reject
- 2) Tank heater control valves, in the steam loop controlling the steam for tank heating

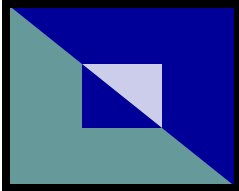


The Asahi-America Quarter Master Chief Series 92 and WellMark Series 2020 is a proven system and ideal for use in well head control, in gas gathering systems to regulate flow, for CO2 and water steam injection systems as well as pressure separators. Suitable for water, gas and other liquid services.



The Asahi-America's Quartermaster Chief series 92 and Taylor Choke Valve series MDI and MDA are also widely used.





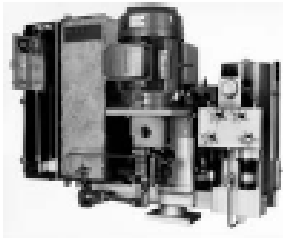
# Pipeline

Kube Engineering



## Delayed Coker Switch Valve

The switch valve diverts coke flow from the heater to drums. MEA enhances the operation with automation. Precise control of the position of the plug prevents improper seating. Automation extended the life of the valves and reduced repair. Used on the Wilson-Snyder and Velan valves.



Pipeline Discharge Control- Electrohydraulic

## OTHER APPLICATIONS

- Emergency Shutdown on water inlet to steam generator
- Nitrogen Blanket reverse flow switching
- Interface control in separation vessels
- Automatic Well test units
- Multipoint Digital Valve Positioning



Pipeline: Oil Flow Control Electrohydraulic



Pipeline: Emergency Shut Down- Electrohydraulic

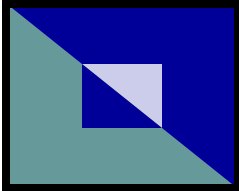


Compressor Surge Control Valve- Electrohydraulic



## ODORANT INJECTION- Natural Gas Transmission

The Max Machinery flow meter is used for precise additive injection dosing of Mercaptan organosulphurs. Typical doses translates to 1-200 cc/min depending on the natural gas velocity.



# Other Products

Kube Engineering

Chemical Injection

## Max Meters Widely Specified for ENHANCED RECOVERY ADDITIVE applications.

The wide rangeability and low flow accuracy capabilities of *MAX-Meters* have resulted in *MAX*- specified systems for many down-hole additive applications. The application profiles vary widely over a long list of chemicals used in enhanced recover operations. Extremes in pressure, viscosity and flow range are not a problem.

The high resolution and wide operating ranges available in all *MAX* flow meters, makes them uniquely suited to record and control the flow rate of drag reducers, foamers and defoamers. Intermittent flow and low flow rates do not detract from the accuracy of the Max, positive displacement meters.

Since the additive component changes (or otherwise adds certain desirable characteristics to) the final injection mix, the formulation must be precise. Further, since this formulation is done "on-the-fly" (as opposed to batch processing), final product quality is dependent on highly accurate metering.

**MAX Equipment Specified:** Due to the low flow rates usually required, the *MAX-213* and *MAX-G004* meters are typically used. Output signals range from frequency, analog, rate indication, alarm limits to closed-loop flow control

Applications: Feedstocks (Shell), Friction Reducer (Conoco), Lube Oil Blends (Mobil, Chevron), Gasoline Additives (Mobil, Chevron, Texaco) and Corrosion Inhibitors (ANR Pipeline).



## Wastewater Sampling

Product: Sirco CVS 4200 indoor sampler

Reason: For laboratory grab samples to test effluent

Benefits: This is a vacuum technology and provides a very clean sample grab without prior contamination of previous sample.



# Tank Farm/Structures

Kube Engineering



**Specific Gravity Analyzers**

Engineered for Ease of Installation and High Reliability

Jogler Specific Gravity Analyzers (SGAs) are a dependable and accurate method for measuring and sampling process liquid levels in virtually any application: acids, caustics, co-generation, light hydrocarbons, beverages, etc.

Jogler SGAs present accurate visual verification of liquid density, can be cross checked against temperature and are compatible with most requirements. Also, they require only small amounts of product for Specific Gravity Measurement.

The hydrometer sleeve and sight tube are made of heavywall borosilicate and the sight chamber is sealed with Teflon Superseals. The Jogler SGAs are equipped with 0.26" FNPT valves for flow control and sampling and the hydrometer is high-visibility and accurate. Installation and maintenance are engineered for simplicity and ease of use.

**Mag Gauge & Transmitter for Oil-Water Separation**

**Mag Gauge Drum Level Indicator**

**Tube-N-Tube Level Gauge**

**Large Diameter Mag Gauge Ultralightweight Hydrocarbon Service**

magnetically up and down tracks the change indicator unit,

There are two flag (patent pending) visibility of an 316SS or another

**Easy Installation**  
Single-section lengths up to 20' or piping to comply multi-section

**Transmitters available**  
Jogler Magnetic for remote level point level switch

ent in sively profile : This n and s fast.

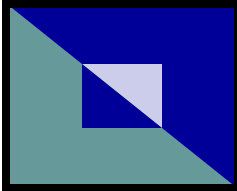
**MGT-6000**

Jogler, Inc.

**Model: LGT-6 For Liquid Level**

Jogler's LGT-8000 level sensor that LGT-8000 contain into (wetted) or applications. The confirmation between level readout of level. The wave Alloy 20, Titanium

**LGT-6000**



# Tank Farm/Structures

Kube Engineering



**TANK HEATER**– Actuator controls the steam valve for heat control on the tanks.



Ross Valve 40DAWR Level Control.  
Purpose: To prevent exceeding a maximum preset storage pressure. Lets the process flow through the same line from storage to user

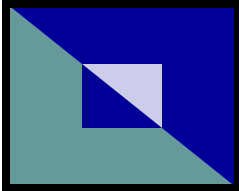


Custom manufactured tanks with modern facilities implementing the latest fabrication procedures, state-of-the-art blasting and coating techniques.



**OIL THIEF**-  
This device from CVS allows for oil sampling within a tank.





# Off Shore Drinking Water and Process Water

Kube Engineering



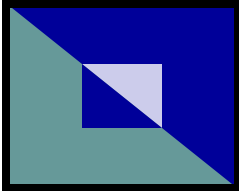
C'treat



Standardized Offshore Watermaker



AIOC	Foxtrot	Phillips Petroleum
Alliance	Global Process Systems	Premier Oil
Amoco	Gulf Resources	Reading & Bates
Anadarko	Hercules	Reading & Bates Drilling
ANR Pipeline	Hess	Reliance Industries
	Hyundai Heavy Industries	Rowan
ARCO		
Arethusa Off-Shore	IMC	Pool
BP	Koch Oil	Pogo
British Gas	LL&E	Rigmar AS
Brown & Root	M3nergy	Rowan Companies
CACT	Marathon	Samedan
Carigali	Maxus	Santos
Chevron	McDermott	Sarawak Shell
CNOOC	Modec	Saudi Aramco
CNG	Mora	Shell
CONHW	Murphy Oil	Sonangol
Conoco	Nabors-Pool Arabia	Sonat Offshore
Conoco Phillips China	Noble Drilling	Star Energy
Cliffs	Noble Energy	Sumitomo Heavy Industries
Cuu Long JOC	Occidental Petroleum	Talisman
Daewoo Heavy Industries	Offshore Express	Texaco
Devon	Oman Petroleum	Transocean
Dolphin Drilling	ONGC of India	Unocal
Dominion Oil	Origin Energy	Vastar
El Paso Production	Oryx Energy	Western Oceanic
ENI Petroleum	Palm Energy	
Enbridge	Pemex	
Enron	Pennzoil	
Ensearch	Perforadora Mexico	
	Pertalahan Arnebatara	
Escal UGS	Natuna	
Esso Australia	PetroBras	
Esso Production Malaysia	Petronas Carigali	
ExxonMobil	Petronas Myanmar	
Falcon	Petro-Tech Peruana	



# Application Guide

Kube Engineering

Misc Equipment



## Your Single Source Solution

- Bulk Transfers
- Waste Removal and Transportation
- Sediment Removal
- On-Site Chemical Storage
- Decontamination Services
  - Clarifiers
  - Containment Areas
  - Storage Tanks

Collection, transportation and recycling of settled solids.

- Lagoon clean-out
- Lagoon closure
- Digester clean-out
- Material transfer between lagoons or facilities

### EMERGENCY SERVICES

- Chemical spills
- Certified Confined Space Entry and Rescue
- 24/7 Emergency Response
- Hazardous Material Acceptable