

ODS Metering Systems



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ODS Organization



- 550 Employees
- Turnover 250 million Euros
- 4 Locations in the Netherlands

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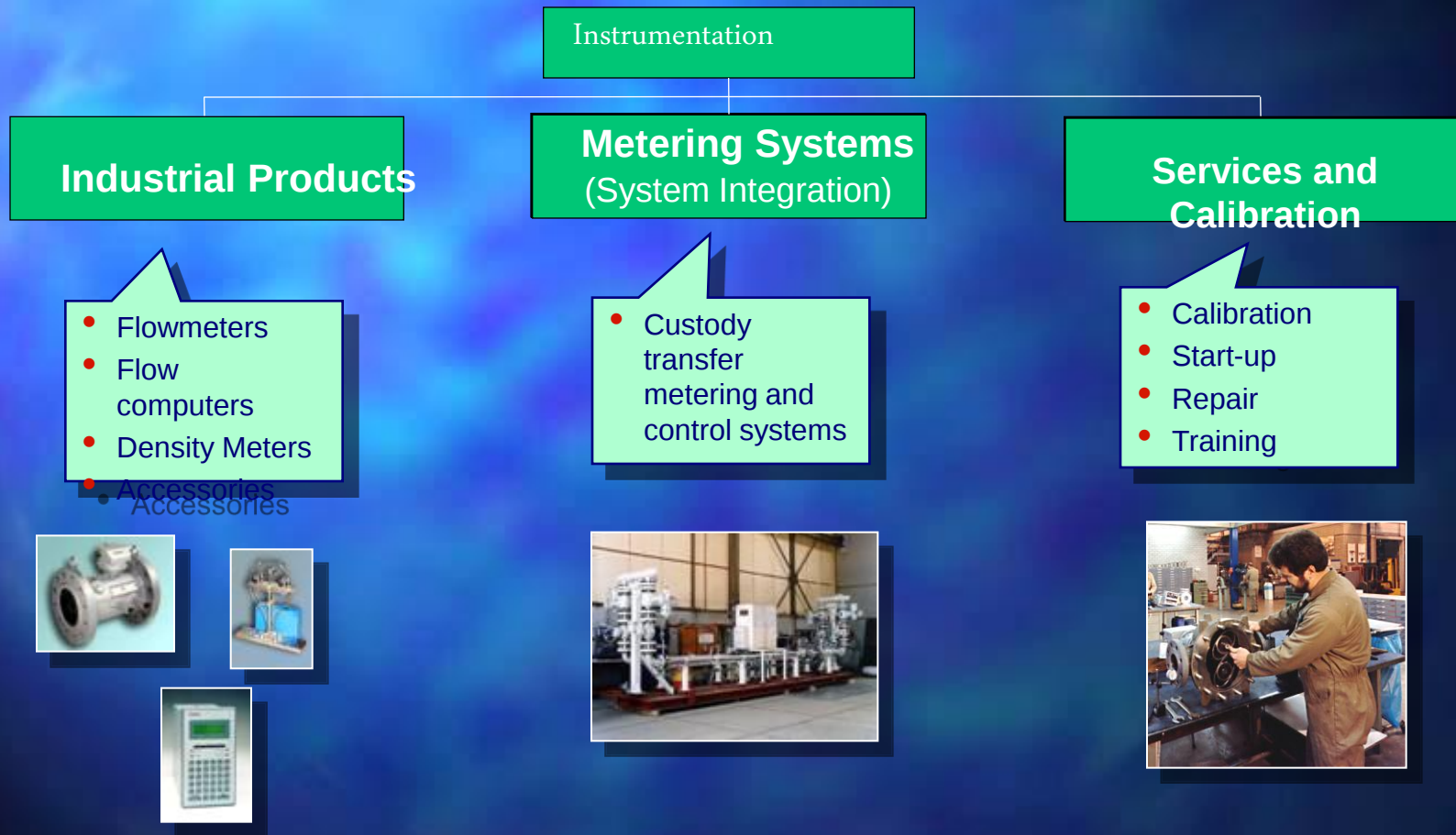
ODS Organization



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ODS Instrumentation



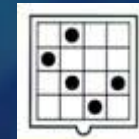
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Calibration Facilities



- Stationary and mobile installations
- Accreditation by NMI, int. traceable
- Test fluids: Water and Oil
- Capacity: Max. 800 m³/h
- Calibration, repair and revision of most volume and mass flow meters.



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The background of the slide is a photograph of an industrial facility, likely a refinery or chemical plant. It shows a complex network of white and blue pipes, large valves with black handwheels, and metal support structures. A blue horizontal line with a red circle on the left side runs across the upper portion of the image.

ODS Metering Systems

Independent Engineering and Fabrication
of
Metering and Control Systems

Why Independent?



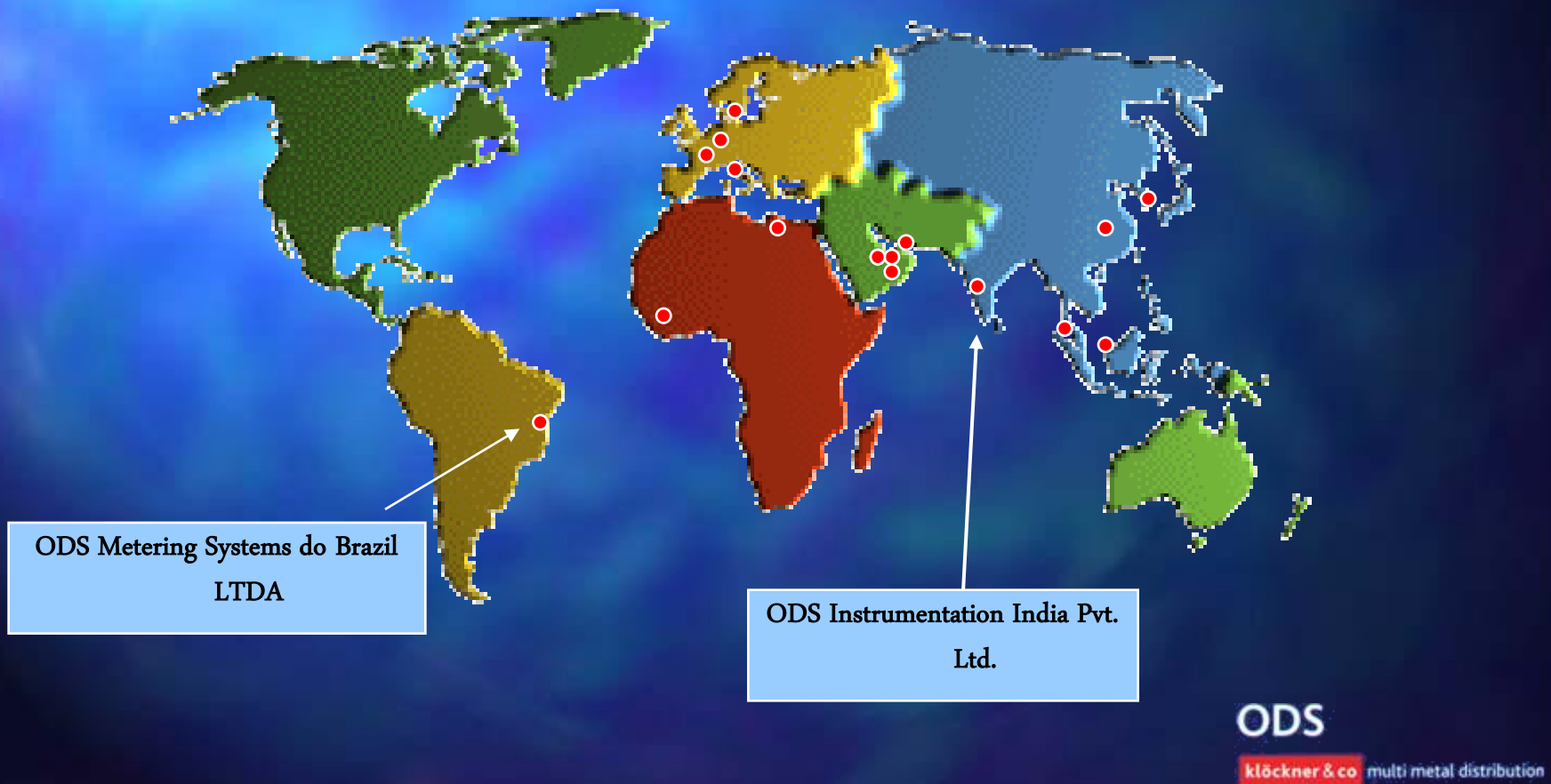
ODS is not related to a flowmeter manufacturer

Advantage of independency?

- No manufacturer driven selection of system components
- The best meter choice for a specific application
- Always's able to confirm to vendor list of end user
- Commercial benefits

Agents and support network

ODS has an agent and support network around the globe
and a subsidiaries in India and Brazil



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Qualifications and Approvals

- Certified by Lloyd's for ISO 9001
- Large international reference list
- Approved vendor for many major oil & gas companies such as:
 - Shell
 - Aramco
 - ExxonMobil
 - Total Elf Fina
 - Gaz de France
 - Petronas
 - etc.



Gulf Advanced Chemical Industries Company Limited

This project, awarded by Fluor Arabia, covered the engineering in per Saudi Arabia Engineering Standards, testing and commissioning of a metering system which will be used for the export from the Saudi Arabia (SABT) Butane pipeline to the Gulf Advanced Chemical Industries Company (GACC). The metering skid is equipped with valves, blower, flow conditioning section, flowmeter, piping, supports, base frame, compact piston prover and is controlled and monitored by a redundant PLC supervisory flowcomputer system.



Total Raffinaderij Vlieland b.v.

Total Raffinaderij Vlieland is a joint venture between TOTAL France and DSM Chemicals. For their large loading operation, ODS was awarded the contract for the design, construction, supply and certification upgrade of their flow computer automation system. The project included 18 loading points at various locations.



Mobil Oil B.V.

This project covers the design, construction, supply, testing, calibration and quality assurance of four custody transfer metering skids and flow computers for loading different types of base oil to tank trucks. The metering installations are approved for custody transfer by NML High accuracy PD meters were used for their high viscous liquids.



/ Single Buoy Moorings

This project included the design, raw material procurement, fabrication, assembly, painting, shop tests, guarantee, packing & forwarding, documentation and technical assistance of all oil metering packages, gas metering packages, and water meters to be installed on a Petrosbras FPSO Hebrides Ltd. A wide variety of measuring principles were used to fulfill the process and authority requirements. The measurements were for Fuel, allocation and operational purposes. A control and supervisory system was supplied based on ODS flow computers.



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Construction capabilities

- Manufacturing located besides the port of Rotterdam
- Crane capacity: upto 60 tons
- Qualified welding capabilities for all materials and wall thicknesses.
- Manufacturing Quality Standards: PED, TUV, ABS, Lloyds, AIB, U-Stamp, DNV, etc.



ODS project services



- Engineering
- Project Management
- Construction
- Calibration
- Certification
- Start-up and training
- Maintenance.

Typical Projects



- Pipeline Metering Systems
 - Oil Offloading Systems
 - Ship, Truck, Rail Loading Systems
 - Control and Supervisory Systems
 - Injection Systems
-
- Liquids
 - Liquified gases
 - Gases

What systems do we offer?

Liquid Metering Systems

- PD-meters
- Turbine Meters
- Coriolis Meters
- Ultrasonic Meters

Gas Metering Systems

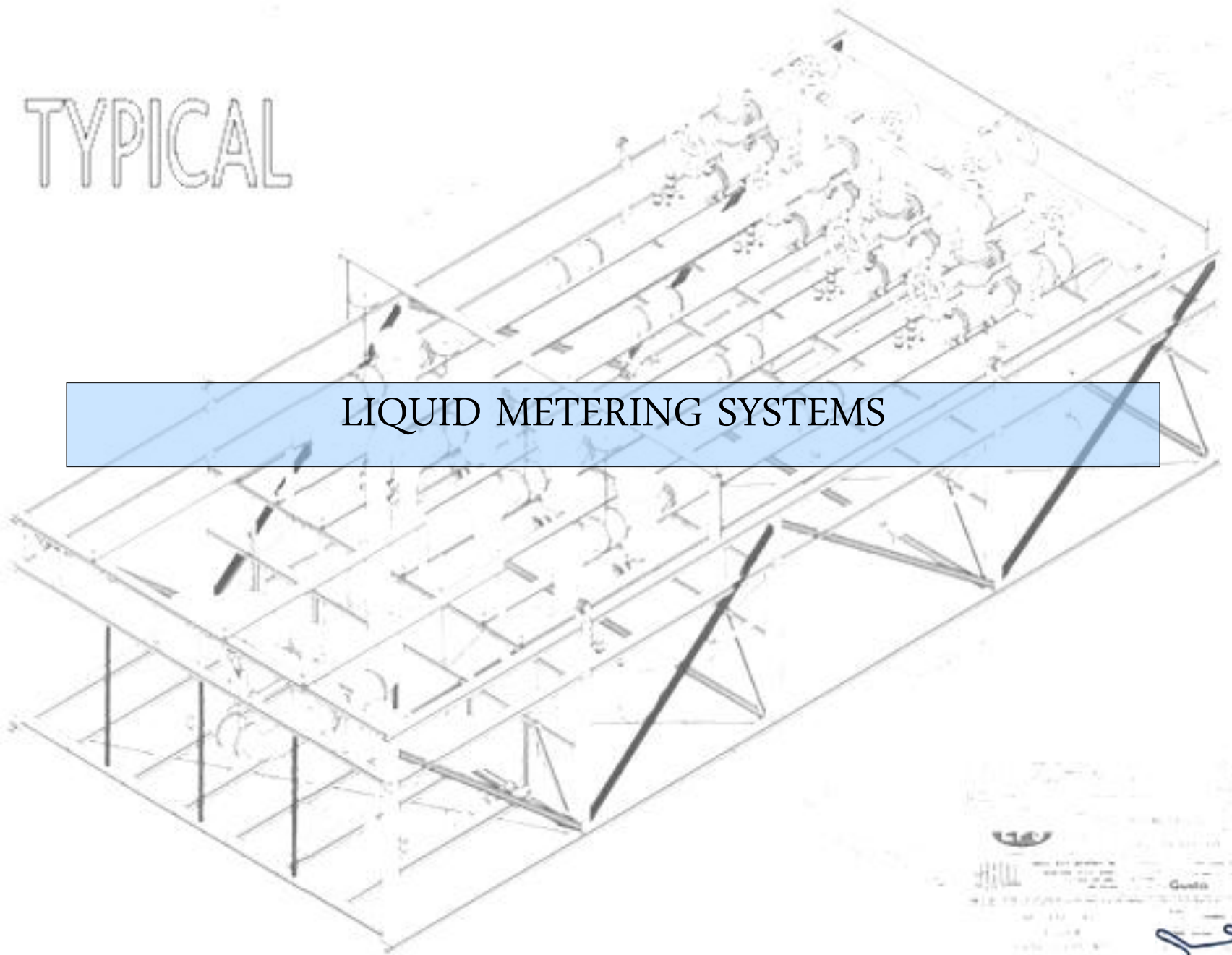
- Orifice meters
- Turbine Meters
- Ultrasonic Meters
- Coriolis Meters

Control and Validation Systems

Injection Systems

TYPICAL

LIQUID METERING SYSTEMS



Liquid Metering Systems



Positive Displacement Meters

Applications

- High viscous liquids
- Truck loading
- Remote locations (no power)

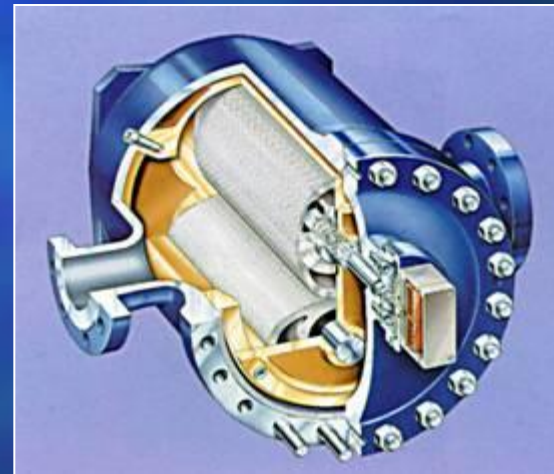


Advantages

- No special installation requirements
- High accuracy
- No power required

Disadvantages

- Strainer required
- High costs at large sizes
- Maintenance
- Periodic calibration required



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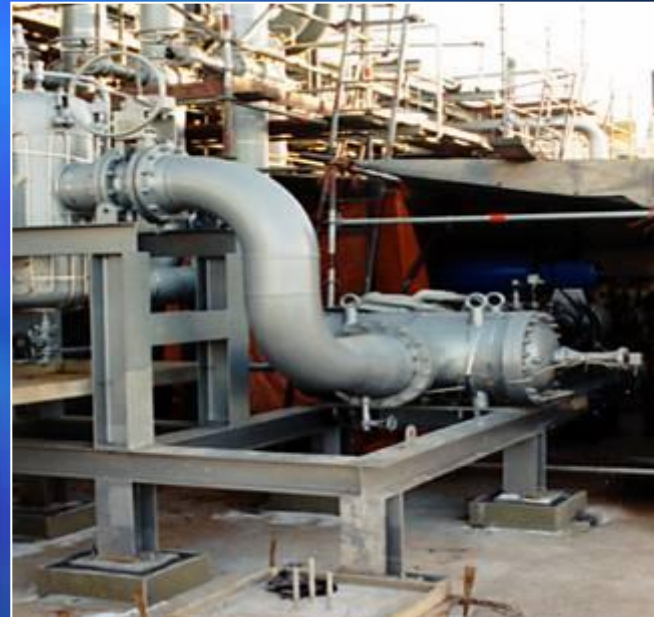
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Kuwait Petroleum



Custody Transfer Ship Loading Installation



Ship loading installation consisting of 12 metering skids (1200 m³/h), cabinets, flowcomputers, supervisory system in communication with the DCS System

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Buna Sow Leuna Olefin GmbH



Four metering systems consisting of:

- Strainers, gas separators and PD-meters
- Control cabinet



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Liquid Metering Systems



Turbine Meters

Applications

- Low viscous liquids
- Higher flow rates

Advantages

- Proven technology
- High accuracy and repeatability
- Real time proving possible

Disadvantages

- Strainer required
- Flow profile conditioning required
- Maintenance
- Periodic calibration required



Crude Oil Offload Metering System for the FPSO Falcon (Yoho field Nigeria)



- Design Capacity 7500 m³/h
- 30" bi-directional ball prover
- Fast loop sampling/analysing system

Crude Oil Offload Metering Systems for the FPSO'S Serpentina (Equatorial Guinae) and Xikomba (Angola)



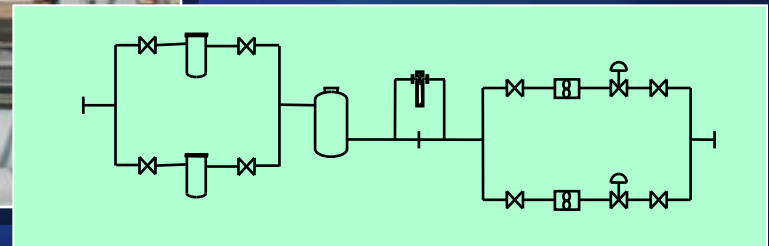
- Design Capacity 7000 m³/h
- 30" bi-directional ball prover
- Fast loop sampling/analysing system



Metering Station for Liquefied Propane Gas (LPG)



- Capacity 960 m³/h
- Pressure: 20 barg
- 2 x 50% meterrun
- Filter section
- Flow Computer cabinet



Liquid Metering Systems



Coriolis Meters

Applications

- All liquids
- Pipeline, loading/offloading

Advantages

- Direct mass flow measurement
- No strainer required
- No flow profile requirements
- Transfer calibration possible
- Low/no maintenance

Disadvantages

- Higher pressure drop
- Calibration with small volume provers more difficult





Veba Oil (HHI)



Fiscal Crude Oil Metering System



- Capacity 1750 m³/h
- 2 off. 12" Rheonik mass flowmeters
- In-line sampling system

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Nederlands Aardolie Maatschappij

Custody Transfer Metering System for condensate



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Custody Transfer Flow Measurement System for
Fina Raffinaderij Antwerpen N.V.

- Two Rheonik coriolis meters in series
- Prover connections
- Dual stream Omni Flowcomputer





Crude Oil Metering Systems for Forcados Yokri Project



- Three metering skids
- 12 ea. 4" coriolis meters





Argos Oil



Fuel Oil jetty loading with 12" coriolis meters



- 4 x 12" Rheonik coriolis meters:
 - 750 - 1500 m³/h
 - 93 degC
- OMNI Flowcomputers
- System integration

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Liquid Metering Systems



Ultrasonic Flowmeters

Applications

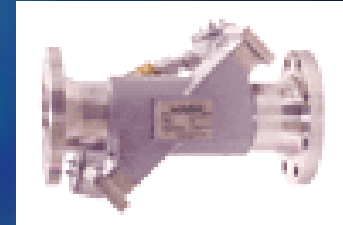
- All liquids, larger sizes
- Pipeline, loading

Advantages

- No strainer required
- Large sizes possible
- No pressure drop
- Low/no maintenance
- No proving required ???

Disadvantages

- Dependent on flow profile
- Calibration with small volume provers difficult
- Short experience





Three metering systems for Shell Nederland Raffinaderij, The Netherlands



- Gasoil Import (2000 m³/h)

- 2 blender skids (Kero, LGO, HGO)





NATO Pipeline



Modification manifolds at various locations in The Benelux. Replacing turbine meters for multi-path ultrasonic flowmeters



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Various metering packages for the Petrobras FPSO Marlim Sul located in Brazil



- Fiscal Oil to Storage Metering System
- Fiscal Gas Meterruns
- Allocation Metering
- Production Metering





Ethylene Pipeline Metering System



- Special design Ultrasonic Flowmeters
- OMNI Flowcomputers for $V_s \leftrightarrow$ density computation
- Control system with HMI



Gas Metering Systems



Orifice Flowmeters

Applications

- All gases
- Pipeline, monitoring

Advantages

- Proven technology
- Widely accepted

Disadvantages

- Theoretical accuracy
- Straight run requirements
- Low turn-down



Metering system for high pressure natural gas:



BASF Antwerpen N.V.



Natural gas pressure regulating and metering station



- Capacity 25.000 Nm³/h.
- Pressure 17⇒4 bar
- Size 6"⇒8"



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Gas Metering Systems



Turbine Flowmeters

Applications

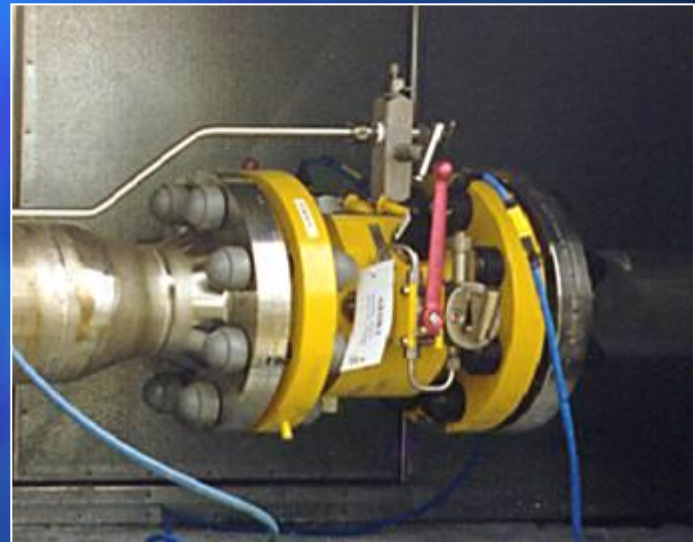
- All gases
- Pipeline, monitoring

Advantages

- Proven technology
- Widely accepted

Disadvantages

- Straight run requirements
- Periodic calibration required

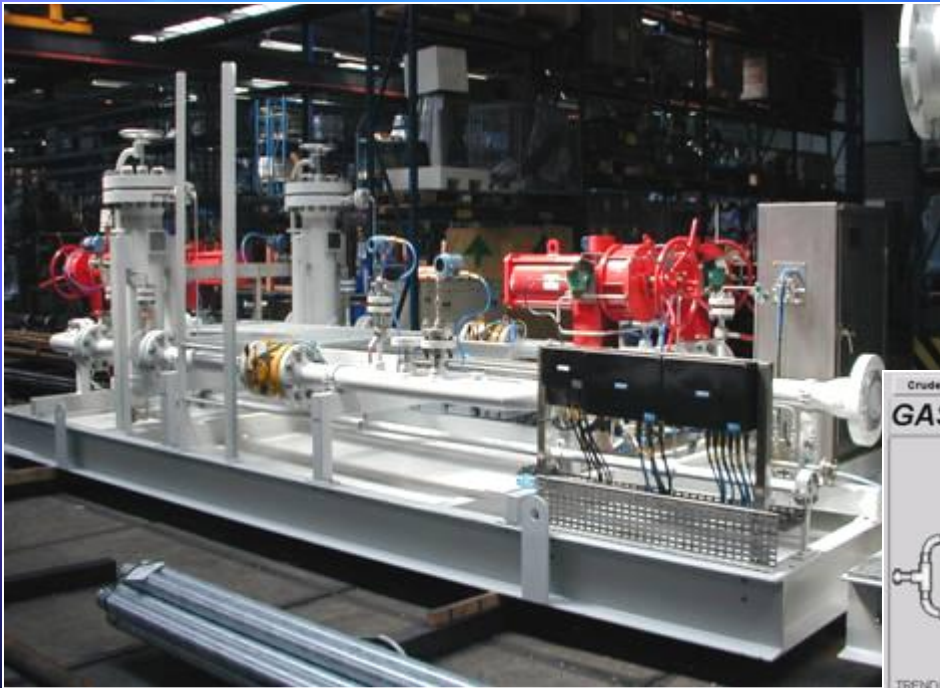




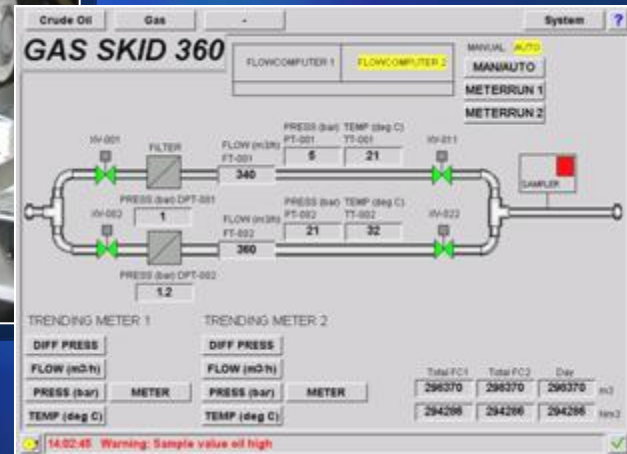
Veba Oil (HHI)



Fiscal Gas Metering System



- Capacity 20.000 Nm³/h
- 2 off. 100% meterrun
- Bypass sampling system



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Gas Metering Systems



Ultrasonic Flowmeters:

Applications

- All gases
- Pipeline, monitoring

Advantages

- High accuracy
- Low/no maintenance requirements
- Additional process information

Disadvantages

- Straight run requirements

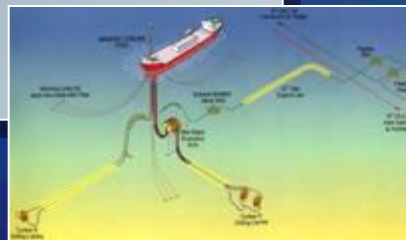




/ Maersk Oil Qatar



Ultrasonic in-line flowmeters for measurement of natural gas.



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Korean National Oil Company (HHI)



Fiscal Gas Metering Systems



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Cawthorne Channel Gathering Project



- One 16" fiscal gas metering system based on senior orifice fittings
- Two 10" gas metering systems based on ultrasonic flowmeters
- Gas analyser house and control room



Gas Metering Systems



Coriolis Flowmeters:

Applications

- All gases, usually high pressure
- Gas distribution

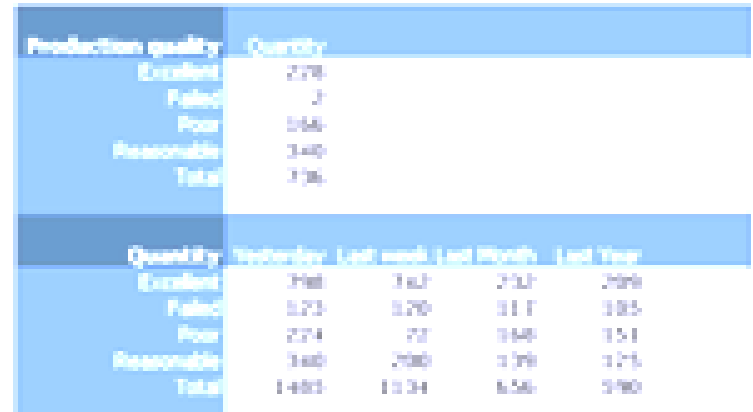
Advantages

- Direct mass measurement
- Low/no maintenance requirements

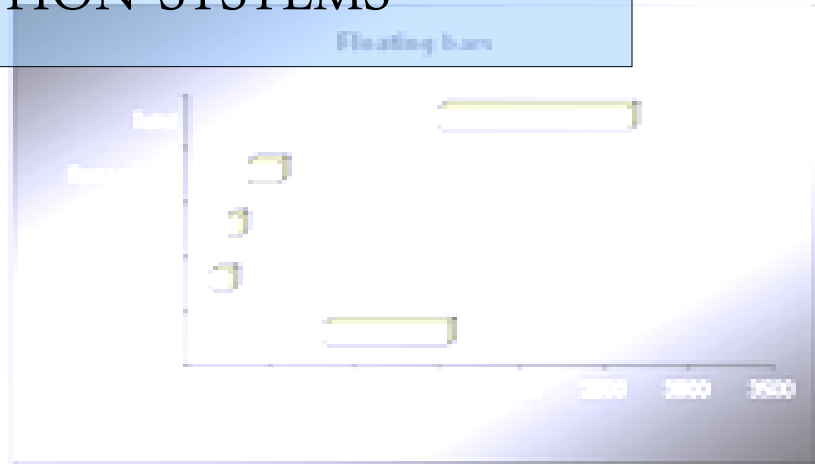
Disadvantages

- High pressure drop
- Low turn-down





Proportion of Total Quantity



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116	118	120	122	124	126	128	130	132	134	136	138	140	142	144	146	148	150	152	154	156	158	160	162	164	166	168	170	172	174	176	178	180	182	184	186	188	190	192	194	196	198	200
3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81	84	87	90	93	96	99	102	105	108	111	114	117	120	123	126	129	132	135	138	141	144	147	150	153	156	159	162	165	168	171	174	177	180	183	186	189	192	195	198	201	204	207	210	213	216	219	222	225	228	231	234	237	240	243	246	249	252	255	258	261	264	267	270	273	276	279	282	285	288	291	294	297	300
4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100	104	108	112	116	120	124	128	132	136	140	144	148	152	156	160	164	168	172	176	180	184	188	192	196	200	204	208	212	216	220	224	228	232	236	240	244	248	252	256	260	264	268	272	276	280	284	288	292	296	300	304	308	312	316	320	324	328	332																	

P1 mfg.	P2 Customer	P3 User 1	P4 User 2	P5 User 3	P6 User 4	P7 User 5	P8 User 6	P9 User 7	P10 Admin	P11 Involved	P12 Involved
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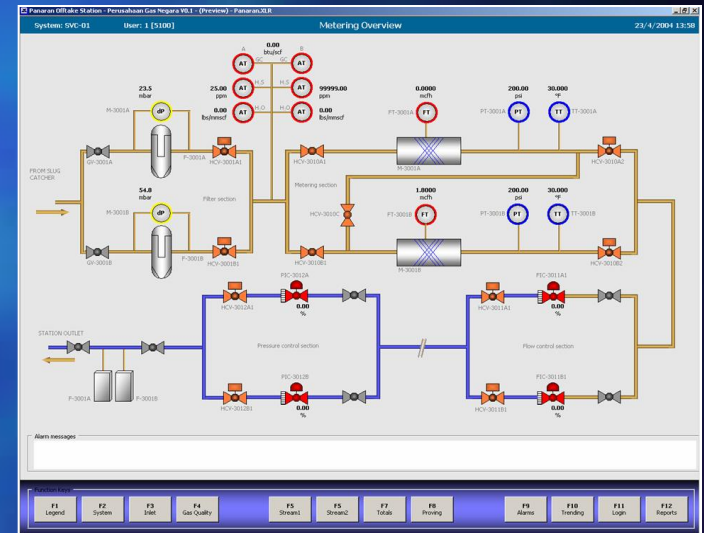
Control and Validation Systems

- Flow computer cabinets
- Supervisory Systems
- Human Machine Interface
- Validation system
- Data trending and archiving



OMNI e^{XL}erate HMI Supervisory System

- HMI functionality added to Microsoft Excel
- Fully free configurable
- Complex calculations (gas flash/VOS) as animations
- Open MS Architecture
- Easy data connection through LAN or Internet.



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OMNI eXLerate Software Philosophy



- Most HMI software is focused on presentation / visualisation of real time data
- More complex (calculation) tasks requires third party software or tailor made components
- eXLerate uses MS Excel for calculations, libraries, trending, event logging, reporting, security, etc. in a powerful single integrated environment
- Due to the use of standard MS office software fast learning and configuration curves for users.

OMNI e*XL*erate Performance Monitoring

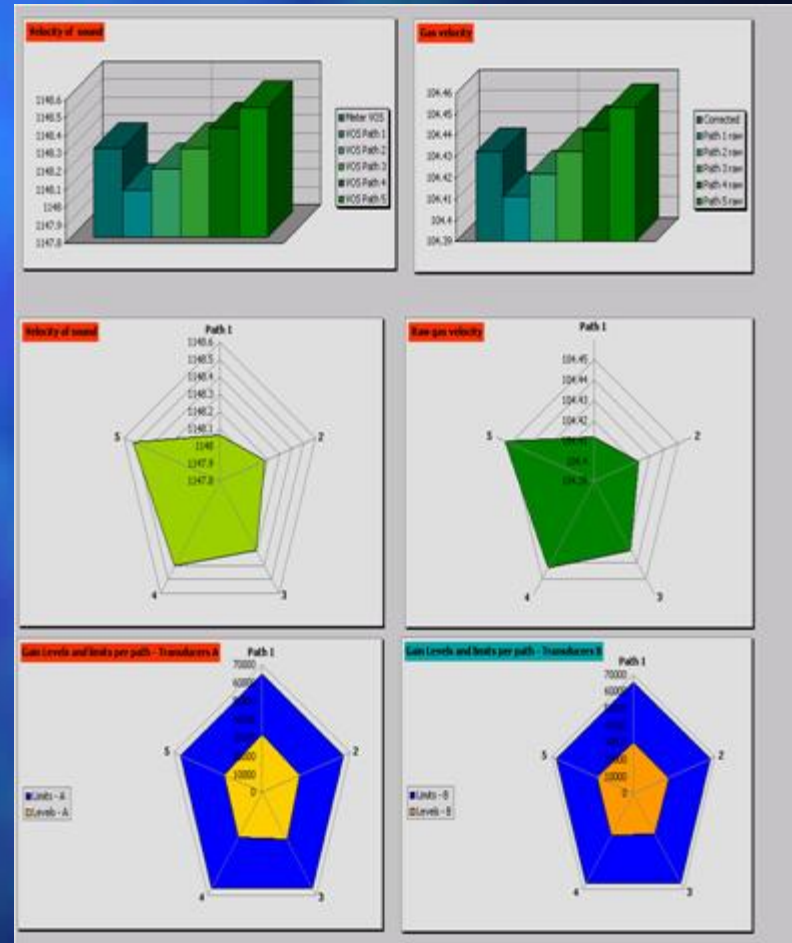


Using SPC techniques to detect:

- Drift
- Shift

For UFM's

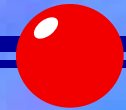
- VOS check
- Signal strength
- Deviation per path
- Etc.



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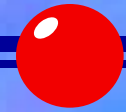
OMNI eXLerate Trending



- Real time & historical trending
- Many standard graph types within Excel
- Flexible customisation



OMNI e^{XL}erate System Maintenance



- Object animation
- Calibration records
- Instrument history
- Alarm management
- Event logging
- Performance monitoring
- Historical trending.

Ultrasonic meter Service Report
Service Center Page 1/1

TEST 1 - PERFORMANCE
The test provides a gross indication of meter condition by comparing per gallon volume measurements.

Test	Unit	Value	Unit	Value	Unit	Value
1.1	gpm	10.00	gpm	10.00	gpm	10.00
1.2	gpm	10.00	gpm	10.00	gpm	10.00
1.3	gpm	10.00	gpm	10.00	gpm	10.00

TEST 2 - GROSS AVERAGE
Gross average for each velocity and rate measurement from benchmarks.

Test	Unit	Value	Unit	Value	Unit	Value
2.1	gpm	10.00	gpm	10.00	gpm	10.00
2.2	gpm	10.00	gpm	10.00	gpm	10.00
2.3	gpm	10.00	gpm	10.00	gpm	10.00

TEST 3 - VOLUMETRIC VARIATION CALCULATION
The test provides an indication of whether meter drift, path length or GPM factor causes meter performance against an independent reference.

Test	Unit	Value	Unit	Value	Unit	Value
3.1	gpm	10.00	gpm	10.00	gpm	10.00
3.2	gpm	10.00	gpm	10.00	gpm	10.00
3.3	gpm	10.00	gpm	10.00	gpm	10.00

TEST 4 - PER FROM GROSS RATES AND PER
The test evaluates the meter's change in GPM factor per gallon volume over the year's range and indicates the device's status, while the value is 0.

Test	Unit	Value	Unit	Value	Unit	Value
4.1	gpm	10.00	gpm	10.00	gpm	10.00
4.2	gpm	10.00	gpm	10.00	gpm	10.00
4.3	gpm	10.00	gpm	10.00	gpm	10.00

TEST 5 - PROPOSED FACTOR EXPANSION
The test evaluates the meter's change in GPM factor between 0.000000 and 0.000000.

Test	Unit	Value	Unit	Value	Unit	Value
5.1	gpm	10.00	gpm	10.00	gpm	10.00
5.2	gpm	10.00	gpm	10.00	gpm	10.00
5.3	gpm	10.00	gpm	10.00	gpm	10.00

Ultrasonic meter Service Report
Service Center Page 1/1

Final Batch Report
System A (Snapshot)

Batch Number: 84
Commenced Loading at: 26 May 2004 15:23:58
Completed Loading at: 06 Jun 2004 08:00:00

	Units	Unofficial	Official
Batch Averages			
Process Temperature	[°C]	45.00	
Process Pressure	[kg/cm²]	42.00	
Process Density	[kg/m³]	483.502	
Standard Density	[kg/m³]	483.502	
Gross Volume Flow Rate	[m³/hr]	315.2	
Gross Volume Flow Rate	[m³/hr]	180	
Batch Totals			
Gross Volume	[m³]	20.2	20.2
Dry Gross Volume	[m³]	20.2	19.3
Standard Volume	[m³]	19.6	19.6
Mass	[t]	13.8	14.6
Dry Mass	[t]	13.8	14.0
Standard Mass	[t]	13.8	13.8
Dry Standard Mass	[t]	13.8	13.8
Mass	[t]	13.8	14.4
Dry Mass	[t]	13.8	13.8
Cumulative Totals of Batch End			
Gross Volume	[m³]	194.0	
Standard Volume	[m³]	162.7	
Mass	[t]	590.2	
Vessel Information			
Vessel Name			
Cargo Number			
Destination			
Berthing Time	[h:m]	0.0	
Requested Volume	[m³]	0	
Comment			
Notes			
Notes			
Notes			
Notes			

OMNI e^{XL}erate Reporting



Reports are generated as Excel worksheets

- Direct interface with OMNI Report Generator
- Maximum flexibility in offering user definable reports
- All data in supervisory is available for reports
- Storage possibilities as HTML formats

Current Values Report

System A

(Snapshot)

Current values at :

30/May/2004 21:06:38

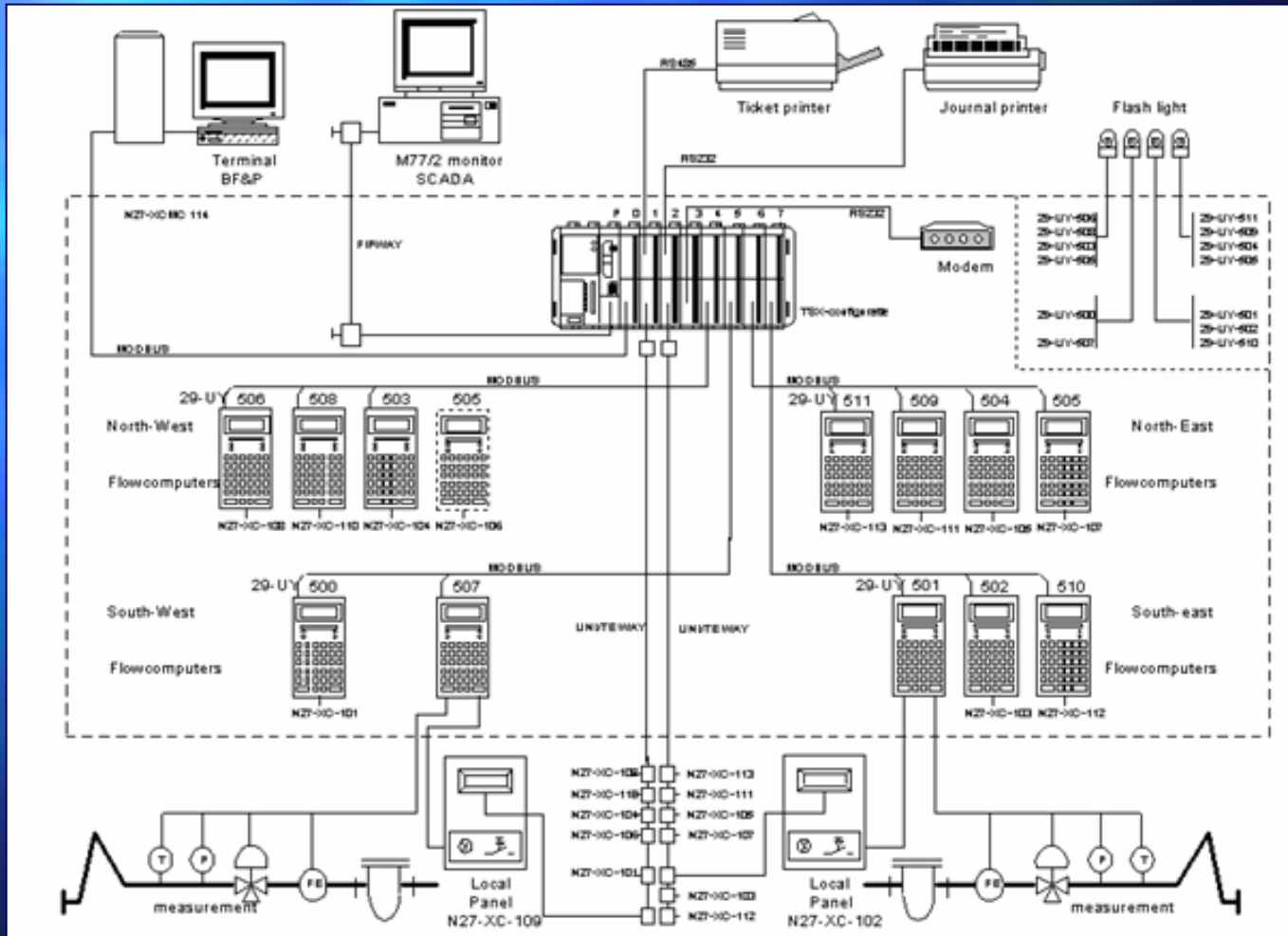
		Line A			
CURRENT VALUES	Units	Stream 1	Stream 2	Master Meter	Station
Conditions					
Body Temperature	[°C]	12.00	0.00	0.00	
Process Temperature	[°C]	45.00	0.00	0.00	
Process Pressure	[bara]	42.00	0.00	0.00	
Process Density	[kg/m ³]	683.58	0.00	0.00	
Standard Density	[kg/m ³]	705.13	0.00	0.00	
ESWA content	[% v/v]				
Flow rates					
Gross Volume	[m ³ /hr]	315.21	0.00	0.00	
Standard Volume	[m ³ /hr]	305.58	0.00	0.00	
Mass	[ton/hr]	215.47	0.00	0.00	
Cumulative Totals					
Cum. Gross Volume	[m ³]	974.0	0.0	0.0	
Cum. Standard Volume	[m ³]	962.7	0.0	0.0	
Cum. Mass	[ton]	588.2	0.0	0.0	
Batch Gross Volume	[m ³]	0.0	0.0	0.0	
Batch Standard Volume	[m ³]	0.0	0.0	0.0	
Batch Mass	[ton]	0.0	0.0	0.0	
API Constants					
Calculation Type		API	Disabled	Disabled	
Density Standard Calculation		Calculated	Manual	Manual	
Fluid Type		Crude	Crude	Crude	
Standard Temperature	[°C]	15.00	0.00	0.00	
API Calculations					
Oil (15 °C to process)		0.962576	0.000000	0.000000	
Cpl (0 barg to process)		1.007126	0.000000	0.000000	
Oil (15 °C to standard)		1.000000	0.000000	0.000000	
Cpl (0 barg to standard)		1.000000	0.000000	0.000000	



Project: MSPO-2:

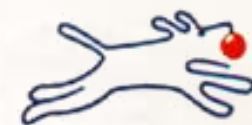
Cabinets with OMNI Flow Computers for various chemicals and steam.





Control system for ship loading installation

INJECTION SYSTEMS



Injection Systems

- Additive injection
- Corrosion inhibitors
- Ratio controlled





Veba Oil (HHI)



Injection Systems



- Methanol injection system



- Corrosion inhibitor injection system

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Shell



Injection systems for Shell Refinery Pernis



- 2 additive injection skids

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