

# Solutions from Essex Lloyds



**PROFESSIONAL**

**INNOVATIVE**

**SOLUTIONS**

## VISION

Essex Lloyds Engineering Services aspires to be a globally recognized engineering concern consistently delivering excellence in offering service with comprehensive solutions through building robust client loyalty, adopting optimal engineering methodologies, empowering effective communication and endorsing proactive planning.



## MISSION

Essex Lloyds Engineering Services is committed to provide technically excellent, innovative smart solutions and studies, offering engineering services throughout the project lifecycle for the benefit of our customers to meet their operational and business objective in terms of sustainability, profitability, reliability and safety.



## ABOUT US

Essex Lloyds Engineering Services, is an Engineering Service company formed by highly experienced engineers specialized in their field of expertise, offering unique engineering services including Safety & Environment engineering/Management services by conducting various safety studies for Green field/Brown field projects & running plants, Sustainable Total Asset Reliability Services, Project Management support services and Design & Detailed engineering of multi-discipline projects catering to all sectors with specialization in Oil & Gas and Process Industries, supporting projects from FEED stage through start-up to final handover & closeout. We have formed a pool of highly experienced and enthusiastic technical resources capable of handling most challenging and demanding tasks in Projects.

# Business Lines

<b>1</b>	<b>Solutions in Industrial Reliability</b>
<b>A</b>	<b>Services Offered in Industrial Reliability</b>
i	Services offered in Condition Monitoring
ii	Services offered in Proactive Maintenance (PM)
iii	Planned Preventive Maintenance (PPM) services for Chilled water pumps & motors & Chiller Panels
iv	Services offered in Lubrication Management
v	Services offered in Motor & Generator Condition Monitoring
<b>B</b>	<b>Products offered in Industrial Reliability</b>
i	Products for Vibration Monitoring
ii	Products for Ultrasound Monitoring
iii	Products for Laser Alignment
iv	Products from Lubrication Management
v	Products for Motor & Generator Condition Monitoring
<b>2</b>	<b>Electrical Testing Services</b>
<b>3</b>	<b>Safety Studies</b>
<b>4</b>	<b>Data Acquisition</b>
<b>A</b>	<b>Services</b>
<b>B</b>	<b>Products</b>
<b>5</b>	<b>VFD Supply &amp; Services</b>
<b>6</b>	<b>Services for Chillers &amp; Cooling Towers</b>
<b>7</b>	<b>Mechanical Maintenance &amp; Overhauling</b>
<b>8</b>	<b>Installation &amp; Commissioning Services</b>
<b>9</b>	<b>Environmental Monitoring</b>
<b>A</b>	<b>Products offered for Environmental Monitoring</b>
<b>10</b>	<b>Services for Inline Pipe Leak Detection for Water &amp; Oil applications</b>
<b>11</b>	<b>Products offered from Orthodyne</b>
	<b>Industrial Gas Chromatographs &amp; Gas Analyzers</b>
<b>12</b>	<b>Products offered from Coltraco</b>
	<b>Ultrasonic - Flowmeters, Level inspection devices</b>
<b>13</b>	<b>Production Measurement, Auditing &amp; Calibration</b>
<b>14</b>	<b>Other Products, Services &amp; Solutions</b>

## Solutions in Industrial Reliability

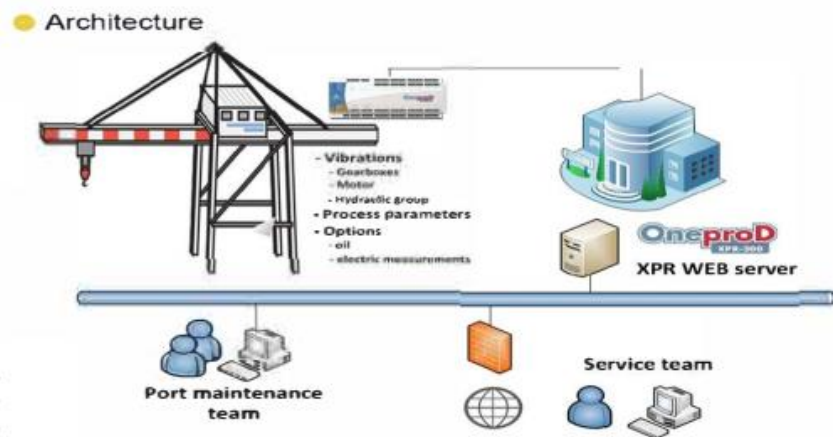
In Plant Reliability, we offer, Services as well as Products and Solutions from our various Principals.

### SERVICES Offered in Industrial Reliability

In Plant Reliability we offer services in following areas:

Condition Monitoring	Proactive Maintenance (PM)	Planned Preventive Maintenance (PPM)
Motor & Generator Condition Monitoring.		Lubrication Management

### Services Offered in Condition Monitoring



### Field Services

- Vibration, noise, Airborne and Structure Borne Ultrasound Measurements & Analysis
- Vibration & Ultrasound Troubleshooting, Site Survey, Commissioning & Start - Up.
- Vibration, Ultrasound, Process Safety and Process Design certifications and training
- Lube oil filtration, oil sampling and testing.

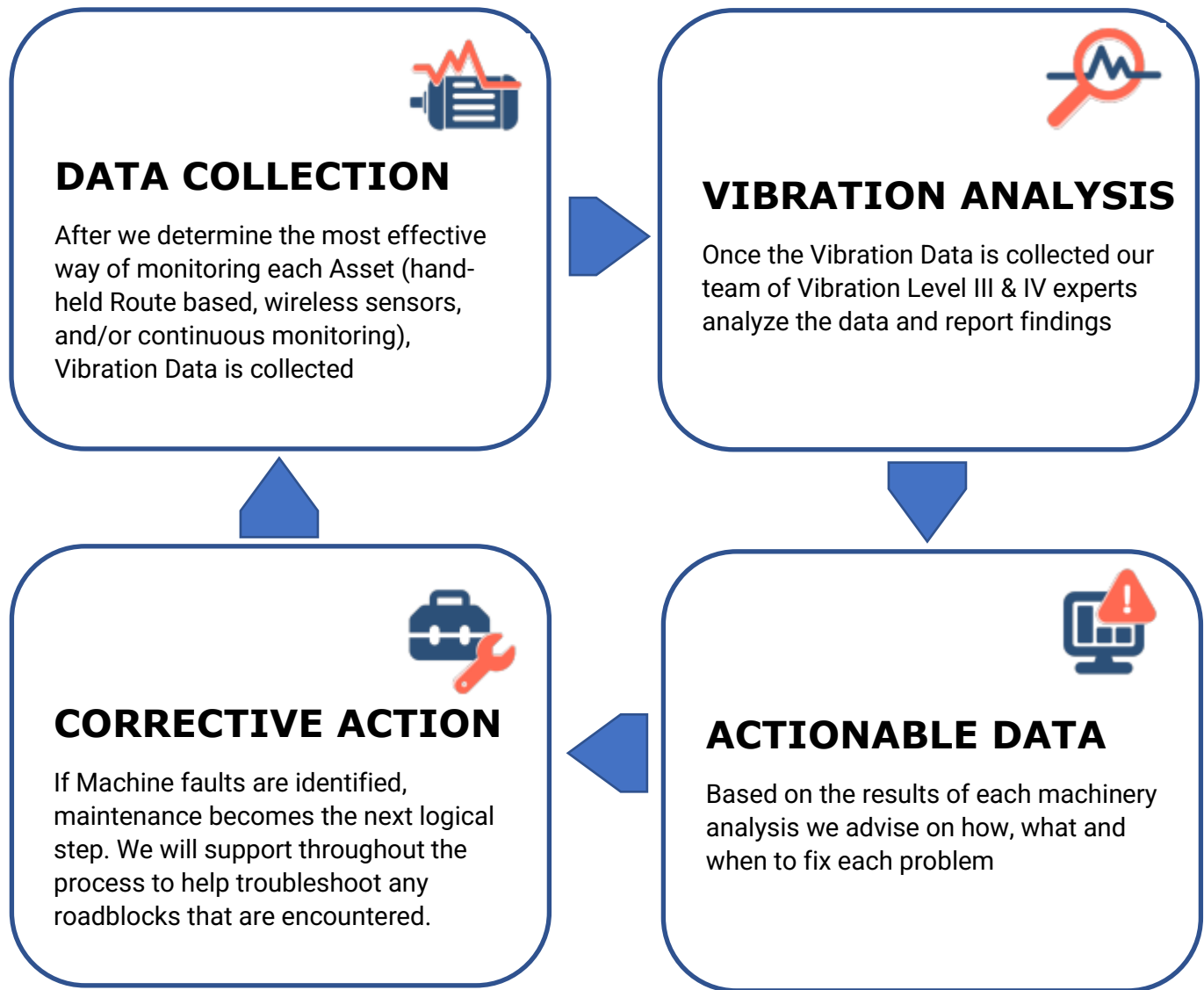
### Systems, Hardware & Software

Installation, upgrade, troubleshooting, maintenance, and Commissioning of continuous monitoring systems for all kind of rotating equipment, machineries including turbomachinery like turbines, HP motors, generators, Gas compressors, cranes etc. Systems and hardware for various monitoring techniques like Vibration, passive ultrasound, current and flux monitoring, partial discharge, end shaft vibrations, gas monitoring, thermography, motion amplification and - Process parameters noise monitoring.

### Online Condition Monitoring

- Remote Diagnosis and Vibration Analysis with Report.
- Health Machine Analysis
- Maintenance Recommendations
- Alert for Critical Items
- Maintenance Optimization

## We Offer A Condition Based Maintenance Strategy

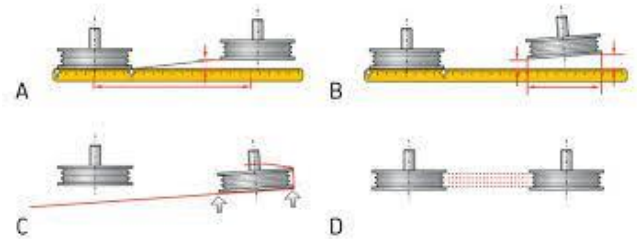
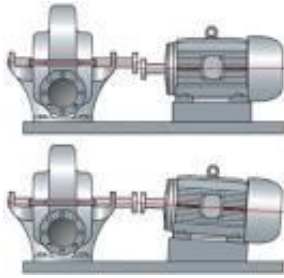


## We are The Reliability Partner

At Essex Lloyds, we understand that implementing a reliability program is not as simple as buying software or installing wireless sensors. Improving reliability requires an in-depth understanding of organizational pains, rotating machinery, available resources, and integration of multiple maintenance strategies.



## Services offered in Proactive Maintenance (PM)



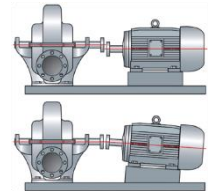
### Shaft Alignment

### Belt Alignment

### Balancing

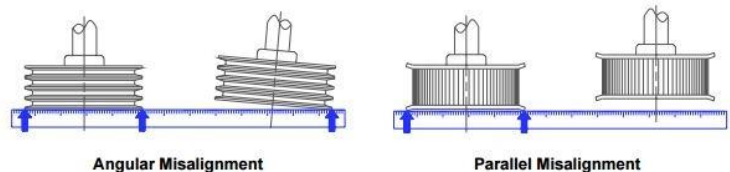
When shafts or belts on rotating equipment are misaligned, the risk of costly, unplanned machine downtime rises dramatically. Misalignment also damages seals and couplings. Lubrication problems often can be traced to seals that have been compromised by shaft or belt misalignment. Simply replacing a seal will not stop future seal failure and associated loss of lubricant – only correcting the misalignment will solve the problem.

**Shaft Misalignment:** Shaft misalignment is responsible for as much as 50 percent of all costs related to rotating machinery breakdowns. Accurately aligning shafts can prevent many machinery breakdowns and reduce much of the unplanned downtime that results in a loss of production.



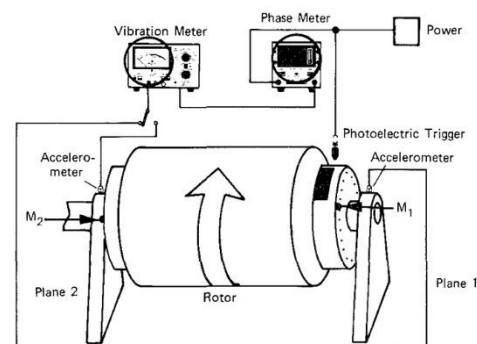
**Belt Misalignment:** Belt misalignment can result in a wide range of detrimental and sometimes dangerous consequences, including:

Reduced efficiency of the machine	Excessive energy consumption
Increased wear on Pulleys & Belt	Increased Noise & Vibration
Increased Friction	Premature Bearing & Belt failure



**Balancing:** When you don't balance rotating equipment, it causes vibration. That vibration means a strain on bearings and seals followed by accelerated wear and machine failure. Balancing your rotating equipment provides several benefits: Increased MTBF, Extended service life, More efficient operation, Smoother running equipment, Reduced noise and vibration

Rotating equipment like motors, generators, pumps, and fans can (and really should) be balanced. The most commonly balanced components include rotors, axles, rotating shafts, impellers, fan blades, and even flywheels.



**Essex Lloyds uses advanced Laser alignment tools, Vibration measurement tools etc. to carry out Shaft Alignment, Belt Alignment & Balancing with speed and precision.**

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## Planned Preventive Maintenance (PPM) services for Chilled water pumps & motors & Chiller Panels

Planned Preventive Maintenance is a time scheduled approach. A time-based maintenance schedule for an asset, equipment or building fabric is based on a library with maintenance activities and its pre-set frequency of execution for that asset. Essex Lloyds offers their PPM services for Chilled Water Pumps, Motors, Chiller Panels, Valves & Compressors. We undertake AMCs to carryout PPM's.

The AMCs for Chilled water Pumps, Motors, Panels is typically carried out on Quarterly basis and the scope is as follows:

1. Check Alignment of Pumps & Motors
2. Check Bearing Temperature
3. Check Vibration
4. Check Lubrication
5. Check coupling for wear
6. Adjust glands necessary to reduce leakages
7. Check grease lubricated bearing for saponification
8. Check holding bolts & nuts
9. Check foundation
10. Check Motor Full load amperes
11. Check Motor side terminations (Direct/Lugging with Glands)
12. Check Motor Voltage Capacity (Kw)
13. Check running motor amperes.
14. Check Starter motor operating amperes
15. Check packing and if necessary, replace
16. Monitor discharge and suction pressure across pump
17. Check the Swing Check Valve vibrations
18. Check the seating of NRV. Check the cushioning air cylinder screw.
19. Visually check leaks
20. Check RPM of pumps
21. Check Motor side terminations
22. Check Motor Voltage capacity



## Services in Lubrication Management

**Oil Filtration Services:** Filtering is best done as part of a system that begins with analysis and incorporates centrifugal methods to remove contaminants and vacuum dehydration to remove water. An effective oil filtration machine can extend the working life of lubricants considerably, making it a cost-effective process.

Essex Lloyds offers Oil Filtration services that can assist you with your lubrication, contamination control, and wear management issues.

**Total Lubrication Care:** We offer Total Lubrication Care (TLC) from our principals, Descase USA. The program has been developed to provide the knowledge, subject matter expertise and project management support to create lasting change towards a sustainable, world-class precision lubrication program for maximum plant efficiency and equipment uptime.

TLC covers various aspects of lubrication management that includes the following

**Lubrication Baseline Assessment:** This assessment focuses on 10 critical areas with each being scored to determine an average score and grade for current lubrication practices to establish a baseline. After a 12-month period, the assessment will be conducted again to evaluate improvement and re-baseline for the next 12 months.

The areas considered are:

- Equipment Maintainability and Contamination
- Lubrication Storage handling and dispensing
- Leakage control & safe lubrication handling
- Lubrication Application Practices
- Training & Education
- Lubrication scheduling, tracking, and reporting
- Lubrication PM Optimization
- Lubrication Selection & Quality
- Oil Analysis Basics
- Oil Sampling Practices

**Lube Room Design Service:** How lubricants are stored, handled, and dispensed impacts every lubricated asset in your plant. The TLC Lube Room Design Service provides specific action items to close the gap between current and preferred practice, including:

- Designs based on optimized list of current lubricants and volumes
- 2D and 3D CAD drawings with configurations that fit any space
- Complete list of products and specifications (BOM)
- Creation of color- and shape-coded lubricant tagging system



**Critical Assets Lubrication Policy:** The Asset Lubrication Policy includes the entire machine train (motor, coupling and driven components). The policy for an asset includes determining:

Lubricant Verification

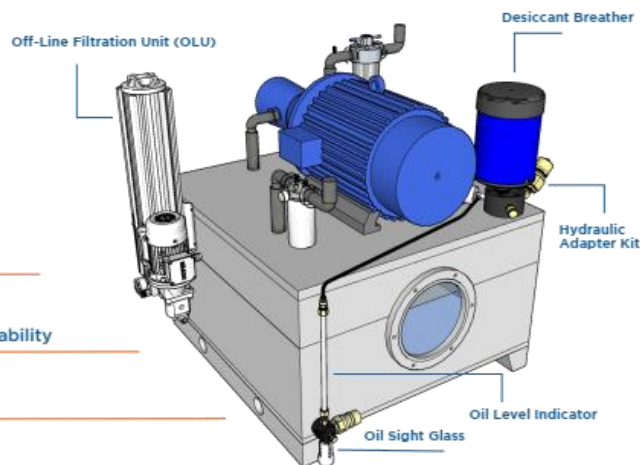
Lubricant Quantity & Frequency

Inspection & Application Procedures

Equipment Modification Plans for Maintainability

Oil Analysis Design & Test Slates

Oil Health and Cleanliness Targets



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**Equipment Modification Plans:** Most new assets are not configured for precision lubrication. TLC's Equipment Modification Plans provide a complete list of modifications required to deploy lubrication best practices, including:

- Breather recommendations
- Quick connect for drain & fill
- Level gauge or oil sight glass
- Oil sample valve
- Installation guide
- Parts BOM

**Training:** Through Descase experts we conduct training to understand Precision Lubrication & to understand Lubrication Best practices.

## Services in Motor & Generator Condition Monitoring

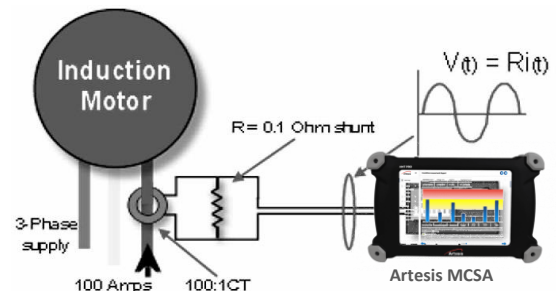
**Motor Current Signature Analysis:** Motor current signature analysis (MCSA) can be described as a technique that helps in determining the induction motor's operating condition without disturbing production.

Essex Lloyds uses a patented technology known as Artesis Model Based technology to carry out MCSA.

With MCSA you can detect faults well in advance.

The typical faults found in MCSA are:

- Rotor Bar damage
- Load Issues
- Unbalance / Misalignment
- Defective Bearings
- Dynamic Eccentricity
- Static Eccentricity



**Motor Condition and Reliability Evaluation Program (MCRE):** Motor life expectancy programs detect potential problems in the stator winding insulation, well before they become critical and cause expensive downtime. Having information on the insulation's condition and expected lifetime enables you to plan maintenance in advance.

MCRE uses various technologies like:

- Electrical Signature Analysis (ISO 20598: 2013)
- Vibration Analysis (ISO 10816-3: 2009)
- Acoustic Emissions Analysis (ISO 22096: 2007)
- Thermal Imaging (ISO 18434 -1: 2008 & ISO 18434-2:2019)



## Benefits of MCRE:

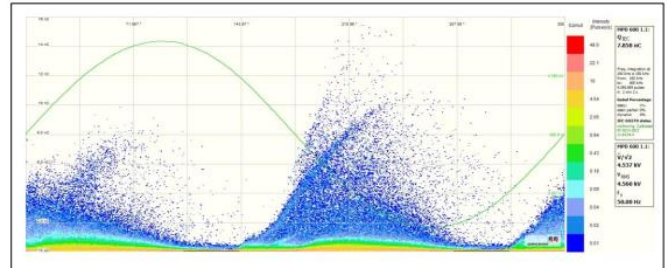
- **Minimized unplanned downtime** – Early warnings provide adequate time for maintenance planning.
- **Optimized maintenance planning** – Enables to move from time-based to condition-based maintenance
- **Reduced cost of ownership** – Increase in lifetime enables better return on investment

- **Better decision-making** – Facilitates decision-making on short and long-term maintenance and run/repair/retrofit/replace options
- **Services are available for all make motors.**

## Services to Monitor Partial Discharge in electrical equipment

Partial discharge (PD) is a localized electrical discharge that only partially bridges the insulation between conductors, and which may or may not occur adjacent to a conductor.

Partial discharge testing is a **leading indicator of machine failure**. If left undetected, it can eventually lead to complete deterioration of the electrical insulation which is one of the principal causes for forced outages.



## PRODUCTS Offered in Industrial Reliability

Essex Lloyds represents various international companies and offers many products in Industrial Reliability

The companies we represent in this section are the following

### ACOEM from France

Specific to In Industrial reliability the products offered from ACOEM are Online Vibration Analyzers, Off-line Vibration Analyzers, Wireless Vibration Analyzers, Laser Alignment Kits.

### CTC from USA

From CTC we offer world's most durable and reliable industrial accelerometers, piezo velocity transducers, 4-20mA vibration sensors, and proximity probes as well as all related mounting hardware, cabling, and junction boxes.

### SDT Ultrasound from Belgium

The ultrasound devices offered by SDT Ultrasound have multiple applications and a whole range of devices are available for applications like Bearing Monitoring, Greased Lubrication\_Monitoring, Valve Passing inspection, Steam Trap Inspection, Air & Gas leak detection, & Tightness testing

### Descase from USA

Descase offers a whole range of equipment that cater to various stages of Oil Lubrication i.e., Storage, Transfer, Filtration, Condition Monitoring, Visual Oil Analysis. Through Descase we can also conduct Training on Lubrication best practices.

### Artesis from Turkey

Artesis is a Baker Hughes affiliate company and offer eMCM, ePCM & AMT Pro that are used specifically for Motor & Generator Condition monitoring & uses Artificial intelligence



## Products from ACOEM

*(Vibration Analyzers & Laser Alignment Kits)*

### FALCON

#### Portable Vibration Analyzer



The ultimate portable vibration data collector and analyzer. With a wide range of optional features available, the FALCON can be configured to perform balancing, run up coast down, frequency analysis and more.

#### Features / Advantages

- Portable device with Synchronous three-axis collection with a single sensor
- Simultaneous 4-channel acquisition at 40 kHz + tachometer, 2 channels at 80 kHz
- Real time processing
- Measurements taken in total safety
- Easily installed with one hand, reducing intervention time
- No wires: reduced maintenance and transport costs
- ATEX Zone 2 certification, IP65
- Withstands a 1.2-meter drop
- Built in stroboscope, Pyrometer with laser sight & camera for recording sensor position

### MVx & MV-120

#### Online Vibration Analyzer



The MVX and MV-120 are powerful and intelligent, real-time, multi-channel data analyzers. The MVX and MV-120 gather multiple datatypes, including vibration, IEPE, and voltage, in real-time, giving you the power to stop machine failures before they happen.

#### Features / Advantages

- Real-time monitoring of one or more machines
- The right information at the right time
- Easy analysis of complex machines through management of operating conditions
- Early detection of faults on slow shafts with Shock Finder
- Two-way communication with PLCs
- Alerts by e-mail / logic outputs
- Management of sub-optimal communication conditions (3G) for isolated machines
- 8 to 32 channels. Number of channels can be extended for process information using Modbus and OPC interfaces Integrated into your environment

### EAGLE

#### Wireless Vibration Analyzer



Wireless, intrinsically safe, automatic vibration analysis that can scale to match the needs of your facility. The EAGLE system pairs up to 150 wireless tri-axial vibration sensors to a single gateway router that allows you to monitor machines that are far away, in confined spaces, or in hazardous locations, all without laying cable.

#### Features / Advantages

- Reliable Fully Wireless solution
- Use of wireless Expanders to reach the most isolated machines
- Up to 50 sensors per gateway
- Immunity to interference with other wireless networks (WiFi, Bluetooth, Wireless HART, proprietary protocols)
- ATEX Zone 0 certification (Class I Div. I) for both the EAGLE sensor and the Expander
- Withstands corrosive environments
- Withstands a 120°C contact temperature & is IP67
- Up to 5 years of unattended operation with several measurements per day
- Standard low-cost battery replaceable by the end user. No need to depend on manufacturer.

## Bearing Defender

### Bearing Health Checker App



The patented, wireless Bearing Defender provides instantaneous feedback on bearing health. It is user-friendly, can be used on just about any industrial machine, and detects bearing faults quickly and accurately.

#### Features / Advantages

- Suitable for early detection of rolling bearing damage in electric motors, pumps, fans, gearboxes, compressors, etc.
- Visual icon-based interfaces and color codes & simple selection of machine speed, power range and mounting type helps to detect quickly bearing defects, unbalance, and misalignment problems.
- Takes just 10sec to capture, process and display the data.
- Android & IOS compatible and maintenance 4.0 suitable
- Signal listening feature available e.g., while greasing your bearing

## Machine Defender

### Tablet Based Machinery Diagnostics



Assess the health of your rotating machinery quickly, easily, and accurately using Acoem's Machine Defender app and wireless sensor.

#### Features / Advantages

- Great tool for proactive and predictive maintenance
- Accessible via any enabled device – tablet, smartphone, laptop etc.
- Links vibration & alignment data to optimize maintenance process
- Synchronous tri-axial measurements in typical 10s
- Good diagnostic capabilities including for bearings, gears, and cavitation problems
- Android and iOS compatible
- IP65

## Accelerometer ASH330

### Suitable for Submersible Applications



The ASH330 accelerometers are suitable for submersible applications including sea water applications. The Super Duplex body gives ruggedness to the sensor in all kinds of submersible applications

#### Features / Advantages

- Very rugged sensor made of Super Duplex material
- Best suited for Submersible applications
- Can be used along-with any system
- Applications in O&G, Water & Wastewater, building services etc.

## Smart Machine Checker

### Instant Machinery Diagnostics & Balancing



The Smart Machine Checker (SMC) is designed to be used by machinery mechanics to give a clear and accurate automatic diagnosis of rotating equipment. Useful to diagnose Unbalance, Misalignment, Bearing defects, Structural Resonance, Gear Wear, Gear Shock modulation, Pump Cavitation

#### Features / Advantages

- Portable device that is easy to use
- Can detect more faults that includes Unbalance, Misalignment, Bearing Defects-Wear & Lubrication, Shock Modulation (Mounting, Clearance, Friction), Structural Resonance, Gear Wear, Shock/Modulation (Gear), Pump Cavitation
- MS Word Reporting
- Built-In Accessories-
- Stroboscope: Pinpoint the machine's RPM, which is crucial for ensuring an accurate diagnosis.
- Pyrometer: Take the temperature of the machine to verify the diagnosis.
- Camera: Create a record for easy machine identification, sensor positioning and for report illustration



## RT - 300

### All in One Alignment, Vibration & Thermography Tool



The first all-in-one alignment, vibration, and thermography tool powered by Acoem's suite of easy-to-use applications.

On-the-spot machine diagnostics with a complete precision shaft alignment tool and a cloud connection to save reports and look up historical data, all combined into one tool – the RT-300 is a truly unique reliability tool for the Industry 4.0 mechanic.

#### Features/Advantages

- Combination of multiple sensors
- IP65 sensors
- Digital Sensor with 30mm detectors+ Line laser eliminates rough alignment and shortens setup time
- Patented Wireless Triaxial Measurement Detects faults on machines more accurately and reliably than any previous automatic diagnostic tool thanks to the patented Accurex™ software
- Pre-mounted fixtures and small sensors provides quick setup also on machines with limited space.
- High Precision & Wireless probe. Measures directly on the machine foot.
- LVDT sensor with  $\pm 2,5$  mm measurement range and high precision (within 0.005 mm)
- Machine Defender finds machine problems such as unbalance, alignment errors, cavitation, structural resonances, bearing problems, and more

## NXA Pro & Ultimate

### Complete Alignment & Geometric Measurement



Alignment applications plus geometric measurement make this the ultimate measurement instrument.

The combination of alignment and geometric routines allows the user to address many of the root causes of outages as part of a complete preventive maintenance program. With a wide range of applications, a screen interface featuring animated 3-D images and a large color touch screen (6.5") the NXA Ultimate is remarkably user friendly.

The NXA Pro aims to provide the user with a fast and simple operation, as well as having access to advanced functions and capabilities, such as the OmniView™ and the VertiZontal Moves™, and probably the best power management system in the marketplace.

#### Features/Advantages

- 3D graphics
- Dual digital sensor with visible line Ia
- Wireless communication between display unit and smart sensors
- Inclinometers in both smart sensors
- Gyroscopes in both smart sensors
- Gyroscopes in the display box that enable the patented walk-around OmniView™ feature in our user interface
- Adaptive User Interface Working with Smart Sensors
- VertiZontal™ Moves
- Live Screen Orientation Changes as You Move Around the Machine
- Enhanced version provides Checking bent shafts, checking bearing clearances, Thermal growth on machine casings, checking movements due to pipe strain, Axial and radial runout checks on flanges, Checking movements on machine feet (soft foot), Eccentric or skewed mounting of coupling hubs, for measuring angular soft foot, for levelling machines.

## AT - 200

### Smart app-based alignment tool



A smart app-based alignment tool with the patented graphical user interface, GuideU.

Connectivity, mobile devices, cloud-based platform, apps are integrated in the AT-200 making it a tool for short response time between machine failures and corrective actions. The smart sensors use CCD technology for a superior measurement performance and precision alignment.

#### Features/Advantages

- Task oriented Horizontal & Vertical Shaft alignment with mobile apps.
- Optional Cloud connectivity with report storage, trending and work order and sharing capabilities with secure communication.
- IP65 Sensors
- Digital Sensor with 30mm detectors eliminates rough alignment and shortens setup time
- Thin sensors suitable for machines with limited space

## ECO

### Entry level Laser Alignment Device



The all-digital wireless ECO is an entry-level system dedicated to horizontal shaft alignment.

With wireless sensor units, a 4" color display, rechargeable batteries, and an IP65 design that withstands harsh environments, you have a laser alignment system at an affordable price!

#### Features/Advantages

- Entry-level system dedicated to horizontal shaft alignment.
- Pre-mounted Sensors
- Vertical moves
- Integrated Bluetooth
- Lifetime Warranty
- Pre-mounted sensors
- Colour screen, 4"
- Screen Flip
- 8 hours battery time, continuous use
- CCD sensors technology
- Live values during adjustment
- IP65 classified
- Slim sensor units

## EXO

### Laser Alignment For Hazardous Areas



Perform shaft alignments in hazardous areas with the EXO.

#### Features / Advantages

- Easy-to-Use Shaft Alignment in Hazardous Areas
- ATEX/IECEx Zone 2 certified including ruggedized IP68 tablet device
- Instant battery check – in both on and off mode
- Horizontal and Vertical alignment
- 30 mm digital sensor detector + line laser eliminates rough alignment a short setup time
- Feetlock™: Solution to solve base-bound and/or bolt-bound machines
- Built-in dual inclinometers to detect backlash and obtain angular values during measurement in horizontal alignment
- VertiZontal™ Moves: Displays exactly how much a misaligned machine needs to be adjusted
- Integrated Bluetooth for wireless communication between display unit and smart sensors



## Products from CTC

(Accelerometers, Proximity Probes & Accessories)

CTC offers a whole range of products in Vibration monitoring.



The flagship line of products offers the world's most rugged, reliable, and cost-effective solutions for industrial vibration monitoring programs, including:

### 4-20 mA Sensors

They include Loop Powered Sensors, Signal Conditioners & Hazardous Area Loop Powered Sensors

### Dynamic Output Sensors

They include Industrial Accelerometers, Ultrasound Sensors & Hazardous Area Accelerometers

### Hardware

Includes Cables & Connectors, Mounting Hardware & Junction Boxes



CTC offers **industry-leading Unconditional Lifetime Warranty** on every CTC Line product.

Unique features of CTC Products are:

- **Welded/hermetic seal construction** for survival in the most demanding environments
- **Shear mode element construction** virtually eliminates erroneous output due to thermal transient interference in low frequency models
- **Helium leak testing performed on 100% of CTC accelerometers** to ensure the highest quality product
- **Complimentary lifetime calibration service** - CTC will recalibrate any accelerometer we manufacture, once per year, at no charge



CTC's PRO Line offers the world's most durable and reliable **Proximity Probe Sets** including drivers, probes, extension cables, and driver enclosures for 24/7 protection of critical machinery in the most demanding industrial environments. CTC PRO Line Proximity Probe Sets are compatible with all major data collectors.



PRO Line Proximity Probe Drivers are the only drivers on the market offering a fully isolated BNC for portable data access in the field.



TMP Line products offer you high performance, lightweight vibration monitoring hardware and accessories designed specifically for your non-permanent research and development needs.



The products in this range include: general purpose accelerometers, cables & connectors, mounting hardware & power supplies & test equipment

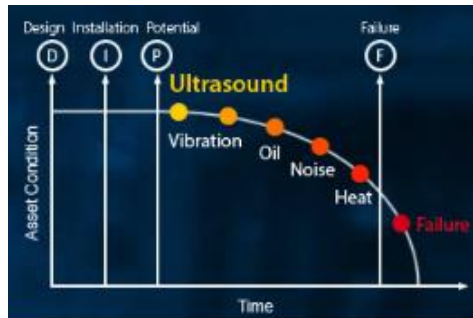
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Ultrasound Solutions

## Products from SDT Ultrasound

*(Ultrasound Devices for multiple applications)*



The first signs of change in operating conditions of an asset are usually indicated in the Ultrasound Frequency

Predict failures, control energy costs, and improve the overall reliability of your assets by using SDT Ultrasound products

### Applications that Ultrasound can address

#### **Bearing Monitoring**

When Bearings start failing, they first generate Ultrasound. By using Ultrasound kits, you can monitor the condition of your plant machinery. Trend and analyze ultrasound vibrations, temperature, and RPM. The SDT products like SDT340 & SDT270 alert you when things transition from good to bad.



#### **Acoustic Lubrication**

Incorrect lubrication of bearings shortens lifespan. Knowing when to grease and how much to grease, are key to optimizing bearing lubrication. Predict re-lubrication intervals and add just the right amount of grease with SDT's integrated ultrasound greasing solutions.



#### **Valve Monitoring**

Valves that leak internally can lead to **major losses of valuable product, or unintended transfer of process constituents**, in some cases seriously elevating process risks.

Such internal leaks will create ultrasound. Regular ultrasonic inspection quickly identifies which valves are leaking and which ones are closed



#### **Steam Trap Monitoring**

Pressure Surges - sudden steam valve openings, improper piping or trap misapplications, or water-hammer can damage the internal components of the steam trap.

Inspecting with SDT products deliver ultrasound and team data. This helps to identify all failed traps and keep your steam system productive and healthy. You can keep a record of the leaking traps.



#### **Air & Vacuum Leak Monitoring**

Compressed air leaks can contribute to problems with system operations. If leaks are there the compressors need to deliver and operate at excess capacity that can cause higher than necessary, cost.

With the SDT Ultrasound devices you can save money while lowering your carbon footprint.



#### **Partial Discharge Monitoring**

Partial Discharge is destructive. It directly destroys all organic insulation materials and produces by-products that form aggressive chemicals which can attack both insulation and conductors. The result of PD is a full discharge (complete failure) of the insulation system.

The SDT devices reveal electrical fault conditions in metal clad switchgear, substations, overhead transmission, and distribution lines.





## SDT 340

### Ultrasound Device



SDT340 is an Ultrasound device used to Detect, trend, and analyze asset health by viewing the ultrasound and vibration time signal and spectrum directly on the SDT340's color display.

#### Features/Advantages

- Measures ultrasound, vibration, RPM, humidity and temperature from one instrument
- Detect, trend, and analyze asset health by viewing the ultrasound and vibration time signal and spectrum directly on the SDT340's color display.
- Enhance productivity in the field with on-screen time signal, spectrum, split screen view, and icon navigation.
- Sampling rate: 32, 64, 128 and 256 kHz oversampling FocUS Mode
- Wide applications like bearing condition monitoring, air & hydraulic leak detection, valve pass inspection, steam trap inspection, tank tightness
- The 3.5" color display gives you a crystal-clear view in the darkest conditions.

## LubExpert

### Ultrasound Device for Lubrication Monitoring



LUBExpert is an ultrasound solution that helps you Grease Bearings Right. Use the right lubricant at the right location using the right intervals and the right quantities while receiving the right indication of a task well done including bearing status.

#### Features/Advantages

- Helps to grease bearings at the right time
- Condition based lubrication
- It reminds you to use the RIGHT LUBRICANT.
- It guides you to the RIGHT LOCATION.
- It tells you to lubricate on the RIGHT INTERVAL
- It prevents over and under lubrication with the RIGHT QUANTITY
- It gives you the RIGHT INDICATORS for lubrication and bearing condition

## SDT 270

### Ultrasound Device for multiple applications



The SDT270 ultrasound detector helps you control energy costs, predict failures, improve product quality, and increase production uptime.

The SDT270 ultrasound detector provides greater insight into the health of your assets

#### Features/Advantages

- Measures ultrasound, vibration, RPM, humidity and temperature from one instrument
- Two channel inputs to connect ultrasound and multifunction sensors with accessories simultaneously
- Unmatched accuracy and repeatability for reliable trending and analysis in ultrasound detection and measurements
- Upgradeable firmware to grow with your needs
- Planned and Conditional Survey modes to guide you logically through your plant
- IP-addressable to access Internet support and training
- **ATEX** Certified model is available

## SonaVu Acoustic Imaging Camera



SonaVu™ is a multi-frequency acoustic imaging camera. An acoustic imaging camera that visualizes sound and ultrasound, to easily locate fugitive emissions, air leaks, electrical discharge, and test for tightness.

### Features/Advantages

- Its 112 ultrasound sensors and optical camera can detect sources of airborne ultrasound and transmit them into a visual image on its touch screen
- Defects such as compressed air system leaks, compressed gas system leaks, vacuum leaks, the presence of partial discharge on electrical assets, and failed/working steam traps all create turbulence. And when there is turbulent flow present, there is airborne ultrasound. SonaVu™ makes the superhuman hearing capabilities of SDT Ultrasound Devices visible to the human eye.
- Defects and failure modes can be visualized and pinpointed from up to 50 meters away

There are many other products that can match your requirements. Please check with us for more information



## Products from Descase (Lubrication management Solutions)

### Achieving Lubricant Health And Cleanliness To Maximize Performance using Descase Solutions

The Products are offered as per the various stages of lubrication i.e

Store & Transfer

Seal & Protect

Filter & Purify

View & Assess

Monitor & Diagnose

## Breathers



To keep machinery from building up too much pressure, equipment OEM's include **vent caps** on the fill port to allow expanded air to escape. These **simple caps** do let the air out of the equipment but these cannot prevent small dirt particles and moisture to enter into the equipment/tank which can damage bearings, gears & valves. Also these caps cause condensation of the moistures that contaminates the oil further.



Descase offer a wide range of Desiccant Breathers that not only remove the moisture from the headspace but also prevents dust and moisture to enter the oil from the atmosphere around.

**Breathers will give you immediate return on investment as they reduce breakdowns and product stoppages.**

## Portable Filtration



With easy maneuverability around plant floors, portable filtration products are the ideal tools to remediate contaminated systems, flush new equipment during commissioning, or periodically decontaminate systems that have inadequate on-board filtration to meet target cleanliness levels.

## Dedicated Filtration



For applications that need regular filtration, or a maintenance location where you bring equipment to be filtered, permanently mounted filtration improves equipment reliability with continuous-duty always-on filtration that cleans oil and keeps it clean.

## Lubricant Storage & Handling



Store, filter, and transfer lubricants using best practice solutions. Customizable lubrication management systems and Iso link oil transfer containers integrate breathers and quick connect technology to fully protect lubricants

## Adapter Kits



Adapter kits are the connection between your application and filtration system. They pair fluid handling filtration with breather protection, allowing maximum system integrity with less equipment and labor and reduced system contamination.

## Filter Elements



Filter elements tackle water, particulate, varnish, sludge and acid removal in a variety of industrial applications



## Products from Artesis (Motor Condition Monitoring Solutions)

**State of the art NASA technology for Rotating Equipment. Artesis Products help you to monitor your equipment with the unique technology based on Model Based Motor Current Signature Analysis with AI.**

### eMCM

#### Motor Condition Monitoring Without Sensors

The Artesis e-MCM is a powerful online condition monitoring, predictive maintenance and power meter tool intended for critical AC rotating equipment. The patented machine learning algorithm of e-MCM enables comprehensive fault detection up to 6 months in advance. With around the clock monitoring and real-time model-based voltage and current analysis, e-MCM can detect electrical, mechanical as well as process faults of fixed, variable speed motors and generators while providing all the benefits without the high complication and cost of traditional systems.



#### HIGHLIGHTS

Artesis e-MCM monitors the condition of equipment driven by an electric motor, effectively using the motor itself as a sophisticated transducer and provides clear information for fault detection, diagnostics, time to failure and corrective actions.

- Comprehensive Fault Coverage
- Online Condition Monitoring
- Automated Fault Diagnosis
- Only Viable Solution for Hard-to-Reach Motors
- Early Fault Detection
- Effects Of Faults On Energy Efficiency
- Award Winning Technology
- Online Power Monitoring

#### How It Works

e-MCM monitors your rotating equipment continuously, constantly taking measurements and comparing them with the digital twin it created during the self-learning process. Its unique machine learning algorithm allows it to recognize normal operation in a wide range of conditions, such as different speeds or loads- allowing tight control without false alarms. If e-MCM identifies a new operating state not experienced during the self-learning phase, it gives you the option of including this state in all future monitoring.



## AMT Pro

### Rotating Equipment Tester without Sensors

The Artesis AMT Pro is a portable motor driven equipment test system which automatically generates a condition assessment report indicating existing electrical mechanical and operational faults, time to failure information, recommended corrective actions, and effects of faults on energy efficiency.



#### HIGHLIGHTS

- Immediate payback by corrective action
- Instant condition assessment report
- Advanced analysis and reporting
- No sensors on motor or equipment
- Improved efficiency and reliability of plant & processes
- Increased machine availability
- Advanced spectrum and waveform tools
- Immediate report generation with actionable information
- Access to hard-to-reach applications
- Cloud integration



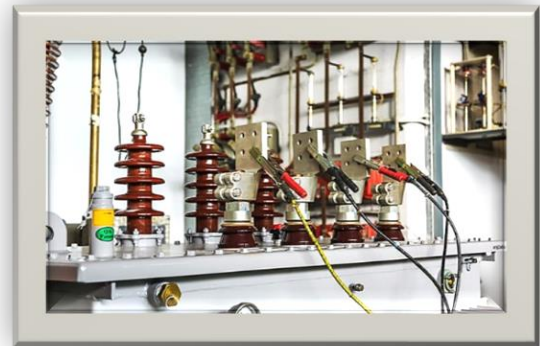
## Electrical Testing Services

The various Electrical testing services provided by Essex Lloyds are:

### Transformer Testing

#### Why is Transformer Testing Required?

The need for transformer testing is to **check the functioning of the transformer and to decrease the chance of failure**. All electrical equipment needs to be maintained safely from some of the failures. Transformer failure can happen because of electrical, thermal, or mechanical factors.



#### Some of the Transformer Testing Procedures:

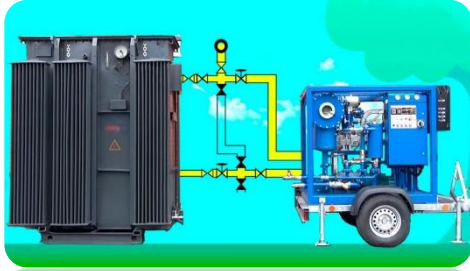
- Turns Ratio
- Insulation Resistance Testing
- Power Factor testing
- Polarity Testing
- Resistance Testing
- Phase Relations Testing

### Transformer Oil Filtration

#### Why is Transformer Oil Filtration Required?

Oil impurities are one of the major causes of transformers deterioration. **To avoid transformer failure**, your insulating oil should be free from any contamination, dirt and moisture. Thus, transformer oil filtration process is needed.

## Transformer Oil Filtration Procedure



### Rising oil temperature

First step is to raise oil temperature up to 65°C to give latent heat which separates moisture and gases. Heating the oil will make it easier to filter because of the decrease in oil viscosity

### Removal of dirt and impurities

Second step is to remove sludge and dirt from the insulating oil. There are 2 ways to eliminate dirt in the transformer oil.

### By filter candles

Insulating oil filtration by filter candles can be classified by using classical edge filter or depth type filter. However, new advancements were made in which transformer oil filtration machines use filter cartridges instead of edge type paper filters.

### By centrifuging action

Another method for separating dirt from oil is through centrifuging. With this process, you can save recurring cost of changing filters.

### Dehydration and degasification of insulating oil

These processes of dehumidification of oil and removal of gasses are executed in the degassing chamber. The dissolved water, oil separation or dissolved gas, oil separation is possible at reduced pressure, i.e., vacuum, due to the difference of boiling point of water, gas and oil. In the process of separation of gases, it becomes important to retain the aromatic hydrocarbons so that the original properties of the oil are retained. When the water level in the oil is above the saturation level of transformer oil, oil is observed in free water. Removal of free water can be done by centrifuge or by coalescing principle.

### Machine Used by Essex Lloyds

The machine works on the principle of High Temperature & Low Vacuum basis. Oil to be filtered enters through the inlet port and passes sequentially through a magnetic strainer, heater, coarse filter, fine filters and then through the dehydrating/degassing chamber and finally cleaned oil exits the outlet of the machine.

## H V Cable VLF Testing



### Why is Cable VLF Testing Required?

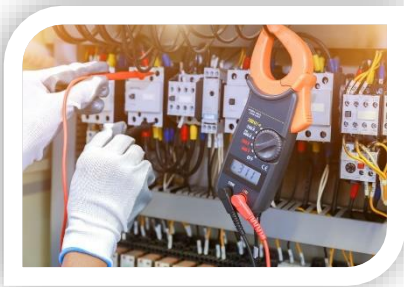
VLF cable testing (Very Low Frequency) is a technique for **testing of medium and high voltage (MV and HV) cables**. The testing is done for checking condition of the insulation in HV & MV Cables. Compared to standard DC testing, it prevents damage to the insulation of aged, extruded cables which causes a premature loss.

## VLF Test Methodology

Essentially, the VLF withstand test is a “go or no-go” test, otherwise known as a “pass/fail” test.

When VLF Withstand testing cable, the proper test voltage and time duration are critical for the success of the test. If a VLF test is too low in voltage and/or too short in duration, more harm than good may result. Perform the test as instructed to make best use of VLF technology. Once partial discharge is triggered in a defect under the test voltage, enough time must be allowed to permit the PD to create an electrical tree and grow to failure. The test voltage and time duration are both critical to causing failures at defect locations severe enough to be triggered into PD during the test. Let the technology and physics work. Lesser defects are not affected, as they are not forced into PD under the test voltage. They remain dormant and are not aggravated by the test voltage since it is below the PD inception voltage level of the defect.

## H V & M V Panel Testing



### Why Panel Testing?

The electrical panel test in any power system is made to ensure that the panel construction, connection and performance is correct from the operational, reliability and safety viewpoint; hence, to ensure the continuity of electrical operation, a comprehensive panel test is carried out in factory, in commissioning and during maintenance programs, with many different inspection, quality and panel test procedures.

### Various Tests Carried out on Panels.

- Insulation Resistance Test
- Current Transformer Test
- Primary Injection Test
- Secondary Injection Test
- Circuit Breaker Contact Resistance Test
- Circuit Breaker Time Travel Analysis
- AC Hi Pot Test

## Tan – Delta Test



Dissipation Factor (Tan-Delta) is one of the most powerful offline nondestructive diagnostic tools used to monitor the condition of extruded cable insulation. Capacitance and Tan-Delta values from a new insulation are used as benchmark readings. By comparing periodic readings of the capacitance and Tan-Delta of your insulating material with the benchmark readings, you can measure the deterioration of the insulation, predict the life expectancy, and plan maintenance and repairs before an unexpected outage occurs. A significant advantage of Tan-Delta Testing is the ability to detect water trees a major source of insulation failures in aged, extruded cables. Tan-Delta Testing can be performed during the manufacturing process. The testing frequency depends

on the rate of change of the insulation quality, history of past failures, environmental conditions, etc. High levels of environmental moisture, elevated temperature, and chemicals or pollution may require more frequent testing.

## Power Quality Test

When any electrical system fails to meet its purpose, it is time to investigate the problem, find the cause, and initiate corrective action. The purpose of the electrical distribution system is to support proper operation of the loads. When a load does not operate properly, the quality of the electric power in the system should be suspected as one possible cause. Whether it's used for troubleshooting purposes or to obtain baseline data, measuring/analyzing electrical system parameters is called power quality analysis. The setup and use of power quality equipment — and obtaining and interpreting usable data — can be intimidating for those not familiar with the process. The key to success is knowing where and how to measure as well as how to interpret the results.

### Measurement Tools

Several measurement tools are available for power quality measurement. Power quality analyzers are the most used tools to observe real-time readings and also collect data for downloading to computers for analysis. While some are permanently installed in the distribution system, handheld analyzers are necessary for many applications, especially troubleshooting.

Handheld power quality analyzers are lightweight (generally 4 lb to 5 lb) and will measure a variety of parameters. The most typical include voltage, amperage, frequency, dips (sags) and swells in voltage values, power factor, harmonic currents, and the resulting distortion and crest factor, power and energy, voltage and current unbalance, inrush current values, and light flicker. If an analyzer measures and records such basic parameters, you can address most power quality issues successfully.



Portable data loggers typically monitor many of the same parameters as the power quality analyzer; however, they are meant for long-term recording (days to several weeks). In addition, the data logger does not typically provide the real-time values on-screen that an analyzer can provide. Additional test equipment, such as scope meters and recording digital multimeters, also find specific use applications.

## Thermography Test

Thermography is a non-destructive test method that may be used to detect poor connections, unbalanced loads, deteriorated insulation, or other potential problems in energized electrical components. These problems may lead to excess power use, increased maintenance costs, or catastrophic equipment failure resulting in unscheduled service interruptions, equipment damage, or other problems.

### Advantages of Thermography test

The National Fire Protection Association (NFPA) estimates that ten percent of the fires occurring in manufacturing properties are related to electrical system failures, such as failure of electrical insulation, terminals, and related components. Additionally, failures can cause employees to be exposed to live electrical circuits, making them susceptible to serious injury or death from electrocution. By detecting high-resistance connections and repairing them, the likelihood of a breakdown of the electrical wires and related components should be reduced.







Other advantages to detecting and repairing these faults are the cost savings from energy conservation and lower outage and repair costs. High resistance in circuits causes an increase in current flow. When current flow is increased, the resulting power consumption will increase. Further, high current draw can cause critical electrical circuit components, such as fuses, circuit breakers, and transformers, to fail prematurely. These failures result in higher maintenance and repair costs, and resultant business interruptions.

## Cable Fault Location



Cable faults are damage to cables which effect a resistance in the cable. If allowed to persist, this can lead to a voltage breakdown. There are different types of cable faults, which must first be classified before they can be located. The insulation of the cable plays a significant role in this. While paper-impregnated cables are particularly susceptible to external chemical and thermal influences, in high-voltage PE or XLPE cables the polyethylene insulation of the conductor is affected, leading to partial breakdowns and cracks that “eat away” the insulation.

**Screening faults**

A contact between conductor and screen generates a varying resistance.

### Phase faults

The contact between multiple conductors generates a varying resistance.

### Sheath faults

Sheath faults are damage of the cable sheath that allows the surroundings contact with the cable screen.

### Faults due to moisture

Water penetrates the cable sheath and contacts the conductors. Impedance changes at the fault location make measuring more difficult. The resistance usually lies in the high-ohmic range.



## Cable Jointing



The cable joints are used to connect low, medium or high voltage cables. The type of cable joint sizes, shapes and configurations vary according to the voltage, structure, insulation and the number of cores of the cable to be jointed. The joints provide electrical insulation as well as mechanical protection and strength. The electrical connection is made in various ways and can crimping, or use of mechanical connectors, soldering, etc.

### Types of electrical power cable joints

There are about four commonly used types of joints; these differ in mechanical arrangement and where they are used.

However, some manufacturers may provide custom designs to suit unique customer requirements.

- Straight through joints
- Branch which can be a T or Y joint
- Pot ends
- Indoor/Outdoor terminations

## Cable Termination

- The electrical cable termination is the physical and electrical connection of a cable end that connects to another cable, or to the terminal of the equipment. The cable terminations are often designed to enable the physical and electrical interconnecting of two cable ends, or a cable end and a terminal on the equipment.
- The electrical connection requirements relate to the voltage drop, current carrying capacity, compatibility of the materials, etc. The physical requirements relate to the environmental protection as well mechanical security.
- The methods used to terminate the cables vary according to the type of cable, type of connector and application. The common type of terminations is crimp connection, soldered connection, compression termination, and wire-wrapping connection, direct connection, loop or eye connection. Some of the factors that determine the type are:
  - Outdoor or indoor use
  - Voltage
  - Current
  - Overhead, or underground
  - Type of Connector on the equipment where the cable will be connected.



## Safety & Environmental Studies

We provide services in the field of safety & environmental studies.

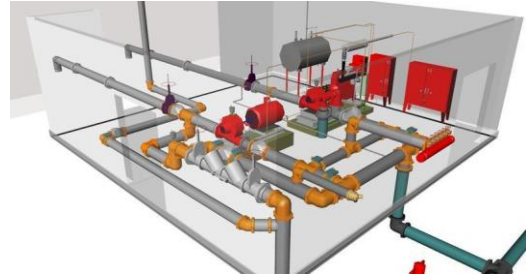
### Services in Safety Studies include

- Hazard & Operability Studies (HAZOP)
- Hazard Identification (HAZID)
- Hazard & Effect Register (H&E)
- MAH Register
- Environmental Aspects Identification (ENVID)
- Safety Integrity Levels (SIL) assessment, Verification & Validation
- Simultaneous Operations (SIMOPS)
- Matrix of Permitted operations (MOPO)
- Project Health Safety & Environmental Review (PHSER)
- Bow-tie Analysis
- Fire Explosion and Risk Analysis (FERA)
- Quantitative and Qualitative Risk Assessment (QRA)
- Escape Evacuation and Rescue Analysis (EERA)
- Thermal Radiation and Flare/Vent Dispersion Studies
- Hazardous Area Classification (HAC) Reviews
- GLC Modelling
- Consequence Analysis



## Reliability Engineering Services include

- Asset Integrity Management Systems (AIMS)
- Compliance Assessment
- Reliability, Availability, and Maintainability (RAM)
- Reliability object model (ROM)
- Fire Protection system design and basic engineering



## Corporate Studies include

- Process Safety management (PSM) through project life cycle Corporate HSE Management
- Authoring of HSE Safety Case/ Design Safety Case
- Pre-Start-up Safety Reviews (PSSR)
- Job Safety Analysis (JSA)
- Critical Task Analysis (CTA)
- Corporate HSE Management
- HSEIA
- Control of Major Accident Hazards (COMAH)
- Safety Audits
- F&G Mapping and Optimization
- Chemical Compatibility Matrix and Storage Plans
- Preparation of Facility and Area Disaster Management Plans and mapping potential disaster consequences through GIS



## Data Acquisition

Data acquisition (commonly abbreviated as DAQ or DAS) is the process of sampling signals that measure real-world physical phenomena and converting them into a digital form that can be manipulated by a computer and software.

The components of a Data Acquisition System include

- Sensors
- Signal Conditioning
- Analog to Digital converter
- Computer with DAQ software for Data Logging and Analysis



## Services Offered in Data Acquisition by Essex Lloyds

All data in a plant or a facility is not constantly collected or monitored. For your studies, if you are looking to acquire data from your plant or your facility for monitoring data or diagnosing of issues, testing of equipment, quality control or for managing your assets. We offer you our services by using IMC, Germany's Crosnos Flex Modular Data Acquisition System.

CRONOS Flex modular Data Acquisition system can accept any kind of sensor output i.e 4-20mA, mV, frequency, digital etc. signals. It gives you an unprecedented degree of flexibility in the setup of your data acquisition needs. Due to its modularity and customization, we can modify the system suitable to your specific needs.

A few applications that can be done through our services are

- Data Recording
- Power analysis & power quality testing
- Structural Dynamics
- Acoustics Monitoring
- Machinery Diagnostics
- In Research & Development
- In Education
- Any temporary studies or monitoring

Our service includes contract measurements, data evaluation and analysis, customer-specific hardware and software development, setup of data acquisition (DAQ) systems, system integration



## Products from IMC (Data Acquisition Systems)

### IMC CROSNOCompact



The imc CRONOScompact is the single most comprehensive data acquisition system (DAQ) for electromechanical testing on the market today. Integrating measurement, control, and simulation into one housing provides you with the reliability of absolute synchronization, and the convenience and ease of use of having all of your tools in one place.

### At a Glance

- Portable and rack-mounted enclosure options
- Modular reconfigurable hardware adaptable to changing testing requirements
- Supports virtually any physical sensor
- Sophisticated and intuitive triggering system
- Versatile storage options including onboard removable flash media
- Networkable with other imc systems for synchronous acquisition of thousands of channels
- Onboard real-time data analysis and reduction
- Standalone, remote, or interactive operation
- Configuration and operation software: imc STUDIO
- Comprehensive data analysis and reports: imc FAMOS



## IMC CROSNOsflex



CROSNOsflex has a modular design. The system requires no rack or frame. Both base unit and the measurement modules (amplifiers or conditioners) have independent housings: by a robust "Click Mechanism", they can easily be either connected directly to one another or alternatively spatially distributed over a standard network cable. A distance of up to 100m between individual modules is possible. Measurement modules are available for every common type of signal and sensor. Experience the flexibility of a modular, spatially distributable data acquisition (DAQ) system.

### At a Glance

- Flexible modularity through frameless expansion
- With the "Click Mechanism", modules are physically and electronically connected
- Ideal for frequently changing measurement tasks - distributed or centrally located
- Simultaneous recording of analog, digital, and vehicle bus data
- Up to 2,000 kS/s per system and up to 100 kS/s per channel
- Supports nearly every signal and sensor type
- Synchronous acquisition from one up to thousands of channels
- Integrated real time analysis
- Ready to go configuration and operation software: imc STUDIO
- For comprehensive data analysis and reports, imc FAMOS software is ideal

## IMC SPARTAN



imc SPARTAN is a compact, high-precision data acquisition system for quasi-static and dynamic voltage, strain gauges, current and temperature signals.

imc SPARTAN is ideal for monitoring tasks, for instance, in civil engineering or transportation applications. Due to its independence from the PC and its self-activation capability, it covers areas in which other PC-based systems have to give up. Further applications can be found in system engineering, automation, material and endurance tests, as well as in the growing market of wind power.

### At a Glance

- High-precision amplifiers
- Integrated signal conditioning for voltage, measurement bridges and temperature
- Synchronous sampling up to 500 samples/s/channel
- Robust PC-independent data logging operations
- Save any number of configurations to a PC, or internal flash storage
- Internal backup power is standard, for reliable operation and shutdown
- Configuration and operation software: imc STUDIO
- For comprehensive data analysis and reports, imc FAMOS software is ideal



## IMC CROSNO XT



With the imc CRONOS-XT, imc is offering for the first time an ultra-robust device in a completely modular platform. The rugged data acquisition base unit and a number of amplifiers can be conveniently connected to form a complete system: without tools and cables via a simple click-mechanism. With protection class IP67 and MIL-STD810F, the system is protected against dirt, dust and water as well as severe shocks and vibrations. The rugged data logger is therefore ideal for mobile measurements on construction machinery, tractors, agricultural machinery and vehicle testing that takes place in harsh environments.

## At a Glance

- More flexibility for everyday testing
- Extremely robust DAQ system
- Spatially distributable
- Networkable with multiple devices
- Real-time analyses in the device
- Comfortable measurement software

**In the IMC range there are many more products that can be selected based on your specific requirement. Please check with us at Essex Lloyds.**

## VFD Supply & Services

Essex Lloyds Engineering Services provides a wide range of Variable Frequency Drive (VFD) and other motor control services including programming, start-up, retrofitting, and installation assistance. Our technicians are the go-to resource any drives related issues or questions. We are experienced in a variety of manufacturers and can even supply replacements when it's time to upgrade.

### Services we Provide:

- Motor Control Retrofitting
- DC to AC VFD Conversions
- Eddy Current Drive to AC VFD Conversions
- Variable Frequency Drive (VFD) Troubleshooting
- Variable Frequency Drive (VFD) Programming and Start-Up
- Motor Soft-Start Troubleshooting
- Motor Soft-Start Programming and Start-Up
- Synchronous, Wound Rotor, and DC Motor Control Troubleshooting



for

## Services for Chillers & Cooling Towers

### Measurement & Data Logging Services for Performance Assessment of Chillers & Cooling Towers

Chillers are among the major energy consumers in building heating, ventilation and air conditioning systems and appropriate performance assessment of chiller systems is essential to ensuring their operational optimality while delivering satisfactory indoor thermal comfort.

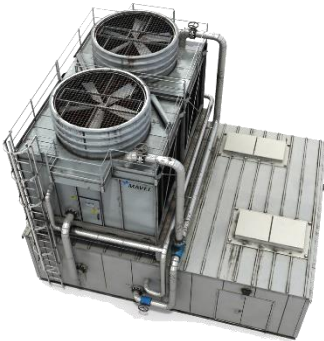
A data driven performance assessment strategy, consists of four steps, which are data collection, data cleaning, energy profiling of the chiller system and data analysis.



In this performance assessment strategy, Data collection and logging of the data over required period of time is necessary.

We have trained engineers and technicians who use either our own or customer provided measurement and data logging devices to measure and collect critical data for further analysis.

- ❖ Single channel or multi-channel dataloggers and respective sensors are used for this purpose.



Cooling towers are a critical part in a chiller Plant. Data from the Cooling towers is also necessary to assess the performance of the Chiller Plant.

Sensors that are used in Chiller system need to be accurate as they make a significant impact on energy conservation initiatives. For every 1°C decrease in chilled water temperature there is a corresponding 1% to 3% increase in chiller energy consumption.

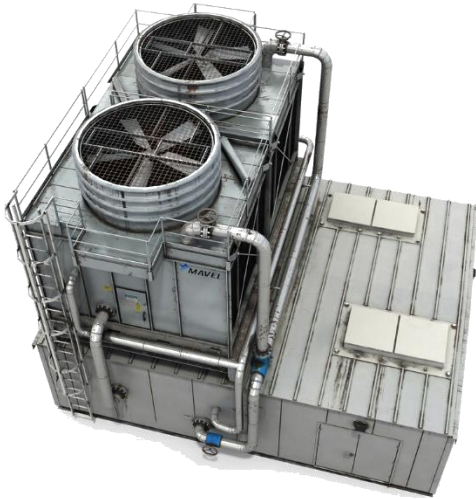
Essex Lloyds provides accurate sensors for measurement and data logging of various parameters for calculating plant efficiency.

The various parameters that are measured and logged are:

- |  |   |
|--|---|
| ❖ Leaving chilled water temperature    | ❖ Pressure drop across evaporator                         |
| ❖ Entering chilled water temperature   | ❖ Pressure drop across condenser                          |
| ❖ Leaving condenser water temperature  | ❖ Compressor Power Input                                  |
| ❖ Entering condenser water temperature | ❖ KW at cooling tower                                     |
| ❖ Chilled water flow rate              | ❖ Entering & Leaving water temperatures in cooling towers |
| ❖ Condenser water flow rate            |   |

Essex Lloyds can not only help to collect data but also help to find out the performance of a chiller system.

## Cooling Tower Assessment Services



Cooling Towers are an important part of a Chiller System. Performance of a cooling tower directly reflects to the performance of a Chiller plant. Essex Lloyds is involved in providing for cooling tower and cooling tower thermal upgrade inclusive of assessment and performance testing of the tower and other allied works for both small and large field erected cooling tower installations in the infrastructure, power, refinery, process, steel and fertilizer industries.

Performance Testing of Cooling Tower / Group of cells of Cooling Tower would be carried out generally on the basis of **CTI Code for testing of cooling towers ATC 105 using the performance curve method**.

**Reports would be generated based on the CTI PERFORMANCE CURVE METHOD OF ANALYSIS and would contain the following as a minimum.**

- Study and analysis of the cooling tower thermal performance
- Study of present operating conditions vs design conditions
- Analysis of fan performance point
- Report on physical observation of the tower at site
- Method of proving for maximum improvement in cooling tower performance including suggestions for change of components if any
- Possible sources for advanced components of cooling towers if needed for tower improvement

## Water Balancing Services



One of the most important factors in a chiller plant system is water balancing. If the water flow is not sufficient e.g. in the air handling units or in the evaporator of the chiller, the heat transfer can be greatly reduced which causes the coils not to absorb the required heat. The side effect is an increased energy consumption, as the chiller will not be operated according to rated conditions which are causing poor efficiency. It can also be the case that the water flows are much higher than rated, which will lead to energy waste as the chilled and condensed water pumps are operating at a higher frequency than required.

Water balancing is done to apply a disciplined procedure to adjust the flow rates in a chiller water system. This helps to meet the design requirements of the system.



## Mechanical Maintenance & Overhauling Services



While cooling towers are durable, they can suffer from wear and tear over time.

All parts of a cooling tower are important, but it is certainly important to exercise the necessary care of the drive gear of your cooling tower, these being the turning parts of a cooling tower.

Essex Lloyds offer a repair service for planned shutdowns and an emergency call out repair service for unplanned breakdowns or failures.



When it comes to HVAC, Essex Lloyds will supply and repair any cooling tower part whether they are structural, mechanical, or individual internal parts, including:

- Fans
- Gearboxes
- Pump Motors
- Driveshafts
- Fan stacks
- Cooling Tower Pumps
- Chiller Pumps
- VFD's

We can also provide our services for other industries as well for various mechanical repairs and overhauling jobs.

## Installation & Commissioning Services



If you are looking for a service partner who can help you to install and commission various types of Valves, Pumps, Motors, and Instrumentation products, Essex Lloyds can help you out. Our service technicians and field engineers can installation and commissioning to ensure the equipment is safely and properly installed and tested. Depending on your demands, we can offer full turnkey solutions, or on demand installation & commissioning and also help to maintain the asset through condition

monitoring and repairs/modifications throughout the equipment working life.

Installation & Commissioning of

- Pumps
- Motors
- Valves
- Instrumentation



## Environmental Monitoring

Environmental monitoring refers to the tools and techniques designed to observe an environment, characterize its quality, and establish environmental parameters, for the purpose of accurately quantifying the impact an activity has on an environment. Results are gathered, analyzed statistically, and then published in a risk assessment and environmental monitoring and impact assessment report.

The main objective of environmental monitoring is to manage and minimize the impact an organization's activities have on an environment, either to ensure compliance with laws and regulations or to mitigate risks of harmful effects on the natural environment and protect the health of human beings.



When it comes to Environmental Monitoring, we offer products from ACOEM, France



### Products from ACOEM (Environmental Monitoring)

Environmental Monitoring Platform	
<b>Cadence</b> Noise monitoring and management solution	<b>Aerovision</b> Airport environment management
<b>Healthy Schools Monitoring Networks</b> Ideal classmate for indoor air-quality monitoring	
Continuous Emissions Monitoring	
<b>Opacity Monitors</b>	<b>Particulate Monitors</b>
<b>Dust Monitor</b>	<b>Marine Smoke Monitors</b>
Air Quality Monitoring	
<b>Air Particulate Monitors</b>	<b>Nephelometers</b>
<b>Aerosol Monitoring</b>	<b>Air Quality Gas Monitors</b>
<b>Greenhouse Gas Monitors</b>	
Dust & Blast Monitoring	
<b>Blast Monitors</b>	<b>Dust samples</b>
<b>Real Time Dust Monitors</b>	
Noise & Vibration Monitoring	
<b>Noise &amp; Vibration Monitoring Stations</b>	<b>Acoustic Cameras</b>
<b>Noise &amp; Vibration Softwares</b>	<b>Dosimeters</b>
Tunnel Sensors	
<b>Tunnel Visibility Monitors</b>	<b>Tunnel gas Monitors</b>
<b>Tunnel Air Flow Monitors</b>	<b>Tunnel luminance monitors</b>

Please check with us for more information.

Continued Next Page



# Services for Inline Pipe Leak Detection for Water & Oil Applications

## Water Leak Detection



We offer

- Comprehensive inspection capabilities for live visual condition assessment and leak detection
- Versatile applications on pressurized pipes of all materials 3" and above g
- Portable and adaptable to suit all site conditions
- Cost effective and convenient – no additional time or cost required for adaptation or equipment installation onto another vehicle



We use an "Investigator" which is an inline detection system that can be used for Leak detection and Pipe Inspection.

The system is mounted onto pipework through a selection of fittings and/or "hot tapings." This process makes access into the pipework simple and cost effective.

Monitoring the real-time data captured by the camera and hydrophone sensor head allows the operator to understand internal pipework conditions and identify leaks. A 300ft (100m) cable is supplied with the system which potentially offers a maximum inspection distance of 600ft (200m) upstream and downstream of the insertion point.

## Oil Leak Detection

Essex Lloyds takes support of Gottesberg, Germany who are the specialists in pipeline inspection. We make use of their four decades worth of experience in the development, manufacture, and sale of leak detection pigs, and their accessories. With Gottesberg's know-how, we're ideally placed to offer innovative technology available to you as a service. You are therefore guaranteed that the latest technology is always used.



To this, GOTTSBERG Leak Detection offers a range of possible models with which we can respond to your individual requirements and structures.

You can, for example, book devices and personnel for single runs, but you can also let us organize the complete, and long-term, leak testing of your pipeline within the framework of continued cooperation.

For you, this means reduced costs, less work, and decreased risk.

We offer Gas Chromatographs & Gas analyzers from Orthodyne, Belgium who are experts in Gas Chromatography.

Orthodyne products are found mainly with the gas producers, in **air separation and cylinder filling plants**, as well as in **laboratories**. The fields of application are very broad, catering to various Industries.

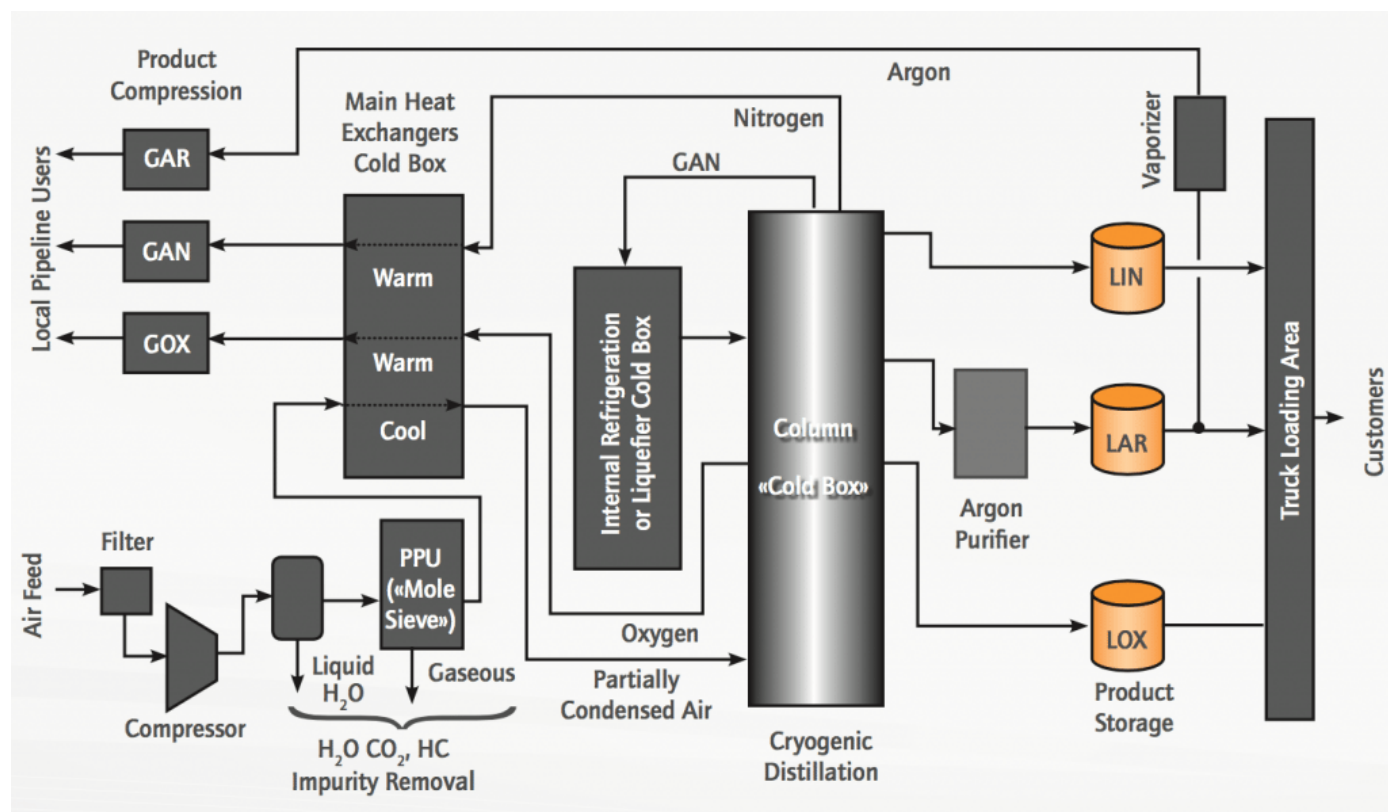
## Industrial Gas Analyzers

To control the **production**, the **storage**, or the **loading**, Orthodyne has a complete range of Industrial Gas Analyzers for industries such as **Air Separation Unit (ASU)**.

Orthodyne provides CH<sub>4</sub>/NMHC or Carbotras (CnHm separated) Gas Chromatographs (GC) on gas producers' sites to control the hydrocarbons level in the Oxygen, Nitrogen, Argon, or Air.

Orthodyne can also supply N<sub>2</sub> traces, O<sub>2</sub> paramagnetic, O<sub>2</sub> zirconium, Infrared and moisture Gas Analyzers for Air Separation Unit.

### Analyzers for Air Separation Units



## Analizers for Cylinder Filling Plant



Various Analyzers are available that are suitable for Cylinder filling plants be it gas mixtures or binary gases, pure gases or gases used in medical.

The various technologies used in these analyzers are

Plasma

Flame Ionization

Katharometer

Zirconia

Paramagnetic

Infrared

## Plasma Gas Chromatographs & Analyzers



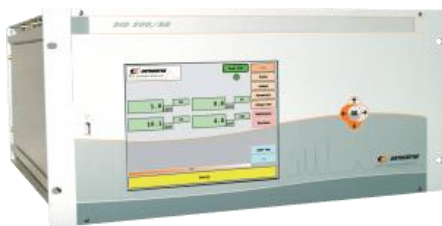
### OrthoSmart Gas Chromatograph

Plasma Detectors measuring trace impurities including hydrocarbons without FID



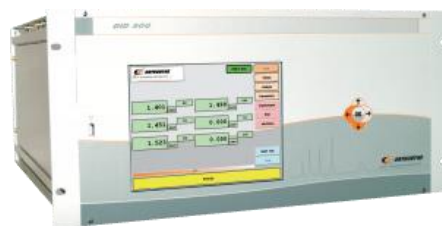
### OrthoPure DID Gas Chromatograph for ppb analysis

This Plasma detector analyses H<sub>2</sub>, Ne, O<sub>2</sub>+Argon, N<sub>2</sub>, Kr, CH<sub>4</sub>, CO, CO<sub>2</sub> and Xe in ppb level



### DID Argon Gas Chromatograph

This Plasma detector Gas Chromatograph analyses H<sub>2</sub>, O<sub>2</sub>, N<sub>2</sub>, CH<sub>4</sub>, CO, CO<sub>2</sub> in Argon



### DID Helium Gas Chromatograph

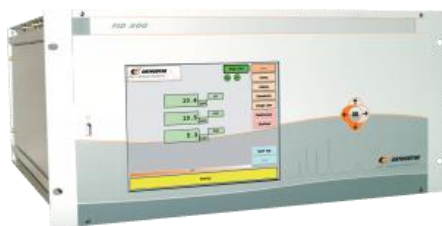
Analysis of H<sub>2</sub>, Ne, O<sub>2</sub>+Ar, N<sub>2</sub>, Kr, CH<sub>4</sub>, CO, CO<sub>2</sub> and Xe in Helium, Argon, Hydrogen, Nitrogen, Oxygen, Carbon Dioxide, Krypton and Xenon with the DID technology.



### Trace Nitrogen Analyser - AZ 8000

The AZ 8000 is an online Trace Nitrogen Analyzer for Argon and Helium.

## Flame Ionization Gas Chromatographs



### FID Gas Chromatograph & Methaniser (UMTR)

Analysis of CH<sub>4</sub>, CO, CO<sub>2</sub> & NMHC in PPB, PPM or % in Helium, Argon, Oxygen, Nitrogen, Hydrogen or Air.



### OrthoPure FID Gas Chromatograph for PPB analysis

Analysis of CH<sub>4</sub>, CO, CO<sub>2</sub> & NMHC in PPBD



### FID 560 - Environment

Measures ambient hydrocarbons (CH<sub>4</sub>, NMHC, THC, BTX, BTEX) in ranges from ppm to ppb

### FID 570 – Environment

This Air Quality Gas Chromatograph uses proven flame ionization detection and capillary column, the FID 570 is a turnkey solution for analysis of Volatile Organic Compounds from C<sub>2</sub> to C<sub>6</sub> and C<sub>6</sub> to C<sub>12</sub> in our environment.



### THC-8000 Total Hydrocarbon Analyzer

Continuous analysis of THC in PPM and PPB level

## Infrared Analyzers



### Infrared Analyzer - IR 8000

Control of CO<sub>2</sub> or N<sub>2</sub>O in ppm level (CO/CO<sub>2</sub> configuration possible for medical applications)



## Paramagnetic Analyzers



### **Oxygen Analyzer (%) - OPM 8000**

Paramagnetic analyser | Analysis of O<sub>2</sub> in % level

## Zirconia Analyzer



### **Trace Oxygen Analyzer - OZR 8000**

Control of pure gases and gas mixtures

## Katharometer Gas Chromatograph



### **TCD Gas Chromatograph**

Analysis of H<sub>2</sub>, O<sub>2</sub>, Ar, N<sub>2</sub>, CH<sub>4</sub>, CO, CO<sub>2</sub>, Kr, Ne, Xe, He in % level.

We offer products from Coltraco a UK based company.  
The various products offered are as below:

## Level Instruments

Non-invasive contents monitoring of fluids, e.g. transformer oils or liquefied gases

### Portagas

Portagas® is a world's first technology for non-invasive, non-destructive monitoring of pressurised, inert gas systems.

### Portalevel® MAX PLUS

The Portalevel® MAX PLUS is an all-new liquid level indicator with three extended calibration features and a display that will indicate if the sensor is in the GAS or LIQUID

### Portalevel® MAX NIPPON

The Portalevel® MAX NIPPON is a variety of the 8th Generation Portalevel® MAX technology and is specifically designed to address

### Portalevel® ORIGINAL

The Portalevel® ORIGINAL is our low-cost, portable and battery powered, liquid level indicator designed to non-invasively, accurately, and reliably measure the level of

### Portalevel® MINI

The Portalevel® MINI is a portable and battery powered, liquid level indicator designed to non-invasively, accurately, and reliably measure the level of fire suppression

### Portalevel® IS

The Portalevel® INTRINSICALLY SAFE is an ultrasonic liquid level indicator approved for Zone 1 ATEX hazardous or explosive environments.

### Portasteele® CALCULATOR

The Portasteele® CALCULATOR is the perfect partner to any of Coltraco Ultrasonics' liquid level detectors. It allows you to convert your measured liquid

### Portamarine®

The Portamarine® is a portable and battery powered, liquid level indicator designed to non-invasively, accurately, and reliably measure the level of fire suppression agent

### Portalevel® MAX MARINE PLUS

The Portalevel® MAX MARINE PLUS is an all-new liquid level indicator designed specifically for use onboard marine vessels and environments within the marine sector.

## Flow Instruments

Non-invasive flow measurement of flow, volume, mass and energy

### Portasonic® 2.FL0

Handheld, clamp-on, transit time ultrasonic flow meter  
Suitable for line sizes DN15 – DN2500  
Accuracy: +/- 0.5%

### Permaflow®

Fixed, Clamp-on, Transit Time Ultrasonic Flow Meter  
Suitable for line sizes DN15 – DN2500  
Accuracy: +/- 0.5%  
Available with Data logging and BTU measurement



## Production Measurement Auditing & Calibration

Essex Lloyds have tied up with CEESI a Canadian service provider for Flowmeter auditing & calibration services.

Our trained staff have a wide range of experience auditing and testing production, export, emissions and hydrocarbon allocation metering systems. We offer internal audits for our clients and can also undertake third-party audits and witnessing on their behalf. We also provide audit verification testing.



## Other Products, Services & Solutions

We provide many other services and solutions as listed below:

- **Trading** of various products like **Pumps, motors, Instrumentation** etc.
- Motor Rewinding
- Installation commissioning of Motors, Generators, Valves
- PLC Installation, Commissioning and revamping
- Manufacturing of Control Panels
- Repairs & Revamping
- Load Test for Cranes
- AMC for Cranes
- Commissioning of Cranes
- Crane Drive Maintenance
- Load Cell Calibration

### Training

**We conduct training programs for following:**

- Vibration, ISO & ASNT Level 2,3 courses
- Level 1 & 2 Ultrasound Certification Training programs
- Lubrication Training courses from Descase

## Companies We Represent



## Our Customers(Partial list)



If you need any further information, please contact us at

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