The PMAC Dynamic Scale Loop

Original PMAC System for evaluation of scaling tendency and inhibitor performance

The **PMAC** System is an invaluable research and development tool for technologists responsible for the design, operation and efficiency of water handling systems in which thermal; pressure or chemical changes promote the deposition of scales.

The **PMAC** System provides an accurate, reproducible and rapid method for selecting and quantifying the most effective means of controlling scale deposition under dynamic conditions. PMAC scale rigs are being used by many laboratories around the world to provide accurate and repeatable results and seen as the Industry Standard by the leading Major Oilfield Chemical Companies.
The **PMAC** series is suitable for use where the process or reservoir temperature is greater than 100°C . It is also recommended where the effects of pressure on scaling tendency is to be studied. It is the only means of studying the deposition of Anhydride under dynamic conditions.

The **PMAC DSL** are designed to the specific temperature and pressure range conditions desired by the client.
Our Standard Unit has a temperature range from ambient to 250°C and pressures up to 3000psi or higher. Our HPHT version ranges to 300°C and 5800psi while our atmospheric DSL has the option to analyse two 'brines' at the same time up to 90°C .

DSL Models:

The **PMAC DSL-2A** Series is a dual channel DSL.
Operating at atmospheric pressure, the DSL-2A is designed within a single electronic module, providing twin dual-headed pumps and an oven unit. Giving the operator the flexibility to run either two different samples or the same sample in duplicate at the same time. Thus reducing analysis time. Each operation has independent differential transducers, which can also be automatically set by the operator. The oven/waterbath is situated to the side of the unit being the similar height and similar dimensions to the main module and contains all the plumbing required including preheat coils and test coil.

The **PMAC DSL-3K** is the latest model in the PMAC DSL range; it is fully automated using LabView (hardware and software) developed specifically for the PMAC DSL. All inputs are through a standard Windows format screen display, all parameters are displayed during the run, selection of no pre-scale/ pre-scale single run or serial dilution operator options. The Automated DSL has programmability for self cleaning after the analysis is complete, before coming to a stop. Overall the DSL occupies a small footprint and easier to set up for routine analysis. The unit can be supplied trolley mounted if required.

PMAC Systems

Flow Assurance Specialists

Products and Services for Corrosion & Erosion Integrity and Monitoring

UK Office

PMAC House
Greenhole Park
Greenhole Place
Bridge of Don
Aberdeen UK
AB23 8EU

Phone: +44 (0)1224 703032
Fax: +44 (0)1224 821660
E-mail: sales@pmacsystems.com

Singapore Office

#01-01, 19 Loyang Way
Changi Logistics Centre
Singapore
508724

Phone: +65 6214 9029
E-mail:
asia.pacific@pmacsystems.com

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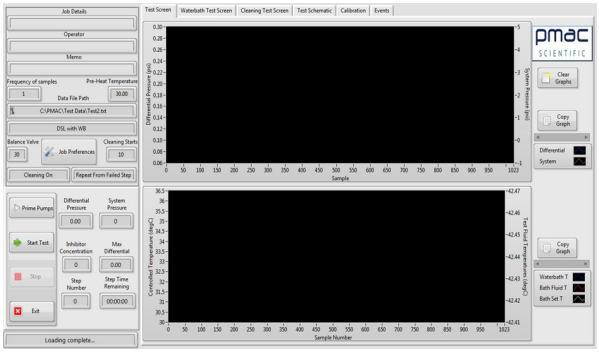
process measurement and control systems

PMAC DSL-6000 cont...

The system is designed with two HPLC pumps, all controlled from the PC but can have three if required. The pump heads are 10cc constructed with ceramic insert liquid-contact parts – minimising any corrosion issues. The system set-up will give a maximum flow rate of 20ml/min (50cc pump head options are available). System design pressure maximum of 3000psi and offer a temperature range covering 0 - 250°C, thus allowing simulation of field conditions. Flow configuration is programmable at flow ratios between 0-100% allowing for a single pump flow if necessary. The Systems process is fully automated and simulated on the PC.

The electronics are all fully enclosed in IP rated boxes for enhanced safety. The oven comes complete with independent temperature control and thermo cut-out as standard. System pressure and the differential pressure both come with pre-set with inbuilt safety cut-out.



The PMAC DSL software fully controls the test, including, running a series of tests, a pre-scale and different dilutions followed by a cleaning cycle. The software logs all results in chronological files with the LabView controlling software; this is then easily manipulated for evaluation and reporting with MS Excel (Microsoft Office software).
The class leading PMAC DSL software includes: non-linear programming, preheats, program save/load, program via ppm or %, repeat test/step/from, inbuilt/standalone calibration (including temperature), summary test report, events, temperature ramps, clean complete, live schematic as well as many others features.

PMAC DSL Options:
Replacing the Loop with an inline filter:
- allowing for detection of ideal for lead and zinc sulphide inhibitors (reference PMAC Field Sidestream for Scale and SPE paper100627)
Note: The DSL could be fitted with both the Loop and the Filter, configured in series, parallel and or independently to individual requirements.
pH Measurement Probe:
- Inline Low Pressure PH and conductivity measurement recorded to the software.
Refrigerated Water Bath.
- Complete with pre and test coils. This is becoming a common request with the growing number of LT deep water tie-backs.
Third HPLC Pump
- The third pump option is available for special test work with three “stable” waters being analysed directly for compatibility tests
Elevated Temperature and Pressure
The standard Automated DSL can be manufactured to operate at 5800 psi and 300°C . or higher on request.
Other Options are available on Request including metallurgy (eg Monel in heated zone)
For Further information please contact sales@pmacsystems.com

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