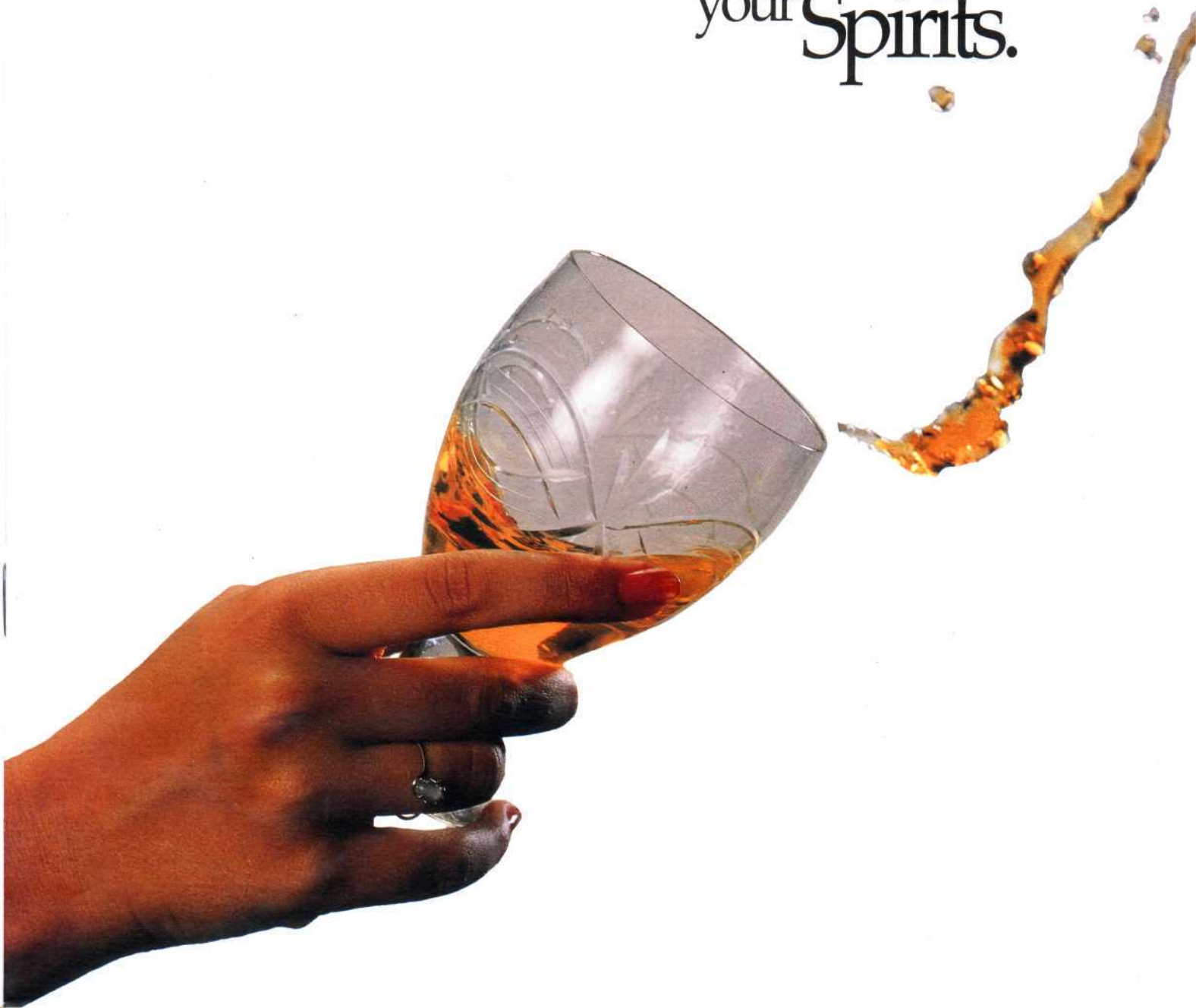
Forbes Marshall

TÜV CERT
DIN ISO 9001
Certificate: 041004422

Alcohol Distillery & Biogas Systems

Gain Control over your Spirits.



Presenting Control Instrumentation Systems for Distilleries

Production & consumption of alcohol is an age old practice. But, with time, the usage areas as well as production techniques have gone through a major transformation. Apart from potable purposes, alcohol today finds application in a varied mix of industrial areas. And with state-of-the-art technology, we now have techniques & systems that bring out much higher quality of the product while effectively lowering production costs. The process of distillation is one with slow dynamics and is accompanied by side streams, making it essential to have a carefully planned and designed control system. FORBES MARSHALL, a company with over 40 years of experience and proven expertise in the fields of Steam Engineering and Control Instrumentation, possesses the competence to plan, design, engineer and commission the perfect control system for your distillery or biogas plant.

Our Systems Team

THE FORBES MARSHALL BENEFITS

Paybacks -

Our Control Instrumentation works on the simple principle of considerably decreasing production costs while increasing the quality and quantity of the product to give you substantial gains. We could provide you with optimum process parameters that give you savings of Rs. 6,000 to 10,000 per day, enabling you to pay back an investment of a whopping 10 lakh in just 6 months.

Better Product Quality -

Distillation is a non-ideal, azeotropic process involving several controlled and manipulated variables. Careful planning of the control system design, offering you a large number of control loop options, helps you achieve and maintain quality standards and specifications.

Operational Efficiency and Safety -

We have proven in-house expertise in Chemical, Mechanical and Instrumentation engineering to tackle all problems in distillation operation and control. Column stability and plant safety is totally ensured and incorporated in the instrumentation design.

Widespread Network and Easy Access to Instrumentation -

We have a countrywide network of branch offices and representatives. And as a single source for total turnkey Instrumentation, access to state-of-the-art control solutions are almost at your doorstep.

CONTROL SOLUTIONS FOR CRITICAL AREAS

The Molasses Feed

The molasses, which may vary in quality, needs to be accurately metered. Our *Krohne* magnetic inductive type flowmeters provide an ideal solution. The 'Corimass' mass flowmeter, which computes compensation for changes in density, viscosity and temperature of the feed, provides an even more sophisticated solution.

Compensation for Process Lag

Being an operation of slow dynamics, there are lags in the process that need to be compensated. This is effectively done by the special algorithms in our *Moore* microprocessor based controllers which compensate for process lags and measuring delays in critical column parameters.

Vapour Boil-up Rates

Perfect regulation of steam pressure and flow is essential in order to maintain vapour boil-up rates. Our *Arca* control valves or pressure reducing stations combined with our varied range of steam flowmeters suit diverse types of steam inlet conditions.

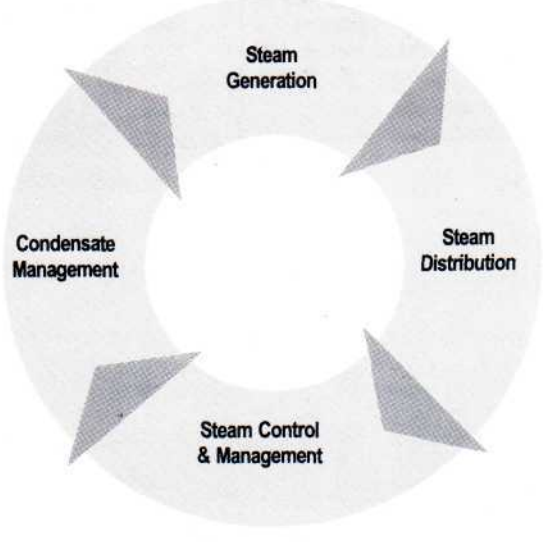
Pressure Drop in Control Valves

The *Arca* control valve (globe or butterfly type) with wetted parts of SS / Teflon / CS are suited for all critical areas, including low pressure vapour services.

Hazardous Area Applications

In any process plant, field instrumentation must be suitable for hazardous area applications. All our *Moore / Krohne* transmitters for flow, pressure, level, and temperature are certified either Ex - proof or intrinsically safe for class I division II areas.

Managing your condensate efficiently is integral in any process plant which has Steam as an important utility. We can offer you not only steam producing and handling products but total solutions for energy efficient condensate management.



STEAM AND CONDENSATE MANAGEMENT

The Steam Engineering Division of Forbes Marshall can offer you equipment for efficient handling of Steam and Condensate such as-

1. Steam Flowmeters for monitoring and controlling steam distribution
2. Pressure Reducing Stations for all columns
3. Steam Traps, Strainers and Separators with on-line monitoring systems
4. Condensate Recovery Systems (Flash Vessel, Condensate Pumps)
5. Temperature Regulators (on the cooling water circuit for fermentor and heating application on heat exchanger)
6. Speciality Disc Check Valves
7. Automatic Boiler Blowdown Controls (ABCO) and Boiler House Controls

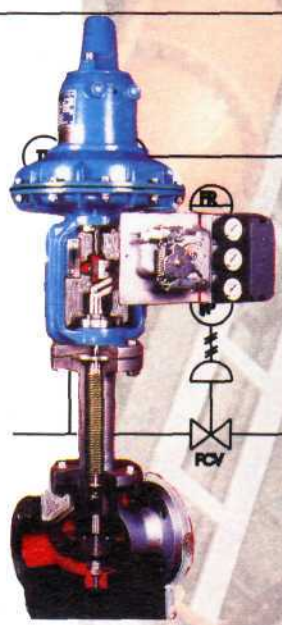
The above equipment is produced by **Spirax Marshall Ltd,** a joint venture between *Spirax Sarco, UK,* and *Forbes Marshall,* an ISO 9001 certified company. Needless to add, the products are backed by decades of proven experience and expertise in the field of Steam Engineering guaranteeing years of trouble free service.

DISTILLERY CONTROL SCHEMATIC

TO CONDENSOR

Krohne Magflow

Feed flow control
Fermented wash is a difficult corrosive to handle being hot and entrapped with high solid contents. *Krohne* Magnetic Flow Meters or the Corimass Mass Flow meter provide the ideal solutions for constant feed control.



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ANALYSER COLUMN

Steam Pressure Control-
High turndown *Arca* Control Valves with self acting pressure regulators provide the necessary constant steam pressure to the columns. In addition Steam Flow Control can be provided by using a *Krohne* Vortex Meter. This provides a constant vapour boil up rate and savings in Steam consumption.

Arca Control Valve

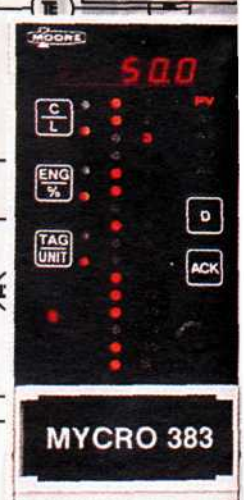
TO CONDENSOR

Plant Wide Monitoring-
Existing plants simple Temper with capillar platinum thermometers w display stations 383 provide displays with compatibility for logging. Typi column has 3 points.

EXTRA NEUTRAL ALCOHOL (ENA)

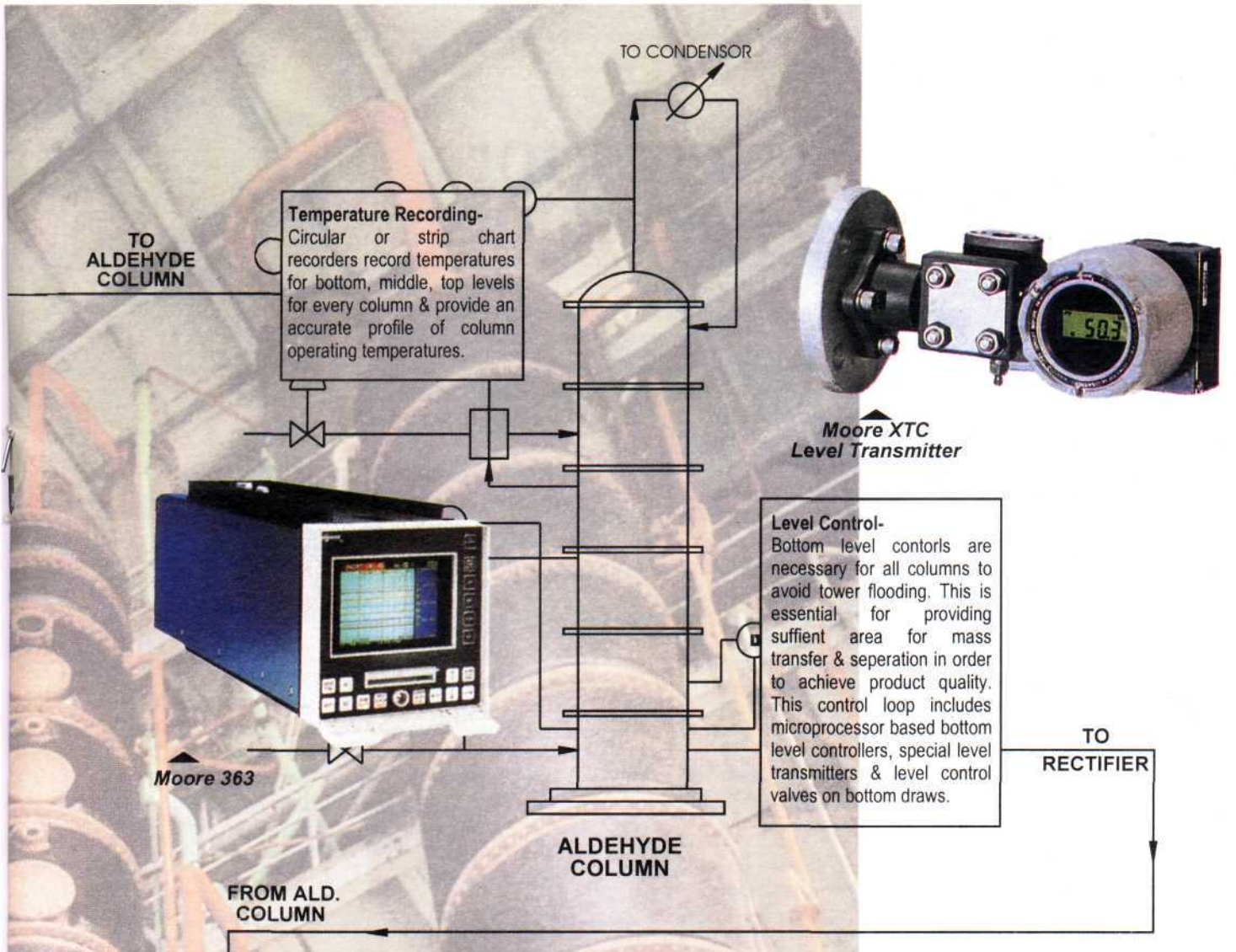
Moore 352

Temperature Control-
Temperatures on all columns are measured by accurate resistance thermometer sensors with a span as low as 10°C. The microprocessor based controller on the panel and pneumatic control valve complete the system. Critical parameters like dead time and process lag compensation are effectively taken care of in the area of temperature control.



RECTIFIER COLUMN

Moore 383



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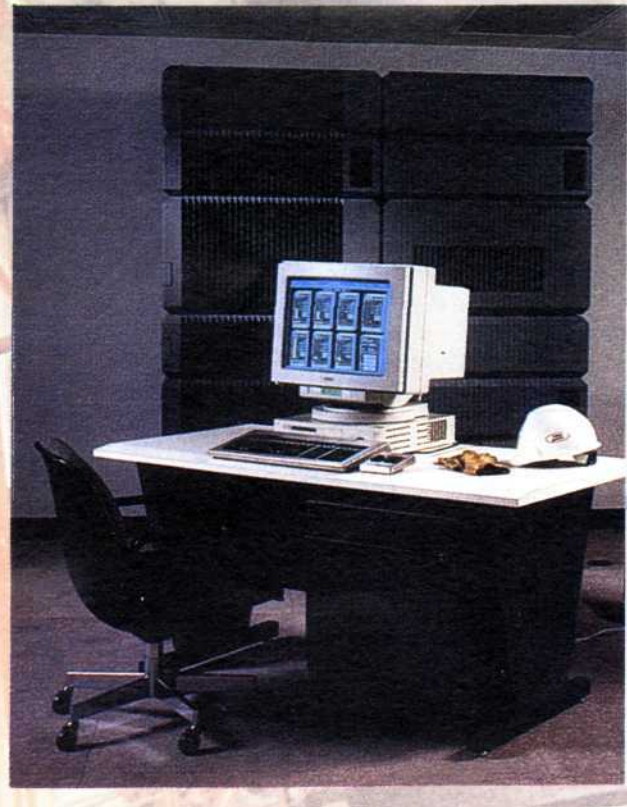

Application of Distributed Control Systems in Modern Distilleries

The APACS Multi-loop process controller is the latest in Distributed Control Systems combining a flexible architecture with modular hardware of PC based programmable logic controllers. This system enables you to save on hardware, maintenance and configuration downtime while optimising process efficiency. The use of HART protocol and the Microsoft Windows user interface put the power of controlling your plant at your finger tips.

Systems for Bio-gas Plants

Most Sugar Plants in India have downstream distilleries. The effluent out of this distillery is a high temperature, low pH liquid which, if discharged into the open, can be potentially dangerous to the environment. That makes biomethanisation plants a standard feature with any process set up that needs to discard large amounts of effluent. These plants treat the effluent, correct the pH & simultaneously produce biogas which is capable of replacing the fuel of the distillery boiler to a large extent. Gas production from such a plant could range from 400 to 2500 nm^3/hr depending on the plant capacity. In addition to the biogas production efficient reduction of BOD & COD is achieved. These anaerobic digestors are supplied by many OEMs in India with different designs but the instrumentation is largely similar. *Forbes Marshall* has supplied instruments & systems to over 30 such plants in the country.

Feed Flow & Recycle Flow

Monitoring & controlling of spent wash in both these lines is efficiently done by *Krohne* magnetic flowmeters & *Moore* single loop controllers. Special SS Control Valves from *Arca* have found excellent acceptance. From the first systems supplied in 1989, more than 80 flowmeters of *Krohne are* working all over the country on this application.

Temperature Control

The spent wash coming from the distillery is between 70 to 90 deg C and is controlled in a Heat Exchanger to produce an outlet temperature of 30 to 35 deg C. This is a simple control system with platinum resistance temperature elements, special temperature transmitters and *Moore* controllers.

pH & Spent Wash

Some OEMs recommend monitoring of pH either in recycle line or in the feed line of distilleries. Very special self cleaning systems from *Polymetron* along with 2- wire transmitters from *Forbes Zellweger Analytics* are employed for this corrosive application. It is ensured that the operator obtains accurate pH reading over extensive periods.

Pressure Control of Bio Reactor

The outlet gas from the biogas reactors is collected in a gas holder or directly compressed before feeding to a boiler. Pressure control of the reactor vessel is essential and this low pressure control system (working in the range of 0 to 30 mbar) is critical for the safe operation of the plant. Special control systems using low range *Moore* transmitters & special *Arca* butterfly control valves have been developed to provide a safe and trouble-free operation. Interlocks are built into the systems for any over-pressure or vacuum conditions which will damage the reactor vessel.

Safety Interlocks and Automatic shutdown system

All the control systems supplied by us include special interlocks for temperature, pressure, pH as well for the feed & outlet gas flow rates. In the event of any emergency the reactor is shutdown automatically.

Flow meters for biogas

This is an extremely complex application where few instruments have succeeded. Pressures are low, line sizes are large & the gas is both corrosive & wet. *Forbes Marshall* has developed a number of solutions using Thermal Flowmeters, Vortex Meters etc. with special designs which avoid all moving parts in this critical application area.

Pay backs

Plant manufacturers for effluent treatment plants typically provide pay back of 11/2 to 2 years on the gas production. Instrumentation pay backs are very similar & provide both the advantage of automation as well trouble free operations of bio-fermentors.