Erba Instruments Inc.

March 7, 1985

US Nuclear Regulatory Commission
Region 1
631 Park Avenue
King Of Prussia, PA 19406
Att: Dr. Glenn

Dear Dr. Glenn,

Further to my recent telephone conversation with the NRC, I believe our recent application has not been processed due to the incorrect fee. Please find enclosed a check for an additional $20.00.

Please do not hesitate to contact me if you require any further information to allow our application to be processed.

Yours sincerely,

A.D. Bashall
Technical Support Manager

enc: Copy of original application
$20.00 Check, #722

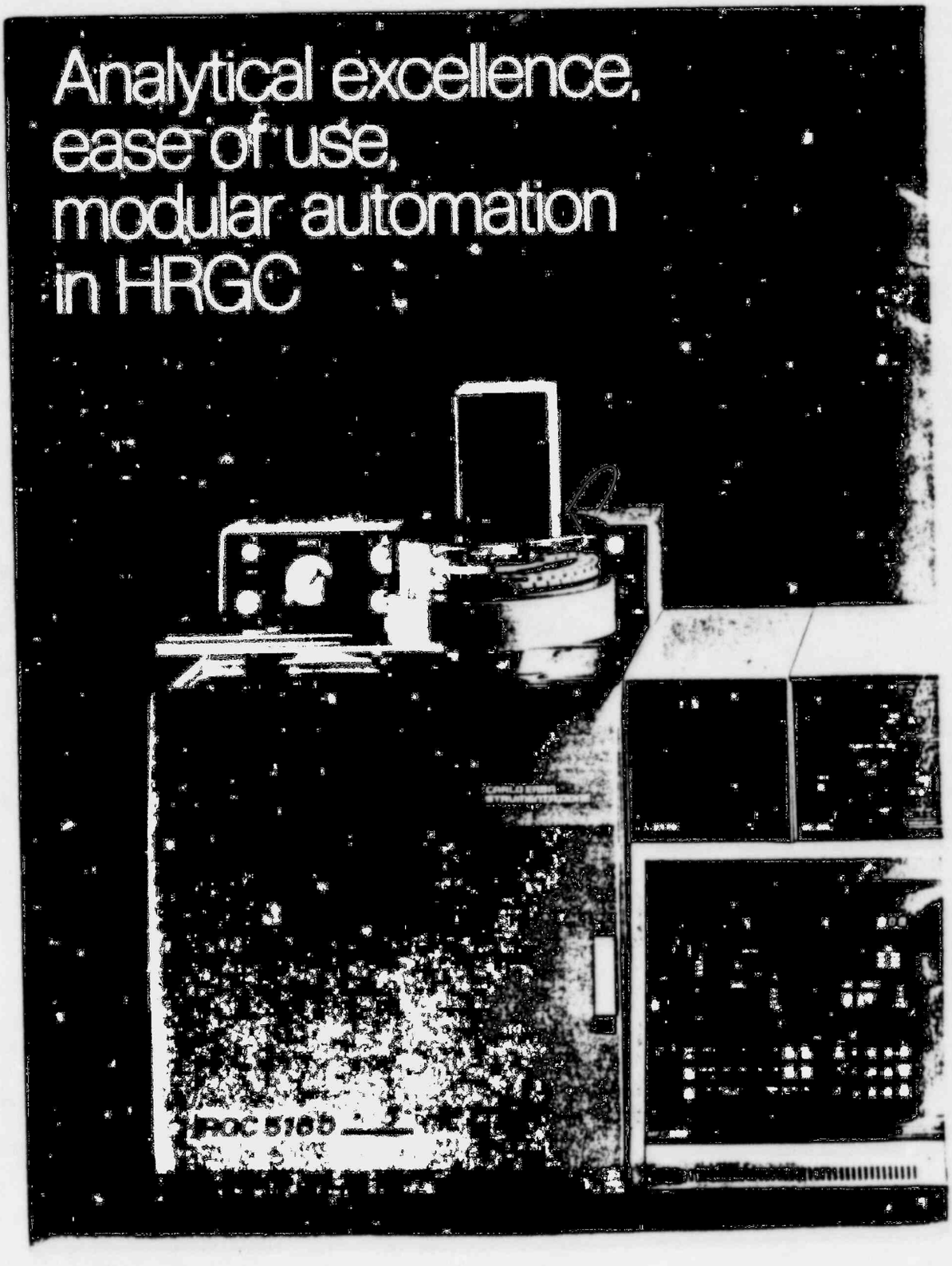
cc: Tim Anderson/Harris Analytical

CARLO ERBA STRUMENTAZIONE

HRGC Mega Series

The perfect environment
for the analysis of your sample

Analytical excellence, ease of use, modular automation in HRGC



Analytical excellence

Designed to match the most exacting requirements of modern and demanding gas chromatography the new Mega Series incorporates all innovative and patented Carlo Erba solutions to provide the chemist with precise, accurate and reliable analytical results.

Unsurpassed ease of use

Terms familiar to chromatographers are used for all functions to facilitate operation without the need of special operator training. The intuitive keyboard coupled to a large graphic array ensures rapid, reliable interaction and easy status recognition.

Modular automation tailored to analytical needs

Modular concept permits the instrument to be upgraded and automated according to your analytical requirements and budget. Plug-in satellite accessories include the widest array of autosamplers for liquid, gas, solid, head space and thermal desorption, a wide choice of advanced data systems and a highly efficient computer.

☐ Ultra stable column oven

Unique patented air flow pattern for an unsurpassed degree of temperature stability to meet the most stringent requirements of modern flexible capillaries.

☐ Versatile, innovative injection systems

Complete package of easily interchangeable packed and capillary injectors including the unique cold on-column with secondary cooling for guaranteed quantitative results in a large variety of applications.

☐ Unique cold on-column autosampler

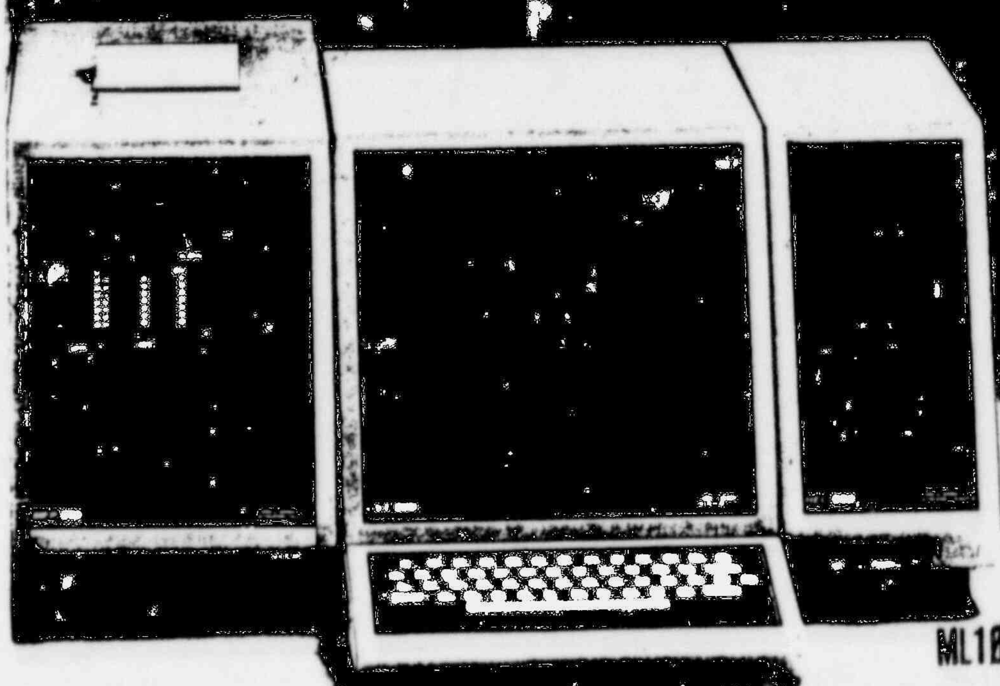
For the first time the benefits of the cold on-column injection technique are available in a fully automatic, unattended way with any standard glass or fused silica capillaries. An important technological breakthrough opening a new era of highly precise and accurate routine analysis of large sample batches.

☐ Readily interchangeable, optimized detectors

Comprehensive range of high sensitivity universal and selective detectors interchangeable in seconds. Stacked and/or parallel detector configurations made easy for multiple information from each injection.

☐ Cost effective, highly efficient data systems

High performance, operator oriented range of Data Systems culminating in an advanced computer utilizing a popular operating system and well known programming languages.



ML10

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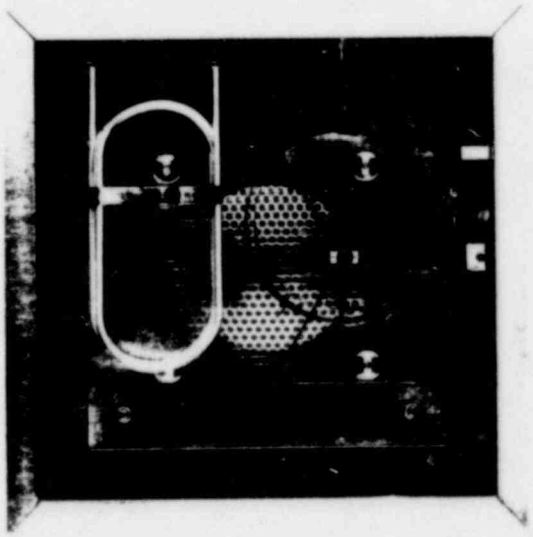
Ultra stable column oven



Optimised column environment

The Mega Series column oven has been designed to meet the most demanding requirements of modern gas chromatography. Experience acquired in over ten years' leadership in capillary gas chromatography has enabled the development of a totally new concept in chromatography ovens, incorporating many innovative, patented solutions leading to greater oven temperature stability, accuracy and precision.

Recent developments in column technology have generated highly reproducible and thermally stable capillary columns where the effects of uneven heating and temperature variation can no longer be tolerated. These effects are very relevant in the case of fused silica or flexible glass columns where the heat transfer between the oven air and the column wall is extremely rapid due to the very low thermal mass of the fused silica. In some cases this could result in peak distortion and/or peak splitting.

In the Mega Series oven all the parameters and components involved in providing a highly accurate, reproducible temperature uniformity have been carefully optimised to produce the best possible environment for the analysis of your sample.

Optimisation in this case means a new concept in air flow circulation, obtained by a unique fan design, ideal shaping of the oven walls as well as the positioning of the heaters within the oven, and sophisticated real time temperature control. The result is an oven which immerses the column in an ideal, thermally quiet zone with a peak-to-peak temperature variation of less than 0.05% of actual temperature.

The optimal temperature accuracy and precision achieved inside the oven are fundamental parameters for the reliability of peak identification essential to method development and investigational research.

This oven is capable of reproducible and accurate operations starting from temperatures 5 to 10 °C above ambient without cryogenic cooling. At near ambient temperatures in fact a highly sophisticated motorized system piloted by the temperature controller permits the automatic, continuous modulation of two flaps in order that both cool air intake and hot air exhaust from the oven are properly proportioned according to the desired operating conditions.

The ambient air entering from the rear of the instrument is not sent directly to the column but is premixed in the fan chamber to ensure a very high degree of temperature stability even for long isothermal periods at close to ambient temperatures.

For applications that require temperatures below ambient the new Cryogenic Unit Mod. 520 is optionally available. This unit will permit operations down to —50 °C using either liquid nitrogen or carbon dioxide as coolant.

An advantage of this unit is represented by the possibility to preset the start cooling temperature threshold in the range 30 to 99 °C therefore permitting faster cooling times or reduced coolant consumption as a function of the application and/or ambient temperature.

Also in this case coolant premixing in the fan chamber assures the utmost temperature stability while preventing thermal shocks to the columns.

The Mega oven's air flow pattern and low thermal mass also ensure rapid heating and cooling times during temperature programmed operation. During the cooling cycle hot air from the oven is vented through a flap at the rear of the chromatograph, not in the front, so that there is neither deterioration of the analysis working conditions nor reduction in work space.

Multiramp temperature programming necessary for capillary column operation or for automatic unattended injections is a standard feature of the Mega Series.

Programming is possible between —50 °C (with cryogenic option) and 450 °C in increments as small as 0.1 °C/min.

Reproducible ballistic temperature programming represents a unique feature of this new oven.

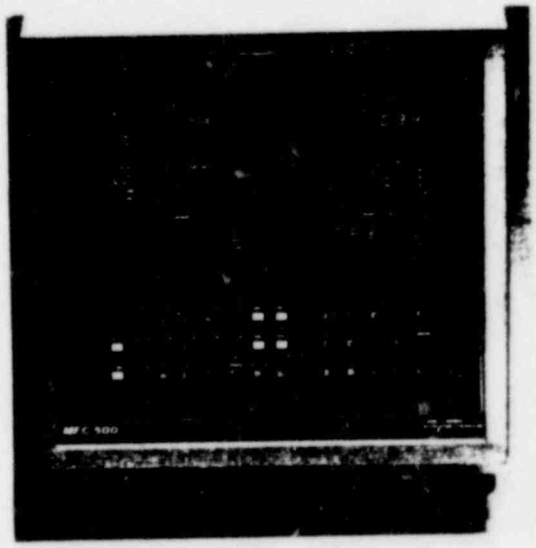
All of the volume of the large Mega Series oven is usable and allows simultaneous side by side installation of packed columns, narrow or wide bore capillary (fused silica as well as glass) columns and column switching valves.

This means that almost any foreseeable configuration of columns may be easily accomodated, an important advantage in any chromatography laboratory.

The oven roof has been designed to allow a variety of injectors, as well as detectors to be easily configured for the maximum flexibility over a wide range of applications.

Additionally it also incorporates an auxiliary gas line which is essential for optimum performance when operating with effluent splitters and multiple detectors.

Unsurpassed ease of use



Multi-function controller MFC 500

In the evolution of the Mega Series oven, considerable resources were devoted to the development of an equally accurate, reproducible yet easy-to-use control system. This resulted in the development of a multi-function controller, the MFC 500.
The multi-function controller allows easy entry of values and parameters by single keystroke programming through a keyboard based on a language of terms already familiar to most chromatographers.
The inclusion of a simple, easy-to-understand, yet accurate control station has been a prime objective in the development of the Mega Series. The multi-function controller separates the control system into four zones, Injector one, Injector two, oven and detectors, each controllable in degrees Kelvin or Centigrade.
In the oven three ramp rates and four isothermal periods may be set, allowing multi-ranip temperature programming. The programme listing is available at any time and any condition listed may be changed when required even during the course of the analysis.
Illogical entries are prevented by the MFC 500 which automatically checks the validity of each command and rejects all impossible values.
Once verified the program is stored in memory. The MFC 500 can optionally store up to 10 complete sets of parameters which can be individually recalled by the operator at any time.
The memory has a battery back up sufficient for thirty days in case of total power failure.
This also allows the chromatograph to be switched off (e.g. during the weekend) without the need of reprogramming when restarting.

When the MFC 500 is used in conjunction with the High Efficiency Computer HEC 960, software packages allow remote control of all its parameters as well as autosampler drive with automatic storage of the results for completely unattended operations.
The multi-function controller's large graphic array displays more information than a menu driven video screen at any one time, and because of its size programme status may be seen at a glance. As the name suggests the graphic array has a multi-function role.

Parameter display
all set temperatures may be readily seen.

Real value display
actual values obtained are constantly displayed for comparison with preset parameters.

Time base
elapsed time in each program phase is constantly displayed and the correct phase is shown by the position of the cursor.

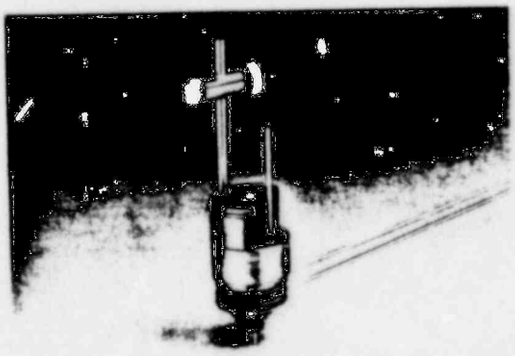
Stop watch
a digital stop watch may be used at any time to verify or re-adjust carrier and fuel gas flow rates.

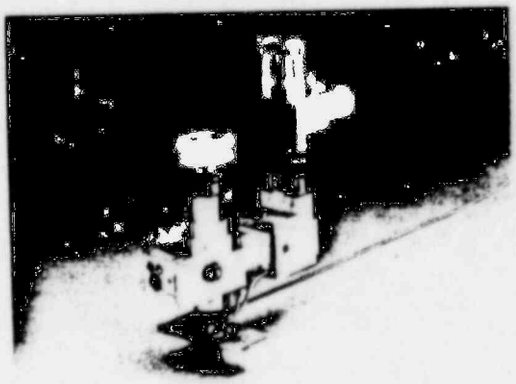
Column protection
an upper oven limit set by the operator independently of the temperature programme, ensures that the column maximum temperature will not be exceeded.

Trouble shooting
if at any time a fault develops ,or one of the zones is not yet "ready" for operation these situations are indicated by a diagnostic code or a "not ready" signal respectively.

Communication
"ready" or "alarm" signals are generated for hand-shaking with external devices such as computing integrators and auto injectors.

Versatile innovative injection systems





No one injection system is suitable for the very gr. .l variety of samples that can now be analysed by gas chromatography. Consequently a wide range of injectors is offered with the Mega Series.

Packed columns

The packed column injection port accepts interchangeable metal and glass columns and is designed to allow the sample to be injected onto the column head. Glass colum.s featuring interchangeable glass inlet liners are available for the injection of dirty samples. When small diameter columns have to be used metal dead volume reducers easily fit into the injector. A new septum cap incorporating a septum cooler and a needle guide is available to reduce ghost peaks generated by the septum. The septum cooler as well as allowing septa to operate at lower temperature reduces (by a factor of ten) the septum area in contact with carrier gas.

On-column injector

Since the on-column injector allows cold liquid sample to be injected directly into the capillary column and does not employ high temperature vapourisation, this offers two advantages: —

— There is no discrimination of sample components even when these have a wide range of volatilities.

— There is no decomposition of thermolabile compounds.

The Mega on-column injector employs a patented secondary cooling system to cool the area of the column where the sample leaves the syringe needle, as well as a ducting system to cool the main body of the injector itself. The secondary cooling, apart from eliminating discrimination, prevents back ejection of the sample even at the higher injection temperatures (ie. above the solvent boiling point) necessary to prevent the peak broadening, distortion and splitting due to the liquid sample transport inside the column, ie., the "flooding effect".

The injector, being septumless, eliminates all the problems previously associated with flexible septa ie. leaks, baseline drift and ghost peaks.

The injector is compatible with either fused silica or glass capillary columns and may operate with syringes fitted with either metal or fused silica needles. The on column injector may be automatically activated by the optional OC 416 control module. This module may also be used to initiate a constant pressure, constant flow accessory which controls the carrier gas supply.

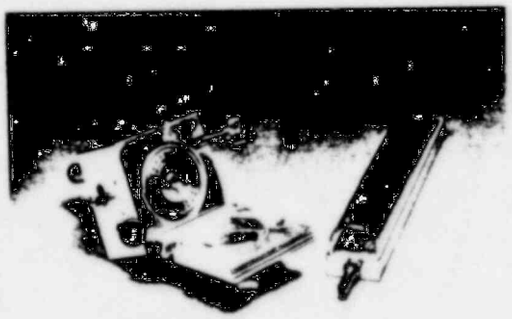
A uniqu. automatic liquid injection system — the Autosampler AS 550 — is now available to allow, for the first time, unattended operations with this injector.

Split-splitless injector

This vaporizing capillary injection system is manufactured according to Grob's original design and may be used for either split or splitless injection. Its controlled septum purge makes it suitable for the automatic introduction of samples onto the capillary column.

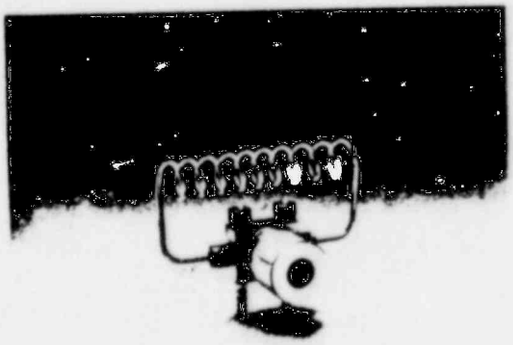
Split injection is a favourite sampling technique for undilutable samples or for samples having a limited range of volatilities, where the main components have to be determined. Splitless injection on the other hand is more suitable for the analysis of several constituents at the trace level when the vaporising step is essential to their separation from by-products. The vaporisation process takes place in an all glass environment.

The injector is fitted with two heated high precision micrometric valves for septum flushing and splitting lines. The splitting line has been arranged to accept the insertion of a filter to avoid flow variations during the injection period. When using the split injection method, the combined action of septum flushing valve and the special geometry of the septum holder prevents bleed and ghost peaks. In its standard configuration splitting and flushing lines are controlled by manually operated needle valves. A fully automatic system is optionally available.



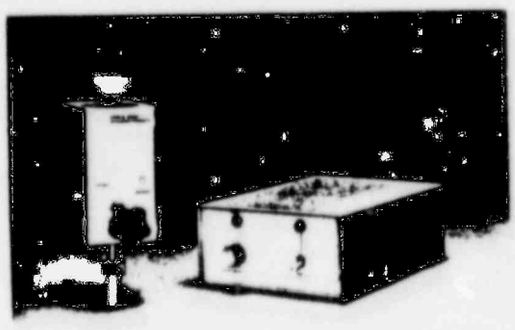
Automatic solid sampler

Solid sample injection is one of the simplest and most economical methods for the automatic injection of a variety of samples.
Solutions of the substances are placed on suitable supports and the solvent evaporated.
The supports are then loaded into a sampler which drops them into the vaporizer where gas chromatography commences. The solid sampler is mounted over the injection port on a tube through which the samples fall into the vaporizer. Inside the sampler a drum retains up to 24 supports in air free conditions. The unit may also be operated manually.



Gas sampling and column switching

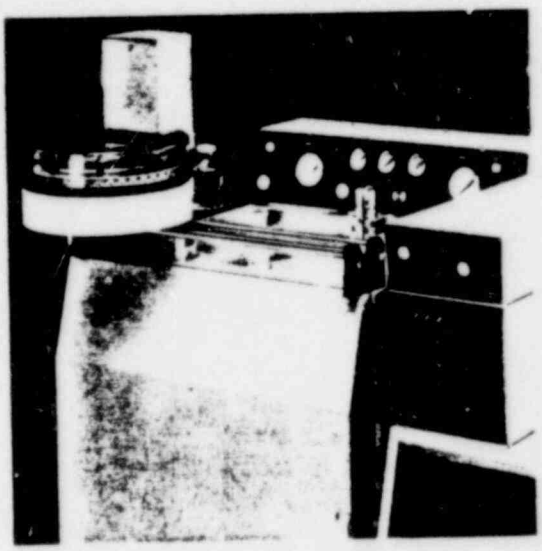
Automatic, manual, rotary and diaphragm valves are available for column switching and sample introduction on the Mega gas chromatographs. All Mega gas chromatographs have gas sampler mounting points fitted as standard.
The reliability of these valves has been proven in several thousand process chromatography installations throughout the world and over several years operations.
Both the gas sampling and column switching valves can be automatically actuated by the MFP 510 and suitable valve drivers therefore providing a truly unattended system from injection to data acquisition.



Residual solvent determination system 125

Checking solvent residues on wrapping materials is an important analytical procedure for many industries.
The mod. 125 consisting of an extraction chamber and a temperature control module may be mounted on any gas chromatograph with a vertical injection port.
The sample is placed in the extraction chamber and preheated to release solvent residues, which are then conveyed by the carrier gas into the column through a two-way valve.
Typical applications include the analysis of solvent residues in printed films of cellophane, cellulose acetate, polyethylene or P.V.C.

Widest choice of autosamplers



Many laboratories now consider automatic, unattended operations to be an essential feature of the gas chromatography system, with overnight running as an established practice.
Two new autosamplers for liquids have been specifically developed for the Mega Series to meet the increasing demand for increased chromatographic output: the models AS-V 570 and AS 550.
The AS-V 570 is used with vaporizing capillary and packed column injectors while the AS 550, for the first time, permits automatic direct injection into capillary columns through the non-discriminative cold on-column injector.

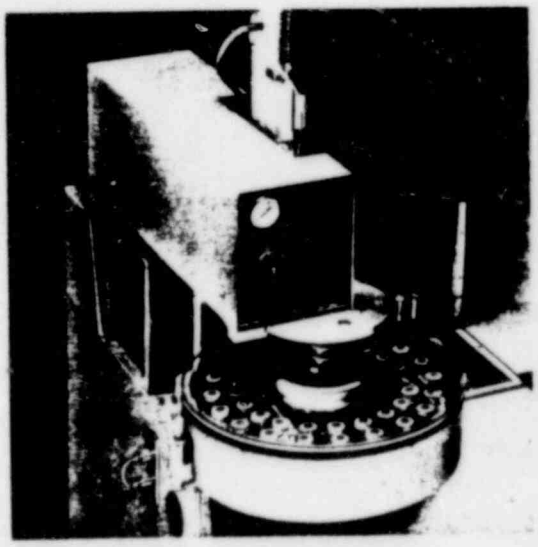
Cold on-column autosampler AS 550

The benefits associated with cold on-column injection have made this technique the favourite for those laboratories where quantitative results are considered a top priority objective. The lack of complete automation has, however, been a major obstacle to the widespread application of this superb injection technique for the routine analysis of large sample batches where unattended automatic operation is a must.
This obstacle has now been removed by the development of the new Autosampler AS 550 — another Carlo Erba first — which allows automatic unattended cold on-column injection of up to 60 samples depending on the carousel selected by the operator.
The AS 550 operates with all standard glass or fused silica capillaries therefore enabling many existing analytical methods to be automated.

This development was made possible by the special geometry of the Carlo Erba cold on-column injector with its unique patented secondary cooling system.
The new AS 550 consists of three components: the sample carousel/injection unit, the cold on-column actuation system and the microprocessor based control module.
The injection mechanism and the automatic on-column actuation system are equipped with interlocks to prevent syringe lowering in the event of accidental misalignement thus preventing needle bending.
The operating parameters including the activation time of the on-column injector secondary cooling are preset by the analyst with the control module.
The AS 550 can inject sample volumes from 0.3 to 10 µl with a reproducibility better than 1%.

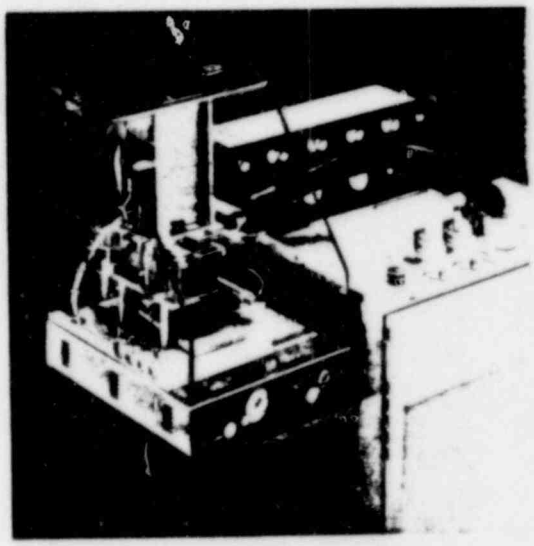
Vaporizing injector autosampler AS-V 570

The new AS-V 570 Autosampler allows automatic unattended operations with capillary and packed columns through vaporizing injectors, and eliminates potential errors arising from different operator techniques. The AS-V 570 has been designed to minimize the space required on the top of the GC and thus allows simultaneous access to the second injector and the use of stacked multiple detectors.
By virtue of its compact overall size, a second Autosampler AS-V 570 or AS 550 can be fitted simultaneously according to the injector configuration of your Mega HRGC.
The AS-V 570 is kinematically mounted on special supporting rails to allow simple repetitive sampler realignement after septum or linear replacement.
The AS-V 570 can inject sample volume from 0.3 to 10 µl with a reproducibility of better than 1%.
The microprocessor based control module interfaces with the chromatograph and allows manual control or automatic operations with remote control from a temperature programmer and/or an external computer. It also can actuate the valves on the Grob splitless injector.



Headspace sampler HS 250

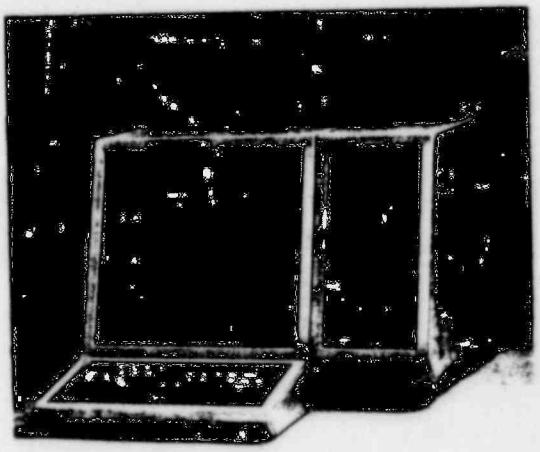
Headspace Chromatography is particularly suitable for the direct determination of traces in samples which cannot be directly injected into the gas chromatograph because their particular structure may lead to contamination of the GC system. The HS250 enables up to 40 such samples to be analyzed after equilibration in a thermostatted liquid bath, at temperatures up to 120 °C.
Equilibrium temperature, syringe flushing and analysis time may be set accurately and monitored by an electronic control module ensuring more reliability and greater reproducibility of the analytical data obtained. The HS250 may be installed on any of the Mega Series gas chromatographs fitted with all detector combinations and is suitable for use in packed as well as in capillary column operation. In most of the gas chromatographs the use of an outlet splitter enables multi-detector operations with headspace analysis to be performed, or in the case of volatiles or flavours and fragrances, one part of the effluent may be taken out to a "sniffing" port.



Thermal desorption autosampler TDAS 5000

The TDAS 5000 is a microprocessor controlled thermal desorber capable of desorbing up to 30 samples (50 optional) and transferring the desorbed gases directly to any gas chromatograph.
The intelligent controller may be used to control the chromatograph or integrator functions (master mode) or to accept commands from the chromatograph (slave mode).
All areas such as temperature control, valves, tubing etc., have been optimised to ensure reliable, reproducible sample transfer.
LED's are used for fault diagnosis or to indicate "empty" status at the end of a series of automatic analyses.
The TDAS 5000 may be used with packed and capillary columns.

Cost effective, highly efficient data systems



High efficiency computer HEC 960

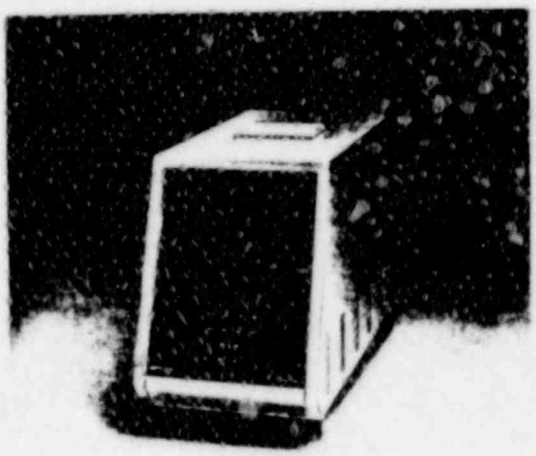
The HEC 960 permits the complete automation of the entire analytical system with an unsurpassed degree of flexibility and ease of use.
A typical example of this is the use of the HEC 960 with an Autosampler for liquids (AS-V 570 or 550) fitted on a Mega HRGC coupled to an MFP 510.
In this case our special software allows each sample in the carousel to be analyzed with its own set of analytical parameters (e.g., oven temperature program, etc.). This means that the analyst no longer is limited to running only "similar type" samples automatically.
The HEC 960 software is designed to permit individual analysis of each sample, that is, the temperature programme and/or detector temperature can be set for each sample individually. In addition samples do not need be analyzed in numerical order. Any desired sequence can be set up by the operator in advance.
This is easily done by storing all the parameters required for analysis set up and quantitative calculation in a single file of the floppy disc. A second file is used to store all sample data and the injection sequence. The result is that by simply inserting a diskette into the twin 5" double density floppy disc drivers, the different samples stored in the autosampler carousel will be automatically processed under specific conditions and the results stored on the disc for future reference.
This fully automatic system, when operated manually — e.g. for analysis parameter set up, — is even simpler to use than any conventional gas chromatograph by virtue of its self-teaching dialogues displayed on the large video unit.

The HEC 960 uses the most widerspread operating system-CP/M* and one of the most common programming languages - Microsoft BASIC.
The direct benefits for the user are:
— the possibility to access to a large low-cost canned software program library
— the possibility to write customized programs
— the possibility to use developed programs for different computers
— the possibility to continue to use all the existing software when another computer is purchased.
Another major advantage is the possibility to use the HEC 960 for other purposes such as word processing, job planning, storage and sorting of analysis results, etc.

* CP/M is a trademark of Digital Research.

Four Color Printer - Plotter

The optional four color printer-plotter permits superior peak recognition and easy interpretation since the most significative components can be plotted with different colors that are correspondingly used on the report.
At the same time it draws, under the chromatogram, the actual baseline used during the integration process to document the integrated area.
The large capacity disk of the HEC 960 allows storage of up to 50 chromatograms which can be retreived and replotted at any time, eliminating bulky and dusty files for ever.



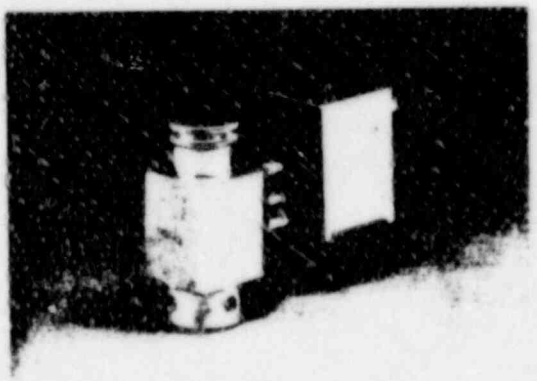
Multi-function processor MFP 510

The MFP 510 is more than a data processor since it also interfaces the Mega Series to a wide range of ancillary equipment such as computers, autoinjectors and column switching systems.
Detector signal processing is the prime role of the MFP 510 and for this role advanced algorithms were developed for base line correction, peak detection and area integration. In addition, the most popular post run calculations such as internal and external standard and normalization have been pre-programmed.
Information on up to 200 peaks may be documented on the report generated by the MFP 510 as well as retention times, peak areas and quantitative results calculated with the usual methods. In addition the MFP 510 generates a unique, auto scaled, hystographic chromatogram.
The integration of the chromatogram may be reprocessed after assigning new baseline information.
As a function controller the MFP 510 offers the following features specifically for use with the automatic samplers for liquid, gas, solid and headspace:
— automatic calibration/analysis sequence
— response factors averages
— sample and internal standards weights and scale factor for 64 samples.
As with the multifunction controller the operator communicates with the MFP through a keyboard based on terms commonly used by chromatographers.
Through its RS 232 output port the MFP 510 can communicate with the Carlo Erba High Efficiency Computer, HEC 960, allowing very sophisticated post run manipulation of the chromatographic data.

Mega series integrator

The Mega Series integrator is a low cost integrator capable of operating as a sophisticated integrator or as a programmable computer performing integration and report writing with the analyst dictating the operating parameters.
A unique membrane keyboard permits the integrated data to be manipulated through a number of pre-programmed calculation methods frequently used by chromatographers eg. area and height percent, normalisation, internal and external standardisation and statistics.
This compact unit featuring a fast 21 cm wide printer plotter, coupled with any of the Mega Series gas chromatographs is the ideal nucleus for a completely automated chromatographic system, since it allows external event switching (six events), basic programming and report writing. The external event controls may be used to operate switching valves, programmers, auto injectors and sampling systems.
Unique in an instrument of this cost and physical size is an optional plug-in module allowing two channel operation.

Readily interchangeable, optimised detectors

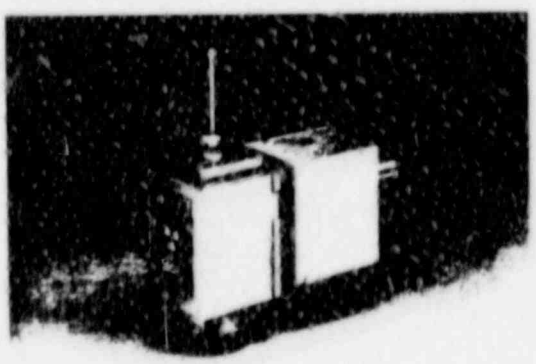


Flame ionisation detector

The FID-40 with its wide linear dynamic range and its high sensitivity is an almost universal detector. The FID-40 features a ceramic jet allowing the detector to operate up to 450 °C, while a thermal barrier between the detector body and the connectors helps provide exceptional low-noise performance. The FID-40 is an ideal detector for the very high temperature operations possible with the latest generation of capillary columns and the new high temperature stationary phases for packed column operation.

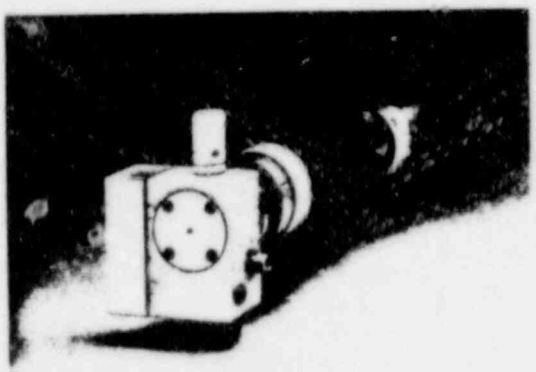
Nitrogen phosphorous detector

The NPD 40 is a newly developed thermionic detector featuring extremely low detection levels for nitrogen and phosphorus because the tuneable selectivity allows the operator to optimise the response. The detector geometry also allows the response from carbon compounds to be adjusted to give either positive or negative peaks.
A three position switch selects from NP, N and P modes of operation.
Other important features are low noise (2×10^{-13} Amps in N mode), a wide linear dynamic range, ($>10^{6}$) and ennanced sensitivity, (2×10^{-13} and 5×10^{-14} g/sec for N and P respectively).
The NPD 40 requires no additional ancillary equipment and uses the standard electrometer.



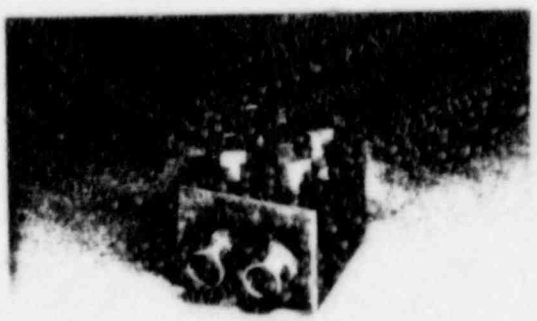
Electron capture detector

The ECD 40 is a new detector developed to allow operation at high temperatures (400 °C) with low noise characteristics. It features a minimum detectable amount of < 0.1 pg of Lindane as well as a wide linear dynamic range, $>10^{4}$, even with nitrogen as carrier gas. Its low internal volume makes it ideal for operation with capillary columns.
The Control Module allows the detector to operate in Constant Current and Constant Frequency Modes and is the only one offering full optimisation of all parameters fundamental to the detection mechanism ie. current, frequency, and voltage.
The detector geometry also allows the collector electrode to be removed, cleaned and restored without disturbing the Ni^{63} source.



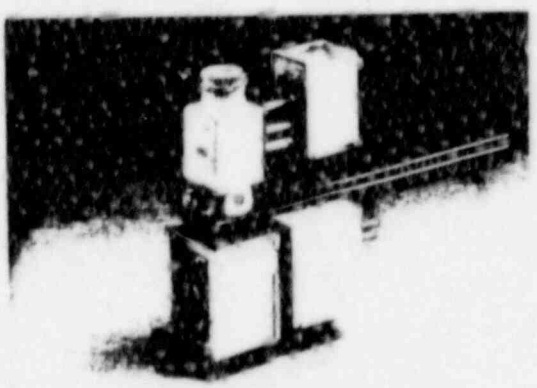
Flame photometric detector

The flame photometric detector of Mega Series has been developed for the selective detection of either sulphur or phosphorous compounds through appropriate filters. Coupled to capillary columns, its high sensitivity provides a unique combination for the environmental analyst concerned with the detection of sulphur and phosphorus in pesticides, drugs, crude oil and polluted air samples. The control module features an electronically linearized output with a variable exponential factor. This ensures that the detector quantification is at its best over the full range of the detector.



Thermal conductivity detector

The HWD 45 is a new detector in which the position of the filaments has been geometrically designed to minimise mechanical noise and enhance sensitivity.
These filaments operate in a direct current feedback mode to increase linear dynamic range and signal noise ratio. They are also protected in the case of carrier case failure since a pressure sensitive switch is included in the carrier gas supply circuit.
Two control modules (HWD 430/450) allow the detector output to be amplified up to 20 times for trace gas analysis. Because of its excellent long term stability and its low internal volumes the HWD 45 may also be used with capillary columns.



Multiple detectors

Many analysts now try to obtain as much information as it is possible from any one chromatographic separation. The ECD 40 and the other Mega detectors have all been developed with this in mind.
The ECD 40 for example may be combined in series using our low dead volume connector with FID, FPD or NPD detectors. The connector unit features its own heater to eliminate any condensation of the sample components. Parallel connection is accomplished using a variable fused silica effluent splitter.

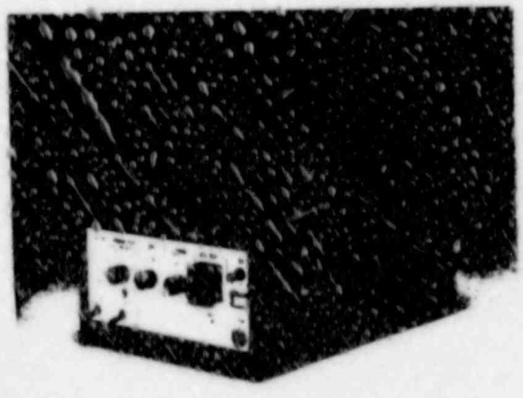
Ancillary equipment

Closed loop stripping apparatus CLSA

It is now known that levels of toxic substances too low for immediate detection by gas chromatography are capable of inflicting similar damage to that induced by higher concentrations. The realisation that tolerable thresholds must be very much lower than previously thought necessary has made the ability to prepare viable samples imperative. It is to meet this demand that the CLSA has been developed.

The CLSA is able to recover substances present in concentrations as low as 1 in 10^{11} (w/w) in the original water sample, and to concentrate them into quantities detectable in subsequent GC analysis. Samples prepared in the CLSA are also free from contamination by the stripper gas. The only limitations on detection are the vapour pressures of individual substances and their polarities. Stripping time is usually between 15 minutes and 3 hours.

The CLSA includes an electrical heated and thermostatically controlled water bath, typically maintained at 30-50 °C. This contains a 1 litre container of sample which is included in a closed loop of circulating stripper gas which is also maintained at elevated temperature. The loop includes a charcoal filter, which is recovered for sample extraction. The sample's freedom from gas contamination is due to the low volume of gas involved in the process: continuous stripping with "pure" gas could involve a total volume of 3,000 dm^3, whereas the CLSA achieves the same result with 0.5 dm^3. The continuous recirculation of a small volume (usually an inert gas, air or purified air) reduces potential contamination to negligible proportions.



Pyroprobe 100 solids pyrolyzer

Pyrolysis gas chromatography is a convenient and effective technique for the indentification of polymers, paints, resins, rubbers and micro-organisms.

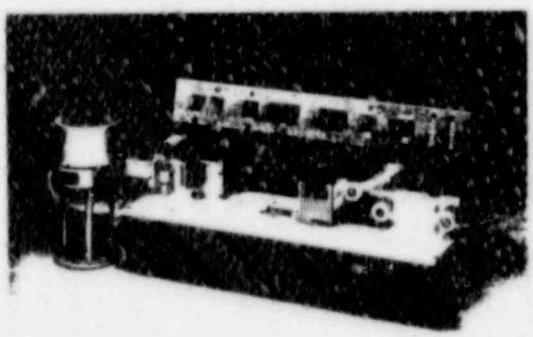
The Pyroprobe has the fastest heating rate of any commercial pyrolyzer i.e. 600 °C is reached in 8 msec (from ambient) as compared to 100-300 msec for commercial Curie Point devices.

The Pyroprobe is supplied with two different probes — ribbon and coil types. The ribbon probe is used for samples that can be dissolved or melted and deposited on the ribbon. The coil probe is used for materials of granular or fibre structure.

Crossbond capillary columns and accessories

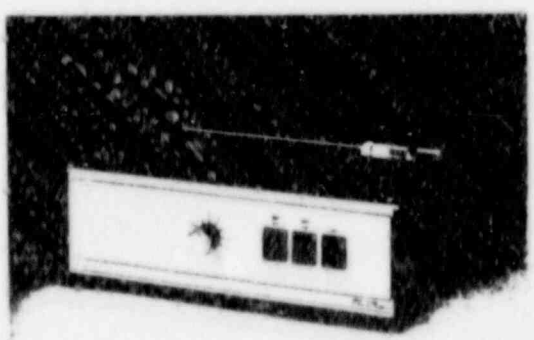
Crossbond capillary columns

"Crossbond" fused silica and glass capillary columns are the fruition of a lengthy research programme to overcome the limitations of earlier flexible columns, especially in the areas of surface inertness, maximum allowable operating temperature and column to column reproducibility.
The new "Crossbond" columns now offer cross linked chemically bonded immobilised stationary phases particularly resistant to any phase stripping that might occur on injecting large solvent volumes. This also brings many other advantages such as: (a) Higher separation efficiency; (b) Less peak tailing under overload conditions; (c) Greater temperature stability, even with thick films; (d) Low bleed rates. These low bleed rates, when combined with the ability to wash out the non volatile by-products that can cause further phase degradation make the combination of crossbond columns with high sensitivity selective detectors a particularly powerful technique.



Glass capillary drawing machine GCDM 60

The GCDM 60 is the first really fast, easy and — most important — totally unattended glass capillary drawing machine available on the market. These benefits have been made possible by the careful engineering of its key components such as the electronically controlled speeds of the feed and drawing motors, the finely regulated temperature of the oven and coil, the original lubrication device and the innovative automatic coiling system.
The high drawing speed of the machine will supply up to 60 meters/hour of finely controlled, constant diameter capillary columns.
An ingenious surveillance system will continuously check the machine is operating under proper conditions and, should the need arise, will stop motors immediately and cool down the oven and the coiling tube in a few seconds while alerting the operator through sound and light alarms.



Glass end straightening machine GESM 102-20

Conventional straightening procedures, besides being delicate and time-consuming, are far from adequate especially for persilylated columns. This is mainly related to carbonization of the phase as a result of the high temperature needed for straightening under flaming.
This temperature can only be efficiently reduced if glass deformation occurs at higher viscosity. This can be achieved through an electrical straightening device, capable of exerting much stronger mechanical forces than those effective during flaming. This condition is thoroughly fulfilled by the new GESM 102-20 through an originally designed miniature furnace automatically driven by a constant speed motor. The operator has just to feed the coiled capillary end into the furnace and push a button to obtain, in a few minutes, highly inert and accurately straightened ends up to 20 cm.

CARLO ERBA STRUMENTAZIONE

STRADA RIVOLTANA - 20090 ROGANO (MILAN) - ITALY - CABLE ERBADAS MILAN
TELEPHONE (2) 8905616/8908161 - TELEX 340449 CEST I

MONTEDISON GROUP
FARMITALIA CARLO ERBA

NRC FORM 313
(1-84)
10 CFR 30, 32, 33, 34, 35 and 40

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED BY OMB
3150-0120
Expires: 8-31-87

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

FEDERAL AGENCIES FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NMSS
WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIAL SECTION B
631 PARK AVENUE
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
MATERIAL RADIATION PROTECTION SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
MATERIAL RADIATION PROTECTION SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

1. THIS IS AN APPLICATION FOR (Check appropriate item)

- [*] A. NEW LICENSE
- [ ] B. AMENDMENT TO LICENSE NUMBER _____
- [ ] C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip Code)

Erba Instruments, Inc.
4 Doulton Place
Peabody, MA 01960

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED:

Erba Instruments, Inc.
4 Doulton Place
Peabody, MA 01960

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Anthony D. Bashall

TELEPHONE NUMBER: 617/535-5986

SUBMIT ITEMS 5 THROUGH 11 ON 8½ x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

9. FACILITIES AND EQUIPMENT

10. RADIATION SAFETY PROGRAM

11. WASTE MANAGEMENT

12. LICENSEE FEES (See 10 CFR 170 and Section 170.31)
FEE CATEGORY: 3L
AMOUNT ENCLOSED: $ 210.00

13. CERTIFICATION. (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948, 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

SIGNATURE - CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
A. D. Bashall	Anthony D. Bashall	Technical Support Mgr.	02/15/85

14. VOLUNTARY ECONOMIC DATA

a. ANNUAL RECEIPTS
- [ ] < $250K
- [ ] $250K - 500K
- [ ] $500K - 750K
- [ ] $750K - 1M
- [*] $1M - 3.5M
- [ ] $3.5M - 7M
- [ ] $7M - 10M
- [ ] > $10M

b. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors): 8

c. NUMBER OF BEDS: 0

d. WOULD YOU BE WILLING TO FURNISH COST INFORMATION (Dollar and/or staff hours) ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? (NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)

- [ ] YES
- [*] NO

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
				DATE
AMOUNT RECEIVED	CHECK NUMBER			