

LEVEL CONTROLS

for

SLURRIES

FOAMS

INTERFACE

GRANULARS

CORROSIVES

and other applications

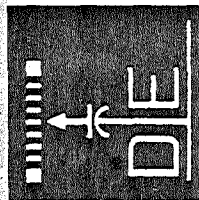


EMERSON®
BROOKS INSTRUMENT DIVISION
EMERSON ELECTRIC CANADA LIMITED
P.O. BOX 150
MARKHAM, ONTARIO L3P 3J6
BUS. 294-9340 TELEX 065-24226



(BILL BAXTER)
PRODUCT SALES MANAGER

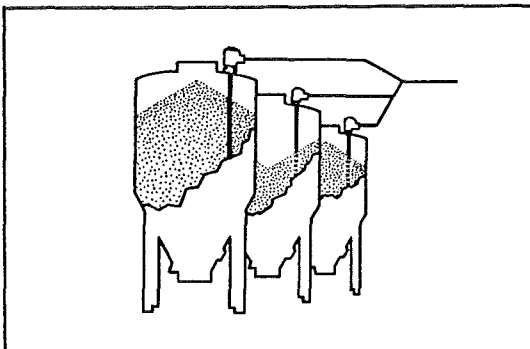
Claude Perrault
1987



DREXELBROOK ENGINEERING
COMPANY

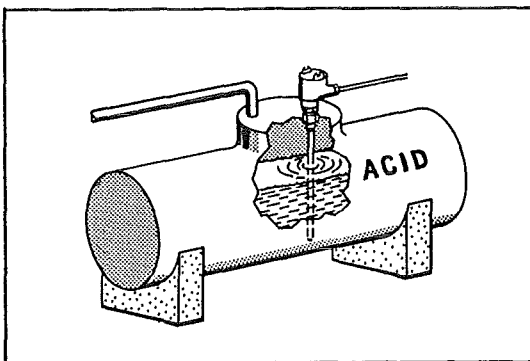
PRECISION LEVEL CONT

granular



GRANULAR
ACCURACIES of 2 to 3%.
CEREAL to ROCKS.
REMOTE or LOCAL indication.

liquid



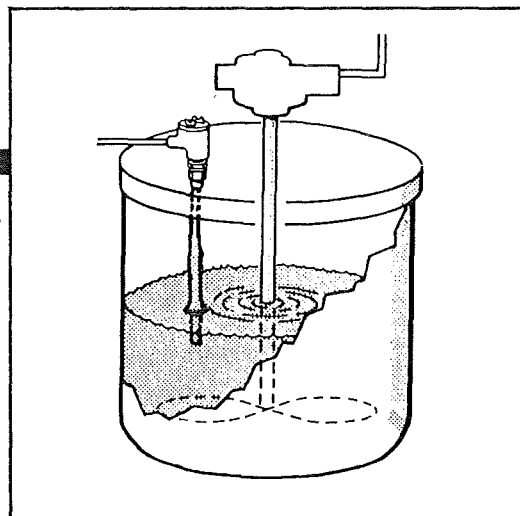
LIQUID
ORGANIC or INORGANIC.
ACIDS, CORROSIVES, FOAM.
HI TEMPERATURE, HI PRESSURE.

APPLICATION KNOW-HOW

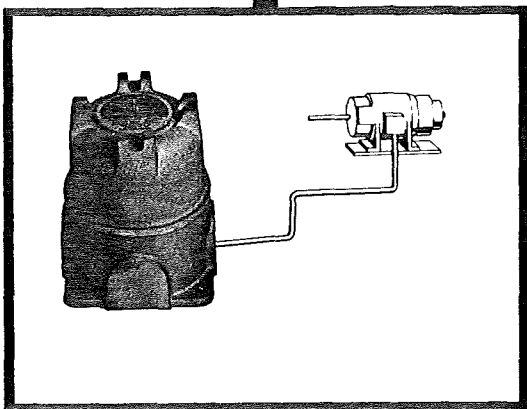
DREXELBROOK will —

- ★ Analyze the application
- ★ Calculate & supply the probe
- ★ Guarantee the result

slurry

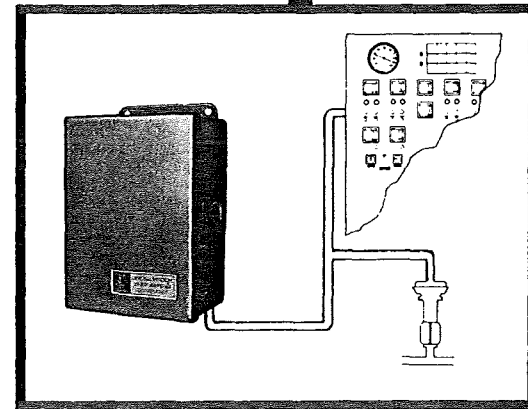


SLURRIES
Lime, paperstock, ore, polymer / monomer, and
crystallizers. High temperature and pressure.



ON/OFF CONTROL—SERIES 506-1000
Heavy-duty Cote Shield™ circuitry for accurate control
regardless of material buildup. No routine re-
calibration.

See Bulletin 506-1000-LA



CONTINUOUS TRUE LEVEL CONTROL
SERIES 508-28 Ignores changes in material com-
position, density, conductivity, etc., providing versa-
tility not found in any other level measurement sys-
tem. No recalibration. Easy to install.

ROL by DREXELBROOK

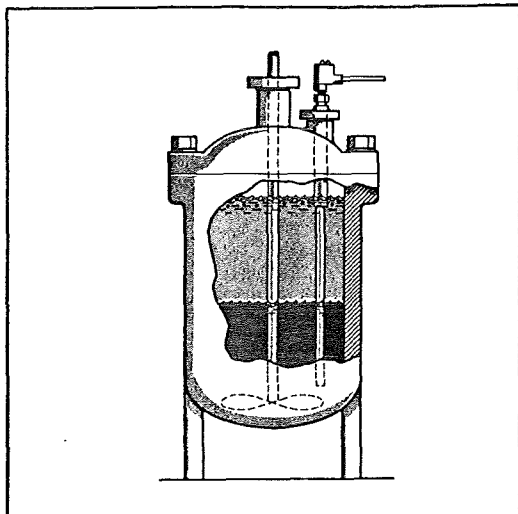
DESIGN EXCELLENCE

DREXELBROOK HAS PIONEERED STABILITY and operating convenience in Admittance Instruments.

TIGHT QUALITY CONTROL

20 Point Check of every instrument. Guarantees Equipment exceeding Specifications.

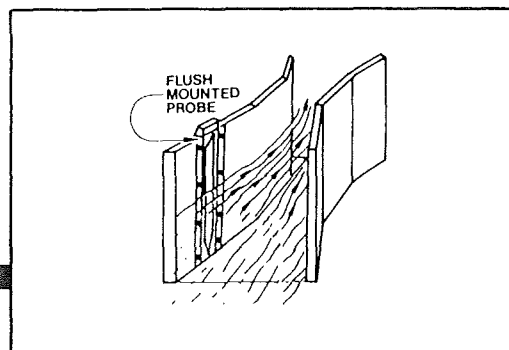
interface



INTERFACE

SMALL SPANS. HIGH TEMPERATURES. HIGH PRESSURES. ORGANICS in ORGANICS, CATALYSTS in ORGANICS, etc.

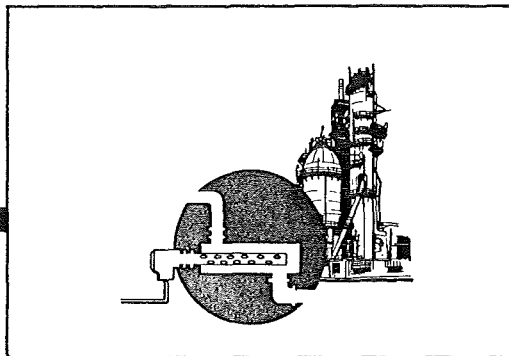
flush-open channel flow



FLUSH OPEN-CHANNEL FLOW

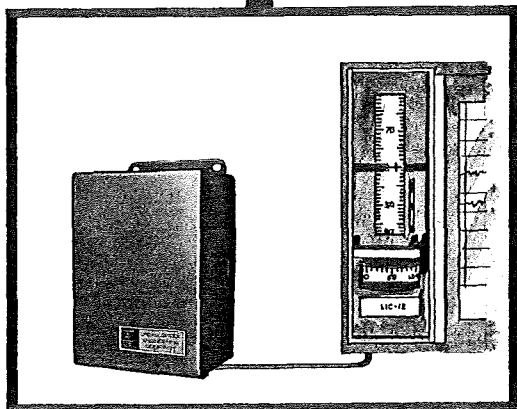
Linear flow measurement, no moving parts, unaffected by material buildup, simple installation, maintenance-free.

composition



COMPOSITION

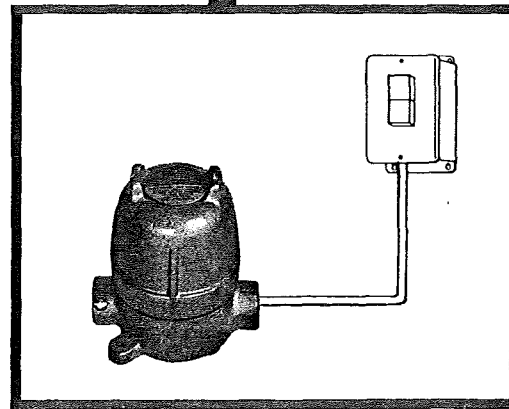
OIL-in-WATER, WATER-in-ORGANIC, WATER-in-OIL, & other two element mixtures. DIELECTRIC COMPARISON.



UNIVERSALEVEL™ TRANSMITTER

SERIES 508-6200 State-of-the-art, all-electronic, two-wire admittance transmitter for all liquids, slurries, interfaces, and granulars. Greatly reduces installation and maintenance costs.

See Bulletin 508-6200-LA

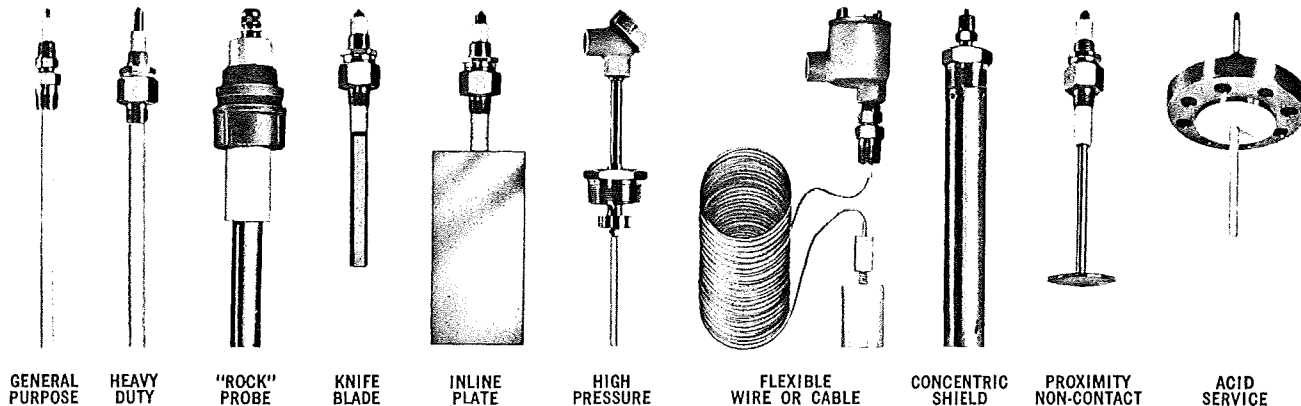


ON/OFF CONTROL—SERIES 507-1000

Cote Shield circuitry ignores material coatings. Compact, reliable, no routine recalibration.

See Bulletin 507-1000-LA

A FEW OF THE MORE THAN 50 STANDARD LEVEL AND COMPOSITION PROBES



CORROSION & BUILD-UP RESISTANT/TEFLON insulated

RUGGED—probes are made from solid bar stock

INTRINSICALLY SAFE—meets ISA standards

CYROGENICS to Molten Metals

HIGH VACUUM to 20,000 PSI

GUARANTEED PERFORMANCE

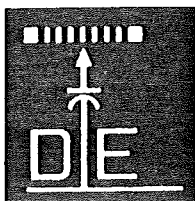
Because of the conviction that DREXELBROOK Level Controls will handle the most difficult level control problems, we have made it possible to buy DREXELBROOK units on a Guaranteed Performance basis.

To purchase a control with this guarantee, we ask only that you describe the application as completely as possible, using our standard Quotation Request Form.

With this information (and any supplementary application data that we consider important) we will quote on a Guaranteed Performance basis.

This means that if the DREXELBROOK Level Control does not perform according to our quotation, we will accept its return for full credit within the pre-specified period after delivery, subject to our inspection.

FREDERICK L. MALTBY, President



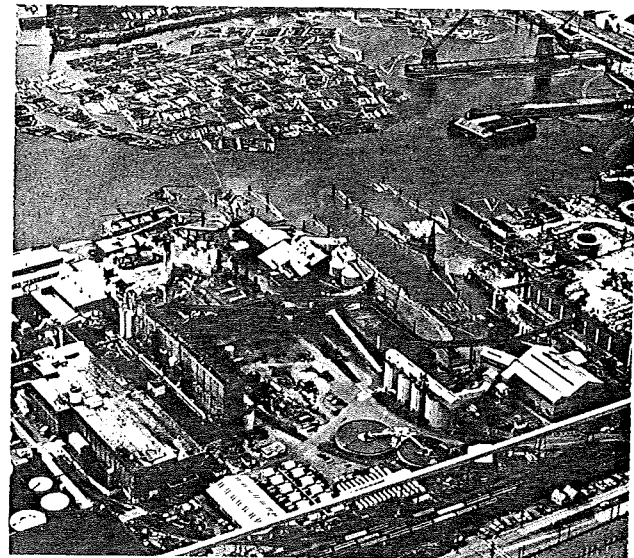
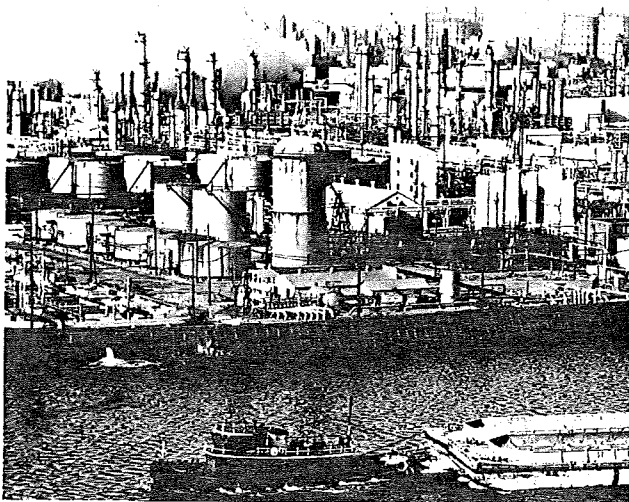
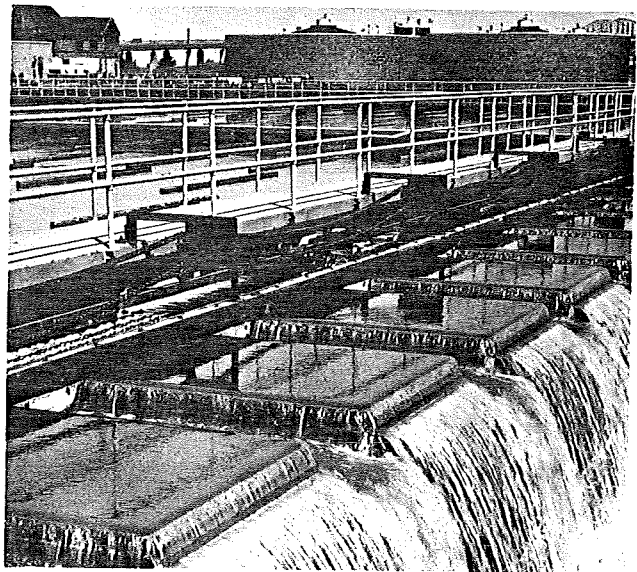
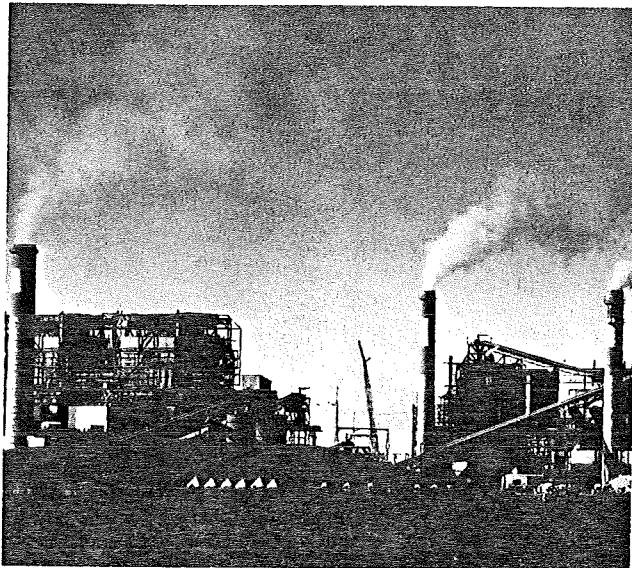
DREXELBROOK ENGINEERING COMPANY

205 KEITH VALLEY ROAD, HORSHAM, PA. 19044

215-674-1234

From Drexelbrook:

A field-proven superior system for **OPEN CHANNEL FLOW MEASUREMENT**

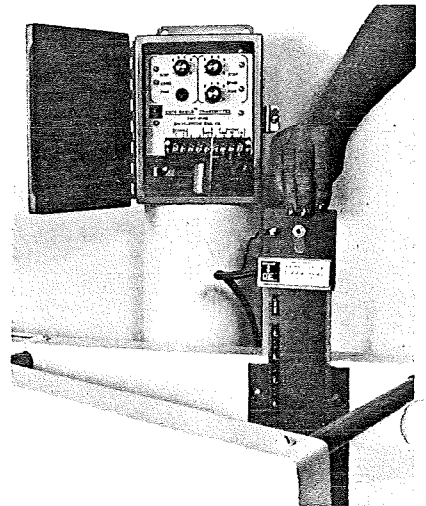
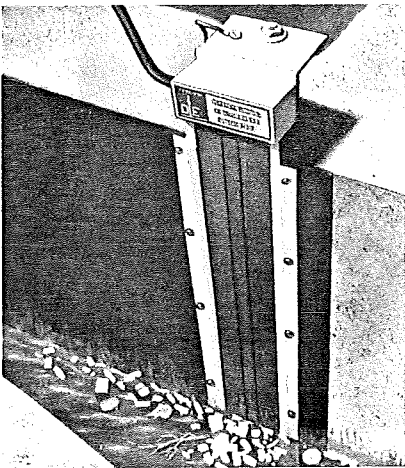


DREXELBROOK ENGINEERING COMPANY



Drexelbrook has changed the face of open channel flow measurement with:

- an ultra-thin flow sensor that ignores coatings, foam, and debris, has no moving parts, and requires no maintenance.
- a system that has met the test of tough usage in thousands of demanding applications.
- a flow sensor that mounts on any flume or weir, with a few rivets, and projects just $\frac{3}{16}$ ".
- a flow measurement system so simple, anyone can calibrate it with a bucket of water in a few minutes.



The flush-mounted, Cote Shield™ flowmeter from Drexelbrook . . . today's standard for accurate open channel flow measurement.

Open channel flow is usually associated with water systems, irrigation, sewage treatment, industrial wastes, batch processing, chemical and industrial processes.

In many cases, the flow measurement problems attached to these systems are considerable, including everything from debris and sticky coatings which jam, corrode, or gum up some sensors, to foam or even cobwebs which may fool others.

In the past many flow measurements were simply dismissed as inexpensive; the recent emphasis on pollution control and water conservation has now changed all that. Open channel flow measurements have become, in many cases, critical; and the new demand for accuracy, combined with the rapidly rising costs of maintenance, has thrust many previously acceptable measurement systems into obsolescence.

Present-day flow measurement systems

Until now, every flow measurement device available was subject to performance limitations inherent in its design.

Primitive boats and floats are the victims of their own linkages, which slip out of calibration; become jammed; are bent by debris; and require costly repair, calibration, and maintenance programs.

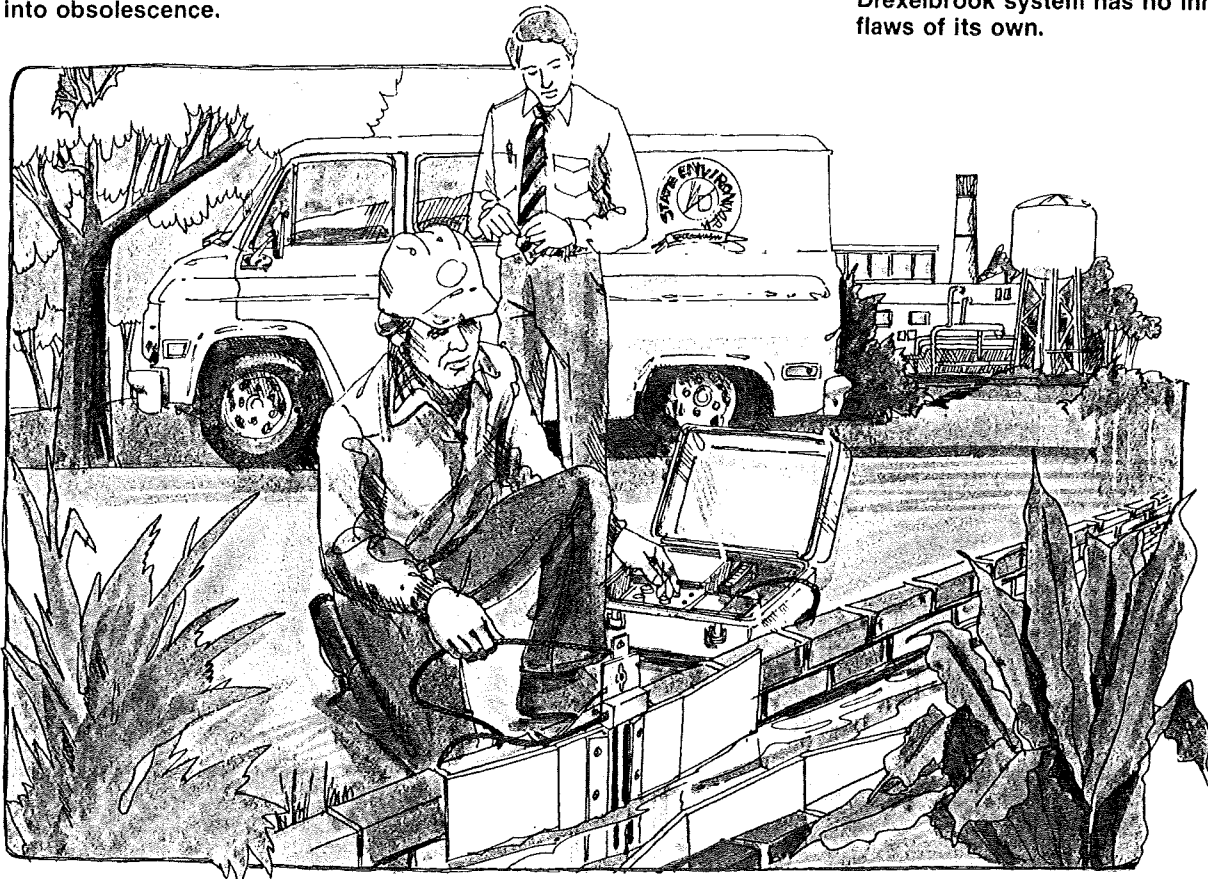
Pressurized socks have membranes which rupture. Capacitance devices are fooled by accumulations of debris and coatings. Bubbler lack the necessary accuracy for today's applications. And ultrasonic devices cannot cope with foam, small throats, debris, wind currents, audible noise, or even cobwebs; they can measure only essentially

homogeneous liquids and require trained personnel to install and maintain them.

The Drexelbrook System: foolproof simplicity

An inert, pre-characterized sensing element that mounts virtually flush with any channel wall; a potted, flood-proof connection; a remote, solid-state electronic unit that produces a linear output compatible with standard readout equipment—that's the Drexelbrook open channel flow measurement system.

Utter simplicity . . . no moving parts . . . nothing fragile . . . no response to anomalous stream conditions or coating buildup . . . certainly, no heir to the problems that plague all other open channel flowmeters. Extensive field testing prior to release for marketing has demonstrated that the Drexelbrook system has no inherent flaws of its own.



Easy to use for accurate checks by plant personnel or government agencies.

How it works

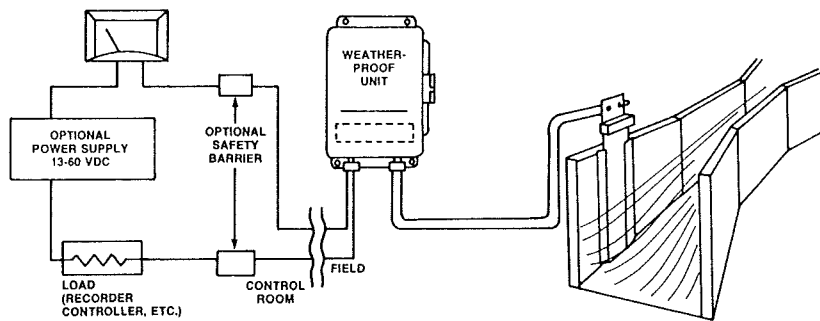
A sensing element is attached flush to the channel wall by means of a mounting track, and connected to the electronic unit by an integral cable. The output of a low-voltage radio-frequency oscillator is applied to the sensing element via the cable.

Level variations in the channel corresponding to changes of flow in the stream will cause minute currents to flow between the sensing element and ground. The sensing element is designed to the characteristics of the channel, so that its output current is linear with flow. The *admittance*—both capacitive and resistive components of the current—is measured in the electronic unit by comparing the sensing element current with a standard supply across a wide range bridge circuit; cable characteristics have no effect on calibration.

The bridge output voltage is applied to a detector circuit and then to a feedback amplifier. The resulting output current is directly proportional to stream flow. This current is compatible with standard readout devices such as meters, recorders, alarm circuits, and electropneumatic transducers.

The Sensing Element

The slim, tough sensing element is coated with a chemically inert material to make it impervious to its environment. About the thickness of a credit card, it slides into a mounting track fastened by rivets to the channel wall.



The track can be premolded into new flumes or attached to existing channels even when flow cannot be stopped. The entire assembly projects only $\frac{3}{16}$ " into the stream.

The sensing element is tough, but not indestructible. In the unlikely event of its damage, it can be easily removed from the track and a new one slipped into place. Calibration can be accomplished merely by sliding the sensing element out of the track, immersing it in a bucket of water and comparing the measured depth with the readout. Or it can simply be withdrawn to the top of the stream and the readout set to zero.

The sensing element is pre-characterized to match the weir or flume to which it is to be applied. Its output is thus always linear with changes in flow for the system being measured, thereby simplifying the associated electronics.

The Electronic Unit

With the plumbing and linkages removed from the system, flowmeter performance becomes solely a function of the electronics. Drexelbrook has engineered extremely high accuracy and reliability into the electronic unit of its flowmeter, a job made easier by the absence of any requirement for moving parts or adjustments. The electronic unit uses significantly derated circuits with large design margins so that even component drift and variations in operating conditions will not affect system performance.

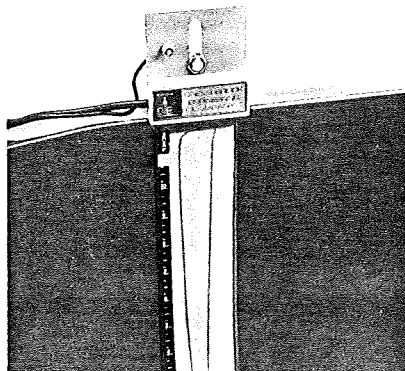
Special Cote Shield™ circuitry enables the system to ignore any sticky materials or coatings that build up on the sensing element. The flowmeter performs accurately, month after month, without the need for periodic recalibration, cleaning, or maintenance.

Why it's better

No moving parts—No floats, links, levers, purge tubes, diaphragms, or membranes.

Ignores coatings and foam—Cote Shield™ circuitry enables the instrument to ignore sticky conductive materials and buildup on sensing elements. Foam, flotsam, and jetsam are simply not a factor.

Maintenance-free—The flush-mounted sensing element accumulates no debris; no need to clean it periodically. Solid state electronics

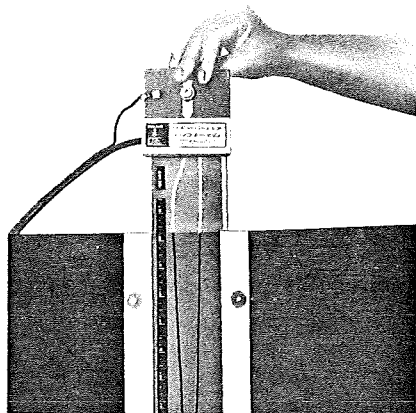


never need adjusting. No compressors, air bottles, or air lines to rod out in the dead of winter.

Submersible—The sensing element is unaffected by complete submersion; the connector is potted in epoxy resin; electronics can be remotely located away from the above "flood" level.

Easily installed—Regular plant maintenance people, using ordinary tools, can install a Drexelbrook flowmeter without difficulty. No special fixtures, electronic equipment, or technical

training is required. The track mounting arrangement permits easy retrofitting and installation in existing flumes even when flow cannot be stopped.



Built-in calibration—Once set, the flowmeter requires no recalibration; the non-interacting controls of the electronic unit make calibration quick and accurate.



Widely applicable—Can be used in water, sewage, and industrial waste applications. It's unaffected by algae or slime buildup; foam, paper, or sludge buildup; caustics, acids, fibers, etc.

Designed for use with Parshall, Leopold-Lagco*, and parabolic flumes and with rectangular, Cippoletti, trapezoidal, and V-notch weirs; flumes with mounting track already molded in are available as options from major flume manufacturers.

Intrinsically safe—Sensing elements and cables are Factory Mutual-approved as intrinsically safe for Class I, Groups A, B, C, & D (Div. 1 or 2) or Class II, Groups E, F, & G (Div. 1 or 2).

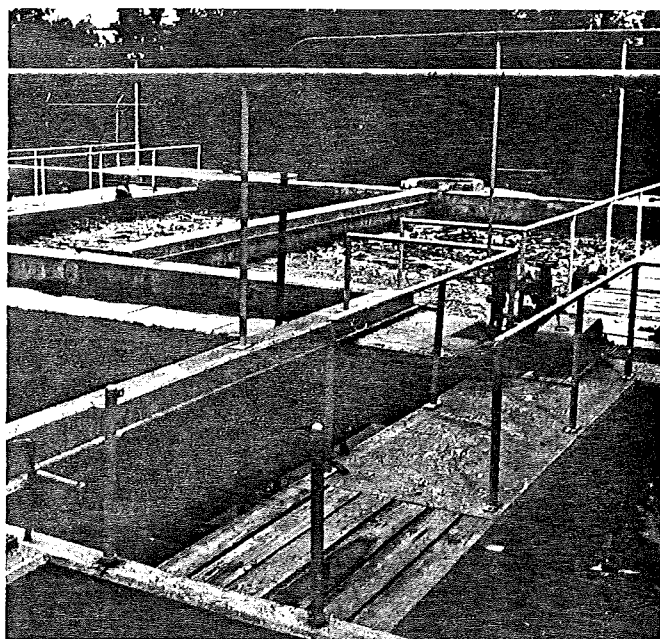
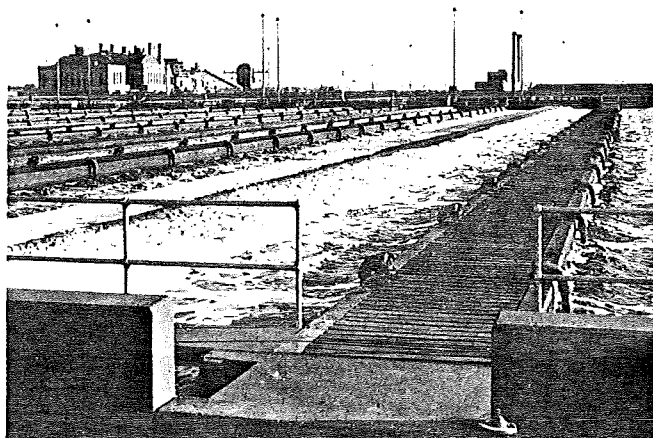
The Drexelbrook System: proven, accurate, reliable, and maintenance-free in the toughest applications.

Drexelbrook has evolved its present flowmeter system through over 5000 installations of level control equipment using essentially the same admittance principle and electronic circuitry. These installations have covered the spectrum of industrial applications and have demonstrated the basic reliability and totally maintenance-free nature of the equipment.

More recently, some 300 Drexelbrook open-channel flowmeter systems of this new flush-mount sensor design have been installed and evaluated in typical flume and weir applications, with similarly excellent results. In nearly every case, the flowmeter system has worked flawlessly; in those few installations where problems were encountered, they were quickly solved

and the measuring system put back into operation without further interruption. Referral to satisfied customers will be made on request (two actual installations are shown below).

This rigorous testing demonstrates Drexelbrook's total commitment to the concept: "It works—and we can prove it—before we sell it."



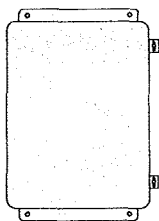
Available Systems

Each Drexelbrook system consists of two elements:

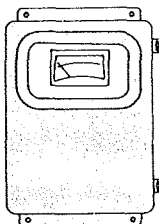
- An electronic unit to meet your requirements;
- A sensing element (including cable) characterized for your flume or weir.

Electronic Units

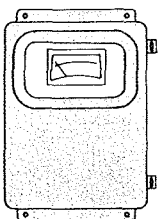
1. Flow transmitter. A 2-wire transmitter suitable for Div. 1 or 2.



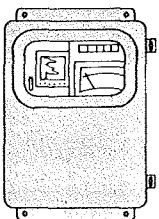
2. Indicating flow transmitter. A 2-wire transmitter with visible indicator suitable for Div. 1 or 2.



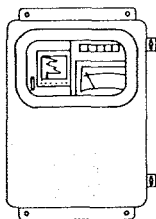
3. Line-powered indicating flow transmitter. 115 Vac-operated transmitter and visible indicator suitable for Div. 2 as standard; Div. 1 available.



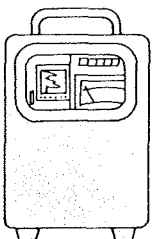
4. Line-powered totalizing flow transmitter. 115 Vac-operated unit for measuring and totalizing flow. Suitable for Div. 2 only as standard; Div. 1 available.



5. Line-powered totalizing/sampler-activating flow transmitter. 115 Vac-operated unit for measuring and totalizing flow and providing sampler activation based on flow via contact closure. Visible indicator.

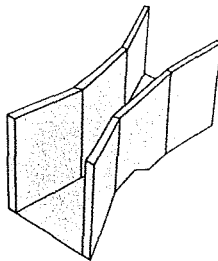


6. Portable battery-operated flow-meter. 12 Vdc-operated unit for measuring, totalizing, and recording flow. Visible indicator.

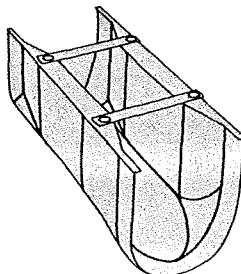


Sensing element to be used on:

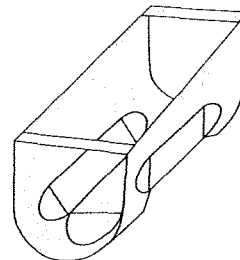
1. Parshall flumes. Flume sizes from 1" to 10'. Flow ranges from 0 to 250,000 gpm. Span ranges from 1.5" to 36".



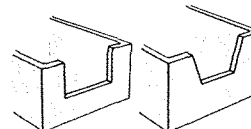
2. Leopold Lagco® flumes. Flume sizes from 6" to 72". Flow ranges from 0 to 53,000 gpm. Span ranges from 1.4" to 50".



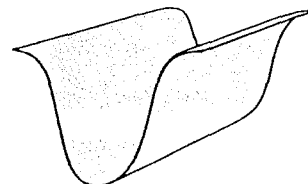
3. Palmer Bowlus flumes. Flume sizes from 6" to 42". Flow ranges from 0 to 18,000 gpm. Span ranges from 1.6" to 30".



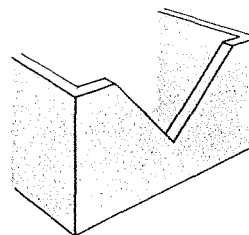
4. Rectangular or Cippoletti weirs. Crest ranges 1.5" to 36".



5. Parabolic flumes. Flume sizes from 12" to 10'. Flow ranges from 400 to 250,000 gpm. Span ranges from 1.5" to 36".

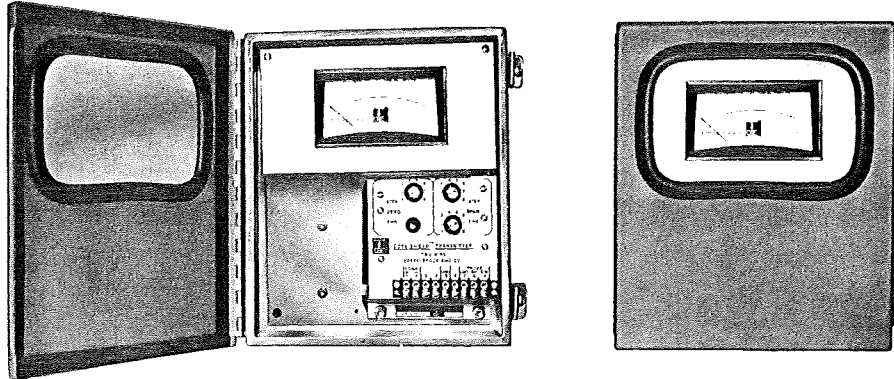


6. V-notch weir. Consult your Drexelbrook representative.



Ask for Open Channel Flow Selection Guide 421-200-1

Technical Data



Span: 1/2" to 20' or greater

Output (2 wires)

4-20 ma

10-50 ma available

(except battery-operated unit)

Output isolation

Voltage breakdown—signal wires
to ground

4000 Vdc

Response time: 20 millisecond standard

Cote Shield™ action—all units

General-purpose instruments meet the following NEMA classifications:

I General-purpose

II Drip-tight

III Weather resistant

V Dust-tight

XII Industrial use: oil- and dust-tight

NEMA IV corrosion-resistant housing available

Intrinsically safe

Probe & cable:

Safe for Groups A, B, C, D, E, F, and G
(Div. 1 or 2)

Adjustable time delay: 0-30 sec available

Required voltage (dc-operated units)

13 Vdc (for polarity-independent
connection)

11.5 Vdc (if polarity is observed)

Voltage effect

±0.2% per 10-volt change maximum

Supply voltage

24 Vdc nominal

60 Vdc max

Required voltage (ac-operated units)

115 ± 20 Vac, 60 Hz

Line voltage effect

± 1/2% from 95 to 135 V

Maximum load resistance
vs. power supply voltage

550 ohms @ 24 Vdc

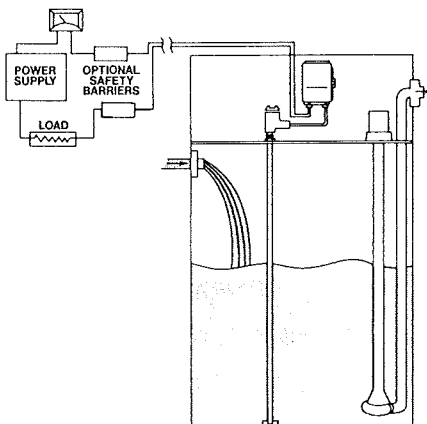
2350 ohms @ 60 Vdc

(2-wire transmitter only)

Other Drexelbrook Systems

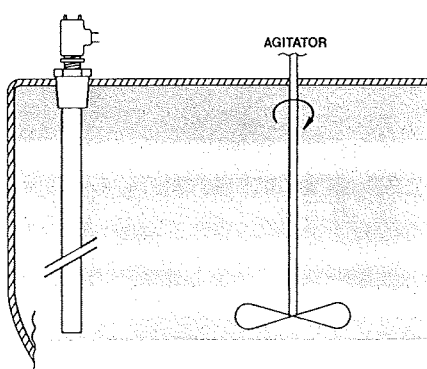
Lift station controls

Provides pump startup at high level, shutoff on reaching preset low level, plus alarms at high limits. Cote Shield™ circuitry ignores coatings. Up to 20 control points and pump and alternator can be accommodated in a system. Ask for data on lift station controls.



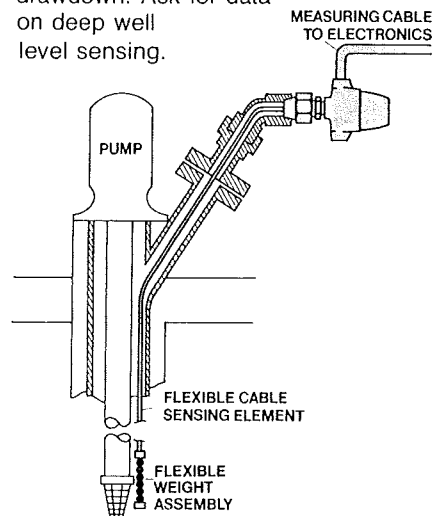
Lime slurry measurement

Lime, widely used for purification, is mixed with water and violently agitated. The slurry tends to build heavy coatings. So a level system must be both mechanically rugged and able to ignore coatings. Drexelbrook provides special heavy duty sensing probes and Cote Shield™ circuitry for both continuous measurement and high/low level alarm applications. Ask for data sheet No. 420-1-171, pages 1 through 6.



Deep well level sensor

For measuring level in deep wells (in the range of 400'), a flexible cable with weighted end is used. Typical application is to monitor water table drawdown. Ask for data on deep well level sensing.

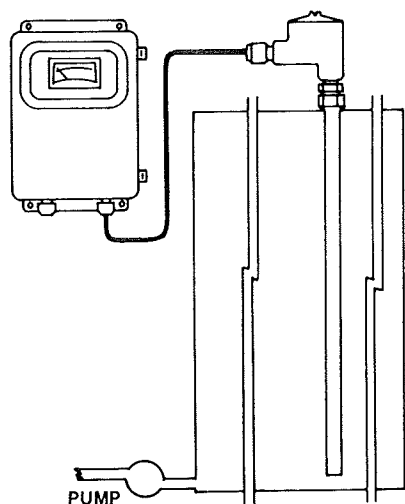


Other systems, back cover.

Other Drexelbrook Systems

Wet well pump control

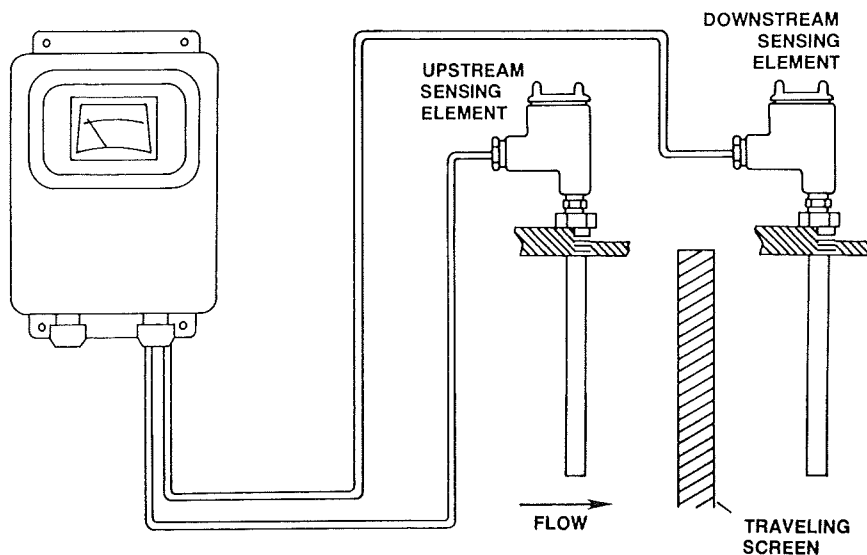
Where a well is used to collect influent to treatment plant prior to pumping to headworks, Drexelbrook level controls provide monitoring to control pump startup/shutoff and alarm for high level. Cote Shield™ circuitry ignores inherent coatings problem. Ask for data on wet well pump control.



Traveling screen clogging indicator

To schedule needed cleaning, it is desirable to get early indication of clogging of screens used for filtering dirt and sand from river water. This can be detected by sensing the actual dif-

ference in levels on both sides of the screen, a problem complicated by changing tide conditions. Ask for data on traveling screen clogging indicator.



Scum pit pump control

(see illustration above.)

Scum and grease should be removed from the surface of the clarifier tank daily, using a mechanical collector to direct materials to a pit for disposal. Drexelbrook level system provides continuous monitoring, pump control, and high-limit alarm. Cote Shield™ ignores coatings. Ask for data on scum pit pump control.

Drexelbrook offers proven float and level control continuous and on-off control for every type of level measurement and control application. We have the equipment, the know-how, and the experience to solve your level control problems. Ask for data on scum pit pump control.

Guaranteed Performance

Because of our conviction that the Drexelbrook open channel flowmeter will handle the most difficult flow measurement problems, we offer the Drexelbrook flowmeter on a guaranteed-performance basis.

If the Drexelbrook flowmeter does not perform according to our

quotation, we will accept its return for credit within a specified period after delivery, subject to our inspection at the job site.

To purchase a flowmeter with this guarantee, we ask only that you describe the application as completely as possible using our standard quotation request form.

With the information you provide, plus any supplementary data we consider important, we will quote on a guaranteed-performance basis.

Frederick L. Maltby
President



DREXELBROOK ENGINEERING COMPANY

205 Keith Valley Road, Horsham PA 19044
(215) 674-1234



ENGINEERING DATA

DREXELBROOK ENGINEERING CO. • 205 KEITH VALLEY RD. • HORSHAM, PA. 19044 • (215) 674-1234

440-1-158

PAGE 1

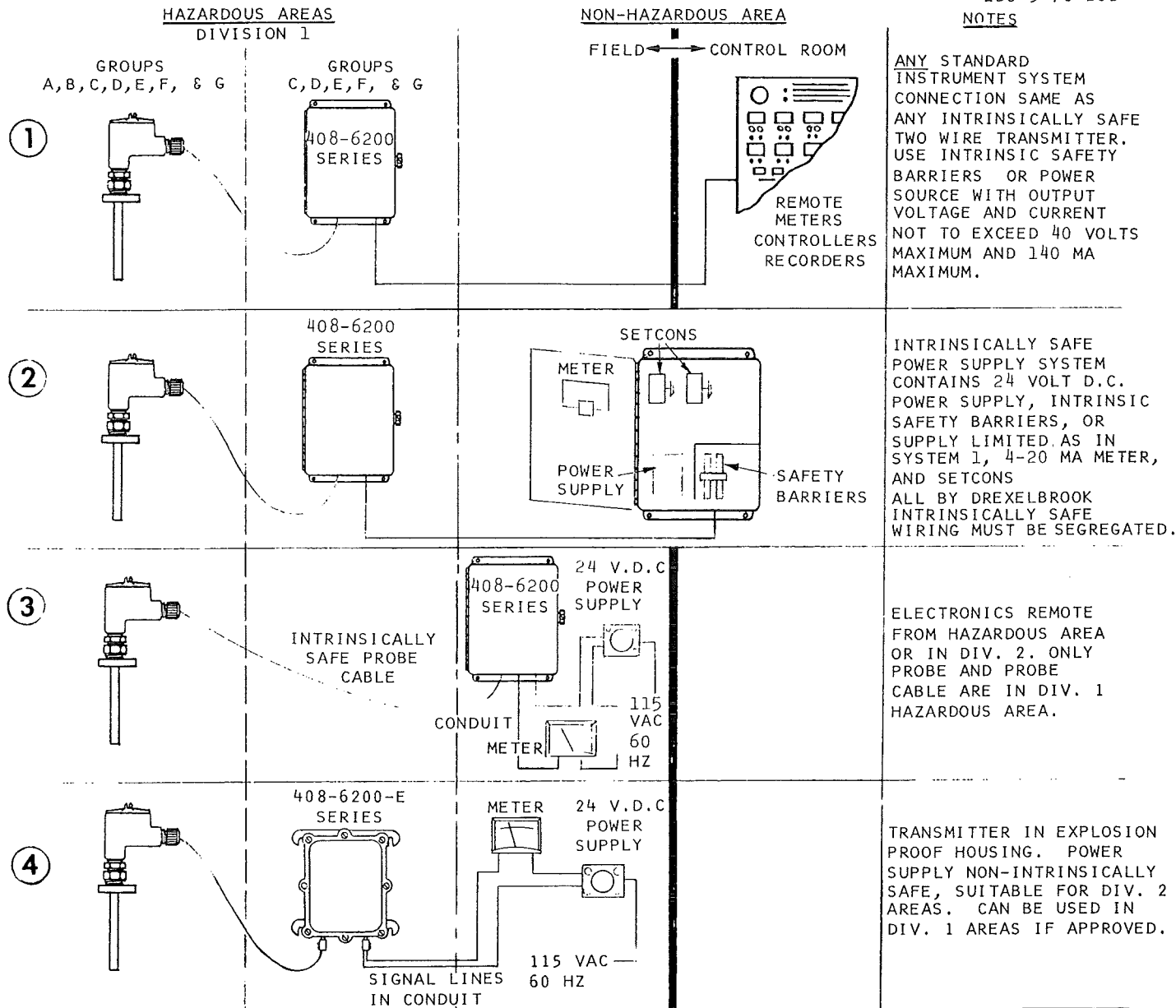
OF 3

ISSUE 4

EDO 3-78-261

UNIVERSAL LEVEL TRANSMITTER METHODS OF SYSTEM CONNECTION IN HAZARDOUS LOCATIONS

NOTES



FACTORY MUTUAL APPROVED

SENSING ELEMENT AND INTERCONNECTING CABLE

INTRINSICALLY SAFE FOR CLASS I DIV. 1, GROUPS A, B, C, D; CLASS II DIV. 1 GROUPS E, F, G; REGARDLESS OF LOCATION OF TRANSMITTER WITH 4-20 MA. OR 10-50 MA. SIGNAL RANGES.

ELECTRONICS

INTRINSICALLY SAFE FOR CLASS I DIV. 1, GROUPS C & D; CLASS II DIV. 1, GROUPS E, F, & G; WHEN CONNECTED TO FACTORY MUTUAL APPROVED BARRIERS OR POWER SOURCE WITH OUTPUT NOT TO EXCEED 40 VOLTS MAXIMUM AND 140 MA. MAXIMUM AND WIRED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE THE INTERNAL UNPROTECTED CAPACITANCE AND INDUCTANCE IS NEGLIGIBLE.

NON-INCENDIVE FOR CLASS I DIV. 2, GROUPS A, B, C, D; SUITABLE FOR CLASS II DIV. 2, GROUPS E, F, G; WHEN WIRED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

EXPLOSION PROOF CASE AVAILABLE FOR CLASS I DIV. 1, GROUPS C & D AND DUST IGNITION PROOF CASE FOR CLASS II DIV. 1, GROUPS E, F, AND G.

HAZARDOUS AREA

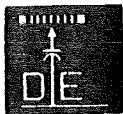
AN AREA IS CONSIDERED HAZARDOUS WHEN DANGEROUS CONCENTRATIONS OF GASSES OR VAPORS ARE PRESENT DUE TO NORMAL OR BY FAULT CONDITIONS.

SEE ARTICLE 500 HAZARDOUS (CLASSIFIED) LOCATIONS, CHAPTER 5 OF THE NATIONAL ELECTRICAL CODE 1975 NFPA.

INTRINSIC SAFETY

EQUIPMENT AND WIRING THAT IS INTRINSICALLY SAFE IS NOT CAPABLE OF RELEASING ENOUGH ELECTRICAL OR THERMAL ENERGY TO IGNITE A SPECIFIC GASEOUS MIXTURE IN ITS MOST EASILY IGNITED STATE. THE EQUIPMENT AND WIRING MUST MEET THESE SPECIFICATIONS UNDER BOTH NORMAL AND ABNORMAL CONDITIONS.

SEE INTRINSICALLY SAFE PROCESS CONTROL EQUIPMENT FOR USE IN CLASS I HAZARDOUS LOCATIONS (NFPA NO. 493-1975) FOR FURTHER INFORMATION.



ENGINEERING DATA

DREXELBROOK ENGINEERING CO. • 205 KEITH VALLEY RD. • HORSHAM, PA. 19044 • (215) 674-1234

440-1-158

PAGE 2

OF 3

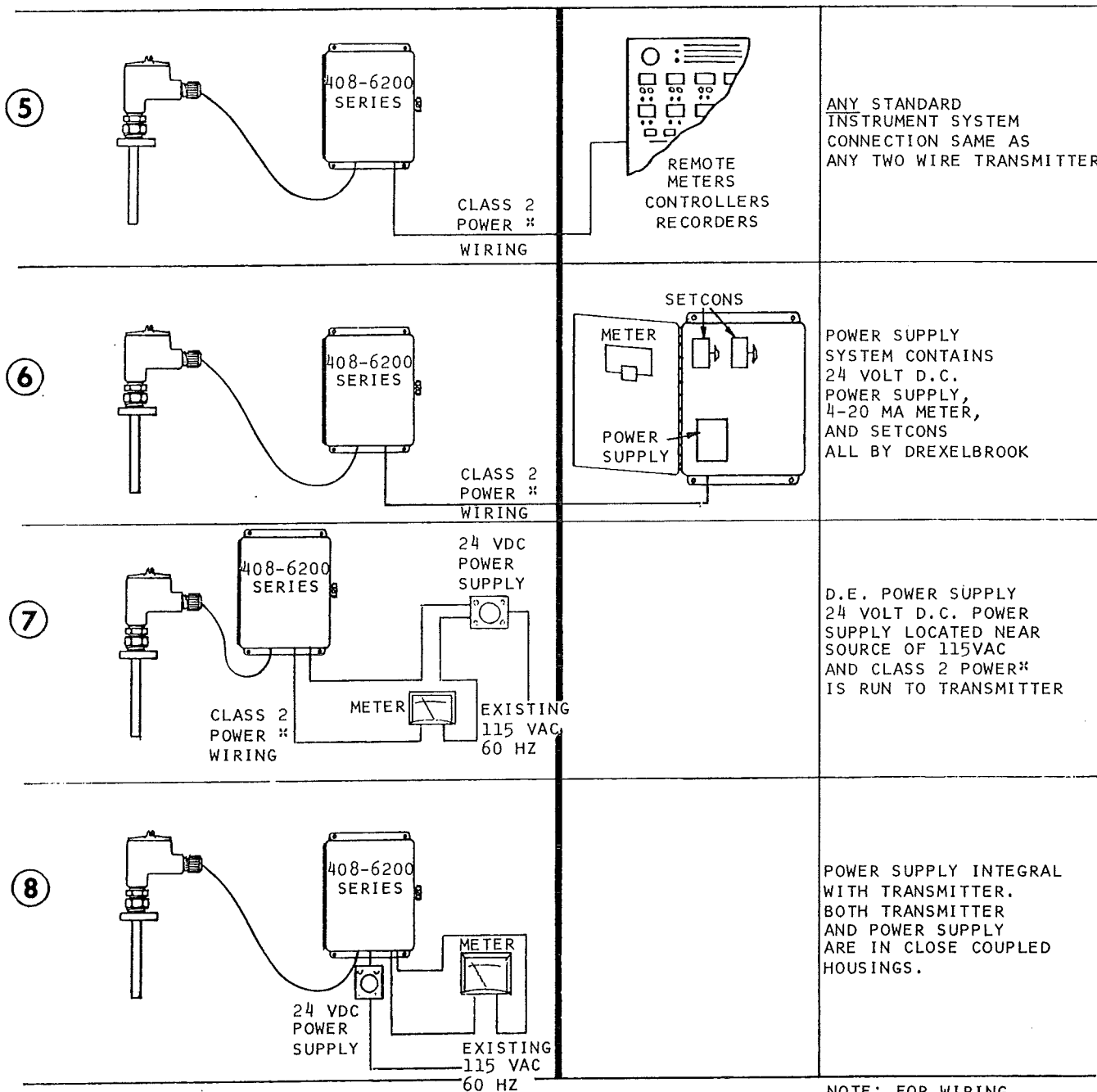
ISSUE 4

EDO 3-78-261

UNIVERSAL LEVEL TRANSMITTER METHODS OF SYSTEM CONNECTION IN NON-HAZARDOUS LOCATIONS

FIELD ←→ CONTROL ROOM

NOTES



NOTE: FOR WIRING DETAILS SEE WIRING DIAGRAM #418-2-20-CD

*CLASS 2 POWER WIRING IS LIMITED POWER IN ACCORDANCE WITH ARTICLE 725 OF NATIONAL ELECTRICAL CODE.

COPYRIGHT 1977
DREXELBROOK ENG. CO.