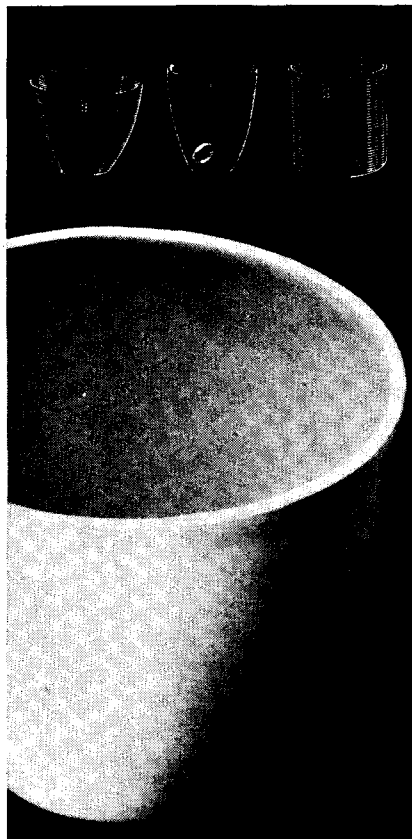


For your convenience—short "refreshers" on last month's ads. Obtain free information on any of the products or services described by circling the corresponding key number in the "Product Capsules" portion of the reply card preceding this section.

- Acids.** Info on nitric, sulfuric, hydrochloric, and glacial acetic acids. **5**
- Adsorption Flow Units.** For surface area measurement of particulate materials. **152**
- Ammonium Sulfate.** Details on ferrous ammonium sulfate reagent offered. **111**
- Analyzers.** Data on carbon, sulfur, oxygen, and hydrogen units. **49**
- Analyzers.** Brochure on unit that detects and records ammonia. **159**
- Analyzers.** For automatic Karl Fischer moisture determination. **158**
- Analyzers.** Bulletin on new, automatic carbon-hydrogen unit. **156**
- Analyzers.** Unit counts and classifies 1000 particles in 15 min. **79**
- Analyzers.** Data on new pulse analysis system with 1024 channels. **71**
- Analyzers.** Unit determines moisture content of any material. Catalog. **32**
- Analyzers.** For automatic protein and/or peptide analyses. **160**
- Analyzers.** Data file on automatic amino acid and peptide analyzer. **85**
- Analyzers.** Info on new, automatic UV analyzer. **76**
- Analyzers.** Unit detects, records M and P alkalinity. **157**
- Analyzers.** Bulletin on automatic on-stream colorimetric units. **128**
- Balances.** Full data offered on single pan Swiss unit. **12**
- Balances.** Bulletin on new single pan analytical unit offered. **92**
- Balances.** Data on triple beam units with sensitivity of 0.1 gram. **120**
- Balances.** Details on single pan, direct-reading units in 5 types. **56**
- Balances.** Full data on new single pan analytical unit offered. **24**
- Calorimeters.** Info on plain, adiabatic, and peroxide bomb types. **60**
- Cans.** 1½-, 2½-, and 5-gallon unbreakable polyethylene cans. **57**
- Cells.** Data on complete line of glass absorption cells. **45**
- Centrifuges.** Bulletin on automatic superspeed refrigerated unit. **132**
- Chemicals.** 500-page "Chemical Materials Catalog" offered. **7**
- Chemicals.** Full data on 2 new amines offered. **33**
- Chromatographs.** Data file on gas unit with flame ionization detector. **147**
- Chromatographs.** New dual column programmed temp gas unit. **35**
- Chromatographs.** Bulletin on new, low cost gas unit. **149**
- Chromatographs.** Data on analytical and preparatory gas units. **117**
- Chromatographs.** Full data on 5 gas models offered. **94**
- Chromatographs.** Low cost gas unit with temp range to 400° C. **300**
- Clamps.** Catalog details front-adjusting frame clamps. **121**
- Colorimeters.** Bulletin on abridged spectrophotometer unit. **4**
- Colorimeters.** Bulletin on first transistor-regulated unit. **21**
- Comparators.** Optical unit is a projection macroscope. Details. **119**
- Connectors.** Bulletin on new "O" rings for vacuum apparatus. **47**
- Counters.** Bulletin on photoelectric drop counter. **144**
- Crystals.** Info on ion exchange crystals and resins. **87**
- Detergents.** Booklet and free samples offered. **55**
- Diffractionmeters.** Catalog on double beam x-ray unit. **99**
- Dishes.** Details on new plastic balance dishes. **11**
- Electrodes.** Bulletin on new complete line of pH electrodes. **153**
- Enclosures.** Booklet on safety enclosures for hazardous materials. **88**
- Evaporators.** Brochure on high vacuum, low temp rotary unit. **58**
- Filter papers.** Sample packet of entire line offered. **17**
- Filters.** Brochure on line of fiber glass sintered filters. **10**
- Flowmeters.** Full details on calibrated and correlated units. **15**
- Fluorometers.** Double beam unit monitors flowing samples. **151**
- Furniture.** Lab planning kit features 38 modular units. **36**
- Furniture.** Catalog on lab equipment and furniture. **113**
- G. C. Packing.** Details on inert column packing aggregate. **42**
- G. C. Packing.** Data on full line of column packing materials. **90**
- Galvanometers.** Bulletin on galvanometer/potentiometer. **155**
- Grease.** Low vapor pressure grease for high vacuum work. **23**
- Hot Plates.** Info on low cost hot plate/magnetic stirrer. **8**
- IR & UV Units.** Bulletin on line of accessory instrumentation. **101**
- IR Attachments.** Data on new attenuated total reflectance units. **93**
- Integrators.** Info on digital chromatograph integrator. **133**
- Integrators.** New disc unit for chromatogram analysis. Bulletin. **95**
- Kjeldahls.** In 6- and 12-unit hooded models. **108**
- Lamps.** Data on portable fused quartz lamps offered. **34**
- Melting Point Units.** Has periscope reader and thermometer illuminator. **74**
- Microscopes.** New electron unit for magnifications of 200,000. **84**
- Mixers.** Electronic controlled unit provides constant torque. **40**
- Mixers.** For mixing in test tubes or small flasks. **30**
- Nuclear Units.** Details on linear-log count rate meter. **142**



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Product Capsules

Nuclear Units. Details on full line of solid-state instruments. **126**

Ovens. Data on 16 new double wall ovens. **28**

Ovens. Catalog features bench-top chromatography oven. **118**

pH Meters. Bulletin on unit with simplified controls. **154**

Photometers. Details on colorimeters and fluorimeters. **46**

Pipets. New 12-page pipet catalog offered. **114**

Presses. Bulletin on 12- and 20-ton models. **13**

Presses. Bulletin on hydraulic unit in 30 and 50 ton sizes. **110**

Pumps. Bulletin on micropumps delivering pre-set volumes. **16**

Pumps. Catalog on vacuum pumps in 10 models. **77**

Pumps. Folder on midget pumps and stirrers offered. **98**

Reagents. Full info on Woodward's reagent K. **123**

Recorders. New chromatography recorder features high impedance. **6**

Recorders. Bulletin on low cost unit with full width chart. **66**

Recorders. For transmittance or linear absorbance recording. **69**

Recorders. New integrating unit is flush-mounting or portable. **140**

Recorders. Potentiometric unit measures 1/100th of a millivolt. **116**

Recorders. Bulletin on sensitive unit for gas chromatography. **65**

Rotators. Details on new multi-purpose rotator. **130**

Scalers. Catalog on portable unit for nuclear research. **143**

Seals. In cups, tubular shapes, eyelets, and windows. **91**

Sensors. New platinum resistance temperature standard. **127**

Services. Full data on radiochemical measurement services. **106**

Spectro Materials. Details on metallic salts, metals, electrodes, etc. **105**

Spectrographs. Full details on 3.4 meter convertible Ebert unit. **41**

Spectrometers. Compact mass unit has 5 basic inlet systems. **22**

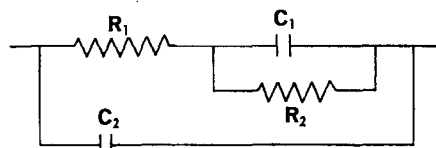
Spectrometers. Bulletin on versatile medium price mass unit. **31**

CHATS ON CONDUCTIVITY

BRIDGE OPERATION 60 OR 1000 CYCLES?

IN an AC Wheatstone Bridge as customarily used in industrial and routine laboratory conductivity measurements, as distinguished from research measurements, a separate capacity balance to produce a sharp null is rarely employed. As a consequence of this and other factors, the instrument reading, or the null position, is more or less dependent upon the frequency employed. Industrial conductivity equipment is most commonly available for operation at either 60 or 1000 cps. A number of factors have influence on the choice of the frequency in any specific application.

It is helpful to view the electrical configuration of the conductivity cell in the test solution, and connected to the bridge, as consisting of the ohmic resistance of the solution, R_1 , in series with the very large capacitance, C_1 , of the electrical double layer residing at the electrode-solution interfaces, a small "leakage" resistance, R_2 , across the double layer capacitance, and the entirety shunted by a "stray capacitance," C_2 , due in part to the dielectric properties of the cell solution and in larger part to the capacitance of the cell lead wires.



If the value of R_1 , the resistance of the solution, is kept between perhaps 500 and 50,000 ohms by proper selection of the cell constant for the service, the value of C_1 maintained very high by platinizing the electrodes, and the value of C_2 kept low by avoiding long distances between the cell and the bridge, instrument readings at 60 and at 1000 cycles will not differ within the 1% tolerance usually applied to industrial conductivity measurements. If C_2 is high due to unavoidably long lead wires, better accuracy is obtained at 60 than at 1000 cps, especially at high resistance values. On the other hand, if the test solution is so highly conductive that even with use of a cell of high cell constant, the measured resistance is substantially below 500 ohms, the use of the higher bridge frequency will provide more accurate readings since the capacitive reactance of C_1 is inversely proportional to frequency, and, with R_1 low, the series capacitive reactance must be kept as low as possible.

This really boils down to the old story we have repeated many times. With proper choice and maintenance of the conductivity cell, 60 or 1000 cps makes no difference in perhaps 98% of all applications. The remaining few percent can be covered simply by remembering that the higher frequency is better for extremely conductive solutions, and the low frequency is the better choice for very poorly conductive solutions.

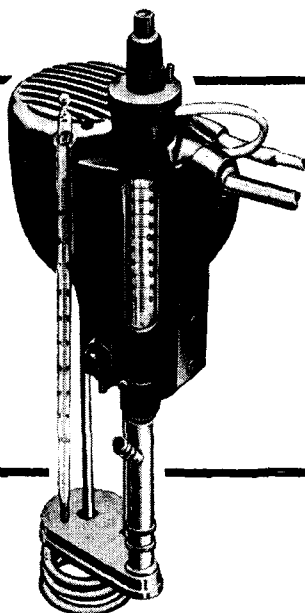


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Product Capsules

Spectrometers. Full info on new liquid scintillation units. **59**

Spectrometers. Mass unit for trace impurities in solids. **124**

Spectrophotometers. Data file on sample spectra and performance. **18**

Spectrophotometers. Info and sample spectra on new double-grating unit. **64**

Spectrophotometers. Data file on new, low-cost IR unit. **146**

Spectrophotometers. Data file on new prism-grating IR unit. **145**

Spectrophotometers. Literature and spectra on UV-VIS unit. **62**

Spectrophotometers. Data file on portable ultraviolet unit. **148**

Spectrophotometers. Info on line of low-cost IR units. **63**

Spectrophotometers. Details on double-beam with new recorder. **70**

Standards. 26-page booklet of IR spectra offered. **67**

Standards. Brochure and sample IR spectra offered. **68**

Stirrers. New folder on full line of heavy duty units. **1**

Stoppers. Bulletin on fusiform bore safety rubber stoppers. **75**

Switches. 5 color-coded receptacles and switches in one unit. **50**

Syringes. G. C. units with capacity of 0.5 μl . to 500 μl . **39**

Temp Controllers. Bulletin on unit for proportional temp control. **26**

Thermistors. Bulletin on hermetically sealed bead thermistors. **2**

Titration. Bulletin on potentiometric unit in manual and automatic models. **37**

Titration. Unit performs routine titrations automatically. **52**

Torches. Flameless blow torch heats to 1000° F. **53**

Valves. Brochure on multi-port switch valves. **161**

Ware, Glass. New catalog details expanded glassware line. **44**

Ware, Quartz. 32-page catalog on fused quartz ware. **72**

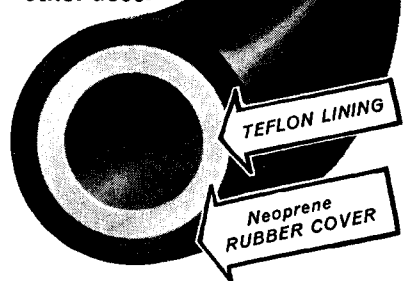
Ware, Stone. Circle 3 for info on stone surface material. **3**

Washers. Bulletin on automatic glassware washers. **29**

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