Proposal Form for FY16 Student Tech Fee Competitive Process (Oxford)

Instructions
Complete one form for each project.
Any faculty member, staff member or student may submit a proposal.
Proposals are due by March 6, 2015.
Projects with an academic focus should be emailed to the Dean of the project lead's division.
Projects with a student life focus should be emailed to techfee@MiamiOH.edu.
Full criteria, guidelines and timetable can be found at: http://www.MiamiOH.edu/techfee

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Project lead's name:

Email: kerrll@miamioh.edu and lalvansb@miamioh.edu
Telephone: 5135290768, 5135290763
Affiliation (Student, CAS, FSB, CEC, CEHS, CCA, LIB, Other): CEC
Faculty/staff sponsor (required for student-submitted proposals): Lei Kerr and Shashi Lalvani

Other project team members:

1. **Project title:** Acquisition of Equipment for New Biotransport Labs in the Dept. of Chemical, Paper and Biomedical Engineering

2. **Brief description of project:**

Bioengineering as a new major in the Department of Chemical, Paper and Biomedical Engineering (CPB) is receiving continuous enrollment increase every year with current enrollment of ~200 students. Biomedical concentration offered within bioengineering constitutes 90% of bioengineering student population. Developing new labs and teaching modules in biomedical area for this major has been the departmental urgent priority. Biotransport Phenomena (CPE 418) is a required engineering course for all bioengineering majors and serves a prerequisite for four other bioengineering courses (CPE 415/515, CPE 417/517, CPE 419/519, CPE 422/522) in the department. Having biotransport lab in this course is critical for effective teaching and learning of the key fundamentals of momentum, heat and mass transfer in biological systems. Thus, in this proposal, we are requesting $18,434.5 for the biotransport labs to foster the effective instruction.

3. **Does this project focus on graduate student education or graduate student life?** __Yes _X_No
If yes, please explain:

This project is mainly for undergraduate teaching. However, CPE 418 is listed as CPE 418/518. Thus, the graduate students who take this course will also benefit.

4. **Describe the problem you are attempting to solve and your approach for solving that problem.**

CPE 418, Biotransport Phenomena is a key fundamental engineering course for all bioengineering majors and serves as pre-requisite for four other bioengineering courses. Biotransport labs will be essential for this course to be effectively instructed and is critical for the ABET (Accreditation Board for Engineering and Technology) accreditation. No commercial equipment is readily available in the market for teaching biotransport labs. During summer 2014, the PIs have designed four lab modules for biotransport. They are the labs of Dialysis, Blood Pressure Drop, Microfludic Respiratory Oxygen Mass Transport and Biological Tissue Thermal Conductivity. With the support from department, the PIs have instructed the experiments for students in the Fall 2014 with two working stations for each experiment with 6 students each station. These labs are well received by faculty and students. The enrollment for the Fall 2014 in CPE 418 is 36 students. Ideally, having three to four students each station will give each student opportunity to get hand-on experience for each station. In addition, we are expecting higher enrollment in CPE 418 starting the Fall 2015.

Thus, we plan to add one more station for each experiment.

5. **The criteria state that technology fee projects should benefit students in innovative and/or significant ways. How would you describe the innovation and/or the significance of your project?**

(1) Innovation

One of the four lab modules, Microfludic Respiratory Oxygen Mass Transport lab involves the cutting technologies of 3D printing and manufacturing of membranes and microfluidic channels. These novel ideas will contribute significantly to student education and quality journal publication can be generated.

(2) Broad student impact and significance

a. CPE 418- Biotransport Phenomena

CPE 418 is a required course for all bioengineering majors and is pre-requisite for four other bioengineering courses. It is offered both in the Fall and Spring semesters. The current enrollment of bioeneigneering major is 163 and our department is experiencing continuing growth of bioengineering majors. Thus, the requested equipment for CPE 418 lab set-up will be important to achieve the departmental vision.

b. CPE 419 – Biomaterials

CPE 419 in the Spring 2015 has ~34 bioengineering major students (half junior and half senior). In this course, students can develop membranes using different biomaterials using the set-up of the use Microfludic Respiratory Oxygen Mass Transport lab.

d. CPE 417- Biomedical Engineering

CPE 417 opens to both bioengineering and chemical engineering majors. CPE 417 of spring 2015

have ~ 34 students. The Spin Coater and 3D printer used in the use Microfludic Respiratory Oxygen Mass Transport lab will allow the students to print various membranes and artificial organs that can be used to effectively teach the physiological concepts such as kinetics of drug delivery, etc.

e. CPE 102-Introduction to Bioengineering and Chemical Engineering.

CPE 102 opens to both bioengineering and chemical engineering majors. CPE 102 have enrollment ~ 107 students as for the Spring 2015. In this course, we will introduce different biotechnologies including the microfluidic Lab-on-chip, dialysis, 3D printing technology and their application in biomedical field. This instrument will be a life demo for students.

f. CPE 204-Materials and Energy Balances

CPE 204 is a required course for both bioengineering and chemical engineering majors. It is offered in both Fall and Spring semesters with total of 108 enrollment in the year 2014-2015. One of the lab modules – Dialysis Lab can be easily modified to teach the concept of the mass and energy balances.

g. USS program and FYRE program and undergraduate research and Student Chapters

Various projects can be generated from these lab modules to meet the fast growing student need for undergraduate research projects in bioengineering. It will be used to support undergraduate research programs such as USS, FYRE programs. In the past couple of years, our faculty members in the department are encountered the increased inquiries from students to join their labs for research experience. However, it is impossible to accommodate so many students in the lab. These labs will offer a great solution to meet this increased need for research projects. In addition, student chapters such as Biomedical Engineering Society (BMES), American Institute of Chemical Engineers (AICHE) or Engineers Without Board can use these labs for their chapter projects.

6. **How will you assess the project?** *Examples: Identify one or more expected project outcomes that indicate project progress and completion. How will you assess the value to students? Measures of enhanced student learning or usage are highly desired. These items should be chosen to facilitate independent evaluation of project completion and value to students.*

(1) Student evaluation will be gathered to get the feedback of teaching these labs. The instructor will also design the test problem to gain the information on the effectiveness of student's learning. This will be done immediately in the fall 2014 of the CPE 418. For example, we will look student learning using Accreditation Board for Engineering and Technology forms. The assessment strategy will be further developed for other courses based on the experience of using these labs in CPE 418 teaching.

(2) Senior design teams will present their results at undergraduate student forum and feedback can be obtained from the audiences' comments.

(3) Another measure of the outcome is that we will produce quality undergraduate student journal publication.

7. **Have you applied for and/or received Tech Fee awards in past years? If funded, what results did you achieve? Did you submit a final report?**

Yes. Last year, we have requested fund to purchase a computer and a Mimic software. We have been partially funded which will allow us purchase a Mimic software. However, we have not used the fund because we are still trying to look for the fund to purchase a computer dedicated to install the Mimic software. Thus, we have not submit a final report.

8. **What happens to the project in year 2 and beyond? Will there be any ongoing costs such as software or hardware maintenance, supplies, staffing, etc? How these will be funded?**

Supporting, maintaining and upgrading bioengineering labs and instruments is departmental top priority due to the increased bioengineering majors every year. The requested labs will make important contribution to student learning and thus will receive the support from the CPB department.

9. **Attach any other supporting information regarding this request**. *Examples: Letters of support from the department chair(s) if curriculum is being changed or from the Space Utilization Group or Classroom Enhancement Council, if your proposal includes requesting changes in rooms or other spaces.*

Detailed Budget – Include all items requested for this project:

Item Category	Item Requested	Number Requested	Unit Cost	Total Cost
Software	*Item 1 – Pasco Capstone Single User License* Justification: Required software for the lab module of Blood Pressure Drop Experiments Vendor: Pasco	2	$99	$198
	Item 2 – Include Product Name & Vendor			
Hardware	*Item 1-* Syringe Pump Justification: Required equipment for mimicking the blood flow over alveolar capillary tube for the lab module of Microfludic Respiratory Oxygen Mass Transport	3	$2055.44	$6166.32
	Item 2- Spin coater Justification: Required equipment for making membrane for the lab module	1	$5427.5	$5427.5

	of Microfludic Respiratory Oxygen Mass Transport			
	Item 3- 3D printer Justification: Required equipment for Printing Microfludic Channels for the lab module of Microfludic Respiratory Oxygen Mass Transport	1	$2,200	$2,200
	Item 4- Pump Justification: Required equipment for mimicking blood flow for the lab modules of Dialysis and Blood Pressure Drop	6	$125	$750
	Item 5- Dialyzer Justification: Required equipment for the lab module of Dialysis	1	$425.69	$425.69
	Item 6- Refractometer Justification: Required equipment to measure drug concentration for the lab module of Dialysis	1	$384	$384
	Item 7- Flow meters Justification: Required equipment for mimicking blood flow during a hemodylasis for the lab modules of Dialysis, Blood Pressure Drop and Microfludic Respiratory Oxygen Mass Transport	For Air (2)	$189	$378
		For water (5)	$94	$470
	Item 7- PASCO USB Link Justification: Required for the connection of computer and pressure sensor for the lab modules of Blood Pressure Drop and Biological Tissue Thermal Conductivity	2	$59	$128
	Item 8- Pressure Sensor Justification: Required for the connection of computer and pressure sensor for the lab module of Blood	1	$289	$289

	Pressure Drop Experiments			
	Item 9- Thermometer Justification: Required equipment for the lab module of Biological Tissue Thermal Conductivity	1	$209.99	$209.99
	Item 10- Miscellous Justification: tubing, fittings required equipment for all the lab modules			$500
	Item 11- Computer Justification: This computer will be used to install the Mimics software from the partially awarded Tech fee proposal last year. This computer will also be used for new station for the Microfludic Respiratory Oxygen Mass Transport.	1	$918	$918
Contractual Services/Installation Shipping/ Maintenance	*Item 1* –installation			
	Item 2			
Student Wages	*Item 1 –Requires justification per guidelines*			
	Item 2			
Graduate Assistant Salary &Tuition	*Item 1 – Requires justification per guidelines*			
Other (Explain)	*Item 1*			
	Item 2			
TOTAL REQUEST				$18,434.5

Add additional lines/pages as necessary.

Purchases made with Tech Fee funding are subject to all relevant University purchasing rules.

When supplying information on equipment for purchase, note the web address for the desired vendor.

SIGMA-ALDRICH

Order Preview(This order has not been submitted)

Web Copy

Order Date:2015-03-12 **Purchase Order:** **Additional Reference:** **Payment Term:Prepaid - 1 day net**	**Email order confirmations to:**

Subtotal:5,427.50 USD
Order Total:5,427.50 USD

Line	Product Number	Description	Qty	Your Reference	Your Price	Net Price
000010	Z551562-1EA	CHEMAT PRECISION SPIN-COATER AC INPUT 1&	1		4,670.00	4,670.00
		1 : Estimated to ship on 04/14/15				
000020	Z551686-1EA	CHEMAT VACUUM CHUCKS DIAM. 1 IN.	1		252.50	252.50
		1 In Stock from MILWAUKEE 03/12/15				
000030	Z551708-1EA	CHEMAT VACUUM CHUCKS DIAM. 2 IN.	1		252.50	252.50
		1 In Stock from MILWAUKEE 03/12/15				
000040	Z551694-1EA	CHEMAT VACUUM CHUCKS DIAM. 1 1/2 IN.	1		252.50	252.50
		1 In Stock from MILWAUKEE 03/12/15				

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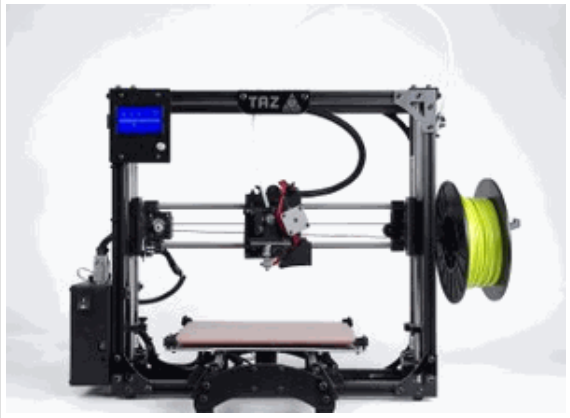

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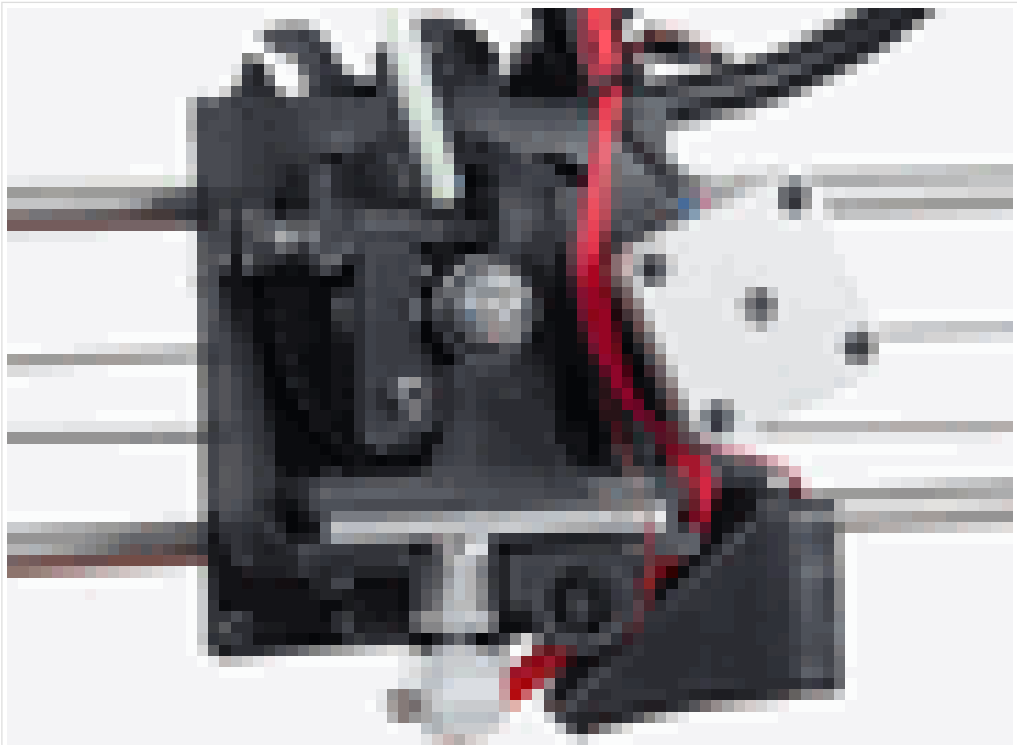

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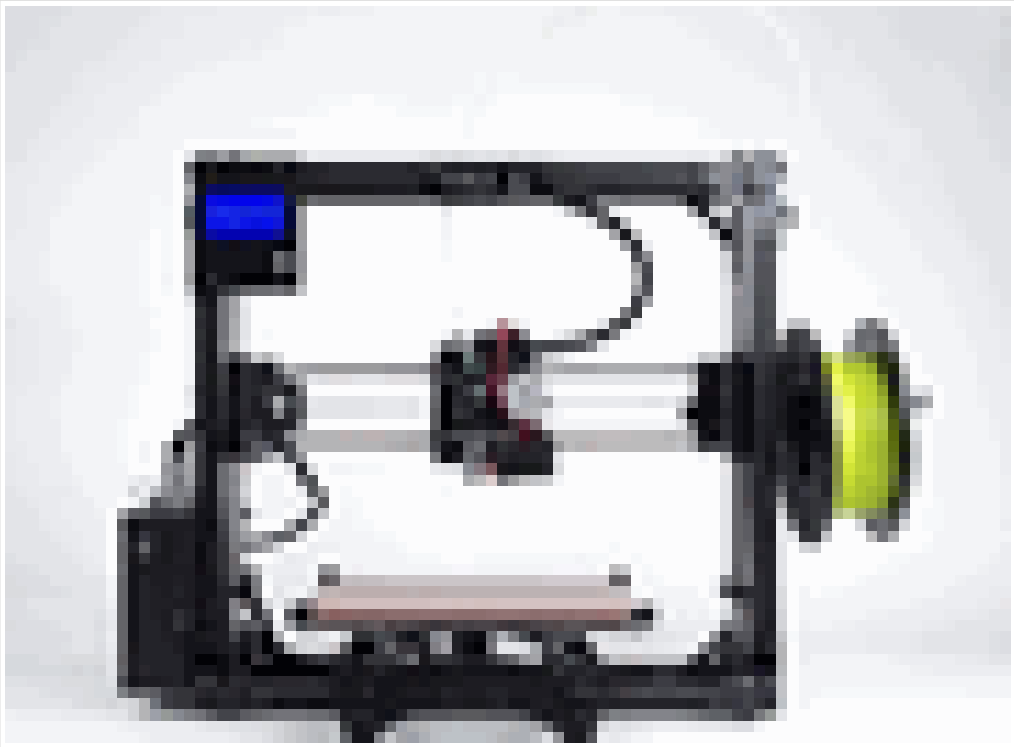

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So who's out there PUSHING the limits of 3D Printing with MakerGeeks Products:

...and YOU! 10's of thousands and counting! of the best makers, geeks, builders and dreamers
thank you for all your support... we look forward to serving you again!!

OFFICIAL QUOTATION

ANALYTICAL WEST, INC.
HIGH PERFORMANCE PRODUCTS FOR CHROMATOGRAPHY, ATOMIC SPECTROSCOPY & MASS SPECTROMETRY

QUOTATION NUMBER: 140714-09KJ-REV

387 MAGNOLIA AVENUE, SUITE 103-540
CORONA, CA 92879
FEIN: 94-3411681 DUNS#: 18165 1360

QUOTE BY: KELLY JAY YOO
PHONE: 800-305-0004
FAX: 717-273-8600
FOB TERMS: **Holliston, MA**
SHIP METHOD: FEDEX Ground Service
TERMS: 2% Net 10 / 30 Days

DATE: 9/15/2014

Quote Issued to:

Miami University
Attn: Prof. Lei Kerr
Chemical, Paper & Biomedical Engr.
EGB 64K
Oxford, OH 45056
Email: kerrll@miamioh.edu
Tel: 513-529-0768

Ship to:

Miami University
Attn: Prof. Lei Kerr
Chemical, Paper & Biomedical Engr.
EGB 64K
Oxford, OH 45056

Bill to:

Miami University
Attn: Prof. Lei Kerr
Chemical, Paper & Biomedical Engr.
EGB 64K
Oxford, OH 45056

Part Number	Description	QTY	COST (ea)	TOTAL
Legato™ 110	P/N: 788110, Legato 110 Single Syringe Infusion/Withdrawal Program	1	$2,035.44	$2,035.44
	**US List Price at $ 2,313.00			
	Free Pack between Luer Slip or Luer Lock			
A1 to A50	*Choice of 1 to 50ml Luer Slip Disposable Syringes*	2	$0.00	$0.00
AL2 to AL50	*Choice of 2 to 50ml Luer Lock Disposable Syringes*	2	$0.00	$0.00
	Note:			
	1. Lead Time 7-10 Days ARO			
	2. This quote is good for next 60 Days			

TOTALS: $2,035.44
IN-LAND SHIPPING CHARGE(Per Pump): $20.00
ORDER TOTAL: *$2,055.44*

First time buyer must fax Purchase Order to **717-273-8600** or email to **AWI@sbcglobal.net** MUST state Purchase Order Number, Ship to Address and Bill to Address. Purchase Order Must state buyer name and ship to attention names. If you are tax exampted then Tax Exampt Certificate must fax-in/email along with Purchase Order.

Please call 800-305-0004 with questions.

Welcome, Lei > > My Account LOG OUT

PASCO

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Viewing Activity completed by Lei Kerr

Activity Date: Aug 11, 2014 8:24 AM PST
Order ID: W1183147
Status: Shipped Complete

Bill To:

Miami University
Dr. Lei Kerr
EGB 64 K, Dept. of Chemical, Paper and Biomedical
Miami University
oxford, OH 45056
United States
Phone: 5135280768

Terms: Shipped Complete
PO Number: CC Kerr

Ship To:

Miami University
Dr. Lei Kerr
EGB 64 K, Dept. of Chemical, Paper and Biomedical
Miami University
oxford, OH 45056
United States
Phone: 5135280768
Email:

Part No.	Description	Qty	Price *	TOTAL
PS-2100A	USB Link	1	$59.00	$59.00
UI-5401	PASCO Capstone Single User License	1	$99.00	$99.00
PS-2164	PASPORT Quad Pressure Sensor	1	$289.00	$289.00

NOTES AND MESSAGES:

* All displayed prices are for US Educational Institutions only.

Estimated Shipping Weight:
3.0 lb = 1.70 kg

Estimated Shipping Volume:
0.22 cu. ft.

SubTotal:	$447.00
Shipping(Ground Commercial):	$24.00
TOTAL:	$471.00

To make a change to this order, please contact PASCO Customer Support at 800-772-8700 or 916-786-3800.

For more information or to contact a PASCO representative,
send e-mail to Customer Support, or call 800-772-8700 (in US) or 916-786-3800.

Prices and specifications subject to change without notification.
| Ordering Information | Legal | Contacts |

Atago Special-scale Refractometer, Ethyl Alcohol

Atago | Mfr# 4434 (PAL-34S) | Item# UX-02941-04

0.0
(No reviews)
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$384.00 USD/EACH
Are you a reseller or buying in bulk? Call us today.

Usually ships in 8 days.
Qty: 1
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- **Measure concentration of specific liquids with these special-scale refractometers**

These compact refractometers give you a direct reading scale of the concentration of some common liquids. Rugged IP65-rated design is ideal for indoor and field use. Simply apply two to three drops of sample onto the prism, press the start key, and the value is displayed in seconds. Digital display eliminates reading errors common with handheld refractometers. Cleanup is simple—easily clean under running water.

What's Included:
storage case and two AAA batteries.

Specifications	
Product Type	Refractometer (Digital)
Brix scale range (Minimum)	0
Brix scale range (Maximum)	45
Resolution	0.5%
Temp compensation	50 to 95°F (10 to 35°C)
Sample volume	0.3 mL minimum
Accuracy	±1.0%
Response time	3 seconds
Display	3-digit LCD
Dimensions	2 in W x 4.25 in H x 1.25 in D (51 x 108 x 32 mm)
CE Compliance	Yes
Power	Two AAA batteries (included)
Manufacturer number	4434 (PAL-34S)
Brand	Atago
Qty/ea	1

Calibrations	**Qty/Price**	**Availability**
NIST-Traceable Calibration; Refractometer UX-17105-00	1 at $80.00 USD/EACH	Usually ships in 9 days. Add to Cart

Technical Resources

Virtual Catalog (PDFs)
- Catalog - Spanish

Related technical articles (Roll over for summary)
- Take the Challenge and see if you're correct! Testing the Refractive Index of Candy
- What's In It? Find Out with Versatile Refractometers
- Testing Refractive Index of Candy

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Contract V797P-4132B

5-Star Seller

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Product Description	Qty	Remove	Price	Total
HI PS 15 Dialyzer **SKU:** BBN7204102 Free Shipping View Details	- 1 + Update		$425.69	$425.69

Estimate Shipping And Tax

Enter your destination to get a shipping estimate.

*Country
United States

State/Province
Please select region, state or province

Zip/Postal Code

Promotional code?

TOTAL

Subtotal	$425.69
GRAND TOTAL	**$425.69**

Or Checkout With:

PayPal Check out
The safer, easier way to pay

INTERNATIONAL CUSTOMER?
Click Here to Pay

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CoaguChek XS PT Test Strips

~~$308.00~~ $239.00

UltraClave Automatic Sterilizer

$6,691.30

Hi lo extra long trainers table

$3,551.50

AutoClave Automatic Sterilizer, Manual Door

$3,384.92

Power Wheelchair

$2,999.00

Airflow Meters
Borescopes
Cable Testers
Calibrators
Clamp-On Meters
Electrical Testers
Gas Analyzers/Testers
Humidity Meters
Lab Instruments
Light Meters
Moisture Meters
MultiMeters
Oscilloscopes
Power Analyzers
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421509: 7 Thermocouple Dual Input Datalogger with Alarm

Memory stores up to 16 data sets, 1024 maximum data capacity

Features:

- Seven Thermocouple type selections: K, J, T, E, R, S, N
- Large backlit LCD with two secondary displays
- Simultaneous display of T1, T2, T1-T2, Time and advanced readouts
- T/C offset adjustment, °C/°F switchable
- REC, MAX, MIN, MAX-MIN, AVG Data Hold and Relative functions
- Programmable Hi/Lo audible alarm
- Built-in bi-directional RS-232 PC interface (PC software and cable included)

For complete specs please download the product datasheet (not available for some accessories)

CE N TRACEABLE CALIBRATION 1 YEAR WARRANTY

Downloads & Software:

- English Datasheet
- English User's Manual
- French User's Manual
- Spanish User's Manual
- CE Declaration of Conformity
- 421509 Software v.1.7 (13.5MB)

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Dr. Scott Thomas Campbell via RT<cechelp@miamioh.edu> Wed, Dec 4, 2013 at 9:41 AM
Reply-To: cechelp@miamioh.edu
To: kerrll@miamioh.edu

$918 for system.

Attached are the specs.

Scott

On Wed, Dec 4, 2013 at 9:22 AM, Dr. Lei L. Kerr via RT
<cechelp@miamioh.edu>wrote:

>
> <URL: https://rt.miamioh.edu/Ticket/Display.html?id=6943 >
>
> John,
> In this case, can you please give me a quote for the new computer? Thank
> you.
>
> Lei

Cole-Parmer 150-mm Direct Reading Flowmeter For Air; Aluminum With Valve, 1.25 LPM

Back to search results

Item# EW-32033-10

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$189.00 USD/EACH
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In stock.
Qty: 1
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- Front shields magnify scale 16%—easy to read from a distance

These direct reading flowmeters have a ceramic millimeter scale is fused onto the flowtube. A vertical tangential locator line ensures hairline accuracy in reading float position. The front polycarbonate shields are magnified 16% for easy, accurate readings.
Select a flowmeter that best suits your application from the several valve options and wetted materials. Nonwetted parts for all models include aluminum frame side plates, polycarbonate shields, and acrylic back plates. Units are supplied with either a black glass (G), a 316 stainless steel (SS), a sapphire (Sa), or a carboloy ©float (see tables). Direct reading flowmeters for argon, CO2, helium, nitrogen, and oxygen are available—call our Applications Specialists for more information.
Inlet and outlet connections are 1/8" NPT(F) with external threading for panel mounting (two retaining nuts are included).
Flowmeter Options
Aluminum is economical and good for general use with noncorrosive gases and liquids. Aluminum fittings, Buna N O-rings, borosilicate glass flowtubes, 316 stainless steel (SS) 150-mesh inlet screens, and glass or 316 SS floats.
Brass is economical and good for use with water. Chrome-plated brass fittings, Buna N O-rings, borosilicate glass flowtubes, 316 SS 150-mesh inlet screens, and glass or 316 SS floats.
316 Stainless Steel withstands higher temperatures and pressures; and features excellent chemical compatibility. Fittings are 316 SS. Viton® O-rings, borosilicate glass flowtubes, 316 SS 150-mesh inlet screens, and glass or 316 SS floats.
Valve Options include valveless or with valve. Valves come mounted at the inlet (bottom) of applicable flowmeters but can be reconfigured to mount at the outlet. For positive pressure applications with liquids and gases, position the valve at the inlet; for vacuum applications, position at the outlet.

ISO 9000 Registered Supplier

Specifications	
Description	Variable Area, Direct Reading Flowmeter
Product Type	Variable Area Flowmeter
Material (fitting)	Aluminum
Material (o-ring)	Buna-N

Material (Housing)	Aluminum
Material (float)	Carboloy
Max operating temperature (° F)	250
Max operating temperature (° C)	121
Max pressure	200 psi
Accuracy	±5% full scale
Process connection	1/8" NPT(F)
Repeatability	±0.25% full-scale
Manufacturer number	PMR1-010608
Qty/ea	1
Brand	Cole-Parmer

Calibrations	Qty/Price	Availability
NIST-Traceable Calibration; Air/Gas Flowmeter EW-17080-00	1 at $240.00 USD/EACH	Usually ships in 11 days. Add to Cart

Technical Resources

Virtual Catalog (PDFs)

- Catalog - Portuguese
- Catalog - Spanish
- Catalog - English

More info

- Proper Mounting of your Variable Area Flow Meter.pdf

Related technical articles (Roll over for summary)

When to Choose Variable-Area Flow Meters
Rotameters—Variable Area Flowmeters Tech Info
Flowmeters- Why less is More
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Product Reviews

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Cole-Parmer Valved Acrylic Flowmeter, 100 mm Scale for Water, 100-1500 mL/min

Item# EW-32461-40

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$94.00 USD/EACH
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- **Meter with valve provides flow control through a highly durable meter body**
- Ideal for process plant applications on air sampling equipment, gas analyzers and chemical feed systems for water treatment
- Integrated precision valve allows precise manual flow across the full scale
- The flexible design allows for panel or bench mounting

Machined from solid acrylic blocks, these meters have integral metering tubes that provide precise readings even in aggressive plant environments. The meters' inlet/outlet ports and mounting studs are extended for easy panel installation. An alternate option is a tripod base (sold separately) which allows for mobility from bench to bench.

Note: There are many additional types of acrylic flowmeters not listed here. Contact our Application Specialists for quotes on acrylic meters with special requirements.
What's Included:
Flowmeter

Specifications	
Description	Variable Area, Direct Reading Flowmeter for Liquids
Product Type	Variable Area Flowmeter
Max pressure (bar)	6.9
Max pressure (psi)	100
Material (fitting)	Chrome-Plated Brass
Material (Valve)	Brass
Material (o-ring)	Buna-N
Material (Housing)	Acrylic
Material (float)	316 Stainless Steel
Max operating temperature (º F)	150
Max operating temperature (º C)	65
Accuracy	±3% full-scale
Process connection	1/8" NPT(F)
Repeatability	±0.5% full-scale
Dimensions	1-3/8"W x 6-1/2"H x 2-1/8"D
Manufacturer number	F45L53BLBN-CP
Qty/ea	1
Brand	Cole-Parmer

Accessories	Qty/Price	Availability	
Tripod base Flowmeter Stand For 32461 EW-32462-55	1 at $66.00 USD/EACH	In stock.	Add to Cart

Calibrations	Qty/Price	Availability	
NIST-Traceable Calibration; Liquid Flowmeter, 1 ccm to 300 LPM water EW-17080-12	1 at $250.00 USD/EACH	Usually ships in 13 days.	Add to Cart

Technical Resources

- Mounting_Variable_Area_Flow_Meter.pdf

Virtual Catalog (PDFs)

- Catalog - Spanish
- Catalog - English

More info

- Proper Mounting of your Variable Area Flow Meter.pdf

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$66.00 USD/EACH
Cole-Parmer Valved Acrylic Flowmeter, 50 mm Scale for Air, 0.1-1 LPM