Ingersoll Rand

Everything You Need for Liquid Handling in Diagnostic Applications

For the widest range of liquid flow solutions and technologies in the market.

THOMAS
OEM Pumps & Compressors

WELCH
Vacuum Pumps & Systems

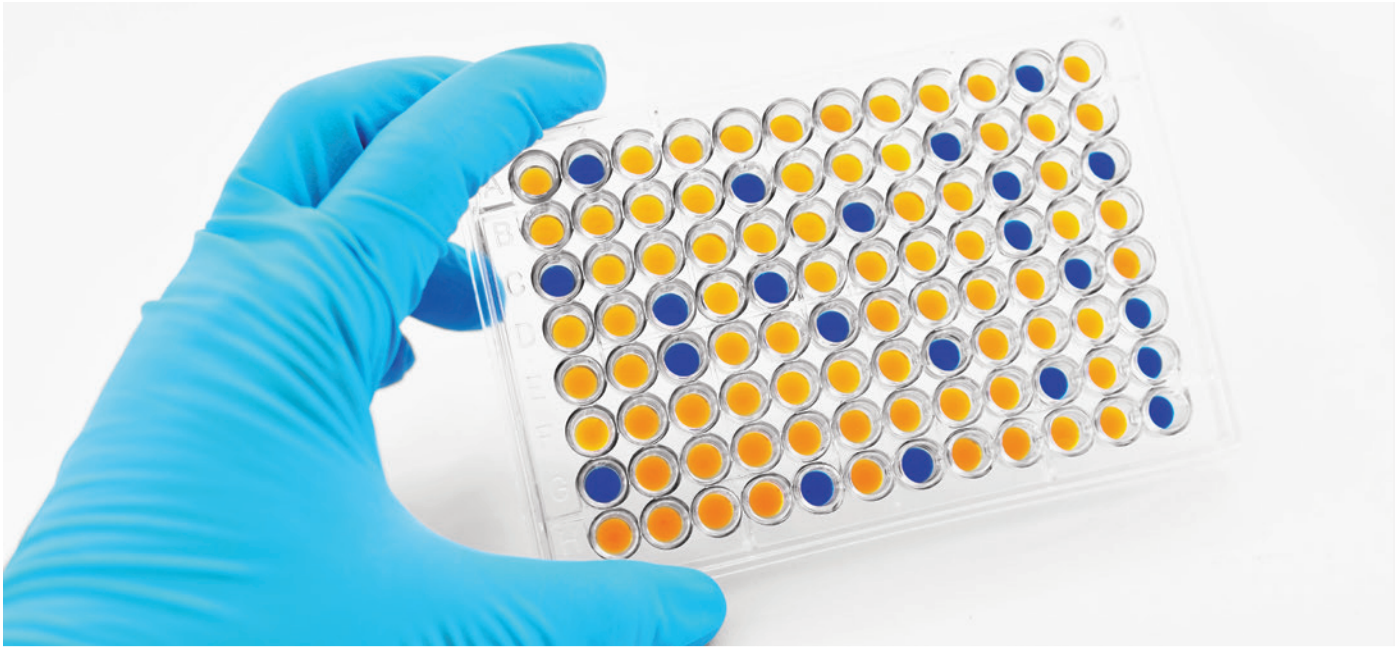
TRICONTINENT
Syringe Pumps

ZINSSER ANALYTIC
Lab Automation

ILS
Syringes

Perfection in every drop

A variety of pumps are required in clinical chemistry, haemostasis analysis, immunology and microbiology to dose reagents, dispense bodily fluids, clean needles, and remove residues. Whatever type of pump you need for in-vitro diagnostics, there is only one supplier that offers them all: Ingersoll Rand's Medical Segment – with its brands Thomas, TriContinent, Welch, Zinsser Analytic and ILS.

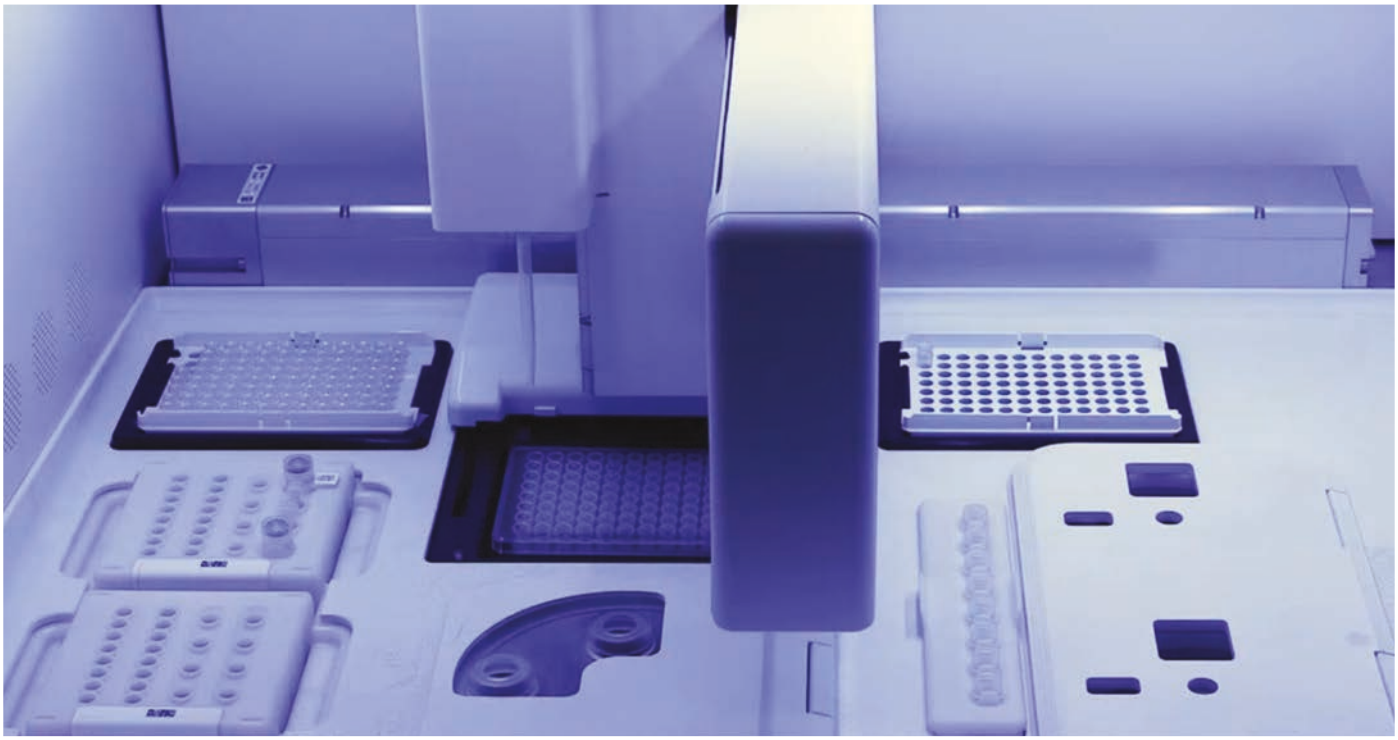


LOWER COSTS, GREATER ACCURACY

In-vitro analysis typically involves expensive reagents. Thanks to their high-precision dosing, our pumps make sure that only the necessary amount of reagent is used. This not only saves costs but also prevents process errors. For accurate dispensing of bodily fluids, there's no better choice than TriContinent syringe pumps.

EASY TO USE, BUILT TO LAST

Our pumps' fast, thorough aspiration capabilities help you easily to transfer analyzed liquids from the analysis chamber or cuvette to the waste container – without leaving any residues or wasting any time. And, thanks to their proven durability, they support reliable analysis for an exceptionally long time. For quick repairs, we also offer convenient service kits for replacement of critical components in diaphragm or peristaltic pumps.



Select the optimal solution for your application

Thomas and TriContinent brands of Ingersoll Rand offer a complete range of pumps for all in-vitro diagnostics applications. Since reliability is vital in this field, our pumps are designed to ensure high-precision dosing. The exact volume of reagent is used for each application, thus minimizing errors and costs.

Gas and Liquid Pumps from Thomas

1210 Series
Liquid diaphragm pump: waste removal

6311 Series
Liquid diaphragm pump: needle cleaning

6313 Series
Liquid diaphragm pump: waste removal

LMF Series
Liquid linear diaphragm pump: reagent dosing

1610 / 1620
Gas diaphragm pump: waste removal

SR 10 / 30 Series
Peristaltic pump: reagent dosing

ETL200 Series
Peristaltic pump: reagent dosing

TriContinent Products

C-Series
TriContinent Syringe Pump: sample aliquoting and dispensing, diluent / reagent delivery

CX-Series
TriContinent Syringe Pump: sample aliquoting and dispensing, diluent / reagent delivery

Air-Z Premier
TriContinent Air Displacement Pump: sample aliquoting and dispensing, reformatting

Air-Z Flex
Sample aliquoting and dispensing, reformatting

Air-Z Mini
Sample aliquoting and dispensing, reformatting

Air-Z Legacy
Sample aliquoting and dispensing, reformatting

Automation Syringes
Sample aliquoting and dispensing, diluent / reagent delivery

ADVANTAGES OF THOMAS PUMPS FOR IN-VITRO DIAGNOSTICS

- High-precision dosing prevents process errors and reduces reagent costs
- Fast, thorough aspiration performance for easy, residue-free liquid transfer
- Outstanding durability for reliable, cost-effective analysis
- Convenient service kits available for quick repairs

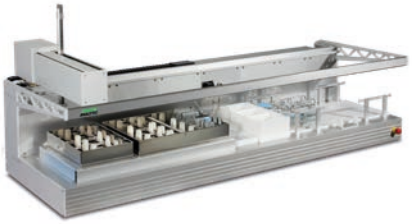
Lab Automation Solutions from Zinsser Analytics

Immunophenotyping

In diagnostic several procedures are applied for determination of e.g. phenotypes of leukemia. For staining blood cells immunophenotyping is used often.

Sterile Filling of Cell Culture Media

For certain cell based experiments, traditional and commercially available cell culture media require addition of specific substances such as cytokines. The preparation of this media with additives is performed under sterile conditions to prevent contamination.



Giemsa Staining

Giemsa staining is an important diagnostic tool applied for staining the chromosomes of cells for the determination of leukemia phenotypes and identification of parasites like malaria or toxoplasmosis.

Glass Micro Syringes from ILS

Premium Glass Syringes for All Liquid Handling Applications and Instruments

The most common applications include infusing, dispensing reagents, calibration, aspirating, pipetting and sampling.

Primary industries that utilize our syringes include pharmaceutical, biotech, chemical, petrochemical, neuroscience, drug research and development, as well as food & beverage industry governmental and academic institutions.

DIAGNOSTIC EQUIPMENT

Immunoassay Test

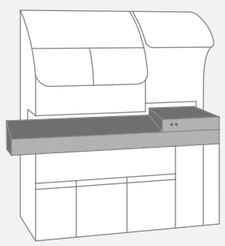
An immunoassay test relies on biochemistry to measure the presence and/or concentration of an analyte. Scientists recently developed a blood test to detect COVID-19 as well as tests to determine antibodies. A variety of pumps are used in automated test environments to dose reagents, dispense bodily fluids, clean needles, and remove residues.

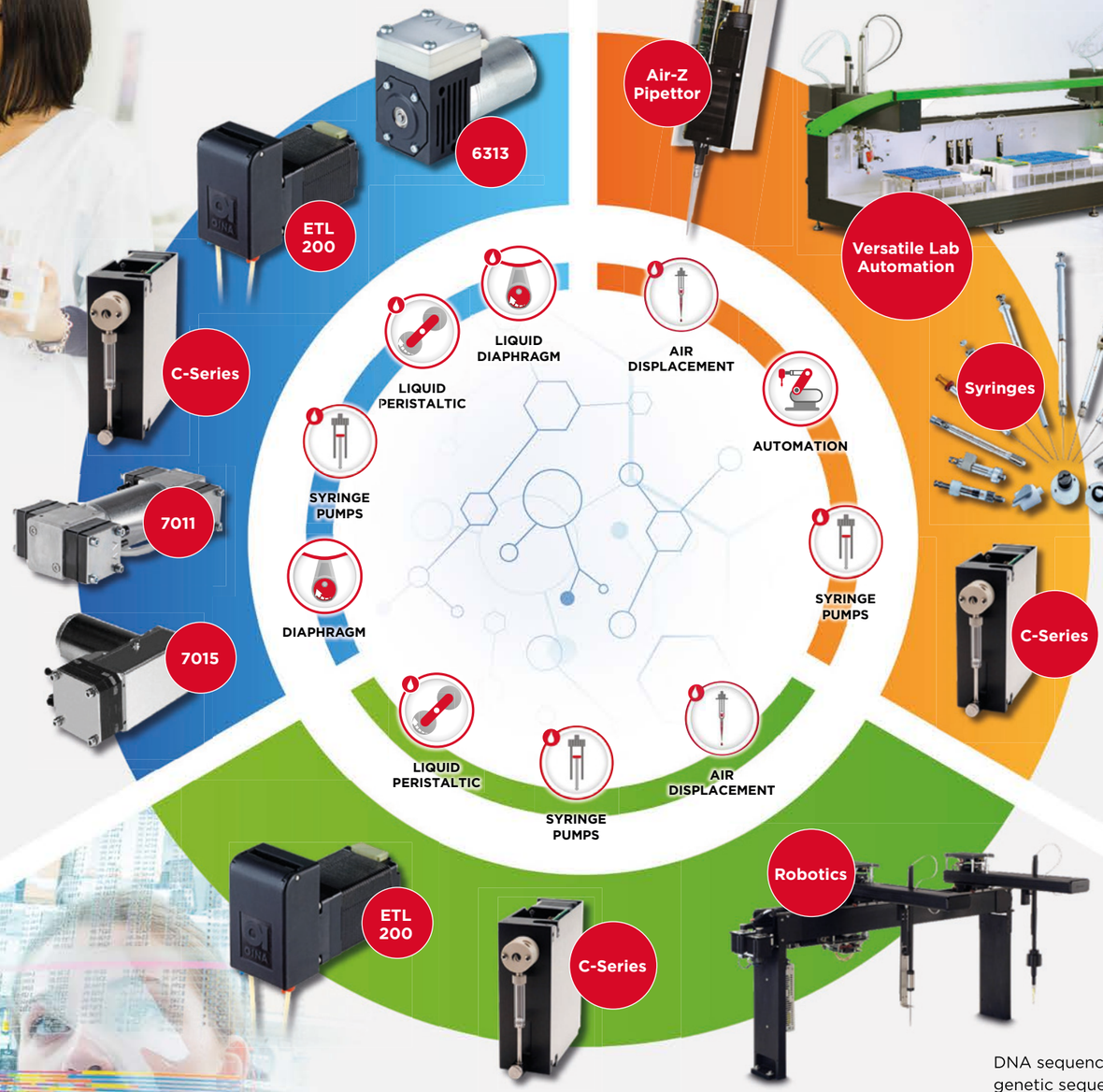
DIAGNOSIS

- ***COVID-19 infection?***
  - Molecular lab test

PROGNOSIS

- ***How severe is it?***
  - **Immuno-chemistry lab tests**
  - **Hematology Hemostasis lab tests**
  - Blood gas lab tests
  - X-ray
  - CT
  - Ultrasound





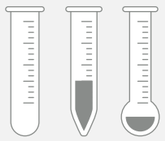
DIAGNOSTIC EQUIPMENT

PCR Test Sample Preparation

In most cases when testing for a virus, a sample needs to be taken from a patient's nose or throat. After this procedure, the specimen (swab for example) is sent to a laboratory for further analysis. Liquid handling platforms with air displacement pumps and syringe pumps are used to prepare samples for the analysis by dispensing or pipetting the samples, reagents and solvents into racks. This process is required before a PCR (Polymerase Chain Reaction) test can be conducted to detect a virus.

SARS-COV-2 (CORONAVIRUS) DETECTION WORKFLOW

Sample Collection → **Sample Preparation** → Nucleic extraction → Amplification and detection



DNA SEQUENCERS

Fluid Handling and Robotics

DNA sequencers are used for the genetic sequencing of a virus and its mutations which ultimately helps scientists to develop a vaccine. In addition, they are also used by microbiologists and virologists for epidemiological studies. For these applications, DNA sequencers require high-precision liquid handling pumps and robotics to provide higher throughput, reproducibility, and efficiency.

Pump and Lab Automation Solutions for Your Diagnostic Equipment

THOMAS
OEM Pumps
www.gd-thomas.com

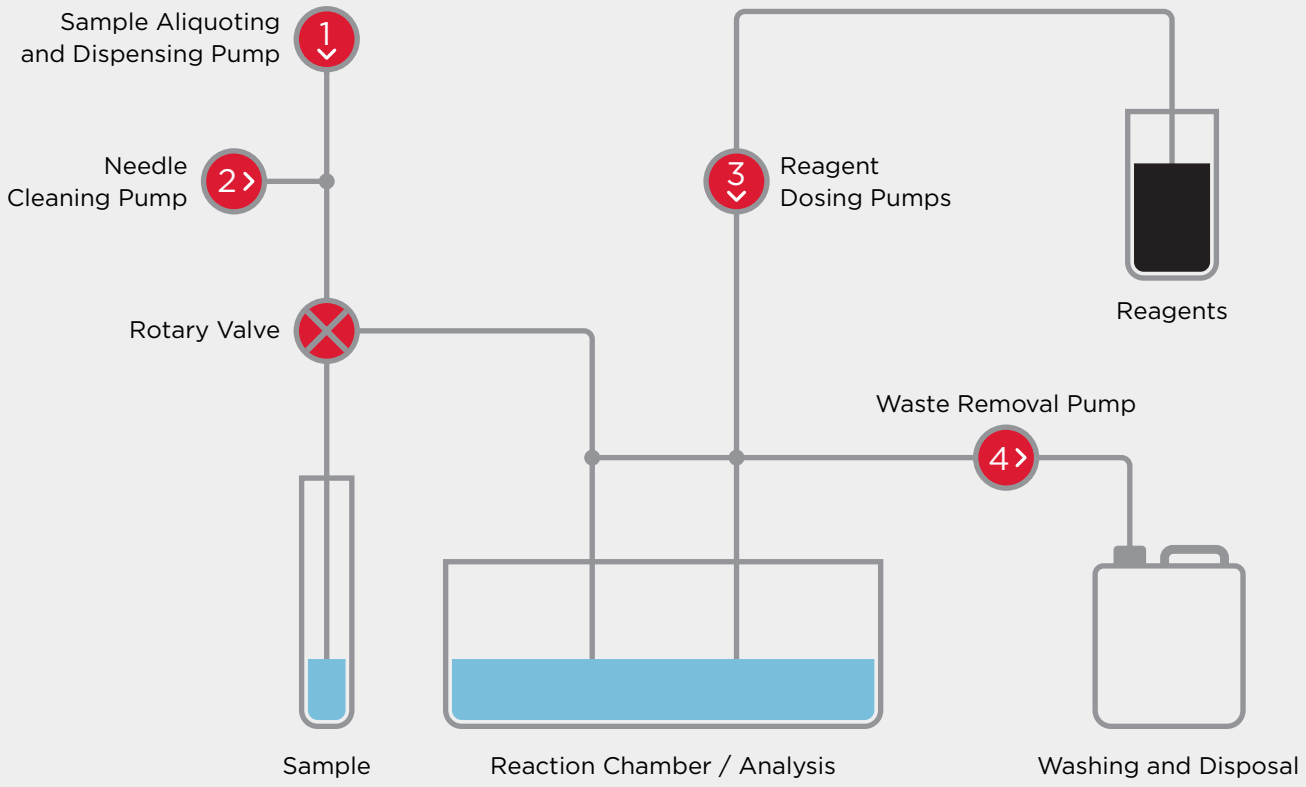
TRICONTINENT
Syringe Pumps
www.tricontinent.com

ZINSSER ANALYTIC
Lab Automation
www.zinsser-analytic.com

ILS
Syringes
www.microsyringes.com

In-Vitro Analysis Fluid Path

LIQUID HANDLING WORKFLOW IN IN-VITRO DIAGNOSTICS



LIQUID PUMPS

1. **Sample aliquoting and dispensing:** Sample is dispensed into the reaction chamber with extreme precision
2. **Needle cleaning:** After contamination with disinfectant, needle is flushed at high pressure to remove all residues
3. **Reagent dosing:** Accurate dosing of reagents to the reaction chamber

MIXED MEDIA

4. **Waste removal:** Residual liquid from the reaction chamber is removed and transferred to the disposal tank. Pumps are capable of handling gas / liquid mixtures

TriContinent C-Series Syringe Pump

TRICONTINENT

Recommended applications

1. **Sample aliquoting and dispensing**
3. **Diluent / reagent delivery**

Description

- High quality stepper motors and lead screws with up to 192,000 steps per full stroke
- Syringe volumes from 50 µL to 12.5 mL
- Wide variety of rotary shear valves
- State-of-the-art communication capabilities

Benefits

- ✔ Highest precision and accuracy in pipetting volumes and flow rates
- ✔ Very wide dynamic range
- ✔ Longevity design for maintenance free operation
- ✔ Plug and play installation and operation

TriContinent CX-Series Syringe Pump

TRICONTINENT

Recommended applications

1. **Sample aliquoting and dispensing**
3. **Diluent / reagent delivery**

Description

- High Resolution options available up to 384,000 steps/full-stroke
- Syringe volumes from 50 µL to 25 mL
- Long-life rotary shear valves
- State-of-the art communication capabilities
- Accommodates valves with up to 6 ports in a variety of configurations

Benefits

- ✔ Excels for large volumes/flows
- ✔ Optimized for very low flow applications requiring minimal pulsation
- ✔ Designed for long life and high reliability
- ✔ Plug and play installation and operation

TriContinent Air-Z Air Displacement Pump

TRICONTINENT

Recommended applications

1 **Sample aliquoting and dispensing, reformatting**

Description

- High quality stepper motors and lead screws for high resolution
- Total volumes 1000 µL
- Tip volume ranges of 20 µL, 50 µL, 200 µL, 1000 µL
- State-of-the-art communication capabilities
- Pressure sensor and capacity sensor
- Active tip drop

Benefits

- ✔ Very high pipetting performance concerning precision and accuracy
- ✔ Wide dynamic range from few microliters to 1 mL
- ✔ Liquid Level Detection (LLD) by pressure, capacity or both (hybrid)
- ✔ Clogged tip detection
- ✔ Active tip drop allows simple reuse of tips

TriContinent Air-Z Air Displacement Pump

TRICONTINENT

Recommended applications

1 **Sample aliquoting and dispensing, reformatting**

Description

- 50 µL, 250 µL and 1,000 µL volumes available
- With or without control electronics, including pressure sensor
- Vertical or horizontal orientation available
- Up to 15 units can be addressed individually

Benefits

- ✔ High-resolution encoder for step loss detection
- ✔ Space saving compact size
- ✔ Universal tip adapter for use on multiple volume tips
- ✔ Pressure sensor for clogged tip detection

TriContinent Air-Z Air Displacement Pump

TRICONTINENT

Recommended applications

1. **Sample aliquoting and dispensing, reformatting**

Description

- 50 µL volume
- Most economical design for low-duty cycle applications
- Designed for easy installation and replacement
- Imprecision and inaccuracy of < 1% full stroke

Benefits

- ✔ Lightweight for smaller point of care systems
- ✔ Compact design for small applications
- ✔ Can be nested on 18 mm centers for multiple dispenses at one time

TriContinent Air-Z Air Displacement Pump

TRICONTINENT

Recommended applications

1. **Sample aliquoting and dispensing, reformatting**

Description

- Pump Volume options of 200 µL, 1,000 µL, 2,000 µL and 5,000 µL
- Optional proximity switch
- Optional motion control board available

Benefits

- ✔ Instrument ready designs
- ✔ Borosilicate glass & PTFE wetted surfaces for long life
- ✔ Compatible with most motion controllers

TriContinent Automation Glass Syringes

TRICONTINENT

Recommended applications

1. **Sample aliquoting and dispensing**
3. **Diluent / reagent delivery**

Description

- 3 cm and 6 cm lengths
- PTFE or UHMWPE seal options
- Syringe sizes from 50 µL to 25 mL

Benefits

- ✔ Compatible with most industry standard pumps
- ✔ Proven designs using high grade seal material and Borosilicate 3.3 glass
- ✔ Custom designs available to meet your needs

Thomas 1210 Series Liquid Diaphragm Pump

Recommended applications

4› **Waste removal**

Description

- Liquid diaphragm pump for smooth, continuous transfer of liquid
- Max. liquid flow: 180 mL/min
- Max. pressure height: 10 mWc
- Max. suction height: 6 mWc

Benefits

- ✔ Smooth, continuous flow with minimized pulses
- ✔ Bubble-free transfer of liquids
- ✔ Full compatibility with corrosive and abrasive media
- ✔ Flexible design for customized solutions

Thomas 6311 Series Liquid Diaphragm Pump

Recommended applications

2› **Needle cleaning**

Description

- Liquid diaphragm pump for transfer of liquids under pressure
- Max. liquid flow: 190 mL/min
- Max. pressure height: 40 mWc
- Max. suction height: 3 mWc

Benefits

- ✔ Linear controllability of flow against pressure
- ✔ High reliability and lifetime even with higher pressures
- ✔ Full compatibility with corrosive and abrasive media
- ✔ Flexible design for customized solutions

Thomas 6313 Series Liquid Diaphragm Pump

Recommended applications

Waste removal

Description

- Liquid diaphragm pump for thorough and fast aspiration
- Max. liquid flow: 300 mL/min
- Max. gas flow: 2.3 L/min
- Max. pressure height: 10 mWc
- Max. suction height: 7 mWc

Benefits

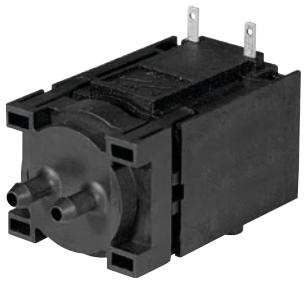
- Excellent aspiration performance
- Valve system optimized for gas/liquid mixtures
- High efficiency
- Excellent reliability and durability even with corrosive and abrasive media
- Flexible design for customized solutions

Thomas LMF Series Liquid Linear Diaphragm Pump

Recommended applications

Reagent dispensing

Description



- Liquid linear diaphragm pump for reliable continuous dosing against low pressures
- Max. liquid flow: 300 mL/min
- Max. pressure height: 5 mWc
- Max. suction height: 2 mWc

Benefits

- Cost-efficiency
- Quiet operation

Thomas 1610/1620 Series Gas Diaphragm Pump

Recommended applications

Waste removal

Description

- Gas diaphragm pump for high end vacuum and performance stability
- Free flow rate up to 16 L/min
- Intermittent pressure up to 2 bar
- Intermittent vacuum up to 90%

Benefits

- Low sound and vibration over performance range
- High evacuation speed
- Performance reliability over lifetime
- Configurable design for customized solutions

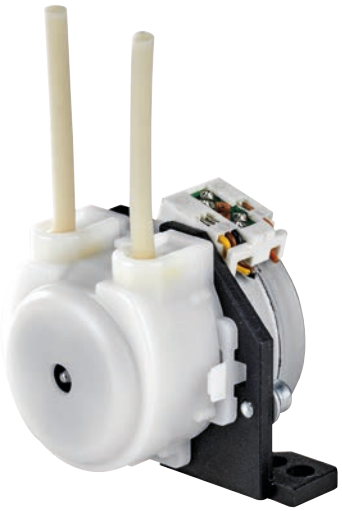
Thomas SR 10/30 Series Peristaltic Pump

Recommended applications

Reagent dispensing

Description

- Peristaltic pump for simple dispensing
- Max. liquid flow: 80 mL/min
- Max. pressure height: 8 mWc
- Max. suction height: 8 mWc



Benefits

- Simple handling, tubing is easy to exchange
- Robust and durable design
- Reliable dosing capabilities
- Flexible choice of motor and tubing

Thomas ETL200 Series Peristaltic Pump

Recommended applications

3 **Reagent dispensing**

Description

- Peristaltic pump for accurate dispensing
- Max. liquid flow: 60 mL/min
- Max. pressure height: 20 mWc
- Max. suction height: 9 mWc

Benefits

- ✔ Dual spring-loaded occlusion for maximum tube lifetime and accuracy
- ✔ Easy tube loading with one movement
- ✔ Usage of bridged tubing
- ✔ Stepper motor
- ✔ Controller board available

Immunophenotyping

In diagnostic several procedures are applied for determination of e.g. phenotypes of leukemia. For staining blood cells immunophenotyping is used often. The staining process has been automated by Zinsser Analytic. Stock solution, staining buffer, buffer solution and vials with blood films (or bone marrow or spinal fluid) are positioned on the workbench prior to starting the method.

Sterile Filling of Cell Culture Media

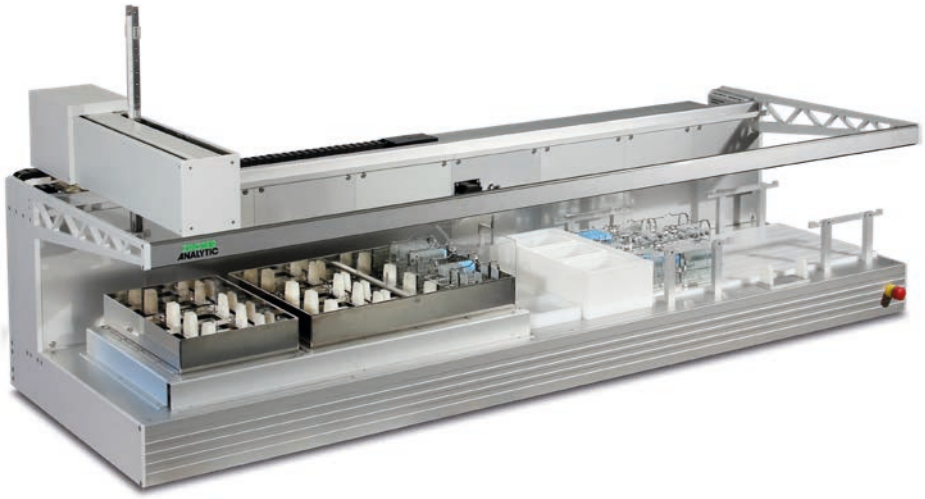
For certain cell based experiments, traditional and commercially available cell culture media require addition of specific substances such as cytokines. The preparation of this media with additives is performed under sterile conditions to prevent contamination. Zinsser Analytic designed an automated platform to carry out this time-consuming and tedious task.

The specific platform consists of two pipetting tips for the addition of supplements, a gripper mounted on the robotic arm for transport of culture vials, a capping/decapping station with an integrated barcode reader for vials and a dispense station for culture medium. Culture tubes, the required cytokines and the standard culture medium are part of the platform. The entire platform is sited in an enclosure which is supplied with sterile air.

Giemsa Staining

ZINSSER ANALYTIC

Giemsa staining is an important diagnostic tool applied for staining the chromosomes of cells for the determination of leukemia phenotypes and identification of parasites like malaria or toxoplasmosis. Specialized oncology or hematology laboratories are faced with large amounts of samples that need fast processing. Prior to process the Giemsa stock solution, staining buffer, buffer solution and slides with blood films are placed onto the workbench.



ILS Analytical Micro Glass Syringes

ILS

Applications

ILS Glass Micro Syringes are a perfect fit for precision sampling and dosage in chromatography, spectroscopy, preparation of standard solutions and other manual application tasks.

Description

ILS offers over 1000 types and variations of glass syringes made from the highest quality of the borosilicate glass. The complete manufacturing process is done in-house. In addition to great engineering expertise, we offer unique customization possibilities to match the individual needs of our customers.

- High variety of microsyringe models have been developed over the years
- Applicable in high-performance liquid-, gas- and thin layer-chromatography
- Volumes ranging from 100 QL to 5 mL

Benefits

- ✔ Compatible with most industry standard pumps and liquid handling instruments
- ✔ Proven designs using high grade seal material and high-quality Borosilicate 3.3 glass
- ✔ Custom designs available to meet your needs

Welch CRVpro Series Vacuum Pumps

Description

Born to perform, designed to simplify your work, and built to last, Welch's CRVpro range is the ultimate evolution of two-stage rotary vane vacuum pumps.

Benefits

- Large oil chamber dilutes chemical vapor and reduces the risk of chemical attacks and oil breakdown
- Enhanced air flow ensures cool running operation and slows down corrosion
- Internal surface PTFE-coating combined with external black oxide coating provides protection from sublimed chemical vapors
- Extended oil changes minimize maintenance intervals and costs
- Robust design provides stable operation while ensuring high reliability and a long product lifespan

Welch VCpro 601 Vacuum Control Box

Description

With our new Welch vacuum control box VCpro 601 you will be able to precisely and easily regulate the pressure for your laboratory or industrial application from 1100 down to 1 mbar. The controller is equipped with a wide range power supply and so can be used worldwide without the need for an adapter.

Benefits

- Intelligent and fully programmable modes
- Security levels for administrators and users
- Log files on all pump activities for easy traceback

GENERAL CONTACT

EMEA
Gardner Denver Thomas GmbH
Livry-Gargan-Str. 10
82256 Fuerstenfeldbruck
Germany

Tel: +49 8141 2280 0
Fax: +49 8141 8892136
thomas.de@gardnerdenver.com

AMERICAS
Gardner Denver Thomas, Inc.
1419 Illinois Avenue
Sheboygan, WI 53081
USA

Tel: +1 920 457 4891
Fax: +1 920 451 4276
td.usa@gardnerdenver.com

ASIA PACIFIC
Gardner Denver Thomas
Pneumatic Systems (Wuxi) Co., Ltd.
No. 1 New Dong An Road
Shuofang Town
Wuxi, Xinwu District
Jiangsu 214142
China

Tel: +86 510 6878 2258
Fax: +86 510 6878 2200
thomas.cn@gardnerdenver.com

Please check out all our brands for your mission-critical flow control technologies:

OEM Pumps
www.gd-thomas.com

Vacuum Pumps & Systems
www.welchvacuum.com

Syringe Pumps
www.tricontinent.com

Lab Automation
www.zinsser-analytic.com

Syringes
www.microsyringes.com