

CDUs, DCLC & Immersion Cooling Data Center Market

GRI Product Application Sheet



Market: Data Centers / Electronics Cooling

OEM Device: Cooling Distribution Unit (CDU), Direct Contact Liquid Cooling (DCLC), Immersion Cooling

Purpose of device: The increasing popularity of Cloud computing and storage, for both home and business, has created a growing demand for highly efficient and extremely fast data centers. The consequence of higher processing speeds is the generation of more heat; not a good thing for electronics. Previously air-cooled, many data centers are now switching to liquid cooling technology as a more effective and efficient method of dissipating computer generated heat in critical high-tech equipment.

CDUs, DCLC and Immersion technology all use heat exchangers as a means to remove heat away from the electronics.

Purpose of pumps: Reliable, efficient, and leak free pumps are required to move fluid through heat exchangers in closed-loop, flooded suction environments.

Market Advantages

Motors

- Brushless DC
- 12-48V
- Manufactured in-house by GRI
- Designed for OEM customization - Production able to electronically throttle motor speed to customer's specific flow and pressure requirements.

Magnetically driven

- Seal-less, leak free, motor is contained away from fluid

Multiple OEM options available

- Multiple suction and discharge port configurations
- Control Options
 - Analog: 0-5v DC Signal
 - Digital: PWM
 - CAN-Bus
 - Tachometer feedback

Pump Series	Maximum Flow GPM, (LPM)	Maximum Head FT, (PSI)	Maximum System Pressure	Motor Specs/ Voltages
INTG1	3.0, (12.0)	22.0, (10.0)	50 PSI	12-24, 36 VDC
INTG3	8.85, (33.5)	37.0, (16.0)	75 PSI	12-24 VDC
INTG5	10.0, (37.9)	80.0, (35.0)	75 PSI	12-24, 36, 48 VDC
INTG7	22.0, (83.0)	80.0, (35.0)	75 PSI	12-24, 36, 48 VDC
INTG8	39.0, (145.0)	70.0, (30.0)	75 PSI	12-24, 36, 48 VDC



INTG1 Series



INTG3 Series



INTG5 Series



INTG7 Series



INTG8 Series



180 Hines Ave. • Bellville, OH 44813 • PH: 419-886-3001 • FAX: 419-886-2338 • www.GRIpumps.com

OEM Guidelines

Gorman-Rupp Industries





OEM Guidelines

Gorman-Rupp Industries

Welcome to Gorman-Rupp Industries!

As modern business progresses, emerging technologies leave off-the-shelf pumps in the dust. Our clients are reengineering systems overnight and demanding a pump partner who can keep up with their progress. Gorman-Rupp Industries routinely meets these challenges with pumping solutions as unique as your cutting-edge applications. As a result, we have become a company known for market innovations and improvements that continue to set the standards for the pump industry. Thank you for considering Gorman-Rupp Industries as your partner for manufacturing your custom pump.

GRI OEM Guidelines - Customizing a pump

We are excited to begin this partnership with you! To help build a strong partnership, we have established this set of guidelines that have been developed from the knowledge and experience of working with OEMs, in the global community, for over 67 years.

The following page offers a guide that will assist you in the process of developing a custom pump. As always, your GRI Territory Manager will be available in assisting, directing, and answering any questions you may have regarding this guide.

Again, thank you for considering GRI Pumps. We look forward to working with you.

Sincerely,

Jody Hastings
General Manager
Gorman-Rupp Industries



OEM Guidelines

Gorman-Rupp Industries

First start with learning more about GRI and what you should expect from our company.

What to expect

1. Pump Selection

2. Pre-Production

3. Product to You

GRI Team



What to Expect, Pricing, Distributors

OEM Guidelines

Clarity Statement

GRI collaborates with OEM engineers, who are searching for fluid pumps in medium to large quantities and are unable to fulfill their unique pump specifications with an off-the-shelf solution and require a custom-engineered pump specific to their application.

Mission Statement

To create and maintain a **mutually beneficial** relationship between GRI and our customers.

Mutually Beneficial (What does this mean?)

Expect the best from GRI. Our reputation, as well as yours, is our number one priority. Our goal is to design the best possible means of moving fluid within your application.

Expect transparent pricing from the start - yours and our budgets demand it. As we launch our partnership, we will attempt to present to you the most accurate pricing available. During the process of validating a pump for your application, it may be possible that additional customization is required. This could increase or in some cases, lower your cost. We will make sure that you are aware of any foreseeable changes in price.

You can trust that, for the benefit of our customers, employees, and shareholders, we will perform our due diligence from day one. We do not see this as a one-time partnership, but one that will last for years to come! This is an investment of both parties!

Mutual Non-Disclosure Agreement

To protect your company's proprietary trade secrets, as well as ours, we do require that a mutual non-disclosure agreement (NDA) be signed. GRI's standard NDA protects both your company's rights as well as GRI's.

Quantities & Pricing

A 250 piece minimum is required for all custom OEM pump orders.

Discounts may be available for quantities greater than 250 pieces. Contact your GRI Territory Manager to discuss.

For non-custom orders (catalog) of less than 250 pumps, it might make better sense for you to connect with a GRI distributor. Ask your GRI Territory Manager for details. See "Distribution Network" below.

Distribution Network (Catalog pump orders)

In cases where non-custom (catalog) pump quantities fall below the 250 piece pricing structure, we can refer you to one of our many global distribution partners. Contact your GRI Territory Manager for details.





Describe Your Application

OEM Guidelines

Company Name:

Affiliate of:

Address:

Your Name / Title:

Application Name:

Application Description:

Production Date:

Expected Annual Quantity:

Over How Many Years?

Total Quantity:

Target Price:



Pump Specification Sheet

OEM Guidelines

Current Pump

Voltage

Speed Control

Maximum Flow

Minimum Flow

Maximum Head Pressure

Minimum Head Pressure

Back Pressure

System Pressure

Fluid Type

Maximum Fluid Temperature

Specific Gravity

Viscosity

Ambient Temperature

Duty Cycle

If Intermittent: Hours:

Days:

Desired Life

Flood Suction

Self Priming

Lift

Dry Run

Submersible

Metering

Bracket

Suction Port Size

Discharge Port Size

Electrical Connectors

Additional Information

Required Approvals

Choose all that apply

UL778: Motor-operated Water Pumps

NSF61: Potable Water

NSF169: Food Grade Certification

NSF372: Lead Content

IP66: No ingress of dust, protection against powerful water jets.

IP67: No ingress of dust, protection against temporary water immersion.

IP68: No ingress of dust, protection against continuous water immersion.

Other:



Sample Pump Testing OEM Guidelines

Review Specification Sheet

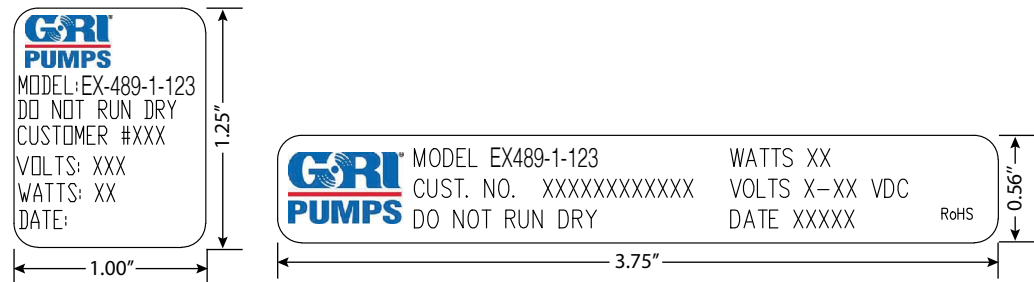
Upon completion and submission of the Pump Specification Sheet, GRI's Engineering team and your GRI Territory Manager will review the information and make a recommendation. The recommendation will be based on customizing a current GRI catalog pump or in some cases, designing from scratch. This recommendation is usually a quick process and is dependent on the accuracy and completeness of the information submitted.

Sample Pump / Pricing

With the recommendation, your Territory Manager will offer a sample pump for testing. **Testing is required for verification in your system.** Pricing, based on the recommended sample and proposed annual quantities can also be discussed at this time.

Sample Pump Model Number

Your sample pump(s) will have a unique model number. Example: EX489-1-123. The "EX" means "experimental" and the remaining numbers are used for identification purposes within our system.



As stated above, testing is required for verification within your system. Testing will confirm fluid/pump compatibility, as well as the accuracy of the information provided in the Pump Specification Sheet i.e. required flow, pressure, etc. The length of testing is based on your application's requirements, your completed Pump Specification Sheet, and your testing results. Based on your testing results, the initial sample may require some fine-tuning and additional samples tested.

Testing Feedback OEM Guidelines

WOW Box

Beginning with the gathering of your specifications and making a pump recommendation, our intentions are to “Wow” you from the start. In most cases, your sample pump will be shipped to you in our “WOW” Presentation Box. This box will include the sample pump(s), pump technical data sheets, and an overview of our company.



Life Testing

When warranted, GRI's Life Testing Lab is available for OEM application testing. Our state of the art lab provides the ability to model an OEM's application and sometimes even install the OEM's actual components. In instances when GRI is approached regarding the replacement of a competitor's pump, we will perform comparison testing of the competitor pump to a GRI model.



Testing Feedback

Validating your pump will require a dedication of time. To qualify the sample pump in your system, it is important that you provide detailed information on how the sample pump performed and if there are any chemical compatibility issues with the fluid. Your GRI Territory Manager will be able to guide you through the gathering of this information prior to, during, and post testing.

During the testing process, it is important to communicate any issues or questions that you have with your Territory Manager. Addressing challenges as they occur will make the validation process more efficient and accurate.

Labels

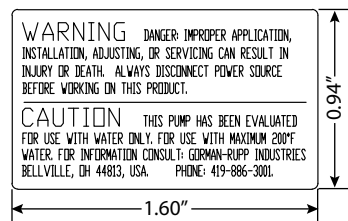
OEM Guidelines

Labels

All GRI products are shipped with labels which provides model number, date code, and electrical information. Labels are designed and printed in-house which gives GRI the ability to customize a label to an OEM's requirements. Due to the size of the labels, there are limitations in the amount of information that can be printed.



Based on a particular pump design and its characteristics, some pumps may require additional labels:



Please discuss any custom label requirements with your Territory Manager.

Packaging OEM Guidelines

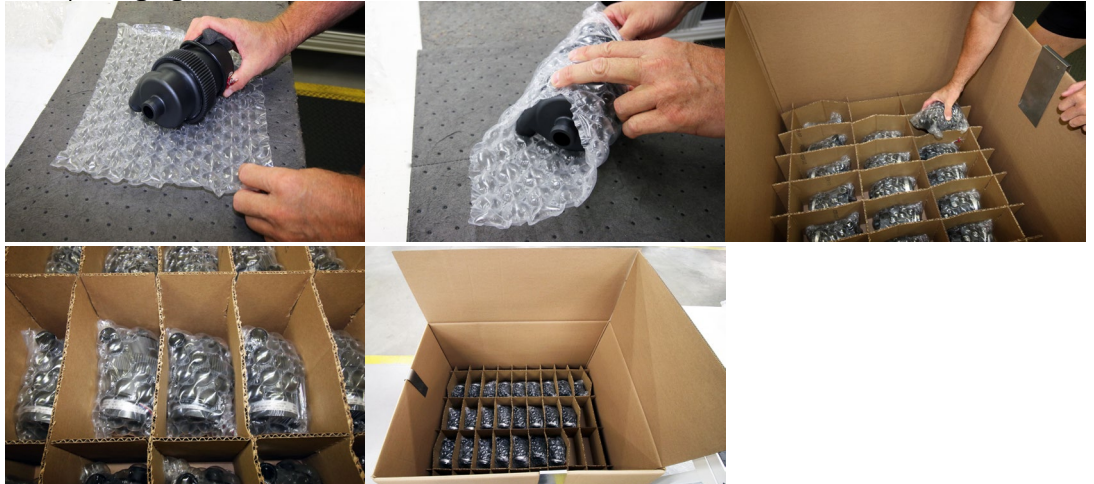
Packaging

GRI works closely with our suppliers to ensure safe and quality packaging. Customized packaging is available when applicable. Please share any custom packaging requirements with your GRI Territory Manager.

Single unit packaging:



Bulk packaging:





You are getting closer! Testing in your system is complete and performance of your new pump is as expected! The next step is to complete the Design Validation Form on the following page. Once complete and returned to GRI we will begin the process of providing a production model number.

Production Model Number

Through the testing process, your sample pump was assigned a EX model number specific to your pump. Now that testing is complete and the sample pump has been validated in your system, GRI will now assign a production model number that is unique to your pump. This number will be the model number you will reference when placing orders.

Exclusive Model Numbers

While every production model number is unique to a certain pump, you may prefer to make this model number “Exclusive” to your company only. This will ensure that any inquiries outside of your company cannot purchase this model number. Anyone contacting GRI or one of our distributors regarding your model number will be directed to your company for purchase or information.

Marking your pump model as “Exclusive” ensures that your competitors cannot purchase this specific production number through GRI or through one of our distributors.

Please note that GRI is unable to control the selling of your pump model through third party retailers such as Ebay, Amazon or other sellers that have been able to acquire your pump outside of GRI or our distributors.





Design Validation

Date _____

Company Name _____

Pump Model: _____

RELEASE FOR PRODUCTION

The above listed Pump Model will be released as Production Model number _____.

Marking the "Accept" box in Customer Response section below and signing the document indicates the pump has been sufficiently tested and approved for your company's application.

DESIGN CHANGE

The above listed Pump Model will undergo a Design Change. See explanation in GRI Comments below.

Marking the "Accept" box in Customer Response section below and signing the document indicates approval of the Design Change.

PROCESS CHANGE

The above listed Pump Model will undergo a Process Change. See explanation in GRI Comments below.

Marking the "Accept" box in Customer Response section below and signing the document indicates approval of the Process Change.

GRI Comments

GRI Contact _____ Title _____

Phone _____ Email _____

Customer Response. Please check response below and comment as needed.

ACCEPT

ACCEPT with change. Add comments in box below.

REJECT. Add comments in box below.

Approved by Name _____ Title _____

Signature _____ Date _____



180 Hines Ave. • Bellville, OH 44813 • PH: 419-886-3001 • FAX: 419-886-2338 • www.GRIpumps.com

Forecasting & Blanket Orders

OEM Guidelines

Forecasting

We hope that by the time you test a sample pump and work through the design validation process you will feel that GRI has “got your back” and that you regard us as a trusted partner. That being said, we certainly rely on you, our partner, in working together with your GRI Territory Manager in developing an accurate forecast.

We know that forecasting is not “written in stone,” and can be affected by many outside forces, however, forecasting assists GRI in providing our Manufacturing the ability to have stock on hand so that your production can continue as expected. Because we feel that forecasting is extremely important, we provide a Blanket Ordering option that is beneficial to both you and GRI.

Blanket Orders

This option provides special pricing to our trusted partners when agreeing to purchase quantities of product over a specified period of time. You will benefit in having confidence that we will have material to manufacture and ship your product on an agreed date - with no pause in your production. GRI benefits in having stock ahead of time, which reduces lead time and allows our Manufacturing Department the ability to create a solid production schedule.

Your GRI Territory Manager will be happy to assist with forecasting and developing a Blanket Order schedule.

Blanket Order Policy

GRI's blanket order policy provides customers the opportunity to obtain the best quantity price available and enable us to schedule parts and production schedules to best meet your delivery requirements.

Blanket orders are intended to be mutually beneficial to both GRI and our customer. The length of the blanket order and its start date is a negotiated item between you and your GRI Territory Manager.

Blanket orders are subject to the following conditions:

1. All pumps must be released on the date of order entry with a minimum shipment of 50 pieces or \$2,500.00 net billing. Requests for delivery of units not released at time of order entry will be subject to normal lead times.
2. Shipments can be rescheduled for later delivery with 30 days notice. Requests to delay shipment with less than 30 days notice may not be honored if products have been built, or are in the assembly process.
3. Shipments that have been rescheduled beyond the time frame of the original blanket order will be subject to revised prices.
4. Every attempt possible will be made to accommodate requests to improve established delivery dates. However, requests will be subject to stock levels, supplier lead times and production schedules.
5. Should it be necessary to cancel a blanket order, cancellation charges equal to 20% of the remaining value of the order plus the cost of special parts will be invoiced at time of order cancellation. We will work with you to minimize these charges.
6. If ordered quantities cannot be used within the blanket order time frame, we reserve the right to invoice for the difference in price for the actual quantity shipped versus the price for the quantity ordered.

Manufacturing OEM Guidelines

Vertically Integrated Manufacturing

Through technology and offshore manufacturing, competition in the OEM pump market has become more and more competitive. GRI's business plan has been and will continue to become more vertically integrated. To do so, millions of dollars have been invested in new technology. Through these investments GRI has been able to perform more in-house manufacturing of parts instead of relying on suppliers to provide parts. Technology-Based Vertical Integration has proven to reduce costs, reduce lead-time (product to customers), provide more flexibility of human resources, and increase GRI's control of quality.

Rapid Prototyping has substantially reduced costs that were once associated with the production of prototype parts through GRI's model shop. What previously took days in manpower and CNC machining now takes only hours with the aid of 3D printing. Benefits include the reduction of labor cost, material cost, the reallocation of labor to other needed processes, and last, but not least, the quick turnaround of fully functional custom prototype sample pumps that are quickly shipped to our customers for evaluation and testing.

Injection Molding has allowed GRI to manufacture increasingly more parts in-house. In years past, GRI relied on supplied molded parts for the construction of pumps. Relying on outside suppliers to supply parts inherently causes delays in product to customers and decreases the ability to control quality.

In-House Motor Manufacturing began with the design of the Integrity Series Pump. Motors, especially custom motors, have been increasingly more difficult to procure since many of the more reliable motor manufacturers are outside the U.S. Manufacturing motors in-house has provided faster lead times for our customers and increased quality.

Lights Out Operation allows the manufacturing of parts during off hours by utilizing robotic technology. This decreases labor costs by utilizing costly machinery during unstaffed shifts. Machines are setup the day before and parts are ready for inspection the following morning.

Watch videos highlighting our vertical integration and other items that places GRI above the competition: <https://www.gripumps.com/learn/videos/culture-videos/>



Shipping & Delivery

OEM Guidelines

Customized Shipping Instructions

GRI offers multiple means for shipping your product in a timely manner. With Blanket Orders, we will determine your preference in shipping at the time of placing the Blanket Order. If you desire a change in a shipping method prior to your scheduled Blanket Order release, please contact in your GRI Territory Manager. They will work with you to make the necessary change.

For custom shipping requests, contact your Territory Manager.





Meet your GRI Team members

International Sales



Jody Hastings
General Manager
(419) 886-5208
JHastings@gripumps.com



Tina Spearman
International Sales Manager
(419) 886-5254
TSpearman@gripumps.com

North American Sales



Aaron Hill
Eastern Territory Manager
(419) 886-5253
AHill@gripumps.com



Jeremy Stapleton
Western Territory Manager
(419) 886-5247
Jeremy.Stapleton@gripumps.com



Chuck McKenzie
Inside Sales Coordinator
(419) 886-5239
CMckenzie@gripumps.com



Sales & Marketing Support



Victor Swisher
Director of Sales & Engineering
(419) 886-5214
VSwisher@gripumps.com



Jim Fehrman
Marketing Manager
(419) 886-5219
JFehrman@gripumps.com



Join our mailing list

www.GRIpumps.com



180 Hines Ave. • Bellville, OH 44813 • PH: 419-886-3001 • FAX: 419-886-2338 • www.GRIpumps.com