

Quadro Engineering Corp.
Research & Development Center

**PRODUCT TESTING
INFORMATION PACKAGE
(LIQUIDS PROCESSING DIVISION)**



Powder Dispersion



Continuous Processing



Homogenization



Emulsification

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RESEARCH & DEVELOPMENT CENTER WELCOME

Quadro Engineering Corp. maintains a world-class Research & Development Center at their Head Office in Waterloo, Ontario, Canada. This R&D Center affords you the opportunity to test your products with our equipment, in order to determine the best process solution.

The Center provides a full range of our latest equipment, two (2) test suites, a product preparation area/analysis area, a boardroom, and training facilities.

Testing is an integral part of equipment selection, and is an important tool used to evaluate and select the correct model, and associated tooling for your specific application.

To arrange for testing of your product(s), please contact your local Quadro Representative, complete the **Test Request Form**, and submit via e-mail. Please also read the attached Information Package that describes in detail our Facility, available equipment, testing protocol, and how to send product to us.

Please feel free to contact Quadro or your local Representative if you would like to further discuss any of the information contained in this Package. Quadro prides itself on exceeding the expectations of its customers, and welcomes even the most challenging applications.

Quadro policy dictates that all information be maintained on a confidential basis; if required, we will be pleased to negotiate and sign a mutual Confidentiality Agreement prior to initiating any testing and/or discussions.

We sincerely hope you will take full advantage of the existing opportunities available at our R&D Center in order to determine the best process solution for your product(s).

Test Center Overview:

Since 1978, Quadro's R&D Test Center has been giving customers the opportunity to run real-world tests of their products on Quadro equipment, and to see the results first-hand.

With a broad range of the latest Quadro machines, auxiliary support equipment and results analysis area, we can provide recommendations for equipment, tooling, process optimization and scale-up.

Visitors are always invited to attend the test; however a video can be taken to supplement the standard written report if you're unavailable to attend the day of testing and uploaded onto our FTP site for immediate viewing. All test results are maintained in our extensive database, which provides us with essential application knowledge for thousands of products. All test results are maintained in the strictest confidence.

Equipment Range:

Quadro® Liquids Processing units are situated in dedicated test cells with all the necessary ancillary equipment such as pumps, tanks, valves, flow-meters and feeders for maximum process flexibility.

Quadro® Liquids Processing – Mixing, Powder Dispersion, Emulsification & Wet Milling:

Liquids Processing equipment can be used to test multi-ingredient products in batches from 2 - 150 gals (7 - 570 liters), or in a continuous in-line dispersion and emulsification system, at rates of up to 60 gpm (227 lpm).

Analysis Equipment:

Our product preparation and analysis area has all the necessary equipment and instrumentation for sample analysis including:

- < **Particle Size Distribution**
- < **Particle or Droplet Size Evaluation**
- < **Viscosity Measurement**
- < **Malvern – Mastersizer 2000**
- < **Bulk/Tapped Density**

If required, arrangements for additional analysis equipment can be made (charges will apply.)

Arranging A Test:

Test arrangements can be made via your local Quadro Representative. If you're unsure who your local Representative is, please contact us directly.

The more information we have about your processes and products, the easier it will be for us to conduct the test. Both the infeed product(s) and the desired end-result are key pieces of information, along with a description of your existing processes and any problems or process difficulties you currently experience. To ensure that we have adequate and accurate information available to us, please complete Quadro's Test Request Form with MSDS of the products.

If you wish to send us a small sample of your product, we may be able to make some initial equipment recommendations by using our comprehensive testing database.

Test Reports:

Once testing is complete, you will receive a report with details of each test conducted, as well as the results, and equipment recommendations.

Test Materials:

Before we accept delivery of any product **we require that an MSDS form be sent to us** for evaluation so that we can make suitable arrangements for the receipt and handling of your product. Whenever a test requires the mixing together of two (2) or more products, an **MSDS is also required for the finished product, in addition to an EIN (Federal Tax ID number) for all USA customers and/or P.O. Number or Freight Account Number for return shipping processing.** At the end of the test, all materials will be returned to you, unless stated otherwise by you (disposal fees may apply).

Please advise and / or discuss any special storage or handling requirements (i.e. refrigeration) for your material prior to shipment so we can be certain your product will be treated accordingly.

Test Material Quantities Required:

The following information outlines the minimum quantities of test material required. If in doubt, please contact us for assistance.

Quadro Liquids Processing:

Small scale proof of concept evaluations are typically done with batch sizes ranging between 2 - 10 US gal (7 - 38 liters). The requirements below are considered guidelines only, and process dependent. If scaling up to larger equipment is necessary, please allow sufficient material for the small scale evaluation, plus adequate material for two or three full-scale tests.

Model	Product Required for One (1) Test	
	US gal	Liters
ZC0	5	19
ZC1	20	76
Z1	5	19
Z3	20	76
Y0	2 - 10	7 - 38
Y2	10 - 100	38 - 380
Y3	20 - 150	76 - 570
HV0	0.5 - 5	2 - 19
HV1	5 - 40	19 - 150

Production Tests:

In some cases, Quadro can perform extensive tests on production quantities of material, depending on volume and set-up requirements. There will be a charge for set-up and testing time on a per diem rate.

Equipment Sanitization:

We test a very wide variety of products, and although our equipment is cleaned between tests it cannot be considered sanitized. Therefore, test material is not suitable for consumption or sale after testing is complete.

Material Shipping & Disposal Costs:

Customers are responsible for the following charges:

- Shipping costs (freight/brokerage/duty/taxes) for sending your products to/from Quadro.
- Your travel and accommodation costs, if you wish to be present for testing.
- Standard testing fees (if applicable, please consult Quadro).
- Non-standard testing requirements, i.e. inert or cryogenic testing consumables; hazardous goods disposal (and freight); extra cleaning time/materials (i.e. carbon black).

Materials may be returned to the originator upon completion of testing, with the only exception being the equipment/floor washing residue, and small quantities of food products.

In some circumstances, we can dispose of materials locally; however, we will obtain an estimate for local disposal prior to pursuing this option.

Shipping Samples to Quadro:

All incoming and out-going freight charges are the customer's responsibility. Please ensure that all necessary paperwork (customs forms, import licenses, etc.) are obtained before the material is shipped.

Please provide a purchase order to cover return shipping costs. Within North America, if preferred, a courier account number can be provided for shipping collect. Allow a minimum of one (1) week shipping time for samples to be received at Quadro.

Please send test material to: **Quadro Engineering Corp.**
613 Colby Drive
WATERLOO, Ontario
Canada N2V 1A1
Attention: Liquids Testing Facility

All shipments must be accompanied by three (3) copies of the MSDS (Material Safety Data Sheet).

If sending materials from outside Canada, a Canada Customs Invoice is required. Ensure the following statements appear on this form:

- All shipments must be marked "FREE DOMICILE" (all charges will be billed to the sender).
- "Material for testing purposes only - no commercial value".
- Re: fair market value - FOR CUSTOMS PURPOSES ONLY - \$_____.
- Generic product name must be used on customs forms.

Attach these forms to the outside of the shipment (very visible to the carrier) or give them to the freight carrier with the Bill of Lading. In special circumstances, when the material is very expensive, for insurance purposes a low fair market value is not practical; please prepare a letter addressed to Canadian Customs. This letter must state that all material is being sent for test purposes only, and that all material will be returned to the originator. This letter must accompany all copies of the Canada Customs Invoice.

Health & Safety:

Quadro has a Joint Health & Safety Program. Basic safety equipment required for testing is as follows: safety glasses, safety shoes and clothing suitable to be worn for movement around moving equipment/parts. If you have/require specific safety equipment for testing, please bring it with you on the scheduled test date.

Hazard and Safe Handling Information & Labeling:

In accordance with Canadian Federal & Provincial legislation/regulations, it is the material supplier's responsibility, in compliance with Workplace Hazardous Materials Information System (WHMIS), to ensure all controlled products are labeled, and that Material Safety Data Sheets (MSDS) are supplied.

Quadro reserves the right to refuse, at our discretion, any such hazardous products. We are not equipped to handle substances that are explosive, carcinogenic or otherwise biologically active that may risk the short or long-term health and safety of our employees.

Every container must be labeled. The labels provide information that workers need in order to safely handle a controlled product. They must include:

1. Product Identifier
2. Supplier Information
3. Statement That MSDS Is Available
4. Appropriate Hazard Symbol
5. Risk Phrases
6. Precautionary Measures
7. First Aid Measures

Material Safety Data Sheets:

The Material Safety Data Sheet (MSDS) is a document containing all hazard and safe handling information for a controlled product. It provides more safety information than is possible to put on a label. The format may vary depending on the supplier; however, the following information, in English, must be available:

- | | |
|-------------------------------|-----------------------------|
| 1. Product Information | 6. Toxicological Properties |
| 2. Hazardous Ingredients | 7. Preventive Measures |
| 3. Physical Data | 8. First Aid Measures |
| 4. Fire and Explosion Hazards | 9. Preparation Information |
| 5. Reactivity Data | |

Finally...

Quadro takes pride in its ability to produce accurate and predictable test results. We are confident in our ability to do so; however, we recognize that as all test data is obtained under controlled conditions, process warranties are neither expressed nor implied, and in-process results may vary and can only be confirmed by plant trials.

Thank you in advance for your interest in the Quadro Liquids R&D Test Center. Our Team stands ready to assist you with your processing improvements and new equipment justification.

THE QUADRO LIQUIDS TEAM