



Ion Exchange Resin
Analysis Kit for
Europe/Middle East/Africa

DOWEX™ Ion Exchange Resin
DIRECTOR Services

DOWEX™ Ion Exchange Resin, DIRECTORSM Services

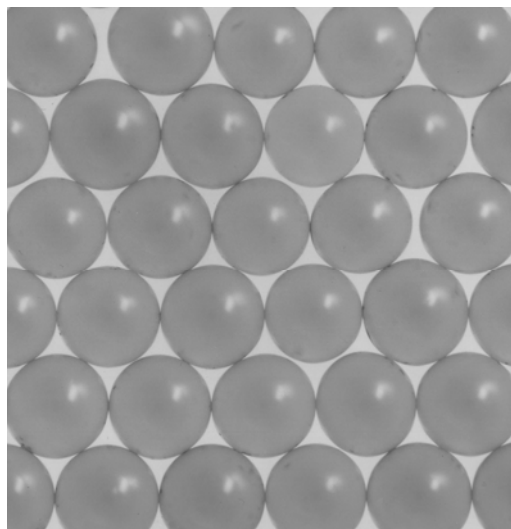
Ion Exchange Resin Analysis Kit

This Ion Exchange Resin Analysis Kit has been provided for your convenience as part of DIRECTORSM water treatment services. Within the kit, you will find complete instructions for sampling, labeling, ordering, and mailing as well as shipping labels.

The Dow Chemical Company offers ion exchange resin testing services to its customers for a nominal fee. DOWEX™ ion exchange resins can be tested to determine suitability for continued operation or to troubleshoot problems in your resin system. In addition to test results, you will receive a complete report with a description of the tests performed and the implications of the test results on your operation.

The following information will help you initiate the resin testing process:

- Available Testing Services
- Resin Analysis Services – Price Sheet
- Analysis Request Form
- Sampling instructions on how to obtain a representative resin sample.
- Shipping Instructions Form



Information needed to begin testing

In order to begin testing, Dow laboratory personnel need to have proper information on the types of resin being sent and the types of testing to be performed. The resin names and descriptions on sample bottle labels identify the types of resins submitted and your completed System Information Sheet will identify your application. Tests will be performed as listed in the next section. If additional tests are desired, please contact your Dow representative.

In addition to the resin and system information, a purchase order number is required before testing will begin. The purchase order number should be provided with the shipment to expedite the process.

Provide a contact name and telephone number with your samples so laboratory personnel can obtain any additional or missing information required to conduct the analysis.

Availability of results

Results are generally available within 4 weeks after your samples, resin and application information, and purchase order are received at our Laboratory site.

Contact your Dow representative

If you have any questions regarding ion exchange resin testing, contact your Dow representative. If you cannot identify your Dow Representative, please call 989-636-4406 for assistance (US, Pacific) or +32 3450 2240 (Europe) or see the Contact Us section of the website at www.dowex.com.

Available Testing Services For Ion Exchange Resins

The Dow Chemical Company offers ion exchange resin analysis services for a nominal fee. The following analysis are available:

Total Wet Volume Capacity (TVC)

Measurement of the total number of ion exchange sites per volume of resin. Fully regenerated resin is titrated to obtain milliequivalents of capacity per milliliter of resin. For cation resins, this property is reported in the H-form. For strong base anion resins, it is reported in the Cl-form. The TVC of weak base anion resins are reported in the free base form.

Strong Base (Salt-Splitting) Capacity (SSC)

Measurement of the strong base (quaternary amine) sites on the resin. Salt splitting sites are necessary in order to remove weak acid species such as bicarbonate and silica. This property is reported for strong base anion resins in the Cl-form and for weak base anion resins in the free base form.

Weak Base Capacity (WBC)

Measurement of the weak base (tertiary amine) sites on an anion resin. Weak base sites are used to remove free mineral acidity (acidic chlorides, sulfates, and nitrates) with a high degree of regeneration efficiency. This property is reported for strong base anion resins in the Cl-form and for weak base anion resins in the free base form.

Water Retention Capacity (WRC)

Measurement of the inherent moisture content of the ion exchange resin. A fully hydrated resin sample is centrifuged to remove free water, and the resulting sample is weighed before and after drying to determine the water content. Elevated water content indicates degradation of the polymer chain, while depressed water content typically results from accumulation of foulants on the beads. This test is performed on cation resins while in the H-form, strong base anion resins while in the Cl-form, and weak base anion resins while in the free base form.

Total Wet Volume Capacity as received (TVC as received)

A measurement of the number of ion exchange sites in the regenerated (H or OH) form. This result can be compared against the total exchange capacity to determine the efficiency or regeneration.

Microscopic Bead Examination

A sample of the resin is placed under a microscope for determination of the physical integrity of the resin and contamination of the bed. Photographs are taken and included in the report.

Organic Fouling

Measurement of the degree of organic accumulation on the anion resin. A sample of resin is subjected to alkaline brine solution and the extract solution is analyzed for total organic compound (TOC) levels.

Resin Fouling

Inorganic contaminants such as iron, calcium and silica can be identified.

Resin Kinetic Response

Measurement of a resin's ability to quickly remove ions from solution. As resins age, the rate of exchange may not be fast enough to remove all ions before flow reaches the bottom of the bed, thus exhibiting poor operating performance while maintaining a high Total Exchange Capacity.

Ionic Rinse Volume

Measurement of the rinse volume is made against conductivity following regeneration of the resin sample. The ionic rinse characteristics gives an indication of the general condition of the resin.

Particle Size Distribution

A sample of the resin is tested with a light blocking device which has been calibrated to determine the particle size distribution of ion exchange resins. The particle size distribution is reported to show the mean size and quantify the effects of bead breakage.

Resin Cleaning Tests

Evaluation of the resin using the standard testing will usually indicate if a resin would benefit from cleaning (e.g. to remove organics, Fe or silica). After cleaning, the resin is retested to evaluate the degree of success and a recommendation made.

DOWEX™ Ion Exchange Resins

Ion Exchange Resin Analysis – Price Sheet

Standard test packages:

Effective Date: August 31, 2009

Packages	Price per Sample (Euro)
Standard Resin Analysis	€ 225
Cleaning/Testing/Recommendation	€ 225
Resin Kinetics	€ 125
Organic Fouling	€ 50
Resin Rinse Profile	€ 50
Water Analysis	€ 300
TEC as received	€ 50
Particle Size Distribution	€ 50

Service notes:

- Pricing is valid for DOWEX™ ion exchange resins.
- The standard resin analysis includes the following: 1) Total Wet Volume Capacity (TVC), 2) Salt Splitting Capacity (SSC) – Anion only, 3) Water Retention Capacity (WRC), and 4) Microscopic Bead Examination.
- Additional analysis includes the following: 1) TVC as received, 2) Kinetic Testing, 3) Organic Fouling, 4) Resin Rinse Profile, 5) Cleaning and Retesting, and 6) Particle Size Distribution.
- Mixed bed samples require BOTH a standard cation and anion analysis.
- Water analysis includes a cation/anion breakdown and balance, pH, silica and metals.
- Standard services require approximately 4 weeks to complete from time of receipt of resin samples and purchase order number at Dow. Special requests will vary; please consult your Dow Water & Process Solutions representative for cost estimates and timing.
- Each of the services above include written documentation indicating the results and recommendations, and a report is mailed/faxed to one location of the client's choice.
- All service items are net 30 days.
- Dow's standard terms and conditions apply.
- CUSTOMERS EXCLUSIVE REMEDY FOR ALL CLAIMS (INCLUDING BREACH OF WARRANTY, NEGLIGENCE AND STRICT LIABILITY) RELATED TO THESE SERVICES IS LIMITED TO A REFUND OF THE PRICE PAID FOR THE SERVICE WHICH IS THE SUBJECT OF THE CLAIM. DOW SHALL NOT BE LIABLE FOR CONSEQUENTIAL, INCIDENTAL, PUNITIVE, SPECIAL OR EXEMPLARY DAMAGES.

DOWEX™ Ion Exchange Resins

Analysis Request Form for Europe/Middle East/Africa

Commercial Information

Send Results To:

Name:

Company:

Plant Name:

Address:

Send Invoice To:

Name:

Company:

Address:

Phone:

Fax:

E-mail:

Phone:

Fax:

E-mail:

Purchase Order Number:

Sample Descriptions:

Application	Train & Vessel	Resin Type	Resin	Resin age	Before/after	Special Tests
ex: Softener, demin., C.P.	ex: Train #1 SAC	ex: Strong acid cation	Name ex: DOWEX* HCR-S	(years)	regeneration	ex: CaSO ₄ , Fe

Contact names and addresses, purchase order number, and sample descriptions must be complete before testing will be initiated. Standard analysis and report will be available within four weeks. Please complete this form and mail it, along with the properly packaged resin samples, to the address below. For questions, please call +33 3 23 38 34 56.

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Technical Information

Feedwater Analysis:

Ca	mg/l or	ppmCaCO ₃	Mg	mg/l or	ppmCaCO ₃	Na/K	mg/l or	ppmCaCO ₃
Cl	mg/l or	ppmCaCO ₃	SO ₄	mg/l or	ppmCaCO ₃	NO ₃	mg/l or	ppmCaCO ₃
HCO ₃	mg/l or	ppmCaCO ₃	SiO ₂	mg/l or	ppmCaCO ₃	Temp C Flow rate, m ³ /h (this train)	T.O.C. Flow rate, m ³ /h (total system)	

System description (each train):

Number of trains in system:

BED-Number	1	2	3	4	5	6
Resin Bed Diameter (mm)						
Depth of Resin in Bed (mm)						
Resin Type						
Regenerant Used						
Regenerate Dosage						
g/l						
at %						
Regeneration Mode						
Co-Current						
Counter Current						
Regenerant Temp C						
Run Length (m ³)						

If problem(s), please describe effect(s) on plant performance:

- Short Cycle Length
- Poor Water Quality:
 - High Sodium
 - High Silica
- Long Rinse Down
- High Pressure Drop
- Other:
- pH Problem:
 - High
 - Low
- After SBA
- After MB's

Did the problem appear:

- Slowly
- Suddenly

Any other comments:

DOWEX™ Ion Exchange Resins

Resin Sampling Procedure

The purpose of this device is to obtain a representative sample of a resin bed from the top of the bed to the bottom with minimum equipment expense.

Step No. 1

Build the device as shown. It is important that the lower stopper be rounded or it will not seat properly. A rubber ball may be substituted in place of the stopper, but its diameter must be larger than the pipe's.

Other Required Equipment:

- 2-3 gallon (-10 liter) clean plastic bucket
- 1 quart (-1 liter) plastic sample jars
- Plastic storage bags for secondary leak containment

Step No. 2

Open access to the resin vessel. This is a good time also to measure the resin depth and inspect the upper distributors. It is not always necessary to remove the manway. If there is a nozzle larger than 2 inches (5 cm), it can be used for this procedure.

Step No. 3

Drain the excess water in the vessel to resin level. Make sure that no free acid or caustic is present. If necessary, rinse the resin to ensure the resins are at neutral pH.

Step No. 4

Allow the lower stopper to extend 6 inches (15 cm) from the bottom of the P.V.C. pipe. Use the upper stopper to hold the string in this position.

Step No. 5

Using a slow up and down motion, insert the device into the resin bed slowly. This must be done slowly to allow the resin level to equalize in the pipe. Inserting the device too fast will give you a sample of only the bottom portion of the bed.

Step No. 6

When the device hits bottom, pull it back 2-3 inches (5-8 cm) and pull the string to seat the lower stopper. Pushing down on the pipe will aid in seating the stopper. Stretch the string tight and insert the upper stopper to hold it.

Step No. 7

Remove the device from the bed and lower the bottom end of the pipe to a person on the floor. Remove the upper stopper. Remove the lower stopper and allow the resin to discharge into the bucket.

Step No. 8

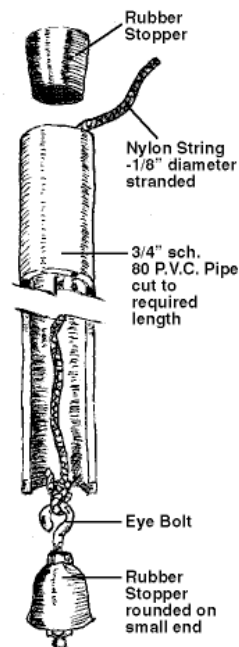
Pour deionized water in the top of the pipe to rinse the resin out of the pipe. Repeat the procedure as many times as required to obtain 1 quart (-1 liter) of resin. Pour collected resin into 1 quart (-1 liter) plastic sample bottles. Seal the sample bottles with tape and place in plastic storage bags for secondary leak containment prior to packaging.

Step No. 9

Proper labeling is essential. If resins are to be shipped for testing, label the bottle with company name, plant name, contact name and phone number, resin name, and bed identification and number. Also indicate whether the sample is regenerated or exhausted.

Step No. 10

Send the resin samples to your resin testing supplier. Remember to include system information as well as which tests should be performed on the resin. For questions about Dow's resin testing services, please contact your Dow representative and ask about DIRECTOR Services.



WARNING: The resin will come out with a lot of force in some cases. Use caution and wear eye protection.

DOWEX™ Ion Exchange Resins

Shipping Instructions Form

This shipping information is provided for your convenience as part of DIRECTORSM services. It contains instructions for sampling, labeling and mailing ion exchange resin samples for analysis.

Dow Water & Process Solutions offers ion exchange resin testing services to its customers for a nominal fee. Ion exchange resins can be tested to determine suitability for continued operation or to troubleshoot problems in your resin system. In addition to test results, you will receive a complete report with a description of the test performed and the implications of the test results on your operation.

Sampling and shipping procedures

In order to obtain representative results, all resin sent for testing should be taken from a core sample from the resin bed. The core samples should be shipped in one-liter (one quart) plastic bottles placed in plastic bags for secondary leak containment. **MAKE SURE THE SAMPLES DO NOT CONTAIN FREE CAUSTIC OR ACID AND THAT NO GLASS CONTAINER IS USED.** The solutions should be at neutral pH for safe shipping.

Labeling is critical. Bottles should be labeled as shown in the example below.

Resin Name	
Resin Type	
Vessel / Line Number	
Resin sampled after regeneration	Yes - No
Date of sample taken	

Warning for handling ion exchange resin:

- Avoid contact with eye
- In case of contact, rinse with plenty of water and seek medical advice
- Resins in regenerated form may leach acid or basic solution when in contact with water
- Wash hands after sampling
- Ship resin in neutral solution
- Ship in plastic bottle

Contact names and addresses, purchase order number and sample descriptions (given on the Analysis Request Form) must be completed before testing will be initiated. Any technical information you can provide on this Form is important so that test results can be properly interpreted. A standard analysis and report will be available within four weeks of Dow receiving the resin sample and documentation.

Notice: Oxidizing agents such as nitric acid attack organic ion exchange resins under certain conditions. This could lead to anything from slight resin degradation to a violent exothermic reaction (explosion). Before using strong oxidizing agents, consult sources knowledgeable in handling such materials.

Notice: No freedom from any patent owned by Seller or others is to be inferred. Because use conditions and applicable laws may differ from one location to another and may change with time, Customer is responsible for determining whether products and the information in this document are appropriate for Customer's use and for ensuring that Customer's workplace and disposal practices are in compliance with applicable laws and other governmental enactments. Seller assumes no obligation or liability for the information in this document. **NO WARRANTIES ARE GIVEN; ALL IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ARE EXPRESSLY EXCLUDED.**

