



August 22, 2005

Randy Leathers  
Culligan Of The Piedmont

Phone: 864-295-9500  
E-mail: randy@waterprofessionals.com

RE: Resin Analyses

Dear Randy:

This letter is in reference to the nine resin samples we received from you. Comparisons are made with ResinTech® equivalents.

#### **Cation Exchange Resin**

Cation #1-5 chemical and physical properties are degraded, cation #5 being the worst.

#### **Anion Exchange Resin**

Anion #1-4 have good capacities but the physical properties show signs of degradation.

#### **Recommendations**

Cation #1-4 still have some useful life, a thorough backwashing is recommended. Cation #5 is most damaged and should be replaced immediately.

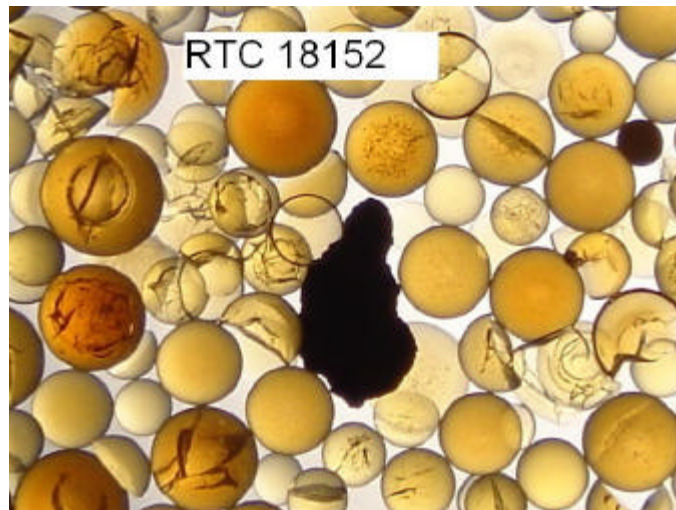
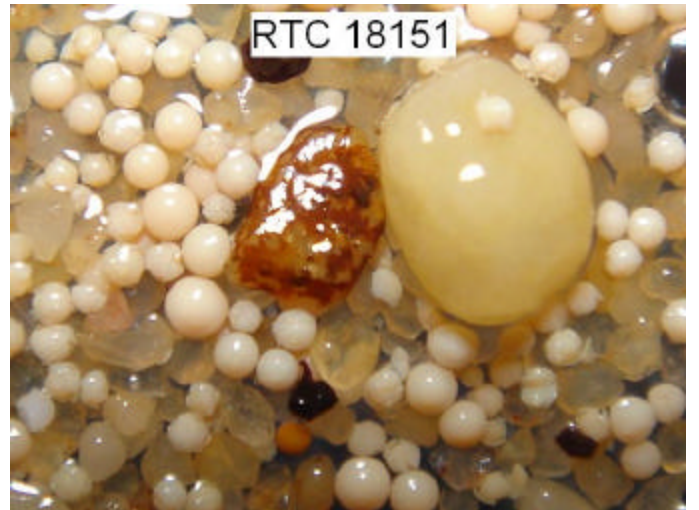
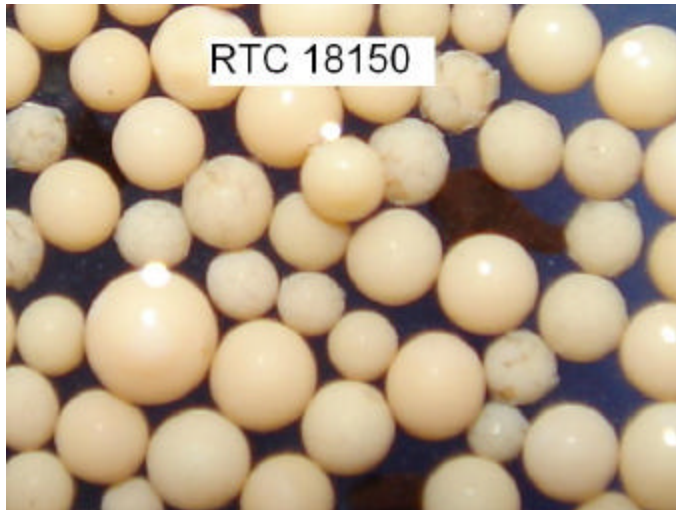
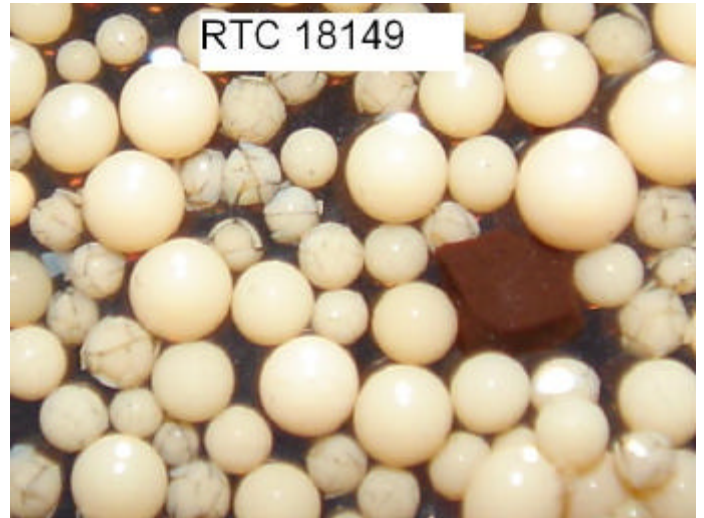
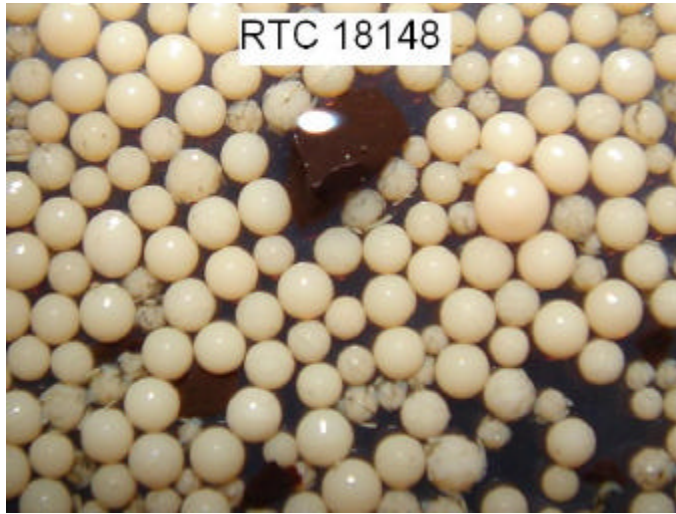
Anion #1-4 have some useful life but a thorough backwashing is recommended.

We are available for any further assistance with your ion exchange applications including troubleshooting, review of regeneration procedures or new resin recommendations.

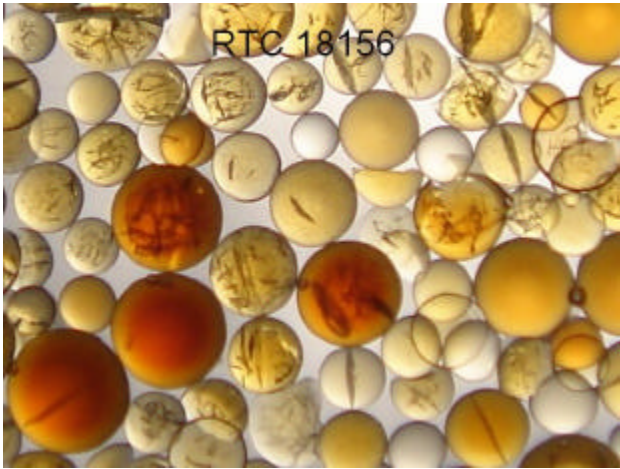
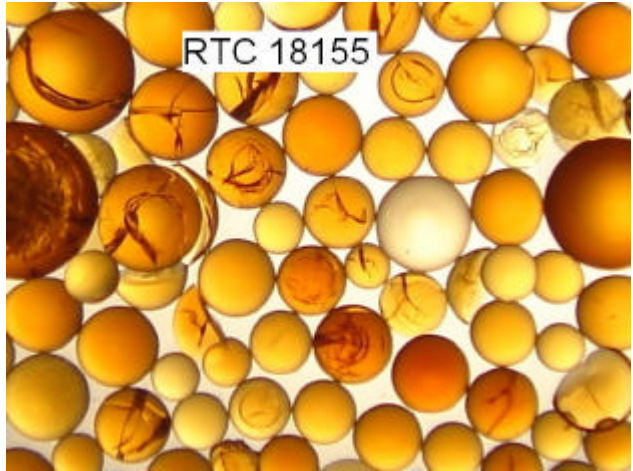
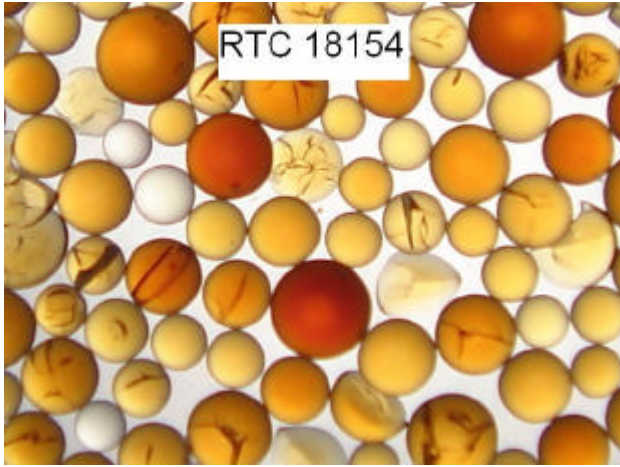
If you have any questions or need additional information, please call your local ResinTech® technical representative, Phil Adams at 678-461-8830.

Sincerely yours,

Robert Rittershausen  
Director of Analytical Services









1 ResinTech Plaza, 160 Cooper Rd.  
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# RESIN ANALYSIS

**Customer:** Culligan (Piedmont)  
**Date:** 08/15/05

|                                |                  |                  |
|--------------------------------|------------------|------------------|
| <b>Sample Designation</b>      |                  |                  |
| <b>Sample Identifier</b>       | <b>Anion #1</b>  | <b>Anion #2</b>  |
| <b>ResinTech Equivalent</b>    | <b>WBMP</b>      | <b>WBMP</b>      |
| <b>Resintech Sample Number</b> | <b>RTC-18148</b> | <b>RTC-18149</b> |

| PARAMETER   | <i>(RESINTECH SPEC VALUE IS INCLUDED IN ITALICS BELOW TO THE RIGHT)</i> |             |             |             |
|---|---|-------------|-------------|-------------|
| <b>Total Capacity - Na or Cl Form</b><br>in meq/mL  | <b>1.45</b>   | <i>1.30</i> | <b>1.49</b> | <i>1.30</i> |
| <b>Salt Splitting Capacity</b><br>in meq/mL         | <b>0.48</b>   |             | <b>0.11</b> |             |
| <b>Treated Total Capacity</b><br>in meq/mL          |   | <i>1.30</i> |             | <i>1.30</i> |
| <b>Treated Salt Splitting Capacity</b><br>in meq/mL |   |             |             |             |

|   |              |                |              |                |
|---|--------------|----------------|--------------|----------------|
| <b>Chemical Moisture (%), Na or Cl Form</b> | <b>40.6%</b> | <i>51 - 58</i> | <b>40.4%</b> | <i>51 - 58</i> |
|---|--------------|----------------|--------------|----------------|

|   |             |  |             |  |
|---|-------------|--|-------------|--|
| <b>Effective Particle Size (mm)</b><br><i>(This is a visual estimation)</i> | <b>0.50</b> |  | <b>0.47</b> |  |
|---|-------------|--|-------------|--|

| <b>Bead integrity (percent)</b> |           |                 |           |                 |
|---------------------------------|-----------|-----------------|-----------|-----------------|
| Whole perfect                   | <b>87</b> | <i>Min. 90%</i> | <b>81</b> | <i>Min. 90%</i> |
| Whole cracked                   | <b>5</b>  | <i>Max. 10%</i> | <b>6</b>  | <i>Max. 10%</i> |
| Broken                          | <b>8</b>  | <i>Max. 5%</i>  | <b>13</b> | <i>Max. 5%</i>  |

| <b>COMMENTS</b>  |   |   |
|--|---|---|
|  | <p>Approximately 3% carbon beads are present.</p> <p>There was a slight orange throw when treated with caustic/brine.</p> <p>Resin is slightly dirty.</p> | <p>Approximately 3% carbon beads are present.</p> <p>There was a slight orange throw when treated with caustic/brine.</p> <p>Resin is slightly dirty.</p> |
| <b>NOTE: All capacity and moisture percentage values correspond to the sodium form for cation resins and to the chloride form for anion resins unless otherwise noted.</b> |   |   |



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# RESIN ANALYSIS

**Customer:** Culligan (Piedmont)  
**Date:** 08/15/05

|                                |                  |                  |
|--------------------------------|------------------|------------------|
| <b>Sample Designation</b>      |                  |                  |
| <b>Sample Identifier</b>       | <b>Anion #3</b>  | <b>Anion #4</b>  |
| <b>ResinTech Equivalent</b>    | <b>WBMP</b>      | <b>WBMP</b>      |
| <b>Resintech Sample Number</b> | <b>RTC-18150</b> | <b>RTC-18151</b> |

| PARAMETER   | <i>(RESINTECH SPEC VALUE IS INCLUDED IN ITALICS BELOW TO THE RIGHT)</i> |             |             |             |
|---|---|-------------|-------------|-------------|
| <b>Total Capacity - Na or Cl Form</b><br>in meq/mL  | <b>1.45</b>   | <i>1.30</i> | <b>1.44</b> | <i>1.30</i> |
| <b>Salt Splitting Capacity</b><br>in meq/mL         | <b>0.19</b>   |             | <b>0.16</b> |             |
| <b>Treated Total Capacity</b><br>in meq/mL          |   | <i>1.30</i> |             | <i>1.30</i> |
| <b>Treated Salt Splitting Capacity</b><br>in meq/mL |   |             |             |             |

|   |              |                |              |                |
|---|--------------|----------------|--------------|----------------|
| <b>Chemical Moisture (%), Na or Cl Form</b> | <b>40.6%</b> | <i>51 - 58</i> | <b>41.2%</b> | <i>51 - 58</i> |
|---|--------------|----------------|--------------|----------------|

|   |             |  |             |  |
|---|-------------|--|-------------|--|
| <b>Effective Particle Size (mm)</b><br><i>(This is a visual estimation)</i> | <b>0.61</b> |  | <b>0.39</b> |  |
|---|-------------|--|-------------|--|

| Bead integrity (percent) |           |                 |           |                 |
|--------------------------|-----------|-----------------|-----------|-----------------|
| Whole perfect            | <b>94</b> | <i>Min. 90%</i> | <b>10</b> | <i>Min. 90%</i> |
| Whole cracked            | <b>3</b>  | <i>Max. 10%</i> | <b>86</b> | <i>Max. 10%</i> |
| Broken                   | <b>3</b>  | <i>Max. 5%</i>  | <b>2</b>  | <i>Max. 5%</i>  |

|  |   |  |
|--|---|--|
| <b>COMMENTS</b>  | <p>There was a slight orange throw when treated with caustic/brine.</p> <p>Approximately 4% carbon beads are present.</p> | <p>There was a slight orange throw when treated with caustic/brine.</p> <p>Approximately 2% carbon beads are present.</p> <p>Tiny beads.</p> |
| <b>NOTE: All capacity and moisture percentage values correspond to the sodium form for cation resins and to the chloride form for anion resins unless otherwise noted.</b> |   |  |



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# RESIN ANALYSIS

**Customer:** Culligan (Piedmont)  
**Date:** 08/15/05

|                                |                  |                  |
|--------------------------------|------------------|------------------|
| <b>Sample Designation</b>      |                  |                  |
| <b>Sample Identifier</b>       | <b>Cation #1</b> | <b>Cation #2</b> |
| <b>ResinTech Equivalent</b>    | <b>CG8</b>       | <b>CG8</b>       |
| <b>Resintech Sample Number</b> | <b>RTC-18152</b> | <b>RTC-18153</b> |

| PARAMETER   | <i>(RESINTECH SPEC VALUE IS INCLUDED IN ITALICS BELOW TO THE RIGHT)</i> |             |             |             |
|---|---|-------------|-------------|-------------|
| <b>Total Capacity - Na or Cl Form</b><br>in meq/mL  | <b>1.85</b>   | <i>1.90</i> | <b>1.91</b> | <i>1.90</i> |
| <b>Salt Splitting Capacity</b><br>in meq/mL         |   | <i>1.90</i> |             | <i>1.90</i> |
| <b>Treated Total Capacity</b><br>in meq/mL          |   | <i>1.90</i> |             | <i>1.90</i> |
| <b>Treated Salt Splitting Capacity</b><br>in meq/mL |   | <i>1.90</i> |             | <i>1.90</i> |

|   |              |                |              |                |
|---|--------------|----------------|--------------|----------------|
| <b>Chemical Moisture (%), Na or Cl Form</b> | <b>51.2%</b> | <i>40 - 47</i> | <b>49.5%</b> | <i>40 - 47</i> |
|---|--------------|----------------|--------------|----------------|

|   |             |  |             |  |
|---|-------------|--|-------------|--|
| <b>Effective Particle Size (mm)</b><br><i>(This is a visual estimation)</i> | <b>0.53</b> |  | <b>0.61</b> |  |
|---|-------------|--|-------------|--|

| <b>Bead integrity (percent)</b> |           |                 |           |                 |
|---------------------------------|-----------|-----------------|-----------|-----------------|
| Whole perfect                   | <b>73</b> | <i>Min. 85%</i> | <b>79</b> | <i>Min. 85%</i> |
| Whole cracked                   | <b>13</b> | <i>Max. 15%</i> | <b>14</b> | <i>Max. 15%</i> |
| Broken                          | <b>14</b> | <i>Max. 7%</i>  | <b>7</b>  | <i>Max. 7%</i>  |

|  |  |  |
|--|--|--|
| <b>COMMENTS</b>  |  |  |
| <i>NOTE: All capacity and moisture percentage values correspond to the sodium form for cation resins and to the chloride form for anion resins unless otherwise noted.</i> |  |  |



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# RESIN ANALYSIS

**Customer:** Culligan (Piedmont)  
**Date:** 08/15/05

|                                |                  |                  |
|--------------------------------|------------------|------------------|
| <b>Sample Designation</b>      |                  |                  |
| <b>Sample Identifier</b>       | <b>Cation #3</b> | <b>Cation #4</b> |
| <b>ResinTech Equivalent</b>    | <b>CG8</b>       | <b>CG8</b>       |
| <b>Resintech Sample Number</b> | <b>RTC-18154</b> | <b>RTC-18155</b> |

| PARAMETER   | <i>(RESINTECH SPEC VALUE IS INCLUDED IN ITALICS BELOW TO THE RIGHT)</i> |             |             |             |
|---|---|-------------|-------------|-------------|
| <b>Total Capacity - Na or Cl Form</b><br>in meq/mL  | <b>1.98</b>   | <i>1.90</i> | <b>1.98</b> | <i>1.90</i> |
| <b>Salt Splitting Capacity</b><br>in meq/mL         |   | <i>1.90</i> |             | <i>1.90</i> |
| <b>Treated Total Capacity</b><br>in meq/mL          |   | <i>1.90</i> |             | <i>1.90</i> |
| <b>Treated Salt Splitting Capacity</b><br>in meq/mL |   | <i>1.90</i> |             | <i>1.90</i> |

|   |              |                |              |                |
|---|--------------|----------------|--------------|----------------|
| <b>Chemical Moisture (%), Na or Cl Form</b> | <b>47.0%</b> | <i>40 - 47</i> | <b>47.0%</b> | <i>40 - 47</i> |
|---|--------------|----------------|--------------|----------------|

|   |             |  |             |  |
|---|-------------|--|-------------|--|
| <b>Effective Particle Size (mm)</b><br><i>(This is a visual estimation)</i> | <b>0.53</b> |  | <b>0.53</b> |  |
|---|-------------|--|-------------|--|

| Bead integrity (percent) |           |                 |           |                 |
|--------------------------|-----------|-----------------|-----------|-----------------|
| Whole perfect            | <b>78</b> | <i>Min. 85%</i> | <b>84</b> | <i>Min. 85%</i> |
| Whole cracked            | <b>14</b> | <i>Max. 15%</i> | <b>7</b>  | <i>Max. 15%</i> |
| Broken                   | <b>8</b>  | <i>Max. 7%</i>  | <b>9</b>  | <i>Max. 7%</i>  |

|  |  |  |
|--|--|--|
| <b>COMMENTS</b>  |  |  |
| <i>NOTE: All capacity and moisture percentage values correspond to the sodium form for cation resins and to the chloride form for anion resins unless otherwise noted.</i> |  |  |



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# RESIN ANALYSIS

**Customer:** Culligan (Piedmont)  
**Date:** 08/15/05

|                                |                  |  |
|--------------------------------|------------------|--|
| <b>Sample Designation</b>      |                  |  |
| <b>Sample Identifier</b>       | <b>Cation #5</b> |  |
| <b>ResinTech Equivalent</b>    | <b>CG8</b>       |  |
| <b>Resintech Sample Number</b> | <b>RTC-18156</b> |  |

| PARAMETER   | <i>(RESINTECH SPEC VALUE IS INCLUDED IN ITALICS BELOW TO THE RIGHT)</i> |             |  |
|---|---|-------------|--|
| <b>Total Capacity - Na or Cl Form</b><br>in meq/mL  | <b>1.75</b>   | <i>1.90</i> |  |
| <b>Salt Splitting Capacity</b><br>in meq/mL         |   | <i>1.90</i> |  |
| <b>Treated Total Capacity</b><br>in meq/mL          |   | <i>1.90</i> |  |
| <b>Treated Salt Splitting Capacity</b><br>in meq/mL |   | <i>1.90</i> |  |

|   |              |                |  |
|---|--------------|----------------|--|
| <b>Chemical Moisture (%), Na or Cl Form</b> | <b>54.0%</b> | <i>40 - 47</i> |  |
|---|--------------|----------------|--|

|   |             |  |  |
|---|-------------|--|--|
| <b>Effective Particle Size (mm)</b><br><i>(This is a visual estimation)</i> | <b>0.53</b> |  |  |
|---|-------------|--|--|

| <b>Bead integrity (percent)</b> |           |                 |  |
|---------------------------------|-----------|-----------------|--|
| Whole perfect                   | <b>71</b> | <i>Min. 85%</i> |  |
| Whole cracked                   | <b>18</b> | <i>Max. 15%</i> |  |
| Broken                          | <b>11</b> | <i>Max. 7%</i>  |  |

|  |  |  |
|--|--|--|
| <b>COMMENTS</b>  |  |  |
| <i>NOTE: All capacity and moisture percentage values correspond to the sodium form for cation resins and to the chloride form for anion resins unless otherwise noted.</i> |  |  |