Proper nutrition is essential for growing top quality geraniums. Sampling the root substrate for pH and electrical conductivity (EC) with the PourThru extraction method is a quick and simple check of the nutritional status of the crop and can provide immediate clues about a crop’s performance before deficiency or toxicity symptoms appear.

Geraniums make a large contribution to the net profit of many greenhouse operations and should be included in a PourThru monitoring program. Geraniums are particularly sensitive to low pH, which can result in iron and/or manganese toxicity causing lower leaf chlorosis and necrosis.

In contrast, a pH above 6.8 can lead to micronutrient deficiency problems, especially with iron which causes upper leaf chlorosis. Both excessively low and high pH’s should be avoided. Routine PourThru sampling will enable growers to detect unfavorable trends before nutritional problems occur. Figure 1 provides pH and EC ranges for geraniums at various developmental stages. Charts for recording pH and EC values are also provided.
Figure 1. Suggested PourThru substrate pH and EC ranges for zonal geraniums grown in soilless substrate. These values are guidelines and adjustments should be made based on your growing practices.

<table>
<thead>
<tr>
<th>Category</th>
<th>Growth Stage</th>
<th>pH Range</th>
<th>EC Range (mS/cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geraniums (Zonal)</td>
<td>All Stages</td>
<td>3.5 3.6 3.7 3.8 3.9 4.0 4.1 4.2 4.3 4.4 4.5 4.6 4.7 4.8 4.9 5.0 5.1 5.2 5.3 5.4 5.5 5.6 5.7 5.8 5.9 6.0 6.1 6.2 6.3 6.4 6.5 6.6 6.7 6.8 6.9 7.0 7.1 7.2 7.3 7.4 7.5 7.6</td>
<td>0.5 0.6 0.7 0.8 0.9 1.0 1.1 1.2 1.3 1.4 1.5 1.6 1.7 1.8 1.9 2.0 2.1 2.2 2.3 2.4 2.5 2.6 2.7 2.8 2.9 3.0 3.1 3.2 3.3 3.4 3.5 3.6 3.7 3.8 3.9 4.0 4.1 4.2 4.3 4.4 4.5 4.6</td>
</tr>
</tbody>
</table>

**Interpretation Key**
- **Target Range** (Optimal pH or EC range)
- **Management Decision Range** (If sampling results determine that the pH or EC levels are outside of the target range, then take corrective steps to move pH or EC back into the target range)
- **Danger Range** (If sampling results determine that the pH or EC levels are outside of the target range, then take IMMEDIATE corrective steps to move pH or EC back into the target range)
PourThru pH chart for geraniums.

Crop: Geranium (zonal)  Target pH Range: 6.0 to 6.6
Starting Date (week 0) ________  Upper pH Decision Range: 6.6 to 6.8
Ending Date ___________  Lower pH Decision Range: 5.8 to 6.0
PourThru EC chart for geraniums.

Crop: Geranium (zonal)  Target EC Range: 2.2 to 3.3 mS/cm
Starting Date (week 0)  Upper EC Decision Range: 3.3 to 3.5 mS/cm
Ending Date  Lower EC Decision Range: 2.0 to 2.2 mS/cm