### Reflectivity Diagram Calculations: Flat Bottom Holes (FBH)

#### Scenario 1: Table 1: Scenario 1 Calculations (Back Wall Echo Reference)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probe Diameter (mm)</td>
<td>$d_c$</td>
<td>24</td>
</tr>
<tr>
<td>Probe Frequency (MHz)</td>
<td>$f$</td>
<td>2</td>
</tr>
<tr>
<td>Materials Velocity (m/s)</td>
<td>$v$</td>
<td>5920</td>
</tr>
<tr>
<td>Reference Echo Type</td>
<td></td>
<td>BWE / Known Reflector (FBH)</td>
</tr>
<tr>
<td>Reference Reflector Diameter (mm)*</td>
<td>$s_{ref}$</td>
<td>N/A</td>
</tr>
<tr>
<td>Reference Reflector Beam Path (mm)</td>
<td>$d_{ref}$</td>
<td>500</td>
</tr>
<tr>
<td>Indication Beam Path (mm)</td>
<td>$d_{ind}$</td>
<td>300</td>
</tr>
<tr>
<td>Indication dB difference to reference</td>
<td>$G$</td>
<td>-18</td>
</tr>
</tbody>
</table>

#### Calculations:

- **Wavelength (mm)**  
  \[ \lambda = \frac{V}{f} \]  
  \[ 2.96 \]

- **Near Zone (mm)**  
  \[ N_c = \frac{d_c^2}{4\lambda} \]  
  \[ 49 \]

- **Reference Position Near Zones**  
  \[ D_{ref} = \frac{d_{ref}}{N_c} \]  
  \[ 10.3 \]

- **Indication Position Near Zones**  
  \[ D_{ind} = \frac{d_{ind}}{N_c} \]  
  \[ 6.2 \]

- **Reference Reflector Relative Size**  
  \[ S_{ind} = \frac{s_{ref}}{d_c} \]  
  \[ N/A \]

#### Plot Both Positions on Graph

- **Reference Position**  
  Reference x = 10.3, y = -16.5
- **Indication Position**  
  Indication x = 6.2, y = -34.5

#### Determine Indication Relative Size from Graph

- **$S_{ind}$**  
  \[ \text{Approx 0.25} \]

#### Calculate FBH Size

- **$d_f = S_{ind} \times d_c$**  
  \[ \text{Approx 6mm} \]

*Not applicable when using BWE as reference*