Acceptable
Photoresist
Outgassing

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### Updated Acceptable Outgassing Rate

#### Assumption

<table>
<thead>
<tr>
<th>Degree of Vacuum of PO</th>
<th>1X10⁻⁵ Pa for H₂O</th>
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<tbody>
<tr>
<td></td>
<td>1X10⁻⁷ Pa for CₓHᵧ</td>
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Resist Outgas/Residual Gas 1/20

### Updated Acceptable Rate for α-tool

<table>
<thead>
<tr>
<th></th>
<th>Outgassing Rate [molecules cm⁻² s⁻¹]</th>
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</thead>
<tbody>
<tr>
<td>H₂O</td>
<td>7X10¹⁴</td>
</tr>
<tr>
<td>CₓHᵧ (45 amu)</td>
<td>7X10¹²</td>
</tr>
</tbody>
</table>
Estimation of EUV intensity on wafer in production tool

Method-1: from the source power of 115 W@IF.
Total reflectivity loss by 12 multilayer mirror (R=68%) = 0.01
Reflectivity loss by mask (65%) = 0.65
Other loss (50%: not sure) = 0.5 → Total: 0.35%
EUV power leaching onto wafer is 0.4 W. If the exposure area is
assumed to be 0.5 cm², EUV intensity on wafer is 0.8 W/cm².

Method-2: from throughput of 100 WpH and resist sensitivity of 5 mJ/cm²
Exposure area = π x (15 cm)² x 80% (effective area ratio) = 565 cm²
Exposure time = 3600 s / 100 x 40% (overhead correction) = 14.4 s

Power = \( \frac{5 \text{ mJ/cm}^2}{14.4 \text{ s}} \times 565 \text{ cm}^2 = 0.2 \text{ W} \)

EUV intensity = 0.2 W / 0.5 cm² = 0.4 W/cm²

Though there are twice discrepancy, it is not so bad.

Temporary, we adopt 0.2 W for power and 0.4 W/cm² for intensity.

The estimation seems OK.
Recommended Measurement Condition

- In-situ and in real time measurement by RGA and pressure gauge is preferable.
- Two mass ranges: H2O (17,18 amu) and 45 amu
- Condition of resist-coated wafer must be unified if at all possible.
  - Time after coating
  - Storage atmosphere
  - Time after evacuation
  - Time before EUV irradiation
- Estimation of intensity dependency is also required.