“Safe” is defined in ISO Guide 51
- Freedom from risk which is not tolerable

**Concept of Tolerable Risk**

- Tolerable risks in Japan (Ministry of Economy, Trade and Industry [METI])
  1. Chemical factory: 1/100K [accident/year • site]
  2. Car: 1/10M [accident/year • unit]
  3. Home appliance: 1/100M [accident/year • unit] for every 1M units on the market

About 1 accident per 100 years
## A2L Refrigerant Risk Assessments & Current R32 Regulated Status

<table>
<thead>
<tr>
<th>Application</th>
<th>Cooling Capacity [kW]</th>
<th>Charge size [kg]</th>
<th>Ignition probability when used in room [No measures, Number/AC/year]</th>
<th>Risk during operation</th>
<th>Regulation</th>
<th>GWP ban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential</td>
<td>2.2~8</td>
<td>0.5~2</td>
<td>3.9 × 10^{-15} (residential room • No mechanical ventilation)</td>
<td>Acceptable (Need a measure for floor standing indoor unit)</td>
<td>No</td>
<td>GWP≤750 (2018)</td>
</tr>
<tr>
<td>Light commercial</td>
<td>3.6~28</td>
<td>3~19</td>
<td>4.2 × 10^{-12} (Office • No mechanical ventilation)</td>
<td>Acceptable (Need a measure for floor standing indoor unit and outdoor unit installed at narrow space)</td>
<td>No</td>
<td>GWP≤750 (2020)</td>
</tr>
<tr>
<td>VRF</td>
<td>More than above</td>
<td>More than above</td>
<td>7.6 × 10^{-13} (Office • No mechanical ventilation)</td>
<td>Acceptable (Need a measure for floor standing indoor unit and outdoor unit installed at narrow space)</td>
<td>Yes to No</td>
<td>Under consideration</td>
</tr>
<tr>
<td>Water source chiller</td>
<td>14~150</td>
<td>5~88</td>
<td>7.6 × 10^{-9} (Office • No ventilation during night time)</td>
<td>Need a measure (according to charge size, room size)</td>
<td>Relaxed</td>
<td>Under consideration</td>
</tr>
<tr>
<td></td>
<td>8~1400</td>
<td>1~7000</td>
<td>6.2 × 10^{-5} (Machine room/no ventilation)</td>
<td>Need a regulatory requirement (Upon equipment capacity)</td>
<td>Relaxed</td>
<td>Under consideration</td>
</tr>
</tbody>
</table>

R32 units have penetrated markets worldwide

- Daikin sold about **8 million units in 50 countries**
- About **20 million** R32 RAC units have been sold in the world
- More than **27 million tons of CO2 were reduced by R32**
  (Estimation as of Aug. 2016 by Daikin)

*1 In case of 1.3kg (including extra charging when installation) of refrigerant charge. Refrigerant charge volume reduction and improvement of Energy Efficiency derived from R32 use are not considered.

* Based on press release or catalog information