The HPDC alloy Silafont-38 was developed by RHEINFELDEN ALLOYS to further increase yield strength in compare to Silafont-36 without significant change in ductility.

Even with an air cooling to lower distortion the complex alloyed Silafont-38 reaches 180 MPa yield strength.

Besides these moderate cooling rates it is possible to cool down with water after the solutionizing treatment to achieve highest strength.

Additionally Silafont-38 has also following properties required for the pressure die casting process:

- excellent castability even with varying wall thicknesses
- no sticking to the die; the low-iron Silafont-38 is there for alloyed with manganese and strontium
- excellent machinability

In more and more applications, mainly in car manufacturing, other properties of Silafont-36 are of increasing importance:

- very good corrosion resistance due to specially balanced composition
- high fatigue strength and crash performance due to reduced effect of disturbing Fe and Si phases
- excellent weldability for aluminium profil-cast designs
- suitable for self-piercing riveting
**Areas of use**
Weight reduced car body structures for vehicles, mechanical engineering

**Distinguishing characteristics**
Casting alloy with very high mechanical properties after T6 treatment including a air queching for reduced distorsion. Very high yield strenght combined with high values of elongation for crash relevant structural die castings. Silafont-38 substitutes sheet designs in vehicle design and offers high cost and weight reduction.

**Alloy denomination**
Chemical denomination: AlSi9MnMgZn

**Chemical composition** [% of mass]

<table>
<thead>
<tr>
<th></th>
<th>Si</th>
<th>Fe</th>
<th>Cu</th>
<th>Mn</th>
<th>Mg</th>
<th>Zn</th>
<th>Ti</th>
<th>Sr</th>
<th>others</th>
</tr>
</thead>
<tbody>
<tr>
<td>min.</td>
<td>8.0</td>
<td>0.1</td>
<td>0.5</td>
<td>0.1</td>
<td>0.1</td>
<td></td>
<td></td>
<td>0.010</td>
<td></td>
</tr>
<tr>
<td>max.</td>
<td>10.0</td>
<td>0.15</td>
<td>0.4</td>
<td>0.8</td>
<td>0.5</td>
<td>0.4</td>
<td>0.15</td>
<td>0.02</td>
<td>0.10</td>
</tr>
</tbody>
</table>

**Mechanical properties**

<table>
<thead>
<tr>
<th>Casting method</th>
<th>Treatment state</th>
<th>Quenching cooling</th>
<th>YTS $R_{p0.2}$ (MPa)</th>
<th>UTS $R_m$ (MPa)</th>
<th>Elongation $A$ [%]</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPDC</td>
<td>F</td>
<td></td>
<td>140 – 160</td>
<td>270 – 300</td>
<td>3 – 7</td>
</tr>
<tr>
<td>HPDC</td>
<td>T6</td>
<td>Water</td>
<td>230 – 270</td>
<td>300 – 345</td>
<td>6 – 9</td>
</tr>
<tr>
<td>HPDC</td>
<td>T6</td>
<td>Air</td>
<td>180 – 200</td>
<td>250 – 275</td>
<td>8 – 10</td>
</tr>
</tbody>
</table>

**Note chapter “Technical Information”!**

**Processing properties compared to standard pressure die casting alloys**

<table>
<thead>
<tr>
<th>Alloy type</th>
<th>Silafont-38</th>
<th>Silafont-36</th>
<th>Silafont-09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sticking tendency</td>
<td>low</td>
<td>low</td>
<td>low</td>
</tr>
<tr>
<td>Die life</td>
<td>100 %</td>
<td>100 %</td>
<td>100 %</td>
</tr>
<tr>
<td>Linear shrinkage</td>
<td>0.4 – 0.6 %</td>
<td>0.4 – 0.6 %</td>
<td>0.4 – 0.6 %</td>
</tr>
</tbody>
</table>

![Graph showing stress strain curve for different temper conditions](image)

**Temper F**
$R_{p0.2} = 147$ MPa
$R_m = 290$ MPa
$A = 5.5 %$

**Temper T6 Water**
$R_{p0.2} = 272$ MPa
$R_m = 344$ MPa
$A = 6 %$

**Temper T6 Air**
$R_{p0.2} = 185$ MPa
$R_m = 278$ MPa
$A = 10 %$