# Pb-free solder paste for automotive
# GSP

GSP is a lead-free solder paste for automotive applications developing Toyota Motor Corporation, Denso corporation and Denso Ten Limited (formerly Fujitsu Ten Limited).

## ■ Solder paste classification

| Solder composition | SnPb | SAC305 | High durable | Low melting point |
|---|---|---|---|---|
| Powder size | Type4<br>(20－38μm) | Type5<br>(15－25μm) | Type6<br>(5-15μm) | Type7<br>(2-11μm) |
| IPC-Flux type | L0 | L1 | M0 | M1 |
| Reflow condition | Air | Nitrogen | | |

## ■ Features

- High surface insulation resistance reliability (over $1.0\times10^9\Omega$) from initial.
- Excellent prevention for cracks of flux residue (-40℃⇔125℃、2000cycles).
- Stable printability and solderability (wetting, void and solder ball) for continuous production.

## ■ Properties（representative value）

| | | Property（Representative value） | Note | |
|---|---|---|---|---|
| Product name | | GSP | – | |
| Alloy composition | | Sn-3.0Ag-0.5Cu | – | |
| Powder size | | 20-38μm(Type4) | IPC J-STD-005A | |
| Solidus temp. | | 217℃ | JIS Z 3198-1 | |
| Liquidus temp. | | 219℃ | | |
| Halide content | | 0.06% | JIS Z 3197 | – |
| Flux content | | 10.9% | | – |
| Copper corrosion | | No corrosion | | 40℃×90% 72h |
| Surface insulation resistance | | ＞$1\times10^9\Omega$ | | 85℃×85% 1,000h |
| Migration | | No migration | | Apply:50V Measure：100V |
| Dryness | | No tackiness（Flux residue） | | – |
| Viscosity property | Viscosity | 160Pa·s | JIS Z 3284-3 | |
| | Thixotropic index | 0.56 | | |
| Slump in printing | | <0.2mm gaps | | |
| Slump in heatin | | <0.2mm gaps | | |
| Tackiness | | ＞1.0N(0～24h) | | |
| Flux efficacy / De-wetting | | Class2 / No de-wetting | JIS Z 3284-4 | |
| Solder Ball | | Class2(0、24h) | | |
| Shelf life | | 6 months | Storage(0～10℃) | |

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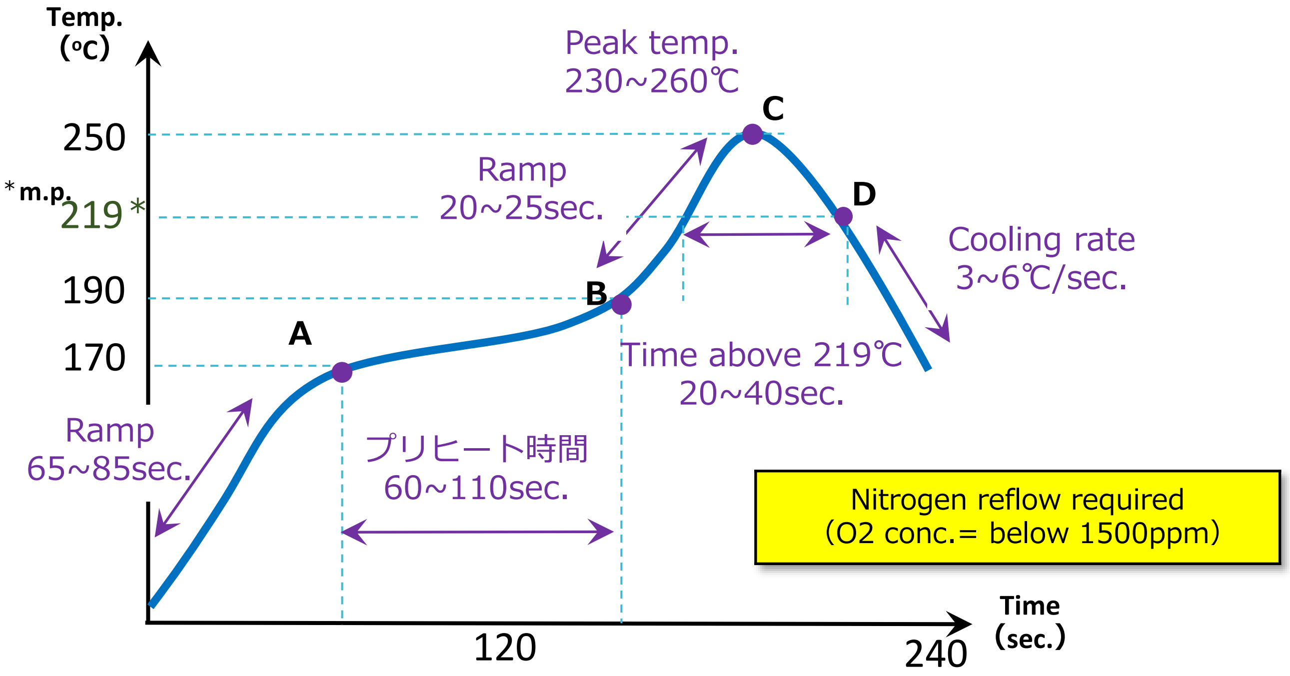
HARIMA

## ■ Recommended reflow profile



Nitrogen reflow required
(O2 conc.= below 1500ppm)

## ■ Precautions for handling

**(1) Storage conditions**

1) Store between 0 and 10℃.
2) Avoid exposing to direct sunlight.
3) Confirm the lid is closed firmly before storage.

**(2) Cautions for handling**

1) Avoid the handling of solder paste other than operator.
2) Wear appropriate gloves and glasses to use solder paste.
3) Wipe off solder paste with ethanol when it adheres to your skin.
4) Wash hands well after handling solder paste.
5) Set up a ventilation system at the handling place.

**(3) Usage Instructions**

1) Do not open the container until solder paste reaches to room temperature.
   * Solder paste quality will be deteriorated due to water condensation if you open the lid before getting to room temperature.
   *Avoid rapid heating, such as using heater.
2) Stir solder paste well before using.
3) Do not use solder paste with any other kind of solder paste or solvent.
4) Avoid using used solder paste mixed with fresh solder paste.
5) Recommended conditions for usage: temperature 22 to 28 ℃ and humidity 50% RH.