FC 5000 Halide Free No-Clean Cored Flux

INTRODUCTION

Asahi FC5000 Solder Wire

Over the last two decades, the size of the electronic assemblies and components has been reduced dramatically. As such, the reliability of the solder joints became a paramount importance towards the overall performance of the operating system.

To satisfy these requirements, ***FC5000 cored flux solder wire is thus developed!***

FC5000 cored flux solder wire is formulated using high purity chemicals together with halide-free materials. This results in a non-corrosive, colourless and transparent residue which exhibits excellent electrical and thermal insulation properties. FC5000 complies with Standard DIN 8511, Type F-SW32 and is highly recommended for use in the No-Clean environment, thus cutting down the process cost.

FC5000 is available in several alloys such as Sn63/Pb37, Sn60/Pb40 and Sn62/Pb36/Ag2.

Any other alloys can be manufactured to your required specifications.

PRODUCT SPECIFICATIONS

FC5000 Halide Free No-Clean Cored Flux Solder Wire was tested in Asahi Laboratory under stringent conditions:

Specifications	**Data**	**Test Standard**
Flux Content	2.0 ± 0.2% by weight	Asahi
Density of Cored Flux @ 25°C	0.866	Asahi
Silver Chromate Test	No Halide Found	ANSI/J-STD 004
Water Extract Resistivity	$1x10^4$ Ω-cm & above	JIS Z 3197
Surface Insulation Resistance (Raw Flux)	$1x10^{12}$Ω & above	ANSI/J-STD 004 (196 Hr)
Electromigration SIR (Raw Flux)	$1x10^{10}$Ω & above	ANSI/J-STD 004 (500 Hr)
Spread Factor	>90.0%	ANSI/J-STD 006
Copper Mirror Test	Pass	ANSI/J-STD 004
Spattering Test	0.06%	ANSI/J-STD 006
Residue Appearance	Transparent & Minimal	Asahi
Flux Residue Dryness	Dry	ANSI/J-STD 006 JIS Z3197

TEST ANALYSIS

Various tests were conducted to evaluate the performance and reliability of FC5000 solder wire so that customers can

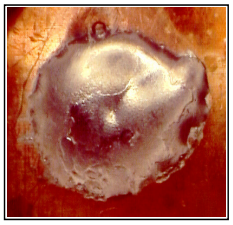
SPREAD TEST

The purpose of this test is to measure the spread capability of the FC5000 cored flux.

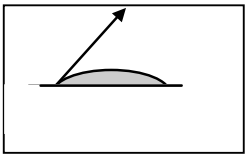
Test Method :

(i) Maintain hot plate temperature at 250°C.
(ii) Place a preform (∅3mm) on a copper coupon.
(iii) Place one drop of flux in the centre of preform
(iv) Place the coupon on hot plate.
(v) Measure rate of spread with the formula below :

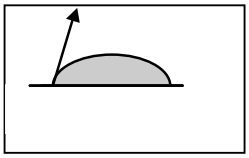
Rate of Spread = (D-H)/D x 100%
where D = $1.24 \times V^{1/3}$
V = Mass / Specific Gravity
H = Height of Spread Solder



Spreading Capacity



FC5000
Low Wetting Angle,
Less Solder Used



Wire X and Y
High Wetting Angle,
More Solder Used

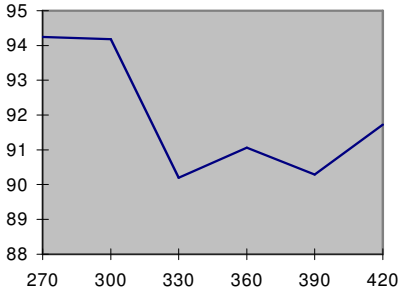
EFFECT OF TEMPERATURE ON SPREADING

FC5000 could be used for various temperature ranges according to your process application.

The test below shows that FC5000 has good spread rate in various temperature ranges.

Test Method :

(i) Set hot plate temperature at 270°C.
(ii) Place a perform (∅3mm) of FC5000 wire on a copper coupon.
(iii) Place the coupon on hot place for 15 secs.
(iv) Repeat for 300°C, 330°C, 360°C, 390°C and 420°C, respectively.
(iv) Measure rate of spread with the formula above.



Rate of Spread Vs Temperature

Temperature	270	300	330	360	390	420
Rate of Spread %	94.25	94.18	90.19	91.07	90.28	91.73

COPPER MIRROR TEST

This test is to check on the corrosivity of the cored flux and to categorise the type of flux used.

Copper Mirror Test

Test Method :

(i) Place one drop of the cored flux on the copper mirror panel.
(ii) Place copper mirror panel at 23 ± 2°C and 50 ± 5%RH for 24 hrs.
(iii) Remove cored flux by immersion in clean 2-propanol.
(iv) Examine copper mirror panel for copper removal or discoloration.

Results :

This confirm that FC5000 belongs to the RMA type of flux.

SPATTERING TEST

Spattering of flux is critical in No-Clean process, especially in the denser boards.

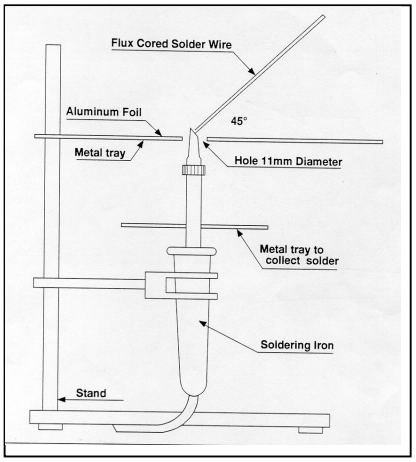
FC5000 has been tested to have minimal spattering by IPC specification.

Test Method :

(i) Measure 100mm of FC5000. Cut into 50mm lengths for convenient handling.
(ii) Apply the solder sample to a soldering iron tip placed at 45°.
(iii) Calculate the percent spattered flux with the following formula :

$$\text{Spattered flux } \% = P_2\text{-}P_1/F \times (W_1\text{-}W_2)$$

where P_1 = Wt of Aluminium Foil
P_2 = Wt of Aluminium Foil with Spattered Flux
F = Cored Flux Content
W_1 = Wt of Wire Sample
W_2 = Wt of Unmelted Wire Sample



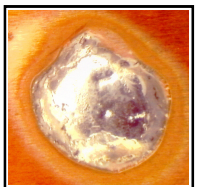
Spattering Test

Results :

The results show FC5000 solder wire to have minimal spattering of flux during soldering.
The amount of flux splatter was calculated to be 0.06%

RESIDUE APPEARANCE

FC5000 gives a transparent and minimal residue after soldering. Thus, it is very suitable for boards where aesthetic look is important. The pictures on the right show the residue appearance of FC5000, Wire X and Y.



FC5000

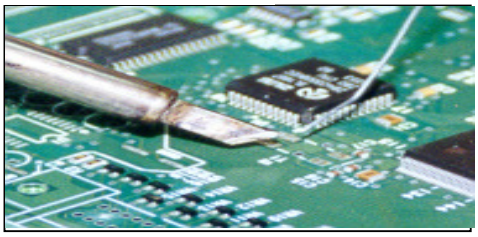
Test Method :

(i) Maintain hot plate at 250°C.
(ii) Place FC5000 on a copper coupon.
(iii) Place copper coupon on hot plate for 15 secs.
(iii) Observe the residue after soldering.

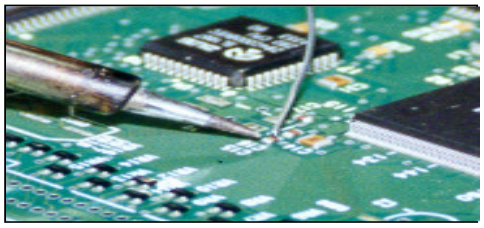
Wire X

Wire Y

APPLICATIONS



Brush Soldering



Point Soldering

FC5000 solder wire is easy to use for automatic, manual or rework soldering.
For the best soldering results, the recommended parameters for various diameters of wires are shown:

Solder Iron Tips: All Types
Soldering Temp: 270 – 350°C
Soldering Time: 1 –3 secs

- Keep solder iron tips clean.
- Tinned iron tips before use.
- Wear gloves when soldering to avoid contaminating the wire.

PACKAGING

FC5000 solder wire is commonly available in various diameters such as 0.5, 0.6, 0.8, 1.0, 1.2, 1.6 and 2.0 mm. For different diameters, please specify your requirements.

Packaging	0.25kg	0.50kg	2.0kg
Diameter	0.5 to 2.0	0.5 to 2.0	0.8 to 2.0

RESIDUE REMOVAL

Since the residues are transparent, minimal, dry, non-tacky and practically inert after soldering, removal is usually not necessary. For assemblies that require cleaning, FC5000 can be completely removed by any solvent type flux cleaner available in the market.

POST FLUX

Hasaconi "AHF" or "ANX" series post soldering fluxes are recommended for applications where mass soldering such as wave soldering must be used.

SAFETY

Wear a chemical mask if the operators are allergic to the fumes released during soldering. For more information, please refer to Material Safety Data Sheet.

STORAGE

Store the solder wire in a cool, dry environment. Wrap up the solder wire when not in use to reduce exposure to environment. FC5000 solder wire can be kept for 2 years if proper storage conditions are observed.

CERTIFIED TO JIS Z3282/QQ-S-571E CERTIFIED ODS FREE 97-0029 BY SISIR
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