



FC 5005 Halide Free No-Clean Cored Flux

INTRODUCTION

Over the last two decades, the electronics industry has been experiencing a rapid growth due to increasing use of electronic products in our daily life. The primary trend in these products design is miniaturization. Products such cellular phones, personal computers and camcorders, are lighter, smaller, less expensive and at the same time, faster, more powerful, reliable, user-friendly and functional.

Such advances in electronics has allowed for the development of *Asahi FC5005 Cored Flux Solder Wire*.



Asahi FC5005 Solder Wire

Using high purity chemicals and halide-free materials, FC5005 gives a non-corrosive, minimal clear yellow-tinted residue which exhibits excellent electrical and thermal insulation properties. FC5005 is highly recommended for use in the No-Clean environment, thus eliminating the cost of cleaning. FC5005 cored flux solder wire is available in several alloys such as Sn63/Pb37, Sn60/Pb40 and Sn62/Pb36/Ag2. For other types of solder alloys using FC5005 cored flux, Asahi is capable of producing to meet your requirements.

PRODUCT SPECIFICATIONS

FC5005 Halide Free No-Clean Cored Flux Solder Wire was tested in Asahi Laboratory under stringent conditions:

Specifications	Data	Test Standard
Flux Content	2.0 ± 0.3% by weight	JIS-Z-3197
Silver Chromate Test	No Halide Found	ANSI/J-STD 004
Water Extract Resistivity	1x10 ⁴ Ω-cm and above	JIS-Z-3197
Surface Insulation Resistance (Raw Flux)	1x10 ¹² Ω and above	ANSI/J-STD 004 (196 Hr)
Electromigration SIR (Raw Flux)	1x10 ¹⁰ Ω and 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	0.07%	ANSI/J-STD 006
Residue Appearance	Clear Tint Yellow & Minimal	Visual
Flux Residue Dryness	Dry	ANSI/J-STD 006 JIS Z3197

TEST ANALYSIS

Various tests were conducted to evaluate the performance and reliability of FC5005 solder wire.

These tests are to assure the customers that the core flux contains activating agents that are effective in cleaning surfaces and yet, the flux residue minimal, electrically inert and non-corrosive.

SPREAD TEST

The purpose of this test is to measure the capability of the FC5005 core flux to spread.

Test Method :

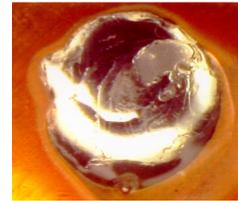
- (i) Prepare solder preform of 3 mm in diameter.
- (ii) Place one drop of the core flux in centre of perform on a copper coupon.
- (iii) Place the coupon on a hot plate set at 250°C.
- (iv) Perform five replicates.
- (v) Measure rate of spread with the formula below :

$$\text{Rate of Spread} = (D-H)/D \times 100\%$$

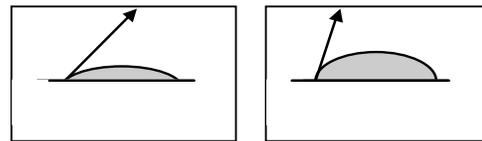
where D = $1.24 \times V^{1/3}$

V = Mass / Specific Gravity

H = Height of Spread Solder



Spreading Capacity



FC5005
Low Wetting Angle,
Less Solder Used

Wire X and Y
High Wetting Angle,
More Solder Used

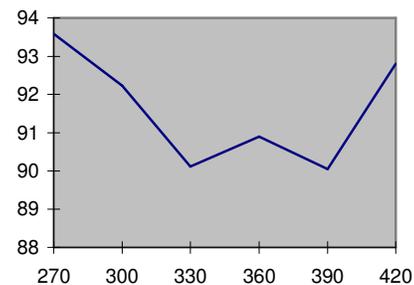
EFFECT OF TEMPERATURE ON SPREADING

FC5005 could be used for various temperature ranges according to your process application.

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

Test Method :

- (i) Prepare solder preform of 3 mm in diameter from FC5005 solder wire.
- (ii) Place the preform on a copper coupon and solder at 270°C on a hot plate.
- (iii) Repeat at 300°C, 330°C, 360°C, 390°C and 420°C.
- (v) Measure rate of spread with the formula above.



Rate of Spread Vs Temperature

Temperature	270	300	330	360	390	420
Rate of Spread %	93.58	92.23	90.11	90.90	90.05	92.80

COPPER MIRROR TEST

The purpose of the test is to check on the corrosivity of the core flux and to categorise the type of flux used.

Test Method :

- (i) Place one drop of the core flux on the copper mirror test panel.
- (ii) Place the copper mirror test panel at $23 \pm 2^{\circ}\text{C}$ and $50 \pm 5\% \text{RH}$ for 24 hrs.
- (iii) Remove the core flux by immersion in clean 2-propanol.
- (iv) Observe the panel for possible copper removal or discoloration.

Results :

The test indicates the core flux conforms to Type RMA of federal specification QQ-S-571.

SPATTERING TEST

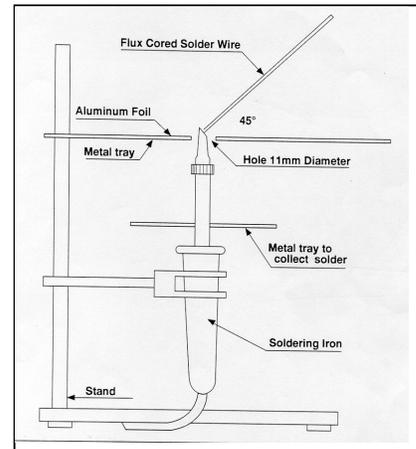
Spattering of flux is not desirable in No-Clean process, especially on denser assemblies.

FC5005 has been tested to have minimal spattering according to 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:

$$\begin{aligned} \text{Spattered flux \%} &= \frac{P_2 - P_1}{F} \times (W_1 - W_2) \\ \text{where } P_1 &= \text{Wt of Aluminium Foil} \\ P_2 &= \text{Wt of Aluminium Foil with Spattered Flux} \\ F &= \text{Cored Flux Content} \\ W_1 &= \text{Wt of Wire Sample} \\ W_2 &= \text{Wt of Unmelted Wire Sample} \end{aligned}$$



Spattering Test

Results :

The results show solder wire FC5005 to have minimal spattering of flux during soldering. The amount of flux splatter was calculated to be 0.07%

RESIDUE APPEARANCE

FC5005 gives a minimal, clear yellow tinted residue after soldering. Thus, it is very suitable for productions whether aesthetic look is important. The pictures below showed the residue appearances of FC505, Wire X and Y.

Test Method :

- (i) Maintain hot plate temperature at 250°C .
- (ii) Place performs of FC5005, Wire X and Wire Y on copper coupons.
- (iii) Remove copper coupons from hot plates and observe.



FC5005

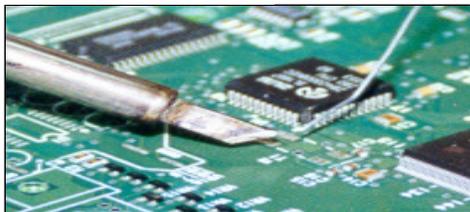


Wire X

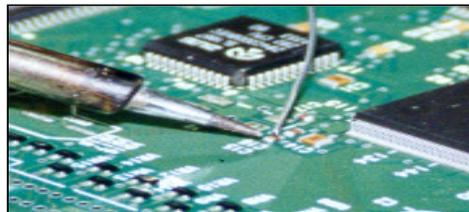


Wire Y

APPLICATIONS



Brush Soldering



Point Soldering

The effective and fast spreading action of FC5005 solder wire is suitable for automatic, manual or rework soldering.

The following parameters for various diameters of wires are recommended to achieve best soldering results:

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

FC5005 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 minimal, dry, non-tacky and practically inert after soldering, removal is usually not required. If cleaning is necessary for appearance and utility reasons, FC5005 can be completely removed with 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 generated during soldering. For more information, please refer to Material Safety Data Sheet.

STORAGE

Store the solder wire in a cool and dry environment. Wrap up the solder wire when not in use to reduce exposure to environment. FC5005 solder wire can be kept for 2 years if proper storage condition is observed.



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