Fusion Paste Division
ISO 9001:2000 Certified

Paste Brazing & Soldering Alloys

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ISO 9001:2000 Certified
The Fusion Paste Process

Applicators
Unlike soldering or brazing alloys in other forms, Fusion Paste Alloys permit single-step application of filler metal and flux to the assembly. The paste alloy itself is stored in a pressurized reservoir, generally sized to meet production requirements for a full 8-hour shift. Fusion positive-displacement applicators may be built into high-speed production equipment for fully automatic assembly, or hand held for semi-automatic processing.

Heating
Heating may be accomplished by most conventional methods, including open flame, atmospheric or non-atmospheric furnace, infra-red, resistance or induction. At specified temperature, the liquid flux is released from the paste alloy, cleaning the joint area for maximum bond reliability. The atomized filler metal then liquifies and flows onto the newly-cleaned area, cooling to form a structurally sound brazed or soldering joint.

Total Responsibility
Among the numerous benefits of Fusion Paste Brazing and Soldering are elimination of pre-fluxing, more precise measurement of filler metal and flux, reduced costs via automation of manual steps, and more consistent joint quality through elimination of human error. In addition, Fusion’s “Total Responsibility” approach ensures a coordinated effort in the manufacture of paste alloys, applicators, and equipment, plus expert system installation and service follow-up. (Request Bulletin T-101 for information on Fusion Automatic Brazing & Soldering Machines.)

Paste Alloys
Custom blended to meet your requirements, each Fusion Paste Brazing or Soldering Alloy contains the following basic components:

- Finely atomized filler metal, alloyed to exacting standards for composition, melting range, and compatibility with base metals to be joined. In general, Fusion alloys conform to all accepted industry standards.
- Fluxing agent, designed to remove and prevent reformation of surface oxides during heating. Type and amount are carefully matched to the individual application, ensuring consistent, dependable joints with minimal flux residue.
- Paste-like binder, which holds flux and filler metal in stable suspension; prevents metal-flux interaction. Controlled formulation ensures consistent application and keeps paste alloy localized in the joint area.

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Selecting a Paste Brazing or Soldering Flux

Base Metals
Base metal oxides vary in regard to rate of formation and tenacity. The flux selected must be capable of removing the oxides from the base metals and keep them oxide-free during heating, when oxidation accelerates.

In soldering, some metals such as aluminum, chrome, and zinc have very tenacious oxides. Oxide removal is frequently marginal on these metals even with the use of highly corrosive, acid fluxes. To successfully solder such metals, plating the surface with easily soldered materials is sometimes desirable. Brazing of metals with tenacious oxides is often performed in a pure hydrogen or vacuum controlled atmosphere.

Residue Removal
Soldering fluxes are classified by the corrosive properties of their post-soldering residue. The three major flux categories are Non-corrosive, Intermediate, and Corrosive. Non-corrosive fluxes should be selected for applications where residue removal is impossible. Active constituents may be added to these non-corrosive fluxes for stronger fluxing action, provided they do not promote corrosion after soldering. Depending on the corrosive nature of the service environment, the residue of Intermediate fluxes may or may not have to be removed. If the soldered assembly is to function under normal atmospheric conditions, it is advisable to remove the intermediate flux residue, since water vapor and oxygen will accelerate corrosion. Corrosive fluxes should be used only when the soldering flux residue can be removed. If left on, the joint, the residue will eventually attack the solder and the base metals. Most brazing flux residues are active in nature and should be removed.

Active Fluxing Temperatures
In both brazing and soldering, the flux must be active at the liquidus temperature of the filler metal. If it is not active at this temperature, oxides will re-form and prevent a metal-to-metal bond. Active fluxing temperature range is dependent upon time and temperature. A slower heating rate increases the possibility of burning out the flux before reaching the melting temperature of the filler metal.

Joint Configuration
Individual flux-binder combinations affect the flow characteristics of paste brazing or soldering alloys. When brazing or soldering assemblies that require the filler metal to flow a considerable distance, a free-flowing flux-binder combination should be selected. Conversely, if the paste is applied to a joint with a narrow shoulder or a vertical surface, a sluggish flux-binder combination is required to stay in place until just below the liquidus temperature of the filler metal. Since the paste flow is also a function of the filler metal, fluxes are selected which augment the flow characteristics of the particular filler metal.

Base Metal/Filler Metal Interaction
The degree of metallurgical interaction at the grain boundaries is a direct function of time at melting temperature. Depending upon the specific application, a high degree of metallurgical interaction between base metal and filler metal may either be desirable or undesirable. Therefore, the degree of interaction wanted should be established in advance. The two most important factors in determining base metal/filler metal interaction are heating time and filler metal melting temperature. The more rapid the heating cycle, and the lower the melting temperature of the filler metal, the less interaction occurs. The degree of interaction affects the mechanical and physical properties of the base metals as well as the joint.

Service Requirements
The filler metal selected must conform to application specifications regarding strength, both at room temperature and, if necessary, elevated or subzero temperatures. The corrosion resistance properties of the filler metal may also be important if the assembly will be subjected to moist or humid operating conditions.

Joint Configuration
The desired distance that the molten filler metal will have to flow is an important factor in filler metal selection. Since the flow properties of filler metals differ, one must be selected that will move completely around or through the joint. These flow properties are important because paste filler metals are usually dispensed at only one point on the joint, and capillary attraction is relied on to equally distribute the filler metal throughout the joint. When brazing or soldering an unusually long or irregularly configured joint, for example, a filler metal with narrow melting range should be selected because of its free-flowing properties.

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Non-corrosive fluxes
Non-corrosive fluxes may or may not have to be removed. If left on, the residue will eventually attack the solder and the base metals. Most brazing flux residues are active in nature and should be removed.

Intermediate fluxes
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Corrosive fluxes
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Corrosive fluxes
Corrosive fluxes should be used only when the soldering flux residue can be removed. If left on, the joint, the residue will eventually attack the solder and the base metals. Most brazing flux residues are active in nature and should be removed.
Non-Corrosive Fluxes
Fluxes are classified as “Non-Corrosive” when their residue after soldering will not corrode and eventually destroy the joint if allowed to remain. Generally incorporating a rosin base, these fluxes contain mild organic acids which are neutral at room temperature but become slightly acidic upon heating. Neutral, rosin fluxes are particularly useful in electrical applications, where their non-conductive, non-corrosive residue may be safely left on the assemblies.

For applications where flux residue cannot be removed, but surface oxides require stronger fluxing action, special additives may be included to produce an “Activated Rosin” flux. The active constituents are designed to decompose at soldering temperatures, yielding a neutral flux residue. Standard non-corrosive fluxes for Fusion Paste Solder Alloys are as follows:

GPR General purpose electronics grade (RMA) formula with average restrictivity and excellent shelf-life. Hand, slightly opaque residue is non-corrosive and non-conductive, making residue removal optional.

WPG Mildly activated rosin flux, formulated specifically for electrical applications due to non-corrosive, almost colorless residue. Restrictive binder localizes paste deposit both before and after soldering. Best suited for lower temperature filler metals. (See fluxing range, page 7).

LPT A rosin flux similar to LPS with the capacity to be paired with higher temperature alloys.

MBC A very mildly activated rosin with characteristics similar to LPT and increased spread.

Intermediate Fluxes
These fluxes usually consist of mild organic salts, with considerably stronger fluxing action than non-corrosive types. Residue after soldering is normally not harmful to the soldered joint. However, residue should be removed whenever possible, as moisture in the atmosphere may initiate corrosion. Standard intermediate fluxes for Fusion Paste Solder Alloys are as follows:

WC Mild halide flux with excellent fluxing properties. At soldering temperatures, a reaction takes place which tends to neutralize the flux residue. May be used on joints with a narrow shoulder.

PMS Mild halide flux with excellent fluxing properties. At soldering temperatures, a reaction takes place which tends to neutralize the flux residue. Provides minimum slump during heating until the alloy melts.

PA Restrictive, activated flux which stays in place well on vertical or narrow-shouldered joints. At soldering temperatures, a reaction takes place which tends to neutralize the flux residue. Provides minimum slump during heating until the alloy melts.

SMH Strong, inorganic flux with activity similar to SSE. Exhibits minimal out-gassing when heated. Recommended where unusually large paste deposits are used. Especially useful in long heating cycles (e.g. ovens).

WCE Active halide flux, suitable for use on most steel, stainless steel, and plated surfaces. Strong fluxing action produces extremely reliable soldered joints. Restrictive nature permits use on both vertical and narrow-shoulder joints.

Corrosive Fluxes
Most corrosive fluxes contain active inorganic acids and salts. Due to their increased strength and ability to quickly remove surface oxides, these fluxes are ideally suited to high-speed, automated soldering operations. Although corrosive fluxes generally produce the most reliable soldered joints, their residue after soldering must be removed, or it will eventually attack and destroy the joint. Standard corrosive fluxes for Fusion Paste Solder Alloys are as follows:

WCE Active halide flux, suitable for use on most steel, stainless steel, and plated surfaces. Strong fluxing action produces extremely reliable soldered joints. Restrictive nature permits use on both vertical and narrow-shoulder joints.
### Tin/Lead Paste

Tin/lead filler metals have good wetting and flow properties and can be used with non-corrosive, intermediate, and corrosive fluxes. The filler metals high in lead content are not as free flowing as the filler metals with a higher percentage of tin.

### Tin/Antimony Paste

Pastes containing these filler metals retain good strength characteristics at elevated temperatures. Since their solidus temperature is considerably higher than tin/lead alloys, they are frequently specified for applications where high service temperatures will be experienced.

### Tin/Silver Paste

Pastes containing these metals also exhibit better strength than the standard tin/lead series. Although slightly higher in cost, they are exceptionally free flowing and offer excellent electrical conductivity. The absence of lead makes these pastes suitable for use in food-handling vessels where lead is prohibited.

### Tin/Lead/Silver Paste

Often selected for use on silver-plated surfaces in the electronics industry. The presence of silver in the alloy improves creep resistance and reduces the tendency to scavenge silver plating from base metals.

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**Fusion Paste Solder Filler Metals**

- By definition (see Glossary page 19), a soldering filler metal has a melting range generally below 840°F and always below that of the base metal to be joined. As shown in the chart on page 9, Fusion Paste Solder Alloys may be blended to meet specific requirements in performance and melting range. Following are the most commonly used combinations and their particular characteristics.

**Tin/Silver Paste**

- Tin/silver filler metal melts at 473°F, producing leak-free joints.

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**Fusion Paste Solder Filler Metals**

<table>
<thead>
<tr>
<th>Fusion Nominal Alloy Composition</th>
<th>Solidus</th>
<th>Liquidus</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>Sn</td>
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<tr>
<td>136</td>
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<td>—</td>
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<tr>
<td>450</td>
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<td>500</td>
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<td>—</td>
</tr>
<tr>
<td>505</td>
<td>95</td>
<td>—</td>
</tr>
</tbody>
</table>

Other alloys are available upon request.
Fusion Paste Brazing Fluxes

Fluxes for Paste Brazing Alloys have been formulated to complement automated operations where quick removal of surface oxides at high temperatures is required. Generally, brazing fluxes are highly corrosive, thus residue after brazing should be removed. Experience has shown that “standard” fluxes/fluxes are sometimes varied to meet a particular application; however, the following fluxes are most commonly used:

STL
Very active, free-flowing flux, for use on normal ferrous and non-ferrous base metals. Can also be used with such hard-tobrazes materials as cadmium-copper and nickel-chrome. Low-temperature fluoride compound results in excellent shelf life.

APW
Ideal for fast heat cycles, including induction, with minimum smoke generated. Use on steel, copper, and brass, yielding excellent post-brazing plating properties.

STN and STK
Restrictive, silver brazing flux for use where a prolonged heating cycle or maximum activity at high temperatures is required. Excellent for stainless steel, malleable iron, and other hard-to-brazes metals including carbids. Useful where brazing and heat treating operations are combined.

LHK
Fluxing properties similar to STL; some what more restrictive, although joint penetration remains excellent. For use with silver, copper/brass, and copper/zinc filler metals.

WSU
Very restrictive, low temperature flux that produces smooth, void-free joints. Withstands extreme temperatures and direct flame. Ideal for extended heat cycles, performs well under open flame, induction, or oven.

WSK
Like WSU, yet specially formulated for long-term stability when packaged in a syringe.

WSP
A very restrictive, low temperature flux often used on small parts or assemblies where application on a vertical surface is necessary. Recommended for use on copper, brass, and stainless steel base metals.

DMX
High-temperature, low fluoride flux with activity from 1100 to 1700°F. Very restrictive, works best when sand-wedged inside joint. Recommended for use on stainless steel and carbides.

BMW
Very high-temperature, borate flux with activity from 1600 to 1900°F. Used primarily on steel, brass and copper, with high-temperature filler metals such as brass, bronze, or nickel.

BMA
Same characteristics as BMW. Flux stays in place very well on vertical joints and surfaces where gravity assist is not favorable.
Fusion Silver Brazing Filler Metals (BAg)

By definition, a filler metal for brazing has a liquidus temperature greater than 840°F but lower than that of the base metal(s) being joined. Fusion paste brazing filler metals are classified on this and the following pages based on their primary metal content. Among the most widely used are silver-bearing paste, which may be used to braze most ferrous and non-ferrous base metals excluding aluminum, titanium, and magnesium.

Fusion offers a full line of controlled atmosphere brazing pastes for various base metals and filler metals. The filler pastes include copper and copper-based alloys, including copper-nickel-phosphorus-based systems, silver brazing alloys, and aluminum-based filler metals.

CCL
- Leaves minimal to no residue
- No hot or cold slump
- Non-sputtering
- Suitable for exovento atmospheres, H₂/N₂ atmospheres, and vacuum
- Compatible with wide range of metal concentrations
- Easily dispensed through “squeeze bottles”
- Adheres to part even after drying
- Ideal for vertical or “upside down” joints

CDW
- Similar to CBL with improved reduced stringiness and lesser hot/cold slump
- Cleaning properties with water better than CBL but not as water washable as EXO and CCL
- Adheres to part even after drying
- Leaves minimal to no residue
- Ideal for extremely low dew point hydrogen or vacuum atmosphere

CMT, CNPG, LW
- Suitable for either atmosphere or vacuum brazing
- Low ash value
- Leaves minimal to no residue when dew point (minimum 20°F or below) and high temperatures (180°F or above) are maintained

EXO
- Typically first choice for copper brazing in exovento atmospheres
- Minimal to no residue under broad range of part cleanliness and atmosphere conditions
- Not recommended for H₂/N₂ atmospheres
- No hot or cold slump
- Non-sputtering
- Compatible with wide range of metal concentrations
- Easily dispensed through “squeeze bottles”
- Adheres to part even after drying
- Water washable cleaning properties

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Furnace Brazing with Fusion Paste Alloys

Typical assemblies joined with Fusion copper brazing pastes.

- CBG, CBG, CFW
- Non-drying, neutral binders for atmosphere brazing
- Suction flow and slump properties permit use on most vertical joints
- Flow properties may be modified with additives, depending on the application

PnP
- Recommended where dew points are marginal and furnace temperatures are in the lower silver brazing range
- Not recommended for use on vertical joints due to pronounced slump in both hot and cold stages

CAP
- Suitable for use in H₂/N₂ and dissociated ammonia atmospheres with low dew points (0 to 30°F)
- Leaves no residue under these conditions
- Also suitable for use in vacuum furnaces

Fusion Furnace Paste Selection Guide

<table>
<thead>
<tr>
<th>Type of Atmosphere</th>
<th>Filler Metal</th>
<th>Base Metals Joined</th>
<th>Recommended Binders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exothermic and Endothermic Atmospheres</td>
<td>Copper (AWS Cu-1a)</td>
<td>Carbon Steels, Stainless Steels</td>
<td>EXO, CBL, CNPG, CAP, CBG, CDW</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carbon Steels, Stainless Steels</td>
<td>EXO</td>
</tr>
<tr>
<td>Hydrogen – Nitrogen Mixtures including Dissociated Ammonia and Pure Hydrogen</td>
<td>Copper (AWS Cu-1a)</td>
<td>Stainless Steels, Stainless Steels</td>
<td>CNPG, CDW, CBL, CAP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Stainless Steels, CDW</td>
<td></td>
</tr>
</tbody>
</table>

* The copper-based filler metals used for furnace brazing are frequently referred to as “low-temp” in the copper brazing field.
Fusion Specialty Brazing Filler Metals

In addition to the widely-used silver brazing alloys, specialized Fusion filler metals are available to meet specific requirements for brazing. Among these criteria are joint strength, service temperatures, economy, and compatibility with the metals being joined. Classified according to their primary metal content, Fusion specialty brazing alloys are explained below and summarized in the selector charts on page 15.

Nickel-Bearing Filler Metals (BNi)

Filler metals of this type are most commonly used for their resistance to heat and corrosion at elevated temperatures. Depending on the specific composition, nickel-bearing alloys are resistant to service temperatures up to 1800°F. Although best results are obtained by brazing in a reducing atmosphere or vacuum, other heating methods are occasionally used with the addition of an appropriate flux. Nickel-bearing filler metals are most commonly used to braze stainless steel (300 and 400 Series) and nickel and cobalt-based alloys.

Copper-Bearing Filler Metals (BCu, BCuP, RBCuZn)

Pure copper and copper-bearing brazing alloys exhibit excellent strength properties—with the strength of some pure copper joints approaching that of the base metal itself. Although high temperature, “pure” copper brazing mandates the use of vacuum or reducing atmosphere, other alloyed copper compositions are suitable for open-air brazing via most conventional heating methods. When copper is combined with zinc or tin (RBCuZn), melting temperature—and resistance to corrosion—are lowered substantially. The addition of copper oxide and/or iron oxide somewhat restricts filler metal flow, yielding improved filletting properties. When phosphorus or phosphorus and silver are added (BCuP), the resulting filler metal exhibits “self-fluxing” properties on copper base metals. These BCuP filler metals, however, should not be used on iron or nickel base metals due to the possibility of Phosphorus Embrittlement—a weakening condition caused by base metal/filler metal interactions.

Gold-Bearing Filler Metals (BAu)

Fusion pastes containing these filler metals are most often used for applications requiring high resistance to corrosion and oxidation. In addition, since these metals exhibit a very low rate of interaction with the base metal, they are often used to join assemblies having a relatively thin section. Iron, nickel, and cobalt base metals are among those which may be successfully brazed with gold-bearing filler metals. The higher-temperature gold filler metals are used almost exclusively in the aircraft industry to meet requirements for high service temperature combined with excellent resistance to corrosion and oxidation. Generally, brazing is done in a vacuum or reducing atmosphere, without the use of flux.

Gas/Oxygen torches melt copper/phosphorus filler metal at 1256°F, sealing capillary tube joints.
Fusion Aluminum Brazing Fluxes & Filler Metals

Fusion has several paste alloys for joining aluminum in open air, using conventional heating techniques and automated processes. Since the melting range of Fusion filler metals is very close to that of the base metals themselves, control of heat is most important. Both water washable and non-corrosive flux formulations permit joining of several commercially available aluminum base metals.

WATER WASHABLE

NDA Most potent fluxing action (contains halides) in this group. Affords the longest flux life for extended heating cycles. Flux residues are completely water washable. Pair with 1070, 1040, 1022, and A071 filler metals.

NPA Similar to NDA with milder, more controlled fluxing, which reduces base metal erosion and etching. Recommended for thin walled parts; water washable. Pair with 1070, 1040, 1022, and A071 filler metals.

NTA Similar to NDA with controlled fluxing and non-slumping characteristics. Creamy and smooth appearance due to fine mesh filler metals. Recommended for small diameter striping applications or any time paste must stay in place; water washable. Pair with 1070E, 1040E, 1022E, and A071E filler metals.

NON-CORROSIVE FLUXES

TNC Chloride-free flux that does not require post cleaning of the joint area. Flux residue has no detrimental effect on joint service life; not water washable. Pair with 1070, 1040, 1022, and A071 filler metals.

TNC Similar to TNC with higher temperature fluxing and reduced (visible) post brazing residue; not water washable. Pair with 1070 and 1040 filler metals.

KNC For use with lower melt point aluminum base metals like 6061 and 6262. Also suitable with 6063 and 3003 base metals; not water washable. Pair with 1040, 1022, and A071 filler metals.

GNC Similar to TNC; specially formulated to braze 5000 series aluminum and other magnesium-containing alloys. Also suitable for commonly used alloys; not water washable. Pair with 1070, 1040, 1022, and A071 filler metals.

Furnace Brazing Flux

FAB A non-corrosive formulation with reduced post-brazing residue. Pair with fine mesh 1070E, 1040E, 1022E, and A071E filler metals.

Non-Corrosive Fluxes

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TNC Similar to TNC with higher temperature fluxing and reduced (visible) post brazing residue; not water washable. Pair with 1070 and 1040 filler metals.

KNC For use with lower melt point aluminum base metals like 6061 and 6262. Also suitable with 6063 and 3003 base metals; not water washable. Pair with 1040, 1022, and A071 filler metals.

GNC Similar to TNC; specially formulated to braze 5000 series aluminum and other magnesium-containing alloys. Also suitable for commonly used alloys; not water washable. Pair with 1070, 1040, 1022, and A071 filler metals.

Furnace Brazing Flux

FAB A non-corrosive formulation with reduced post-brazing residue. Pair with fine mesh 1070E, 1040E, 1022E, and A071E filler metals.

Non-Corrosive, KNC-1040-400 aluminum paste deposited to tube/core joints.
Cleaning Brazed or Soldered Joints

**Cleaning** - A controlled brazing or soldering environment achieved by excluding oxygen and replacing it with one or a mixture of other gases. In production, this technique will minimize or eliminate the need for flux, as the atmosphere itself, combined with heat, acts to reduce existing surface oxides. Most often associated with furnace brazing.

**Brazing** - A joining process whereby a non-ferrous filler metal is heated to melting temperature (above 840°F) and distributed between two or more close-fitting parts by capillary attraction. At its liquidus temperature, the molten filler metal interacts with a thin layer of the base metal, cooling to form an exceptionally strong joint due to grain structure interaction.

**Soldering** - A joining process wherein a particular metal or metal alloy will remain in a completely molten state. Generally considered the melting point of a particular filler metal.

**Flux** - A material which, when heated, serves to remove and exclude surface oxides from the base metal. Brazing fluxes are generally of a highly corrosive nature. Solder fluxes may be classified into the following two groups:

- **Non-corrosive** - A rosin or mildly active organic acid used in wetting clean surfaces and producing a residue which is neither electrically conductive nor corrosive to the finished joint. Although such fluxes are active at elevated temperatures, they are inert at ambient temperature.
- **Corrosive** - Generally composed of strong organic or inorganic acids which promote high-speed cleaning of metals with strong surface oxides. Corrosive residue should be removed to prevent damage to the joint.

**Oxidation (Also, Surface Oxides)** - A chemical reaction promoted by oxygen and moisture in the air, wherein clean metal surfaces are covered with a metal oxide film which prevents proper wetting with soldering or brazing filler metal. Since oxidation accelerates during heating, the metal must not only be cleansed initially, but protected from oxidation during the joining process.

**Stump** - The relative tendency of a paste alloy to sag or flow away from a sloping or vertical joint. Largely a function of paste rheology, this may occur while the assembly is cold, or during heating before the paste alloy has reached its melting temperature.

**Pre-cleaning** - The process of removing contaminants from the joint area. Pre-cleaning methods may be divided into the following two categories:

- **Chemical** - Cleaning with solvents, acid or pickling baths compatible with the contaminates and the metals used. Such procedures should always be followed by thorough rinsing. Fusion offers the following pre-cleaner:
  - **Fuz-Clean AB** - An alkaline cleaner that removes heavy deposits of oil, grease, and soils from aluminium and brass surfaces.
  - **Fuz-Clean SS** - A rosin or mildly active organic acid used in wetting cleansurfaces and producing a residue which is neither electrically conductive nor corrosive to the finished joint. Although such fluxes are active at elevated temperatures, they are inert at ambient temperature.
  - **Activated Rosin Fluxes** - These hard, glass-like deposits are insoluble in many cleaners. They may be cracked off, however, by quenching the hot assembly in water immediately after brazing. A solution of dilute hydrochloric acid may also be helpful. Fusion offers an all-purpose brazing post-cleaner:
    - **Fuz-Clean FS** - Dissolves flux residues and heat scale on both ferrous and non-ferrous metals after brazing. It eliminates the use of strong acids and abrasive processes, besides removing rust, mill and heat scale directly on the production line. Use in an ultrasonic tank is recommended.
  - **Rosin Type Flux Residues** - Generally, these are non-corrosive and may be left on the part without damage to the joint area. If residue removal is desired, it may be removed using alcohols or chlorinated hydrocarbon solvents, or combinations of both families.
  - **Oily or Greasy Flux Residues** - Generally may be removed with an alkaline cleaner such as Fuz-Clean 5.

**Rosin or Mildly Active Organic Acid** - A material which, when heated, serves to remove and exclude surface oxides from the base metal. Brazing fluxes are generally of a highly corrosive nature. Solder fluxes may be classified into the following two groups:

- **Rosin or Mildly Active Organic Acid** - A material which, when heated, serves to remove and exclude surface oxides from the base metal. Brazing fluxes are generally of a highly corrosive nature. Solder fluxes may be classified into the following two groups:
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  - **Corrosive** - Generally composed of strong organic or inorganic acids which promote high-speed cleaning of metals with strong surface oxides. Corrosive residue should be removed to prevent damage to the joint.