# Multicore® Cored Solder Wire Flux 400, 502, 505 & 511

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## NO CLEAN, CLEAR RESIDUE CORED SOLDER WIRE FLUXES

Properties of Multicore 400, 502, 505 and 511 solid flux for cored solder wires

- Halide free version – Multicore 400
- Fast soldering – range of activities to suit all applications
- Good spread on copper, brass and nickel
- Clear residues
- Heat stable – low spitting

## PRODUCT RANGE

Multicore 400 is designed for users who require a halide free formulation. The remaining products in the range contain higher halide levels to maximise soldering power.

Multicore 400, 502, 505 and 511 cored wires are manufactured with a range of flux contents. Although users will normally be using products with a nominal flux content of 3%, the superior performance of these products may allow a lower flux content to be specified e.g 2.2%. This will further improve residue appearance by reducing the quantity.

For applications requiring low residue halide free fluxes, Multicore 400 is available at 1% flux content (formerly Multicore X-39).

Multicore 400, 502, 505 and 511 cored wires are available in a variety of alloys conforming to J-STD-006 and EN 29453 or alloys conforming to similar national or international standards. For details refer to document "Properties of Alloys used in Cored Solder Wires". A wide range of wire diameters is available.

Alternative flux contents and alloys may be manufactured to special order.

## TECHNICAL SPECIFICATION

A full description of test methods and detailed test results are available on request.

**Alloys**: The alloys used for Multicore cored solder wires conform to the purity requirements of the common national and international standards. A wide range of wire diameters is available manufactured to close dimensional tolerances. For details refer to document "Properties of Alloys used in Cored Solder Wires".

**Flux**: Multicore Multicore 400, 502, 505 and 511 solid fluxes are based on modified rosins and carefully selected activators. In use they exhibit a mild rosin odour and leave a small quantity of clear residue.

| FLUX PROPERTIES | | | | |
|---|---|---|---|---|
| **TEST** | **400** | **502** | **505** | **511** |
| Acid Value, mg KOH/g | 205-220 | 156-172 | 159-177 | 164-176 |
| Halide content, % | Zero | 0.2 | 0.5 | 1.1 |
| J-STD-004<br>Solder spread $mm^{-2}$<br>Corrosion Test | <br>210<br>Pass | <br>310<br>Pass | <br>315<br>Pass | <br>340<br>Pass |
| SIR Test (without cleaning)<br>IPC-SF-818 Class 3<br>Bellcore TR-NWT-000078 | <br>Pass<br>Pass | <br>Pass<br>Pass | <br>Pass<br>Pass | <br>Pass<br>Pass |
| Electromigration Test (without cleaning)<br>Bellcore TR-NWT-000078 | <br>Pass | <br>Pass | <br>Pass | <br>Pass |
| Classification<br>EN29454-1<br>J-STD-004<br>IPC-SF-818 | <br>1.1.3<br>ROLO<br>LR3CN | <br>1.1.2<br>ROM1<br>MR3CN | <br>1.1.2<br>ROM1<br>MR3CN | <br>1.1.2<br>ROM1<br>MR3CN |

## SPECIAL PROPERTIES

Multicore 400, 502, 505 and 511 cored solder wires are designed to give fast and sustained wetting on both copper and brass. This can be demonstrated using spreading tests on both substrates under standard conditions for the Multicore products and comparable competitor products. After 5 seconds, area of spread is measured to form a comparative index indicating total flux efficacy.

| RELATIVE WETTING PERFORMANCE OF MULTICORE AND HALIDE FREE COMPETITOR PRODUCTS* | | | |
|---|---|---|---|
| **PRODUCT** | **FLUX CONTENT (%)** | **AREA OF SPREAD, $mm^2$** | |
| | | **Oxidised copper*** | **Oxidised brass** |
| Multicore 400 | 2.2 | 222 | 209 |
| Competitor A | 3.5 | 191 | 140 |
| Competitor B | 2.5 | 202 | 140 |

*-oxidised for 1 hour @ 205°C

| RELATIVE WETTING PERFORMANCE OF MULTICORE AND COMPETITOR PRODUCTS* | | | | |
|---|---|---|---|---|
| **PRODUCT** | **FLUX CONTENT (%)** | **HALIDE CONTENT (%)** | **AREA OF SPREAD $mm^2$** | |
| | | | **Oxidised copper*** | **Oxidised brass** |
| Multicore 502 | 2.7 | 0.2 | 220 | 160 |
| Competitor E | 2 | 0.4 | 200 | 150 |
| Competitor F | 2.4 | 0.4 | 190 | 180 |
| Competitor G | 3.5 | 0.4 | 150 | 120 |
| Competitor H | 2.7 | 0.5 | 230 | 150 |
| Multicore 505 | 2.7 | 0.5 | 220 | 240 |

*-oxidised for 1 hour @ 205°C



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## RECOMMENDED OPERATING CONDITIONS

**Soldering iron:** Good results should be obtained using a range of tip temperatures. However, the optimum tip temperature and heat capacity required for a hand soldering process is a function of both soldering iron design and the nature of the task and care should be exercised to avoid unnecessarily high tip temperatures for excessive times. A high tip temperature will increase any tendency to flux spitting and it may produce some residue darkening.

The soldering iron tip should be properly tinned and this may be achieved using Multicore cored wire. Severely contaminated soldering iron tips should first be cleaned and pre-tinned using Multicore Tip Tinner/Cleaner TTC1, then wiped on a clean, damp sponge before re-tinning with Multicore cored wire.

**Soldering process:** Multicore cored wires contain a careful balance of resins and activators to provide clear residues, maximum activity and high residue reliability, without cleaning in most situations. To achieve the best results from Multicore solder wires, recommended working practices for hand soldering should be observed as follows:

- Apply the soldering iron tip to the work surface, ensuring that it simultaneously contacts the base material and the component termination to heat both surfaces adequately. This process should only take a fraction of a second.
- Apply Multicore flux cored solder wire to a part of the joint surface away from the soldering iron and allow to flow sufficiently to form a sound joint fillet – this should be virtually instantaneous. Do not apply excessive solder or heat to the joint as this may result in dull, gritty fillets and excessive or darkened flux residues.
- Remove solder wire from the work piece and then remove the iron tip.

The total process will be very rapid, depending upon thermal mass, tip temperature and configuration and the solderability of the surfaces to be joined.

Multicore flux cored solder wires provide fast soldering on copper and brass surfaces as well as solder coated materials. Activity of the halide activated versions on nickel is also good depending on the state of oxidation of the nickel finish. The good thermal stability of Multicore fluxes means they are also well suited in soldering applications requiring high melting temperature alloys.

**Cleaning:** Multicore 400, 502, 505 and 511flux cored solder wires have been formulated to leave pale flux residues and to resist spilling and fuming.

Cleaning will not be required in most situations but if necessary this is best achieved using Multicore MCF800 Cleaner (see separate technical data sheet). Other proprietary solvent or semi-aqueous processes may be suitable. Saponification may be viable but customers must ensure that the desired level of cleanliness can be achieved by their chosen system.

## GENERAL INFORMATION

**For safe handling information on this product, consult the Material Safety Data Sheet, (MSDS).**

**Note**

The data contained herein are furnished for information only and are believed to be reliable. We cannot assume responsibility for the results obtained by others over whose methods we have no control. It is the user's responsibility to determine suitability for the user's purpose of any production methods mentioned herein and to adopt such precautions as may be advisable for the protection of property and of persons against any hazards that may be involved in the handling and use thereof. In light of the foregoing, **Henkel Corporation specifically disclaims all warranties expressed or implied, including warranties of merchantability or fitness for a particular purpose, arising from sale or use of Henkel Corporation's products. Henkel Corporation specifically disclaims any liability for consequential or incidental damages of any kind, including lost profits.** The discussion herein of various processes or compositions is not to be interpreted as representation that they are free from domination of patents owned by others or as a license under any Henkel Corporation patents that may cover such processes or compositions. We recommend that each prospective user test his proposed application before repetitive use, using this data as a guide. This product may be covered by one or more United States or foreign patents or patent applications.

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