



## The Benefits of Designing with Antimicrobial Copper Alloys

The increasing threat from microorganisms, be it swine flu or hospital superbugs, is highlighting the role touch surfaces have in the transmission of infection and the role antimicrobial materials have to play in helping to curb the spread of disease.

Despite recommended protocols to wash hands and disinfect as a first line of defence against infections, 80% of infectious disease is transmitted by touch.

Copper has been proven to be a broad spectrum antimicrobial, effective against the headline-making organisms threatening public health today – MRSA, *E. coli*, *Influenza A* and *Clostridium difficile*.

Laboratory testing, clinical trial results and the stringent testing carried out to satisfy the US Environmental Protection Agency, provide a solid body of scientific evidence which has been peer reviewed and published.

Now designers and architects can consider how to harness this inherent property of copper to design out infection in critical environments such as hospitals and care homes, where touch surfaces can act as reservoirs for dangerous germs.

### Designing with Copper Alloys

Copper alloys are easy to work with and form into different shapes so designs can be readily realised. While copper is the active element with the antimicrobial effect, most touch surface applications require enhanced mechanical properties such as strength and wear resistance and these can be provided by one of the families of copper alloys.

Copper combines readily with a range of alloying elements to form brasses, bronzes, nickel silvers and copper nickels, each of these being generic terms for alloy families. Specific alloys are classified by EN material designations with defined compositional and property ranges.

The copper alloy system not only provides a range of antimicrobial materials with different combinations of mechanical properties suited to different end uses but also a palette of colours: from the rich reds of the high coppers through the warm golden-yellows of the brasses to the silvery-whites of the nickel silvers. These choices can help designers create a warmer, more soothing, healing environment.

The interior elements and products that could benefit from copper's antimicrobial properties include worktops, banister rails, lift interiors (particularly control panels), door handles and push plates, bathroom fittings such as taps, grab rails and even toilet seats. The antimicrobial properties are intrinsic to the metal so last the lifetime of the product, even if subject to knocking and scratching, and offer continuous protection against disease-causing germs. At end of life, products are 100% recyclable and so contribute towards sustainable design.

### Proper Use and Care

For copper alloys to retain their antimicrobial efficacy, their surfaces must not be oiled, painted, waxed, lacquered or coated in any way. Surfaces should be cleaned as per standard procedures. Any natural oxidation that occurs to these active surfaces under these circumstances does not impair their antimicrobial efficacy.



Often chosen for decorative interior design elements, copper alloys can also be used for functional touch surfaces to provide an additional line of defence to supplement standard infection control practices.

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### Alloy Selection

In laboratory tests carried out at the University of Southampton, a range of alloys with varying copper contents has been tested against a long list of pathogens, using stainless steel, the ubiquitous healthcare material, as a control. Results of these tests show that killing times are faster with higher copper contents (greater than 60%) and that organisms survive on stainless steel for hours and even days.

In the US, independent laboratory testing led to the registration in February 2008 of over 280 copper alloys which can kill 99.9% of specified bacteria, (including MRSA and *E.coli*) within 2 hours, even after repeated contamination with extraordinarily high challenges. Other than copper, no plastic, wood, aluminum, stainless steel, solid surface material or coating has received EPA registration as an antimicrobial material.

Designations, compositions and colours of some of the most commonly available antimicrobial copper alloys are given in the table below.

Alloy	Designation (EN)	Cu (%)	Zn (%)	Sn (%)	Ni (%)	P (%)
Copper	CW004A	99.9				
Phosphor Bronze	CW451K	95		5		0.2
70/30 Brass	CW505L	70	30			
Copper Nickel	CW352H	90			10	
Nickel Silver	CW409J	65	17		18	

### Further Information

Copper Development Association (CDA) is working with material suppliers to support designers and architects through the provision of **information**, including 'Hygienic Copper Touch Surfaces - Specifiers' Guide' via the website:

[www.copperinfo.co.uk/antimicrobial](http://www.copperinfo.co.uk/antimicrobial).

**Enquiries** on the use of antimicrobial copper alloys can be submitted to CDA via the online enquiry form:

[www.copperinfo.co.uk/enquiry-form.shtml](http://www.copperinfo.co.uk/enquiry-form.shtml).

To help specifiers appreciate the aesthetics of these remarkable materials CDA is offering architects and designers credit-card sized wallets of **sample alloys**. To request a free sample set, contact:

[helpline@copperdev.co.uk](mailto:helpline@copperdev.co.uk).

CDA produces an **online catalogue** of antimicrobial copper products. To view and find out how to submit your product visit:

[www.copperinfo.co.uk/antimicrobial/products](http://www.copperinfo.co.uk/antimicrobial/products).

The **Antimicrobial Copper Interest Group** has been formed for designers, architects, healthcare professionals, facilities managers, product manufacturers and material suppliers who wish to keep up with the latest developments and research on antimicrobial copper from around the world. The prime aims of the group are information dissemination and networking. To apply to join please email your expression of interest to:

[bryony.samuel@copperdev.co.uk](mailto:bryony.samuel@copperdev.co.uk)



*A hand contaminated with germs can infect the next 7 surfaces touched. Antimicrobial copper and copper alloy touch surfaces can help to break the chain of infection and reduce the risk of spreading disease in healthcare and other community facilities, including public and commercial buildings.*