

# Phoenix MB72

## Stage equipment UV decontamination unit



The Newell Phoenix MB72 is a UVC exposure chamber designed especially for stage and conference equipment.

Designed with the fast and efficient workflow of public events in mind the MB72 is intended to be a seamless part of the general process of shows, exhibitions, and conferences.

For far too many years the AV industry has been complacent with the hygiene of equipment used in close proximity to performers, public, and delegates, often no measures are taken to ensure equipment that was used in a tactile manner, or within the field of respiration was safe to use from a sanitary perspective. Where measures were taken they have been little more than a well-meaning, but ignorant token gesture. Measures such as spraying an item with a deodorant or alcohol, or wiping with an anti-bacterial wipe, often by untrained staff while well-meaning, are often worse than no measures at all. According to Stanford University studies *“Aqueous alcohol solutions are not appropriate for surface decontamination because of the evaporative nature of the solution; a contact time of ten minutes or more is necessary”* Thus in most cases passing an alcohol wipe over an item is simply cosmetic and ineffective.

With the current nature of viral pandemic we have taken some time to review all the options to us as an industry and in conjunction with local industry experts, Newell Acoustic Engineering have developed a solution taken from a proven, widely used, effective laboratory solution, and developed it into a tool tailored for our industry.

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The Phoenix MB72 is the first UV exposure unit custom designed for the technical equipment of the event industry. After in-depth studies into effective, and ineffective methods for the anti-bacterial, anti-viral cleaning of event equipment it was identified that a new purpose-built solution was needed. The MB72 was designed from zero in the period of three weeks by our technical experts to enable the struggling event industry to return to work. While it may be possible to re-purpose existing laboratory equipment it was found to be difficult to obtain in the current circumstances, and hopelessly impractical when dealing with the fast turnaround of event equipment the industry needs. Static laboratory equipment was far too fragile and unsuitable for the constant movement and transportation that the event industry needs. In any case there was no laboratory equipment with facility to receive event equipment in a manner that allows the equipment to be ideally presented for UVC exposure.

The Phoenix MB72 has a pair of high quality Philips 36 watt, 12 watt TUV 250nm UVC frequency light output sterilisation tubes designed for killing bacteria and virus particles in flowing air and water, the tubes have the power to sterilise passing air in ventilation systems and as such have more than adequate power to kill bacteria and virus matter in the chamber of the MB72. The MB72 has a calculated UVC chamber power of in excess of 10mW/cm<sup>2</sup> which is adequate to kill most known viruses within a few seconds of exposure. At the standard exposure time of two minutes the MB72 is in the order of many tens (if not hundreds) of times above the necessary dose to kill most virus and bacteria particles, this allows adequate headroom for the assumed existence of shadows between badly packed equipment and for the lower levels of light to penetrate the interstices common in much equipment.

The Phoenix MB72 is specifically designed to be safe, easy to use in a familiar manner by stage hands, and free from user error in most common situations. The MB72 has only one control, simply pressing the START button when the door has closed will initiate a sterilisation cycle on our in-house custom-programmed microprocessor controller, once the cycle has completed the unit will show a COMPLETE indicator and the material is safe to remove from the unit. If the cycle is disturbed by power failure, or door opening, the COMPLETE light will not illuminate, and the cycle must start again. ONLY if the COMPLETE light has illuminated will the contents be deemed to have been processed. An automation grade position limit switch protects users from light exposure if the door is opened. The protection switch directly kills all power to the electrical control system ensuring that in no circumstance could an electronics failure leave the user exposed to dangerous UVC rays. Operation can be verified by the presence of a blue RUNNING LED and additionally through a deep red UV filter window in the front door.



The Phoenix MB72 is made from touring grade 18mm arctic birch plywood, finished with a strong polymer finish that is commonly used on touring loudspeakers, this ensures that the unit is able to withstand the rigours of touring and is easy to renovate in a way familiar to production staff if it becomes cosmetically damaged. For robustness, the light tubes are supported along their lengths by a 4-point suspension system. As any form of protective cover would seriously degrade the UVC output (common glass and plastics absorb UVC rays) the tubes must be directly exposed to the chamber, the custom engineered 4 point suspension system helps protect the tubes from physical damage inside the chamber. All parts for the MB72 were custom designed in house and as bespoke custom hardware they are all made on our in-house 3D printer farm. This has enabled us to produce exactly the type of component we need, when we need it, and has enabled us to avoid inappropriate parts that could be a hiding place for contamination. Door hinges are external and the door locking mechanism has no mechanical moving parts all external parts are made from food-safe PETG, impact resistant UV stable plastic, Internal plastic parts are made from UV resistant ASA plastic often used in UV exposed automotive components. We took the polymer choice very seriously during development in order to ensure greatest durability while maintaining the best custom solution. Internal surfaces are designed from materials that best reflect and diffuse the UVC rays to ensure as few shadows as possible, a diffuse semi-matt aluminium sheet was chosen for such properties as commonly used stainless steel in laboratory equipment is 5x less effective at reflecting UVC than aluminium. All interior parts are self-sterilising and require no decontamination, only external parts and commonly touched door surfaces require disinfection periodically.

The Phoenix MB72, as a professional piece of equipment, is designed to be field serviceable, all electronics are commonly available items locally to wherever you are. Lamps are available from specialist retailers, and all mechanical moving parts are able to be replicated on any high quality 3D printing system (STL print files provided). This ensures that no matter where you may be, you can keep your MB72 running when up-time is not negotiable. Such is the system headroom that should one lamp be damaged the unit will still effectively function. It is ideally recommended that in the event of a lamp being broken the unit is operated for two cycles, and the tray rotated 180 degrees between the cycles just to be extra safe, but calculations show that even without that process there should be more than adequate margin of exposure to ensure that there is no risk in the event of operation with one lamp.

Operation of the Phoenix MB72 should only be carried out in conjunction with the published procedure chart, it is essential that correct asset management be observed at all times in order to avoid the risk of cross-contamination of objects or people. It must be remembered that all untreated items **MUST** be considered a biohazard and be treated with the correct respect regarding that status. All items existing the chamber after processing should be immediately placed in a sealed bag or container by a person wearing correct PPE to avoid re-contamination. This item should only be removed from its container when placed directly into use.

The Phoenix MB72 is designed with portable operation in mind, however there are important conditions to avoid. Keep the machine clean at all times and use in a clean environment. Do not get the MB72 wet. Do not

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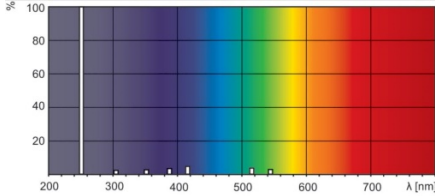


subject the MB72 to falls or impacts. To avoid excessive heat inside, use out of direct sunlight. Do not allow non-trained non-professional personnel to operate. Keep away from children. Do not put creatures inside. Do not put your dinner inside. Do not sit or stand on the MB72. Do not throw it at unruly performers.

It is critically important that the Phoenix MB72 be used as a part of your own fully audited procedures. Newell Acoustic Engineering Lda will take no responsibility for the overall effectiveness of your procedures, or whether in conjunction with specific items of equipment, the MB72 performs any specific measured degree of sterilisation or not. If in doubt you should get the specific item you wish to sterilise in conjunction with the MB72 tested with an accredited test facility which can test for whatever contamination you wish to protect against. While we have engineered the unit to exceed, *by a very far degree*, the normal sterilisation UVC dose, we cannot know the properties of every item to be used in the machine, and whether that item has hidden surfaces prone to maintaining contamination. The unit will only treat surfaces that are exposed to the light, consider this when using the MB72. It is absolutely forbidden to use the MB72 for the sterilisation of any item that is in any way inserted into the human body through any orifice or surgery. The MB72 should not be used for the sterilisation of wind instruments as there are paths which the UVC light cannot penetrate which will remain infected. If a performer is prone to putting the microphone head in constant physical contact with their mouth or nose it is recommended to remove the grille from the mic and submerge it in an effective sterilisation liquid for a few minutes for a very deep thorough cleaning. Ideally this type of performer should always use their own equipment, and no stagehand should touch it. The MB72 is only to be used for items which are used external to the human body, and which can knowingly (proven) be treated with 250nm UVC sterilisation procedures. The Phoenix MB72 is not intended or to be sold for medical use.

UVC rays will negatively affect many plastics and foams over extended periods of time, Newell Acoustic Engineering will accept no responsibility for the cosmetic or structural decay of such parts through use in the MB72. It must be accepted that sterilisation in any form is an aggressive process for materials not designed for constant use in such environments. While most professional equipment is perfectly fine in extended exposure in such circumstances, and extended use outdoors for many years has proven most common items to be resilient, there may be some plastics (like ABS, Polypropylene, LDPE, and PLA ) that can become damaged by UV light over time. Although the exposure cycles are kept as short as possible, almost all items frequently sterilised may show cosmetic effects over years of use. The effects of UVC upon technical equipment will be considerably less aggressive than use of chemical or thermal disinfection processes.

## Technical Specifications.

Dimensions.	63cm x 63cm x 73cm
Voltage	220V
Light source	2 x 36W TUV Low pressure gas UVC 250nm
Microcontroller	ATMEGA 8 bit Arduino platform – Code, open source.
Ballast	Electronic instant start
Cabinet material	18mm Baltic Birch Plywood
Safety mechanisms	Door hard kill switch, positionally accurate.
Exposure cycle	Standard exposure 2 minutes, User option alternatives.
Item support	Optional standard cassettes, or custom support systems.
User control	Single button start, manual door operation.
Indicators	Door Closed, Running, Cycle complete.
UV radiated power	10mW / CM <sup>2</sup> or higher
UV Spectrum	
Lamp life	9000h - 270,000 2 min cycles. (73 years 10 cycles per day)