# Designing a Wound Dressing to Manage Burns

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**It is estimated that one million burn injuries occur annually in the United States, resulting in 45,000 hospitalizations. The hands are involved with a large number of burn injuries, and partial thickness burns (PTBs) are among the most frequently-occurring types. A PTB is marked by the destruction of the epidermal cell layers of the skin, extending into, but not through, the dermis.**

There are a number of management options for PTBs today, but the most common management remains the use of gauze dressings applied in conjunction with silver sulfadiazine ointment. Some of the common challenges associated with managing PTBs include: non-conformable dressings that are difficult to apply and remove; patient trauma experienced during both tissue debridement and dressing application; the dressing's inability to absorb the burn exudate; and, potential infection. Clinicians continue to search for ways to offer patients increased comfort during burn healing.

Since 2002, burn surgeons have been using a dressing with a unique technology and mechanism of action to manage PTBs. Known as AQUACEL® Ag dressing, it is designed with Hydrofiber® Technology, a patented carboxymethylcellullose gelling technology that can rapidly absorb fluid, holding it within the structure of the fibers. This unique mechanism of action makes it possible to maintain a moist wound environment, which aids in the healing process and helps to minimize dehydration of the wound bed. Unlike dressings with Hydrofiber® Technology, conventional gauze dressings are unable to either retain absorbed fluid or promote a physiological moist wound healing environment over several days or weeks. The clinical benefits of using Hydrofiber® Technology on burns have been well documented. In clinical studies, wound dressings with Hydrofiber® Technology have been shown to maintain a moist wound environment, prevent lateral spread of exudate, conform closely to the wound bed and to adhere to the burned tissue as exudate levels decrease, whilst allowing re-epithelialization of the healing tissue underneath the dressing, with the dressing detaching as the underlying tissue heals. As more clinicians have used dressings that incorporate Hydrofiber® Technology, they have identified opportunities to apply this advance in ways that

improve patient care even further. Based on user feedback, product engineers have formulated AQUACEL® Ag BURN dressing with the ability to be rehydrated quickly and with greater flexibility and a reduced level of dimensional shrinkage compared to the original AQUACEL Ag dressing. All these attributes represent important advantages for the management of PTBs.

**AQUACEL® Ag BURN dressing design**

The dressing's base material, a hydroentangled nonwoven web, is only half as thick as standard Hydrofiber® dressings. This structure helps reduce shrinkage of the material when hydrated and makes the dressing more flexible and easier to rehydrate when it dries out. To maintain the benefits of Hydrofiber® Technology, the structure has a slightly reduced degree of gelling within its sodium carboxymethyl cellulose material. In vitro data show that the dressing is able to gel, absorb and retain fluid and minimize the spread of fluid laterally.

The dressing is reinforced with Nylon fibres via stitchbonding, to provide dimensional stability and promote flexibility. Enhanced flexibility and mobility for burn patients is especially important to ensure that the wound heals properly and to prevent any contractures across the healing tissue that can limit the range of motion after healing. AQUACEL® Ag BURN dressing also contains ionic silver, a proven antimicrobial that may help prevent infection. Infection can delay healing and can lead to more serious complications which require further patient treatment. The dressing's intimate contact with the burn tissue may also reduce the presence of dead-space areas where bacteria can thrive.

**AQUACEL® Ag BURN dressing glove design**

AQUACEL® Ag BURN dressing is available in a range of sizes and shapes including gloves, allowing clinicians to contour the dressing to any burn area on the body. The

gloves come in a range of sizes to manage PTBs in patients from very young children to adults.

The glove dressing was designed to be ambidextrous, easy to apply, and to conform to the wound bed. The dressing has an opening on one side to make it easier to insert and remove the hand. The entire glove is cuttable, giving clinicians the option to cut out specific parts such as the tips of the fingers. Five sizes of the gloves were created to accommodate various hand sizes and the anticipated degrees of swelling of the hand post-burn.

**Conclusion**

AQUACEL® Ag BURN dressing was designed to deliver certain improvements on the existing dressing with Hydrofiber® Technology. In vitro data demonstrates that AQUACEL® Ag BURN dressing has less shrinkage, improved flexibility when dried out and is easier to remove compared to AQUACEL® Ag dressing. The flexibility of AQUACEL® Ag BURN dressing affords patients increased comfort and movement which may have a positive impact on rehabilitation. The improved characteristics of AQUACEL® Ag BURN allow the dressing to act like a second skin providing a good cosmetic effect and protocol of care.

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