

# MiraPLY – Self-Adhering, Blindside Waterproofing White Paper

## Abstract

During the design phase of a building requiring new construction, when dealing with limited space, a contaminated water table or zero-lot-line parameters, the design will sometimes call for what is called blindside waterproofing. Blindside waterproofing is the practice of installing the waterproofing protection (whether horizontal or vertical) prior to the installation of the concrete structure which the membrane is intended to protect during the life of the structure. In general this is accomplished with bentonite clay panels, for example in a vertical application, by hanging the sheets directly on the lagging wall, installing the forms and pouring the concrete to erect the below-grade wall. What is created is a waterproofed wall, from the outside-in. The use of bentonite clay panels offers an effective and environmentally neutral way of providing waterproofing to below-grade structures and is best utilized in expansive areas without penetrations, transitions or terminations.

## Problem

The most common problem with bentonite panels is the requirement for them to remain under constant compression to be effective. Should the foundation shift due to soil erosion or seasonal cycles, the waterproofing can disengage from the structure, allowing water to penetrate between the membrane and the concrete. In addition, situations occur where the pH of a water table contain chemicals that can attack bentonite waterproofing panels, including traditional asphalt-based waterproofing membranes, and thereby reduce the ability for the membrane to protect against water migration. Further, it is difficult to fabricate details around penetrations and positive terminations with bentonite clay panels as they require multiple layers in specific configurations, again, while remaining under constant compression. Finally, bentonite membranes must remain dry during installation, and up to and through the application of the concrete layer that covers them. If the membrane comes in contact with water prior to the installation of the concrete layer, the membrane will swell prematurely and fail to effectively bond with the concrete under compression or properly swell when designed to do so, which is what creates the essential waterproofing seal.

## Design

A solution is needed that combats the problem with compression in areas susceptible to shifting soil conditions, water table concerns, detailing and positive sealing. Currently materials exist that address these problems which include TPO membranes and butyl adhesive technology. Manufactured in tandem, the combination of these two materials, with the addition of a release liner, provide a lasting solution to the difficulties of providing blindside waterproofing. Ideally the best solution is a compression-seal-gasket to provide a dedicated seal against water migration and with membrane that can accommodate the dynamic movement of shifting soil conditions. In addition, the need for the membrane to rebond is necessary as movement will occur during the life of the structure and the membrane must accommodate these shifts.

## Solution

MiraPLY™ has been developed to eliminate the aforementioned problems by serving as a self-adhering, blindside material that provides a layer of TPO (thermoplastic polyolefin) and butyl alloy to eliminate water migration, ensure positive compression after installation and withstands construction-site traffic before, during and after installation. This composition provides a secure, direct bond to the substrate without the need for soil

compression and features built-in waterproofing redundancy as both layers (TPO and butyl) are independent waterproofing elements. The self-adhering nature allows improved detailing versus the non-adhesive element of bentonite as laps, seams and penetrations can be more effectively addressed and resolved. Issues related with a contaminated water table are also minimized as the TPO layer protects against undesirable water and soil conditions. Installation of the membrane is also aided with the inclusion of a dedicated side lap adhesive strip that is exposed by removing the edge-section of the release liner. This is to provide a dedicated area for following membrane sheet, from one section to the next, to ensure a continual bond. Supporting this side lap adhesive design are a host of architectural details that provide direction regarding panel placement, orientation, end and side lap measurements and effective mechanical attachment patterns.

The choice we made to use Butyl “alloy” technology was done as part of overall product design. We chose this type versus other PSA materials (V) for adhesion to membrane, required compatibility with membrane physical properties, application life required and adhesion to concrete. Likewise when making the Horizontal version the need to have the membrane coating be low tack yet still have good adhesion and to be survivable in normal outdoor conditions at a construction site. Other systems could provide some of the required properties but not all, especially in a single pass coating. Most other systems failed on the application life criteria which stipulated 21-28 days of exposure possible before concrete may be applied.

A TPO membrane was chosen because of its “betweenness” to rubber and plastic. The TPO we utilize does not undergo plastic deformation and has a much lower modulus than plastics such as HDPE. This equates to greater flexibility at the same thickness, more elongation and a greater resistance to catastrophic fracture (penetration). Plastics provide good impermeability to water, but the need to address the dynamic nature a building faces led us to choose a material that is not only impermeable but also would be able to deal with the normal geological stresses that concrete faces. TPO works by helping to dampen and spread those stresses preventing damage to the concrete by minimizing stress concentration that can lead to cracking.

## **Conclusion**

Blindside waterproofing is becoming more prevalent in today’s new commercial construction environment. Providing solutions to these waterproofing challenges is essential to the industry as more blindside waterproofing designs are implemented and standards for this type of application are created and adopted throughout the construction industry. MiraPLY provides a solid blindside system when bentonite clay panels are not appropriate, or when conditions call for combating undesirable situations such as water table concerns, penetrations, transition or positive terminations. By utilizing MiraPLY, blindside waterproofing challenges are thoroughly addressed and minimized thereby providing a strong solution for the construction industry.