

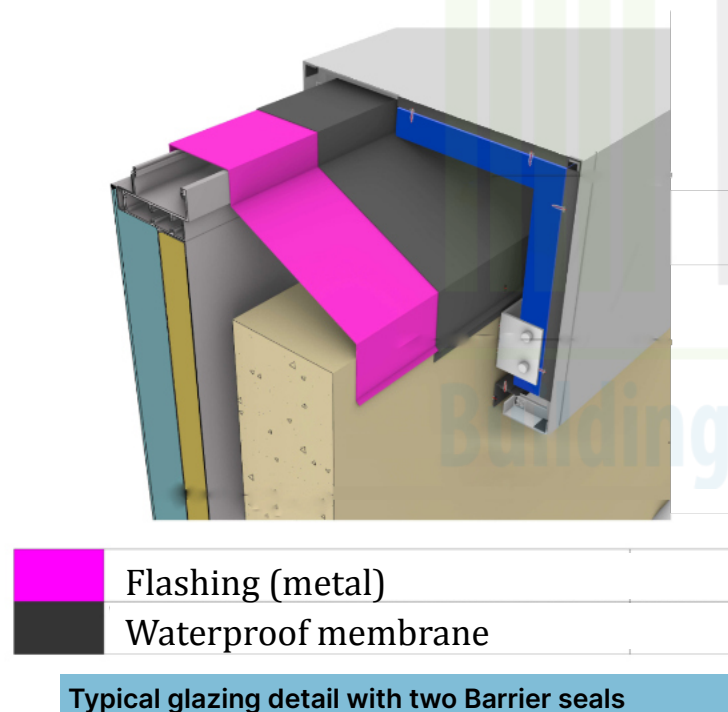
# SECRETS TO LEAK PROOF BUILDING FACADES

## Enhancing Building Integrity: A Comprehensive Guide to Waterproofing Facade Glazing and Cladding Details.

Waterproofing of Building facade details plays a pivotal role in preserving several aspects such as Structural integrity, Weather Performances, Durability, and overall life of the building's exterior and interior spaces. Often designers' poor attention by designers leads to serious consequences and defects, hence meticulous attention to waterproofing details is essential. This article tries to explore some key considerations and best practices for effective waterproofing in facade systems.

### BASICS OF TYPICAL DETAIL

Though there are many different applications and conditions of details may be different. But the principle will remain the same. A good detail will try to achieve min. 2 barrier seal so that it does not just rely on external face sealing. If the external seal fails, the primary seal will function as a weather barrier. Details are designed for the specific challenges not just adopted from somewhere else. Sketch illustrated with a typical glazing detail.



### UNDERSTANDING THE CHALLENGES

Facade glazing and cladding are exposed to various weather conditions, making them susceptible to water ingress. Factors such as wind-driven rain, temperature fluctuations, and building settlement can contribute to potential vulnerabilities. A robust waterproofing strategy becomes imperative to prevent moisture-related issues, including mold growth, material degradation, and compromised insulation. Construction quality and tolerances will have a greater impact on facades such as opening tolerances, quality of openings, etc.,

#### Building Construction Problems

Building construction quality and tolerances are critical for the weatherproofed envelope. Often facades deal with poorly finished concrete and out-of-tolerance openings.



#### Facade Issues

Not just high-quality materials alone will lead to long-lasting facades. Unresolved or poorly detailed facade interfaces without considering practical aspects, Details are adopted without considering the applications and site conditions will lead to failures. Often problems are passed on to the site team without resolved design details, hence the implementations are done based on an ad-hoc approach. The impact of these cases is severe while the building is in operation such as leaking facades, insecure panels, disruptions to users, etc.,



## UNDERSTANDING MATERIALS

Facade systems use various materials which require a good understanding of material behaviors, properties, and limitations. Whenever two or more different materials are in contact, designers focus on each material's characteristics and weathering. Several materials have limitations on exposure conditions, such as few materials will not perform under direct exposure to harsh weather conditions (Rain and Sun). Hence detailing must take care of these aspects.



### Key Components of Waterproofed Details:

Sealants	Waterproofing Membranes	Flashing	Sloping and Drainage
<p>Long lasting and High-quality sealants are fundamental in sealing joints and gaps in facade systems. Silicone based sealants are commonly used for their flexibility, durability, and resistance to UV radiation for most of glazing, cladding systems. Proper application, good sealant joint sizing, ensuring a continuous and uniform seal, is critical for preventing water penetration.</p>	<p>Waterproof membranes act as a protective barrier against water intrusion. Selecting the right membrane depends on factors such as climate, building movement, and substrate compatibility. Commonly used choices are bituminous, EPDM, Butyl based membranes, each offering unique advantages in specific applications. Not any one material will work for all types of substrates.</p>	<p>This is thin metal sheet connecting concrete / building opening to facade systems at the perimeter. Aluminum, Galvanized sheets are generally used for all types of facade end sealing. Proper flashing installation is crucial in redirecting water away from vulnerable areas. Flashing should be strategically placed at transitions, corners, and intersections to create a continuous perimeter seal at the interfaces.</p>	<p>All surfaces are to be designed with adequate slopes and drainage channels ensures efficient water runoff. Details are to be designed with proper sized weep holes help prevent water accumulation, minimizing the risk of water infiltration. Any seepage infiltrated onto details internal cavities must be able to drain with gravity. Always consider any water seeps inside the details must drain out.</p>

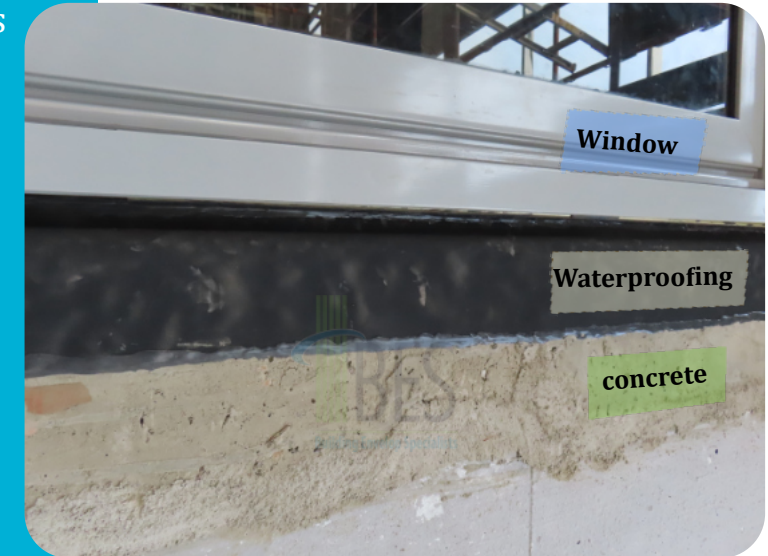
## UNDERSTANDING APPLICATION BETTER

Following some experiences are shared, lead to better understanding of actual building construction which will lead to better details towards leak proof facades. Good design will lead to maintenance free long lasting facade works

### Window Systems:

Fixed within a floor with surrounding walls constructed using bricks, blocks, or concrete. The following are noted about the quality of building openings that will receive windows.

- Perimeter/window opening sizes, consider large tolerances if civil works are not good
- Perimeter seal details, check if it works as per the civil works opening.
- For in-consistent and poorly finished openings, consider detail with flashing
- Perimeter finished before window fixing, rectification after window fixing not reliable.



Window Sill Details -Designed for Large Tolerances



Glazing Head Details- Designed for Large Tolerances

### Curtain wall Systems:

Fixed to the edge of the building perimeter spans vertically several floors, commonly used for commercial buildings.

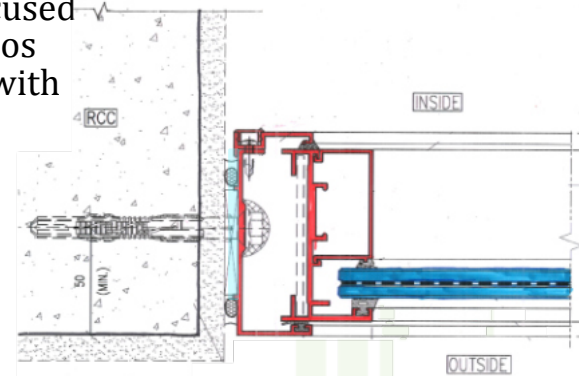
- If slab outline tolerances (in/out) are too big then interface details are to be designed to accommodate large tolerances.
- RCC walls (Shear walls), columns, brick walls, etc., quality of construction is critical. If these walls are porous often water leakages or seepages from the wall not from the facade interfaces
- Terminations or vertical ends of glazing abutting to main building (Columns or walls), check verticality and tolerances. This will define the end interface details.

## ACHIEVING WEATHER PROOF DETAILS

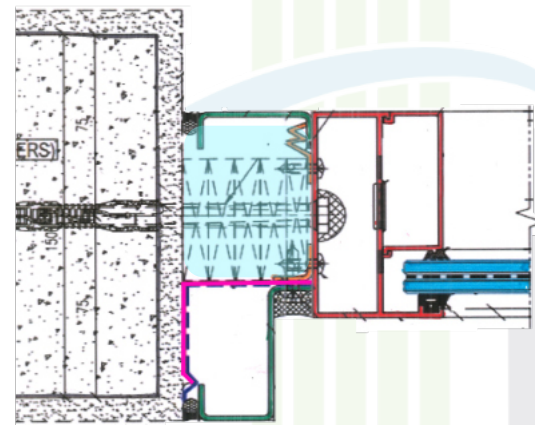
Achieving good weatherproofing needs thinking holistically, not just facade focused but rather taking care of actual scenarios and arrive the best possible solutions with experiences.

### Good Detailing:

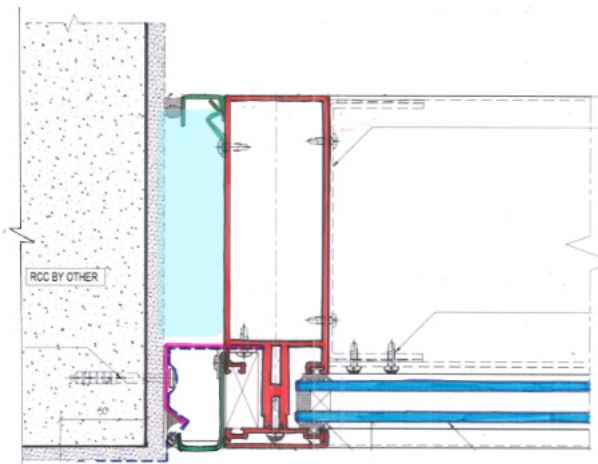
Facades interfacing with the main building are sealed with various types of constructions such as brick/block wall, Concrete and other forms of building construction. These junctions are hot spots of defects, leakages, and failures. If not addressed properly. An experienced designer will pay special attention to these areas to detail appropriately with an understanding of the application. Designer to ensure details are practical, easy to implement, and designed for the conditions. For example, details that do not allow adequate tolerances of the main building (concrete opening) may not be implemented correctly and lead to leakages in the near future.



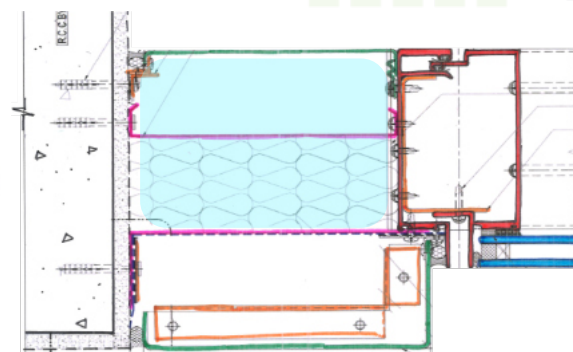
Window Jamb details for Std Tolerances



Glazing Jamb details for Large Tolerances



Glazing Jamb details for standard Tolerances



Glazing Jamb details for Large Tolerances



### Quality Materials:

Invest in high-quality sealants, waterproof membranes, and flashing materials. Cost-cutting on material quality may compromise the effectiveness of the waterproofing system and may lead to costly repairs in the future. Often repairing are daunting task and in some cases impossible due to lack of access, discomfort to occupants, etc. Hence a preventive solution will be wiser than dealing with post-completion defects.

### Skilled Installation:

Entrust the installation to experienced professionals familiar with facade waterproofing. Adequate skills should be in place at the site with good checking and monitoring systems. Conduct a detailed inspection of the facade components before installation to identify potential weak points. Do not install facade works and then try to rectify, rather rectify concrete openings before install. Rectify any substrate irregularities and ensure a clean and dry surface for optimal adhesion of waterproofing materials.



### Quality Control :

As a good practice carry out site tests periodically to verify on-going works are as per acceptable quality. Verifications must be essential quality control measures to validate implementation quality. Develop the testing regime as the works progress.



### Maintenance:

Implement a routine maintenance schedule to inspect and address any signs of wear, damage, or degradation. Regular cleaning and timely repairs can prevent minor issues from escalating into major water-related problems. Well-maintained facades will lead to extended life without major repairing works.

## CONCLUSION

Waterproofing of glazing and cladding details is a critical aspect of building design and construction. Interface designs play a critical role, the details should reflect the reality of actual site construction and the tolerances achievable. By integrating high-quality materials with good installation practices will result in less maintenance and long-term durable building envelopes. This approach will safeguard against water-related issues and preserve the overall quality of the building. A Holistic approach will lead to good weather-proofed and long lasting buildings with enhanced commercial values.