

WHY MY BUILDING WINDOWS ARE LEAKING !

Water leakage through the windows and exterior walls is a common problem most of us face during normal or rainy conditions. For many building owners, water leakages have to be dealt with regularly. Irrespective of any building types such as high rise, low rise, urban or rural buildings, this issue is widespread. Even with the modern building constructions, water leakages an annoying defect that upsets most of us. Though we live in the new age of technologies, unfortunately our buildings are unable to meet expectations.



Joins not treated, leakages at wall and roof

TYPICAL CAUSES

Some typical defects and reasons are tabulated below:

Aspects	Problems	Impact on windows
Structural / wall opening	Unevenly finished , porous	Perimeter sealing compromised
	Wall seepages, Cracks on wall plastering	Dampness, seepages on to interior
	Opening tolerances, too much vary	Windows will have no gaps at ends to seal correctly
Windows design defects	Not engineered or designed	Water leakages through weep holes, due to negative pressure.
	Not enough drainage provided	
Poor materials used	Gaskets, connections, finishes used are of poor quality, worn out within few years of services	Loss of life, require maintenance or replacements as early as (say) 5 to 10 years
Bad fabrications	Poor fabrication or fixing defects	Leakages through frames, joints
Poor workmanship	Flashing, waterproofing discontinued or corners untreated	Water leakages through holes or voids
Badly integrated services	Penetrations for pipes, ducts, etc.,	Compromised waterproofing and poor sealing.

LEAKAGES DUE TO CONCRETE & EXTERIOR WALLS

These defects are majorly due to poor construction methods, bad workmanship, low quality material and other issues.

Construction methods

Modern construction techniques such as using Aluminium formwork may avoid porous surfaces, honeycomb in concrete. Advanced shuttering and concrete techniques are generally adopted for modern building constructions, which include low rise or high rise buildings. Joints between concrete (roof) and block walls, if not treated properly can lead to severe seepages. All joints at the exterior of civil works to be treated to improve weatherproofing. External plastering finished with improper waterproofing may lead to water seepages after weathering.

Windows opening tolerance, having a wide gap or no gaps makes waterproofing very weak. Window frames are pre-fabricated, designed for site adjustment with reasonable tolerances. But building openings (Civil works) must comply with acceptable tolerances. it is not practical to follow too much varying site dimensions for each window.



Leakage due to Cracked Concrete



Loosely filled mortar, can't achieve good waterproofing



Poor Concrete Opening, Window perimeter sealing very difficult and risk of water seepages

LEAKAGES DUE TO WINDOWS / FAÇADE DEFECTS

These defects are majorly due to poor Façade interfaces, missing of flashing, incorrect waterproofing, low quality material, bad design & several other issues, some of which are elaborated below:



Flashing Discontinued, entry of water into joints

If the concrete or wall openings are not consistent due to poor constructions, then windows perimeter sealing must address appropriate details as per site conditions. In these cases, dual sealing (inside and outside) using flashing and waterproof membrane shall be considered. It can be further avoided by providing necessary drain slots and slopes for water to flow or drain out from the façade.

Poorly Sealed with the building

Windows perimeter sealing with the building concrete openings is critical to achieving weatherproofed details. Often waterproofing is compromised at the corners or there are no overlaps for longer joints. Good design details will address these issues. However, site implementation skills impact the performances.



Flashing Discontinued at Interface, risk of leakages

Material Quality

Materials used should be durable enough to withstand harsh external weather ie, rain, wind & heat. Poor quality materials such as gaskets, sealants, weatherproofing are generally the first barriers that get damaged due to environmental conditions such as daily sun exposure and sudden winds. Poor quality materials can often degrade quickly in just few years. This will increase risk of water leakage and impact facade performance.



Waterproofing layer weathered out, lead to seepages

Fabrication and Workmanship Defects

Various workmanship issues such as misaligned fixing, poor fabrications may lead to site defects. If frameworks are not fabricated as per allowable tolerances and connections don't follow good practices, it will leave gaps in frame joints and lead to water seepages. Often these defects are rectified by applying weather sealant over the surface, but these quick fixes will not last long.

Quality and tolerances of fabrication will have significant impact on weatherproofing of windows.



Incorrect Corner Joint- Poor Fabrication



Gutter not sealed / joined at ends, holes in facade

Poor Fabrication

Windows and openings need to be correctly sealed in closed conditions. Use of the right hardware and correct design approaches help to seal the openable sashes to withstand extreme weather conditions. The pre-fabrication approach is highly recommended to avoid more site works. Hardware fixing requires a good level of skill set so that hardware can perform its functions properly.



Openable window with gaps - Not sealed



Leakage due to poor hardware & Gasket

Improper Integrations

Residential facades are more function driven whereas commercial facades are more aesthetic driven. However, design requirements and challenges are very different among these type of building facades. Careful thought should be given at design stages to well integrate services and penetrations so that it will not interfere with windows or facades. Afterthought works may lead to compromise on building envelopes.



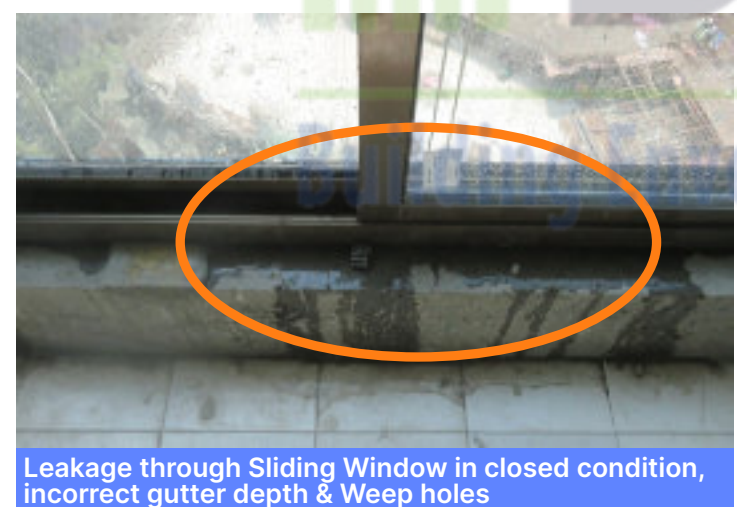
Service Pipes -Interfere with Occupant space



Service Pipes - Compromised envelope

Adhoc approach and post completion changes by other trades, will compromise durability and performance of building envelopes. These defects can be avoided with well resolved pre-construction designs

Uneven concrete openings are not rectified prior to window fixings and poorly designed track profiles can lead to water ponding and inability to drain .



Leakage through Sliding Window in closed condition, incorrect gutter depth & Weep holes



Bad profile designs, inadequate Track depth - lead to leakages

DAMAGED WITH INTERIOR

Often damages due to interior works can lead to severe leakages and pose challenges to rectify. Certain damages are beyond repair. As a general rule, no interior works should come in contact or overlap with windows. Avoid screw fixing, puncturing frame works, decorative cladding, etc.



Window frames punctured with screws - risk of leakages



Framings damaged due to interior fixings, lead to water leakages

WAYS TO GET IT RIGHT

Window Leakages are not a single trade fault. Often, defects arises due to poor building construction and carried over with bad window design and workmanship issues involving several trades. The range of issues includes poor detailing, wrong designs, incorrect spec, poor skills, quality compromise, cost cuttings, insufficient quality check and supervision, no site verifications, etc.

Hence, the correct approach from the design to execution with better site management plays a vital role in successful implementation and leak-proof facades or windows. Knowledge of correct design and materials together with coordination among all trades, following correct sequence of work, helps to avoid such defects. In this process, the site construction team plays a vital role in implementing quality control not just in the paper but in real-time. [Stringent monitoring](#) and good quality control systems will bring substantial-quality and avoid post-completion defects. Unfortunately, the site team's lack of systematic approach and adequate skills is not addressed by the management. Often these key aspects rely on a single person (so-called Quality in-charge) without any monitoring, checking, and tracking systems.

It doesn't cost more to adopt a planned and systematic approach with the right skills and expertise. This can save significant cost, time, and most importantly, the value of the building.