



## **10 Reasons Why BUR Systems Leak (And How to Really Fix Them)**

The following extract is taken from Samuel Corser Gale's Training Manual, "How To Really Fix Roof and Building Leaks". Mr. Gale can be reached at 920.868.9051, or on the web @ [www.roof-rite-way.com](http://www.roof-rite-way.com)

Mr. Gale has also authored a companion book called "Water Runs Downhill"...or defense tips for attorneys and claims adjusters defending roofing contractors in construction litigation". The opinion is that if a roof is not fixed with the aid of his first book, then the problem can be defended with the aid of his second.

Almost everywhere over the last several decades, economic pressure to maximize building developer return-on-investment was accompanied by the decline of quality in the design, on-site fabrication and maintenance of Built-Up-Roofing (BUR). Simply stated, when it came time to react to build-out budget pressures, money was taken away from Peter (Roofing) to pay Paul (marble in the foyer/lobby – Granite counter tops in the kitchen etc). The result has been the proliferation of poorly designed, specified, applied and maintained BUR roofing systems adorning our industrial, commercial and attached/detached residential housing buildings across the country. To this day there are still building plans and specifications being created nation wide that succinctly state, "BUR Roofing" period.

No specification or manufacturer listed, and no details presented!!!! On the other hand, one consistently sees extremely detailed, computer generated specification that look impressive on paper, but that have little to do with the as-built construction realities of a particular project they purport to address! Either way, the poor devil who is ultimately tagged with the responsibility of installing the said roofing system is usually left to his own devices and, once again, the building owner may suffer.

Now if that wasn't enough, the contiguous building components that impinge upon the roofing system and the roof-mounted equipment that is placed upon the BUR are usually suspect in the waterproofing department too! If you or your tenant complains about a "roof leak" today...chances are at least 50/50 that the leak is caused by a building/equipment design error or construction problem relating to other trades (i.e. framing, electrical, plumbing, metal, mechanical, stucco).

Mr. Gale states that over the last decade he has kept records of the causes of reported “roof leaks” and his records show a ratio of 37% roofing related and 63% non-roofing related! And when a BUR roof is constructed according to proven industry standards, 85% of all early “leak calls” can be traced to causes other than roofing application or roofing material failure.

Tenant Improvements (TI's) have quite a bit to do with the above statistics. TI's come in all shapes and sizes. Almost always, they are installed after original roofing by parties who do not understand or appreciate quality waterproofing techniques.

So in summary you and your building have probably inherited a world of blatant or hidden problems usually made worse by a cast-of-characters who summarily trash the roofing with TI's (while the property manager pays the bill!)...and you have a recipe for how to fail “Roofing Asset Management 101”.

**Unfortunately this is the scenario: Most often BUR Systems are:**

1. Treated as nothing more than equipment platforms
2. Improperly attached to plywood decks
3. Incorporating less than desirable number of plies
4. Lacking in adequate waterproofing asphalt
5. Suffering from poor surfacing
6. Missing base flashing materials
7. Not tied-in properly to neighboring building components
8. Improperly repaired
9. Poorly maintained (if at all!)
10. Inadequately stabilized...and lack an asset management plan to assure the stabilization of that portion of the exterior building envelope asset.

What is a normal BUR Roof?

In the NW USA you should not see a BUR roofing system resting on a 1/2” plywood deck and if you see, or have a 3/8” plywood deck on your building, then somebody busted a minimum code requirement; if you have 3/4” plywood deck, somebody was designing smart. If you have compressed random-oriented-strand-board deck there is going to be a greater chance that other elements of the roof/building may also possess below (desirable) standard components as well.

The BUR roof membrane should be mechanically attached to the plywood deck (concrete or metal decks have different attachment requirements and will not be discussed herein). If the original roof installer cut corners and fully hot-mopped the base sheet directly to the deck....you've already got BIG problems: As solid-mopped membrane usually can't withstand subsequent building movement.

Normal attachment is mechanical: Air driven Staple-Type systems or hand nailed using annular or ring shank nails with 1” diameter flat (disc-like) heads. Either way, mechanically attaché, the membrane will not usually telegraph building movement, but rather “float” relatively free from earth/wind movement, thermal shock and building settlement.

The base sheet is exactly what it state: A “base” or foundation for the application of the waterproofing components of the BUR roofing system: hot waterproofing asphalt and ply sheet(s).

Therefore, the “base” sheet is not considered to be one of the “plies” that most manufacturers and specifiers mention when speaking of the “number of plies” in a BUR roofing system.

For example, a typical “TILT-UP” building with a panelized deck system in the SW United States might include a specification for a “three-ply” roof. In reality, that specification is one base sheet, one ply sheet, and one surfacing cap sheet. The waterproofing is nominally 50 pounds per 100 square feet (1 roofing square) of the specified asphalt (usually type III). In reality the above is a ONE PLY roof, since by themselves, base sheets and capsheets are not waterproof, but rather a sheet that respectively keeps asphalt away from the deck and keeps the sun away from the waterproofing.

	Comparison (over nailed decks)	
Industry	CORSER	
Elements	Description	Description Reality
* Base, 1 Ply, capsheet	3-ply	1-ply
* Base, 2-ply, capsheet	4-ply	2-ply
* Base, 3-ply, capsheet	5-ply	3-ply

The ply sheet is lightweight and relatively porous. It therefore easily accepts the hot waterproofing asphalt during application. The ply sheets are lapped during application in such a way that the distance between laps tells you how many true plies your roof possesses:

LAP DISTANCE	
Corser	Distance
Description	Between Laps
* 1-ply	34”
* 2-ply	17”
* 3-ply	11”

Embedment of hot asphalt should yield no less than 25 pounds per square (30# preferred) between the base sheet, each ply and capsheet respectively.

Remember, the asphalt embedded in and around the ply sheet(s) IS THE WATERPROOFING, not the base sheet and capsheet surfacing! Surfacing of single or multiple ply BUR roofs in the SW USA usually consists of capsheet application because of its lower comparative cost when compared with other surfacing methods.

- 1.) Asphalt/Aggregate flood-coating
- 2.) Asphalt emulsion and reflective coatings

No matter which type of waterproofing ply surfacing is chosen, all surfacing basically protects the applied integrity of the asphalt/ply waterproofing combinations from weathering influences, particularly UV radiation.

The waterproofing asphalt employed in BUR systems can be one of four types: I,II,III,IV. Suffice to say the Type I and II soften easily under normal hot weather and Type III and IV resist high heat better. Therefore, Type III or IV is usually specified in warm climate locations.

Most roofing failures are the result of roofing detail failures and building/equipment defects (that impinge upon the roofing system) you can fix a bad roofing detail and save a marginal BUR roofing system, until you have the time and money to re-roof properly the second time around!

See Mr. Gale's Training Manual and/or visit his web site for much, much more on roofing repairs [www.roof-rite-way.com](http://www.roof-rite-way.com)

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