



Featured Technical Topic Summary

FGI Monthly Members Meeting

Friday, January 9, 2026



TOPIC: Your Liner is Leaking, What Should You Do?

Each month Tim Stark introduces a new technical topic for discussion and possible action. This month's topic is: "**Your Liner is Leaking, What Should You Do?**". This topic generated significant discussion with the main "take-aways" listed below.

Is Your Liner really leaking?

- First action should be to determine if your liner/geomembrane is really leaking because loss of water/liquid could be due to evaporation
- Is it evaporation? – check evaporation using evaporation calculator: <https://www.omnicalculator.com/physics/evaporation-rate>

Surface area of water ...
43,000 ft² ▾

Air speed ...
10 mph ▾

Use temperature and relative humidity

Air temperature ...
80 °F ▾

Relative humidity ...
25 %

Evaporation rate ...
1,913 US gal / hr ▾

- Or check evaporation using this evaporation calculator: <https://hdsc.nws.noaa.gov/pub/hdsc/data/papers/TR33.pdf>

Evaporation Rate Table Using the US Department of Energy Simulation Method

Water Temp		Evaporation Rates in Lbs/Hr per Sq Ft of Pool Surface Area																		
		76°	78°	80°	82°	84°	86°	88°	90°	102°	104°									
Air Temp	Relative Humidity (RH) ■ is 50% RH ■ is 60% RH																			
	72°	.0341	.0288	.3830	.0330	.0427	.0374	.0474	.0421	.0523	.0470	.0574	.0521	.0630	.0577	.0688	.0635	.1112	.1059	.1196
74°	.0323	.0266	.0364	.0307	.0408	.0352	.0455	.0399	.0504	.0448	.0556	.0499	.0611	.0555	.0670	.0613	.1093	.1036	.1178	.1121
76°	.0303	.0242	.0345	.0284	.0389	.0328	.0436	.0375	.0485	.0424	.0536	.0476	.0592	.0531	.0650	.0590	.1074	.1013	.1158	.1097
78°	.0282	.0218	.0324	.0259	.0368	.0303	.0415	.0350	.0464	.0399	.0515	.0451	.0571	.0506	.0629	.0565	.1053	.0988	.1137	.1072
80°	.0260	.0191	.0302	.0233	.0346	.0277	.0393	.0324	.0442	.0373	.0494	.0424	.0549	.0480	.0607	.0538	.1031	.0962	.1115	.1046
82°	.0237	.0163	.0279	.0205	.0323	.0249	.0370	.0296	.0419	.0345	.0470	.0396	.0526	.0452	.0584	.0510	.1008	.0934	.1092	.1018
84°	.0212	.0134	.0254	.0175	.0298	.0219	.0345	.0266	.0394	.0315	.0446	.0367	.0501	.0422	.0559	.0481	.0983	.0904	.1067	.0989
86°	.0186	.0102	.0228	.0144	.0272	.0188	.0319	.0235	.0368	.0284	.0420	.0336	.0475	.0391	.0533	.0449	.0957	.0873	.1041	.0957
88°	.0169	.0069	.0210	.0111	.0354	.0155	.0301	.0202	.0350	.0251	.0402	.0302	.0457	.0358	.0516	.0416	.0939	.0840	.1024	.0924
90°	.0130	.0034	.0171	.0076	.0215	.0120	.0262	.0167	.0311	.0216	.0363	.0268	.0418	.0323	.0477	.0381	.0900	.0805	.0985	.0889
92°	.0099	.0002	.0141	.0039	.0185	.0083	.0232	.0130	.0281	.0179	.0332	.0231	.0388	.0286	.0446	.0345	.0870	.0768	.0954	.0852

All temperatures listed are in degrees Fahrenheit

- With a single geomembrane bottom liner system, it is important to calculate evaporation rate because the geomembrane cannot be checked due to the lack of a leak detection zone below the geomembrane
- A double geomembrane bottom liner system has two geomembranes with a leak detection zone between the geomembranes so it can be determined if the upper or primary geomembrane is leaking
- If double-geomembrane bottom liner system is used, there will also be some liquid in the leak detection zone for a while after filling due to condensation, rainfall, etc. so don't worry immediately
- If the pond is double-lined and the liquid level in the sump is about the same as the pond, there is a leak because equalization of the liquid levels
- If you are concerned with leakage, the pond/reservoir should be double-lined
- If the pond is singly-lined important to calculate and/or measure evaporation rate because the geomembrane cannot be checked
- To measure evaporation – A Pan evaporation test can be performed using a 48" diameter and 10" deep pan, which is the test usually used by NOAA; alternatively, fill with a pan that is 12" wide x12" long x2" deep so it if loses one 1" of water per day; the evaporation rate is 1"/square foot of pond
- Also can mark the pond liquid level on the exposed geomembrane and let it sit for 24 hours and compare with evaporation rate with rate

estimated from evaporation calculators above

- The color of geomembrane also influences evaporation rate
- If moisture gages installed outside of the pond are indicating increased moisture or similar contaminants as in the pond, the pond is probably leaking
- A rise in groundwater does not necessarily mean a water pond or reservoir is leaking because a nearby subdivision with lots of irrigation could cause a rise in groundwater/moisture level so consider surrounding infrastructure
- Pat Elliott's photo of displaced soil cover from the top of a PVC geomembrane because of leakage from a nearby leaking irrigation channel, leakage from irrigation channel caused increase in groundwater, which raised the geomembrane so problem not in the pond
- If geomembrane bubbles up due to groundwater increase, the bubble(s) is large and flat so can for identifying cause
- If geomembrane bubbles up due to gas pressure, gas bubbles are smaller and more circular than due to groundwater
- After the irrigation canal was lined with a geomembrane, the nearby pond continued to perform well because the groundwater returned to its initial level



- 90% of the time a pond is leaking and damage is not obvious (wildlife and hoses), the leak is usually due to a concrete attachment or pipe

penetration

- Include typical action leakage rates in geomembrane contract – state's have allowable leakage rates, which can be included in contract
- In addition, the leakage rate should be accompanied by a plan if the pond does leak so plan is in-place and can be followed. For example, if measured leakage is one-half of allowable leakage rate, this action will be taken. If measured leakage is equal to the allowable leakage rate this action will be taken so no argument about actions that should be taken
- Photo below: geomembrane bridging is due to wind erosion of the subgrade so the geomembrane is bridging over the void



- Neil Nowak of GLA shared the following two photos:
- First photo shows a leaking 5 acre pond seven years after installation – sediments from brine and wind blown sand covered most of the geomembrane after draining the pond
- Second photo shows the leak after a leak location survey was able to locate it even with sediment on top of geomembrane



WYOMING - SEDIMENTS IN POND BOTTOMS AFTER REMOVAL OF WATER FOR LINER REPAIRS; POND OPERATIONAL 7 YEARS. WATER WAS 13,000 PPM TO 66,000 PPM TDS.





SEDIMENTS REMOVED BY HAND
USING SHOVELS AND POWER
WASHER, THEN WHEELBARROW
THE SEDIMENTS TO THE TOP OF
THE POND. LOAD THE DRIED
SEDIMENTS IN WASTE TRUCKS FOR
DISPOSAL AT AN OILFIELD WASTE
LANDFILL.

- Pat Elliott showed a video of an underwater dye test showing concrete outside of a geomembrane lined area, video is available with this Featured Technical Topic
- PPG Aquatapoxy A-6 = underwater epoxy that was used to seal the concrete water leak without lowering the reservoir
- VIDEO:

If pond is leaking

- Call engineer, liner installer, and general contractor before emptying the pond
- DO NOT EMPTY THE POND before contacting engineer, installer, and contractor
- Dealing with removed liquid is difficult and liquid helps identify the leak location
- Check penetrations first and that includes the pipe boot and pipe itself
- If you empty the pond, lower the liquid level slowly
- Common damage is due to hoses introduced to the pond and wildlife
- Use leak location survey or smoke or dye testing to locate leak
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