



Terrace Inlets: Why Orifices Are Important

Why Use Orifices?

The USDA's Natural Resources Conservation Service (NRCS) designs storage terraces to drain runoff from fields through underground outlet tile (UGO) systems. A system's flood duration refers to how long it takes for runoff water to drain from the system's terrace storage areas. Shorter flood durations require larger, costlier tiles. Flood durations are controlled by orifices in UGO risers. An orifice is a hole in a plate or fitting that is installed inside the inlet of each UGO riser in a terrace system. The performance of the UGO system depends on the size of these orifices.

UGO Tile System Capacity

All UGO system components (risers, riser holes, orifices, tees and main pipes) are designed to drain terrace channels in a way that causes minimal crop damage. The orifices in risers should allow pipes to fill with slightly less water than the full-flow capacity of the pipes. This prevents excessive pressure inside the pipes, which have joints that are not designed or manufactured to handle pressure flow.

To reduce plugging, risers with closed tops are used to keep debris out of UGO systems. The closed tops force water to enter risers through numerous one-inch holes in the sidewalls of the risers. Some debris could enter through the one-inch holes in risers, but NRCS designs UGO systems with orifices that are large enough to allow that debris to pass through into the main tile lines.

Benefits of Orifice Systems

- Using orifices allows all terraces on a common UGO system to drain in about the same amount of time. A significantly different drainage time between two terraces utilizing the same UGO line could indicate that a riser or UGO requires maintenance.
- Orifices prevent the formation of pressure within UGO tile lines that can damage joints.

Don't Remove Orifices

If an orifice plugs, a landowner could be tempted to remove the plugged orifice plate from its riser. But a riser without an orifice can cause serious problems. In systems that utilize one UGO to drain multiple terraces, the excess flow from an upper terrace with its riser orifice removed could prevent water in lower terraces from entering the main pipe. The excess flow could even force water out of the inlet pipe in a lower terrace. Either of these scenarios will likely cause a terrace to overtop, which could compromise every terrace below it due to a cascading effect from the uncontrolled water. Overtopping erodes terraces, which must then be rebuilt.