

# Drip System References (2023)

## General References and Summary Documents:

### Chesapeake Bay Expert Panel Reports:

Drip Irrigation and Peat Treatment System, On-site Wastewater Nutrient Removal BMP Expert Panel Report (2018):

[https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Advanced\\_OWTS\\_Drip\\_Peat\\_BMP\\_Panel\\_2018.pdf](https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Advanced_OWTS_Drip_Peat_BMP_Panel_2018.pdf)

Recommendations of the On-Site Wastewater Treatment Systems Nitrogen Reduction Technology Expert Review Panel (Final Report 2014):

[https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Final\\_OWTS\\_Expert\\_Panel\\_WQGIT\\_approved\\_07142014\\_w\\_Apdx\\_G.pdf](https://d18lev1ok5leia.cloudfront.net/chesapeakebay/documents/Final_OWTS_Expert_Panel_WQGIT_approved_07142014_w_Apdx_G.pdf)

NOWRA Recommended Guidance for the Design of Wastewater drip Dispersal Systems (March, 2006): <https://www.nowra.org/Customer-Content/www/CMS/files/Resources/DRIP-Guidance-edited-adopted.pdf>

TVA (EPRI Subsurface Wastewater Drip Distribution: Peer-Reviewed Guidelines for Design, Operation and Maintenance (May 2004):

[https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwisqv7JxvX-AhWYnGoFHXI1Dd8QFnoECBIQAQ&url=https%3A%2F%2Fwww.waterboards.ca.gov%2Fwater\\_issues%2Fprograms%2Fwine\\_country%2Fdocs%2FWastewater\\_Subsurface\\_Drip.pdf&usq=A0vVaw1\\_zFk6lw4ec59qywC7h2Ak](https://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=&cad=rja&uact=8&ved=2ahUKEwisqv7JxvX-AhWYnGoFHXI1Dd8QFnoECBIQAQ&url=https%3A%2F%2Fwww.waterboards.ca.gov%2Fwater_issues%2Fprograms%2Fwine_country%2Fdocs%2FWastewater_Subsurface_Drip.pdf&usq=A0vVaw1_zFk6lw4ec59qywC7h2Ak)

## Various State Rules and Guidance Documents:

Ohio Drip Guidelines (December 2008): <https://epa.ohio.gov/static/Portals/35/guidance/pti5.pdf>

Washington State Subsurface Drip Systems (December 2020):

<https://doh.wa.gov/sites/default/files/legacy/Documents/Pubs/337-015.pdf>

Iowa Drip dispersal Systems Technology Assessment and Design Guidance (August 2007):

[https://www.iowadnr.gov/portals/idnr/uploads/water/wastewater/files/dg\\_dispersal\\_manual.pdf](https://www.iowadnr.gov/portals/idnr/uploads/water/wastewater/files/dg_dispersal_manual.pdf)

Arkansas Rules Pertaining to Drip Dispersal Systems (May 2022):

[https://www.healthy.arkansas.gov/images/uploads/rules/Drip\\_Dispersal\\_Rule\\_.pdf](https://www.healthy.arkansas.gov/images/uploads/rules/Drip_Dispersal_Rule_.pdf)

Indiana Standards for Subsurface Drip Systems (December 2009):

[https://www.in.gov/health/eph/files/Standard\\_SDS\\_09-12-01.pdf](https://www.in.gov/health/eph/files/Standard_SDS_09-12-01.pdf)

North Carolina:

Innovative Approvals:

American, Anaerobic Drip: <https://ehs.dph.ncdhhs.gov/oswp/docs/approvals/ie/IWWS-1993-1-R7A-092613.pdf>

American, Aerobic Drip: <https://ehs.dph.ncdhhs.gov/oswp/docs/approvals/ie/American-IWWS-93-1-R6B.pdf>

EZ-Treat Aerobic Drip: <https://ehs.dph.ncdhhs.gov/oswp/docs/approvals/IWWS-2007-1-R2-8-31-2010.pdf>

Generic Drip Rules (In new State Rules, Effective January 1, 2024): See Drip Reference Materials Folder

New Jersey Drip Dispersal Wastewater Disposal System Guidance Document (January 2022): [https://www.nj.gov/dep/dwq/pdf/OWM\\_NJ\\_Drip\\_Guidance.pdf](https://www.nj.gov/dep/dwq/pdf/OWM_NJ_Drip_Guidance.pdf)

Tennessee Rules and Regulations (Revised Effective April, 2014): <https://publications.tnsosfiles.com/rules/0400/0400-48/0400-48-01.20140408.pdf>

## **Manufacturers/Distributors Uploads:**

Geoflow (Anua):

New Design Tool (2023): <https://geoflow.com/download/design-tool/#>

Other Downloads: <https://geoflow.com/downloads/>

American Manufacturing:

Calc. Tool: <https://www.americanonsite.com/design/perc-rite-residential-drip-dispersal/calctool/>

Community/Commercial Design Manual: [https://www.americanonsite.com/wp-content/uploads/2021/12/ASD\\_Engineer\\_Manual-with-new-Logo.pdf](https://www.americanonsite.com/wp-content/uploads/2021/12/ASD_Engineer_Manual-with-new-Logo.pdf)

JNM General Design Calculator:

<https://www.jnmtechnologies.com/documents/2019/1/Bioline-UniRam%20Calc%20V2-09.xltm>

Netafim Drip Irrigation Historical Perspective/Timeline: 1965 to 2016+:

[www.netafimlegacy.com/timeline](http://www.netafimlegacy.com/timeline)

## **References with Web Links:**

Boone S. Hillenbrand. 2010. An Investigation for the need of Secondary Treatment of Residential Wastewater when Applied with a Subsurface Drip System. Masters Thesis. University of Tennessee-Knoxville.

[https://trace.tennessee.edu/cgi/viewcontent.cgi?article=1753&context=utk\\_gradthes](https://trace.tennessee.edu/cgi/viewcontent.cgi?article=1753&context=utk_gradthes)

He, J; M. Dougherty, Z. Chen. 2021. Numerical assessment of a soil moisture controlled wastewater SDI disposal system in Alabama Black Belt Prairie. Chemosphere 263

<https://doi.org/10.1016/j.chemosphere.2020.128210>

Bohrer, R.M and J.C. Converse. 2001. Soil Treatment Performance and Cold Weather Operations of Drip Distribution Systems. Small Scale Waste Management Project, University of Wisconsin-Madison. Publication No. 10.24.  
[https://soilsfacstaff.cals.wisc.edu/sswmp/SSWMP\\_10.24.pdf](https://soilsfacstaff.cals.wisc.edu/sswmp/SSWMP_10.24.pdf)

### **Other References:**

Beggs, R.A.; D.J. Hills, G. Tchobanoglous, J.W. Hopmans. 2011 Fate of nitrogen for subsurface drip dispersal of effluent from small wastewater systems  
Journal of Contaminant Hydrology 126, pp. 19-28

Beggs, R. A.; G. Tchobanoglous, D. Hills, and R. W. Crites. 2004. Modeling Subsurface Drip Application of Onsite Wastewater Treatment Effluent. In: *On-Site Wastewater Treatment X*, Conference Proceedings, March 21-24, 2004 (Sacramento, California USA), ASAE 701P0104, ed. K.R. Mankin, St. Joseph, Mich. pp. 92-103

Burton, D. J.; F. H. Harned, B. J. Lesikar, J. F. Prochaska, R. J. Suchecki. 2001. Design Principles for Drip Irrigation Disposal of Highly Treated On-Site Wastewater Effluent. In: *On-Site Wastewater Treatment, Proc. Ninth Natl. Symp. on Individual and Small Community Sewage Systems*, March 11-14, 2001 (Fort Worth, Texas, USA), ASAE 701P0009.  
ed. K. Mancl., St. Joseph, Mich. pp. 606-616

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Duan, X.; B. J. Lesikar, R. A. Persyn, A. L. Kenimer, J. K. Mechell. 2007. Evaluating Pressurization Time and Application Uniformity for Residential Drip Fields. In: *On-Site Wastewater Treatment, Proc. Eleventh Natl. Symp. on Individual and Small Community Sewage Systems*, October 20-24, 2007, (Warwick, Rhode Island, USA), ASABE 701P1107

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