



MARYLAND DEPARTMENT OF THE ENVIRONMENT

1800 Washington Boulevard • Baltimore MD 21230

410-537-3000 • 1-800-633-6101 • www.mde.maryland.gov

BEST AVAILABLE TECHNOLOGY CLASSIFICATION DEFINITIONS:

This document is to be for the classification of best available technology for the removal of nitrogen (BAT). Effective on July 1, 2015 there are five different classifications of BAT. Each of these classifications works in conjunction with Regulation 26.04.02 for the reduction of Nitrogen on-site sewage disposal systems. This document is intended only to classify the use of BAT systems on domestic wastewater usage. Domestic wastewater is defined by the BAT Technical Review Committee (BAT TRC) as having a total nitrogen (TN) influent concentration of 60mg/L. Supporting documents that clearly and concisely define the methods in which each of these classifications can be used are on MDE BRF webpage for reference.

BAT CLASS I

BAT Class I systems are stand alone units that are approved through Maryland Department of the Environment (MDE) protocols as BAT units capable of reducing total nitrogen to 30 mg/L or less. These units are currently on the approved BAT list and have successfully completed the Maryland field verification. The flow chart for approval of BAT Class I units is available on the MDE website. Units that are still under field verification are listed as BAT Class II (*previously titled, "Field Verified Units"*) and upon successful completion of the field verification will become BAT Class I.

BAT CLASS II

BAT Class II systems are stand alone units that are undergoing field verification for BAT Class I. Upon successful completion of the field verification; they will become BAT Class I. All requirements and guidance for BAT Class I apply to BAT Class II technologies. Technologies that do not reduce the effluent nitrogen to 30 mg/l or less will be either removed from the BAT listing, enter a modified field verification process (contingent on prior approval from BAT TRC), or be classified as BAT Class III at the discretion of the BAT TRC and working with the manufacturer's representative.

BAT CLASS III

BAT Class III systems are pre-treatment technologies approved by MDE as capable of reducing nitrogen to 48 mg/L effluent. **These technologies may only be installed as BAT when paired with a BAT Class IV soil disposal system.** BAT Class III technologies must have one of the following certifications: NSF 245, NSF 40 Class I, CAN/BNQ 3680-600, CEN Standard 12566-3 or equivalent. Technologies proposed as BAT Class III, must first apply to MDE for BAT classification using the technology application found within the MDE website. The application needs to be accompanied by the final report of the verification organization. Once submitted to the BAT TRC, analysis of the data and the application will begin. The BAT TRC will analyze for the TN reduction capabilities of the unit. If the analysis of data concludes the unit will not reduce total nitrogen percent to 48 mg/L, the technology will be denied entry into the BAT program.

- continued -



BAT CLASS IV

BAT Class IV systems are on-site sewage disposal systems that are installed above, at, or just below (12-inch maximum depth) grade and are thus capable of reducing effluent TN by 30 percent. For inclusion as a BAT in Maryland, these units are to be paired with a BAT Class III, Class II or Class I system. No modification of this is authorized unless applied for and approved by the Department on a case by case basis.

BAT Class IV systems, installed under the BAT classification, must be maintained on the same frequency as any BAT in accordance with COMAR Regulation 26.04.02.07. Since no specific manufacturer is tied to this type of system, the operation and maintenance provider of the BAT Class III, II, or I unit must successfully complete the MDE-approved course for the Installation and Operation and Maintenance of the specific system.

Sand Mound, At Grade Systems and Low Pressure Dosing are addressed in Code of Maryland Regulation 26.04.02.05. All practices and criteria listed in this regulation must be applied when installing these as BAT. All installation contractors of sand mounds must be certified by the Department. The MDE Design and Construction Manual for Sand Mound Systems and the Construction Manual for At Grade systems is to be utilized for latest and best installation practices for these systems. Information sheets are available for each system type.

▪ SAND MOUNDS

An elevated sand mound system is an on-site sewage disposal system that is elevated above the natural soil surface in a suitable sand fill material. Gravel-filled absorption trenches or beds are constructed in the sand fill, and the effluent is pumped into the absorption area through a pressure distribution network. Pretreatment of sewage occurs either in a septic tank or advanced pretreatment unit, and additional treatment occurs as the effluent moves downward through the sand fill and into the underlying natural soil. The sand mound must be installed over a natural surface A or B horizon. No BAT credit is given to sand mounds installed over sand or loamy sand soils. Please refer to, "BAT Class IV: Sand Mound," for exact details as to what is needed to qualify for BAT Classification.

▪ AT-GRADE SYSTEMS

The at-grade system is an on-site sewage disposal system that utilizes a raised bed of gravel or stone over the natural soil surface with a pressure distribution system constructed to equally distribute the pretreated effluent along the length of the gravel bed. The purpose of the design is to overcome site limitations that prohibit the use of conventional trench or seepage pit on-site sewage disposal systems. Please refer to, "BAT Class IV: At-Grade Mound Systems," for exact details as to what is needed to qualify for BAT Classification.

▪ SHALLOW PLACED LOW PRESSURE DISTRIBUTION

Shallow-placed pressure dosing allows for uniform distribution of effluent at a depth not to exceed 12 inches across the entire dispersal field. Dosing allows for the creation of fluctuating aerobic/anoxic environments, which sets up the conditions for nitrification and denitrification to occur. Please refer to, "BAT Class IV: Shallow-Placed Pressure-Dosed Dispersal," for exact details as to what is needed to qualify for BAT Classification.

BAT CLASS V

BAT Class V systems are technologies that mitigate the impact of TN on groundwater but do not fit into any of the above BAT classifications. As systems are identified that will apply to be identified as Class V, the BAT TRC will develop a concise plan for the unit to enter the BAT classification. Examples include but are not limited to waterless toilets and individually engineered peat systems.