

Ohio EPA
Division of Air Pollution Control
Engineering Guide #9

Question:

What are the criteria for evaluating the compliance status of new and existing grain dryers when reviewing applications for PTIs and PTOs for such sources? (This question was submitted by Don Waltermeyer of the Northwest District Office on April 8, 1980.)

Answer:

Grain dryers are classified as either having a column (grain flows from the top to the bottom in one or more continuous packed columns between two perforated metal sheets) or rack (grain flows from the top to the bottom in a cascading flow around rows of baffles (racks)) configuration with the column type being much more prevalent. Column dryers have lower emission rates than rack dryers because some of the particulates are trapped by the column of grain and because they are more fuel efficient. In some cases, an enclosure may be built around the dryer that can act as a relatively effective settling chamber because of its moist environment. In rack dryers, the emission rate of larger particulates can be higher because the turning motion of the grain liberates more flaky material from the kernel, and the design of the dryer facilitates dust to escape. Most rack dryers have been replaced by the lower emitting and more fuel efficient column dryers.

Based on the definition of “air contaminant” in section 3704.01(B) of the Revised Code, emissions from agricultural production activities, as defined in section 929.01 of the Revised Code (and that meet the five criteria specified in the definition), are exempt from all DAPC regulations. However, per the definition, agricultural production activities do not include the installation and operation of off-farm facilities for the storage or processing of agricultural products, including, but not limited to, alfalfa dehydrating facilities, rendering plants, and feed and grain mills, elevators, and terminals. Most of the grain dryers regulated by the DAPC are located at feed and grain mills, elevators, and terminals.

The criteria for evaluating the compliance status of any regulated grain dryers are based upon the requirements of the applicable rules. Those requirements are summarized in the sections below.

- (1) Emissions from grain dryers include particulate matter from the actual drying of the grain and the products of incomplete combustion from whatever fuel (typically natural gas, propane, or #2 oil) is being burned. Emissions from both need to be evaluated using AP-42 emission factors and documented in any permit application. Because of the AP-42 emission factors for grain dryers and the high throughput rates for the dryers, we are not aware of any grain dryer that qualifies for a “de minimis” exemption under OAC rule 3745-15-05; therefore, all are required to be permitted. Per Engineering Guide 25, each

dryer is permitted separately.

(2) Grain dryers are regulated in OAC Chapter 3745-17 as follows:

(a) Grain dryers are typically fugitive dust sources as the particulate matter emissions from such dryers meet the criteria stated in the definition of "fugitive dust" [OAC rule 3745-17-01(B)(6)].

(b) The requirements of OAC rule 3745-17-11 are not applicable to grain dryers. They are specifically exempted in OAC rule 3745-17-11(A)(1)(d).

(c) Pursuant to OAC rule 3745-17-07(A)(3)(h), the opacity limitations in OAC rule 3745-17-07(A)(1) are not applicable to grain dryers that are vented through a stack or stacks and are not subject to any mass emission limitation in OAC rule 3745-17-08 or 3745-17-11. (We are not aware of any column dryer that is vented through a stack.)

(d) Fugitive dust emissions from grain dryers are regulated under the requirements of the fugitive dust rule, OAC rule 3745-17-08, if the dryer meets at least one of the following conditions:

- (i) The dryer is located within an area identified in "Appendix A" of that rule and is also located at a grain elevator having a permanent storage capacity of 2.5 million bushels or greater; or
- (ii) Probable cause exists to believe that the dryer, regardless of the location or the size of facility, is causing or contributing to a public nuisance in violation of OAC rule 3745-15-07.

Uncontrolled grain dryers that are subject to the requirements of OAC rule 3745-17-08 (B), are subject to the visible emission limitation specified in OAC rule 3745-17-07(B). Note that the fugitive dust limitation of 20% opacity specified in OAC rule 3745-17-07(B) is not stringent enough for grain dryers contributing to a public nuisance.

(3) Grain dryers that were installed prior to the initial effective date of OAC rule 3745-31-02 (January 1, 1974) are exempt from obtaining a PTI and meeting the Best Available Technology (BAT) requirements of OAC rule 3745-31-05(A)(3) unless a modification, as defined under OAC rule 3745-31-01(QQQ), occurred after that date. Companies that installed or modified grain dryers after January 1, 1974 are subject to the PTI requirements of OAC Chapter 3745-31. Regardless of the installation date, a PTO was required for each grain dryer under the requirements of OAC Chapter 3745-35; however, on June 30, 2008, OAC Chapter 3745-35 was rescinded and replaced by the new Permit-to-Install and Operate (PTIO) program in OAC Chapter 3745-31.

(4) For companies that installed or modified grain dryers after January 1, 1974, the BAT

requirements of OAC rule 3745-31-05(A)(3) are applicable. The BAT requirements for grain dryers have evolved over time; and while older permits may have little or no requirements, the newer ones contain a combination of mass emission rate limits (a fugitive tons per year (TPY) limit based on a maximum annual grain throughput rate and a corresponding TPY limit for any criteria pollutant from fuel combustion over the “de minimis” level of 1.82 tons), a visible emissions restriction of 10% opacity (as a three-minute average), and a control equipment requirement as follows:

- (a) for column dryers, a plate perforation diameter of 0.094 inch or less; and
- (b) for rack dryers, the installation of a vacuum-cleaned screen filter of 50 mesh or less.

Note that with the passage of Senate Bill 265 and the subsequent revisions to OAC Chapter 3745-31, BAT is currently not required for an air contaminant source that was installed or modified on or after August 3, 2006 and has the potential to emit (PTE), taking into account air pollution controls installed on the source, less than 10 TPY of emissions of an air contaminant or precursor of an air contaminant for which a National Ambient Air Quality Standard has been adopted under the Clean Air Act. Grain dryers, however, are subject to BAT since their PTEs are definitely greater than 10 TPY for fugitive particulate matter. (Even though many dryers are operated predominantly during the harvest season, USEPA does not recognize this as an inherent restriction limiting the PTEs. The PTE must be calculated using the maximum hourly grain throughput rate x AP-42 emission factor x 8760 hours/year x 1 ton/2,000 pounds.) The PTE for combustion emissions varies depending upon the fuel used and needs to be calculated in each case.

Because of the seasonal operation of many of these dryers, PTI applications are often received where the companies request voluntary restrictions under the provisions of OAC rule 3745-31-05(F) on the annual grain throughput rates to ensure annual emission rates less than 10 TPY. With such a request, although BAT is avoided, the resulting PTI must still be written to contain one of the above control requirements, an annual grain throughput restriction, and a restriction of 10 % opacity, as a three-minute average, to ensure the < 10 TPY limit is “practically enforceable.” These restrictions, along with the appropriate monitoring and record keeping requirements, effectively establish a new PTE for the dryer without going through the more cumbersome “federally enforceable” provisions of OAC rule 3745-31-05(D).

In August of 2009, in accordance with the provisions of Senate Bill 265, the BAT provisions of OAC Chapter 3745-31 go away. For dryers that are installed or modified after that date, unless DAPC has effective rules in place defining what BAT is for grain dryers, only applicable SIP or NSPS requirements can be cited in a PTI.

- (5) New and existing column and rack dryers located at any “grain terminal elevator” or “grain storage elevator,” for which a facility commenced construction, modification, or

reconstruction after August 3, 1978, are subject to Part 60-Standards of Performance For New Stationary Sources (NSPS), Subpart DD-Standards of Performance for Grain Elevators. “Grain storage elevator” and “grain terminal elevator” are specifically defined in Section 60.301 (Definitions) of the rule. Like all NSPS categories, determining rule applicability is impossible without reviewing the definitions.

If a determination is made that the NSPS are applicable, the requirements are:

- (a) for column dryers with a column plate perforation exceeding 0.094 inch, 0 percent opacity; and
- (b) for rack dryers with a vacuum-cleaned, screen filter coarser (larger) than 50 mesh, 0 percent opacity.

Note that the NSPS 0 percent opacity standard does not apply to column dryers with column plate perforations less than or equal to 0.094 inch in diameter or to rack dryers with a screen filter that has openings that are less than or equal to 50 mesh. In fact, it is very unlikely that any dryer you come across will exceed these opening sizes. In these instances, although you must cite the rule in the permit as being applicable, the NSPS establish no requirements.

TK/JO/DW

(May 9, 1980; reviewed and revised December 24, 2008)