

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

DRY HYDRANT

CODE 432

DEFINITION

A non-pressurized permanent pipe assembly system installed into a water source that permits the withdrawal of water by suction.

PURPOSES

To provide local fire departments or individuals an available water source for fire suppression, regardless of the time of year.

CONDITION WHERE PRACTICE APPLIES

1. Where it is necessary to draw water for fire suppression.
2. Where there is an available water source capable of supplying 250 gallons per minutes for a continuous 2-hour period.
3. Where strainer, pipe and static head losses in the designed system does not exceed 20 feet at the designed pumping rate.
4. Where the dry hydrant is safely accessible at the pumping location via an all weather access road.

CRITERIA

Design

It is the intent of this standard not to repeat in detail, but to comply with the National Fire Protection Association (NFPA) 1142, Standard on Water Supplies for Suburban and Rural Fire Fighting, specifically, Appendix B, Water Supply:

- B-3 Natural Water Sources
- B-4 Mad-Made Sources of Water
- B-5 Dry Hydrants
- B-6 Access to Water Supplies

The most current dated NFPA 1142 shall be the governing document. At the time of this standard (December 2002), the current dated NFPA 1142 is 2001.

The information listed here shall be in addition to, or as an alternative to, materials or techniques listed or described in NFPA 1142.

The design criteria for dry hydrants on which insurance companies offer insurance premium discounts may be more stringent than those in NFPA 1142 or any listed in this standard. It shall be the responsibility of the landowner or operator to obtain and submit to the designer the required design criteria from the insurance company.

Section IV, FOTG Standard 432

Water Requirement

This section addresses the minimum water requirements to meet this standard. However, the local fire department needs to be contacted for specific requirements that could exceed these minimum standards, and become part of the plan.

The quantity to be considered available to a dry hydrant is the minimum pumpable volume available (at not over 15 feet total static lift) during a drought. A minimum of 30,000 gallons (1.1 acre-inches) of pumpable impoundment water or a minimum pump flow rate of 250 gpm without interruption for 2 hours is considered a dependable water supply. For a supply volume to be considered pumpable with a fire truck, a minimum of 2 ft. of head is needed between the water surface and the top of the intake screen. The 50-year drought and freeze conditions are considered unavailable water when ponds are used to obtain reductions in fire insurance rates. Other water uses are also considered unavailable water when figuring the lowest known water level for design purposes.

In Ohio, the 50-year drought and freeze condition may be estimated to be 4 feet below the normal water level (principal spillway crest elevation). Therefore, the top of the water intake shall be placed a minimum of 4 feet, plus the depth of water necessary to obtain 30,000 gallons (2 ft. minimum), below the normal water level. Two feet shall also be provided from the bottom of the pond to the water intake to reduce the risk of plugging by sediment.

When site conditions do not allow the intake to be placed deep enough to meet this standard, but the landowner is still interested in installing a dry hydrant, the limitations of the water supply shall be discussed with the landowner and local fire department.

Reducing the minimum depth requirements between the normal water level and the top of the intake screen reduces the design frequency for the drought and freeze conditions and probably makes the dry hydrant system not acceptable for any insurance premium discounts.

If the landowner and local fire department agree to a lesser minimum depth, the limitations shall be documented in the operation and maintenance plan and documented in the Assistance Notes. In all cases, the minimum distance between the normal water level and the top of the water intake screen shall be 4 feet. The following statement shall be put on the engineering plan:

This facility is designed to provide an emergency water supply during a fire, however the pond depth and/or available volume are not sufficient to meet the recommended usable depth of water source stated in section B-5.3.2 of National Fire Protection Association (NFPA) 1142.

The available depth between the normal water level of the pond and the top of the intake screen for this facility is ___ ft., and this depth represents an estimated volume of ____ gallons.

Capacity

The pipe size shall be large enough to deliver the required capacity to the pumping station. As recommended in NFPA 1142 the minimum pipeline diameter shall be 6 inches. The maximum standpipe diameter should be 6 inches due to the difficulty in maintaining a prime with large diameter pipes. Larger standpipes are possible but only as a special design consideration.

Pipe

The pipe material may be iron, steel or plastic. Plastic pipe shall be schedule 40, SR-26 or otherwise protected from ultraviolet rays. All pipe joints shall be solvent welded. No more than two 90-degree elbows shall be used in the entire pipe system. The pipe shall be fitted with intake screen or strainer and standard fire truck hose adapters for quick connect/release operations acceptable to the local fire department.

The depth at which the pipe is installed shall be below the frost-free depth for the area.

Standard thermoplastic pipe designation code for PVC pipe shall be 1120 or 1220 and for ABS pipe shall be 1316 or 2112.

Federal, State, and Local Laws

Design and construction activities shall comply with all Federal, State, and Local laws, rules and regulations governing all activities in or along streams or bodies of water, or in relation to pollution abatement, health and safety. The owner or operator shall be responsible for securing all required permits or approvals and for performing in accordance with such laws or regulations. NRCS employees are not to assume responsibility for procuring these permits, rights or approvals or for enforcing laws and regulations. NRCS may provide the landowner or operator with technical information needed to obtain the required permits, rights or approvals to construct, operate or maintain the practice.

CONSIDERATIONS

Some sediment will be stirred up during construction. These effects should be minimal. If the intake is located in a stream, there will be some sediment caused by installation of the intake. Installation should be less than 1 day and impacts should be minimal.

The water quantity in a given water source may be impacted depending on the volume of water available. Lowering the water level could adversely effect a recreation area. The water quality under these conditions may also be adversely affected. Impact on ground water quality and quantity will be negligible.

Dry hydrants are intended to give local fire departments water supplies to fight fires. The end user is the local fire department; it is therefore necessary to involve them in the planning stages of these facilities.

The Ohio Fire Academy recommends a pumping rate goal of 1,000 gpm. This is due to the type of equipment being manufactured, the increasing water demands, and anticipated water needs and equipment in the next 10 to 20 years.

Due to sediment, debris and low water problems, intakes placed in streams are not recommended. This should be treated as a special design consideration.

The following are safety items to be considered when planning, constructing, and operating dry hydrants:

1. Locate and notify all overhead and underground utility companies prior to excavation and consider utilities during the planning of the access.
2. Dry hydrants shall be placed far enough away from the waters edge or steep banks to prevent hazardous situations during use or maintenance.
3. Shape pond banks to 2:1 slopes or flatter to prevent under cutting.
4. Any excavation along streams or ponds has a high potential for trench cave-ins. Most of these excavations will have water in the trench creating unstable trench walls. If workers must enter the trench, which should be a rare occasion, OSHA 1926, "Excavation Regulations", shall be followed.
5. The placement technique in NFPA 1142, excavating from the riser to the water source, is the recommended technique. The trench may also be excavated from the water source to the riser. This allows water to follow the trench during excavation. If the soil conditions are such that cave-ins occur, this would not be a recommended technique. It is possible to leave a soil "plug" between the water and the trench, so the trench may be dug dry.

**Section IV, FOTG
Standard 432**

PLANS AND SPECIFICATIONS

Plans and specifications are to be prepared for the specific field conditions based on this standard. Plans and specifications may include construction plans, drawings, standard drawings, job sheets, construction specifications, installation requirements, the kind, amount or quality of material to be used or the timing or sequence of construction activities.

OPERATION AND MAINTENANCE

The operation plan for the system is the responsibility of the landowner and fire department. NFPA 1142 suggests in detail how to operate such a water supply system.

The maintenance plan for the system is the responsibility of the local fire department and landowner. Maintenance is outlined in NFPA 1142, Section B-5-4, "Maintenance of Dry Hydrants". The local fire department should have a maintenance schedule acceptable to the landowner. It is strongly suggested that the limitations of the water source be discussed with the local fire department and landowner and included in the operation and maintenance plan.

The following items are included here to emphasize their importance.

Keeping the site clear of obstruction and regular mowing of the dry hydrant access area will be required to keep the area readily available for emergency use.

Pumper testing of the dry hydrant shall be done at least annually to verify site usability. This test shall include back flushing, followed by a pumper test at the maximum designed flow rate. Careful attention should be given to silt, debris, aquatic growth, or other interference that may limit the full operation of the dry hydrant.

Checks of the intake screen should be made once every five years to identify any sediment build-up and to provide information for a clean-out operation or for aquatic growth control needs. The hydrant should be back-flushed each spring and fall to remove any silt or debris that may have accumulated on the screen.

REFERENCES

1. National Fire Protection Association, (NFPA) Standard on Water Supplies for Suburban and Rural Fire Fighting, NFPA 1142-2001. This document can be ordered from:

NFPA
11 Tracy Drive
Avon, MA 02322-9908
Phone: 1-800-344-3555
email: custserv@nfpa.org

or

Instructional Materials Lab (IML)
1900 Kenny Road
Columbus, Ohio 43210
Phone: (614) 292-4277

2. Ohio Fire Academy
Division of State Fire Marshal
Ohio Department of Commerce
8895 East Main Street
Reynoldsburg, Ohio 43068
3. Natural Resources Conservation Service
Standard Drawing #OH-N or E-701, 702 or 703
Design Sheet #OH-ENG-228
4. ISO Commercial Risk Services, Inc.
445 Hutchinson Avenue, Suite 840
Columbus, Ohio 43235-5677