

## NATURAL RESOURCES CONSERVATION SERVICE

### CONSERVATION PRACTICE STANDARD

#### Dry Hydrants

(Each)

Code 432

#### DEFINITION

A dry hydrant is a standpipe connected by means of a non-pressurized pipeline to a water source that permits the withdrawal of water by suction.

#### PURPOSES

To provide a dependable, readily available source of water for fire suppression, regardless of the time of year.

#### CONDITIONS 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 at least 250 gallons per minute for a continuous 2-hour period at any time of the year. Local ordinances and fire departments may require higher pumping rates.
3. Where static head losses in the designed system do not exceed 15 feet during drought conditions.
4. Where the dry hydrant is safely accessible at the pumping location via an all weather road.

#### CRITERIA

##### 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 and along 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 and regulations.

##### Design

It is the intent of this standard not to repeat in detail but to comply with the National Fire Protection Association (NFPA) 1231, *Standard on Water Supplies for Suburban and Rural Fire Fighting*, specifically Appendix B, Water Supply.

The design criteria for dry hydrants on which insurance premium discounts are based may be more stringent than those in NFPA 1231 or 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.

The dry hydrant shall be within 10 feet of an all weather road so that it is accessible to a pumper truck. The connecting pipeline shall be as straight as possible with no more than two 90-degree elbows in the entire system. The pipe

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must be below the maximum frost penetration depth (20 inches along the south boundary and 52 inches along the northern boundary of Indiana) and below the drought level of the pool to reduce the volume of air that has to be pumped to prime the system. The system must remain airtight at all times to maintain prime during operation.

The NRCS Dry Hydrant Design Worksheet IN-ENG-50D, along with the IN-ENG-50 Standard Drawing should be used to document the design computations.

#### Access

Vehicle access to and from the dry hydrant shall be provided for fire truck and pumper units. Access shall have an all-weather surface, be well drained and be at least 12 feet wide for ease of movement by personnel and equipment during an emergency. When local road traffic may be involved, an all-weather road surface adjacent to the dry hydrant and completely off the public road is recommended for safety of the emergency personnel and the public.

#### Water Source

The water source should be available year round and be capable of supplying a minimum of 250 gallons per minute for a continuous 2-hour period. This rate requires 4,000 cubic feet of usable water. A flow rate of 1000 gpm requires 16,000 cubic feet of useable water. The 50-year drought and freeze conditions and other water uses are considered as unavailable water. In Indiana, the 50-year drought and freeze conditions in lakes and ponds may be estimated to be 4 feet below the normal pool for areas north of U.S. Hwy 40 and 3 feet below normal pool for areas south of U.S Hwy 40.

The NFPA requires 2 feet of water above the intake for usable water to prevent the formation of a vortex or whirlpool. A vortex may cause the loss of pump prime. Two feet of water should be provided below the intake for sediment accumulation and to reduce the risk of plugging. The intake shall be at least 4 feet beyond the earth slope.

#### Capacity

The pipe size shall be large enough to deliver the required capacity to the pump station. The minimum pipeline diameter shall be 6 inches. The maximum standpipe diameter should be 6 inches due to the difficulty in obtaining a prime with larger diameters of pipe. Eight-inch diameter standpipes are possible with modern pumpers but only as a special design with the approval of the local fire department.

If necessary for capacity, larger connecting pipes may be used with the 6-inch standpipe. The total lift (pumping head) shall not exceed 20 feet when all losses are totaled.

#### Dry Hydrant Head

The hydrant sleeve shall be made of bronze, brass, aluminum alloy or other durable, non-corrosive metal. Non-threaded sleeves must be permanently affixed to a PVC head using epoxy adhesive and stainless steel bolts. Threaded sleeves must have a rubber "O" ring between the sleeve and PVC head.

The hydrant head shall be able to accept a 6-inch NHT (American National Fire Hose Thread) connection to provide maximum supply.

All hydrants shall contain a removable head strainer and stainless steel snap ring that can be removed without special tools. The strainer shall be conical in shape to maximize straining area.

A recessed hydrant (below ground level) may be specified for use in areas with special needs, such as high vandalism or for low profile and esthetic needs. It is also referred to as a flush mount hydrant and does not require the 24-inch high riser. It may be used with the 45-degree or straight dry hydrant head assembly.

All hydrant heads shall have prior approval of the local fire departments to insure compatibility with their pumper units.

#### Strainer

The strainer shall be fabricated from non-corrosive material compatible with the pipe. Individual inlet holes shall not exceed 3/8-inch

diameter. Manufactured well screens and all other components shall be corrosion resistant. Screens and strainers shall have a minimum open area of 4 times the pipe cross sectional area. A strainer may be formed by drilling 1/4-inch to 3/8-inch diameter holes with a minimum of one hole diameter between holes in PVC pipe. Drilled holes shall be deburred and the pipe cleaned before putting the strainer into service.

#### Dry Hydrant Cap

The cap shall be of snap on/snap off design and removable without special tools. It shall be permanently attached to the dry hydrant head with a steel cable or chain. The cap shall be hard plastic or of the same metal as the NHT connection.

#### Inlet End Cap

The end cap must be easily removed without special tools. Perforations are recommended in the end cap to improve flow conditions and for jetting action for silt cleanout.

#### Materials

Know the material, size, and designation of the manufactured standpipe head before specifying the kind of pipe used for the system. The materials must be compatible in size and designation with the local fire department's pumpers. PVC bell and spigot pipe with rubber gasket seals shall NOT be used. The minimum pipe quality shall be Schedule 40 or SDR 26 PVC (Pressure Rated) or equivalent.

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

Plastic pipe shall conform to one of the following ASTM specifications:

D1785, Polyvinyl Chloride (PVC) Plastic Pipe, Schedule 40, 80, and 120.  
D2241, Polyvinyl Chloride (PVC) Pressure Rated Pipe (SDR Series).  
D1527, Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe, Schedule 40 and 80.  
D2282, Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe (SDR-PR).

Pressure pipe fittings shall conform to the requirements of the following ASTM specifications:

D2464, Threaded Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80.  
D2466, Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 40.  
D2467, Socket-Type Polyvinyl Chloride (PVC) Plastic Pipe Fittings, Schedule 80.  
D2468, Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings, Schedule 40.  
D2672, Joints for IPS PVC Pipe Using Solvent Cement.

Solvents for solvent-welded pipe joints shall conform to the following ASTM specifications:

D2235, Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe Fittings.  
D2564, Solvent Cements for Polyvinyl Chloride (PVC) Plastic Pipe Systems.  
D2855, Making Solvent-Cemented Joints with Polyvinyl Chloride (PVC) Pipe and Fittings

#### Safety

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

1. Locate and notify all overhead and underground utility companies at least 2 working days prior to construction. The utilities should be considered when planning the access.
2. Place dry hydrants 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 or flatter to prevent undercutting.
4. Any excavated trench near a body of water has potential for saturation and unstable walls. Trench installations shall be in accordance with all OSHA regulations.
5. The installation technique in NFPA 1231, excavating from the standpipe to the water source, is recommended. If trenching is to

be done from the water source to the standpipe, a soil plug between the water and the trench may be used to aid in keeping the trench dry.

## **CONSIDERATIONS**

Dry hydrants are intended to give local fire departments water supplies to fight fires. The end user is the fire department. It is necessary to involve them in the planning stages of these facilities. Ideally, a dry hydrant should be installed during the initial construction of a pond.

Some sediment will be stirred up during construction. Most installations should be completed in a day and impacts should be minimal.

The water quantity in a given water source may be impacted depending on the volume of water available. A recreation area could be temporarily adversely affected. Impact on ground water quality and quantity will be negligible.

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

The landowner/user will be advised if wetlands will be affected. USDA-NRCS wetland policy will apply. All work planned shall be in compliance with General Manual Title 450-GM, Part 405, Subpart A, Compliance With Federal, State, and Local Laws and Regulations. If archaeological or historical properties are encountered, the USDA-NRCS policy in General Manual Title 420-GM, Part 401 shall be followed.

Consideration shall be given to the use of construction materials, grading practices, vegetation, and other site development elements

that minimize visual impacts and maintain or complement existing landscape uses.

## **PLANS AND SPECIFICATIONS**

Plans and specifications for installing dry hydrants shall be in keeping with this standard and shall describe the requirements for applying the practice to achieve its intended purpose. Required permits shall be obtained prior to start of construction.

## **OPERATION AND MAINTENANCE**

NFPA 1231 suggests in detail how to operate and maintain dry hydrants. The operation and maintenance plan for this system is the responsibility of the landowner and local fire departments. Upon completion of the installation, the fire department shall make an initial pumper test of the system. Pipe sealants should have at least a 24-hour curing time before such tests are made.

The maintenance schedule should be acceptable to both the landowner and the local fire department. It is strongly suggested that the limitations of the water source be discussed with the fire department and landowner and be included in the operation and maintenance plan.

The following items are included here to emphasize their importance.

1. Perform regular pump test and back flushing. Test should be done on at least an annual basis or as per NFPA recommendations.
2. Keep the hydrant and all-weather road clear of snow and debris and in good repair.
3. Keep trees and underbrush trimmed away from the hydrant and all-weather road

