

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

DRY HYDRANT

(no.)

CODE 432

DEFINITION

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

current ISO minimum requirements for "Class 8 protection" are: 1) a minimum water supply of 250 gallons per minute shall be available for a 2 hour duration for fire protection throughout the area to be recognized. 2) There shall be at least one piece of responding, suitably equipped apparatus that has a pump capable of at least 250 gallons per minute rated at 150 psi.

PURPOSE

To provide all weather access to available water source for fire suppression.

CONDITIONS WHERE PRACTICE APPLIES

Where a dependable source of water is available, where transport vehicles can access the site, and where a source of water is needed for fire suppression.

Location. A location map showing the exact site of the hydrant and vehicle access shall be furnished local fire department with a copy to the landowner. A letter of approval to use the site shall be obtained from the landowner prior to construction. Access, topography, and location should be reviewed by fire department personnel prior to installation.

CRITERIA

Site Conditions. Site conditions shall be such that an all weather vehicle access is available to the dry hydrant or can be developed. The dry hydrant shall be reasonably close to the water source to minimize the length of suction line. This should be determined in conjunction with local fire officials. Special care and maintenance will be required when debris and fine soil particles are part of the streambed.

The fire truck connection shall be within 10 feet of the edge of an all weather access road. The all weather access road and fire truck pumper connection shall be higher than the auxiliary spillway elevation if installed in a constructed impoundment.

Water Requirement. The quantity to be considered available to a dry hydrant is the minimum 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.

Capacity. Minimum design flow rate should be in accordance with the ISO (currently 250 gpm). The pumping capacity of local fire fighting equipment and/or the requirements of local Fire Departments should also be taken into account in determining design flow rate. Consideration should also be given to designing for higher flow rates such as 750 or 1000 gpm to allow for future equipment upgrades.

The Insurance Service Office (ISO) is the fire insurance rating organization for Texas. The

Water supply. The adequacy of the water supply from

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

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impoundments shall be determined in accordance to appropriate local criteria. The RESOP or similar computer program can be used to determine the water supply contained by earthen construction or water impounding embankments. The adequacy of stream flow source can be determined from regional analysis of stream gage data.

The ISO rating system requires that the minimum supply be available during a drought having an average 50-year frequency.

The 50-year frequency drought level in ponds or reservoirs may be determined from Texas Engineering Technical Note No. 210-11-TX1, "Planning and Design of Dry Hydrants".

Pipe. The pipe material may be iron, steel or plastic. Plastic pipe shall be schedule 40, SDR-26 or otherwise protected from ultraviolet rays. No more than two 90-degree elbows shall be used in the entire pipe system. Pipe shall be 6 inches nominal diameter or larger. 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.

Pipe Intake. The pipe intake depth shall be calculated from the design water elevation plus pipe diameter plus 2 feet. The intake screen should have a minimum opening of 4 times the pipe cross sectional area. Where the intake is more than 3 feet off the bottom, a trash rack may be used in lieu of a screen.

A dry hydrant installation shall provide for a positive slope toward the water source. In pits or impoundment's, the intake screen or strainer shall be supported and secured at least two feet above the pool bottom.

The under water support shall be constructed of concrete or non-corrosive metal. It shall be of sufficient design to support and stabilize the strainer inlet and to provide ease of adjustment. The intake shall be at least 4 feet beyond the earth slope.

To avoid a vortex or whirlpool during pumping, the top of the inlet pipe shall be at least 2.0 feet below the design water level unless a special design is prepared to prevent vortex.

In streams, the intake screen or strainer shall be anchored in a 2 to 4 feet deep by 4 feet wide bed of crushed stone or gravel located below the streambed. The inlet end of the screen or strainer shall be capped to prevent entry of silt and debris.

In concrete or steel water storage facilities the intake may be secured at or near the bottom of the facility. Installation shall conform to manufacturer's recommendations.

Pump Lift. The top of the fire truck pumping connection or centerline of pump (whichever is higher) shall be no more than 15 feet in elevation above the bottom of the fire protection pool or stream surface during drought conditions.

The fire truck connection shall be approximately 24 inches above the ground surface, but never higher than the intake of the using fire truck.

The total lift (pumping head) shall not exceed 20 feet when all losses are totaled. Pumping head for each site shall include head loss from screen or strainer, elbows, line friction, elevation (static head), and hard rubber or flexible suction hose to the fire truck.

Dry Hydrant. Dry barrel (conventional) hydrants may not be used due to excess suction loss and the necessity that they be absolutely airtight.

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

Dry Hydrant Head. The hydrant sleeve shall be made of bronze, brass, aluminum alloy or other durable, non-corrosive metal. Sleeve must be permanently affixed inside a PVC

head using epoxy adhesive and stainless steel bolts.

The hydrant head shall be able to accept a 6-inch NHT (American National Fire Hose Thread) connection to provide maximum supply. Hydrant (6 inch) head shall conform to ASTM 2466.

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. All hydrants shall use a rubber "O" ring between the threaded sleeve and PVC head.

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

Strainer. *The intake screen shall be constructed of plastic, steel or other acceptable material as specified under "Pipe".* Individual inlet holes shall not exceed 3/8-inch diameter. All components, including pins, shall be non-corrosive. Manufactured well screens 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 the holes in PVC pipe. Drill holes shall be deburred and the pipe cleaned before putting the strainer into service. The screens or strainers shall be capped with a removable end cap.

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

Materials. All materials shall meet or exceed the minimum requirements for materials described in the various sections of this standard.

Markings. *The dry hydrant shall be clearly marked with appropriate signs acceptable to the local fire department. Use of reflective*

paint on signs and connection cap will help improve visibility during emergencies. Guard posts, guard rails, or other physical barriers shall be installed if needed to protect the above ground pipe system.

Access. Vehicle access to and from the dry hydrant shall be provided for fire truck and pumper units. *Access to and from the dry hydrant shall not interfere with or create a safety hazard to emergency or other vehicular traffic.* 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.

Protection. After the dry hydrant installation, the site shall be graded for surface drainage and vegetated or otherwise protected from erosion. Vegetation shall be in accordance with Critical Area Planting Standard and Specification (342).

CONSIDERATIONS

1. Effect of the use of the dry hydrant on upstream and downstream water quantity.
2. Sediment production caused by erosion during construction.
3. Possible effects on surface and ground water of spilled fuels and lubricants by fire trucks using the dry hydrant.
4. This practice has the potential to negatively affect National Register listed or eligible (significant) cultural resources (archaeological, historical or traditional cultural properties); it also has the potential to protect listed or eligible historic structures. Consider these factors during planning and also follow the NRCS State policy during construction and maintenance.
5. *If streams are used as a water source, those with sand, gravel, or rock bottoms provide the best operating conditions.*

6. Consideration should be given to meeting water requirements of the Texas Key Rate Schedule.

7. Installation of the entire length of horizontal pipe below the water surface is also desirable.

8. Use of the dry hydrant during emergencies may reduce available water quantity for livestock, fish and wildlife, recreation, and other related uses.

9. Pumping from dry hydrants installed in ponds may improve water quality by removing anoxic bottom water containing sediment and high levels of nutrients.

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.

Plans and specifications shall be prepared for each hydrant, and shall be based on this standard. Plans and specifications include construction plans, drawings, job sheets, construction specifications, or other similar documents. These documents are to specify the requirements for installing the practice, such as the kind, amount, or quality of materials to be used, or the timing or sequence of installation activities.

Construction Specifications describing the requirements for applying this practice shall be developed from the generalized Construction Specifications (Texas) for Dry Hydrant. The Construction Details section shall be used to describe site specific job requirements

Required easements, permits, and ingress and egress shall be obtained prior to initiating any work. Copies of easements and

permits should be obtained for NRCS files

OPERATION AND MAINTENANCE

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. Aquatic vegetation shall be controlled to prevent clogging of the intake screen.

For protection from fires, all vegetation should be controlled within 5 feet of the dry hydrant riser.

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

*Insurance Service Organization
National Fire Protection
Association (NFPA)*

APPROVAL AND CERTIFICATION

DRY HYDRANT

(no.)

CODE 432

PRACTICE STANDARD APPROVED:

_____/s/ John Mueller_____
State Conservation Engineer

_____/7/29/02_____
Date

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