

**CHAPTER 4725  
DEPARTMENT OF HEALTH  
WATER WELL CONSTRUCTION CODE**

- |           |  |  |
|-----------|--|--|
| 4725.0100 | DEFINITIONS.   | <b>STANDARDS FOR CONSTRUCTION OF WELLS</b>   |
| 4725.0200 | APPLICATION TO ALL WATER WELLS.  | 4725.3400 CASING FOR PERMANENT WELLS.  |
| 4725.0300 | PUBLIC WATER SUPPLY.   | 4725.3500 WELLS IN SHALLOW CONTINUOUS<br>GLACIAL OUTWASH MATERIAL<br>PENETRATING NONARTESIAN<br>WATER. |
| 4725.0400 | MODIFICATION BY THE<br>COMMISSIONER.   |  |
|           | <b>LICENSING</b>   |  |
| 4725.0500 | QUALIFICATIONS.  | 4725.3600 MINIMUM PROTECTIVE DEPTHS OF<br>WELLS.   |
| 4725.0600 | APPLICATIONS AND FEES.   | 4725.3700 CASING USED AS A SUCTION LINE.   |
| 4725.0700 | APPLICATION FOR EXAMINATION.   | 4725.3800 GROUTING.  |
| 4725.0800 | APPLICATION FOR LICENSURE.   | 4725.3900 ROTARY, BORED, OR AUGERED<br>WELLS.  |
| 4725.0900 | COUNCIL EVALUATION OF<br>APPLICANTS.   | 4725.4000 DRIVEN CASING WELLS.   |
| 4725.1000 | EXAMINATION.   | 4725.4100 UNCONSOLIDATED GLACIAL DRIFT<br>WELLS.   |
| 4725.1100 | DENIAL OF APPLICATION.   | 4725.4200 ROCK WELLS.  |
| 4725.1200 | LICENSE REQUIREMENT.   | 4725.4300 CAVERNOUS ROCK WELLS.  |
| 4725.1300 | LICENSE RENEWAL.   | 4725.4400 FLOWING ARTESIAN WELLS.  |
| 4725.1400 | LICENSING OF PARTNERSHIPS,<br>CORPORATIONS, OR BUSINESS<br>ASSOCIATIONS.       | 4725.4500 WELL SCREENS.  |
| 4725.1500 | SUSPENSION OR REVOCATION OF<br>LICENSE.  | 4725.4600 CAPPING.   |
| 4725.1600 | REINSTATEMENT.   | 4725.4700 YIELD TEST.  |
| 4725.1700 | PLACEMENT OF DECALS AND<br>LICENSE NUMBER.                                     | 4725.4800 ALIGNMENT.   |
| 4725.1800 | WELL DRILLING MACHINE<br>REGISTRATION.   | 4725.4900 DRILLING WATER.  |
| 4725.1850 | REGISTRATION OF ENGINEERS WHO<br>DRILL MONITORING WELLS.                       | 4725.5000 DUG OR BORED WELLS.  |
| 4725.1860 | MONITORING WELLS.  | 4725.5100 WELL DEVELOPMENT.  |
|           | <b>LOCATION OF WELLS</b>   | 4725.5200 DISPOSAL OF MATERIAL.<br><b>WELL CASING SEALS AND CONNECTIONS</b>                            |
| 4725.1900 | LOCATION OF WELL.  | 4725.5300 WATER LEVEL MEASUREMENT<br>DESIGN.   |
| 4725.2000 | DISTANCE FROM POLLUTION OR<br>CONTAMINATION SOURCES.                           | 4725.5400 ABOVE-GRADE CONNECTIONS.   |
| 4725.2100 | WELLS ADJACENT TO BUILDINGS,<br>GAS LINES, OR OVERHEAD ELECTRIC<br>POWERLINES. | 4725.5500 BELOW-GRADE CONNECTION,<br>OTHER METHODS.  |
| 4725.2200 | AREAS SUBJECT TO FLOODING.   | <b>PUMP INSTALLATION</b>   |
|           | <b>GENERAL PROTECTION OF GROUNDWATER<br/>QUALITY AND RESOURCES</b>             | 4725.5700 PUMP AND WELL ROOMS.   |
| 4725.2300 | REUSE OF WATER, DISPOSAL,<br>RECHARGE, OR GAS STORAGE<br>WELLS.                | 4725.5800 SLABS, PLATFORM, AND FLOORS.   |
| 4725.2400 | MAINTENANCE AND REPAIR OF<br>WELLS.  | 4725.5900 PUMPS AND PUMPING EQUIPMENT.   |
| 4725.2500 | ABANDONMENT OF WELLS.  | 4725.6000 WATER SUCTION LINES.   |
| 4725.2600 | TEMPORARY ABANDONMENT.   | 4725.6100 PUMP DISCHARGE LINES.  |
| 4725.2700 | PERMANENT ABANDONMENT OF<br>WELLS.   | 4725.6200 PRESSURE TANKS.  |
| 4725.2800 | OWNER'S RESPONSIBILITY FOR<br>SEALING WELL.                                    | 4725.6300 VENTS.   |
| 4725.2900 | ABANDONMENT.   | 4725.6400 SAMPLING FAUCET.   |
| 4725.3100 | TEST HOLES AND BORINGS.  | 4725.6500 DISINFECTION.  |
| 4725.3200 | DEWATERING AND DEPRESSURIZING<br>AND OTHER WELLS.                              | <b>RECORDS AND SAMPLES</b>   |
| 4725.3300 | OTHER WATER SOURCES,<br>CROSS-CONNECTIONS, AND STORAGE<br>RESERVOIRS.          | 4725.6600 WATER SAMPLE.  |
|           |  | 4725.6700 WATER WELL RECORDS.  |
|           |  | 4725.6800 WATER WELL CUTTING FORMATION<br>SAMPLES.   |
|           |  | <b>PLASTIC WELL CASING</b>   |
|           |  | 4725.6900 PLASTIC WELL CASING; GENERALLY.  |
|           |  | 4725.7000 DEFINITIONS.   |
|           |  | 4725.7100 STANDARDS.   |
|           |  | 4725.7200 PIPE MARKINGS.   |
|           |  | 4725.7400 STORAGE, HANDLING, AND<br>COMPONENTS.  |
|           |  | 4725.7500 TECHNIQUE FOR JOINING PLASTIC<br>WELL CASING.  |
|           |  | 4725.7600 INSTALLATION OF PLASTIC WELL<br>CASING.  |

**4725.0100 DEFINITIONS.**

Subpart 1. **Scope.** For the purposes of these rules promulgated pursuant to Minnesota Statutes, chapter 156A, as amended, the terms defined in this part have the meanings given them, except where the context clearly indicates otherwise.

Subp. 2. **Scope of subparts 3 to 15.** The following terms apply primarily to the licensing rules, parts 4725.0500 to 4725.1800, but are also applicable to the Water Well Construction Code, parts 4725.1900 to 4725.7600 when used therein.

# MINNESOTA RULES 1985

4231

## WATER WELL CONSTRUCTION CODE 4725.0100

Subp. 3. **Act.** "Act" means Minnesota Statutes, sections 156A.01 to 156A.08, as amended, under which these rules are promulgated.

Subp. 4. **APA.** "APA" means the Administrative Procedure Act, Minnesota Statutes, chapter 14.

Subp. 5. **Applicant.** "Applicant" means any person who applies for a water well contractor's license pursuant to the act.

Subp. 6. **Application for examination.** "Application for examination" means the application submitted by an applicant from which the commissioner determines whether the applicant is eligible to take the examination.

Subp. 7. **Application for licensure.** "Application for licensure" means the application submitted by an applicant upon his successful completion of the examination, or at the end of each calendar year for licensure renewal.

Subp. 8. **Commissioner.** "Commissioner" means the commissioner of health or his or her authorized representative.

Subp. 9. **Council.** "Council" means the Water Well Contractors, and Exploratory Borers, Advisory Council created pursuant to the provisions of Minnesota Statutes, section 156A.06.

Subp. 10. **Licensee.** "Licensee" means a person who is licensed as a water well contractor pursuant to the provisions of the act and these rules.

Subp. 11. **Person.** "Person" means any natural person, corporation, partnership, or other business association.

Subp. 12. **Representative.** "Representative" means an individual who is in charge of the water well drilling and contracting operation and qualifies for licensure on behalf of a partnership, corporation, or other business association rather than on his own behalf.

Subp. 13. **Upper termination of the well casing.** "Upper termination of the well casing" means a point 12 inches above the established ground surface.

Subp. 14. **A water well drilling machine.** "A water well drilling machine" means any machine or device such as a cable tool, hollow rod, or auger used for construction of a water well including drive point wells or a hoist or machine used in the well repair service which involves the modification to the well casing, screen, depth, or diameter below the upper termination of the well casing.

Subp. 15. **Year of experience.** "Year of experience" for a water well contractor means a year during which the applicant personally drilled five water wells and was actively working in the trade for a period of 1,000 hours under the supervision of a licensed water well contractor. An applicant drilling 1,000 hours per year and completing fewer than five wells per year may qualify, if the experience is gained in constructing one or more large diameter wells (casing outer diameter is ten inches or more) which are more than 500 feet deep. An applicant who seeks to qualify under this provision shall have his license limited to construction of such deep and large diameter wells. Supervision of a drilling operation shall not be considered as an equivalent to personally drilling a well. The experience must have been gained in Minnesota except that an applicant may provide the commissioner with information demonstrating that his experience was gained in an area with the same or similar geological and other well drilling conditions as in the applicant's proposed well drilling operations territory in Minnesota. Such experience may be considered as meeting the experience requirement of these rules. Applicants from states having no standards or licensing programs, or standards less strict than those adopted pursuant to Minnesota Statutes, chapter 156A shall have obtained at least one year of experience in Minnesota under the supervision of a licensed water well contractor, in addition to that which is required under parts 4725.0500 to 4725.1800.

# MINNESOTA RULES 1985

## 4725.0100 WATER WELL CONSTRUCTION CODE

4232

Subp. 16. **Application of subparts 17 to 54.** The following terms apply to the Water Well Construction Code, parts 4725.1900 to 4725.7600.

Subp. 17. **Abandoned water well.** "Abandoned water well" means a well whose use has been permanently discontinued, or which is in such disrepair that its continued use for the purpose of obtaining groundwater is impracticable or may be a health hazard.

Subp. 18. **Administrative authority.** "Administrative authority" means the commissioner. When this code, parts 4725.1900 to 4725.7600, is adopted by any municipality of the state, such municipality may apply to the commissioner for authorization to act as an inspection agent of the administrative authority to enforce the provisions of the act and these rules.

The inspection agent's authority shall be limited to inspections to determine compliance with the provisions of these rules and to exercise any other powers specifically given the administrative authority by these rules. The commissioner may grant such authority if the municipality demonstrates that at least one of its employees is qualified and familiar with the well drilling operations in that municipality. Such authorization may be revoked without cause by the commissioner or released by the municipality on ten days' written notice. This subpart shall not preclude the commissioner or any municipality from reaching an agreement authorized by Minnesota Statutes, section 471.59.

Subp. 19. **Annular space.** "Annular space" means the space between two cylindrical objects one of which surrounds the other, such as the space between a drillhole and a casing pipe, or between a casing pipe and liner pipe.

Subp. 20. **Approved basement.** "Approved basement" means a private home basement with walls and floor constructed of concrete or equivalent which is not subject to flooding and not located within a floodplain.

Subp. 21. **Aquifer.** "Aquifer" means a water-bearing formation (soil or rock horizon) that transmits water in sufficient quantities to supply a well.

Subp. 22. **Casing.** "Casing" means an impervious durable pipe placed in a well to prevent the walls from caving and to seal off surface drainage or undesirable water, gas, or other fluids to prevent their entering the well and includes specifically but not limited to:

A. "Temporary casing" means a temporary casing placed in soft, sandy, or caving surface formation to prevent the hole from caving during drilling.

B. "Protective casing" means the permanent casing of the well.

Subp. 23. **Cesspool.** "Cesspool" means an underground pit into which raw household sewage or other untreated liquid waste is discharged and from which the liquid seeps into the surrounding soil or is otherwise removed.

Subp. 24. **Coliform group.** "Coliform group" means all of the aerobic and facultative anaerobic, gram-negative, non-spore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 35 degrees centigrade.

Subp. 24a. **Confining bed.** "Confining bed" means a layer or body of soil, sediment, or rock with low vertical permeability relative to the aquifers or beds above or below it.

Subp. 25. **Director.** "Director" means the director of the Division of Environmental Health of the department, or his authorized representative, who shall carry out the administrative functions of these rules on behalf of the commissioner.

Subp. 26. **Drawdown.** "Drawdown" means the extent of lowering of the water surface in a well and aquifer resulting from the discharge of water from the well.

# MINNESOTA RULES 1985

4233

## WATER WELL CONSTRUCTION CODE 4725.0100

Subp. 27. **Dug well.** "Dug well" means a well in which the side walls may be supported by material other than standard weight steel casing. Water enters a dug well through the side walls and bottom.

Subp. 28. **Established ground surface.** "Established ground surface" means the intended or actual finished grade (elevation) of the surface of the ground at the site of the well.

Subp. 29. **Geological material.** "Geological material" means all materials penetrated in drilling a well.

A. The following table lists materials other than consolidated rock classified according to average particle size (Wentworth 1922).

Material	Particle Diameters		Screen Slot No.	
	Millimeters	Inches	From	To
Clay	Up to 0.005	Up to 0.0002	-	-
Silt	0.005-0.062	0.0002-0.0025	-	-
Fine Sand	0.062-0.250	0.0025-0.010	2	10
Medium Sand	0.250-0.50	0.010-0.020	10	20
Coarse Sand	0.50-1.00	0.020-0.040	20	40
Very Coarse Sand	1.00-2.00	0.040-0.080	40	80
Fine Gravel	2.00-4.00	0.080-0.160	80	160
Coarse Gravel	4.00-62.5	0.160-2.50	160 and larger	
Cobbles	62.5-250.0	2.50-10.0	-	-
Boulders	250.0 and larger	10.0 and larger		

B. "Alluvium" is a general term for clay, silt, sand, gravel, or similar unconsolidated material deposited during comparative recent geologic time by a stream or other body of running water as a sorted or semisorted sediment.

C. "Glacial drift (unconsolidated)" means a general term applied to all rock material (clay, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or by running water emanating from the glacier.

D. "Glacial outwash" means a stratified sand and gravel removed or washed out from a glacier by meltwater streams and deposited in front of or beyond the terminal moraine or the margin of an active glacier.

E. "Hardpan" is a term to be avoided if possible, but when used means a hard impervious layer composed chiefly of clay, cemented by relatively insoluble materials, which does not become plastic when mixed with water and definitely limits the downward movement of water and roots.

F. "Shale" means rock consisting of hardened silts and clays.

G. "Sandstone" means cemented or otherwise compacted sediment composed predominately of sand.

H. "Limestone" means rock which contains at least 80 percent of carbonates of calcium and has strong reaction with HCl (muriatic acid).

I. "Dolomite" means rock which contains at least 80 percent of carbonates of magnesium and has a weak reaction with HCl (muriatic acid).

J. "Gypsum" means a soft light colored formation of calcium sulfate crystals and may be found as streaks in a shale formation.

Subp. 30. **Grout.** "Grout" means neat cement, concrete, heavy drilling mud, or heavy bentonite water slurry. Heavy drilling mud or heavy bentonite water slurry when used as grout shall be of sufficient viscosity to require a time of at least 70 seconds to discharge one quart of the material through an API (American Petroleum Institute) marsh funnel viscometer.

# MINNESOTA RULES 1985

## 4725.0100 WATER WELL CONSTRUCTION CODE

4234

Subp. 30a. **Monitoring well.** "Monitoring well" means any excavation that is drilled, cored, bored, washed, driven, dug, jetted, or otherwise constructed for the purpose of extracting groundwater for physical, chemical, or biological testing. "Monitoring well" includes "groundwater quality sampling well" as that phrase is used in Minnesota Statutes, section 156A.03, subdivision 3.

Subp. 31. **Municipality.** "Municipality" means a city, village, township, borough, county, district, or other political subdivision of the state created by or pursuant to state law or any combination of such units acting cooperatively or jointly.

Subp. 32. **Pitless adapter.** "Pitless adapter" means a device for above or below ground discharge designed for attachment to one or more openings through a well casing, and constructed so as to prevent the entrance of contaminants into the well.

Subp. 33. **Pitless unit.** "Pitless unit" means an assembly with cap which extends the upper end of the well casing to above grade, and constructed so as to prevent the entrance of contaminants into the well.

Subp. 34. **Pollution or contamination.** "Pollution" or "contamination" means the presence or addition of any substance to water which is or may become injurious to the health, safety, or welfare of the general public or private individuals using the well; which is or may become injurious to domestic, commercial, industrial, agricultural, or other uses which are being made of such water.

Subp. 35. **Potable water.** "Potable water" means water which is safe for human consumption in that it is free from impurities in amounts sufficient to cause disease or harmful physiological effects.

Subp. 36. **Pressure tank or hydropneumatic tank.** "Pressure tank" or "hydropneumatic tank" means a closed water storage container constructed to operate under a designed pressure rating to modulate the water system pressure within a selected pressure range.

Subp. 37. **Priming.** "Priming" means the first filling of a pump with water and the action of starting the flow in a pump.

Subp. 38. **Pump house.** "Pump house" means a building constructed over a well exclusively to protect the well, pump, and water treatment equipment.

Subp. 39. **Pump room or well room.** "Pump room" or "well room" means an enclosed structure, either above or in a below grade approved basement housing the pump, top of the well, a suction line or any combination thereof.

Subp. 40. **Pumping water level.** "Pumping water level" means the distance measured from the established ground surface to the water surface in a well being pumped at a specified rate for a specified period of time.

Subp. 41. **Pumps and pumping equipment.** "Pumps and pumping equipment" means materials used or intended for use in withdrawing or obtaining groundwater for any use, including without limitation, seals and other safeguards to protect the water from pollution and together with fittings, and controls to provide sanitary water storage facilities. "Installation of pumps and pumping equipment" means the selection of, and procedure employed in the placement and preparation for operation of, pumps and pumping equipment, including construction involved in making entrance to the well and establishing proper seals and other safeguards to protect groundwater from pollution, including repairs to existing installations.

Subp. 42. **Sewage.** "Sewage" means the water carried waste products from residences, public buildings, including the excrementious or other discharges from the bodies of human beings or animals together with such groundwater infiltration and surface water as may be present.

# MINNESOTA RULES 1985

4235

## WATER WELL CONSTRUCTION CODE 4725.0100

Subp. 43. **Seepage pit or dry well.** "Seepage pit" or "dry well" means an underground pit into which a septic tank discharges household sewage or other liquid waste and from which the liquid seeps into the surrounding soil through the bottom and openings in the side of the pit.

Subp. 44. **Septic tank.** "Septic tank" means a watertight tank of durable materials through which sewage flows very slowly and in which solids separate from the liquid to be decomposed or broken down by bacterial action.

Subp. 45. **Sewer.** "Sewer" means a pipe or conduit carrying sewage or into which sewage may back up.

Subp. 46. **Subsurface disposal field, seepage bed, drainfield, percolation system, or tile absorption field.** "Subsurface disposal field," "seepage bed," "drainfield," "percolation system," or "tile absorption field" means a system composed of open jointed tile lines buried in stones and shallow trenches or beds for final disposal into the ground of sewage effluent from a septic tank. The septic tank effluent is applied to land by distribution beneath the surface through the open jointed lines.

Subp. 47. **Static water level.** "Static water level" means the distance measured from the established ground surface to the water surface in a well neither being pumped, nor under the influence of pumping nor flowing under artesian pressure.

Subp. 48. **Subterranean gas.** "Subterranean gas" means a gas occurring below the land surface. It may be flammable such as methane or highly toxic as hydrogen sulfide and may be associated with ground water.

Subp. 49. **Suction line.** "Suction line" means a pipe or line connected to the inlet side of a pump or pumping equipment or any connection to a well casing that may conduct nonsystem water into the well because of negative pressures.

Subp. 50. **Water varieties.** "Water varieties" mean:

A. "Groundwater" means the water in the zone of saturation in which all of the pore spaces of the subsurface material are filled with water. The water that supplies springs and wells is groundwater.

B. "Near surface water" means water in the zone immediately below the ground surface. It may include seepage from barnyards, disposal beds or leakage from sewers, drains, and similar sources of pollution.

C. "Surface water" means water that rests or flows on the surface of the ground.

Subp. 51. **Well.** "Well" means water well as defined in Minnesota Statutes, section 156A.02, subdivision 1.

Subp. 52. **Well seal.** "Well seal" means a device or method used to protect a well casing or water system from the entrance of any external pollutant at the point of entrance into the casing of a pipe, electric conduit, or water level measuring device.

Subp. 53. **Well vent.** "Well vent" means an outlet at the upper terminal of a well casing to allow equalization of air pressure in the well and escape of toxic or flammable gases when present.

Subp. 54. **Yield or production.** "Yield" or "production" means the quantity of water per unit of time which may flow or be pumped from a well under specified conditions.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**History:** *8 SR 1625*

# MINNESOTA RULES 1985

## 4725.0200 WATER WELL CONSTRUCTION CODE

4236

### 4725.0200 APPLICATION TO ALL WATER WELLS.

These rules shall apply to all water wells in the state of Minnesota except those specifically exempted by the act. Those aspects covered are the construction of new wells, the repair and maintenance of wells where specified, the proper abandonment of wells, and the proper isolation of possible sources of contamination from existing wells to protect the quality of ground water aquifers for providing safe drinking water supplies.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.0300 PUBLIC WATER SUPPLY.

In accordance with part 4720.0010, no system of water supply, where such system is for public use, shall be installed by any public agency or by any person or corporation, nor shall any such existing system be materially altered or extended, until complete plans and specifications for the installation, alteration, or extension, together with such information as the commissioner may require shall have been submitted in duplicate and approved by the director insofar as any features thereof affect or tend to affect the public health. No construction shall take place except in accordance with the approved plans. The plans for the well shall conform as specified by this well code. No municipal well may be drilled without approval of the site by the director.

**Statutory Authority:** *MS s 144.08; 144.12 subd 1; 144.381 to 144.388*

### 4725.0400 MODIFICATION BY THE COMMISSIONER.

When the strict applicability of any provision of these rules presents practical difficulties or unusual hardships, the commissioner, in a specific instance, may modify the application of such provisions consistent with the general purpose of these rules and the act and upon such conditions as are necessary, in the opinion of the commissioner, to protect the groundwater of the state and the health, safety, and general well-being of persons using or potential users of the groundwater supply.

Any request for modification shall be submitted to the administrative authority in writing and shall be signed by both the owner and the licensee. In addition any persons involved in providing documentary evidence in support of the request shall sign the request submitted by the owner. Such request shall specify in detail the nature of the modification being sought, the reasons therefor, and the special precautions to be taken to avoid contamination of the well. The request shall also include: the proposed well depth, casing type and depth, method of construction and grouting, geological conditions likely to be encountered, and location of the well and of possible sources of contamination. Whether or not the requests are granted, the commissioner shall state in detail the reasons for the decision.

The owner of a water well is bound by all the provisions of parts 4725.0100 to 4725.7600 which relate to location, construction, maintenance, and abandonment of wells.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

## LICENSING

### 4725.0500 QUALIFICATIONS.

All applicants shall meet the following requirements:

- A. a minimum of three years experience in water well drilling;
- B. honesty, integrity, and an ability to perform the work of a water well drilling contractor; and
- C. submission to the commissioner of properly completed applications.

# MINNESOTA RULES 1985

4237

## WATER WELL CONSTRUCTION CODE 4725.0900

All applicants must successfully complete the examination provided for in the act and in these rules.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.0600 APPLICATIONS AND FEES.

All applicants shall submit two applications. The first one shall be an application for examination. If the applicant qualifies, then he shall submit an application for licensure.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.0700 APPLICATION FOR EXAMINATION.

Subpart 1. **Submission of application.** An application for examination shall be submitted to the commissioner on forms provided by him. The application shall be accompanied by the filing fee of \$50. The fee shall be paid using only a money order, bank draft, or certified check made payable to the Minnesota state treasurer.

The commissioner shall not act upon the application until he has received reference letters from individuals who are familiar with the applicant's work experience, honesty, integrity, and ability to perform the work of a water well drilling contractor.

The filing fee for an application for examination shall not be refunded for any reason except when an applicant is not found to be qualified to take the written examination.

Subp. 2. **Reapplication.** An individual may apply for examination as many times as he desires. Each application must be accompanied by the filing fee as prescribed by the act.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.0800 APPLICATION FOR LICENSURE.

Subpart 1. **Licensure application.** Upon satisfactory completion of the examination, the applicant must apply for a license within one year of the date on which he is notified of passing the exam, upon forms provided by the commissioner. The application shall be accompanied by a license fee of \$50. The fee shall be paid using only a money order, bank draft, or certified check made payable to the Minnesota state treasurer. This fee shall not be refunded for any reason.

Subp. 2. **Deadline for receipt of license application.** If an applicant passes the examination or qualifies for licensure but the commissioner does not receive his application for licensure within one year from the date of the letter from the commissioner notifying him of his eligibility for licensure, then no license may be issued. Such an applicant, in order to become licensed at some later date, shall requalify by submitting a new application for examination and the prescribed fee.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.0900 COUNCIL EVALUATION OF APPLICANTS.

The council shall evaluate each applicant and forward its recommendations to the commissioner. The commissioner or council may conduct oral interviews and require sworn affidavits and other supporting evidence to determine qualifications of the applicant.

**Statutory Authority:** *MS s 156A.01 to 156A.08*



# MINNESOTA RULES 1985

## 4725.1000 WATER WELL CONSTRUCTION CODE

4238

### 4725.1000 EXAMINATION.

Subpart 1. **Application for examination.** No applicant shall be permitted to take the examination unless he has submitted an application for examination, the accompanying filing fee, and been determined to be qualified by the council.

Subp. 2. **Examination.** The applicant shall take an examination which may be any combination of written, oral, or practical work as determined by the commissioner with the advice of the council. Satisfactory completion of the examination is a mandatory prerequisite for licensure.

Subp. 3. **Examination of representatives of partnership, corporation, or business association.** An applicant which is a partnership, corporation, or other business association, shall designate one partner, officer, or other responsible full-time employee who shall be its representative to take the examination on its behalf. Upon licensure of the applicant, the representative shall be responsible for the supervision of all operations required of water well contractors by the act and the rules adopted thereunder.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.1100 DENIAL OF APPLICATION.

An application for examination or license may be denied for any of the following reasons:

- A. failure of the applicant to complete the application;
- B. failure of the applicant to submit the application with the prescribed fee;
- C. failure of the applicant to meet the experience, reference, examination, and other qualifications required by the act and these rules; or
- D. other sufficient causes as determined after notice and hearing in accordance with APA.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.1200 LICENSE REQUIREMENT.

No person shall drill, construct, or repair a water well within this state unless in possession of a valid license to do so issued by the commissioner; provided, however, that persons installing or repairing pumps on a well shall not be licensed as water well contractors provided their work does not involve modifications to the well casing, screen, depth, or diameter below the upper termination of the well casing. The initial and renewal license shall not be transferable and expires on January 31 of the year after that for which it was issued. The initial license shall contain the name of the licensee; the licensee's representative, if applicable; the date of issue; and the license number.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.1300 LICENSE RENEWAL.

Each licensee shall submit an application for license renewal on forms provided by the commissioner no later than January 31 of the year for which application is made. The license renewal application shall be accompanied by a fee of \$50. A penalty fee of \$10 shall also be paid if the renewal is submitted after the January 31 deadline. Upon receipt of the application answered in a manner acceptable to the commissioner, a licensee shall be sent a renewal license. The renewal license shall consist of a card in duplicate and contain the name of the licensee; the licensee's representative, if applicable; expiration date; and license number. One card shall be kept posted with the original license. The other shall be carried by the licensee or his representative. Any licensee who does not renew his license within one year may have his license renewed only upon the recommendation of the council and only after showing sufficient

# MINNESOTA RULES 1985

4239

## WATER WELL CONSTRUCTION CODE 4725.1500

cause for not renewing. Until such showing is made and the renewal license issued, the licensee shall not work as a water well contractor.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.1400 LICENSING OF PARTNERSHIPS, CORPORATIONS, OR BUSINESS ASSOCIATIONS.**

Subpart 1. **Licensee.** In the case of those applicants who are subject to part 4725.1000, subpart 3, the licensee shall be the partnership, corporation, or other business association who that individual represents and not the representative.

A. A person who acts as a representative may not be in the employ of any water well contractor other than the one he represents.

B. When the representative leaves the licensee or is otherwise incapable of performing his responsibilities, the licensee shall inform the commissioner within five days of such fact and give the name of a qualified individual acceptable to the commissioner, who shall be responsible for the acts of the licensee during the interim period while a new representative is being qualified. Although the licensee shall retain the same numbered license upon the licensing of the new representative, all applications, examinations, fees, and other requirements must be satisfied in order to qualify the new representative who must qualify within 90 days. If he does not do so, the water well contractor shall be without a license and must cease operations.

Subp. 2. **Licensed individual acting as representative.** If an individual has his own license and desires to act as a representative, or if a representative desires to obtain a license in his own name, the business association or the individual, as the case may be, need only submit an application for licensure and fee. The examination need not be retaken.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.1500 SUSPENSION OR REVOCATION OF LICENSE.**

Subpart 1. **Commissioner action.** The commissioner may suspend or revoke the license of a water well contractor upon finding that the licensee has violated the provisions of the act or the rules adopted thereunder. The commissioner may initiate such proceedings upon his own motion or upon recommendation of the council.

Subp. 2. **Investigation.** The commissioner or council may cause an investigation to be made in any case in order to determine whether there has been a violation of the act or of these rules and, in so doing, may request the licensee to appear before them to determine the merits of the situation in question. In each case the council shall make a recommendation to the commissioner as to whether proceedings under the act and the APA would be appropriate.

Subp. 3. **Disciplinary action.** Any disciplinary action taken under this part shall comply with the provisions of the APA.

Subp. 4. **Revocation or suspension.** A license may be suspended until certain conditions are fulfilled and/or for a specified period of time as determined to be most appropriate by the commissioner. The suspended or revoked license along with the current renewal certificates shall be returned to the commissioner by the licensee. When the license of a water well contractor who is subject to the provisions of part 4725.1000, subpart 3 is revoked or suspended, the disciplinary action shall apply to both the licensee and its representative.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

# MINNESOTA RULES 1985

## 4725.1600 WATER WELL CONSTRUCTION CODE

4240

### 4725.1600 REINSTATEMENT.

Subpart 1. **Revoked license.** A revoked license may not be reinstated. The licensee who has had his license revoked may be relicensed by filing the usual applications and fees, and by taking the examination. The commissioner shall require an investigation or hearing to determine whether the person should be issued a new license; provided, however, that in no case shall a new license be issued prior to one year after the revocation has taken effect.

Subp. 2. **Suspended license.** A licensee suspended for a specified period of time shall be automatically reinstated at the end of that time. Nothing herein shall be interpreted to prevent the making of such reinstatement conditional upon terms established by the commissioner in his order of suspension.

A licensee suspended for an indefinite period of time may be reinstated at the commissioner's own motion after due investigation to determine that the conditions upon which the suspension was based have been corrected or upon the commissioner receiving reasonable assurance to his satisfaction that such conditions will not reoccur.

Subp. 3. **Hearing for reinstatement.** The person whose license has been revoked or indefinitely suspended may petition the commissioner for a hearing for reinstatement of his license. Such hearing shall be granted only upon a showing by the petitioner that reasonable grounds exist for such hearing.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.1700 PLACEMENT OF DECALS AND LICENSE NUMBER.

A licensee shall place in a conspicuous location on both sides of each well drilling machine his license number in figures not less than three inches high and 1-1/2 inches wide. The number shall be in a contrasting color to the background. Decals designating the year for which the license was issued or renewed and the words, "MINNESOTA LICENSED WATER WELL CONTRACTOR," shall be affixed directly adjacent to and below the license number on each well drilling machine. Water well contractors using a rope spool or other devices for well installation shall attach their decal on a portable display to be shown at the well site. The decals shall be issued by the commissioner upon licensure and renewal.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.1800 WELL DRILLING MACHINE REGISTRATION.

An initial or renewal license issued pursuant to Minnesota Statutes, chapter 156A and the water well contractors rules, parts 4725.0100 to 4725.7600, shall include the registration of one drilling machine. Each water well contractor shall pay an annual fee of \$5 for the registration with the commissioner of each additional drilling machine. Upon receipt of the required fee and information, a water well drilling machine registration card shall be issued for identification purposes for each drilling machine registered by the well drilling contractor. The card shall be carried on the water well drilling machine at all times where it may be inspected by the director. The card expires on January 31 of the year after that for which it was issued.

The registration card and duplicate decals furnished for a water well drilling machine are not transferable. The card and decals shall be returned to the director when a water well drilling machine is sold, traded, or otherwise disposed of. A registration card and two new decals for a drilling machine so transferred will be provided upon receipt of the water well drilling machine registration fee, the old card, the two old decals and application for the new drilling machine.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.1850 REGISTRATION OF ENGINEERS WHO DRILL MONITORING WELLS.**

Subpart 1. **Original registration.** A professional engineer who is registered with the Board of Architecture, Engineering, Land Surveying, and Landscape Architecture as a civil or geological engineer, and who seeks to drill monitoring wells, shall register annually on a form provided by the commissioner. The completed form must be returned to the commissioner, along with the \$50 registration fee. The registrant shall register each calendar year, and the registration expires on December 31.

Subp. 2. **Renewal.** Each registrant shall submit an application for registration renewal on a form provided by the commissioner no later than December 31 of the year preceding the year for which the application is made. The registration renewal application must be accompanied by a fee of \$50. A penalty fee of \$10 must be paid in addition to the \$50 renewal fee if the renewal is submitted after the December 31 deadline.

Subp. 3. **Drilling monitoring wells.** An engineer may not drill monitoring wells unless he is currently registered with the commissioner.

**Statutory Authority:** *MS s 156A.03*

**History:** *8 SR 1625*

**4725.1860 MONITORING WELLS.**

Subpart 1. **Use of well.** A monitoring well may not be used as a source of water for human consumption, or for any industrial or agricultural use, or for any public or private water supply. A monitoring well may not be used for any purpose other than groundwater quality testing and monitoring.

Subp. 2. **Installation of well.** A monitoring well may only be installed by a water well contractor licensed under parts 4725.0500 to 4725.1800 or a professional engineer who is registered under part 4725.1850.

Subp. 3. **Applicability of code.** Unless otherwise provided in this rule, all provisions of the water well construction code, this chapter, apply to the construction and abandonment of a monitoring well.

Subp. 4. **Special provisions and exceptions to code.** Special provisions and exceptions to this chapter are as follows:

A. A monitoring well may not interconnect aquifers which are separated by a confining bed. If a confining bed is penetrated below the aquifer to be monitored, the drillhole through the confining bed must be filled with neat cement grout from the bottom of the drillhole to the top of the confining bed.

B. A monitoring well may be constructed into the first aquifer nearest to the ground surface without prior approval by the Department of Health.

Before a monitoring well which is constructed for the purpose of investigating potential, existing, or future groundwater contamination may be drilled into any aquifer which is below the first aquifer nearest to the ground surface, plans, specifications, and construction features of the proposed installation must be submitted to and approved by the administrative authority.

C. Only a monitoring well which is constructed for the purpose of investigating potential, existing, or future groundwater contamination is exempt from the provisions in part 4725.2000 relating to isolation distances from sources of contamination.

D. A monitoring well must be constructed using materials meeting the standards prescribed in parts 4725.3400 to 4725.3600 and 4725.6900 to 4725.7600. In addition, a monitoring well may be constructed using schedule 5 stainless steel pipe which meets the standards of ASTM A 312-81a (American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103).

E. A person constructing a monitoring well need not meet the yield test requirement imposed in part 4725.4700. However, the person constructing

the well shall submit the results of any yield tests which may be performed along with the well log.

F. For monitoring wells where the use of chlorine disinfectants will interfere with the intended water quality analyses, alternate disinfection methods or materials may be used if they are approved by the commissioner.

G. A monitoring well is exempt from the venting requirement in part 4725.6300.

H. The inside casing diameter for a monitoring well must be at least 1-1/2 inches, except that a driven well point may be equipped with a casing at least 1-1/4 inches in diameter.

Subp. 5. **Protective measures.** Protective measures are as follows:

A. Every monitoring well must be closed by use of an overlapping, locked metal cap or a wrench-tightened, threaded metal cap. The metal cap must be equivalent to the casing in strength and weight.

B. A monitoring well must be protected from damage by whichever of the methods in subitems (1) to (3) is most appropriate for the existing and anticipated site conditions.

(1) Protection may be by the placement of three posts of at least four-inch diameter, around the well at equal distances from each other and two feet from the casing. The posts must extend four feet above the ground surface and must be installed to a depth of four feet into solid ground or to a depth of two feet if each post is surrounded with six inches of concrete to a depth of two feet. The posts may be made of any of the following materials: schedule 40 steel pipe, if capped with an overlapping, threaded, or welded steel or iron cap, or filled with concrete; reinforced concrete; or preservative-treated wood.

(2) Protection may be by surrounding the casing with a concrete slab which has horizontal dimensions of four feet by four feet, which rises 12 inches vertically above grade at the outer edge, and whose surface is sloped away from the well casing.

(3) If a monitoring well is to be protected by means other than those prescribed in subitems (1) and (2), the licensee or engineer shall first obtain written approval for the other means from the administrative authority. The alternate method must assure a degree of protection at least equal to that provided by the methods in subitem (1) or (2).

C. A monitoring well need not be protected according to the procedures in item B if the well is routinely inspected at least weekly and if the well is located in an area where it is not likely to be damaged by vandals or by impact from heavy equipment, cars, snowmobiles, or similar vehicles.

D. In addition to the measures prescribed in item B, a monitoring well which is cased with plastic must be protected within a watertight schedule 40 steel casing which is embedded in cement or concrete to a depth of two feet. The steel casing must be covered with an overlapping, locking steel cap. The inner casing must be capped or protected with an overlapping, threaded cap.

E. If a monitoring well is damaged, the damage must be corrected within 72 hours of its discovery. If a monitoring well is damaged irreparably, it must be properly sealed and abandoned in accordance with parts 4725.2600 to 4725.2900 within seven days of discovery of the damage.

**Statutory Authority:** *MS s 156A.03*

**History:** *8 SR 1625*

# MINNESOTA RULES 1985

4243

## WATER WELL CONSTRUCTION CODE 4725.2000

### LOCATION OF WELLS

#### 4725.1900 LOCATION OF WELL.

A well shall be located consistent with the general layout and surrounding area giving due consideration of the size of the lot, contour of the land, slope of the water table, rock formation, porosity and absorbency of the soil, local groundwater conditions, and other factors necessary to implement the basic policies that follow. A well shall be:

A. Located on a site which has good surface drainage, at a higher elevation than, and at a sufficient distance from, cesspools, buried sewers, septic tanks, privies, barnyards and feedlots, or other possible sources of contamination so that the supply cannot be affected thereby, either underground or from the surface of the ground.

B. Located so that the well and its surrounding area can be kept in a sanitary condition.

C. Adequate in size, design, and development for the intended use.

D. Constructed so as to maintain existing natural protection against pollution of water-bearing formations and to exclude all known sources of pollution from entering the well.

E. Located at least five feet from a property line. A well constructed to produce water for a community public water supply shall be located at least 50 feet from a property line. In locating any well, consideration shall be given to the sources of contamination from adjacent property. "Community public water supply" as prescribed in part 4720.0200 means a system providing piped water for human consumption, which serves 15 service connections or living units or regularly serves at least 25 persons residing in the area for more than six months of the year.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

#### 4725.2000 DISTANCE FROM POLLUTION OR CONTAMINATION SOURCES.

Subpart 1. **Distances.** A well shall be at least:

A. One hundred fifty feet from a preparation area or storage area of spray materials, commercial fertilizers, or chemicals that may result in pollution of the soil or groundwater.

B. One hundred feet from a below-grade manure storage area if in conformance with Minnesota Pollution Control rule SW 52(2)(e).

A below grade manure storage area may present a special hazard to groundwater quality which may require a greater isolation distance than provided for in these rules depending upon hydrologic and geologic conditions.

C. Seventy-five feet from cesspools, leaching pits, and dry wells.

D. Fifty feet from a buried sewer, septic tank, subsurface disposal field, grave, animal or poultry yard or building, privy, or other contaminants that may drain into the soil.

E. Twenty feet from a buried sewer constructed of cast iron pipe or plastic pipe (ASTM 2665 for polyvinyl chloride pipe or ASTM 2661 for acrylonitrile-butadiene-styrene pipe, as prescribed in the Minnesota Plumbing Code, part 4715.0420, subpart 3 with tested watertight joints, a pit or unfilled space below ground surface, a sump or a petroleum storage tank except that a well may be drilled closer than 20 feet to an approved basement, but no closer than as provided in part 4725.2100. A community public water supply well shall be isolated at least 50 feet from any source of contamination.

"Sump" means a watertight tank which receives sewage or liquid waste and which is located below the normal grade of the gravity system and must be emptied by mechanical means.

F. Wells with casings less than 50 feet in depth and not encountering at least ten feet of impervious material shall be located at least 150 feet from

# MINNESOTA RULES 1985

## 4725.2000 WATER WELL CONSTRUCTION CODE

4244

cesspools, leaching pits, or dry wells and at least 100 feet from a subsurface disposal field, manure storage pile, or similar source of contamination.

For example, a manure storage pile, would be considered as a potential source of contamination to the well; however, the presence of animals in open pasture in an area would not necessarily concentrate contaminants to the degree that would cause contamination to enter the groundwater.

Subp. 2. **Waste landfill.** The safe distance that a well should be located from a waste landfill or waste stabilization pond (lagoon) cannot be assigned a fixed number because of the varieties of hydrologic and geologic parameters associated with the undetermined types and amounts of materials that may be carried by groundwater from leachates discharged from the waste landfill or waste stabilization ponds (lagoons). It is recommended that wells not be located in an area between the landfill or waste stabilization ponds (lagoons) sites and the point of groundwater discharge to a surface water source.

Any well that may intercept leachates from a waste landfill or waste stabilization pond (lagoon) by water withdrawal from the well shall not be used for potable water.

Subp. 3. [Repealed, 8 SR 1625]

Subp. 4. **Modifications of isolation distances.** The administrative authority may modify the isolation distances in these rules for individual well installations. The request for modifications shall be made according to the provisions of part 4725.0400. A request for modification of the isolation distance from existing wells shall be submitted and signed by the owner. In addition any experts or persons involved in providing documentary evidence in support of the request shall sign the request submitted by the owner. The request shall also include: the well depth, geological formations encountered, casing type and depth, method of construction and grouting, and location of the well on the property in relation to possible sources of contamination.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

NOTE: The cross-reference to Minnesota Pollution Control rule in subpart 1, item B cannot be converted to a Minnesota Rule number because SW 52(2)(e) has been repealed.

## 4725.2100 WELLS ADJACENT TO BUILDINGS, GAS LINES, OR OVERHEAD ELECTRIC POWERLINES.

A well shall be located:

A. at least three feet horizontally from a building or any projection thereof, except for a pumphouse, unless modified in writing by the administrative authority;

B. accessible for cleaning, treatment, repair, test inspection, and other attention as may be necessary.

No well shall be located within the footing of any building or room beneath the floor under which there are buried sewers.

A well shall not be located within 15 feet of a gas line or overhead electric distribution line or 25 feet from an electric transmission line which is in excess of 50 kV except for the underground electrical service line to the well. These distances should be observed when locating a gas line or overhead electric line in the vicinity of an existing well or known proposed well. Where there is a question of the voltage in an electrical line the 25-foot distance should be observed or where less distance is required the utility company should be consulted for their recommendation for safe distances.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

# MINNESOTA RULES 1985

4245

WATER WELL CONSTRUCTION CODE 4725.2400

## 4725.2200 AREAS SUBJECT TO FLOODING.

Subpart 1. **Location of well.** A well shall not be located in areas subject to flooding unless the casing extends at least two feet above the level of the highest known flood of record or otherwise protected as prescribed in writing by the administrative authority. The ground surface immediately adjacent to the well casing shall be graded so that surface water is diverted away from the casing. The well shall be located at least 50 feet horizontally from the normal high water mark of a stream, river, or lake and at a higher established ground surface elevation than the soil absorption system, septic tank, or other source of contamination.

Subp. 2. **Community public water supply.** For a community public water supply:

A. The surface of the ground at the well site shall be at least two feet above the highest known water level of any lake, pond, river, stream, or any other body of surface water, the waters of which at the highest level would approach to within 50 feet measured horizontally of the well.

B. The earth surfaces shall be sloped to drain away from the well and be so graded as to prevent the accumulation and retention of surface water within 50 feet of the well.

C. Filling shall be protected from erosion by riprap or other suitable means.

Subp. 3. **Radial water collector.** Projection of collectors shall be in areas and at depths approved by the director. The exact location of all caisson construction joints and porthole assemblies shall be indicated. The caisson wall shall be substantially reinforced. Procedures shall be employed which will assure minimum vertical rise of the collectors. The top of the caisson shall be covered with a watertight floor and pump openings shall be curbed. Pump discharge piping shall not be placed through the caisson walls. There shall be no construction joint within ten feet of the original ground surface.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

## GENERAL PROTECTION OF GROUNDWATER QUALITY AND RESOURCES

### 4725.2300 REUSE OF WATER, DISPOSAL, RECHARGE, OR GAS STORAGE WELLS.

A well for the storage of gas or liquid under pressure may not be drilled without first having secured a permit therefor from the commissioner of natural resources in accordance with Minnesota Statutes, sections 84.57 to 84.58.

Water used for cooling parts of engines, air compressors, or other equipment or water used for air conditioning, shall not be returned to any part of the potable water system.

A well shall not be used for disposal of surface water, near surface water, or groundwater or any other liquid, gas, or chemical.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.2400 MAINTENANCE AND REPAIR OF WELLS.

Subpart 1. **Maintenance to protect water sources.** Every well shall be maintained in a condition whereby it will conserve and protect the groundwater resources, and whereby it will not be a source or channel of contamination or pollution to the water supply of that well or any aquifer.

Subp. 2. **Materials used for maintenance.** All materials used in maintenance, replacement, or repair of any well shall meet the requirement of these rules for new installation.

Subp. 3. **Repair.** Broken, punctured, or otherwise defective or unserviceable casing, screens, fixtures, seals, or any part of the well head shall be repaired or replaced. The well shall be abandoned in accordance with the



requirements of these rules if such repair or replacement is not performed. Repairs to wells completed with the well head terminating below ground (buried seal) where practicable, should include extending the well casing, pitless adapter, or pitless unit above the land surface. Extension of the casing above grade shall be accomplished in accordance with rules for new wells.

Subp. 4. **Precautions for acid treating of wells.** Before acid treating a well, subpart 3 shall be complied with to prevent a hazardous condition caused by release of H<sub>2</sub>S (hydrogen sulfide) or other toxic gases in a pit or confined space. All confined spaces shall be blown out with fresh air before entry and a supply of fresh air provided during occupancy. Pits or chambers should not be entered without a lifeline and adequate lifting power on the surface to quickly haul up a worker. Where there is any question whether the air supply procedure has provided a safe atmosphere, a self-contained breathing apparatus shall be worn (ordinarily canister-type gas masks do not protect against atmospheres low in oxygen).

**Statutory Authority:** *MS s 156A.01 to 156A.08*

#### **4725.2500 ABANDONMENT OF WELLS.**

Any water well which is to be abandoned must be abandoned in accordance with these rules. The owner of a well which is no longer being used will be ordered to sample the well and to disinfect or otherwise pump or remove the contamination before the well is plugged. If a well provides a potential or actual source of contamination for the aquifer, the commissioner may order that the well be permanently plugged and abandoned.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

#### **4725.2600 TEMPORARY ABANDONMENT.**

Prior to placement into service or when temporarily removed from service, the well shall be sealed with a watertight steel cap. A well removed from service and not permanently abandoned may be temporarily abandoned if approved in writing by the commissioner. The licensee and the owner shall submit a request for temporary abandonment on forms provided by the department.

The well shall be maintained whereby it is not a source or channel of contamination when not in service.

Until a well is permanently abandoned by sealing procedures, all provisions for protection of the water against contamination and pollution and for maintaining satisfactory sanitary conditions around the well shall be carried out to the same extent as though the well were in routine use.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

#### **4725.2700 PERMANENT ABANDONMENT OF WELLS.**

Subpart 1. **Closing the well.** A well that is to be permanently abandoned shall be disconnected from the system and the hole filled to prevent contaminating materials from entering the water-bearing ground formations. Concrete or cement grout shall be used for sealing material; however, if the well is so large that the use of these materials is not practical, the filling materials should be selected so as to restore natural conditions as nearly as possible. Neat cement grout or concrete, as defined in part 4725.3800 (grouting) and part 4725.0100, subpart 30, are satisfactory for filling parts of wells in rock formations. Sand and heavy drilling fluid may be used in sand and gravel sections of wells.

All materials, debris, and obstructions that may interfere with sealing operations shall be removed from the well. Liner pipe shall be removed or perforated when necessary to assure placement of an effective seal. The administrative authority will be consulted for instruction in case of abandonment of a contaminated well or where there is a question of proper procedure.

# MINNESOTA RULES 1985

4247

## WATER WELL CONSTRUCTION CODE 4725.2800

All casing and screen may be salvaged except casing that has been cemented in place. The well shall be filled with appropriate sealing materials as described in parts 4725.2700 to 4725.2900 prior to removal of the casing. The top of the hole shall be filled with ten feet of cement or concrete grout to within two feet of the land surface. Casing remaining in the hole shall be cut off at least two feet below land surface. The remaining top two feet of hole shall be filled with native topsoil.

**Subp. 2. Sealing the well.** An abandoned well shall be filled and sealed by one of the following methods in accordance with the materials penetrated, in such a manner as to prevent it from acting as a channel for pollution. A report of the method of sealing shall be filed with the commissioner on water well record forms provided:

A. A well in unconsolidated deposits shall be filled with clean sand and puddled clay, neat cement grout or concrete grout to provide a permeability no greater than the natural condition.

B. The section of a well in a cavernous or creviced rock (such as cavernous limestone or basalt lava rock, creviced granite, etc.) shall be filled with concrete or neat cement grout or alternate layers of concrete or neat cement grout, gravel, or stone aggregate. The filling shall be completed at the top by a layer of neat cement grout or concrete grout extending at least ten feet into the above overlying formation and finished as provided in parts 4725.2700 to 4725.2900.

C. When concrete, cement grout, puddled clay, or heavy drilling fluid is used for sealing an abandoned well, it shall be inserted in the well through a grout pipe from the bottom of the well upward to the surface under pressure and in one continuous operation.

D. Test wells shall be sealed to prevent the well from being a channel for the vertical movement of water and a source of contamination to the groundwater supply in accordance with well abandonment provisions of parts 4725.2500 to 4725.2900.

E. The flow in a flowing well shall be confined, if possible, and the well filled in accordance with well abandonment provisions of parts 4725.2500 to 4725.2900.

Proper judgment shall be exercised in the feasibility and practicability of sealing flowing wells. In some cases the confining formation may have been so badly disturbed that sealing may only cause the flow to discharge in a less appropriate location. In other situations, the flow may have eroded so much material that the landscape has taken on the appearance of a natural spring. The sealing in this case may be impracticable, if not impossible.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.2800 OWNER'S RESPONSIBILITY FOR SEALING WELL.**

The owner shall be responsible for the permanent sealing of an abandoned well except:

A. As mutually agreed upon in a written contract between the owner and licensee and in accordance with these rules to protect the groundwater aquifer.

B. When the licensee improperly locates, constructs, or completes the well or fails to meet the conditions of his contract; in which case the licensee shall be responsible for the sealing of the well.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.2900 ABANDONMENT.**

A licensee shall permanently abandon any well that he removes from service in accordance with parts 4725.2500 to 4725.2900 and shall report such abandonment to the commissioner. A licensee shall report to the commissioner any unsealed abandoned water wells.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.3000** [Repealed, 8 SR 1625]**4725.3100 TEST HOLES AND BORINGS.**

Test holes shall be permanently abandoned and sealed by the well contractor after the drilling, logging, and testing have been completed unless the owner or his agent has submitted a request to the director and obtained his written permission to extend the time limit, or the well is being completed as a water supply or other approved type well.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.3200 DEWATERING AND DEPRESSURIZING AND OTHER WELLS.**

Subpart 1. **Prevention of contamination of groundwater.** Dewatering and depressurizing wells shall be constructed in a manner and with such materials to prevent the contamination of the groundwater system. Discharges from the dewatering system shall not be cross connected to a potable water supply.

Subp. 2. **Temporary water supply.** There may be incidents during construction where nearby residences with private water supplies will lose their source of supply during dewatering operations. If such a situation occurs, the licensee shall cooperate with the homeowner as may be required to provide a temporary supply of water during construction operations, including, but not necessarily limited to, supplying bottled water for drinking and cooking purposes and potable bulk water for other uses.

Subp. 3. **Notification requirements.** The commissioner shall be notified prior to commencement of a groundwater dewatering operation by the licensee. The licensee shall report the approximate area to be dewatered, the maximum depth to be dewatered, the number of wells to be affected, and the measures that will be taken to provide potable water to persons adversely affected by the dewatering operation. This may be reported by phone. The licensee shall retain the name of the commissioner's staff member taking the information and shall report this information in writing to the commissioner within three days of commencement of the groundwater dewatering operation.

Subp. 4. **Licensee compliance with orders of the commissioner.** The licensee shall comply with any orders issued by the commissioner which may include but not be limited to the collection of water samples from wells in the dewatered area for analysis to determine any health hazards prior to the commissioner relieving the licensee of responsibility for furnishing a safe water supply to well owners in the area affected by the dewatering operation. If the licensee has been released of his responsibility but thereafter difficulties develop in the water supply of well owners in the area affected by the dewatering operation as a result of such operation, the licensee may again be required to comply with subpart 2.

Subp. 5. **Elevator shafts.** Wells constructed or holes drilled for the installation of elevator shafts or hydraulic cylinders shall be cased, sealed, and maintained in a manner to prevent the vertical movement of water as a source of contamination to the groundwater or any aquifer and as approved by the commissioner.

Subp. 6. **All other wells.** All wells except those specifically exempted by the act shall be constructed and maintained in accordance with standards for water supply wells except when prior exemption has been obtained from the

# MINNESOTA RULES 1985

4249

## WATER WELL CONSTRUCTION CODE 4725.3400

commissioner.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.3300 OTHER WATER SOURCES, CROSS-CONNECTIONS, AND STORAGE RESERVOIRS.**

Subpart 1. **Storage reservoirs.** If a storage reservoir, excluding a pressure tank, is used, plans shall be submitted to the administrative authority for approval. The plans shall meet the standards specified in the Manual of Water Supply Sanitation, section VII, paragraph 715, published in 1969 by the department.

Subp. 2. **Other water sources.** In cases where a potable water supply cannot be obtained by well drilling, permission may be granted by the administrative authority to use springs, infiltration tile lines, or other similar sources as a water supply or to install water treatment facilities. Plans and specifications for such facilities, together with operating procedures, shall be approved by the administrative authority. The plans shall meet the standards of the Manual of Water Supply Sanitation, section VI, published in 1962 by the department.

Subp. 3. **Cross-connections.** Cross-connections between water wells and other systems or equipment containing water or other substances of unknown or questionable safety, including pesticides and fertilizers, are prohibited, except where equipped with a suitable protective device such as a break tank or backflow preventer which is approved by the commissioner and which the owner agrees to install, test, and maintain to assure proper operation.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **STANDARDS FOR CONSTRUCTION OF WELLS**

#### **4725.3400 CASING FOR PERMANENT WELLS.**

Subpart 1. **Casing materials.** A permanent well casing used for the protective or outside casing shall be of at least standard weight (schedule 40) steel or iron pipe through eight inches inside diameter. Larger diameter casing shall have minimum weights and thicknesses as specified in subpart 10. Dimensions and weights of schedule 40 pipe are given in Standard B36.10-1959 of the American Standards Association, 29 West 39th Street, New York, New York and Standards A53-69a or A120-69 of the American Society for Testing Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103. Casing for permanent wells shall be of ferrous material or, where permitted by statute, plastic material. For ferrous pipe, the specifications and installation procedures are prescribed below. For plastic pipe, the specifications and installation procedures are prescribed in parts 4725.6900 to 4725.7600.

Subp. 2. **Casing joints.** A protective well casing shall be watertight throughout its length, with threaded or welded joints or other types of joints given written approval by the director. Recessed or reamed and drifted couplings shall be used on threaded casing, or, as an alternate, other couplings can be used but the design, taper, and type of thread of the coupling shall match that of the pipe. No thread shall be exposed on the pipe when the pipe is joined to the coupling. Other casing design or materials shall be approved only by official written order of the commissioner.

Subp. 3. **Standard for pipe.** Pipe used as the protective casing in the permanent construction of a well shall be new pipe produced to recognized standards of the American Society for Testing Materials, No. 5L (1970) of the American Petroleum Institute, 1271 Avenue of the Americas, New York, New York, or NM. C201-66 and C202-64 of the American Water Works Association, 2 Park Avenue, New York, New York, or other grade weldable new pipe having

# MINNESOTA RULES 1985

## 4725.3400 WATER WELL CONSTRUCTION CODE

4250

a quality equal to or greater than those heretofore specified. New pipe, when salvaged within 30 days of the drilling of a water well test hole or dry hole only, may be used as new pipe if still in new condition.

**Subp. 4. Specification marked on pipe.** Pipe shall be marked with the specification designation or marked "Meets Minnesota Well Construction Code Standards." Such markings shall include wall thickness, weight per foot, and identification of supplier. The commissioner may require that such pipe be submitted to an independent testing laboratory for evaluation and verification that the pipe will equal or exceed minimum standards. Failure of the pipe supplier to submit the pipe for evaluation and verification or failure of the pipe to meet minimum standards specified in subparts 1 and 3 shall be sufficient cause for automatic rejection of such pipe for use in well construction in Minnesota.

**Subp. 5. Examination of pipe.** Pipe intended for water well use that is sold within this state, regardless of specification designation, is subject to random examination by the administrative authority who may require any lot of pipe or part thereof containing defective lengths to be rejected. Defective lengths or lots shall include, but not be limited to pipe with girth welded joints, pipe with welded patches, and lots having more than five percent of the pipe with lengths less than five feet.

**Subp. 6. Temporary, inner, and protective casing; liner.** Temporary casing may be standard weight pipe or lighter pipe, but lightweight material shall be of such minimum thickness as is required to withstand the structural load imposed by conditions both inside and outside the well. In no case shall the casing have a wall thickness of less than specified in subpart 10. An inner casing shall be surrounded by at least two nominal inches of neat cement grout when welded joints are used. Subpart 11 lists inner and outer pipe size combinations which would be appropriate to fulfill the requirements of these rules. If couplings are used the annular space shall be at least four inches in diameter larger than the outer diameter of the coupling. The annular space between the casing and open hole shall be grouted with neat cement, concrete grout, or as provided in part 4725.3800, 4725.3900, 4725.4000, or 4725.4100.

An inner casing shall be grouted for its entire length with the grout material being added from the bottom upward in one continuous operation or as provided in part 4725.4100.

Casings to be grouted shall be provided with sufficient centering guides, welded to the casing, to permit unobstructed flow and deposition of the grout.

**Subp. 7. Inside casing diameter.** Under no conditions shall the casing inside diameter be less than two inches except for a driven well point which shall be equipped with a casing pipe of at least 1-1/4 inches inside diameter. The well shall also be of sufficient diameter to receive a pump or pumping apparatus of sufficient size to discharge the design capacity including anticipated decline in water levels.

**Subp. 8. Vertical extension.** A well casing or extension thereof shall extend vertically at least 12 inches above ground surface or above the floor of an approved basement offset, pump room, or well room. However, in an above grade installation the casing shall extend at least six inches above the floor or slab.

**Subp. 9. Offsets.** Well casing offsets are prohibited.

# MINNESOTA RULES 1985

4251

Subp. 10. Casing pipe weight and dimensions.

WATER WELL CONSTRUCTION CODE 4725.3400

Size in Inches	Wgt. Lbs. Per Ft.			Thickness in Inches	Diameter—Inches		Thrds. per Inch	Couplings	
	Plain End	Thrds. & Cplgs.*	Thrds. R&D Cplgs.		External	Internal		Minimum External Diameter Inches	Minimum Length Inches
1	1.68	1.68	1.70	.133	1.315	1.049	11½	1.576	2-5/8
1¼	2.27	2.28	2.30	.140	1.660	1.380	11½	1.900	2-3/4
1½	2.72	2.73	2.75	.145	1.900	1.610	11½	2.200	2-3/4
2	3.65	3.68	3.75	.154	2.375	2.067	11½	2.750	2-7/8
2½	5.79	5.82	5.90	.203	2.875	2.469	8	3.250	3-15/16
3	7.58	7.62	7.70	.216	3.500	3.068	8	4.000	4-1/16
3½	9.11	9.20	9.25	.226	4.000	3.548	8	4.625	4-3/16
4	10.79	10.89	11.00	.237	4.500	4.026	8	5.200	4-5/16
5	14.62	14.81	15.00	.258	5.563	5.047	8	6.296	4-1/2
6	18.97	19.18	19.45	.280	6.625	6.065	8	7.390	4-11/16
8	28.55	29.35		.322	8.625	7.981	8	9.625	5-1/16
10	40.48	41.85		.365	10.750	10.020	8	11.750	5-9/16
12	49.56	51.15		.375	12.750	12.000	8	14.000	5-15/16
14	54.57	57.00		.375	14.000	13.250	8	15.000	6-3/8
16	62.58	65.30		.375	16.000	15.250	8	17.000	6-3/4
18	70.59	73.00		.375	18.000	17.250	8	19.000	7-1/8
20	78.60	81.00		.375	20.000	19.250	8	21.000	7-5/8
22	86.61			.375	22.000	21.250			
24	94.62			.375	24.000	23.376			
26	102.63			.375	26.000	25.250			
30	118.65			.375	30.000	29.250			
32	126.66			.375	32.000	31.250			
34	134.67			.375	34.000	33.250			
36	142.68			.375	36.000	35.250			

\*Nominal weight based on length of 20 feet including coupling.

# MINNESOTA RULES 1985

## 4725.3400 WATER WELL CONSTRUCTION CODE

4252

Subp. 11. Inner and outer casing combinations providing the minimum annular space when welded joints are used.

Inner Casing in nominal inches	Outer Casing in nominal inches
2	6
4	8
5	10
6	12
8	14
10	16
12	18
14	20
16	22
18	24
20	26
22	30
24	30
26	32
30	36

Subp. 12. Gauges for steel or galvanized steel casing irrigation wells in shallow continuous glacial outwash material penetrating nonartesian water.

Diameter of Plain and Perforated Casing (inches)				Diameter of Corrugated Metal Pipe (inches)		
12	14	16	18	12	15	18
Gauge				Gauge		
12	10	10	10	12	12	12

Statutory Authority: *MS s 156A.01 to 156A.08*

### 4725.3500 WELLS IN SHALLOW CONTINUOUS GLACIAL OUTWASH MATERIAL PENETRATING NONARTESIAN WATER.

A well drilled for irrigation purposes in shallow continuous glacial outwash material penetrating nonartesian water may be constructed of pipe as specified in part 4725.3400, subpart 12. The annular space shall be closed by washing the fine-grained casing material around the casing.

Well casing in part 4725.3400, subpart 12 shall be new pipe; however, salvaged pipe may be used if the condition of the salvaged pipe is yet of new pipe quality.

Statutory Authority: *MS s 156A.01 to 156A.08*

### 4725.3600 MINIMUM PROTECTIVE DEPTHS OF WELLS.

All wells shall be watertight to such depth as may be necessary to exclude pollution. A well shall be constructed so as to seal off formations that are, or may be contaminated or undesirable.

Requirements will be fulfilled to the minimum extent when the protective casing has been installed in conformity with the applicable construction set forth in parts 4725.3400 to 4725.5200. Where it is not feasible to follow the standards contained in this part, the licensee shall obtain approval of the administrative authority as to the design of the well before proceeding. The acceptability of the formation for well development shall be based on the satisfactory results of analysis of the water. Any water-bearing formation yielding water which is contaminated, as evidenced by the presence of chemicals or bacteria of sewage origin, shall be regarded as unsatisfactory for use as a potable supply unless

# MINNESOTA RULES 1985

4253

## WATER WELL CONSTRUCTION CODE 4725.3800

adequate treatment is provided. The Minnesota Department of Health shall be consulted for measures that may be feasible to adequately treat the water to provide a potable supply.

Any potable water supply well constructed entirely in glacial outwash or alluvium earth formations in which the casing does not extend to a depth of 50 feet below established ground level or through at least ten feet of impervious soil formation shall be located in accordance with part 4725.2000, subpart 1, item F.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.3700 CASING USED AS A SUCTION LINE.

A well casing used for a potable water supply shall not be used as a suction line unless protected by a standard weight outer casing to a depth of at least ten feet. The top of both casings shall be finished in accordance with parts 4725.5700 to 4725.6500.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.3800 GROUTING.

Subpart 1. **Grouting required.** A well having an open annular space around the casing, or between the surface casing and protective casing, or between an inner casing surrounded by an outer casing, shall be grouted from the lower termination of the casing to the ground surface or to the base of the pitless unit. Grouting shall be commenced without delay upon completion of drilling of the well or any portion of a well which must be grouted. Grouting shall be performed by adding the mixture through the casing or a grout pipe from the bottom of the space to be grouted upward to the surface in one continuous operation. Concrete grout may be used in the dry portion of a hole. Neat cement grout or concrete grout shall be allowed to set a minimum of 12 hours when hi-early cement is used or a minimum of 48 hours when regular cement is used, before drilling operations are resumed. Heavy drilling mud or heavy bentonite water slurry may be used as grout in wells developed in glacial drift.

Subp. 2. **Concrete grout.** Concrete grout is a mixture of cement, sand, and water, in the same proportion of one bag of Portland cement (94 pounds) (ASTM C150-69a) and an equal volume of dry sand to not more than six gallons of clean water. Where large volumes are required to fill annular openings, gravel not larger than one-half inch size may be added. Concrete grout shall not be used as grout below the water level in the well.

Subp. 3. **Neat concrete grout.** Neat cement grout is a mixture of one bag (94 pounds) of Portland cement (ASTM C150-69a) to not more than six gallons of clean water. Bentonite up to two percent by weight of cement to reduce shrinkage or other admixtures (ASTM C494-68) to reduce permeability and/or control time of set may be used.

Subp. 4. **Heavy drilling fluid.** Heavy drilling fluid when used as grout in a rotary drilled well shall contain a high percentage of clay or bentonite to minimize shrinkage of the slurry within the annular space. Heavy bentonite water slurry is a mixture of ten percent by weight of bentonite added to clean water or approximately five percent bentonite added to drilling mud. Bentonite shall contain 85 percent of the mineral montmorillonite and shall meet American Petroleum Institute specification standard 13A (March 1966). Saline, acid, or alkaline substances or other additives to cause a temporary increase in viscosity of the bentonite slurry are not permitted.

**Statutory Authority:** *MS s 156A.01 to 156A.08*



**4725.3900 ROTARY, BORED, OR AUGERED WELLS.**

Rotary, bored, or augered wells shall have the annular space around the casing tightly sealed in accordance with the materials and procedures which are appropriate to the particular geological and hydrologic conditions at the well site, as prescribed in parts 4725.3800, 4725.4100, 4725.4200, 4725.4300, and 4725.5000. Drilling mud additives shall be stored in clean containers and shall be free of material that may adversely affect the well, aquifer, or quality of the water to be pumped from the well.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.4000 DRIVEN CASING WELLS.**

Where the upper drillhole is clay or similar material of ten feet or more in thickness, the annular space between the drillhole and casing shall be kept filled with clay, slurry, or equivalent material when driving the protective casing. In lieu of this, a starting casing should be used and sealed with 20 feet of concrete grout. (When a pitless adapter or pitless unit is used, see part 4725.5500.)

The bottom of the protective well casing shall be equipped with a drive shoe or otherwise protected from damage during construction of the well as dictated by drilling procedures and conditions of each particular well.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.4100 UNCONSOLIDATED GLACIAL DRIFT WELLS.**

A well drilled into unconsolidated glacial drift may be completed with a tight seal made around the protective casing if the annular space is closed by washing the fine-grained casing material around the casing prior to disinfection of the well. Wells shall be pumped promptly after setting the casing until clear, and native materials shall be washed immediately into the annular space. Any annular space remaining unfilled shall be grouted with neat cement or concrete using a tremie pipe to pump the grout under pressure from the bottom up in one continuous operation.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.4200 ROCK WELLS.**

**Subpart 1. Rock at depth greater than 25 feet.** Where rock is encountered, i.e., consolidated as opposed to unconsolidated geological material, at a depth greater than 25 feet from the surface the protective casing shall be equipped with a drive shoe which shall be driven firmly into stable rock to provide a tight joint that will prevent pollution or sand from entering the well.

**Subp. 2. Rock encountered within 25 feet of the surface.** Where rock is encountered within 25 feet of the surface, an oversized hole shall be drilled. Such hole shall be four inches larger than the nominal casing size when welded construction is used, and four inches larger in diameter than the coupling if threaded joints are used. The annular space shall be pressure grouted with neat cement or concrete grout as prescribed in part 4725.3800 to a depth sufficient to exclude water which is or may be contaminated.

**Subp. 3. Well in fractured, jointed, noncavernous rock.** In an area where a well can be developed only in fractured, jointed, but noncavernous rock, the casing may terminate in the formation if there is at least 25 feet of sand or clay material above the rock, there is no record of this rock containing contaminated or polluted water, and geologic conditions offer no natural direct surface or near surface water inlets into the rock aquifer. Where there is less overburden or deeper strata will not produce potable water, the administrative authority shall be consulted and its written approval obtained by the well owner for water treatment and well construction features necessary to provide a safe water supply.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

# MINNESOTA RULES 1985

4255

## WATER WELL CONSTRUCTION CODE 4725.4400

### 4725.4300 CAVERNOUS ROCK WELLS.

Subpart 1. **Special conditions.** Geological formations which are creviced or cavernous (limestone or dolomite) shall not be used as a potable source of groundwater unless overlain by at least 50 feet of drift material and/or by a firm insoluble rock material (sandstone) extending for at least one mile horizontal distance from the well in all directions to render the movement of contaminated water in the formation to the well improbable. The casing shall be equipped with a drive shoe and seated into the top of the limestone or dolomite formation.

Where the pumping level is determined to be at least ten feet above the top of the cavernous formation the well shall be cased at least ten feet below the pumping level. Any unfilled annular space shall be sealed according to the procedure prescribed in either part 4725.3800 or 4725.4100.

Where the pumping level is determined to be less than ten feet above the top of the limestone or dolomite formation the drill hole shall be at least four inches larger in diameter than the nominal casing size if welded construction is used, and four inches larger than the couplings if threaded joints are used. The annular space shall be filled with neat cement or concrete grout as prescribed in part 4725.3800.

Subp. 2. **Wells underlying cavernous rock.** Where an adequate and safe water supply is available in a geological formation overlain by one or more faulty rock formations, all faulty rock formations should be completely cased off. The casing should extend at least 15 feet into the safe aquifer if such exists, or at least 15 feet into a stable, insoluble, noncavernous or noncreviced geological formation beneath the lowest faulty rock formation and above the aquifer and at least ten feet below the pumping level. The drill hole extending through the creviced rock formation and 15 feet into the firm rock formation or aquifer should be at least four nominal inches larger in diameter than the casing if welded construction is used, and four nominal inches larger in diameter than the couplings if threaded joints are used. The annular space shall be filled with cement grout as provided in part 4725.3800.

Subp. 3. **Protective mantle over cavernous and noncavernous aquifer.** Where any faulty rock formation which overlies a safe aquifer is itself overlain by a protective mantle of drift, or by a firm insoluble consolidated formation of sufficient depth and for a sufficient radius as described in subpart 1, the casing need not extend through the protected faulty rock formation. The casing shall also extend ten feet below the pumping level. The acceptability of water taken from a well so constructed will be dependent upon treatment of the water, if the need for treatment is indicated by analytical studies of the water.

Subp. 4. **Water entry.** A well shall not provide water entry from more than one aquifer.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.4400 FLOWING ARTESIAN WELLS.

Flowing artesian wells should be constructed to prevent erosion of the aquifer or the overlying confining mantle. This provision will not be interpreted so as to preclude licensees from attempting to drill a well in a flowing artesian area, when it is likely that a water well can be safely installed if proper precautionary measures are followed.

Flow control from a flowing artesian well shall be provided, consisting of valved pipe connections, water-tight pump connections, or a receiving tank set at an altitude corresponding to that of the artesian head. A direct connection between the discharge pipe and a receiving tank or a sewer or other source of pollution or contamination shall be prohibited.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

# MINNESOTA RULES 1985

## 4725.4500 WATER WELL CONSTRUCTION CODE

4256

### 4725.4500 WELL SCREENS.

A well installed in unconsolidated sand and gravel aquifers shall ordinarily be fitted with a screen properly sized so the aquifer can be properly developed to produce sand-free water at the pumping rate of the permanent pump. Wells shall provide sand-free water to the extent that the sand will not interfere with the intended use and operation of the water supply system.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.4600 CAPPING.

Temporary capping of a well until the pumping equipment is installed shall be such that no pollution or foreign objects can enter the well.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.4700 YIELD TEST.

Every well shall be test pumped to produce a minimum initial supply of 600 gallons of sand-free water per hour if geological conditions permit. A well in which a pump of a capacity of 20 gallons per minute or more is to be installed shall be tested for yield and drawdown with periodic water level measurements being made where possible, during the drawdown and subsequent recovery periods. The well shall be test pumped at rates greater than is expected from the well during its normal usage as follows: up to 400 gpm, 1.5 times; 400 to 600 gpm, 1.4 times; 600 to 800 gpm, 1.3 times; 800 to 1,000 gpm, 1.2 times; 1,000 gpm and over, 1.1 times. Shallow nonartesian wells used for irrigation purposes may be test pumped at a rate equivalent to the yield of the aquifer and for a period of at least 12 hours. Wells shall be test pumped for a minimum of one hour or more if more is required by the well owner or as prescribed by the consulting engineer or hydrologist.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.4800 ALIGNMENT.

A well shall not vary from the vertical or alignment so as to interfere with installation and operation of the pump.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.4900 DRILLING WATER.

Water used for drilling, development, or rehabilitation purposes, other than from the well itself, shall be chlorinated clear water containing a free chlorine residual at the time of use and be conveyed in clean sanitary containers or water lines.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.5000 DUG OR BORED WELLS.

A dug or bored well constructed with materials other than those authorized in parts 4725.3400 to 4725.3600 may be constructed only in glacial drift formations and shall:

A. Be cased with material of sufficient strength to withstand the pressures of the formation.

B. Be installed in an oversized hole at least six inches in diameter larger than the casing, with the annular space between the casing and the formation filled three inches thick with neat cement or concrete grout placed in one operation to a depth sufficient to exclude water which is or may be contaminated, or to a depth of ten feet, whichever is greater; or

C. Be installed with a watertight concrete curbing or casing at least four inches thick poured in one operation to a depth sufficient to exclude water

# MINNESOTA RULES 1985

4257

## WATER WELL CONSTRUCTION CODE 4725.5400

which is or may be contaminated, or ten feet, whichever is greater. The annular space between the casing and the formation shall be filled as provided in part 4725.3900 or 4725.4100.

D. Be protected with a heavy precast overlapping steel reinforced concrete cover or a heavy locked overlapping metal cover not less than 3/16 inch in thickness. The cover shall be tight fitting so as to exclude vermin, dust, or other contaminants from the well.

E. Have pump openings and any below grade connection sealed with concrete or cement as prescribed in item C.

Prior to constructing a dug or bored well, the licensee shall obtain from the owner an agreement to the following conditions: the owner will maintain the isolation distances prescribed in part 4725.2000, subpart 1; once per year, or as otherwise prescribed by the Minnesota Department of Health, the owner will have the water from the dug or bored well analyzed for nitrate and for bacteria. This agreement shall be documented on forms provided by the Minnesota Department of Health and shall be returned to the department along with the water well record.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.5100 WELL DEVELOPMENT.

The well shall be developed to remove native silts and clays deposited on the aquifer face during the drilling, drilling fluid, and the predetermined finer fraction of the gravel pack, all of which shall be done to ensure that the maximum practical specific capacity will be obtained from the completed well.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.5200 DISPOSAL OF MATERIAL.

Drilling mud, cuttings, and discharged water shall not be disposed in a manner so as to create damage to public or private property. During the test pumping discharged water shall be piped to a point of overland drainage.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

## WELL CASING SEALS AND CONNECTIONS

### 4725.5300 WATER LEVEL MEASUREMENT DESIGN.

Provisions shall be made in the well seal with a minimum one-half inch diameter threaded plug for future measurements of static and pumping water levels. A minimum one-inch diameter threaded plug is preferred where feasible.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.5400 ABOVE-GRADE CONNECTIONS.

An above-grade connection into the top or side of a well casing shall be at least 12 inches above the established ground surface or two feet above the regional flood level whichever is higher, and constructed so as to exclude dirt or other foreign matter by one or more of the following methods, as may be applicable:

- A. threaded connection;
- B. welded connection;
- C. rubber expansion sealer;
- D. bolted flanges with rubber gaskets;
- E. overlapping well cap; and

F. extension of the casing at least one inch into the base of a power pump mounted and sealed on a concrete pedestal and at least 12 inches above the established ground surface or the floor of an approved basement, pump room, or well room.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.5500 BELOW-GRADE CONNECTION.**

A connection to a well casing made below ground, or less than 12 inches above the established ground surface, shall be protected by a pitless adapter or pitless unit. The pitless adapter or pitless unit shall be approved by the commissioner on the basis of design and materials. A below-ground connection shall not be submerged in water at the time of installation. The director will furnish a list of approved pitless adapters and pitless units that meet the requirements of these rules. Native materials shall be packed tightly around the casing and pitless adapter or pitless unit after installation.

A connection to a well casing located at least 12 inches above the floor of an approved basement offset is considered equal to an above-grade installation for residential use only. An approved basement offset shall be a room with a floor 12 inches above the floor of an approved basement, shall extend beyond the footings of the building. The well shall extend three feet beyond any roof projection. Any basement located in a regional flood zone shall not be considered an approved basement. Water from a well located within a basement offset of a farm home may be piped for use in other farm buildings.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.5600 OTHER METHODS.**

Any other method of connection to a well casing shall be specifically approved in writing by the director before installation.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**PUMP INSTALLATION****4725.5700 PUMP AND WELL ROOMS.**

A room housing pumping equipment or the top of a well casing shall be constructed above the established ground surface permitting access to the pump and well for maintenance or repair, or may be located below-grade if the containing room is located in or attached to an approved basement.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.5800 SLABS, PLATFORM, AND FLOORS.**

A well, except where an approved pitless adapter or pitless unit is used, shall be protected by a durable watertight concrete or equal slab, platform or floor, at least four inches thick, extending horizontally at least one foot in every direction from the well casing, and sloped to divert water away from the casing. A watertight seal, which may be asphalt or similar material to provide resiliency, shall be provided between the casing and the platform, pump room, or approved basement floor or slab.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

**4725.5900 PUMPS AND PUMPING EQUIPMENT.**

Subpart 1. **Specifications.** A pump shall be constructed so that no unprotected openings into the interior of the pump or well casing exist.

A hand pump, hand pump head, stand or similar device shall have a closed spout, directed downward, and a pump rod that operates through a stuffing box.

A power driven pump shall be attached to the casing or approved suction or discharge line by a watertight connection, including flange connections, hose clamp type connections, or other flexible couplings, or shall have a base plate meeting the requirements of part 4725.5300.

Subp. 2. **Priming requirements.** A pump shall be designed, installed, and maintained so that priming is not required for ordinary use. Pumps installed for use only on a well water irrigation system are exempted but priming water shall be clear water free of contamination and carrying a chlorine residual. An irrigation well equipped with a centrifugal pump may be primed without

# MINNESOTA RULES 1985

4259

## WATER WELL CONSTRUCTION CODE 4725.6300

chlorination when the pump is filled with water taken directly from the well.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.6000 WATER SUCTION LINES.**

A water suction line shall be constructed of copper, galvanized iron or steel, cast iron, or plastic pipe as approved by the director, or other material given written approval by the director. Aluminum pipe is acceptable for well water irrigation systems in addition to the above materials. A water suction line extending outside the well casing shall not be used unless protected by one or more of the following methods:

A. fully exposed in an approved basement offset, pump room, or well room and at least 12 inches above the floor of an approved below-grade structure;

B. fully exposed above grade; and

C. lying within an outer casing with the annular space filled with water from the system and maintained at system pressure.

An unprotected suction line may be installed below grade only for nonpotable irrigation wells located in agricultural fields and installed in shallow glacial outwash material penetrating nonartesian aquifers for manifold collection systems under negative pressures provided the area is sufficiently isolated from potable water wells.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.6100 PUMP DISCHARGE LINES.**

A buried discharge line between the well casing and the pressure tank in any installation, including a deepwell turbine or a submersible pump, shall not be under negative pressure at any time. If a check valve is installed in a buried water line between the well casing and the pressure tank, the water line between the well casing and the check valve shall meet the requirements for a suction line unless equipped with an air release valve. Pump discharge lines shall be materials as approved for suction lines in part 4725.6000. A frostproof yard hydrant shall be located at least ten feet from the well.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.6200 PRESSURE TANKS.**

It is recommended that a pressure tank be installed in an approved pump room or well room. However, partially buried pressure tanks shall project horizontally above the ground or into an approved basement. A totally buried pressure tank may be used if the manufacturer's unit has been approved in writing by the commissioner as to its design, type of material and specification for its installation. A pressure relief or air release valve on a pressure tank which may contain subterranean gases and which is located within a building shall be vented to the outside.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.6300 VENTS.**

All wells shall be vented. A casing vent shall be of materials complying with part 4725.6000 with watertight joints terminating at least two feet above the regional flood level or one foot above the established ground surface or the floor of a pump room, well room, or approved basement, whichever is higher. The casing vent shall be screened and point downward. Vents may be offset provided they meet the provisions of this part. Any submersible pump shall be installed with a vented cap on the top of the well casing or pitless unit to prevent drawing near surface water, mud, sand, etc., into the well through shielding around the electric cable. Flowing artesian wells may be exempted if protected by a specially designed pitless unit or if the casing is protected as provided in

# MINNESOTA RULES 1985

## 4725.6300 WATER WELL CONSTRUCTION CODE

4260

part 4725.3700. Where the well casing on small diameter wells (1-1/2 inches or less) is used as a suction pipe, the casing need not be equipped with a vented cap, provided the casing is protected in accordance with part 4725.3700.

If toxic or flammable gases are present, they shall be vented from the well. The vent shall extend to the outside atmosphere above the roof level at a point where the gases will not produce a hazard. Openings in pump bases shall be sealed watertight. If the type of gas is not known and is to be carried through the water supply, the administrative authority shall be consulted for proper identification and treatment.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

## 4725.6400 SAMPLING FAUCET.

In a pressure water system provision shall be made for collection of water samples by installation of a faucet or sampling device in a convenient location as near to the well as possible.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

## 4725.6500 DISINFECTION.

A new, repaired, or reconditioned well or pump installation shall be thoroughly pumped to waste until the water is as clear as is reasonably possible, dependent upon groundwater conditions in the area. Thereafter the well and pumping equipment shall be disinfected with chlorine so applied that a concentration of at least 50 parts per million of chlorine shall be obtained in all parts of the well. The chlorine solution shall be introduced into the well in a manner to flush the well surfaces above the static level with chlorine solution. A minimum contact period of two hours shall be provided before pumping the well to waste and flushing the chlorine solution from the distribution system.

A licensee shall be responsible for chlorinating the work he performs on the well, pump, or pumping equipment.

Disinfection in a well repair operation may be accomplished at the beginning of the operation with chlorine applied to obtain a concentration of 200 parts per million for the period of the well repair operation. The water shall be pumped to waste prior to taking of water samples or use being made of the water.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

## RECORDS AND SAMPLES

## 4725.6600 WATER SAMPLE.

Prior to placing the well into service, the licensee will be responsible for collecting one or more water samples from the installation for water quality analysis. Such samples shall be submitted to the Minnesota Department of Health in containers and in accordance with procedures issued by the director. The results of the data will be stored in a ground water quality information system. The sample must be received within 30 hours of collection. Results of water sample analysis for a domestic supply not acceptable for drinking water will be reported to the well owner and the licensee along with recommendations for corrective actions. The results of the sample analysis are not intended to provide a basis of water quality for a transaction involving the sale or purchase of property.

If the licensee chooses to submit the water sample to a laboratory other than that of the Minnesota Department of Health, that laboratory must be certified by the Minnesota Department of Health for determination of the presence of coliform bacteria. The sample must be collected in containers approved by the director and must be received by the certified laboratory within 30 hours of the time of collection. The costs of such analysis shall be paid by the licensee. Results of the analysis shall be submitted to the Minnesota Department of

# MINNESOTA RULES 1985

4261

## WATER WELL CONSTRUCTION CODE 4725.6800

Health.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.6700 WATER WELL RECORDS.**

A water well record shall be completed and submitted to the commissioner by the licensee within 30 days after completion of any well. The licensee shall furnish the well owner one copy, the director three copies, and retain one copy in his files, of a well record containing such available information as required on the form furnished by the director. Terms when used for describing formations on the well log form shall conform to definitions set forth in these rules.

A water well record shall be submitted for a dry hole. Information on several dry holes within a small area may be submitted on a single well record form if the geologic materials are similar.

A well record shall be submitted after an abandoned well has been sealed showing the method of sealing.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### **4725.6800 WATER WELL CUTTING FORMATION SAMPLES.**

**Subpart 1. Procedures for obtaining information.** In order to improve the state's water information system, more detailed geologic and hydrologic information is needed about the rocks and sediments which contain the state's groundwater resources. Water well cuttings provide the least expensive source of this kind of information. The information derived from such a program is essential to the better understanding and protection of the state's groundwater resources. Subparts 2 to 7 set forth the means by which such information shall be obtained.

**Subp. 2. Determination of area to be sampled.** The commissioner, in consultation with the Minnesota Geological Survey (hereinafter referred to as the survey), shall determine areas where water well-cutting samples are needed to provide subsurface geological and hydrological information required by the commissioner, the survey, and other state agencies for development of the state water information system. The general standards to be used in making such a determination are:

A. To obtain the minimum amount of detailed geologic and hydrologic information needed for the state water information system, at least one set of water well-cutting samples per township in rural areas and at least one set of water well-cutting samples per section in urban areas are required. The latest State Planning Agency land-use map will be used for determining rural and urban areas for collection of well cutting formation samples.

B. The commissioner, in consultation with the survey, may determine that more information is required from specific areas for accuracy and detail in the state water information system.

C. Water well-cutting samples will be required only where there is reason to believe that a well will encounter bedrock materials below glacial sediments or from a well which the licensee estimates will reach a depth of at least 200 feet. The commissioner may require water well-cutting samples from areas other than as specified in this subpart where needed for accuracy and detail in the state water information system.

Any licensee who has reason to believe that a well may be of exceptional geologic or hydrologic interest is encouraged to call the survey collect to inform that agency of the opportunity to obtain samples, even if the well is not within the area currently designated for collection of samples.

**Subp. 3. Notification to licensees.** The commissioner, through the survey, shall notify licensees of the general areas from which water well-cutting samples are required and provide the licensees most frequently operating within such areas with maps or lists indicating counties, townships, section, or other



# MINNESOTA RULES 1985

## 4725.6800 WATER WELL CONSTRUCTION CODE

4262

designated areas where cutting samples are required. In addition, the commissioner shall specify the approximate number and depths of wells from which cutting samples are needed in the designated areas.

Subp. 4. **Sampling materials furnished to licensee.** The survey shall furnish all licensees so notified with well-cutting sample bags, labels, and return postage cards for collecting and reporting water well-cutting samples.

Subp. 5. **Collection of samples by licensees.** Licensees so notified and supplied with sample collecting materials shall collect cutting samples during the course of drilling wells in the designated areas according to the requirements specified in the notification. Licensees not supplied with sample collecting materials but who shall have occasion to drill a well in an area designated for sampling shall notify the survey. Licensees shall collect the cutting samples in an accurate manner so as to ensure that they are representative of the materials encountered. Samples shall be taken at five-foot intervals and at every change in rock or sediment type. The cuttings shall be placed in the sample bags provided by the survey which shall have an attached tag on which the commissioner's recording form well-record number of the well, the well owner's name, the well location, and the sample depth (example: five feet) must be written.

Subp. 6. **Notification to Minnesota Geological Survey of completion.** Licensees shall notify the survey within 30 days after the well's completion so that the cutting samples can be collected. Pending collection, the contractor shall store the samples in a proper manner, so that they are protected from weather and disturbance and segregated in such a way that all samples may be properly identified with respect to the commissioner's recording form well-record number and depth interval.

Subp. 7. **Collection of samples by survey.** The survey, upon notification by the licensee, shall collect the samples from the contractor. The cutting samples shall be described and a geologic log prepared. The geologic log will be retained in the files of the Minnesota Geological Survey, with a copy being sent to the contractor.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

## PLASTIC WELL CASING

### 4725.6900 PLASTIC WELL CASING; GENERALLY.

In addition to complying with parts 4725.0100 to 4725.6800, an installer who uses plastic well casing must comply with the provisions of parts 4725.6900 to 4725.7600 with regard to construction and installation.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.7000 DEFINITIONS.

Subpart 1. **Scope.** The following terms shall have the meanings given to them.

Subp. 2. **Installer.** "Installer" means any person who constructs a well using plastic casing, whether or not such person is a driller or contractor who is licensed pursuant to Minnesota Statutes, chapter 156A.

Subp. 3. **Plastic.** "Plastic," when used in parts 4725.0100 to 4725.7600, means a thermo-plastic pipe or casing material composed of either polyvinyl chloride (PVC) or acrylonitrile-butadiene-styrene (ABS).

**Statutory Authority:** *MS s 156A.01 to 156A.08*

# MINNESOTA RULES 1985

4263

## WATER WELL CONSTRUCTION CODE 4725.7200

### 4725.7100 STANDARDS.

Subpart 1. **Approved materials.** Any plastic pipe used for water well casing shall meet the standards of the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103, which are referenced as Standard Specification for Thermoplastic Water Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), ASTM F-480. Such pipe shall be capable of withstanding pressures equal to or greater than 200 pounds per square inch (psi). Subpart 2 lists the pipe included in ASTM F-480 which meets the 200 psi rating.

Subp. 2. **Standard thermoplastic dimension ratios (SDR) and water pressure ratings (PR) at 23 degrees Celsius (73 degrees Fahrenheit) for nonthreaded PVC and ABS plastic pipe equal to or greater than 200 psi.**

#### Pressure Rating of PVC Pipe Materials

	PVC 1120	PVC 2116	PVC 2112
	PVC 1220		
	PVC 2120		
SDR	psi	psi	psi
13.5	315	250	200
17	250	200	
21	200		

#### Pressure Rating of ABS Pipe Materials

	ABS 1316	ABS 2112
SDR	psi	psi
13.5	250	200
17	200	

Any plastic pipe, couplings, components, solvents, cements, or primers used in water well casing construction shall have the approval of a testing laboratory which has demonstrated the use of unbiased, reliable and appropriate testing methods, as determined by the commissioner of health. Such laboratory must approve the material as being intended for use in the transport of potable water. This approval shall be stamped on the pipe as prescribed in part 4725.7200.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.7200 PIPE MARKINGS.

Subpart 1. **Well casing pipe.** The plastic well casing pipe shall be marked at least every 1.5 m (five feet), in letters not less than five mm (3/16 inch) high in a contrasting color with the following information:

A. nominal well casing pipe size (for example, five inches), as specified in ASTM F-480;

B. well casing pipe standard dimension ratio, in accordance with designation code given in part 4725.3400, subpart 10 (for example, SDR 17, 1316);

C. type of plastic casing pipe material (for example, ABS or PVC);

D. the wording, "well casing," followed by the impact classification (for example, IC-3);

E. designation "ASTM F-480" including the year of issue of the standard with which the well casing pipe complies;

F. manufacturer's name or trademark;

G. manufacturer's code for resin manufacture, lot number, and date of manufacture;

H. the seal or mark of the laboratory making the evaluation of the plastic for potable water use spaced at intervals specified by the laboratory; and

I. pressure rating (must be 200 psi or more).

Subp. 2. **Coupling markings.** Plastic well casing pipe couplings shall be marked in letters not less than five mm (3/16 inch) high, with the following information:

- A. nominal well casing pipe coupling size (for example, five inches), as specified in ASTM F-480;
- B. type of plastic well casing pipe coupling material (for example, ABS or PVC);
- C. designation "ASTM F-480," including year of issue of the standard with which the well casing pipe coupling complies;
- D. manufacturer's name or trademark; and
- E. the seal or mark of the laboratory making the evaluation of the plastic for potable water use spaced at intervals specified by the laboratory.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

#### 4725.7400 STORAGE, HANDLING, AND COMPONENTS.

The installer shall:

- A. Not use pipe and couplings that have been stored in direct sunlight. Pipe must be stored in such a manner so as to prevent sagging or bending.
- B. Inspect pipe and couplings carefully for cuts, gouges, deep scratches, damaged ends, and other major imperfections and shall not use any plastic pipe or coupling which has such defects or imperfections.
- C. Use solvent cement meeting the requirements of the specifications for the particular plastic used. The cement used shall provide sufficient open time for making good joints but the installer shall complete joints immediately upon applying the solvent cement.
- D. Use only pipe and coupling combinations that give close and satisfactory interference fits which will readily mate when the solvent cement is applied and the pieces are joined. The pipe shall enter the socket to between one-half or two-thirds of the socket depth when inserted and turned.
- E. An installer may use plastic pipe couplings with molded or formed threads but he must use only the thread lubricant which is suitable for the particular type of plastic being used.
- F. When the installer connects plastic pipe to a nonplastic well screen, he shall use a coupling appropriate for the specific transition intended.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

#### 4725.7500 TECHNIQUE FOR JOINING PLASTIC WELL CASING.

Subpart 1. **Cutting.** The installer shall use fine-tooth blades with little or no set for cutting the pipe. Pipe ends shall be cut square. A plastic pipe cutter equipped with extra-wide rollers and thin cutting wheels may be used. Standard steel pipe or tubing cutters shall not be used for cutting plastic pipe.

Subp. 2. **Cleaning.** The installer shall clean all dirt, dust, moisture, and burrs from pipe ends and couplings. The installer may use only chemical or mechanical cleaners which are suitable for the particular plastic material being used. All burrs shall be removed.

Subp. 3. **Primer.** The installer shall use a primer when, because of the type of plastic material being used, the pipe and coupling surfaces must be softened and dissolved in order to form a continuous bond between the mating surfaces, and/or when the particular type of solvent cement being used requires one.

Subp. 4. **Cement application.** The installer shall apply a moderate and even coat of cement to the inside of the coupling to cover the distance of the joining surface only. The installer shall then quickly apply an even coat of cement to the outside of the pipe being joined to a distance which is equal to the depth of the pipe coupling socket.

# MINNESOTA RULES, 1985

4265

## WATER WELL CONSTRUCTION CODE. 4725.7600

Caution should be used when handling solvent cement to avoid skin contact or inhalation of vapors.

Subp. 5. **Assembly.** The installer shall:

- A. make the joint as quickly as possible after application of the cement, and before it dries;
- B. reapply cement before assembling if the cement dries partially;
- C. insert the pipe into the coupling socket, turning the pipe to ensure even distribution of cement;
- D. make sure that the pipe is inserted to the full depth of the coupling socket, and assemble pipe by using pipe joiners;
- E. remove excess solvent cement from the exterior of the joint with a clean, dry cloth;
- F. tighten a threaded joint by no more than one full turn using a strap wrench;
- G. not disturb the coupling joint until after the cement has set, in order to avoid damage to the joint and loss of fit;
- H. allow sufficient time for the joint to develop good handling strength based on the setting times given in subpart 6.

Subp. 6. **Initial set time.**

Temperature Range During Initial Set Time degrees C (degrees F)	Set Time for Pipe Sizes 2 to 3 in	Set Time for Pipe Sizes 3-1/2 to 12 in
15 to 40 (60 to 100)	30 min.	1 hr.
5 to 15 (40 to 60)	2 hrs.	4 hrs.
-20 to +5 (0 to 40)	6 hrs.	12 hrs.

**Statutory Authority:** *MS s 156A.01 to 156A.08*

### 4725.7600 INSTALLATION OF PLASTIC WELL CASING.

Subpart 1. **Drilling an open hole.** The installer shall drill an open hole which is four inches larger than the nominal casing size where:

A. Rock (consolidated as opposed to unconsolidated geological material) is encountered within 25 feet of the surface. The annular space shall be grouted with neat cement or concrete grout as prescribed in part 4725.3800.

B. Rock is encountered at a depth greater than 25 feet from the surface. The casing shall extend at least five feet into the stable rock formation. The casing shall be sealed into the rock using neat cement grout. The remaining annular space shall be grouted as prescribed in part 4725.3800 or 4725.4100.

C. Boulders or unstable geologic conditions require than an oversized hole be drilled in order to install and protect the well casing. The annular space shall be grouted as prescribed in part 4725.3800 or 4725.4100.

D. The well screen is to be gravel packed. The gravel pack shall not extend more than ten feet above the static water level nor within 50 feet of the land surface. The remaining annular space shall be grouted as prescribed in part 4725.3800 or 4725.4100.

Subp. 2. **Drilling inside of plastic casing prohibited.** An installer may not insert the drill stem inside the plastic casing when drilling any kind of well.

Subp. 3. **Grouting.** The installer shall fill the annular space between the drill hole wall and the casing pipe with grout as prescribed in part 4725.3800 or 4725.4100 to assure equal loading around the casing in order to prevent collapse or deformation of the casing and to prevent any contamination from entering the well. Native sand may be used in nonartesian wells drilled in outwash material having no clay lense or lenses (a geological stratum composed of clay). The upper 30 feet in any type of well shall be grouted with neat cement grout (defined in part 4725.3800, subpart 3) using a tremie pipe. A tremie pipe is one

# MINNESOTA RULES 1985

## 4725.7600 WATER WELL CONSTRUCTION CODE

4266

which is small enough to fit in the annular space and which carries the grout to the bottom of a hole. The grout shall be fed under pressure from the bottom to the top in one continuous operation.

Because of its high heat of hydration, grout made of rapid-setting cement is not permitted for use in wells which are cased with PVC pipe.

The following shows the strength of PVC at various temperatures based on 73.4 degrees Fahrenheit being 100 percent of its tested strength:

- A. 50 degrees Fahrenheit, 114 percent;
- B. 60 degrees Fahrenheit, 107 percent;
- C. 70 degrees Fahrenheit, 101 percent;
- D. 80 degrees Fahrenheit, 95 percent;
- E. 90 degrees Fahrenheit, 88 percent;
- F. 100 degrees Fahrenheit, 83 percent;
- G. 110 degrees Fahrenheit, 77 percent;
- H. 120 degrees Fahrenheit, 72 percent;
- I. 130 degrees Fahrenheit, 65 percent;
- J. 140 degrees Fahrenheit, 40 percent; and
- K. 150 degrees Fahrenheit, 10 percent.

Subp. 4. **Protection for plastic-cased wells.** All plastic-cased wells must terminate above grade as prescribed in parts 4725.1900 to 4725.2200 and 4725.3400, subpart 8. The installer may equip a plastic-cased well with a steel casing or steel pitless unit which is satisfactory for use in plastic-cased wells, to a depth equal to or greater than the frost line. Where a steel casing or steel pitless unit is not used, the plastic casing shall be extended above grade to a distance prescribed in parts 4725.1900 to 4725.2200 and 4725.3400, subpart 8, and must be protected with any one of the following:

- A. an oversize steel casing which extends from the top of the plastic casing down to a depth below the frost line; or
- B. at least three posts (schedule 40 steel pipe) of at least four inch diameter at equal distances from each other and which are placed two feet from the center of the plastic casing. Such posts shall be installed to a depth of four feet into solid ground, or to a depth of two feet if each post is surrounded with one foot of concrete to a depth of two feet; or
- C. a well house which is constructed so as to provide a degree of protection which is equivalent to that provided in item B.

Subp. 5. **Abandonment.** The installer shall plug and abandon a bore hole as prescribed in parts 4725.2700 to 4725.2900;

- A. whenever the plastic casing cannot be installed without exerting pressure; or
- B. whenever a screen or pump cannot be installed without force; or
- C. whenever the casing fails during the construction or pumping stages.

Subp. 6. **Cavernous rock wells.** Plastic water well casing shall not be used as an outside casing in wells cased and cement grouted through cavernous rock formations. However, in such formations, plastic casing may be used as an inner casing pursuant to the requirements of part 4725.3400, subpart 6, if surrounded by an outer casing.

Subp. 7. **Use of screws.** Screws shall not be used to join solvent weld joints.

**Statutory Authority:** *MS s 156A.01 to 156A.08*