

WELL CONSTRUCTION CODE ADMINISTRATIVE RULES

Filed with the Secretary of State on April 5, 1994.

These rules take effect 15 days after filing with the Secretary of State

(By authority conferred on the department of public health by sections 33 and 63 of Act No. 306 of the Public Acts of 1969, as amended, and section 12714 of Act No. 368 of the Public Acts of 1978, as amended, being "24.233, 24.263, and 333.12714 of the Michigan Compiled Laws)

PART 1. WELL CONSTRUCTION CODE

R 325.1601 **Definitions; A.**

R 325.1601a **Definitions; B.**

R 325.1602 **Definitions; C, D.**

R 325.1603 **Definitions; G to M.**

R 325.1603a **Definitions; N, O.**

R 325.1604 **Definitions; P.**

R 325.1605 **Definitions; R to T.**

R 325.1606 **Definitions; W, Y.**

R 325.1607 **Terms defined in the act.**

R 325.1608 **Authorized activities.**

R 325.1610 **Adoption of standards and specifications.**

R 325.1611 **Application of rules to existing water supplies.**

R 325.1612 **Compliance with regulations and local codes.**

R 325.1613 **Deviations from minimum standards.**

R 325.1621 **Location and construction of wells generally.**

R 325.1622 **Wells; distances from contamination sources.**

R 325.1624 **Wells; relation to buildings and access for maintenance.**

R 325.1625 **Wells; areas subject to flooding.**

R 325.1626 **Construction of wells; steel casing.**

R 325.1627 **Construction of wells; steel casing and types of joints.**

R 325.1631a **Construction of wells; PVC casing dimensions.**

R 325.1631b **Construction of wells; PVC casing material standards.**

R 325.1631c **Construction of wells; PVC well casing joints.**

R 325.1631d **Construction of wells; examination of pipe.**

R 325.1632 **Construction of wells; casing diameter, depth, termination, and installation procedures.**

R 325.1632a **Construction of wells; driven well points.**

R 325.1633 **Rescinded.**

R 325.1633a **Construction of wells; grouting.**

R 325.1634 **Rescinded.**

R 325.1634a **Construction of wells; grouting rotary-bored or augered wells**

R 325.1635 **Construction of wells; grouting driven casing wells.**

R 325.1636 **Rescinded.**

R 325.1637 **Construction of bedrock wells.**

R 325.1637a **Verification of well grouting.**

R 325.1638 **Construction of flowing artesian wells.**

R 325.1639 **Construction of wells; well screens; lead packers, lead plugs, lead wool and certain drilling fluids prohibited; requirements for steel pipe used as screen riser pipes, blanks, or tailpipes; well pumping rate; temporary capping; well alignment; drilling water; requirements when using chlorine or other well rehabilitation chemicals.**

R 325.1640 **Certification of water well components.**

R 325.1641 **Abovegrade well casing connections.**
R 325.1642 **Belowground well casing connections.**
R 325.1651 **Construction of room housing pumping equipment or well casing; location of pump or pumping equipment in single- family dwelling permitted; access required for repair and maintenance of water supply system components.**
R 325.1652 **Rescinded.**
R 325.1653 **Pump construction, installation, design, and maintenance.**
R 325.1653a **Pump installation; hand pumps.**
R 325.1654 **Pump installation; water suction lines.**
R 325.1655 **Pump installation; water service lines.**
R 325.1656 **Pump installation; pressure tanks.**
R 325.1656a **Pump installation; venting of gases.**
R 325.1657 **Pump installation; vents.**
R 325.1657a **Pump installation; well caps and seals.**
R 325.1658 **Pump installation; sampling faucets.**
R 325.1661 **Disinfection of well and pumping equipment.**
R 325.1662 **Abandoned wells and dry holes; persons responsible for plugging; removal of debris and obstructions; wells taken out of service when municipal water is installed.**
R 325.1663 **Abandoned wells and dry holes; plugging method.**
R 325.1664 **Abandonment of wells; plugging materials.**
R 325.1665 **Plugging of dug wells and crock wells.**
R 325.1666 **Rescinded.**
R 325.1667 **Plugging wells drilled by person other than property owner or registered well drilling contractor.**
R 325.1668 **Order to plug abandoned well or dry hole.**
R 325.1669 **Owner and contractor responsibility for plugging abandoned wells**
R 325.1670 **Temporarily abandoned wells.**
R 325.1671 **Rescinded.**
R 325.1672 **Storage reservoirs.**
R 325.1673 **Provision of notice of health hazard to person using contaminated water supply**
R 325.1674 **Other water sources.**
R 325.1674a **Water supply cross-connections.**
R 325.1675 **Well records.**
R 325.1676 **Pump installation records.**

PART 2. DRILLING CONTRACTORS' AND PUMP INSTALLERS' REGISTRATION

R 325.1701 **Qualifications.**
R 325.1701a **Proof of work experience.**
R 325.1702 **Grandfather clause.**
R 325.1703 **Submission of applications.**
R 325.1704 **Advisory board's evaluation of applicants.**
R 325.1705 **Rescinded.**
R 325.1705a **Out-of-state applicants.**
R 325.1706 **Examinations.**
R 325.1707 **Denial of applications.**
R 325.1707a **Suspension or revocation of certificate; denial of renewal application.**
R 325.1708 **Initial certificate; nontransferability; content; renewal certificate; content; notice of change in applicant information; notice of loss of registered contractor representative.**

R 325.1709 **Reinstatement of expired and revoked certificates.**

R 325.1711 **Public representations and advertising.**

PART 3. DRILLING MACHINES AND SERVICE VEHICLES

R 325.1721 **Well drilling machine registration.**

R 325.1722 **Identification on well drilling machines and service vehicles.**

PART 1. WELL CONSTRUCTION CODE

R 325.1601 Definitions; A.

Rule 101. (1) "Abandoned water well" means any of the following:

- (a) A well which has its use permanently discontinued.
- (b) A well which is in such disrepair that its continued use for the purpose of obtaining groundwater is impractical.
- (c) A well which has been left uncompleted.
- (d) A well which is a threat to groundwater resources.
- (e) A well which is or may be a health or safety hazard.

(2) "Act" means Part 127 of Act No. 368 of the Public Acts of 1978, as amended, being "333.12701 to 333.12715 of the Michigan Compiled Laws.

(3) "Annular space" means the space between 2 cylindrical objects, 1 of which surrounds the other, such as the space between a borehole wall and a permanent casing or between a temporary casing and a permanent casing.

(4) "Approved basement" means a basement which has walls and a floor that are constructed of concrete or its equivalent, which is reasonably watertight, which is properly drained, and which is in ordinary daily use.

(5) "Aquifer" means a subsurface water-bearing geologic material that transmits water in sufficient quantities to supply a well.

R 325.1601a Definitions; B.

Rule 101a. (1) "Basement offset" means a below grade well room or pump room which has walls and a floor that are constructed of concrete or its equivalent, which is reasonably watertight, and which is attached directly to, and drained into, an approved basement in a manner that provides access for the maintenance of water supply system components.

(2) "Bedrock" means consolidated and continuous geologic material, such as limestone, dolomite, shale, sandstone, basalt, or granite.

(3) "Bentonite" means a plastic, colloidal clay which has an extensive ability to absorb fresh water and swell in volume and which is composed predominantly of the mineral montmorillonite.

(4) "Bentonite chips" means bentonite that is crushed to an approximate size range of 3/8 to 3/4 of an inch.

(5) "Bentonite grout" means a slurry which consists of bentonite and water and which has a high solids concentration and a minimum density that meets specifications approved by the department. A slurry of drilling fluid bentonite and water or drilled cuttings, either singularly or in combination, is not bentonite grout.

(6) "Bentonite pellets" means bentonite that has been processed into pellet or tablet form with a diameter of 1/4 to 1/2 of an inch.

R 325.1602 Definitions; C, D.

Rule 102. (1) "Casing" means an impervious durable pipe that is placed in a well to prevent the walls from caving

- and to prevent surface drainage, undesirable water, gas, or other fluids, from entering the well.
- (2) "Coliform group" means all of the aerobic and facultative anaerobic, gram-negative, nonspore-forming, rodshaped bacteria that ferment lactose with gas formation within 48 hours at 35 degrees Celsius.
- (3) "Concrete grout" means a mixture of cement, sand, and water in the proportion of 1 bag of cement (94 pounds), an equal volume (1 cubic foot) of dry sand or gravel aggregate, and not more than 6 gallons of clean water.
- (4) "Confining layer" means geologic material which has a low hydraulic conductivity, which is 5 feet or more in thickness, and which impedes or prevents vertical groundwater movement.
- (5) "Contaminant" means a biological, chemical, physical, or radiological constituent in water that is or may become injurious to the public health, safety, or welfare.
- (6) "Date of completion" means the date on which the installation of the pump or pumping equipment was completed, the date on which well drilling was completed if a pump or pumping equipment will not be installed or will be installed by a person other than the well drilling contractor, or the date on which the water supply system is placed into service after the collection of water samples pursuant to the provisions of R 325.1661.
- (7) "Department" means the state department of public health.
- (8) "Dewatering well contractor" means an individual, partnership, or corporation which is qualified to engage in dewatering well construction and dewatering well pump installation and which constructs or installs dewatering wells, plugs abandoned dewatering wells, or supervises such work.
- (9) "Dewatering well pump installer" means an individual, partnership, or corporation which is qualified to engage in installing and operating dewatering pumps and which installs and operates dewatering pumps or supervises such work.
- (10) "Director" means the director of the department or an authorized representative.
- (11) "Drilling fluid bentonite" means bentonite that is processed into a powdered form for use as a viscosifier and filtrate reducer in drilling operations.
- (12) "Dry hole" means an open borehole or cased borehole that does not produce water in sufficient quantity for the intended use.

R 325.1603 Definitions; G to M.

- Rule 103.** (1) "Geologic material" means all materials that are penetrated in drilling a well.
- (2) "Granular bentonite" means bentonite that has an approximate size range of 1/32 to 1/8 of an inch.
- (3) "Ground surface" means the intended or actual finished grade of the surface of the ground at the well site, which shall be consistent with the surrounding land surface.
- (4) "Groundwater" means the water in the zone of saturation that fills all of the pore spaces of the subsurface geologic material.
- (5) "Grout" means a material that has a low permeability, such as neat cement, bentonite grout, bentonite chips, bentonite pellets, granular bentonite, or other materials which have equivalent sealing properties and which are approved in writing by the department before use.
- (6) "Grouting" means the placement of grout into the annular space that surrounds a permanent casing for the purpose of sealing the annular space to prevent the entrance or migration of surface water, near surface water, and contaminants to the groundwater and to maintain the natural protection of aquifers.
- (7) "Health officer" means the administrative officer who is in charge of a full-time local health department or an authorized representative.
- (8) "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 any construction that is involved in making an entrance to the well and also means installing a pitless adapter, well cap, pump drop pipe, suction line, discharge line, water service line, or pressure tank.

(9) "Liner pipe" means a permanent casing installed within another permanent casing or open borehole subsequent to initial construction of the well.

(10) "Municipality" means a city, village, township, county, district, or other public body that is created by or pursuant to state law or any combination of such units acting cooperatively or jointly.

R 325.1603a Definitions; N, O.

Rule 103a. (1) "Neat cement" means a mixture of 1 bag of Portland cement (94 pounds) and not more than 6 gallons of fresh water. Drilling fluid bentonite that is not more than 5% by weight of cement and additional water that is not more than 0.6 gallons for each 1% of bentonite may be added to neat cement. Other additives and admixtures shall be approved by the department before use.

(2) "Overburden" means unconsolidated geologic material, such as gravel, sand, silt, and clay, that overlies bedrock.

R 325.1604 Definitions; P.

Rule 104.(1) "Permanent casing" means durable, impervious pipe placed or driven into the borehole and left in place to maintain the well opening.

(2) "Pitless adapter" means a device or assembly of parts which will permit water to pass through the wall of the well casing or extension thereof and which provides access to the well and to the parts of the water supply system within the well in a manner to prevent the entrance of contaminants into the well and the water produced.

(3) "Potable water" means water which is free of contaminants in concentrations that may cause disease or harmful physiological effects and which is safe for human consumption.

(4) "Pressure tank" means a closed water and air storage container that modulates the water supply system pressure within a selected range.

(5) "Priming" means the filling of a pump with water and the action of starting the flow in a pump.

(6) "Pumping equipment " means equipment or materials that are used or intended to assist a pump in withdrawing groundwater from a well, including any of the following:

(a) Seals and other safeguards to protect the water from contamination.

(b) Associated fittings.

(c) Intake and discharge piping.

(d) Controls to provide sanitary water storage facilities and deliver water to a distribution piping system.

(7) "Pump room" means an enclosed structure which is either above ground surface or located within or attached to an approved basement and which houses a pump or pumping equipment.

(8) "Pumping water level" means the distance measured from the ground surface to the water surface in a well that is being pumped.

(9) "PVC" means polyvinyl chloride plastic.

R 325.1605 Definitions; R to T.

Rule 105. (1) "Recharge well," as used in section 12701 of the act, means a well used to discharge groundwater into an aquifer.

(2) "Static water level" means the distance measured from the ground surface to the water surface in a well that is neither being pumped nor under the influence of pumping.

(3) "Suction line" means a pipe or line that is connected to the inlet side of a pump or any pipe or line connected to a casing or pump which is or may be at less than atmospheric pressure (0 psi).

- (4) "Sump" means a shallow excavation into the ground in which the side walls may be supported by material other than steel casing. Water may enter the sump by drainage over the ground or by seepage through the side walls and bottom.
- (5) "Surface water" means water that rests or flows on the surface of the ground.
- (6) "Temporarily abandoned well" means a well that is not in use, but intended by the owner to be used as a source of groundwater.
- (7) "Temporary casing" means durable pipe placed or driven into a borehole to maintain an open annular space around the permanent casing during construction of a well.
- (8) "Test well," as used in section 12701 of the act, means a well that is used to obtain information on groundwater quantity, quality, or aquifer characteristics for the purpose of designing or operating a water supply well.

R 325.1606 Definitions; W, Y.

Rule 106. (1) "Wastewater" means a liquid waste that includes any of the following:

- (a) Human excreta.
 - (b) Wastes from a sink, lavatory, bathtub, shower, or laundry.
 - (c) Any other liquid waste of organic or chemical nature, either singularly or in combination.
- (2) "Water supply system" means a well, pump, and pumping equipment.
- (3) "Well," as defined in section 12701 of the act, also includes all of the following:
- (a) "Water supply well," which means a well that is used to provide potable water for drinking or domestic purposes.
 - (b) "Irrigation well," which means a well that is used to provide water for plants, livestock, or other agricultural processes.
 - (c) "Heat exchange well," which means a well for the purpose of utilizing the geothermal properties of earth formations for heating or air conditioning.
 - (d) "Industrial well," which means a well that is used to supply water for industrial processes, fire protection, or similar nonpotable uses.
- (4) "Well drilling" means any of the following:
- (a) Constructing, reconstructing or repairing a well.
 - (b) Operating a well drilling machine.
 - (c) Installing or removing casing or a well screen.
 - (d) Well grouting.
 - (e) Well development.
 - (f) Well rehabilitation.
 - (g) Hydrofracturing.
 - (h) Chemical treatment of a well.
 - (i) Plugging abandoned wells.
- (5) "Well house" means an enclosed structure which is located above the ground surface and which houses a well or water supply system.
- (6) "Well log" or "water well record" means a record of information about a specific well as provided for in section 12707 of the act.
- (7) "Well seal" means a device to prevent the entrance of contaminants into the top of a well casing.
- (8) "Well used temporarily for dewatering," as used in section 12701 of the act, means a well that is used to lower the groundwater level temporarily at a construction site.
- (9) "Vent" means an outlet which is at the upper terminal of a well casing and which allows the equalization of air pressure in the well.

R 325.1607 Terms defined in the act.

Rule 107. The terms defined in the act have the same meanings when used in these rules.

R 325.1608 Authorized activities.

Rule 108. (1) A registered well drilling contractor may perform the well drilling activities that are set forth in R 325.1606(4) and pump installation activities that are set forth in R 325.1603(8).

(2) A registered pump installer may perform the pump installation activities that are set forth in R 325.1603(8), but shall not perform well drilling activities that are set forth in R 325.1606(4).

R 325.1610 Adoption of standards and specifications.

Rule 110. (1) These rules refer to the following standards and specifications of nationally recognized organizations or associations, which were in effect on October 1, 1993, and are adopted by reference in these rules:

(a) The following standards of the American society for testing and materials, which are available at a cost as of the time of adoption of these rules of \$12.00 each from the American Society for Testing and Materials (ASTM), 1916 Race Street, Philadelphia, Pennsylvania 19103:

(i) ASTM specification A 53-90b, "Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless."

(ii) ASTM specification A 106-91, "Standard Specification for Seamless Carbon Steel Pipe for High Temperature Service."

(iii) ASTM specification A 589-89a, "Standard Specification for Seamless and Welded Carbon Steel Water-Well Pipe."

(iv) ASTM specification F 480-90, "Standard Specification for Thermoplastic Water Well Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR)."

(v) ASTM specification D 1785-91, "Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Schedules 40, 80, and 120."

(vi) ASTM specification D 2239-89, "Standard Specification for Polyethylene (PE) Plastic Pipe (SIDR-PR) Based on Controlled Inside Diameter."

(vii) ASTM specification D 2241-89, "Standard Specification for Poly(Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series)."

(viii) ASTM specification D 2662-89, "Standard Specification for Polybutylene (PB) Plastic Pipe Based on Controlled Inside Diameter."

(ix) ASTM specification D 2666-89, "Standard Specification for Polybutylene (PB) Plastic Tubing."

(x) ASTM specification D 2737-89, "Standard Specification for Polyethylene (PE) Plastic Tubing."

(xi) ASTM specification C 150-89, "Standard Specification for Portland Cement."

(b) American petroleum institute (API) specification 5L, 1990, "Specification for Line Pipe," which is available at a cost as of the time of adoption of these rules of \$8.00 each and the API "Specification for Materials and Testing for Well Cements," API specification 10, 1990, which is available at a cost as of the time of adoption of these rules of \$12.00 each. Both specifications may be obtained from the American Petroleum Institute, 1220 L Street, Northwest, Washington, DC 20005.

(c) American national standards institute (ANSI)/national sanitation foundation (NSF) "Standard Number 60 for Drinking Water Treatment Chemicals - Health Effects," 1988, and ANSI/NSF "Standard Number 61 for Drinking Water System Components - Health Effects," 1990, and ANSI/NSF "Standard Number 14 for Plastic Piping Components and Related Materials," 1989, which are available at a cost as of the time of adoption of these rules of \$45.00 each from the National Sanitation Foundation (NSF), 3475 Plymouth Road, P. O. Box 1468, Ann Arbor, Michigan 48106.

(2) The standards and specifications adopted by reference in subrule (1) of this rule are available for inspection and purchase at the office of the Michigan Department of Public Health, Bureau of

Environmental and Occupational Health, Division of Water Supply, 3423 North Logan/Martin Luther King Jr. Blvd., P. O. Box 30195, Lansing, Michigan 48909.

R 325.1611 Application of rules to existing water supplies.

Rule 111. (1) When extensive changes or repairs are made to a water supply system that was constructed before the effective date of these amendatory rules, the changes or repairs shall be in compliance with the provisions of these rules unless a deviation is issued pursuant to the provisions of R 325.1613. Extensive changes include replacing the entire casing, removing a casing from the ground, or changing aquifers.

(2) Upgrading a water supply system to conform with these rules is not required when minor repairs to the system occur, such as any of the following:

- (a) Replacing a telescoped well screen.
- (b) Changing screen elevation.
- (c) Deepening or plugging back a bedrock well.
- (d) Installing a liner pipe.
- (e) Replacing a pump, controls, pump drop pipe, or pressure tank.
- (f) Chemical treatment of the well or well disinfection.

R 325.1612 Compliance with regulations and local codes.

Rule 112. A person who installs a well, pump, or pumping equipment shall comply with applicable laws, regulations, ordinances, and codes, including all of the following:

- (a) Act No. 399 of the Public Acts of 1976, as amended, being '325.1001 et seq. of the Michigan Compiled Laws. (safe drinking water act)
- (b) Act No. 266 of the Public Acts of 1929, as amended, being '338.901 et seq. of the Michigan Compiled Laws. (state plumbing code)
- (c) Act No. 154 of the Public Acts of 1974, as amended, being '408.1001 et seq. of the Michigan Compiled Laws. (occupational safety and health act)
- (d) Act No. 53 of the Public Acts of 1974, as amended, being '460.701 et seq. of the Michigan Compiled Laws. (utility damage prevention act)
- (e) Act No. 217 of the Public Acts of 1956, as amended, being '338.881 et seq. of the Michigan Compiled Laws. (electrical administrative act)
- (f) Act No. 331 of the Public Acts of 1976, as amended, being '445.901 et seq. of the Michigan Compiled Laws. (consumer protection act)
- (g) Any local code of a municipality which regulates the installation of a well, pump, or pumping equipment and which is not less restrictive than these rules. If a local board of health, in the discharge of its duties to protect the public health, deems it necessary to establish requirements that are more stringent than these rules, it shall do so and file a record of the requirements with the director. Well drilling contractors who drill wells in the counties that are affected by the more stringent requirements shall be notified, in writing, by the department or local health department not less than 5 days before the effective date of the modified requirements.

R 325.1613 Deviations from minimum standards.

Rule 113. (1) A health officer, in the discharge of his or her duty to protect the public health, may issue a deviation from the provisions of specific rules as provided for in this rule, if the spirit and intent of these rules are observed and the public health, safety, and welfare are assured.

(2) Rules or parts of rules, specific minimum standards, requirements, and conditions for which deviations may be permitted are as follows:

(a) The provisions of R 325.1611(1) may be deviated from to permit a water service line to remain in a condition that is not in compliance with the provisions of these rules when extensive changes or repairs to a water supply system are made if the water service line is located beneath a permanent structure or pavement.

(b) The provisions of R 325.1622 may be deviated from as follows:

(i) A well may be located closer than the specified minimum distance to a potential or known source of contamination if the dimensions of the property on which the well is to be located do not permit compliance with the specified minimum distances and if any of the following conditions exist:

(A) Hydrogeologic data indicate that the direction of groundwater flow at the contamination source is away from the well.

(B) The depth of the well and depth of grouting of the casing that is specified by a health officer as a condition of the deviation will provide equivalent protection of groundwater quality and the public health.

(C) The well is being constructed to replace an existing water supply well that is located on a site where a habitable structure exists.

(ii) A well may be required to be located more than the specified minimum distance from a potential or known source of contamination if the minimum specified distance will not protect groundwater quality or the public health due to local groundwater conditions, geology, or other factors.

(iii) A well may be located closer than the specified minimum distance, but not closer than 10 feet, to a pressurized sewer that meets all of the following requirements:

(A) The sewer pipe and joints have been pressure tested, after installation, to not less than 100 pounds per square inch and have been determined to be watertight.

(B) The sewer pipe and joints meet or exceed the standards of ASTM specification D 1785-91 or D 2241-89. The specifications are adopted by reference in R 325.1610.

(C) The sewer has a wall thickness that is equivalent to, or thicker than, schedule 40 or SDR 21.

(iv) A health officer may require a study of the hydrogeological conditions of a site to support a deviation issued pursuant to the provisions of this subrule.

(c) The provisions of R 325.1624(1)(a) may be deviated from to permit a well to be located closer than 3 feet to a building, pump room, or any projection thereof if all of the following conditions exist:

(i) The well is replacing an abandoned well.

(ii) The dimensions and features of the property on which the well is to be constructed do not permit location of the well to be in compliance with the specified minimum distance.

(iii) Access for maintenance of the well is provided.

(d) The provisions of R 325.1632(3) may be deviated from to permit a well casing to extend less than 25 feet below the ground surface if the well will not be used to supply water to habitable structures or for human consumption and if both of the following conditions exist:

(i) The well and water supply system are clearly and permanently identified as not being suitable for human consumption or body contact.

(ii) The well and water supply system are separated from any potable water supply system on the premises.

(e) The provisions of R 325.1632(3) may be deviated from to permit a well casing to extend less than 25 feet below the ground surface if there is reason to believe that potable water of suitable quantity does not exist at a reasonable depth of more than 25 feet and if either of the following conditions exists:

(i) The distance between the well and a potential or known source of contamination is increased pursuant to the provisions of subdivision (b)(ii) of this subrule.

(ii) A confining layer is present above the aquifer that will be used by the shallow well.

(f) The provisions of R 325.1634a(1) may be deviated from to permit the length of casing to be grouted for rotarybored or augered wells to be decreased if the well is more than 100 feet deep and if a confining layer is not penetrated.

(g) The provisions of R 325.1637 may be deviated from to require that a well casing extend more than 25 feet below the ground surface if there is reason to believe that nonpotable water is or may be present in the upper bedrock.

(h) The provisions of R 325.1638(2) may be deviated from to permit flowing well discharge if the well owner or the well owner's representative demonstrates any of the following:

(i) Control of the flow is not practical.

(ii) Control of the flow will likely result in the production of sand or turbidity in the water.

(iii) The discharge is for a beneficial use.

(3) Deviations from the rules listed in subrule (2) of this rule shall be made, in writing, by a health officer and shall state the reasons for each deviation. A health officer may require special well construction features as a condition for the issuance of a deviation and may require well construction features that are more stringent than these rules when deemed necessary to protect the groundwater quality or the public health. Reasons for the issuance of a deviation or special well construction features as a condition for the issuance of a deviation by a health officer shall be based upon any of the following factors:

(a) Site hydrogeology.

(b) Site topography.

(c) Site dimensions.

(d) Soil Characteristics

(e) Depth of well.

(f) Type of well.

(g) Well pumping rate.

(h) Well drilling method.

(i) Distance from contamination sources.

(j) Presence of groundwater contamination.

(k) Other similar factors.

R 325.1621 Location and construction of wells generally.

Rule 121. (1) All of the following provisions apply to well location:

(a) A well shall be located with due consideration of all of the following:

(i) Lot size.

(ii) Hydrogeology.

(iii) Site topography.

(iv) Soil characteristics.

(v) Other factors that are necessary to implement the provisions of these rules.

(b) A well shall be located so that the well and its surrounding area can be kept in a sanitary condition.

(c) A well shall be located so that access to the well for maintenance is provided.

(d) A well shall be located so that damage and personal injury do not result from contact with utilities during the construction or service of the well.

(2) A well shall be adequate in size, design, and development for the intended use giving due consideration to local groundwater conditions.

(3) All of the following provisions apply to well construction:

(a) A well shall be constructed to maintain existing natural protection against the contamination of aquifers.

(b) A well shall be constructed to exclude all known sources of contamination from the well.

(c) A well shall be constructed, equipped, and operated to prevent unnecessary discharge from flowing wells.

R 325.1622 Wells; distances from contamination sources.

Rule 122. (1) A well that furnishes water for any beneficial use shall be located where it is not subject to contamination. Groundwater contaminant movement is influenced by the type of contaminant, groundwater flow direction and velocity, and other hydrogeologic, geologic, and geochemical factors. If available, hydrogeologic data shall be used to select well location. Where possible, a well shall be located upgradient of a potential or known source of contamination. A well shall be located the maximum practical distance from a potential or known source of contamination. The following minimum horizontal distances shall be maintained when locating a well:

(a) Eight hundred feet from either of the following:

(i) The active work area of a landfill, as defined in R 299.4101.

(ii) Land surface application of septage waste, as defined by section 2 of Act No. 181 of the Public Acts of 1986, being '325.312 of the Michigan Compiled Laws.

(b) Three hundred feet from any of the following:

(i) Land application or subsurface injection of effluent or digested sludge from a municipal wastewater treatment facility.

(ii) Oil and gas wells.

(iii) Petroleum product processing or storage facilities.

(iv) Underground or abovegrade storage tank systems of not less than 1100 gallons which are regulated under Act No. 423 of the Public Acts of 1984, as amended, being '299.701 et. seq. of the Michigan Compiled Laws, when secondary containment as defined by Act No. 423 of the Public Acts of 1984, as amended, is not provided.

(c) One hundred and fifty feet from a preparation or storage area for fertilizers, agricultural chemicals, or other chemicals that might contaminate the soil or groundwater.

(d) Fifty feet from any of the following:

(i) A buried sewer, other than a sewer that is specified in subdivision (g) of this subrule.

(ii) A septic tank.

(iii) A subsurface disposal field.

(iv) A dry well.

(v) A sewage pump chamber.

(vi) A pressurized sewer.

(vii) A grease trap.

(viii) A seepage pit.

(ix) A cesspool.

(x) An animal or poultry yard.

(xi) An outhouse.

(xii) Any other wastewater handling or disposal unit or site of liquid wastes draining into the soil.

(e) Fifty feet from underground or abovegrade storage tank systems which have a capacity of not less than 1,100 gallons, which are regulated pursuant to the provisions of Act No. 423 of the Public Acts of 1984, as amended, being '299.701 et seq. of the Michigan Compiled Laws, and which have secondary containment as defined in Act No. 423 of the Public Acts of 1984, as amended.

(f) Fifty feet from underground or abovegrade storage tank systems which have a capacity of less than 1,100 gallons and which store motor or heating fuels for noncommercial purposes or consumptive use on the premises where the fuel is stored.

(g) Ten feet from any of the following:

(i) A buried gravity-flow sewer that is constructed of service weight or heavier ductile-iron pipe with watertight joints, schedule 40 PVC plastic with watertight joints, or other material and joints that are approved, in writing, by the director.

(ii) A sump, pit, or unfilled space that is below the ground surface, except for a crawl space.

(iii) A surface water body, such as a lake, pond, river, or stream.

(2) The health officer who is responsible for enforcement of this rule may deviate from the minimum isolation distances in this rule pursuant to the provisions of R 325.1613, either increasing or decreasing the minimum isolation distances for individual well installations.

(3) A well that serves a public water supply, as defined pursuant to the provisions of Act No. 399 of the Public Acts of 1976, as amended, being '325.1001 et seq. of the Michigan Compiled Laws, shall be isolated from contamination sources in accordance with requirements specified in R 325.10101 et seq.

(4) A well owner shall be responsible for maintaining the isolation distances that are specified in the provisions of R 325.1622 and R 325.1624 for property that is owned by the well owner.

R 325.1624 Wells; relation to buildings and access for maintenance.

Rule 124. (1) A well shall be located not less than 3 feet horizontally from a building, pump room, or any projection thereof, unless a deviation is issued pursuant to the provisions of R 325.1613.

(2) A well shall be accessible for cleaning, treatment, repair, testing, inspection, and other attention as may be necessary. A well owner shall maintain access to a well for a well drilling machine.

R 325.1625 Wells; areas subject to flooding.

Rule 125. (1) A well shall not be located in an area that is subject to flooding unless the well is protected as prescribed, in writing, by the health officer.

(2) A well owner shall grade the ground surface that is immediately adjacent to the well casing so surface water is diverted away from the well.

R 325.1626 Construction of wells; steel casing.

Rule 126. (1) Steel pipe that is used as permanent well casing shall be new pipe that is manufactured in compliance with the standards of ASTM specification A 53-90b, A 106-91, or A 589-89a or in compliance with the standards of API specification 5L-90. The specifications are adopted by reference in R 325.1610.

(2) Steel pipe that is used as permanent well casing shall be at least standard weight or schedule 40 through 10 inches inside diameter. Larger diameter pipe shall be at least standard weight. Weights and dimensions of standard weight or schedule 40 pipe are set forth in ASTM specification A 53-90b, A 106-91, and A 589-89a, API 5L-90 specification, and in table 1.

**Table 1
Steel Well Casing
Pipe Weights and Dimensions***

Nominal Pipe Size (Inches)	Weight-Lbs. Per Ft.			Wall Thickness (Inches)	Outside Diameter (Inches)	Inside Diameter (Inches)
	Weight/Schedule	Plain End	Threaded/Couplings			
1 1/4	Std./40	2.27	2.30	.140	1.660	1.380
1 1/2	Std./40	2.72	2.75	.145	1.900	1.610
2	Std./40	3.65	3.75	.154	2.375	2.067
2 1/2	Std./40	5.79	5.90	.203	2.875	2.469
3	Std./40	7.58	7.70	.216	3.500	3.068

3 1/2	Std./40	9.11	9.25	.226	4.000	3.548
4	Std./40	10.79	11.00	.237	4.500	4.026
5	Std./40	14.62	15.00	.258	5.563	5.047
6	Std./40	18.97	19.45	.280	6.625	6.065
8	Std./40	28.55	29.35	.322	8.625	7.981
10	Std./40	40.48	41.85	.365	10.750	10.020
12	Std.	49.56	51.15	.375	12.750	12.000
14	Std.	54.57	57.00	.375	14.000	13.250
16	Std.	62.58	65.30	.375	16.000	15.250
18	Std.	70.59	73.00	.375	18.000	17.250
20	Std.	78.60	81.00	.375	20.000	19.250
24	Std.	94.62	---	.375	24.000	23.250

* Dimensions and tolerances are listed in the specifications adopted in R 325.1610.

(3) Each length of steel pipe that is used as permanent well casing shall be legibly marked, by the manufacturer, with all of the following information:

- (a) The name of the manufacturer.
- (b) The kind of pipe (continuous welded, electric resistance welded, or seamless).
- (c) The weight or schedule.
- (d) The nominal or outside diameter.
- (e) The specification number.
- (f) The length.
- (g) The heat or lot number.

R 325.1627 Construction of wells; steel casing and types of joints.

Rule 127. (1) Steel pipe that is used as permanent well casing shall be watertight throughout its length and shall have threaded or welded joints.

(2) Couplings that are used on threaded steel casing shall be recessed or reamed and drifted couplings that are manufactured in compliance with the standards of ASTM specification A 589-89a or API specification 5L-90. The specifications are adopted by reference in R 325.1610. Couplings shall have a design, taper, and type of thread that is consistent with the thread of the pipe and threads shall not be exposed on the pipe.

(3) Welded joints shall be in compliance with the specifications of table 2 and provide a structurally sound and watertight joint. Pipe ends shall be free of oil, grease, heavy rust, paint, or other foreign materials, except for tightly adherent mill scale. The weld bead shall be chipped and brushed to remove slag and other extraneous materials between passes.

Table 2
Minimum Number of Passes
For welding Steel Casing

Pipe Diameter (inches)	Minimum Number passes
4	2
5	2
6	3
8	3
10 or larger	4

R 325.1631 Rescinded.

R 325.1631a Construction of wells; PVC casing dimensions.

Rule 131a. (1) PVC pipe that is used as permanent casing shall be new pipe that is manufactured in compliance with the standards of ASTM specification F 480-90, which is adopted by reference in R 325.1610.

(2) PVC pipe that is used as permanent casing shall be SDR 21 or heavier. PVC pipe that is installed at depths of more than 200 feet shall be SDR 17 or heavier.

(3) PVC pipe that is used as permanent well casing shall have an outside diameter and minimum wall thickness as specified in table 3. Dimensional standards for PVC pipe are specified in ASTM specification F 480-90.

**Table 3
Diameter and Wall Thickness
of PVC Well Casing and Liners**

Nominal Pipe Size (inches)	Outside Diameter (inches)	Minimum Wall Thickness (inches)	
		SDR 21	SDR 17
2	2.375	.113	.140
3	3.500	.167	.206
4	4.500	.214	.265
5	5.563	.265	.327
6	6.625	.316	.390
8	8.625	.410	.508
10	10.750	.511	.632
12	12.750	.606	.750
14	14.00	.667	---
16	16.00	.762	---

R 325.1631b Construction of wells; PVC casing material standards.

Rule 131b. (1) PVC pipe that is used as permanent casing shall be new pipe that is in compliance with ASTM specification F 480-90, which is adopted by reference in R 325.1610.

(2) Each length of PVC pipe that is used as permanent well casing shall be legibly marked, by the manufacturer, with all of the following information:

- (a) The nominal pipe size.
- (b) The standard dimension ratio (SDR).
- (c) The type of plastic (PVC 1120 or PVC 1220).
- (d) The wording "well casing."
- (e) The impact classification (IC).
- (f) A designation that the pipe is in compliance with the provisions of ASTM specification F 480-90.
- (g) The manufacturer's name or trademark.
- (h) The manufacturer's code for resin manufacture.
- (i) The lot number and date of manufacture.
- (j) A certification mark that verifies that the pipe is in compliance with the provisions of ANSI/NSF standard 14.

(3) Casing pipe that is manufactured from thermoplastic materials other than PVC shall be in compliance with the provisions of ASTM specification F 480-90, which is adopted by reference in R 325.1610, and shall be used only with the written prior approval of the director.

R 325.1631c Construction of wells; PVC well casing joints.

Rule 131c. (1) PVC well casing joints shall be deep socket bell ends or couplings that are manufactured in accordance with ASTM specification F 480-90, which is adopted by reference in R 325.1610.

(2) PVC casing fittings shall be legibly marked with all of the following information:

(a) The nominal well casing pipe coupling size.

(b) The type of plastic.

(c) A designation that the fittings are in compliance with the provisions of ASTM specification F 480-90.

(d) The manufacturer's name or trademark.

(e) A certification mark that verifies that the fittings are in compliance with the provisions of ANSI/NSF standard 14.

(3) PVC well casing joints shall be formed utilizing a 2-step solvent cementing process that is consistent with the provisions of ASTM specification F 480-90. The pipe ends shall be free of burrs, dust, or moisture that might interfere with the solvent weld. A primer or welding solvent shall be used before cementing. The primer, welding solvent, and solvent cement shall be compatible with the pipe being coupled and the ambient temperature at the time of use and shall be in compliance with the provisions of R 325.1640.

(4) Screws or similar mechanical fasteners shall not be used for joining PVC well casing.

(5) PVC well casing joints which are not of a bell end configuration or are not made utilizing a 2-step solvent cementing process shall be approved, in writing, by the director before use.

R 325.1631d Construction of wells; examination of pipe.

Rule 131d. Pipe which is intended for water well use and which is sold within the state, regardless of specification designation, shall be subject to random examination by the director. Any lot of pipe that contains defective lengths or lengths which are not in compliance with the specifications required in these rules shall not be used in the construction of a well.

R 325.1632 Construction of wells; casing diameter, depth, termination, and installation procedures.

Rule 132. (1) Steel pipe that is used as permanent casing shall have an inside diameter of not less than 2 inches, except as provided in R 325.1632a.

(2) PVC pipe that is used as permanent casing shall have an inside diameter of not less than 5 inches, except if the pipe is installed as liner pipe. PVC well casing shall be installed only in an oversized borehole without driving.

(3) A casing shall extend not less than 25 feet below, and terminate not less than 12 inches above, the ground surface. A well that has less than 26 feet of casing shall not be used without obtaining written approval from the health officer pursuant to the provisions of R 325.1613.

(4) The top 25 feet of a well casing shall not be used as a suction line unless the well casing is protected by a standard weight or heavier outer casing. The top of both casings shall be finished pursuant to the provisions of R325.1641 and R 325.1643.

(5) A driven steel permanent casing shall be protected by a drive shoe.

(6) In a paved area, the health officer may approve, in writing, a casing termination of 2 inches or more above the ground surface if the area is not subject to flooding, if the connections and openings are threaded or welded and watertight, and if acceptable casing venting is provided.

R 325.1632a Construction of wells; driven well points.

Rule 132a. (1) Steel pipe that is used as permanent casing for a driven well point shall not be less than 1 ¼ inches inside diameter.

(2) A driven well point shall not be used as a water supply well without the written approval of the health officer.

R 325.1633 Rescinded.

R 325.1633a Construction of wells; grouting.

Rule 133a. (1) Shale traps, cementing baskets, packers, or other devices shall not be used to suspend grout above an open annular space. Excessive development, washing, shoveling of cuttings, or other similar activities shall not be used to induce collapse of the borehole wall or to reduce the amount of open annular space surrounding a permanent casing.

(2) Neat cement or bentonite grout shall be placed through the permanent casing or a grout pipe from the bottom of the annular space upward to the ground surface in a continuous operation without interruption. The density of grout flowing from the annular space at the ground surface shall be the density of the grout being pumped in.

(3) A permanent casing shall be installed in a borehole that has a diameter of not less than 2 inches larger than the nominal size of the permanent casing, except as provided in subrule (4) of this rule and R 325.1635.

(4) When grout is placed through a grout pipe outside the permanent casing, the borehole diameter shall be not less than 2 7/8 inches larger than the nominal casing size.

(5) An annular space between a permanent casing and temporary casing shall be grouted during temporary casing removal by pumping neat cement or bentonite grout, or by pouring bentonite chips, bentonite pellets, or granular bentonite, into the annular space. Granular bentonite shall not be poured into an annular space that contains drilling fluid or water.

(6) Neat cement shall be allowed to set a minimum of 24 hours when standard type I, type Ia, or high-early type III cement is used. If bentonite is added to neat cement, the grout shall be allowed to set a minimum of 48 hours before drilling operations are resumed.

R 325.1634 Rescinded.

R 325.1634a Construction of wells; grouting rotary-bored or augered wells

Rule 134a. (1) A well that is constructed by rotary, auger, or other drilling method where the permanent casing is placed in an oversized borehole shall be grouted with neat cement or bentonite grout, pursuant to the provisions of R 325.1633a, the entire length of the casing. If a well screen is installed, the annular space shall be grouted from a point not more than 10 feet above the top of the well screen up to the ground surface.

(2) The depth of grouting may be decreased by the health officer pursuant to the provisions of R 325.1613(2)(f).

R 325.1635 Construction of wells; grouting driven casing wells.

Rule 135. A well that is constructed by cable tool, hollow rod, jetting, or other drilling method where the permanent casing is driven shall be grouted pursuant to either of the following provisions:

(a) Where temporary casing or oversized borehole is not used or where the temporary casing or oversized borehole is less than 25 feet in depth, dry granular bentonite shall be maintained around the permanent casing as it is being driven.

(b) By installing a temporary casing or oversized borehole not less than 3 inches larger than the nominal size of the permanent casing and extending not less than 25 feet below the established ground surface

and grouting the annular space surrounding the permanent casing pursuant to the provisions of R325.1633a.

R 325.1636 Rescinded.

R 325.1637 Construction of bedrock wells.

Rule 137. (1) Where bedrock is encountered within 25 feet of the ground surface, an oversized borehole shall be drilled and the permanent casing shall be grouted with neat cement for a minimum depth of 25 feet.

(2) In an area where a well can be developed only in fractured, jointed, or cavernous bedrock, the casing may terminate in the formation if there is not less than 25 feet of soil above the bedrock, if there is no record of the bedrock containing contaminated water, and if geologic conditions offer no natural direct surface or near surface water inlets into the bedrock aquifer. Where there is less overburden and deeper strata will not produce potable water, the well owner shall obtain written approval from the health officer for water treatment and well construction features that are necessary to provide a safe supply.

(3) Hydraulic fracturing of bedrock is not permitted without the prior written approval of the health officer.

R 325.1637a Verification of well grouting.

Rule 137a. Where the department or health officer determines that any of the following conditions exist, the well drilling contractor may be required to excavate the well head for inspection:

(a) A visible open annular space surrounding a well casing.

(b) Failure to detect, using a soil probe, excavation, geophysical logging, or other methods, grout 2 feet or more below the water service line connection to the casing.

(c) Placement of tracer dye around the casing at or near the ground surface with subsequent detection of the dye in the well water.

(d) Receipt of a well log which indicates that the well has not been grouted or which lacks information or contains incomplete information pertaining to grouting of the well.

R 325.1638 Construction of flowing artesian wells.

Rule 138. (1) A well that is constructed in a location where flowing artesian conditions are encountered or are expected to occur shall be grouted to protect the artesian aquifer, prevent erosion of overlying geologic materials, and confine the flow to within the casing.

(2) Flowing well discharge control shall be provided to conserve groundwater and to prevent the loss of artesian head by preventing or reducing continuous discharges, unless a deviation is issued pursuant to the provisions of R 325.1613. Flow control shall consist of valved pipe connections, watertight pump connections, a receiving tank that is set at an altitude corresponding to that of the artesian head, a flowing well pitless adapter, a packer, or other method approved by the health officer. A flow discharge pipe, where installed, shall not be directly connected to a sewer or other source of contamination.

R 325.1639 Construction of wells; well screens; lead packers, lead plugs, lead wool and certain drilling fluids prohibited; requirements for steel pipe used as screen riser pipes, blanks, or tailpipes; well pumping rate; temporary capping; well alignment; drilling water; requirements when using chlorine or other well rehabilitation chemicals.

Rule 139. (1) A water supply well that is installed in unconsolidated sand and gravel aquifers shall ordinarily be fitted with a screen that has openings which are properly sized so that the aquifer can be properly developed to produce sand-free water at the pumping rate of the permanent pump. A well

screen, where installed on a casing that is less than 4 inches inside diameter, shall be telescoped and removable, except for a driven well point that is installed pursuant to the provisions of R 325.1632a.

(2) Lead packers, lead plugs, or lead wool shall not be used as a well component.

(3) Drilling fluids or additives that contain guar gum or other biodegradable organic materials shall not be used during the drilling of a well.

(4) Steel pipe that is used as well screen riser pipes, blanks, or tailpipes shall be in compliance with the minimum weight, dimension, and material standards for well casing that are listed in the provisions of R 325.1626 and R325.1627.

(5) A new, repaired, or reconditioned well shall be developed and pumped to waste at a pumping rate which equals or exceeds that of the permanent pump, until the water is as clear as is reasonably possible considering the groundwater conditions in the area. The permanent pump shall not be used to develop the well without the owner's consent.

(6) Temporary capping of a well until the pumping equipment is installed shall be provided to prevent contaminants from entering the well.

(7) A well shall be sufficiently straight and vertical to allow normal installation and operation of the pump.

(8) Water that is used for drilling purposes, other than water from the well itself, shall be potable water that contains a free chlorine residual of not less than 10 parts per million at the time of use and shall be conveyed in containers that are clean and capable of being maintained in a clean condition. Surface water shall not be used for drilling purposes unless it is obtained from a municipal water supply system.

(9) When chlorine is placed into a water supply system pursuant to the provisions of R 325.1661 or when well rehabilitation chemicals are used, the well drilling contractor or pump installer shall provide notification to the well owner or building occupants or shall make the system inoperable during the treatment period.

R 325.1640 Certification of water well components.

Rule 140. (1) Water supply system components that are in contact with groundwater shall be free of materials that may adversely affect the aquifer or water pumped from the well and shall not support microbiological growth.

(2) After January 1, 1994, a person shall not use the following water well components unless they are in compliance with or surpass ANSI/NSF standard 14, 60, or 61, ASTM specification C 150, or section 10 of API specification 10, as adopted by reference in R 325.1610:

(a) Drilling fluids, grouts, and casing sealing materials.

(b) Additives to drilling fluids, grouts, and casing sealing materials.

(c) Pipe joint compounds, thread cutting oils, gasket sealants, or coatings on steel pipe.

(d) Solvent cements, primers, cleaners, or other compounds that are used with PVC pipe.

(e) Bladders, diaphragms, coatings, or lining materials that are in contact with water in a pressure or storage tank.

(f) Chemicals that are used for the development, maintenance, treatment, disinfection, or rehabilitation of a water well, except for sodium hypochlorite or calcium hypochlorite.

R 325.1641 Abovegrade well casing connections.

Rule 141. An abovegrade connection into the top or side of a well casing shall be not less than 12 inches above the ground surface and shall be constructed to exclude dirt or other foreign matter, through 1 or more of the following methods, as applicable:

(a) A threaded connection.

(b) A welded connection.

(c) A rubber expansion sealer.

- (d) Bolted flanges with rubber gaskets.
- (e) A weathertight, vermin-proof well cap.
- (f) Extension of the casing at least 1 inch into the base of a power pump mounted on and sealed to a concrete pedestal.

R 325.1642 Belowground well casing connections.

Rule 142. (1) A connection to a well casing that is made below the ground, or less than 12 inches above the ground surface, shall be protected by approved threaded or welded joints or by an approved pitless adapter. A belowground connection shall not be submerged in water during installation.

(2) Clamp-on, saddle-style pitless adapters shall have both gaskets pressurized by water from the pump so that any water leakage will be from the pressure system outward. A pitless adapter shall provide complete clearance within the internal diameter of the casing and shall vent the casing if required by the provisions of R 325.1657. A person shall not install a pitless adapter that has not been approved, in writing, by the department.

R 325.1651 Construction of room housing pumping equipment or well casing; location of pump or pumping equipment in single- family dwelling permitted; access required for repair and maintenance of water supply system components.

Rule 151. (1) A room that houses pumping equipment or the top of a well casing shall be constructed above the ground surface; however, the room may be located below grade if it is a basement offset as defined in R325.1601a(1).

(2) A pump or pumping equipment may be located within a crawl space beneath a single-family dwelling if the space does not accumulate water.

(3) A pump room, basement offset, crawl space, or well house shall provide access for maintenance or repair of the water supply system components.

R 325.1652 Rescinded.

R 325.1653 Pump construction, installation, design, and maintenance.

Rule 153. (1) A pump shall be constructed so that there are no unprotected openings into the interior of the pump or well casing.

(2) A power driven pump shall be attached to the casing or approved suction or discharge line by a watertight connection or shall have a base plate that is in compliance with the provisions of R 325.1641.

(3) A pump shall be designed, installed, and maintained so that priming is not required for ordinary use.

(4) Plastic pump drop pipe shall be in compliance with the material requirements for water service lines pursuant to the provisions of R 325.1655(2). Flexible or coiled plastic pipe, when used as submersible pump drop pipe, shall not have splices. Plastic pump drop pipe shall not be used with a packer-jet assembly.

(5) Submersible pump motor lubricants and vertical turbine shaft lubricants shall be USDA or FDA-approved food contact grade formulations.

R 325.1653a Pump installation; hand pumps.

Rule 153a. (1) A hand pump, hand pump head, hand pump stand, or similar device shall be constructed in accordance with the provisions of R 325.1653, shall provide for venting pursuant to the provisions of R 325.1657, and shall have a closed downward-directed spout and a sealed pump rod packing assembly.

(2) A hand pump shall be attached to a steel well casing or standpipe by sealed flange or other method approved by the department. The flange shall be not less than 6 inches above a concrete slab or the

ground surface. An annular space between a standpipe and a well casing shall be sealed in accordance with the provisions of R325.1641 or with materials listed in subrule (5) of R 325.1603.

(3) Where a well casing functions as a hand pump cylinder wall, the plunger shall be not less than 25 feet below the ground surface. A casing wall weep hole is not permitted.

R 325.1654 Pump installation; water suction lines.

Rule 154. (1) A water suction line shall be constructed of copper, galvanized steel, plastic pipe or other material that is approved, in writing, by the director.

(2) A water suction line that is outside the well casing shall be protected by utilizing 1 or more of the following methods:

(a) By fully exposing the line and by situating the line not less than 12 inches above the floor of an approved basement, basement offset, or pump room.

(b) By fully exposing the line above ground surface.

(c) By situating the line within an outer casing with the annular space filled with water from the system and maintained at system pressure.

(d) By surrounding the line by air space in a straight rigid conduit which does not have joints and which has positive drainage by gravity to the ground surface or to an approved basement, basement offset, or pump room, with the conduit directly connected to the well casing by a threaded or welded watertight joint. The openings into the casing shall be welded watertight or shall be sealed in accordance with the provisions of R 325.1641 to R 325.1643 and the total length of the suction line that is protected by the gravity drained conduit shall not be more than 20 feet.

R 325.1655 Pump installation; water service lines.

Rule 155. (1) The buried portion of a water service line between the well casing and the pressure tank in any installation shall be under positive pressure at all times. If a check valve is installed in the water line between the well casing and the pressure tank, the water line between the well casing and the check valve shall be in compliance with the requirements for a suction line pursuant to the provisions of R 325.1654.

(2) Plastic water service line material shall have a minimum rated working pressure of 160 pounds per square inch, shall be in compliance with ASTM specification D 2239-89, D 2737-89, D 2662-89, D 2666-89, D 1785-91, or D 2241-89, which specifications are adopted by reference in R 325.1610.

R 325.1656 Pump installation; pressure tanks.

Rule 156. (1) A pressure tank shall be installed in an approved pump room, well house, crawl space, basement offset, or basement.

(2) A totally buried pressure tank may be used if the manufacturer's unit has been approved, in writing, by the director as to its design, type of material, and specification for its installation.

(3) If a pump is capable of developing water pressures greater than the manufacturer's rated working pressure of the pressure tank, a pressure relief valve shall be installed near the pressure tank.

R 325.1656a Pump installation; venting of gases.

Rule 156a. Toxic or flammable gases that are present in the groundwater shall be vented from the water supply system. The vent shall discharge to the outside atmosphere where the gases will not be a hazard. A health officer or the department shall be consulted for proper identification or treatment of gases.

R 325.1657 Pump installation; vents.

Rule 157. (1) A casing vent shall be provided on all well caps and seals, except for those used on deep well, single pipe-packer jet installations, or on flowing wells where the flow rate is greater than the

pumping rate of the permanent pump. A vent shall be screened, pointed downward, and terminate not less than 12 inches above the ground surface or above the floor of an approved basement, basement offset, or pump room, and at a point not less than 24 inches above any known flood level. Vents may be offset if they are in compliance with the provisions of this rule. Vents shall be in compliance with the minimum sizes listed in table 4.

**Table 4
Minimum Well Casing Vent Sizes**

Casing Inside Diameter (Inches)	Circular Vent Diameter (Inches)
2	1/4
4	1/2
5 or 6	3/4
8	1
12 OR LARGER	2

(2) Vent screening shall be not less than 20-mesh per inch and not more than 30-mesh per inch screen. Screening shall not reduce the vent open area by more than 50%.

R 325.1657a Pump installation; well caps and seals.

Rule 157a. Well caps and seals shall be weathertight and vermin-proof, provide venting pursuant to the provisions of R 325.1657, and be tightly secured to the well casing.

R 325.1658 Pump installation; sampling faucets.

Rule 158. Provision shall be made for the collection of water samples by installing a downturned faucet, not less than 8 inches above the floor, in a convenient location at the pressure tank or as near to the well as possible.

R 325.1661 Disinfection of well and pumping equipment.

Rule 161. (1) After thoroughly pumping to waste pursuant to the provisions of R 325.1639(5), a well and pumping equipment shall be disinfected with chlorine that is applied to obtain a chlorine concentration and minimum contact period specified in table 5 in all parts of the water supply system before pumping the well to waste and flushing out the chlorine solution. A well drilling contractor or pump installer shall be responsible for chlorinating that portion of the water supply system on which work has been performed.

**Table 5
Minimum Chlorine Concentration and Contact Time**

Amount of Chlorine Added to 100 Gallons of Water*			
Chlorine Concentration (Parts per Million)	Gallons of 5.25% Sodium Hypochlorite (Liquid Bleach)	Pounds of Dry Calcium Hypochlorite (Granular)	Minimum Contact Time
50 PPM	1 2/3 CUPS (1/10 GAL.)	1/5 CUPS (0.1 LBS.)	20 HR
100 ppm	3 1/3 cups (1/5 gal.)	2/5 cups (0.2 lbs.)	10 hr
250 ppm	6 2/3 cups (2/5 gal.)	4/5 cups (0.4 lbs.)	4 hr
500 PPM	1 GAL	0.70 LBS.	2 HR

1000 PPM	2 GAL	1.40 LBS	1 HR
----------	-------	----------	------

(2) Before placing a new, repaired, or reconditioned water supply system into service, and after all traces of chlorine have been flushed out, 1 or more water samples shall be collected from the sampling faucet. Organisms of the coliform group shall not be present in the sample or samples.

(3) The water supply owner shall be responsible for collecting the water sample or shall arrange for the owner's designated representative to collect the sample. The well drilling contractor or pump installer shall notify the water supply owner of the owner's responsibility for collecting the water sample.

(4) A well driller or pump installer is not required to redisinfect a well or pump as a result of water samples that are collected from a location other than the sampling faucet required pursuant to the provisions of R 325.1658.

R 325.1662 Abandoned wells and dry holes; persons responsible for plugging; removal of debris and obstructions; wells taken out of service when municipal water is installed.

Rule 162. (1) An abandoned well or dry hole shall be plugged by a well drilling contractor who is registered pursuant to the provisions of the act or by the well owner. An abandoned well that is located on property which has a well that serves the public or a residence other than the well owner's residence, shall be plugged by a registered well drilling contractor.

(2) A pump, a drop pipe, a packer, other equipment, debris, or obstructions shall be removed from the well, if possible, before plugging.

(3) A well that is abandoned when municipal water is installed shall be plugged pursuant to the provisions of these rules.

R 325.1663 Abandoned wells and dry holes; plugging method.

Rule 163. (1) An abandoned well or dry hole shall be plugged as follows:

(a) A well or dry hole that terminates in overburden shall be plugged by filling with any of the following materials:

- (i) Neat cement.
- (ii) Concrete grout.
- (iii) Bentonite chips.
- (iv) Bentonite pellets.
- (v) Bentonite grout.

(b) A section of a well or dry hole that is in bedrock shall be plugged by filling with neat cement or concrete grout from the bottom of the well or dry hole to not less than 20 feet above the top of the bedrock or to the ground surface. The section of the well from 20 feet above the bedrock to the ground surface shall be plugged in accordance with the provisions of subdivision (a) of this subrule.

(2) Gravel, sand, stone aggregate, or other materials that are acceptable to the department may be used for plugging that portion of a well that penetrates lost circulation zones, such as gravel or cavernous, creviced, or fractured bedrock.

(3) The flow from an abandoned flowing well shall be stopped by plugging the well with neat cement or concrete grout.

(4) Abandoned wells that discharge subterranean gases shall be plugged with neat cement or concrete grout.

R 325.1664 Abandonment of wells; plugging materials.

Rule 164. Abandoned well or dry hole plugging materials shall be placed as follows:

(a) Bentonite chips or bentonite pellets shall be poured slowly into the top of the well or dry hole to prevent bridging in the casing or borehole. Fine bentonite particles that accumulate in the shipping

container shall not be used. The plugging operation shall continue until the bentonite chips or bentonite pellets appear at the ground surface. Upon completion of the plugging operation, water shall be placed into the casing or borehole to promote expansion of the bentonite above the static water level.

(b) Neat cement, concrete grout, or bentonite grout shall be placed through a tremie pipe from the bottom of the well or dry hole to the ground surface.

(c) Other materials and methods may be used if the materials and methods proposed to be used will plug the abandoned well or dry hole to prevent them from acting as a channel for contamination or the escape of subterranean gases and if prior approval is given by a health officer.

R 325.1665 Plugging of dug wells and crock wells.

Rule 165. A large diameter dug well or crock well shall be plugged pursuant to the provisions of R 325.1663 and R325.1664 or may be plugged as follows

(a) A layer of bentonite chips or bentonite pellets that is not less than 6 inches thick shall be placed at the bottom of the well. The remainder of the well shall be plugged by placing clean soil backfill in layers that are not more than 10 feet thick, with a layer of bentonite chips or bentonite pellets that is not less than 6 inches thick placed on top of each clean soil backfill layer. Dry granular bentonite may be used in place of, or in combination with, bentonite chips or bentonite pellets, and neat cement or concrete grout may be poured if the well has been dewatered before plugging.

(b) The uppermost section of concrete crock or tile or the upper 3 feet of stone, brick, or other curbing material that supports the well bore shall be removed. Before backfilling the well up to the ground surface, a layer of bentonite chips or bentonite pellets that is not less than 6 inches thick shall be placed.

R 325.1666 Rescinded.

R 325.1667 Plugging wells drilled by person other than property owner or registered well drilling contractor.

Rule 167. A well that was drilled by a person other than the property owner or by a person other than a well drilling contractor who is registered pursuant to the provisions of the act shall be abandoned and plugged pursuant to the provisions of these rules.

R 325.1668 Order to plug abandoned well or dry hole.

Rule 168. The department or a health officer may order a well owner or a registered well drilling contractor to plug an abandoned well or a dry hole.

R 325.1669 Owner and contractor responsibility for plugging abandoned wells

Rule 169. (1) A well owner shall be responsible for the plugging of an abandoned well, except as provided in a written contract between the owner and a registered well drilling contractor.

(2) If a health officer or the department determines that a registered well drilling contractor has improperly located or constructed a well, the well drilling contractor shall be responsible for plugging the well.

R 325.1670 Temporarily abandoned wells.

Rule 170. (1) A temporarily abandoned well shall be in compliance with the minimum construction and isolation distance requirements of these rules.

(2) A temporarily abandoned well shall be disconnected from any water distribution piping and shall have the top of the casing securely capped to prevent the entrance of surface water or foreign materials into the well and to prevent access to the well.

R 325.1671 Rescinded.

R 325.1672 Storage reservoirs.

Rule 172. If a storage reservoir is used in a water supply system, plans for the storage reservoir installation shall be submitted to the health officer and approval obtained before installation of the reservoir. A storage reservoir shall be constructed of materials approved by the department and shall be designed, operated, and maintained in a manner to prevent the entrance of contaminants. For the purposes of this rule, a storage reservoir does not include a pressure tank.

R 325.1673 Provision of notice of health hazard to person using contaminated water supply.

Rule 173. An owner or occupant who uses a contaminated water supply or a supply which, in the judgment of a health officer, represents a health hazard shall be notified, in writing, by the health officer of the health hazard.

R 325.1674 Other water sources.

Rule 174. If a water well cannot be constructed in compliance with the provisions of these rules due to hydrogeological limitations, a health officer may authorize the use of an alternate water source. Plans, specifications, and monitoring, operating, and maintenance procedures for the alternate water source shall be approved by the health officer.

R 325.1674a Water supply cross-connections.

Rule 174a. (1) A physical connection between a water supply that is in compliance with the requirements of these rules and another water supply that is not in compliance with the requirements of these rules is prohibited.

(2) A yard hydrant that has a buried stop-and-waste valve shall not be installed on a water service line or a branch of the service line. A stop-and-waste valve shall not drain into a well.

(3) A water supply system shall be designed, operated, and maintained in a manner that will prevent contamination from nonpotable liquids, solids, or gases from being introduced into the water supply or aquifer through cross connections or any other piping connections to the water supply system.

R 325.1675 Well records.

Rule 175. (1) Within 60 days of the date of completion of a well, a well drilling contractor shall furnish the well owner with 1 copy and a health officer with 2 copies of a well log that contains the information required on the form furnished by the director. The health officer shall send 1 copy of the well log to the department of natural resources within 30 days after the health officer receives the copies of the well log. A well drilling contractor shall retain a copy of the well log.

(2) A well drilling contractor shall record the geologic material types and thicknesses penetrated on a record that is kept at the well construction site. The record shall be available for inspection during well construction.

(3) Within 60 days after plugging an abandoned well or dry hole, the person who performed the plugging operation shall provide the department or local health department with 2 copies of a report that sets forth all of the following information:

- (a) The well owner's name.
- (b) The location of the well.
- (c) The well depth.
- (d) The well diameter.
- (e) The plugging procedure.
- (f) The plugging material.

(g) The amount of plugging material used.

Standard forms for the report shall be provided by the department. When an abandoned well is plugged where a replacement well will be or has been constructed, the plugging information may be recorded on the well log that is submitted for the replacement well. Information on several abandoned wells or dry holes within a single parcel may be submitted on a single well log form if the geologic materials and plugging methods are similar.

(4) A well log shall be signed by a registered well drilling contractor.

(5) Where a well drilling contractor fails to submit a well log within 60 days of the date of completion of a well or fails to maintain the drilling record pursuant to the provisions of subrule (2) of this rule, the department or health officer may require geophysical logging of the well to verify geologic materials and thicknesses of geologic materials penetrated.

R 325.1676 Pump installation records.

Rule 176. (1) Within 60 days of the date of completion of a pump installation upon a new well, a well drilling contractor or pump installer shall furnish the well owner with 1 copy and a health officer with 2 copies of a pump installation record that contains available information that is required on a form furnished by the director. The health officer shall send 1 copy of the record to the department of natural resources within 30 days after the health officer receives the copies of the pump record. A well drilling contractor or pump installer shall retain a copy of the pump record. All of the following data shall be provided on the form:

(a) The type of pump installed (jet, submersible, reciprocating, hand-operated, or other type).

(b) The pump capacity in gallons per minute.

(c) The length of drop pipe.

(d) The horsepower of the pump motor.

(e) The pump model number.

(f) The pump manufacturer's name.

(2) A pump record shall be signed by a registered well drilling contractor or by a registered pump installer.

PART 2. DRILLING CONTRACTORS' AND PUMP INSTALLERS' REGISTRATION

R 325.1701 Qualifications.

Rule 201. An applicant who is applying for registration pursuant to the provisions of the act shall meet all of the following requirements, as applicable:

(a) Have not less than 2 years of well drilling experience and have completed not less than 20 wells for registration as a well drilling contractor or have not less than 2 years of pump installation experience and have completed not less than 20 pump installations for registration as a pump installer. Well drilling experience shall have been acquired under the supervision of an active Michigan registered well driller and pump installation experience shall have been acquired under the supervision of an active Michigan registered well driller or pump installer. The experience shall have been obtained within the past 5 years.

(b) Be not less than 18 and have completed high school or submit proof of equivalent education. Up to 4 years of work experience may be substituted for equal years of education; however, this shall be in addition to the experience requirement in subdivision (a) of this rule.

(c) Be of good moral character, as defined and determined pursuant to the provisions of Act No. 381 of the Public Acts of 1974, being '338.41 et seq. of the Michigan Compiled Laws.

(d) Provide proof of work experience as required in R 325.1701a.

R 325.1701a Proof of work experience.

Rule 201a. (1) Proof of an applicant's work experience in the well drilling or pump installation field shall be documented by submitting all of the following to the department:

(a) Well logs or pump records to demonstrate completion of not less than 20 water wells by a well driller applicant and not less than 20 pump installations by a pump installer applicant. The records shall be true and accurate photocopies of those records initially submitted by the supervising contractor to satisfy the requirements of section 12707 of the act. The records shall demonstrate completion of work by the applicant over a period of not less than 2 years and not more than 5 years.

(b) A chronological work history, on a form furnished by the department, that documents all work performed in the well drilling or pump installation field. Before submitting the work history form to the department, an applicant shall submit the work history form for review to the local health department that has jurisdiction in the area in which the applicant has worked.

(c) Notarized reference letters, on a form provided by the department, from not less than 2 persons who are not related to the applicant and who can attest to the applicant's work experience and ability to perform the work of a well driller or pump installer. At least 1 reference letter shall be completed by a person who is registered pursuant to the act in the same category as the applicant.

(d) Any of the following which verifies that the applicant has acquired the minimum experience and which identifies the applicant's occupation as a well driller or pump installer and states the name of applicant's employer:

(i) Federal W-2 income tax withholding forms or equivalent income tax filing forms.

(ii) Paycheck stubs.

(iii) Employers' payroll records.

(iv) Workers' compensation insurance records.

(v) Health insurance records.

(vi) Any combination of the items listed in paragraphs (i) to (v) of this subdivision.

(2) Documentation of completion of an apprenticeship training program established by the Michigan well drillers association or a similar industry organization may be accepted in place of the proof of work experience that is required in subrule (1) of this rule, if the training program has been approved by the department and the advisory board created by the act.

R 325.1702 Grandfather clause.

Rule 202. A well driller or pump installer who filed a prequalification experience record with the director before May 1, 1967, may, upon application filed by April 30, 1994, be registered without meeting the educational qualifications and without taking the written examination, if the well driller or pump installer has been continuously employed in the water well trade.

R 325.1703 Submission of applications.

Rule 203. (1) An application for an initial or renewal registration shall be made to the department on the form prescribed and provided by the department.

(2) An application shall be accompanied by the fee prescribed by the act, which shall be in the form of a bank draft, check, or money order payable to the state of Michigan. An application filed without the prescribed fee shall not be reviewed by the department until the fee is paid.

(3) A renewal application shall be submitted by March 1 of each year to permit time for issuing the renewal certificate by May 1, as required by the act.

(4) The completed initial application, proof of work experience as required in R 325.1701a, and registration and examination fees as required in the act and these rules shall be submitted to the director not less than 60 days before the date of the examination. Failure to meet this time deadline shall result in the applicant being scheduled for the next examination.

(5) A person who operates a well drilling or pump installation business shall file a certificate of assumed name with the department.

R 325.1704 Advisory board's evaluation of applicants.

Rule 204. The advisory board that is created by the act shall carefully evaluate an applicant for registration and forward its advice to the director.

R 325.1705 Rescinded.

R 325.1705a Out-of-state applicants.

Rule 205a. An applicant who is not a resident of Michigan, but who is licensed or registered to engage in the business of well drilling or pump installing in the applicant's state of residence, is eligible for registration in Michigan if all of the following requirements are met:

(a) The applicant submits to the department proof of current licensure or registration in the applicant's state of residence.

(b) The applicant is in good standing in the state in which the applicant is licensed or registered.

(c) The applicant meets the requirements of R 325.1701, R 325.1701a, and R 325.1703, with the following exceptions:

(i) A reference letter from a Michigan registered well driller or pump installer is not required. At least 1 reference letter from a well driller or pump installer who is licensed in the applicant's state of residence and who is not a relative of the applicant shall be submitted.

(ii) The chronological work history form shall be reviewed by the agency that is responsible for regulating water well construction in the applicant's state of residence.

R 325.1706 Examinations.

Rule 206. (1) After meeting the application requirements in these rules, an applicant shall satisfactorily complete an examination that is administered by the advisory board created by the act. The examination may be any combination of written, oral, or practical work.

(2) A candidate who fails to pass the examination may apply for reexamination after completing an industry training course that is approved by the department and the advisory board created in the act. A reexamination shall be granted upon payment of a fee of \$25.00.

(3) An applicant may inspect the examination in the office of the department during normal business hours within 60 days after the applicants are notified of examination results.

R 325.1707 Denial of applications.

Rule 207. (1) An initial application for registration may be denied for any of the following reasons:

(a) Failure of the applicant to meet the work experience, education, and character qualifications of registration.

(b) Deliberately providing false or misleading information in the application package or failure to complete the application package.

(c) Offering payment to a person who is registered pursuant to the provisions of the act for completing a reference letter or an affidavit.

(d) Violation of sections 12701 to 12715 of the act, a rule or construction code promulgated pursuant to the act, or an order issued pursuant to the provisions of section 12709 of the act.

(e) Conviction in any civil or criminal proceeding or failure to comply with a judgement or order that is issued by the court in connection with any matter related to the conduct necessary to provide the services of a well drilling contractor or pump installer.

(2) When an initial or renewal application for registration is denied, the department shall give written notice of the denial to the applicant and shall state the reason for the denial. Within 30 days of the denial, the applicant may request reconsideration of the application at an informal conference and a contested case hearing before the director. A contested case hearing that is requested by the applicant shall be held pursuant to the provisions of the Act No. 306 of the Public Acts of 1969, as amended, being '24.201 et seq. of the Michigan Compiled Laws.

R 325.1707a Suspension or revocation of certificate; denial of renewal application.

Rule 207a. A certificate of registration may be suspended or revoked and an application for renewal of a certificate of registration may be denied for any of the reasons listed in R 325.1707 or for any of the following reasons:

- (a) Failure to complete the renewal application.
- (b) Violation of the stipulations contained in a consent agreement issued pursuant to the provisions of Act No. 306 of the Public Acts of 1969, as amended, being '24.201 et seq. of the Michigan Compiled Laws.
- (c) Conviction in any civil or criminal proceeding or failure to comply with a judgment or order that is issued by the court in connection with well drilling or pump installation activities.
- (d) Failure to pay civil monetary penalties that are assessed pursuant to the provisions of section 2262 or 2461 of the act.
- (e) Deliberately providing false or misleading information on a well log or in a reference letter or affidavit for another person who is applying for registration pursuant to the act, or accepting payment for completing a reference letter or affidavit.
- (f) Having obtained a certificate of registration through fraud or misrepresentation.
- (g) Aiding or abetting an unregistered person to evade the provisions of the act or these rules, allowing one's certificate of registration to be used by an unregistered person, or acting as an agent, partner, or associate of an unregistered person with the intent to evade the provisions of the act or these rules.
- (h) Failure to respond to a written inquiry from the department regarding a written complaint filed with the department against the registrant.

R 325.1708 Initial certificate; nontransferability; content; renewal certificate; content; notice of change in applicant information; notice of loss of registered contractor representative.

Rule 208. (1) The initial certificate that is issued to a registered well drilling contractor or registered pump installer is nontransferable, shall be suitable for framing, and shall contain all of the following information:

- (a) The name of the registrant.
- (b) The business name.
- (c) The date of issuance.
- (d) The expiration date.
- (e) The registration certificate number.
- (f) The signature of the director.

(2) A renewal certificate shall consist of a registration card, in duplicate, and shall contain all of the following information:

- (a) The name of the registrant.
- (b) The business name.
- (c) The expiration date
- (d) The registration certificate number.
- (e) The signature of the director.

One section of the card shall be kept with the original registration certificate and a copy shall be carried by the person who represents the registered contractor.

(3) Within 30 days of any changes in the information on the application that is submitted to the department, a registrant shall inform the department of the changes.

(4) Within 10 days of the loss of the sole registered contractor representative, a firm, partnership, or corporation shall notify the department of the loss. The firm, partnership, or corporation may continue to engage in the business of well drilling or pump installation, if a qualified individual applies, within 30 days of the loss of the representative, to take the next scheduled registration examination on behalf of the firm, partnership, or corporation or if another registered contractor is employed within 30 days of the loss of the representative. If the applicant fails to successfully complete the examination or if a registered contractor is not employed, the firm, partnership, or corporation shall immediately cease operating in the well drilling or pump installation field.

R 325.1709 Reinstatement of expired and revoked certificates.

Rule 209. (1) A registration certificate that has expired for failure of the registrant to apply and pay renewal fees may be reinstated by the director as follows:

(a) If within 2 years of the date of expiration of the certificate, upon receipt of a renewal application, advice of the advisory board, and payment of renewal registration fees for each year during which registration had expired in accordance with the fee and penalty schedule set forth in the act.

(b) If after 2 years of the date of expiration of the certificate, upon successful completion of the examination in accordance with provisions of R 325.1701, R 325.1701a, R 325.1703, R 325.1705a, and R 325.1706.

(2) A holder of a certificate of registration that has been revoked in accordance with the act, after a waiting period of not less than 1 year after the registration certificate was revoked, may petition the director for a hearing for reinstatement of the registration certificate. The hearing shall be granted only upon a showing by the petitioner that reasonable grounds exist for the hearing. Reasonable grounds shall include correction of the conditions upon which the revocation was based and assurance that such conditions will not reoccur.

(3) The registration certificate shall be reinstated only upon the recommendation of the director and successful completion of the written examination specified in R 325.1706.

R 325.1711 Public representations and advertising.

Rule 211. (1) A person shall not cause any word or words to be used in any contract, business form, document, sign, display, or other advertising medium which indicate or imply that a person, firm, partnership, or corporation is engaging in the business of well drilling, as defined in R 325.1606, or in the installation of pumps and pumping equipment, as defined in R 325.1604, unless that person, firm, partnership, or corporation has obtained a certificate of registration from the department.

(2) A person who is registered pursuant to the provisions of section 12704 of the act shall not use, in any contract, business form, document, sign, display, or other advertising medium, a name other than the name that is filed with the department or a registration number other than the registration number that is issued by the department.

PART 3. DRILLING MACHINES AND SERVICE VEHICLES

R 325.1721 Well drilling machine registration.

Rule 221. (1) A drilling machine registration card shall be issued for each drilling machine that is registered by a well drilling contractor. The card shall be carried on the drilling machine at all times where it may be inspected at any reasonable hour upon a request by the department representative or a health officer. The card expires on April 30 each year.

(2) The registration card and duplicate seals that are furnished for a drilling machine are not transferrable. The card and seals shall be returned to the department when a drilling machine is sold, traded, or otherwise disposed of. A registration card and 2 new seals for a drilling machine that is sold, traded, or otherwise disposed of will be provided without cost upon receipt of the old card, the 2 old seals, and an application that requests authorization to operate a different drilling machine.

(3) Registration of a well drilling machine by the department does not exempt a person from any applicable federal, state, or local vehicle registration requirements or from payment of applicable road taxes, license plate fees, or vehicle registration fees.

R 325.1722 Identification on well drilling machines and service vehicles.

Rule 222. A person who is registered pursuant to the act shall place the registration number, including the county number for the business location, and the business name and address, in letters and numbers not less than 2 inches high, in a conspicuous location on both sides of each well drilling machine and service vehicle.

PART 4. DEWATERING WELLS

R 325.1741 Applicability of part 4.

Rule 241. (1) This part applies to construction, operation, and abandonment of dewatering wells and pump installations, except that the exemption in section 2 of the act is construed to mean a dewatering well where the inside casing diameter is not more than 2 inches and the total depth of the casing and well point is not more than 25 feet.

(2) A shallow sump installed for the purpose of removing water that has collected in an underground excavation or water that may seep into a sump, equipped with a low lift pump to remove the water which would enter or interfere with the excavation, is not considered a dewatering well and is exempt from these rules if the sump is:

- (a) Constructed within the limits of the excavation.
- (b) Not more than 8 feet below the specified excavation elevation.

R 325.1742 Location and general construction.

Rule 242. (1) A dewatering well shall be located to accomplish the temporary dewatering process, and shall be constructed and maintained to prevent surface water and other known sources of pollution from entering the well.

(2) The location of all existing underground structures and utilities shall be determined before any construction to prevent damages or hazards.

R 325.1743 Casings.

Rule 243. (1) The wall thickness of the casing of a dewatering well shall be selected to withstand the forces expected to be exerted on the well casing during installation and removal.

(2) The casing shall extend not less than 12 inches above the working grade. The top of a casing shall be capped or covered in a manner to prevent entry of extraneous objects imminent, precautions shall be taken to prevent the entry of flood water into the casing. However, the casing on a well point system may extend less than 12 inches above grade when a closed piping collection network is used under vacuum and the closed piping is maintained to prevent surface waters from entering the well points.

R325.1744. Well screens and drilling water.

Rule 244. (1) A dewatering well contractor shall select the well screen. However, material and construction of the screen shall be sufficiently strong and durable so that the screen may be readily removed intact from the dewatering well.

(2) Water used for drilling purposes shall be obtained preferably from a municipal water system or a well. Water from any other source shall be clean and be chlorinated to a free chlorine residual at the point of discharge into the well. When drilling water is transported to the well site, clean sanitary containers shall be used. An exception may be made to the requirement of chlorinating water used for drilling a dewatering well for legitimate reasons relating to water source, use of the well, site location, aquifers being penetrated or other justifiable reasons, and shall be obtained in writing from the department for each project. Water from a shallow surface pond which is generally polluted, turbid, and contains algae or other microscopic plants and animals shall not be used for drilling purposes.

R 325.1746 Filter material.

Rule 246. Filtering material shall be clean and free of deleterious materials and placed so as to eliminate debris and surface water from entering the well during placement. After placement, the ground surrounding the well casing shall be mounted to divert surface waters away from the well casing.

R 325.1748 Flowing artesian aquifers.

Rule 248. A dewatering well in an aquifer under an artesian head requires special installation practices. A dewatering well contractor shall take necessary precautions if he encounters a flowing artesian aquifer that flows above working grade, to prevent unreasonable waste of the water and to prevent damage of nearby properties or watercourses or both. Methods of construction and abandonment shall be determined in pre-construction conference with all concerned parties, including the consulting engineer, and shall be approved in writing by the department.

R 325.1751 Pump discharge and suction lines.

Rule 251. (1) A discharge line of a dewatering well shall leave the well above working grade. A pump in a dewatering well shall be installed in a manner that will permit discharging water above the working grade. Approval in writing shall be obtained from the department for a belowground discharge connection to a dewatering well casing.

(2) A suction line or header pipe and well points of a dewatering system shall be maintained to prevent surface water from entering the aquifer.

R 325.1752 Electrical connections.

Rule 252. Electrical connections to the pumping equipment shall be made in accordance with applicable electrical codes and shall be made in a manner that protects the safety and welfare of workers and the public from possible electrical shock.

R 325.1753 Gases and mineralized water.

Rule 253. (1) If toxic or flammable gases are present, the health officer shall be notified immediately and special construction features shall be used. The gas shall be vented not less than 8 feet above working grade to minimize the explosive hazard and remove the gas from direct human contact. The well casing shall be sealed tight to assure that all gas is exhausted through the vent. R 325.1764 and R325.1766 prescribe plugging procedures for a dewatering well containing gas.

(2) Where the water resources commission, consulting engineer, municipality, or other governmental unit involved in the dewatering project determines that disposal of contaminated water or water with a

high mineral content or dissolved or entrained gases creates a problem, the department may make additional requirements.

R 325.1755 Pump operation.

Rule 255. Water pumped from a dewatering well shall be conveyed to a natural watercourse in a manner that does not cause damage to abutting property, create a hazard, or cause silting in the receiving stream. This water is not considered potable and shall not be used for drinking or domestic purposes. The pumping water level in a dewatering well shall be maintained at the minimum possible depth below the ground surface that will dewater the excavation. Duration of operation shall also be regulated by the contractor or minimize time of pumping to the period actually needed to dewater the excavation effectively. The contractor, consulting engineer, and the owner of the construction project for which the dewatering wells are being drilled shall give due consideration as to what effect lowering the groundwater table will exert on existing wells.

R 325.1761 Abandonment and plugging.

Rule 261. Plugging of an abandoned dewatering well shall be accomplished by 1 of the procedures set forth in R 325.1762 and R 325.1763.

R 325.1762 Wells 40 feet or less below grade.

Rule 262. A dewatering well used in conjunction with underground construction or building excavation when the dewatering well is not more than 40 feet below the working grade shall be plugged as provided in this rule except dewatering wells covered by R 325.1763. At the time the filter is added, the well shall be backfilled from a depth of not less than 7 feet below the working grade to the working grade with an inorganic parent soil material encountered within the upper 7 feet. A finer textured inorganic soil shall be used when substituted for the parent material. The plugging shall be completed after the casing and screen are removed from the dewatering well by addition and compacting additional inorganic parent material naturally occurring in the upper 7 feet or with finer textured soils in the excavation remaining at the site due to slumping of the filter material. These soils shall be added in a manner to prevent future slumping and assure that the drill hole shall remain filled to the working grade. Where 1 or more dewatering wells are deeper than 40 feet in depth, plugging procedure prescribed in R325.1763 shall be used on all wells penetrating the deeper aquifer. Exception to this plugging procedure may be requested and a written decision reached through a conference with the department.

R 325.1763 Deep wells; tunnels; relief and municipal wells.

Rule 263. (1) A dewatering well deeper than 40 feet below the working grade, a dewatering well used in conjunction with tunnel construction or a well used as an artesian pressure relief well and all dewatering wells located within 500 feet of a municipal well site shall be plugged during construction as prescribed in this rule. The annular space between the bore hold and the casing shall be backfilled at the time the filter material is added with a mixture of 4 pounds of bentonite to each cubic foot of fine textured inorganic soil, upward from a minimum depth of 10 feet below the working grade. The bentonite and fine textured inorganic soil shall be thoroughly mixed at the time of backfilling.

(2) The following chart relates bore hole diameter to volume and quantity of bentonite needed per foot of bore hole.

Boring diameter	Gallons per 1 foot of depth	Cu. Ft. per 1 foot of depth	Pounds bentonite* per 1 foot of depth
12 inches	5.9	0.8	3/2
18 inches	13.2	1.8	7.2
24 inches	23.5	3.1	12.4
30 inches	36.7	4.9	19.6
36 inches	52.9	7.1	28.4
42 inches	72.0	9.6	38.4

*Based on 4 pounds bentonite per cubic foot of excavation.

(3) The plugging shall be completed after the casing and screen are removed from the dewatering well by backfilling the hole with a mixture of 4 pounds of bentonite to each cubic foot of fine textured inorganic soil for a distance of not less than 5 feet of the bore hole. The bentonite and fine textured inorganic soil shall be thoroughly mixed at the time of backfilling. A minimum of 142 pounds of bentonite shall be used in backfilling a 36-inch diameter hole and a minimum of 62 pounds of bentonite in a 24-inch diameter hole. The plugging shall be completed by adding and compacting additional inorganic parent material or fine textured soils. These soils shall be added in a manner to prevent future slumping and assure that the drill hole shall remain filled to the working grade. Approval in writing shall be obtained from the department prior to instituting any modification in the plugging requirements of this rule.

R 325.1764 Plugging in special situations.

Rule 264. The method of abandonment of a dewatering well installed in the situations described in R325.1765 and R 325.1766 or other special situations shall be determined after considering the requirements of all parties concerned and shall be approved in writing by the department. The procedures shall be used as a general guide and may be modified by the department after a conference of concerned parties.

R 325.1765 Artesian flows and bedrock.

Rule 265. (1) A dewatering well terminated in aquifers under sufficient head to provide a flow above the working grade shall be sealed with neat cement grout or other method approved by the department to contain completely the flow caused by the artesian head.

(2) A dewatering well penetrating bedrock shall have the part of the well drilled into the bedrock formation sealed with neat cement grout. The plugging shall be completed by a layer of neat cement grout extending at least 15 feet above the top of the bedrock. Neat cement grout shall be added from the bottom of the hole upward in 1 continuous operation, as the casing is removed.

R 325.1766 Water of poor chemical quality or producing methane.

Rule 266. (1) A dewatering well that produces water which is sufficiently contaminated or high in mineral content to constitute a significant hazard to lakes, streams, or to groundwater aquifers by direct infiltration or inter-aquifer migration, shall be filled and sealed, with the method of abandonment being determined by a conference.

(2) A dewatering well that is producing methane gas at the time the well is to be filled and sealed shall be plugged with neat cement grout with the precise procedure determined by a conference.

R 325.1768 Dewatering well drilling records.

Rule 268. A dewatering well contractor shall furnish the health officer 2 copies and the contractor responsible for abandoning the dewatering well 1 copy, and shall retain 1 copy for his files, of a well record containing such available information as is required on the dewatering well record form. Data obtained during the dewatering well drilling activities shall be reported on a form furnished by the department or such other form approved by the department. For 1 project location, information on all holes with similar geologic formation may be submitted on a single well record form. However, an individual record shall be provided for a dewatering well drilled into bedrock, or other dewatering well that produces methane gas or produces water which is contaminated or high in mineral content or artesian flow above working grade. The dewatering well drilling contractor may substitute soil boring records for the construction project in lieu of submitting dewatering well drilling records if all dewatering wells are less than 40 feet in depth.

R 325.1771 Registration qualifications.

Rule 271. After April 1, 1974, a person who represents a dewatering well contractor or dewatering well pump installer, except for those qualified under R325.1772, shall meet the following minimum requirements for registration under the act:

- (a) At least 2 years of experience in his respective field in underground contracting with supervisory or actual field experience in this state relating to the drilling of at least 20 dewatering wells for a drilling contractor and 20 pump installations for a pump installer.
- (b) Completion of the tenth grade in high school or submission of proof of equivalent ability demonstrated by successful completion of approved short courses or written examination. The board may accept up to 4 years of work experience for equal years of education, in addition to the subdivision (a) experience requirement.
- (c) Reference statements from 2 persons, 1 of whom shall be registered as a dewatering well drilling or pump installer contractor under the act and familiar with the applicant's work experience, honesty, integrity, and ability to perform the work of a dewatering well drilling or pump installer contractor, shall be submitted before advisory board approval to take the examination.

R 325.1772 Grandfather clause.

Rule 272. An individual who is a member or employee of a registered dewatering well drilling or pump installing firm, with a minimum of 2 years' experience in his respective field of work before April 30, 1974, and who files by April 30, 1975, a record of experience and background with the department on a form prepared for this purpose, may be registered upon application. This individual shall be registered without meeting the educational qualifications and without taking the written examination if he has been employed continuously in the dewatering well trade.

R 325.1773 Submission of applications.

Rule 273. An application for an initial or renewal registration shall be made to the department on forms prescribed by it. An application shall be accompanied by the fee prescribed by the act in the form of a bank draft, check or money order payable to the state of Michigan. A renewal application shall be submitted by March 1 of each year to permit time for issuance of the renewal certificate by May 1 as required by the act. The initial fee shall be refunded to an applicant not qualified to take the examination.

R 325.1774 Advisory board review.

Rule 274. The advisory board created by the act shall evaluate an applicant for registration carefully with the assistance of a representative from the dewatering well drilling industry and forward its advice to the department. The board may conduct oral interviews and require affidavits or other supporting evidence to determine qualification of an applicant.

R 325.1775 Examinations.

Rule 275. A person representing a dewatering well contractor or pump installer may take the examination only after fulfilling all requirements in the rules and having approval of the advisory board. He shall satisfactorily complete an examination covering various aspects of dewatering well operations before being registered under section 5 of the act. This examination may be any combination of written, oral, or practical work administered by the advisory board. A candidate failing to pass the examination may apply for reexamination at the expiration of 6 months.

R 325.1776 Denial of applications.

Rule 276. An application for initial or renewal registration may be denied for any of the following reasons:

- (a) Failure to accompany the application with the prescribed fee.
- (b) Failure of the applicant to meet the experience and education qualifications of registration.
- (c) Other good and sufficient cause after due notice and proper hearing.

R 325.1777 Certificates; initial; renewal; limited.

Rule 277. (1) The initial certificate issued to a registered dewatering well drilling contractor or pump installer shall be nontransferable and contain the names of the contractor and representative, date of issuance, expiration date, certificate number, and signature of the director.

(2) A renewal certificate shall consist of a registration card in duplicate containing the names of the contractor and representative, expiration date, certificate number, and signature of the director. One section of the card shall be kept with the original registration certificate and a copy shall be carried on the person representing the registered contractor.

(3) The initial and renewal certificates shall authorize a registered dewatering well contractor to participate in all dewatering well activities, but he is limited to dewatering well installations and related operations, including pump installation for dewatering installations and abandonment of dewatering wells. A registered dewatering well pump installer is limited to pump installations, operation, and abandonment of dewatering wells.

R 325.1778 Reciprocity.

Rule 278. The secretary of the advisory board shall obtain requirements for registration in the state from which an applicant requests reciprocity as either a registered dewatering well drilling contractor or pump installer and confirm that the applicant was in fact registered.

R 325.1779 Reinstatement of lapsed, suspended, and revoked certificates.

Rule 279. (1) A registration certificate which has expired for failure of the registrant to apply and pay renewal fees may be reinstated by the department:

- (a) Within 3 years, upon receipt of a renewal application, with the advice of the advisory board, and payment of renewal registration fees for each year during which registration has lapsed in accordance with the fee and penalty schedule in the act.
- (b) After 3 years, after examination in accordance with the rules for new applicants.

(2) A holder of a certificate of registration which has been suspended or revoked in accordance with the act, after a waiting period equal to the period of suspension, but not to exceed 9 months after the registration certificate was suspended or revoked, may petition the director for a hearing for reinstatement of his registration certificate.

R 325.1781 Dewatering well drilling machine registration.

Rule 281. (1) A drilling machine registration card shall be issued for identification purposes for each drilling machine registered by a dewatering well drilling contractor. The card shall be carried on the drilling machine at all times where it may be inspected at any reasonable hour upon request of an authorized representative of the department or health officer. The registration card expires on April 30 each year.

(2) The registration card and duplicate seals furnished for a dewatering well drilling machine are not transferable. The card and seals shall be returned to the director when a drilling machine is sold, traded, or otherwise disposed of. A registration card and 2 new seals for a drilling machine so transferred will be provided without cost upon receipt of the old card, the 2 old seals, and an application requesting authorization to operate a different drilling machine.