CHAPTER 4717
DEPARTMENT OF HEALTH
ENVIRONMENTAL HEALTH RULES

4717.0100 [Repealed, 19 SR 1419; 19 SR 1637]

4717.0150 APPLICABILITY.

Parts 4717.0150 to 4717 3975 establish operation and maintenance, design, installation, and construction standards for public pools and facilities related to them

Statutory Authority: *MS s 144 05; 144.12, 144 123, 145A 02, 157 01*

History: *19 SR 1419; 19 SR 1637*

4717.0200 [Repealed, 19 SR 1419, 19 SR 1637]

4717.0250 DEFINITIONS.

Subpart 1. **Scope.** For the purposes of parts 4717.0150 to 4717 3975, the terms defined in this part have the meanings given them

Subp. 2. **Commissioner.** "Commissioner" means the commissioner of health or the commissioner's authorized representative.

Subp 3. **Operator.** "Operator" means the individual designated by the owner as responsible to operate and maintain the public pool in compliance with parts 4717.0150 to 4717.3975

Subp. 4 **Owner.** "Owner" means the person who owns the public pool and is responsible for compliance with parts 4717 0150 to 4717 3975

Subp 5 **Person.** "Person" means an individual, firm, partnership, association, limited liability company, corporation, company, government agency, club, or organization of any kind

Subp 6 **Pool.** "Pool" means any structure, chamber, or tank containing an artificial body of water for swimming, diving, relaxation, or recreational use including special purpose pools and wading pools

Subp 7 **Private residential pool.** "Private residential pool" means a pool connected with a single–family residence or owner–occupied duplex, located on private property under the control of the homeowner, the use of which is limited to family members or the family's invited guests A private residential pool is not a pool used as part of a business

Subp 8. **Public pool.** "Public pool" means any pool, other than a private residential pool, intended to be used collectively by numbers of persons, and operated by any person whether the person be an owner, lessee, operator, or concessionaire, and regardless of whether a fee for use is charged A public pool includes, but is not limited to, pools operated by a person in a park, school, licensed child care facility, group home, motel, camp, resort, apartment building, club, condominium, hotel, manufactured home park, or political subdivision

Subp 9 **Spa pool.** "Spa pool" means a hot water pool intended for seated recreational use with a water agitation system in addition to the recirculation system Spa pool is synonymous with the term "whirlpool "

Subp 10 **Special purpose pool.** "Special purpose pool" means a pool intended to accommodate a use other than normal swimming, diving, or wading A special purpose pool includes, but is not limited to, spa pools, pools used for water therapy, dedicated plunge pools, flume water slides, and wave pools

Subp 11 **Trained operator.** "Trained operator" means an individual who meets the requirements of part 4717 0650, subpart 5

Subp 12 **Wading pool.** "Wadmg pool" means any pool with a maximum depth of 24 inches used or designed to be used exclusively for wading

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.0275 INCORPORATIONS BY REFERENCE.

This part indicates documents, specifications, methods, and standards that are incorporated by reference in parts 4717 0150 to 4717 3975 This material is not subject to frequent change and is available from the source listed, for loan or inspection from the Barr Library of the Minnesota Department of Health, or through the Minitex interlibrary loan system

A American Public Health Association, "Standard Methods for the Examination of Water and Wastewater," 18th edition (1992), 1015 Fifteenth Street NW, Washington, D.C , 20005.

B American Society of Testing Materials (ASTM) Standard F1346–91 (1991) "Standard Performance Specification for Safety Covers and Labeling Requirements for All Covers for Swimming Pools, Spas and Hot Tubs," 1916 Race Street, Philadelphia, PA 19103

C NSF International, Standard 50 "Circulation System Components for Swimming Pools, Spas or Hot Tubs," May 1992, 3475 Plymouth Road, P O Box 1468, Ann Arbor, MI 48106

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02; 157.01*

History: *19 SR 1419, 19 SR 1637*

4717.0300 [Repealed, 19 SR 1419, 19 SR 1637]

4717.0310 PLAN REVIEW FEES.

All plans for swimming pool construction, installation, or alteration submitted to the commissioner of health for review and approval under part 4717 0450 must be accompanied by the fee specified in this part

A. each pool, except as provided in items B and C, $500,

B each spa pool, $200, and

C alterations to an existing pool without changing the size or configuration of the pool, $200

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.0350 [Repealed, 19 SR 1419, 19 SR 1637]

4717.0375 INSPECTIONS; WATER SAMPLING.

The commissioner is authorized to inspect and sample the water in public pools for compliance with parts 4717 0150 to 4717 3975

The commissioner has the right of entry at any reasonable hour to ensure compliance with parts 4717 0150 to 4717 3975

The commissioner may collect and examine water samples for compliance with part 4717 1750 at any reasonable hour

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419; 19 SR 1637*

4717.0400 [Repealed, 19 SR 1419, 19 SR 1637]

4717.0450 SUBMISSION OF PLANS AND SPECIFICATIONS.

Subpart 1 **Plan submission and review.** No public pool shall be constructed, installed, or materially altered until complete plans and specifications are submitted to the commissioner in duplicate and approved by the commissioner.

A. A separate plan is required for each pool site

B Plans shall be reviewed and approved by the commissioner for sanitation and safety

C Once a plan is approved by the commissioner, no modification affecting the safety and sanitation features of the public pool shall be made without prior approval of the commissioner

D The pool and related facilities must be built in accordance with the approved plan unless prior approval of changes are given in writing by the commissioner

E. Projects that include design features not specifically addressed in parts 4717 0150 to 4717 3975 must be reviewed in the design development stage. Those design features shall be permitted only where the pool owner demonstrates that safety and water quality can be maintained based on the current technology and information provided to the commissioner at the time of review The commissioner may require special provisions to assure that safety and water quality are maintained. Special provisions may include continuous supervision

Subp 2. **Plan contents.** Plans and specifications for pool construction and any existing pool alteration must contain

A the name and address of the facility where the pool is located;

B. the name and address of the pool owner and operator,

C. the name, address, and telephone number of the organization or individual who prepared the plans and specifications,

D. a site plan or floor plan, drawn to scale, showing·

(1) the facility and dimensions of deck areas;

(2) fencing, access, and other security provisions,

(3) toilet and shower areas;

(4) pool equipment location, and

(5) any related facilities,

E plans for the pool drawn to scale, with top and profile views, that include dimensions and all equipment or appurtenances such as skimmers, gutters, inlets, drains, lights, diving boards, slides, ladders, steps, and handrails;

F a plan of the recirculation system showing all pipe sizing, fittings, valves, gauges, and equipment connections,

G a plan for the deck and equipment room that shows all drams, sumps, deck slopes, and air gaps at discharges to the sewer from all deck drains, pool drams, and recirculation system drams,

H a complete equipment list specifying manufacturer, model number, and size; and

I. the pool volume, surface area, and design recirculation rate.

Subp. 3 **Inspection of completed project.** The owner of the pool or the owner's agent must notify the commissioner and any local jurisdiction which regulates pool use at the time the pool is complete to permit inspection of the pool and related facilities

A. The pool must not be placed into public use until the commissioner's inspection shows compliance with parts 4717 0150 to 4717 3975

B If sustained construction of the pool does not begin within one year of the plan approval date, the approval is no longer valid.

Statutory Authority: *MS s 144 05, 144.12; 144.123, 145A.02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.0500 [Repealed, 19 SR 1419; 19 SR 1637]

4717.0600 [Repealed, 19 SR 1419; 19 SR 1637]

4717.0650 POOL OPERATION AND MAINTENANCE; OPERATOR TRAINING.

Subpart 1 **Pool maintenance.** A public pool, pool equipment, and related facilities and equipment must be maintained in a properly operating condition

Subp 2 **Responsibility for operation.** A public pool and the related facilities and equipment must be operated and maintained in working condition by a person who is designated as responsible for compliance with parts 4717.0150 to 4717 3975 and ensures that the pool poses no threat to public health or safety The owner shall be responsible for the operation of the pool and related facilities and compliance with parts 4717.0150 to 4717 3975 Where another person has operational authority under an agreement with the owner, that person also has responsibility for the operation of the pool and related facilities and for compliance with parts 4717 0150 to 4717 3975

Subp 3 **Designation of trained operator.** The owner or operator of the pool must designate a trained operator who is responsible for the direct operation of the pool whenever the pool is open for use.

A The trained operator must be responsible for the daily operation of the pool and ensure that required testing is done and records are maintained The trained operator, or a designated alternate trained operator, must be able to respond to emergency, unsafe and unsanitary conditions at any time the pool is open for use.

B. The trained operator must assure that other individuals who assist with chemical monitoring and pool equipment operation are trained for those functions

Subp 4 **Operations manual.** An operations manual must be available that provides operational information relating to all pool equipment.

Subp 5 **Operator training.** The owner or operator must ensure that the designated trained operator is trained to operate the pool in compliance with parts 4717.0150 to 4717.3975.

A The trained operator must be trained in safe chemical handling and the use of protective equipment in addition to pool operation and sanitation described in items B to F

B Until January 1, 1997, any operator is eligible for certification through attendance at and successful completion of a pool operator's training course

C After January 1, 1997, the trained operator must be certified as successfully completing a pool operator training course as specified in item E

D A certified trained operator must successfully complete a training course as specified in item E at least once every five years after January 1, 1997

E Acceptable training courses are

(1) the National Swimming Pool Foundation Certified Pool Operator course;

(2) the National Spa and Pool Institute Tech I and Tech II courses (both required), or

(3) the National Recreation and Park Association Aquatic Facility Operator course

F After January 1, 1997, a copy of the trained operator's training certificate must be posted at the facility whenever the pool is open for use

Statutory Authority: *MS s 144 05; 144.12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.0700 [Repealed, 19 SR 1419, 19 SR 1637]

4717.0750 POOL RECORD.

A record of a public pool's operation and routine maintenance must be kept by the operator The record must be maintained for six years The record must include the following for each day the pool is open to use·

A the operating periods of recirculation pumps and filters and corresponding rate–of–flow meter readings,

B. amounts of chemicals used, except chemicals added through an automated system,

C disinfectant residuals including both free and total disinfectant residuals,

D pH readings;

E the temperature readings of a pool with a heater;

F any other pool chemistry measurements taken, although not required to be recorded daily, such as alkalinity and cyanuric acid concentrations,

G maintenance of equipment,

H. any malfunction of equipment; and

I any accidents or injuries requiring assistance from a lifeguard, attendant, or emergency medical personnel

Statutory Authority: *MS s 144 05, 144 12, 144 123; 145A 02, 157.01*

History: *19 SR 1419, 19 SR 1637*

4717.0775 REPORTING.

All pool incidents resulting in death or serious injury that require assistance from emergency medical personnel must be reported to the commissioner by the owner or the owner's agent by the end of the next working day

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.0800 [Repealed, 19 SR 1419, 19 SR 1637]

4717.0900 [Repealed, 19 SR 1419; 19 SR 1637]

4717.0950 LIFEGUARD REQUIREMENT.

An individual currently certified in first aid and adult, child, and infant cardiopulmonary resuscitation must be on duty at all times the pool is open to use, unless a sign warning that a lifeguard is not present is posted as specified in part 4717 1050.

The individual must have a Red Cross lifeguard certification or equivalent and be responsible for user supervision, safety, and sanitation at all times the pool is in use

Statutory Authority: *MS s 144 05; 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.1000 [Repealed, 19 SR 1419, 19 SR 1637]

4717.1050 NO LIFEGUARD WARNING SIGN.

When a lifeguard is not on duty at a public pool open to use, a warning sign must be placed in plain view.

A The sign must state m clear, legible letters at least four inches high. "Warning – No lifeguard on duty"

B The sign must state in clear, legible letters at least one inch high "Children must not use the pool without an adult in attendance"

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.1100 [Repealed, 19 SR 1419, 19 SR 1637]

4717.1200 [Repealed, 19 SR 1419, 19 SR 1637]

4717.1250 EMERGENCY TELEPHONE LOCATION.

A pool with a lifeguard present must have a telephone in or immediately adjacent to the pool area When a telephone is provided, the emergency number must be posted When a telephone is not located in the pool enclosure, a sign placed in plain view must indicate the location of the nearest telephone available to a pool user and the emergency number

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.1300 [Repealed, 19 SR 1419, 19 SR 1637]

4717.1350 POOL FACILITY CAPACITY.

Subpart 1 **Posting pool facility capacity.** The capacity for the pool, determined according to subpart 2, must be posted in the pool enclosure area

Subp. 2 **Pool user capacity.** User capacity must be determined as specified in this subpart

A One person is permitted for each 15 square feet of pool water surface in areas of the pool with five feet or less in water depth

B One person is permitted for each 25 square feet of pool water surface in areas of the pool over five feet in water depth

C Three hundred square feet of pool water surface area must be reserved around each diving board, diving platform, or slide The area in this item must not be included when computing the user capacity in item B Ten persons must be included in the user capacity for each diving board, diving platform, and slide

D Spa pools must be limited to one user for each three linear feet of seating space provided in the spa pool, measured along the front edge of the seats

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.1400 [Repealed, 19 SR 1419, 19 SR 1637]

4717.1450 LIFEGUARD STATIONS AND LIFESAVING EQUIPMENT.

Subpart 1 **Lifeguard stations.** At any time a pool with more than 2,250 square feet of water surface is operated primarily for unorganized use, the pool must have an elevated lifeguard platform or chair In a pool with 4,000 square feet or more of water surface, additional elevated platforms, or chairs must be located to provide a clear, unobstructed view of the pool bottom in the area under surveillance

Subp 2 **Lifesaving equipment.** Except for a spa pool or wading pool, not less than one unit of lifesaving equipment as described in subpart 3, must be at every public pool One unit must be provided for each 2,000 square feet of water surface or fraction thereof

Subp 3 **Lifesaving equipment unit.** One unit of lifesaving equipment is.

A a ring buoy attached to a 3/16 inch manila, or equivalent material, rope that is 1–1/2 times the pool width, but not over 60 feet, and

B a lifepole or shepherd's crook pole with blunted ends and a minimum fixed length of 12 feet, or

C where a lifeguard is provided, a rescue tube may be used instead of a ring buoy

Subp 4 **Lifesaving equipment; access.** Lifesaving equipment must be mounted in conspicuous places, distributed around the pool deck, at lifeguard chairs or at another readily accessible location The equipment must be plainly marked "For emergency use only" Equipment must be kept in repair and ready condition No one may tamper with, use for any purpose other than its intended use, or remove equipment from its established location, except for emergency use

Subp 5 **First aid kit; spine board.** Every pool where a lifeguard is present must have a first aid kit filled and ready for use and a spine board with ties The spine board must be within the pool enclosure The first aid kit must contain at least

A two units of one inch adhesive compress,
B. two units of two–inch bandage compress,
C two units of three–inch bandage compress,
D two units of four–inch bandage compress,
E one unit of (three–inch by three–inch) plain gauze pad,
F two units of gauze roller bandage,
G one unit of eye dressing packet,
H four units of plain absorbent gauze one–half square yard,
I three units of plain absorbent gauze, (24 inches by 72 inches),
J four units of triangular bandages, 40 inches,
K one bandage scissors,
L one tweezers,
M rubber gloves, and
N pocket face mask

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.1500 [Repealed, 19 SR 1419, 19 SR 1637]

4717.1550 POOL ACCESS RESTRICTION; FENCING.

Subpart 1 **General.** Access to a public pool must be controlled to effectively prevent the entrance of children

A Where fencing is used to control access, it must comply with subparts 2 to 6 except as noted in item B, subitem (2)

B Access to a public pool within a building or enclosure must be controlled

(1) by locating the pool in a separate room with self–latching doors that restrict access to the room, or

(2) with fencing or a comparable barrier which is at least four feet high and has self–closing, self–latching doors or gates

Exception poolside guest rooms, corridors adjacent to poolside guest rooms, and poolside activity areas may be within the pool enclosure

Subp 2 **Fencing.** Fencing must

A be at least five feet high;
B be equipped with self–closing, self–latching gates capable of being locked,
C not have any opening greater than four inches,
D not have any opening greater than two inches below the fence, and
E not be a readily climbable design

Subp 3 **Existing four–foot fencing.** Fencing in existence prior to January 4, 1995, that is less than five feet high must

A be no less than four feet high,
B be equipped with self–closing, self–latching gates capable of being locked,
C not have any opening greater than four inches, and
D not be a readily climbable design

Subp 4 **Wading pools.** Fencing for a wading pool enclosure must be at least 42 inches high for existing installations and 48 inches high for new installations

Subp 5 **Chain link fencing.** New chain link fencing must not exceed 1–1/2 inch mesh for fencing less than eight feet high New chain link fencing eight foot high or higher must have mesh which does not exceed two inches

Subp 6 **Latches.** Latches for new installations must be four feet above the ground

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.1575 POOL COVERS.

If a pool cover is used, any new cover must comply with ASTM Standard F1346–91

A Pool covers must be maintained in a clean and sanitary condition to preclude contamination of the pool water.

B If the deck area is accessible when the cover is in place, a fully secured safety cover must be used.

C A pool cover may not be used in lieu of a fence or other access restrictions required by part 4717 1550.

Statutory Authority: *MS s 144 05, 144.12; 144 123, 145A 02; 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.1600 [Repealed, 19 SR 1419; 19 SR 1637]

4717.1650 USER SANITATION AND SAFETY.

Subpart 1 **Posting user safety and sanitation rules.** Placards and pictorial representations, where appropriate, embodying the requirements in this part must be posted in plain view in the pool room or enclosure and in the dressing rooms of all public pools. Lettering must be clear, legible, and at least one–fourth inch high

Subp 2 **Communicable disease.** No person with or suspected of having a communicable disease which could be transmitted through use of the pool shall work at or use any public pool

Subp 3 **Warning.** A person with any considerable area of exposed subepidermal tissue, open blisters, or cuts must be warned that these may become infected and advised not to use the public pool

Subp 4. **Showering.** Any person using a public pool must take a cleansing shower using warm water and soap and thoroughly rinse off all soap before entering the pool enclosure A user leaving the pool to use the toilet must take a second cleansing shower before returning to the pool enclosure. A person who exercises, applies lotion, or uses a sauna or steam room must shower before using the pool

Subp 5 **No spitting.** Spitting, spoutmg water from the mouth, and blowing the nose in the pool is prohibited

Subp 6. **No running.** No running or boisterous or rough play, except supervised water sports, is permitted in the pool, in dressing rooms or shower rooms, on runways, on the diving board, or platforms

Subp 7. **Glassware.** Glassware and similar material with a tendency to shatter on impact is not allowed in the pool enclosure area.

Subp 8 **Diving.** Diving is not permitted except in areas that comply with part 4717 3750

Subp 9. **No pets.** Domestic animals are not permitted in the pool enclosure, showers, or dressing rooms

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419; 19 SR 1637*

4717.1700 [Repealed, 19 SR 1419, 19 SR 1637]

4717.1750 POOL WATER CONDITION.

Subpart 1 **Maximum water temperature.** The water temperature in a pool must not be more than 104 degrees Fahrenheit

Subp 2. **Test kits.** Each pool must have the testing equipment specified in this subpart.

A a DPD (Diethyl–P–Phenylene Diamine) test kit to measure the concentration of disinfectant in water, accurate within 0 1 parts per million,

B a phenol red pH testing kit accurate to the nearest 0 2 pH unit;

C a test kit to measure alkalinity using the methyl orange or equivalent method; and

D where cyanuric acid is used, a test kit to test cyanuric acid concentration

Subp 3 **Disinfection residual.** When in use, a pool must be continuously disinfected with a chemical that imparts an easily measured, free available residual.

A When chlorine is used, a free chlorine residual of at least 0 5 parts per million must be maintained throughout the pool

B When bromine is used, a bromine residual of at least 1 0 parts per million must be maintained throughout the pool

C. The minimum free residual for chlorine must be 1 0 parts per million and 2 0 parts per million for bromine when any of the following conditions exist.

(1) cyanuric acid exceeds 30 parts per million,

(2) the pH exceeds 7 7,

(3) the water temperature exceeds 84 degrees Fahrenheit, or

(4) the pool is a wading pool.

D The disinfectant concentration in an operating pool must not exceed five parts per million for chlorine and ten parts per million for bromine

E. If other halogens are used, residuals of equivalent disinfectant strength must be maintained.

F. If the concentration of combined chlorine residual exceeds 0 5 parts per million, the pool must be superchlorinated or treated to reduce the concentration of the combined chlorine residual to not exceed 0 5 parts per million

G. Where a cyanuric acid compound is used to stabilize chlorine, the concentration of cyanuric acid in the pool must not exceed 100 parts per million.

Subp 4. **Disinfection of spa pools.** The disinfectant residual in a spa pool must be at least 2 0 parts per million for free chlorine and 4 0 parts per million for bromine throughout the pool when in use.

Subp. 5. **pH.** Water in the pool must be maintained with a pH of not less than 7 2 and not more than 8 0.

Subp 6. **Alkalinity.** The alkalinity of the water in the pool must be at least 50 parts per million

Subp. 7 **Water clarity.** Whenever the pool is open for use, the pool water must be clear enough so the bottom drain is easily visible

Subp 8 **Use of nontoxic chemicals; chemical container security.** Chemicals used to control water quality must not impart toxic properties to the water All containers used for chemicals must be kept in a secure location, inaccessible to pool users, and properly labeled and stored according to the manufacturer's instructions

Subp 9 **Bacteriological samples.** When bacteriological sampling is done, no sample collected may.

A exceed 200 bacteria per milliliter as determined by the heterotrophic plate count, or

B indicate the presence of total coliform organisms in a 100 milliliter sample by any of the following methods:

(1) multiple tube,

(2) membrane filter, or

(3) the Mimmal Medium ONPG–MUG test described in Code of Federal Regulations, title 40, part 141

All samples must be collected, dechlorinated, and examined according to the American Public Health Association's "Standard Methods for the Examination of Water and Wastewater."

Subp. 10 **Bacteriological treatment.** Where sampling indicates that the standards in subpart 9 are exceeded, the pool must be treated to effectively reduce biological concentration to a complying level.

Statutory Authority: *MS s 144 05, 144 12, 144 123; 145A 02; 157 01*

History: *19 SR 1419; 19 SR 1637*

4717.1800 [Repealed, 19 SR 1419; 19 SR 1637]

4717.1850 DEPTH OF POOL WATER.

Subpart 1. **General.** The minimum depth of water in a public pool must be three feet. The maximum depth at the shallow end of the pool must not exceed three feet six inches

Subp 2. **Exceptions.** The requirements in subpart 1 do not apply to special purpose pools, wading pools, and pools used for supervised competition

A. A wading pool must have a maximum depth of no more than 24 inches

B A pool with a zero depth area may be approved by the commissioner if

(1) a lifeguard is present at the zero depth area at all times the pool is in use, and

(2) there is an effective barrier, such as stanchions and ropes to restrict access from the deck of the pool to the area where the water depth is less than three feet, except on the side of zero depth The barrier must permit easy removal for emergency access or maintenance

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.1900 [Repealed, 19 SR 1419, 19 SR 1637]

4717.1950 POOL CLEANING.

Subpart 1 **Cleaning schedule.** Visible dirt on the bottom of the pool must be removed every 24 hours or more frequently as needed to eliminate buildup Visible scum or floating matter on the pool surface must be removed no less than every 24 hours by flushing or other effective means

Subp. 2 **Cleaning system.** A vacuum–cleaning system capable of cleaning the entire pool must be provided, except that it is not required for spa pools with less than 75 square feet of water surface

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2000 [Repealed, 19 SR 1419,.19 SR 1637]

4717.2100 [Repealed, 19 SR 1419; 19 SR 1637]

4717.2150 WATER SUPPLY.

Subpart 1. **Potable supply.** The water supply serving a pool and all plumbing fixtures, including drinking fountains, lavatories, and showers, must meet the requirements of the commissioner for potable water specified in chapters 4720 and 4725

Subp 2 **Backflow prevention.** All portions of the water distribution system serving the pool and related facilities must be protected against backflow Water introduced into the pool, either directly or through the recirculation system, must be supplied through an air gap or protected with a suitable backflow preventer as specified in parts 4715 2000 to 4715 2170

Statutory Authority: *MS s 144.05, 144 12, 144.123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2200 [Repealed, 19 SR 1419, 19 SR 1637]

4717.2250 SEWER SYSTEM.

The sewer system must adequately serve the pool, bathhouse, dressing rooms, and related facilities and must conform to the standards of the commissioner of health and the Minnesota Pollution Control Agency

A There must be no direct physical connection between the sewer system and any dram from the pool or recirculation system

B Any pool, gutter drain, or overflow from the recirculation system when discharged to a sewer system, storm drain, or other complying natural drainage course must discharge through a complying air gap or air break to preclude the backup of sewage or waste into the pool or piping system.

C Valves and pumps used for draining the pool must be sized or designed to prevent the surcharging of the sanitary sewer

D Any sanitary sewer serving facilities related to the pool must discharge into the public sewer system

E Where a public sewer system is not available, the connection must be made to a treatment system designed, constructed, installed, and operated according to the requirements of the commissioner of health and the Minnesota Pollution Control Agency

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157.01*

History: *19 SR 1419, 19 SR 1637*

4717.2300 [Repealed, 19 SR 1419, 19 SR 1637]

4717.2350 POOL STRUCTURE.

Subpart 1 **General.** The pool and all appurtenances must be constructed of materials which

A are inert, nontoxic, impervious, permanent and enduring,

B withstand design stress,

C provide a tight tank with a smooth and easily cleaned surface, and

D can be finished in a white or light color

Wood tank construction and vinyl liner pools are prohibited.

Subp. 2 **Finish.** The pool basin finish, including bottom and sides, must

A be of white or light colored material,

B be nontoxic to humans,

C have a smooth finished surface,

D be void of cracks, and

E be bonded to the supporting members, excluding structural expansion joints

Subp 3 **Design, detail, and structural stability.** The pool must be designed, installed, operated, and constructed to withstand all anticipated loading for both full and empty conditions

Subp 4 **Designer responsibility.** The owner and the architect, engineer, contractor, or other designer is responsible for the structural stability and safety of the pool design

Subp 5 **Relief valve.** A hydrostatic relief valve or an underdrain system must be provided where a high water table may affect the stability of the pool

Subp 6 **Shape.** The pool's shape must

A be such that the circulation of pool water and control of users' safety are not impaired,

B allow complete, continuous circulation of pool water throughout all parts of the pool, and

C ensure that user safety is not impaired Underwater or overhead projections or obstructions that would endanger user safety or interfere with operation are prohibited

Subp 7 **Corners.** Corners formed by the intersection of walls and the bottom must be rounded with at least a one–half inch radius

Subp 8. **Slope of bottom.** The slope must conform to the provisions in this subpart

A The slope of the bottom of any part of the pool with a water depth of less than five feet must not be more than one foot in ten feet and must be uniform.

B In parts of the pool with a water depth greater than five feet, the slope must not exceed one foot in three feet

Subp 9. **Side walls.** The walls of the pool must be either·

A vertical for water depths of at least six feet, or

B vertical for a distance of three feet below the water level, below which the wall may be curved to the bottom with a radius not greater than the difference between the depth at that point and three feet, provided that vertical is interpreted to permit slopes not greater than one foot, horizontally, for each five feet of depth of sidewall (11 degrees vertical)

Subp 10. **Ledges.** A ledge along the pool wall withm the pool basin is permitted only if it is a necessary part of the sidewall construction. The ledge must be·

A. at least two feet six inches below the water surface,

B not over four inches wide, and

C sloped into the pool with a rounded outside edge

Subp 11 **Wading pools.** Wading pools must be physically separated from other pools and have a separate recirculation system

Subp. 12 **Fountains.** Fountains or similar features require approval by the commissioner and must be located in areas of two feet or less of water depth They must be designed to preclude climbing

Statutory Authority: *MS s 144 05, 144.12, 144 123, 145A 02, 157.01*

History: *19 SR 1419; 19 SR 1637*

4717.2400 [Repealed, 19 SR 1419, 19 SR 1637]

4717.2450 MARKINGS AND LINES.

Subpart 1. **Depth markings.** The depth of the water in the pool must be plainly marked in numbers and letters, be in a color contrasting with the background, and specify the water depth and units in feet and inches Numerals must be at least four inches high The water depth must be indicated.

A on the edge of the deck next to the pool;

B at the maximum and minimum depths,

C on all sides of the pool;

D at the points of change of slope between deep and shallow portions, and

E at intermediate increments of depth, spaced at not more than 25–foot intervals.

Subp 2 **Depth transition markings.** Where a transition to a steeper bottom slope occurs, the transition must be marked on the bottom and walls of the pool by a stripe of dark contrasting color at least six inches wide

Subp 3 **No diving markings.** Pools and sections of pools that do not comply with the depth requirements for diving in part 4717.3750 must have.

A the words "No Diving" in letters not less than four inches high and of a color contrasting with the background located on the pool deck on all sides of the pool where diving is not permitted and spaced at not more than 25 foot intervals; or

B the universal no diving symbol at least four inches high accompanied by the words "No Diving" in letters not less than one–half inch high and of a color contrasting with the background located on the pool deck on all sides of the pool where diving is not permitted and spaced at not more than 25 foot intervals. This provision does not apply to spa pools, wading pools, flume or plunge pools.

Subp 4 **Stair markings.** The leading edge of stair treads must be marked by a stripe of dark, contrasting color between one–half inch and two inches in width

Statutory Authority: *MS s 144.05, 144.12; 144 123; 145A 02; 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2500 [Repealed, 19 SR 1419; 19 SR 1637]

4717.2550 RECIRCULATION SYSTEM.

All pools must have a water recirculation system with treatment and filtration equipment consisting of overflow gutters or skimmers, main drains, inlets, pumps, piping, filters, water conditioning, disinfection equipment, and other accessory equipment. The pumps, filter, disinfectant and chemical feeders, and related appurtenances must be kept in operation at all times during the swimming season unless approved by the commissioner

Statutory Authority: *MS s 144.05; 144 12; 144 123, 145A.02; 157.01*

History: *19 SR 1419, 19 SR 1637*

4717.2560 RECIRCULATION RATE.

Subpart 1 **General recirculation rate.** The water recirculation system must clarify and disinfect the pool volume of water in six hours or less.

Subp 2 **Wading pools and special purpose pools.** The water recirculation system of a wading pool or a special purpose pool must recirculate a water volume equal to the pool volume in two hours or less.

Subp 3 **Spa pools.** The recirculation system m a spa pool must recirculate a water volume equal to the pool volume in 30 minutes or less, except that a minimum rate of 35 gallons per minute is required

Subp 4 **Dedicated plunge pools.** The recirculation system of a dedicated plunge pool must recirculate a water volume equal to the total volume of the pool m one hour or less.

Subp. 5 **Pools with zero depth area.** The recirculation system of a pool with a zero depth end must recirculate water at the rate specified in this subpart

A. The area of the pool with a water depth of less than three feet must have a recirculation rate of two hours or less

B The remainder of the pool must meet the requirements in subpart 1.

C. A system of bottom inlets must be provided in the shallow end

Statutory Authority: *MS s 144 05, 144 12, 144 123; 145A 02, 157.01*

History: *19 SR 1419; 19 SR 1637*

4717.2570 RECIRCULATION EQUIPMENT.

Subpart 1 **General.** Equipment which is part of the installation or alteration of a pool recirculation system must comply with Standard 50 "Circulation System Components for Swimming Pools, Spas or Hot Tubs" of the NSF International

Subp 2 **Recirculation system strainers.** The recirculation system must include a strainer to prevent debris such as hair and lint from reaching the pump and filters The strainer must

A. be corrosion–resistant,

B. have openings not more than one–eighth inch,

C. provide a free flow area at least four times the area of the pump suction line, and

D be readily accessible for frequent cleaning

Subp 3 **Recirculation system piping.** Recirculation system piping must·

A. carry the recirculation quantity of water required in part 4717.2650 at a velocity not exceeding six feet per second for suction piping, eight feet per second for discharge piping, and three feet per second for gravity flow piping,

B be nontoxic and corrosion–resistant, and able to withstand operating pressures, and

C be identified by a label, color code, tag, or other distinguishing marking.

Subp 4 **Rate–of–flow indicator.** A rate–of–flow indicator, reading m gallons per minute, must be installed and located, preferably on the pool return line, so the rate of recirculation and backwash rate are indicated The indicator must be capable of reading flows measuring at least 1–1/2 times the design flow rate, be accurate withm ten percent of the true flow, and be easy to read.

Subp. 5. **Pumps.** Pumps must provide the number of turnovers of pool water specified in part 4717.2560

If the pump or suction piping is located above the overflow level of the pool, the pump must be self–priming. The pump or pumps must be capable of providing flow to backwash filters.

Under normal conditions, the pump or pumps must supply the recirculation rate of flow specified in part 4717.2560 at a dynamic head of at least 50 feet for pressure filters

Subp. 6. **Heaters.** Pools equipped with heaters must have a fixed thermometer in the recirculation line to measure the temperature of the water returning to the pool.

Subp 7 **Valves.** Valves must be provided on the main dram and skimmer lines to permit balancing the recirculation flow.

Statutory Authority: *MS s 144 05, 144 12, 144 123; 145A 02; 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2580 INLETS AND OUTLETS.

Subpart 1 **Outlets.** All pools must have an outlet at the deepest point to permit the pool to be completely emptied.

A. Outlet openings must be covered by grating not readily removable by users

B Outlet openings of the grating on the floor of the pool must be at least four times the area of discharge pipe and provide enough area so the velocity of water passing the grate does not exceed 1–1/2 feet per second

C Grate openings must be no more than one–half inch wide

D When a single outlet is used, it must be at least 100 square inches in size, or have an antivortex cover

E In pools more than 30 feet wide, multiple outlets must be provided The outlets must be no more than 30 feet apart, and no more than 15 feet from the side walls

Subp 2. **Inlets.** Water inlets must be located to produce uniform circulation of water and maintain a uniform disinfectant residual throughout the entire pool without the existence of dead spots

A Inlets from the recirculation system must be flush with the pool wall and submerged at least 12 inches below the water level

B Over–the–rim fill spouts are not permitted unless located under a diving board or installed in a manner that does not present any hazard

C Make up water spouts must terminate at least six inches above the fill rim of the pool or surge tank

Subp 3 **Adjustable inlets.** Inlets must be directionally adjustable and located so there is complete, uniform circulation of incoming water throughout the pool, a uniform disinfectant residual is maintained at all times, and there are no dead spots

A Each inlet must be adjustable or have an individual gate or similar valve to permit adjustment of water volume to obtain the best circulation

B The maximum spacing of inlets must be 20 feet based on the pool perimeter

C In a pool with a surface area greater than 1,600 square feet or longer than 60 feet, side inlets must be placed at 15–foot intervals around the entire perimeter

D An engineered, manufactured gutter system with integral supply orifices may be used instead of individual directional inlets

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2590 OVERFLOW GUTTERS.

Subpart 1 **General.** Overflow gutters must extend completely around the pool except at steps or recessed ladders

A The overflow gutter must also serve as a handhold

B The gutter must continuously remove 50 percent or more of the recirculated water and return it to the filter

C Pools with overflow gutters must be provided with surge capacity

D The gutters, drains, and return piping must be sized to remove overflow water caused by recirculation, displacement, wave action, or other cause produced from maximum pool user load

E Drain outlets must not be more than 15 feet apart

F The opening into the gutter beneath the coping must not be less than four inches wide The interior of the gutter must not be less than three inches wide with a depth of at least three inches

G Gutters must be designed to prevent the entrance of or entrapment of a user's arms or legs

H The overflow edge or lip must be rounded and no thicker than 2–1/2 inches for the top two inches

I. Overflow outlets must have outlet pipes at least two inches in diameter

J Outlet fittings must have a clear opening in the grating at least equal to 1–1/2 times the cross sectional area of the outlet pipe

K New overflow gutter system installations must include automatic water level control to provide automatic and continuous skimming during quiescence.

Subp 2 **Surge systems and surge capacity.** An in–pool surge system may be used only if it is part of an engineered and manufactured gutter system that has surge weirs which provide effective skimming during quiescence

A In–pool surge weirs must be self–closing during normal pool use

B The total surge capacity of the system must be at least one gallon per square foot of water surface

C If some of the surge capacity is within the gutter system, the system must be able to carry 50 percent of the recirculation flow while maintaining the surge capacity

Subp 3. **Rollout and deck systems.** Nothing in this part precludes the use of a rollout overflow system or deck level system if proper surge capacity is provided as specified in subpart 2

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A.02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2595 SKIMMERS.

Subpart 1 **Skimmers.** Skimmers are permitted in lieu of a gutter if the suction outlets induce enough motion to the pool water to remove floating oil and waste from the entire pool surface, and the edge of the pool deck provides a handhold for swimmers

A Skimming devices must be built into the pool wall.

B At least one skimming device must be provided for each 400 square feet of water surface area or fraction thereof

C Where two or more skimmers are used, they must not interfere with each other and must ensure skimming of the entire pool surface

D The flow through rate must be no less than 30 gallons per minute

E Skimmer piping and other components must be designed for a total capacity of at least 80 percent of the required filter flow of the recirculation system

F The skimmer weir must automatically adjust and operate freely with continuous action to variations in water level over a range of at least four inches.

(1) The weir must operate at all flow variations

(2) The weir must be of a buoyancy and design to permit effective skimming velocity

G Provision must be made to prevent airlock in the skimmer suction line

(1) Where an equalizer pipe is used, it must be sized to meet the capacity requirements of the filter and pump and not be less than two inches in diameter If equalizer lines are not provided on skimmers, the main drain must be sized based on the total recirculation flow The equalizer pipe must be located at least one foot below the lowest overflow level of the skimmer It must be provided with a valve or equivalent device that automatically opens when the water level drops below the lowest weir level

(2) If any other device, surge tank, or arrangement is used, enough water for pump suction must be assured.

(3) Equalizer pipe is not required on a pool with an automatic water level control and on spa pools with less than a 1,000 gallon capacity

Subp. 2 **Screen.** Skimmers must have an easily removable and cleanable basket or screen through which all overflow water passes to trap large solids

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2600 [Repealed, 19 SR 1419; 19 SR 1637]

4717.2610 DISINFECTANT AND CHEMICAL FEEDERS.

A pool must have a disinfectant feeder or feeders that meet the requirements in this part

A. Feeders must be sturdy and withstand wear, corrosion, or attack by disinfectant solutions or vapors

B Feeders must not be adversely affected by repeated regular adjustment or other anticipated use.

C Feeders must be capable of being disassembled for cleaning and maintenance.

D The design and construction of feeders must preclude stoppage from chemicals intended to be used or foreign materials.

E Feeders must incorporate failure–proof features so the disinfectant cannot feed directly into the pool, the pool piping system, water supply system, or pool enclosure under any type of failure of the equipment, or during its maintenance.

F Feeders must be able to supply at least the equivalent of one pound of chlorine in eight hours for each 10,000 gallons of pool capacity

G Feeders must have a graduated and clearly marked dose adjustment ranging from full capacity to 25 percent of capacity

H Feeders must be capable of continuous delivery within ten percent of the dose at any setting

I When the disinfectant is introduced at the suction side of the pump, a device or method to prevent air lock of the pump or recirculation system must be provided

Statutory Authority: *MS s 144.05, 144.12; 144 123, 145A.02; 157.01*

History: *19 SR 1419, 19 SR 1637*

4717.2620 CHEMICAL HANDLING EQUIPMENT; PROTECTIVE EQUIPMENT.

Equipment and piping used to apply chemicals to the water must be sized, designed, and of material that does not clog and is easily cleaned. Material must be resistant to the action of the chemicals used.

Protective equipment recommended by the chemical manufacturer as necessary for the safe handling of any chemicals used must be provided

Statutory Authority: *MS s 144.05; 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2630 USE OF GAS CHLORINE.

Subpart 1 **General.** The standards in this part apply when compressed gas chlorine is used The gas chlorine and chlorinatmg equipment must be in·

A a separate, mechanically ventilated room, or

B a secure reach–in enclosure.

Subp. 2 **Rooms.** When a room is used, it must comply with the provisions in this subpart

A The room must be above grade

B. A shatter resistant inspection window must be installed in an interior wall or the door

C The room must have a ventilating fan with a capacity to provide one complete air change per minute when the room is occupied.

D Separate switches for the fan and lights must be located outside the room Outside switches must be protected from vandalism. A signal light indicating fan operation must be provided at each entrance when the fan can be controlled from more than one point.

E. The ventilating fan must take suction near the floor as far as practical from the door and air inlet, with the point of discharge located so as not to contaminate air inlets to any rooms or structures

F. Air inlets must be through louvers or other ventilation openings near the ceiling.

G When present, floor drains must discharge to the outside of the building and must not be connected to other internal or external drainage systems

Subp 3 **Reach–in enclosures.** Reach–in enclosures must be.

A not over two feet in depth,

B vandal resistant, and

C. naturally ventilated by means of openings in the upper and lower parts of the enclosure.

Subp 4 **Doors.** The door of a room or enclosure must be labeled "DANGER – GAS CHLORINE" in letters at least four inches high

Subp 5 **Seals.** All openings between a chlorine room or enclosure and other enclosed space must be sealed

Subp 6 **Venting.** Vents from feeders and storage rooms or enclosures must discharge to the outside atmosphere, above grade.

Subp 7 **Chlorinating equipment.** Chlorinating equipment must be capable of withstanding wear without developing leaks

A All chlorine cylinders must be anchored to prevent falling over

B A valve stem wrench must be maintained on the chlorine cylinder so the supply can be shut off quickly in an emergency

C The valve protection hood must be kept in place except when the cylinder is connected to the system.

D The chlorine feeding device must be designed so that during accidents or interruptions of the water supply, leaking chlorine gas is conducted to the out–of–doors

E. The chlorinator must be a vacuum–operated solution–feed type, capable of delivering chlorine at its maximum rate without releasing chlorine gas to the atmosphere

F Pressurized chlorine feedlines must not carry chlorine gas beyond the chlorinating room

G. Chlorinators must be designed to prevent the backflow of water into the chlorine solution container

Subp 8. **Respiratory protection equipment.** Respiratory protection equipment, meeting the requirements of the National Institute for Occupational Safety and Health (NIOSH) or the United States Bureau of Mines for chlorine use must be available where chlorine gas is handled The respiratory protection equipment must be stored at a convenient location, in a closed cabinet accessible without a key, but not inside any room where chlorine is used or stored.

A. The respirators must use compressed air, have at least a 30–minute capacity, and be compatible with or exactly the same as the respirators used by the fire or emergency rescue department responsible for the pool facility, or be a canister type gas mask with full face mask and replacement canisters provided

B A record of use and inspection must be kept to ensure that the respirators will be serviceable when needed.

Subp. 9 **Chlorine leak detection.** A bottle of ammonium hydroxide, 56 percent ammonia solution, or a comparable solution recommended by the chlorine supplier, must be available for chlorine leak detection.

A Where ton chlorine containers are used, an emergency leak repair kit recommended by the Chlorine Institute, Inc , 2001 "L" Street NW, Washington, D C 20036, must be provided

B. Where an automatic leak detector is provided, it must be equipped with both an audible alarm and a visual warning sign

Subp. 10 **Trained personnel.** Installation of chlorinator equipment and its operation must be carried on by and under the supervision of personnel trained by the manufacturer or supplier for the installation and operation of such equipment

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A.02; 157.01*

History: *19 SR 1419, 19 SR 1637*

4717.2650 USE OF HYPOCHLORITE SOLUTION.

When hypochlorite solution is fed through hypochlorinating equipment

A the feed must be continuous under all conditions of pressure in the circulating system and feed without artificial constriction of the pump suction line, whether or not the pump suction line is under vacuum or pressure head,

B regulation must be provided to ensure constant feed with varying supply or back pressure,

C positive features must be designed to prevent backflow from the recirculation system to the solution container and reduce to a minimum the entry into the pool of free calcium released from calcium hypochlorite, and

D for aboveground installations, means must be provided to prevent siphoning of hypochlorite solution when the recirculation pump and hypochlorinator are both turned off

Statutory Authority: *MS s 144 05; 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2700 [Repealed, 19 SR 1419, 19 SR 1637]

4717.2750 USE OF EROSION FEEDERS.

An erosion feeder must

A have enough capacity to achieve the disinfectant residual specified in part 4717 1750,

B be adjustable in output rate, and

C be capable of continuous operation

Statutory Authority: *MS s 144 05, 144.12, 144 123, 145A 02; 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2800 [Repealed, 19 SR 1419, 19 SR 1637]

4717.2850 SAND FILTERS.

Subpart 1 **Applicability.** The requirements in this part apply to vacuum and pressure sand filters

A. Pressure sand filters must filter at a maximum rate of three gallons per minute per square foot of bed area at the time of maximum head loss with enough area to meet the rate of flow specified in part 4717 2560

B The filtration rate for high–rate sand filters and vacuum sand filters must not exceed 20 gallons per minute per square foot of bed area.

Subp 2 **Filter material.** Filter material must be screened, sharp filter sand sized between 0 4 and 0 55 millimeters with a uniformity coefficient not exceeding 1 75 Anthracite sized between 0.6 and 0.8 millimeters with a uniformity coefficient not exceeding 1 8, may be used instead of sand

A The filter material must be at least 20 inches deep for standard pressure sand filters and at least 12 inches deep for high–rate sand filters

B. The filter material must be supported by at least ten inches of graded filter gravel. The gravel must distribute water uniformly during filtration and backwashing

C A reduction in depth or an elimination of gravel is permitted when equivalent performance and service is demonstrated through compliance with NSF International Standard 50

Subp 3 **Underdrain system.** The underdrain system must be corrosion–resistant, enduring, and provide even collection and distribution of the flow during filtration and backwashing Orifices and other openings must maintain constant area

Subp. 4. **Freeboard.** Freeboard provided between the upper surface of the filter media and the lowest portion of the pipes or drains which serve as overflows during backwashing must be designed to prevent loss of filter material

Subp 5 **Filter system.** The filter system must have influent and effluent pressure gauges or a filter–mounted pressure gauge, backwash sight glass on the waste discharge line, and an air–relief valve at or near the high point of the filter The filter system must have valves and piping that permit

A filtering to the pool,

B individual backwashing of filters to waste at a rate of not less than 15 gallons per minute per square foot of filter area,

C isolation of individual filters for repair while other units are in service,

D complete drainage of all parts of the system, and

E maintenance, operation, and inspection

Subp 6 **Filter access.** Each pressure filter tank must have an access opening to permit maintenance

Subp 7 **Coagulant feed.** Devices with dosage control features must be provided if coagulants are added ahead of filters

Subp. 8 **Tank.** On pressure filters, the tank and integral parts must have a pressure safety factor of four based on the maximum shutoff head of the pump For design purposes, the shutoff head must in no case be considered less than 50 pounds per square inch.

Statutory Authority: *MS s 144 05, 144.12, 144 123, 145A 02; 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.2900 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3000 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3050 DIATOMACEOUS EARTH FILTERS.

Subpart 1 **Area.** The filter area for a diatomaceous earth filter must meet the design pump capacity as required by this part. Where fabric is used, the filter area is determined by the surfaces created by septum supports with no allowance for areas of impaired filtration such as broad supports, folds, or portions which may bridge

Subp 2 **Rate of filtration.** The rate of filtration must not be greater than two gallons per minute per square foot of filter area without continuous body feed and no greater than 2 5 gallons per minute per square foot with continuous body feed

Subp 3 **Use of body feeder.** If a body feeder is used, it must be accurate within ten percent and capable of continually feeding within a calibrated range adjustable from two to six parts per million at the capacity of the recirculation pump The feeding of diatomaceous earth through skimmers is prohibited

Subp 4 **Filter and components.** The filter and all component parts must withstand normal continuous use without significant deformation, deterioration, corrosion, or wear which adversely affects filter operation The filter design, construction, or other provision must preclude introduction of filter aid into the pool during precoating operations

A. Where dissimilar metals which may set up galvanic electric currents are used in the filters, provision must be made to resist electrolytic corrosion

B The filter and surrounding space must permit removal, replacement of any part, and maintenance

C The filter must be cleaned by backwashing, air pump assist backwashing, mechanical or manual spray wash, or agitation.

Subp 5 **Filter tank.** The tank containing the filter elements must be constructed of steel, plastic, or another material resistant to corrosion, with or without coating

A. Pressure filters must be designed for a minimum working pressure of 50 pounds per square inch with a four–to–one safety factor

B Vacuum filters must withstand the pressure developed by the weight of the water contained therein with a safety factor of 1 5

C Closed vacuum filters must withstand crushing pressure developed under a vacuum of 25 inches of mercury with a safety factor of 1 5

D The septa or elements which support the filter–aid must be corrosion–resistant The septa must resist rupture under conditions of maximum differential pressure between influent and effluent developed by the circulating pump, and resist stress developed by cleaning.

Subp 6 **Filter plant.** The filter plant must have pressure, vacuum, or compound gauges to indicate the condition of the filter In vacuum filters where the circulating pump is two

horsepower or higher, an adjustable high vacuum automatic shutoff must be provided to prevent damage to the pump by cavitation

Subp 7 **Complete draining of filter.** The filter must provide for complete drainage

Statutory Authority: *MS s 144.05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3100 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3150 CARTRIDGE FILTERS.

Surface–type cartridge filters must be sized for a maximum filtration rate of 0 375 gallons per minute per square foot An effluent pressure gauge and an air relief valve must be provided. A spare set of cartridges must be provided and available at all times

Statutory Authority: *MS s 144.05, 144 12, 144 123; 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3200 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3250 STEPS, LADDERS, HANDHOLDS, AND HANDRAILS.

Subpart 1 **Step or ladder location in–pool.** Steps or ladders must be provided at the shallow end of the pool if the vertical distance from the bottom of the pool to the deck or walk is over two feet. Recessed steps or ladders must be provided at the deep end of the pool If the pool is over 30 feet wide, steps or ladders must be installed on each side

Subp 2 **Steps.** Steps leading into the pool must be of nonslip material, have a minimum tread of 12 inches, and have a maximum rise or height of ten inches

A Steps must have accent stripes as specified in part 4717 2450, subpart 4

B. There must be no abrupt drop–off or submerged projections into the pool, unless guarded by handrails

C. At least one sturdy handrail, reachable from the pool bottom, must be provided for all steps

D At least two rails must be provided when the steps are over six feet wide or an additional railing is needed to define the location of the steps

E If steps are inserted in the walls or if stepholes are provided, they must be easily cleaned and drain into the pool to prevent the accumulation of dirt. Stepholes must have a minimum tread of five inches and a minimum width of 14 inches

Subp. 3. **Ladders.** Pool ladders must be corrosion–resistant and equipped with nonslip treads.

A. All ladders must provide a handhold and be rigidly installed.

B There must be a clearance of not more than five inches nor less than three inches between any ladder and the pool wall

Subp 4 **Handrails.** When stepholes or ladders are provided in the pool, handrails must be provided that extend over the coping or edge of the deck.

Subp 5 **Handholds; coping.** All pools, except wading pools and spa pools, must have a continuous handhold along the pool edge.

A. Handholds must be no more than nine inches above the normal water line

B. Where bull–nosed coping is used, it must not be over 2–1/2 inches thick for the outer two inches.

C If brick coping is used, it must be completely rounded on the pool side, overhang the pool wall 1–1/2 inches, and slope away from the pool at least one–half inch over the length of the brick.

Subp 6 **Diving boards.** Supports, platforms, and steps for diving boards must safely carry the maximum anticipated load.

A Steps must be corrosion–resistant, cleanable, and constructed of nonslip material.

B. Handrails must be provided for all steps and ladders leading to any diving board more than one meter above the water

C Platforms and diving boards over one meter above the water must be protected with guardrails

Statutory Authority: *MS s 144.05, 144 12; 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3300 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3350 DECKS AND WALKWAYS.

A continuous deck, free from fixed obstruction, at least five feet wide, must extend completely around the pool. The deck must be sloped away from the pool to drain at a grade of one–fourth inch per lineal foot The deck must have a nonslip, nonabsorbent surface.

A. Deck drains connected to the recirculation system or gutters are prohibited for new installations

B Carpeting must not be used within ten feet of the pool unless it is outside the required deck area and separated from the deck by an effective access barrier In deck areas where carpeting is contiguous to the deck area, water must be conveyed away from the carpeted area

C Wood decking is prohibited

D A minimum ceiling clearance of seven feet is required above pool edges and pool decks.

(1) Where diving boards are provided, ceiling clearances must comply with part 4717 3750

(2) Greater heights must be provided as necessary to accommodate the use of slides or to comply with state building code requirements

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157.01*

History: *19 SR 1419, 19 SR 1637*

4717.3400 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3450 LIGHTING, VENTILATION, AND ELECTRICAL REQUIREMENTS.

Subpart 1 **Lighting.** Lighting must meet the criteria in this part

A When underwater lighting is used, not less than 0.5 watts shall be employed per square foot of pool water surface area

B. Light must be located to provide illumination so all portions of the pool, including the bottom, may be seen without glare

C Area lighting must provide at least ten footcandles of illumination at all locations on the pool surface and on any deck within five feet of the pool whenever the pool is in use

D A pool used for education, training, or competition must have at least 30 footcandles of illumination on the pool surface and on any deck within five feet of the pool

E. Security lighting, when provided, must illuminate the entire pool area to make it readily visible

Subp 2 **Ventilation.** All indoor pools, dressing rooms, shower rooms, and toilet space must be ventilated by mechanical means

A Pool equipment rooms must have natural or mechanical ventilation

B For new installations, ventilation must comply with the Minnesota Building Code

C Gas chlorine rooms must have mechanical ventilation as specified in part 4717.2630, subpart 2

Subp. 3. **Electrical.** All electrical installations must conform with the standards of the Board of Electricity effective at the time of installation

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3475 STARTING BLOCKS AND PLATFORMS; SLIDES; OTHER OBJECTS.

Subpart 1 **Starting block or platform use.** Starting blocks or starting platforms located at any pool area with a water depth of less than five feet must be removed when the pool

is used for other than supervised competitive swimming or training for competitive swimming. For installations after January 1, 1995, all starting blocks or starting platforms must be positioned at a water depth of five feet or greater

Subp 2. **Play equipment.** All play equipment at a pool must be specifically designed for pool use and installed in accordance with the safe use parameters specified by the manufacturer and the requirements of the commissioner All slides used at a pool must meet the requirements specified in part 4717 3870

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419; 19 SR 1637*

4717.3500 [Repealed, 19 SR 1419; 19 SR 1637]

4717.3550 DRESSING ROOMS.

When dressing rooms are provided for both sexes, they must be separated by a tight partition and be designated for men or women

A. The entrances must be screened to break line of sight

B Floors and wet paths between showers and the pool must have a smooth, nonslip surface, impervious to moisture, and sloped to a dram

C The junctions between walls and floors must be coved or provided with a sealed, easily cleaned joint

D Walls and partitions must be of smooth, impervious material, free from cracks or open joints

E Lockers must be set either on solid masonry bases four inches high or on legs with the bottom of the locker at least ten inches above the floor Lockers must be vented.

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3600 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3650 TOILETS, LAVATORIES, SHOWERS, AND DRESSING ROOMS.

Subpart 1 **General.** Toilets, showers, and dressing rooms must be conveniently available to pool patrons.

A Toilets, showers, and dressing rooms may be in a nearby toiletroom, locker room, or, if conveniently available, withm the living units of an apartment building, hotel, or similar occupancy.

B Toilet, shower, lavatory, and locker and other ancillary facilities must be maintained in a sanitary condition to preclude the possibility of spreading pathogens to the pool

C When toilet facilities are accessible to pool patrons in the pool area, each toilet facility must include showers which permit nude showering within each toilet facility

D At least one shower must be provided which is conveniently located to permit a shower before entering any pool when sauna or exercise facilities are provided.

Subp. 2 **Ratios.** Toilet, handwashing, and shower facilities must be provided according to the following schedule

	First 300 males	First 300 females	Additional males over 300	Additional females over 300
Water closets	1/100	1/50	1/200	1/100
Urinals	1/100	—	1/200	—
Lavatories	1/100	1/100	1/200	1/200
Showers	1/50	1/50	1/50	1/50

Subp 3 **Additional fixtures.** Additional sanitation fixtures must be provided for pool facilities with extensive deck areas or facilities that provide other functions m accordance with the sanitation fixture requirements in the state building code.

Subp 4 **Shower temperature.** Showers must be supplied with water at a temperature of at least 90 degrees Fahrenheit at a rate of at least 2.0 gallons per minute Thermostatic, tempering, or mixing valves must be installed if necessary to prevent water temperatures in excess of 130 degrees

Subp 5 **Layout.** Pool users leaving the dressing room must pass the showers last in route to the pool

Subp 6 **Floor finish.** The floor finish between the toilet and shower areas and the pool must be nonslip and nonabsorbent.

Subp 7 **Wading pool exception.** On–site showers are not required for freestanding wading pools if a free chlorine residual of at least two parts per million is maintained in the pool and the owner of the pool requests that on–site showers not be required.

Subp 8 **Lighting.** Lighting for toilet, shower, and locker facilities must provide at least ten footcandles illumination measured at floor level

Statutory Authority: *MS s 144 05, 144.12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3675 DRINKING FOUNTAINS.

Drinking fountains must be provided in the pool area for pools over 1,600 square feet

Statutory Authority: *MS s 144 05, 144.12, 144 123, 145A 02; 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3700 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3750 STANDARDS FOR POOLS WITH DIVING.

The dimensions of the pool and appurtenances in a diving area must meet the standards in this part

A. There must be a completely unobstructed clear distance of 16 feet above the diving board measured from the center of the front end of the board This area must extend at least eight feet behind, eight feet to each side, and 16 feet ahead of the measuring point

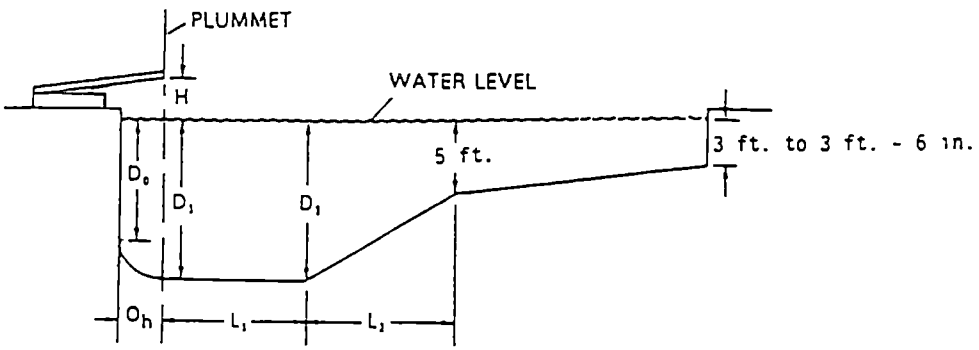
B Pools used for competitive diving must provide pool depths compatible with the level of competition anticipated

C Diving is not permitted, except in areas which conform to the minimum dimensions specified in this part

D The dimensions of the diving area in all pools must conform to the minimum dimensions specified in this part

				Lengths		
Height of Diving Board	Water Depths		Minimum Overhang	Length of Diving Well	Run–out	
H	D_o	D_1		O_h	L_1	L_2
Deck Level or no board	6 ft	8 5 ft		3 ft	12 ft.	10 5 ft.
1 m	6 ft	10 ft.	5 ft	12 ft.	15 ft.	
3 m	6 ft	12 ft.	5 ft	13 ft	21 ft	

Height of Diving Board	Water Depths		Clearances: Adjacent Board's Center–to–Center	Clearances: Center of Board to Sidewall
H	D_o	D_1		
Deck Level or no board	6 ft	8 5 ft	10 ft.	10 ft.
1 m	6 ft	10 ft	10 ft.	10 ft
3 m	6 ft	12 ft	10 ft.	12 ft.



Statutory Authority: *MS s 144 05, 144 12, 144.123, 145A 02; 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3800 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3850 SPA POOLS.

Subpart 1 **Applicability.** Spa pools must comply with parts 4717 0150 to 4717 3975, except as modified in this part

Subp. 2 **Recirculation rate.** The recirculation system must recirculate a water volume equal to the pool volume in 30 minutes or less, except that a minimum rate of 35 gallons per minute is required

Subp 3 **Inlets.** The recirculation system must have at least two remote inlets to the pool.

Subp. 4. **Main drain.** The main drain must consist of

A. a grate–covered bottom opening at least 100 square inches in size, or

B a bottom opening with an antivortex cover

Subp 5 **Agitation system.** The agitation system must have a separate pump If sidewall suction fittings are used, at least two inlets, remotely located, must be provided

Subp 6 **Timer.** The agitation system must be controlled by a timer with the control switch accessible to pool users but at least five feet from the pool The maximum time setting must be 15 minutes

Subp 7 **Access.** Access to a spa pool must be provided according to this subpart.

A Access to the pool must be provided by an unobstructed deck, at the pool elevation, which extends at least five feet from the pool around the entire perimeter.

B Where a deck cannot be provided as specified in item A, a five–foot wide deck at the pool elevation must extend along at least 25 percent of the pool perimeter The remaining perimeter must be one foot or less to a wall, partition, or other effective barrier to restrict access The deck must provide complete and unobstructed access to the steps in the pool.

C Where access is provided by sitting on the edge of a raised pool and swinging the legs into the pool

(1) the deck requirement in item A or B must be met,

(2) the pool must be no less than 18 inches nor more than 20 inches above the deck,

(3) steps with equal risers and 12–inch minimum treads must be provided outside the pool which line up with the steps inside the pool, and

(4) the pool edge must not exceed 12 inches in width

Subp 8. **Steps.** The requirements for steps in this subpart apply to spa pools

A Steps for access to an elevated spa pool must have a handrail and a finished surface that meets the requirements for decks in part 4717.3350

B Steps withm manufactured spa pools may vary from the dimensions in part 4717 3250, subpart 2, if the commissioner determines that the design is safe.

Subp 9 **Disinfectant.** The disinfection residual must be maintained m accordance with part 4717 1750, subpart 4

Subp 10 **Signs.** In addition to the signs required in parts 4717 1050, 4717.1250, 4717 1350, and 4717 1650 signs with the warnings m items A to C must be posted and plainly visible m the spa pool area

A. Pregnant women, small children, or persons with heart disease, diabetes, high blood pressure, or low blood pressure should not enter the spa except under advice of a physician

B Avoid use while under the influence of alcohol or drugs.

C. Exposure may result m nausea, dizziness, or fainting Observe a reasonable time limit.

Statutory Authority: *MS s 144 05, 144.12, 144.123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3870 POOL SLIDES.

Subpart 1 **General.** All slides used at a pool must be specifically designed and intended for use with a pool, and for use as a slide

Subp 2 **Standard pool slide.** Standard pool slides must meet the Consumer Product Safety Commission Standard "Safety Standard for Swimming Pool Slides," Code of Federal Regulations, title 16, part 1207, as amended through December 18, 1978

Subp 3 **Slides in wading pools.** Slides for use by children in wading pools must be designated by the manufacturer for use in 24 inches or less of water, and installed accordingly

Subp. 4. **Drop Slides.** A slide other than a standard pool slide that discharges to a pool with a drop of more than two inches to the water surface must meet the requirements in this subpart

A At least one attendant must be continuously present observing the slide and controlling its use

B Slide entry areas must be designed so the rider is able to properly enter and position before sliding down the chute This area must be a platform or flat portion of the chute with assist bars.

C Handrails must be present on both sides of the ladder or steps. Platforms and landings must have 42–inch high guardrails, with at least one mtermediate–height rail.

D A landing area must be provided that extends five feet on either side of the center line of the slide and from the back wall to 20 feet in front of the slide terminus

(1) The landing area must not infringe on the required landing area for any other slide or diving equipment

(2) The landing area must be separated from the rest of the pool

(3) A slide mounted in a separate diving area may be allowed to use the separate diving area if access to the diving well is restricted to patrons using the slide and diving equipment

E Each slide must have a separate dedicated ladder or stair to exit the pool

F. The terminus of the slide chute must extend beyond the pool wall and be so oriented that the landing area in front of the slide does not interfere with the landing area of another slide or other pool equipment

G The maximum angle of the slide runway at the exit must be between zero degrees and 11 degrees, measured downward from horizontal

H The area from the slide terminus outward to six feet in front of the slide terminus must have a depth as specified in this item

(1) The slide must provide for the entrance of the rider into the water in this six-foot area

(2) If the depth of the terminus area is five feet or less, the bottom of this area must have a maximum slope of one inch in 12 inches and the slide must be located at least five feet from any change to steeper slope of the pool bottom.

(3) If the slide exit is 12 inches or less above the water, the water depth from the slide terminus to six feet in front of the terminus must be in the four to five feet range

(4) If the slide exit is more than 12 inches above the water, the water depth from the slide terminus to six feet in front of the terminus must be at least eight feet.

I The maximum drop height at the terminus of the slide must not exceed 42 inches

J If water is pumped from a pool to the slide, the pump intake must be enclosed or constructed to prevent injury or entrapment of pool users Intake velocity must not exceed 1-1/2 feet per second

K Slides must be located and constructed to allow easy supervision When a slide is not supervised, or not open for use, it must be secured to prevent access

L The slide must have posted a set of rules that include the requirements in subitems (1) to (6)

(1) One rider at a time Wait until the landing area is clear before entering the slide

(2) Slide in a sitting position or on the back only

(3) Do not attempt to stop on the slide

(4) Leave plunge area immediately

(5) WARNING Water depth is feet.

(6) Nonswimmers not permitted (If landing area water depth is over five feet)

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3875 FLUME WATER SLIDES.

Subpart 1 **Applicability.** A flume water slide facility must comply with parts 4717 0150 to 4717 3975, except as modified in this part

Subp 2 **Attendant required.** When the flume is in use, at least one attendant must be continuously present, observing the flume and controlling its use

Subp 3 **Discharge pool.** A flume must discharge to a dedicated plunge pool or dedicated area of a pool with a separate ladder or stairs

A The pool's operating water depth at the end of the flume must be no less than three feet and no more than three feet six inches

B. The depth specified in item A must be maintained in front of the flume's discharge point for a distance of at least ten feet

C Steps with handrails or a ladder must be provided at the exit from the pool

Subp 4 **Flume exit design.** The exit end of the flume must be perpendicular to the plunge pool wall for a distance of at least ten feet

A The flume must terminate no more than six inches below the pool operating water surface level and no more than two inches above the pool operating water surface level

B The side of the exit end of the flume must be at least four feet from the side of the pool wall

C The distance between the sides of any adjacent flume exit must be at least six feet.

D The distance between a flume exit end and the opposite side of the pool must be at least 20 feet

Subp 5 **Water reservoirs.** Water pumped to the top of a flume must be pumped from a reservoir connected to the pool.

A The reservoir must be inaccessible to patrons

B. The reservoir must be secured to prevent unauthorized access

C Intakes must enable cleaning and be designed to prevent entrapment of patrons

D Where any entrance to a pump reservoir presents an underwater obstruction, patron access to that area must be prevented

E. Water inlet velocity to the reservoir must not exceed 1–1/2 feet per second

Subp 6 **Pump valves.** Each flume pump discharge pipe must have a check valve The volume of water in the pool during use and shutdown of any flume pump must permit proper operation of the recirculation system

Subp 7 **Dedicated plunge pools.** The recirculation system for a dedicated plunge pool must recirculate the water in accordance with part 4717.2560, subpart 4

Subp 8 **Walkway, stairs, and platform surfaces.** Walkways from the pool deck to the top of the flume or tower, the tower stairs, and platforms must have finished surfaces which meet the requirements for decks in part 4717.3350.

Subp 9 **Fencing.** Fencing complying with part 4717 1550 or other enclosure must encompass the pool deck, walkways, and flume access

Subp 10 **Flume plan content; certification.** Flume design plans must include

A. flume construction and layout details,

B flume support structure details,

C. tower structure, stair, and platform details, and

D all related construction details

Flume support and tower structure plans must be certified by a registered engineer or approved by a local building official for structural integrity

Subp 11 **Signs.** A legible sign with the warnings in this subpart must be located at the entrance to each flume slide

A Do not use this slide while under the influence of alcohol or drugs.

B Follow the instructions of the flume attendant.

C No running, standing, kneeling, rotating, tumbling, or stopping in the flume

D Only one person at a time.

E Keep your hands inside the flume

F No diving from the flume

G Leave the flume pool promptly after entering.

Statutory Authority: *MS s 144 05, 144 12; 144.123, 145A.02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3900 [Repealed, 19 SR 1419, 19 SR 1637]

4717.3950 WAVE POOLS.

Subpart 1 **Applicability.** Wave pools must comply with parts 4717 0150 to 4717 3975, except as modified in this part.

Subp 2 **Lifeguard required.** When the wave pool is in use.

A the minimum number of lifeguards who must be continuously present must be one for every 2,000 square feet of pool surface water where the pool depth is greater than two feet, and

B. where the design, configuration, or operation requires additional lifeguards to provide complete observation of the entire pool they must be provided in addition to those required in item A

Subp 3 **Water depth.** Water depth may reduce to zero at the shallow end of the pool to allow for dissipation of the waves

Subp 4 **Access barriers.** In addition to the fencing required in part 4717 1550, a safety barrier of stanchions and ropes or a similar barrier at least 42 inches high must be located to prevent pool patrons from entering the pool at any location other than at the zero water depth end. The barrier must have at least one intermediate height rope

Subp. 5 **Emergency shut off.** An emergency shut off for wave generation must be provided at every lifeguard chair or station

Subp 6 **Wave strength.** The wave generating equipment must not be capable of producing waves that could cause pool users to have contact with the pool bottom in a manner which may cause injury

Subp 7 **Overflow gutters.** Overflow gutters may be omitted along the side of a pool with the wave generating equipment

A If overflow gutters are not provided on the pool side where the wave generating equipment is located, effective skimming devices are required and must be designed and maintained to function continuously during all periods when waves are not generated.

B Overflow gutters are required on the sides of the pool where the wave generating equipment is not installed

C A gutter is required along the zero depth end of the pool

Subp 8 **Decks.** Deck areas accessible to pool users may be omitted along the side of the pool with the wave generating equipment

Subp 9 **Recirculation system.** The recirculation system must operate at a rate equivalent to recirculating the total volume of water in the pool in four hours or less A system of bottom inlets must be provided in the shallow end

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.3970 POOL CLOSURE.

When any of the conditions in items A to E are found, a public pool must be immediately closed to use when so ordered by the commissioner The owner of the pool or the owner's agent must place a sign at the entrance to the pool indicating that the pool is closed. The pool must remain closed until the condition is corrected and approval to reopen is granted by the commissioner. A pool must be closed when

A the units of lifesaving equipment specified in part 4717 1450 are not provided,

B the water clarity standard specified m part 4717 1750, subpart 7, is not met,

C the disinfection residual specified in part 4717 1750 subpart 3, is not met,

D the pool has been constructed or physically altered without approval of plans as required by part 4717 0450, or

E there is any condition that endangers the health or safety of the public

Statutory Authority: *MS s 144 05, 144 12, 144.123, 145A 02, 157 01*

History: *19 SR 1419; 19 SR 1637*

4717.3975 VARIANCE.

The commissioner shall grant a variance to parts 4717 0100 to 4717 3950 only according to the procedures and criteria specified in parts 4717 7000 to 4717 7050

Statutory Authority: *MS s 144 05, 144 12; 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

4717.7000 VARIANCE REQUEST.

Subpart 1 **Request.** A party may ask the commissioner of health to grant a variance from the following rules.

[For text of items A to K, see M R]

L public swimming pools, parts 4717 0150 to 4717 3975,

[For text of items M to P, see M R]

[For text of subps 2 and 3, see M R]

Statutory Authority: *MS s 144 05, 144 12, 144 123, 145A 02, 157 01*

History: *19 SR 1419, 19 SR 1637*

HEALTH RISK LIMITS

4717.7100 PURPOSE.

Parts 4717 7100 to 4717 7800 establish the factors and methods used to calculate health risk limits and use those factors and methods to calculate the health risk limit numbers for substances found to degrade Minnesota groundwater Minnesota Statutes, section 103H 201, indicates that health risk limits be calculated as human health–based groundwater standards.

Statutory Authority: *MS s 103H 201*

History: *18 SR 1340*

4717.7150 DEFINITIONS.

Subpart 1 **Scope.** For the purposes of parts 4717 7100 to 4717 7800, the terms in this part have the meanings given them

Subp 2 **Carcinogen.** "Carcinogen" means a substance or chemical listed by the United States Environmental Protection Agency as a human carcinogen or a probable human carcinogen according to the "EPA Classification System for Categorizing Weight of Evidence for Carcinogenicity from Human and Animal Studies" contained in The Risk Assessment Guidelines of 1986, published by the United States Environmental Protection Agency August 1987 by the Office of Health and Environmental Assessment, Washington, D C A carcinogen does not include a possible human carcinogen

Subp. 3 **Chemical abstract service registry number or CAS RN.** "Chemical abstract service registry number" or "CAS RN" means the chemical abstract service registry number assigned to a chemical by the Chemical Abstracts Service, a division of the American Chemical Society, 2540 Olentangy River Road, Box 3012, Columbus, Ohio 43210 The chemical abstract service registry numbers are incorporated by reference CAS RNs are published by the Chemical Abstracts Service in the Registry Handbook–Common Names, which is available through the Minitex interlibrary loan system and is updated annually

Subp 4 **Health risk limit or HRL.** "Health risk limit" or "HRL" has the meaning given in Minnesota Statutes, section 103H 005, subdivision 3

Subp 5 [Repealed, 19 SR 1191]

Subp 6 **Possible human carcinogen.** "Possible human carcinogen" means a substance or chemical listed by the United States Environmental Protection Agency as a possible human carcinogen according to the "EPA Classification System for Categorizing Weight of Evidence for Carcinogenicity from Human and Animal Studies" contained in The Risk Assessment Guidelines of 1986, published by the United States Environmental Protection Agency August 1987 by the Office of Health and Environmental Assessment, Washington, D C

Subp 7 **Reference dose or RfD.** "Reference dose" or "RfD" means the dose of a substance or chemical that is unlikely to cause toxic effects in humans who are exposed to this dose daily over a lifetime The RfD is expressed in units of milligrams of the substance or chemical per kilogram of body weight per day

Subp 8 **Relative source contribution or RSC.** "Relative source contribution" or "RSC" means the percent of total exposure to a substance or chemical, including air and food, that comes from ingesting water listed as the relative source contribution or RSC by the United States Environmental Protection Agency, and specified in part 4717 7200, subpart 2, items C and D

Subp 9 **Slope factor or potency slope.** "Slope factor" or "potency slope" means the measure of potency for carcinogens This number is projected from a mathematical extrapo-

lation model that uses data for each carcinogen It is expressed as the cancer risk per unit dose in units of the inverse of milligrams of the substance or chemical per kilogram of body weight per day.

Subp. 10 **Systemic toxicant.** "Systemic toxicant" means a substance or chemical not defined in this part as a carcinogen Systemic toxicants include possible human carcinogens

Subp 11 **Uncertainty factor or UF.** "Uncertainty factor" or "UF" means the numerical factor listed by the United States Environmental Protection Agency, and specified in part 4717 7200, subpart 4, items B and C, that is incorporated into the equation specified in part 4717.7200, subpart 4, to account for the possible carcinogenic effects of a substance or chemical.

Statutory Authority: *MS s 103H 201*

History: *18 SR 1340; 19 SR 1191*

4717.7200 HEALTH RISK LIMITS FOR SYSTEMIC TOXICANTS.

Subpart 1 **Scope.** This part establishes the method for determining the health risk limit for a systemic toxicant.

Subp 2 **Equation for systemic toxicants other than nitrate (as nitrogen) or possible human carcinogens.** The equation for determining the health risk limit for a systemic toxicant other than nitrate (as nitrogen) or a possible human carcinogen is.

$$HRL = \frac{(RfD)(70)(RSC)(1{,}000)}{(2)}$$

Where:

A HRL is expressed in microgram or micrograms per liter

B (70) is the standard weight of an adult expressed in kilograms

C The RSC for substances or chemicals not listed in item D shall be 0 2

D The RSC for the following substances or chemicals is

Name	CAS RN	RSC
(1) antimony	7440–36–0	0 4
(2) barium	7440–39–3	0 8
(3) cadmium	7440–43–9	0 25
(4) chromium III	16065–83–1	0 7
(5) chromium VI	18540–29–9	0 7
(6) manganese	7439–96–5	0 8

E (1,000) is a factor used to convert the units of concentration from milligrams per liter to micrograms per liter There are 1,000 micrograms per milligram.

F. (2) is the standard amount of water ingested by an adult expressed in liters per day

Subp 3 **Equation for nitrate (as nitrogen).** The equation for determining the health risk limit for nitrate (as nitrogen) is·

$$HRL = \frac{(RfD)(4)(1{,}000)}{(0\ 64)}$$

Where·

A. HRL and (1,000) have the meanings given in subpart 2

B (4) is the standard weight of an infant up to three months of age expressed in kilograms.

C. (0 64) is the standard amount of water used to prepare formula for an infant up to three months of age expressed m liters per day

Subp 4 **Equation for possible human carcinogens.** The equation for determining the health risk limit for a possible human carcinogen that has an RfD is

$$HRL = \frac{(RfD)(70)(RSC)(1,000)}{(2)(UF)}$$

Where

A HRL, (70), (RSC), (2), and (1,000) have the meanings given in subpart 2

B The UF for possible carcinogens not listed in item C is ten

C The UF for 1,1,1,2–tetrachloroethane (CAS RN 630–20–6) is three

D If a possible human carcinogen has a slope factor but no RfD, then the health risk limit must be determined using the method in part 4717 7300.

Statutory Authority: *MS s 103H 201*

History: *18 SR 1340, 19 SR 1191*

4717.7300 HEALTH RISK LIMITS FOR CARCINOGENS.

Subpart 1 **Scope.** This part establishes the method for determining the health risk limit for a carcinogen

Subp 2 **Equation for carcinogens.** The equation for determining the health risk limit for a carcinogen is

$$HRL = \frac{(10^{-5})(70)(1,000)}{(\text{Slope factor})(2)}$$

Where

A HRL is expressed in microgram or micrograms per liter

B (10^{-5}) is the lifetime risk level such that no more than one out of every 100,000 people exposed to a substance or chemical over a lifetime would be estimated to develop cancer from that exposure

C (70) is the standard weight of an adult expressed in kilograms

D (1,000) is a factor used to convert the units of concentration from milligrams per liter to micrograms per liter There are 1,000 micrograms per milligram

E (2) is the standard amount of water ingested by an adult expressed in terms of liters per day

Statutory Authority: *MS s 103H 201*

History: *18 SR 1340*

4717.7400 HEALTH RISK LIMITS.

The table of health risk limits in part 4717 7500 lists the health risk limits derived from the methods specified in parts 4717 7200 and 4717 7300. For each substance or chemical listed in the table of health risk limits in part 4717 7500, the table shall specify the.

A chemical or substance name;

B CAS RN,

C reference dose for a systemic toxicant or slope factor for a carcinogen, and

D health risk limit

Statutory Authority: *MS s 103H 201*

History: *18 SR 1340*

4717.7500 TABLE OF HEALTH RISK LIMITS.

Subpart 1 **Generally.** This part contains the table of the health risk limits. For each substance or chemical listed in a subpart, the information required by part 4717.7400 shall be specified in the manner required by this subpart.

CAS RN	RfD* (milligrams per kilogram per day)	Slope factor* (the inverse of milligrams per kilogram per day)	Health Risk Limit (micrograms per liter)
Subp. 2. **Acenaphthene.** Acenaphthene:			
83–32–9	0 06	—	400
Subp 3 **Acetone.** Acetone			
67–64–1	0 1	—	700
Subp 3a. **Alachlor.** Alachlor·			
15972–60–8	—	0 08	4
Subp 4. **Aldicarb.** Aldicarb			
116–06–3	0 0002	—	1
Subp. 4a. **Allyl chloride (3 chloropropene).** Allyl chloride (3 chloropropene)			
107–05–1	0 05 (C)	—	30
Subp. 5. **Anthracene.** Anthracene:			
120–12–7	0.3	—	2,000
Subp 6. **Antimony.** Antimony			
7440–36–0	0 0004	—	6
Subp. 6a **Atrazine.** Atrazine			
1912–24–9	0 035 (C)	—	20
Subp. 7 **Barium.** Barium:			
7440–39–3	0 07	—	2,000
Subp. 8 **Benzene.** Benzene:			
71–43–2	—	0 029	10
Subp. 9. **Benzoic acid.** Benzoic acid:			
65–85–0	4	—	30,000
Subp. 10. **Beryllium.** Beryllium·			
7440–41–7	—	4.3	0.08
Subp. 11 **1,1–Biphenyl (Diphenyl).** 1,1–Biphenyl (Diphenyl).			
92–52–4	0.05	—	300
Subp. 12 **Bis(chloroethyl)ether (BCEE).** Bis(chloroethyl)ether (BCEE):			
111–44–4	—	1 1	0.3
Subp. 13. **Bis(chloromethyl)ether (BCME).** Bis(chloromethyl)ether (BCME)			
542–88–1	—	220	0 002
Subp 14 **Boron.** Boron:			
7440–42–8	0 09	—	600
Subp. 15. **Bromodichloromethane.** Bromodichloromethane·			
75–27–4	—	0.062	6
Subp 16 **Bromoform.** Bromoform·			
75–25–2	—	0 0079	40
Subp. 17. **Bromomethane (Methyl bromide).** Bromomethane (Methyl bromide)			
74–83–9	0.0014	—	10

Subp. 18. **n–Butanol.** n–Butanol.

71–36–3	0.1	—	700

Subp. 19 **Butyl benzyl phthalate.** Butyl benzyl phthalate:

85–68–7	0.2 (C)	—	100

Subp. 20. **Butylphthalyl butylglycolate (BPBG).** Butylphthalyl butylglycolate (BPBG):

85–70–1	1	—	7,000

Subp. 21. **Cadmium.** Cadmium:

7440–43–9	0.0005	—	4

Subp. 22. **Carbon disulfide.** Carbon disulfide:

75–15–0	0.1	—	700

Subp. 23. **Carbon tetrachloride.** Carbon tetrachloride:

56–23–5	—	0.13	3

Subp. 23a. **Chloramben.** Chloramben:

133–90–4	0.015	—	100

Subp. 24. **Chlorobenzene.** Chlorobenzene:

108–90–7	0.02	—	100

Subp. 25 **Chloroform.** Chloroform.

67–66–3	—	0.0061	60

Subp. 26. **2–Chlorophenol.** 2–Chlorophenol:

95–57–8	0.005	—	30

Subp. 26a. **Chlorothalonil.** Chlorothalonil:

1897–45–6	—	0.011	30

Subp. 26b. **Chromium III.** Chromium III:

16065–83–1	1	—	20,000

Subp. 27. **Chromium VI.** Chromium VI:

18540–29–9	0.005	—	100

Subp. 28. **Cumene (Isopropyl benzene).** Cumene (Isopropyl benzene):

98–82–8	0.04	—	300

Subp. 29. **Cyanide, free.** Cyanide, free:

57–12–5	0 02	—	100

Subp. 30. **Dibromochloromethane.** Dibromochloromethane:

124–48–1	0 02 (C)	—	10

Subp. 31. **1,2–Dibromoethane (Ethylene dibromide, EDB).** 1,2–Dibromoethane (Ethylene dibromide, EDB):

106–93–4	—	85	0.004

Subp. 32. **Dibutyl phthalate.** Dibutyl phthalate·

84–74–2	0.1	—	700

Subp. 33. **Dicamba.** Dicamba:

1918–00–9	0.03	—	200

Subp. 34. **1,2–Dichlorobenzene.** 1,2–Dichlorobenzene:

95–50–1	0.09	—	600

Subp. 34a. **1,4–Dichlorobenzene (para).** 1,4–Dichlorobenzene (para):

106–46–7	—	0.024	10

Subp. 35. **3,3'–Dichlorobenzidine.** 3,3'–Dichlorobenzidine:

91–94–1	—	0.45	0.8

Subp. 36. **Dichlorodifluoromethane.** Dichlorodifluoromethane:

75–71–8	0 2	—	1,000

Subp 37. **p,p'–Dichlorodiphenyl dichloroethane (DDD).** p,p'–Dichlorodiphenyl dichloroethane (DDD):

72–54–8	—	0 24	1

Subp 38. **p,p'–Dichlorodiphenyldichloroethylene (DDE).** p,p'–Dichlorodiphenyldichloroethylene (DDE):

72–55–9	—	0 34	1

Subp. 39. **p,p'–Dichlorodiphenyltrichloroethane (DDT).** p,p'–Dichlorodiphenyltrichloroethane (DDT):

50–29–3	—	0.34	1

Subp. 39a. **1,1–Dichloroethane.** 1,1–Dichloroethane:

75–34–3	0.1 (C)	—	70

Subp. 40. **1,2–Dichloroethane.** 1,2–Dichloroethane:

107–06–2	—	0.091	4

Subp. 40a **1,2–Dichloroethylene (cis).** 1,2–Dichloroethylene (cis):

156–59–2	0 01	—	70

Subp 41. **1,1–Dichloroethylene (Vinylidene chloride).** 1,1–Dichloroethylene (Vinylidene chloride):

75–35–4	0 009 (C)	—	6

Subp. 42. **1,2–Dichloroethylene, trans–.** 1,2–Dichloroethylene, trans–:

156–60–5	0.02	—	100

Subp. 43 **Dichloromethane (Methylene chloride).** Dichloromethane (Methylene chloride):

75–09–2	—	0.0075	50

Subp. 44 **2,4–Dichlorophenol.** 2,4–Dichlorophenol

120–83–2	0.003	—	20

Subp. 45. **2,4–Dichlorophenoxyacetic acid (2,4–D).** 2,4–Dichlorophenoxyacetic acid (2,4–D):

94–75–7	0.01	—	70

Subp. 45a. **1,2–Dichloropropane.** 1,2–Dichloropropane

78–87–5	—	0 068	5

Subp. 45b **1,3–Dichloropropene.** 1,3–Dichloropropene.

542–75–6	—	0 18	2

Subp. 46 **Di(2–ethylhexyl)phthalate (DEHP).** Di(2–ethylhexyl)phthalate (DEHP)

117–81–7	—	0 014	20

Subp. 47 **Diethyl phthalate.** Diethyl phthalate.

84–66–2	0.8	—	6,000

Subp 48 **2,4–Dimethylphenol.** 2,4–Dimethylphenol:

105–67–9	0.02	—	100

Subp. 48a. **Dimethylphthalate.** Dimethylphthalate:

131–11–3	10	—	70,000

Subp. 49. **2,4–Dinitrophenol.** 2,4–Dinitrophenol:

51–28–5	0.002	—	10

Subp. 49a. **Disulfoton.** Disulfoton·

298–04–4	0.00004	—	0 3

Subp. 50. **Ethylbenzene.** Ethylbenzene:

100–41–4	0.1	—	700

Subp. 51. **S–Ethyl dipropylthiocarbamate (EPTC).** S–Ethyl dipropylthiocarbamate (EPTC):

759–94–4	0.025	—	200

Subp 52 **Ethyl ether.** Ethyl ether:

60–29–7	0.2	—	1,000

Subp 52a. **Ethylene glycol.** Ethylene glycol·

107–21–1	2	—	10,000

Subp 53. **Fluoranthene.** Fluoranthene:

206–44–0	0 04	—	300

Subp 54 **Fluorene (9H–Fluorene).** Fluorene (9H–Fluorene)

86–73–7	0.04	—	300

Subp 54a. **Formaldehyde.** Formaldehyde:

50–00–0	0.2	—	1,000

Subp. 55 **Heptachlor.** Heptachlor

76–44–8	—	4 5	0.08

Subp 56 **Heptachlor epoxide.** Heptachlor epoxıde:

1024–57–3	—	9 1	0 04

Subp 57 **Hexachlorobenzene.** Hexachlorobenzene

118–74–1	—	1 6	0.2

Subp. 58 **Hexachlorobutadiene.** Hexachlorobutadıene:

87–68–3	0 002 (C)	—	1

Subp 58a. **Hexane (n–hexane).** Hexane (n–hexane):

110–54–3	0 06	—	400

Subp 59 **Isophorone.** Isophorone.

78–59–1	0 2 (C)	—	100

Subp 60. **Linuron.** Lınuron

330–55–2	0.002 (C)	—	1

Subp. 61 **Manganese.** Manganese:

7439–96–5	0.005	—	100

Subp. 61a **Methanol.** Methanol.

67–56–1	0.5	—	3,000

Subp 62 **2–Methyl–4–chlorophenoxyacetic acid (MCPA).** 2–Methyl–4–chlorophenoxyacetic acıd (MCPA)

94–74–6	0 0005	—	3

Subp. 62a. **Methyl ethyl ketone (MEK, 2–butanone).** Methyl ethyl ketone (MEK, 2–butanone).

78–93–3	0 6	—	4,000

Subp 62b. **Methyl isobutyl ketone (MIBK).** Methyl ısobutyl ketone (MIBK):

108–10–1	0 05	—	300

Subp. 63. **2–Methylphenol (o–cresol).** 2–Methylphenol (o–cresol)·

95–48–7	0.05 (C)	—	30

Subp 64 **3–Methylphenol (m–cresol).** 3–Methylphenol (m–cresol):

108–39–4	0.05 (C)	—	30

Subp. 64a. **4–Methylphenol (p–cresol).** 4–Methylphenol (p–cresol)·

106–44–5	0.005 (C)	—	3

Subp. 65. **Metolachlor.** Metolachlor

51218–45–2	0 15 (C)	—	100

Subp. 66. **Metribuzin.** Metrıbuzın·

21087–64–9	0 025	—	200

Subp 66a **Naphthalene.** Naphthalene

91–20–3	0 04	—	300

Subp. 67. **Nickel, soluble salts.** Nickel, soluble salts:

7440–02–0	0.02	—	100

Subp. 68. **Nitrate (as nitrogen).** Nitrate (as nitrogen):

14797–55–8	1.6	—	10,000

Subp. 69. **N–Nitrosodiphenylamine.** N–Nitrosodiphenylamine:

86–30–6	—	0.0049	70

Subp. 70. **Pentachlorophenol.** Pentachlorophenol:

87–86–5	—	0.12	3

Subp. 71. **Phenol.** Phenol:

108–95–2	0.6	—	4,000

Subp. 72 **Picloram.** Picloram:

1918–02–1	0.07	—	500

Subp. 72a. **Polychlorinated biphenyls (PCBs).** Polychlorinated biphenyls (PCBs):

1336–36–3	—	7.7	.04

Subp. 73 **Prometon.** Prometon·

1610–18–0	0.015	—	100

Subp. 74. **Propachlor.** Propachlor:

1918–16–7	0.013	—	90

Subp 75. **Pyrene.** Pyrene:

129–00–0	0.03	—	200

Subp. 76. **Selenium.** Selenium:

7782–49–2	0.005	—	30

Subp. 77. **Silver.** Silver:

7440–22–4	0.005	—	30

Subp. 77a. **Simazine.** Simazine

122–34–9	0.005	—	30

Subp. 78. **1,1,1,2–Tetrachloroethane.** 1,1,1,2–Tetrachloroethane·

630–20–6	0.03 (C)	—	70

Subp. 78a. **1,1,2,2–Tetrachloroethane.** 1,1,2,2–Tetrachloroethane:

79–34–5	—	0 2 (C)	2

Subp 78b. **1,1,2,2–Tetrachloroethylene.** 1,1,2,2–Tetrachloroethylene:

127–18–4	—	0.051	7

Subp. 78c. **Thallium salts.** Thallium salts:

7440–28–0	0.00008	—	0.6

Subp. 78d. **Tin.** Tin:

7440–31–5	0.6	—	4,000

Subp. 79. **Toluene.** Toluene·

108–88–3	0.2	—	1,000

Subp. 80. **Toxaphene.** Toxaphene:

8001–35–2	—	1 1	0.3

Subp. 80a. **1,1,1–Trichloroethane.** 1,1,1–Trichloroethane·

71–55–6	0.09	—	600

Subp. 81. **1,1,2–Trichloroethane.** 1,1,2–Trichloroethane:

79–00–5	0.004 (C)	—	3

Subp. 81a. **1,1,2–Trichloroethylene (TCE).** 1,1,2–Trichloroethylene (TCE):

79–01–6	—	0.011	30

Subp. 82. **Trichlorofluoromethane.** Trichlorofluoromethane:

75–69–4	0.3	—	2,000

Subp 83 **2,4,6–Trichlorophenol.** 2,4,6–Trichlorophenol

88–06–2	—	0 011	30

Subp 84. **2,4,5–Trichlorophenoxyacetic acid (2,4,5–T).** 2,4,5–Trichlorophenoxyacetic acid (2,4,5–T)

93–76–5	0.01	—	70

Subp. 85. **2 (2,4,5–Trichlorophenoxy) propionic acid.** 2 (2,4,5–Trichlorophenoxy) propionic acid:

93–72–1	0.008	—	60

Subp 86. **1,2,3–Trichloropropane.** 1,2,3–Trichloropropane

96–18–4	0.006	—	40

Subp 87 **1,1,2–Trichloro–1,2,2–trifluoroethane.** 1,1,2–Trichloro–1,2,2–trifluoroethane·

76–13–1	30	—	200,000

Subp 88. **1,3,5–Trinitrobenzene.** 1,3,5–Trinitrobenzene.

99–35–4	0.00005	—	0.3

Subp 88a. **Vanadium.** Vanadium·

7440–62–2	0.007	—	50

Subp. 88b **Vinyl chloride.** Vinyl chloride

75–01–4	—	1.9	0.20

Subp 89. **Xylenes (mixture of isomers o, m, p).** Xylenes (mixture of isomers o, m, p)

1330–20–7	2	—	10,000

Subp. 89a. **Zinc.** Zinc

7440–66–6	0 3	—	2,000

Subp 90 **Reference doses and slope factors.** For purposes of this part·

* Substances or chemicals that have a RfD or slope factor annotated with a (C) are classified by the United States Environmental Protection Agency as possible human carcinogens

Statutory Authority: *MS s 103H 201*

History: *18 SR 1340, 19 SR 1191*

4717.7600 HEALTH RISK LIMITS FOR MIXTURES.

Subpart 1. **Definitions.** For the purposes of parts 4717.7600 to 4717 7800, the terms in this part have the meanings given them

Subp. 2. **Groundwater.** "Groundwater" has the meaning given in Minnesota Statutes, section 115.01, subdivision 21.

Subp 3. **Mixture.** "Mixture" means groundwater in which two or more substances or chemicals, for which a health risk limit is specified in part 4717.7500, are detected.

Subp. 4. **Toxic endpoint.** "Toxic endpoint" means.

A the organ or physiological system affected by exposure to a substance or chemical, where the physiological effect is listed in the study or studies used by the United States Environmental Protection Agency to calculate a reference dose specified in part 4717 7500, or

B cancer for a chemical or substance that is identified as a carcinogen.

Toxic endpoints include, but are not limited to, cancer, cardiovascular system, developmental effects, endocrine system, eyes, hematologic system, immune system, kidney, liver, male reproductive system, nervous system, and stomach

Statutory Authority: *MS s 103H.201*

History: *18 SR 1340*

4717.7650 TOXIC ENDPOINTS.

Subpart 1. **Scope.** The toxic endpoints specified for each substance or chemical for which a health risk limit is specified in part 4717 7500 are listed in this part. Each subpart contains the chemical name, the CAS RN, and the toxic endpoint or endpoints.

Subp 2 **Acenaphthene.** Acenaphthene, 83–32–9, liver

Subp 3. **Acetone.** Acetone, 67–64–1, kidney.

Subp 3a **Alachlor.** Alachlor, 15972–60–8, cancer

Subp. 4 **Aldicarb.** Aldicarb, 116–06–3, nervous system

Subp 4a **Allyl chloride (3 chloropropene).** Allyl chloride (3 chloropropene), 107–05–1, nervous system

Subp. 4b. **Atrazine.** Atrazine, 1912–24–9, cardiovascular system.

Subp 5. **Barium.** Barium, 7440–39–3, cardiovascular system

Subp. 6 **Benzene.** Benzene, 71–43–2, cancer

Subp 7. **Beryllium.** Beryllium, 7440–41–7, cancer

Subp 8 **1,1–Biphenyl (Diphenyl).** 1,1–Biphenyl (Diphenyl), 92–52–4, kidney

Subp 9 **Bis(chloroethyl)ether (BCEE).** Bis(chloroethyl)ether (BCEE), 111–44–4, cancer

Subp. 10 **Bis(chloromethyl)ether (BCME).** Bis(chloromethyl)ether (BCME), 542–88–1, cancer

Subp 11 **Boron.** Boron, 7440–42–8, male reproductive system.

Subp 12 **Bromodichloromethane.** Bromodichloromethane, 75–27–4, cancer

Subp. 13 **Bromoform.** Bromoform, 75–25–2, cancer.

Subp 14 **Bromomethane (Methyl bromide).** Bromomethane (Methyl bromide), 74–83–9, stomach

Subp 15 **n–Butanol.** n–Butanol, 71–36–3, nervous system

Subp 16 **Cadmium.** Cadmium, 7440–43–9, kidney.

Subp. 17. **Carbon disulfide.** Carbon disulfide, 75–15–0, developmental effects.

Subp 18 **Carbon tetrachloride.** Carbon tetrachloride, 56–23–5, cancer

Subp. 18a **Chloramben.** Chloramben, 133–90–4, liver

Subp. 19 **Chlorobenzene.** Chlorobenzene, 108–90–7, liver

Subp. 20 **Chloroform.** Chloroform, 67–66–3, cancer.

Subp 21. **2–Chlorophenol.** 2–Chlorophenol, 95–57–8, developmental effects

Subp 21a **Chlorothalonil.** Chlorothalonil, 1897–45–6, cancer

Subp 22. **Cyanide, free.** Cyanide, free, 57–12–5, endocrine system, nervous system.

Subp. 23 **Dibromochloromethane.** Dibromochloromethane, 124–48–1, liver.

Subp. 24 **1,2–Dibromoethane (Ethylene dibromide, EDB).** 1,2–Dibromoethane (Ethylene dibromide, EDB), 106–93–4, cancer

Subp 25 **Dicamba.** Dicamba, 1918–00–9, developmental effects

Subp 26 **1,2–Dichlorobenzene.** 1,2–Dichlorobenzene, 95–50–1, liver

Subp 26a **1,4–Dichlorobenzene (para).** 1,4–Dichlorobenzene (para), 106–46–7, cancer

Subp. 27. **3,3'–Dichlorobenzidine.** 3,3'–Dichlorobenzidine, 91–94–1, cancer.

Subp 28 **p,p'–Dichlorodiphenyl dichloroethane (DDD).** p,p'–Dichlorodiphenyl dichloroethane (DDD), 72–54–8, cancer.

Subp 29. **p,p'–Dichlorodiphenyldichloroethylene (DDE).** p,p'–Dichlorodiphenyldichloroethylene (DDE), 72–55–9, cancer.

Subp 30 **p,p'–Dichlorodiphenyltrichloroethane (DDT).** p,p'–Dichlorodiphenyltrichloroethane (DDT), 50–29–3, cancer.

Subp. 30a. **1,1–Dichloroethane.** 1,1–Dichloroethane, 75–34–3, kidney.

Subp 31 **1,2–Dichloroethane.** 1,2–Dichloroethane, 107–06–2, cancer.

Subp 32. **1,1–Dichloroethylene (Vinylidene chloride).** 1,1–Dichloroethylene (Vinylidene chloride), 75–35–4, liver

Subp 32a **1,2–Dichloroethyene (cis).** 1,2–Dichloroethyene (cis), 156–59–2, hematologic system

Subp. 33. **Dichloromethane (Methylene chloride).** Dichloromethane (Methylene chloride), 75–09–2, cancer

Subp 34 **2,4–Dichlorophenol.** 2,4–Dichlorophenol, 120–83–2, immune system

Subp. 35 **2,4–Dichlorophenoxyacetic acid (2,4–D).** 2,4–Dichlorophenoxyacetic acid (2,4–D), 94–75–7, hematologic system, kidney, liver

Subp. 35a **1,2–Dichloropropane.** 1,2–Dichloropropane, 78–87–5, cancer

Subp. 35b. **1,3–Dichloropropene.** 1,3–Dichloropropene, 542–75–6, cancer

Subp 36. **Di(2–ethylhexyl)phthalate (DEHP).** Di(2–ethylhexyl)phthalate (DEHP), 117–81–7, cancer.

Subp 37 **2,4–Dimethylphenol.** 2,4–Dimethylphenol, 105–67–9, hematologic system, nervous system

Subp. 37a. **Dimethylphthalate.** Dimethylphthalate, 131–11–3, kidney

Subp 38 **2,4–Dinitrophenol.** 2,4–Dinitrophenol, 51–28–5, eyes.

Subp 38a **Disulfoton.** Disulfoton, 298–04–4, nervous system.

Subp 39 **Ethylbenzene.** Ethylbenzene, 100–41–4, kidney, liver.

Subp 40. **S–Ethyl dipropylthiocarbamate (EPTC).** S–Ethyl dipropylthiocarbamate (EPTC), 759–94–4, cardiovascular system, nervous system.

Subp. 40a **Ethylene glycol.** Ethylene glycol, 107–21–1, kidney

Subp. 41 **Fluoranthene.** Fluoranthene, 206–44–0, kidney, liver

Subp 42. **Fluorene (9H–Fluorene).** Fluorene (9H–Fluorene), 86–73–7, hematologic system

Subp 42a. **Formaldehyde.** Formaldehyde, 50–00–0, stomach

Subp 43 **Heptachlor.** Heptachlor, 76–44–8, cancer

Subp 44. **Heptachlor epoxide.** Heptachlor epoxide, 1024–57–3, cancer.

Subp 45 **Hexachlorobenzene.** Hexachlorobenzene, 118–74–1, cancer

Subp 46 **Hexachlorobutadiene.** Hexachlorobutadiene, 87–68–3. kidney

Subp. 46a **Hexane (n–hexane).** Hexane (n–hexane), 110–54–3, nervous system.

Subp 47. **Isophorone.** Isophorone, 78–59–1, kidney.

Subp. 48. **Linuron.** Linuron, 330–55–2, hematologic system

Subp 49 **Manganese.** Manganese, 7439–96–5, nervous system

Subp. 49a. **Methanol.** Methanol, 67–56–1, liver, nervous system.

Subp. 50 **2–Methyl–4–chlorophenoxyacetic acid (MCPA).** 2–Methyl–4–chlorophenoxyacetic acid (MCPA), 94–74–6, kidney, liver

Subp. 50a. **Methyl ethyl ketone (MEK,2–butanone).** Methyl ethyl ketone (MEK,2–butanone), 78–93–3, developmental effects

Subp 50b. **Methyl isobutyl ketone (MIBK).** Methyl isobutyl ketone (MIBK), 108–10–1, kidney, liver

Subp 51 **2–Methylphenol, (o–cresol).** 2–Methylphenol, (o–cresol), 95–48–7, nervous system

Subp 52 **3–Methylphenol, (m–cresol).** 3–Methylphenol, (m–cresol), 108–39–4, nervous system.

Subp. 53 **Metolachlor.** Metolachlor, 51218–45–2, developmental effects.

Subp 54. **Metribuzin.** Metribuzin, 21087–64–9, kidney, liver

Subp. 55 **Nitrate (as nitrogen).** Nitrate (as nitrogen), 14797–55–8, hematologic system.

Subp. 56. **N–Nitrosodiphenylamine.** N–Nitrosodiphenylamine, 86–30–6, cancer

Subp. 57 **Pentachlorophenol.** Pentachlorophenol, 87–86–5, cancer

Subp 58 **Phenol.** Phenol, 108–95–2, developmental effects.

Subp 59. **Picloram.** Picloram, 1918–02–1, liver.

Subp. 59a. **Polychlorinated biphenyls (PCBs).** Polychlorinated biphenyls (PCBs), 1336–36–3, cancer.

Subp. 60. **Pyrene.** Pyrene, 129–00–0, kidney.

Subp. 60a **Simazine.** Simazine, 122–34–9, hematologic system

Subp. 61. **1,1,1,2–Tetrachloroethane.** 1,1,1,2–Tetrachloroethane, 630–20–6, kidney, liver

Subp 61a **1,1,2,2–Tetrachloroethane.** 1,1,2,2–Tetrachloroethane, 79–34–5, cancer.

Subp. 61b **1,1,2,2–Tetrachloroethylene.** 1,1,2,2–Tetrachloroethylene, 127–18–4, cancer

Subp. 61c. **Thallium salts.** Thallium salts, 7440–28–0, liver

Subp. 61d. **Tin.** Tin, 7440–31–5, kidney, liver

Subp. 62. **Toluene.** Toluene, 108–88–3, kidney, liver.

Subp 63. **Toxaphene.** Toxaphene, 8001–35–2, cancer.

Subp 63a. **1,1,1–Trichloroethane.** 1,1,1–Trichloroethane, 71–55–6, liver.

Subp. 64 **1,1,2–Trichloroethane.** 1,1,2–Trichloroethane, 79–00–5, immune system.

Subp. 64a **1,1,2–Trichloroethylene (TCE).** 1,1,2–Trichloroethylene (TCE), 79–01–6, cancer

Subp. 65. **2,4,6–Trichlorophenol.** 2,4,6–Trichlorophenol, 88–06–2, cancer

Subp 66. **2,4,5–Trichlorophenoxyacetic acid (2,4,5–T).** 2,4,5–Trichlorophenoxyacetic acid (2,4,5–T), 93–76–5, developmental effects, hematologic system.

Subp. 67. **2 (2,4,5–Trichlorophenoxy) propionic acid.** 2 (2,4,5–Trichlorophenoxy) propionic acid, 93–72–1, liver.

Subp 68 **1,2,3–Trichloropropane.** 1,2,3–Trichloropropane, 96–18–4, hematologic system, kidney, liver.

Subp 68a. **Vinyl chloride.** Vinyl chloride, 75–01–4, cancer.

Subp. 69 **Xylenes (mixture of isomers o, m, p).** Xylenes (mixture of isomers o, m, p), 1330–20–7, nervous system.

Statutory Authority: *MS s 103H.201*

History: *18 SR 1340, 19 SR 1191*

4717.7700 PROCEDURE FOR DETERMINING IF THE HEALTH RISK LIMIT FOR A MIXTURE OF CARCINOGENS IS EXCEEDED.

To determine if the health risk limit for a mixture of carcinogens is exceeded, a hazard index must be calculated using the procedure in this part.

A. A hazard index shall be determined for substances or chemicals with a toxic endpoint of cancer as specified in part 4717.7650 using the following equation.

$$\text{Hazard index} = \frac{E_{C1}}{HRL_{C1}} + \frac{E_{C2}}{HRL_{C2}} + . + \frac{E_{Cn}}{HRL_{Cn}}$$

Where

(1) E_{Cn} represents the concentration of the first, second, . ., nth carcinogen detected in groundwater; and

(2) HRL_{Cn} represents the health risk limit of the first, second, ..., nth carcinogen as specified in part 4717 7500.

B. A hazard index of one indicates a lifetime risk level of one in 100,000

C. A hazard index of one equals the health risk limit

D. A hazard index greater than one exceeds the health risk limit.

Statutory Authority: *MS s 103H.201*

History: *18 SR 1340*

4717.7750 PROCEDURE FOR DETERMINING IF THE HEALTH RISK LIMIT FOR A MIXTURE OF SYSTEMIC TOXICANTS IS EXCEEDED.

To determine if the health risk limit for a mixture of systemic toxicants is exceeded, a hazard index must be calculated using the procedure in this part.

A. The substances or chemicals detected in the groundwater must be grouped by toxic endpoint as specified in part 4717 7650.

B When two or more substances or chemicals have the same toxic endpoint, a hazard index must be determined for each group of substances or chemicals with the same toxic endpomt using the following equation

$$\text{Hazard index} = \frac{E_{ST1}}{HRL_{ST1}} + \frac{E_{ST2}}{HRL_{ST2}} + \; + \frac{E_{STn}}{HRL_{STn}}$$

Where.

(1) E_{STn} represents the concentration of the first, second, . , nth systemic toxicant detected in groundwater; and

(2) HRL_{STn} represents the health risk limit of the first, second, ., nth systemic toxicant as specified in part 4717 7500

C. A hazard index of one equals the health risk limit

D A hazard index greater than one exceeds the health risk limit

Statutory Authority: *MS s 103H 201*

History: *18 SR 1340*

4717.7800 REVISION OF PARTS 4717.7500 and 4717.7650.

Subpart 1 **Scope.** This part specifies the conditions under which parts 4717.7500 and 4717 7650 shall be revised

Subp 2 **Revising a health risk limit or toxic endpoint.** The department shall revise a health risk limit for a chemical or substance specified in part 4717.7500 or a toxic endpomt specified in part 4717.7650 under the procedures described in subpart 5 if·

A. the RfD or slope factor listed in part 4717.7500 is revised and listed by the United States Environmental Protection Agency;

B the RSC specified m part 4717.7200, subpart 2, item C or D, is revised and listed by the United States Environmental Protection Agency,

C the UF specified in part 4717 7200, subpart 4, item B or C, is revised and listed by the United States Environmental Protection Agency,

D the classification of a substance or chemical is changed from carcinogen to systemic toxicant and the RfD for the substance or chemical is listed by the United States Environmental Protection Agency,

E the classification of a substance or chemical is changed from systemic toxicant to carcinogen and the slope factor for the substance or chemical is listed by the United States Environmental Protection Agency;

F the United States Environmental Protection Agency reclassifies a systemic toxicant as a possible human carcinogen; or

G the United States Environmental Protection Agency reclassifies a substance or chemical so that it is no longer a possible human carcinogen.

Subp. 3 **Methods.** The revised health risk limit shall be calculated or the revised toxic endpoint shall be specified according to the methods in parts 4717.7100 to 4717.7700

Subp 4. **Adding a health risk limit or toxic endpoint.** The commissioner shall add to part 4717 7500 a substance or chemical, the health risk limit for that substance or chemical, and the information specified in part 4717 7400 or add to part 4717 7650 a substance or chemical, CAS RN, and toxic endpoint when a substance or chemical is detected in Minnesota groundwater and the RfD or slope factor for the substance or chemical is listed by the United States Environmental Protection Agency The new health risk limit shall be calculated or the new toxic endpomt shall be specified according to the methods in parts 4717 7100 to 4717.7700 and the procedures described in subpart 5

Subp 5 **Frequency of revisions.** Revisions made according to this part shall be published in the State Register at least annually beginning in January 1994 The revisions shall be effective 30 days after publication unless the commissioner receives 25 requests for the department to adopt the revisions according to the administrative rules procedures in Minnesota Statutes, sections 14.001 to 14.560

Statutory Authority: *MS s 103H 201*

History: *18 SR 1340, 19 SR 1191*