

Chapter 7081 QUICK REFERENCE GUIDE - MSTS

Per 2011 purple code book. For complete official language visit www.revisor.leg.state.mn.us vers 15.2
(Green hilited are major bullet points that are above and beyond typical 7080 requirements)
Chp 7081 regulates Subsurface Sewage Treatment Systems 5,001-10,000 gpd (MSTS).

7081.0020 Definitions.

Advanced designer: Required for Type I-V systems > 2500 gpd. Also for high strength waste, collection systems and nutrient removal (nitrogen & phosphorus).

Designer must follow the “guidance document” per state statute, as well as 7080-81.

MSTS : are **individual** systems with flow values of 5,001-10,000 gpd with sub-surface discharge, to include collection systems.

(example: a campground with 3-2500 gpd systems is NOT an MSTS, it is 3-2500 ISTS’s)

Other Establishment : sewage from anything other than a typical residential dwelling.

Since no single home >5000gpd, all MSTS’s are class V injection wells and must register with the EPA/MPCA by **submitting the “basic inventory form”**.

Residential Strength Waste: Treatment Level C to soil treatment area:

<170 BOD (or <125 cBOD), <60 mg/l TSS, < 25mg/l FOG

SDS : ‘State Disposal System’ permit issued by the MPCA for systems with a higher potential to cause environmental impacts.

To include any system > 10,000 gpd, or

a group of systems under common ownership with drainfields within ½ mile, with a combined flow > 10,000 gpd.

7081.0040 **Permit flow.** Design guidance II.D.

Permit flow can get confusing.

Permit flow currently is the “greater of” 7081.0130 estimated flow tables, (which does not accommodate for 7-day averaging), OR from measured flow and applying 7-day averaging of the peak week. (*hopefully future code will allow 7-day averaging on estimated*)

For system under common ownership with the drainfields within ½ mile of each other, permit flow is the combined flow of all the individual systems. Design guidance gives examples.

7081.0080 Compliance Criteria.

To be in compliance, an MSTS must :

- 1 -not be an IPHT,
- 2 -maintain proper vertical separation,
- 3 -not have leaky tanks below the operating level,
- 4 -not allow fecals to contaminate underground water,
- 5 -control Nitrogen discharge such that:

a) if it impacts an aquifer,(no clay layer) the effluent in combination with the groundwater will not exceed 10 total N at the property line or nearest receptor, (via: registered product, soil denitrify, aquifer denitrify, rain dilution)

OR

b) if NOT impacting an aquifer (clay layer), that best management practices will be employed, (via: mound on loamy soil, RSF, registered Nitrogen product)

- 6 -control Phosphorus discharge as to not exceed the P limit of the receiving water, (via: biological methods, sludge settling from added chemical, soil)

- 7 -be current on it’s monitoring, management and operating permit requirements.

MSTS’s found NON-compliant because they are not current with maintenance or operating requirements must be brought into compliance immediately.

- 7081.0120 Design flow determination (residential cluster system).
Existing dwellings:
 Use standard 7080 requirements of 150 gpd / bedroom to calculate:
 (Total flow from 10 largest dwellings) + (total flow from remaining dwellings * .45)
New developments:
 Developer shall restrict # of bedrooms, then calculate flow the same as existing method.
- 7081.0130 Design flow determination (“Other Establishment”).
 Use 7081.0130 table I “design flow for other establishments” starting on page 73
OR average the measured daily flows of a peak week at the establishment.
- If the sewage strength exceeds normal residential strength limits, the concentration must be determined and acceptable to the LUG. The design must reduce the strength to Residential strength limits (<170 BOD (<125 CBOD), <60 TSS, < 25 FOG), or be otherwise designed to accommodate those higher levels.
- 7081.0140 Infiltration.
Design flow must include collection pipe infiltration of 200 gallons per inch of pipe diameter, per mile, per day. (*hopefully future code will eliminate this outdated requirement*)
- 7081.0160 Preliminary Evaluation. Standard ISTS items to be verified in addition to:
-If the drainfield is within 500 feet of public water, a phosphorus impact study is req'd by a P.E.
-Location of system on a US geological survey map & the area within 1 mile.
- 7081.0170 Field Evaluation. Standard ISTS items to be verified in addition to:
-The soil investigation to use Pits only, preferred to be done outside the proposed dispersal area, on or near the borders. The # of pits are to be determined by the designer and LUG.
- Hydraulic conductivity testing (perks or other) must be done along with soil descriptions to determine the SLR.
-Past land use if known, & site map with 2' contours.
- 7081.0190 All current and future dispersal areas must be protected from compaction or other damage.
- 7081.0210 Ground water impact investigation.
LUG and designer will decide if “effluent monitoring” (labwork) is req'd to verify treatment as intended, to include the limits and frequency.
Per design guidance:
 Mounding can occur over an “unsaturated restrictive layer”, and over a “saturated zone”.
 Must assess for both, and each require a deep boring 20' and desktop modeling by Adv desg.
Models to estimate mounding for “unsaturated layer” : the Kahn equation or GMOUND.
Models to estimate mounding for “saturated zone”: Hantush equation or GMOUND.
Any mounding found must be added to the limiting layer for computing vertical separation.
All MSTs require monitoring of ground water mounding height for the life of the system.
 (Piezometer/observation well).
- 7081.0230 A flow measuring device must be employed on all MSTs. (time dosing meets this requirement)
All components must be registered OR have sufficient regulatory oversight.

- 7081.0240 Sewage Tanks.
Septic tanks sized for 3 days retention when system is gravity flow to tank, and 4 days retention for sewage pumped to the septic tank.
Tanks connected in series, with each tank a minimum 25% of total tank capacity.
Tankage prior to other treatment devices shall be according to manufacturers requirements.
Holding tanks serving 'other' establishments must be sized at 5 times design flow.
Effluent filters (with High level alarm), pump filters, or pump vaults must be used on all MSTs.
Lint filters are recommended for laundry facilities.
Tank liquid capacity must be less than 84".
- 7081.0250 Distribution of Effluent.
MSTs must employ pressure distribution, and include dose and rest zones.
"resting" is in the range of 2-5 years.
- 7081.0260 Dosing of Effluent.
The Dosing system must have an alternating 2 pump system with a minimum tank capacity of 50% of design flow.
The average head pressure at the perforations must be 2' for 1/4", 7/32 and 3/16" holes, and 5' of head for 1/8" holes.
- 7081.0270 Final Treatment and Dispersal.
The treatment area must have a minimum of 12" to SHWT and be original soil.
The treatment area must have as many inspection pipes as deemed necessary to assess system.
The soil absorption area shall be sized according to the appropriate tables (7080.2150 tables IX or IXa page 43) and on the Treatment level anticipated.
If the absorption area receives Level C effluent: the absorption area shall be made 50% larger, and zoned for dosing and resting. "resting" means 2-5 years.
The system lawn area sizing shall be sized to prevent groundwater mounding from interfering with separation requirements (3' for level C, B2, A2. And 2' for level A/B).
A reserve Lawn area size of 100% is required for systems receiving Level A/B effluent.
A reserve Lawn area size of 50% is required for systems receiving Level C effluent.
(i.e. 50% more of the Level C plus 50% as required above).
- If impacting aquifer: (use the design guidance II.F.2.C to determine if impacting)
Then must employ Nitrogen mitigation so effluent & groundwater together is < 10 mg/l at the property line or nearest receptor
Else must apply BMP for those not impacting an aquifer. (7081.0080 sub 4D).
See design guidance II.F for protocol.
- If public water or lake < 500' away:
Then must employ Phosphorus mitigation (7081.0080 sub 4 E & 7081.0160 F).
And if the MPCA requires a phosphorus standard, this req's a P.E per D.G.
- 7081.0280 Construction Requirements.
The MSTs designer must observe critical periods of system construction.
- 7081.0275 Collection Systems.
The collection system must be designed according to Design guidance, or by an engineer.

7081.0290

Operation and Maintenance.

New and existing systems must be operated according to the Operating permit, and maintained according to the Monitoring and Maintenance plans, and basic pumping requirements as stated in 7080.2450 (< 3 years between assessments, pumping through manhole, etc.)

All grease traps must be routinely inspected and maintained.

Designers submit an Operation and Maintenance manual to the LUG prior to system operation.