

Total Suspended Solids (TSS) Checklist * REV. 11/17/23

Based on NR 149 (2021), NR 219 (2022), and Standard Methods 2540 D (1997, Ed. Rev. 2011, 2015)

Some questions may not be applicable to every lab. If applicable, all answers must be "yes" to be in compliance.

***This checklist was created for the aid of registered laboratories. It is only an internal audit guideline; it is not meant to be comprehensive of all regulatory requirements, to dictate DNR audit format, or to include all acceptable method options. Laboratories must comply with all applicable code and method requirements whether listed on this checklist or not. Additional general NR 149 requirements are on a separate checklist.**

	Sample Storage and Handling	Y	N	Notes	Reference
1	If analysis is not started immediately (within 15 minutes of collection), are the samples stored at $\leq 6^{\circ}\text{C}$ (but above its freezing point) prior to analysis?				NR 219 Table F; NR 149.442 (4)(b); SM 2540 A (3)
2	Are TSS samples collected in non-preserved containers?				NR 219 Table F; SM 2540 A (3)
3	Are samples analyzed within the hold time of 7 days?				NR 219 Table F; SM 2540 A (3)

	Equipment	Y	N	Notes	Reference
4	Are glass fiber filter disks (without organic binder) used or are other products used that give equivalent results?				SM 2540 D (2), C (2)(a)
5	Does the filtering apparatus use a fritted disk (and not a Gooch crucible or Buchner funnel)?				NR 149.50 (4)(a)
6	Is the frit in good enough condition to ensure a uniform distribution of solids on the filter?				NR 149.44 (1)(a); SM 2540 D (2), C (2)(b)
7	Are the pans used for drying the sample filters uniquely labeled?				NR 149.45
8	When pipets are used, are they wide-bore or wide tipped?				NR 149.50 (4)(b); SM 2540 D (2); SM 2540 B (2)(h) -1997, -2011; SM 2540 B (2)(b) -2015
9	Are graduated cylinders and pipets used to measure the sample volume class B or better?				SM 2540 D (2); SM 2540 B (2)(h), (2)(i), (2)(j) -1997, -2011; SM 2540 B (2)(b), (2)(c) -2015
10	Does the lab have an analytical balance capable of weighing to 0.1 mg?				SM 2540 D (2); SM 2540 B (2)(f) -1997, 2011; SM 2540 B (2)(i) -2015
11	Is a monthly balance check done with a class 2 or better certified weight?				NR 149.44 (3)(d)(3)
12	Is the balance verification weight certified or replaced every 5 years?				NR 149.44 (3)(d)(3)(b)
13	Is a suitable desiccator with color indicating desiccant used?				SM 2540 D (2); SM 2540 B (2)(d) -1997, -2011; SM 2540 B (2)(i) -2015
14	Is the desiccant replaced when it's all pink, indicating that the desiccant is spent?				NR 149.44 (1)
15	Is the drying oven capable of consistently maintaining 103 - 105 $^{\circ}\text{C}$?				SM 2540 D (1)(a), (2), (3)(c); NR 149.44 (1)

	Sample Measurement	Y	N	Notes	Reference
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16	When preparing the filters in-house, are the filters each rinsed with three ~20 mL portions of reagent-grade water?				SM 2540 D (3)(a)
17	When preparing the filters in-house, are the filters dried at 103-105°C for at least an hour?				SM 2540 D (3)(a)
18	Are the sample filters stored on dishes or pans in the desiccator or oven after drying?				SM 2540 D (3)(a)
19	If using purchased pre-weighed filters, is each lot of filters verified by analyzing a method blank that differs by <0.5 mg compared to the vendor weight?				SM 2540 D (3)(a) - 2015
20	Are the filters properly seated by wetting the filter with a small volume of reagent-grade water?				SM 2540 D (3)(c) - 1997, -2011
21	Are very large particles removed from the sample if it is deemed that they are not representative?				SM 2540 D (1)(b)
22	Is the sample stirred or shaken well and immediately filtered?				SM 2540 A (2), D (3)(c)
23	Is the sample filtered and then washed with at least three ~10 mL portions of reagent-grade water?				SM 2540 D (3)(c)
24	Does the sample volume yield at least 1.0 mg of residue on the filter or is at least 500 mL of sample filtered?				Lab Cert Allowance; SM 2540 D (3)(b)
25	Does the sample volume yield no more than 200 mg of residue on the filter?				SM 2540 D (3)(b)
26	Is the filter with sample dried overnight (at least 8 hours), or is the filter with sample re-dried for at least 1 hour?				Lab Cert Allowance; SM 2540 D (3)(c)
27	If not drying the filters overnight, is the sample re-dried for at least 1 hour and re-weighed until the residue weight change is less than 0.5 mg (or less than 4%)?				SM 2540 D (3)(c)
28	Is the filter with sample dried at 103-105°C?				SM 2540 D (3)(c)
29	Are calculations of suspended solids done correctly?				SM 2540 D (4)

	Reporting and Qualifiers	Y	N	Notes	Reference
30	Is the reporting limit determined and reported on the eDMR by the following equation? Reporting Limit (mg/L) = $1000 / (\text{sample volume filtered in mL})$ (e.g., <i>reporting limit = 2 mg/L for a 500 mL sample volume</i>)				NR 149.48 (4)(c)
31	Are results qualified if samples were analyzed past hold time? (<i>hold time is 7 days</i>)				NR 219 Table F; NR 149.47 (4)(b)
32	Are results qualified if samples were not dried at the appropriate temperature for the entire drying time? (<i>If samples were dried below 103°C, the samples may be redried for at least 1 hour within the 103-105°C range without qualifying the results.</i>)				NR 149.47 (5); SM 2540 D (3)(c)

	Documentation and Records - Are all of the following documented or recorded, if applicable?	Y	N	Notes	Reference
33	Sample collection date				NR 149.45
34	Sample storage temperature				NR 149.45
35	Analyst (for set up and read out)				NR 149.45
36	Analysis date (for set up and read out)				NR 149.45
37	Analysis time (for set up and read out)				NR 149.45

38	Unique sample IDs				NR 149.442 (1)(d); NR 149.45
39	Oven temperatures (need daily temp, or will need temp when filters put in and taken out; can be on separate log from the benchsheet)				NR 149.44 (3)(d)(4); NR 149.45
40	Sample volume				NR 149.45
41	No prefilled volumes				NR 149.45
42	Raw data (weight measurements)				NR 149.45
43	Units (e.g., g, mL)				NR 149.45
44	Sequence of analysis is clear				NR 149.45
45	Purchased pre-weighed filter verification (method blank)				NR 149.45; SM 2540 D (3)(a) -2015
46	Corrections made to data were done properly (crossed out with a single line; not scribbled out or overwritten)				NR 149.39 (1)(g); NR 149.45
47	Corrective actions taken (e.g., when temperatures are out of range, residue on filter is >200 mg, analyzed past hold time, etc.)				NR 149.38 (3), NR 149.45

Other Observations

WI DNR TSS Resources

DNR Website: Laboratory Certification Wisconsin DNR
Example TSS SOP
Example TSS and TSS/TVS benchsheets
Example analytical balance monthly verification log
Example daily equipment temperature measurements log
Example equipment maintenance log
Example general corrective action log
Lab Accreditation Program staff - contact any staff with questions or concerns