

Parameter and Method Codes for Loading PM_{2.5} Chemical Speciation Network (CSN) URG 3000N Carbon Data in AQS

The following is a brief description of the parameter and method codes available to load carbon data from the URG 3000N sampler into AQS. The PM_{2.5} Chemical Speciation Network (CSN) encompasses both the “STN” and “SLAMS” monitoring sites. RTI will be loading the URG3000N data as currently done for the CSN. New AQS method codes and parameter codes were developed to accept organic carbon (OC) and elemental carbon (EC) data and the fractions of OC and EC at local conditions for the new CSN sampling and analysis methods (see attached table).

For clarification purposes, it helps to start by defining total OC and EC as generated by the IMPROVE_A method. Both total OC and total EC are mathematically-derived values from the fractions of OC, EC and OP.

$$\text{OC} = \text{OC1} + \text{OC2} + \text{OC3} + \text{OC4} + \text{OP}$$
$$\text{EC} = \text{EC1} + \text{EC2} + \text{EC3} - \text{OP}$$

When adjustments are made to the OC, the adjustments are made to each OC fraction and the pyrolyzed organic carbon (OP). Initially, OC data will not be adjusted for the positive OC sampling artifact in the CSN. The following unadjusted OC parameters will be loaded:

- The unadjusted OC fractions (OC1, OC2, OC3, OC4) will be loaded under parameter codes 88374, 88375, 88376, and 88377 respectively with new method code 841 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “IMPROVE_A”).
- The EC fractions (EC1, EC2, and EC3) will be loaded under existing parameter codes 88329, 88330, and 88331 and method code 841 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “IMPROVE_A”). No artifact adjustments are made to the EC fractions.

The Atmosylic Model 2001 IMPROVE carbon analyzer (used by DRI for analysis) is a dual laser instrument that provides pyrolyzed organic carbon (OP) from both the reflectance and transmittance lasers. Both OP fractions will be loaded as follows:

- The unadjusted OP fraction from the reflectance laser (OP TOR) will be loaded under new parameter code 88378 and method code 842 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “IMPROVE_A TOR”).
- The unadjusted OP from the transmittance laser (OP TOT) will be loaded under new parameter code 88388 and method code 826 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “IMPROVE_A TOT”).

Because total OC and total EC are mathematically-derived values from the fractions of OC, EC and OP, the unadjusted total OC TOR and OC TOT data will initially be loaded as follows:

- Unadjusted total OC TOR will be loaded under parameter code 88370 and method code 838 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “OC1 + OC2 + OC3 + OC4 + (OP(TOR)) = 88374 + 88375 + 88376 + 88377 + 88378”).
- Unadjusted total OC TOT will be loaded under parameter code 88355 and method code 839 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “OC1 + OC2 + OC3 + OC4 + (OP(TOT)) = 88374 + 88375 + 88376 + 88377 + 88388”).
- Total EC TOR (using unadjusted OP TOR) will be loaded under parameter 88380 with method code 831 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “EC1 + EC2 + EC3 - (OP(TOR)) = 88329 + 88330 + 88331 - 88378”).
- Total EC TOT (using unadjusted OP TOT) will be loaded under parameter 88357 with method code 840 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “EC1 + EC2 + EC3 - (OP(TOT)) = 88329 + 88330 + 88331 - 88388”).

Once EPA has developed an agreed upon protocol for OC artifact adjustment in the CSN, the data will then be entered as adjusted OC fractions (including adjusted OP) and the resulting adjusted total OC and EC under the following parameter codes:

- The adjusted OC fractions (OC1, OC2, OC3, OC4) will be loaded under existing parameter codes 88324, 88325, 88326, and 88327 with method code 846 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “IMPROVE_A w/CSN urban adjustment”).
- The adjusted OP TOR will be loaded under 88328 and method code 830 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “IMPROVE_A TOR w/CSN urban adjustment”).
- The adjusted OP TOT will be loaded under 88379 with method 828 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “IMPROVE_A TOT w/CSN urban adjustment”).
- Adjusted total OC TOR will be loaded under 88320 and method code 827 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “OC1 + OC2 + OC3 + OC4 + (OP(TOR)) = 88324 + 88325 + 88326 + 88327 + 88328”).

- Adjusted total OC TOT will be loaded under 88382 and method code 851 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “OC1 + OC2 + OC3 + OC4 + (OP(TOT)) = 88324 + 88325 + 88326 + 88327 + 88379”).
- Total EC TOR (with adjusted OP TOR) will be loaded under existing parameter code 88321 and method code 829 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “EC1 + EC2 + EC3 - (OP(TOR)) = 88329 + 88330 + 88331 - 88328”).
- Total EC TOT (with adjusted OP TOT) will be loaded under parameter code 88381 and method code 850 (“URG 3000N w/ Pall Quartz filter and Cyclone Inlet” with Analysis Description “EC1 + EC2 + EC3 - (OP(TOR)) = 88329 + 88330 + 88331 - 88379”).

Field blanks (filters that remain in the sampler for 24-hours with no flow) and backup quartz filters will also be collected and loaded into the AQS. The sample type for these blanks will be “24-HOUR FIELD” and “BACKUP FILTER”. Results from the analysis of these blanks will be loaded using the same approach as described above. The units will be the same as the existing CSN data in AQS. Twenty-four-hour field blanks will use a nominal sample volume to determine data units of $\mu\text{g}/\text{m}^3$. The backup filters will have the same sample collection volume as the routinely-collected front quartz filter and be loaded in units of $\mu\text{g}/\text{m}^3$.

Carbon Parameter Codes Used for URG3000N Sites

Parameter Code	Parameter Name	Method Code - Description	Analysis Description
88370	OC CSN_REV Unadjusted PM2.5 LC TOR	838 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	OC1+OC2+OC3+OC4+ (OP(TOR)) = (88374+88375+88376+88377 +88378)
88355	OC CSN_REV Unadjusted PM2.5 LC TOT	839 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	OC1+OC2+OC3+OC4+ (OP(TOT)) = (88374+88375+88376+88377 +88388)
88380	EC CSN_REV PM2.5 LC TOR	831 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	EC1+EC2+EC3-(OP(TOR)) = (88329+88330+88331-88378)
88357	EC CSN_REV PM2.5 LC TOT	840 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	EC1+EC2+EC3-(OP(TOT)) = (88329+88330+88331-88388)
88374	OC1 CSN_REV Unadjusted PM2.5 LC	841 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A
88375	OC2 CSN_REV Unadjusted PM2.5 LC	841 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A
88376	OC3 CSN_REV Unadjusted PM2.5 LC	841 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A
88377	OC4 CSN_REV Unadjusted PM2.5 LC	841 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A
88378	OP CSN_REV Unadjusted PM2.5 LC TOR	842 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A TOR
88388	OP CSN_REV Unadjusted PM2.5 LC TOT	826 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A TOT
88320	OC PM2.5 LC TOR	827 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	OC1+OC2+OC3+OC4+ (OP(TOR)) = (88324+88325+88326+88327 +88328)
88379	OP PM2.5 LC TOT	828 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A TOT w/CSN urban adjustment
88321	EC PM2.5 LC TOR	829 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	EC1+EC2+EC3-(OP(TOR)) = (88329+88330+88331-88328)
88324	OC1 PM2.5 LC	846 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A w/CSN urban adjustment
88325	OC2 PM2.5 LC	846 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A w/CSN urban adjustment

Parameter Code	Parameter Name	Method Code - Description	Analysis Description
88326	OC3 PM2.5 LC	846 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A w/CSN urban adjustment
88327	OC4 PM2.5 LC	846 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A w/CSN urban adjustment
88328	OP PM2.5 LC TOR	830 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A TOR w/CSN urban adjustment
88381	EC PM2.5 LC TOT	850 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	EC1+EC2+EC3-(OP(TOT)) = (88329+88330+88331-88379)
88329	EC1 PM2.5 LC	841 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A
88330	EC2 PM2.5 LC	841- URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A
88331	EC3 PM2.5 LC	841 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	IMPROVE_A
88382	OC PM2.5 LC TOT	851 - URG 3000N w/ Pall Quartz filter and Cyclone Inlet	OC1+OC2+OC3+OC4+(OP(TOT)) = (88324+88325+88326+88327+88379)