

TRANSMITTAL OF RULES ADOPTED

STATE AIR POLLUTION  
FROM: CONTROL BOARD  
(Name of Agency)

TO: CODE REVISER  
LEGISLATIVE BLDG (Southwest Corner, Ground Floor)  
Olympia 98501

The enclosed Permanent rules  , being order No. 6  
Emergency rules

relating to (Name of rules or description of subject matter)

Carbon monoxide. These rules and regulations create chapter 18-32 WAC and establish the air quality standard for CO, the air quality objective, the method of measuring and reporting.

(ALTERNATIVE A. Use only for adoption of permanent rules)

pursuant to Notice No. 2242 <sup>①</sup> filed with the code reviser on Jan. 21, '69 <sup>②</sup> were regularly adopted as permanent rules of this agency at Olympia, Washington, on Feb. 13, 1969 and are herewith filed in the office of the code reviser pursuant to chapter 34.04 RCW. The effective date of such rules shall be <sup>③</sup>

(ALTERNATIVE B. Use only for adoption of emergency rules)

pursuant to its finding that the immediate adoption of these rules is necessary for the preservation of the public health, safety, or general welfare and that observance of the requirements of notice and opportunity to present views on the proposed action would be contrary to the public interest, were regularly adopted as emergency rules of this agency at \_\_\_\_\_ on \_\_\_\_\_ and are herewith filed in the office of the code reviser pursuant to chapter 34.04 RCW.

Dated this 13th day of February, 1969.

STATE OF WASHINGTON  
FILED  
FEB 18 1969  
CODE REVISER'S OFFICE  
KET 2357 FILE # 1

STATE AIR POLLUTION CONTROL BOARD  
(AGENCY)  
*Wallace Lane, M.D.*  
By Wallace Lane, M.D.  
Chairman  
Title

- ① NOTICE NUMBER AS APPEARS ON THE COPY OF NOTICE RETURNED TO YOU BY REVISER'S OFFICE (IF PROCEEDINGS WERE CONTINUED, USE NO. OF LAST NOTICE)
- ② STAMPED DATE AS APPEARS ON THE COPY OF NOTICE RETURNED TO YOU BY REVISER'S OFFICE (IF PROCEEDINGS WERE CONTINUED, USE DATE OF LAST NOTICE)
- ③ UNLESS A LATER DATE IS SPECIFIED IN THIS ORDER OR IS PRESCRIBED IN ANOTHER STATUTE, RULES ARE EFFECTIVE 30 DAYS AFTER FILING: RCW 34.04.040. LEAVE THIS SPACE BLANK EXCEPT IN SUCH SPECIAL CASES.

STATE OF WASHINGTON  
STATE AIR POLLUTION CONTROL BOARD

PURSUANT to the authority vested in it by the laws of the State of Washington, particularly chapter 70.94 RCW, and pursuant to chapter 34.04 RCW, the State Air Pollution Control Board does hereby adopt as permanent rules and regulations chapter 18-32 WAC, pertaining to carbon monoxide. These rules and regulations, as attached hereto, establish the air quality standard for carbon monoxide, the air quality objective, and the method of measuring and reporting.

THIS order after being first recorded in the order register of this agency shall be forwarded to the Code Reviser for filing pursuant to chapter 34.04 RCW and chapter 1-12 WAC.

DONE in the City of Olympia, County of Thurston, State of Washington, this thirteenth day of February, 1969.

WASHINGTON STATE AIR POLLUTION  
CONTROL BOARD

Wallace Lane, M.D.  
Wallace Lane, M.D., Chairman

\_\_\_\_\_  
Donald W. Moos

August T. Rossano, Jr.  
August T. Rossano

Gordon Tongue  
Gordon Tongue

\_\_\_\_\_  
John C. Ranger

Harvey S. Poll  
Harvey S. Poll

\_\_\_\_\_  
Frank Roberts

\_\_\_\_\_  
Glen A. Yake

John W. Judy  
John W. Judy

Chapter 18-32

CARBON MONOXIDE

WAC 18-32-010 DEFINITIONS.

(1) Ambient Air - The surrounding outside air.

(2) Air Quality Standard - An established concentration, exposure time and frequency of occurrence of a contaminant or multiple contaminants in the ambient air which shall not be exceeded.

(3) Air Quality Objective - The concentration and exposure time of a contaminant or multiple contaminants in the ambient air below which according to present knowledge undesirable effects will not occur.

(4) Primary Air Mass Station (PAMS) - A station designed to measure contamination in an air mass and representing a relatively broad area. The sampling site shall be representative of the general area concerned and not be contaminated by any special source. The probe inlet shall be a minimum of thirty feet and a maximum of one hundred and fifty feet above ground level. Actual elevation should vary to prevent adverse exposure condition caused by surrounding buildings and terrain. The probe inlet shall be placed approximately twenty feet above the rooftop and meteorological measurement shall be made at approximately the same level as the probe inlet.

(5) Primary Ground Level Monitoring Station (PGLMS) - A station designed to provide information on contaminant concentrations near the ground and provide data valid for the immediate area only. The probe inlet shall be ten to twenty feet above ground level with a desired optimum height of twelve feet. The sampling site shall be representative of the immediate area and not be contaminated by any unique source. The probe inlet shall not be less than two feet from any building or wall.

WAC 18-32-020 AIR QUALITY STANDARD. Carbon monoxide in the ambient air measured at either a primary air mass or a primary ground level monitoring station shall not exceed an average concentration of twenty parts per million by volume for any consecutive eight hours.

WAC 18-32-030 AIR QUALITY OBJECTIVE. In recognition of the need for continuing improvement of the quality of the air resource, it is the intent of the State Air Pollution Control Board to work toward the achievement of the following objectives for carbon monoxide:

(1) Average concentrations that shall not exceed ten parts per million by volume for any consecutive eight hours.

(2) Average concentrations that shall not exceed five parts per million by volume for any consecutive twenty-four hours.

WAC 18-32-040 METHOD OF MEASUREMENT. For determining compliance with this regulation, carbon monoxide shall be measured by an infrared carbon monoxide analyser. The analyser shall have a full-scale range of one hundred parts per million or less and be calibrated with known zero and span gases. Measurement shall be made according to the infrared method in WAC 18-32-060.

WAC 18-32-050 REPORTING OF DATA. Local and regional air pollution control agencies monitoring carbon monoxide shall notify the State Office of Air Quality Control each time con-

centrations of carbon monoxide exceed the standard. Notification shall be made by telephone immediately after validation of the violation and also by mail on forms provided by the state agency. Data to be reported shall include:

- (1) Location of sampler.
- (2) Time span involved.
- (3) Concentrations recorded.
- (4) Type of sampler used.
- (5) Other relevant information requested by the state.

An annual report summarizing all occurrences of concentrations exceeding the standard shall be submitted to the state agency.

WAC 18-32-060 METHOD OF DETERMINATION AND REPORTING FOR CONTINUOUS INFRARED ANALYSIS. The following infrared method shall be used for the measuring of carbon monoxide. However, other continuous and manual methods of measurement may be used as an alternative after they are accepted and approved by the State Air Pollution Control Board and can be shown to be comparable to the infrared technique in reproducibility, selectivity, sensitivity, and accuracy.

(1) To monitor atmospheric carbon monoxide with an automatic analyzer, the following equipment and materials are recommended:

(a) One Luft infrared analyzer complete with pump, control devices, and readout unit (i.e., Strip chart recorded).

(b) One two-liter Erlenmeyer flask.

(c) One two-hole rubber stopper.

(d) Two pieces of eight millimeter glass tubing, one of sufficient length to reach within one-half inch of the bottom of the Erlenmeyer flask, the other to extend one inch beyond the bottom of the stopper into the flask.

(e) Sufficient one-fourth inch tygon tubing to allow a three-foot condensation loop between the Erlenmeyer flask and the input port of the instrument.

(Subdivisions (c), (d), and (e) are needed when humidity control is maintained by saturation.)

(f) One cylinder of span gas made of carbon monoxide and either reconstituted air or nitrogen, of a concentration to be in the upper twenty-five percent of the recorder scale (i.e., on a zero to one hundred parts per million recorder, eighty-five parts per million would be a good concentration for the span gas).

(g) One cylinder of zero gas of reconstituted air (twenty-one percent  $O_2$ , seventy-nine percent  $N_2$ ).

(h) One hopcalite tube<sup>2</sup>.

(Subdivisions (g) and (h) may be replaced by other zero gas known to be free of CO.)

(i) Two two-stage pressure regulators with attendant valves and restraints for installation of gas cylinders.

(j) Sufficient copper tubing, one-quarter inch inside diameter, refrigeration grade, to plumb the cylinders of zero and span gas to the control panel. (Appendixes A and B suggest a method for plumbing the instrument and a method for constructing the hopcalite tube.)

(2) In the operation and calibration of the instrument, the instrument must be allowed to reach operating temperature before data is recorded. Allow at least two hours for the instrument to reach equilibrium. It should then be balanced, zeroed and spanned. Zeroing and spanning shall be repeated at least once per week. The zero and span gases and the sample

air shall be passed through a bubbler or other humidity control device to maintain a constant moisture content. It is recommended to flow the reconstituted air (zero gas) through a hopcalite filter to eliminate any measurable concentrations of CO.

The instrument shall be rebalanced whenever there is inadequate zero and span adjustment available on the control panel and whenever maintenance is performed on the instrument's electrical or optical systems.

(3) Carbon dioxide (CO<sub>2</sub>) response should be less than one part per million indicated CO for one thousand parts per million CO<sub>2</sub>. As atmospheric concentrations are in the order of three hundred parts per million CO<sub>2</sub>, the interference from CO<sub>2</sub> should always be less than 0.5 part per million CO.

Water vapor concentration varies very widely in the atmosphere, and a rejection ratio of 2500:1 (two thousand five hundred parts per million H<sub>2</sub>O may cause a response of not more than one part per million CO) is acceptable. To correct for conditions where wide variations in atmospheric moisture content occur, proper humidity controls must be applied to assure that sample, zero and span gases all have the same relative humidity when passed into the analyzer. Insertion of a water bubbler in the sampling line of the instrument to assure a saturated gas stream at all times is one way of correcting for water vapor interference.

Other contaminants in concentrations commonly found in the atmosphere do not interfere with the infrared carbon monoxide analysis.

(4) Data shall be recorded on strip chart recorders, tape units or other devices compatible with the analyzer and data processing system in use. Results shall be reported in parts per million and data for each day shall include:

(a) All hourly averages (a minimum of six instantaneous readings at approximately equal intervals are needed each hour to calculate the average).

(b) Maximum hourly average and time of occurrence.

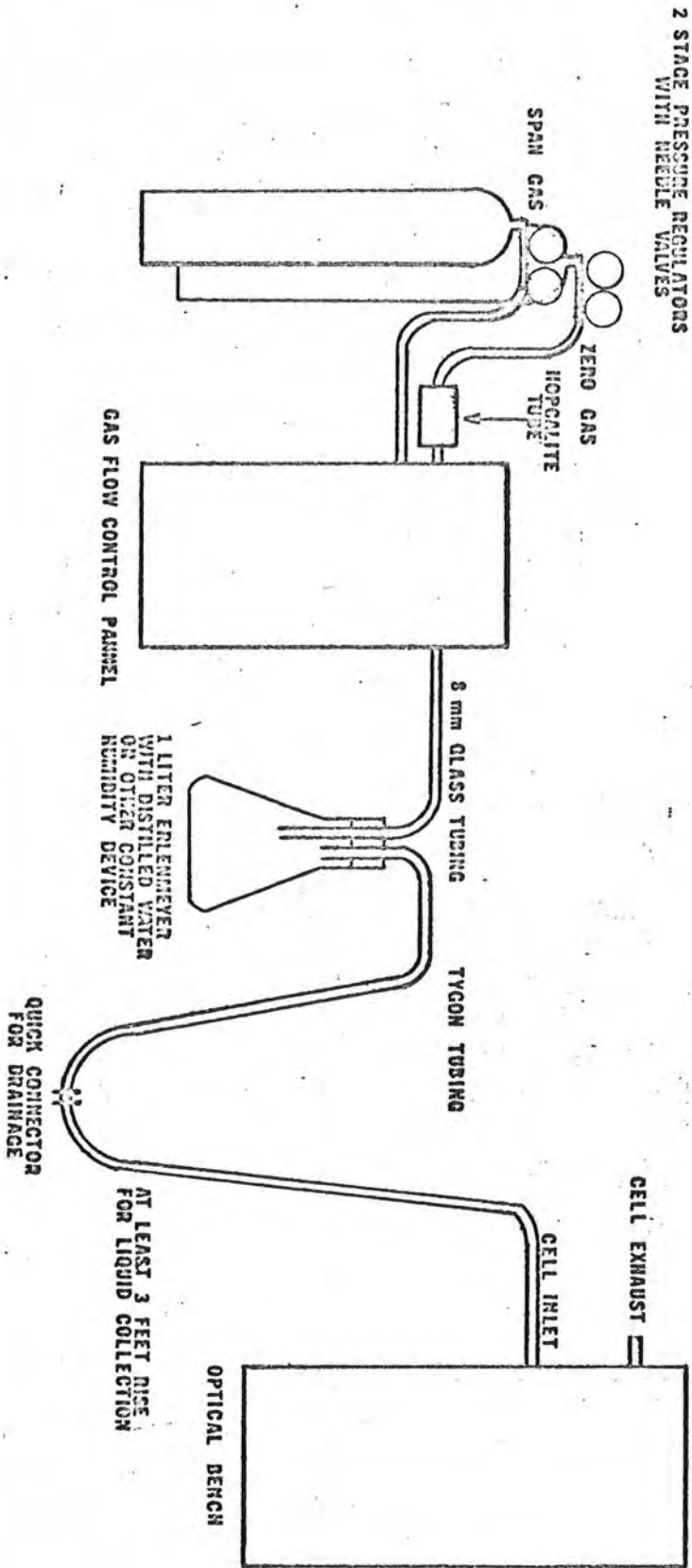
(c) Twenty-four hour average.

(d) Number hours >twenty parts per million.

(e) Maximum eight-hour average and time of occurrence.

(f) All eight-hour averages >twenty parts per million and times of occurrences.

APPENDIX A. Suggested Method of Assembly.

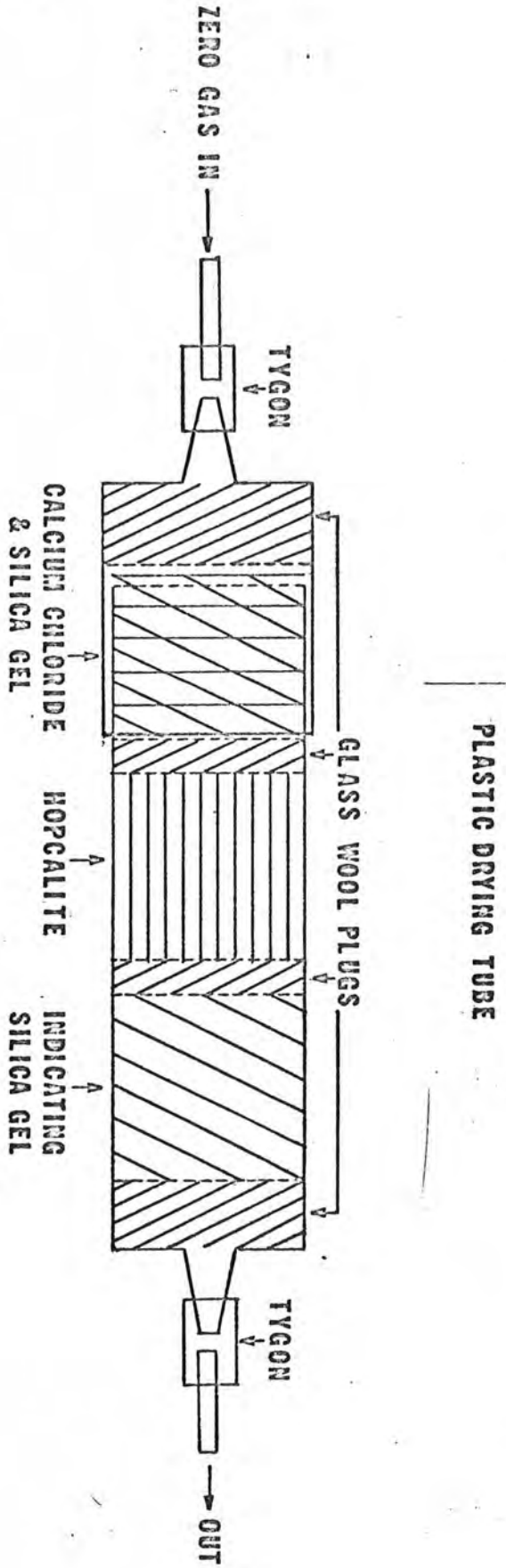


TYPICAL PLUMBING INSTALLATION

NON DISPERSIVE I. R. CARBON MONOXIDE ANALYZER

APPENDIX B. Suggested Construction.

MATERIALS:  
INDICATING SILICA GEL - MATHISON CO.  
HOPCALITE - MINE SAFETY APPLIANCE CO.



HOPCALITE ZERO GAS TUBE

INFRA RED CO ANALYSERS

NO SCALE

CIG-68