

# Exam Blueprint

# Environmental Compliance Inspector Certification

Exam Blueprint & Suggested References

**ECI  
Grade 2**

v 01.31.19



# Exam Blueprint & Suggested References

Effective January 2019

CWEA’s Technical Certification Program Environmental Compliance Inspector Grade 2 exam is based on an exam blueprint that outlines the exam content and is periodically reviewed by CWEA Subject Matter Experts. This exam blueprint is based on a job task analysis that includes research of the essential duties of an Environmental Compliance Inspector at a representative cross-section of systems and facilities in California. The Environmental Compliance Inspector Grade 2 exam was last reviewed by Subject Matter Experts in 2016.

The exam content outline that follows presents content covered on the Environmental Compliance Inspector Grade 2 exam and shows the amount of the exam devoted to each Knowledge, Skills and Abilities (KSA) area in the column labeled “% on exam.” Following the outline, you’ll find a list of suggested references and a link to a free self-evaluation you can take to help you identify your strengths and areas to work on as a candidate. You will also find an Equivalent & Formula Sheet which will be available on screen during the exam.

Please be sure to review CWEA's Technical Certification Program Candidate Handbook, which contains CWEA's certification procedures and policies. Applicants and certification holders are responsible for understanding all certification policies. The TCP Candidate Handbook can be downloaded for free in our [Online Store](#).

KSA	Exam Content Outline	% on exam
201	<p><b>Review and evaluate non-complex permit applications, self-monitoring reports, facility modifications and pretreatment systems.</b></p> <ul style="list-style-type: none"> <li>● Calculate size requirements of basin/containment structures.</li> <li>● Identify EPA requirements as it applies to a discharge permit system and discharge consent.</li> <li>● Understand mass limit requirements defined by National Pretreatment Standards.</li> <li>● Understand industrial waste plan check review and approval process.</li> </ul>	4%



KSA	Exam Content Outline	% on exam
202	<p><b>Generates permits following established practices, policies, procedures internal guidelines and models.</b></p> <ul style="list-style-type: none"> <li>● Understand terms and examples of Point-Source Pollution and Non-Point Source Pollution discharge.</li> <li>● Explain the effective control mechanism duration for a Significant Industrial User as outlined in 40 CFR 403.</li> </ul>	2%
203	<p><b>Perform calculations related to industrial discharge permitting, including calculation of production-based and alternative limits.</b></p> <ul style="list-style-type: none"> <li>● Calculate Production-Based and Mass-Based limits.</li> </ul>	2%
204	<p><b>Thoroughly inspect pretreatment systems, facilities, and processes of industrial, commercial, residential, and institutional establishments for compliance with Federal, State, and local laws, rules regulations and codes that regulate wastewater pretreatment, pollution prevention and stormwater management.</b></p> <ul style="list-style-type: none"> <li>● Describe the process of pollution prevention hierarchy assessments.</li> <li>● Identify pollutants of concern for a POTW that may arise with various industrial users.</li> <li>● Understand terms and definitions relating to organic loading, buffering capacity and infiltration.</li> <li>● Understand the Municipal Separate Storm Sewer System (MS4) permit and requirements.</li> <li>● Identify the paths in which water can infiltrate the sanitary sewer.</li> <li>● Identify the substances that are used in metal finishing procedures.</li> <li>● Understand the steps an inspector should take when responding to a suspected illicit discharge.</li> <li>● Explain the effectiveness of dental amalgam regulations and requirements.</li> </ul>	9%
205	<p><b>Determine sampling locations and methods when necessary to reflect changed conditions.</b></p> <ul style="list-style-type: none"> <li>● Identify open channel flow rate measurement devices, and the specifics of Flumes and Weirs.</li> <li>● Choose appropriate cleaning methods for sampling equipment.</li> </ul>	2%



KSA	Exam Content Outline	% on exam
206	<p><b>Collect representative samples of water and wastewater from industrial, commercial, residential, institutional sources, and storm sewers.</b></p> <ul style="list-style-type: none"> <li>• Understand the various aspects of a sampling program.</li> <li>• Understand the required information that should, and should not be, included on a Chain of Custody.</li> <li>• Understand the limitations of split samples in the field.</li> <li>• Identify the proper location to take a wastewater sample in order to receive the best results.</li> </ul>	4%
207	<p><b>Use appropriate collection devices, containers and preservation techniques per Standard Methods.</b></p> <ul style="list-style-type: none"> <li>• Describe organic chemical analysis test methods as outlined in 40 CFR 136, Appendix A.</li> <li>• Understand preservation methods for samples as shown in 40 CFR Part 136.</li> </ul>	4%
208	<p><b>Perform basic field tests and/or coordinate with appropriate lab personnel on samples collected.</b></p> <ul style="list-style-type: none"> <li>• Understand terms and specifics relating to method blanks, turbidity, pH and temperature.</li> </ul>	4%
209	<p><b>Observe and record field conditions, meter readings, field test results, and other data relevant to sampling conditions and complete documentation.</b></p> <ul style="list-style-type: none"> <li>• Understand how to reduce conventional pollutants using sewage treatment methods.</li> <li>• Understand how to calculate flow rate, and Open Channel Flow Measurement devices.</li> <li>• Identify the best practices for taking grab samples.</li> </ul>	4%
210	<p><b>Respond to call-outs and investigate and trace the sources of illegal or nuisance waste discharges entering the control authority's stormwater or wastewater collection systems.</b></p> <ul style="list-style-type: none"> <li>• Calculate and understand how to identify an illicit discharge in the sanitary sewer.</li> </ul>	4%



KSA	Exam Content Outline	% on exam
	<ul style="list-style-type: none"> <li>● Understand time limit requirements Industrial Users must abide by when reporting self-monitoring violations.</li> <li>● Understand proper sampling procedures per 40 CFR 136.</li> </ul>	
211	<p><b>Undertake appropriate response and enforcement action after identifying noncompliance with local limits or other industrial waste discharge permit requirements; participate in enforcement hearings and monitor follow-up action.</b></p> <ul style="list-style-type: none"> <li>● Identify when assistance from local law enforcement might be needed when entering an inspection site.</li> <li>● Understand proper inspection protocol.</li> <li>● Understand and calculate Significant Non-Compliance violations such as, but not limited to: chronic effluent violations, and technical review criteria violations.</li> </ul>	4%
212	<p><b>Provide technical and other assistance to collections and operations personnel.</b></p> <ul style="list-style-type: none"> <li>● Identify the main functions of responding to spill incidents.</li> <li>● Understand all aspects of a gravity settling clarifier.</li> </ul>	2%
213	<p><b>Implement safety regulations and identify, correct and/or report unsafe conditions.</b></p> <ul style="list-style-type: none"> <li>● Understand proper protocol for opening a sewer manhole.</li> <li>● Ability to identify the different levels of personal protection for facilities and work sites.</li> <li>● Familiarity with Safety Data Sheets.</li> <li>● Identify flash point temperatures of liquids.</li> <li>● Recall traffic control requirements and devices.</li> </ul>	7%
214	<p><b>Explain environmental compliance regulations, requirements, and policies to business owners/operators, other government agencies, and the public.</b></p> <ul style="list-style-type: none"> <li>● Recognize examples of various categories of pollutants.</li> <li>● Understand terms and definitions relating to Significant Industrial Users, CERCLA, and RCRA.</li> <li>● Explain the main components of the Clean Water Act.</li> <li>● Identify EPA-regulated industrial categories.</li> </ul>	6%



KSA	Exam Content Outline	% on exam
	<ul style="list-style-type: none"> <li>Know the limitations of a local ordinance and an inspector’s authority to inspect an Industrial User.</li> </ul>	
215	<p><b>Communicate professionally with customers and the public to report technical and/or specialized information clearly and concisely, and provide feedback, observations, education, and analysis related to stormwater and wastewater.</b></p> <ul style="list-style-type: none"> <li>Familiarity with the steps that must be taken before acquiring samples between storm events as outlined in 40 CFR 122.21.</li> <li>Understand terms and definitions regarding pollution prevention hierarchy, such as source reduction, refractory materials, precipitation/coagulation treatment, complex metals, and precipitation of metals.</li> <li>Ability to respond to difficult situations during an inspection of a Significant Industrial User.</li> </ul>	6%
216	<p><b>Prepare written notices of requirements and violations of regulations.</b></p> <ul style="list-style-type: none"> <li>Understand the procedures a POTW must adhere to when responding to noncompliance.</li> <li>Understand Significant Non-Compliance Requirements and record keeping requirements.</li> <li>Familiarity with an inspector’s responsibilities when conducting an investigation.</li> <li>Familiarity with all aspects of a Control Authority’s Enforcement Response Plan.</li> </ul>	6%
217	<p><b>Plan and participate in public outreach activities, including the development of user specific best management practices, pollution prevention plans, and stormwater best management practices.</b></p> <ul style="list-style-type: none"> <li>Understand terms and definitions relating to ion exchange tanks, water softeners, pollution prevention, waste minimization, and reverse osmosis units.</li> <li>Identify benefits for industries that follow pollution prevention strategies.</li> <li>Familiarity with Stormwater Construction Permit and waste minimization as outlined in 40 CFR 122.2.</li> </ul>	6%
218	<p><b>Research compliance history of facilities.</b></p>	2%



KSA	Exam Content Outline	% on exam
	<ul style="list-style-type: none"> <li>● Identify Self-Monitoring Report requirements and specifics.</li> <li>● Recognize when a facility is in Significant Non-Compliance.</li> </ul>	
219	<p><b>Keep current on pertinent information and developments in environmental compliance.</b></p> <ul style="list-style-type: none"> <li>● Ability to locate information relating to pretreatment regulations for specific industries.</li> </ul>	2%
220	<p><b>Analyze and implement federal, state, or local requirements as necessary to maintain approved pretreatment, pollution prevention, and stormwater programs.</b></p> <ul style="list-style-type: none"> <li>● Know policies and procedures for enforcement actions established by a POTW.</li> <li>● Familiarity with NPDES and Industrial User Permits.</li> <li>● Identify the Control Authorities responsibility in enforcing the Clean Water Act of 1977 and the levels of pretreatment equipment it required.</li> </ul>	4%
221	<p><b>Review compliance monitoring reports, such as toxic organic management plans (TOMPs), stormwater pollution prevention plans (SWPPPs), spill prevention control and countermeasure plans, slug discharge control plans, baseline and self monitoring reports, 90-day reports, periodic reports of continued compliance, and monitoring reports for compliance with federal, state, and local requirements.</b></p> <ul style="list-style-type: none"> <li>● Calculate concentrations of chemicals in illegal loads of wastewater.</li> <li>● Recognize noncompliance of Significant Industrial Users.</li> <li>● Identify required data needed for Baseline Monitoring Report, timeline reporting requirements for categorical dischargers and essentials that would constitute a SSO.</li> </ul>	6%
222	<p><b>Prepare written notices of requirements and violations of regulations.</b></p> <ul style="list-style-type: none"> <li>● Recall reporting requirements and the agency that should be notified in the event of a SSO.</li> <li>● Understand Metal Finishing and how it could affect a POTW.</li> </ul>	2%
223	<p><b>Research tenant occupancy use(s) and classification(s) and respond to inquiries concerning sewer impact fees.</b></p> <ul style="list-style-type: none"> <li>● Ability to calculate penalties for exceeding discharge limitations.</li> </ul>	2%



KSA	Exam Content Outline	% on exam
	<ul style="list-style-type: none"><li>Determine which agency has the authority to change an IU's assigned category.</li></ul>	
224	<b>Identify and verify wastewater strength, including calculating sewer impact fees.</b> <ul style="list-style-type: none"><li>Understand all aspects of a grease Interceptor, sizing requirements and clarifier calculations.</li><li>Calculate annual sewer service fees, organic loading and wastewater strength.</li></ul>	4%
225	<b>Provide management with information and recommendations.</b> <ul style="list-style-type: none"><li>Understand policies when dealing with IU's confidential records and ability to properly identify an IU's category.</li></ul>	2%





## Suggested References

CWEA’s exam is based on a job task analysis that includes research of the essential duties of an Environmental Compliance Inspector at a representative cross-section of systems and facilities in California. CWEA’s exams do **not** correspond directly to any specific textbook, educational course, or program; instead, the exams are based on an analysis of the duties commonly performed in actual practice. In developing the exam, CWEA subject matter experts used their years of experience in the field along with the key textbooks and reference materials listed below. Candidates should understand that the references listed do not necessarily cover all exam content. Candidates who meet the minimum qualifications for this exam may find these suggested references useful when preparing for this exam; however, these suggested references are not required reading and should not be interpreted as constituting the sole source of all exam questions.

This list does **not** include all the available textbooks and materials for studying for this exam. Candidates are strongly encouraged to seek additional material, training, and experience, especially in content areas for which the candidate is not adequately prepared. Candidates are encouraged to prepare for CWEA certification exams using as many different study materials as possible plus education events and on-the-job training. Candidates are encouraged to develop their own personal study plan based on individual needs and knowledge. Taking our free self-evaluation can help identify strengths and areas to work on; the link to that self-evaluation tool follows at the end of this document.

KSA	Suggested References <i>This list is not intended to be an endorsement of any of the publications listed.</i>
201	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 1 (1.0-1.4), Chapter 2 (2.3-2.36)</li> <li>• 40 CFR 403</li> </ul>
202	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 3 (3.2-3.3), Appendix II- Pretreatment Arithmetic</li> <li>• 40 CFR 403</li> </ul>
203	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Appendix II- Pretreatment Arithmetic</li> </ul>
204	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 1 (1.0-1.2), Chapter 9 Appendix – Pollution Prevention Opportunity Checklists, Chapter 10 (10.3-10.5), Appendix II- Pretreatment Arithmetic</li> </ul>



KSA	Suggested References <i>This list is not intended to be an endorsement of any of the publications listed.</i>
	<ul style="list-style-type: none"> <li>Industrial Users Inspection and Sampling Manual for POTWs, January 2017, U.S. Environmental Protection Agency</li> <li>40 CFR 403</li> </ul>
205	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 6, Chapter 7 (7.0-7.5)</li> </ul>
206	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 6</li> <li>Industrial Users Inspection and Sampling Manual for POTWs, January 2017, U.S. Environmental Protection Agency</li> </ul>
207	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 6, Table 6.1</li> </ul>
208	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 6, Table 6.1, Chapter 7 (7.0-7.2)</li> </ul>
209	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 6, Table 6.1, Chapter 7 (7.0-7.5), Appendix II- Pretreatment Arithmetic</li> </ul>
210	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 3 (3.0-3.4), Chapter 6, Appendix II- Pretreatment Arithmetic</li> </ul>
211	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 3 (3.4-3.5), Chapter 4 (4.0-4.4)</li> </ul>
212	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 1 (1.0-1.4)</li> </ul>
213	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 4 (4.0-4.3), Chapter 5 (5.0-5.5) and Appendices A-D, Chapter 11</li> </ul>
214	<ul style="list-style-type: none"> <li>Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 1 (1.0-1.13), Chapter 2 (2.5-2.8) and Appendix A, Chapter 5 (5.2-5.3)</li> <li>40 CFR 403</li> <li>California Manual on Uniform Traffic Control Devices, 2014 Edition, California Department of Transportation</li> <li>Introduction to the National Pretreatment Program, June 2011, U.S. Environmental Protection Agency</li> </ul>



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215	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 1, Chapter 3 (3.4-3.5), Chapter 4 (4.0-4.4), Chapter 9 (9.3-9.4)</li> <li>• 40 CFR 122</li> </ul>
216	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 3 and Appendix F</li> </ul>
217	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 1, Chapter 9 (9.3-9.4)</li> <li>• Best Management Practices For Industrial Storm Water Pollution Control, Sacramento Stormwater Management Program.</li> </ul>
218	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 3</li> <li>• 40 CFR 403</li> </ul>
219	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 1</li> <li>• 40 CFR 403</li> <li>• EPA National Pollutant Discharge Elimination System (NPDES) website</li> </ul>
220	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 1, Chapter 2 (Lessons 1-3)</li> <li>• EPA National Pollutant Discharge Elimination System (NPDES) website</li> </ul>
221	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Appendix II- Pretreatment Arithmetic</li> <li>• 40 CFR 403</li> </ul>
222	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 2</li> <li>• State Water Resources Control Board Order No. 2006-0003-DWQ</li> </ul>
223	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Appendix II- Pretreatment Arithmetic</li> <li>• 40 CFR 403</li> </ul>



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224	<ul style="list-style-type: none"> <li>• Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010. Chapter 2, Appendix II- Pretreatment Arithmetic</li> </ul>
225	<ul style="list-style-type: none"> <li>• Introduction to the National Pretreatment Program, June 2011, U.S. Environmental Protection Agency</li> <li>• Industrial Users Inspection and Sampling Manual for POTWs, January 2017, U.S. Environmental Protection Agency</li> </ul>

**Publications in the Suggested Reference list:**

- 40 CFR 403
- 40 CFR 122
- [State Water Resources Control Board Order No. 2006-0003-DWQ](#)
- [California Manual on Uniform Traffic Control Devices, 2014 Edition, California Department of Transportation](#)
- [Best Management Practices For Industrial Storm Water Pollution Control, Sacramento Stormwater Management Program](#)
- [EPA National Pollutant Discharge Elimination System \(NPDES\) website](#)
- [Introduction to the National Pretreatment Program, June 2011, U.S. Environmental Protection Agency](#)
- [Industrial Users Inspection and Sampling Manual for POTWs, January 2017, U.S. Environmental Protection Agency](#)
- [Pretreatment Facility Inspection: A Field Study Training Program, 3rd Edition, 3rd Printing 2010](#)

**Gauge your readiness with this self-evaluation Gap Analysis Tool**

Help identify the knowledge, skills, and abilities you are confident in and those you might need to spend more time on by using this self-evaluation tool.

<https://www.cwea.org/tcp/pdf/ECI1-4%20KSA%20Gap%20Tool.pdf>

**Equivalents & Formula Sheet**

Familiarity with the following formula sheet is important. There is no need to memorize it, as it can be accessed on screen during the exam.



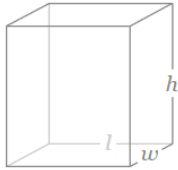
## Environmental Compliance Inspector Grades 1-4 Equivalents & Formulas

### Conversions

3.785 L/gal	453.6 g/lb	8.34 lb/gal	7.48 gal/ft <sup>3</sup>
28.35 g/oz	43,560 ft <sup>2</sup> /acre	$\pi = 3.14159$	

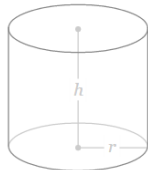
### Volumes

Rectangular Solid



$$V = lwh$$

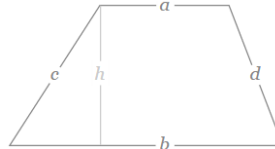
Right Cylinder



$$V = \pi r^2 h$$

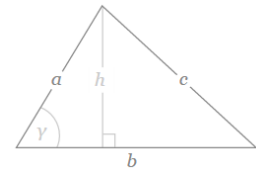
### Areas

Trapezoid



$$A = \frac{a + b}{2} h$$

Triangle



$$A = \frac{hb}{2}$$

### Formulas

Manning

$$Q = \frac{1.49 AR^{2/3} S^{1/2}}{n}$$

Q = flow rate (CFS)

A = cross-sectional area of flow (ft<sup>2</sup>)

R = hydraulic radius (ft)

S = slope of the hydraulic radius

n = Manning roughness coefficient

Counterflow  
Rinsing

$$R^n = \frac{C_p}{C_n}$$

R = rinse ratio (ratio of rinse water volumetric flow rate to the drag out volumetric flow rate)

C<sub>p</sub> = plating bath metal concentration

C<sub>n</sub> = metal concentration in the n<sup>th</sup> rinse tank

n = number of rinse tanks

Combined Waste  
Stream

$$C_T = \frac{[\sum_{i=1}^N C_i F_i][F_T - F_D]}{[\sum_{i=1}^N F_i][F_T]}$$

C<sub>T</sub> = alternative concentration limit

C<sub>i</sub> = concentration limit for stream i

F<sub>i</sub> = average daily flow of stream i

F<sub>T</sub> = F<sub>i</sub> + F<sub>D</sub>

F<sub>D</sub> = average daily flow of dilute wastestream

Periodic Properties of Elements					
Element	Symbol	Atomic Weight (grams/mole)	Element	Symbol	Atomic Weight (grams/mole)
Hydrogen	H	1.0	Potassium	K	39.1
Carbon	C	12.0	Calcium	Ca	40.1
Nitrogen	N	14.0	Chromium	Cr	52.0
Oxygen	O	16.0	Iron	Fe	55.8
Fluorine	F	19.0	Nickel	Ni	58.7
Sodium	Na	23.0	Copper	Cu	63.5
Magnesium	Mg	24.3	Zinc	Zn	65.4
Aluminum	Al	27.0	Arsenic	As	74.9
Phosphorus	P	31.0	Silver	Ag	107.9
Sulfur	S	32.1	Cadmium	Cd	112.4