

Path #5. API 571. In this path we will see 38 closed book questions to be studied for the API 653 Certification Examination. They are all based on API 571, 4.3.3 Corrosion Under Insulation (CUI).

The following questions were extracted from the standards by me. The format is a Q&A one, different from the multiple choice question format from other courses I have seen online. I prefer this method because it takes away all the clutter that leads to confusion when treating these standards. I advise you to copy this info and paste it in a spaced repetition software like Anki or Supermemo, as the Q&A format allows, and start studying right away. You could choose to print flashcards too. When days pass by, you will see who you remember all of the information with no problem.

### **The following questions correspond to Corrosion Under Insulation**

203. Q: Damage mechanisms resulting from water entrapment under insulation or fireproofing:  
A: Corrosion Under Insulation Ref: API 571 4.3.3
204. Q: The 4 materials that can be affected by CUI are \_\_\_\_\_, low alloy steel, 300 Series SS and duplex stainless steel  
A: Carbon steel Ref: API 571 4.3.3
205. Q: The 4 materials that can be affected by CUI are Carbon steel, \_\_\_\_\_, 300 Series SS and duplex stainless steel  
A: Low alloy steels Ref: API 571 4.3.3
206. Q: The 4 materials that can be affected by CUI are Carbon steel, low alloy steel, \_\_\_\_\_ and duplex stainless steel  
A: 300 series SS Ref: API 571 4.3.3
207. Q: The 4 materials that can be affected by CUI are Carbon steel, low alloy steel, 300 Series SS and \_\_\_\_\_.  
A: Duplex Stainless steels Ref: API 571 4.3.3

208. Q: Let's review all 4 steels prone to Corrosion Under Insulation  
A: Carbon steel, low alloy steel, 300 series  
SS and duplex stainless steel                      Ref: API 571 4.3.3
209. Q: Carbon Steel and Low alloy steels are more affected by CUI mainly in which temperature range?  
A: -12°C and 175°C                      Ref: API 571 4.3.3
210. Q: Austenitic steels (300 series) and duplex stainless steels are more affected by CUI mainly in which temperature range?  
A: 60°C and 205°C                      Ref: API 571 4.3.3
211. Q: In CUI, if metal temperature increases, corrosion rates increase/decrease  
A: Increase                      Ref: API 571 4.3.3
212. Q: When do corrosion rates stop increasing when there is Corrosion Under Insulation?  
A: Until water evaporates quickly                      Ref: API 571 4.3.3
213. Q: For insulated components, what is the metal temperature range when corrosion under insulation is more severe?  
A: Between the boiling point (100°C) and 121°C                      Ref: API 571 4.3.3
214.      Following metal surface temperature, the most critical factor that promotes CUI is .....  
            Design of the insulation system                      Ref: API 571 4.3.3
215. Q: If an insulation material absorbs water, corrosion rates (CUI) increase/decrease  
A: Increase                      Ref: API 571 4.3.3
216. Q: Why pyrogel is better than calcium silicate insulation?  
A: Calcium Silicate absorbs water  
(Illustrating the point in 4.3.3.3.e)                      None

217. Q: Look at the image. Why material A insulates better than material B?  
A: Because it leaves no annular space to water to become entrapped                      None
218. Q: Which type of contaminant can be present in insulation that is corrosive to 300 series SS?  
A: Chlorides                      Ref: API 571 4.3.3.3.h
219. Q: Cyclic thermal operation can increase/decrease corrosion  
A: Increase                      Ref: API 571 4.3.3
220. Q: When does condensation happen on a metal surface ?  
A: When temperature is below dew point                      Ref: API 571 4.3.3
221. Q: Inland locations are more prone to CUI than marine locations. True/False  
A: False                      Ref: API 571 4.3.3
222. Q: API 571 mentions 2 airborne contaminants typical of marine locations and cooling tower drift. What are they?  
A: Chlorides and SO<sub>2</sub> (Sulfur dioxide causes acid rain)                      Ref: API 571 4.3.3
223. Q: Which equipment is susceptible to Corrosion Under Insulation?  
A: All insulated piping and equipment                      Ref: API 571 4.3.3
224. Q: Which materials mainly show localized pitting and localized loss in thickness when subject to CUI?  
A: Carbon steels and low alloy steels                      Ref: API 571 4.3.3
225. Q: If chlorides are present and there exists CUI, which other damage mechanism can be promoted in 300 series SS?  
A: Stress Corrosion Cracking (SCC)                      Ref: API 571 4.3.3
226. Q: Between 300 Series SS and duplex SS, which one is more susceptible to Stress Corrosion Cracking (SCC)?  
A: Duplex SS                      Ref: API 571 4.3.3

227. Q: Which of all of the 4 materials prone to CUI are susceptible to localized pitting?  
A: All of them Ref: API 571 4.3.3
228. Q: Name one insulation material that was known for containing chlorides  
A: Calcium Silicate Ref: API 571 4.3.3
229. Q: For 300 series SS, specifically in older calcium silicates, which 2 phenomena can occur?  
A: Localized pitting and chloride stress corrosion cracking (CI-SCC) Ref: API 571 4.3.3
230. Q: What is usually the appearance of CUI in carbon and low alloy steels?  
A: Loose, flaky scale Ref: API 571 4.3.3
231. Q: In some localized cases, CUI can appear to be \_\_\_\_\_  
A: Carbuncle type pitting Ref: API 571 4.3.3
232. Q: Which is the best defense against CUI?  
A: Using *Appropriate coatings* and *Maintaining the insulation barriers* Ref: API 571 4.3.3
233. Q: What metal coating is useful in protecting carbon steel from CUI?  
A: Flame-sprayed aluminum coatings Ref: API 571 4.3.3
234. Q: What form of corrosion acts over aluminum coatings?  
(Intergranular/Galvanic/Crevice/Uniform)  
A: Galvanic Ref: API 571 4.3.3
235. Q: Thin foils of which metal are used on stainless pipes and equipment to reduce Corrosion Under Insulation?  
A: Aluminum thin foils Ref: API 571 4.3.3

236. Q: Why closed cell foam glass is better than mineral wool as an insulating material?  
A: Because it holds less water against the pipe or equipment Ref: API 571 4.3.3
237. Q: If heat conservation is not important, what should a designer do to reduce probabilities of CUI?  
A: Remove the insulation Ref: API 571 4.3.3
238. Q: Low chloride insulation should be used on \_\_\_\_ to minimize the potential for pitting and CI-SCC  
A: 300 series SS Ref: API 571 4.3.3
239. Q: If an equipment is suspected of having Corrosion Under Insulation, all the insulation should be removed for inspection. True/False  
A: False. It should be removed only to the extent necessary Ref: API 571 4.3.3
- 240 Q: Can guided Wave UT help in inspecting for CUI? Yes/No  
A: Yes Ref: API 571 4.3.3

This pdf is part of a series of articles on API 65 questions. For more articles, see the following

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2. [Path #2](#)
3. [Path #3](#)
4. [Path #4](#)

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