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Concrete Coating Inspector (Level 1)

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Question: 1464

A wastewater lift station concrete dome applies 100% solids polyurea hybrid (1:1 ratio, <30-second pot life) via heated plural spray at 160°F. PDS requires 80 mils WFT for 80 mils DFT, no thinning. Inspector notes WFT gauge teeth unable to penetrate fully on first pass due to instant tack-free surface after 3 seconds. Applicator requests 2% thinner approval. What is the mandated inspector response?

- A. Accept DFT verification post-cure only
- B. Reduce heat to 140°F extending gel time
- C. Approve thinning to improve gauge readability
- D. Reject thinning and enforce 1.5-second maximum pass intervals

Answer: D

Explanation: 100% solids polyureas react exothermically without solvents; thinning introduces bubbles/voids compromising elongation/impermeability critical for H₂S dome exposure—rapid passes prevent inter-pass cure, ensuring monolithic film build measurable by gauge timing technique.

Question: 1465

A heavily reinforced beam supporting coated equipment is detailed to have 40 mm clear spacing between parallel bars, with a 20 mm nominal maximum aggregate size. Field measurement shows about 15 mm clearance in some locations due to bar misplacement. Which inspector instruction best addresses both consolidation and long-term durability beneath coatings on the beam soffit?

- A. Require adjustment of bar positions to restore at least the specified minimum clear spacing before placement
- B. Accept the reduced spacing because the beam soffit will be coated, limiting moisture ingress
- C. Approve the condition if slump is increased to improve flow around the closely spaced bars
- D. Only require the contractor to use internal vibrators of smaller head diameter without moving the bars

Answer: A

Explanation: Clear spacing less than recommended minimums relative to nominal aggregate size impedes concrete flow and consolidation, leading to potential voids, trapped air, and poor-quality cover concrete at the surface. Adjusting bar positions to restore specified spacing reduces the risk of honeycombing and weak cover on the soffit, which is important for both structural durability and the performance of the coating applied to the underside.

Question: 1466

ASTM D7234 testing on 800-micron glass-flake reinforced vinyl coating over concrete shows all failures

at 2.3 MPa within flakes layer despite full scoring. What ASTM D7234 reporting nuance applies for thick, multi-layer systems?

- A. Report >2.3 MPa adhesion
- B. Average with substrate tests
- C. Report as 2.3 MPa coating failure
- D. Invalid - rescore deeper

Answer: A

Explanation: ASTM D7234 interprets consistent cohesive failure within coating layers (even thick/flake-filled) after proper scoring as adhesion exceeding coating cohesive strength (> observed value). Report conservatively as ">2.3 MPa" indicating substrate bond adequate; distinguishes from adhesive failure defining true minimums.

Question: 1467

Using IR thermometer, concrete wall ambient 24°C (75°F), RH 80%, surface reads 26°C, DP 19°C. Reflective coating nearby skews IR to 28°C false. True spread?

- A. RH violation
- B. Verify contact thermometer
- C. 7°C safe
- D. Proceed on IR

Answer: B

Explanation: IR inaccurate on reflective/low-emissivity surfaces; use magnetic contact for true 26°C surface. Spread 26-19=7°C ok, RH<85%. Verify to avoid errors.

Question: 1468

Scenario: Coating inspector enters permit space alone to verify DFT on concrete floor. Permit requires attendant and retrieval. Violation?

- A. Yes; no lone entry without communication and monitoring
- B. Allow if short duration
- C. No; inspector qualified
- D. Permit overrides

Answer: A

Explanation: PRCS entry requires attendant outside, continuous communication, no unauthorized solo entry.

Question: 1469

Rheology modifier additive at 0.5% HEC in waterborne acrylic concrete sealer causes 25% sag at 10 mil WFT on vertical wall. What HEUR associative thickener loading provides KU viscosity 120 with $ICI > 1.5$?

- A. 0.5% fumed silica
- B. 0.3% HEUR for shear thinning
- C. 1.0% HEC increase
- D. 0.2% organoclay

Answer: B

Explanation: HEUR at 0.3% provides pseudoplastic flow ($ICI/KU > 1.5$) for brush/roll sag resistance via hydrophobic association, unlike HEC Newtonian viscosity prone to drain.

Question: 1470

An inspector observes orange peel texture predominantly in a 100% solids epoxy topcoat applied via roller on horizontal concrete. The base coats were smooth. Primary contributing factor?

- A. Substrate outgassing
- B. Roller nap imprint and insufficient back-rolling for leveling
- C. Thick single coat application
- D. Rapid curing from exothermic reaction

Answer: B

Explanation: Roller application of high-viscosity epoxies imparts stipple from nap fibers; without thorough back-rolling or cross-rolling, the texture remains as orange peel. Thin topcoats exacerbate this as limited material mass hinders self-leveling. Airless spray or specialized low-nap rollers minimize this defect.

Question: 1471

A project specification section titled “Informative Notes” explains that “in many cases, profile ranges of CSP 2–3 will be adequate,” while the normative section explicitly specifies CSP 4–5 for traffic-bearing coating areas. During submittals review, the contractor selects a blast process that yields CSP 2–3 for all areas, citing the informative note. How should the inspector respond?

- A. Average the values and use CSP 3–4
- B. Let the contractor decide which text to follow
- C. Enforce CSP 4–5 for traffic-bearing areas as mandated in the normative section and treat the

informative note as general background not overriding the stricter requirement

D. Accept CSP 2–3 for all areas based on the note

Answer: C

Explanation: Normative specification text specifying CSP 4–5 for a defined service condition takes precedence over generalized, non-binding commentary; inspectors must apply the specific requirement for the actual service category rather than generalizations in informative notes. Using a lower profile than specified could compromise adhesion under traffic and would not comply with the contract documents.

Question: 1472

Pavement with high sulfate deicing alternative shows pitting spalling. Mechanism?

- A. Chemical pitting from acid
- B. Abrasion
- C. Localized high crystallization in surface depressions
- D. Thermal shock

Answer: C

Explanation: Uneven surface traps solution; localized mirabilite crystallization causes pit-like spalling distinct from uniform scaling per alternative deicer damage reports.

Question: 1473

Electronic auto-log vs manual sling: Hygrometer logs 83% peak unnoticed, sling spots during check. Protocol integration?

- A. Electronic primary
- B. Ignore peaks
- C. Sling verification every 3 hours
- D. Wind sync

Answer: C

Explanation: Electronics trend, sling validates absolutes; periodic cross-check catches drifts, ensuring <85% compliance on concrete projects.

Question: 1474

Polyaspartic concrete seawall runs 8 inches verticals only, 75°F/5mph wind. WFT 16 mils.

- A. Wind chill vertical evaporation gradient
- B. Thinner volatility shear loss
- C. Wave vibration substrate
- D. Rapid gel horizontal vs. flow vertical

Answer: D

Explanation: <5-sec gel arrests horizontal instantly; verticals flow pre-gelling—pass speed 24 in/sec prevents.

Question: 1475

During slump testing of a self-consolidating concrete (SCC) mix with viscosity-modifying admixture, the measured slump flow is 650 mm but visual stability index shows segregation. What is the primary cause per ASTM C1611 variations?

- A. Inadequate VMA dosage for cohesion
- B. Over-vibration in the cone lift
- C. Excessive rodding during standard C143 procedure
- D. High paste volume overwhelming aggregate suspension

Answer: A

Explanation: SCC requires balanced rheology; insufficient viscosity-modifying admixture fails to stabilize the mix against segregation despite good flow, as assessed by visual stability index in ASTM C1611, leading to poor passing ability and in-place uniformity.

Question: 1476

Water tank dome abrasive blasting with aluminum oxide #24 at 115 psi achieves CSP 5 uniformity but post-vacuum blower test shows 25% rebound. Inspector notes rounded particle morphology. Per AMPP, what abrasive quality rejection criterion applies?

- A. >20% fines content
- B. Angular index <85%
- C. Rebound >15%
- D. Bulk density <90 lb/ft³

Answer: C

Explanation: AMPP concrete abrasive blasting limits rebound $\leq 15\%$ indicating sharp angular particles for efficient profiling; 25% rebound confirms rounded/fractured abrasive reducing cut rate and profile consistency. Reject lot, reload fresh angular media.

Question: 1477

Brush application required for detailed areas around penetrations in concrete tank lining with novolac epoxy. Inspector notes runs and sags on vertical transitions.

- A. Brush too large, use smaller angled sash
- B. Temperature too low, increase heat
- C. Thixotropy insufficient, request higher yield
- D. Over-application per stroke, use stippling technique

Answer: C

Explanation: Novolac epoxies need strong thixotropic properties for vertical hold; inadequate rheology allows flow under gravity causing runs. Manufacturer formulations for tank linings include additives; inspector verifies PDS compliance and may reject batch if sag resistance fails index testing.

Question: 1478

An inspector audits a coating project where tight-fitting respirators are shared between multiple workers, with only surface wiping between users. OSHA respiratory protection rules and general infection-control guidance emphasize what minimum practice?

- A. Sharing respirators without any cleaning is acceptable if workers agree
- B. Only external straps require cleaning
- C. No cleaning is needed if filters are changed regularly
- D. Each tight-fitting respirator assigned to a single user or thoroughly cleaned, disinfected, and stored between different users according to manufacturer and regulatory guidance

Answer: D

Explanation: Respirator standards require that reusable respirators be cleaned and disinfected according to specified procedures between uses, particularly when shared among workers, to prevent disease transmission and maintain equipment integrity. Many programs also assign each tight-fitting respirator to a single user to simplify hygiene and fit control.

Question: 1479

In a high-traffic industrial concrete floor coating project, the selected binder must balance hardness with flexibility to withstand thermal cycling and impact without cracking. Which advanced hybrid binder system incorporates silane modification for enhanced performance?

- A. Silane-terminated polyurethane

- B. Vinyl ester resin
- C. Pure acrylic emulsion
- D. Standard bisphenol A epoxy

Answer: A

Explanation: Silane-terminated polyurethanes provide superior flexibility, abrasion resistance, and crack-bridging while maintaining hardness, ideal for concrete floors subject to movement and impacts. They outperform standard epoxies in elongation and pure acrylics in chemical resistance, representing latest trends in durable hybrid binders.

Question: 1480

NCR-092 mud cracking NCR disposition "remove + recoat thin passes" specifies 150-micron max/coat but omits cure interval verification (24 hr @20°C), humidity limits during recoat, or recurrence prevention training. Deficiency category?

- A. Thickness parameter detail
- B. Process control parameters
- C. Removal method UHP psi
- D. Cracking pattern photos

Answer: B

Explanation: NCR CAPA requires full process parameters (cure to König 80 sec, RH<70% recoat, operator WFT training) preventing volumetric shrinkage >7% in thick epoxies; partial spec risks repeat cracking (stress >45 MPa), mandating cure verification grid, environmental logs, and competency audit for industrial floor abrasion resistance.

Question: 1481

Hot weather curing of exposed HPC uses evaporative retarders followed by ponding. Critical timing?

- A. Delay ponding 24 hours
- B. Start ponding after final set
- C. Pond immediately post-placement
- D. Apply retarder during finishing

Answer: B

Explanation: Direct water before set dilutes surface paste in low w/cm HPC; ACI 305/308 recommend evaporation control then ponding post-set to avoid strength loss while maintaining moisture.

Question: 1482

After completion of qualification testing on panels for a complex concrete geometry, the manufacturer's report indicates acceptable performance only when adhesion exceeded a certain threshold and surface preparation met specific roughness parameters. The project specification states: "Production work shall replicate the qualified procedure." The contractor proposes a smoother profile to ease cleaning. How should the inspector relate qualification testing to production work?

- A. Inspector may approve any change that benefits application speed
- B. Qualification tests are theoretical and need not match production
- C. Production may ignore qualification limits if visual appearance is good
- D. Production parameters such as profile, cleaning method, and curing must remain within the envelope demonstrated during qualification tests; significant deviations require re-qualification or formal engineering approval

Answer: D

Explanation: Qualification testing is intended to validate performance under a defined set of application conditions; project specifications that require replicating the qualified procedure mean that critical variables (profile, surface condition, environmental controls) must not be changed arbitrarily in production. Deviations invalidate the link between test results and field performance and should be treated as requiring engineering review or re-qualification.

Question: 1483

Wind shelter psychrometer: Inside barrier at 10 km/h, sling depression 4°C vs outside 2°C at same temps. Why greater depression inside?

- A. Reduced wind aids evaporation
- B. Barriers trap moisture
- C. False reading
- D. Position error

Answer: A

Explanation: Lower wind allows optimal wick airflow without over-evaporation, true depression/RH; shelters enable precise readings during marginal winds.

Question: 1484

Solvent vapors from coating on concrete exceed IDLH in poorly ventilated area. What emergency ventilation rate?

- A. Natural only
- B. Recirculate
- C. Mechanical at 1 CFM/ft² minimum
- D. No rate specified

Answer: C

Explanation: Emergency ventilation for hazardous vapors requires high-rate mechanical exhaust, often 1 CFM per square foot floor area, to rapidly dilute to safe levels in confined concrete spaces.

Question: 1485

A concrete coating uses zinc-rich epoxy primer but shows poor performance over alkaline substrate. What binder modification addresses saponification risk?

- A. Phenalkamine curing agent
- B. Cycloaliphatic hardener
- C. Amine blush inhibitor
- D. Standard polyamide

Answer: A

Explanation: Phenalkamines cure rapidly in cold/damp conditions and resist alkali, preventing saponification in zinc-rich systems on fresh concrete.

Question: 1486

Conventional distance variance: 25cm center thick, 45cm edges thin. Standard?

- A. Vary by zone
- B. Measure post
- C. Closer edges
- D. 35±5cm uniform

Answer: D

Explanation: Consistent 35cm prevents DFT gradients on concrete.

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