

AMPP CIP Level 2 exam-day sheet

The rules and numbers for this exam, on one page you can print.

Film thickness

Dry from wet	$DFT = WFT \times VS \div 100$
Wet from dry	$WFT = DFT \times 100 \div VS$
Wet from dry, with thinner	$WFT = DFT \times (100 + \text{thinner } \%) \div VS$
Theoretical spreading rate	$m^2/L = 10 \times VS \% \div DFT \mu m$
Spreading rate, US units	$ft^2/US \text{ gal} = 1604 \times VS \% \div 100 \div DFT \text{ mils}$
Units	$1 \text{ mil} = 25.4 \mu m \cdot ^\circ F = ^\circ C \times 9 \div 5 + 32$

Conditions

- Steel at least **3 °C above the dew point** during blasting, application and early cure (SSPC-PA 1 gives 5 °F); many specifications also cap relative humidity, often at 85 %.
- Read the steel temperature on the surface you will coat, with a contact thermometer.

Dry film thickness

- SSPC-PA 2, Level 3 (the default):** a spot is the average of 3 or more readings in a 4 cm circle; single readings are not restricted. An area is 5 spots in about 10 m². Each spot average at least 80 % of the minimum and at most 120 % of the maximum; each area average within the range.
- ISO 19840:** mean $\geq$ nominal; every reading $\geq$ 80 % of nominal; fewer than 20 % of readings between 80 % and 100 %; none above the maximum. Subtract 10, 25 or 40 μm for a fine, medium or coarse profile (25 μm if unknown).
- Gauges: magnetic and eddy-current gauges read over metal; ultrasonic gauges read over concrete and can separate layers. The Tooke gauge (ASTM D4138) reads each coat in a precise angled cut, so it is destructive.

Adhesion

- Pull-off (ISO 4624, ASTM D4541): report the stress and the failure mode: adhesive, cohesive or glue. A glue failure means the coating is at least as strong as the reading.
- Cross-cut (ISO 2409): 0 (nothing detached) to 5, for films up to about 250 μm . ASTM D3359 runs the other way: 5B is best. Thicker films: X-cut (ISO 16276-2) or pull-off.

Cure

- Solvent-borne (ethyl silicate) inorganic zinc cures with moisture from the air; dry air slows it. Check it with the MEK double-rub test (ASTM D4752) before topcoating. Water-borne (alkali silicate) types cure as the water evaporates; high humidity slows them.
- Organic coatings: solvent rub, hardness and the data sheet's checks. Wash off amine blush before overcoating.

Galvanizing and cathodic protection

- Hot-dip galvanizing (ISO 1461, ASTM A123): thickness by magnetic gauge over reference areas; the minimum local and mean values depend on the steel thickness. Before painting (ASTM D6386): clean, then sweep blast or treat the zinc.
- Cathodic protection: a common criterion is -850 mV or more negative against a copper/copper sulfate electrode (NACE SP0169, ISO 15589-1). Too much protection, or an unsuitable coating, can cause cathodic disbondment.
- Holiday testing (NACE SP0188): low-voltage wet sponge for films of 500 μm (20 mils) or less, high-voltage DC for thicker films, at the voltage the film thickness calls for. Too high a voltage damages sound film. Mark, repair and re-test every holiday.

Corrosivity

ISO 12944-2: C1 (very low) to C5 (very high) and CX (extreme) in the atmosphere; Im1 fresh water, Im2 sea or brackish water without cathodic protection, Im3 soil, Im4 sea or brackish water with cathodic protection.

Concrete

- Profile: ICRI CSP 1 to 10, compared or measured with replica putty (ASTM D7682).
- Moisture: plastic sheet (ASTM D4263), calcium chloride emission (ASTM F1869) or in-situ RH probes (ASTM F2170).

Practical exam

Eight instrument stations, up to 8 minutes each, scored out of 100. The eddy-current DFT gauge carries 20 points, the Paint Inspection Gauge and pull-off 15 each.

Stop and ask

- Steel less than 3 °C above the dew point, or humidity above the specification's limit.
- Salts, dust or oil above the limits: soluble salts (ISO 8502-6 and -9), dust (ISO 8502-3), compressed air (blotter test, ASTM D4285).
- Mixed paint past its pot life, or a recoat window passed without the preparation the data sheet asks for.
- A hold point not yet released: stop until it is released. Work past an unreleased hold point, or work that does not meet the specification: record a nonconformance.