1 / 12 · Review PT Principles

What force draws penetrant into a surface crack?

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2 / 12 · Review PT Principles

What does a small contact angle tell you about a penetrant?

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Does a narrower opening pull a wetting liquid in harder or more weakly?

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Viscosity controls what: whether penetrant can enter, or how fast?

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Why is high volatility a problem in a penetrant?

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6 / 12 · Review PT Principles

How does a fluorescent dye make an indication visible?

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It wets the surface well and spreads. Above 90 degrees a liquid beads up and is pushed out of a fine tube instead of rising into it.

Topic: Penetrant properties, wetting and contact angle

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Capillary action, driven by surface tension along the walls of the opening, for a liquid that wets the metal.

Topic: Capillary action, driving force

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4 / 12 · Review PT Principles

How fast. High viscosity means slow filling and a longer dwell; very low viscosity can drain from shallow openings. Cold raises viscosity.

Topic: Penetrant properties, viscosity and rate of entry

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Harder. Capillary rise varies inversely with the bore radius, which is why fine cracks can still fill.

Topic: Capillary action, rise height and opening size

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6 / 12 · Review PT Principles

It absorbs UV-A near 365 nm and re-emits longer wavelength visible light, usually yellow-green, which shows against a dark field.

Topic: Penetrant properties, fluorescent dye response to UV-A

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It evaporates during dwell, dries on the part, resists removal and bleeds out poorly.

Topic: Penetrant properties, volatility

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7 / 12 · Review PT Principles

What is the one rule for what PT can detect?

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8 / 12 · Review PT Principles

Why can a machined part hide cracks from PT until it is etched?

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Should PT go before or after shot peening, plating or painting?

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Can PT find a lamination in plate?

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Does PT need a magnetic material?

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What does a PT indication reliably tell you, and what not?

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8 / 12 · Review PT Principles

Machining can smear metal over the crack mouth. Etching removes the smeared layer and reopens it.

Topic: Detection limits, smeared metal and etching

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7 / 12 · Review PT Principles

The discontinuity must be open to the surface being tested.

Topic: Detection limits, surface-breaking openings

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10 / 12 · Review PT Principles

Only where it reaches a cut edge. A lamination is internal and parallel to the faces, so the faces show nothing.

Topic: Detection limits, internal discontinuities

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Before. Those operations close or cover openings. PT goes after operations that can create cracks, such as grinding or heat treatment.

Topic: Detection limits, sequence with other operations

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12 / 12 · Review PT Principles

Location and surface length. Not depth. Tight cracks hold less liquid and give fainter indications than wider ones of similar length.

Topic: Detection limits, what an indication shows

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11 / 12 · Review PT Principles

No. It works on almost any nonporous material: steels, aluminum, titanium, glazed ceramics and many plastics.

Topic: Applications, material types

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