

# PENETRANT COMPARATOR



## "Cracked Aluminum Block"

Conforms to: ASME Boiler and Pressure Vessel Code, Section V  
ASME Boiler and Pressure Vessel Code, Section III  
MIL-I-25135C, Inspection Material, Penetrant

**Description:** The "penetrant comparator" or "cracked aluminum block" is used to compare the performance of two penetrant systems or to compare the effectiveness of an in-service penetrant against unused penetrant.

The "penetrant comparator" is a 2" by 3" panel. It is made from SB-211, Type 2024 aluminum, as rolled, 3/8" thick. A machined groove divides the panel into two 2" x 1.5" sections, labeled "A" and "B."

The panel's cracks are created thermally. 950°F Tempilaq is painted on the panel's center in an approximately one inch circle. The panel is held over a Bunsen Burner until the Tempilaq changes color, indicating a temperature of at least 950°F. The panel is then quenched in cold water, creating cracks on both sides of the panel's two sections.

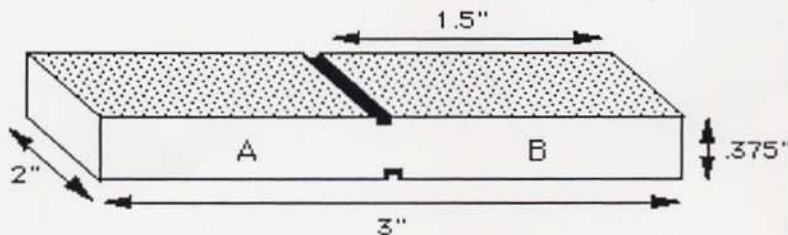
### Normal Shipping Quantities:

Major price breaks occur at each threshold.

- 1 - 9 panels
- 10 - 19 panels
- 20 or more panels

**Basic Instructions:** (These instructions describe generally how to use the Penetrant Comparator. They may be amended to comply with applicable specifications and/or inspection criteria provided by the contracting agency.)

Place the penetrant being tested on one of the panel's sections and the standard penetrant on the other section. Follow the penetrant manufacturer's procedures for dwell, removal, and developing. Compare the two sections' flaw patterns for completeness, sharpness, color, general visibility, and similar characteristics of interest.



When comparing high temperature or low temperature penetrant performance to a standard penetrant at ambient temperature, it is essential to cut the panel into two separate sections. The section to be tested with high or low temperature penetrant will be heated or cooled, as appropriate, while the section to be tested with conventional penetrant remains at room temperature.

Penetrants laying on separate sections of a panel may affect each other even though a groove separates the panel's sections. If the difference in the penetrants' surface tensions is extreme, the penetrant with higher surface tension will be repelled from the center of the panel, while the other liquid may cross the groove. To compare liquids which affect each other in this way, use a panel cut into two separate pieces. The two sections should be well separated from each other during the penetrant dwell.

Cutting panels in two makes using different processing techniques, such as different cleaning techniques or different developing agents, feasible.

**Note 1 — Differences Between Panel Sections:** Theoretically, the flaw patterns of a panel's two sections will be nearly identical. Even so, the patterns will differ. In some cases, the difference will be significant, making the panel of little value as a means of comparison. It is important to recognize differing crack patterns as such, and not misinterpret them as indicating a faulty penetrant.

**Note 2 — Cleaning and Re-Use:** Adequate cleaning of cracked aluminum blocks to make them fully reusable is not possible. This is especially true when panels have been exposed to red visible dyes. Only new panels should be considered valid comparators.

Cleaning methods include hot aluminum alkaline cleaners, vapor degreasing, and reburning. While no cleaning method is satisfactory, some basis for judging performance is obtainable if three, or more, used, but cleaned, panels are included in the evaluation. Cleaning and reuse of panels is discouraged, however, and reuse over three times is definitely not recommended.

## PRODUCT INFORMATION

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