

# Q-PANEL Standard Substrate Applications Guide

| Q-PANEL® Type                           | Steel           |                |                |                |                | Aluminum       |                |
|---|-----------------|----------------|----------------|----------------|----------------|----------------|----------------|
|   | D               | QD             | R              | S              | R-I            | A              | AL             |
| Thickness (inches)                      | 0.010"          | 0.020"         | 0.032"         | 0.032"         | 0.032"         | 0.025"         | 0.025"         |
| Thickness (mm)                          | 0.25 mm         | 0.5 mm         | 0.8 mm         | 0.8 mm         | 0.8 mm         | 0.64 mm        | 0.64 mm        |
| Coating                                 | -               | -              | -              | -              | phosphate      | -              | chromate       |
| Finish                                  | smooth          | smooth         | matte          | ground         | -              | smooth         | smooth         |
| Roughness RMS (micro-inches)            | <20 µ in.       | <20            | 25-65          | 20-45          | 25-65          | 10-20          | 10-20          |
| Roughness RMS (micro-meters)            | <0.5µm          | <0.5           | 0.63-1.65      | 0.50-1.14      | 0.63-1.65      | 0.25-0.5       | 0.25-0.5       |
| <b>VISUAL PROPERTIES</b>                |                 |                |                |                |                |                |                |
| Color Measurement                       | ●               | ●              | ●              | ●              | ●              | ●              | ●              |
| Gloss Measurement                       | ●               | ●              | ◐              | ●              | ●              | ●              | ●              |
| Wave Scan (orange peel)                 | ●               | ●              | ◐              | ◐              | ◐              | ●              | ●              |
| <b>PHYSICAL PROPERTIES</b>              |                 |                |                |                |                |                |                |
| Abrasion - Taber                        | ◐               | ◐              | ●              | ●              | ●              | ◐              | ◐              |
| Abrasion - other                        | ●               | ●              | ●              | ●              | ●              | ●              | ●              |
| Adhesive (scratch, cross-hatch)         | ●               | ●              | ●              | ●              | ●              | ●              | ●              |
| Adhesive (pull-off)                     | ◐               | ◐              | ●              | ●              | ●              | ◐              | ◐              |
| Impact                                  | ○               | ◐              | ●              | ●              | ●              | ◐              | ◐              |
| Bend - Mandrel                          | ◐               | ●              | ●              | ●              | ●              | ●              | ●              |
| Bend - Zero t                           | ●               | ●              | ◐              | ◐              | ◐              | ◐              | ◐              |
| Gravelometer                            | ○               | ◐              | ●              | ●              | ●              | ◐              | ◐              |
| Film Thickness - wet film               | ●               | ●              | ●              | ●              | ●              | ●              | ●              |
| Film Thickness -electronic dry film     | ● <sub>i</sub>  | ● <sub>i</sub> | ● <sub>i</sub> | ● <sub>i</sub> | ● <sub>i</sub> | ● <sub>i</sub> | ● <sub>i</sub> |
| Hardness - pencil                       | ●               | ●              | ●              | ●              | ●              | ●              | ●              |
| Hardness - rocker                       | ◐               | ◐              | ●              | ●              | ●              | ●              | ●              |
| <b>CHEMICAL / ACID</b>                  |                 |                |                |                |                |                |                |
| Chemical Resistance                     | ◐               | ◐              | ●              | ●              | ●              | ●              | ●              |
| Acid Resistance (coating itself)        | ◐               | ◐              | ●              | ●              | ●              | ●              | ●              |
| Acid Resistance -corrosion of substrate | ◐ <sub>s</sub>  | ◐ <sub>s</sub> | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>a</sub> | ● <sub>a</sub> |
| <b>WEATHERING &amp; CORROSION</b>       |                 |                |                |                |                |                |                |
| Corrosion - Salt Spray                  | ◐ <sub>s</sub>  | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>a</sub> | ● <sub>a</sub> |
| Corrosion - Humidity / Condensation     | ◐ <sub>s</sub>  | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>a</sub> | ● <sub>a</sub> |
| Corrosion - Outdoor Natural Exposure    | ◐ <sub>st</sub> | ◐ <sub>s</sub> | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>s</sub> | ● <sub>a</sub> | ● <sub>a</sub> |
| Accelerated Weathering                  | ◐               | ●              | ●              | ●              | ●              | ●              | ●              |
| Outdoor Weathering                      | ◐ <sub>t</sub>  | ◐              | ◐              | ◐              | ◐              | ●              | ●              |
| <b>SALES SAMPLES - BATCH RECORDS</b>    |                 |                |                |                |                |                |                |
| Sales Samples (light weight)            | ●               | ◐              | ◐              | ◐              | ◐              | ●              | ●              |
| Batch Records (light weight)            | ●               | ◐              | ◐              | ◐              | ◐              | ●              | ●              |
| <b>BAKING AND CURING</b>                |                 |                |                |                |                |                |                |
| Baking / Curing - Liquid Coating        | ●               | ●              | ●              | ●              | ●              | ●              | ●              |
| Baking / Curing - Powder Coatings       | ◐ <sub>t</sub>  | ●              | ●              | ●              | ●              | ●              | ●              |

● = Best   ↔   ○ = Not Suitable

i = good if your thickness instrument works on this metal

s = good if end use is on steel

a = good if end use is on aluminum

t = may be too thin for some applications



## Q-PANEL Application Guide - Notes

**Color Measurement, Haze Measurement:** All types work well for most color and haze measurements

**Gloss Measurement:** Type R is rougher, and the texture may “telegraph” through some thin coatings.

**Wave Scan (Orange Peel):** This “Distinctness of Image” test requires an extremely smooth substrate.

Recommend Type QD, D, A or AL. Surface texture of Type R, S and R-I may “telegraph” through the coating.

**Abrasion – Taber:** Requires fairly strong and robust panel. Recommend Type R, S, or R-I.

**Abrasion – Other:** All types work well for most abrasion tests.

**Adhesive – Scratch or Cross Hatch:** all types work well for scratch adhesion.

**Adhesive – Pull Off:** Requires robust panel to prevent deformation during pull-off. Recommend R, S or R-I.

**Impact:** D is too thin; metal will often break in impact. QD, A, and AL will break in severe impacts.

Use R, S or R-I.

**Bend – Mandrel:** Most panels will work for most mandrel bends. If bending with just your fingers, recommend D, A or AL, because they are thinner and easier to bend. If using a bending jig with a handle, you can use thicker steel panels.

**Bend – Zero Thickness:** Thinner panels like D and QD are easier to bend. A and AL are too brittle and will crack when bent back 180° upon themselves.

**Gravelometer:** D is too thin and will dent and deform badly upon gravel impact. QD, A and AL will also usually deform too much. Deformation of the panel dissipates energy that is supposed to go into chipping the coating. Recommend R, S or R-I.

**Film Thickness – Wet Film:** Any type will work fine.

**Film Thickness – Electronic Dry Film:** Some electronic thickness instruments work only on steel or only on aluminum. Make sure the panel is made out of the appropriate metal for your instrument.

**Hardness – Pencil:** Any type will work fine.

**Hardness - Rocker, Shore, Barcol, Pendulum:** Any type will work fine.

**Chemical Resistance:** Any type will work fine.

**Acid Resistance of Coating Itself:** Any type will work fine.

**Acid Resistance – Corrosion of Substrate:** Use steel panels if end use is on steel; aluminum panels if end use is on aluminum.

**Corrosion – Salt Spray and Humidity:** Use steel panels if end use is on steel, aluminum panels if end use is on aluminum. Sometimes Type D panels are too thin. When using steel panels, be sure to protect the back side to avoid extraneous corrosion that may contaminate the test.

**Corrosion – Outdoor Natural Exposure:** Use steel panels if end use is on steel, aluminum panels if end use is on aluminum. Thinner steel panels like D or QD may be subject to wind damage.

**Accelerated Weathering:** Most types work fine. Accelerated weathering usually does not produce corrosion, so the type of metal is not critical. Type A and AL are a little more convenient because the back does not need to be protected to prevent rust.

**Outdoor Weathering:** Thin panels like Type D or QD may be subject to wind damage. Type A and AL may also be subject to wind damage, but they have the advantage of being free from corrosion that can interfere with viewing gloss and color loss. Type R and S and R-I are thick and strong, so they resist wind damage. However, remember to coat the back of steel panels to prevent extraneous corrosion. Type R-I panels produce better adhesion because of the phosphate coating.

**Samples and Batch Records:** Most people prefer the lightest panels; Type D, A or AL. Type AL panels usually provide better adhesion because they have a chromate pretreatment, so the paint will be less likely to scratch off.

**Baking and Curing:** Most types work fine. However, some types of powder coatings require a substrate with more mass than is found in the very thin Type D.

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