

# **Q-PANEL**

The World's Standard Test Substrate



# What is a Standard Test Substrate?

Manufacturers of coatings, plating, adhesives, sealants, rust inhibitors, and other products need to test the visual, chemical, and physical properties of their products when applied to metals.

If these coatings tests are to be reliable and reproducible, they must be performed on a substrate that is consistent from test to test. However, ordinary commercial sheet metal displays wide variations in surface properties, which affect the bonding, weatherability, and corrosion resistance of coatings.

Standard panels are used to eliminate the substrate as a source of bias in coatings tests. Laboratories around the world use them for a wide variety of coatings testing applications. Standard panels ensure that test results are characteristic of the coating, and not a problem with the underlying metal.



## MILLIONS OF PANELS

Thousands of labs use millions of Q-PANEL brand steel and aluminum panels every year for color development, weathering exposures, salt spray and corrosion testing, physical properties testing, and quality control.

# Why Choose Q-PANEL Substrates from Q-Lab?

## Q-Lab is Number 1 Worldwide



Q-Lab has been producing standard test substrates since 1956. Today, we produce more paint test panels than anyone in the world!

**Look for the Q-shaped hole. It's our trademark, and your assurance of quality.**



### Clean

The Q-PANEL production process thoroughly cleans panels and removes any oil and contaminants from the surface. Special handling assures that all panels are completely clean when they are packaged. Special packaging ensures they remain clean until they are ready to be used.

### Consistent

Q-Lab achieves consistent quality through volume metal purchasing from strategic, selected mills and automated production of millions of panels each year on a high-speed line. Rigorous inspection at several processing stages from raw material to finished product ensures high quality.

### Convenient

For maximum convenience, Q-PANEL substrates are supplied with a Q-shaped hanging hole. For safety and ease of handling, the panels have rounded corners and deburred edges. Our inventory of over a million panels means that 95% of our orders are shipped from stock.

### Cost-Effective

High-volume production means that Q-PANEL substrates cost less than you might expect for such a standardized surface. Equally important, the convenience of pre-cleaned panels reduces the time lab personnel spend cleaning and handling panels.

# What Makes It a Q-PANEL?

## Q-SHAPED HOLE

*It's our trademark and your assurance of quality. Accept no substitutes.*

## PRE-CLEANED

*Special pre-cleaning processes allow most Q-PANEL substrates to be used right out of the box.*

## BURR-FREE EDGES

*A deburring process ensures that all Q-PANEL edges are safe and easy to handle.*

## SHIPPED FROM STOCK

*Nearly all Q-PANEL substrates are available for shipping within 24 hours from order placement.*

## COST-EFFECTIVE

*Q-PANEL substrates are priced low because of high-volume production efficiency.*



## HIGH-QUALITY METAL

*Q-Lab has special relationships with select, trusted, and strategic mills to ensure consistent quality.*

## STANDARDIZED SURFACES

*A variety of finishes are available to reproduce different real-world metal surfaces, such as smooth mill, matte, and ground. Strict quality control processes ensure that these surfaces deliver repeatable and reproducible test results.*

## SPECIAL PACKAGING

*Steel substrates are carefully packaged with a vapor phase rust inhibitor to guarantee pristine surface quality free of oil stains, with a shelf life of years.*

## EXPERIENCE

*Q-Lab provides expert-level applications assistance to help get the most out of testing with your Q-PANEL substrates. We can help you understand the best panel selections for a wide variety of uses and industries.*

## NO-NONSENSE WARRANTY

*Q-Lab offers a complete, 100% warranty on Q-PANEL substrates. Just return them for any reason if you're not satisfied.*

# General Purpose Steel Panels

Q-PANEL steel substrates are available in a wide variety of alloys and surface finishes, to provide just the right standardized surface for your application. General purpose steel panels represent some of our most popular offerings and are used widely across many industries and test types. See page 10 for additional steel Q-PANEL substrate options.

## SMOOTH, MATTE, and GROUND FINISH

**Type D and QD:** smooth, bright mill finish, ideal for color and gloss testing.

**Type R:** dull matte mill finish, representative of general-purpose sheet metal.

**Type S:** same as Type R with one side ground for better adhesion results.



**SMOOTH** (D, QD)



**MATTE** (R)



**GROUND** (S)

## IRON PHOSPHATE PRE-TREATED

**Type R-XX-I and Type S-XX-I** are Type R and S panels surface treated with widely-used Bonderite® industrial iron phosphate and chrome seal.

**Type R-XX-ICF and Type S-XX-ICF** use a REACH/RoHS-compliant chrome-free seal.

## PRE-COATED

Pre-coating eliminates the time required to prime test substrates and can also be used to test the hiding ability of a coating. Pre-coated panels are 0.20 cm (0.08 in) thick.

**Type WW** panels are similar in color to white automotive primer.

**Type GW** panels are similar in color to gray automotive primer.

**Type WWS** panels are like Type WW, with an additional black stripe.



## SPECIAL PACKAGING

Steel panels are packed in plastic bags in quantities of 20 to 50 panels, depending on type and thickness. Each packet contains vapor phase rust inhibitor. Between 4 and 10 packets are placed in a sturdy cardboard carton.

With this packaging, our steel panels have a shelf life of up to 10 years. The panels are stored completely clean, so there is no chance of oil stain ruining the surface.

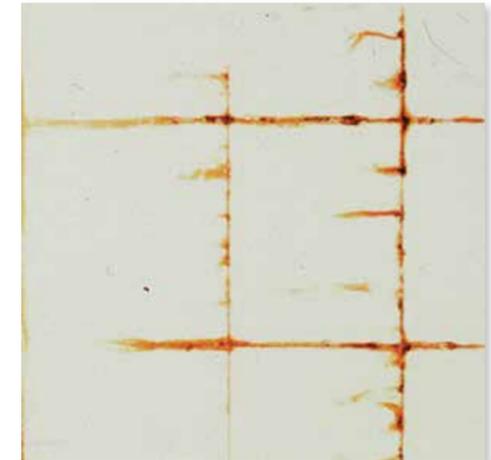
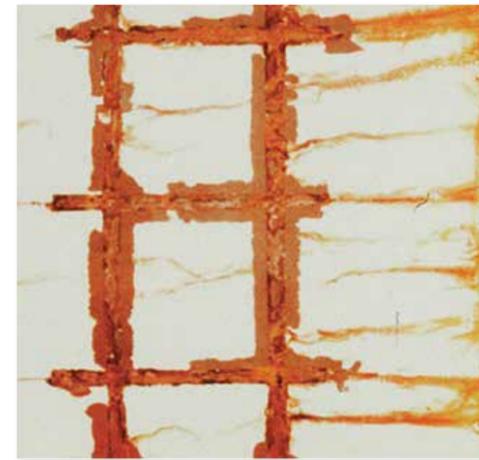


## CASE STUDY: STEEL SURFACE QUALITY IS CRITICAL

A paint can perform very differently, based solely on the metal to which it is applied. An American automaker demonstrated this effect by cutting up a car body fresh off their production line, and then testing various parts of it in a salt fog chamber according to ASTM B117.

As is normal in a car plant, the steel in different parts of the body was from different production lots. However, the whole body had received the same pretreatment and painting: as a completely assembled unit it was cleaned, dip phosphated, electro-coated, primed, and topcoated - all on the car maker's normal finishing line.

The photos below illustrate the substantial differences in corrosion performance from different parts of the auto body, solely the result of variation in steel.



## SOURCES OF VARIABILITY

Surface problems can come from a number of sources:

1. Surface texture variation from the condition of the rollers used to cold roll the steel to its final thickness.
2. Surface cleanliness variation from the mill's cleaning procedure. Carbon smut can be baked onto the steel during processing and is impossible to remove except by mechanical abrasion.
3. Rust variation depending on the care taken in fabrication and handling at the mill, and during transport and storage
4. Chemistry variation from steel stored for a long time with rust-inhibiting oil. This reacts to form an incomplete oxide known as oil stain, making ordinary steel unsuitable for coatings tests.

Although some commercial steel provides an excellent surface for coatings, you are just as likely to find steel that gives poor adhesion and poor rust resistance - even with good coatings. In fact a single mill will often produce both very good and very poor surface quality, depending upon a number of uncontrolled factors. Cleaning and phosphating help, but they cannot overcome surface defects formed at the mill.

## Q-PANEL SUBSTRATES MINIMIZE VARIABILITY

The Q-PANEL production process is specifically tailored to minimize the variability of steel surfaces.

- We buy all of our steel directly from mills that are both willing and able to control surface quality. Moreover, our volume purchasing enables us to specify close tolerances on surface cleanliness and surface texture.
- Panels are cleaned, straightened, punched, and deburred in a continuous automated process.
- Rust and oil stains are prevented.

# General Purpose Aluminum Panels

Q-PANEL® aluminum test substrates from Q-Lab minimize metal variability as a source of bias in critical tests. Made from high-quality aluminum, they are clean, consistent, convenient, and economical. A wide range of panel sizes and types are available for immediate shipment from stock. Panels are stored completely clean, and in most cases can be used right out of the box.

## BARE ALUMINUM

**Type A** standard aluminum panels are made from alloy 3003 H14, and are 0.64 mm (0.025 in) thick. This is the most widely-used general purpose aluminum alloy from coil stock.

## ANODIZED ALUMINUM

Anodized aluminum panels are treated with an anodization process, which improves resistance to corrosion. Most aluminum exposed to exterior weathering is given such a durable treatment.

**Type AN** panels are the same 3003 H14 aluminum alloy and 0.64 mm (0.025 in) thickness as Type A, with an anodized surface treatment.

## CHROMATED ALUMINUM

Chromated aluminum panels are treated with a chromium conversion coating to improve paint adhesion and resistance to underfilm corrosion. Most aluminum is given such a pretreatment prior to painting.

**Type AL** panels are the same 3003 H14 aluminum alloy and thickness as Type A, but are treated with a hexavalent chromium coating. This offers the best paint adhesion performance, but is restricted by certain EU regulations.

**Type AT** panels are the same as Type AL, but instead treated with an environmentally-friendly trivalent chromium pretreatment that may offer less adhesion than Type AL.



**MILL FINISH (A)**



**ANODIZED FINISH (AN)**



**CHROMATED FINISH (AL, AT)**

## PACKAGING

Aluminum panels are packed in plastic bags in quantities of 20 to 50 panels, depending on type and thickness. Between 4 and 10 packets are placed in a sturdy cardboard carton. With this multi-layer packaging, our aluminum panels have a shelf life of up to 10 years. The panels are stored completely clean, so there is no chance of contaminants ruining the surface.



## CASE STUDY: THE TYPE OF ALUMINUM SUBSTRATE MATTERS

The specific alloy of aluminum and its surface characteristics can have a significant effect on the adhesion of paint to its surface due to corrosion. The images below show two different types of aluminum Q-PANEL test substrates, each cleaned and then painted with the same primer and white enamel, following 250 hours of neutral salt spray testing. The metal on the right shows significant delamination of the paint from the scribe, while the metal on the left demonstrates excellent adhesion.

The base metal is the only difference and demonstrates just how important the substrate itself is in paint adhesion performance.



*Aluminum panel made from alloy X shows excellent paint adhesion*



*Aluminum panel made from alloy Y shows poor adhesion & significant delamination of paint from the surface*

## THE TYPE OF PRETREATMENT ALSO MATTERS

Aluminum is frequently pre-treated to improve paint adhesion, but the type of pre-treatment can have a significant effect on paint adhesion. A variety of aluminum Q-PANEL substrate pre-treatments are available. The images below show test results of painted panels with no pretreatment, pretreatment A, and pretreatment B, after exposure to 3,000 hours of salt fog.

The image on the left is from a specimen where paint was applied to a bare aluminum surface, with no pre-treatment. After exposure, the paint has completely delaminated and the resulting metal surface shows sign of additional wear. The middle image is from paint applied to an aluminum Q-PANEL surface, using pre-treatment A. Although some spots of delamination have appeared, much of the paint remains intact. The image at far right is from a panel with a different surface pre-treatment, and demonstrates excellent paint adhesion and corrosion resistance performance even after an extensive accelerated salt spray test.

In short, the presence or type of pre-treatment can have a dramatic effect on paint adhesion performance.



*Paint applied to bare aluminum surface has completely delaminated*



*Paint applied to aluminum with pre-treatment A shows minimal adhesion failures*



*Paint applied to aluminum with pre-treatment B shows excellent adhesion performance*

# Specialty Steel Panels

Q-Lab produces a wide variety of steel panels to meet a multitude of different testing needs. Special use Q-PANEL substrates are designed to meet a particular test standard, or for a particular limited application. They will often be more expensive than similarly-sized General Purpose panels. The available sizes and finishes of these are limited and they may not be available directly from stock.

## TINPLATE

**Type DT** panels are the same as Type D, but with a tin-plated surface, as required for certain legacy government standards.

## LOW-ALLOY STEEL

**Type HA** panels contain molybdenum and chromium as strengthening agents and meet AMS 6350/6351.

**Type HN** panels are similar to Type HA but designed to meet AMS 6345.

## STAINLESS STEEL

**Type SS** panels are made from 304 2B stainless steel, and are popular for some lap shear adhesion tests.

## TABER® ABRASER PANELS

**Type S-44T** and **R-44-T** panels are specially sized, with a hole punched in the middle for mounting on the turntable of a Taber Abraser. They are made from the same steel and have the same thickness as Type R and S panels.

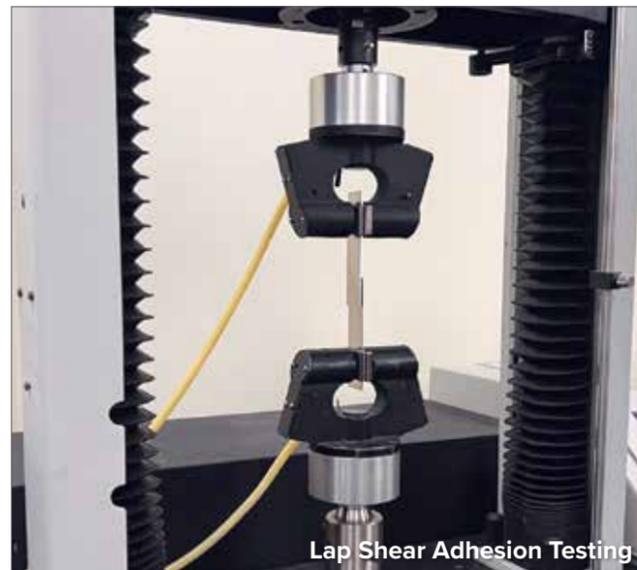
## ADHESIVE PANELS (Ground Finish)

**Type RS** panels use heavy-gauge steel and are designed for lap shear testing of adhesives in a tensile tester.



Taber Abrasion Testing

Photo courtesy of Taber Industries



Lap Shear Adhesion Testing

# Specialty Aluminum Panels

General Purpose aluminum Q-PANEL substrates meet most testing needs, but Q-Lab also offers additional panels for more specialized applications. The available sizes and finishes of these are limited and they may not be available from stock. Several of these Q-PANEL substrates (AQ, AQT, AEX) meet the specific requirements for Qualicoat substrates.

## BARE ALUMINUM

**Type AQ** panels are offered in Europe to meet Qualicoat requirements.

**Type ARX, ASX, and AGX** panels are made from specialty aluminum alloys. ARX are 2024-T3, ASX are 6061-T6, and AGX are 7075-T6.

## CHROMATED ALUMINUM

**Type AQT** panels use the same environmentally-friendly trivalent chromium pretreatment as Type AT, with a different metal base to meet Qualicoat requirements.

## EXTRUDED ALUMINUM

**Type AEX** panels are extruded from alloy 6063 T5/T6, and meet Qualicoat requirements.

## ADHESIVE PANELS

**Type AR** panels are bare aluminum panels of type 2024-T3 alloy, used for lap shear adhesion testing.

**Type AD** are the same as Type AR, but are "Alclad" for improved corrosion resistance.

## LARGE DISPLAY

**Type L-1424** panels are made from series 3000 aluminum and are useful for evaluating and displaying paints and coatings anywhere a large format is needed.



## WEATHERING TESTING

Aluminum Q-PANEL substrates are used as a substrate to evaluate color change effects in paints due to outdoor and accelerated weathering





# Curved and Custom Panels

In addition to our standard panels, we can also make types and sizes not shown on our regular Price Lists. These include custom panels as small as 2.54 cm (1 in) circles, to as large as 1.5 m x 1.5 m (5 ft x 5 ft) automotive-sized panels. Custom panels may also be ordered in a variety of shapes, alloys and finishes. This includes panels that are curved, bent, grit-blasted, welded, embossed, perforated, pre-painted in grey or white with a variety of patterns, and other options.

These custom panels are most cost-effective when ordered in quantities sufficient to allow an economical production run, and when the special panels employ either our stock metal or readily-available alloys. But even small order-quantity custom panels are available.

## CURVED PANELS

Any standard Q-PANEL steel or aluminum substrate between 76-152 mm (3-6 in) width can be ordered with a curve (including a standard height) by appending -CU to the panel designation.

## GRIT-BLASTED

An ideal panel for industrial maintenance paints and coatings. Bridges, steel beams, storage tanks, ships, and industrial equipment industries utilize grit-blasted panels to ensure their coatings' performance.

## PRE-PRIMED

Pre-primed panels help with paint adhesion and ensure accurate gloss readings.

## STRIPED & HIDING POWER

Ensure paint coverage and coating with our striped panel. The stripe will not show a bump, ensuring accuracy of your product applied to the surface.

## PRINTED & EMBOSSED LOGOS

Add your company's embossed logo to your Q-PANEL substrates for a personalized touch.

Printed Logo



Embossed Logo



Custom Curved Panel



Round/Disc custom panels



Paint Hiding Power Panels



Brass Custom Panel



Automotive Styling Panel - Custom Size



Grit-Blasted Panel



## CURVED PANELS

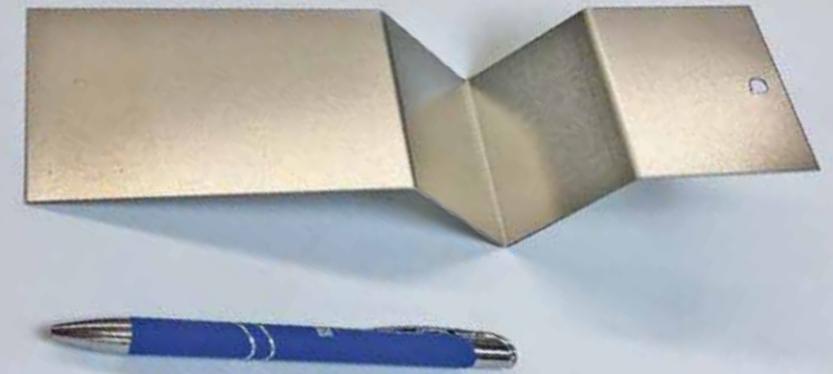
Curved panels offer three-dimensional surfaces for coating evaluations, highlighting a coating's visual property changes when viewed from various angles.



Custom Stamping and Hole Sizes



Complex Custom Shapes



# Corrosion (Mass Loss) Coupons

Corrosion test coupons ensure repeatability and reproducibility when performing laboratory corrosion testing. They help a user independently monitor the test conditions in the chamber, by measuring the mass loss of the steel coupons as the test progresses.

CX series corrosion coupons are designed to meet the stringent requirements specified in modern corrosion test methods.

All Q-PANEL CX-series corrosion coupons include a Certificate of Analysis, come pre-cleaned, and are ready to use right out of the package. This allows the user to simply weigh the panels and place them in the tester, saving time and effort. And best of all, CX corrosion coupons are often half the price of competitors' coupons.



**Type CXB-12:** SAE1008-1010 carbon steel, 25 × 51 × 3 mm (1 × 2 × 0.125 in).

**Type CXC-35:** SAE1008 cold-rolled carbon steel, 76 × 127 × 0.8mm (3 × 5 × 0.032 in).

**Type CXD-2.76-5.90:** CR-4-grade steel, 70 × 150 × 1.2 mm (2.76 × 5.90 × 0.040 in).



**CXB-12**

(GMW 14872 and SAE J2334)

**CXC-35**

(ASTM B117)

**CXD-2.76-5.90**

(ISO 9227 and VDA 233-102)

# Automotive Refinish and Styling Panels

The Q-PANEL Automotive Refinish Training System (ARTS) is a low-cost platform used by automotive refinish centers to train technicians on proper painting techniques. The system comprises a portable mounting cart and set of lightweight, simulated automobile hood and fender panels.

The mounting cart is designed to fully support the panels in the correct orientation for painting. It may be folded up when not in use, requiring very little storage space. The large primed aluminum hood and fender panels are shaped like real automobile panels, but are much less expensive and can be used multiple times.

» **Save Money**

Lower in cost than actual automobile hoods and fenders, and reusable.

» **Save Time**

No tools are needed for setup, panels can be changed quickly, and no priming is necessary.

» **Save Space**

Easy folding saves storage space. ARTS panels can be easily tilted and rolled to working or storage locations.

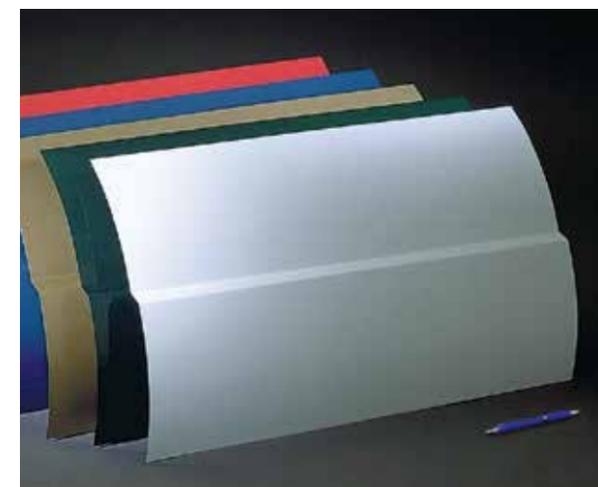


**ATS-101:** Mounting Cart

**ATS-201-K:** Simulated Hood (32 pcs)

**ATS-301-K:** Simulated Fender (32 pcs)

**ATS-401-K and ATS-451-K** Hood and Fender Kits



## AUTOMOTIVE STYLING PANELS

Q-Lab also offers large automotive styling panels with compound curves and a horizontal crease to simulate car doors. Coatings applied to styling panels reflect light in a manner similar to a coating on an actual automobile side panel. Panels are available in a light gray, coil coated, polyurethane finish. They are an economical way for the coating designer to show how the coating looks on a large complex surface.

**Type SPC** automotive styling panels are made from pre-primed series 3000 aluminum.

**Type SPR** panels are made from steel and feature an unpainted, matte finish.



## OUR GLOBAL NETWORK

We are committed to provide world-class technical, sales, and repair support in over 80 countries in which we operate. Visit [Q-Lab.com/support](https://www.q-lab.com/support) for contact information specific to your location and inquiry type.

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