

SOUTHEAST MESA LIBRARY | Exterior Material Legend

S O U T H E A S T MESA LIBRARY

City Of Mesa, Arizona



CODE	DESCRIPTION	MANUFACTURER	MODEL	COLOR / FINISH	SIZE	COMMENTS
CON-P	CONCRETE PAVERS	-	-	NATURAL	-	PERVIOUS
CON-X	EXPOSED CONCRETE	-	-	NATURAL	-	BOARD-FORMED TEXTURE
GLX-1	EXTERIOR GLAZING	VITRO	SOLARBAN 90	CLEAR / CLEAR	5'-0" × 10'-0" MAX UNIT	-
MP-1	EXTERIOR METAL PANEL	-	A606 STEEL	WEATHERING STEEL (CORTEN ROOF)	16GA (5' × 14' MAX PANEL)	-
MT-1	ALUMINUM WINDOW WALL	ARCADIA	#7	DARK BRONZE ANODIZED	-	-
WDC-1	WOOD CLADDING	ACCOYA	ACETYLATED PINE WOOD	NATURAL / WEATHERED TEX- TURE	1" × 5" NOMINAL	VERTICAL ORIENTATION

materiality

naturally "living" finishes will change with time, developing a patina creating an array of colors and contrasts.

Eventually the progression slows by creating a protective oxide layer

building elevation material breakdown

Glass 39%

Corrugated Fiber Cement 9%

Weathering Steel 49%

Modified Wood 3%



Under construction









Year 10

vandalism + durability

Weathering steel - Most graffiti are dark in color and the contrast does not benefit the urban "artist" and will find other "canvases". Graffiti can be removed using <u>naphtha</u> or other mild solvent. ¹

Corrugated fiber cement – is a highly durable + impact resistant material. We specify an anti-graffiti coating that is colorless, will not tarnish or yellow and ultra mat finish.

Glass – anti-graffiti coatings on glass tend to become cloudy over time. We would recommend a commercial grade solvent. Major vandalism etches/scratches can be sanded/buffed by professionals.

Wood –has been removed from locations subject to vandalism.







Mechanical Cleanliness

By mechanical cleanliness, a steel surface must be free of regions that are torn, scratched, dented, and gouged. This would also include surface marring from manufacturing processes and packaging issues that alter the surface. Mechanical cleanliness is a restorative process where the surface regains most if not all of its intended geometry.

VANDALISM

Scratches and Mars

If the graffiti is scratched onto the surface with a rock or key, the finish can usually be restored. This would also include scratches from handling and installation of large sections.

Weathering steel that has develop the oxide is very hard, and most substances will be undermined by the hardness of the weathering steel. However, materials can leave a streak that is light in contrast to the darkened surface. To repair the surface, consider cleaning the surface of loose material. You will need to perform this on more of the surface than simply where the scratch is in order to blend it. Figure 8.16 shows a surface of weathering steel on a memorial that was scratched with gravel. The surface was re-abraded with fine abrasive pads, then rewetted. As the surface is wetted



FIGURE 8.16 Memorial constructed of weathering steel. Initial repair showing discoloring. *Source:* L. William Zahner.

down it grows the oxide back slowly, and this should be lightly blended. Eventually, after several wet and dry cycles, it will blend with the adjoining surfaces.

Take a coarse, nonmetallic pad and rub it across the surface, working the scratch and deposited material away. Then wet the surface periodically to even out the oxidized surface. This technique also works well in mild transport damage that may occur to the surface of the weathering steel.

Scratches cannot be removed, but if they are not deep they will quickly oxide and be less conspicuous. Major scuffs on the surface can be treated by first cleaning with a pressure washer. Follow with a light abrasive pad then use steam to bring the surface back to match the surrounding areas. You may need to use a light abrasive pad and work the surface out to the edges. Allow the surface to dry. Repeat the steaming process as needed to help blend the surface and remove the mark.

Dents

Steel and weathering steel are significantly harder and more durable than most other metals in use. For the weathering steels, yield strength is approximately 40% greater as compared to normal steel. It will require a significant amount of energy to dent plates of weathering steel. The oxide that develops is also very hard, as compared to most other surfaces. The initial oxide is weak, but as it grows the oxide gets very hard.

Hailstorms, even the monster-size hail of the Midwest United States, have negligible effect on weathering steel surfaces. They simply do not possess the energy needed to achieve plastic deformation of the metal.

Ghosting from Packaging Materials

On occasion, when steel surfaces are protected and stored for periods of time, the protective media can leave light stains on the surface. In particular, art made from weathering steel that has been wrapped and placed into storage is subject to a surface mark that is a ghosting of the wrap. Moisture can be trapped and held against the weathering steel or the oxide may be rubbed by the packaging material.

To repair the surface, it will be necessary to wet the surface and regenerate the oxide where it has been damaged. Sometimes lightly sanding the surface is needed. Hot steam aids in the redevelopment of the finish surface. To avoid creating a more visual discolored region, the entire surface plane may need to be worked by lightly sanding, steaming, and drying. This will need to be repeated several times until the surface has returned. The far right image of Figure 8.17 shows the surface after restoration.

Distortion

Steels, like other wrought metals, are anisotropic. That is, mechanical properties in one direction are different from mechanical properties in the other. This is due to the microscopic alignment of grains as the metal is produced. Most of the steels used in art and architecture are leveled and stress



FIGURE 8.17 Ghosting from packaging material. *Source:* L. William Zahner.

relieved in such a way that internal directional bias is reduced. Couple this with the low reflective levels of the steels and distortions are not visible. A high gloss paint may, however, reveal distortions, but weathering steel and galvanized steel coatings do not.

Welding Distortion

Distortions created by welding processes are not usually an issue with steel, in particular, weathering steel. The very low gloss and diffuseness of the coarse surface that develop mutes any distortion. Distortions may occur localized around the weld where the metal has drawn in and created a concave distortion. Good welding practices and welding skill will eliminate this from occurring.

Shielded metal arc welding, SMAW, is a popular welding process for plate and heavy sheet but it is slower and will buildup heat lead to distortion. Higher-speed processes should be considered instead, particularly those that are automated such as submerged arc welding, SAW, electron beam welding, and laser welding. Gas tungsten arc welding (GTAW), when automated, will produce good welds in an automated and semiautomated system.

Distortions from Cold-Forming Operations

Weathering steel sheet and plate are provided leveled and flat. The high strength of these alloys requires more power in shearing and forming but typically they appear flat. On horizontal and lightly sloped regions dishing (concavity) of the center should be avoided. Surfaces made from weathering steel should always drain.

Abrasive blasting the surface of weathering steel on one side results in a convexity toward the side being blasted. The surface being blasted is stretched and has more tension; thus dishing toward the abrasive blast will occur. Dishing will occur on thick sheets and plates as well as thin. It is recommended to apply the abrasive blast onto both surfaces to even out the stress and flatten the metal.

The low gloss and coarseness of the surface will conceal minor distortions. They will be measurable, but not visible. The surface is extremely low in reflectivity.

Hail Damage and Small Dent Repair

As mentioned previously, it will take a lot of energy to dent weathering steel plates, or any steel plates, for that matter. Thinner sheet can be more easily dented but rarely by hail stones. Steel used on our automobiles experience hail impact, but this is typically on the horizontal surfaces. The steel used on automobiles is not as strong as the high-strength, low-alloy (HSLA) steels we commonly refer to as weathering steel.

Small dents can be removed. For the dent to have occurred, the steel would have gone through localized plastic deformation. There may be some thinning as the dent stretches the metal slightly, but this is hardly noticeable. If the dent is acute and has a visible crease, the crease will not be removable. If the dents are marks in the surface such as hammer marks, these as well are not repairable. Smooth concave and convex dents are repairable.

To remove a dent, first lightly abrade the reverse side of the panel or sheet. This will pinpoint exactly where the dent is, and it will highlight the area. Block the face side with a clean, smooth, wooden block, end grain against the metal. On the reverse side, the dent can be carefully hammered out with another wood block against the metal. Work it gently and the dented metal will return close to the original position (Table 8.7).

TABLE 8.7 Mechanical cleanliness.

Condition	Cleaning regimen-mechanical cleanliness		
Scratches and mars	Light abrasion followed by steam or wet and dry cycles		
Dents	Block and hammer to reverse damage. Refinish.		
Ghosting from packaging	Fully abrade and restore finish with steam and wet/dry		
Distortions	Design and skill		



FIGURE 8.9 Removing graffiti paint from a weathering steel surface. *Source:* L. William Zahner.

powder-coated steel, graffiti can be removed using naphtha or other mild solvent. Refer to Table 8.2 and try the low hydrogen bond solvents first.

There are a number of tools at one's disposal to achieve a physically clean surface. Most of these tools are readily available. Physical cleanliness considers the removal of foreign substances that have not damaged the underlying metal or metal surface but instead are adhering or bonding to the surface. Removal, then, requires lifting the substance from the metal and rinsing it away. Some of the tools are listed below.

High-Pressure Water Blasting

Similar to washing your car, high-pressure water blasting is an excellent and inexpensive method of removing substances adhering to the steel surface. On well-prepared weathering steel surfaces, ones that have a thick, developed oxide, will not flake when hit with high pressure washing. General

TABLE 8.2 Physical cleanliness.

Condition	Cleaning regimen-physical cleanliness		
Oils and grease	Detergent, steam, solvent degreasing		
Fingerprints	Detergent, glass cleaner, isopropyl alcohol, deionized water		
Dirt and grime	Detergent, steam		
Bird waste	High-pressure wash, detergent, steam		
Adhesives, gums	Solvent		
Silicones	Solvent		
Building exhaust	Solvent, steam, detergent		
Graffiti	Solvent		
Concrete or plaster spatter	High-pressure wash		

dirt and bird debris are removed as well as chloride salt deposits before they can have a detrimental effect on the steel surface. High-pressure washing should use clean water, with or without detergent. A final rinse with deionized water if possible is another added means of removing soils and minute deposits from the surface of weathering steel.

Steam Cleaning

There are several commercial steam-cleaning systems that operated similar to high-pressure water blast but instead incorporate a small boiler that heats the clean water up and delivers a blast of hot steam. The pressurized steam gets into the metal pores and breaks the bonds holding the foreign substance to the metal. For weathering steel, steam also promotes the development of the surface oxide.

Deionized Water

Deionized water is an excellent final rinse for metals. Deionized water is water that has had all the dissolved salts removed. Water is passed through a series of tanks containing charged resins, called ion exchange resins. Essentially what occurs is, the metal ions dissolved in the water, calcium, iron, magnesium, sodium, copper are attracted to the anion resin and exchanged for hydrogen ions. The metals are held in the anion tank for later disposal. The anions in the water, chlorides, fluorides, nitrates and sulfates are removed in the next tank containing cation resins and exchanged for hydroxyl ions. The resulting water is free of metal salts. The process of making deionized water is quicker and more economical than distilled water.

The deionized water attracts other minerals and free elements on the surface of the metal by virtue of the water alone. Since the ions have been removed, deionized water seeks out all ionic particles that can be on the surface of the metal.

corrugated fiber cement – Park Central – Phoenix, AZ installed 2018, photographed 2023





acetylated wood

Accoya[™] is not a spices of wood, but the trade name of acetylated wood.

Acetylated wood is produced from fast-growing radiata pine sourced from sustainable forests. Through a series of chemical reactions, the treatment process protects the entire piece of wood to its core, as opposed to other methods which only treat the surface and leave chemicals that can leech out.

It permanently "swells" the wood, creating a stable material with superior dimensional stability, which is a measure of its resistance to cycles of stretching and shrinking. These products have strong resistance to rotproducing fungi and are indigestible to insects (such as termites) and microorganisms.

Accoya[™] has a 50 year warranty against decay/rot + swell/shrinkage (greater than 2.5% in one direction)

https://www.accoya.com/app/uploads/2020/05/PerformanceTesting_US-1.pdf





acetylation permanently alters the chemical makeup of wood at a cellular level



