

Department of Homeland Security
Customs and Border Protection (CBP)
San Diego Sector
USBP Station Murrieta, CA (NAZ)
TPO Membrane restored with Silicone
IPP Silicone Roof Restoration System

These photos show the application process used to apply IPP products on TPO, EPDM and PVC membranes. The same application process is used when conducting in-house preventative maintenance and sealing any roof leaks. This IPP product line meets or exceeds federal sustainability goals set by: Executive Orders (EO), Federal Acquisition Regulation (FAR), Department of Energy (DOE), Environmental Protection Agency (EPA), and Cool Roof Rating Council (CRRC).

USBP – Murrieta Station / NAZ: This picture shows the old TPO membrane that's failed over time. It also shows mildew/mold growing on/in the membrane because of its organic properties. Ponding areas cause burn through, as the sun heats the water and acts like a magnifying glass burning the membrane causing leaks. The new Silicone UV Stable Highly Reflective roof will eliminate both these issues. Silicone is inorganic and will not grow mold/mildew in the membrane. It also does not break down in ponding water like TPO, PVC, EPDM, Cap-sheet, and BUR membranes. Silicone will not burn through like other roof membranes and is not effected by ponding water.



TPO/EPDM/PVC Pressure wash the old membrane using IPP Wash and Prime cleaning solution. This solution was formulated to remove dirt and the oxidized top layer on roof membranes. The deck will be washed and prepared for detail work around equipment. Cleaning the membrane will ensure 100% bonding of rubber emulsion across the entire deck.



Drains/Scuppers/Seams: The #1 source of leaks on failed roof membranes.

These drains show the baskets and rings removed. The drains will be inspected to ensure proper connection between drain pans and down spouts. The new membrane will encapsulate the drains, seams are reinforced with fabric encapsulated in rubber emulsion 60mils thick. This application will be applied across the entire deck with: drains, scuppers, penetrations, seams, utility lines, parapet walls, flashing, transitions, and equipment. (Detail Work)



Roof Drains / Detail Work: Rubber asphalt emulsion is used around roof drains and reinforced by embedding fabric into the rubber. This is the first stage of application after cleaning the roof surface. Penetrations will be inspected and coated with 60mils of rubber emulsion, which has >800% elongation properties to ensure decades of protection against expansion/contraction cycles.

Drains, One-way Vents, Curbs, Flashing, penetrations, and Seams all spray coated with rubber emulsion. (Details)

Drains encapsulated with rubber emulsion and ready for monolithic seamless application of rubber emulsion across the entire deck.



DRAINS The final waterproof coating is 40mils thick, white UV stable highly reflective silicone. The silicone top coating drops surface temperatures, saves on energy costs, reduces Co2 emissions, no/low VOC's and reduces heat island effect. These are all federal sustainability goals set by Executive Order, Federal Acquisition Regulation, DOE, EPA, ASHRAE and CRRC guidelines for Cool Roofs. (See links last slide)



Cleaning TPO membrane Prior to detail work around equipment curbs, stacks, utilities, seams and penetrations. The wash and prime is sprayed across the deck with a hand pump sprayer for easy application. This product sits for 15 minutes and breaks down the oxidized materials on the surface. Once pressure washed you can see how clean the membrane is and ready for IPP rubber.



One Way Vent Installation: One-way vents allow membranes to release gasses or built up pressure from the building. This prevents membrane lift, blisters or bubbling across the roof system. These vents are installed following manufactures recommendation for layout. A hole is cut in the membrane to match the inside vent diameter and glued to the membrane. The vent is then bonded to the membrane with rubber emulsion and reinforced fabric. The entire deck will be coated with rubber emulsion, primer and silicone.



Detail Work around the entire deck: This picture shows all detail work completed. This was spray applied, but it can be rolled as well to meet specifications. The next step is full seamless rubber application, followed by a primer and then final top coating with silicone.



Seams and Fabric: All seams, transitions, and flashing applications are sealed with rubber emulsion. Rubber is applied at 30mils, reinforced fabric is embedded into the rubber and coated with an additional 30mils of rubber. The final thickness at seams and penetrations is 60mils reinforced, the fabric adds additional strength at joints/seams for expansion/contraction. The deck is then coated with two coats of 40mil thick rubber emulsion for an 80mils thick deck membrane.



1st Rubber Emulsion Coating: This coating was spray applied but the system can be rolled or brushed as needed around equipment. The 1st coat is 40mils thick and will cure over 24-48hrs depending on weather conditions and humidity. Once cured and inspected, the 2nd coat can be applied, which will provide a new 80mils thick rubber membrane across the entire roof deck.



2nd Rubber Emulsion Coat: This coating bonds to the 1st coat and provides an elastomeric membrane with elongation properties up to 1000%. This new water proofing membrane seals the entire roof envelope. Once this coat cures, it'll be inspected and a primer applied.



Seamless Rubber Emulsion This was spray applied, but rolling is also used to accomplish the thickness required. Site conditions will dictate which application is used to obtain 80mils thickness of rubber emulsion across the deck. The next application after the rubber cures is to apply primer.



Primer and Silicone: Primer is applied to the rubber emulsion and after the coating has cured, silicone is applied at 40mils dry thickness. This final coating will provide the UV stability needed to conserve energy, reduce heat island effect, reduce Co2 emissions from roof top equipment and meet sustainability goals.



Primer: Primer is applied at 12-14mils wet and dries at >10mils thick. This coating bonds to the rubber emulsion and provides a surface ready for the silicone coating. The primer also acts as a bleed blocker preventing any discoloration to the silicone that could be caused by old asphalt roof systems. The gray color is primer and the white is silicone being rolled over the primer at 20mils thick, once this coat cures, it'll be recoated with an additional 20mils of silicone.



250HS High Solids Silicone: The silicone top coat is 40mils thick, encapsulating the entire deck in a monolithic seamless system. This system provides 2x the thickness in UV protective coatings than standard TPO, which has only 20mils thickness of top coating. This top coat is inorganic and will not break down in water if there ponding areas. The new membrane is 130mils thick on the deck and 190mils thick on seams and penetrations. This new system provides a total deck membrane thickness of 250mils thick. (New IPP membrane and the restored TPO)



Final Silicone Top Coat: This system meets or exceeds Sustainability Goals set by the Federal Government. The surface temperatures depending on site location can drop up to 60 degrees compared to traditional roofing surfaces. This 20+ year warranty ensures a sealed roof envelope with all the benefits of cool roof systems. Energy Savings, Waste Reduction, Low VOC, Reduced Co2 Emissions, Reduced Heat Island Effect, and Life-Cycle Cost Savings. This silicone roof will reduce energy demand in the summer, less HVAC cycle times equates to energy savings, reduced Co2 and less equipment run-times equates to longer equipment life-cycles.



Sustainability Design and Cool Roof Technology

- Federal Sustainability Plan: www.sustainability.gov/federalsustainabilityplan/
- Executive Order: 14005, 14008, 14057
- FAR 36.104 Policy: www.acquisition.gov/far/part-36#FAR_36_104
- FAR 23 Acquisition, Environment, Energy and Water: www.acquisition.gov/far/part-23
- EPA, Heat Island Effect, Co2 Emissions and VOC's: www.epa.gov/heatislands
- EPA, Guiding Principles for Sustainable Federal Buildings: www.epa.gov/greeningepa/guiding-principles-sustainable-federal-buildings
- Cool Roof Rating Council CRRC/ANSI rated products: www.coolroofs.org/resources/ansi-crrc-s100
- DHS Sustainability Plan 2022: www.sustainability.gov/pdfs/dhs-2022-sustainability-plan.pdf
- DOE Energy Star Roof Products 2022: www.instacoat.com/energystar/sunsetting
- Federal Energy Management Program (FEMP): www.energy.gov/eere/femp/federal-energy-management-program