

Department of Homeland Security
Customs and Border Protection (CBP)
U.S. Border Patrol (USBP) Station
San Diego Sector

Chula Vista, CA BUCA-0386 and 0483 **BUR Gravel Roof**

IPP Silicone Roof Restoration Systems
(SRRS)

These slides show the application process used to apply IPP products on existing roof decks. These products meet federal sustainability requirements while restoring existing roof envelopes and providing a new roof membrane. Different roof systems on this site included: cap-sheet, shingles, TPO, BUR gravel, and metal standing steam.



Built-Up-Roof (BUR) Gravel Deck

This old tar and gravel roof surpassed its lifecycle and was failing. The seams split and water was leaking into the facility during rainstorms. Maintenance employees had been chasing leaks on this roof for years. Gravel is used to protect the tar because it's not UV stable and will fail in sunlight, however the gravel also traps and retains heat across the deck. A roof deck 60' x 200' will have 42K pounds of gravel across the deck. The IPP system will remove and recycle more than half of that gravel, reducing the deadload by 21K pounds. On a building like this that's 70 years old with water and termite damage, removing 21K pounds, helps extend the useful life cycle, while improving the structural integrity of the facility.



Gravel Removal-Vacuum/Brooms

The loose gravel is removed from the deck and recycled onsite as fill or landscaping materials.

Vacuum systems can be used on large areas, brooms, shovels and dust pans can collect the remaining excess gravel. The picture shows the remaining gravel that's embedded into the old tar roof. This entire deck will be flood coated with rubber emulsion. The liquid will fill all voids, cracks and seams across the deck. When completed this roof will be a seamless membrane of rubber with expansion contraction ratings of 800-1000%. It'll be top coated with customer selected coatings for the site. Silicone—White, Tan, or Quartz aggregates to match existing shingles or cap-sheet.



Remaining Gravel to Flood Coat

This gravel will remain on the surface and be coated with 80-100 mils thick, neoprene asphalt rubber emulsion. The old gravel surface retained heat and didn't have the solar reflective properties of today's cool roofs. Silicone can be selected in many colors, however, white and tan are generally the selected roof coatings. With BUR roofs after flood coating with rubber, quartz aggregate can be cast into the top layer of rubber emulsion. The quartz comes in different colors to match onsite color schemes. This quartz is a UV stable product that also helps to drop temperatures across the roof surfaces, while protecting the rubber base coat.



Spray Applied Neoprene Asphalt Rubber Emulsion

The spray applied flood coat, levels out and fills all the voids on the roof deck. Multiple coats can be applied to a desired thickness. This roof had 80-100 mils thick of rubber applied over the old tar and gravel deck. This new membrane sealed all cracks, seams, penetrations and voids preventing any further water damage. The roof gravel that was removed averaged 3.5 lbs per sqft and this new roof only adds .3 lbs per sqft. So, the new roof is 17,400 pounds less deadload than the old system.



New Rubber Emulsion Membrane

Not removing the deck can save hundreds of thousands of tax dollars. At the same time meeting federal sustainability goals, by reducing construction waste. The roof was left in place preventing over 100K lbs of construction waste being dumped into a landfill. This saves tax dollars on labor, because there's no demolition, savings on dump fees, dumpsters, dump truck costs, etc... If these are eliminated, then Co2 emissions are also reduced. Remember, this is a cold applied system, so there's no hot tar kettles or torch applied systems; which all emit Co2 into the atmosphere. The IPP roofing systems meet or exceed federal sustainability goals: Executive Order 14005, 14008, and 14057 Federal Acquisitions Regulation (FAR) 36.104 Policy EPA and DOE goals are also met, the links are on the last slide for market research



Spray applied flood coat over BUR

This shows how fast and easy the system is to apply. Once the excess rock is removed, the material is applied easily across the roof deck. This first coat will cure and the second coat will be sprayed directly over top and form a monolithic membrane. (seamless)

Most BUR, Cap-sheet, PVC, TPO, and EPDM roofs all fail at the same locations—seams. Having thousands of linear feet of seams to fail is not comforting when paying for a new roof. So, an IPP roof provides zero worry from seam failure because its seamless. Also, any penetrations or seams on the old decks are reinforced with fabric embedded in rubber emulsion. This added step ensures 800-1000% elongation properties stand up to expansion/contraction for decades.

Spray Applied Rubber Emulsion

This is roof was one of several at this station which had a BUR gravel system. The deadloads were dropped significantly on these 50-70 year old structures. The wooden rafters and trusses had minor water damage which was repaired, but removing deadload is a huge benefit to help extend the life cycle of these facilities.

Final Coat of Rubber Emulsion

This roof was selected for quartz aggregate to match existing roofs with cap-sheet or shingles. The next step for this project is to cast in aggregate, which will bond to the rubber and provide a UV stable topcoat. Any excess aggregate can be collected and cast into the next roof section. This is a great example of taking an old roof and restoring it with a new membrane holding a 20-year warranty.





Aggregates Cast on Rubber

This roof was selected for quartz aggregate to match existing roofs with cap-sheet or shingles. The customer selected a gray/white color to reduce surface temperatures across the deck. This is a great example of taking an old roof and restoring it with a new membrane holding a 20-year warranty.

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](http://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