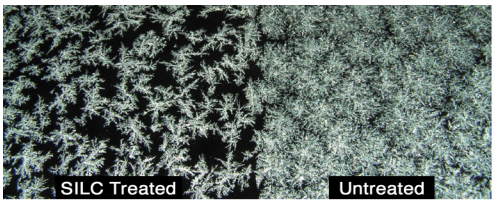
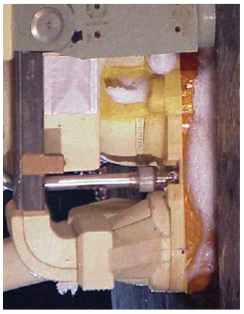
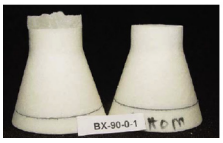
John F. Kennedy Space Center's Shuttle Ice Liberation Coating (SILC) For Use As An Ice Adhesion Reduction Coating







The National Aeronautics and Space Administration (NASA) seeks partners interested in the commercial application of an ice adhesion reduction coating. This technology is an icephobic/ice release coating developed to reduce the adhesion of ice to surfaces of the Space Shuttle System prior to and during launch. Although cryogenic insulation is used throughout the Space Shuttle External Tank (ET) to prevent ice formation, there are several areas on the ET where it is not possible to place insulation due to geometric or space limitations. Without adequate insulation, ice forms in these areas posing a debris hazard to the Shuttle during launch.

BENEFITS

- Reduces surface ice adhesion by up to 90%
- May prevent the formation of ice altogether under certain conditions due to high contact angle causing water runoff
- Excellent durability to environmental weathering
- Can withstand several cycles of ice growth/ removal without loss of performance
- Can be buffed until application surface appears transparent with no loss of performance
- Can be used to coat surfaces that require transmission of optical light
- Inexpensive to produce

technology opportunity

APPLICATIONS

- Aerospace Vehicles
- Commercial and Military Aircraft
- Commercial Vehicle Windows
- Ships, Boats, and Submarines
- Military Vehicles
  -Tanks
  - Infantry Fighting Vehicles
- Hydropower and Waterway Navigation Facilities

TECHNOLOGY STATUS

- ☑ Patent pending
- ☐ U.S. patent
- ☐ Copyrighted
- ☑ Available to license
- ☐ Available for no-cost transfer
- ☐ Seeking industry partner for further codevelopment

Technology Details

Scientists from Kennedy Space Center (KSC), Marshall Space Flight Center (MSFC), and Langley Research Center (LaRC) co-developed an ice adhesion reduction coating technology to help combat the dangers posed to Shuttle launch operations by the formation of ice on the Space Shuttle External Tank (ET). Ice falling from under-insulated portions of the ET following liftoff could strike the Shuttle Orbiter, endangering both the vehicle and its crew. The unique formulation of this coating changes the adhesion of ice on surfaces to which it is applied by an order of magnitude, resulting in the fracturing and release of ice from the ET during engine ignition prior to liftoff of the vehicle from the launch pad. Although not an ice prevention coating, this technology may in some cases prevent or delay ice formation due to its high contact angle causing water to run off the coating even if the surface is a very slight angle. Extensive testing of the coating conducted by the US Army Corps of Engineers Cold Regions Research and Engineering Laboratory (CRREL) showed that the performance and durability of this coating is excellent.

Partnership Opportunities

All NASA licenses are individually negotiated with the prospective licensee, and each license contains terms concerning commercialization (practical application), license duration, royalties, and periodic reporting. NASA patent licenses may be exclusive, partially exclusive, or nonexclusive. If your company is interested in this new ice adhesion reduction coating technology, or if you desire additional information, please reference Case Numbers KSC-13100 or KSC-13101 and contact:

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