

# IsoCARC™

## Chemical Agent Resistant Coating (CARC)

### Technical Data Sheet



#### Product Description

IsoCARC is a patent-pending, single pack, zero VOC, moisture-cure CARC system containing no free isocyanates. The coating meets a qualification test regime based on the MIL-C-53039B specification. IsoCARC is intended for use on tactical military vehicles and equipment. It was developed under a SBIR program and qualifies for sole source contracts.

#### IsoCARC™ Background

Current CARC topcoat and primer systems are required to protect aluminum, steel and organic matrix composite substrates from harsh natural and military service-imposed operational environments, minimize enemy threat detection, and resist contamination or degradation by chemical warfare agents. These types of paints are generally based on isocyanate urethanes and currently have Volatile Organic Compound (VOC) levels of 180-420 g/L. They are often multi-component systems. The problems associated with current generation urethane coating systems are two-fold.

The first problem relates to the environmental impact of VOCs which contribute to smog formation. Recent NESHAP limitations have been extended to encompass applications of CARC. As a result, the U.S. Military is taking an aggressive position to reduce the VOC content in its specified coatings.

The second problem associated with current generations of CARC is the health impact on coating applicators.

#### Available FED-STD-595 Colors

Green 383, 34094
Brown 383, 30051
Black, 37030
Aircraft Gray, 36300
Tan 686A, 33446

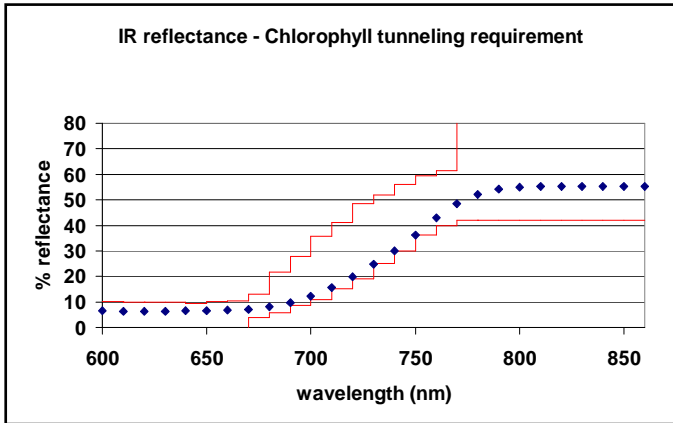
Custom pigment systems have been designed and one pigmented IsoCARC system is uniquely specified on a military vehicle.

During Desert Storm, the United States military sent thousands of vehicles and equipment to theater for repainting to the desert camouflage scheme. The military-established painting operations were reportedly limited in personal protection equipment, and it was later discovered that there was inadequate adherence to applicable safety and occupational health policies and procedures. The CARCs used during Desert Storm contained isocyanates. Overexposure to isocyanate vapor can cause permanent damage to the brain, liver, nervous system, and kidneys. Isocyanates cause problems in the respiratory system and are harsh skin and mucous membrane sensitizers<sup>1</sup>.

IsoCARC was developed under an SBIR program for the United States Navy. It is a single component, VOC and isocyanate free system designed to meet performance requirements of MIL-C-53039B. Pigmented IsoCARC coatings are currently in use on the USMC Expeditionary Fighting Vehicle.

<sup>1</sup> United States Naval Flight Surgeon's Manual: Third Edition 1991: Chapter 21: Toxicology: Isocyanate

**Performance Data**



IsoCARC Color Green 383, 34094 passes the infrared spectral reflectance test. The test requires Green 383, 34094 and Dark Green 34082 to give the same IR signature as chlorophyll, i.e. plant life, to provide true camouflage in wooded areas.

Mustard (HD) chemical agent resistance testing was performed by a qualified third party lab per MIL-C-53039B. All of Isotron’s formulations outperformed the commercial Sherwin Williams CARC.

Isotron Formulation ID	Average HD Desorption ( $\mu\text{g}/\text{cm}^2$ )
IsoCARC	15.6
A12.118.075*	23.2
A12.125.127*	18.0
Sherwin Williams MIL-C-53039	30.0
ND = 0.2 $\mu\text{g}/\text{cm}^2$ of HD	

\* Developmental formulations

**A summary of the MIL-C-53039B conformance tests results for IsoCARC.**

Test	MIL-C-53039B or Description	Test Method	Result
Specular Gloss	4.6.12	ASTM D523	PASS
VOC Content	4.6.8	ASTM D3960	PASS
DS-2 Resistance	NA	NA	PASS
Solvent Resistance	MEK rubs	ASTM D5402	PASS
Hardness	NA	ASTM D3363	PASS
Flexibility	4.6.18	ASTM D522	PASS
Adhesion	4.6.20	ASTM D3359	PASS
Recoat Adhesion	4.6.19	ASTM D3359	PASS
Water Resistance	4.6.21	ASTM D1308	PASS
Hydrocarbon Resist	4.6.22	ASTM D1308	PASS
Acid Resistance	4.6.23	NA	PASS
Chemical Agent Resistance	4.6.26	NA	PASS
QUV Weathering	4.6.24	ASTM G26	PASS

**Application**

IsoCARC can be rolled, brushed or sprayed. The coating is applied directly from the container. Exempt solvents such as PCBTF (aka Oxsol® -100) and t-butyl acetate may be added to thin to a desired consistency.

**Safety, Storage, and Handling**

Customers considering the use of any of Isotron Corporation’s products should consult the latest Material Safety Data Sheets and labels for product safety information. Store at room temperature. Keep containers tightly sealed and avoid contact with moisture.