Defense Systems Information Analysis Center

DSIAC TECHNICAL INQUIRY (TI) RESPONSE REPORT

Vision Block Manufacturers

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ABOUT DSIAC

The Defense Systems Information Analysis Center (DSIAC) is a U.S. Department of Defense Information Analysis Center sponsored by the Defense Technical Information Center. DSIAC is operated by SURVICE Engineering Company under contract FA8075-14-D-0001.

DSIAC serves as the national clearinghouse for worldwide scientific and technical information for weapon systems; survivability and vulnerability; reliability, maintainability, quality, supportability, and interoperability; advanced materials; military sensing; autonomous systems; energetics; directed energy; and non-lethal weapons. We collect, analyze, synthesize, and disseminate related technical information and data for each of these focus areas.

A chief service of DSIAC is free technical inquiry (TI) research, limited to 4 research hours per inquiry. This TI response report summarizes the research findings of one such inquiry. For more information about DSIAC and our TI service, please visit www.DSIAC.org.

ABSTRACT

The Defense Systems Information Analysis Center (DSIAC) received a technical inquiry requesting information on manufacturers capable of producing and supplying vision blocks for a gunner station hatch for amphibious tactical vehicles. DSIAC completed open-source searches to identify and contact U.S.-based transparent armor manufacturers to determine abilities and interest of further discussions with the inquirer if the opportunity arose. A list of such manufacturers was compiled in a response report and delivered to the inquirer.

Contents

1.0 TI Request

1.1 INQUIRY

What original equipment manufacturers (OEMs) have the capability to provide transparent armor (TA) for vision blocks in an amphibious military vehicle?

1.2 DESCRIPTION

The inquirer noted that the current supplier may be closing, and alternative suppliers are being researched. The inquirer had already researched the OEM TA solutions but was interested in OEMs that produce replacement parts, given the somewhat short life span and need for readily-available, manufactured TA and vision blocks for military vehicles.

2.0 TI Response

Defense Systems Information Analysis Center (DSIAC) staff contacted OEMs to identify TA providers that could produce high-quality, low-cost replacement vision blocks between 10 and 12 inches wide for amphibious armored vehicles.

TA for vehicular protection is typically a glass-based, layered laminate that uses ductile polymers for debris protection [1]. It is used in various ways in all armored military vehicles, such as in small side windows or as vision blocks or large windshields. As of 2017, replacing delaminated TA costs the Marine Corps $15–20 million a year; TA has a relatively short life span of only 3–4 years before delamination [2].

2.1 VISION BLOCK MANUFACTURERS

DSIAC identified seven OEMs that could provide TA for vision blocks.

2.1.1 Oran Safety Glass (OSG)

OSG is an Israeli-based glass fabricator with three divisions (i.e., transportation, defense and security, and special applications) [3]. It has two manufacturing facilities in southern Virginia for its U.S. projects, which include multiple military contracts [4]. OSG is an approved supplier of TA for numerous military forces, including the U.S. Army and Marine Corps, and the largest supplier of armored windows for the mine-resistant, ambush-protected (MRAP) and MRAP all-terrain vehicle families of armored vehicles [5].

OSG's U.S. point of contact (POC) confirmed that OSG could produce TA vision blocks for amphibious armored vehicles. Some of OSG's relevant projects included teaming up with General Dynamics for vision blocks in tank hatches and a 360-degree vision block for a

commander's post. The POC noted that OSG's competitive pricing has allowed previous military contracts [4].

2.1.2 PPG Aerospace

PPG Aerospace provides TA and specialty products designed and tested to provide protection against a multitude of impact, ballistic, and blast threats. PPG works with customers to develop solutions for a variety of purposes, including military agencies [6]. PPG Aerospace is a leading manufacturer of windshields, canopies, windows, blast barriers, and specialty transparencies for military aircraft such as the AH-64 Apache, V-22 Osprey, and Lockheed Martin F-16, among others [7]. PPG Aerospace has provided vision blocks in the past, but the cost could be higher than what the inquirer would prefer, according to a PPG POC [8].

2.1.3 Dlubak Specialty Glass Corporation

Dlubak is a Pennsylvania-based, small business that is an experienced supplier of ballistic and blast windows for the U.S. military. Their multilayered glass polycarbonate constructions range from 1.5 to 6 inches thick to offer protection from a wide range of threats [9]. Dlubak has supplied over 300,000 windows to the U.S. Army Tank-automotive and Armaments Command for gunner protection kits and provided ballistic and blast-resistant glass for various military vehicles since 2005, including the MRAP platform [9, 10].

2.1.4 Standard Bent Glass (SBG)

SBG is a Pennsylvania-based company specializing in innovative solutions for TA vehicle OEMs and U.S. government customers. SBG has TA approved for light, medium, and heavy tactical vehicles, MRAP platforms, etc. [11]. SBG's Vice President of Military Products stated that the company is capable of producing vision blocks [12].

2.1.5 Ibis Tek

Ibis Tek is a Pennsylvania-based company that specializes in TA for both marine vessels and ground vehicles. They have supplied over 500,000 TA windows composed of traditional and advanced materials in monolithic and spaced designs. Ibis Tek works closely with OEMs, government, industry, and academia to develop tailored TA solutions to minimize weight and maximize survivability. Their TA has been installed in ground vehicles ranging from MRAPs to high-mobility, multipurpose, wheeled vehicles [13].

2.1.6 Transparent Armor Systems (TAS)

TAS is an international manufacturer of ballistic glass and frame systems for defense, automotive, and architectural applications. TAS has extensive experience in engineering these systems for tactical armored vehicles [14].

2.1.7 Surmet Corporation

Best known for its aluminum oxynitride (ALON) advanced transparent ceramic armor, Massachusetts-based Surmet manufactures and supplies ALON components to military and industrial customers for armor and infrared optics applications [15]. In response to a DSIAC inquiry, the Director of Security Products noted that ALON products are much harder and stronger than typical glass-based TA but at a much higher expense. Surmet is manufacturing and supplying ALON products in sizes, such as 22 x 24 inches [16].

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