

Award-Winning 1937 Alfa Romeo Gets a Boost with Cold Spray

By Julio Villafuerte



The 1937 Alfa Romeo 8C 2900B Touring Berlinetta won the 2018 Best of Show award at the Pebble Beach Concours d' Elegance. (David and Ginny Sydorick, Beverly Hills, Calif. Copyright Kimball Studios / Courtesy of Pebble Beach Concours d' Elegance.)

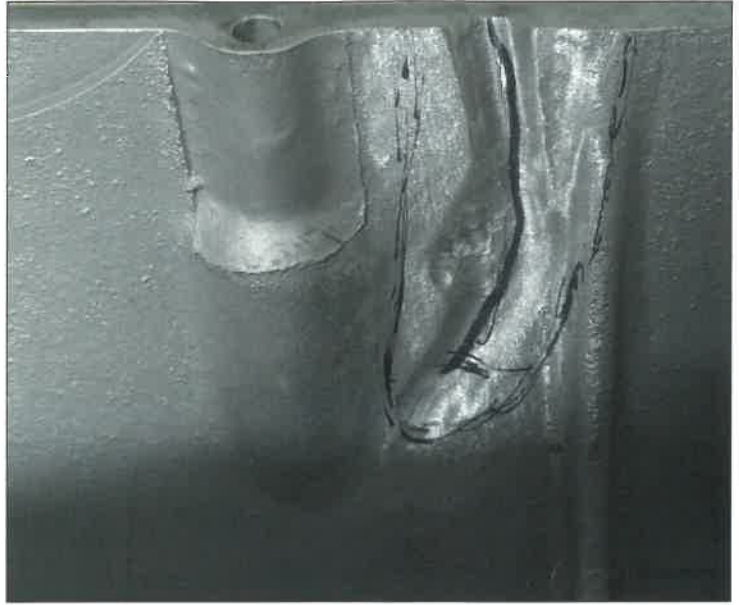


Fig. 1 — Visible cracks and unacceptable aesthetics are seen around the oil pan.

Although less powerful than its predecessors, the Alfa Romeo 8C 2900B Touring Berlinetta was exclusively designed for select customers of the automaker. It later became an attractive vintage item to avid international automotive collectors. The car is believed to have been kept in Germany through World War II and into the 1950s. In 1956, the vehicle was purchased by an American collector and imported into the United States for the first time. Initially restored in the 1990s, it spent time on both sides of the Atlantic over the years before finally joining the collection of David and Ginny Sydorick. In 2001, an early production of the vehicle won the Most Elegant Closed Car award at the Pebble Beach Concours d’Elegance. The automotive event is an annual display of historic and beautiful cars and considered to be the world’s most prestigious. In 2018, the Sydorick car, fresh from its recent restoration, won the ultimate prize Best of Show at the renowned car show. It also received two other awards at the show, the Charles A. Chayne Trophy and the J. B. & Dorothy Nethercutt Most Elegant Closed Car.

Challenges during Restoration

In trying to restore the car to its original condition under the hood, many challenges were faced. Corrosion, tear, and wear had damaged both the aesthetics and functionality of the cast aluminum oil pan. There were visible cracks on the inside, unacceptable aesthetics on the outside, and multiple oil leaks during operation — Fig. 1. The aluminum cast alloys used to fabricate these components were all heat treated, making them quite sensitive to thermal repair processes such as welding or conventional thermal spray, for degraded mechanical properties and distortion. Replacing the old part with a new one wasn’t an option because these components went out of production a long time ago. Attempts had been made to dimensionally repair these defects by special welding methods, which still rendered poor performance results and worsened the aesthetic appearance. Consequently, the restoration professionals made an

effort to search for modern repair techniques that would restore functionality while not compromising mechanical integrity and improving aesthetics.

The Cold Spray Choice

Cold spray is a solid-state metal consolidation process that uses a high-speed gas jet to propel metal and other powder particles against a substrate where particles plastically deform and consolidate upon impact. The term “cold spray” refers to the relatively low temperature involved in the process, which is typically much lower than the melting point of the spray material and substrate. Since adhesion of the metal powder to the substrate and deposited material is achieved in the solid state, the characteristics of cold spray deposits are quite unique, making cold spray suitable for depositing well-bonded, low-porosity, oxide-free deposits. These attributes make cold spray uniquely suitable for depositing a range of temperature-sensitive materials in this application.

Portable cold spray equipment offered an economically viable option to conduct the repair using nitrogen as a propellant and aluminum-based powder as the repair material — Fig. 2. After low-temperature dimensional restoration of the area, the new consolidated material was effectively machined back to tolerance using standard machining techniques.

The Procedure

The cold spray processes began with surface preparation, which consisted of cleaning, pre-machining for suitable deposition, and grit blasting. Then, an SST™ Series P machine was utilized to manually fill in all repair areas, using the spray parameters depicted in Table 1. The sprayed component was finally machined to desired dimensional tolerances — Fig. 3. The vehicle was then reassembled by a professional restoration shop (Ref. 1) to its original functionality and aesthetics — Fig. 4.



Fig. 2 — The commercial SST™ Series P cold spray system was used to conduct the oil pan restoration job. (Courtesy of CenterLine Windsor Ltd.)



Fig. 3 — Restored oil pan. (Courtesy of RX Autoworks.)

Table 1 — Spray Parameters

Machine: **SST™ Series P / Manual Gun / 2.0-mm Orifice / UltiLife™ nozzle**

Spray Powder: **SST A0050 (Aluminum – Alumina)**

Substrate: **5000 Series Aluminum**

Gas: **Nitrogen**

Gas Temperature: **450°C**

Gas Pressure: **170 lb/in.² (12 bar)**

Conclusion

After several attempts in the quest for appropriate repair technologies, the professional restorer was able to salvage and restore the irreplaceable oil pan back to its original condition thanks to the use of cold spray. ▲

References

1. RX Autoworks, Vancouver, British Columbia, Canada, rxautoworks.com.

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Fig. 4 — The vehicle is reassembled following the restoration of the oil pan. (Courtesy of RX Autoworks.)