

WELDING ACCEPTANCE TEST FOR ALUMINUM

Application

The procedure outlined herein is a standard welding acceptance test for all aluminum alloys which are recognized or specified by the Ford Motor Company to be resistance weldable. Essentially, it is a procedure to approve the capability of a supplier or Company activity to obtain a spot weldable surface. This procedure shall constitute a method by which such a supplier or Company activity may become an approved supplier of spot weldable aluminum sheet and as a quality control procedure for checking consistency of weldability.

Equipment Required

Spot Welder

This test shall be conducted on an air operated single point press type spot welder featuring a low inertia welding system and in general complying with the Resistance Welder's Manufacturing Association specifications for the size of machine required. It shall be equipped with a Ford approved resistance welding control featuring 90° firing and phase shift heat control. It shall have electrode force capacities to meet the requirements of the range of material to be welded at a maximum of 550 kPa (80 psi) operating air supply line pressure. The transformer tap setting shall be selected to meet the secondary current requirements at phase heat control settings between 85 and 100 %. The welder must be equipped with electrode holders conforming to Ford Drawing 2 ZU 265 and shall have furnished to it sufficient water flow capacity so that 7.6 L/min (2.0 gal/min) will flow through each electrode holder as isolated circuits from the water cooled transformer, secondary conductors, control panel, etc.

Knife Edge Dial Caliper

Brown and Sharpe Model 599-579-10 (metric model), or equivalent.

Welding Electrodes

Ford standard "increased water flow" electrode caps with a radius welding face shown in Figure 1 will be used for all tests. The electrode caps must be made from Ford standard M-2A107C (RWMA Class 1) material. The electrode caps, adapters and holder to be used will be found under the following identifications:

Electrode Cap WC - modified as per Figure 1
Cap Adapter WB 1S
Electrode Holder Assembly Drawing 2 ZU 265

Date	Action	Revisions
2002 08 30	Activated	Formerly BA 113-07 R. Lord

Printed copies are uncontrolled

Procedure

Surface Preparation of Material

The material submitted for approval shall be prepared according to the practice proposed to be used for production quantities. A letter shall accompany the material noting all pertinent data to identify completely the method of preparation. A minimum of 7.5 square metres of material shall be submitted in a width equal to the maximum capability of the surface preparation equipment.

The material shall be sheared in 25 x 300 mm and 100 x 300 mm pieces. Care shall be exercised to obtain pieces of each size from various positions of its width.

The Welding Acceptance Test shall be conducted as outlined herein. If failure occurs, the material is rejected. If the material passes the initial Welding Acceptance Test, the unused portion of the submitted material shall be stored on a rack permitting exposure of both surfaces of the sheets to normal shop atmosphere for 90 days. The Welding Acceptance Test is then repeated on the material after 90 days exposure.

Approved Criteria

Approval is granted when all of the following conditions are met:

1. Welding Acceptance Test on material before and after 90 days exposure to shop atmosphere produces a minimum of 2000 consecutive acceptable welds without failure.
2. Set up samples of 25 x 300 mm test strips to be free of expulsion (whiskers).
3. Indentation due to electrode pressure does not exceed 14 % of indented sheet thickness.
4. No sheet separation or buckling due to indentation.
5. Surface roughness meets applicable paintability specification requirements.

Following approval, no changes in material or processing which could affect weldability may be made without prior written approval from the responsible Ford activity.

Welding Acceptance Test

Electrode Conditioning

The electrode caps shall be installed in the machine so that they are in precise alignment in the vertical plane and their welding faces are parallel under the electrode force requirement for the thickness of the material under test. Specimens for this setup are 100 x 300 mm coupons of the actual test material. This alignment shall be checked and face conditioned by making a series of 60 welds at welding current at least 10 % under that shown in the Weld Schedule Section of this specification.