



Soldered/Brazed Connections

1 Introduction

Note: Nothing in this standard supercedes applicable laws and regulations.

Note: In the event of conflict between the English and domestic language, the English language shall take precedence.

1.1 Purpose. This standard describes the general requirements for the quality and appearance of soldered connections and contains general instructions on the soldering procedure, so far as this is not described in detail on the drawings.

1.2 Applicability. This standard can be used for soldered connections in motor vehicles.

1.3 Remarks. Soldered connections can be classified according to design, soldering procedure and scope. The soldering design can be, for example, flat/overlap or inserted joint connections.

The joining procedures are soldering and brazing.

This classification is specified in DIN 8505-2 and DIN 8505-3.

This specification is classified according to the scope:

Type A: Tube connections made of aluminum and/or aluminum alloys used, for example, heat exchangers, air conditioning equipment etc.

Type B: Flat products and profiles, made of aluminum and/or aluminum alloys.

Type C: Tube connections made of steel, for example, fuel lines.

2 References

Note: Only the latest approved standards are applicable unless otherwise specified.

2.1 External Standards/Specifications.

DIN 8505-1	DIN 8505-3	DIN EN ISO 6520-1	DIN EN ISO 18279
DIN 8505-2	DIN 8524-3	DIN EN ISO 6520-2	

2.2 GM Standards/Specifications.

GMW3059

2.3 Additional References.

Component Drawing

3 Test Preparation and Evaluation

3.1 Resources.

3.1.1 Facilities.

3.1.1.1 Calibration. The test facilities and equipment shall be in good working order and shall have a valid calibration label.

3.1.1.2 Alternatives. Alternative test facilities and equipment may also be used. However, all measuring variables as specified in this standard shall be determined correctly with respect to their physical definition.

3.1.2 Equipment. Not applicable.

3.1.3 Test Vehicle/Test Piece. Not applicable.

3.1.4 Test Time. See Section 4 for test times.

3.1.5 Test Required Information. Not applicable.

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3.1.6 Personnel/Skills. Test technician familiar with test facilities and equipment.

3.2 Preparation. Not applicable.

3.3 Conditions.

3.3.1 Environmental Conditions. Not applicable.

3.3.2 Test Conditions. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

3.4 Instructions. Not applicable.

3.5 Data. Not applicable.

3.6 Safety. This Engineering Standard may involve safety requirements for hazardous materials, the method of operations and equipment. This standard does not propose to address all the safety issues associated with its use. It is the responsibility of the user of this standard to ensure compliance with all appropriate safety and health practices. This would include any specific training that may be required. The safety and health standards include site specific rules and procedures, company rules and procedures, and Government Standards. Contact shall be made with the appropriate site Safety and Health personnel for further direction and guidance in these matters.

3.7 Documentation. Samples of components or material released to this standard shall be tested for conformity with the requirements of this standard and approved by the responsible GM Department prior to the start of delivery of production level components or materials.

Any change to the component or material, e.g., design, function, properties, manufacturing process and/or location of manufacture requires a new release of the product. It is the sole responsibility of the supplier to provide the customer, unsolicited, with documentation of any change or modification to the product/process, and to apply for a new release.

If not otherwise agreed to, the entire verification test shall be repeated and documented by the supplier prior to start of delivery of the modified or changed product. In some cases, a shorter test can be agreed to between the responsible GM department and the supplier.

3.7.1 Test Results. Not applicable.

3.7.2 Deviations from Test Procedure. Deviations from the requirements of the test procedures shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4 Requirements and Procedure

4.1 System/Subsystem/Component/Part Definition.

4.1.1 Appearance. According to DIN 8505-2.

4.1.2 Ambient Environment. The soldered connections must be free of fluxes or residues which may cause failure of components under operating conditions as a result of chemical reactions between the flux used or its residues and the operating or ambient medium.

4.2 Product Characteristics.

4.2.1 Performance Requirements.

4.2.1.1 Bonds and Degree of Filling.

4.2.1.1.1 Type A. There shall be a good metallic bond between the solder and the substrate. The average degree of filling validated at three metallographic sections for each soldered part shall be $\geq 60\%$. Hereby the degree of filling of each metallographic section shall be $\geq 50\%$ (see 4.3).

In a borderline case (average degree of filling $60\% \geq MW \geq 50\%$), two additional soldered parts of the same production batch shall be tested according to the above mentioned conditions.

If the additional test results do not obtain the nominal value ($MW \geq 60\%$), the soldered part will be rated as not acceptable.

4.2.1.1.2 Type B. Same as Type A.

4.2.1.2 Soldering Lengths.

4.2.1.2.1 Type A. For soldering lengths ≥ 5 mm, there shall be continuous, flawless, soldering lengths of ≥ 2 mm metal bonded on both sides.

4.2.1.2.2 Type B. Same as Type A.