Standard Practice for
Acoustic Emission Monitoring During Resistance Spot-Welding

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1. Scope
1.1 This practice describes procedures for the measurement, processing, and interpretation of the acoustic emission (AE) response associated with selected stages of the resistance spot-welding process.
1.2 This practice also provides guidelines for feedback control by utilizing the measured AE response signals during the spot-welding process.

2. Units—The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in non-conformance with the standard.

3. Terminology
3.1 Definitions — For definitions of terms relating to acoustic emission testing, see Section B of Terminology E1316.

4. Significance and Use
4.1 The AE produced during the production of a spot-weld can be related to weld quality parameters such as the strength and size of the nugget, the amount of expansion, and the amount of cracking. Therefore, in-process AE monitoring can be used both as an examination method, and as a means for providing feedback control—Summary of Practice.
4.2 The resistance spot-welding process consists of several stages. These are the set-down of the electrodes, squeeze, current flow, forging, hold time, and lift-off. Various types of acoustic emission signals are produced during each of these stages. Often, these signals can be identified with respect to the nature of their source. The individual signal elements may be greatly different, or totally absent, in various materials, thicknesses, and so forth. Fig. 1 is a schematic representation showing typical signal elements which may be present in the AE signature from a given spot-weld.
4.3 Most of the depicted AE signal features can be related to factors of weld quality. The AE occurring during set-down and squeeze can often be related to the condition of the electrodes and the surface of the parts. The large, often brief, signal at current

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