EMP - a puzzle with only two pieces

Four important parameter settings that govern the end result of RF welding are sealing bar pressure, the amount of energy applied, and the welding and cooling time.

Factors that will influence optimal parameter settings are the material properties, type of sealing bar and general enviromental conditions.

In traditional welding processes it is normal for the machine operator to adjust machine parameters on the basis of prevailing conditions to achieve the best possible welding result.

With EMP the settings of the machine are automatically adapted to prevailing conditions.

Several factors are therefore removed from the equation relieving the operator from achieving an optimum result. In this way, the welding process is simplified considerably and dependence on the individual skill of the operator is reduced. Accordingly, opportunities are therefore created for better efficiency and considerable improvements in the quality of the final product.

To explain how EMP works we start with the pressure, which traditionally has an neglected role in the welding process. The machine is set at a certain pressure that is not adjusted appreciably for different types of welding work. However, the fact is that the pressure has considerable effect on the welding result. The following table shows recommended pressure values for various categories of material when welding with a standard sealing bar:

Material category	**Guide value, pressure (pounds / sq.in., psi)**
Non woven PVC	5-20 pounds / sq.in.
Reinforced PVC	
- up to about 10 ounces coating	35-65 pounds / sq.in.
- up to about 30 ounces coating	35-50 pounds / sq.in.
- up to about 40 ounces coating	15-30 pounds / sq.in.

The differences are quite considerable and consequently incorrect pressures could result in significantly reduced strength of the welded seam.

In traditional welding it is only possible to set the total welding force. This means that the actual force per unit area of material can vary considerably depending on the size of the sealing bar.

A sealing bar of 124 sq.in. and total force 1760 pounds would give a pressure of 14 pounds/sq.in., while a sealing bar half the size, ie, 62 sq.in. and the same total force would give a pressure of 28 pounds/sq.in., ie, double that of the larger sealing bar.

The problem is avoided altogether with EMP, because the pressure is given per unit area (pounds/sq.in., psi).

When welding a particular material using EMP, the operator indicates the welding area of the sealing bar and a guide value for the pressure per square inch. A test weld is then done. As the material begins to move a little as a result of the weld seam beginning to form, the operator ends the welding cycle. A manual check of the material is then carried out. If the quality of the weld is approved the welding cycle can be repeated over and over again, with the same favourable result as the first time. The machine has actually memorized how the test weld was done and saved the values, not only the force per unit area that was used but also the total power-consumption.

In this way both power and time are taken out of the equation. The machine applies the total amount of energy that is needed to achieve an optimal weld, which takes a certain time depending on the power output at each given time.

All the operator needs to think about is the sealing bar area and the pressure.

When changing to a different sized sealing bar of the same type only the size of the new sealing bar needs to be indicated. The machine automatically adjusts its welding parameters in relation to the new weld area and the same weld quality is also achieved with this sealing bar.

The setup procedure of test welding must be repeated when changing material, when changing the number of layers of one and the same material, and also when changing between different types of sealing bars, because the optimum settings for pressure and energy application will be different.