



SAVING WITH SORPAS®

A customer was awarded a contract welding DP600 steel and had only eight weeks to weld assemblies effectively. The customer found it difficult to obtain stable welding lobes, acceptable welding parameters and consistent measurable weld nuggets. The use of SORPAS® software facilitated an estimated set-up and run-in saving of US\$100,000 through the optimization of weld schedules.

Sorpas® software reduced the man hours required to determine weld schedules, optimized those schedules, and reduced wastage or rework of completed assemblies. In addition, pre-production run-in labour was lessened. These labour savings were augmented by optimizing parameters that effectively enlarged the welding lobe, helping to ensure consistent weld buttons were pulled in testing. In addition, the customer found that Sorpas® improved their understanding of welding advanced high strength steels – leading to the adoption of two pulse welding with superior results.

Weld Current Range of DP600 (1.2mm) @ Different Weld Time

Weld Current(kA) Weld Condition	Diameter (mm)				
	4√t (Minimum)	5√t	6√t	Expulsion	Lobe
Weld Time = 15 Cycles	9.45	10	10.5	10.6	1.15
Weld Time = 18 Cycles	9	9.4	10	10.2	1.2
Weld Time = 21 Cycles	8.05	8.4	9	9.2	1.15

Sorpas® simulations were able to **reduce** many hours of design and testing by proposing optimum weld schedules resulting in **large savings** in time and labour. These schedules were validated by actual welding results, shown at left. The weld current required (in kA) at varying button sizes from minimum weld size (MWS) of 4√t (t=single sheet thickness), to the expulsion limit, are shown at increasing weld times. The effective welding lobe width (expulsion current minus MWS current) is in the most right hand column. The lower chart shows that the use of two pulse welding with no intermediate cooling time enlarged the lobe width. This **increases** the robustness and stability of the welding process. **Thus Sorpas® provides a valuable tool for engineers to innovate and implement improvements.**

Comparison of Weld Current Range for DP600 (1.2mm) @ Different WT1 (2-pulse)

Weld Current(kA) Weld Condition	Diameter (mm)				
	4√t (Minimum)	5√t	6√t	Expulsion	Lobe
2-Pulse WT1 = 2 Cycles	8.3	9	9.4	10	1.7
2-Pulse WT1 = 3 Cycles	8	8.3	9.2	9.4	1.4
2-Pulse WT1 = 5 Cycles	7.6	8.1	8.7	9	1.4

Huys Industries gratefully acknowledges the financial assistance and technical insights of:



National Research Council Canada

Conseil national de recherches Canada

