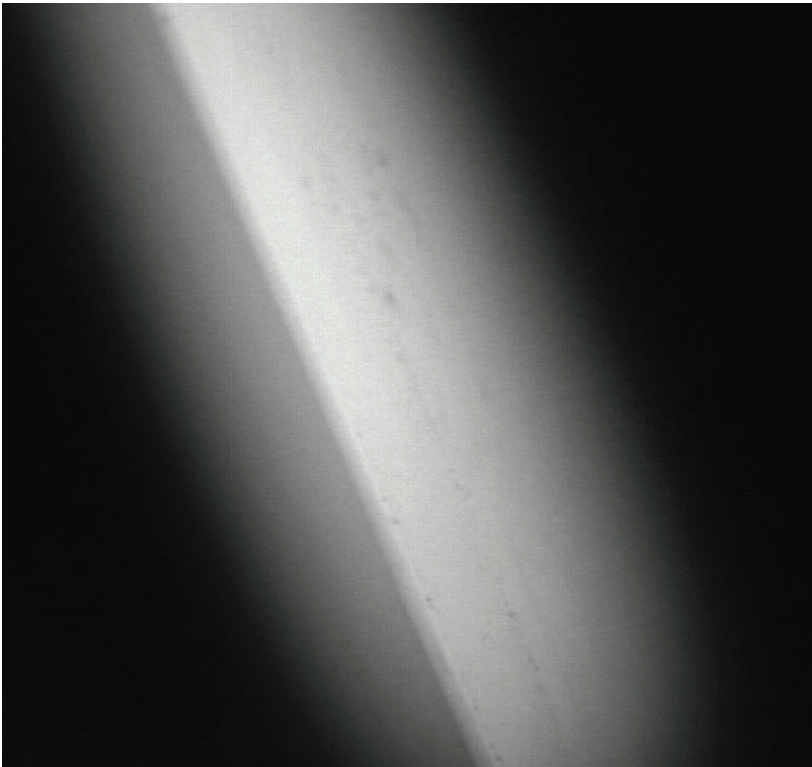


# MONITORING THE GLOW SPOT IN HSAW WELDING



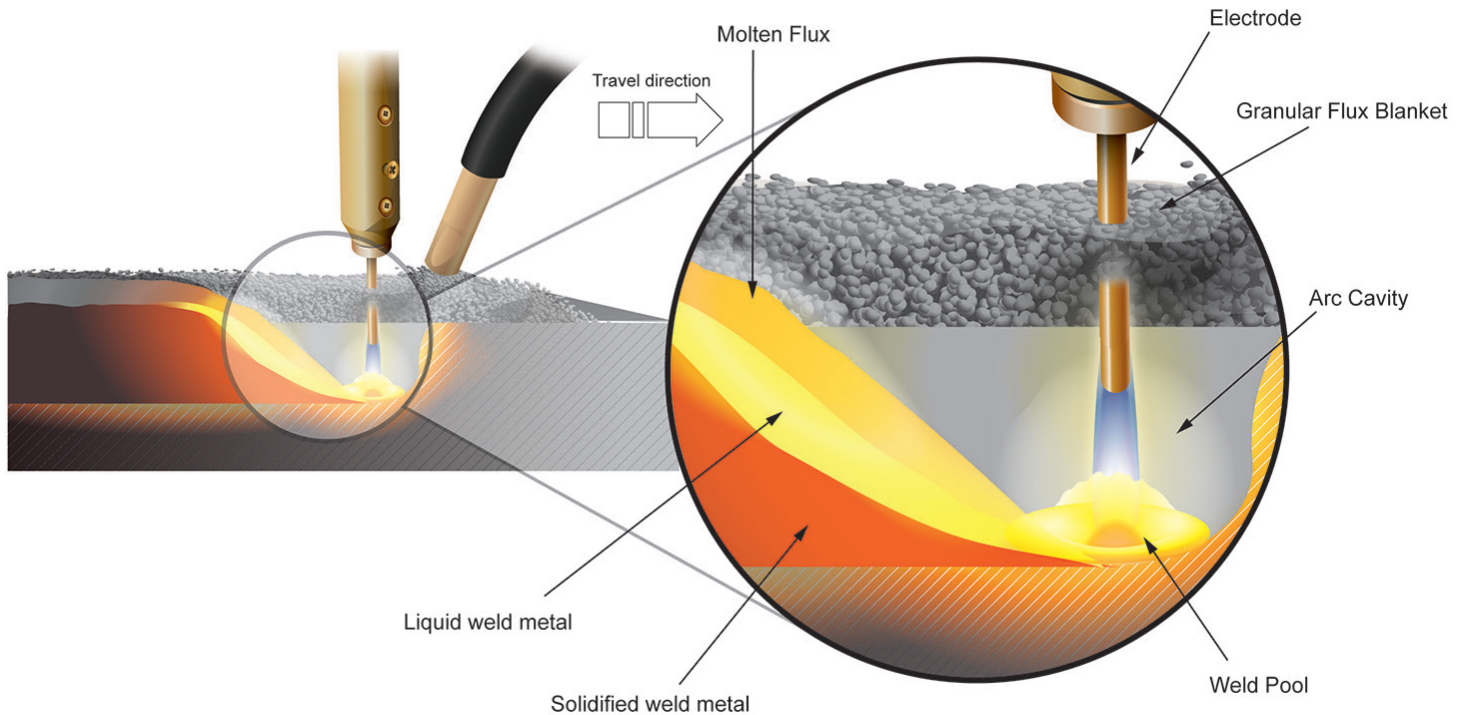
**The Glow Zone or "Spot" seen from the backside of the weld, showing the extent of heat and the location of the seam.**

A challenge most fabricators face when fabricating large diameter pipe using a Helical Submerged Arc Welding (HSAW) process, also known as spiral welding, is ensuring that the welding torch is aligned with the seam during the root pass weld. As a granular flux is used during HSAW, it usually covers the welding puddle, obscuring the operators' view of the melt pool and its position relative to the seam to be welded from the outside of the pipe.

Depending on how the pipe is welded together, operators perform their weld from one side of the pipe wall and rely on a mirror, or a camera, on the other side of the pipe wall to view the "glow spot," or the hot spot generated from the heat of the torch. Although the glow spot is visible from either the front side or the backside of the weld, the back of the weld usually provides a clearer image without the welding apparatus. By aligning the glow spot to the seam location also on the backside of the weld, operators can ensure they stay on course when welding their pipe.

However, when welding thicker material in particular, the glow spot is no longer visible to the human eye as the glow spot is not as bright as in thinner material. As a result, operators are not able to see how their torch is aligned.

A major North American spiral welded pipe manufacturer faced this situation and needed a solution to align the glow spot to the seam. Thermal cameras could see the heat zone of the weld but could not see the seam. Regular, visible light cameras



This image of a typical submerged arc is courtesy of CWB Group, CWBi Acorn.

provided a clear view of the seam but were not able to show the glow spot or any change in temperature in the pipe material near the weld.

Working with this manufacturer, Xiris developed a special camera, that was a thermally enhanced, HDR (high dynamic range) weld camera that captures both the visible light coming from the cooler, physical material structures such as the seam boundary, as well as a component of the thermal response of the hotter structures in the welding environment, all in one image. The thermally enhanced camera was mounted externally to the pipe, allowing the operators to see the seam-to-glow spot alignment well enough to steer their welding torch properly.

This imaging solution was complemented with the addition of a visible light camera mounted on the interior of the pipe, which helps identify and correct other

deviations, such as insufficient flux supply or contact tip damage.

A remote monitor can be configured to display multiple processes concurrently, allowing a single operator to monitor the inner and outer sub-arc welding processes simultaneously. On the display, the thermally captured heat zone appears white, and the seam of the plate or strip appears as a dark grey groove.

The benefits of this weld camera enhancement are numerous. The thermally enhanced detail in the camera's images gives operators a clear image to assess the torch-to-seam alignment. The ability to view both sides of the welding process (inside and outside) results in an increase in weld productivity and better yield. As well, health and safety and ergonomics for the operators are improved because they no longer have to bend down and look under the pipe to view the mirror.

Since spiral welded pipe is used to transport flammable and non-flammable gases and liquids, the integrity of the pipe welds is critical. Xiris' thermally enhanced weld camera gives manufacturers a new tool to ensure that they are achieving the highest quality welds by providing alignment to seam monitoring capability. The thermally enhanced weld camera improves productivity and helps to avoid potential faults—leading to greater output for spiral welded pipe manufacturers. **W**

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