AugmentedArc™ Augmented Reality Welding System

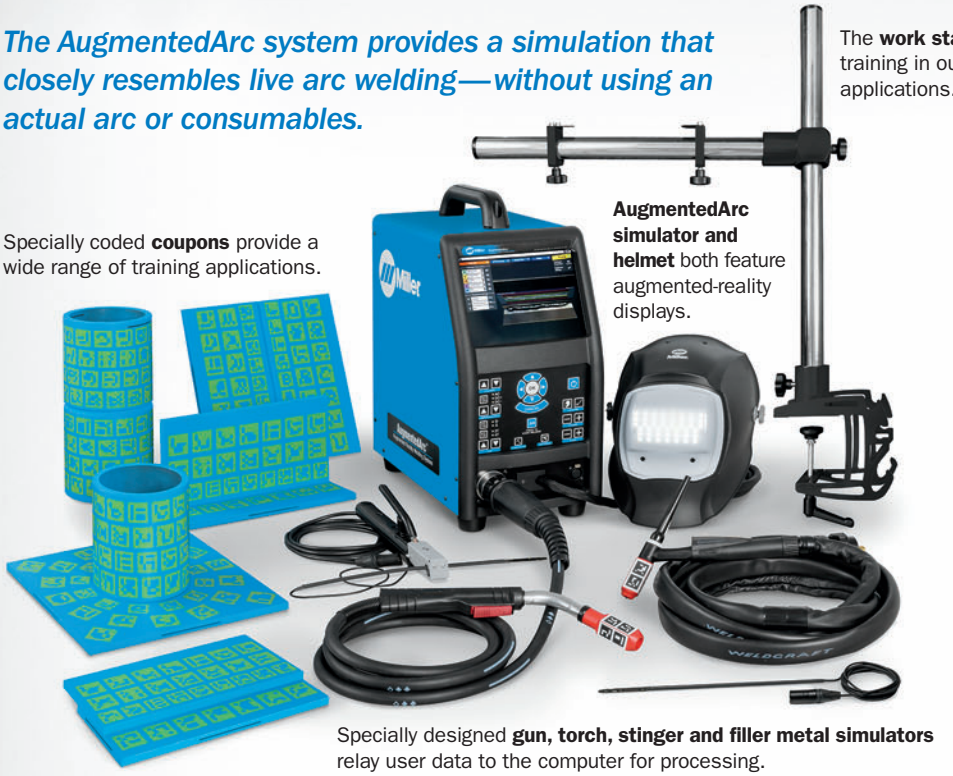
The industry's most realistic welding simulation solution.

For beginner and intermediate-level weld students, the Miller AugmentedArc™ Augmented Reality Welding System simulates multiprocess GMAW (MIG), FCAW (flux-cored), SMAW (stick) and GTAW (TIG) welding, blending real-world and computer-generated images into a unique, augmented reality environment. AugmentedArc helps students complete their training faster and instructors make more effective use of their time.

Students who have never welded before can start working with the system almost immediately and benefit from an experience that not only closely resembles live arc welding, but also delivers immediate, objective, quantitative feedback on their welding techniques. The system offers intuitive, easy-to-understand setup assistance and post-weld feedback to help users quickly develop proper welding techniques. Students can use AugmentedArc to gain process knowledge and valuable experience without being exposed to an actual arc or consuming wire, shielding gas or coupons.

Advanced, engaging technology for welding education

The AugmentedArc system provides a simulation that closely resembles live arc welding—without using an actual arc or consumables.



The **work stand** allows for training in out-of-position applications.

AugmentedArc simulator and helmet both feature augmented-reality displays.

Specially coded **coupons** provide a wide range of training applications.

Specially designed **gun, torch, stinger and filler metal simulators** relay user data to the computer for processing.

Optional components

The heavy-duty **transportation case** provides heavy-duty protection for the complete system during transportation or storage.

The **AugmentedArc controller** provides the capability to link multiple AugmentedArc systems together into a virtual classroom environment.

How it works

- Instructors use the system's Teacher software to develop a curriculum with theory, quizzes and welding exercises, as well as monitor student performance and create progress reports. Add the optional controller for the capability to connect multiple systems and create a virtual classroom with centralized monitoring and content distribution.
- To complete an assignment, students wear a specially designed welding helmet that contains an external optical sensor, which captures images of coded devices and coupons and sends them to the AugmentedArc simulator.
- The simulator generates three-dimensional images of metal workpieces, weld arcs and weld beads, augmenting them into a real-world environment.
- Inside the helmet, the augmented reality environment appears on a specially designed heads-up display panel, precisely showing the user's proximity to and interaction with the workpieces and welding gun/torch. The same images also appear on a second display panel in the simulator's case. Additionally, realistic arc sounds feed through speakers located in the helmet.
- The AugmentedArc system continuously monitors the user's adherence to pre-determined or custom welding parameters. GMAW/FCAW parameters tracked include work angle, travel angle, travel speed, contact-tip-to-work distance (CTWD), and aim. SMAW parameters tracked include work angle, travel angle, travel speed, arc length, and aim. GTAW parameters tracked include rod work angle, rod travel angle, travel speed, arc length, and aim.
- The helmet's heads-up display delivers immediate visual feedback on the user's performance, providing confirmation when parameters are being maintained and alerts when they are exceeded.
- When the welding exercise is complete, an analysis screen provides feedback on the user's performance in the form of scores and graphs. Video of the welding exercise is also recorded and made available for later playback, allowing instructors to evaluate students' performance.

Specifications (Subject to change without notice.)

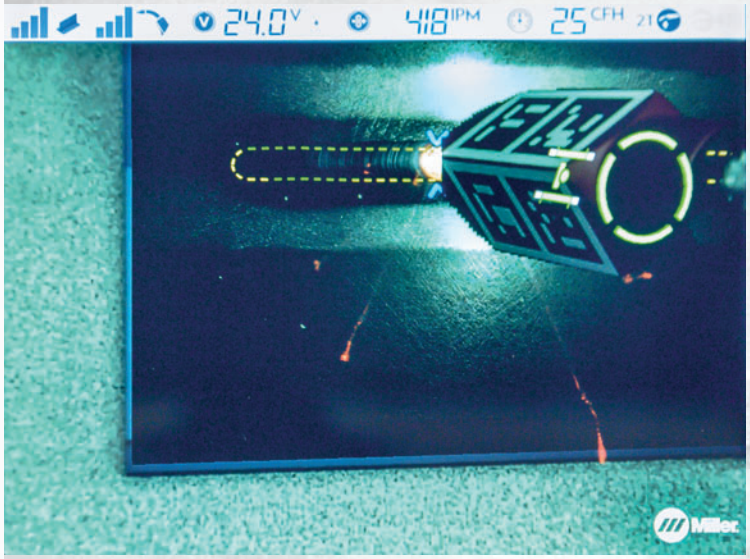
Processes	Welding Positions	Joints	Workpiece Positions	Input Power	Voltage/ Amperage Selection	Polarity Selection	Shielding Gas Selection	Wire Speed Selection (ipm/m-min)	Base Material Selection	Workpiece Selection (in./mm)	Stick Electrode Selection	Diameter Selection (in./mm)	Dimensions (in./mm)	Net Weight (lb./kg)
GMAW FCAW SMAW GTAW	1F–4F, 1G–6G	Bead on plate, t-joint, butt joint, lap joint, pipe-plate, pipe-pipe	Horizontal, vertical, flat, overhead	115 V, 15 A, 60 Hz	GMAW: 10–36 V 25–270 A FCAW: 12–36 V 25–270 A SMAW: 50–240 A GTAW: 25–270 A	DCEP, DCEN, AC	CO_2, argon O_2, argon CO_2, and mixtures	GMAW/FCAW: 47–787 (1.2–20)	Carbon steel, stainless steel, aluminum	1/8, 1/4, 3/8 (3.2, 6.4, 9.5)	E7018, E6010, E6013	Solid wire: .030, .035, .045 (0.8, 0.9, 1.2) Stick electrode: 1/8, 3/32, 5/32 (2.5, 3.25, 4.0) Filler rod: 5/64, 3/32 (2.0, 2.4)	Simulator: H: 21 (533) W: 9.38 (238) D: 17.25 (438)	Simulator: 26.3 (12) AR welding helmet: 2.5 (1.1)

Augmented reality displays

The simulator and helmet displays combine real and computer-generated imagery to create a unique interactive environment, and offer immediate feedback to help quickly develop proper welding techniques.

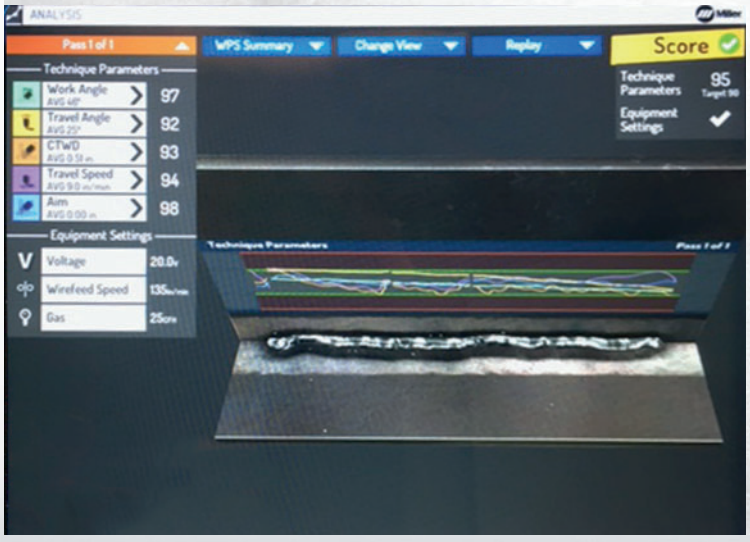
The AugmentedArc displays

- The helmet's external optical sensor captures images of coded devices and coupons, and sends them to the AugmentedArc system's simulator.
- The simulator generates three-dimensional images of metal workpieces, weld arcs and weld beads, augmenting them into a real-world environment.
- The helmet display precisely shows the user's proximity to and interaction with the workpieces and welding gun/torch.
- The same images also appear on the second display panel in the simulator's case.



Welding simulation screen

- During a simulated weld sequence, visual graphical aids guide the user to achieve target parameters.
- The system continuously monitors the user's adherence to the pre-determined or custom welding parameters, and provides confirmation when they are maintained or alerts when exceeded.
- Realistic arc sounds fed through speakers located in the helmet accompany the visuals for a truly immersive experience.



Post-weld feedback screen

- After an exercise is completed, an analysis screen scores and graphs the user's performance, which is recorded for playback.
- GMAW/FCAW parameters tracked include work angle, travel angle, travel speed, contact-tip-to-work distance (CTWD), and aim.
- SMAW parameters tracked include work angle, travel angle, travel speed, arc length, and aim.
- GTAW parameters tracked include rod work angle, rod travel angle, travel speed, arc length, and aim.

AugmentedArc™ Augmented Reality Welding System

Delivering unbeatable advantages

Optimize instructor efficiency

Instructors can use the Teacher software with an AugmentedArc controller to create a virtual classroom with customized curriculum, quizzes and weld exercises. Students can work at their own pace, and instructors have more time to assist students one-on-one.

Deliver real-time feedback

By providing immediate feedback on users' techniques, AugmentedArc quickly helps correct errors, reinforce proper welding practices and accelerate skill advancement prior to actual live arc welding in a lab.

Reduce overall training time

Compared to traditional methods, AugmentedArc significantly reduces the amount of time needed to teach students.

Minimize material cost

By helping students refine their welding skills in a simulation environment before beginning live arc welding, Miller systems deliver a green training solution: There's less waste of wire, gas and coupons.

Build a larger, more-skilled welding workforce

AugmentedArc is attractive to computer-savvy young people, drawing them to welding education programs and increasing their success — key to building the larger, more-skilled welding workforce the world depends on.

TRUE BLUE® WARRANTY

The AugmentedArc™ system is warranted for one year, parts and labor.

The **LiveArc™ welding performance management system**, used together with AugmentedArc, provides students with a natural progression from classroom welding simulation to laboratory live arc welding.

AugmentedArc equipment ordering information

AugmentedArc 951689

Comes complete with:

- AugmentedArc simulator
- Teacher software
- Black Infinity™ AR helmet (277265) with premium headgear
- AugmentedArc router (277397)
- Work stand (277266) for out-of-position applications
- SMAW stinger (277268)
- SMAW electrode (277267)
- TIG torch (301400) with AR tip (277272)
- TIG filler rod (277271)
- MIG gun (301401) with AR tip (277269)
- Butt joint coupon (277274)
- T-joint coupon (277270)
- Butt pipe coupon (277275)
- Pipe-to-plate coupon (277276)
- Lap joint coupon (277273)

Optional components:

- AugmentedArc controller (301395) for multiple system connectivity
- Heavy-duty transportation case (301396)

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