REDWELD COMPACT WELDING SIMULATOR
RED-WS200

Dimensions: 63cmx54cmx60cm
Weight: 30kg
Welding processes supported:

- SMAW
- GMAW - MIG/MAG
- FCAW
- GTAW – TIG
- Robotic (*optional)

Welding positions: PA, PB, PC, PD, PF/PG, PE, PH/PJ, 1F, 2F, 3F, 4F, 5F, 6F, 1G, 2G, 3G, 4G, 5G, 6G
Welding joints: V-groove butt pipe, V-groove butt plates, T-joint inner corner, pipe-to-plate T-joint, plate overlay, and straight stitching.
Accesories: Arc welding torch, Gas welding torch, Tig welding torch, VR based welding mask
Thickness selection: 3-10 mm
Material selection: Carbon steel, stainless steel, and aluminium
Power supply: 100-240 V, 50-60 Hz.
Total power: 1KW

Voltage selection	Yes
Amperage selection	Yes
Shielding gas selection	Yes
Wire speed selection	Yes
Stitch technic selection	Yes
Direction selection	Yes
Hand selection	Yes. Right or left
Real welding torches	Yes
Video recording	Yes
Helmet	Meta Quest 3

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Zümrütevler Mah. Lalegül Sok. No: 8A Maltepe Istanbul Turkey
www.redlab.com.tr - www.weldsimulator.com - +90 216 599 0036

Languages	English, Spanish, German, French, Dutch, Korean, Polish, Portuguese, Arabic
Visual Hint	Yes
Area Selection	Yes, welding workshop, construction zone, maintenance center, shipyard
Polarization	Yes
Electrode / wire material selection	Yes
Electrod / wire diameter selection	Yes
User Evaluation System	Yes
Project to Larger Screens	Yes
Remote maintenace	Yes
Display size	15,6” touch screen
Vision technology	Virtual reality
Sound	3D sound
Updates	Yes
Warranty	2 years

Analyzed Parameters:	**Analyzed welding errors:**
• Travel speed, • Work angle, • Travel angle, • Arc length, • Position, • Distance between contact nozzle and workpiece.	• Insufficient penetration, • Slag containment, • Undercut, • Porosity, • Poor bead placement, • Convex, Concave • Wrong welding size, • Excess Spatter, • Melt/Blow through.

Macro Test Parameters:	
• Heat Input • Filler Penetration • Root Penetration • Fusion Line • Heat Affected Zone (HAZ)	• Cracks or Porosity • Leg Length Asymmetry • Toe Angles • Percent Weld Dilution • Throat Thickness

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Technical Specifications

1- In the Welding Simulation Training Set based on the virtual reality (VR) system; It consists of welding machine, torches and welding mask.
2- It has original gas metal arc and tig torches and specially designed electrode arc welding pliers (SMAW - Electric arc welding).
3- Welds according to at least 6 welding positions; V-groove butt pipe, V-groove butt plates, T-joint inner corner, pipe-to-plate T-joint, plate overlay, and straight stitching.
4- Working angle, feed rate and angle, feed coordinates, weld seam guide lines and arc length distance can be measured accurately and data (numbers and graphics) can be viewed instantly.
5- The thickness of the workpiece can be selected between 3 and 10 mm and material selection (Carbon Steel, Stainless Steel and Aluminum) can be made.
6- According to welding types, welding torches, gas metal arc and tig torches have original weight and structure (with their real equivalents), different wire thicknesses can be selected with the electrode selection.
7- Device; It can perform electric arc welding (SMAW), gas metal arc welding (GMAW-GTAW), cored wire arc welding (FCAW), TIG welding.
8- CO2, ARGON-CO2 mixture and ARGON options are available as shielding gas.
9- Real-time feedback is provided on the welding technique applied using visual cues.
10- Supervision and control of the welding applications and ethernet or wireless access to all data with the teacher's computer.
11- Amperes and volts can be adjusted according to welding types and positions.
12- In addition to the exercises performed by the users and the analysis results of these exercises, it is possible to store the video of the exercise on the simulator device.
13- Scoring can be made by considering how well the student welds according to the welding technique determined by the teacher.
14- Student studies or possible welding errors can be analyzed by the system, reported and transferred to the teacher's computer with the simulator screen.
15- The welding technique applied by the student is shown with a graph containing lines of different colors, and this graph consists of lines belonging to different parameters.
16- There is a scoring system for the evaluation of the user. With the help of this system, users can be tested, and a multiple-choice exam can be applied to users with the teacher software.
17- Position of welded joint, distance between contact nozzle and workpiece, working angle, feed angle, feed rate, reaching target, weld porosity, electrode; It simulates the situations where it melts and can be replaced with a new one while using, and splashing slag situations are simulated.
18- Overlay welding can be performed from normal and single pass up to 4 passes in the welding simulator.
19- It allows manual and automatic trigger options while simulating gas metal, cored wire and tig welds with the simulator.
20- There are flat, zig zag, triangular crescent and circular weld seam options.
21- With its right-to-left and left-to-right welding feature, the welding apparatus and the software are also suitable for right-handed and left-handed users.
22- There is an adjustable virtual work stand in different positions to place the virtual welding parts.
23- The welding mask has sufficient inner depth between the screen in the mask and the forehead so that students with glasses can also use it. The apparatus has VR technology.

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24- In electrode and cored wire welding, there is a shell cleaning feature for observing before and after the removal of the welding shell.
25- User data for up to 20 users can be compared numerically and graphically.
26- All analysis data can be saved as PDF.
27- The welding simulator has licensed teacher software. The software can be updated in accordance with the technological requirement.
28- Supervision and control of the welding applications and ethernet or wireless access to all data with the teacher's computer
29- Student studies or possible welding errors can be analyzed by the system, reported and transferred to the teacher's computer with the simulator screen.
30- There is a scoring system for the evaluation of the user. With the help of this system, users can be tested, and a multiple-choice exam can be applied to users with the teacher software.
31- Simulator computer specifications: Intel i5 13400F 2.5GHz, RTX5060 8GB, 16GB Ram, 500GB SSD
32- VR Helmet specifications: Capacity 128 GB, Screen Type: LCD, Resolution Per Eye: 2064x2208, Refresh Rate: 120 Hz., Viewing Angle: 110 °
33- Since the system is a computer simulation, there is a 15,6” monitor and other equipment, internal USB, ethernet, HDMI cable in order to watch the images in the system.

Robotic welding module features:

34- The system includes a robotic welding feature. With this feature, an industrial robot in the virtual reality environment can be programmed to weld selected parts.
35- The robot has realistic kinematics and moves just like a real robot in the virtual environment.
36- Linear and circular motion programming are supported.
37- The robot can be programmed using a teach pendant.
38- With the Dry Run feature, it is possible to preview the programmed robot path without starting the welding process.
39- The robot can be moved both in XYZ mode and Joint mode.
40- Using the Home button, the robot can automatically return to its starting position.
41- The robot can navigate between code lines, and the codes can be edited using the Edit button.
42- A new point can be recorded for each movement point.
43- The robot’s speed can be adjusted.
44- Through the Command button, the following commands can be added:
    - Wait command
    - Arc Start command
    - Arc End command
    - Move Home command

45- The robot can perform welding on the following parts:
    - V-groove pipe
    - V-groove plates
    - T-joint inner corner connection
    - Pipe-to-plate connection
    - Straight bead welds
    - Overlapped plates

Macro test feature:

46- Displays Macro Test evaluation screen after welding operation
47- Shows macro cross-section visualization of the weld
48- Performs multi-point macro cross-section analysis at three locations (A, B, C)
49- Displays Heat Input Score
50- Displays Filler Penetration Score
51- Displays Root Penetration Score
52- Displays Fusion Line Score
53- Displays Heat Affected Zone (HAZ) Score
54- Calculates and displays numerical Heat Input value (kJ/mm) for each cross-section
55- Measures and displays Filler Penetration depth (mm) for each cross-section
56- Measures and displays Root Penetration depth (mm) for each cross-section
57- Measures and displays Fusion Line length (mm) for each cross-section
58- Measures and displays Heat Affected Zone width (mm) for each cross-section
59- Displays defect presence check for:
    - Lack of penetration (Yes / No)
    - Lack of fusion (Yes / No)
    - Undercut (Yes / No)
    - Cracks or porosity (Yes / No)
60- Displays weld bead geometric values, including:
    - Leg length
    - Leg length asymmetry
    - Toe angles
    - Throat thickness
    - Weld dilution percentage

61- Shows individual parameter scores in a dedicated “Macro Test Scores” panel
62- Displays numerical score values for each macro test parameter
63- Presents visual comparison of cross-sections A, B and C side by side
64- Macro test results can be saved in PDF report format.

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SPECIFICATIONS

VR / AR welding simulation system equipment:

- Welding simulator machine,
- Arc welding torch
- Gas metal arc welding torch
- TIG welding torch
- Virtual reality supported welding mask.

Analyzed Parameters:

- Travel speed,
- Work angle,
- Travel angle,
- Arc length,
- Position,
- Distance between contact nozzle and workpiece.

Analyzed welding errors:

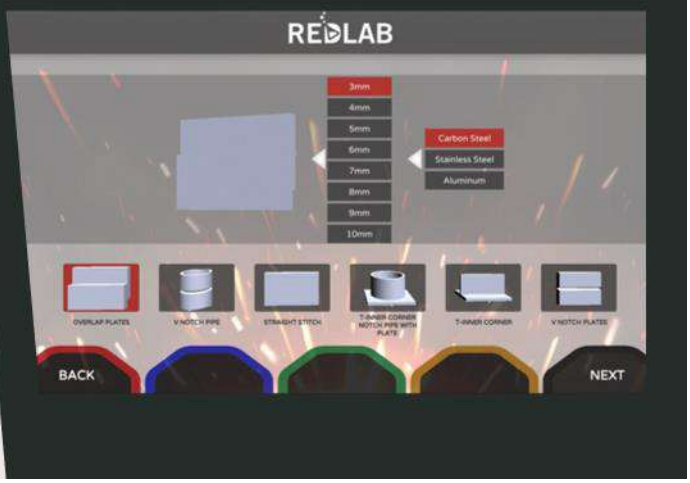
- Insufficient penetration,
- Slag containment,
- Undercut,
- Porosity,
- Poor bead placement,
- Convex, Concave,
- Wrong welding size,
- Excess Spatter,
- Melt/Blow through.

PART AND MATERIAL SELECTION

Welding part positions (ceiling, perpendicular, horizontal, cornice) can be changed.

Part and Material Selection

- Welding part positions (ceiling, perpendicular, horizontal, cornice) can be changed.
- Parts for welding and connecting positions can be chosen.
- PA, PB, PC, PD, PE, PF, PG, PH, PJ welding positions can be chosen.
- The thickness of the items to be welded might range from 3 to 10 millimetres.
- Carbon steel, stainless steel, and aluminium are all options for part materials.



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HELP (VISUAL HINT)

Visual hints can be observed before or during the welding process, assisting the operator in welding with more precision.

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- Use the guideline assistance to see where the welding should be done.
- Speed assistance can be used to ensure that progress is maintained at optimum levels.
- By looking at the angle assistance, you can keep the travel and work angle at their best.
- By examining at the distance assistance, you can keep the arc length at its best.

AREA SELECTION

The welding environment can be changed and welding experience can be experienced in different areas.

Welding in different areas can be experienced by changing the environment to be welded. It is possible to move in the all direction within the selected virtual environment.

- The construction area (open environment) can be selected.
- Welding workshop environment (indoor environment) can be selected.
- Maintenance facility environment (open environment) can be selected.

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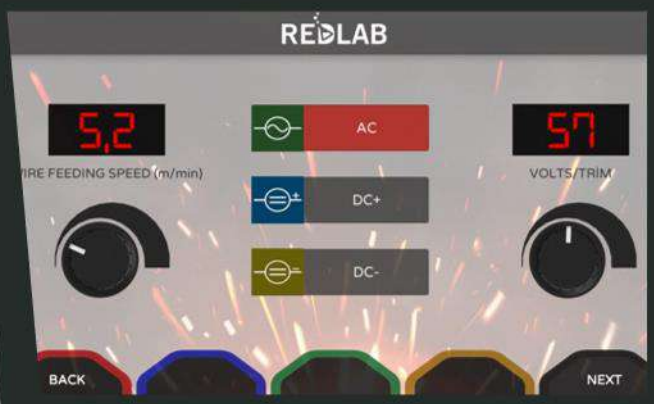
WELDING PARAMETERS SELECTION

Current, volt, wire feeding speed values can be adjusted.

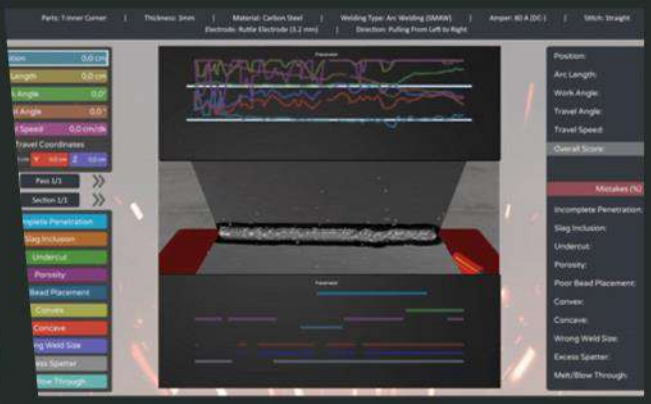
- Current, volt, wire feeding speed values can be adjusted.
- AC, DC+, DC-polarization can be selected.
- Gas mixture and gas flow can be adjusted.
- Electrode material and diameter can be selected.
- Welding seam direction and seaming technique can be selected.



ANALYSIS OF WELDING

Instant analysis of welding parameters and mistakes is provided.

- Instant analysis of welding parameters and mistakes is provided.
- On the data screen, all data may be displayed graphically.
- It is possible to inspect a live welding seam.
- Welding failures are displayed along with their location on the material.
- Analysis can be used to evaluate the welding.
- Separate analyses can be performed on welded sections and passes.
- It is possible to capture the welding report as well as the welding video.



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USER EVALUATION SYSTEM

All data of the welding performed by users can be accessed.

- All data of the welding performed by users can be accessed.
- Video footage of users recorded during the welding can be viewed.
- Multiple-choice exams can be created to evaluate users.
- Exam result data can be examined.

ROBOTIC WELDING FEATURE

An industrial robot in the virtual reality environment can be programmed to weld selected parts.

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CONTACT US

Redlab Mühendislik Limited Şirketi

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- Tel: +90 216 599 0036
- Mail: info@redlab.com.tr
- Web: www.weldsimulator.com