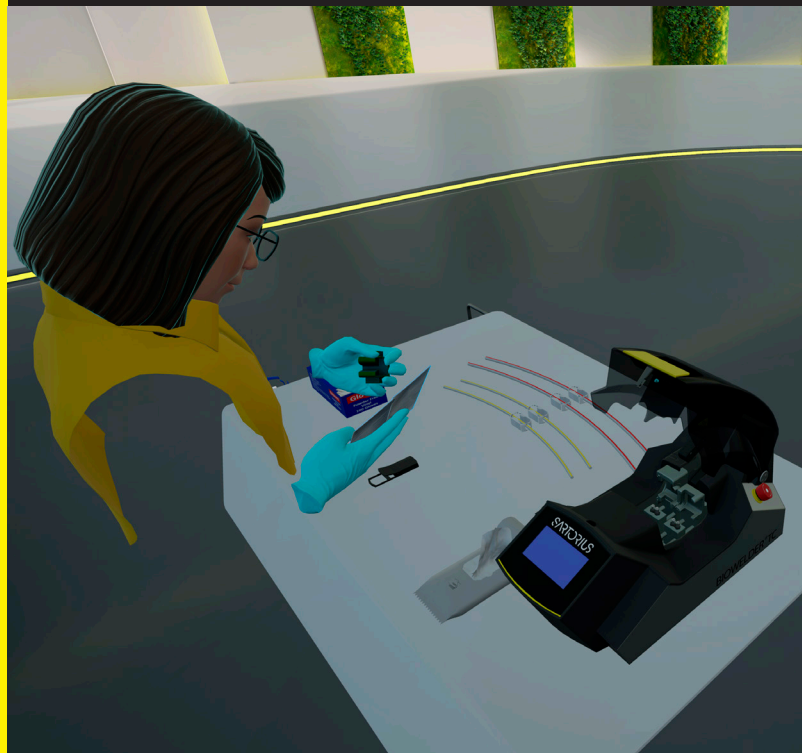


# Biowelder® TC Virtual Reality Training and Assessment

On-demand digital training and assessment in a safe virtual environment, independent of trainer and system availability.



## Benefits

- On-demand training and assessment with the flexibility to train operators at their own pace and convenience
- Cost efficient training alternative, by eliminating the dependency on trainers, systems and venues
- Accelerated operator qualification with a standardized training
- Safe and controlled environment for operators to practice their skills without risk of contamination or product damage
- Improved engagement and retention for operators through interactive and immersive training
- Decreased carbon emissions associated with training by eliminating the need of travel

## Product Information

The Biowelder® TC Virtual Reality Training provides fully immersive virtual reality training for making sterile connections between thermoplastic elastomer (TPE) tubing elements using the Sartorius Biowelder® TC. The training is designed to provide a realistic and interactive experience, allowing operators to practice their skills and gain confidence in a virtual environment before final qualification on the actual Biowelder® TC.

## Product Description

Virtual reality (VR) training for the Sartorius Biowelder® TC is an innovative way to train operators on how to make sterile connections between thermoplastic elastomer (TPE) tubing elements using the Sartorius Biowelder® TC in a safe and efficient manner. The training is designed to provide a realistic and interactive experience, allowing operators to practice their skills in a virtual environment before operating the actual equipment. The VR training also reduces the risk of errors and accidents, making it a safer training format complementary to traditional in-person training.

The Biowelder® TC Virtual Reality Training enables operators to get hands-on experience in an immersive computer-generated environment, which simulates the real-life scenario of operating the Sartorius Biowelder® TC. Operators use a VR headset and controllers to interact with the virtual environment. They can freely move around the virtual training room and work on the computer-generated Sartorius Biowelder® TC to complete the training steps and interact with colleagues as virtual avatars. They can practice their skills and gain confidence in their abilities without using real systems.

The Biowelder® TC Virtual Reality Training has three interactive training modules that allow operators to practice and assess their skills:

- **Self-guided training:** The self-guided training mode provides flexibility for operators, enabling them to learn at their own pace, from anywhere in the world. Guiding elements such as highlights, animations, voiceovers and in-text instructions guide the trainees throughout the training by giving detailed information on the training steps.



- **Live instructor-led training:** This mode provides an opportunity for operators to collaborate with a live trainer in a virtual classroom setting. Up to seven operators can complete the training together in the same virtual room. A live trainer guides the operators through the training, providing an opportunity for personal interaction between the trainer and trainees. This allows trainees to ask questions, seek clarification and receive feedback in real-time, eliminating the need of travel.



- **Assessment:** The assessment mode enables operators to assess their knowledge and skills on making sterile connections between thermoplastic elastomer (TPE) tubing elements using the Sartorius Biowelder® TC. There are no guiding elements in the assessment mode. A completion certificate can be downloaded upon completion of the assessment module.

# Benefits of training operators with the Biowelder® TC Virtual Reality Training

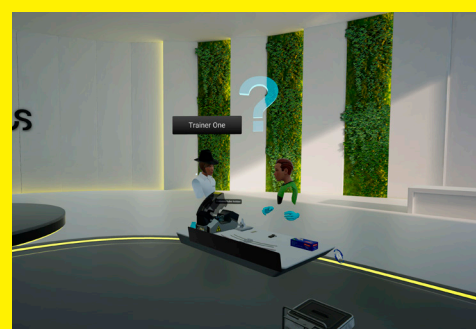
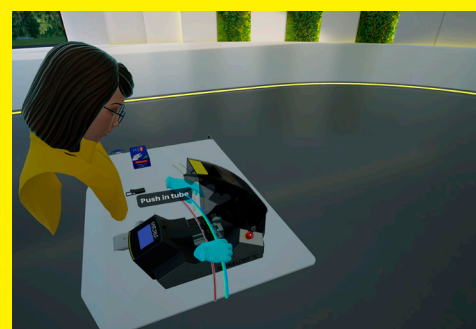
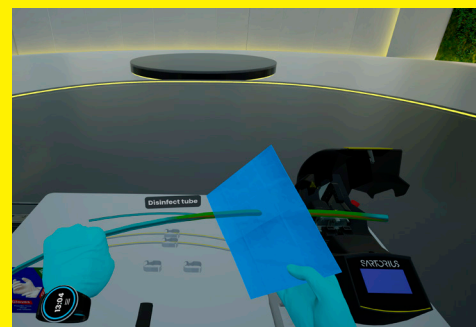
Training your operators with the Biowelder® TC Virtual Reality Training comes with several advantages.

- **Reduce operational costs.** Biowelder® TC Virtual Reality Training provides on-demand training independent of the availability of trainers, systems and venues. It allows you to train your operators without interrupting the production process, eliminates the need for expensive equipment, travel costs and venue rentals, making it a cost-effective option for organizations of all sizes.
- **Bring qualified operators faster to the shop floor.** The Biowelder® TC Virtual Reality Training is highly efficient. Operators can practice their skills and gain experience in a fraction of the time it would take using traditional training methods.
- **Increase engagement through fully immersive training.** The Biowelder® TC Virtual Reality Training allows operators to fully immerse themselves in realistic and interactive simulations of establishing sterile connections between thermoplastic elastomer (TPE) tubing elements, creating a highly engaging and memorable learning experience which leads to better retention of information.
- **Train your operators in a safe environment.** The Biowelder® TC Virtual Reality Training provides a safe virtual environment for trainees to learn and explore without the risk of contamination or product damage. It minimizes the risk of errors and accidents through safe and controlled training.
- **Get firsthand experience while waiting for your systems to arrive.** The Biowelder® TC Virtual Reality Training allows operators to become familiar with the Biowelder® TC equipment and its functionalities, even before your systems are delivered. Your operators will have time to practice, increasing their confidence and competence through realistic simulations and feedback.
- **Evaluate the knowledge of your operators.** The Biowelder® TC Virtual Reality Training enables you to assess knowledge of your operators and create a standardized certification process throughout your organization.
- **Ensure standardized training throughout your organization.** The Biowelder® TC Virtual Reality Training can be accessed from anywhere in the world, ensuring a standardized learning experience for your operators and trainers alike.
- **Train operators in a classroom setting.** The Biowelder® TC Virtual Reality Training enables you to train up to seven operators simultaneously in the same virtual training room, accompanied by a live trainer. Operators have the opportunity to collaborate with a live trainer in a virtual classroom setting, without depending on the availability of the systems, venues.
- **Decrease carbon emissions associated with training.** Operators can access the Biowelder® TC Virtual Reality Training from anywhere in the world, without the need to travel to production or training sites, reducing the carbon emissions associated with transportation for training.
- **Retrain your operators on a regular basis.** The Biowelder® TC Virtual Reality Training enables you train and qualify your operators at regular intervals ensuring consistent experience with the standardized training.



# Training Features

- **The watch menu:** The watch menu offers various functionalities and is always available in the trainings. In order to display the watch menu, look at your left wrist while you are in the virtual room. You will see a computer-generated digital watch. Click on it using your controller to open it. From the watch menu, you can mute/unmute yourself, display the guide, take a tutorial, or go back to the main menu easily.
- **Visual guidance\*:** Throughout the training, various visual elements assist the learning process. Guidance elements can be disabled in the self-guided training mode.
  - Animations: Highlighted green animations mimic the training interactions, guiding users how to complete a specific training step.
  - Highlights: Blue highlights provide hint regarding where to place a specific object.
- **Instructions\*\*:** Detailed instructions about training steps are available for users in text and audio format throughout the training.
  - Text flags: Guide users on the specific step by giving brief instructions.
  - Voiceovers: In each step of the training, a voiceover provides users with detailed instructions about the specific training step.
- **Moving between the steps:** Users have the option to complete the training step by step or select and train on individual steps. In the self-guided training mode, users can switch between the steps via the watch menu. In order to do this, simply open the watch menu, click on the guide icon to display training steps, and use the arrow icons to move between steps. In live instructor-led training mode, both trainees and the trainer can move between the steps simply by clicking on the step or module they would like to work on from the main menu above their work station.
- **Special features for the self-guided training mode:**
  - Guide menu: Any time during the self-guided training, you can display detailed text instructions by using the watch menu. In order to do this, open your watch menu, and select the book icon. You can pin this guide menu by clicking the pin icon and placing it anywhere in the virtual room. The guide menu is only available in the self-guided training mode.
- **Special features for the live instructor-led training mode:**
  - Camera function: Trainees have the opportunity to see the trainer's virtual workstation during the training. This feature allows trainees to follow what the trainer is doing in real time without leaving their own virtual workstation. In order to enable camera mode, simply click the camera icon on the main menu located above your work station. The trainer can grab and change the camera angle at any point during the training.
  - Asking a question: Trainees have the opportunity to ask the trainers questions in the virtual room. To do this, trainees need to click the question icon on the main menu located above the work station. A question mark symbol will then appear in the virtual room alerting the trainer of the request.
- **Special features for the assessment mode:**
  - Certification: Users can download a completion certificate after they complete the assessment mode three times in a row. The certificate can be found in the following directory on your computer: C:\Users\UserName\AppData\Roaming\realworldone\RW1Core\Saved\Screenshots\WindowsNoEditor



\*Please note that visual guidance elements are not available in the Assessment mode.  
\*\*Please note that instructions are not available in the Assessment mode.

# Technical Specifications

For taking the Biowelder® TC Virtual Reality Training, you need:

- A VR headset that is compatible with the VR training software.
- A computer or device that meets the minimum requirements for running the VR training software.
- A stable internet connection to download and access the VR training software.
- A physical room with sufficient space.

## Supported Virtual Reality (VR) Headsets

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HP Reverb G2

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Meta Quest 3 / Meta Quest 2

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## Physical Room Recommendations

Before use, ensure there is enough space around you. Make sure that there are no other persons near you whom you could injure and that there are no objects around you that can be damaged or injure you.

Size	A physical room with the size at least 2 x2 m is needed for your VR set-up (desk, PC/laptop, head-mounted display). Make sure to mark the individual areas on the floor and to leave some space between each area. It is recommended that the user use these boundaries to set up his/her guardian area to prevent any collisions while using VR.
Floor and ceiling	A room in which the floor doesn't reflect light should be chosen for the sensors of the head-mounted display to function properly. Marble or tiled floors may impact equipment performance. Other reflective surfaces, such as mirrors or windows, may also interfere with the tracking sensors. Make sure that the ceiling is not too low or have low-hanging lamps/fans, so that the user has enough space to move without the danger of collision.
Installation	The PC/laptop requires sufficient air supply while running. Ensure that it is installed in an open area, e.g. on a laptop stand, shelf, table, or similar.
Ventilation	As heat will be generated, the room should have a ventilation system or windows that can be opened.
Cable management	Set up a cable management system to keep the cables in order and prevent any tripping hazards. A ceiling-mounted cable management system is recommended.

## Computer Requirements

Component	Recommended specifications
Processor	Quad-core Intel or AMD, 2.5 GHz or faster
Graphics card	NVIDIA RTX 3060 (Alternatives: RTX 2070 / NVIDIA GTX 1080) / NVIDIA Quadro RTX 3000 or greater
Memory	8 GB + RAM (16 GB RAM recommended)
SSD storage	1 TB
Operating system	Windows 11 / Windows 10 (May 2019 update or later for HP Reverb G2)
USB ports*	1 X USB 3.0 TYPE C
Video output*	DisplayPort 1.3

\* USB Ports and Video Output depends on the requirements of the used VR headset. The specified requirements match with HP Reverb G2.


## Network Requirements

Domain	TCP Ports	UDP Ports	WebSockets (TCP)
*.realworld-one.com	443		443
51.138.93.170 (or ds-gateway.real-world-one.com)	9000-10000 19000-20000 29000-30000	9000-10000 19000-20000 29000-30000	29000
rw1euwuserfilesprod.blob.core.windows.net	443		
cdn-global.configcat.com	443		
api.statuspage.io	443		
o384799.ingest.sentry.io	443		

# Ordering Information

Order number	Description
S87GTA20BTCVRT	Biowelder TC Virtual Reality Training - Trial Subscription Plan
S87GTA20BTCVRA	Biowelder TC Virtual Reality Training - Annual Subscription Plan
S87GTA20BTCVRR	Biowelder TC Virtual Reality Training - Renewal Subscription Plan

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