

Heat Pump ramp up in Germany

How to counter shortage of skilled workers

September 29th 2023, Madrid

Joint Workshop on Workforce Shortages and Upskilling for the clean Energy Transition

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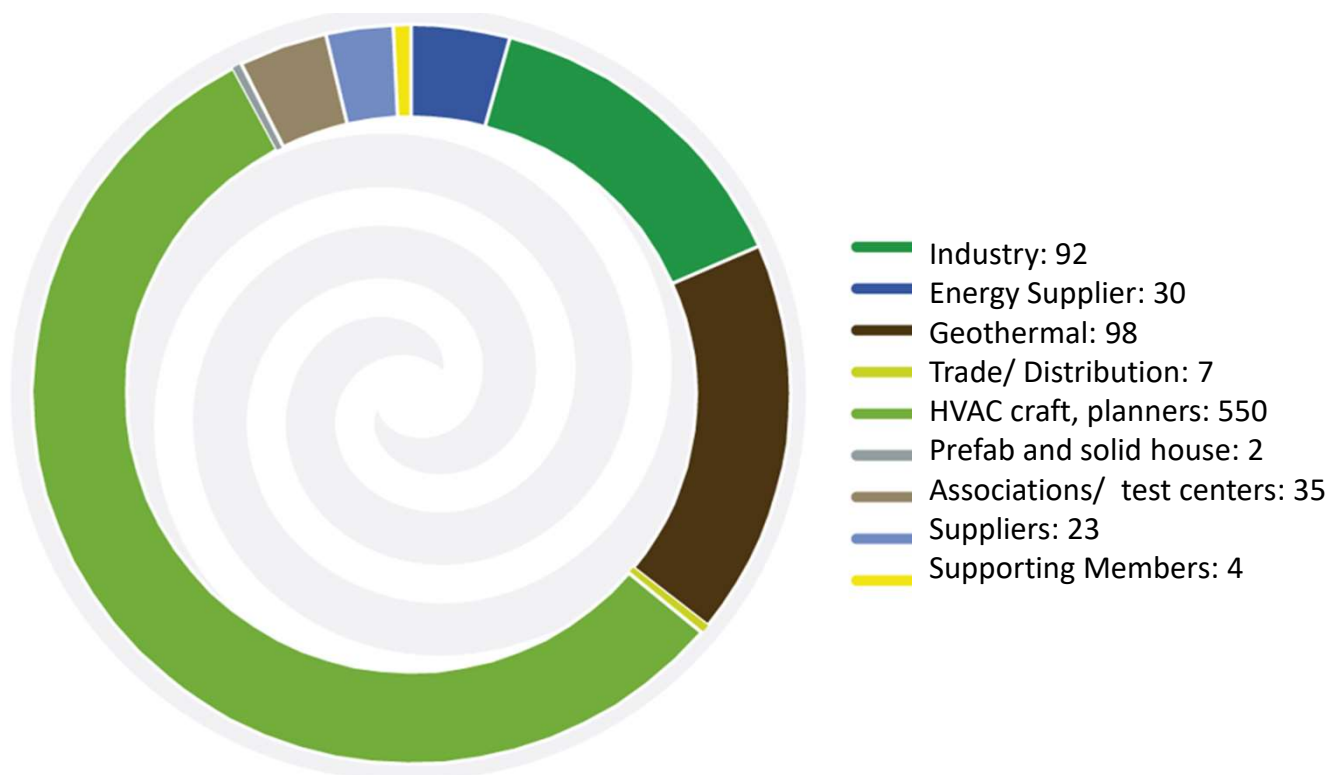
German Heat Pump Association (BWP e.V.)

About the German Heat Pump Association



German Heat Pump Association: Members (BWP)

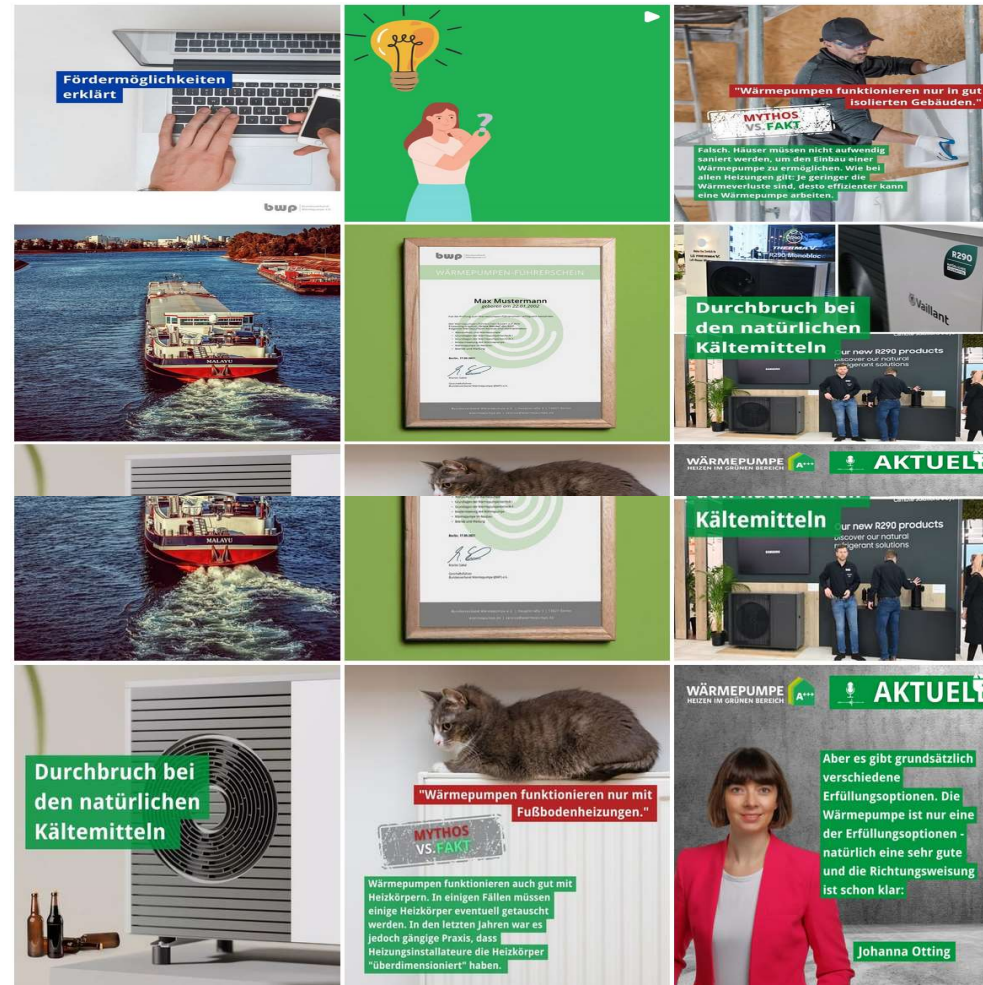
Distribution of BWP members across the Heat Pump value chain



- More than **830** member companies
- More than **250** new members since 2022
- More than **530** installing & planning companies

German Heat Pump Association (BWP): Key activities

- Political work
- Norms and standards
- Quality assurance
- **Qualification** Market research and outlook
- Public Relations, events
- Media campaigns
- Information material for builders, modernisers, consultants and everyone



„Heroes of Energy Transition“: Skilled workers challenge



Challenge: Heat pump = cross trade technology

- mainly air-water or ground-water HPs (water-bearing-heating systems)
- to install air-water-heat pump in Germany you need at least two professionals (for installation, commissioning & electrical connection) in some cases (split devices) an additional HVAC professional (certification)
- Heat pumps has ever since only been a very small subject in the 3.5 years of SHK- training, because most buildings in Germany have been and still are heated with oil or gas boilers (or district heating). **This is changing rapidly since last year!!!**
- That is why we, BWP, have developed some qualification measures for trainees and for professional installers, to close this gap.

Qualification measures offered by BWP



Continuing qualification for professionals (since 2018)



**Association
of German
engineers**

Based on guideline VDI 4645
**Heating systems with heat pumps in single- and
multi family houses**
Planning, construction, operation
*Trainings, examinations, certifications of
qualification*



Continuing qualification: VDI 4645-1

VDI:

- Preparation of guidelines and examination regulations
- Examination of training partners documents, recognition of instructors
- Supervision of the training program (600 - 800 minutes)

BWP:

- qualification partner conducts online exams
- maintains online registers
- issues qualification certificates

Industry, chambers, guilds, educational institutions:

- training partners conducts the training courses
- distributes certificate of attendance incl. access code for online examination

Continuing qualification: VDI 4645-1

Target group:

Planners and installers of small to medium sized plants, where usually only a limited planning process is applied

Target:

- Avoidance of malfunctions, operational disturbances or damage
- Optimization of heat pump systems

Training categories:

- E (Installers, 560 minutes)
- P (Planners, 595 minutes)
- **PE (Planners and installers, 800 minutes) 2-3 days**


Structure of the training (PE) = Planner/ Installer

- 1 - 4.) scope of application / normative references / terms / formula / symbols
- 5.) balance limits and efficiency consideration
- 6.) preliminary investigation
- 7.) responsibilities
- 8.) basic investigation
- 9.) detailed planning
- 10.) award of contract / commissioning / instruction / Inspection and maintenance of the plant

Appendices A to L (sample calculations, checklists, extracts from standards)

VDI 4645-1: certificate, register entry

Startseite Register Schulung Prüfung



SIE INTERESSIEREN SICH FÜR EINEN FACHMANN FÜR IHRE WÄRMEPUMPE?

Hier finden Sie geeignete Sachkundige für Wärmepumpensysteme sowie Informationen zur Prüfungsform.

[Zum Register >](#)

DIE VDI 4645

Die Richtlinie VDI 4645 behandelt die für die Planung von Wärmepumpenanlagen in Ein- und Mehrfamilienhäusern erforderlichen Schritte von der Voruntersuchung und Konzepterstellung bis zur Detailplanung. Sie gibt Hinweise zu empfohlenen hydraulischen Schaltungen, zur Dimensionierung von Anlagenvorparaneten, zur Dokumentation, zur Inbetriebnahme der Anlage und Unterweisung des Betreibers und auch zu Kostenbetrachtungen.

Mehr Infos unter vdi.de/4645

SCHULUNGEN & TERMINE

Zielgruppen der Schulungen sind in erster Linie Fachhändler und Planer. Die Schulungen haben eine Dauer von 2-3 Tagen und sind in die drei Kategorien Errichter (E), Planer (P) und Planer und Errichter (PE) unterteilt. Die Schulungen werden im Auftrag der VDI-Gesellschaft für Energie und Umwelt durch anerkannte Schulungspartner und von qualifizierten Referenten durchgeführt.

Mehr Infos unter vdi.de/4645

PRÜFUNGEN

Teilnehmer am Schulungsprogramm nach VDI 4645-1 müssen zum Erlangen des Qualifikationsnachweises eine unabhängige Online-Prüfung bestehen. Die Anmeldung zur Prüfung erfolgt über einen anerkannten Schulungspartner. Die Prüfung fragt Kenntnisse aus allen Bereichen der VDI-Richtlinie ab und gilt erst dann als bestanden, wenn der Prüfling seine Kenntnisse insgesamt und in den einzelnen Blöcken nachweisen konnte. Erst dann erfolgt der Eintrag in das Register.

SACHKUNDIGENREGISTER

Sachkundiger:

Kategorie:

Firma:

Postleitzahl:

9 Ergebnisse

Firma	Sachkundiger	Kategorie	Registernummer	Prüfungdatum
Anlagen-technik Metz GmbH & Co. KG	Stefan Rohrer	Errichter	120918-00201-E-07	18.10.2018
EnergieArt	Marco Darfenne	Errichter & Planer	110918-00103-PE-07	05.10.2018
Frank Dittmer Sanitär, Heizung, Lüftung, Energie	Frank Dittmer	Errichter	120918-00201-E-01	23.09.2018
Hochdanner Sanitär- und Heizungs-GmbH	Helko Hochdanner	Errichter & Planer	050618-00102-PE-04	07.11.2018
Jäger GmbH	Peter Jäger	Errichter & Planer	231018-00104-PE-06	27.10.2018
Korsmeier Energietechnik GmbH	Norbert Korsmeier	Errichter	120918-00201-E-04	15.10.2018
Korsmeier Energietechnik GmbH	Martin Schulte	Errichter	120918-00201-E-02	30.09.2018
Mielke Installations GmbH	Hölger Mielsch	Errichter & Planer	190618-00101-PE-03	05.07.2018
Stiebel Eltron GmbH & Co. KG	Thomas Schmidt	Errichter	120918-00201-E-10	03.10.2018

« Vorherige Seite 1 » Nächste Seite »

- Since mid-2018 more than 340 trainings conducted
- Interest is growing exponentially
- register:

www.vdi-fachkraft-waermepumpe.de

since 2018

Attendees trainings

appr. 4.700

Exams

appr. 2.500

Passed exam

appr. 2.350

VDI 4645-1: selection of training partners



NIBE



SHK-Innung München



TWK



KARL ENDRICH
HAUSTECHNIK



Panasonic Marketing
Europe GmbH

Panasonic

heating & cooling solutions

SHK INFO



Vaillant



MAX CARL
HAUSTECHNIK



Regionale
Energiegemeinschaft
Süd Hessen e.V.



Stiebel Eltron

STIEBEL ELTRON

Technik zum Wohlfühlen

Viessmann

VIESMANN



Changes for the Better

SHK-Innung Berlin



Technische Hochschule
Rosenheim



WATERKOTTE



ait-deutschland



Campus-EW GmbH



EnBW
Energiegemeinschaft e.
V.



GIENGER & FUNK
HAUSTECHNIK



August Brötje



Daikin



Fachverband Sanitär
Heizung Klima
Thüringen



GIH Hessen



Bosch



Dimplex



Fachverband SHK
Mecklenburg-
Vorpommern



GIH Nord



Buderus



ELBCAMPUS



Fachverband SHK
Sachsen



Handwerkskammer
Braunschweig-Lüneburg-
Stade



Facts about VDI 4645-1

- Heat Pump ramp up requires fundamental heat pump knowledge which is missing in many of the installing companies
- The qualification based on VDI 4645 is a manufacturer neutral training which is highly demanded by many installers
- The VDI qualification certificate is one possible indicator of fundamental heat pump knowledge (among a growing number of others)
- VDI guidelines are very highly regarded and provide a recognized standard when it comes to technical requirements
- Heat pump trainings (like VDI 4645-1) are subsidized by the government (BAW) since 2023
- **The program provides expertise but is is no compulsory qualification!**

VDI 4645 -1: Current Developments

- Continuous updates of contents
- ... the integration of the training in master craftsman courses will be offered.
- ... the examination is also possible after other training courses In addition, a sheet VDI 4645-2 is being worked on, because

... institutions like technician schools, universities and other educational institutions should be offered to integrate the VDI training into courses of studies, etc.. For this purpose, the structure must be adapted.

Structure of the VDI 4645: practical part of training

- practical part depends on quality of training location
- quality of the practical part is randomly checked by VDI
- in many teaching facilities equipment like learning walls, pedagogical material is still needed and the situation need to be improved.



Heat Pump-Online-Training (not only) for trainees (since 2020)



We want to turn the "bearers of fire" into the "heroes of the energy transition"!

<https://www.waermepumpe.de/fuer-handwerker/training/>

Heat Pump-Online-Training (not only) for trainees (since 2020)

Motivations

- survey with vocational school teachers (2019), SHK-trainers of guilds and chambers confirmed the need for material on the topic of heat pumps
- the desire for digital material (blended learning) was also explicitly expressed

Advantages

- permanent adaptation/updating possible
- Blended learning: not only in classroom but also usable also on mobile devices (target group affinity) gamification, responsive design
- since 2020, the material has been made available to all educational institutions free of charge
- Since 2021: supplemented by WP driving licence

6 Learning modules: appr. 1.5 hours for each module



Modul 1: climate change & HP



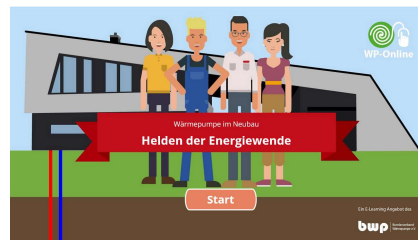
Modul 2: Basics of Heat pump technology I



Modul 3: Basics of Heat pump technology II



Modul 4: Modernization with HP: From proposal to installation

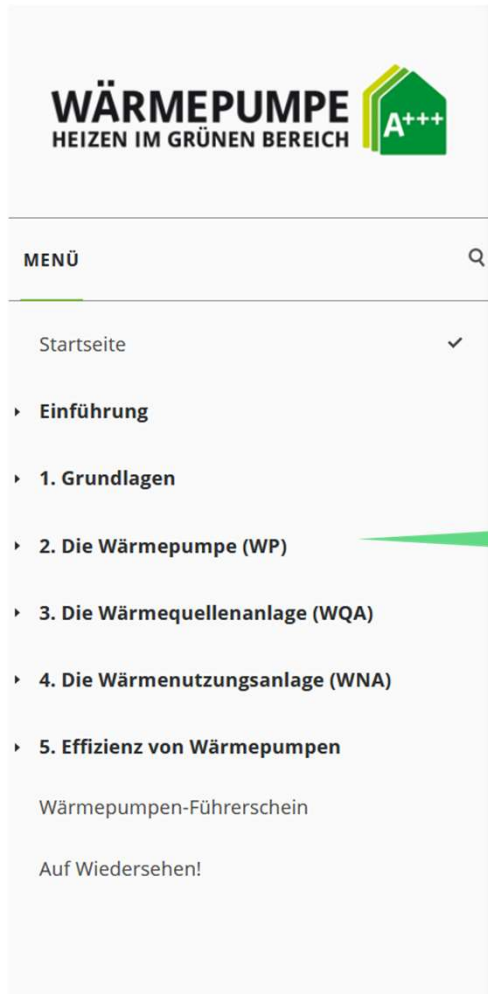


Modul 5 New construction with HP: from proposal to installation



Modul 6: Operation & Maintenance

Structure of Modules



- ▼ 2. Die Wärmepumpe (WP)
 - Start: Die Wärmepumpe
 - Wärmepumpen von außen
 - Wärmepumpen von innen
 - Arbeitsweise Wärmepumpe
 - Zustände des Kältemittels
 - Exkurs Thermodynamik
 - Log p,h-Diagramm
 - Kreisprozess der Wärmepumpe
 - Verschiedene Kältemittel
 - Bauteile einer Wärmepumpe I
 - Bauteile einer Wärmepumpe II
 - Arten von Wärmepumpen
 - Quiz: Die Wärmepumpe

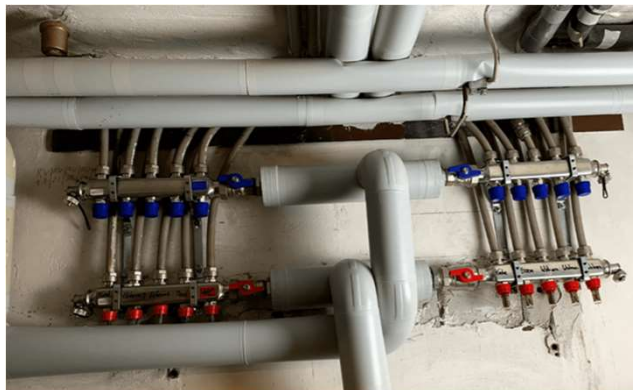
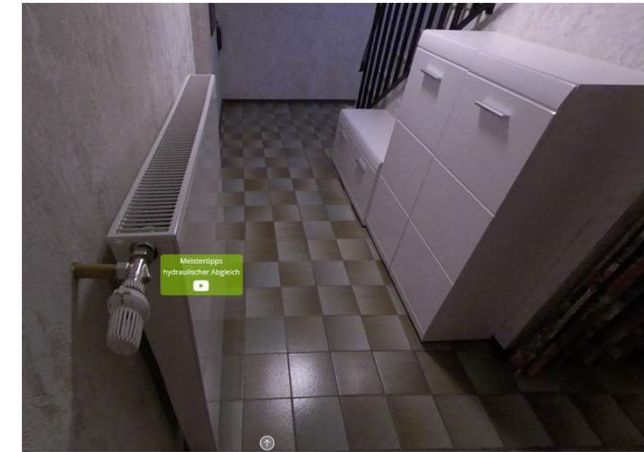
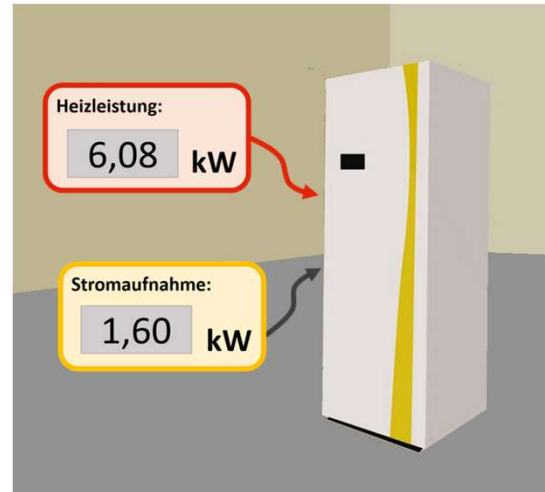
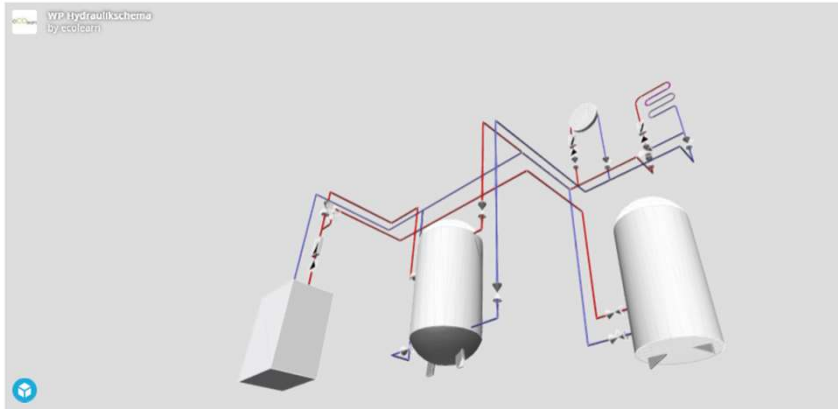
Each chapter follows a content structure that can also be used for navigation.

- Teaser (intro video)
- content with intermediate questions
- concluding quiz
- transition to the next chapter (outro)
- Responsive design

Interaction, Quizes, Videos, Animations

3D-Hydraulikschemata Wärmepumpe

Anhand des 3D-Modells kannst du dir das Schema noch genauer ansehen:



An interactive educational slide with a green border. It features a character on the left and a character on the right. The slide includes the equation $\dot{Q} = c \cdot \dot{m} \cdot \Delta T$, a bar chart, and a diagram of a heat pump circuit. A speech bubble from the left character says: "Kein Rauschen mehr. Die Nennweite muss also größer sein!". A speech bubble from the right character says: "Sehr gut! Merke dir bei Wärmepumpen: - Geringe Spreizung - Mehr Massenstrom - Größere Rohre". A "zurück" button is at the bottom.

... a brief look inside

Die Umgebungswärme muss natürlich vorher aufgenommen werden. Darum gehört zu jeder Wärmepumpenheizung eine Wärmequellenanlage:

Aufbau einer Wärmepumpenheizungsanlage:

Wärmequellenanlage Wärmepumpe Wärmenutzungsanlage

Navigation icons: book, folder, house, left arrow, right arrow.

Interaction, Quizes, Videos, Animations

1. Ziehe die Heizung in das Haus:

2. Randbedingungen ändern:

- Strom aus 100% EE
- hohe CO₂-Steuer

Alles zurücksetzen

Gewählt: **Erdreich-Wärmepumpe (JAZ 3,7)**

CO₂-Emissionen:
29,3 kg/(m²a)

Endenergiepreis:
0,220 €/kWh

Endenergiebedarf dieses Gebäudes:
52,8 kWh/(m²a)

Primärenergiebedarf dieses Gebäudes:
95,0 kWh/(m²a)

Energy performance scale: A+, A, **B**, C, D, E, F, G, H

Bottom navigation bar icons: book, folder, briefcase (highlighted), house, play button, play button.

Glossary



Media library/ additional teaching material



Final exam: Heat-Pump License

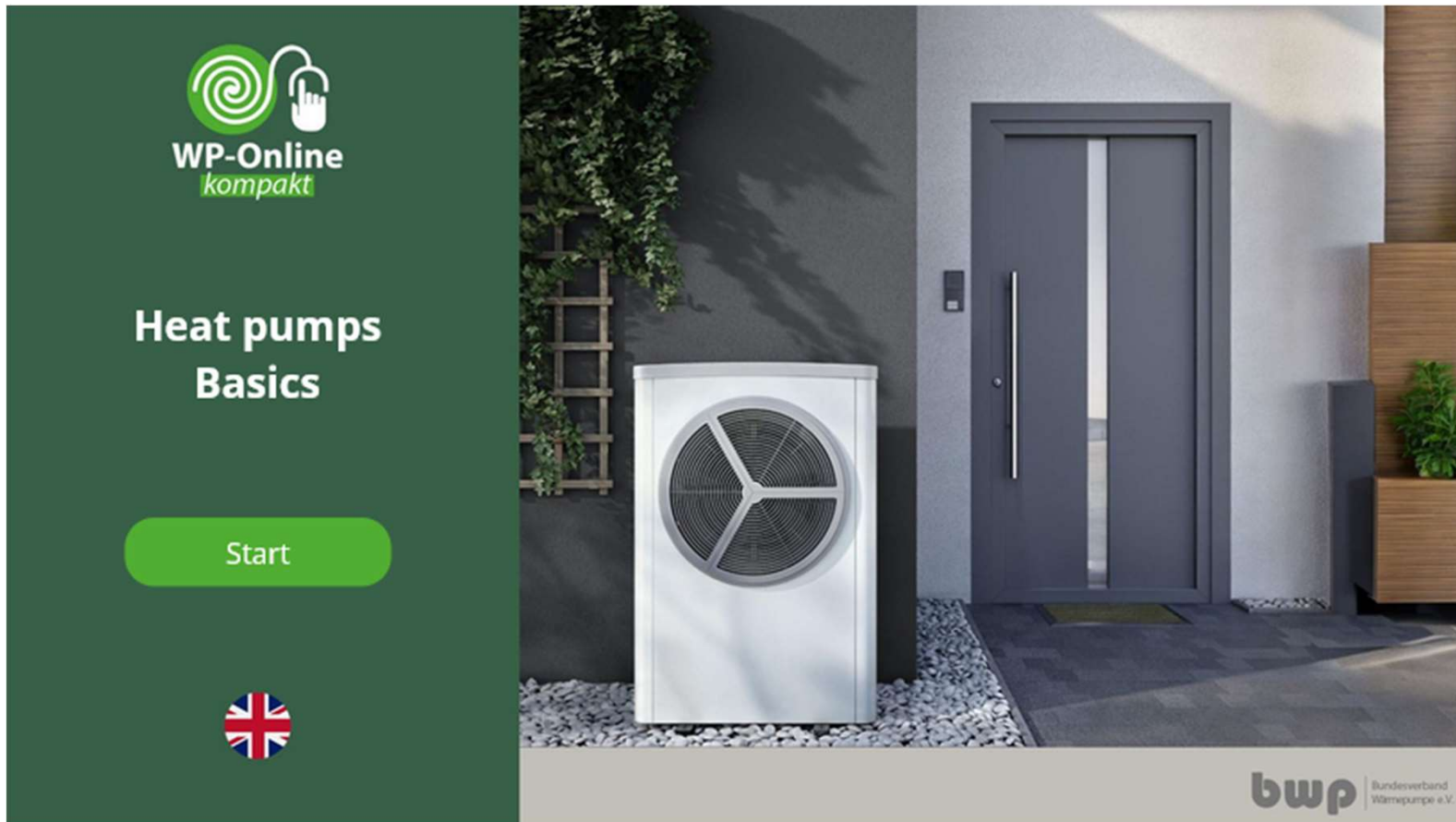


- Online Training final exam
- 60 questions (10 per module)
- Random, questions from the quizzes
- Active since November 2021
- 39,90 Euro per participant, 2 attempts per e-mail address, document by e-mail
- Voucher, class groups on demand
- Media cooperation, social media campaigns

HP-Online Training & Heat-Pump License

- Can be used by trainees/ bachelors (E-Learning)
- Can be used by trainers, teacher (Blended learning)
- Additional material as long as official training framework hasn't been adapted
- Constant adaptation e.g. to new political regulations possible
- Springboard for further qualification measures (e.g. VDI 4645-1)
- Different version for Energy Efficiency Advisor available
- ...

Soon to come: WP-Online compact: for career changers

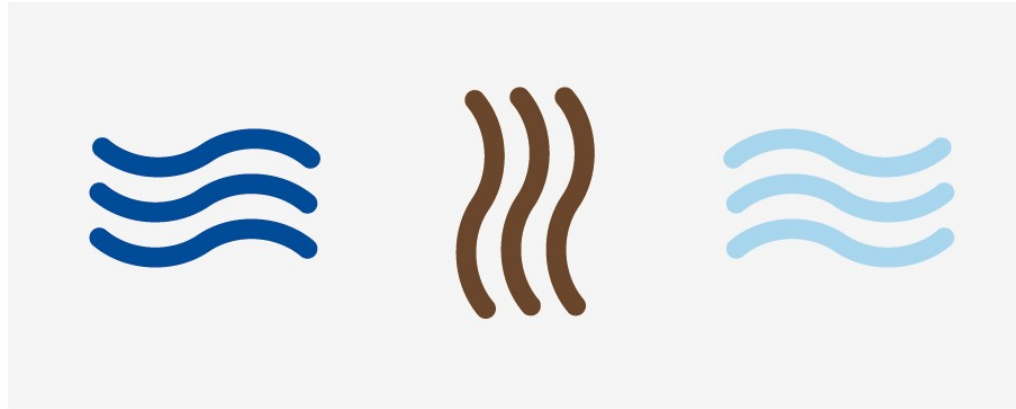


The advertisement features a dark green vertical sidebar on the left. At the top of the sidebar is the logo for 'WP-Online kompakt', which consists of a green spiral icon and a hand cursor icon. Below the logo, the text 'Heat pumps Basics' is displayed in white. A green button with the word 'Start' is positioned below the text. At the bottom of the sidebar is a small circular icon of the United Kingdom flag. The main part of the advertisement is a photograph of a modern, white, compact heat pump unit installed outdoors next to a grey door. The unit has a large circular fan grille on its front. The background shows a modern building facade with a grey door and a wooden planter box. In the bottom right corner of the advertisement, the 'bwp' logo is visible, followed by the text 'Bundesverband Wärmepumpe e.V.'.

Various languages will be available very soon!

Questions?





Thank you for your attention!

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www.waermepumpe.de

bwp