Training Needs Assessment and Work Package

DITRA-HEAT for Customer Service and Sales People

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version:	-

Summary

The existing Ditra Heat training resources are comprehensive. To maximise the value of instructor-led training, we propose revising the learner experience as follows:

1) **Structure**

- add context, overview, guidance to existing resources
- extract fundamentals upfront
- organize to be more task-oriented

2) **Baseline knowledge, pre-classroom**

- Onscreen tutorials
- Onscreen **Quiz** and revision

3) **Practice, in class and after**

- Onscreen **scenario**-based concept exercises (to supplement the existing hands-on exercises) for use in classroom with instructor coaching, and after:
    - frequently-asked-questions
    - using measuring / testing equipment
    - common issues
    - advanced issues

- Onscreen **Quiz** and revision for retention

4) **Job Aid**

- Various sheets and tools already exist. Let's consolidate them into an easy-to-use format and design the training scenarios around it.

Proposed Development

- new Schluter-network page (on Connect?) with introduction, overview and links.
- update existing e-learning (and upgrade some voice-over?)
- new e-learning piece for electrical fundamentals (10 mins)
- revise existing Powerpoint presentations
- new pre & post quizzes with revision cards (onscreen)
- new scenario-based exercises (onscreen)
- consolidate existing diagnostic guides into a practical Job-aid, applicable to the scenario-based concept exercises

Modular Approach

The proposed training development is modular for flexibility. Some modules could be optional for some learners, depending on support levels.

Needs Assessment	
Briefly describe the **training request**:	• DITRA-HEAT –training • mostly internal. some external.

Describe the **current situation** that requires training:	• Customers need support for Ditra-Heat systems
	• Customer Service, depending on level, requires knowledge and confidence in some or all:
	  ○ background concepts for electrical systems, symbols, measurements & meters
	  ○ data gathering
	  ○ how to resolve common issues that are within their competence and authority to resolve
	  ○ when to escalate
	• Technical Support requires knowledge & skill in
	  ○ interpreting cases escalated to them
	  ○ conducting specific tests with equipment onsite
	  ○ diagnostic process
	  ○ remedial reconfigurations, re-installs or repairs
	• New hires at Schluter
	• Existing staff requesting training & resources
	• Technical Services is establishing an "Electricians Network" who will have experience in electrical / tile / Schluter but need insights on Ditra-Heat-electrical-specific issues, solutions, equipment & resources.

Describe the **target learners** and any relevant characteristics (i.e. role, experience, existing knowledge, language skills etc.)	**Schluter staff** • CSR, DHCSR – desk-based • TM, Technical Services (onboarding) – desk & mobile **External** • ASD staff – desk & mobile • Electricians – mostly mobile **Experience** • General knowledge of tile installation and Schluter business. **Course shall assume no prior knowledge of:** • Electrical concepts • Electrical testing equipment • Floor warming systems • Ditra Heat electrical system: specification, installation, troubleshooting

Training Goals & Objectives
What should the learner be able to do after completing the training
 	
(see topics table and diagrams below)
	GOALS
	• Successfully assist customers with Ditra Heat at a level appropriate to role
	• Gather and appropriately share relevant information
	• Resolve issues or escalate when appropriate
	
	OBJECTIVES
	• **CSR**
	  ○ give typical customers and installers verbal assistance via phone/online
	  ○ discuss fundamental concepts
	  ○ explain listed points related to DH system specification, installation, configuration and use
	  ○ Answer 40 Frequently Asked Questions
	  ▪ Thermostat (16)
	  ▪ Power Module (6)
	  ▪ Installation (18)
	  ○ resolve common issues. (8?)
	• **DHCSR / TM**, additionally
	  ○ in-person and hands-on.
	  ○ resolve advanced issues. (6?)
	• **Lead DHCSR / Select TM / Electrician Network**, additionally
	  ○ live line measurements
	  ○ break location (with hi-pot & variac)
	  ○ repairs
	  ○ general application of diagnostic approach to uncommon issues
	
	All learners shall demonstrate readiness - retention of knowledge and competence in tasks - via periodic post-classroom practice.

What is the **training format** (i.e. self-paced, workshop, live stream etc.)	1) Self-paced study • handbook • youtube videos • e-learning • baseline quiz 2) Instructor-led workshop • Presentations, with Q&A • Quiz with instructor coaching • Scenario-based exercises (onscreen & physical), with instructor coaching 3) Self-paced study • periodic quiz challenge (eg. daily or weekly), with revision cards (for retention) • scenario-based exercises with feedback & revision

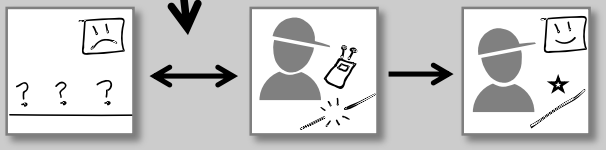
Customer & installer / support levels

1 Select, install, configure, use

Understand features & benefits | Plan & specify | Install | Configure & use

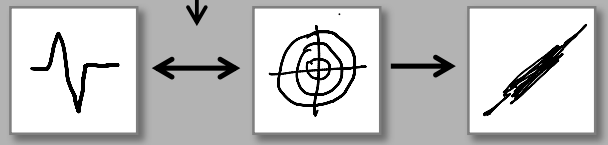
2 Resolve Common issues

(inc. Job-aid)



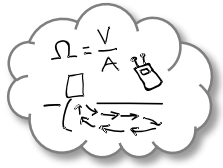
Diagnostic questions & tests | Identify root-cause (or escalate) | Solution

3 Resolve Advanced Issues



Advanced diagnostics | Break-location | Repairs

CSR

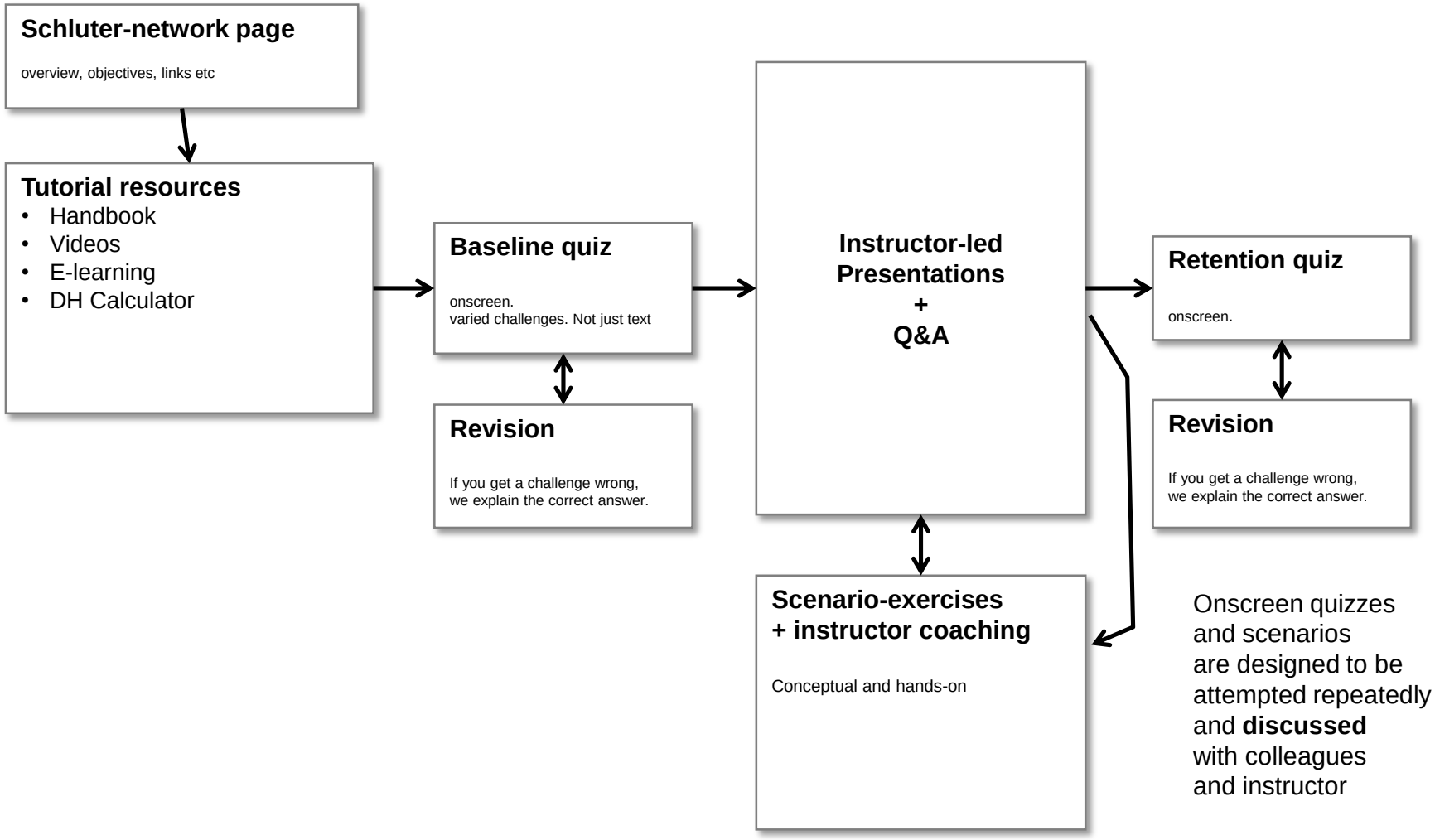


Fundamental concepts: Radiant heat, electrical systems, symbols, measurements, & equipment

DHCSR | TM | ASD

Technical Services | Select TMs | Electrician's network

Proposed learner experience



Onscreen quizzes and scenarios are designed to be attempted repeatedly and **discussed** with colleagues and instructor

Sections, modules & learning points

Fundamental concepts

Radiant heat, electrical systems, symbols, measurements & equipment

- Radiant heat / thermodynamics
  - converting electrical energy into heat
- Electrical systems
  - Power / wattage per square foot
  - Potential difference
  - Current
  - Resistance
  - relationship between the above (OHM's Law)
- Equipment
  - Electrical measurements
    - line/load voltage (multimeter or megohmmeter)
    - continuity/ resistance under low voltage (multimeter or megohmmeter)
    - continuity/voltage/resistance under high voltage (megohmmeter)
    - current (Ammeter)
  - Other indicators
    - Cable fault finder
    - Thermal sensor
  - Protection
    - Ground Fault Circuit Interrupter (GFCI)
    - Arc fault circuit interruptor (AFCI)
  - arc + weld-making (concept)
    - hi-pot
  - system loading to reveal heat pattern (concept)
    - variac
- Measurements & tests, step-by-step
  - test1: resistance
    - Megohmmeter
    - multi-meter
    - clamp-on ammeter
  - test2: continuity (integrity of conductor isolation under low voltage)
    - multi-meter
    - Megohmmeter
    - clamp-on ammeter
  - test3: insulation (integrity of conductor isolation under high voltage)
    - Megohmmeter
  - test4: temperature-sensor test (resistance at room temperature)
    - Megohmmeter
    - multi-meter
    - clamp-on ammeter
  - test5: Voltage in&out of on-thermostat
    - Megohmmeter
    - multi-meter
    - clamp-on ammeter
  - Test 6: Current Test
    - clamp-on ammeter
  - Test 7: Fault finder test
    - Fault Finder
  - Test 8: Thermal imaging test
    - Thermal imaging camera

Specify, install, configure, use

1a) Understand Ditra Heat features & benefits

("features" includes component internals, how it works, & some manufacturing details)

- System features & benefits
  - scenarios of use (stories)
  - Suitable areas of application
    - exterior: Not suitable
    - walls: Not suitable
    - Shower pans : Yes
    - Excessively large floors: Yes
    - Countertops: Yes
    - Primary heat: Mostly no. It depends
- Components
  - Thermostats
    - Features
      - internal GFCI protection
    - Benefits
  - DITRA-HEAT membrane
    - Features
  - Sensors
    - Features
  - Cables
    - Features
      - corrosion resistant. tinned-braid ground
      - low EMF. twisted pair
      - safe for wet environments. jacket insulation
  - Power modules
    - Features
- how it all fits together
- correct function
- misconfiguration or malfunction

1b) Plan & specify

nb. here we only guide customers to guides and tools available and quote what is written. but for liability reasons, we will not make decisions for the customer or offer validation of their calculations or choices beyond what is stated in published materials.

- Calculate tiled space
- Calculating heating space
  - safe places & clearances
  - excess cable / buffer zone
  - (refer to HVAC consultant re. TU calculation for space heating)
- Selecting the appropriate cable options
- choice of thermostat
- power supply calculation
  - power module requirements if any
  - additional circuit?
  - solutions for larger areas
    - (>135sft) 240V cable (electrician installs double pole)
    - (>269sft) multiple cable + power module + 2nd circuit
- Cable installation techniques
  - Managing excess cable

1c) Install

- Steps
- testing procedures (megohmmeter)
- connect thermostart & power module/s
- post-tiling wait period

1d) Configure & use

- programming thermostats
- ...

Resolve Common Issues

2a) Diagnostic questions & tests

- The problem-solving process
  - Gather info
  - hypothesis, test, conclusion
  - process of elimination

2b) Identify root-cause (or escalate)

- root-cause analysis
  - ...
- when & how to escalate

2c) Solution

- List of Common Issues & their solutions (see later)
  - during install
    - ...
  - post-install
    - Not heating
    - Stopped heating
    - Floor not warm enough
    - Uneven heating
    - GFCI trip
- Thermostat codes
- Resources
  - documentation
  - ...

Resolve Advanced Issues

3a) Advanced diagnostics

- special equipment & tests

3b) Repairs

- Repairing cables

3c) Break-location

- Equipment
  - hi-pot
  - variac
  - gloves
  - thermal sensor
- Safety
- Steps

note: Priority topics highlighted because fundamentals / direct impact for customer satisfaction / safety related.

Scenarios *< input to come from Josh >*

Troubleshooting - Common Issues (8 approx)

	Symptoms & test results	Root Cause	Solution
1	E0: Internal failure		replace Thermostat
2	E1: Internal sensor defective		replace Thermostat
3	E2: External floor sensor disconnected, or defective		
4	E5: Internal overheating		
5	T-stat is blank		
6	GFCI error		
7	GFCI Tripped		
...			

Troubleshooting - Advanced Issues (6 approx)

	Symptoms & test results	Root Cause	Solution
1	Floor is not heating		
2	E3: faulty floor sensor		
3	Red GFCI light ON (only time is displayed)		
4	99 degrees displayed		
5	Floor temperature reading on T-stat doesn't match floor temperature (T-stat limit, has also been increased)?		
...			

NOTES

Learner time

Roll-out shall include guidance for learners, approved by managers, on how much time to invest in training & study: eg...

pre-workshop	3 hours (in 20 min segments)
workshop	3 days
post-workshop	2 hours (in 20 min segments)
ongoing	20 mins per week

All onscreen resources shall be in 10min modules, and easy to stop mid-way and resume later.

Empowerment vs Escalation

To repeat for emphasis, a primary goal of the training is clear statement and correct understanding of

- each role's responsibilities
- what authority and resources pertain to each role
- when and how to act, and when and how to escalate.

Topics currently out-of-scope for this development

(because they are covered by existing training)

- Non-electrical aspects of Ditra Heat: Membrane and tile-assembly
    - The uncoupling principle
    - Substrates challenges & solutions
    - Waterproofing
    - Movement joints

- Customer Service Administration
    - Maximiser,
    - Credit card retainer
    - Processing Claims
    - etc