

Level I Basics of Masonry Heater Theory and Practice

Module I, Day I—Introduction to Masonry Heaters I

Notes:

- § Session I will consist of two, two-day modules.**
- § Listing of resource materials (e.g. articles, videos) should be classed in order of complexity and introduced at the appropriate time.**
- § Material cost-recovery can be helped by selling core(s) after workshop.**

8:30–9:15 Introductions

8:30–8:45 Course and Instructor

- § instructor introduces self (name, occupation, qualifications, etc.)
- § outline of course (i.e. what to expect)
- § housekeeping issues (e.g. washrooms, breaks, safety practices, emergency procedures)

8:45–9:00 Presentation on who/what is the MHA

- § history
- § mission statement
- § general membership
- § annual functions
- § development of the MHA program

9:00–9:15 Participants introduce selves (e.g. where from, what they do, why there), so that the instructor can determine how to tailor elements of the course so as to meet individual needs

Resources:

9:15–10:15 What is a Masonry Heater?

- § using visual aids (e.g. slides, handouts), explain standard terminology (i.e. heater components)
- § different types of heaters and their origins; history (scale models)
- § what's happening today in the North American heater industry (builders, manufacturers, suppliers)

Resources:

10:15–10:30 Break**10:30–11:00 Governing Bodies**

- § who they are, why they exist, what they do
- § MHA's relationship with them
- § ASTM, building codes, EPA, insurance companies, WETT (regional considerations)

11:00–12:00 The Process (brief overview)

- § determining if the heater is the right choice for the client
- § determining heating need, re: heat loss of house, heater output
- § heater location considerations, using building codes / ASTM as references
- § chimney location support
- § clearances
- § air intake
- § proper functioning

Exercises: Solve install questions using guides.

Resources:

12:00–12:30 Lunch

12:30–12:45 Recap/Questions**12:45–1:30 Hand-built vs. Kit**

- \$ skill level required
- \$ design options, add-ons
- \$ kits on the market (members)
- \$ Tulikivi

1:30–2:30 Methods and Materials (overview)

Core Materials

- \$ temperature limitations/requirements
- \$ types
- \$ castable refractory
- \$ refractory mortar clay
- \$ slab units (size, use)
- \$ fire brick (shapes

Insulation, Expansion, and Slip Joints

- \$ foam glass
- \$ skamolex
- \$ vermiculite
- \$ ceramic
- \$ blanket
- \$ fibre cloth
- \$ roxaul
- \$ rope

Facing Materials (re: heat conductivity)

- \$ soapstone
- \$ brick
- \$ block and tile

- § stone
- § tile
- § thin vs. thick

2:30–2:45 Break

3:00–4:00 Summary

Who:

- § are your suppliers? (cores, materials, hardware, plans, info)
- § the end-users? (profile)
- § the builders? (DIYs, certified)
- § the regulators?

What:

- § is a heater?

Where:

- § can you find buildings?
- § can you build heaters?
- § get more information?

When:

- § is the best time to build?
- § can I begin? (timelines: planning, approvals, construction, curing)

Why:

- § invest in one? (e.g. clean, comfortable, cost-effective, “green”)

Day 2

8:30–9:30 Introduction to Tools Used in Workshop

- § Handouts, Q&A
- § Tools Covered
- § skill saw

- \$ wet saw
- \$ quick-cut
- \$ drill mixer
- \$ laser level
- \$ hand tools (knife, tape measure, square, chalk box, level)

Personal Safety Equipment

- \$ boots, gloves, ear, eye, head

9:30–10:15 Orientation Prior to Build (Contra-flow with oven)

Safety Procedures (handout)

- \$ first aid box
- \$ eye wash
- \$ fire exit
- \$ hospital location
- \$ Material Safety Data Sheets for materials used.
- \$ overview of Activity Areas

(The following activities can be changed to suit any build.)

- \$ Castable refractory (oven components, forms, mix, vibrate)
- \$ Insulating Concrete (forms, mix, vibrate)
- \$ Fire Box cuts (fire brick: identify, mark, cut)
- \$ Layout and base installation on skids (position, size, perimeter, square)

10:15–10:30 Break

10:30–12:00 Skills Introduction

- \$ cast oven components (slabs)
- \$ cut firebrick (cut list)
- \$ cast insulation base
- \$ prepare insulating materials

- \$ cast cap slabs
- \$ layout (jack lines, build base)

12:00–12:30 Lunch

12:30–3:00 Construction

- \$ construct base/firebox from precut/cast materials¹
- \$ build on base, which can be moved with a forklift/handcart

3:00–4:00 Clean up and Review

End of Module I—At this point, participants can receive a certificate indicating completion of Module I.

¹ Time to precut/cast must be factored into course cost.

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Module 2, Day I—Introduction to Masonry Heaters II

Overview of the module goals and activities for the next two days. Q&A

8:30–9:30 Introduction to the Principles of Combustion

- \$ types of flame based on colour
- \$ factors affecting combustion
- \$ air (temperature, rate/volume, intake to firebox)
- \$ moisture (air, wood, materials)
- \$ fuel (type, size, wood species, BTU output per pound)
- \$ chimney height
- \$ secondary

9:30–10:15 House as a System Overview

- \$ chimney affect . positive/negative pressure
- \$ draft (determining factors: fans, flue size)
- \$ temperature differences (in/out)

10:15–10:30 Break

10:30–12:00 Construction

Assistant trainer to start construction of second firebox, while the lead trainer continues construction of first firebox/core. This allows more hands-on participation and uses the components that were produced in Module I.

12:00–12:30 Lunch

12:30–2:30 Next Steps

Discuss next steps to complete core construction.

2:30–2:45 Break**2:45–3:30 Cores**

Complete both cores up to top of transition chamber.

3:30–4:00 Clean up

Clean up and hand out plans for chamber construction options.

Day 2**Module II—Introduction to Masonry Heaters II****8:30–9:45 Review**

§ Review channel construction (cuts, expansion)

§ Discuss capping slab installation

9:45–10:00 Break**10:00–11:00 Facing Installation**

§ do's and don'ts

§ hardware installation

11:00–12:00 Channel and Cap

Set up and organize channel and cap installation.

12:00–12:30 Lunch

12:30–3:00 Construction

Build channels in one core and install capping slabs.

Call break when appropriate.

3:30–4:00 Clean up

\$ Q&A

Module II complete. Hand out document of completion. Arrange for core removal.