

BushProof

Training in Household Bio-sand Filtration



Machakos, Kenya

Introduction

Safe drinking water is one of the most important issues of development work, especially among low-income families. Biosand filtration is an appropriate and low-cost method for household water treatment, and is proven to reduce diarrhoeal incidence. This introduction course offered by BushProof is intended for those who want to learn about household level biosand filtration as an effective household water treatment.



This course will provide an overview of the theoretical aspects of sand filtration, but a large part will also involve hands-on practical sessions since the course is held on the project site of an ongoing successful biosand filter project. Practical sessions include construction of concrete filters by the participants, installation and maintenance of filters - as such, participants are encouraged to get stuck in and get their hands dirty! In addition, there will be opportunities for field visits to households in the project area which will give invaluable insight into the longer term use of biosand filters in rural households.

The course will be in English.

Dates

See website www.bushproof.com for details.

Location

The training will be held in a rural part of Machakos District, located about 3 hours drive south of Nairobi, Kenya.

Note that accommodation and food will be fairly basic.

Contact details

Telephone: +44 (7814) 788 846

Email: training@bushproof.com



How to book

Go to www.bushproof.com and click on *Products > Training > Booking a Training*. Here you will find booking procedures and application forms. Please contact us if you experience any difficulties.

Resources

Course handouts will accompany the course, as well as a resource CD with a wealth of expertise in the

form of documents and articles. A certificate will be presented to participants on completion of the training.

Course fees & duration

The cost of the course is for the 5-day training is detailed below:

Early bird – application received more than 2 months prior to course	1,400 Euro
Standard – application received between 2 weeks and 2 months prior to course	1,500 Euro
Late snail – application received less than 2 weeks prior to course	1,600 Euro

The course fee includes:

- 5 days of tuition, handouts, resource CD, basic food & accommodation, field trips & practicals, plus transport by van to and from Nairobi.

The course fee does not include the following:

- International airfares, accommodation in Nairobi, travel or medical insurance or visa.

Further details including rendezvous point in Nairobi will be sent upon application.

Note: we have to get a minimum attendance of 5 people to make the course viable, otherwise we may have to reschedule the course. Please confirm with us prior to paying for international flights.

Training schedule

Day	No	Time	Main subjects	Details
Monday	1	08.00 – 11.30	Travel to Machakos	
	2	11.30 – 12.30	Introduction to Household Water Treatment	Importance of household water treatment in reaching the Millennium Development Goals. Options: slow sand filtration, ceramic filters, solar disinfection, sedimentation, coagulation & flocculation, household RO. Container contamination studies. Practical: ceramic filter, SODIS demonstration, chlorination & coagulation using Sur Eau/WaterMaker/Moringa seeds.
	3	14.00 – 15.30	Introduction to biosand filtration	General overview of processes involved in sand filtration: how the filter works, reason for water level, biological layer. Intermittent vs. continuous filtration. Slow vs rapid sand filtration. Different types of sand filters in addition to concrete filter.
	4	16.00 – 17.30	Practical: preparation for making filters on Day Two. Overview of workshop set-up & staffing.	Preparing to cast filter on Day Two. Visit to sand source to get samples for sieve analysis on Day Two. Workshop set-up: how much space and what materials are needed – walk around workshop in Machakos.
Tuesday	5	09.00 – 10.30	Filter processes within the sand	Detail on filtration processes: Physical & mechanical filtration; Biological action - the schmutzdecke defined
	6	11.00 – 12.30	Theory & practical: casting first filter	Theory introduction to the Filter Construction Guidelines and Mould Construction Guidelines & where to download. Introduction to www.biosandfilter.org website. Filters cast in teams of 2-3. Discussion of advantage of round mould vs square mould.
	7	14.00 – 15.30	Diffuser plate explanation. Practical: making diffuser plates	Reason for use – what height from the sand, Made from what & reason for material. Practical making diffuser plates. Problems with metal plates in Machakos project. Test quality of different diffuser plates and assess scour.

	8	16.00 – 17.30	Filter media. Practical: sieve analysis. Additions to filter media & alternative media.	What sand type needed & reasons: Effective size and Uniformity Coefficient explained. Why filter media size is important generally. What Effective Size and Uniformity Coefficient needed for slow sand filters. How does sand size and sand bed depth affect water quality. Practical: sieve analysis. Role of gravel in a filter - what size & reason for use.
Wednesday	9	09.00 – 10.30	Field visit to households	Field visit to households that purchased a filter. User satisfaction & problems encountered. View filters in action & measure flow rate. Marketing the filters: how did it work in Machakos. Investigate why people bought their filters: health reasons and non-health reasons. Perceived benefits of the filter by users: firewood, time saving.
	10	11.00 – 12.30	Practical: open moulds from first filters cast on Day Two	Mould from the first filters are removed & repair work carried out. Curing – how to do it by filling with water. Cleaning moulds and preparing everything for second casting session in afternoon.
	11	14.00 – 15.30	Practical: casting second filter	Second filters cast
	12	16.00 – 17.30	Practical: filling a filter with media and starting to run. Operation & maintenance procedures.	Demonstration of how to fill up a concrete filter with gravel and sand. Importance of not getting air pockets when filling with sand and water. Operation & maintenance: how to practically clean the filter – wet harrowing vs. scraping 1-2 cm of sand and replacing. When you need to do one or the other.
Thursday	13	09.00 – 10.30	Flow rate: Darcy's Law & effect on water quality. Water testing.	Flow rates in sand filters: how water travels through sand & Darcy's Law explained. What flow rate to expect in the intermittent filter as opposed to continually-operated filters. Effect of flow rate on: bacteriological water quality, turbidity and colour removal. The need for further research on hydraulic loading. Water testing: when to test water, what is most important to test for – core and secondary tests.
	14	11.00 – 12.30	Effect of biosand filters on water quality: literature review	The effect of biosand filtration on bacteriological, chemical and aesthetic water quality: evidence from continually-operated vs. intermittently-operated systems

	15	14.00 – 15.30	Practical: check leaks from first filters. How to start up a filter project: case study of Machakos & Madagascar. Open moulds from second filters cast on Day Two.	Checking for leaks in first filter. Mould from second filter removed by participants & repair work carried out. How to start up a filter project: principles, budget, staffing. Brainstorm how to replicate workshop in participants' countries. Subsidy vs. full commercial model. Lessons learned from Nairobi slum & Karamoja: what not to do & the importance of being demand-led. The advantages of the commercial approach.
	16	16.00 – 17.30	Machakos evaluation review. Operation and maintenance issues	2003 Machakos evaluation results. Operation and maintenance of the filters & the importance of technical instruction on installation. The importance of follow up to ensure that users know what to do. How long it takes for the biological layer to recover with wet harrowing and scraping.
Friday	17	09.00 – 10.30	Household visit for filter commissioning	Field visit to a household to install a filter in real time.
	18	11.00 – 12.30	Practical: check leaks. Transporting filters.	Check for leaks in second filter. Transporting filters – problems & solutions reviewed.
	19	14.00 – 15.30	Revision & questions. BushProof overview. Open session to expand on certain topics.	Revision and cover questions raised that have not been dealt with during the training. Open session. BushProof: overview of services offered.
	20	16.00 – 19.30	Travel to Nairobi	

Health advice

Prior to travel to Kenya, please ensure that you are properly vaccinated and take relevant precautions. Visit your doctor before travelling.

Special notes:

- Make sure you are fully vaccinated.
- There is some malaria risk so prophylaxis is recommended.

For advice on how to prevent insect bites:

<http://www.nathnac.org/pro/factsheets/iba.htm>

- Dysenteries and diarrhoeal diseases are common. Attention to what you eat, and perhaps more importantly to hygiene (e.g. washing hands) is therefore especially important).

Visas

Visas are needed by most nationalities and can be obtained at Kenyan consulates prior to travel. Equally, it is possible to obtain entry visas at the airport on arrival. More information is available at:

<http://kenya.embassyhomepage.com/kenyan visa kenya embassy uk kenyan embassy london uk.htm>

An airport visa for up to 90 days should cost \$50 (US Dollars). You will need a passport that is valid for at least 6 months but you don't need passport photos.

International travel

Getting to Kenya is relatively easy and not so expensive. Please contact us if you are having difficulties, and we can recommend some options for you. Travel agents you can try:

www.travelocity.co.uk

www.crystaltravel.co.uk