

With effect April 2005

STUDY GUIDE

Energy Efficiency for Domestic Heating

Introduction

The reference documents you have received will be referred to in the Energy Efficiency for Domestic Heating training course, and will be used during the assessment. It is therefore important that you are familiar with the documents, and know how to use them.

This study guide has been prepared to help direct your pre-course study. The guide has been broken down into three sections:

- Section 1 takes you through the things that all heating installers need to know and understand
- Section 2 is relevant to the installation of domestic heating by oil boilers
- Section 3 is relevant to the installation of domestic heating by gas boilers

The documents you need to complete this study guide are

- Central Heating System Specifications (CHeSS) Year 2005 (GIL 59)
- Whole House Boiler Sizing Method for Houses and Flats (CE54)
- Domestic Heating by Oil: Boiler Systems (CE29)
- Domestic Heating by Gas: Boiler Systems (CE30)

The final part of the study guide consists of a short self-assessment, giving you five questions which are presented in a similar format to that used in the formal assessment. This provides you with an opportunity to familiarise yourself with the type of questions you might expect to be asked in the test. You should aim to complete the self-assessment questions within 15 minutes. The correct answers to the questions are provided to enable you to check if you got them right, and to identify any areas you may need to revise before attending the training workshop.

Completion of the worksheets, and familiarisation with all the documents, should mean that you will find the training workshop more enjoyable, you will get more out of it, and you should find the assessment easier.

We hope you enjoy your learning.

Section 1

Central Heating System Specification (CHeSS) (GIL59)

This document gives Basic and Recommended Best Practice specifications for domestic wet central heating systems that are critical to energy efficiency. Basic means sufficient to comply with Building Regulations in England & Wales (April 2005), Building (Scotland) Regulations (May 2005) and the Building Regulations (Northern Ireland). Recommended Best Practice means the adoption of products and techniques that go a step further to save energy, without incurring undue risk or undue cost.

Page 3 of the document refers to SAP. What is SAP?

Pages 5 and 6 of the document refer to Basic and Recommended Best Practice specifications for domestic wet central heating systems. They are identified by reference numbers ie HR5, HC5, HR6 and HC6. In each case, H refers to heating, R refers to regular boilers, C refers to combination boilers, and the number refers to the level of the specifications. Level 5 is Basic, and Level 6 is Recommended Best Practice.

From the above explanation, what SEDBUK rating must a boiler have for HR6 and what type of room thermostat is required?

CHeSS HC5 (2005) and HC6 (2005) refer to combi boilers (refer to page 7)

What is meant by a combi boiler?

SEDBUK is used in SAP assessments and the Building Regulations (refer to page 8)

What is SEDBUK?

Pages 11, 12 & 13 comprise reference tables for homes, showing SAP ratings, carbon indices, energy and fuel cost savings that can be achieved by use of Basic and Recommended Best Practice specifications.

Using Table 1 - Dwellings with Gas Boilers, give the SAP rating for a semi-detached house with filled cavity walls and a combi boiler using CHeSS Best Practice

Using Table 3 - Dwellings with Oil Boilers, what cost saving is achieved in a mid-terraced house with filled cavity walls and a regular boiler using CHeSS Basic?

Whole house boiler sizing method for houses and flats (CE54)

This document provides a simple but reasonably accurate way of sizing a boiler for a typical dwelling in the UK. You will be given the opportunity to work through the worksheet and to size a boiler on your training course. This study guide aims to familiarise you with the range of uses for the Boiler Sizing Method.

The Whole House Boiler Sizing method should only be used to size certain types of boiler.

What type of boiler can be sized using the Whole House Boiler Sizing method?

The calculation requires three measurements to be taken

What three measurements are needed to size a boiler using the Whole House Boiler Sizing method?

The Whole House Boiler Sizing method can be used to size typical dwelling types

How should you go about using the method for an 'L' shaped property?

The method can be used to size a regular boiler for a bottom flat

What number would you use for the roof area in your calculation?

Section 2

Domestic heating by oil: boiler systems (CE29)

This guide is designed to assist you in the selection of a 'wet' or 'hydronic' central heating system using an oil-fired boiler. It gives advice on how to achieve better energy efficiency, lower running costs and reduced carbon dioxide emissions.

The efficiency of the boiler is the main factor in the overall efficiency of a domestic central heating system, and the efficiency of the overall system has a major impact running costs and the associated CO₂ emissions.

Give four factors that affect the efficiency of a boiler

From April 2005 the reference efficiency for existing buildings is set at 86% - a level that can be achieved only by condensing boilers.

In the period from April 2005 to March 2007, what is the minimum allowable efficiency for

- (a) regular oil-fired boilers
- (b) oil-fired combis

New dwellings must comply with Part L1 of the Building Regulations. Three methods of demonstrating compliance are given using boiler efficiencies (based on SEDBUK). One is the 'Target U-value' Method.

What are the other two methods?

Energy consumption and running costs: using the BRE Domestic Energy Model, identify

- (a) the annual saving for heating and hot water in a semi-detached dwelling if a regular pre-1998 oil boiler was replaced with a new condensing boiler, and
- (b) the difference in CO₂ emissions achieved in a new bungalow if a regular condensing boiler was installed rather than a new combi

- (a)
- (b)

In England and Wales, the installation of an oil-fired heating system requires that details of the installation are made available to OFTEC, who will send a copy of the certificates to the householder and to the local authority Building Control Department. An installer registered with OFTEC is deemed competent, through the Competent Persons scheme, to undertake this work.

What other way can be used to notify details of installations if the installer is not registered as a 'Competent Person'?

Section 3

Domestic heating by gas: boiler systems

This guide is designed to assist you in the selection of a 'wet' or 'hydronic' central heating system using a gas boiler. It gives advice on how to achieve better energy efficiency, lower running costs and reduced carbon dioxide emissions.

The efficiency of the boiler is the main factor in the overall efficiency of a domestic central heating system, and the efficiency of the overall system has a major impact on running costs and the associated CO₂ emissions. Boiler efficiency depends upon several factors, including fuel, boiler type and design, system controls, flow and return temperatures.

Give two other factors that affect the efficiency of a gas boiler

With effect from April 2005, it is a requirement of the Building Regulations that newly installed gas boilers should be condensing, but there are instances where installing a non-condensing boiler is reasonable.

What method can be used to justify the fitting of a non-condensing boiler?

Heating controls are recognised by the Government as an energy efficiency measure

What rate of VAT should an installer who is registered for VAT apply to the equipment and installation costs?

Existing non-condensing boiler flues can be open-flue or room-sealed, natural draught or fanned

What are the flue arrangements for all domestic gas condensing boilers?

Energy consumption and running costs: using the BRE Domestic Energy Model, identify

- (a) the annual saving for heating and hot water in a terraced house if the old, heavy weight gas boiler was replaced with a new condensing boiler, and
- (b) the difference in CO₂ emissions achieved between installing a gas condensing boiler and a gas non condensing boiler in a new detached house

(a)

(b)

SELF ASSESSMENT

Sample Test Questions

If you are familiar with the course materials, it should take no longer than 12 minutes to complete the following five questions. The qualification assessment involves answering 30 questions in 75 minutes, and familiarisation with the course materials is key to passing the exam.

All questions have four possible answers; select only one answer for each question by ticking the appropriate box

Q1 What is the main characteristic of a combi boiler? [CE29 & CE30]

- (a) it provides instant hot water at mains pressure
- (b) the heating goes off when a hot tap is opened
- (c) it produces more hot water than a regular boiler
- (d) two boilers can easily be combined for more hot water

Q2 What percentage of total household energy is consumed by heating and hot water? [CE29 & CE30]

- (a) less than 40%
- (b) 58%
- (c) 76%
- (d) 84%

Q3 What does the acronym CHeSS stand for?

- (a) Central Heating Energy Saving Standard
- (b) Central Heating System Specifications
- (c) Combined Heat Saving System
- (d) Central Heating Efficient System Specification

Q4 What is 'boiler interlock'? [CE29 & CE30]

- (a) a method of electrically wiring the time control, thermostats and motorised valves to the boiler to ensure it only fires when there is a demand for heat
- (b) a method of fixing the boiler to the building to ensure that it cannot be removed illegally
- (c) a method of ensuring the boiler will stop when all TRVs are closed, and start again when they open
- (d) a method of coupling two or more boilers together

Q5 Why is it important to install good controls for heating systems? [CE29 & CE30]

- (a) they take up less space
- (b) they ensure that hot water is always available
- (c) they maximise the efficiency of a heating system
- (d) they ensure the house remains heated when no one is at home

Now you have completed the study guide, take this and your other documentation with you when you attend the training workshop.

[Answers: 1 (a) 2 (d) 3(b) 4 (a) 5 (c)]