Alpha
HEATING INNOVATION

NHER SAP Assessment Technical Guide

Practical, affordable systems to help meet
the Code for Sustainable Homes

Alpha's CSH Level 3 solution

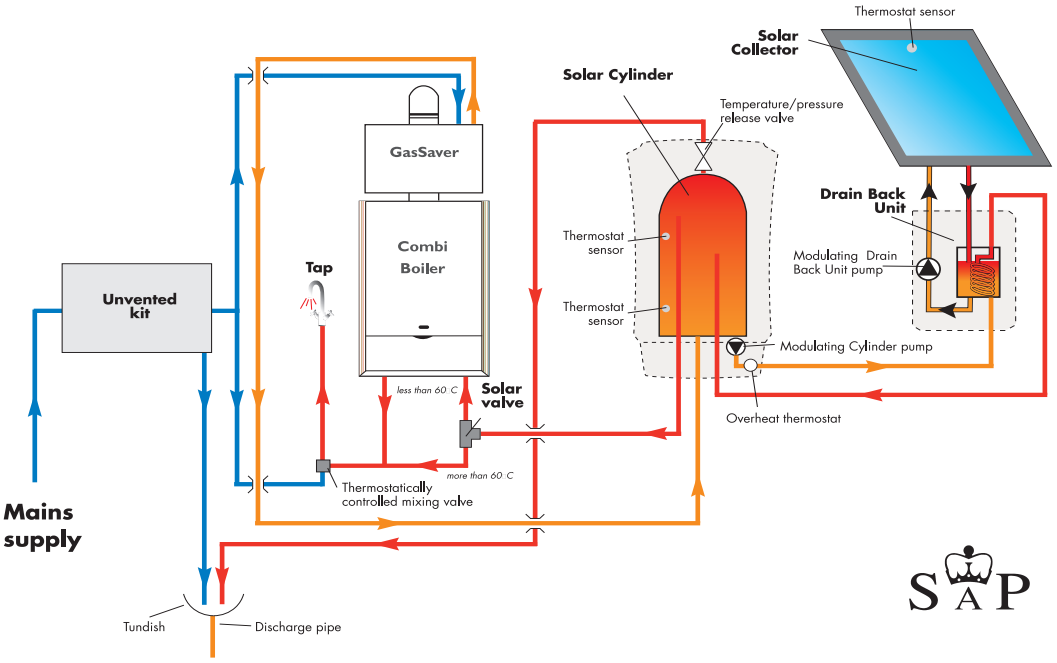
Faced with meeting national standards such as the Code for Sustainable Homes, there's a growing emphasis on finding alternative heating and hot water solutions that deliver greater energy efficiency and reduce CO_2 emissions.

Alpha's unique solution, incorporating the award-winning SolarSmart and GasSaver heat recovery unit, helps you achieve CSH Level 3 without having to radically rethink heating system specification, or change the fabric of the building.

This affordable solution, which is fully recognised in SAP Appendix Q as well as being WRAS approved, will help you significantly improve energy efficiency and Dwelling Emission Rates.

At the heart of the system is our innovative Solar Valve which enables it to operate with a combination boiler, providing far better energy efficiency than the traditional system boiler and unvented cylinder approach more commonly specified. This system has become the preferred CSH Level 3 heating solution for a number of the UK's leading house builders and developers.

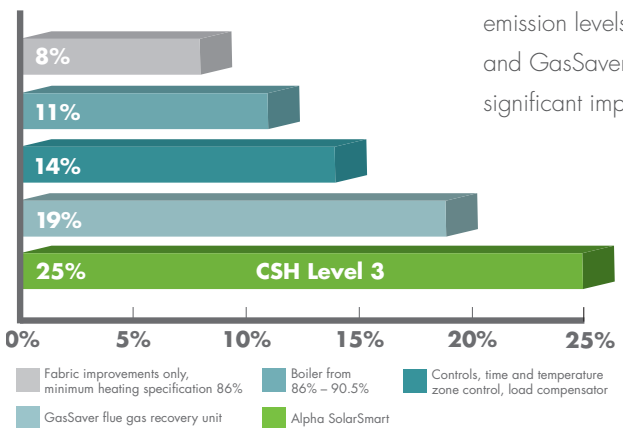
SolarSmart with GasSaver and high efficiency boiler



SAP Appendix Q example

This graph demonstrates how Alpha Heating Innovation can help you easily and affordably achieve Level 3 of the CSH.

25% reduction in CO_2 emissions



By achieving a 25% reduction in CO_2 emission levels, the unique SolarSmart and GasSaver solution makes a significant impact on sustainability.

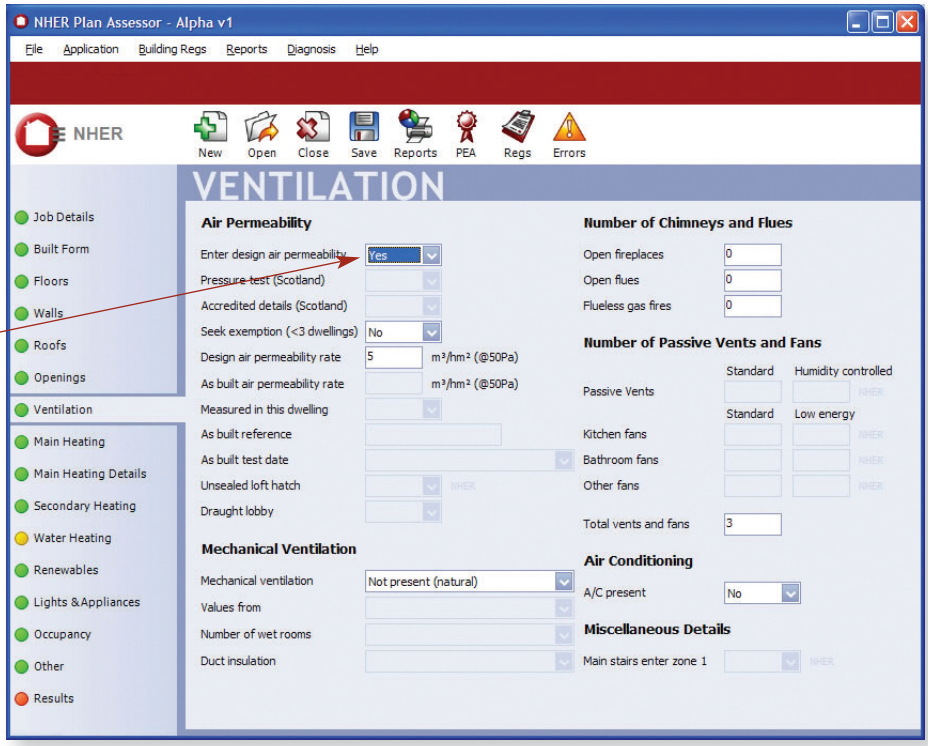
Listed below are a number of alternative products that can also be added into SAP, in conjunction with GasSaver and SolarSmart to help achieve Code Levels 3 and 4.

- Photovoltaic
- Load compensators
- Time and temperature control
- Mechanical ventilation
- Positive input vents instead of extractor fans

Step-by-step guide

Step 1: Ventilation

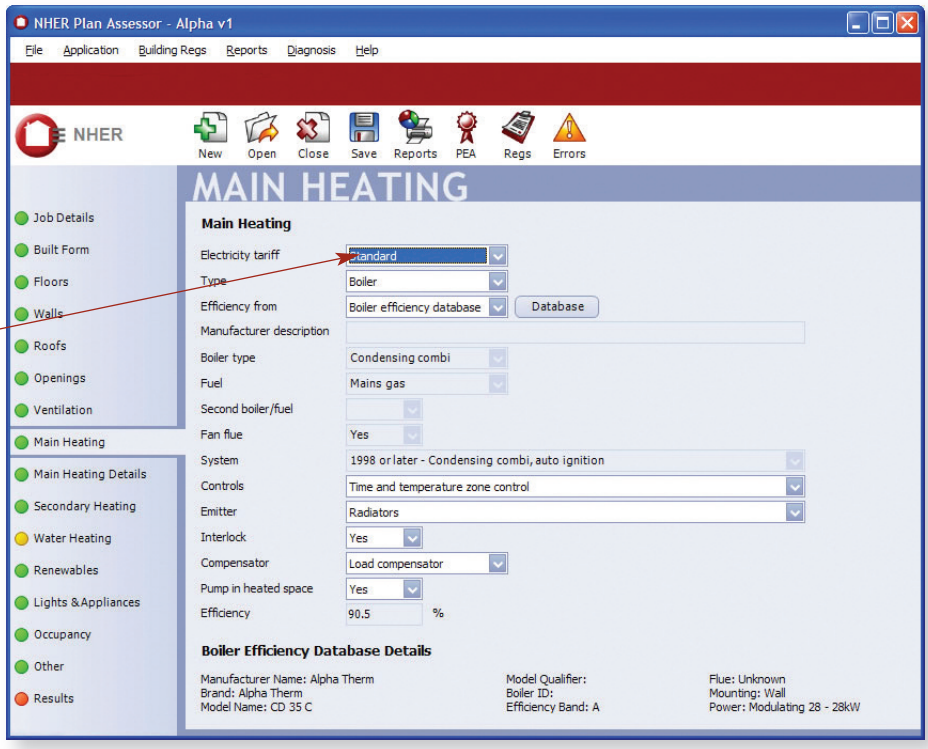
Input the air permeability for the properties and any mechanical ventilation if required.



Step 2: Main Heating

Select database and choose the required Alpha Boiler.

The appropriate information will automatically filter into the boxes



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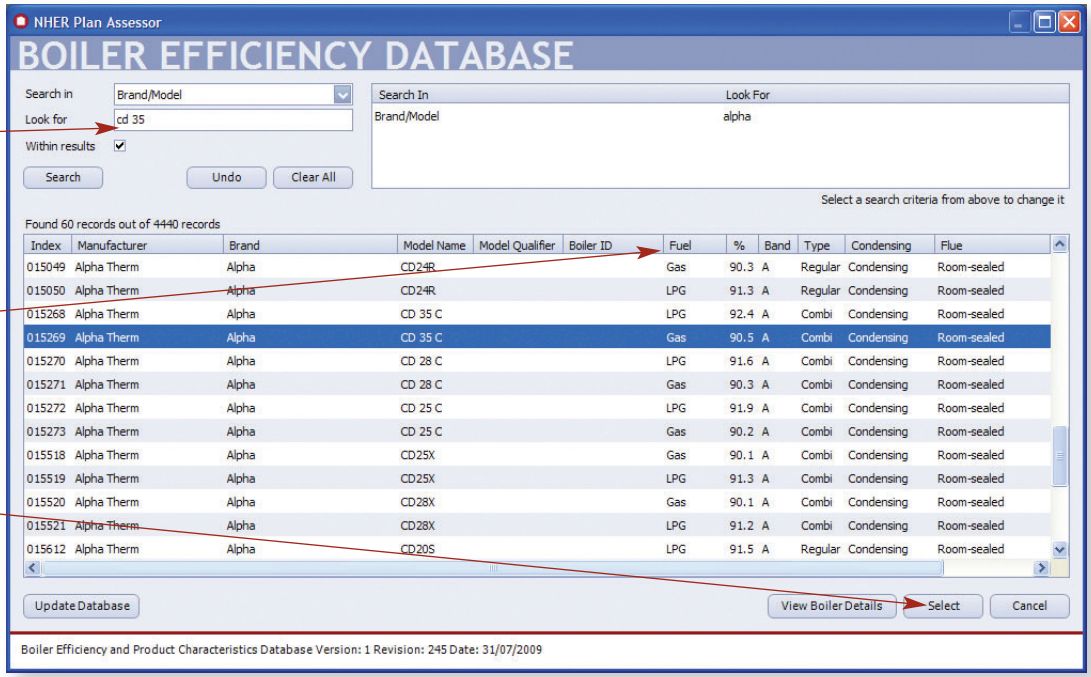
Step-by-step guide

Step 3: Boiler Database

Search for the appropriate boiler model.

NOTE: Ensure the correct fuel type has been selected

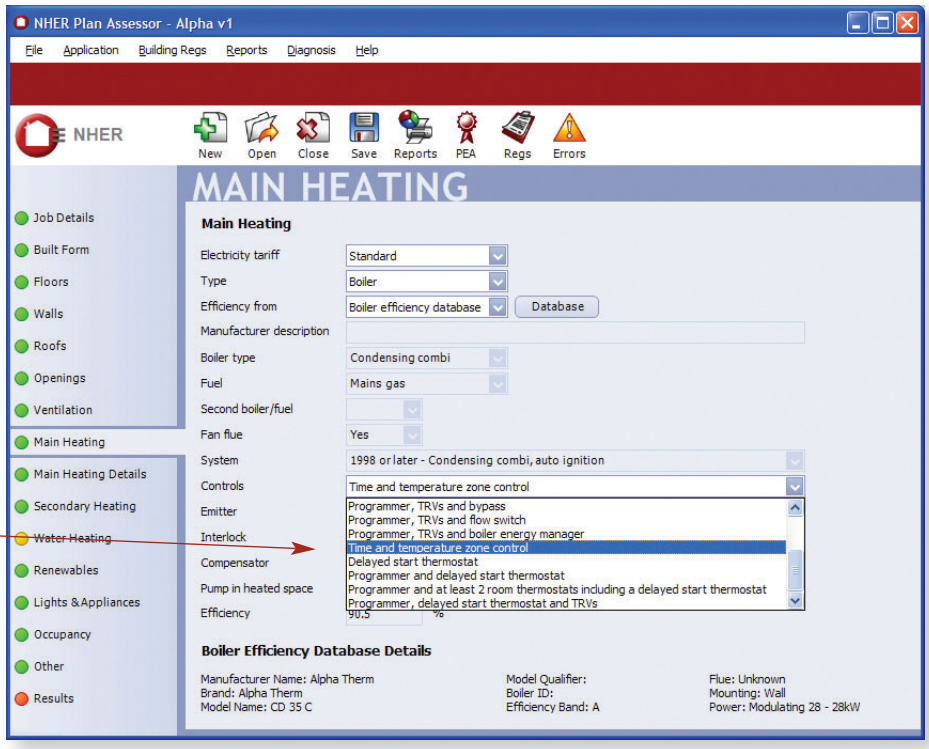
Click select



Step 4: Heating Controls

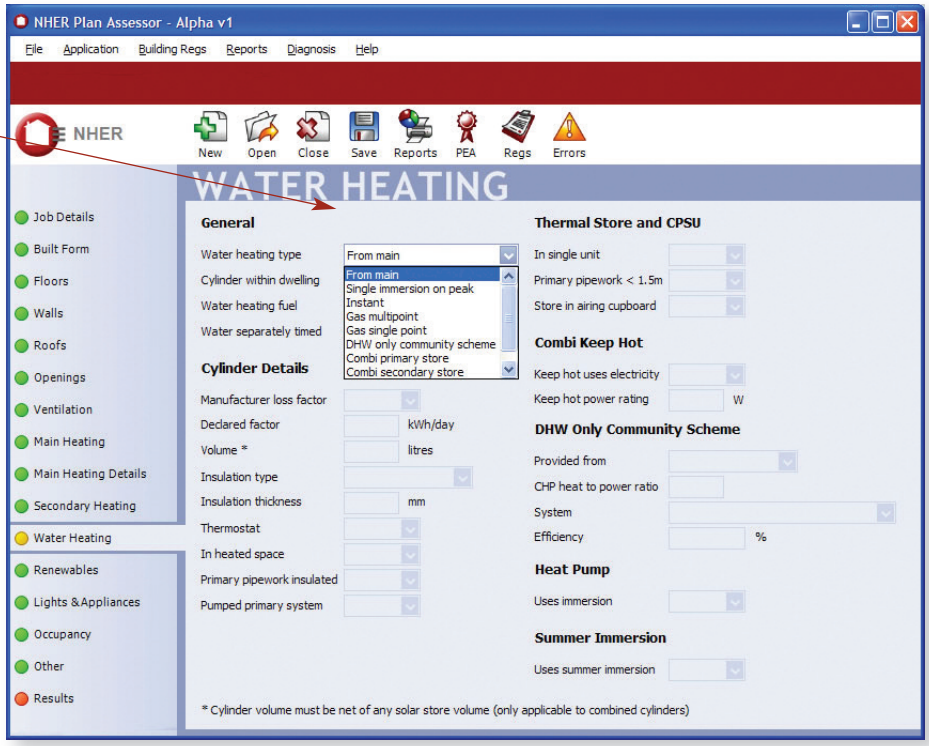
Select the appropriate system controls (eg time/temperature zone control).

Select the appropriate interlocks, compensators, emitter type and pump location.



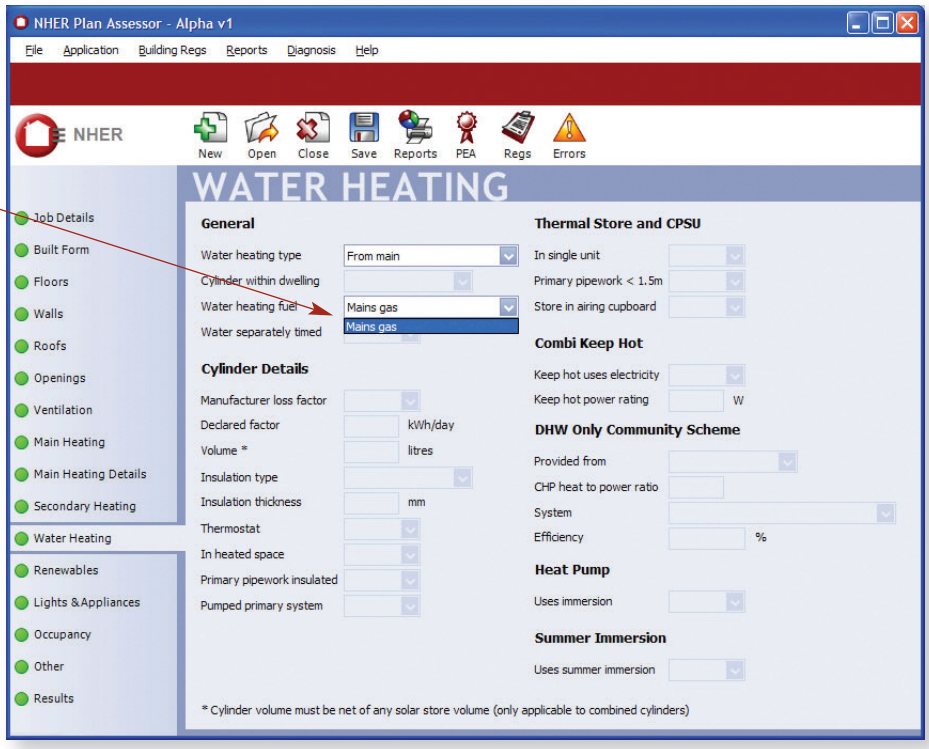
Step 5: Water Heating

Select Water heating type



Step 6: Gas Fuel Water Heating

Select mains gas



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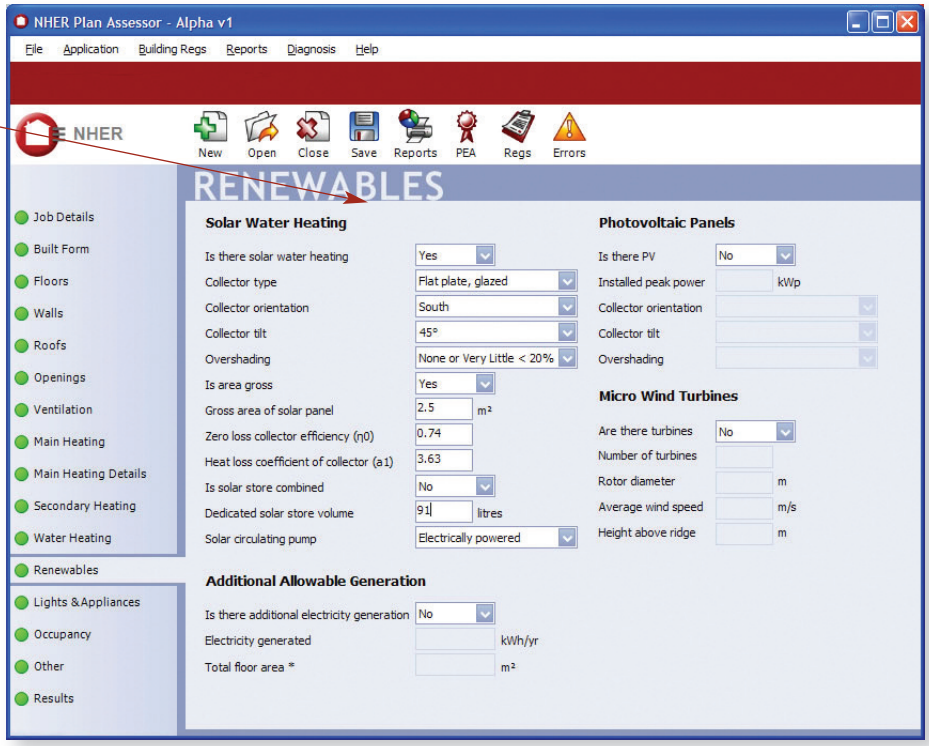
Step-by-step guide

Step 7: Renewables

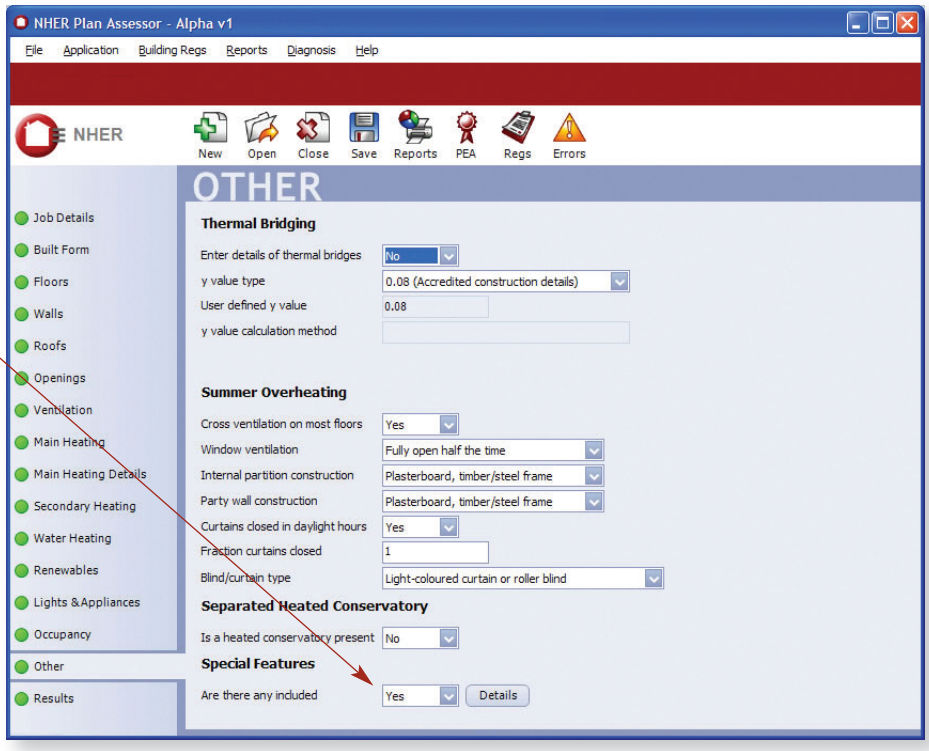
Input the data on the SolarSmart System.

All information can be found at the back of this guide.



Step 8: GasSaver Input

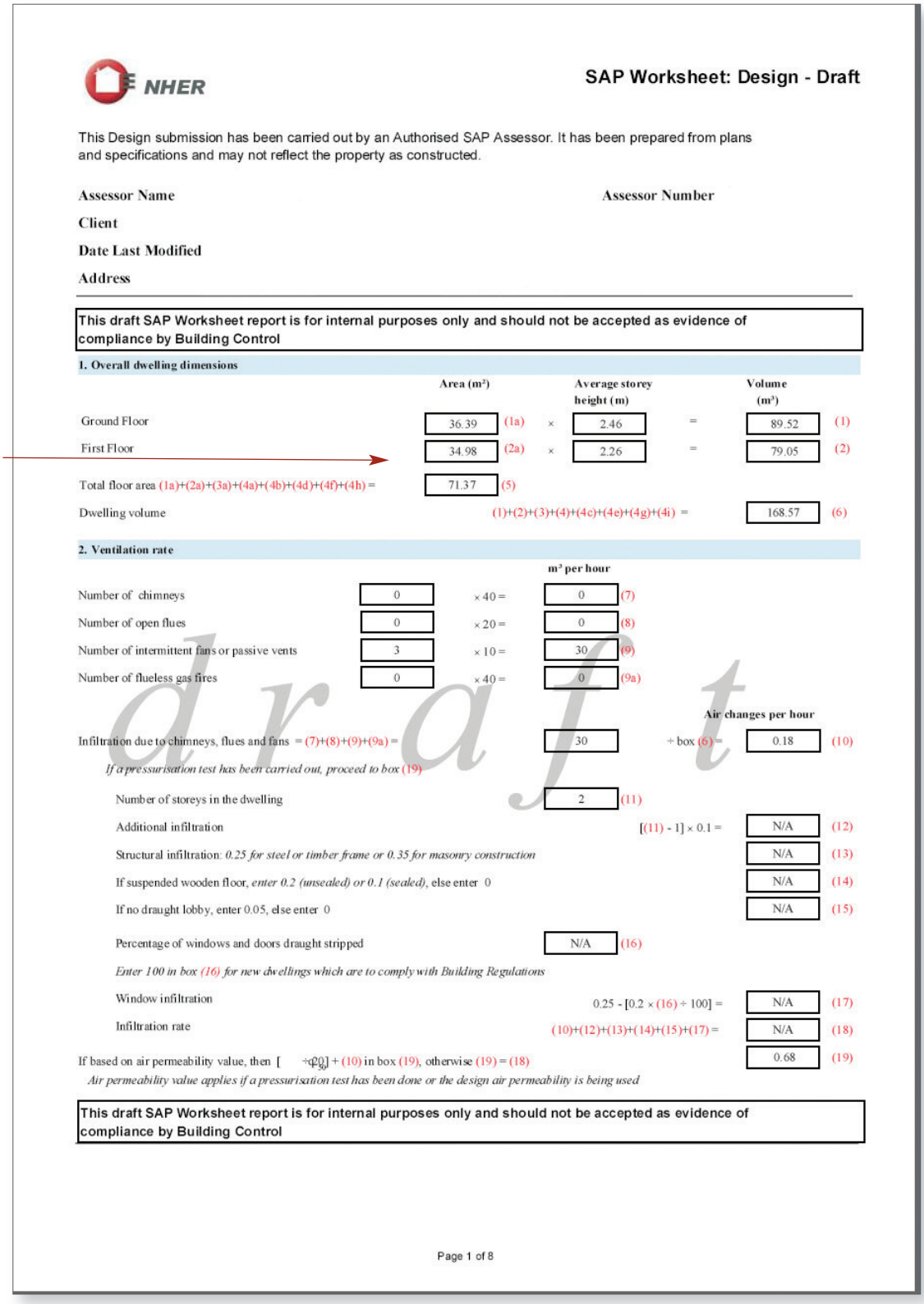
Select 'Yes' for special features and click 'Details' to add Zenex GasSaver.



Step 9: SAP Examples

Run a draft SAP worksheet to get values for appendix Q

Take values from the data boxes and input into Appendix Q, sections 5-87e.



NHER

SAP Worksheet: Design - Draft

This Design submission has been carried out by an Authorised SAP Assessor. It has been prepared from plans and specifications and may not reflect the property as constructed.

Assessor Name **Assessor Number**

Client

Date Last Modified

Address

This draft SAP Worksheet report is for internal purposes only and should not be accepted as evidence of compliance by Building Control

1. Overall dwelling dimensions

	Area (m²)		Average storey height (m)		Volume (m³)	
Ground Floor	36.39	(1a)	× 2.46	=	89.52	(1)
First Floor	34.98	(2a)	× 2.26	=	79.05	(2)
Total floor area (1a)+(2a)+(3a)+(4a)+(4b)+(4d)+(4f)+(4h) =	71.37	(5)				
Dwelling volume			(1)+(2)+(3)+(4)+(4c)+(4e)+(4g)+(4i) =		168.57	(6)

2. Ventilation rate

			m³ per hour	
Number of chimneys	0	× 40 =	0	(7)
Number of open flues	0	× 20 =	0	(8)
Number of intermittent fans or passive vents	3	× 10 =	30	(9)
Number of flueless gas fires	0	× 40 =	0	(9a)

			Air changes per hour	
Infiltration due to chimneys, flues and fans = (7)+(8)+(9)+(9a) =	30	+ box (6) =	0.18	(10)
If a pressurisation test has been carried out, proceed to box (19)				
Number of storeys in the dwelling	2	(11)		
Additional infiltration		[(11) - 1] × 0.1 =	N/A	(12)
Structural infiltration: *0.25 for steel or timber frame or 0.35 for masonry construction*			N/A	(13)
If suspended wooden floor, *enter 0.2 (unsealed) or 0.1 (sealed)*, else enter 0			N/A	(14)
If no draught lobby, enter 0.05, else enter 0			N/A	(15)
Percentage of windows and doors draught stripped	N/A	(16)		
Enter 100 in box (16) for new dwellings which are to comply with Building Regulations				
Window infiltration		0.25 - [0.2 × (16) ÷ 100] =	N/A	(17)
Infiltration rate		(10)+(12)+(13)+(14)+(15)+(17) =	N/A	(18)
If based on air permeability value, then [÷20] + (10) in box (19), otherwise (19) = (18)			0.68	(19)

Air permeability value applies if a pressurisation test has been done or the design air permeability is being used

This draft SAP Worksheet report is for internal purposes only and should not be accepted as evidence of compliance by Building Control

Page 1 of 8

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Step-by-step guide

Step 10: Appendix Q

Input Zenex GasSaver in to step one

Input boiler details

Input values from draf SAP worksheet.

Take value from appendix Q, to input into special features page

SAP Appendix Q calculation process for
Flue Gas Heat Recovery System (FGHRS) or Passive Flue Gas Heat Recovery Device (PFGHRD)

SAP Assessment Reference		

Step 1 : Record details of FGHRS (NB: Select the brand and model on worksheet "Select FGHRS")

FGHRS index number (taken from "Select FGHRS")		101	Box Q01
FGHRS brand name		Zenex GasSaver	
FGHRS model name		GS-1	
This FGHRS is intended for use with a boiler using the fuel		Mains gas	
This FGHRS is intended for use with a boiler of type(s)		No No Regular Combi (storage)	

Step 2 : Identify boiler and enter details in green cells below. Fuel and boiler type must match those for which the FGHRS is applicable, otherwise no savings will be credited.

Boiler brand name		
Boiler model name		
Fuel (select answer from box)	Mains gas	Box Q02
Boiler type (select answer from box) §	Combi instantaneous - no keep hot facility	Box Q03
Is it a condensing or non-condensing boiler? (select answer from box)	Condensing	Box Q04

§ If unsure of boiler type: if Q09 = 0 and Q08 > 0 then it is storage combi. For keep-hot status check your SAP calculator water heating section.

Step 3 : Enter data into the SAP calculator, ignoring any boiler efficiency adjustments in Table 4c (section 1). This means underfloor heating or load/weather compensation must not be selected.

Step 4 : Obtain data from the SAP calculator (box number in red) and enter in the green cells below.

Total floor area (m^2)	box (5)	71.37	Box Q05
Volume of hot water store (litres)† *	box (43)	0	Box Q06
Temperature factor‡	box (44b)	0	Box Q07
Water storage heat loss (kWh/year) ‡ *	box (47)	0	Box Q08
Primary circuit heat loss (kWh/year) (select from answer from drop downbox) ‡	box (48)	0	Box Q09
Combi loss (kWh/year), if any, ‡	box (49)	573.66	Box Q10
Contribution from any solar water heating (not photovoltiac) ‡	box (50)	844.33	Box Q11
Space heating requirement (useful)	box (81)	4,436	Box Q12
Fraction of heat from secondary/supplementary system ‡	box (82)	0	Box Q13
Electricity used by keep hot facilty ‡	box (87e)	0	Box Q14

† If box (41) is greater than zero obtain the volume from the same source as the manufacturers declared storage loss factor and not from box 43.
‡ A value must be entered even if it is zero. If the SAP calculator box is blank enter zero also.
* Q06 and Q08 must be either both zero (instantaneous combi) or both positive (regular or storage combi).

Step 5 : Results from the energy saving calculation are shown in the yellow boxes below. Copy them into the Special Features section of the SAP calculator, as indicated.

Energy saved (kWh), to be entered in box (95)	Box Q15	353 kWh
Fuel for the above	Box Q16	Mains gas
Additional energy consumed (kWh), to be entered in box (96)	Box Q17	0 kWh
Fuel for the above	Box Q18	Mains gas

IMPORTANT NOTES
(1) If the boiler brand or model is changed, the energy saving must be re-calculated.
(2) If an error message appears above, or the energy saving (Box Q15) is zero, then an assessment of savings cannot be made.
Errors are reported when not all input data has been entered, the FGHRS and boiler type are not compatible, floor area is less than 30m², and other consistency checks as indicated.

Version 5 - 27 Feb 2009

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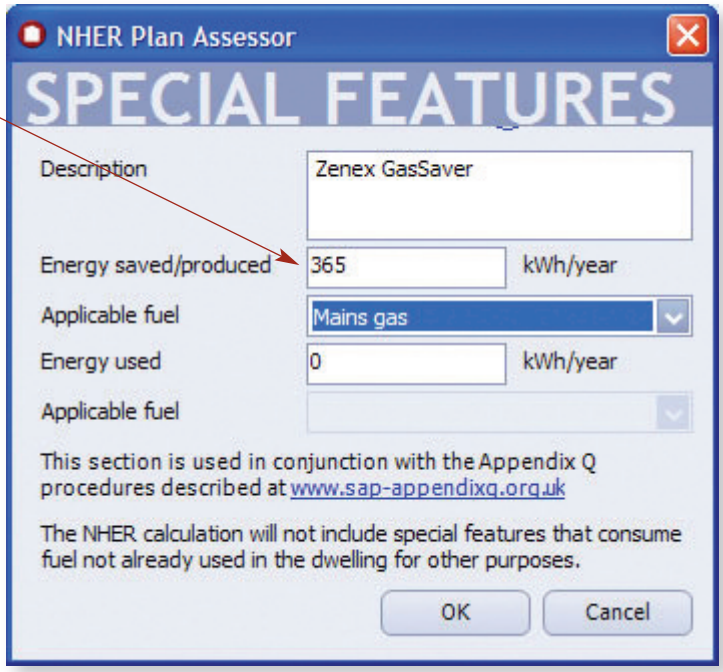
Copy of SAPQ_FGHRS_Calculation_27_Feb_2009 alpha boiler.xls Calculate_savings 27/08/2009 15:10

Step 11: Special Features

Add in energy saved value from Appendix Q to complete calculation

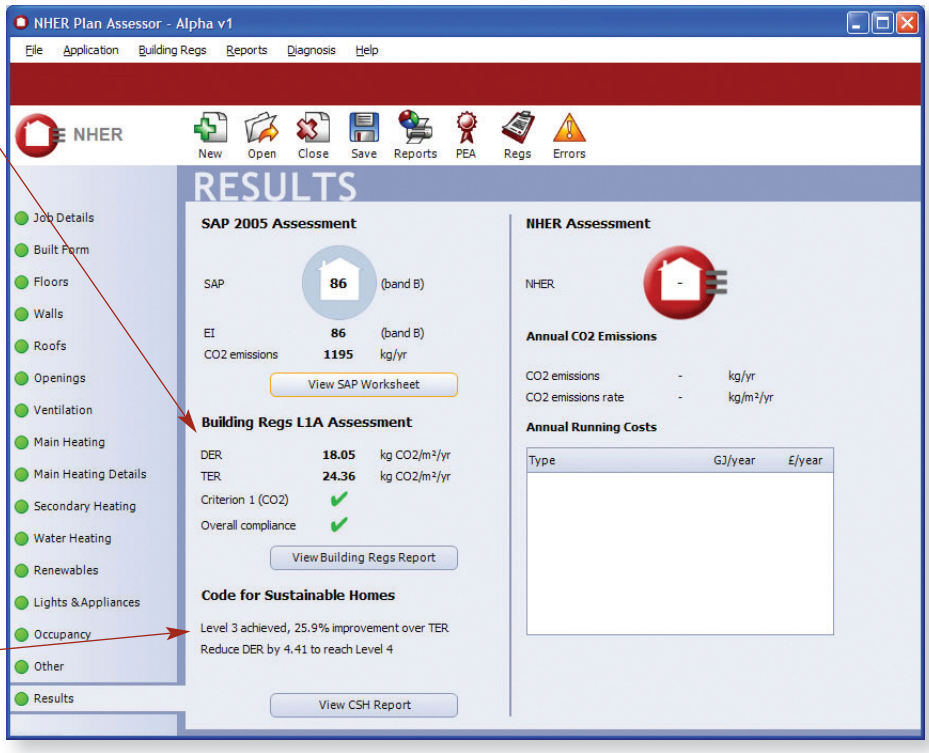
Complete description as Zenex GasSaver and select mains gas.



Step 12: Results

Here is the page that shows the DER/TER saving

Code 3 achieved.



Technical data

SAP – Performance Technical Data

Solar Cylinder – Material		Stainless Steel
DHW Storage Cylinder Volume		91L
DBU Heat Exchanger – Material		Copper
Covers/Insulation Material		EPP
Global Warming Potential	GWP	Zero
Ozone Depletion Potential	ODP	Zero
Solar Cylinder Nominal Insulation Thickness		50mm
Standing Energy Loss of Solar Cylinder		0.92 kWh/24hr - 0.43 watts/litre
Energy Performance		3.5GJ/yr
Total Collector Surface Area		2.5m²
Collector Aperture Area		2.27m²
Aperture to Gross Collector Area Ratio		0.9
Zero Loss Collector Efficiency	(no)	74%
Collector Heat Loss Coefficient	(a1)	3.629W/m²k

Alpha boiler efficiency and products of combustion data

				Combustion Data – Natural Gas – G20					
	SEDBUK Efficiency			NOX			CO^2	CO	
Boiler Model	Efficiency Band	Natural Gas SAP Seasonal Efficiency %	LPG SAP Seasonal Efficiency %	Class	PPM	Mg/kWh	%	PPM	Mg/kWh
CD32C	A	90.7	92.0	5	18	31	9.5	20	22
CD24C	A	90.7	91.8	5	31	55	9.2	23	25
CD24S	A	90.8	91.9	5	31	55	9.2	23	25
CD50	A	91.2	92.5	5	18	31	9.5	20	22
CD13R	A	90.1	91.1	5	19	34	9.2	14	15
CD18R	A	90.1	91.2	5	21	37	9.2	31	33
CD24R	A	90.3	91.3	5	18	32	9.2	24	26
CD18S	A	90.5	91.5	5	12	21	9.1	11	12
CD30S	A	90.4	—	5	22	39	9.6	22	24
CD25C	A	90.2	91.9	5	22	39	9.4	47	50
CD28C	A	90.3	91.6	5	21	36	9.3	28	30
CD35C	A	90.5	92.4	5	13	22	9.3	22	24
CD25X	A	90.1	91.3	5	22	39	9.4	15	16
CD28X	A	90.1	91.2	5	22	39	9.4	5	6
CD12S	A	90.1	91.2	5	13	23	9.4	8	9
CD20S	A	90.1	91.5	5	18	31	9.4	7	7
CD28S	A	90.1	91.6	5	20	35	9.4	8	8
CD50S	A	90.4	91.4	5	22	38	9.3	35	37
CD70S	A	90.0	91.3	5	8	14	9.4	43	46

Features

	Combination					System			Regular			Storage Combi	System	
General	**CD25C**	**CD28C**	**CD35C**	**CD25X**	**CD28X**	**CD12S**	**CD20S**	**CD28S**	**CD13R**	**CD18R**	**CD24R**	**CD50**	**CD50S**	**CD70S**
SEDBUK rating	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Lift weight (kg)	41	42	43	41	42	37	38	40	27	27	28	70	63	68
DHW flow rate (l/min)	9.6	11.4	14.2	9.6	11.4							18		
Max horizontal flue (m)	12	12	12	12	12	12	12	12	12	12	12	12	30	30
Max vertical flue (m)	15	15	15	15	15	15	15	15	15	15	15	15	30	30
Standard guarantee (years)	3	3	3	2	2	3	3	3	1	1	1	3	3	3
Boiler Dimensions														
Height (mm)	720	720	720	720	720	720	720	720	600	600	600	900	950	950
Width (mm)	440	440	440	440	440	440	440	440	390	390	390	600	600	600
Depth (mm)	300	300	300	300	300	300	300	300	305	305	305	450	525	525
Installation Clearances (relative to the casing)														
Above (mm)	235	235	235	235	235	235	235	235	235	235	235	220	350	350
Below (mm)	250	250	250	250	250	250	250	250	100	100	100	250	250	250
Side (mm)	5	5	5	5	5	5	5	5	5	5	5	10	10	10
Front (mm)	450	450	450	450	450	450	450	450	450	450	450	450	450	450
GasSaver compatible	•	•	•	•	•	•	•	•	•	•	•	•		
SolarSmart compatible	•	•	•	•	•							•		
Features														
Stainless steel heat exchanger	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Seasonality Valve	•	•	•											
Built-in filling loop	•	•	•									•		
Factory fitted valves and copper tails	•	•	•	•	•	•	•	•						
Pipes clip distance from the wall	•	•	•	•	•	•	•	•				•		
Pre-wired	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Electronic ignition	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Anti-cycling device	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Pump overrun on heating	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Daily pump kick	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Frost thermostat	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Fully modulating burner	•	•	•	•	•	•	•	•	•	•	•	•	•	•
One man lift									•	•	•			
Cyclone protection	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]						
Earth bonding plate	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]						
Rear piping	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]						
Split flow tails	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]	•[1]						

[1] When fitted with optional PremierPack

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HEATING INNOVATION

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