

# SAP 10 SUPPORTING DOCUMENT

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## PRODUCT CHARACTERISTICS DATABASE SPECIFICATION

Issue 1.0

## DOCUMENT REVISIONS

Documents will be revised by issue of updated editions or amendments. Revised documents will be posted on the website at [www.ncm-pcdb.org.uk/sap](http://www.ncm-pcdb.org.uk/sap).

Technical or other changes which affect product recognition requirements (for example) will result in a new issue. Minor or administrative changes (e.g. corrections of spelling and typographical errors, changes to address and copyright details, the addition of notes for clarification etc.) may be made as amendments.

The issue number will be given in decimal format with the integer part giving the issue number and the fractional part giving the number of amendments (e.g. Issue 3.2 indicates that the document is at Issue 3 with 2 amendments).

Users of this document should ensure that they possess the latest issue.

## DOCUMENT REVISION LOG

DATE	ISSUE NO.	DETAILS
23/05/2023	1.0	First release

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# 1. BACKGROUND

1.1. The UK's National Calculation Methodologies for the energy rating of buildings are used to deliver multiple Government policy initiatives. These range from Building Regulation compliance checks and the production of Energy Performance Certificates, which satisfy the UK's obligations under the European Performance of Buildings Directive (EPBD), to supporting the Green Deal and Energy Companies Obligation (ECO) schemes by enabling the differentiation of improvement measures. Assessing the performance of a measure is complex and it may not always be possible to describe in terms of a simple number for comparison purposes. In such instances the assessment of performance is only possible using building energy performance assessments that utilise specific product performance data.

1.2. In order to assess a building's energy performance, information is needed that describes the energy performance of the building fabric and building services. Such product performance data is either generic, determined by the materials and type of product used ('type data') or specific, where validated individual branded product performance data has been made available ('product data'). In the case of the National Calculation Methodology for energy rating of dwellings, known as the Standard Assessment Procedure (SAP), product performance data is normally held in the Product Characteristics Database (PCDB).

1.3. The listing of product performance data in this PCDB does not denote any form of approval or endorsement of that product, actual or implied, nor does it imply that the building's energy performance rating is better than that obtained using alternative products.

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- 1.4. Product performance data held in the PCDB is provided solely to support building energy performance assessments and is not intended to support the marketing efforts of manufacturers. To this end, the Terms and Conditions applicable to the listing of individual branded product performance information outline how product data listed in the databases can be referenced in marketing and promotional material.
- 1.5. All manufacturers and suppliers who apply for their products to be listed in the PCDB must submit validated evidence of performance (UKAS or equivalent), produced by testing against an agreed test specification, and agree to be bound by the Terms and Conditions applicable to the listing of individual branded product performance information.
- 1.6. The PCDB is maintained to help SAP assessors find the correctly calculated seasonal efficiency and other characteristics for heating and other products, and to reduce risk of miscalculation and confusion with other data. It holds data in separate Tables for various products. Entries contain fields to aid product identification, and other technical data relevant to SAP calculations.
- 1.7. The PCDB holds information on both current products and obsolete products. Data are submitted by manufacturers. Current products may later be marked as obsolete at the request of the manufacturer.
- 1.8. A “manufacturer” for the purposes of the PCDB is defined as a manufacturer or supplier who is responsible for placing a product on sale in the United Kingdom of Great Britain and Northern Ireland (UK) and who has submitted product data to the PCDB. The manufacturer must be a legal entity, such as a limited company, not a trade name. It is not acceptable for more than one UK supplier, who is responsible for sales of a manufacturer’s product, to exist in the PCDB. Where this occurs, the manufacturer is normally entered in the PCDB, but this is reviewed on a case-by-case basis.

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## 2. PCDB DATA FILE

- 2.1. The Product Characteristics Database File is updated monthly, generally on the last day of each month. The file contains data on products in a form readable by SAP software. The structure and contents of the Product Characteristics Database File is defined in Section 0 of this document.
- 2.2. Occasionally, updates to the Product Characteristics Database File may occur at other times, normally to resolve significant errors, should they become apparent.
- 2.3. For each update of the Product Characteristics Database File, control lines included in the file will make clear the revision number and the date of issue, as explained in Section 6.3.
- 2.4. The Product Characteristics Database File holds data in separate Tables on various following product types as listed in Section 3.
- 2.5. Both current and obsolete products may be included. Future revisions may include data on other product types. The data file can also include other data that may need to be amended during the currency of a given SAP version, such as fuel prices.
- 2.6. It is essential that SAP assessors use only the latest edition of the Product Characteristics Database File, as new editions may contain not just new entries but corrections to previous ones. Using an older edition is a breach of quality control requirements, as consistency between surveys cannot then be assured and calculated SAP results may be invalid.
- 2.7. The Product Characteristics Database File is held in computer-readable form at [www.ncm-pcdb.org.uk/pcdb/pcdb10.dat](http://www.ncm-pcdb.org.uk/pcdb/pcdb10.dat). SAP assessment software should compare the revision date of the data file presently in the software with the current date, updating the file if necessary and advising the SAP assessor that this has occurred. Software should do this date check whenever it launches, or the first time the assessor seeks to use the database.

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### 3. DATA TABLES

The Data File consists of a number of tables, as below. Any of the tables may appear more than once; see specification rules in Section 7.7. In particular, if a table has two or more occurrences with the same format number each instance is read and their contents merged by SAP assessment software.

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TABLES IN THE DATA FILE		
Table no.	Name	Current format no.
011	Database Amendments Table	031
021	Database Amendment Texts Table	041
301	Manufacturers Table	207
105	Gas and Oil Boiler Table	211
122	Solid Fuel Boiler Table	225
131	Cooker Boiler Table	234
143	CoGen Table	244
161	ECO Measures Table	261
162	RHI Tariffs Table	262
163	FIT Tariffs Table	263
172	Postcode Table	272
181	Indicative Costs Table	283
191	Fuel Price Table	294
199	Historical Fuel Price Table	295
196	Fuel Table	296
313	Flue Gas Heat Recovery System Table	414
322	Decentralised MEV Table	428
329	MV In-use Factors Table	432
323	Centralised MEV and MVHR Table	431
341	MVHR Duct Table	442
353	Waste Water Heat Recovery System Table	454
362	Heat Pump Table	465
371	Heating Controls Table	473
372	Heating Control Requirements Table	472
381	Warm Air System Table	482
391	Electric Storage Heaters Table	491
501	Heat Network Table	602
506	Heat Interface Unit Table	606

## 4. PRODUCT IDENTIFICATION

### 4.1 Presentation of data

In the case of SAP assessments utilising product performance data held in the database, software should read the data file and present the data in a suitable manner that enables the SAP assessor to select a product on the basis of its description (see Section 4.2). Generally, software should require the assessor to make an explicit choice of brand name, model and model qualifier, so that responsibility for the choice lies with the assessor in each individual case.

The data used for calculations should be obtained from (in order of preference):

- 1) the PCDB database
- 2) SAP Tables

Outputs from SAP assessment software should state the source of the product performance data used and, if from the database, the database revision number and date (month and year).

### 4.2 Index numbers

All tables in the data file, except tables 11, 21, 301, 172, 181 and 191, describe products. An index number is assigned to each product's data record within these tables. The index numbers in these tables form a set with no duplicates. A single product appearing in multiple data records (e.g. a boiler that can be used with different fuels; an exhaust air heat pump which appears in both the heap pump table and the mechanical ventilation table) will have a different index number in each case. Index numbers assigned to products in the database are always 6 digits (with leading zeros added as necessary). They will not be altered and so will appear consistently through all issues of the Product Characteristics Database File. An index number freed as a result of entry deletion will not be re-assigned to another product.

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### 4.3 Product identification and selection

Product data held in the database must be presented by SAP assessment software in terms of the following identifying fields, known as the NCM (SAP) Identifier:

- 1) Brand Name
- 2) Model Name
- 3) Model Qualifier

The selection of product data must be prompted in the order 1) to 3).

Brand name is the name of the brand as shown on the product (or if a brand name has not been supplied to the database administrator, the original manufacturer name will be inserted instead). Each of these identifying fields must be unique with reference to each other; no duplication is permitted, even in part.

The original manufacturer name is not suitable to construct a list for product selection as several products will not be found.

There are two circumstances when the above might not be unique:

- 1) The product can use more than one fuel (in which case there is more than one entry in the database for the product). This happens in many cases for gas/LPG. Here the manufacturer has the option of modifying the model qualifier to distinguish between them, but is not obliged to do so. Thus there are entries in the database where brand+model+qualifier is the same for two boilers, one of them being gas and the other LPG. If a particular fuel has been selected (and heat distribution type (and weather compensation presence in the case of heat pumps, see next paragraph)) then brand+model+qualifier should be unique. Otherwise it will be necessary to, for example, append the fuel to the model qualifier to clarify the difference between the two cases. A similar situation arises with solid fuel boilers. Therefore, it is recommended that SAP assessment software encourages assessors to choose the fuel and only then offers a selection based on brand/model/qualifier.
- 2) For heat pumps there can be more than one entry in the database for different heat distribution types (35, 45, 55, 58/65°C, warm air system) and for with and without

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weather compensation. In that case (for a given fuel) compensator+heat distribution type+brand+model+qualifier is unique. Therefore, it is recommended that SAP assessment software encourages assessors to choose the fuel and the heat distribution type and then offers a selection based on brand/model/qualifier with and without compensator.

The manufacturer table 301 gives the name and contact details for the manufacturer currently responsible for the product concerned. In many cases the current manufacturer is the same as the original manufacturer, but differs in some cases, e.g. where one firm has taken over another. This table is not relevant to product identification or selection. It is included as additional information, e.g. if a SAP assessor needs to contact the manufacturer with a query.

The appropriate entry from Table 301 can be used to provide information to the assessor once a product has been selected. A list built from Table 301 is of no use for product identification or selection; SAP assessment software must not offer a list based on Table 301.

Note: Manufacturers are not permitted to truncate naming information within the Model Name and/or Model Qualifier fields for the purpose of recognising “product families”, i.e. variants of a product with performance that is similar or identical. There may be exceptions, but these will be assessed on a case-by-case basis.

#### 4.3.1 Product identification – boilers and CoGen

Unique identification of a product for the purposes of SAP requires consideration of more than one data field in the database. For boilers and CoGen it requires the concatenation of the following to define a unique record:

- fuel + brand name + model name + model qualifier.

For single-fuel products within any one table, the concatenation of the following is unique in most cases:

- brand name + model name + model qualifier.

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An (unlikely) exception is when a new manufacturer takes over an existing brand name and sells a different product with the same brand name, model name, and model qualifier as previously. In that case the concatenation of the following is unique:

- manufacturer name + brand name + model name + model qualifier.

For multi-fuel products (e.g. mains gas and LPG, or anthracite and wood), the manufacturer might not alter the model name or model qualifier according to the fuel. In that case the concatenation of the following is unique:

- fuel + brand name + model name + model qualifier,

Brand name + model name + model qualifier will be unique after a particular fuel has been selected, refer to Section 4.3.

#### 4.3.2 Product identification – mechanical ventilation systems

The concatenation of the following defines a unique record:

- duct type + brand name + model name + model qualifier.

If the duct type (flexible or semi-rigid, rigid) is specified, then concatenation of the following is unique:

- brand name + model name + model qualifier.

#### 4.3.3 Product identification – flue gas heat recovery systems

The concatenation of the following defines a unique record:

- brand name + model name + model qualifier.

#### 4.3.4 Product identification – waste water heat recovery systems

The concatenation of the following defines a unique record:

- brand name + model name + model qualifier.

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#### 4.3.5 Product identification – heat pumps

The concatenation of the following defines a unique record:

- fuel + heat distribution type + weather compensation (yes/no) + brand name + model name + model qualifier.

If the fuel has been defined (e.g. electricity) the concatenation of the following defines a unique record:

- heat distribution type + weather compensation (yes/no) + brand name + model name + model qualifier.

#### 4.3.6 Product identification – heating controls

The concatenation of the following defines a unique record:

- Ecodesign class + fuel + brand name + model name + model qualifier.

### 4.4 Manufacturers

Table 301 gives the current manufacturer details for products. Field 2 of a product data record links the product to a current manufacturer record. Index numbers in this table are always 6 digits (with leading zeros as needed) but may be changed in different issues of the Data File.

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## 5. STATUS OF PRODUCTS

5.1. The database includes 'illustrative' products: gas, oil and solid fuel boilers, Cogen, heat pumps, FGHRs, WWHRs and others. These are not actual products but have characteristics comparable to currently available products.

5.2. Illustrative products are included to enable SAP assessment software to run scenarios, for example to examine the effect of improvement measures.

5.3. Illustrative products are used within SAP calculations solely for the purpose stated in Section 5.2. They must not be offered as options within SAP assessment software; only actual products are to be visible. Illustrative products are used only in the context of defined scenario calculations.

5.4. Actual products in the database are assigned one of four status categories, defined as follows:

- Normal. The product data can be used for SAP assessments.
- Under investigation. There are issues with some of the data in the record. This status is temporary and will either revert to normal or change to not valid when the investigation is completed. The product data can be used for SAP assessments but may be subject to change.
- Not valid. It has been established that one or more of the data elements is incorrect. The product data must not be used for new assessments. It is permissible to use the data for a re-calculation of a previous assessment.
- Methodology under review. The methodology used to calculate the energy performance of the product is being investigated. This status is temporary and will either revert to normal or change to not valid when the investigation is completed. The product data can be used for SAP assessments but may be subject to change.

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## 6. UNIFORM RESOURCE LOCATORS

- 6.1. The following Uniform Resource Locator addresses (URL) are for use only by SAP assessment software implementing automatic downloads.
- 6.2. The Product Characteristics Database File for use by SAP 10 software is at the URL: [www.ncm-pcdb.org.uk/pcdb/pcdb10.dat](http://www.ncm-pcdb.org.uk/pcdb/pcdb10.dat).
- 6.3. In addition, a small file is maintained to allow software to check that it is using the current version of the PCDB file. It is a text file consisting of a single line giving the revision number of the PCDB file. The URL is: [www.ncm-pcdb.org.uk/pcdb/pcdb10version.dat](http://www.ncm-pcdb.org.uk/pcdb/pcdb10version.dat).

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## 7. DATA DEFINITION FOR PCDB FILE

### 7.1 Background

The Product Characteristics Database File will contain sufficient descriptive and technical data to allow SAP assessors to identify a particular product and find its characteristics needed for the SAP calculations. The Data File is provided for the purposes of undertaking SAP calculations.

### 7.2 File contents

The file is text consisting of any number of comment lines, control lines, and data lines.

A control line followed by a sequence of data lines is described as a table. The table is terminated when the next control line is reached. There may be several tables within the file and they may be placed in any order. A table may include any number of data lines, including zero.

All lines commencing # are to be treated as comments and disregarded by SAP assessment software, wherever they occur within the file.

All lines commencing \$ are control lines and must be recognised by the receiving SAP assessment software. Control lines are used to introduce and terminate data tables and give information about the formats used and dates issued.

All lines commencing with other characters are data lines, forming the contents of data tables. The data lines for a table may be in any order.

Any table with an unrecognised table number (i.e. not listed in Section 3) must be ignored. A file error should not be reported to the assessor but should be reported to the database administrator.

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### 7.3 Control lines

Control lines commence with \$ and are followed by a 3-digit type number. Depending on type number, additional information may be provided on the same line. Some control lines introduce data tables. At present the following control lines have been defined:

CONTROL LINES		
Type	Example	Description
001	\$001,382,2019,08,21	Database revision date. Example indicates revision no. 382 of the database occurred on 21 Aug 2019. As each new issue is published, the revision number is incremented, and the date changed.
301	\$301,207,109,2010,04,16,2	Introduces Table 301, known as the Manufacturers Table. Example indicates that the subsequent data lines conform to defined format no. 207 (formats are specified below); the Table is revision no. 109; and that it was last revised on 16 April 2010. As each new revision of the Table is published, the revision number is incremented and the revision date set to the date of the latest alteration to data contained in the Table. The last field signifies the data source and is to be included in all tables; codes are 1 Gastec, 2 BRE, 3 Other1, 4 Other2, etc [To be determined and recorded by database administrator]. It may be blank if unknown or not applicable.
The other data tables listed in Section 3, using the same syntax as 301.		
998	\$998	Signifies that the data file is a special version created for testing purposes. Files placed on the web for normal use will not have \$998.
999	\$999	End of file. The receiving SAP assessment software should not read beyond this point.
nnn	where 'nnn' is any value not given above or in Section 3. This control line, together with all subsequent lines until the next control line is reached, must be ignored.	

## 7.4 Data lines

Each data line is one record of the table introduced in the preceding control line. The format and meaning of the data in any table is defined by the format number given in the preceding control line. A description of these formats is provided later in this section.

Any future change in format or meaning will always be given a new format number, so that receiving SAP assessment software may check it is reading data in a known format.

## 7.5 Data syntax

Data will conform to the following syntax rules:

- Each item of data contains only the visible characters (32-126, 160-255).
- Each item of data within a record is separated from the next by a comma.
- The final item of data in each record may or may not be terminated by a comma.
- No item of data will contain an embedded comma.
- The first item of data in each record will not commence with # or \$.
- Leading and trailing spaces are not allowed.
- Null items of data are permissible and may be construed as minimum value (“blank” or zero according to context).
- Short records are permissible; i.e. a trailing sequence of null data items (a succession of commas) may be truncated.

## 7.6 File structure

The Product Characteristics Database File will commence with control line type 001 and terminate with control line type 999.

In between there will be any number of tables, introduced by control lines as defined under Section 7.3. The end of a table is recognised when the next control line (of any type) is reached.

Comment lines may occur anywhere in the file and must be ignored by the receiving SAP assessment software.

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## 7.7 Data tables

Tables may be of zero length, i.e. contain no data.

The format specification of the data tables may be varied from time to time. Each such format specification will bear a unique format number.

The Product Characteristics Database File may contain tables that are not defined in this specification, or it may contain a defined table with a format number that is not defined in this specification. The purpose of this is to allow new tables or amended formats of existing tables to be added (which may be used in future SAP revisions or other applications). In order that existing SAP assessment software is not broken by these additional tables or additional formats, the parsing routines must adopt the following rules:

- a) If the receiving SAP assessment software encounters an unknown table number, it should skip (read and ignore) all lines in the data file until the next control line is reached.
- b) If the SAP assessment software encounters a recognised table number with an unknown format number, it should skip all lines in the data file until the next control line is reached. If, having read the whole file, the software has encountered one or more instances of a recognised table number, but none of them has a known format number, it must report the situation to the SAP assessor and database administrator.
- c) If more than one occurrence of a table with the same table number and the same recognised format number is encountered within the file, the receiving software should read each one and treat all records as being within a single table.
- d) If more than one occurrence of a table with the same table number but differing recognised format number is encountered within the file, the receiving SAP assessment software should retain the data from the occurrence of the table with the highest recognised format number and discard any data in the table with other format numbers.

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## 7.8 Data format: Database Amendments Table 011

FORMAT 031 (for database amendments)		
Field	Field name	Description
1	Product index (6 digits)	Product index number of item amended. If this is 000000 the amendment applies to all products in the table number identified in field 2.
2	Table number (3 digits)	Table number when field 1 is 000000; otherwise blank.
3	Amendment number (up to 3 digits)	The amendment number for the product identified in field 1. The amendment number starts at 1 and is incremented for each amendment for the product concerned.
4	Amendment date (yyyy/mmm/dd)	Date when amendment made by the database administrator. This is the date on which the amendment was made to the product table, not to this table.
5	Amendment index (4 digits)	Reference to amendment text in Table 021. Amendment indexes are unique and are assigned from 0001 upwards.

### Note to Database Amendments Table:

An entry is put in this table whenever a non-trivial alteration is made to a data record.

## 7.9 Data format: Database Amendment Texts Table 021

FORMAT 041 (for database amendment texts)		
Field	Field name	Description
1	Amendment index (4 digits)	Amendment index from Table 011.
2	DB changed (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
3	Amendment text (up to 255 chs.)	Description of amendment
4	Web link (up to 63 chs)	URL of document giving further details of the amendment. Blank if not applicable (i.e. all details provided in field 3). Used when the amendment cannot be fully described in field 3 or it is relevant to provide additional information.

## 7.10 Data format: Manufacturers Table 301

FORMAT 207 (for Manufacturers Table)		
Field	Field name	Description
1	Index (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes.
2	Current name (up to 50 chs.)	Current name of manufacturer, or company responsible for the product in the UK, which may not be the same as the original name.
3-10	Address (up to 365 chs.)	Address of manufacturer, or company responsible for the product in the UK. For addresses in the UK the format will normally be as recommended in BS 7666 Part 3 Section 2 Table 1. If the company does not have a UK address then a foreign address is entered, matching the UK format so far as possible. The elements of the address are shown below.
3		Secondary addressable object name (up to 60 chs.)
4		Primary addressable object name (up to 60 chs.)
5		Designated street name (up to 100 chs.)
6		Locality name (up to 35 chs.)
7		Town name (up to 30 chs.)
8		Administrative area name (up to 30 chs.)
9		Postcode (up to 20 chs.)
10		Country if not UK (up to 30 chs.)
11	Phone number (up to 25 chs.)	Phone number of manufacturing company, including international code if not in UK.
12	URL (up to 75 chs.)	Website address to provide hotlink to manufacturer's website.
13	DB entry updated (yyyy/mm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.

## 7.11 Data format: Gas and Oil Boiler Table 105

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 211 (for Gas and Oil Boiler Table)			
Field	X	Field name	Description
1		Product index number (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (6 digits)	Reference to current name of manufacturer (see field 2 in Manufacturers Table).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the boiler. If none the original manufacturer name will be inserted instead. If the same boiler model is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of boiler model, as it appears on the boiler casing. If the same boiler is sold under more than one model name then separate entries for each will appear in the database. See note 1 below.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		Boiler ID (up to 40 chs.)	Boiler identifier. It may be GC (formerly Gas Council) number for a gas boiler or OFTEC Registration number for an oil boiler, but if not available the manufacturer may choose another identifier marked on the boiler.
10		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
11		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
12	X	Fuel (up to 2 digits)	Fuel type, which is any one of the fuel codes for a gaseous or liquid fuel as specified in SAP Table 12 under sub-headings "gas fuels" or "liquid fuels". If the same boiler may use more than one type of fuel then separate entries for each appear in the database, except that a boiler listed for bulk LPG is also applicable to bottled LPG and LPG subject to special condition 11F. If fuel used is from Fuels Table 196 then field code is 99.
13		Mounting position (1 digit)	Boiler mounting position, which is one of "unknown", "floor", "wall", "either floor or wall", or "back boiler". These are encoded as 0, 1, 2, 3 or 4.
14		Exposure rating (1 digit)	Exposure rating, which is one of "unknown", "indoor only", or "outdoor". These are encoded as 0, 1 or 2.

15	X	Main type (1 digit)	Main boiler type, for the purpose of SAP efficiency calculation. It is one of "regular" "combi", or "CPSU" (see SAP 10 Appendix D for definitions). These are encoded as 1, 2 or 3. If not known it is encoded as 0. Note: If an unknown value is encountered, skip record and treat the boiler as non-existent. Do not report a file format error.
16	X	Subsidiary type (1 digit)	Subsidiary type, for the purpose of indicating the presence of special features. It is one of "normal", "with integral FGHRs", "combined electric heat pump and boiler", or "combined electric heat pump and boiler with integral FGHRs" encoded as 0, 1, 2 or 3 respectively. See note 2 below table. Other values may be introduced later. Note: If an unknown value is encountered, treat as if it were 0. Do not report a file data error.
17	X	Subsidiary type table (3 digits)	The table number within the database holding data for boiler special features, if special features have been indicated in "Subsidiary type" and it is necessary to refer to additional data. Otherwise this field is blank.
18	X	Subsidiary type index (6 digits)	The product index number of an entry within the database table number that has been indicated by "Subsidiary type table". If "Subsidiary type table" is blank then this field is blank.
19	X	Condensing (1 digit)	Either "non-condensing" or "condensing" (see SAP 10 Appendix D clause D1.2), encoded as 1 or 2. If not known it is encoded as 0.
20	X	Flue type (1 digit)	Flue type, which is one of "unknown", "open", "room-sealed", or "open or room-sealed" encoded as 0, 1, 2 or 3.
21	X	Fan assistance (1 digit)	Whether or not flue is fan assisted. It is one of "unknown", "no fan", or "fan". These are encoded as 0, 1 or 2.
22		Boiler power (bottom of range) (number, up to 7 chs; eg "nnn.nnn")	Output power (to water) of the boiler in kW. For range rated boilers it is the lower of the range of values for which the efficiency test results are valid. For other boilers this is the same as field 23.
23	X	Boiler power (top of range) (number, up to 7 chs; eg "nnn.nnn", or text >"70kW")	Output power (to water) of the boiler in kW. For BED-compliant boilers this is the rated output as required for the purpose of Council of the European Communities Directive 92/42/EEC. If the power was originally quoted in BTU/hr then it will have been converted using the factor 1 BTU/hr = 0.000293 kW. For range rated boilers this is the top of the range of values for which the efficiency test results are valid. Where the upper limit of the range exceeds 70kW this is shown as ">70kW" instead of the exact value. (Not used at present but might be needed in connection with a future App.Q assessment.)
24		Ecodesign energy efficiency class – space heating (up to 4 chs.)	The energy efficiency class as defined by Ecodesign regulations (A+++ , A++ , A+ , A , B , C , D , E).
			[New Fields 63 - 66 relate to Field 24]
25		Annual seasonal efficiency (number, up to 4 chs; eg "nn.n")	Annual seasonal efficiency, expressed as a percentage and rounded to the nearest 0.1%. This will have been obtained by one of the methods defined for the efficiency category (see field 31 and Note 3.) In the case of efficiency categories 1 and 2 the annual seasonal efficiency will be the SEDBUK(10) value. Not used for calculations by SAP 2009 and later versions (use fields 26 and 27 instead).
26	X	SAP winter seasonal efficiency (number, up to 4 chs; eg "nn.n")	Winter seasonal efficiency for use in SAP, expressed as a percentage and rounded to the nearest 0.1%. This will have been obtained by one of the methods defined for the efficiency category (see field 31 and Note 3.)
27	X	SAP summer seasonal efficiency (number, up to 4 chs; eg "nn.n")	Summer seasonal efficiency for use in SAP, expressed as a percentage and rounded to the nearest 0.1%. If separate DHW tests (see field 48) this will have been derived from those tests, otherwise it will have been obtained by one of the methods defined for the efficiency category (see field 31 and Note 3.)
28		Hot water efficiency 1 (number, up to 4 chs; eg "nn.n")	Hot water efficiency (gross calorific basis) for comparative purposes (not used by SAP). See Note 7 below table. This field is only populated in special circumstances determined by BRE. If this field is blank the value is taken from field 29 instead.
29		Hot water efficiency 2 (number, up to 4 chs; eg "nn.n")	Hot water efficiency (gross calorific basis) for comparative purposes (not used by SAP). See Note 7 below the table. This value is calculated by the database. This field may also be blank. If field 28 is non-blank, field 29 is to be ignored.
30		Blank	



31		Efficiency category (1 digit)	Category of annual seasonal efficiency, encoded as 0=unknown, 1=SEDBUK based on validated and certified data, 2=SEDBUK based on certified data, 3=estimated (for obsolete boilers only). See Note 3. For category 3 the SAP equation used (in field 34) is entered as 0.
32		Test gas for LPG (1 digit)	This applies only to a LPG boiler with efficiency category 1 or 2. If the efficiency tests from which SEDBUK was calculated were carried out using LPG, this is 0. If the tests were carried out using natural gas and the modified calculation procedure, this is 1. If inapplicable, this is blank.
33		Test correction for LPG (1 digit)	This applies only to an LPG boiler tested with natural gas. The test procedure allows for a correction to be applied. If the correction was not applied to the results this field is 0; if the correction was applied it is 1. If inapplicable, this is blank.
34	X	SAP equation used (up to 3 digits)	The number of the SEDBUK equation used to calculate annual seasonal efficiency. Number 0 indicates that no SEDBUK calculation has been performed. Other numbers are as shown in SAP 10 Appendix D supporting documents. The equation number corresponds to the boiler type and other properties (whether gas/oil, instantaneous/storage/CPSU, condensing/non-condensing, and on-off/modulating). (Not used at present but might be needed in connection with a future App.Q assessment.)
35		Ignition (1 digit)	Whether or not has permanent pilot light, encoded as 0=unknown, 1=no, 2=yes.
36	X	Burner control (1 digit)	Whether on-off or variable, encoded as 0=unknown, 1=on-off, 2=variable (stepped or modulating down to at least 30% of the nominal load).
37		Electrical power at full load (up to 4 digits)	See Note 4. Measured electrical power consumed while the boiler is firing under full load (nominal) conditions, in watts. This is defined as "elmax" by Ecodesign regulations and includes fans, motors, heaters, and other electrical equipment, but excludes any pump used to circulate water <i>outside</i> the boiler. If unknown, this field is blank.
			[New Field 67 relates to Field 37 and 38]
38		Electrical power while boiler is not firing (up to 4 digits)	See Note 4. Measured electrical power consumed while the boiler is not firing (standby conditions), in watts. This is defined as "P <sub>SB</sub> " by Ecodesign regulations. If unknown, this field is blank.
39	X	Store type (1 digit)	See Note 5. For a storage combination boiler, this is 1 if the internal hot water store contains primary water or 2 if it contains secondary water. For a CPSU, it is 3. If unknown or inapplicable, it is 0.
40		Store loss in test (1 digit)	See Note 5. If heat loss from the internal hot water store has been <i>excluded</i> in the efficiency test values reported, this is 1. If <i>included</i> then this is 2. If unknown or inapplicable, it is blank.
41		Separate store (1 digit)	See Note 5. If the hot water store is within the boiler casing (an 'internal hot water store') then this is 0; otherwise it is 1. If unknown or inapplicable, this is blank.
42	X	Store boiler volume (number, up to 7 chs; eg "nnn.nnn")	See Note 5. The water volume of the internal hot water store that is capable of being heated by the boiler, in litres. This is the total volume of the store less the store solar volume (field 43). May be a real number to 3 decimal places. If unknown or inapplicable, this is blank.
43	X	Store solar volume (number, up to 7 chs; eg "nnn.nnn")	If the internal hot water store includes a dedicated solar zone, the water volume of the dedicated solar zone in litres. May be a real number to 3 decimal places. If unknown or inapplicable, this is 0.0.
44	X	Store insulation thickness (up to 3 digits)	See Note 5. The thickness of the insulation applied to the internal hot water store in mm. If unknown or inapplicable, this is blank.
45		Store insulation type (1 digit)	See Note 5. The material used to insulate the internal hot water store. This is 1 for mineral wool (rock), 2 for polyurethane foam, or 3 for mineral wool (glass). For other insulants the following values signify that the thermal conductivity is: 4 closest to MW (rock), 5 closest to PU, 6 closest to MW (glass). If unknown or inapplicable, it is blank.
46		Store temperature (2 digits)	See Note 5. The average temperature of the hot water in contact with the exterior walls of the internal hot water store in degrees Celsius. If unknown or inapplicable, this is blank.
47		Store heat loss rate (up to 5 digits)	See Notes 5. The measured heat loss from the hot water store in Watts. Not used at present (this figure may be used in a future SAP specification in place of calculations based on fields 43-44). If unknown or inapplicable, this is blank.
48	X	Separate DHW tests (1 digit)	Hot water tests carried out on a combi boiler in accordance with EN 13203-2 (gas) or OPS 26 (oil). Encoded as: 0 = none or not applicable; 1= one test, using profile M; 2 = two tests, using profiles M and L; 3 = two tests, using profiles M and S.

49		Fuel energy for HW test 1 (number, up to 7 chs, possibly including decimal point eg "12.3456")	Fuel input energy (corrected) in kWh/day based on the net calorific value for domestic hot water test 1 carried out on a combi boiler in accordance with EN 13203-2 (gas) or OPS 26 (oil). Hot water test 1 means tested under draw-off profile M as defined in the standard. If the boiler is not a combi, or if domestic hot water test 1 has not been carried out, this is blank.
50		Electrical energy for HW test 1 (number, up to 6 chs, possibly including decimal point eg "123.45")	Electrical input energy (corrected) in kWh/day for domestic hot water test 1 carried out on a combi boiler in accordance with EN 13203-2 (gas) or OPS 26 (oil). Hot water test 1 means tested under draw-off profile M as defined in the standard. If the boiler is not a combi, or if domestic hot water test 1 has not been carried out, this is blank.
51	X	Rejected energy $r_1$ in HW test 1 (number, up to 6 chs, eg "0.1234")	Proportion of energy, expressed as a decimal number in the range 0 to 1, rejected in domestic hot water test 1 carried out on a combi boiler in accordance with EN 13203-2 (gas) or OPS 26 (oil). If the boiler is not a combi, or if domestic hot water test 1 has not been carried out, this is blank.
52	X	Storage loss factor $F_1$ (number, up to 7 chs, e.g. 400.123)	Loss factor $F_1$ in kWh/day related to domestic hot water test 1 for use in conjunction with SAP 10 Table 3b. If the boiler is not a combi, or if domestic hot water test 1 has not been carried out, this is blank.
53		Fuel energy for HW test 2 (number, up to 7 chs, possibly including decimal point eg "12.3456")	Fuel input energy (corrected) in kWh/day based on the net calorific value for domestic hot water test 2 carried out on a combi boiler in accordance with EN 13203-2 (gas) or OPS 26 (oil). If "Separate DHW tests" (field 48) is 2 then hot water test 2 means tested under draw-off profile L as defined in the standard. If "Separate DHW tests" (field 48) is 3 then hot water test 2 means tested under draw-off profile S as defined in the standard. If the boiler is not a combi, or if domestic hot water test 2 has not been carried out, this is blank.
54		Electrical energy for HW test 2 (number, up to 6 chs, possibly including decimal point eg "123.45")	Electrical input energy (corrected) in kWh/day for domestic hot water test 2 carried out on a combi boiler in accordance with EN 13203-2 (gas) or OPS 26 (oil). If "Separate DHW tests" (field 48) is 2 then hot water test 2 means tested under draw-off profile L as defined in the standard. If "Separate DHW tests" (field 48) is 3 then hot water test 2 means tested under draw-off profile S as defined in the standard. If the boiler is not a combi, or if domestic hot water test 2 has not been carried out, this is blank.
55		Rejected energy $r_2$ in HW test 2 (number, up to 6 chs, eg "0.1234")	Proportion of energy, expressed as a decimal number in the range 0 to 1, rejected in domestic hot water test 2 carried out on a combi boiler in accordance with EN 13203-2 (gas) or OPS 26 (oil). If the boiler is not a combi, or if domestic hot water test 2 has not been carried out, this is blank. This is not used in SAP assessments, only $r_1$ with $F_3$
56	X	Storage loss factor $F_2$ (number, up to 7 chs, e.g. 400.123)	Loss factor $F_2$ in kWh/day related to domestic hot water tests 1 and 2 for use in conjunction with SAP 10 Table 3c. If the boiler is not a combi, or if domestic hot water test 2 has not been carried out, this is blank.
57	X	Rejected factor $F_3$ (number, up to 7 chs, e.g. -0.0003)	Rejected factor $F_3$ in litres <sup>-1</sup> related to domestic hot water tests 1 and 2 for use in conjunction with SAP 10 Table 3c (can be negative). If the boiler is not a combi, or if domestic hot water test 2 has not been carried out, this is blank.
58	X	"Keep-hot" facility (1 digit)	See Note 6. The type of "keep-hot" facility, intended to keep the internal store hot while not in use. This is 0 if there is no "keep-hot" facility; 1 if there is a "keep-hot" facility fuelled by gas/oil only; 2 if there is a "keep-hot" facility powered by electricity; or 3 if there is a "keep-hot" facility both fuelled by gas/oil and powered by electricity. If inapplicable, this is blank.
59	X	"Keep-hot" timer (1 digit)	See Note 6. Where there is a "keep-hot" facility, this is 1 if there is a time-switch control which turns off the facility overnight. If there is no such control this is 0. If unknown or inapplicable, this is blank.
60	X	"Keep-hot" electric heater (up to 5 digits)	The power rating of the electric heating element in the internal hot water store, in watts. This is 0 if no electric heating element is fitted. If unknown or inapplicable, this is blank.
61	X	Control capabilities (4, 8 or 16 hex digits)	Values that indicate features that are relevant for heating controls. See Note 8.
62	X	Fire fuel	Fuel used by fire fronting a back boiler, encoded as 0 if same fuel as back boiler and 1 if electricity. Blank if not applicable.
63		Ecodesign energy efficiency class – hot water heating (up to 4 chs.)	The hot water heating energy efficiency class as defined by Ecodesign regulations (A+++, A++, A+, A, B, C, D, E). Only applicable for combination boilers, so may be blank. Blank if unknown.
64		Ecodesign efficiency – hot water heating (up to 3 chs; nnn)	The hot water heating efficiency calculated for Ecodesign regulations (%). Only applicable for combination boilers, so may be blank. Blank if unknown.

65		Ecodesign – hot water heating – load profile (up to 3 chs; nn)	The load profile used during Ecodesign regulation hot water efficiency tests (M, L, XL, etc). Blank if unknown.
66		Ecodesign efficiency – space heating (up to 3 chs; nnn)	The space heating efficiency calculated for Ecodesign regulations (%). Blank if unknown.
67		Electrical power at 30% part load (up to 4 digits)	See Note 4. Measured electrical power consumed while the boiler is firing under 30% part load conditions, in watts. This is defined as “elmin” by Ecodesign regulations and includes fans, motors, heaters, and other electrical equipment but excludes any pump used to circulate water <i>outside</i> the boiler. If unknown, this field is blank.
68	X	Calculated electrical energy (up to 3 digits)	Calculated annual electrical energy in kWh derived from above Ecodesign measurements. Overwrites default value in SAP Box 230 (d) if oil-fuelled or (e) if gas-fuelled. If blank, use Table 4f default. Note: Circulation pump energy is excluded from this value, Table 4f default should be used.
69		Heat loss in standby mode (up to 4 digits)	The rate of heat loss in standby mode during standard tests, in watts. This is defined as “P <sub>stby</sub> ” by Ecodesign regulations. If unknown, this field is blank.
70		Full load efficiency in gross terms (nnn.n)	The gross efficiency value from standardised tests
71		Part load efficiency in gross terms (nnn.n)	The gross efficiency value from standardised tests
72	X	Integral circulation pump	Whether a post 2013 integral circulation pump exists. Coded as 1=no, 2=yes. If unknown, this field is blank.
73		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this “Master Model”. Blank if not applicable.
74		Emissions of nitrogen oxides (number, up to 5 chs; eg “nn.nn”)	Emission of nitrogen oxides in mg/kWh.
75	X	Index number of Fuel (6 digits)	If fuel used is from Fuels Table 196, then this field records the index number of this Fuel. Blank if not applicable.
76		ADL2 boiler seasonal efficiency (gross calorific value) (up to nnn.n)	The ADL2 boiler seasonal efficiency (gross calorific value) calculated for SBEM (%). Blank if unknown.

Notes to the Gas and Oil Boiler Table for SAP 10:

Note 1: The model name does not repeat the brand name. If the brand name matches the leading characters of the model name, the leading characters of the model name will be removed to avoid repetition.

Note 2: If the boiler has an integral FGHRs, there are two possibilities:

- a) The energy performance characteristics of the integral FGHRs are given in another data record. In that case the number of the data table and the product index number of the relevant entry within it are given in fields 17 and 18. This occurs when the FGHRs has an internal heat store. The data in the boiler record are for the boiler including the direct heat recovered by the FGHRs (and so the data record for the FGHRs has zero for direct heat recovered) and the effect of the FGHRs internal store should be allowed for as described in SAP 10 Appendix G.

b) The energy performance characteristics of the integral FGHRs have been incorporated in the test data used to create the boiler record. In that case fields 17 and 18 are blank. This occurs in the case of an integral FGHR without a FGHR heat store. The data in the boiler record are for the boiler with the FGHR and no adjustment for the FGHR is made within the SAP calculation.

In either case SAP assessment software should indicate that a FGHR has been included and must prevent the SAP assessor from separately selecting an FGHR (or indicate an error condition if that happens).

- Note 3: Definitions of efficiency category are given in section 4.
- Note 4: This value includes all electrical boiler power, except circulation pump, which is counted separately in SAP via a default (Table 4f). Measured values (at full load, part load and no firing/standby mode) are used to calculate annual electrical energy (field 67).
- Note 5: These fields are relevant only for Storage Combination Boilers and CPSUs, as defined in SAP Appendix D. For other boiler types they are zero or blank.
- Note 6: These fields are relevant only for Instantaneous Combination Boilers. For other boiler types they are blank.
- Note 7: This field is not used in SAP calculations but may be displayed as an aid to those seeking to compare hot water energy performance.
- Note 8: This is constructed as 32 boolean values, for example 453C is 0100010100111100. Control capabilities are defined in the Heating Control Requirements Table. See also the format for the Heating Controls Table.
- Note 9: Although the database will contain other descriptive and technical details, all boiler entries must include annual efficiency values. For cooker boilers, each efficiency value has an “efficiency category”, defined as follows:

a) Efficiency category 1: SEDBUK based on validated and certified data

Efficiency has been calculated by the SEDBUK method from the results of standard tests. The results of the standard tests must have been certified by a suitably qualified Notified Body (i.e. an independent test house deemed competent under European rules for boiler testing). The

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test results have been further amended by a validation process to reduce excessive measurement uncertainties.

b) Efficiency category 2: SEDBUK based on certified data

Efficiency has been calculated by the SEDBUK method from the results of standard tests. The results of the standard tests must have been certified by a suitably qualified Notified Body (i.e. an independent test house deemed competent under European rules for boiler testing).

c) Efficiency category 3: Estimated

Efficiency has been taken from SAP Table 4b, based on boiler type. An earlier version of SAP may have been used. Entries with efficiency category 3 are for obsolete boilers only.

Note 10: If the boiler is part of a combined electric heat pump and boiler package, then two heating systems are specified in SAP assessments and all space heating performance characteristics are contained in the heat pump table. The data table and the product index number of the relevant entry within it are given in fields 17 and 18.

## 7.12 Data format: Solid Fuel Boiler Table 122

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 225 (for Solid Fuel Boiler Table)			
Field	X	Field name	Description
1		Product index number (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).

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2		Manufacturer reference no. (6 digits)	Reference to current name of manufacturer (see field 2 in Manufacturers Table).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name
6		Brand name (up to 50 chs.)	Name of brand, as shown on the boiler. If none the original manufacturer name will be inserted instead. If the same boiler is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of boiler model, as it appears on the boiler casing or leaflet of owners' instructions. If the same boiler is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		Boiler ID (up to 40 chs.)	Boiler identifier, which, in conjunction with manufacturer name, is unique for the model and all other characteristics affecting efficiency. Where known this provides a short cut for identification. The manufacturer may choose any suitable identifier marked on the boiler.
10		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
11		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
12	X	Fuel (2 digits)	Fuel type, encoded 11 "house coal", 12 "smokeless fuel", 15 "anthracite", 20 "wood logs", 21 "wood chips" or 23 "wood pellets". If the same boiler may use more than one type of fuel then separate entries for each appear in the database. If fuel used is from Fuels Table 196 then field code is 99.
13	X	Main type (1 digit)	Main boiler type, for the purpose of SAP efficiency calculation. It is one of "open fire with boiler", "closed room heater with boiler", or "independent boiler", encoded as 1 to 3 respectively. Note: If an unknown value is encountered, skip record and treat the boiler as non-existent. Do not report a file format error.
14	X	Flue type (1 digit)	Flue type, which is one of "unknown", "open", "room-sealed", "open or room-sealed", or "open chimney" encoded as 0, 1, 2, 3 or 4.
15		Fan assistance (1 digit)	Whether or not flue is fan assisted. It is one of "unknown", "no fan", or "fan". These are encoded as 0, 1 or 2.
16	X	Fuel feed	Fuel feed, which is one of "unknown", "manual feed", "gravity feed", "screw feed", "other" encoded as 0, 1, 2, 3 or 4. Blank if not applicable.
17		Boiler power (bottom of range) (number, up to 7 chs; eg "nnn.nnn")	Output power (to water) of the boiler in kW. For range rated boilers it is the lower of the range of values for which the efficiency test results are valid. For other boilers this is the same as field 18.
18		Boiler power (top of range) (number, up to 7 chs; eg "nnn.nnn", or text ">70kW")	Output power (to water) of the boiler in kW. If the power was originally quoted in BTU/hr then it will have been converted using the factor 1 BTU/hr = 0.000293 kW. For range rated boilers this is the top of the range of values for which the efficiency test results are valid. Where the upper limit of the range exceeds 70kW this is shown as ">70kW" instead of the exact value.
19		Boiler power at minimum burn rate (number, up to 7 chs; eg "nnn.nnn")	Output power of the boiler in kW at the minimum burn rate at which the fire can be sustained.
20		Energy efficiency class (up to 4 chs.)	The energy efficiency class as defined for the proposed European energy label. Definition and format have not yet been decided. This field is being left blank until the European energy labelling scheme has been defined.
21	X	SAP seasonal efficiency of boiler (number, up to 4 chs; eg "nn.n")	Seasonal efficiency for use in SAP, expressed as a percentage and rounded to the nearest 0.1%.

22		Efficiency category (1 digit)	Category of SAP efficiency, which is one of 1 = HETAS approved, 2 = certified measurement to BS EN standard, 3 = estimated as SAP default value.
23	X	Measured fuel input at nominal output power (number, up to 7 chs; eg "nnn.nnn")	Certified rate of fuel input energy, measured at gross calorific value, when boiler is operating at nominal output power, in kW. The database administrator will require independently certified evidence. If no evidence is submitted this field will be left blank. See Note 1.
24	X	Measured heat to water at nominal output power (number, up to 7 chs; eg "nnn.nnn")	Certified rate of heat output to water when boiler is operating at nominal output power, in kW. This must be measured in the same test as the measurement of rate of fuel input given in field 23. The database administrator will require independently certified evidence. If no evidence is submitted this field will be left blank.
25	X	Measured heat to room at nominal output power (number, up to 7 chs; eg "nnn.nnn")	Certified rate of heat output to room when boiler is operating at nominal output power, in kW. This must be measured in the same test as the measurement of rate of fuel input given in field 23. The database administrator will require independently certified evidence. If no evidence is submitted this field will be left blank.
26	X	Measured fuel input at part output power (number, up to 7 chs; eg "nnn.nnn")	Certified rate of fuel input energy, measured at gross calorific value, when boiler is operating at part output power, in kW. The database administrator will require independently certified evidence. If no evidence is submitted this field will be left blank.
27	X	Measured heat to water at part output power (number, up to 7 chs; eg "nnn.nnn")	Certified rate of heat output to water when boiler is operating at part output power, in kW. This must be measured in the same test as the measurement of rate of fuel input given in field 26. The database administrator will require independently certified evidence. If no evidence is submitted this field will be left blank.
28	X	Measured heat to room at part output power (number, up to 7 chs; eg "nnn.nnn")	Certified rate of heat output to room when boiler is operating at part output power, in kW. This must be measured in the same test as the measurement of rate of fuel input given in field 26. The database administrator will require independently certified evidence. If no evidence is submitted this field will be left blank.
29		Ple test method (2 digits)	Method used for part-load efficiency test. Coding not yet defined: at present, all entries are set to 0.
30		Burner control (1 digit)	0=unknown, 1>manual, 2=electrical. Code 2 means capable of being switched between full and minimum burn rate (or off) by electrical signal from a thermostat or time switch.
31		Electrical power while boiler is firing (up to 4 digits)	Average electrical power consumed while the boiler is firing, in watts. This includes fans, motors, heaters, and other electrical equipment but excludes any pump used to circulate water <i>outside</i> the boiler. If unknown or inapplicable, this field is blank.
32		Electrical power while boiler is not firing (up to 4 digits)	Average electrical power consumed while the boiler is not firing, in watts. This includes fans, motors, heaters, and other electrical equipment but excludes any pump used to circulate water <i>outside</i> the boiler. If unknown or inapplicable, this field is blank.
33		Additional ventilation rate (number, up to 4 chs; eg "nn.n")	Ventilation rate in m <sup>3</sup> /h for appliances that are not room-sealed. If unknown or inapplicable, this field is blank.
34		Separate store (1 digit)	If the hot water store is within the boiler casing (an 'internal hot water store') then this is 0; otherwise it is 1 (a 'separate hot water store'). If unknown or inapplicable, this is blank.
35	X	Store volume (number, up to 7 chs; eg "nnn.nnn")	The water volume of the internal hot water store that is capable of being heated by the boiler, in litres. This is the total volume of the store less the store solar volume (field 43). May be a real number to 3 decimal places. If unknown or inapplicable, this is blank.
36	X	Store insulation thickness (up to 3 digits)	See Note 3. The thickness of the insulation applied to the internal hot water store in mm. If unknown or inapplicable, this is blank.
37		Store insulation type (1 digit)	The material used to insulate the internal hot water store. This is 1 for mineral wool (rock), 2 for polyurethane foam, or 3 for mineral wool (glass). For other insulants the following values signify that the thermal conductivity is: 4 closest to MW (rock), 5 closest to PU, 6 closest to MW (glass). If unknown or inapplicable, it is blank.
38		Store heat loss rate (up to 5 digits)	The measured heat loss from the hot water store in Watts. Not used at present (this figure may be used in a future SAP specification in place of calculations based on fields 35-36). If unknown or inapplicable, this is blank.

39		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this "Master Model". Blank if not applicable.
40	X	Index number of Fuel (6 digits)	If fuel used is from Fuels Table 196, then this field records the index number of this Fuel. Blank if not applicable.

Notes to Solid Fuel Boiler Table:

Note 1: Nominal output is total heat output of the device quoted by the manufacturer and achieved under defined test conditions when burning a specified test fuel.

Note 2: Entries can include a SAP seasonal efficiency value. If so, each entry for a SAP seasonal efficiency value has an "efficiency category", defined as follows:

a) Efficiency category 1: SAP efficiency from HETAS declaration

Efficiency has been calculated from the results of standard tests and confirmed by HETAS.

b) Efficiency category 2: SAP efficiency based on certified data

Efficiency has been calculated from the results of standard tests. The results of the standard tests must have been certified by a suitably qualified Notified Body (i.e. an independent test house deemed competent under European rules for boiler testing).

c) Efficiency category 3: Estimated

Efficiency has been taken from SAP Table 4a, based on boiler type. Entries with efficiency category 3 are for obsolete boilers only.

7.13 Data format: Cooker Boiler Table 131

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column

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for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 234 (for Cooker Boiler Table) [gas & liquid fuels only]			
Field	X	Field name	Description
1		Product index number (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (6 digits)	Reference to current name of manufacturer ( <i>see field 2 in Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the product. If none the original manufacturer name will be inserted instead. If the same product is sold under more than one brand name then separate entries for each will appear in the database. See note 1 below.
7		Model name (up to 50 chs.)	Name of product model, as it appears on the casing or leaflet of owners' instructions. If the same product is sold under more than one model name then separate entries for each will appear in the database. See note 1 below.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		Product ID (up to 40 chs.)	Product identifier, which, in conjunction with manufacturer name, is unique for the model and all other characteristics affecting efficiency. Where known this provides a short cut for identification. It may be GC (formerly Gas Council) number for a gas product or OFTEC Registration number for an oil product, but if not available the manufacturer may choose another identifier marked on the product.
10		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
11		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
12	X	Fuel (up to 2 digits)	Fuel type, which is any one of the fuel codes for a gaseous or liquid fuel as specified in SAP Table 12 under sub-headings "gas fuels" or "liquid fuels". If the same product may use more than one type of fuel then separate entries for each appear in the database, except that a boiler listed for bulk LPG is also applicable to bottled LPG and LPG subject to special condition 11F. If fuel used is from Fuels Table 196 then field code is 99.
13	X	Main type (1 digit)	Main product type, for the purpose of SAP efficiency calculation. At present this is encoded as 1, meaning "cooker boiler with separately controlled twin burners". Note: If an unknown value is encountered, skip record and treat the boiler as non-existent. Do not report a file format error.
14	X	Condensing (1 digit)	Either "non-condensing" or "condensing" (see SAP 10 Appendix D), encoded as 1 or 2. If not known it is encoded as 0.
15	X	Flue type (1 digit)	Flue type, which is one of "unknown", "open", "room-sealed", or "open or room-sealed" encoded as 0, 1, 2 or 3.
16	X	Fan assistance (1 digit)	Whether or not flue is fan assisted. It is one of "unknown", "no fan", or "fan". These are encoded as 0, 1 or 2.
17		Boiler power (bottom of range) (number, up to 7 chs; eg "nnn.nnn")	Output power (to water) of the boiler part of the cooker in kW. For range rated boilers it is the lower of the range of values for which the efficiency test results are valid. For other boilers this is the same as field 18.

18		Boiler power (top of range) (number, up to 7 chs; eg "nnn.nnn", or text ">70kW")	Output power (to water) of the boiler part of the cooker in kW. For BED-compliant boilers this is the rated output as required for the purpose of Council of the European Communities Directive 92/42/EEC. If the power was originally quoted in BTU/hr then it will have been converted using the factor 1 BTU/hr = 0.000293 kW. For range rated products this is the top of the range of values for which the efficiency test results are valid. Where the upper limit of the range exceeds 70kW this is shown as ">70kW" instead of the exact value.
19	X	Case loss at full output (number, up to 7 chs; eg "nnn.nnn")	The case loss from the product, measured in kW, when the boiler part only is operating at full output power. This must not include contribution from the cooker part.
20	X	Full output power (number, up to 7 chs; eg "nnn.nnn")	Output power of the boiler alone, measured in kW, at which the case loss has been measured.
21		Energy efficiency class (up to 4 chs.)	The energy efficiency class as defined for the proposed European energy label. Definition and format have not yet been decided. This field is being left blank until the European energy labelling scheme has been defined.
22		Annual seasonal efficiency (number, up to 4 chs; eg "nn.n")	Annual seasonal efficiency, expressed as a percentage and rounded to the nearest 0.1%. This will have been obtained by one of the methods defined for the efficiency category (see field 27 and Note 2). In the case of efficiency categories 1 and 2 the annual seasonal efficiency will be the SEDBUK(10) value. Not used for calculations by SAP 2009 and later versions (use fields 23 and 24 instead).
23	X	SAP winter seasonal efficiency (number, up to 4 chs; eg "nn.n")	Winter seasonal efficiency for use in SAP, expressed as a percentage and rounded to the nearest 0.1%. This will have been obtained by one of the methods defined for the efficiency category (see field 27 and Note 2.)
24	X	SAP summer seasonal efficiency (number, up to 4 chs; eg "nn.n")	Summer seasonal efficiency for use in SAP, expressed as a percentage and rounded to the nearest 0.1%. This will have been obtained by one of the methods defined for the efficiency category (see field 27 and Note 2.)
25		Hot water efficiency (number, up to 4 chs; eg "nn.n")	Hot water efficiency for comparative purposes (not used by SAP). See Note 3 below table. This field cannot be blank.
26		Blank	
27		Efficiency category (1 digit)	Category of SAP efficiency, encoded as 0=unknown, 1=SEDBUK based on validated and certified data, 2=SEDBUK based on certified data, 3=estimated (ie SAP default). For category 3 the SAP equation used (in field 29) is entered as 0.
28		Test gas for LPG (1 digit)	This applies only to a LPG product with efficiency category 1 or 2. If the efficiency tests from which SEDBUK was calculated were carried out using LPG, this is 0. If the tests were carried out using natural gas and the modified calculation procedure, this is 1. If inapplicable, this is blank.
29		SAP equation used (up to 3 digits)	The number of the SEDBUK equation used to calculate SAP efficiency. Number 0 indicates that no SEDBUK calculation has been performed. Other numbers are as shown in SAP 10 Appendix D supporting documents. The equation number corresponds to the boiler type and other properties (whether gas/oil, instantaneous/storage/CPSU, and on-off/modulating).
30		Ignition (1 digit)	Whether or not has permanent pilot light, encoded as 0=unknown, 1=no, 2=yes.
31		Burner control (1 digit)	Whether on-off or variable, encoded as 0=unknown, 1=on-off, 2=variable (stepped or modulating).
32		Electrical power at full load (up to 4 digits)	See Note 4. Measured electrical power consumed while the boiler is firing under full load (nominal) conditions, in watts. This is defined as "elmax" by Ecodesign regulations. This includes fans, motors, heaters, and other electrical equipment but excludes any pump used to circulate water <i>outside</i> the boiler. If unknown, this field is blank.
33		Electrical power at 30% part load (up to 4 digits)	See Note 4. Measured electrical power consumed while the boiler is firing under 30% part load conditions, in watts. This is defined as "elmin" by Ecodesign regulations. This includes fans, motors, heaters, and other electrical equipment but excludes any pump used to circulate water <i>outside</i> the boiler. If unknown, this field is blank.
34		Electrical power while boiler is not firing (up to 4 digits)	See Note 4. Measured electrical power consumed while the boiler is not firing (standby conditions), in watts. This is defined as "P <sub>SB</sub> " by Ecodesign. If unknown, this field is blank.

35	X	Calculated electrical energy (up to 3 digits)	Calculated annual electrical energy in kWh derived from above Ecodesign measurements. Overwrites default value in SAP Box 230 (d) if oil-fuelled or (e) if gas-fuelled. If blank, use Table 4f default. Note: Circulation pump energy is excluded from this value, Table 4f default should be used.
36	X	Fire fuel	Fuel used by fire fronting a back boiler, encoded as 0 if same fuel as back boiler and 1 if electricity. Blank if not applicable.
37		Ecodesign energy efficiency class – hot water heating (up to 4 chs.)	The hot water heating energy efficiency class as defined by Ecodesign regulations (A+++, A++, A+, A, B, C, D, E). Only applicable for combination boilers, so may be blank. Blank if unknown.
38		Ecodesign efficiency – hot water heating (up to 3 chs; nnn)	The hot water heating efficiency calculated for Ecodesign regulations (%). Only applicable for combination boilers, so may be blank. Blank if unknown.
39		Ecodesign – hot water heating – load profile (up to 3 chs; nn)	The load profile used during Ecodesign regulation hot water efficiency tests (M, L, XL, etc). Blank if unknown.
40		Ecodesign efficiency – space heating (up to 3 chs; nnn)	The space heating efficiency calculated for Ecodesign regulations (%). Blank if unknown.
41		Heat loss in standby mode (up to 4 digits)	The rate of heat loss in standby mode during standard tests, in watts. This is defined as “P <sub>stby</sub> ” by Ecodesign regulations. If unknown, this field is blank.
42		Full load efficiency in gross terms (nn.n)	The gross efficiency value from standardised tests
43		Part load efficiency in gross terms (nn.n)	The gross efficiency value from standardised tests
44		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this “Master Model”. Blank if not applicable.
45	X	Index number of Fuel (6 digits)	If fuel used is from Fuels Table 196, then this field records the index number of this Fuel. Blank if not applicable.

Notes to Cooker Boiler Table:

Note 1: The model name does not repeat the brand name, if one has been specified. If the brand name matches the leading characters of the model name, the leading characters of the model name will be removed to avoid repetition.

Note 2: Definitions of efficiency category are given in section 4.

Note 3: This field is not used in SAP calculations but may be displayed as an aid to those seeking to compare hot water energy performance.

Note 4: This value includes all electrical boiler power, except circulation pump, which is counted separately in SAP via a default (Table 4f). Measured values (at full load, part load and no firing/standby mode) are used to calculate annual electrical energy (field 35).

Note 5: Although the database will contain other descriptive and technical details, all boiler entries must include annual efficiency values. For cooker boilers, each efficiency value has an “efficiency category”, defined as follows:

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a) Efficiency category 1: SEDBUK based on validated and certified data

Efficiency has been calculated by the SEDBUK method from the results of standard tests. The results of the standard tests must have been certified by a suitably qualified Notified Body (i.e. an independent test house deemed competent under European rules for boiler testing). The test results have been further amended by a validation process to reduce excessive measurement uncertainties.

b) Efficiency category 2: SEDBUK based on certified data

Efficiency has been calculated by the SEDBUK method from the results of standard tests. The results of the standard tests must have been certified by a suitably qualified Notified Body (i.e. an independent test house deemed competent under European rules for boiler testing).

c) Efficiency category 3: Estimated

Efficiency has been taken from SAP Table 4b, based on boiler type. An earlier version of SAP may have been used. Entries with efficiency category 3 are for obsolete boilers only.

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## 7.14 Data format: CoGen Table 143

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 7, 8, 9.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 244 (for CoGen Table)			
Field	X	Field name	Description
1		Product index number (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference number (6 digits)	Reference to current name of manufacturer ( <i>see field 2 in Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		APM version number (up to 5 chs, eg nn.nn)	Version number of the Annual Performance Method used to generate the data record from test data.
6		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name
7		Brand name (up to 50 chs.)	Name of brand, as shown on the cogen package. If none the original manufacturer name will be inserted instead. If the same cogen model is sold under more than one brand name then separate entries for each will appear in the database.
8		Model name (up to 50 chs.)	Name of cogen model, as it appears on the cogen unit casing or leaflet of owners' instructions. If the same cogen package is sold under more than one model name then separate entries for each should appear in the database.
9		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
10		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
11		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
12	X	Fuel (up to 2 digits)	Fuel type, Fuel type, which is any one of the fuel codes specified in SAP Table 12 under sub-headings "gas fuels", "liquid fuels" or "solid fuel". If the same cogen package may use more than one type of fuel then separate entries for each appear in the database, except that a boiler listed for bulk LPG is also applicable to bottled LPG and LPG subject to special condition 11F. If fuel used is from Fuels Table 196 then field code is 99.
13	X	Index number of Fuel (6 digits)	If fuel used is from Fuels Table 196, then this field records the index number of this Fuel. Blank if not applicable.
14	X	Condensing (1 digit)	Either "non-condensing" or "condensing", encoded as 1 or 2. If not known it is encoded as 0.

15	X	Flue type (1 digit)	Flue type, which is one of "unknown", "open", "room-sealed", or "open or room-sealed" encoded as 0, 1, 2 or 3.
16	X	Service provision (1 digit)	Service provision, encoded as: 0 unknown; 1 space and water heating all year; 2 space and water heating during heating season only; 3 space heating only; 4 water heating only.
17	X	HW vessel (1 digit)	Hot water storage vessel, encoded as: 1 integral within package; 3 separate cylinder; 4 none (service provision code 3).
18		Energy efficiency class (up to 4 chs.)	The energy efficiency class as defined for the proposed European energy label. Definition and format have not yet been decided. This field is being left blank until the European energy labelling scheme has been defined.
19	X	Water heating efficiency (sch.M) (nnnn.n)	Water heating efficiency from profile M test schedule as defined in EN 13203-2 (% gross, $\eta_{\text{water},1}$ ). Blank if service provision code is 3.
20	X	Net specific electricity consumed (sch.M) (number eg "±nn.nnn")	Specific electricity consumed (-ve if generated) during water heating efficiency test profile M, kWh <sub>e</sub> per kWh <sub>h</sub> ( $e_{\text{water},1}$ ). Blank if service provision code is 3.
21	X	Water heating efficiency (sch.L) (nnnn.n)	Water heating efficiency from profile L test schedule as defined in EN 13203-2 (% gross, $\eta_{\text{water},2}$ ). Blank if service provision code is 3 or not tested to this profile.
22	X	Net specific electricity consumed (sch.L) (number eg "±nn.nnn")	Specific electricity consumed (-ve if generated) during water heating efficiency test profile L, kWh <sub>e</sub> per kWh <sub>h</sub> ( $e_{\text{water},2}$ ). Blank if service provision code is 4 or not tested to this profile.
The remaining items are omitted for service provision code 4 (hot water provision only)			
23		Cogen package power (bottom of range) (number, up to 7 chs; eg "nnn.nnn")	Output power (to water) of the cogen package in kW. For range rated cogen packages it is the lower of the range of values for which the test results are valid. For other cogen packages this is the same as field 23.
24	X	Cogen package power (top of range) (number, up to 7 chs; eg "nnn.nnn", or text ">70kW")	Output power (to water) of the cogen package in kW. For range rated cogen packages this is the top of the range of values for which the test results are valid. Where the upper limit of the range exceeds 70 kW this is shown as ">70kW" instead of the exact value.
25	X	Heating duration (2 digits or V)	Coded 24 for continuous; 16 for 16 hours/day; 11 for 9 hours in the week and 24 at weekends; V for variable – same as 11 but switches to 16 or 24 hours on colder days before supplementary heating is applied.
26		Separate circulator (1 digit)	Whether the cogen package contains within it a water circulator for the emission system, or a separate system circulator must be installed outside the package. This must be confirmed on the test certificate. Encoded as: 0 unknown; 1 within; 2 separate. SAP uses Table 4f assumptions regardless.
27	X	Number of plant size ratios (up to 2 digits)	The number of plant size ratios for which data are provided in the record (maximum 9).
28	X	A: Plant size ratio (up to 4 chs; eg n.nn)	Group A: This field introduces a set of results known as group A. It contains the plant size ratio to which the other data in group A relate.
29	X	A: Space heating efficiency (number, up to 6 chs; eg "nnn.n")	Group A: Space heating thermal efficiency ( $\eta_{\text{space}}$ ) expressed as % gross.
30	X	A: Net specific electricity consumed (space heating) (number eg "±nn.nnn")	Group A: specific electricity consumed (negative if generated) during space heating, kWh <sub>e</sub> per kWh <sub>h</sub> ( $e_{\text{space}}$ ).
31 to 26+3n	X	Group B, C, D, etc	Group B, C, D ... Sets of results in the same format as those for group A for other plant size ratios. Plant size ratios are listed in the record in ascending order. n is the value in field 26.

Notes to CoGen Table:

See Appendix A for combinations of service provision and DHW vessel.

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## 7.15 Data format: ECO Measures Table 161

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 261 (for ECO Measures Table)			
Field	X	Field name	Description
1		Improvement type (1 or 2 characters)	Improvement type as defined in SAP Appendix T or other documentation. If this is the @ symbol field 6 gives the factor to multiply ECO emissions scores.
2		Lifetime (1 or 2 digits)	Lifetime of the measure in years.
3		Eligible for CERO (1 digit)	Whether the measure is eligible for the Carbon Emission Reduction Obligation, encoded as 0=no, 1=yes, 2=as secondary measure only.
4		Eligible for CSCO (1 digit)	Whether the measure is eligible for the Carbon Saving Community Obligation, encoded as 0=no, 1=yes.
5		Eligible for HHCRO (1 digit)	Whether the measure is eligible for the Home Heating Cost Reduction Obligation, encoded as 0=no, 1=yes.
6		In-use factor for ECO (up to 5 chs, e.g. n.nnn)	Factor multiplying the emissions saving from the measure in an ECO Assessment. Blank if not applicable (measures that apply to HHCRO only). If field 1 is @ this is the factor to multiply ECO emissions scores calculated by RdSAP 9.92 or later (note: this factor is not applied if scores calculated by RdSAP 9.91).
7		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.

## 7.16 Data format: RHI Tariffs Table 162

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 262 (for RHI Tariffs Table)			
Field	X	Field name	Description
1		Record format (1 char)	This declares the format of this particular record within the Table, which is either A or B. The specification for each field of each format follows.
A:2		Technology (1 or 2 digits)	Encoded as 1 ground source heat pump, 2 air source heat pump, 3 biomass, 4 solar thermal. If an unrecognised technology is encountered, skip the record and continue at the next record.
A:3		Heat distribution for heat pump (1 digit)	Space heat distribution to which the value in field 6 applies, encoded as: 0: any distribution system; 1 wet system, flow temperature 55°C; 2 wet system, flow temperature 45°C; 3 wet system, flow temperature 35°C; 4 warm air system. Blank if record is not for a heat pump.
A:4		Duration of tariff (1 or 2 digits)	Number of years that tariff is payable for.
A:5		SPF (up to 5 chs; eg nn.nn)	Seasonal performance factor of heat pump to be used for calculation of eligible heat demand. Blank if record is not for a heat pump.
A:6		Tariff (up to 5 chs; eg nn.nn)	Tariff in p/kWh
A:7		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
B:2		Start date of tariff (yyyy/mmm/dd)	The first date on which the tariffs in the table apply. See Note 2.
B:3		End date of tariff (yyyy/mmm/dd)	The last date on which the tariffs in the table apply. See Note 2.

### Notes to RHI Tariff Table:

Note 1: Several instances of the RHI Tariff Table may be present, each with the same table number and format number but with differing dates in fields B:2 and B:3. Where multiple instances are present the start date of one instance will be the day following the end date of another, but the order in which instances appear in the PCDF is not specified. When new tariffs are announced a further table is added with the applicable dates of the new tariffs.

Note 2: The table contains only one record with format B and the dates it contains apply to all tariffs in the table.

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## 7.17 Data format: FIT Tariffs Table 163

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 263 (for FIT Tariffs Table)			
Field	X	Field name	Description
1		Record format (1 char)	This declares the format of this particular record within the Table, which is either A or B. The specification for each field of each format follows.
A:2		Technology (1 or 2 digits)	Encoded as 1 PV, 2 wind, 3 micro-CHP, 10 export tariff. If an unrecognised technology is encountered, skip the record and continue at the next record.
A:3		Duration of tariff (1 or 2 digits)	Number of years that tariff is payable for.
A:4		Export percentage (up to 3 digits)	The fraction of generated electricity that is assumed exported under FIT rules, expressed in %.
A:5		Tariff 1 (up to 5 chs; eg nn.nn)	Tariff in p/kWh for: PVs: 1 is for installation <= 4 kW, SAP rating A-D 2 is for installation <= 4 kW, SAP rating E-G 3 is for installation > 4 kW and <= 10 kW, SAP rating A-D 4 is for installation > 4 kW and <= 10 kW, SAP rating E-G 5 is for installation > 10 kW and <= 50 kW, SAP rating A-D 6 is for installation > 10 kW and <= 50 kW, SAP rating E-G wind: 1 is for installation <= 1.5 kW 2 is for installation > 1.5 kW and <= 15 kW 3 to 6 are blank other: single value for tariff 1, 2 to 6 are blank
A:6		Tariff 2 (up to 5 chs; eg nn.nn)	
A:7		Tariff 3 (up to 5 chs; eg nn.nn)	
A:8		Tariff 4 (up to 5 chs; eg nn.nn)	
A:9		Tariff 5 (up to 5 chs; eg nn.nn)	
A:10		Tariff 6 (up to 5 chs; eg nn.nn)	
A:11		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
B:2		Start date of tariff (yyyy/mmm/dd)	The first date on which the tariffs in the table apply. See Note 2.
B:3		End date of tariff (yyyy/mmm/dd)	The last date on which the tariffs in the table apply. See Note 2.

Note 1: Several instances of the FIT Tariff Table may be present, each with the same table number and format number but with differing dates in fields B:2 and B:3. Where multiple instances are present the start date of one instance will be the day following the end date of another, but the order in which instances appear in the PCDF is not specified. When new tariffs are announced a further table is added with the applicable dates of the new tariffs.

Note 2: The table contains only one record with format B and the dates it contains apply to all tariffs in the table.

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## 7.18 Data format: Postcode Table 172

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification using local weather.

FORMAT 272 (for Postcode Table)			
Field	X	Field name	Description
1		Area (1 or 2 characters)	Postcode area. See Note 1
2		District (1 or 2 characters)	Postcode district. See Note 1. For each postcode area there is a record with * for the district, to be used in cases where the district does not exist in the table.
3		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
4	X	Climate region (1 or 2 digits)	Region code as defined in the SAP specification (map in Appendix U). 0 if unknown. See Note 2
5	X	Country (1 digit)	Country in which postcode is located, encoded as 2 Scotland, 3 Northern Ireland, 4 England, 5 Wales. Any other value means that the data record is not valid for SAP purposes. See Note 3.
6		District or area (1 digit)	Whether the data following are for the postcode district or postcode area, encoded as 0 district, 1 area. In most cases the data are for the postcode district; data for postcode area are given for non-geographical postcodes and in those records with * for the district.
7		Height above sea level (up to 4 digits)	Typical height above sea level for the postcode in metres. Blank if unknown. See Note 4
8	X	Latitude (up to 4 chs, e.g. 57.6)	Latitude in ° north of the equator.
9		Longitude (up to 5 chs, e.g. -10.7)	Longitude in ° east of the Greenwich meridian. Locations west of the Greenwich meridian have negative values. See Note 4.
10	X	Temperature for January (up to 4 chs, e.g. -10.3)	Mean external temperature for the month of January in °C.
11 to 21	X		Mean external temperature for months February to December.
22	X	Wind speed for January (up to 4 chs, e.g. 12.4)	Mean wind speed for the month of January in m/s.
23 to 33	X		Mean wind speed for months February to December.
34	X	Solar radiation for January (up to 3 digits)	Mean global solar irradiance on a horizontal plane for the month of January in W/m <sup>2</sup> .
35 to 45	X		Mean global solar irradiance for months February to December.

### Notes to Postcode Table:

Note 1: This table uses the first part of the postcode, e.g. B1 or AB24 in which B and AB are areas and 1 and 24 are districts. The area is one or two letters. The district is usually an integer in the range 0 to 99 but in London it can be a numeral and a letter, e.g. SW1V.

Note 2: The data may include regions not used in SAP; these have region code greater than 21.

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Note 3: SAP regions 8 and 9 are in both England and Scotland. SAP regions 5 and 7 are in both England and Wales. The data may include territories that are not part of the UK; these have country code greater than 5.

Note 4: Height above sea level and longitude are not used in SAP and are provided for information only.

## 7.19 Data format: Indicative Costs Table 181

FORMAT 283 (for Indicative Costs Table)		
Field	Field name	Description
1	Improvement type or interest rate (1 or 2 characters)	Improvement type as defined in SAP Appendix T or other documentation. If this is the @ symbol field 5 gives the current interest rate. If an unrecognised improvement type is encountered, skip the record and continue at the next record; do not report a file format error.
2	Recommendation number (up to 2 digits)	Recommendation number as defined in SAP Appendix T. If it is 0 the indicative cost applies to all recommendations of the type in field 1.
3	Cost range (1 digit)	Whether the cost is to be given as a single figure or as a range, encoded as: 1 – cost to be given as a single figure 2 – cost to be given as a range.
4	Cost type (1 digit)	Cost type encoded as 1, 2, see Note 1. 1 – cost data B is not applicable 2 – cost data B is applicable
5	Bottom of range cost data A (up to 6 chs, e.g. nnn.nn)	Cost data A, applies to bottom of range if cost range is 2. Can be zero. If field 1 is @ this is the interest rate to be used for calculation of annual repayments.
6	Bottom of range cost data B (up to 6 chs, e.g. nnn.nn)	Cost data B, applies to bottom of range if cost range is 2. Blank if not applicable.
7	Top of range cost data A (up to 6 chs, e.g. nnn.nn)	Cost data A, applies to top of range. Blank if not applicable
8	Top of range cost data B (up to 6 chs, e.g. nnn.nn)	Cost data B, applies to top of range. Blank if not applicable.
9	Lifetime for Green Deal assessment (1 or two digits)	Lifetime of the measure in years for GD assessment. If field 1 is @ then: - if this field is blank there is no over-riding maximum - if it is not blank it is the maximum period for calculation of repayments.
10	Cost for Green Deal assessment (up to 5 digits)	Cost to be used for the calculation of Green Deal annual repayments. If blank this cost is the middle of the range determined by fields 3 to 8.
11	Eligible for Green Deal (1 digit)	Whether the improvement is eligible for Green Deal finance, encoded as 0=no, 1=yes. Blank if not applicable.
12	In-use factor for SAP (up to 4 chs, e.g. 0.90)	Factor multiplying the energy saving from the measure in RdSAP assessment Blank if not applicable
13	In-use factor for OA (up to 4 chs, e.g. 0.90)	Factor multiplying the energy saving from the measure in Occupancy Assessment Blank if not applicable

14	Minimum SAP increase (up to 4 chs, e.g. x.xx)	Minimum increase in SAP rating as a result of the measure in order for it to be recommended on an EPC. Blank if not applicable.
15	DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.

#### Notes to Indicative Costs Table:

Note 1: If cost type is 1, the indicative cost is generated from cost data A only. If cost type is 2, the indicative cost is calculated as  $A + B \times \text{<variable>}$  where <variable> depends on the measure.

### 7.20 Data format: Fuel Prices Table 191

FORMAT 294 (for Fuel Prices Table)		
Field	Field name	Description
1	Fuel category (up to 2 digits)	One of gas, oil, solid fuel, electricity, community heating not CHP, community heating CHP, other, coded as 1 to 7 respectively. See Notes 1, 2 and 3.
2	Fuel or heat source (up to 3 digits)	For fuel categories 1 to 4, fuel type encoded with the same codes as in SAP 10 Table 12. For fuel category 5 it is 47 and for fuel category 6 it is 48. See Note 5.
3	Standing charge (up to 3 digits)	Standing charge in £/year. See Note 5.
4	Fuel price (up to 5 chs; eg nn.nn)	Fuel price in p/kWh. If Field 7=1, then price for on-peak tariff.
5	DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
6	Index number of Fuel (6 digits)	If fuel has an index number use data from Fuels Table 196. Blank if not applicable.
7	On/off peak tariff (1 digit)	If on/off tariff =1, blank if not applicable.
8	Fuel price for off peak (up to 5 chs; eg nn.nn)	If field 7 =1, then prices for off-peak tariff. Blank if not applicable. Fuel unit price in p/kWh

#### Notes to Fuel Prices Table:

Note 1: The standing charge for community heating is given in the record for fuel category 5. This standing charge applies to all cases of community heating.

Note 2: The price given for fuel category 5 applies when the community heat source is a boiler or heat pump. The price given for fuel category 6 applies when the community heat source is CHP, waste heat from power station or geothermal.

Note 3: The footnotes to SAP 10 Table 12 apply where relevant.

Note 4: When SAP assessment software encounters Table 191, the fuel prices in it must not overwrite the fuel prices in Table 12 of the SAP 10 specification. The prices in Table 12 are to be used for the calculation of SAP ratings

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throughout the currency of SAP 10. Table 191 is used for calculating running costs and savings for Energy Performance Certificates and similar purposes (e.g. Green Deal).

Note 5: If fuel or heat source code is 99, then software must use Fuel prices from Fuels Table 196 for compliance and ratings. For calculating running costs and savings for Energy Performance Certificates and similar purposes (e.g. Green Deal) software must use current Fuel prices from Table 191.

## 7.21 Data format: Historical Fuel Prices Table 199

FORMAT 295 (for Fuel Prices Table)		
Field	Field name	Description
1	Mode (1 letter)	Modes A, B, C. Where A stores data on the historical fuel prices data, B stores data on the PCDB revision number and C stores data on the fuel prices revision number.
Mode A		
2	Fuel category (up to 2 digits)	One of gas, oil, solid fuel, electricity, community heating not CHP, community heating CHP, other, coded as 1 to 7 respectively.
3	Fuel or heat source (up to 3 digits)	For fuel categories 1 to 4, fuel type encoded with the same codes as in SAP 10 Table 12. For fuel category 5 it is 47 and for fuel category 6 it is 48.
4	Standing charge (up to 3 digits)	Standing charge in £/year.
5	Fuel price (up to 5 chs; eg nn.nn)	Fuel price in p/kWh
6	DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
7	Index number of Fuel (6 digits)	If fuel has an index number use data from Fuels Table 196. Blank if not applicable.
7	On/off peak tariff (1 digit)	If on/off tariff =1, blank if not applicable.
8	Fuel price for off peak (up to 5 chs; eg nn.nn)	If field 7 =1, then prices for off-peak tariff. Blank if not applicable. Fuel unit price in p/kWh
Mode B		
2	PCDB version number	The PCDB revision number in which the prices were originally given
3	Year	The year of the fuel price table in which the prices were originally given
4	Month	The month of the fuel price table in which the prices were originally given
5	Day	The day of the fuel price table in which the prices were originally given
Mode C		
2	Fuel prices version number	The fuel prices table revision number in which the prices were originally given
3	Year	The year of the fuel price table in which the prices were originally given
4	Month	The month of the fuel price table in which the prices were originally given
5	Day	The day of the fuel price table in which the prices were originally given

See Notes on Fuel Prices Table for additional information.

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## 7.22 Data format: Fuel Table 196

FORMAT 296 (for Fuel Table)			
Field	X	Field name	Description
1		Index (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual fuel, 1=illustrative (non-existent) fuel, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
3		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
4		Fuel name (up to 50 chs.)	Name of the fuel as shown on relevant documentation. See Note 1.
5	X	Fuel category (up to 2 digits)	One of gas, oil, solid fuel, electricity, community heating not CHP, community heating CHP, other, coded as 1 to 7 respectively. See Note 2 and 3.
6	X	SAP compatibility	Compatible with SAP and/or RdSAP., encoded as 1=SAP only, 2=RdSAP only, 3=SAP and RdSAP
7	X	Standing charge (up to 3 digits)	Standing charge in £/year.
8	X	Treat as Fuel Code	Fuel codes specified in SAP Table 12.
9	X	On/off peak tariff (1 digit)	If on/off tariff =1, blank if not applicable. If on/off peak tariff, then Group A is on peak and Group B is off peak. If tariff is not on/off peak, then only use Group A. Group B is blank.
10	X	Group A: Fuel price (up to 5 chs; eg nn.nn)	Fuel unit price in p/kWh. See Note 4.
11	X	Group A: Carbon emission factor for month 1 (5 chs n.nnn)	Carbon emissions in kgCO <sub>2</sub> e/kWh for Month 1. Months follow ascending order from 1 to 12 starting from January.
12-22	X	Group A: Carbon emission factor for month 2-12 etc (5 chs n.nnn)	Set of results in the same format as those for Month 1 for other months.
23	X	Group A: Primary energy factor for month 1 (5 chs n.nnn)	Primary energy factor in kWh/kWh. Months follow ascending order from 1 to 12 starting from January.
24-34	X	Group A: Primary energy factor for month 2-12. (5 chs n.nnn)	Set of results in the same format as those for Month 1 for other months.
35- 59	X	Group B	Set of results in the same format as those for Group A if off peak also present. This is indicated by field 9.

### Notes to Fuel Table:

Note 1: This is the fuel name that would be readily available to a SAP assessor.

Note 2: The footnotes to SAP 10 Table 12 apply where relevant.

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Note 3: The fuel category field indicates the category from SAP 10 Table 12 that most closely describes the fuel. The “other” option should be used when this is not applicable.

Note 4: Table 191 is used for calculating running costs and savings for Energy Performance Certificates and similar purposes (e.g. Green Deal).

### 7.23 Data format: Flue Gas Heat Recovery Systems Table 313

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 414 (for FGHS Table)			
Field	X	Field name	Description
1		Index (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference number (6 digits)	Reference to current name of manufacturer ( <i>see field 2 in Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the heat recovery device. If none the original manufacturer name will be inserted instead. If the same system is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model of heat recovery device, as it appears on the boiler casing or leaflet of owner's instructions. If the same system is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.

9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
11	X	Applicable fuel (up to 2 digits)	Fuel to which the data apply, which is any one of the fuel codes specified in SAP Table 12 under sub-headings "gas fuels" or "liquid fuels". If the same device may be used with more than one type of fuel then separate entries for each appear in the database, except that a boiler listed for bulk LPG is also applicable to bottled LPG and LPG subject to special condition 11F. If fuel used is from Fuels Table 196 then field code is 99.
12		Test fuel (1 digit)	Fuel used to obtain the test data, which is one of "gas", "LPG", or "oil" encoded as 1, 2 or 4. If this differs from the fuel in field 11, the data have been adjusted.
13	X	Applicable boiler types (up to 6 chs, eg RCS)	Between one and six letters indicating which boiler types the system can be used with: R – regular boiler C – instantaneous combi without keep-hot facility and without close-coupled store K – instantaneous combi with keep-hot facility E – instantaneous combi with close-coupled store S – storage combi P – CPSU These can be in any order.
14	X	Integral only (1 digit)	Whether the FGHRs is used only as an integral part of a boiler. This is 1 if it is integral only and 0 if not. See Note 1.
15	X	Heat store (1 digit)	Whether or not the device has a FGHRs heat store and close-coupled store. This is 1 if it has no store, 2 if it has a FGHRs heat store and 3 if it has a FGHRs heat store and close-coupled store. Heat store = 3 is valid only with an instantaneous combi boiler with close-coupled store (applicable boiler type E).
16	X	Close-coupled heat store total volume (up to 3 digits)	Total volume of close-coupled heat store in litres, 0 if no close-coupled store.
17	X	Heat store recaptured volume (up to 3 digits)	Volume of heat store heated by the recovered heat, 0 if no store. For single purpose stores this is the same as the total volume. For multiple purpose stores it is the volume below main heating coil.
18	X	Close-coupled heat store loss rate (up to 5 chs, eg x.xx)	Heat loss rate from close-coupled external store measured according to BS 1566, in kWh/day. Blank if not applicable.
19	X	Direct total heat recovered (up to 5 chs, eg x.xxx)	Total fraction of heat recovered by the device in a hot-water-only test using a combi boiler without keep-hot facility.
20	X	Direct useful heat recovered (up to 5 chs, eg x.xxx)	Useful fraction of heat recovered by the device in a hot-water-only test using a combi boiler without keep-hot facility. Blank if not applicable
21	X	Power consumption (up to 5 chs, eg x.x)	Annual power consumption of any electrical components in kWh/year (for example a pump). Blank if not applicable
22	X	Photovoltaic module (1 digit)	Whether the device includes a PV module connected to a close-coupled store. This is 1 if it has a PV module and 0 if not. Valid only if Heat store = 3.
23	X	Cable loss (up to 5 chs, eg x.xxx)	Fraction of PV power dissipated in cable connecting PV array to immersion heater. Blank if not applicable.
24	X	Number of equations (up to 2 digits)	The number of equations. If the device has no heat store (field 15 = 1) this field is zero and the remaining fields of the record are blank.
25	X	A: Space heating requirement from boiler system, up to 6 digits	This field introduces the parameters for equation A. It contains the monthly space heating requirement from the boiler in kWh as calculated by SAP (before application of boiler efficiency)
26	X	A: coefficient a (sign and number, up to 7 chs; eg "-x.xxx")	Coefficient a for equation A, instantaneous combi not supported by EN13203-2 data. See Note 2. Fields 26, 27 and 28 are blank if the system does not apply to an instantaneous combi without keep-hot facility and without close-coupled store
27	X	A: coefficient b (sign and number, up to 7 chs; eg "-xxxx.x")	Coefficient b for equation A, instantaneous combi not supported by EN13203-2 data. See Note 2 and Note 3.



28	X	A: coefficient c (sign and number, up to 7 chs; eg "-xxxx.x")	Coefficient c for equation A, instantaneous combi not supported by EN13203-2 data. See Note 2 and Note 3.
29	X	A: coefficient a (sign and number, up to 7 chs; eg "-x.xxx")	Coefficient a for equation A, all other cases. May or may not be supported by EN13203-2 data. See Note 2 and 3.
30	X	A: coefficient b (sign and number, up to 7 chs; eg "-xxxx.x")	Coefficient b for equation A, all other cases. May or may not be supported by EN13203-2 data. See Note 2 and 3
31	X	A: coefficient c (sign and number, up to 7 chs; eg "-xxxx.x")	Coefficient c for equation A, all other cases. May or may not be supported by EN13203-2 data. See Note 2 and 3.
32 to 24+7n	X	Groups B, C, D, etc	Groups B, C, D, ...: Equations in the same format as Group A. n is the value in field 24.
25+7n	X	Index number of Fuel (6 digits)	If fuel has an index number use data from Fuels Table 196. Fuel code 99 in SAP. Blank if not applicable.

Notes to the Flue Gas Heat Recovery System Table:

Note 1: The following rules apply to an integral FGHRs

- If a boiler with integral FGHRs has been selected (as determined by the entry in the boiler table), SAP assessment software must not permit a FGHRs to be selected by the assessor. The list of available FGHRs must not be presented to the assessor. The SAP software must select the linked FGHRs automatically (implicit selection).
- If the assessor selected a FGHRs first (explicit selection) and then a boiler with integral FGHRs, the selection of the FGHRs is to be cancelled automatically by SAP assessment software and a warning given. The software then selects the linked FGHRs automatically.
- If a boiler with integral FGHRs was selected and is then changed for a different boiler, the implicit selection of the FGHRs to which the first boiler was linked is to be cancelled automatically by SAP assessment software.
- A FGHRs for which field 14 in the FGHRs table is set to 1 is never shown to the SAP assessor as available to select. It can be applied in the SAP calculation only by choosing a boiler with integral FGHRs that is linked to it.

Note 2: The first set of coefficients a, b and c (fields 26 to 28) only apply to an instantaneous combi boiler without keep-hot facility and without close-

coupled store that are unsupported by EN13203-2 data. Those supported by EN13203-2 test data must always use the second set of coefficients (29 to 31), irrespective of the presence of a keep-hot facility or close-coupled store.

Note 3: If the FGHRs is integrated within a boiler, then heat recovered directly will be incorporated in boiler hot water performance test results (EN13203-2) and reflected in the boiler's PCDB data record. In such cases, coefficient b of the FGHRs PCDB data record will be affected. Additionally, if the FGHRs device does not feature a FGHRs Heat Store, a data record for the device in this table will not be required.

## 7.24 Data format: Centralised Mechanical Ventilation Systems Table 323

This table incorporates centralised mechanical ventilation systems that are extract-only, supply-only, and balanced supply and extract.

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 431 (for Centralised Mechanical Ventilation Systems)			
Field	X	Field name	Description
1		Index (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (6 digits)	Reference to current name of manufacturer ( <i>see field 2 in Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.

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5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the ventilation unit. If none the original manufacturer name will be inserted instead. If the same system is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model of ventilation unit, as it appears on the unit's casing or leaflet of owners' instructions. If the same system is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
11		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this "Master Model". Blank if not applicable.
12	X	Main type (1 digit)	Main product type, which is one of "centralised mechanical extract ventilation" (MEV), "balanced whole-house mechanical ventilation with heat recovery" (MVHR), "balanced whole-house mechanical ventilation without heat recovery" or "positive input ventilation" coded as 1, 3, 4 and 5 respectively. Note: If an unknown value is encountered, skip record and treat the ventilation system as non-existent. Do not report a file format error.
13	X	Integral only (1 digit)	Whether the MEV or MVHR is used only as an integral part of an exhaust air heat pump system. This is 1 if it is integral only and 0 if not. See Note 1.
14	X	Duct type (1 digit)	Whether tested using flexible, rigid ducting or semi-rigid, coded as 1,2 and 3 respectively. Any other value means the data record is not valid. If the same system has been tested for multiple duct types then separate entries for each appear in the database. See Note 2.
15	X	Test duct size (1 digit)	Coded as 1 for 125 mm diameter or 204 x 60 rectangular or larger, coded as 2 for 100 mm diameter or 100 x 50 rectangular. If the same system has been tested with both sizes then separate entries for each will appear in the database. See Note 3.
16	X	Summer by-pass	Whether an MVHR has a by-pass of the heat recovery unit which can be used during summer, encoded as 0=unknown; 1=no; 3=yes; 4=partial. Blank if not applicable.
17	X	Number of exhaust terminal configurations (up to 2 digits)	The number of different configurations tested. This will include the kitchen and at least one other wet room.
18	X	A: number of additional wet rooms (up to 2 digits)	This field introduces a set of test results known as group A. It contains the number of additional wet rooms (i.e. in addition to the kitchen) to which the other data in group A relate.
19		A: Nominal test flow rate (up to 5 chs e.g. nn.n)	Test flow rate in litres/sec
20	X	A: Specific fan power (up to 4 chs e.g. n.nn)	Specific fan power in watts per (litre per second).
21	X	A: Heat exchanger efficiency (up to two digits)	Heat exchanger efficiency in %. MVHR only, blank if not applicable.
22 to 17+4n	X	Groups B, C, D, etc	Groups B, C, D, ...: Sets of results in the same format as Group A. n is the value in field 17

Notes to the Centralised Mechanical Ventilation Systems Table:

Note 1: If the MEV/MVHR is integral only its characteristics are applied only when the system is specified by the data record for an exhaust air heat pump. Either:

- It must not appear in a list of systems selectable by SAP assessors using assessment software, or
- SAP assessment software must generate an error if the heating system and mechanical ventilation system are incompatible.

Note 2: Semi-rigid duct types have the same in use factors as rigid duct type.

Note 3: The test data are valid provided that the installed duct size is at least as great as the test duct size.

## 7.25 Data format: Decentralised MEV Systems Table 322

A Decentralised Mechanical Extract Ventilation (dMEV) system extracts air from wet rooms via an extract fan in each wet room. Fans can be through-the-wall with no ducting, or within short lengths of ducting.

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 428 (for Decentralised MEV systems)			
Field	X	Field name	Description
1		Index (digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (6 digits)	Reference to current name of manufacturer (see field 2 in Manufacturers Table).

3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the ventilation unit. If none the original manufacturer name will be inserted instead. If the same system is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model of ventilation unit, as it appears on the unit's casing or leaflet of owners' instructions. If the same system is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
11		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this "Master Model". Blank if not applicable.
12	X	Main type (1 digit)	Main product type, which is "decentralised mechanical extract ventilation" coded as 2. Note: If an unknown value is encountered, skip record and treat the ventilation system as non-existent. Do not report a file format error.
13	X	Number configurations (up to 2 digits)	The number of different configurations tested. At present this is 6 (two types of wet room and three types of fan location)
14	X	A: configuration	This field introduces a set of test results known as group A. It defines the configuration which the other data in group A relate, encoded as: 1 In-room fan, kitchen 2 In-room fan, other wet room 3 In-duct fan, kitchen 4 In-duct fan, other wet room 5 Through-wall fan, kitchen 6 Through-wall fan, other wet room
15		A: Nominal test flow rate (up to 5 chs e.g. nn.n)	Test flow rate in litres/sec. Blank if this configuration has not been tested, see Note 1
16	X	A: Specific fan power (up to 4 chs e.g. n.nn)	Specific fan power in watts per (litre per second) in minimum flow rate test. Blank if this configuration has not been tested, see Note 1.
17 to (13+3n)	X	Groups B, C, D, etc	Groups B, C, D: Sets of results in the same format as Group A. n is the value in field 13.

### Notes to the Decentralised MEV Table:

Note 1: For some products data may not be provided for certain configurations. Such configurations are not a valid selection for SAP calculations.

Note 2: The basis of all test results within this data record table is that tests are conducted in accordance with the revised SAP 10 test method. The method differs from the previous version, which was applicable to SAP 2005, 2009 and 2012. Changes include that flexible duct configurations are no longer tested.

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For decentralised MEV systems the data in the table refers to a package of individual extract fans.

## 7.26 Data format: MV In-use Factors Table 329

FORMAT 432 (for MV In-use Factors table)			
Field		Field name	Description
1	X	System type (up to 2 digits)	Main product type to which adjustments are applicable, which is one of "centralised mechanical extract ventilation", "decentralised mechanical extract ventilation", "balanced whole-house mechanical ventilation with or without heat recovery", "positive input ventilation" or "default data" coded as 1, 2, 3, 5 and 10 respectively. If any other value the record should be disregarded.
2	X	SFP adjustment 1 for flexible ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with flexible ducting when system is not installed under an approved installation scheme.
3	X	SFP adjustment 1 for rigid ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with rigid ducting when system is not installed under an approved installation scheme.
4	X	SFP adjustment 1 for no ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with no ducting (through-the-wall type) when system is not installed under an approved installation scheme. Blank if not applicable.
5	X	MVHR efficiency adjustment 1 for uninsulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with uninsulated ducting when system is not installed under an approved installation scheme. System not installed exclusively within dwelling heated envelope. Blank if not applicable.
6	X	MVHR efficiency adjustment 1 for insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with insulated ducting when system is not installed under an approved installation scheme. System not installed exclusively within dwelling heated envelope. Blank if not applicable.
7	X	MVHR efficiency adjustment 1 for level 1 insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with level 1 insulated ducting when system is not installed under an approved installation scheme. System installed exclusively within dwelling heated envelope. Blank if not applicable.
8	X	MVHR efficiency adjustment 1 for level 2 insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with level 2 insulated ducting when system is not installed under an approved installation scheme. System installed exclusively within dwelling heated envelope. Blank if not applicable.
9	X	SFP adjustment 2 for flexible ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with flexible ducting when system is installed under an approved installation scheme.
10	X	SFP adjustment 2 for rigid ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with rigid ducting when system is installed under an approved installation scheme.
11	X	SFP adjustment 2 for no ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with no ducting (through-the-wall type) when system is installed under an approved installation scheme. Blank if not applicable.
12	X	MVHR efficiency adjustment 2 for uninsulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with uninsulated ducting when system is installed under an approved installation scheme. System not installed exclusively within dwelling heated envelope. Blank if not applicable.
13	X	MVHR efficiency adjustment 2 for insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with insulated ducting when system is installed under an approved installation scheme. System not installed exclusively within dwelling heated envelope. Blank if not applicable.
14	X	MVHR efficiency adjustment 2 for level 1 insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with level 1 insulated ducting when system is installed under an approved installation scheme. System installed exclusively within dwelling heated envelope. Blank if not applicable.

15	X	MVHR efficiency adjustment 2 for level 2 insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with level 2 insulated ducting when system is installed under an approved installation scheme. System installed exclusively within dwelling heated envelope. Blank if not applicable.
16	X	SFP adjustment 3 for flexible ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with flexible ducting when measured SFP is used. Blank if not applicable.
17	X	SFP adjustment 3 for rigid ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with rigid ducting when measured SFP is used. Blank if not applicable.
18	X	SFP adjustment 3 for no ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to specific fan power when unit is used with no ducting (through-the-wall type) when measured SFP is used. Blank if not applicable.
19	X	MVHR efficiency adjustment 3 for uninsulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with uninsulated ducting when measured SFP is used. System not installed exclusively within dwelling heated envelope. Blank if not applicable.
20	X	MVHR efficiency adjustment 3 for insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with insulated ducting when measured SFP is used. System not installed exclusively within dwelling heated envelope. Blank if not applicable.
21	X	MVHR efficiency adjustment 3 for level 1 insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with level 1 insulated ducting when measured SFP is used. System installed exclusively within dwelling heated envelope. Blank if not applicable.
22	X	MVHR efficiency adjustment 3 for level 2 insulated ducting (up to 5 chs e.g. n.nnn)	Multiplying factor to be applied to MVHR efficiency when unit is used with level 2 insulated ducting when measured SFP is used. System installed exclusively within dwelling heated envelope. Blank if not applicable.
23	X	DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.

Notes to the MV In-use Factors Table:

- Note 1: The factors for system types 1, 2, 3 and 5 are used for the applicable system where the specific fan power and efficiency are based on test data applicable to SAP. The factors for system 10 are used where the specific fan power and efficiency are taken from SAP Table 4g.
- Note 2: Balanced whole-house mechanical ventilation without heat recovery is system type 3 (in field 1) for the purposes of this table. In this case only the SFP adjustment is relevant (the heat recovery efficiency is given as zero).
- Note 3: If there is no applicable approved installation scheme the values for with and without scheme are the same.

## 7.27 Data format: MVHR Duct Table 341

The following fields must be read and included in any printout: 6, 7, 8.

FORMAT 442 (for MVHR ducts)			
Field	X	Field name	Description
1		Index (digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (digits)	Reference to current name of manufacturer ( <i>see field 2 in Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the duct system and MHVR unit. If the same system is sold under more than one manufacturer name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model of duct system, as shown on the duct system and MHVR unit.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
11	X	Duct type (1 digit)	Type of ducting: flexible, rigid or semi-rigid, coded as 1, 2 and 3 respectively. Any other value means the data record is not valid.
12		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this "Master Model". Blank if not applicable.



## 7.28 Data format: Waste Water Heat Recovery System Table 353

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 454 (for WWHRs)			
Field	X	Field name	Description
1		Product index number (digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (digits)	Reference to current name of manufacturer (see field 2 in Manufacturers Table).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the device. If the same system is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model of device, as it appears on the shower casing or leaflet of owner's instructions. If the same unit is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model. For an instantaneous WWHRs, this is "System A", "System B" or "System C".
9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
11		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this "Master Model". Blank if not applicable.
12	X	Instantaneous or storage (1 digit)	Whether an instantaneous or storage WWHRs, encoded as 1 and 2 respectively.
13	X	System type (1 char or blank)	For an instantaneous WWHRs, this is A, B or C as defined in the SAP specification. If data are available for more than one system type, a record for each will be included. For a storage WWHRs this is blank.
14	X	Storage type (1 char or blank)	For a storage WWHRs, this is "combined" or "separate", encoded as 1 or 2. For an instantaneous WWHRs this is blank.
15		Storage WWHR efficiency (up to 5 chs, e.g. nnn.n)	Heat recovery efficiency of storage WWHR system (%). For an instantaneous WWHRs this is blank.

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16	X	Utilisation factor (up to 5 chs, e.g. n.nnn)	Utilisation factor for system (fraction between 0 and 1)
17		Test dedicated volume (up to 4 chs, e.g. nnnn)	Dedicated storage volume used in efficiency test in litres. For an instantaneous WWHRS this is blank.
18	X	Low dedicated volume (up to 4 chs, e.g. nnnn)	Low end of validity range of dedicated storage in litres. For an instantaneous WWHRS this is blank.
19	X	High dedicated volume (up to 4 chs, e.g. nnnn)	High end of validity range of dedicated solar volume. For an instantaneous WWHRS this is blank
20	X	Electricity consumption (up to 6 chs, e.g. n.nnnn)	Daily electricity consumption of an instantaneous or storage WWHRS in kWh/day.
21	X	Number of flow rates (1 digit)	The number of flow rates (n) for which data are provided in the record (maximum 8). Only applicable for instantaneous WWHR systems.
22	X	A: Instantaneous WWHRS flow rate (nn.n)	Group A: This field introduces a set of results known as group A. It contains the flow rate to which the other data in group A relate.
23	X	A: Instantaneous WWHRS efficiency (up to 5 chs, e.g. nnn.n)	Group A: Heat recovery efficiency of Instantaneous WWHR system (%).
24 to 21+2n	X	Group B, C, D, E, F, G, H etc	Group B, C, D, E, F, G, H - Set of results in the same format as those for group A for other flow rates. Flow rates are listed in the record in ascending order. n is the value in field 21 (number of flow rates).

## 7.29 Data format: Heat Pump Table 362

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 7, 8, 9.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 465 (for Heat Pump Table)			
Field	X	Field name	Description
1		Product index number (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference number (6 digits)	Reference to current name of manufacturer (see field 2 in <i>Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		APM version number (up to 5 chs, eg nn.nn/nn.nn.nn)	Version number of the Annual Performance Method used to generate the data record from test data, followed by calculation engine version number.

6		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
7		Brand name (up to 50 chs.)	Name of brand, as shown on the heat pump package. If none the original manufacturer name will be inserted instead. If the same heat pump package is sold under more than one brand name then separate entries for each will appear in the database.
8		Model name (up to 50 chs.)	Name of heat pump model, as it appears on the heat pump unit casing or leaflet of owners' instructions. If the same heat pump package is sold under more than one model name then separate entries for each should appear in the database.
9		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
10		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
11		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
12		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this "Master Model". Blank if not applicable.
13		Data quality (1 digit)	Data quality encoded as: 1 Independent test data; 2 Manufacturer test data via report – laboratory MCS011 or equivalent approved; 3 Manufacturer test data via report; 4 Manufacturer test data via declaration – laboratory MCS011 or equivalent approved; 5 Heat Pump KEYMARK certificate submitted for all data within application; 6 Unknown.
14	X	Heat source (1 or 2 digits)	Heat source encoded as: 1 ground; 3 air; 4 exhaust air MEV; 5 exhaust air MVHR; 6 mixed exhaust air and outside air; 7 ground water; 8 surface water; 9 solar assisted – Type A; 10 solar assisted – Type B, see Note 5; Additional source classes may be defined in future using 2 digits
15	X	Combined electric heat pump and boiler package	The package comprises an electric heat pump and boiler to satisfy Service Provisions 1 to 3. Not applicable if service provision = 4. Encoded as: 0 = Not applicable, 1 = Combined electric heat pump and boiler package. See Note 7.
16		Index number of boiler within Combined electric heat pump and boiler package (6 digits)	If Field 15 = 1, then package contains a boiler recorded in Table 105. In this case, the field records the index number for the boiler's data record. If Field 15 = 0, then this field is blank. See Note 7 and 8.
17	X	Fuel (up to 2 digits)	Fuel type, which is 39 for electricity or any one of the fuel codes specified in SAP Table 12 under sub-headings "gas" or "oil". If the heat pump package can use more than one type of fuel then separate entries for each appear in the database, except that a heat pump listed for bulk LPG is also applicable to bottled LPG and LPG subject to special condition 11F. If fuel used is from Fuels Table 196 then field code is 99.
18	X	Index number of Fuel (6 digits)	If fuel used is from Fuels Table 196, then this field records the index number of this Fuel. Blank if not applicable.
19	X	Heat distribution type (1 or 2 digits)	Space heat distribution, encoded as: 1 - wet system, flow temperature 55°C; 2 - wet system, flow temperature 45°C; 3 - wet system, flow temperature 35°C; 5 - wet system, flow temperature 58°C; 6 - wet system, flow temperature 65°C; 7 – wet system, flow temperature 70°C (default for combined electric heat pump and boiler); 4 - warm air system. Blank if not applicable (service provision code 4). If the heat pump package is a wet system then separate entries for 35°C, 45°C, 55°C and 58°C or 65°C may appear in the database. If a high temperature heat pump (wet system), then an entry at 65°C will replace that at 58°C. If a combined electric heat pump and boiler (wet system), then an entry at 70°C will replace that at 58°C. Therefore, eight entries per heat pump may appear in database, since presence of weather compensation will cause duplication.
20	X	Weather compensation control (1 digit)	Weather compensation control included in the results (1 yes; 2 no). Blank if not applicable (service provision code 4).
21	X	Flue type (1 digit)	Flue type, which is one of "unknown", "open", "room-sealed", "open or room-sealed", "none" encoded as 0, 1, 2, 3 or 4. For electric heat pumps it is 4.
22	X	MEV or MVHR product index (6 digits)	The MVHR or MEV system that is integrated with this heat pump and for which the space heating data applies. Blank if heat source code is not 4, 5 or 6. See Note 1.
23	X	Service provision (1 digit)	Service provision, encoded as: 1 space and water heating all year, 2 space and water heating during heating season only; 3 space heating only; 4 water heating only. See Note 6.

24	X	HW vessel (1 digit)	Hot water storage vessel, encoded as: 1 integral or part of package; 2 separate and specified vessel (in fields 25, 26, 27); 3 separate but unspecified vessel; 4 none (service provision code 3).
25	X	Vessel volume (up to 4 chs; nnnn)	Hot water storage vessel volume in litres. In the case of HW vessel code 2 this is the minimum volume of the separate vessel to which the performance data relates (a reduced water heating efficiency applies in the SAP calculation if the actual vessel is smaller). Blank for HW vessel code 3 or 4.
26	X	Vessel heat loss (up to 7 chs; nnn.nnn)	Declared vessel heat loss rate in kWh/day at 45K rise above ambient. In the case of HW vessel code 2 this is the maximum heat loss rate of the separate vessel to which the performance data relates (a reduced water heating efficiency applies in the SAP calculation if the actual vessel has a higher heat loss rate). Blank for HW vessel code 3 or 4.
27	X	Vessel heat exchanger area (up to 7 chs; nnn.nnn)	Minimum vessel heat exchanger area in m <sup>2</sup> of the separate vessel to which the performance data relates (an in-use factor correction to water heating efficiency applies if the actual vessel has a lower heat transfer area). Blank for HW vessel code 3 or 4.  If manufacturer declared heat exchanger is contained within the heat pump itself (hot water storage vessel code is 1), or specification of the area is not required, this field will be 0. In this case, SAP assessment software will not require entry of heat exchanger area and an in-use factor correction will not apply.
28		Ecodesign energy efficiency class – hot water heating (up to 4 chs.)	The hot water heating energy efficiency class as defined by Ecodesign regulations (A+++, A++, A+, A, B, C, D). Blank if unknown or service provision 3.
29		Ecodesign – hot water heating – load profile (up to 3 chs; nn)	The load profile used during Ecodesign regulation hot water efficiency tests (M, L, XL, etc). Blank if unknown or service provision 3.
30		Ecodesign efficiency – hot water heating (up to 3 chs; nnn)	The hot water heating efficiency tested for Ecodesign regulations (%). Blank if unknown or service provision 3.
31	X	Water heating efficiency (profile.M) (up to 6 chs; nnnn.n)	Water heating efficiency ( $\eta_{\text{water},1}$ ), if service provision 4, based on tapping profile M (% gross) efficiency tests if service provision 4, but with correction. Blank if service provision 1, 2 or 3.
32	X	Net specific electricity consumed during hot water production (up to 7 chs; ±nn.nnn)	Specific electricity ( $e_{\text{water},1}$ ) consumed (kWh <sub>e</sub> per kWh <sub>h</sub> ) for non-electric heat pumps for service provision 1, 2 (calculated by method) or 4 (during tapping profile M). Blank if service provision code is 3 or if heat pump is powered solely by electricity.
33	X	Water heating efficiency (profile. L) (up to 6 chs; nnnn.n)	Water heating efficiency ( $\eta_{\text{water},2}$ ), for service provision 4, based on tapping profile L (% gross), but with correction. Blank if service provision code is 1, 2 or 3 or not tested to this profile.
34	X	Net specific electricity consumed (profile. L) (up to 7 chs; ±nn.nnn)	Specific electricity consumed ( $e_{\text{water},2}$ ) during tapping profile L, kWh <sub>e</sub> per kWh <sub>h</sub> . Blank if service provision code is 1, 2 or 3 or not tested to this profile. This value is blank for heat pumps powered solely by electricity.
35	X	Control capabilities (4 or 8 hex digits)	Values that indicate features that are relevant for heating controls. See Note 2.
The remaining items are omitted for service provision code 4 (hot water provision only)			
36		Ecodesign energy efficiency class – space heating low (up to 4 chs.)	The space heating energy efficiency class as defined by Ecodesign regulations (A+++, A++, A+, A, B, C, D) at low temperature application (35°C). Blank if unknown.
37		Ecodesign energy efficiency class – space heating medium (up to 4 chs.)	The space heating energy efficiency class as defined by Ecodesign regulations (A+++, A++, A+, A, B, C, D) at medium temperature application (55°C). Blank if not applicable or unknown.
38		Ecodesign efficiency – space heating low (up to 3 chs; nnn)	The space heating efficiency calculated for Ecodesign regulations (%) at low temperature application (35°C). Known as Seasonal Coefficient of Performance (SCOP) when in decimal form. Blank if unknown.
39		Ecodesign efficiency – space heating medium (up to 3 chs; nnn)	The space heating efficiency calculated for Ecodesign regulations (%) at medium temperature application (55°C). Known as Seasonal Coefficient of Performance (SCOP) when in decimal form. Blank if not applicable or unknown.
40	X	Integrated Thermal Store present (1 digit)	1 = Yes, 2 = No. Integrated Thermal Store for heat pump applications. If the heat pump package has been analysed with and without such a vessel, then separate entries for each appear in the database. This shall be denoted by a dedicated model name and model qualifier (if required) for the heat pump plus Integrated Thermal Store package.

41		Integrated Thermal Store volume (up to 4 chs; nnnn)	Integrated Thermal Store volume in litres. Blank if not present.
42	X	Integrated Thermal Store heat loss (up to 7 chs; nnn.nnn)	Declared Integrated Thermal Store heat loss rate in kWh/day at 45K rise above ambient. Blank if not present.
43	X	Integrated Thermal Store charge temperature (up to 2 chs; nn)	Control set point temperature in °C. Blank if not present.
44	X	Integrated Thermal Store continuous charging	Control set point temperature maintained continuously: 1 – Yes, 2 – No (intermittently heated). Blank if not present.
45	X	Integrated Thermal Store location	Within heated envelope = 0, Outside heated envelope = 1. If outside envelope then heat losses treated differently by SAP software.
46	X	Reversible (1 digit)	Whether the heat pump is reversible so as to provide cooling in summer. Coded as 1=no, 2=yes.
47	X	(up to 5 chs; nn.nn)	The Seasonal Energy Efficiency Ratio of the heat pump in cooling mode, from Ecodesign regulations. Blank if unknown or inapplicable.
48	X	Maximum output (number, up to 7 chs; nnn.nnn)	Maximum heat output of the heat pump in kW at SAP design conditions. Note this varies with heat distribution type.
49	X	Heating duration (2 digits or V)	Coded 24 for continuous; 16 for 16 hours/day; 9 for 9 hours/day; V for variable – same as 9 but switches to 16 or 24 hours on colder days.
50		Fixed or Variable capacity control (1 digit)	Fixed or Variable capacity heat pump (1 Fixed; 2 Variable)
51		Minimum modulation rate low (up to 4 chs; n.nn)	Expressed as a decimal of minimum heat output (EN14825 Condition C) divided by maximum heat output (EN14511 standard rating condition) at sink temperature of 35°C. Blank if Field 50 = 1.
52		Minimum modulation rate high (up to 4 chs; n.nn)	Expressed as a decimal of minimum heat output (EN14825 Condition C) divided by maximum heat output (EN14511 standard rating condition) at sink temperature of 55°C (even if field 18 = 5, 6, or 7). Blank if Field 50 = 1.
53		Heat sink pump power (up to 4 chs, nnnn)	Not used in SAP calculation. Pump power, in watts, for heat sink. The heat pump calculation method assumes 15 watts, but this may vary if separate Integrated Thermal Store plumbing circuits are specified. If field is blank then the method has assumed 15 watts for database entry.
54		Heat source pump power (up to 4 chs, nnnn)	Not used in SAP calculation, used in heat pump calculation method (for database entry). Pump power, in watts, for heat source. Only present if heat source code is one of 1, 7, 8, 9, 10, otherwise blank. If heat source code is 1, then this value may be generated (based on default).
55	X	Number of air flow rates (1 digit)	(2 or 3 or blank) Number of air flow rates for which the group of space heating results apply. Blank if heat source code is not 4, 5 or 6.
56	X	Air flow air 1 (number nnn.n)	Lowest or lower air flow rate in l/s when tested for which the groups of results apply. Blank if heat source code is not 4, 5 or 6.
57	X	Air flow rate 2 (number nnn.n)	Medium or higher flow rate in l/s for which the group of results. Blank if heat source code is not 4, 5 or 6.
58	X	Air flow rate 3 (number nnn.n)	Highest air flow rate in l/s when tested for which the groups of space heating results apply. Blank if heat source code is not 4, 5 or 6.
59	X	Number of plant size ratios (1 digit)	The number of plant size ratios (n) for which data are provided in the record (maximum 14). If there is more than one flow rate (field 55 = 2 or 3), this number is the same for each flow rate in the record.
60	X	A: Plant size ratio (nn.nn)	Group A: This field introduces a set of results known as group A. It contains the plant size ratio to which the other data in group A relate. If there is more than one flow rate the plant size ratios for each flow rate are the same.
61	X	A: Electric heat pump space heating fraction (up to 4 chs; n.nn)	Group A: For combined electric heat pump and boiler systems, this calculated fraction ( $e_{\text{space},F}$ ; less than 1) represents the proportion of space heating demand satisfied by the electric heat pump, using $\eta_{\text{space},1}$ . See Note 3.  For heat pumps alone (any fuel), this field is blank.
62	X	A: space heating efficiency of heat pump (number, up to 5 chs; nnn.n)	Group A: space heating thermal efficiency ( $\eta_{\text{space},1}$ ) [uses SPF H4 system boundary, so includes back-up heat source (though not if a combined electric heat pump and boiler system), which is different to previous SAP versions] (% gross).

63	X	A: space heating efficiency of boiler only (number, up to 5 chs; nnn.n)	Group A: space heating thermal efficiency of boiler-only ( $\eta_{space,2}$ ) [uses SPF_H4 system boundary] (% gross). If Field 61 is blank, this field is blank.
64	X	A: specific electricity consumed (space heating) (number, up to 7 chs, nnn.nnn)	Group A: specific electricity consumed during space heating ( $e_{space}$ ), kWh <sub>e</sub> per kWh <sub>h</sub> . If the heat pump is powered solely by electricity this is blank.
65	X	A: Electric heat pump water heating fraction (up to 4 chs; n.nn)	Group A: For combined electric heat pump and boiler systems, this calculated fraction ( $e_{water,F}$ ; less than 1) represents the proportion of water heating demand satisfied by the electric heat pump, using $\eta_{water,1}$ . See Note 3.  For heat pumps alone (any fuel), this field is blank.
66	X	A: water heating efficiency (number, up to 5 chs; nnn.n)	Group A: water heating thermal efficiency ( $\eta_{water,3}$ ) for service provisions 1 or 2 (% gross). Blank if service provision 3 or 4. Blank if Field 15 = 1 and the boiler indicated in Field 16 is a combi. See Note 3 and 7.
67	X	A: Running hours (number, up to 4 chs nnnn)	Group A: heat pump running hours per year. Only used for heat source code 4, 5 and 6, <u>may</u> be blank for other heat source codes.
68		A: Combined SPF H4 efficiency (number, up to 5 chs; nnn.n)	Group A: The combined space and hot water efficiency (% gross) using an SPF H4 system boundary definition and assumed hot water energy demand profile. It uses the hot water vessel(s) characteristics held in this data record. See note 4. May be blank.
69 to 59+9n	X	Group B, C, D, etc	Group B, C, D - Set of results in the same format as those for group A for other plant size ratios. Plant size ratios are listed in the record in ascending order. n is the value in field 59 (number of plant size ratios).
60+9n to 59+18n	X		PSR-dependent results (i.e. Groups A, B etc) for air flow rate 2. n is the value in field 59. Omitted if blank as not applicable.
61+18n to 59+27n	X		PSR-dependent results (i.e. Groups A, B etc) for air flow rate 3. n is the value in field 59. Omitted if blank as not applicable.

Notes to the Heat Pump Table:

Note 1: Exhaust air heat pumps consist of a heat pump and a MEV or MVHR system that are tested together and the database contains data for both heat pump and MV performance. Field 21 provides the product index in the MEV/MVHR table.

If such a heat pump is selected SAP assessment software should indicate in its ventilation data section that the mechanical ventilation is part of the system and must prevent the SAP assessor from selecting an alternative mechanical system or alternative ventilation type (or indicate an error condition if that happens).

Note 2: This is constructed as 32 boolean values, for example 453C is 0100010100111100. Control capabilities are defined in the Heating Control Requirements Table. See also the format for the Heating Controls Table.

- Note 3: For combined electric heat pump and boiler systems, the first system is always an electric heat pump, the second is a boiler with fuel defined by the boiler index number in field 16.
- Note 4: For combined electric heat pump and boiler systems, boiler input energy is multiplied by the SAP Primary Energy Factor for mains gas (or LPG) divided by that for electricity (transforming the delivered energy to be in terms of delivered electricity) to derive a combined SPF H4 (in %).
- Note 5: A solar-assisted heat pump uses solar energy to improve seasonal performance. For solar-assisted - Type A heat sources, the utilisation of Appendix Q data is necessary to enable the recognition of additional variables. For solar-assisted - Type B heat sources, the PCDB data record includes all necessary data
- Note 6: Ecodesign regulation definitions for “low temperature heat pump” and “combination heat pump” have been added to the PCDB application portal under “Service Provision”, as has “space heating, cooling and water heating”. These have not been added to the database specification. By definition, a “low temperature heat pump” provides space heating only, but this occurs with a design flow temperature (heat distribution type) of 35°C. By definition, a “combination heat pump” provides space and hot water heating and has a fixed hot water vessel specification (HW vessel field code = 1). Though the vessel is not necessarily integrated within a single heat pump case, it must be supplied as a package. If “space heating, cooling and water heating” is selected, then field 45 = 2 (yes) and a SEER value must be provided in field 46.
- Note 7: SAP software must not permit the independent selection of a boiler where the data record confirms it relates to a “combined electric heat pump and boiler” package. The boiler’s hot water efficiency data is taken from Table 105 as normal by SAP software (whether the package comprises a regular or combination boiler) with reference to the boiler data record specified in Field 16. Boiler space heating efficiency data is taken from this table.
- Note 8: This index number could relate to a generic boiler data record within Table 105.

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See Appendix A for combinations of service provision and DHW vessel.

### 7.30 Data format: Heating Controls Table 371

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

The table is used for (a) compensating controls for boilers and (b) time and temperature zone control for boilers and heat pumps.

FORMAT 473 (for Heating Controls)			
Field	X	Field name	Description
1		Index (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (digits)	Reference to current name of manufacturer ( <i>see field 2 in Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the installed product. If the same system is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model of installed product, as it appears on the unit's casing. If the same unit is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".



11		Index number of Master Model (6 digits)	If data record is a duplication of another record within same table, then this field records the index number of this "Master Model". Blank if not applicable.
12	X	Control function (1 or 2 digits)	Type of control function provided, encoded as 1=weather and/or load compensation, 2=time and temperature zone control, 3=both of these, 4=none of these.
13	X	Heating system category (1 or 2 digits)	Category of heating system to which the control is applicable. Categories are defined in Table 4a of the SAP specification from 1 to 11. If the unit is applicable to more than one category, separate entries for each will appear in the database.
14	X	Fuel (up to 2 digits)	Fuel used by heat generator to which the record applies to, which is any one of the fuel codes specified in SAP Table 12. If the same controller may be used with more than one fuel then separate entries for each appear in the database. Blank if not applicable (in which case the control applies to any fuel).
15	X	Heat generator control requirements (4,8 or 16 hex digits)	Values that must be in the "Control type" field of the record for the heat generator (e.g. boiler) for the control to be assigned a benefit. See Notes 1 and 2. If zero the control applies to any heat generator of the category in field 13 subject to any restrictions given in the SAP specification.
16	X	Ecodesign class (1 digit)	Integer between 1 and 8 denoting classes I to VIII respectively. See Note 3.
17	X	Additional hours heating off – Zone 2 (up to 5 chs, e.g. xx.xx)	Additional number of daytime hours that the heating is off in zone 2 (non-living area). See Note 4.
18	X	Temperature reduction – Zone 2 (up to 5 chs, e.g. xx.xx)	Temperature reduction compared to SAP Table 9 defaults in zone 2 (non-living area). See Note 4.
19	X	Delayed start (1 digit)	One of "no", "yes", "incompatible with separate control device". These are encoded as 0, 1 or 2. "yes" or "incompatible" means that a separate delayed start cannot be specified.
20	X	Heating control type (1 digit)	Type of heating control as defined by Table 4e of the SAP specification from 1 to 3.
21	X	Additional hours heating off – Zone 1 (up to 5 chs, e.g. xx.xx)	Additional number of daytime hours that the heating is off in zone 1 (living area). See Note 4.
22	X	Temperature reduction – Zone 1 (up to 5 chs, e.g. xx.xx)	Temperature reduction compared to SAP Table 9 defaults in zone 1 (living area). See Note 4.
23	X	Index number of Fuel (6 digits)	If fuel used is from Fuels Table 196, then this field records the index number of this Fuel. Blank if not applicable.

Notes to Heating Controls Table:

Note 1: This is a bit-wise comparison of two 32-bit values using the boolean 'and' operator. Example: The 'Control compatibilities' field of a boiler is 453C and 'Heat generator control requirements' of the heating control is 0008. In binary these are:

0100010100111100

0000000000001000

The condition is fulfilled in this case because the control's required feature, 4th digit from the right, is present in the heat generator.

Note 2: Control requirements are defined in the Heating Control Requirements Table.

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Note 3: Where boiler and control compatibility is demonstrated, i.e. the 'Control capabilities' of the boiler contain the 'Heat generator control requirements' of the control, the boiler efficiency is amended according to the Ecodesign class of the control with reference to SAP 10 Tables D1 to D3.

Note 4: Data is implemented with SAP calculations via SAP Table 9

### 7.31 Data format: Heating Control Requirements Table 372

SAP assessment software implementing the SAP 10 specification should contain the means to display to the SAP assessor the explanation of any incompatibility between a heat generator's capabilities and a controller's requirements as given in field 2.

FORMAT 472 (for Heating Control Requirements)			
Field	X	Field name	Description
1	X	Bit number (up to 2 digits)	Bit number in Control capabilities of a heating system table or the Heat generator control requirements of the Heating controls table. Bit numbers are counted from 0 upwards starting with the least significant.
2	X	Description (up to 63 chs)	Short description of the feature.
3		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.

### 7.32 Data format: Warm Air Systems Table 381

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 482 (for Warm Air Systems Table)			
Field	X	Field name	Description

1		Product number (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (6 digits)	Reference to current name of manufacturer (see field 2 in Manufacturers Table).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the warm air unit. If none the original manufacturer name will be inserted instead. If the same model is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model, as it appears on the unit casing or leaflet of owners' instructions. If the same unit is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
11	X	Fuel (up to 2 digits)	Fuel type, which is any one of the fuel codes for a gaseous or liquid fuel as specified in SAP Table 12 under sub-headings "gas fuels" or "liquid fuels". If the same unit may use more than one type of fuel then separate entries for each appear in the database, except that a unit listed for bulk LPG is also applicable to bottled LPG and LPG subject to special condition 11F.
12		Mounting position (1 digit)	Mounting position, which is one of "unknown", "floor", "wall" or "either floor or wall". These are encoded as 0, 1, 2, or 3 respectively.
13		Heat exchanger type (1 digit)	Whether heating is provided by combustion products to warm air heat exchanger or by a secondary heat exchanger (water to warm air) encoded as 1 primary air to air, 2 secondary (water to air).
14	X	Condensing (1 digit)	Either "non-condensing" or "condensing", encoded as 1 or 2.
15	X	Flue type (1 digit)	Flue type, which is one of "unknown", "open", "room-sealed", or "open or room-sealed" encoded as 0, 1, 2 or 3.
16	X	Fan assistance (1 digit)	Whether or not flue is fan assisted. It is one of "unknown", "no fan", or "fan". These are encoded as 0, 1 or 2.
17	X	Fan position	If fan flue assisted, position of combustion fan position upstream or downstream of heat exchanger encoded (0 no fan, 1 upstream and 2 downstream). Will be 0 if field 16 is 1.
18		Flow direction (1 digit)	Flow direction within the unit, which is one of "unknown", "upflow" or "downflow", encoded as 0, 1 or 2 respectively.
19		Output power (bottom of range) (number, up to 7 chs; eg "nnn.nnn")	Output power of the unit in kW. For range rated units it is the lower of the range of values for which the efficiency test results are valid. For other units this is the same as field 20.
20	X	Output power (top of range) (number, up to 7 chs; eg "nnn.nnn", or text ">70kW")	Output power of the unit in kW. For range rated units this is the top of the range of values for which the efficiency test results are valid. Where the upper limit of the range exceeds 70kW this is shown as ">70kW" instead of the exact value.
21		Energy efficiency class (up to 4 chs.)	The energy efficiency class as defined for the proposed European energy label. Definition and format have not yet been decided. This field is being left blank until the European energy labelling scheme has been defined.
22	X	Integral warm air distribution fan (1 digit)	Whether system contains a warm air distribution fan, encoded 1 = no, 2= yes

23	X	Specific fan power (number, up to 6 chs; eg "nn.nnn")	Specific fan power in W/(l/s), inclusive of in-use factor. Blank if field 22 is 1.
24	X	Water pump (1 digit)	Whether system requires a water pump, encoded 1=no, 2=yes. This will usually be no for heat exchanger type 1 and yes for heat exchanger type 2.
25	X	Pump electricity (up to 5 digits eg xxx.x)	Annual electricity used by water pump. Blank if not applicable.
26		Ignition (1 digit)	Whether or not has permanent pilot light, encoded as 0=unknown, 1=no, 2=yes.
27		Burner control (1 digit)	Whether on-off or variable, encoded as 0=unknown, 1=on-off, 2=variable (stepped or modulating).
28		Maximum firing rate (number, up to 7 chs; eg "nnn.nnn")	Heat output at maximum firing rate in during efficiency measurements in kW
29		Minimum firing rate (number, up to 7 chs; eg "nnn.nnn")	Heat output at minimum firing rate, if any, during efficiency measurements in kW. For on-off burner control this is blank.
30		Measured efficiency at full load (number, up to 7 chs; eg "nnn.nnn")	Measured heating efficiency at full load (% gross)
31		Measured efficiency at minimum load (number, up to 7 chs; eg "nnn.nnn")	Measured heating efficiency at part load, if any (% gross). This is blank for on-off burner control.
32	X	Seasonal heating efficiency (number, up to 4 chs; eg "nn.n")	Heating seasonal efficiency based on the gross calorific value, expressed as a percentage and rounded to the nearest 0.1%, derived from laboratory measurements above.
33		Electrical power while firing (up to 4 digits)	Average electrical power consumed while the unit is firing, in watts. This includes fans, motors, heaters, and other electrical equipment but excludes any fan used to distribute warm air <i>outside</i> the unit. If unknown or inapplicable, this field is blank.
34		Electrical power while not firing (up to 4 digits)	Average electrical power consumed while the unit is not firing, in watts. This includes fans, motors, heaters, and other electrical equipment but excludes any fan used to distribute warm air <i>outside</i> the unit. If unknown or inapplicable, this field is blank.
35	X	Hot water service	Whether the unit provides domestic hot water, encoded as 0=no, 1=yes.
36	X	Hot water service type (1 digit)	Hot water service type regular or instant combi or storage combi encoded as 1=regular, 2=instant combi, 3=storage combi. Blank for hot water service 0 (hot water not provided).
37	X	Index number of Fuel (6 digits)	If fuel used is from Fuels Table 196, then this field records the index number of this Fuel. Blank if not applicable.
The remaining items are omitted for hot water service code 0 (hot water not provided)			
38		Store volume (number, up to 7 chs; eg "nnn.nnn")	The water volume of the internal hot water store that is capable of being heated by the warm air unit, in litres. If unknown or inapplicable, this is blank.
39		Store insulation thickness (up to 3 digits)	The thickness of the insulation applied to the internal hot water store in mm. If not a storage combi, it is blank.
40	X	Store loss factor (up to 5 chs e.g. x.xxx)	Store loss factor in kWh/day. If not a storage combi, it is blank
41	X	Water heating efficiency (up to five chs e.g. nnn.n)	Water heating efficiency based on the gross calorific value (%) derived from the data below or obtained by methods deemed to satisfy European Council Directive 92/42/EEC
42	X	Separate DHW tests (1 digit)	Hot water tests carried out on a combi type in accordance with EN 13203-2 (gas) or OPS 26 (oil). Encoded as: 0 = not applicable; 1= one test, using profile M; 2 = two tests, using profiles M and L; 3 = two tests, using profiles M and S. This must not be 0 or blank for hot water service type instant combi or storage combi.
43		Fuel energy for HW test 1 (number, up to 6 chs, possibly including decimal point eg "123.45")	Fuel input energy (corrected) in kWh/day for domestic hot water test 1 carried out on a combi type in accordance with EN 13203-2 (gas) or OPS 26 (oil), based on gross calorific value. Hot water test 1 means tested under draw-off profile M as defined in the standard. If the unit is not a combi, this is blank.

44		Electrical energy for HW test 1 (number, up to 6 chs, possibly including decimal point eg "123.45")	Electrical input energy (corrected) in kWh/day for domestic hot water test 1 carried out on a combi in accordance with EN 13203-2 (gas) or OPS 26 (oil). Hot water test 1 means tested under draw-off profile M as defined in the standard. If the unit is not a combi this is blank.
45	X	Rejected energy $r_1$ in HW test 1 (number, up to 6 chs, eg "0.1234")	Proportion of energy, expressed as a decimal number in the range 0 to 1, rejected in domestic hot water test 1 carried out on a combi in accordance with EN 13203-2 (gas) or OPS 26 (oil). If the unit is not a combi this is blank.
46	X	Storage loss factor $F_1$ (number, up to 7 chs, e.g. 400.123)	Loss factor $F_1$ in kWh/day related to domestic hot water test 1 for use in conjunction with SAP 10 Table 3b. If not a combi this is blank.
47		Fuel energy for HW test 2 (number, up to 6 chs, possibly including decimal point eg "123.45")	Fuel input energy (corrected) in kWh/day for domestic hot water test 2 carried out on a combi appliance in accordance with EN 13203-2 (gas) or OPS 26 (oil), based on gross calorific value. If "Separate DHW tests" (field 42) is 2 then hot water test 2 means tested under draw-off profile L as defined in the standard. If "Separate DHW tests" (field 42) is 3 then hot water test 2 means tested under draw-off profile S as defined in the standard. If the appliance is not a combi, or if domestic hot water test 2 has not been carried out, this is blank.
48		Electrical energy for HW test 2 (number, up to 6 chs, possibly including decimal point eg "123.45")	Electrical input energy (corrected) in kWh/day for domestic hot water test 2 carried out on a combi appliance in accordance with EN 13203-2 (gas) or OPS 26 (oil). If "Separate DHW tests" (field 42) is 2 then hot water test 2 means tested under draw-off profile L as defined in the standard. If "Separate DHW tests" (field 42) is 3 then hot water test 2 means tested under draw-off profile S as defined in the standard. If the appliance is not a combi, or if domestic hot water test 2 has not been carried out, this is blank.
49		Rejected energy $r_2$ in HW test 2 (number, up to 6 chs, eg "0.1234")	Proportion of energy, expressed as a decimal number in the range 0 to 1, rejected in domestic hot water test 2 carried out on a combi appliance in accordance with EN 13203-2 (gas) or OPS 26 (oil). If the appliance is not a combi, or if domestic hot water test 2 has not been carried out, this is blank. This is not used in SAP assessments, only $r_1$ .
50	X	Storage loss factor $F_2$ (number, up to 7 chs, e.g. 400.123)	Loss factor $F_2$ in kWh/day related to domestic hot water tests 1 and 2 for use in conjunction with SAP 10 Table 3c. If the appliance is not a combi, or if domestic hot water test 2 has not been carried out, this is blank.
51	X	Rejected factor $F_3$ (number, up to 9 chs, e.g. -0.000031)	Rejected factor $F_3$ in litres <sup>-1</sup> related to domestic hot water tests 1 and 2 for use in conjunction with SAP 10 Table 3c (can be negative). If the unit is not a combi, or if domestic hot water test 2 has not been carried out, this is blank.

### 7.33 Data format: High Heat Retention Storage Heaters Table 391

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 491 (for High Heat Retention Storage Heaters Table)		
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Field	X	Field name	Description
1		Product index number (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (6 digits)	Reference to current name of manufacturer ( <i>see field 2 in Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the heater. If the same model is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model, as it appears on the heater casing or leaflet of owners' instructions. If the same unit is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
11	X	Storage capacity (up to 5 chs; eg xx.xx)	Maximum heat storage capacity in kWh
12	X	Output power (up to 5 chs; eg nnnnn)	Nominal output power from stored heat in W
13	X	Boost output (up to 5 chs; eg nnnnn)	Output power from in-built boost heater in W. Blank if not applicable.
14	X	Heat retention	Heat retention in % as defined in EN 60531.
15	X	High heat retention	Whether heater qualifies as high heat retention, encoded as 0 = no, 1 = yes.

## 7.34 Data format: Heat Network Table 501

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 602 (for Heat Networks Table)			
Field	X	Field name	Description
1		Community heat network index number (digits)	Unique index number for each network, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2	X	Community heat network version number (2 digits)	Network version for the network identified in field 5. It is numbered from 1 upwards and incremented if the network is extended and when equipment data is amended (for example a change to a heat generator) or if the energy use information is updated.
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 5).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5	X	Community heat network name (up to 50 chs.)	The name by which the community heat network is known.
6		Description of network (up to 255 chs)	A short description identifying the dwellings to which the network version applies. Where the network is constructed in phases this may also indicate which phases are connected.
7	X	Validity end date (yyyy/mmm/dd)	The last day of validity of this data record. Dwellings assessed after this date use a data record with a higher network version number (in the case of new dwellings the applicable assessment date is that of the as-designed assessment). Blank if there is no record with a higher network version number.
8		Postcode of the Primary Energy Centre (up to 8 chs)	The postcode of the energy centre providing heat for the network. Where there is more than one energy centre, it is the postcode for the energy centre supplying the largest amount of heat
9	X	Service provision (1 digit)	Service provision, encoded as: 1 space and water heating; 3 space heating only; 4 water heating only. If a network has separate systems for space heating and water heating, there will be a record for each.
10	X	Data source (1 digit)	Whether the record represents provisional (estimated) data, actual recorded data or forecast data, encoded as 1,2 and 3 respectively. Provisional data may be assigned to new networks for which recorded data are not yet available.
11	X	Year (up to 4 digits)	The calendar year to which the data relates. Blank if provisional data.
12	X	Number of sub-heat networks	The total number of sub-heat networks included in the assessment of this heat network.
13	X	A: Sub-heat network name	The name by which the sub community heat network is known.

14		A: Distribution loss factor (up to 4 chs, e.g. x.xx)	Factor that allows for losses from the heat distribution network.
15		A: Pumping electrical energy per sub-heat network (up to 6 digits, e.g. xxxx.xx)	Annual electrical energy for pumping in the heat distribution network attributed to each sub-heat network, in kWh/year.
16	X	A: Pumping energy factor (up to 4 chs, e.g. x.xx)	Electrical energy used for pumping as fraction of heat energy supplied, attributed to each sub-heat network. Blank if unknown.
17	X	A: Carbon dioxide intensity of heat (up to 6 digits e.g. xx.xxx)	The average carbon dioxide intensity of the heat delivered to customers. in kg/kWh. This value takes into account all factors which influence the emissions associated with the heat supplied.
18	X	A: Primary energy factor of heat up to 5 digits e.g. xx.xx)	The average primary energy factor of the heat delivered to customers, in kWh/kWh. This value takes into account all factors which influence the primary energy associated with the heat supplied.
19	X	A: Cost of heat up to 8 digits e.g xxxxx.xx	The cost of the heat delivered to customers, in pence/kWh. This value takes into account all factors which influence the cost associated with the heat supplied.
20 to 12+7n	X	Group B, C, D, E..etc	Group B, C, D, E...etc. Set of data in the same format as those for group A for other blocks. n is the value in field 12.



### 7.35 Data format: Heat Interface Unit Table 506

Data from the fields marked X in the second column are needed when carrying out a calculation to the SAP 10 specification. In addition, the following fields must be read and included in any printout: 6, 7, 8.

SAP assessment software implementing the SAP 10 specification should contain an option to display to the SAP assessor at least all the data marked X in the second column for any specified data record (this is because the data might be required in connection with an Appendix Q procedure).

FORMAT 606 (for Heat Interface Unit Table)			
Field	X	Field name	Description
1		Product index number (6 digits)	Unique index number for each record, assigned automatically by database software and used for control and reference purposes (See Section 4.2).
2		Manufacturer reference no. (6 digits)	Reference to current name of manufacturer ( <i>see field 2 in Manufacturers Table</i> ).
3	X	Status (one digit)	Status of the data record, encoded as 0=normal status for an actual product, 1=illustrative (non-existent) product, 2=under investigation, 3=not valid, 4=methodology under review (See Section 0).
4		DB entry updated (yyyy/mmm/dd hh:mm)	Date and time this record was created or last amended by the database administrator.
5		Original Manufacturer name (up to 50 chs.)	The original name of the manufacturer, which may be different from the current name.
6		Brand name (up to 50 chs.)	Name of brand, as shown on the unit. If the same model is sold under more than one brand name then separate entries for each will appear in the database.
7		Model name (up to 50 chs.)	Name of model, as it appears on the unit casing or leaflet of owners' instructions. If the same unit is sold under more than one model name then separate entries for each will appear in the database.
8		Model qualifier (up to 30 chs.)	Qualifier to model name, if needed in addition to the model name to discriminate between different versions of same model.
9		First year of manufacture (up to 4 chs.)	First year of manufacture, if known; otherwise blank.
10		Final year of manufacture (up to 8 chs.)	Final year of manufacture, or "current" if still in production. If no longer produced but date production ceased is unknown, then "obsolete".
11	X	HIU type (one digit)	Type of Heat Interface Unit, encoded as 1=indirect, 2=direct
12	X	Heat loss (up to 4 chs; eg xx.xx)	Heat loss in kWh/day.
13		VWART 70C (up to 4 chs; eg xx.x)	Return temperature (°C) during test at 70°C flow.
14		VWART 60C (up to 4 chs; eg xx.x)	Return temperature (°C) during test at 60°C flow.
15	X	Electricity consumption (up to 7 chs, e.g. nn.nnnn)	Daily electricity consumption in kWh/day.

## Appendix A - Cogen and Heat Pumps – Service and Vessel Combinations

### Cogen

Service HW vessel	1 all year	2 season only	3 space only	4 water only
1 integral*	OK	OK, see note 2	n/a	OK, see note 3
2 ERROR	n/a			
3 separate	OK	OK, see note 4	n/a	OK, see note 3
4 none	n/a	n/a	OK, see note 4	n/a

### Heat pumps

Service HW vessel	1 all year	2 season only	3 space only	4 water only
1 integral*	OK	OK, see note 2	n/a	OK
2 separate, specified	OK	OK, see note 2	n/a	OK
3 separate, unspecified	OK	OK, see note 2	n/a	OK
4 none	n/a	n/a	OK, see note 4	n/a

\*Integral to the package, not necessarily in the same case.

Notes to the above

- Note 1: The combinations shown as n/a should not occur. If this does occur, the data record has an error; SAP assessment software should report the situation to the assessor.
- Note 2: If the package provides hot water in the heating season only, the DHW store (whether integral or separate) should be assumed to contain an immersion for summer use. The energy used by the immersion is calculated for months in which the space heating requirement is zero. If a Cogen or heat pump is made for which that treatment is not adequate, it may be handled via SAP Appendix Q.
- Note 3: Service provision 4, hot-water only, is not allowed for at present in the case of Cogen. If such a Cogen is made it may be handled via SAP Appendix Q.
- Note 4: Separate water heating system to be specified.

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