

## Difference in the rating scale between SAP 1998 and SAP 2001

The SAP rating scale was changed for SAP 2001 compared with SAP 1998. However, it is straightforward to convert from one to the other if the total floor area of the dwelling is known. This note describes how the scale was changed and provides the method of converting, either by a look-up table or by using a formula that could be implemented in a spreadsheet.

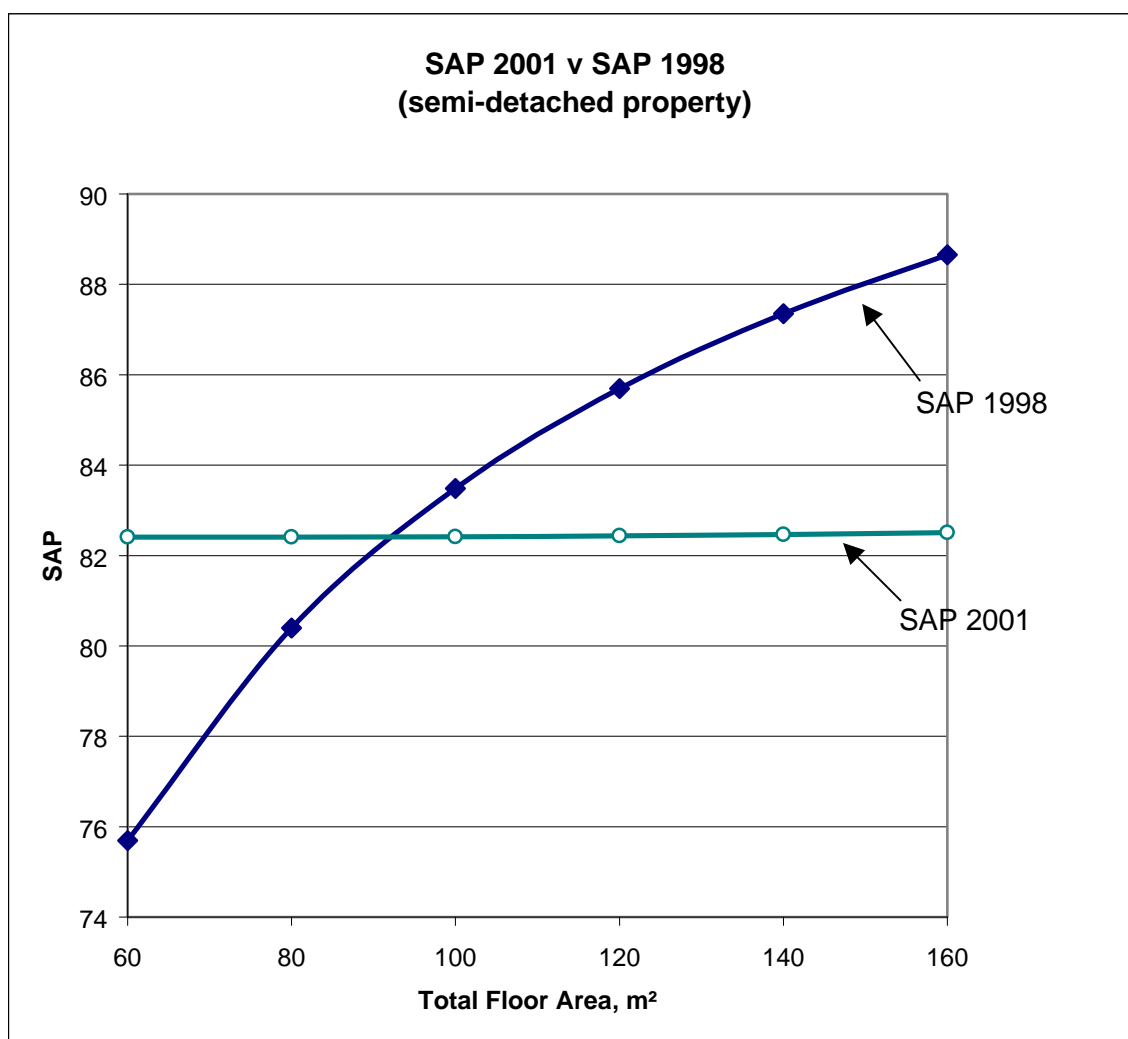
In SAP 1998, the SAP rating was calculated from the Energy Cost Factor (ECF) defined as

$$\text{ECF} = \frac{\text{Energy cost} \times \text{deflator}}{\text{TFA}}$$

where TFA is the Total Floor Area of the dwelling. Using this expression, the rating increases with dwelling size, all else equal (same U-values, same heating efficiency, opening area as a fixed fraction of total floor area, etc). This was considered to convey an inappropriate message, and for SAP 2001 the ECF was amended to

$$\text{ECF} = \frac{\text{Energy cost} \times \text{deflator}}{\text{TFA} + 45}$$

The inclusion of 45 m<sup>2</sup> in the denominator has the effect of making the SAP rating virtually independent of dwelling size (all else equal) as is illustrated in the following diagram.



The SAP ratings are equal for a dwelling of average size (85 to 90 m<sup>2</sup>).

For smaller dwellings SAP 2001 is greater than SAP 1998.

For larger dwellings SAP 2001 is less than SAP 1998.

A rating calculated according to SAP 1998 can be converted to SAP 2001 according to the data in the following table, depending on the total floor area (TFA) of the dwelling.

$$\text{SAP 2001} = \text{SAP 1998} + \text{Difference}$$

| TFA (m <sup>2</sup> ) | Difference |
|-----------------------|------------|
| 40                    | 15         |
| 45                    | 12         |
| 50                    | 10         |
| 55                    | 8          |
| 60                    | 6          |
| 65                    | 5          |
| 70                    | 4          |
| 75                    | 2          |
| 80                    | 1          |
| 85                    | 0          |
| 90                    | 0          |
| 95                    | -1         |
| 100                   | -2         |
| 110                   | -3         |
| 120                   | -4         |
| 130                   | -5         |
| 140                   | -6         |
| 150                   | -7         |
| 160                   | -7         |
| 170                   | -8         |
| 180                   | -8         |
| 190                   | -9         |
| 200                   | -9         |

Alternatively, the following formula can be used:

$$\text{SAP 2001} = \text{SAP 1998} + \text{Difference}$$

$$\text{Difference} = -18 - 100 \times \log_{10} \left( \frac{\text{TFA}}{\text{TFA} + 45} \right)$$

The conversion can be used for individual properties, or for the average SAP rating over a number of properties using the average floor area of the dwellings concerned.