

components of residential wastes are reported in Table 4-5. As shown, the energy content values are on an *as discarded* basis. The Btu values given in Table 4-5 may be converted to a dry basis by using Eq. (4-8).

$$\text{Btu/lb (dry basis)} = \text{Btu/lb (as discarded)} \left( \frac{100}{100 - \% \text{ moisture}} \right) \quad (4-8)$$

The corresponding equation for the Btu per pound on a dry ash-free basis is

Btu/lb (dry ash-free basis)

$$= \text{Btu/lb (as discarded)} \left( \frac{100}{100 - \% \text{ moisture} - \% \text{ ash}} \right) \quad (4-9)$$

Data from Table 4-5 are used to compute the energy content of an MSW in Example 4-3. Additional data on the energy content of individual waste materials on an *as collected*, dry, and dry ash-free basis are given in Table 4-2.

**TABLE 4-5**  
**Typical values for inert residue and energy content of residential MSW<sup>a</sup>**

| Component              | Inert residue, <sup>b</sup> percent |         | Energy, <sup>c</sup> Btu/lb |                    |
|------------------------|-------------------------------------|---------|-----------------------------|--------------------|
|                        | Range                               | Typical | Range                       | Typical            |
| Organic                |                                     |         |                             |                    |
| Food wastes            | 2-8                                 | 5.0     | 1,500-3,000                 | 2,000              |
| Paper                  | 4-8                                 | 6.0     | 5,000-8,000                 | 7,200              |
| Cardboard              | 3-6                                 | 5.0     | 6,000-7,500                 | 7,000              |
| Plastics               | 6-20                                | 10.0    | 12,000-16,000               | 14,000             |
| Textiles               | 2-4                                 | 2.5     | 6,500-8,000                 | 7,500              |
| Rubber                 | 8-20                                | 10.0    | 9,000-12,000                | 10,000             |
| Leather                | 8-20                                | 10.0    | 6,500-8,500                 | 7,500              |
| Yard wastes            | 2-6                                 | 4.5     | 1,000-8,000                 | 2,800              |
| Wood                   | 0.6-2                               | 1.5     | 7,500-8,500                 | 8,000              |
| Misc. organics         | —                                   | —       | —                           | —                  |
| Inorganic              |                                     |         |                             |                    |
| Glass                  | 96-99+                              | 98.0    | 50-100 <sup>d</sup>         | 60                 |
| Tin cans               | 96-99+                              | 98.0    | 100-500 <sup>d</sup>        | 300                |
| Aluminum               | 90-99+                              | 96.0    | —                           | —                  |
| Other metal            | 94-99+                              | 98.0    | 100-500 <sup>d</sup>        | 300                |
| Dirt, ashes, etc.      | 60-80                               | 70.0    | 1,000-5,000                 | 3,000              |
| Municipal solid wastes |                                     |         | 4,000-6,000                 | 5,000 <sup>e</sup> |

<sup>a</sup> Adapted in part from Refs. 6 and 8.

<sup>b</sup> After complete combustion.

<sup>c</sup> As discarded basis.

<sup>d</sup> Energy content is from coatings, labels, and attached materials.

<sup>e</sup> The typical energy value given in this table is higher than the corresponding value given in the predecessor of this text (see Table 4-10) [11]. The reason is due largely to (1) the reduced amount of raw food wastes and