Assembly Waste

Introduction

Items which are consumed, but do not form part of the product that is wanted by the end-customer include:

- Manufacturing paperwork!

- Packaging for materials used in the manufacturing process

- Packaging for the completed product.

An environmental audit of any manufacturing facility will inevitably uncover a number of such issues.
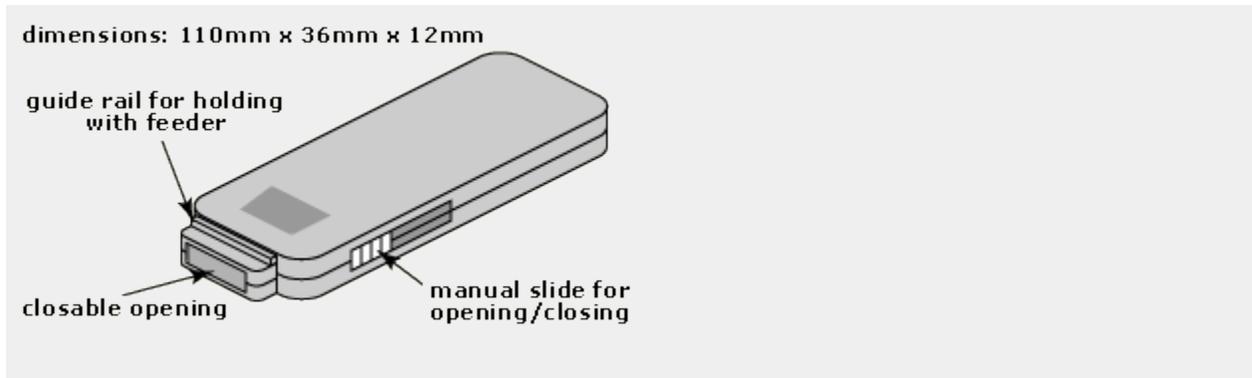
Manufacturing paperwork

Responses to the waste generation challenge include at least the *intention* of implementing a 'paper-less workplace', in which the information requirements of the factory management system are recorded electronically rather than in hard copy. The difficulty here is winning acceptance of this, especially among people with a traditional quality management system approach, and the very real challenge of developing systems that are both foolproof and totally secure. In this context, 'security' relates to the continued integrity of data during unexpected power down, the ability of the system to sort information and select only that which is correct, and the security of the system against unauthorised attempts to corrupt it.

Packaging during manufacture

There is an opportunity for suppliers and users to work together to reduce waste: the collection of waste for recycling is not only economically effective but a useful housekeeping measure!

A particular problem has been noted in relation to tapes used for component placement, where the packaging forms a large percentage of the bulk of the total delivery! The alternative, of bulk packaging of small components in reusable containers, has attracted some attention. Earlier methods of bulk packaging were not satisfactory, because of feeder jamming problems: cassettes (Figure 1), where a factory-filled container is mated with a one-at-a-time dispenser, are seen as effective in both reducing waste and increasing the time between component feeder replenishment. After the cassette has been placed on an appropriate feeder, the bottom opening is opened by means of the manual slide.

Figure 1: Bulk case for transferring components

dimensions: 110mm x 36mm x 12mm

guide rail for holding with feeder

closable opening

manual slide for opening/closing

The trays used for large components also present a challenge for the recycling-conscious engineer. Here the problem is not just one of economic collection for return to vendor, but is compounded by the very wide range of different tray types (several hundreds) and the length of the distribution chain from the original packager, typically in the Far East.

Outer packaging

Packaging has to be environmentally friendly, and this has proscribed the use of foams expanded with CFCs and discouraged the use of paper products produced with chlorine-containing bleaches. Given that paper products are generally recyclable, there is a discernible trend towards their use in preference to expanded foams, but where alternatives are considered, due notice must be taken of the frequent need for packaging to be part of the static protection for a product.

Given that some packaging is inevitable, then the company must establish a policy for the recycling of waste. This means that the manufacturer bears responsibility for making sure that packaging materials are recycled or, if this is not practicable, at least that they are capable of being recycled by the end-user.

The primary legislation is the European Packaging and Packaging Waste Directive (94/62/EC), interpreted in the UK by the Packaging (Essential Requirements) Regulations 1998, which set the rules for what can be used for packaging, and the Producer Responsibility Obligations (Packaging Waste) Regulations 1997, which sets targets for recovery and recycling of waste.

Currently the UK is meeting its recovery and recycling targets, but new EU Directives are likely to set higher and more challenging targets:

- an overall recovery[1] target of between 60%-75% (was 50%-65%)

- an overall recycling target of between 55%-70% (was 25%-45%)

- differentiated targets for specific materials (glass 60%, paper/board 55%, metals 50% and plastics 20%).

In fact, in September 2002, the European Parliament voted to increase the minimum recycling targets by weight for packaging from the 55% proposed by the commission to 65% and decided that these targets should be met by December 2006 - two years earlier than the environment committee would prefer.

If you would like to research this topic further, suggested starting points are:

- The British Plastics Federation – http://www.bpf.co.uk/bpf/industry_issues/general_issues/environment/recycling/

- The Industry Council for Packaging and the Environment – http://www.incpen.org/

- Envirowise (formerly the DTI's Environmental Technology Best Practice Programme) – http://www.envirowise.gov.uk/.

  [This site needs registration, and you may prefer to download your soft copy of the DTI's GG140 *Cutting costs and waste by reducing packaging use* throughhttp://www.tangram.co.uk/]

[1] *For the purposes of the packaging directive, recovery of packaging waste includes incineration with energy recovery (energy from waste) and recycling, including composting. Recycling of packaging waste does not take place until the recycled material has been put back into productive use.*

Product recycling

In a parallel move, responsibility is also being passed back to the manufacturer to have available and promote a policy of recycling the product as well as its packaging. These issues affect a business in every

aspect from marketing and design to manufacture, distribution and servicing, and can be expected to have a major impact on the design and construction of products for the 21st century.

WEEE contains a number of measures on recycling, with encouragement to minimise the number of types of plastic used, use materials which can be easily recycled, and design and make parts which are easier to repair, upgrade, re-use, dismantle and re-cycle. There is also a requirement to minimise the use of certain dangerous substances, with a time-scale to phase out lead and other 'hazardous' materials, and this issue is dealt with in the next section.

Under WEEE regulations, producers have to set up (and bear the costs of) waste recovery systems, and must supply information to users, recyclers and the authorities. There are targets for collection (to be reassessed), and increasing targets for component, material and substance re-use and recycling.