



## **A case study of 2 clients who have used hot blacking systems and now use Blackfast**

### **THE MAIN CONSIDERATIONS WHEN COMPARING THE 2 PROCESSES**

1. Health & safety
2. Environment
3. Cost
4. Appearance
5. Protection against oxidation

### **UNDERSTANDING BOTH METHODS**

A summary of the hot and cold blacking methods.

1. Hot blacking converts the metal surface into an iron oxide, which has no oil absorption properties. It is a glossy finish and has a black appearance when dried without oil.
2. Blackfast converts the metal surface to a copper complex, which has excellent oil absorption properties. It is a matt finish and has a dark grey appearance when dried without an oil. The oil is an important component of the Blackfast process because it helps to retain the black colour and provide protection against oxidation.

The Blackfast process, unlike hot blacking, will eliminate the need for post heat treatment (de-embrittlement).

## **A COMPARISON OF THE OPERATING PROPERTIES OF THE HOT AND COLD BLACKING SYSTEMS**

### **BLACKFAST**

Blacking at 22 degrees C

Low energy.

Low operating costs

Safe & easy chemical

No heat distortion

Low capital setup cost

Convenient to set up an in house system

Blackens cast iron

Easy to control

### **HOT BLACKING**

Blacking at 140 degrees C

High heat up and maintenance costs

Difficult to maintain, as replenishment during use can cause eruptions & splattering

Distortion can occur

Requires expensive and complicated extraction systems

Requires high energy supply/services /extraction

Turns cast iron red / brown

Difficult. Relies on operating temperature

## **Company A**

Investigated the Blackfast process and the use of the product for the following reasons:

- 1.Environment - The Blackfast process was adopted to meet the environmental specifications demanded by the quality system ISO 14001 and to improve conditions of the workplace. The water treatment system installed involves steam evaporation and enables the company to recycle 90 % of their water.
- 2.Health & safety – Blackfast offered a cleaner working environment for the employees. The simple and safe nature of the Blackfast process enabled the company to install a number of smaller automatic blacking process lines throughout their facility.
- 3.Appearance – The thorough pre-treatment process developed has enabled the company to produce consistent surface finish over a variety of materials of different hardness. This was not possible with the previous hot process.

4. Cost – Production cost measured in throughput time was reduced. The Blackfast blacking time takes 1 minute as compared to 5 – 10 minutes with hot blacking. Considerable savings were also achieved because of the elimination of a time consuming manual process involving the removal of the residual caustic salts that developed in the blind holes of the carbide tool holders. This is a common problem associated with hot blacking.
5. Protection - Tests concluded over a long period have shown that components treated with the Blackfast process and the correct oil gave better protection than those treated with the hot process.

Even though it is not mandatory, they now adopt a policy of asking their sub-contractors and other facilities to independently test and install the Blackfast process. This is taking place globally with several facilities already using Blackfast.

Today the facility process approx. 20,000 kgs of tools every week, consuming 100 ltrs of Blackfast 181 at a cost of £7.66 / ltr = £766 for 20,000 kgs = 0.383 pence per kg.

The total cost of operating the plant and other chemicals are calculated by multiplying the Blackfast 181 cost x 2.5 = 0.957 pence per kg.

Disposal of the Blackfast 181 is not required as filtration and replenishment is carried out daily. All other products and the filters used in the Blacking process are disposed of within the existing waste disposal system.

Blackfast 181 contains low levels of copper / nickel / selenium – levels which are not toxic. The water recycle system removes all traces of these metals from the rinse waters.

## Company B

Company B investigated the use of Blackfast on the advice of their sister company in South Africa. They installed the Blackfast process for the following reasons:

1. Environment – The Blackfast process met the requirements of the environmental quality management system ISO 14001. The equipment installed included the newly designed Blackfast water recycle system using activated carbon and de-ionization resin products, (Video of this process is available)

2. Health & safety - The Blackfast offered a cleaner working environment for the employees. Adoption of the Blackfast process has also enabled them to consider cellular production units for future expansion plans.

3. Appearance – The thorough pre-treatment sequence allows the treatment of a wider variety of material substrates.

4. Cost – They achieve 50% savings in production costs. The elimination of residual salts from blind holes played a major part in achieving these cost savings.

5. Protection – Tests have confirmed that the Blackfast gave better corrosion protection than had been obtained with the previous system.

The company has used Blackfast for 4 years. The process treats approximately 10,000 kgs per week when in full production.

The company process 10,000 kgs of parts weekly, consuming 50ltrs of Blackfast 181 at a cost of £7.66 / ltr = £383 for 10000Kgs = 0.383 pence per kg

Cost of operating the plant and other chemical cost are accounted for by multiplying the Blackfast 181 cost x 2.5 = 0.957 pence per kg

Disposal of the Blackfast solutions falls in line with their existing disposal methods. The Blackfast water recycle system eliminates concerns with the water authorities.