

How do you finish mild steel components in your department? Do you remember the days when hot components were immersed in old engine oil to blacken steel surfaces? Oil blackening has associated with it high risk, health and safety hazards. But what are the alternatives - brush or spray painting?

DTEP – Design and Technology Education Partnership are able to supply a starter pack, called 'FAB1 kit' of workshop safe chemicals which, when simply mixed with water, produces a 'blackening solution' A uniform black finish between 0.2 to 3 microns can be produced at room temperature. The finishing process can be achievable within one school period. The running cost varies between 2 - 12p per kg of steel, this depends upon the surface area to be finished. The quality of finish of course depends on the quality of finish of the steel component. Finish is easily produced on threaded areas and blind holes without affecting subsequent component assembly at a later stage.

The system has the following advantages:

- No drying time
- Gives an example of an industrial process
- Produces a professional finish with immediate results
- Cheap setup and running costs
- Non-hazardous chemicals used
- Room temperature process
- Permanent finish
- No dimensional changes

Complete process achieved within a single class period (total process time approx 33 minutes)

Environmental issues are minimal as the solutions are simply 'topped up' when they have become weak.

Containers holding the solutions should be made of plastic/polythene.

The Process

The process involves four stages with a water rinse in between, stage 1 – degreasing, stage 2 – conditioning, stage 3 – blacking and stage 4 de-watering. A light alkaline degrease is used in the preparation of clean metal surfaces prior to blacking. Although the steel surface may be clean after de-greasing, in order to produce a consistent blacking, the next stage involves the use of a 'conditioner' the component being immersed for 1 – 2 minutes. Immersion for longer periods is not recommended as this will also lead to inconsistent blacking and patchy results. Stage 3 involves immersion in the blacking solution for about 1 minute, ideally at 20°C - room temperature. Temperatures less than 16°C will produce a poor surface finish. The final stage involving 'de-watering' using a white spirit based oil, this removes any water from the surface and produces a protective, anti-corrosive layer within the black coating. The 'FAB1' schools kit provides all chemical concentrates for mixing.



Figure 1 - Example of Blackfast finish

Rather than have all the component finished in this way, why not complete the process, then lightly machine/skim or turn parts producing blacked and un-blackened surfaces on the finished component!

Further Information:

www.dtep.org.uk for further product information

Email enquiries quoting 'FAB1' made to: Annette@dtep.org.uk

www.blackfast.com A Surrey based company producing the required 'BLACKFAST' chemicals for the blacking process. Very useful 'Application Data Sheets' and 'Safety Data Sheets' are downloadable from this website. Article: 'Finishing School' pages 18-19, Genius magazine, Winter 2010, downloaded from www.dtep.org.uk

	Process	Time	Solution	Solution Strength
1	Degreasing	15 – 20 minutes	BLACKFAST 716,	1:1 with water
2	Water Rinse	30 seconds		
3	Conditioning	1 minute	BLACKFAST 551	10% solution in water
4	Water Rinse	30 seconds		
5	Blacking	1 minute	BLACKFAST 181	3:1 with water
6	Water Rinse	30 seconds		
7	De-watering	5 – 10 minutes	BLACKFAST 833	Oil based, no dilution.