

COMMON QUESTIONS

What is 'Elusive Yellowing'?

Also known as phenolic yellowing or storage yellowing - It is the reversible chemical reaction of Oxides of Nitrogen (an atmospheric pollutant) with anti-oxidants, under alkaline conditions on textile materials resulting in a yellow discolouration.

What Can Be Effected?

Any natural or man-made fibres but it is only obvious with white and pastel colour merchandise.

When Does It Occur?

'Elusive Yellowing' can occur at any stage up to point of sale.

Instances of customer complaint relating to used merchandise are not found - complaints of merchandise becoming yellow are usually due to other agencies, e.g. poor light fastness, wet alkali light fastness, or bleach.

How Can Elusive Yellowing Be Prevented?

The following factors are required:-

1. Presence of Oxides of Nitrogen in the atmosphere.
2. Certain chemicals (anti-oxidants) present on the fabric.
3. The fabric to be in an alkaline condition.

If any one of these factors is absent, then the probability of 'Elusive Yellowing' is significantly reduced.

To prevent Elusive Yellowing it is advisable to remove the cause; ensure all reasonable precautions have been taken to minimise or preferably eliminate the causes, both in the factories and throughout the supply chain. Subcontractors and outworkers may present particular problems due to reduced controls over sewing machine oils, domestic heaters and packaging or wrapping materials used.

BOLTON CONSULTANCY LTD

Is an independent consultancy offering confidential advice on textiles, textile products, clothing and consumer products. We have in-depth understanding of the processes systems and requirements needed to assure product integrity and compliance with National & International Standards and legislation.

AFFILIATIONS

Bolton Consultancy is a member of:

- British Standards Institution
- National Children's Wear Association

QUESTIONS If you have any questions on the content of this information sheet or wish to discuss any other technical matters please contact Bolton Consultancy Ltd.

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'ELUSIVE YELLOWING'

GUIDELINES FOR PREVENTION

BS EN ISO 105 X18:2007



OXIDES OF NITROGEN

Cannot be eliminated completely as they are naturally occurring gases. At very low, naturally occurring, levels (10 ppb) there is no problem. Increasing the pollution in the atmosphere can promote yellowing. The following must be avoided:-

- Use of open-flame gas heating, including space heaters, in both production and warehouse areas, even on a temporary basis.
- Use of diesel/gas engine fork lift trucks in the production or warehouse areas.
- Reversing lorries into warehouses entrances so that exhaust fumes pollute the warehouse. Once warehouse doors are open, the vehicle engines must NOT be left running. This should become standard procedure.

Levels of Oxides of Nitrogen pollution in the warehouse and factory can easily be checked.

10 - 20 ppb is highly unlikely to give yellowing problems.

40 - 70 ppb is a potential problem if exposure is continuous at this high level.

Even at 70 ppb Oxides of Nitrogen are unlikely to be a health risk.

Drager Tubes can be used to assess levels of Oxides of Nitrogen. However, this only gives a measure at the time of reading.

CHEMICALS (INCLUDING ANTI-OXIDANTS)

Ensure that fabric and component suppliers are correctly processing to assure that all loose dyeing and finishing chemicals are efficiently removed and that the fabric is processed so it remains slightly acid (approximately pH 5 - 6.5).

Fabric /Yarn

Many machine oils, including sewing machine lubricants, contain anti-oxidants. Strict control should be made of the types of machine oils used to ensure they are Butyl Hydroxy Toluene (BHT)-free. Here special attention should be paid to service or temporary mechanics who may be unaware of your requirements.

Packaging

All Polythene used throughout fabric / garment manufacture must be BHT-free. BHT is commonly used as it is a 'food safe' antioxidant used in polythene packaging, (it is a sterically hindered phenol).

Polythene suppliers may claim their products are BHT-free but care is needed as the Polythene may contain the anti-oxidant under a Trade Name.

Fabric and work-in-progress should **NOT** be left un-packaged longer than absolutely necessary. It should be packaged in BHT-free Polythene to prevent contamination by Oxides of Nitrogen.

Tissue paper may be used. However, this is not a barrier to Oxides of Nitrogen. Fold / display boards and boxes, if used, must be Phenol and Sulphur free.

TESTING

Merchandise should be checked for the potential to 'Elusive Yellowing' using the test method ISO 105 X18 [BS EN ISO 105 X18:2007 Textiles - tests for colour fastness - Part X18 Assessment of the potential to phenolic yellowing of materials].

Polythene packaging can be tested to ensure it is free of BHT and similar chemicals. Your supplier should be able to give appropriate test results.

STOCK ROTATION

Since fabric and garments have a greater chance of yellowing the longer they are stored, correct stock rotation is important in minimising storage times and hence potential to yellow.

OTHER TYPES OF YELLOWING

Yellowing may also result from other causes including:

- Loss of OBA through washing.
- Poor OBA light fastness
- Discoloration of polyurethane foam.

For more information on troubleshooting yellowing problems contact Bolton Consultancy Ltd

The information contained in this note is believed to be accurate at the time of printing but is for information only and should not be relied upon. Reference should be made to the published standard or legislation.