Waterless Textile Dyeing

THE SOLUTION TO THE WATER SHORTAGE CRISIS

Supercritical Carbon Dioxide - CO₂ has demonstrated success in dyeing yarn, fabric or garments

Cost Effective - No Pollution - Green Technology
Waterless Textile Dyeing

Water shortages everywhere... and it will get worse in the future

Every kilogram of textiles processed uses over 100-150 liters of water for dyeing only!

The world will only have 60 percent of the water it needs by 2030, according to a recent United Nations report. While countries are rapidly depleting their groundwater, rainfall patterns around the world are becoming more unpredictable, meaning there will be less water in reserve. Meanwhile, as the population increases by 80 million persons a year, so does demand for potable water, snowballing an already massive problem.

Plan now for future shortages

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and cut your operating expenses at the same time

Supercritical CO₂ Textile Dyeing Process

- CO₂ replaces water as the dye solvent
- Water pollution eliminated
- No energy intensive drying step
- 50% reduction in energy consumption and chemical use
- Greater than 95% of CO₂ is recycled
- Meets AATCC Tests
- Excellent dye uniformity
- Smaller plant footprint
- Geographic flexibility - locate plants closer to markets

Grey Yarn dyed in scCO₂

Grey Yarn dyed in water

eCO₂Dye.com NO Water is Used

eCO₂Dye has developed a color database for CO₂

- eCO₂Dye has developed a color database which may be used in the Datacolor ColorMatch Software.
- Use our color match capability on Yarn! Fabric! Garment!
- Obtain excellent color match even with as many as 4 dyes!

Now meet the COLOR matching requirement that fashion demands with CO₂

Datacolor ColorMatch Software
What is a Supercritical Fluid?

A supercritical fluid is any substance where a combination of temperature and pressure on the substance giving it both the properties of a gas and a liquid.
- Dense like a liquid to dissolve materials
- Low viscosity, high diffusivity, no surface tension like a gas

Carbon Dioxide – a “green solvent”
Carbon dioxide is the most commonly used supercritical fluid and becomes supercritical at 31°C and 74 BAR. There are many applications for scCO2 outside the textile dyeing industry, most commonly used in the decaffeination of coffee and the extraction of natural herbs and spices. Existing CO2 is used and recycled causing no increase in greenhouse gases. The system is closed resulting in no pollution.

Tunable solvating power
Supercritical CO2 has the unique property of tuning its solvent properties by manipulating its temperature and pressure; CO2 can dissolve compounds of different chemical structures, for example, a variety of different dyes.

Simple Dyeing Process steps:
- Load dyes and DRY textiles into the pre-heated dyeing vessel
- System brought to pressure with CO2
- scCO2 is circulated in dyeing system
- CO2 is depressurized and recycled for continued re-use.
- Dyed textile is removed DRY from the vessel

Efficient dyeing AND No drying
Textile goes in DRY and comes out DRY

NO costly, energy intensive water drying step necessary

Efficient CO2 Use

Yarn and Fabric are dyed uniformly

eCO2Dye has entered into a relationship with Applied Separations, Inc., a leading worldwide manufacturer of supercritical fluid systems for 30 years. Applied Separations, Inc. has been involved in cutting edge research in the field, as well as a manufacturer of process systems.

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