# EPS® 4431

## OIL MODIFIED URETHANE

# DATA SHEET

### *Description*

**EPS 4431** is an oil modified urethane resin cut in PCBTF to allow very low VOC formulations. EPS 4431 is designed to provide very fast dry and excellent early hardness development. While additional PCBTF solvent can allow the formulation of very low (<5g/L) VOC varnishes, use of mineral spirits will give less lifting upon recoat and is recommended.

- ✓ Very fast dry
- ✓ High Sward hardness
- ✓ Exempt solvent, zero VOC

### *Specifications*

| | |
|---|---|
| *Weight Solids:* | 55.0 ± 0.7% |
| *Weight/Gallon:* | 9.63 ± 0.10 |
| *Viscosity:* | $Z_1 – Z_4$ |
| *Acid Value:* | 2 max |
| *Color:* | 6 max |

### *Suggested Drier Package*

*(% Metal on Resin Solids)*

| | |
|---|---|
| Manganese | 0.01 |
| Activ-8 | 0.10 |

### *Typical Properties*

| | |
|---|---|
| *Volume Solids:* | 61.1 ± 0.7% |
| *Oil Type:* | Soya |
| *Visc. (Reduced):* | N/A |
| *Modifier:* | TDI |
| *Solvent:* | PCBTF (45%) |

### *Suggested Formulations*

EPS 4431/4854 BT1 - Economical Gloss Varnish ≤275g/L VOC

EPS 4431 BT3 - Gloss Varnish ≤275g/L VOC

EPS 4431 BT4 - Satin Varnish ≤275g/L VOC

Technical Solutions - 4431 for Low VOC (≤275 g/L) Varnishes

05-09-2014

**Questions? Call EPS Technical Service @ 1-800-601-8111**

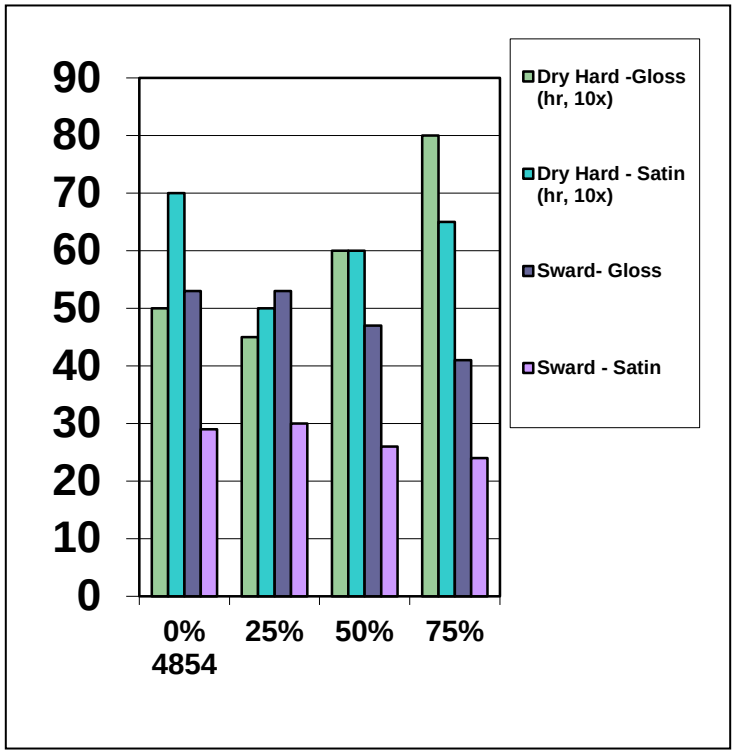
# TECHNICAL SOLUTIONS

## For Wood and Flooring Applications
## Using EPS® 4431 for Low VOC (≤275 g/L) Varnishes

**EPS 4431** is an oil-modified urethane resin cut in the exempt solvent, *para*-chlorobenzene trifluoride (PCBTF). It is designed to provide very fast dry and excellent early hardness development while lowering VOCs. Using it either alone or in combination with **EPS 4854** allows the formulation of varnishes below 275 g/L.

The recommended drier package is 0.01% Manganese (Mn) based on binder solids. Use of a chelating amine accelerator (Activ-8, RT Vanderbilt or Dri-RX, OMG) is further recommended.

Satin finishes can be achieved using flattening silica (TS-100, Evonik) and a suspending additive (Byk 405)




Gloss Varnish (75/25 4431/4854)

Ultralow (<5 g/L) formulations can be achieved using only PCBTF. However, these materials do tend to exhibit lifting problems upon recoat. The following formulations achieve excellent VOC reductions and improved resistance to lifting

The data here shows the excellent drytimes and hardness development (Sward, 7 day) of the EPS 4431/EPS 4854 blends. The dry times are on a 10X scale, so 70 = 7 hours dry hard. The lower cost of EPS 4854 allows for more economical formulation of VOC compliant varnishes.

25% EPS 4854 gives the fastest dry and highest hardness development in these finishes.

Formulas attached:

EPS 4431 BT3 - ≤275 g/L Gloss Varnish
EPS 4431 BT4 - ≤275 g/L Satin Varnish
EPS 4431/4854 BT1 - ≤275 g/L Economical

rev 4-26-2011

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# EPS® 4431/4854 SUGGESTED FORMULATION

## FORMULA: EPS 4431/4854 BT1 (5/08)

## ≤275 G/L ECONOMICAL GLOSS VARNISH

| Pounds | Gallons | Raw Material | Supplier | Instructions |
|---|---|---|---|---|
| 553.35 | 57.46 | **EPS 4431** | **EPS** | Add under agitation |
| 144.90 | 18.41 | **EPS 4854** | **EPS** | |
| 0.69 | 0.09 | Mn 6% CEM-ALL | OMG | |
| 2.25 | 0.29 | Skino #2 | OMG | |
| 0.52 | 0.06 | Dri-RX HF | OMG | |
| 103.62 | 15.94 | Low-Aromatic (<1%) Mineral Spirits | | |
| 86.35 | 7.74 | PCBTF | | |
| **891.68** | **100.00** | **Totals** | | |

### *Formulation Parameters*

| | |
|---|---|
| Weight Solids | 45.55% |
| Volume Solids | 46.83% |
| VOC Level | 2.15 lb/Gal |
| | 257 g/L |
| Weight/Gallon | 8.92 |

### *Suggested Application Methods*

Brush

### *Typical Paint Properties*

| | |
|---|---|
| Viscosity, #2 Zahn cup (77°F) | 38 seconds |
| Dry Film Thickness | 1.2 mils |
| **Dry Times** (75°F, 50% RH) | |
| Set-to-Touch (STT) | 20 minutes |
| Zapon 500g | 2.5 hour |
| Dry Hard (DH) | 4.5 hours |
| Gloss at 60°/20° | 95/80 |
| Sward Hardness (7 days) | 53 |
| König Hardness (7 days) | 61 seconds |

rev. 13 Oct 2011

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# EPS® 4431

# SUGGESTED FORMULATION

## FORMULA: EPS 4431 BT3 (5/08)

## ≤275 G/L GLOSS VARNISH

| Pounds | Gallons | Raw Material | Supplier | Instructions |
|---|---|---|---|---|
| 660.26 | 68.56 | **EPS 4431** | **EPS** | Add under agitation |
| 0.60 | 0.08 | Mn 6% CEM-ALL | OMG | |
| 1.08 | 0.14 | Skino #2 | OMG | |
| 0.46 | 0.06 | Dri-RX HF | OMG | |
| 128.38 | 19.75 | Low-Aromatic (<1%) Mineral Spirits | | |
| 127.31 | 11.41 | PCBTF | | |
| **918.10** | **100.00** | **Totals** | | |

### *Formulation Parameters*

| | |
|---|---|
| Weight Solids | 39.59% |
| Volume Solids | 41.87% |
| VOC Level | 2.10 lb/Gal |
| | 252 g/L |
| Weight/Gallon | 9.18 |

### *Suggested Application Methods*

Brush

### *Typical Paint Properties*

| | |
|---|---|
| Viscosity, #2 Zahn cup (77°F) | 22 seconds |
| Dry Film Thickness | 1.2 mils |
| **Dry Times** (75°F, 50% RH) | |
| Set-to-Touch (STT) | 15 minutes |
| Zapon 500g | 1 hour |
| Dry Hard (DH) | 5 hours |
| Gloss at 60°/20° | 94/81 |
| Sward Hardness (7 days) | 53 |
| König Hardness (7 days) | 77 seconds |

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# SUGGESTED FORMULATION

## FORMULA: EPS 4431 BT4 (5/08)
## ≤275 G/L SATIN VARNISH

| Pounds | Gallons | Raw Material | Supplier | Instructions |
|---|---|---|---|---|
| 646.27 | 67.11 | **EPS 4431** | **EPS** | Add under agitation |
| 0.59 | 0.08 | Mn 6% CEM-ALL | OMG | |
| 1.06 | 0.14 | Skino #2 | OMG | |
| 0.46 | 0.06 | Dri-RX HF | OMG | |
| 127.78 | 19.66 | Low-Aromatic (<1%) Mineral Spirits | | |
| 52.80 | 4.73 | PCTBF | | |
| 17.42 | 0.95 | TS-100 Silica | Evonik | Sift in under moderate agitation |
| 3.59 | 0.46 | BYK 405 | BYK | |
| 76.03 | 6.81 | PCBTF | | |
| **926.00** | **100.00** | **Totals** | | |

### *Formulation Parameters*

| | |
|---|---|
| Weight Solids | 40.51% |
| Volume Solids | 42.16% |
| VOC Level | 2.10 lb/Gal |
| | 252 g/L |
| Weight/Gallon | 9.26 |

### *Suggested Application Methods*

Brush

### *Typical Paint Properties*

| | |
|---|---|
| Viscosity, #2 Zahn cup (77°F) | 28 seconds |
| Dry Film Thickness | 1.2 mils |
| **Dry Times 75°F, 50% RH** | |
| Set-to-Touch (STT) | 15 minutes |
| Zapon 500g | 1 hour |
| Dry Hard (DH) | 7 hours |
| Gloss at 60°/20° | 22/4 |
| Sward Hardness (7 days) | 29 |
| König Hardness (7 days) | 71 seconds |

rev 13 Oct. 2011

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