

# Protect Your IV Drugs From Potentially Harmful Light

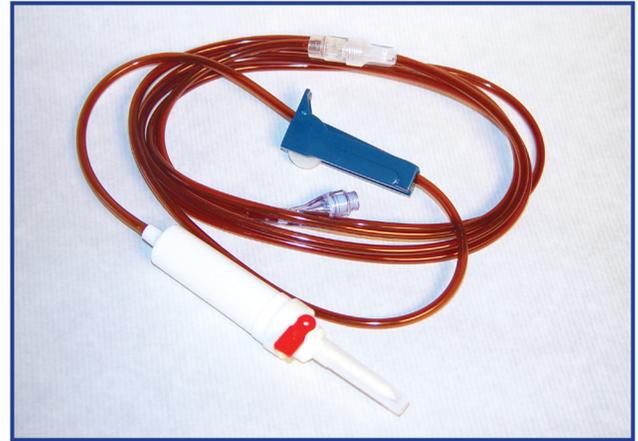
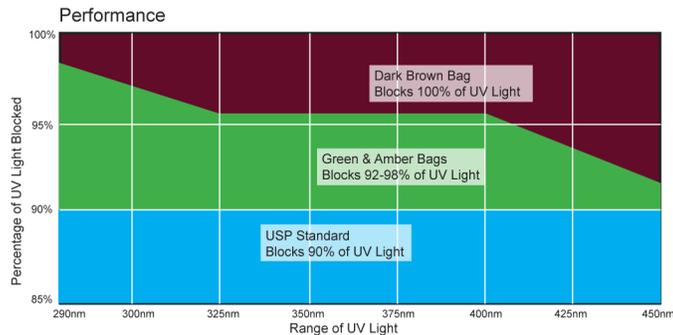
Amber IV administration sets are designed to protect certain drugs from light exposure. Light exposure on these drugs can cause reduction in potency, discoloration, which makes the drug unusable, and complete degradation, which causes the drug to be potentially dangerous and unsafe to use. This adverse effect of light is called photolysis or photodegradation.

A number of drugs including amphotericin B, furosemide, dacarbazine, doxorubicin hydrochloride, sodium nitroprusside, and vitamin A can be affected by photodegradation. Drugs that are infused through an I.V. administration set are particularly subject to photodegradation because of their extended exposure to light during administration.

## Protection Against Light Transmission

There are currently no standards or limits for infusion set exposure to light. Closure-sealed containers for photolytic drugs have been set at a maximum range of 15% light transmission for 5mL containers. These limits could logically be applied to tubing sets that claim photo-protection. It has also been found that UV light in the range of 290 to 450 nm.

These amber IV Administration Sets have been tested for light transmission. Sample sets were scanned at four wavelengths within the UV range. The highest recorded transmission for the samples tested ranged between 10.2% light transmission and 15.2% light transmission. The mean percentage light transmission for all samples was below 15%, which meets the limits for all IV containers.



## Amber IV Administration Sets can be used to infuse:

- Amphotericin B
- Furosemides
- B-Vitamins:  
Cyanocobalamin, Dexpantenol, Folic Acid, Hydroxocobalamin, Methylcobalamin, Niacin, Niacinamide, Pyridoxine, Riboflavin, Thiamine
- Alpha Lipoic Acid
- Ascorbic Acid
- Biotin

### Amber IV Administration Sets

Item #7976 Price: \$149.00/50 sets

Item #8275 Price: \$4.03/each

### Amber Bag/Bottle Covers

Proven Protection for light sensitive medications. Easy, convenient, effective, and affordable.

Item # 8228 Price: \$0.30ea | \$0.23/100+  
For 250/500mL IV bags

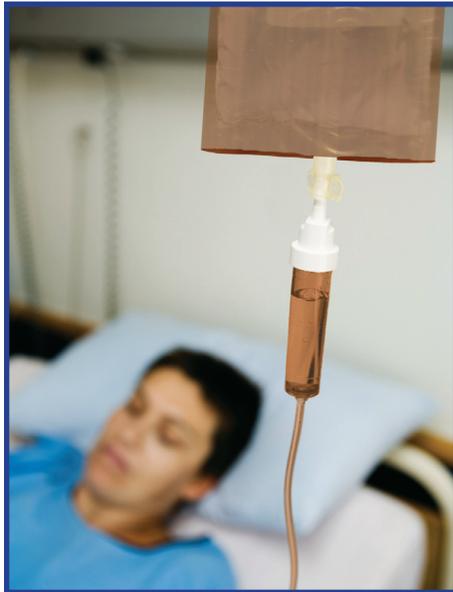
# Studies Show Benefits of UV Protection in Amino Acid and Vitamin Solutions

## Light Effects in Neonatal TPN

The nutritional requirements of a typical preterm, neonatal infant are approximately 200 times their stomach capacity. Therefore, supplemental I.V. feedings with lipids and Total Parenteral Nutrition (TPN) have become essential.

If these nutritional support solutions are exposed to light, their composition can be altered, recent studies have confirmed. Light exposure can produce high levels of harmful hydrogen peroxide, oxidants and oxidizing agents that can dangerously stress the compromised antioxidant systems of preterm infants or serious ill neonates.

Recent tests have shown that amber tubing can significantly reduce the production of these nutrient oxidants and oxidizing agents. Results confirm that amber tubing protects TPN solutions from harmful light.



## Positive Test Results Confirm Protection

**Hydrogen Peroxide Levels Test<sup>1</sup>:** Tests were conducted on non-lipid TPN. In Group 1 the solution bags and I.V. sets were not shielded from light. In Group 2, the solution bag was shielded on all sides, except the bottom or along the tubing. In Group 3, the entire solution bag and deliver I.V. tubing system were protected. The I.V. sets used in Group 3 consisted of amber tubing. Levels of peroxides were measured in the bag and at the point of delivery.

Hydrogen Peroxide Levels	Group 1	Group 2	Group 3
Peroxide level in bag	282 + 5 $\mu$ M	141 + 13 $\mu$ M	106 + 14 $\mu$ M
Peroxide level at delivery	282 + 5 $\mu$ M	215 + 24 $\mu$ M	146 + 15 $\mu$ M

**These test results demonstrate that the volume of exogenous toxic peroxides delivered is reduced by over 50% with shielded TPN bags and amber tubing sets.**

**Urinary Peroxides Test<sup>2</sup>:** These test results are further demonstrated by the levels of peroxide in urine. Preterm infants were fed a TPN consisting of Dextrose 10%, a multivitamin preparation and amino acids. Urine was assayed for peroxide content. The following table shows the results:

Urinary Peroxides	Day 1	Day 2	Day 3
Photo protected	25 $\mu$ M	24 $\mu$ M	26 $\mu$ M
No photo protection	25 $\mu$ M	32 $\mu$ M	73 $\mu$ M

**These test results show that the compromised antioxidant system of preterm infants is not capable of handling the increased levels of peroxides found in non photo-protected TPN solutions.**

**Bronchopulmonary Dysplasia and Fibrosis Test<sup>3</sup>:** BPD is a frequent complication found in preterm infants (<28 weeks). The detection of mRNA for  $\alpha$ 1(I) procollagen is commonly used as a marker for the onset of fibrosis associated with BPA. Tests on the appropriately preterm animals shows an approximately 50% lower level of mRNA when TPN feeding was performed by means of photo protected systems. The following table shows the results of this test.

Bronchopulmonary Dysplasia & Fibrosis	Procollage mRNA
Photo protected	1.06 $\pm$ 0.06
No photo protection	1.51 $\pm$ 0.25

**These test results strongly suggest that photo protection reduces the generation of peroxides in the TPN solution, and lowers the induction of lung fibrosis and the onset of BPA.**

### References:

(1), (2) Chessex P., Laborie S., et al.: Photoprotection of Solutions of Parental Nutrition Decreases the Infused Load as well as the Urinary Excretion of Peroxides in Premature Infants. Seminars in perinatology, Vol. 25, No. 2 (April), 2001: pp 55-59.

(3) Lavoie, J-C., rouleau T., et al: Photoprotection Prevents TPN-Induced Lung Procollagen mRNA in Newborn Guinea Pigs. Free Radical Biology and Medicine, Vol. 33, no. 4, pp 512-520, 2002.