M.V.I. – 12 ®

(Multi-Vitamin Infusion without vitamin K)
For dilution in intravenous infusions only.
℞ **only**

M.V.I. - 12® UNIT VIAL
multi-vitamin infusion without vitamin K

DESCRIPTION

M.V.I. - 12® UNIT VIAL is a sterile product in a two-chambered single-dose vial which must be mixed just prior to use.

ADULT FORMULATION (INTENDED FOR AGES 11 AND OLDER)

LOWER CHAMBER OF UNIT VIAL*

Ingredient	Amount per Unit Dose
Fat Soluble Vitamins**	
Vitamin A (retinol)	1 mg[a]
Vitamin D (ergocalciferol)	5 µg[b]
Vitamin E (dl-alpha-tocopheryl acetate)	10 mg[c]
Water Soluble Vitamins	
Vitamin C (ascorbic acid)	200 mg
Niacinamide	40 mg
Vitamin B_2 (as riboflavin 5-phosphate sodium)	3.6 mg
Vitamin B_1 (thiamine)	6 mg
Vitamin B_6 (pyridoxine HCl)	6 mg
Dexpanthenol (d-pantothenyl alcohol)	15 mg

*WITH 30% PROPYLENE GLYCOL AND 2% GENTISIC ACID ETHANOLAMIDE AS STABILIZERS AND PRESERVATIVES; SODIUM HYDROXIDE FOR PH ADJUSTMENT; 1.6% POLYSORBATE 80; 0.028% POLYSORBATE 20; 0.002% BUTYLATED HYDROXYTOLUENE; 0.0005% BUTYLATED HYDROXYANISOLE.

**Fat-soluble vitamins A, D, and E are water solubilized with polysorbate 80.

(a) 1 mg vitamin A equals 3,300 USP units.

(b) 5 µg ergocalciferol equals 200 USP units.

(c) 10 mg vitamin E equals 10 USP units.

Upper Chamber of Unit Vial*

Biotin	60 µg
Folic acid	600 µg
Vitamin B_{12} (cyanocobalamin)	5 µg

*WITH 30% PROPYLENE GLYCOL; AND CITRIC ACID, SODIUM CITRATE, AND SODIUM HYDROXIDE FOR PH ADJUSTMENT.

"Aqueous" multivitamin formula for intravenous infusion: M.V.I – 12 ® (Multi-Vitamin Infusion without vitamin K) makes available a combination of important fat-soluble and water-soluble vitamins in an aqueous solution, formulated specially for incorporation into intravenous infusions.

Through special processing techniques, the liposoluble vitamins A, D, and E have been solubilized in an aqueous medium with polysorbate 80, permitting intravenous administration of these vitamins.

INDICATIONS AND USAGE

This formulation is indicated for the prevention of vitamin deficiency and thromboembolic complications in people receiving home parenteral nutrition who also receive warfarin-type anticoagulant therapy.

The physician should not await the development of clinical signs of vitamin deficiency before initiating vitamin therapy.

Patients with multiple vitamin deficiencies or with markedly increased requirements may be given multiples of the daily dosage for two or more days as indicated by the clinical status. Clinical testing indicates that some patients do not maintain adequate levels of certain vitamins when this formulation in recommended amounts is the sole source of vitamins.

CONTRAINDICATIONS

Known hypersensitivity to any of the vitamins in this product or a pre-existing hypervitaminosis. Allergic reaction has been known to occur following intravenous administration of thiamine. This formulation is contraindicated prior to blood sampling for detection of megaloblastic anemia, as the folic acid and the cyanocobalamin in the vitamin solution can mask serum deficits.

WARNINGS

WARNING: This product contains aluminum that may be toxic. Aluminum may reach toxic levels with prolonged parenteral administration if kidney function is impaired. Premature neonates are particularly at risk because their kidneys are immature, and they require large amounts of calcium and phosphate solutions, which contain aluminum.

Research indicates that patients with impaired kidney function, including premature neonates, who receive parenteral levels of aluminum at greater than 4 to 5 μg/kg/day accumulate aluminum at levels associated with central nervous system and bone toxicity. Tissue loading may occur at even lower rates of administration.

PRECAUTIONS

Studies have shown that vitamin A may adhere to plastic, resulting in inadequate vitamin A administration in the doses recommended with M.V.I. – 12 ®.

Where long-standing specific vitamin deficiencies exist, it may be necessary to add therapeutic amounts of specific vitamins to supplement the maintenance vitamins provided in M.V.I. – 12 ®.

In patients receiving parenteral multivitamins, blood vitamin concentrations should be periodically monitored to determine if vitamin deficiencies or excesses are developing.

M.V.I. – 12 ® SHOULD BE ASEPTICALLY TRANSFERRED TO THE INFUSION FLUID.

Drug-Drug Interactions:

Physical Incompatibilities:

M.V.I. – 12 ® (Multi-Vitamin Infusion without vitamin K) is not physically compatible with DIAMOX® (acetazolamide) 500 mg, DIURIL® Intravenous Sodium (chlorothiazide sodium) 500 mg,

or aminophylline 125 mg, ampicillin 500 mg or moderately alkaline solutions. ACHROMYCIN® (tetracycline HCl) 500 mg may not be physically compatible with M.V.I.-12®. It has been reported that folic acid is unstable in the presence of calcium salts such as calcium gluconate. Some of the vitamins in M.V.I –12 ® may react with vitamin K bisulfite. Direct addition of M.V.I. – 12 ® to intravenous fat emulsions is not recommended. Consult appropriate references for listings of physical compatibility of solutions and drugs with the vitamin infusion. In such circumstances, admixture or Y-site administration with vitamin solutions should be avoided.

Several vitamins have been reported to decrease the activity of certain antibiotics. Thiamine, riboflavin, pyridoxine, niacinamide, and ascorbic acid have been reported to decrease the antibiotic activity of erythromycin, kanamycin, streptomycin, doxycycline, and lincomycin. Bleomycin is inactivated in vitro by ascorbic acid and riboflavin.

Some of the vitamins in M.V.I. – 12 ® may react with vitamin K bisulfite or sodium bisulfite; if bisulfite solutions are necessary, patients should be monitored for vitamin A and thiamine deficiencies.

Clinical Interactions:
A number of interactions between vitamins and drugs have been reported which may affect the metabolism of either agent. The following are examples of these types of interactions.

Folic acid may lower the serum concentration of phenytoin resulting in increased seizure frequency. Conversely, phenytoin may decrease serum folic acid concentrations and, therefore, should be avoided in pregnancy. Folic acid may decrease the patient's response to methotrexate therapy.

Pyridoxine may decrease the efficacy of levodopa by increasing its metabolism. Concomitant administration of hydralazine or isoniazid may increase pyridoxine requirements.

In patients with pernicious anemia, the hematologic response to vitamin B_{12} therapy may be inhibited by concomitant administration of chloramphenicol.

Consult appropriate references for additional specific vitamin-drug interactions.

Drug-Laboratory Test Interactions
ASCORBIC ACID IN THE URINE MAY CAUSE FALSE NEGATIVE URINE GLUCOSE DETERMINATIONS.

Carcinogenesis, Mutagenesis, and Impairment of Fertility:
Carcinogenicity studies have not been performed.

PREGNANCY:

Pregnant women should follow the U.S. Recommended Daily Allowances for their condition, because their vitamin requirements may exceed those of nonpregnant women.

Nursing Mothers:
Lactating women should follow the U.S. Recommended Daily Allowances for their condition, because their vitamin requirements may exceed those of nonlactating women.

Pediatric Use:
Safety and effectiveness in children below the age of 11 years have not been established.

ADVERSE REACTIONS

There have been rare reports of anaphylactoid reactions following large intravenous doses of thiamine. The risk, however, is negligible if thiamine is co-administered with other vitamins in the B group. There have been no reports of fatal anaphylactoid reactions associated with M.V.I. – 12 ®.
There have been rare reports of the following types of reactions:
Dermatologic — rash, erythema, pruritus
CNS — headache, dizziness, agitation, anxiety
Ophthalmic — diplopia
Allergic — urticaria, periorbital and digital edema

OVERDOSAGE

The possibility of hypervitaminosis A or D should be borne in mind. Clinical manifestations of hypervitaminosis A have been reported in patients with renal failure receiving 1.5 mg/day retinol. Therefore, vitamin A supplementation of renal failure patients should be undertaken with caution.

DOSAGE AND ADMINISTRATION

M.V.I.–12® is ready for immediate use in adults and children aged 11 years and above when added to intravenous infusion fluids.

Directions for UNIT VIAL: Remove the protective plastic cap, turn the plunger-stopper 90° and press down firmly to force liquid in the upper chamber and the center seal into the lower compartment. Gently agitate to mix solution. Sterilize the rubber stopper in the usual manner and insert needle squarely through the center of the plunger-stopper until tip is just visible. Vial should be mixed just prior to use. Invert vial and withdraw a 10mL dose in the usual manner. The mixed solution is ready for dilution in not less than 500 mL of infusion solution.
M.V.I.–12® should not be given as a direct, undiluted intravenous injection as it may give rise to dizziness, faintness, and possible tissue irritation.

The withdrawal of container contents should be accomplished without delay. The solution should be used within 4 hours after dilution.

USE OF THIS PRODUCT IS RESTRICTED TO A SUITABLE WORK AREA, SUCH AS A LAMINAR FLOW HOOD.

FOR INTRAVENOUS FEEDING, ONE DAILY DOSE OF M.V.I.–12® (10 mL) ADDED DIRECTLY TO NOT LESS THAN 500 mL, PREFERABLY 1,000 mL, OF INTRAVENOUS DEXTROSE, SALINE OR SIMILAR INFUSION SOLUTIONS.

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit.

After M.V.I.–12® is diluted in an intravenous infusion, the resulting solution is ready for immediate use. Some of the vitamins in this product, particularly A and D and riboflavin, are light sensitive, and exposure to light should be minimized.

Store at 2–8°C (36-46°F).

HOW SUPPLIED

M.V.I.-12® UNIT VIAL — NDC 61703-423-81 Boxes of 10 two-chambered 10 mL vials.

Manufactured by:
AstraZeneca LP, Westborough, MA 01581
Sterilized and Filled by:
Enzon Pharmaceuticals
Indianapolis, IN 46268

Manufactured for:
Mayne Pharma (USA) Inc.
Paramus, NJ 07652

Rev. 08-2004

M.V.I. – 12®

(Multi-Vitamin Infusion without vitamin K)
For dilution in intravenous infusions only.
℞only

This package insert contains information for both the Pharmacy Bulk Package and the single dose vial.

DESCRIPTION

M.V.I.–12® is available as a sterile product consisting of two vials, labeled Vial 1 (50 mL) and Vial 2 (50 mL Fill) to provide ten 10 mL single doses.

Single Dose Vial: A sterile product consisting of two vials labeled Vial 1 (5 mL) and Vial 2 (5 mL). Both vials to be used for a single 10 mL dose.

ADULT FORMULATION (INTENDED FOR AGES 11 AND OLDER)

VIAL 1*

Ingredient	Amount per Unit Dose
Fat Soluble Vitamins**	
Vitamin A (retinol)	1 mg[a]
Vitamin D (ergocalciferol)	5 µg[b]
Vitamin E (dl-alpha-tocopheryl acetate)	10 mg[c]
Water Soluble Vitamins	
Vitamin C (ascorbic acid)	200 mg
Niacinamide	40 mg
Vitamin B_2 (as riboflavin 5-phosphate sodium)	3.6 mg
Vitamin B_1 (thiamine)	6 mg
Vitamin B_6 (pyridoxine HCl)	6 mg
Dexpanthenol (d-pantothenyl alcohol)	15 mg

*WITH 30% PROPYLENE GLYCOL AND 2% GENTISIC ACID ETHANOLAMIDE AS STABILIZERS AND PRESERVATIVES; SODIUM HYDROXIDE FOR PH ADJUSTMENT; 1.6% POLYSORBATE 80; 0.028% POLYSORBATE 20; 0.002% BUTYLATED HYDROXYTOLUENE; 0.0005% BUTYLATED HYDROXYANISOLE.

**Fat-soluble vitamins A, D, and E are water solubilized with polysorbate 80.

(d) 1 mg vitamin A equals 3,300 USP units.

(e) 5 µg ergocalciferol equals 200 USP units.

(c) 10 mg vitamin E equals 10 USP units.

Vial 2*

Biotin	60 µg
Folic acid	600 µg
Vitamin B_{12} (cyanocobalamin)	5 µg

*WITH 30% PROPYLENE GLYCOL; AND CITRIC ACID, SODIUM CITRATE, AND SODIUM HYDROXIDE FOR PH ADJUSTMENT.

"Aqueous" multivitamin formula for intravenous infusion: M.V.I.–12® (Multi-Vitamin Infusion without vitamin K) makes available a combination of important fat-soluble and water-soluble vitamins in an aqueous solution, formulated specially for incorporation into intravenous infusions.

Through special processing techniques, the liposoluble vitamins A, D, and E have been solubilized in an aqueous medium with polysorbate 80, permitting intravenous administration of these vitamins.

INDICATIONS AND USAGE

This formulation is indicated for the prevention of vitamin deficiency and thromboembolic complications in people receiving home parenteral nutrition who also receive warfarin-type anticoagulant therapy.

The physician should not await the development of clinical signs of vitamin deficiency before initiating vitamin therapy.

Patients with multiple vitamin deficiencies or with markedly increased requirements may be given multiples of the daily dosage for two or more days as indicated by the clinical status. Clinical testing indicates that some patients do not maintain adequate levels of certain vitamins when this formulation in recommended amounts is the sole source of vitamins.

CONTRAINDICATIONS

Known hypersensitivity to any of the vitamins in this product or a pre-existing hypervitaminosis. Allergic reaction has been known to occur following intravenous administration of thiamine. This formulation is contraindicated prior to blood sampling for detection of megaloblastic anemia, as the folic acid and the cyanocobalamin in the vitamin solution can mask serum deficits.

WARNINGS

WARNING: This product contains aluminum that may be toxic. Aluminum may reach toxic levels with prolonged parenteral administration if kidney function is impaired. Premature neonates are particularly at risk because their kidneys are immature, and they require large amounts of calcium and phosphate solutions, which contain aluminum.

Research indicates that patients with impaired kidney function, including premature neonates, who receive parenteral levels of aluminum at greater than 4 to 5 μg/kg/day accumulate aluminum at levels associated with central nervous system and bone toxicity. Tissue loading may occur at even lower rates of administration.

PRECAUTIONS

Studies have shown that vitamin A may adhere to plastic, resulting in inadequate vitamin A administration in the doses recommended with M.V.I.–12®.

Where long-standing specific vitamin deficiencies exist, it may be necessary to add therapeutic amounts of specific vitamins to supplement the maintenance vitamins provided in M.V.I. – 12 ®.

In patients receiving parenteral multivitamins, blood vitamin concentrations should be periodically monitored to determine if vitamin deficiencies or excesses are developing.

M.V.I.–12® SHOULD BE ASEPTICALLY TRANSFERRED TO THE INFUSION FLUID.

Drug-Drug Interactions:

Physical Incompatibilities:

M.V.I.–12® (Multi-Vitamin Infusion without vitamin K) is not physically compatible with DIAMOX® (acetazolamide) 500 mg, DIURIL® Intravenous Sodium (chlorothiazide sodium)

500 mg, or aminophylline 125 mg, ampicillin 500 mg or moderately alkaline solutions. ACHROMYCIN® (tetracycline HCl) 500 mg may not be physically compatible with M.V.I.-12®. It has been reported that folic acid is unstable in the presence of calcium salts such as calcium gluconate. Some of the vitamins in M.V.I–12® may react with vitamin K bisulfite. Direct addition of M.V.I.–12® to intravenous fat emulsions is not recommended. Consult appropriate references for listings of physical compatibility of solutions and drugs with the vitamin infusion. In such circumstances, admixture or Y-site administration with vitamin solutions should be avoided.

Several vitamins have been reported to decrease the activity of certain antibiotics. Thiamine, riboflavin, pyridoxine, niacinamide, and ascorbic acid have been reported to decrease the antibiotic activity of erythromycin, kanamycin, streptomycin, doxycycline, and lincomycin. Bleomycin is inactivated in vitro by ascorbic acid and riboflavin.

Some of the vitamins in M.V.I.–12® may react with vitamin K bisulfite or sodium bisulfite; if bisulfite solutions are necessary, patients should be monitored for vitamin A and thiamine deficiencies.

Clinical Interactions:
A number of interactions between vitamins and drugs have been reported which may affect the metabolism of either agent. The following are examples of these types of interactions.

Folic acid may lower the serum concentration of phenytoin resulting in increased seizure frequency. Conversely, phenytoin may decrease serum folic acid concentrations and, therefore, should be avoided in pregnancy. Folic acid may decrease the patient's response to methotrexate therapy.

Pyridoxine may decrease the efficacy of levodopa by increasing its metabolism. Concomitant administration of hydralazine or isoniazid may increase pyridoxine requirements.

In patients with pernicious anemia, the hematologic response to vitamin B_{12} therapy may be inhibited by concomitant administration of chloramphenicol.

Consult appropriate references for additional specific vitamin-drug interactions.

Drug-Laboratory Test Interactions
ASCORBIC ACID IN THE URINE MAY CAUSE FALSE NEGATIVE URINE GLUCOSE DETERMINATIONS.

Carcinogenesis, Mutagenesis, and Impairment of Fertility:
Carcinogenicity studies have not been performed.

PREGNANCY:
Pregnant women should follow the U.S. Recommended Daily Allowances for their condition, because their vitamin requirements may exceed those of nonpregnant women.

Nursing Mothers:
Lactating women should follow the U.S. Recommended Daily Allowances for their condition, because their vitamin requirements may exceed those of nonlactating women.

Pediatric Use:
Safety and effectiveness in children below the age of 11 years have not been established.

ADVERSE REACTIONS

There have been rare reports of anaphylactoid reactions following large intravenous doses of thiamine. The risk, however, is negligible if thiamine is co-administered with other vitamins in the B group. There have been no reports of fatal anaphylactoid reactions associated with M.V.I.–12®.
There have been rare reports of the following types of reactions:
Dermatologic — rash, erythema, pruritus
CNS — headache, dizziness, agitation, anxiety
Ophthalmic — diplopia
Allergic — urticaria, periorbital and digital edema

OVERDOSAGE

The possibility of hypervitaminosis A or D should be borne in mind. Clinical manifestations of hypervitaminosis A have been reported in patients with renal failure receiving 1.5 mg/day retinol. Therefore, vitamin A supplementation of renal failure patients should be undertaken with caution.

DOSAGE AND ADMINISTRATION

M.V.I.–12® is ready for immediate use in adults and children aged 11 years and above when added to intravenous infusion fluids.

Directions for Pharmacy Bulk Package: Transfer the contents of Vial 1 into Vial 2. The mixed solution will provide ten 10 mL single doses. Each 10 mL single dose is ready for dilution in not less than 500 mL of infusion fluid. Utilize a suitable sterile transfer device or dispensing set, which allows measured distribution of the contents.

Directions for Single Dose Vial: Dilute the contents of Vial 1 (5 mL) and the contents of Vial 2 (5 mL) in not less than 500 mL of infusion fluid, both vials to be used for a single dose. The vial 1 and vial 2 container closures may be penetrated only one time, utilizing a suitable sterile transfer device or dispensing set, which allows measured distribution of the contents.

The withdrawal of container contents should be accomplished without delay. The solution should be used within 4 hours after dilution.

USE OF THIS PRODUCT IS RESTRICTED TO A SUITABLE WORK AREA, SUCH AS A LAMINAR FLOW HOOD.

M.V.I.–12® should not be given as a direct, undiluted intravenous injection as it may give rise to dizziness, faintness, and possible tissue irritation.

FOR INTRAVENOUS FEEDING, ONE DAILY DOSE OF M.V.I.–12® (10 mL) ADDED DIRECTLY TO NOT LESS THAN 500 mL, PREFERABLY 1,000 mL, OF INTRAVENOUS DEXTROSE, SALINE OR SIMILAR INFUSION SOLUTIONS.

Parenteral drug products should be inspected visually for particulate matter and discoloration prior to administration, whenever solution and container permit.

After M.V.I.–12® is diluted in an intravenous infusion, the resulting solution is ready for immediate use. Some of the vitamins in this product, particularly A and D and riboflavin, are light sensitive, and exposure to light should be minimized.

Store at 2–8°C (36-46°F).

HOW SUPPLIED

M.V.I.-12® — NDC 61703-423-82 Boxes of 10 single doses and cartons of 100 single doses. Each box contains two vials— Vial 1 (5 mL) and Vial 2 (5 mL), both vials to be used for a single dose.

M.V.I.-12® PHARMACY BULK PACKAGE — NDC 61703-423-83 Boxes of 20 vials, 50 mL each (10 Vial 1 and 10 Vial 2). Mix contents of Vial 1 and Vial 2 to provide ten single doses.

Manufactured for:
Mayne Pharma (USA) Inc.
Paramus, NJ 07650
By: AstraZeneca LP
Westborough, MA

808604-00 Rev. 08-2004