METHYLENE BLUE- methylene blue injection
Akorn, Inc.

Disclaimer: This drug has not been found by FDA to be safe and effective, and this labeling has not been approved by FDA. For further information about unapproved drugs, click here.

Methylene Blue Injection 1%

(FOR SLOW INTRAVENOUS ADMINISTRATION)

Rx only

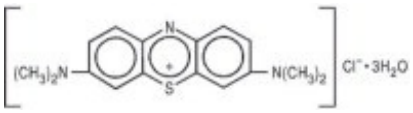
WARNING: SEROTONIN SYNDROME WITH CONCOMITANT USE OF SEROTONERGIC DRUGS

Methylene Blue Injection may cause serious or fatal serotonergic syndrome when used in combination with serotonergic drugs. Avoid concomitant use of Methylene Blue Injection with selective serotonin reuptake inhibitors (SSRIs), serotonin and norepinephrine reuptake inhibitors (SNRIs), and monoamine oxidase inhibitors (see WARNINGS and PRECAUTIONS, Drug Interactions).

DESCRIPTION:

Methylene Blue Injection is a sterile solution of Phenothiazin-5-ium, 3, 7-bis (dimethylamino)-, chloride, trihydrate. Each mL contains methylene blue, 10 mg in water for injection q.s. pH adjusted with hydrochloric acid and/or sodium hydroxide when necessary.

The structural formula is:



The molecular formula is:

$C_{16}H_{18}ClN_3S \cdot 3H_2O$ MW = 373.90

CLINICAL PHARMACOLOGY:

Methylene blue will produce two opposite actions on hemoglobin. Low concentrations will convert methemoglobin to hemoglobin. High concentrations convert the ferrous iron of reduced hemoglobin to ferric iron which results in the formation of methemoglobin.

Methylene blue is metabolized in the body to leukomethylene blue which is excreted primarily in the urine. Some unchanged drug is also excreted in the urine. (1)

INDICATIONS AND USAGE:

Drug-induced methemoglobinemia.

CONTRAINDICATIONS:

Methylene blue can cause fetal harm when administered to a pregnant woman. An association exists between the use of methylene blue in amniocentesis and atresia of the ileum and jejunum, ileal occlusions and other adverse effects in the neonate. (2, 3) Methylene blue is contraindicated in women

who are or may become pregnant. If this drug is used during pregnancy, or if the patient becomes pregnant while taking this drug, the patient should be apprised of the potential hazard to the fetus.

Intraspinal and subcutaneous injections are contraindicated.

Methylene blue is contraindicated in patients with a known hypersensitivity to the drug.

WARNINGS:

Methylene blue should not be given by subcutaneous or intrathecal injection.

Methylene blue is a potent monoamine oxidase inhibitor: Methylene blue has been demonstrated to be a potent monoamine oxidase inhibitor (MAOI) and may cause potentially fatal serotonin toxicity (serotonin syndrome) when combined with serotonin reuptake inhibitors (SRIs). (4) (See **DRUG INTERACTIONS**.) Serotonin toxicity is characterized by development of neuromuscular hyperactivity (tremor, clonus, myoclonus and hyperreflexia, and, in the advanced stage, pyramidal rigidity); autonomic hyperactivity (diaphoresis, fever, tachycardia, tachypnoea, and mydriasis); and altered mental status (agitation, excitement, and in the advanced stage, confusion). If methylene blue is judged to be indicated, SRIs must be ceased, prior to treatment/procedure/surgery.

PRECAUTIONS:

Drug Interactions: Methylene blue may interact with any drug that acts as a serotonin reuptake inhibitor (SRI) including, amongst others, selective serotonin reuptake inhibitors (SSRIs), serotonin and norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), norepinephrine-dopamine reuptake inhibitors (NDRIs), triptans and ergot alkaloids; such combinations may have the consequence of potentially fatal serotonin toxicity (serotonin syndrome). Methylene blue should not be co-administered with any drug that acts as an SRI.

Pregnancy: Pregnancy Category X: Epidemiologic evidence exists that methylene blue is a teratogen. An association exists between the use of methylene blue in amniocentesis and atresia of the ileum and jejunum, ileal occlusions and other adverse effects in the neonate. (2,3) Methylene blue injection should not be administered to pregnant women during amniocentesis due to the risk of teratogenicity and other newborn adverse effects (see **CONTRAINDICATIONS**).

Glucose-6-Phosphate Dehydrogenase Deficiency (G6PD Deficiency): Methylene blue should be avoided in patients with G6PD deficiency due to the risk of paradoxical methemoglobinemia and hemolysis. (5,6)

Renal Failure: Methylene blue should be used with caution in patients with severe renal impairment (see **CLINICAL PHARMACOLOGY**).

Methylene blue must be injected intravenously very slowly over a period of several minutes to prevent local high concentration of the compound from producing additional methemoglobin. Do not exceed recommended dosage.

Large intravenous doses of methylene blue produce nausea, abdominal and precordial pain, dizziness, headache, profuse sweating, mental confusion and the formation of methemoglobin.

DOSAGE AND ADMINISTRATION:

0.1 to 0.2 mL per kg body weight (0.045 to 0.09 mL per pound body weight). Inject methylene blue intravenously very slowly over a period of several minutes.

Methylene blue must be injected intravenously very slowly over a period of several minutes to prevent local high concentration of the compound from producing additional methemoglobin. Do not exceed recommended dosage.

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

HOW SUPPLIED:

Methylene Blue Injection, 1% is supplied as follows:

NDC 17478-504-01

1 mL in 2 cc (partially filled) vials in packages of 10.

NDC 17478-504-10

10 mL vials in packages of 10.

The vials are packaged with a Flip Tear-Off Seal. The seal can either be flipped normally to reveal the rubber stopper or be totally removed so the rubber stopper can be taken out of the vial. The plastic button is attached to the metal seal, which when pulled, tears the seal at the score line allowing the metal portion to be removed.

STORAGE:

Store at 20° to 25°C (68° to 77°F) [see USP Controlled Room Temperature].

Flip Tear-Off Seal: Directions for Use:

1. With the thumb, flip the plastic button up to reveal the rubber stopper.
2. Pull the button to tear the seal at the score line and twist to remove.

REFERENCES:

1. DiSanto AR, Wagner JG. Pharmacokinetics of highly ionized drugs II: methylene blue – absorption, metabolism, and excretion in man and dog after oral administration. J Pharm Sci. 1972; 61:1086-1090.
2. Cragan JD. Teratogen update: methylene blue. Teratology. 1999; 60:42-48.
3. Kidd SA, Lancaster PA, Anderson JC, Boogert A, Fisher CC, Robertson R, et al. Fetal death after exposure to methylene blue dye during mid-trimester amniocentesis in twin pregnancy. Prenat Diagn. 1996; 16:39-47.
4. Ramsay RR, Dunford C, Gillman PK. Methylene blue and serotonin toxicity: inhibition of monoamine oxidase A (MAOA) confirms a theoretical prediction. Br J Pharmacol. 2007; 152:946-51.
5. Beutler E. G6PD Deficiency. Blood. 1994; 84:3613-3636.
6. Youngster I, Arcavi L, Schechmaster R, Akayzen Y, Popliski H, Shimonov J, Beig S, Berkovitch M. Medications and glucose-6-phosphate dehydrogenase deficiency: an evidence-based review. Drug Saf. 2010; 33:713-726.

Methylene Blue and Methylene Blue Injection were in compliance with USP #39, but differs from the Current USP #40 with respect to active assay, Impurities: Azure A, Azure B, Azure C, and unknown impurities.

AKORN

Manufactured by: **Akorn, Inc.**
Lake Forest, IL 60045

MB00N Rev. 11/17

Principal Display Panel Text for Container Label:

NDC 17478-504-10

Methylene Blue

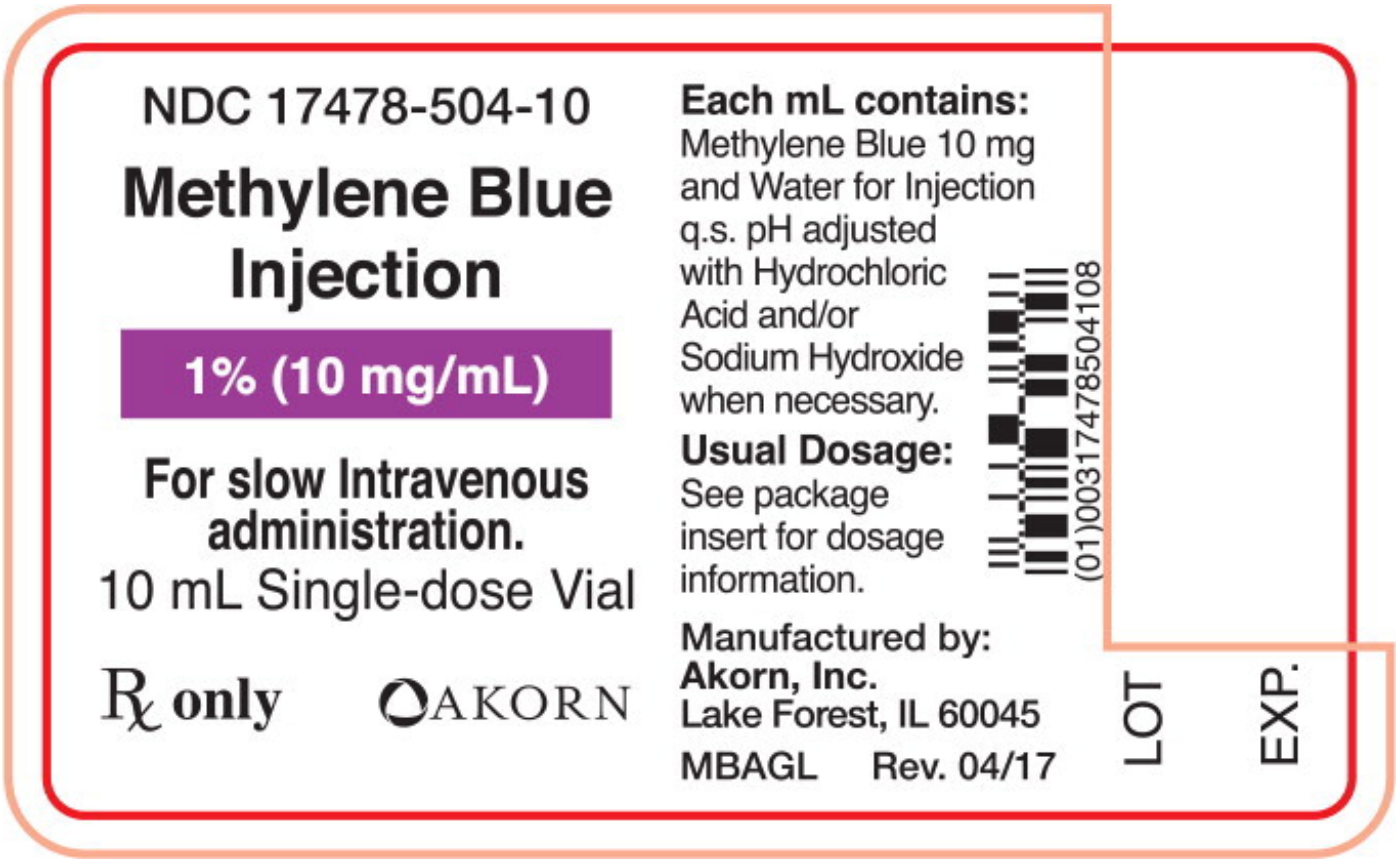
Injection

1% (10 mg/mL)

For slow Intravenous administration.

10 mL Single-dose Vial

Rx only Akorn Logo



Principal Display Panel Text for Carton Label:

NDC 17478-504-10

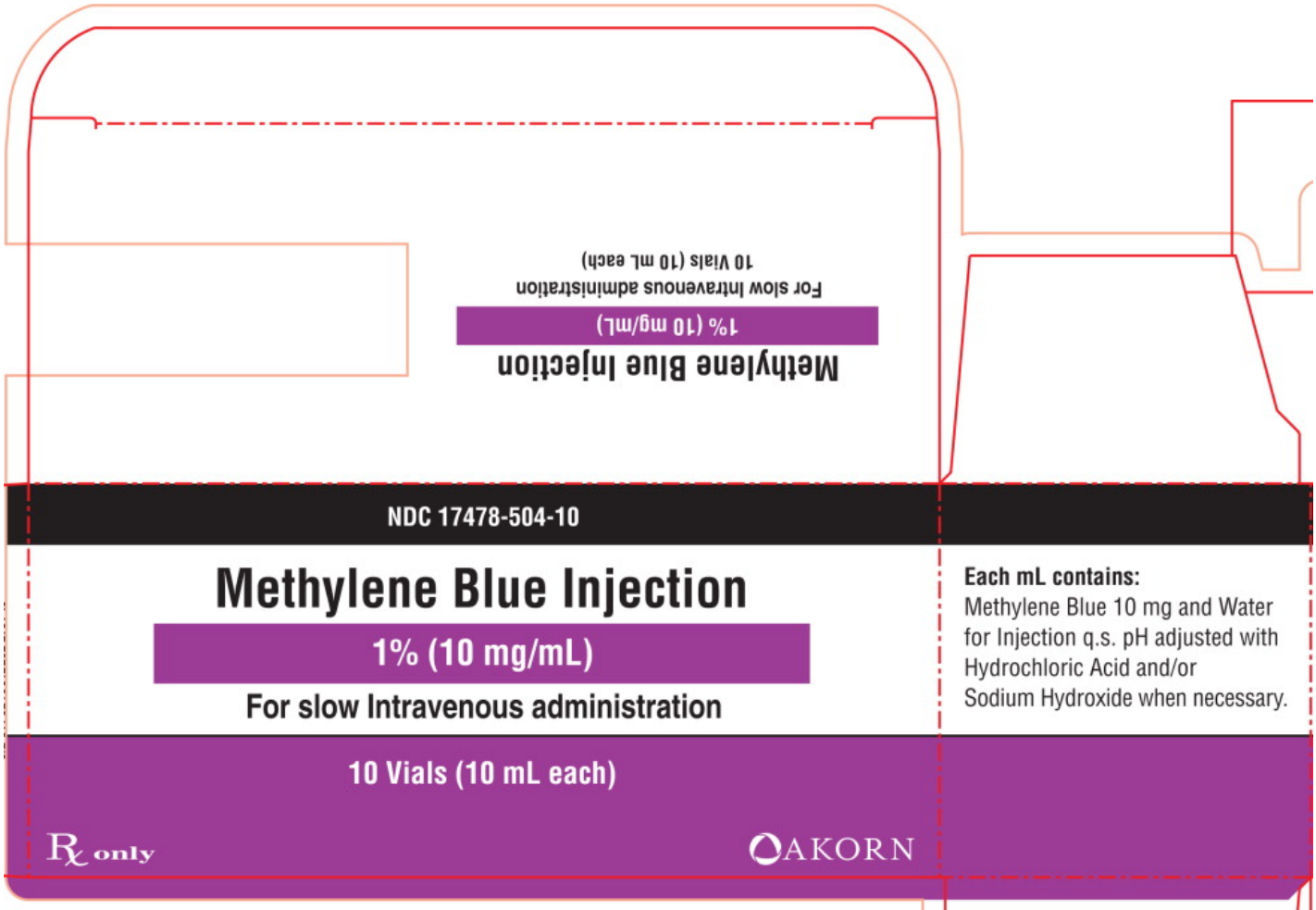
Methylene Blue Injection

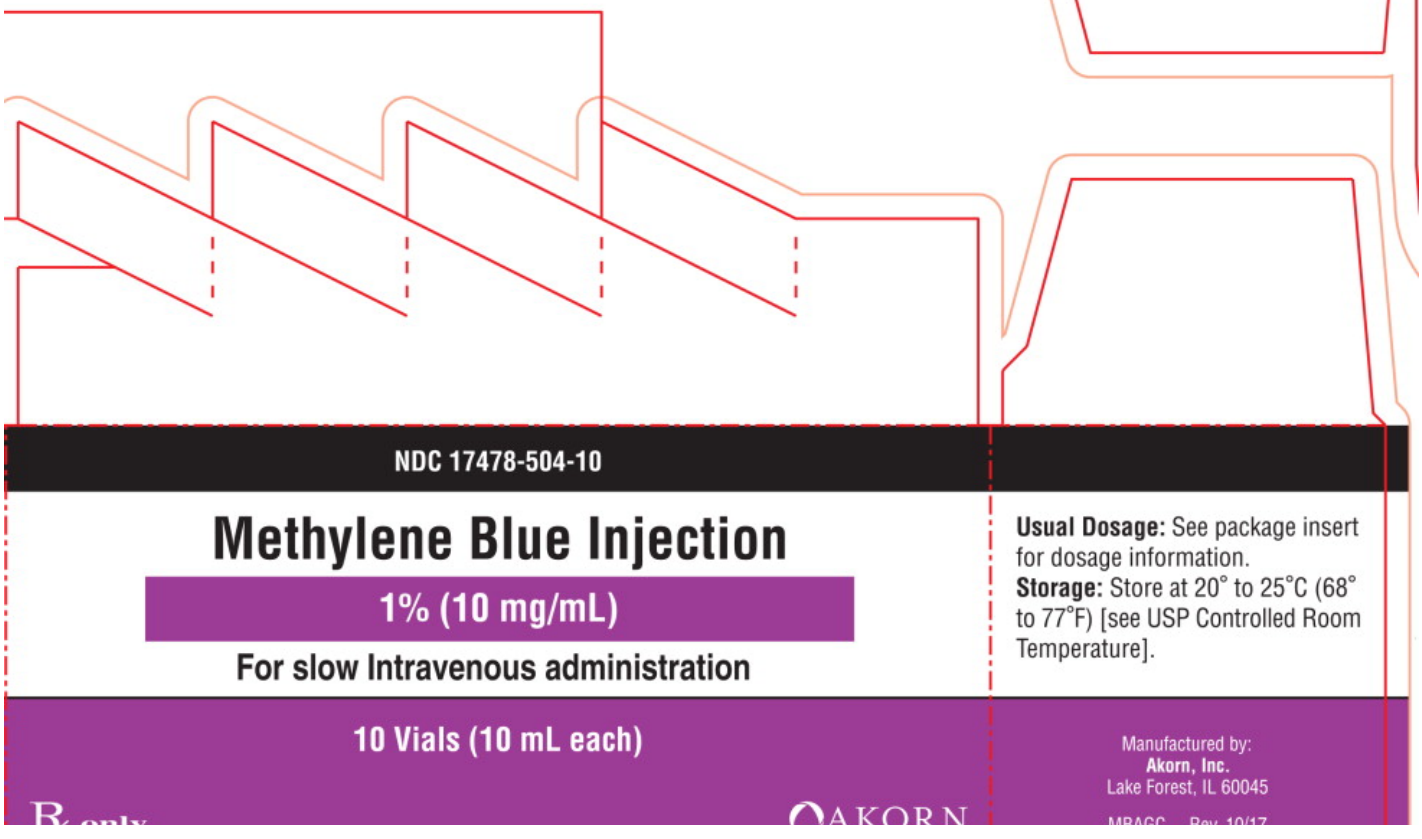
1% (10 mg/mL)

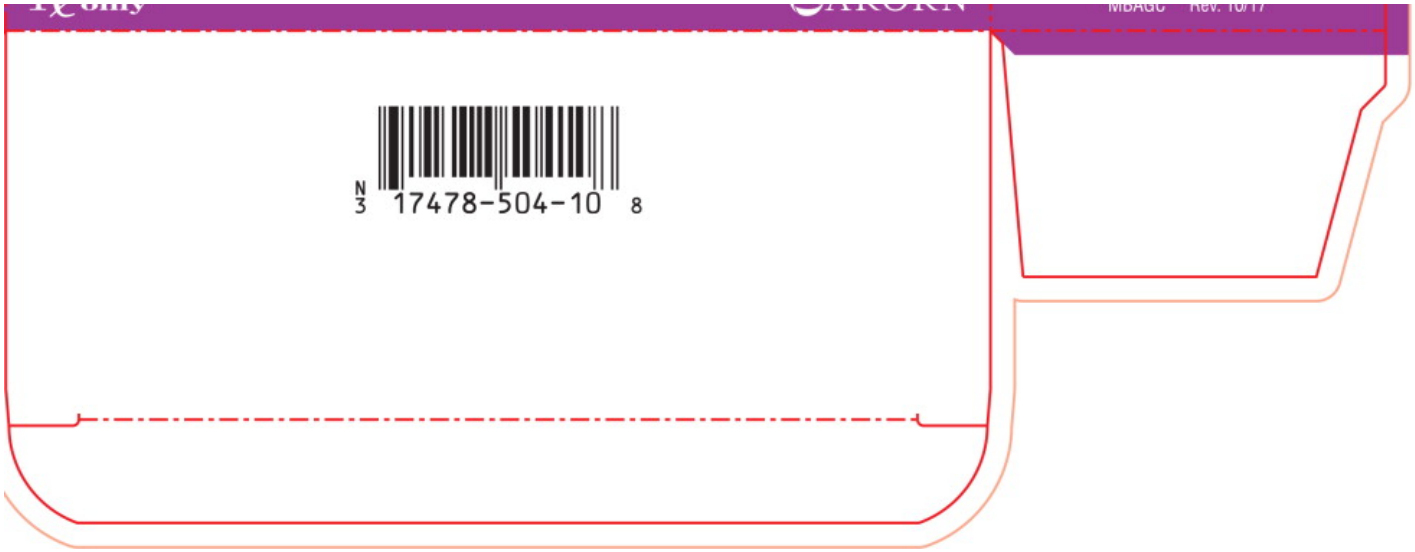
For slow Intravenous administration

10 Vials (10 mL each)

Rx only Akorn Logo


Methylene Blue Injection
1% (10 mg/mL)
For slow Intravenous administration
10 Vials (10 mL each)
NDC 17478-504-10
Methylene Blue Injection
1% (10 mg/mL)
For slow Intravenous administration
10 Vials (10 mL each)
Rx only
AKORN
Each mL contains:
Methylene Blue 10 mg and Water for Injection q.s. pH adjusted with Hydrochloric Acid and/or Sodium Hydroxide when necessary.


NDC 17478-504-10
Methylene Blue Injection
1% (10 mg/mL)
For slow Intravenous administration
10 Vials (10 mL each)
Rx only
AKORN
Usual Dosage: See package insert for dosage information.
Storage: Store at 20° to 25°C (68° to 77°F) [see USP Controlled Room Temperature].
Manufactured by:
Akorn, Inc.
Lake Forest, IL 60045



METHYLENE BLUE

methylene blue injection

Product Information			
Product Type	HUMAN PRESCRIPTION DRUG	**Item Code (Source)**	NDC:17478-504
Route of Administration	INTRAVENOUS		

Active Ingredient/Active Moiety		
Ingredient Name	**Basis of Strength**	**Strength**
Methylene Blue (UNII: T42P99266K) (Methylene Blue Cation - UNII:ZMZ79891ZH)	Methylene Blue	10 mg in 1 mL

Inactive Ingredients	
Ingredient Name	**Strength**
Water (UNII: 059QF0KO0R)	
Hydrochloric Acid (UNII: QTT17582CB)	
Sodium Hydroxide (UNII: 55X04QC32I)	

Packaging				
#	**Item Code**	**Package Description**	**Marketing Start Date**	**Marketing End Date**
1	NDC:17478-504-10	10 in 1 CARTON	04/01/2009	
1		10 mL in 1 VIAL; Type 0: Not a Combination Product		
2	NDC:17478-504-01	10 in 1 CARTON	04/01/2009	
2		1 mL in 1 VIAL; Type 0: Not a Combination Product		

Marketing Information			
Marketing Category	**Application Number or Monograph Citation**	**Marketing Start Date**	**Marketing End Date**
unapproved drug other		04/01/2009	

Labeler - Akorn, Inc. (117696770)

Registrant - Akorn Operating Company LLC (117693100)

Establishment

Name	Address	ID/FEI	Business Operations
Akorn, Inc.		117696832	MANUFACTURE(17478-504) , REPACK(17478-504) , ANALYSIS(17478-504)

Revised: 10/2020 Akorn, Inc.