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## **Sample IP Report** **Pantoprazole injection**

**Plot No. 74, Sector 58**

**Faridabad**

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## Product Details [USA] for Pantoprazole Injection

<b>Active</b>	<b>Pantoprazole Sodium</b>		
<b>Brand Name</b>	Protonix		
<b>Category</b>	Proton Pump Inhibitor		
<b>Innovator</b>	Altana/Wyeth		
<b>Generic Firms</b>	Teva, Sun, KUDCO Ireland		
<b>FDA Details</b>			
NDA#	<b>#20988</b>	#20987	#22020
Approval Date	22-Mar-01	2-Feb-00	14-Nov-07
Dose Form	Infusion Injectable	Delayed Release Tablet	Delayed release suspension
Strengths	Eq 40mg base/vial	Eq 20mg ; Eq 40mg	Eq40mg base/vial
Company	Wyeth	Wyeth	Wyeth
<b>OB Details</b>			
NDA #	<b>#20988</b>	<b>#20988</b>	<b>#20988</b>
Patent	US4758579	US6780881	US7351723
Type	Product	Formulation	Formulation
Estimated Expiry	19-Jan-11	17-May-22	17-May-22
Exclusivities	None		
<b>Label Info</b>			
Active	5-(difluoromethoxy)-2-[[[(3,4-dimethoxy-2-pyridinyl)methyl] sulfinyl]-1H-benzimidazole		
Salt	Sodium		
Form/hydration	Sesquihydrate		
Appearance	White to off-white crystalline powder		
<b>Formulation</b>	PROTONIX I.V. for Injection is supplied as a freeze-dried powder in a clear glass vial fitted with a rubber stopper and crimp seal containing pantoprazole sodium, equivalent to 40 mg of pantoprazole, edetate disodium (1 mg), and sodium hydroxide to adjust pH.		
<b>Indication 1</b>	PROTONIX I.V. for Injection is indicated for short-term treatment (7 to 10 days) of patients having gastroesophageal reflux disease (GERD) with a history of erosive esophagitis		
<b>2</b>	PROTONIX I.V. for Injection is indicated for the treatment of pathological hypersecretory conditions associated with Zollinger-Ellison Syndrome or other neoplastic conditions.		
<b>Para IV</b>	<b>A para IV ANDA has been filed on 7-Apr-2005 in FDA.</b>		
<b>ANDA Details</b>			
Company	Teva		
Approval Date	20-Oct-2008 (tentative)		
Dose Form	Injectable Injection		
Strength	Eq 40mg base		

DMF Details for Pantoprazole Sodium	
Company	Details
ISOICHEM GROUPE SNPE	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN GENEVILLIERS, FRANCE
DOTTIKON SYNTHESIS AG	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN DOTTIKON, SWITZERLAND.
SUN PHARMACEUTICAL INDUSTRIES LTD	PANTOPRAZOLE SODIUM AS MANUFACTURED IN MAHARASHTRA, INDIA.
DR REDDYS LABORATORIES LTD	PANTOPRAZOLE SODIUM AS MANUFACTURED IN ANDHRA PRADESH, INDIA.
TEVA GROUP	PANTOPRAZOLE SODIUM AS MANUFACTURED IN BE'ER SHEVA, ISRAEL.
CIPLA LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN BANGALORE, INDIA.
QUIMICA SINTETICA SA	PANTOPRAZOLE SODIUM AS MANUFACTURED IN MADRID, SPAIN.
MATRIX LABORATORIES LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN ANDHRA PRADESH, INDIA.
UQUIFA MEXICO S.A. DE C.V.	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN MORELOS, MEXICO.
MOEHS IBERICA SL	PANTOPRAZOLE SODIUM AS MANUFACTURED IN CANTABRIA, SPAIN.
LUPIN LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN MAHARASHTRA, INDIA.
AUROBINDO PHARMA LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE DRUG SUBSTANCE AS MANUFACTURED IN ANDHRA PRADESH, INDIA.
PLIVA HRVATSKA DOO	PANTOPRAZOLE SODIUM AS MANUFACTURED IN ZAGREB CROATIA
AMINO CHEMICALS LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN MARSALA MALTA
HETERO DRUGS LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN ANDHRA PRADESH INDIA
ERREGIERRE SPA	PANTOPRAZOLE SODIUM AS MANUFACTURED IN BERGAMO ITALY
WANBURY LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN MAHARASHTRA INDIA
ESTEVE QUIMICA SA	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MFG. IN GIRONA, SPAIN.
WOCKHARDT LTD	PANTOPRAZOLE SODIUM AS MANUFACTURED IN GUJARAT, INDIA.
MSN LABORATORIES LIMITED	PANTOPRAZOLE SODIUM AS MANUFACTURED IN ANDHRA PRADESH, INDIA
JUBILANT ORGANOSYS LTD	PANTOPRAZOLE SODIUM AS MANUFACTURED IN KARNATAKA, INDIA
DR REDDYS LABORATORIES LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN ANDHRA PRADESH, INDIA
RANBAXY LABORATORIES LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE (NON-STERILE BULK DRUG SUBSTANCE) AS MANUFACTURED IN PUNJAB, INDIA
NATCO PHARMA LTD CHEMICAL DIV	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN ANDHRA PRADESH, INDIA
APOTEX PHARMACHEM INC	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN BRANTFORD, ONTARIO, CANADA
ORCHID CHEMICALS AND PHARMACEUTICALS LTD	PANTOPRAZOLE SODIUM (NON-STERILE BULK API) AS MANUFACTURED IN MAHARASHTRA, INDIA
SMS PHARMACEUTICALS LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN ANDHRA PRADESH, INDIA
MACLEODS PHARMACEUTICALS LTD	PANTOPRAZOLE SODIUM SESQUIHYDRATE AS MANUFACTURED IN GUJARAT, INDIA

### OB listed Patents

Patent #	Expiry(OB)	Details
US4758579	19-Jan-11	This is the OB listed patent for pantoprazole. The patent claims the pantoprazole sodium specifically in claim 25. Claim 26 further claims a medicament of the salt useful to inhibit gastric acid secretion and further claim 27 suggests treatment based on excessive secretion of HCl by the stomach.
US6780881	17-May-22	This orange book listed patent claims for the process to prepare an injectable formulation of pantoprazole salt. More specifically the first claim entails a process for producing a formulation comprising freeze -drying of an aqueous solution of pantoprazole (its salts and/or solvate thereof), ethylenediamine tetraacetic acid or a salt thereof, and sodium hydroxide and/or sodium carbonate. The claim also characterises the freeze dried powder by number of particles upon dissolution. In claim 4 pantoprazole sodium sesquihydrate is claimed. Further dependent claims indicate an injectable kit with physiological saline.
US7351723	17-May-22	This Orange book patent claims for the marketed formulation of PROTONIX IV. Claim 1 entails a lyophilised preparation comprising pantoprazole (its salts and/or solvates thereof), EDTA and/or its suitable salt, sodium hydroxide and/or sodium carbonate. Claim 14 entails a similar formulation comprising pantoprazole sodium sesquihydrate. The patent also claims pantoprazole magnesium dihydrate.
<b>Inference</b>		The above key patents related to pantoprazole injectable formulation will be expiring only in the year 2022. However, Teva parenteral has file a NDA for its injectable product of Intravenous pantoprazole formulation. It is thus speculated that the Teva formulation is a sterile product and is probably stable liquid formulation. Sun pharma is also reportedly an early generic competition. It is believed that the Sun Pharma also has access to a sterile pantoprazole for injection instead of the lyophilised product. Sun and Teva have filed a para IV for the injectable formulation of pantoprazole.

## Patent Landscape for Pantoprazole Injection [Protonix I.V.]

Patent #	Family	Assignee	Publication Date	Priority Date	Title	Comment
US5589491	WO9402141(A1) SK279554 (B6) SG52479(A1) RU2126252(C1) NZ254237(A) NO304098(B1) KR100258423(B1) HU71900(A2) HK52397(A) GR3021937(T3) FI950379(A) FI113338(B1) ES2093445(T3) EP0652751(A1) EP0652751(B1) DK652751(T3) DE69305642 (T2) CZ284249 (B6) CA2140347(A1) A2140347 (C) AU4583893 (A) AU674015 (B2) AT144421 (T)	Fujisawa pharmaceutical	31-Dec-1996	28-Jul-1992	Injection and injection Kit containing Omeprazole and its analogs	The present patent claims an injection solution comprising a 2-[(2-pyridyl)methylsulfanyl]-benzimidazole compound or a salt thereof having antiulcer activity and an aqueous solvent added with no nonaqueous solvent is disclosed wherein the pH is not less than 9.5 and not more than 11.5.
US5888535	none	Sepracor	30-Mar-1999	27-Apr-1993	Methods and compositions for treating gastric disorders using optically pure (-) pantoprazole	A method of treating ulcers in a human which comprises administering to said human an amount of (-) pantoprazole, or a pharmaceutically acceptable salt thereof, substantially free of its (+) stereoisomer, said amount being sufficient to alleviate or palliate said ulcers.
US6953808	US20040142032A1	Sepracor	22-Jul-2004	27-Apr-1993	Method for treating gastric disorders using optically pure (-) pantoprazole	A method of inhibiting H <sup>+</sup> ,K <sup>+</sup> -ATPase which comprises administering to a mammal an amount of (-) pantoprazole, or a pharmaceutically acceptable salt thereof, substantially free of its (+) stereoisomer, said amount being sufficient to inhibit H <sup>+</sup> ,K <sup>+</sup> -ATPase.
DE4324014	WO/96/17607	BYK Gulden	19-Jan-1995	17-Jul-1993	Process for the production of a composition which can be reconstituted in water	The patent claims the preparation of a lyophilizate of pantoprazole sodium sesquihydrate in the presence of sucrose as an auxiliary at production temp of -250C to -300C. The lyophilisate is claimed to have improved stability at room temperatures. The product has shelf-life of more than 18 months.
EP1039905	WO9918959(A9) PT1039905(E) JP2001519390(T) ES2268800(T3) EP1039905(A1) EP1039905 (B1) DK1039905(T3) DE69835165 (T2) CA2308143(A1) AU1361399(A) AT332133 (T)	Eisai	22-Apr-1999	14-Oct-1997	Pharmaceutical Formulation Comprising Glycine as a Stabiliser	The patent describes aqueous pharmaceutical composition which are chemically and physically stable for intravenous injection which compromise anti-ulcerative compound and glycine as stabiliser in carrier.
US6852739	US2004266828 (A1) US7332505 (B2)	NitroMed	8-Feb-2005	22-Jan-1999	Methods using proton pump inhibitors and nitric oxide donors	The patent claims for a composition to treat several ailments including ulcers and Zollinger-Elison Syndrome by administering a benzimidazole moiety (including pantoprazole or its salts) and atleast one compound that donates, transfers or releases nitric oxide, induces the production of endogenous nitric oxide or endothelium-derived relaxing factor, stimulates endogenous synthesis of nitric oxide or is a substrate for nitric oxide synthase. The patent does not specify the route of administration but claims any suitable mode of administration including parenteral formulation

US6436975B1	WO9944595 (A2) WO9944595(A3) RU2227030 (C2)JP2002505276 (T) ITM1980443 (A1) HU0203648 (A2) ES2251180 (T3) EP1083887 (A2) EP1083887(B1) DK1083887 (T3) DE69927584 (T2) CN1291896 (A) CA2322865 (A1)CA2322865 (C) BR9908427 (A) AU2726399 (A) AU757155 (B2) AT305791 (T)	Nicox	20-Aug-2002	25-Feb-1999	Pharmaceutical compositions for ulcer	The patent claims a pharmaceutical formulation for the therapy and prevention of ulcer comprising conventional anti-ulcer products (including PPI like pantoprazole) and organic compounds containing -ON=O function or inorganic compounds containing the -NO group, characterized in that they are NO nitric oxide donors.
CN1235018	None	Dongyu Pharmaceutical	17-Nov-1999	22-Apr-1999	Preparation of freeze-dried pantoprazole injection and preparing method thereof	A freeze-dried injection powder of pantolazole sodium containing no crystallized water with pH value of 9-12.5 is composed of pantolazole sodium (1 wt.%), freeze-dried powder supporting agent (1-5 wt.%, metal ion complexing agent (0.05-2 wt.%) and pH regulator. Its preparing process includes filtering to remove carbon, sterilizing, and pouring. At first, it is pre-frozen at -35-- -55 deg.C. After the temp. is kept for 1-4 hr, it is vacuumized and the temp. is raised to 10-50 deg.C within 15-30 hr while vacuum state is kept for 3-10 hr. After nitrogen is aerated, it is stored. Its advantages include high stability to light, heat, oxygen and water, no content of crystallized water and easy operation. It can be used for intravenous drip without any toxic by-effect.
KR100910606B1	none	Not Known	2-Jul-2003	17-Nov-2001	Freeze Dried pantoprazole preparation and Pantopazole Injectoion.	No other Info
US20090093522	WO0241919 (A1) ZA200303593 (A) YU37703 (A) US2004220228 (A1) US7351723 (B2) US2003003058 (A1) US6780881 (B2) UA80961 (C2) TW284041 (B) SK6062003 (A3) SI1339430 (T1) PT1339430 (E) PL361118 (A1) NZ525911 (A) NO20032303 (A) MXPA03004548 (A) KR20080003010 (A) JP2004513970 (T) IS6820 (A) IL155601 (A) HU0303278 (A2) HR20030410 (A2) HK1060848 (A1) ES2298295 (T3) EP1762249 (A2) EP1339430 (A1) EP1339430 (B1) EE200300182 (A) ECSP034613 (A) DK1339430 (T3) DE60132108 (T2) CZ20031416 (A3) CN1476335 (A) CN1250292 (C) CA2541946 (A1) CA2428870 (A1) CA2428870 (C) BR0115483 (A) BG107828 (A) AU2002216042 (B2) AU1604202 (A) AT381946 (T)	Nycomed	4-Sep-2009	17-Nov-2001	Freeze-dried pantoprazole preparation and pantoprazole injection	A pantoprazole injection for bolus administration obtainable by reconstitution of a lyophilized preparation consisting of: (a) 5-difluoromethoxy-2-[(3,4-dimethoxy-2-pyridinyl)methylsulfinyl]-1H-benzimidazole (pantoprazole) or a solvate, hydrate, salt, hydrate of a salt or solvate of a salt thereof; (b) ethylenediamine tetraacetic acid and/or a suitable salt thereof, and (c) sodium hydroxide and/or sodium carbonate; in an aqueous solvent.
US6780881	EP1339430 (B1) WO0241919 (A1) ZA200303593 (A) YU37703 (A) US2004220228 (A1) US7351723 (B2) US2003003058 (A1) US6780881 (B2) US2009093522 (A1) UA80961 (C2) TW284041 (B) SK6062003 (A3) SI1339430 (T1) PT1339430 (E) PL361118 (A1) NZ525911 (A) NO20032303 (A) MXPA03004548 (A) KR20080003010 (A) JP2004513970 (T) IS6820 (A) IL155601 (A) HU0303278 (A2) HR20030410 (A2) HK1060848 (A1) ES2298295 (T3) EP1762249 (A2) EE200300182 (A) ECSP034613 (A) DK1339430 (T3) DE60132108 (T2) CZ20031416 (A3) CN1476335 (A) CN1250292 (C) CA2541946 (A1) CA2428870 (A1) CA2428870 (C) BR0115483 (A) BG107828 (A) AU2002216042 (B2) AU1604202 (A) AT381946 (T)	Altana Ph	24-Aug-2004	17-Nov-2001	Freeze-dried pantoprazole preparation and pantoprazole injection	Process for the production of a freeze-dried preparation comprising 5-difluoromethoxy-2-[(3,4-dimethoxy-2-pyridinyl)methylsulfinyl]-1H-benzimidazole (pantoprazole), a salt thereof, a solvate of pantoprazole or a salt thereof, comprising freeze-drying of an aqueous solution of pantoprazole, a salt thereof, a solvate of pantoprazole or a salt thereof, ethylenediamine tetraacetic acid and/or a suitable salt thereof, and sodium hydroxide and/or sodium carbonate, wherein upon dissolution in an aqueous solvent, the preparation has less than 130 subvisible particles per vial, the particles having a size equal to or greater than 10 µm, wherein the number of particles is determined according to USP 24 by light obscuration particle test count.

US7351723	WO0241919 (A1) ZA200303593 (A) YU37703 (A) US2004220228 (A1) US7351723 (B2) US2003003058 (A1) US6780881 (B2) UA80961(C2) TW284041 (B) SK6062003 (A3) SI1339430 (T1) PT1339430 (E) PL361118 (A1) NZ525911 (A) NO20032303 (A) MXPA03004548 (A) KR20080003010 (A) JP2004513970 (T) IS6820 (A) IL155601 (A) HU0303278 (A2) HR20030410 (A2) HK1060848 (A1) ES2298295 (T3) EP1762249 (A2) EP1339430 (A1) EP1339430 (B1) EE200300182 (A) ECSP034613 (A) DK1339430 (T3) DE60132108 (T2) CZ0031416 (A3) CN1476335 (A) CN1250292 (C) CA2541946 (A1) CA2428870 (A1) CA2428870 (C) BR0115483 (A) BG107828 (A) AU2002216042 (B2) AU1604202 (A) AT381946 (T)	Nycomed	4-Jan-2010	17-Nov-2001	Freeze-dried pantoprazole preparation and pantoprazole injection	Lyophilized preparation consisting of: (a) 5-difluoromethoxy-2-[(3,4-dimethoxy-2-pyridinyl)methylsulfinyl]-1H-benzimidazole (pantoprazole) or a solvate, hydrate, salt, hydrate of a salt or solvate of a salt thereof; (b) ethylenediamine tetraacetic acid and/or a suitable salt thereof, and (c) sodium hydroxide and/or sodium carbonate
WO/2005/011678	WO/2005/011678	Altana Ph	2-Oct-2005	31-Jul-2003	Method for Reducing the volume of gastric refluxate	The patent claims a new use of pantoprazole administered in short 2 minute infusion for reducing, by reducing the gastric volume, the gastric acid output in pre-operative patients.
WO/2005/018639	US2008167349 (A1) US2009209591 (A1) JP2007502803 (T) EP1658073 (A1) CA2535813 (A1) AU2004266076 (A1)	Altana Ph	3-Mar-2005	21-Aug-2003	PHARMACEUTICAL PRODUCT FOR INJECTION	This patent application entails a pharmaceutical product for injection comprising a container including a closure suitable for preparations for injection, the container containing a compound selected from the group of an acid labile proton pump inhibitor, a salt thereof, a solvate of an acid labile proton pump inhibitor and a salt thereof, wherein the container and closure are made of material which essentially does not release zinc ions. The patent specifically claims pantoprazole sodiumsesquihydrate. The claims extend to reducing pressure inside the container.
US2007014875	WO2005065682 (A3) US2007014875 (A1) EP1713476 (A2) BRPI0416027 (A)	Bajaj Mannalal IN	18-Jan-2007	5-Nov-2003	Novel drug delivery system for proton pump inhibitors and process thereof	The patent claims a parenteral benzimidazole formulation comprising pharmaceutically acceptable excipient in powder form, ready to be reconstituted in injectable dosage. More precisely the formulation indicates an active benzimidazole salt and mannitol and sodium hydroxide (both as excipients) freeze dried to give the powder; wherein the pH of the reconstituted solution is between 9 and 11. However, the patent specifically claims rabeprazole as the active but the first claim indicates to any benzimidazole compound.
US20070161679	q`4	Allergan Ing	12-Jul-2007	18-Feb-2004	Method and compositions for the intravenous administration of compounds related to proton pump inhibitors	The patent discloses a method of treatment of PPI (including pantoprazole) comprising dissolving in an aq. Solution a therapeutic amount of PPI active coupled to an ionic functional group or a conjugate acid or base via a sulfonamide linkage. The composition can be administered parenterallyThe pH of the aq. solution is between 3 and 7.

CN1689568A	none	Yin Xiaofeng	2-Nov-2005	29-Apr-2004	Pharmaceutical composition containing cyclodextrin derivatives and proton pump inhibitor of parietal cell	The patent application was withdrawn after publication. The patent application entails a preferably intravenous parenteral formulation of PPI comprising the Active ingredient or its salt and /or their crystallohydrates; cyclodextrin derivative; and/or other water soluble supplementary material for non-intestinal applied medicine.
CN1293879C	none	Hangzhou Huadong Medicine	10-Jan-2007	20-Jan-2005	Freeze-dried powder injection of pantoprazole sodium and its preparation	this is a granted patent. The patent claims a freeze-dried powder injection of pantoprazole sodium which is proportionally prepared from pantoprazole sodium, and an excipient, weak-acid strong-alkaline salt, Disodium edetate, and inorganic alkali
WO/2006/082490	CN1813729 (A)	Ranbaxy	8-Oct-2006	2-Feb-2005	INJECTABLE FORMULATIONS OF BENZIMIDAZOLE COMPOUNDS	The patent application claims a parenteral formulation of pantoprazole comprising l-arginine and a pharmaceutical excipient. The description contains all examples of lansoprazole as the drug. The EP counterpart has been withdrawn.
WO2009001163	AR061155 (A1)	Combino Pharma	31-Dec-2008	1-Jun-2006	Lyophilised preparations of Pantoprazole Sodium for Injections	The first claim of the patent application very specifically entails lyophilized preparation for injection comprising: i. between approximately 21 mg and approximately 64 mg of pantoprazole sodium; and ii. between approximately 17 mg and approximately 52 mg of sodium citrate. further claims relates to process of preparation using pantoprazole sodium sesquihydrate.
WO/2005/070426	None	Altana Ph	8-Apr-2005	27-Jan-2007	FREEZE-DRIED (-)-PANTOPRAZOLE PREPARATION AND (-)-PANTOPRAZOLE INJECTION	This application claims magnesium salt of pantoprazole. Although the International phase has expired; there's seemingly no national phase entry.
CN100484525C	none	Shandong Pharmacy	6-May-2009	18-Jan-2008	Pantoprazole sodium freeze-dried powder injection and preparing method thereof	This is a granted patent. The patent entails a freeze dried pantoprazole sodium powder for injection comprising mannitol.
CN100548298C	None	Hainan Benchuang Pharma	27-Aug-2008	9-Apr-2008	Pantoprazole sodium liposomes freeze-dry preparations and method of preparing the same	The invention discloses a freeze-dried preparation of pantoprazole sodium liposomes, wherein pantoprazole sodium is encapsulated in antioxidant-containing liposomes made of soybean lecithin and cholesterol. The freeze-dried preparation is administered intravenously with stable quality, less toxicity and high effectiveness