IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF NEW YORK

Biofer S.p.A., Plaintiff, v. Vifor (International) AG., Defendant.	C.A. No. _____ **COMPLAINT FOR PATENT INFRINGEMENT** **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Biofer S.p.A. ("Plaintiff" or "Biofer"), by its undersigned attorneys brings this action against Defendant Vifor (International) AG. ("Vifor" or "Defendant"), and hereby alleges as follows:

NATURE OF THE ACTION

1. This is an action for infringement of United States Patent Nos. 8,759,320 ("the '320 Patent" or "the Asserted Patent") under the Patent Laws of the United States, 35 U.S.C. § 100 *et seq.*, including §§ 271(a) and (g), arising from Vifor's unauthorized development, manufacturing, importation, commercial marketing, distribution, offers for sale, sales and/or use of ferric carboxymaltose active pharmaceutical ingredient ("API") and/or Injectafer® (ferric carboxymaltose injection), an iron replacement product, as detailed herein. A true and correct copy of the '320 Patent is attached as Exhibit A.

THE PARTIES

2. Plaintiff Biofer S.p.A. is a company organized and existing under the laws of Italy, having a registered address of Via Canina, 2A, 41036 Medolla MO, Italy.

3. Biofer is the owner of all rights, including the right to enforcement, of the Asserted Patent.

4. Biofer is in the business of, *inter alia*, developing pharmaceutical products, including pharmaceutical products containing iron complexes.

5. Upon information and belief, Defendant Vifor is a company organized and existing under the laws of Switzerland having a registered address of Rechenstrasse 37, CH-9001, St. Gallen, Switzerland.

6. Upon information and belief, Vifor is a pharmaceutical company in the business of, among other activities, developing, manufacturing, and/or commercializing pharmaceutical products containing iron.

7. Upon information and belief, Vifor developed the drug product ferric carboxymaltose injection, and commercially manufactures, distributes, markets, offers for sale and/or sells it under the name Ferinject® outside of the United States.

8. Upon further information and belief, Ferinject® is known as Injectafer® (ferric carboxymaltose injection) in the United States.

9. Upon information and belief, both Ferinject® and Injectafer® contain the same or substantially identical API, known as ferric carboxymaltose.

10. Upon information and belief, Vifor manufactures the API contained in Ferinject® and Injectafer®.

11. Upon information and belief, the API in Ferinject® and Injectafer® is manufactured using the same or substantially identical processes.

12. Upon information and belief, the drug product Ferinject® is the same or substantially identical to Injectafer®.

13. Upon information and belief, Vifor manufactures ferric carboxymaltose API and/or Injectafer® outside of the United States.

14. Upon further information and belief, Vifor imports ferric carboxymaltose and/or Injectafer® into the United States.

15. Upon further information and belief, Vifor licenses Injectafer® to American Regent Inc. ("American Regent") for the commercial marketing, distribution, and sales of Injectafer® to residents throughout the United States, including in this district.

16. Upon information and belief, American Regent is a corporation organized and existing under the laws of the State of New York, with a principal place of business at 5 Ramsey Road, Shirley, New York 11967. Upon information and belief, American Regent was formerly known as Luitpold Pharmaceuticals, Inc., until January 2, 2019, when its New York Certificate of Incorporation was amended to change the name of the corporation to American Regent, Inc. Upon information and belief, American Regent is a subsidiary of Daiichi Sankyo, Inc., which is located at 211 Mt. Airy Road, Basking Ridge, New Jersey 07920.

17. Upon information and belief, American Regent is a pharmaceutical company in the business of, among other activities, developing, manufacturing, and/or commercializing pharmaceutical products containing iron complexes.

18. Upon information and belief, American Regent licenses Injectafer® from Vifor in the United States.

19. Upon information and belief, American Regent purchases ferric carboxymaltose and/or Injectafer® from Vifor in the United States.

20. Upon further information and belief, American Regent commercially markets, offers for sale, and/or sells Injectafer® to residents throughout the United States, including in this District.

JURISDICTION AND VENUE

21. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. §§ 100 et seq., including §§ 271(a) and 271(g).

22. This Court has subject matter jurisdiction over this action under 28 U.S.C. §§ 1331, 1332 and 1338(a).

23. This Court has personal jurisdiction over Vifor.

24. Upon information and belief, this Court has personal jurisdiction over Vifor, under New York's long arm statute, New York Civil Practice Law § 302, because Vifor, through partnership with American Regent, commercially markets, distributes, offers for sale and sells Injectafer® to residents throughout the United States, including in New York. Upon further information and belief, Vifor regularly does business in New York, derives substantial revenue from goods used or consumed in New York, and expects or should reasonably expect its acts to have consequences in New York. Upon further information and belief, Vifor has established, and will continue to maintain, minimum contacts with this forum such that the exercise of jurisdiction over Vifor would not offend traditional notions of fair play and substantial justice.

25. Venue is proper in this Judicial District as to Defendant Vifor under 28 U.S.C. § 1400(b) at least because, upon information and belief, Vifor has committed acts of infringement and has a regular and established place of business in this Judicial District.

26. Upon further information and belief, venue is proper in this judicial district as to Vifor under 28 U.S.C. §§ 1391 and 1400(b) for at least the reason that Vifor is a foreign corporation not residing in any United States district and may be sued in any judicial district that has personal jurisdiction, including this judicial district.

FACTUAL BACKGROUND

Iron Replacement Therapy Introduction

27. Iron replacement therapy is an important field of medicine due to the prevalence of iron deficiency anemia (IDA). IDA is a common type of anemia, a condition in which blood lacks adequate healthy red blood cells for carrying oxygen to the body's tissues. IDA occurs due to insufficient iron. Without enough iron, a person cannot produce enough hemoglobin in red blood cells to carry adequate amounts oxygen throughout the body. As a result, IDA may cause a person to be tired and/or short of breath. IDA can be treated with iron supplementation.

28. Trivalent iron (III) complexes have been used in the treatment of IDA. However, it is important that such complexes possess certain characteristics, such as high bioavailability, low toxicity, and ease of production. In addition, stability of the complex is important because it impacts not only the shelf life of the selected pharmaceutical form, but also the bioavailability of the complexed iron.

The Asserted Patent

29. Biofer is owner of all title, right and interest in the '320 Patent and has the right to enforce it. The '320 Patent, entitled "Process for the Preparation of Trivalent Iron Complexes with Mono-, Di- and Polysaccharide Sugars," was duly and legally issued on June 24, 2014 and lists Stefania Sacchi, Mauro Montorsi, and Egidio Marchi as inventors. The '320 Patent issued from

U.S. Patent Application No. 11/908,575 ("the '575 Application"), which is the national stage entry of PCT/IB2006/000560, filed on March 14, 2006. The '320 patent is presumed valid.

30. In Europe, Biofer's PCT/IB2006/000560 issued as EP 1858930 B1 on July 20, 2011. On April 20, 2012, Vifor filed an opposition before the European Patent Office against EP 1858930 B1. Accordingly, Vifor was aware of Biofer's PCT/IB2006/000560 at least as of the filing date of its opposition against Biofer's EP 1858930 B1 on July 20, 2011, and was further aware of the '575 Application prior to issuance of the '320 Patent and was aware of the '320 Patent on or shortly after its date of issuance.

31. The '320 Patent describes, *inter alia*, improved methods of making iron complexes. For example, the '320 Patent describes improved processes for preparation of trivalent iron (III) complexes with mono-, di- and polysaccharide sugars. (Ex. A ('320 Patent) at 1:6-8.)

32. The iron (III) complexes manufactured according to the processes described in the '320 Patent are characterized by good physical-chemical stability over time, low toxicity, safety and good bioavailability. (*Id*. at 8:54-59.)

33. The manufacturing processes described in the '320 Patent include four steps: (1) activation of mono-, di- or polysaccharide sugar; (2) complexation of the activated sugar with ferric hydroxide generated in solution; (3) purification of the ferric hydroxide/sugar complex still not stabilized; and (4) stabilization of the ferric hydroxide/sugar complex. (*Id*. at 9:60-67.)

34. With respect to the first step, it is known that sugars having an aldehyde end group can be oxidized using bromine, but such methods can be difficult to carry out. (*Id*. at 6:2-11.) However, the inventors of the '320 Patent discovered that the problems associated with the use of bromine as an oxidizing agent can be overcome by producing the bromine oxidizing agent *in situ*. This can be done by the controlled addition of sodium hypochlorite in an aqueous solution

containing an alkaline or alkaline earth bromide (such as sodium bromide) and the sugar, at a pH between 7.0 and 9.0. (*Id*. at 6:30-36.)

35. The ’320 Patent further explains that sugar activation is advantageously carried out on an industrial scale using the methods of the invention due to the ease of handling of the reagents and the repeatability of the reaction itself. (*Id*. at 6:36-43.)

36. An advantage of the method according to the ’320 Patent is the handling of reagents which require particular precautions, such as bromine, is avoided and the activation reaction is carried out in controlled conditions. The amount of bromide used may be between 0.5% and 5% by weight of the sugar to be activated. Therefore the bromine quantity which is formed during the activation reaction is low with respect to the quantity of sugar to be activated. (*Id*. at 6:43-52.)

37. The novel manufacturing processes discovered by the Biofer inventors for making iron complexes is reflected in exemplary claims 1 and 7 of the ’320 Patent which recite:

> 1. A process for the preparation of an activated sugar comprising the step of reacting a sugar having an aldehyde end group with bromine in a solution at a pH between 7.0 and 9.0 with the specific oxidation of the end aldehyde, wherein
>
> > i) said sugar is selected from the group consisting of dextrins and dextrans and wherein
> >
> > ii) said bromine is produced in situ through the addition of a hypochlorite and an alkaline or earth alkaline metal bromide to said solution, said hypochlorite being added in stoichiometric quantities with respect to the aldehyde end groups, wherein said hypochlorite is added instant by instant, such that an excess of hypochlorite in solution is never present.
>
> 7. The process according to claim 1, where, in a following step, Fe(III) salt is added to react with said activated sugar to form a Fe(III)-activated sugar complex.

(*Id*. at claims 1, 7.)

The Injectafer® Product is Manufactured Using an Infringing Process

38. Upon information and belief, American Regent is the owner of NDA No. 203565 for Injectafer® (ferric carboxymaltose) which the FDA approved on July 25, 2013. Upon

information and belief, the FDA's Orange Book originally listed the owner of NDA No. 203565 as Luitpold Pharmaceuticals, Inc. ("Luitpold"). Upon information and belief, Luitpold changed its name to American Regent, Inc., effective January 2, 2019.

39. Upon information and belief, Vifor is the manufacturer of the API (ferric carboxymaltose) for Injectafer®

40. Upon information and belief, Vifor is the holder of the Drug Master File (DMF) for the API contained in Injectafer®.

41. Upon information and belief, the API contained in Injectafer® is made in accordance with Drug Master File (DMF) No. 16967.

42. Upon information and belief, Vifor is the holder of Drug Master File (DMF) No. 16967.

43. Upon information and belief, the code "VIT-45" is an internal Vifor code for the active ingredient, ferric carboxymaltose.

44. Upon information and belief, the active pharmaceutical ingredient (API) in Injectafer, *i.e.*, ferric carboxymaltose is manufactured by Vifor using a process which meets every limitation of at least one claim of the '320 Patent.

45. Upon information and belief, the active pharmaceutical ingredient (API) in Injectafer, *i.e.*, ferric carboxymaltose, is manufactured outside of the United States by or on behalf of Vifor.

46. Upon information and belief, the ferric carboxymaltose API in Injectafer is imported into the United States by or on behalf of Vifor.

47. Upon information and belief, Injectafer® is imported into the United States.

48. Upon information and belief, Injectafer® is imported into the United States by or on behalf of Vifor.

49. Upon information and belief, once the Injectafer® product is imported into the United States by or on behalf of Vifor, it is commercially marketed, distributed, used, offered for sale, and/or sold by American Regent, pursuant to a license from Vifor, throughout the United States.

50. Upon further information and belief, American Regent commercially markets, distributes, offers for sale, sells, and/or uses the Injectafer® product throughout the United States in the same form in which it is manufactured by Vifor.

51. Upon information and belief, Vifor manufactures ferric carboxymaltose and/or Injectafer® using a process which infringes one or more claims of the '320 Patent, and the product is not materially changed by any subsequent processes and does not become a trivial and nonessential component of another product. Rather, Injectafer® is imported and commercially marketed, distributed, offered for sale, sold and/or used, in the United States in the same or substantially the same form in which it is produced using a manufacturing process which infringes the claims of the '320 Patent. Upon information and belief there are no additional manufacturing processes which materially alter the Injectafer® product. Upon information and belief, ferric carboxymaltose is an essential component of the Injectafer® product.

52. Upon information and belief, American Regent licenses Injectafer® and certain Orange Book listed patents from Vifor, and American Regent commercially markets, distributes, offers for sale, sells, and/or uses Injectafer®, in this judicial district and throughout the United States.

53. Upon information and belief, the FDA Orange Book lists United States Patent Nos. 7,612,109 ("the '109 Patent"); 7,754,702 ("the '702 Patent"); 8,895,612 ("the '612 Patent"); 9,376,505 ("the '505 Patent"), and 11,123,321 ("the '321 Patent") (collectively, "the Orange Book Patents") with respect to Injectafer®. Upon information and belief, Vifor is the assignee of the '109 Patent, the '505 Patent, and the '321 Patent. Upon information and belief, American Regent is the assignee of the '702 Patent and the '612 Patent. Upon information and belief, American Regent licenses the '109 Patent, the '505 Patent, and the '321 Patent from Vifor.

54. Upon information and belief, the Orange Book Patents for which Vifor is the assignee, *i.e.*, the '109 Patent, the '505 Patent and the '321 Patent, each recite purported manufacturing methods in Examples 1-8.

55. Each of the Examples 1-8 appearing in the '109 Patent also appear in the '505 Patent and '321 Patent, and citations to the '109 Patent are representative of the identical citations in the '505 Patent and '321 Patent.

56. Each of Examples 3-8 of the '109 Patent recite the step of oxidizing a maltodextrin with a sodium hypochlorite solution and sodium bromide.

57. Example 3 of the '109 Patent recites:

> 100 g maltodextrin (9.6 dextrose equivalent measured gravimetrically) are dissolved by stirring in 300 ml water at 25° C. and oxidized by addition of 30 g sodium hypochlorite solution (13 to 16 weight percent active chlorine) and 0.7 g sodium bromide at pH 10.
>
> At first the oxidized maltodextrin solution and then 554 g sodium carbonate solution (17.3% weight/weight) are added at room temperature to 352 g of a stirred iron (III) chloride solution (12% weight by weight Fe).
>
> Then the pH is adjusted to 6.5 by addition of sodium hydroxide and the solution is heated to 50° C. and kept for 60 minutes at 50° C. Then, acidification to a pH of 5 to 6 is effected by addition of hydrochloric acid, the solution is kept at 50° C. for a further 30 minutes and then heated to 97-98° C. and the temperature is kept for

> 30 minutes at this range. After cooling the solution to room temperature the pH is adjusted to 6-7 by the addition of sodium hydroxide.
>
> The solution is then filtered through a sterilisation filter and then examined for sediments. Thereafter, the complex is isolated by precipitation with ethanol in a range of 1:0.85 and then dried in vacuum at 50° C.
>
> The yield is 139 g (corresponding to 88% of the theoretical value) of a brown amorphic powder having an iron content of 26.8% weight/weight (measured complexometrically).
>
> Molecular weight mw 140 kDa.

(*Id*. at 6:6-33.)

58. Example 4 of the ’109 Patent recites:

> A mixture of 45 g maltodextrin (6.6 dextrose equivalent measured gravimetrically) and 45 g maltodextrin (14.0 dextrose equivalent measured gravimetrically) is dissolved by stirring in 300 ml water at 25° C. and oxidized by addition of 25 g sodium hypochlorite solution (13 to 16 weight percent active chlorine) and 0.6 g sodium bromide at pH 10.
>
> At first the oxidized maltodextrin solution and then 554 g sodium carbonate solution (17.3% weight/weight) are added at room temperature to 352 g of a stirred iron (III) chloride solution (12% weight by weight Fe).
>
> Then the pH is adjusted to 11 by addition of sodium hydroxide and the solution is heated to 50° C. and kept for 30 minutes at 50° C. Then, acidification to a pH of 5 to 6 is effected by addition of hydrochloric acid, the solution is kept at 50° C. for a further 30 minutes and then heated to 97-98° C. and the temperature is kept for 30 minutes at this range. After cooling the solution to room temperature the pH is adjusted to 6-7 by the addition of sodium hydroxide.
>
> The solution is then filtered through a sterilisation filter and then examined for sediments. Thereafter, the complex is isolated by precipitation with ethanol in a range of 1:0.85 and then dried in vacuum at 50° C.
>
> The yield is 143 g (corresponding to 90% of the theoretical value) of a brown amorphic powder having an iron content of 26.5% weight/weight (measured complexometrically).
>
> Molecular weight mw 189 kDa.

(*Id*. at 6:35-62.)

59. Example 5 of the '109 Patent recites:

> 90 g maltodextrin (14.0 dextrose equivalent measured gravimetrically) are dissolved by stirring in 300 ml water at 25° C. and oxidized by addition of 35 g sodium hypochlorite solution (13 to 16 weight percent active chlorine) and 0.6 g sodium bromide at pH 10.
>
> At first, the oxidized maltodextrin solution and then 554 g sodium carbonate solution (17.3% weight/weight) are added at room temperature to 352 g of a stirred iron (III) chloride solution (12% weight by weight Fe).
>
> Then the pH is adjusted to 11 by addition of sodium hydroxide and the solution is heated to 50° C. and kept for 30 minutes at 50° C. Then, acidification to a pH of 5 to 6 is effected by addition of hydrochloric acid, the solution is kept at 50° C. for a further 30 minutes and then heated to 97-98° C. and the temperature is kept for 30 minutes at this range. After cooling the solution to room temperature the pH is adjusted to 6-7 by the addition of sodium hydroxide.
>
> The solution is then filtered through a sterilisation filter and then examined for sediments. Thereafter, the complex is isolated by precipitation with ethanol in a range of 1:0.85 and then dried in vacuum at 50° C.
>
> The yield is 131 g (corresponding to 93% of the theoretical value) of a brown amorphic powder having an iron content of 29.9% weight/weight (measured complexometrically).
>
> Molecular weight mw 118 kDa.

(*Id*. at 6:64-7:23.)

60. Example 6 of the '109 Patent recites:

> A mixture of 45 g maltodextrin (5.4 dextrose equivalent measured gravimetrically) and 45 g maltodextrin (18.1 dextrose equivalent measured gravimetrically) is dissolved by stirring in 300 ml water at 25° C. and oxidized by addition of 31 g sodium hypochlorite solution (13 to 16 weight percent active chlorine) and 0.7 g sodium bromide at pH 10.
>
> At first the oxidized maltodextrin solution and then 554 g sodium carbonate solution (17.3% weight/weight) are added at room temperature to 352 g of a stirred iron (III) chloride solution (12% weight by weight Fe).

> Then the pH is adjusted to 11 by addition of sodium hydroxide and the solution is heated to 50° C. and kept for 30 minutes at 50° C. Then, acidification to a pH of 5 to 6 is effected by addition of hydrochloric acid, the solution is kept at 50° C. for a further 30 minutes and then heated to 97-98° C. and the temperature is kept for 30 minutes at this range. After cooling the solution to room temperature the pH is adjusted to 6-7 by the addition of sodium hydroxide.
>
> The solution is then filtered through a sterilisation filter and then examined for sediments. Thereafter, the complex is isolated by precipitation with ethanol in a range of 1:0.85 and then dried in vacuum at 50° C.
>
> The yield is 134 g (corresponding to 88% of the theoretical value) of a brown amorphic powder having an iron content of 27.9% weight/weight (measured complexometrically).
>
> Molecular weight mw 178 kDa.

(*Id*. at 7:25-52.)

61. Example 7 of the ’109 Patent recites:

> 100 g maltodextrin (9.6 dextrose equivalent measured gravimetrically) are dissolved by stirring in 300 ml water at 25° C. and oxidized by addition of 29 g sodium hypochlorite solution (13 to 16 weight percent active chlorine) and 0.7 g sodium bromide at pH 10.
>
> At first the oxidized maltodextrin solution and then 554 g sodium carbonate solution (17.3% weight/weight) are added at room temperature to 352 g of a stirred iron (III) chloride solution (12% weight by weight Fe).
>
> Then the pH is adjusted to 11 by addition of sodium hydroxide and the solution is heated to 50° C. and kept for 30 minutes at 50° C. Then, acidification to a pH of 5 to 6 is effected by addition of hydrochloric acid, the solution is kept at 50° C. for a further 70 minutes. After cooling the solution to room temperature the pH is adjusted to 6-7 by the addition of sodium hydroxide.
>
> The solution is then filtered through a sterilisation filter and then examined for sediments. Thereafter, the complex is isolated by precipitation with ethanol in a range of 1:0.85 and then dried in vacuum at 50° C.
>
> The yield is 155 g (corresponding to 90% of the theoretical value) of a brown amorphic powder having an iron content of 24.5% weight/weight (measured complexometrically).

Molecular weight mw 137 kDa.

(*Id*. at 7:54-8:12.)

62. Example 8 of the '109 Patent recites:

> 126 g maltodextrin (6.6 dextrose equivalent measured gravimetrically) are dissolved by stirring in 300 ml water at 25° C. and oxidized by addition of 24 g sodium hypochlorite solution (13 to 16 weight percent active chlorine) and 0.7 g sodium bromide at pH 10.
>
> At first the oxidized maltodextrin solution and then 554 g sodium carbonate solution (17.3% weight/weight) are added at room temperature to 352 g of a stirred iron (III) chloride solution (12% weight by weight Fe).
>
> Then the pH is adjusted to 11 by addition of sodium hydroxide and the solution is heated to 50° C. and kept for 30 minutes at 50° C. Then, acidification to a pH of 5 to 6 is effected by addition of hydrochloric acid, the solution is kept at 50° C. for a further 70 minutes. After cooling the solution to room temperature the pH is adjusted to 6-7 by the addition of sodium hydroxide.
>
> The solution is then filtered through a sterilisation filter and then examined for sediments. Thereafter, the complex is isolated by precipitation with ethanol in a range of 1:0.85 and then dried in vacuum at 50° C.
>
> The yield is 171 g (corresponding to 86% of the theoretical value) of a brown amorphic powder having an iron content of 21.35% weight/weight (measured complexometrically).
>
> Molecular weight mw 170 kDa.

(*Id*. at 8:14-39.)

63. Upon information and belief, Vifor's Drug Master File (DMF) for ferric carboxymaltose includes a step of using sodium hypochlorite and sodium bromide to oxidize aldehyde end groups of maltodextrin.

64. Upon information and belief, Vifor filed a patent term extension (PTE) request dated September 19, 2013 ("Vifor's PTE Request") with respect to the '109 Patent.

65. In Vifor's PTE Request, it asserted that the "marketing applicant for the approved product upon which this application for extension is based is Luitpold Pharmaceuticals, Inc."

(Vifor's PTE Request at 1.) In Vifor's PTE Request, Vifor further asserted that "Luitpold Pharmaceuticals is a corporation organized under the laws of New York and is the licensee of U.S. Patent No. 7,612,109." (*Id*.) In Vifor's PTE Request, Vifor further asserted that "Luitpold Pharmaceuticals, Inc. is authorized under that license to register, import, manufacture, market, distribute, use and sell the approved product." (*Id*.) Upon information and belief, Luitpold Pharmaceuticals changed its name to American Regents, as set forth above.

66. In Vifor's PTE Request, Vifor asserted that the "ferric carboxymaltose in Injectafer® is a water soluble iron carbohydrate complex and has a weight average molecular weight (Mw) of approximately 120,000 to 200,000 Da." (*Id*. at 5.)

67. In Vifor's PTE Request, Vifor asserted that "[t]he approved process for manufacturing ferric carboxymaltose includes each process step identified in claim 1" of the '109 Patent. (*Id*.) Claim 1 of the '109 Patent recited the following:

> 1. A water soluble iron carbohydrate complex having a weight average molecular weight (Mw) of 80,000 to 400,000, comprising the reaction product of:
>
> (a) an aqueous solution of an iron (III) salt and
>
> (b) an aqueous solution of the oxidation product of
>
> (i) at least one maltodextrin and
>
> (ii) an aqueous hypochlorite solution at an alkaline pH, wherein,
>
> when one maltodextrin is present, the maltodextrin has a dextrose equivalent of between 5 and 20, and wherein,
>
> when a mixture of more than one maltodextrin is present, the dextrose equivalent of each individual maltodextrin is between 2 and 40, and the dextrose equivalent of the mixture is between 5 and 20.

(*Id*. at 5; *see also* '109 Patent at claim 1.)

68. In Vifor's PTE Request, Vifor further asserted the manufacturing process used to manufacture Injectafer® purportedly included the following steps:

> The complex is obtained from an aqueous solution of iron (III) chloride and an aqueous solution of the oxidation product of one or more maltodextrins. The oxidation product is made by dissolving a maltodextrin with a dextrose equivalents between 5 and 20 in water. The resulting aqueous solution is oxidized by adding a sodium hypochlorite solution at an alkaline pH. The oxidized maltodextrin solution is then mixed with an iron (III) chloride solution. The resulting solution is filtered, precipitated, and dried in a vacuum. The dry product is then reconstituted with water and sealed in glass vials for injection.

(Vifor's PTE Request at 6.)

69. In Vifor's PTE Request, Vifor further asserted that claim 6 of the '109 Patent "reads on the currently approved method used to manufacture the approved product." (*Id.*) Claim 6 of the '109 Patent recited the following:

> 6. A process for producing a water soluble iron carbohydrate complex having a weight average molecular weight (Mw) of 80,000 to 400,000, comprising the steps of:
>
> (a) oxidizing at least one maltodextrin in an aqueous solution at an alkaline pH with an aqueous hypochlorite solution to form an oxidized maltodextrin solution, and
>
> (b) contacting the oxidized maltodextrin solution with an aqueous solution of an iron (III) salt, wherein,
>
> when one maltodextrin is present, the maltodextrin has a dextrose equivalent of between 5 and 20, and wherein,
>
> when a mixture of more than one maltodextrin is present, the dextrose equivalent of each individual maltodextrin is between 2 and 40, and the dextrose equivalent of the mixture is between 5 and 20.

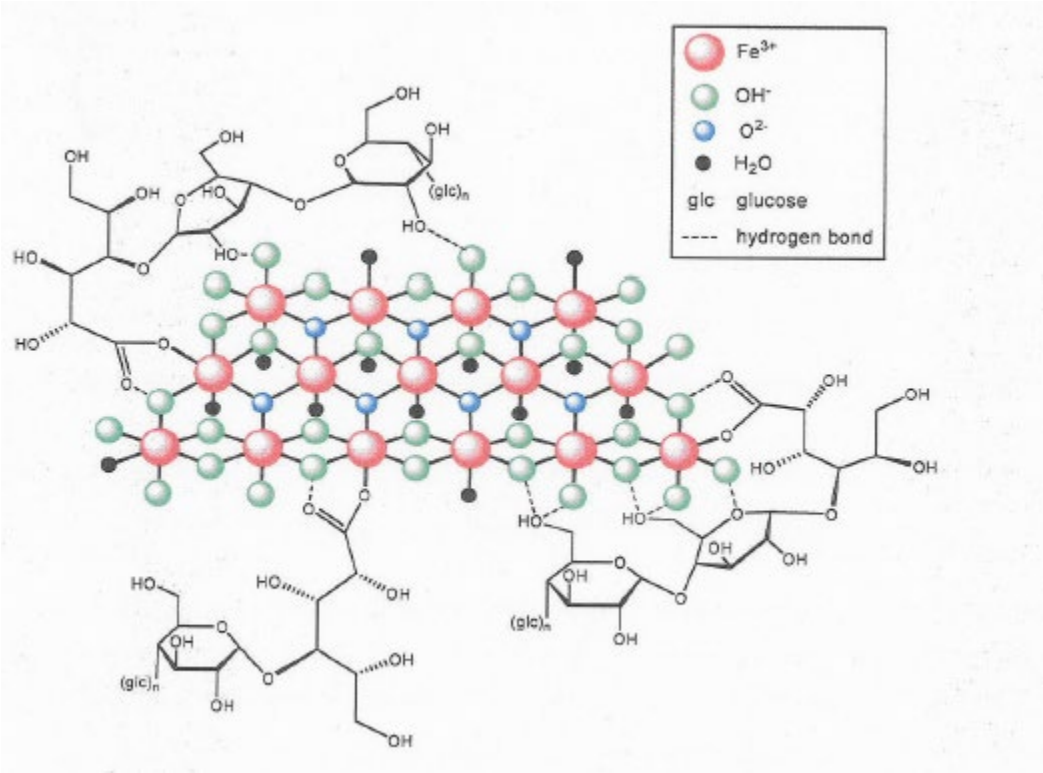
(Vifor's PTE Request at 6; *see also* '109 Patent at claim 6.)

70. Upon information and belief, Injectafer® is approved and marketed in the United States as an iron replacement product indicated for the treatment of iron deficiency anemia (IDA) in adults and pediatric patients 1 year of age and older who have either intolerance to oral iron or an unsatisfactory response to oral iron, and adult patients who have non-dialysis dependent chronic kidney disease. (Injectafer® Prescribing Information at § 1.)

71. Upon information and belief, Injectafer® contains the active ingredient ferric carboxymaltose, which is an iron carbohydrate complex with the chemical name polynuclear iron (III)-hydroxide 4(R)-(poly-(1→4)-*0*-α-D-glucopyranosyl)-oxy-2(R),3(R),5(R),6-tetrahydroxy-hexanoate. (*Id*. at § 11.)

72. Upon further information and belief, the ferric carboxymaltose in Injectafer® has a relative molecular weight of approximately 150,000 Da corresponding to the following empirical formula: $[FeO_x(OH)_y(H_2O)_z]_n$ $[\{(C_6H_{10}O_5)_m (C_6H_{12}O_7)\}_l]_k$, wheren $n \approx 10^3$, $m \approx 8$, $l \approx 11$, and $k \approx 4$, further wherein *l* represents the mean branching degree of the ligand. (*Id*. at § 11.)

73. A schematic representation of the chemical structure of the ferric carboxymaltose in Injectafer® is presented below:



(*Id*. at § 11.)

74. Upon information and belief, Injectafer® is a dark brown, sterile, aqueous, isotonic colloidal solution for intravenous injection, wherein each mL contains 50 mg iron as ferric carboxymaltose in water for injection. (*Id*. at § 11.)

75. Upon information and belief, Injectafer® is available in 2 mL, 15 mL and 20 mL single dose vials, wherein sodium hydroxide and/or hydrochloric acid may have been added to Injectafer® to adjust the pH to 5.0-7.0. (*Id*. at § 11.)

76. Upon information and belief, the ferric carboxymaltose in Injectafer® is a colloidal iron (III) hydroxide in complex with carboxymaltose. (*Id*. at § 12.1.)

77. Upon information and belief, when Injectafer® is added to an infusion bag containing 0.9% sodium chloride injection, USP, at concentrations ranging from 2 mg to 4 mg of iron per mL, Injectafer® solution is physically and chemically stable for 72 hours when stored at room temperature and to maintain stability should not be diluted to concentrations less than 2 mg iron/mL. (*Id*. at § 2.2.)

78. Upon information and belief, Injectafer® contains no preservatives and each vial of Injectafer® is intended for single-dose only. (*Id*. at § 2.2.)

Reverse Engineering Studies Show Injectafer® is Manufactured With an Infringing Process

79. Upon information and belief, the Ferinject® product commercialized outside of the United States, and the Injectafer® product commercialized inside of the United States are the same, or substantially the same product, and are manufactured using the same or substantially same process.

80. Reverse engineering studies performed on commercial batches of Ferinject® (which is the same as Injectafer®) (referred to herein as the "Injectafer® Reverse Engineering

Studies") indicate that the ferric carboxymaltose in Injectafer® is manufactured using a process which infringes one or more claims of the '320 Patent, e.g., claims 1 and 7.

81. Upon information and belief, the ferric carboxymaltose in Injectafer® contains an activated maltodextrin sugar. (See, e.g., Vifor's PTE Request at 6.)

82. Upon information and belief, the activated matodextrin in the ferric carboxymaltose in Injectafer® is prepared by reacting a maltodextrin having an aldehyde end group with bromine in a solution at a pH between 7.0 and 9.0. (See e.g., Injectafer® Reverse Engineering Studies.) Upon information and belief, this reaction causes the specific oxidation of the end aldehydes.

83. Upon information and belief, the sugar in Injectafer® is a maltodextrin, which is either a dextrin or a dextran.

84. Upon information and belief, the bromine used in preparing ferric carboxymaltose in Injectafer® is produced *in situ* through the addition of a hypochlorite and an alkaline or earth alkaline metal bromide (e.g., sodium bromide). (See, e.g., '109 Patent, at Examples 3-8 and Injectafer® Reverse Engineering Studies.)

85. Upon information and belief, in preparing the ferric carboxymaltose in Injectafer® the hypochlorite is added in stoichiometric quantities with respect to the aldehyde end group such that excess of hypochlorite in solution is never present.

86. Upon information and belief, in preparing Injectafer® the hypochlorite is added instant by instant, such that an excess of hypochlorite in solution is never present.

87. In the context of Vifor's opposition before the European Patent Office filed against Biofer's EP 1858930 B1, Vifor argued that any skilled person in the art would understand that hypochlorite must be added slowly in order to avoid side reactions.

88. Upon information and belief, in preparing Injectafer®, an iron (III) salt is added to react with the activated sugar to form an iron (III) activated sugar complex.

89. Upon information and belief, if Vifor did not use Biofer's patented process, it would be unable to produce the Injectafer® product having the attributes it has.

90. Upon information and belief, a substantial likelihood exists that Injectafer® is manufactured by Vifor using a manufacturing process which infringes the claims of the '320 Patent.

91. Plaintiff Biofer has made substantial and reasonable efforts to determine the process used in the production of Injectafer®. All available information, including publicly available information and Injectafer® Reverse Engineering Studies, indicate that Injectafer® is manufactured using a process which infringes the claims of the '320 Patent.

92. Prior to filing suit, Plaintiff Biofer requested that Vifor provide information regarding the manufacturing process for Injectafer® (e.g., the Injectafer® DMF and/or manufacturing batch records) for review. Vifor did not produce any information concerning the manufacturing process for Injectafer® to Biofer for review.

93. Upon information and belief, Vifor has refused to produce such manufacturing process information (e.g., the Injectafer® DMF and/or manufacturing batch records) to Biofer because such documents will show that Injectafer® is manufactured using a process which infringes the claims of the '320 Patent.

94. Upon information and belief, Vifor's refusal to produce such manufacturing information (e.g., the Injectafer® DMF and/or manufacturing batch records) evidences a substantial likelihood that Injectafer® is manufactured using a process that infringes the claims of the '320 Patent.

95. Vifor had knowledge of the Asserted Patent prior to this suit.

96. Upon information and belief, Vifor's infringement of the Asserted Patent was and continues to be deliberate, intentional, and willful.

97. Upon information and belief, Vifor's refusal to produce such manufacturing information (e.g., the Injectafer® DMF and/or manufacturing batch records) evidences that Vifor's and/or American Regent's infringement of the '320 Patent is knowing and willful.

COUNT 1:

(Infringement of the '320 Patent)

98. Plaintiff incorporates each of the preceding paragraphs as if fully set forth herein.

99. Vifor has infringed and continues to infringe one or more claims of the '320 Patent, including but not limited to exemplary claims 1 and 7, pursuant to 35 U.S.C. § 271(g), at least by without authority, importing into the United States, offering to sell, selling, and/or using within the United States the Injectafer® product, which is made by a process claimed in the '320 Patent. For example, Vifor imports ferric carboxymaltose and/or the Injectafer® product into the United States, which is made by a manufacturing process which infringes the claims of the '320 Patent, and through a licensing arrangement with American Regent, the Injectafer® product is commercially marketed, distributed, offered for sale, sold, and/or used throughout the United States.

100. On information and belief, the ferric carboxymaltose in Injectafer® is manufactured by a process covered by one or more claims of the '320 Patent.

101. On information and belief, after the ferric carboxymaltose in Injectafer® is manufactured by a process covered by the claims of the '320 Patent it is not materially changed

by subsequent processes and it does not become a trivial and nonessential component of another product.

102. On information and belief, Vifor has actual knowledge of the ’320 Patent.

103. On information and belief, Vifor became aware of the ’320 Patent no later than when it was issued by the Patent Office.

104. On information and belief, Vifor has acted with full knowledge of the ’320 Patent and without a reasonable basis for believing that it would not be liable for infringement of the ’320 Patent.

105. On information and belief, Vifor’s infringement of the ’320 Patent has been and continues to be intentional and willful.

106. On information and belief, under 35 U.S.C. § 295, Plaintiff is entitled to a presumption that Vifor’s manufacturing of the ferric carboxymaltose in Injectafer® uses a process which infringes the ’320 Patent.

107. Vifor’s infringement has caused and is continuing to cause damage and irreparable injury to Plaintiff. Plaintiff will continue to suffer damage and irreparable injury unless and until that infringement is enjoined by this Court, as a remedy at law alone would be inadequate.

108. Plaintiff is entitled to injunctive relief and damages in accordance with 35 U.S.C. §§ 271, 281, 283, and 284.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff Biofer requests that the Court enter judgment for Plaintiff against Defendant Vifor as follows:

A. A judgment that Vifor infringes the ’320 Patent under 35 U.S.C. § 271(a) and/or (g);

B. A permanent injunction restraining and enjoining Vifor, and their officers, agents, servants, and employees, and those persons in active concert or participation with of them, and their successors and assigns, from commercially manufacturing, marketing, distributing, using, offering to sell, or selling Injectafer® within the United States, or importing Injectafer® into the United States, prior to the expiration of the '320 Patent;

C. That Plaintiff be awarded damages adequate to compensate it for Vifor's past, present, and/or future infringement of the '320 Patent, said damages being no less than a reasonable royalty and/or lost profits together with any pre-judgment and post-judgment interest as allowed by law, costs, and other damages permitted by 35 U.S.C. § 284;

D. A judgment finding that Vifor's infringement of the Asserted Patents was deliberate and willful, and an award of treble damages to Plaintiff pursuant to 35 U.S.C. § 284;

E. A declaration that this is an exceptional case and an award of attorneys' fees pursuant to 35 U.S.C. § 285;

F. An award of costs and expenses in this action; and

G. Such other and further relief as the Court may deem just and proper.

Date: April 15, 2022

/s/ Scott J. Bornstein
Scott J. Bornstein (NY 2737492)
Richard C. Pettus (NY 2805059)
Jonathan D. Ball (NY 4137907)
Greenberg Traurig, LLP
One Vanderbilt Avenue – Suite 2900
New York, NY 10017
Tel. (212) 801-9200
bornsteins@gtlaw.com
pettusr@gtlaw.com
ballj@gtlaw.com

Benjamin D. Witte (Bar No. 834865)
Greenberg Traurig, LLP

Terminus 200 3333
Piedmont Road NE – Suite 2500
Atlanta, GA 30305
Tel. (678) 553-2100
ben.witte@gtlaw.com

Attorneys for Plaintiff
Biofer S.p.A