

**OPINION UNDER SECTION 74A**

Patent	<b>EP(UK) 0456377</b>
Proprietor(s)	NWD Europe Ltd
Exclusive Licensee	
Requester	NWD Europe Ltd, on 28 February 2007
Observer(s)	Mr Danny Crowe
Date Opinion issued	25 May 2007

**The Request**

1. The requester, who is also the proprietor of the patent EP 0 456 377 B1, seeks an Opinion as to whether the patent, which relates to pipe couplings, is i) valid and ii) infringed by components manufactured, sold or distributed etc by:

- a) Parker Hannifin GmbH ('Parker')
  - b) VOSS Holding GmbH & Co. KG ('VOSS')
- and
- c) DunlopHiflex. ('Hiflex')

2. The request comprises a request document of some twelve pages, supporting documentary exhibits A to J and three samples of pipe coupling components, each labelled as originating from a respective one of the above listed parties. The request document discusses the background to and a brief history of the invention with a very brief introduction to the allegedly infringing components which does not amount to much more than a reference to exhibits H to J and the associated samples.

3. Despite the references to validity no case is made on the issue of validity. The Office telephoned the requester's representative, Mr Bebb, who confirmed that an Opinion relating to validity was not required. I note that no amendment was made to the initial request.

4. I shall not, therefore, form an opinion with regard to validity despite the presence of comment with respect to validity in the observations and observations in reply.

5. The exhibits comprise (as referenced in the request):
- A) a copy of the patent;
  - B to D) Drawings relating to historical couplings;
  - E and F) Drawings said to exemplify typical couplings in compliance with the Patent;
  - G) A Copy of ISO 8434-4, the international standard for 'Metallic tube connections for power and general use – Part 4: 24° cone connectors with O-ring weld-on nipples' which shows a number of couplings with O-rings in grooves;
  - H) Two pages of an undated Parker publication entitled 'Ermeto Original' which appear to be from a catalogue or brochure and which contain images of pipe couplings;
  - I) Two undated and un-annotated drawings of pipe couplings that have been attributed to VOSS; and
  - J) Two copies of a drawing of a single Dunlop Hiflex A65177 coupling fitting (i.e. one half of a complete male to female coupling) and three pages of what appears to be a catalogue from the company HEV Inc (apparently taken from:  
[http://www.hev.com/catalog.dunlop\\_hiflex/dkl\\_dko\\_dkm\\_metric\\_female.htm](http://www.hev.com/catalog.dunlop_hiflex/dkl_dko_dkm_metric_female.htm)) and each relating to single coupling fittings and labelled as DunlopHiflex A19175, A19177, A19987, A19977, A19179 and A19151. These three pages each bear a date of printing from the internet of 25 July 2006. The last of these three pages bears a 2004 copyright marking.

The samples comprise:

- a double ended male fitting with twin captive nuts and attributed to Parker;
- a complete coupling having male and female fittings held together by a nut and attributed to VOSS; and
- a male coupling member and nut which is attributed to Hiflex.

## **Observations**

6. Observations were filed by Hiflex Europe on time and comprise a one page letter commenting on validity by stating that BTR Industries (of which Hiflex was a subsidiary) had developed a coupling design incorporating a

shoulder between 1979 and 1982 and some 12 pages of engineering drawings of a coupling part in support thereof. No observations were received from either Parker or VOSS.

### **Observations in reply**

7. These were filed on time by the requester and answer the comments on validity in the observations.

### **The law**

8. On questions of infringement Section 60(1) provides that:

*'...a person infringes a patent for an invention if, and only if, while the patent is in force he does any of the following things in the United Kingdom without the consent of the proprietor of the patent, that is to say –*

*a) where the invention is a product he makes, disposes of, offers to dispose of, uses or imports the product or keeps it whether for disposal or otherwise.'*

and Section 60(2):

*'...a person (other than the proprietor of the patent) also infringes a patent for an invention if, while the patent is in force and without the consent of the proprietor, he supplies or offers to supply in the United Kingdom a person other than a licensee or other person entitled to work the invention with any of the means, relating to an essential element of the invention, for putting the invention into effect when he knows, or it is obvious to a reasonable person in the circumstances, that those means are suitable for putting, and are intended to put, the invention into effect in the United Kingdom.'*

### **The Patent**

9. The patent, which was filed on 24 April 1991, was granted on 6 June 1994. It designates GB and is still in force. It relates to a hydraulic hose coupling having mating male and female fittings. The female fitting has an internal bore and an internal tapered surface (hereafter 'female seat') in communication with the bore. The male fitting includes a bore, an external surface (or 'male seat') tapered to correspond to the female seat and a circumferential groove in the male seat which contains an O-ring. In use the male seat is received within the female and the two fittings are urged together by a screw threaded connection to compress the O-ring and form a metal to metal and metal to elastomer seal.

10. A problem with this arrangement is that because material is removed from the male seat to form the O-ring groove its tip is particularly prone to inward deformation under the wedging action of the tapered female seat and upon over tightening the tip may suffer from what the patent refers to as 'nose collapse' whereupon it is damaged and may restrict flow through the coupling.

11. In order to eliminate the possibility of 'nose collapse' the patent provides a flange at the broad end of the male seat which forms a stop shoulder that moves into abutment with a facing abutment surface on the female fitting to limit travel of the male fitting within the female.

### Claim 1

12. The Patent has a single independent claim and three subordinate claims. Claim 1 reads:

*"A hydraulic coupling comprising a female fitting member (6) having a central bore (14) and an internal tapered surface (16); a male fitting member (18) having a central bore (34) coaxial with the bore of the female member and being received within the female member, an external tapered surface (22) complementary to the female tapered surface, and an annular groove (24) in the external tapered surface; an O-ring having a cross-sectional height which is greater than the minimum depth of the groove and extends above the groove; and a screw threaded connection means (42, 10) associated with the male and female members for drawing the male member into the female member to thereby force the tapered surfaces (16,22) together and deform the O-ring (36); the male fitting member (18) further having a flange portion (18) located behind the external tapered surface (22) and having a diameter greater than the outer diameter of the external tapered surface, characterised by the flange portion defining a stop shoulder (28) facing an abutment surface (30) of said female fitting member; the stop shoulder (28) being arranged to move into abutment with the female member abutment surface (30) to thereby limit the travel of the male member within the female member and prevent collapse of the male member in the area of its external tapered surface (22)."*

13. In construing the claims I shall follow the well known authority on claim construction which is *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9. This requires that I put a purposive construction on claim 1, interpret it in the light of the description and drawings as instructed by Section 125(1) and take account of the Protocol to Article 69 of the EPC. Simply put, I must decide what a person skilled in the art would have understood the patentee to have used the language of the claim to mean.

14. I consider that for present purposes the 'person skilled in the art' is a technician with good background technical knowledge in the field of coupling hydraulic components and hoses to each other.

15. Neither requester nor observer has made any comment on claim construction.

16. It is convenient to divide claim 1 into sections A to E thus:

A)

*"A hydraulic coupling comprising a female fitting member having a central bore and an internal tapered surface; a male fitting member having a central bore coaxial with the bore of the female member and being received within the female member, an external tapered surface complementary to the female tapered surface, and an annular groove in the external tapered surface;*

B)

*an O-ring having a cross-sectional height which is greater than the minimum depth of the groove and extends above the groove;*

C)

*and a screw threaded connection means associated with the male and female members for drawing the male member into the female member to thereby force the tapered surfaces together and deform the O-ring;"*

D)

*" the male fitting member further having a flange portion located behind the external tapered surface and having a diameter greater than the outer diameter of the external tapered surface; characterised by the flange portion defining"*

E)

*"a stop shoulder facing an abutment surface of the female fitting member; the stop shoulder being arranged to move into abutment with the female member abutment surface to thereby limit the travel of the male member within the female member and prevent collapse of the male member in the area of its external tapered surface."*

### Parker

17. The first of the two pages of exhibit H contains a poor photocopy of a partly cut away image of a connector associated with what appears to be a 120° elbow and the second page shows a similar image of a connector in a

straight configuration plus some small line drawings of similar connectors. The drawings are clear enough, however, for me to determine their content.

18. Having looked carefully at each of these images and drawings it is clear to me that each has, without doubt, all of the features of parts A, C and E of claim 1, namely a male and a female fitting with corresponding seats that are forced together by a screw thread arrangement comprising a nut retained on the male fitting by a thrust wire and engaging with threads on the female fitting. The male seat has a groove which contains a component explicitly labeled as an O-ring.

19. Nothing is said in claim 1 about the conditions under which the cross-sectional height of the O-ring is greater than the minimum depth of the groove. I think, however, that the skilled person would have no trouble in understanding that it is the O-ring in the relaxed state that would protrude from its groove and thus have the required height. This is borne out in the Parker sample, which while different in some respects to the connectors in the images (it is a double ended male fitting), does have a protruding O-ring and all of the other connector features of the drawings, including the nuts being retained by respective thrust rings. Thus, I consider that the connectors in the Parker drawings also meet part B of claim 1.

20. It is also clear from the drawings that the free end of the female fitting will readily contact, upon minimal further tightening of the connector, a stop shoulder at the broad end of the male tapered seat formed where the diameter of the male fitting increases stepwise and remains constant thereafter.

21. Thus the only portion of claim 1 not clearly met by the images of exhibit H or the Parker sample is part D. I need to consider whether the stepwise increase in diameter mentioned in the preceding paragraph falls within the meaning intended by the patentee as judged by our skilled person of a 'flange portion located behind the external tapered surface'. In short: is 'flange portion' to be given the classical engineering meaning of a:

*'projecting flat rim, collar or rib'* (The Concise Oxford Dictionary, Oxford University Press 1964 Fifth edition (1973))

or is it to be read as meaning an enlargement in diameter providing an axial abutment surface?

22. In the preferred embodiment as shown in the figures of the patent there is clearly a 'flange' within that classical engineering meaning of the term in that there is an increase in diameter provided by a shoulder followed by a decrease in diameter provided by a second shoulder as described at the sentence bridging columns 2 and 3 in the patent:

*“ A flange portion 26 is disposed immediately behind tapered surface 22 and defines a forwardly facing shoulder 28, which is in axial alignment with the leading edge 30 of the female member 6. Flange portion 26 further defines a rearwardly facing shoulder 32, which may be tapered as shown in the figures.”*

23. There is no other reference in the patent that points to the patentee having any other meaning in mind for the term ‘flange portion’. (For completeness I note that there is a reference at lines 46 and 47 of column 2 to another ‘flange portion 12’ but there is no detail whatsoever regarding its overall form).

24. I thus consider that the word ‘flange’ in the patent is used to mean a classical flange comprising a projecting flat rim, collar or rib and this is not the same as the stepwise increase in diameter followed by a constant diameter that is found in exhibit H or the Parker sample. I conclude, therefore, that these do not meet the requirements of claim 1.

#### VOSS

25. Exhibit I comprises two drawings. The first is of such poor quality that I can come to no opinion.

26. The second drawing is what appears to be a composite drawing with a first coupling shown inside a second coupling. The first coupling is also so unclear that I can come to no opinion.

27. The second coupling in the second drawing is clear enough to make out the relevant details of an assembled coupling and comprises a female fitting having a tapered female seat and an external screw thread. Within the female fitting and engaging the female seat is a male fitting having a corresponding male seat that has an annular groove containing what appears to be an O-ring compressed in the groove by the female seat. Immediately behind the male seat is clearly a flange in the classical sense mentioned above in that there is an annular lip of larger diameter than the axially adjacent portions of the male fitting. A nut shown engaged with the external screw thread is clearly maintaining the assembled condition of the coupling by acting on the male fitting through a hose gripping arrangement. The second coupling in this drawing therefore clearly meets parts A, C and D of claim 1 without the need for further interpretation and also meets part B for the same reasoning as paragraph 19 above.

28. It is also clear from the drawing that the free end of the female fitting is in contact with or, given the slight blurring of the drawing lines, will readily contact a stop shoulder of the flange upon minimal further tightening of the

connector. The second connector in this drawing is therefore considered to meet part E of claim 1.

29. The sample connector attributed to VOSS by the requester is similar to that of the drawing except that it has a spigot at the opposite end of the male fitting from the tapered seat and that the nut directly engages the male fitting on a second shoulder of the flange remote from the male seat.

30. I therefore conclude that the VOSS sample coupling has all of the features of claim 1.

### Hiflex

31. Exhibit J comprises five pages of what appear to be drawings from a catalogue or brochure and show seven distinct coupling parts and each having a tapering male seat (despite being described therein as 'female' they are in the terms of the patent 'male' fittings). No complete couplings are shown. The quality of reproduction is poor and in some cases inadequate. Each of the couplings of exhibit J also has a spigot at its end remote from the seat but that is not relevant to this Opinion.

32. I will deal with each drawing in turn:

33. A56177 has a coupling portion (ignoring the spigot) that is essentially the same as that of the male fittings attributed to Parker above in that there is a tapered male seat having an annular groove containing an O-ring which is shown in its uncompressed state and has a cross-sectional height greater than that of the groove. There is a nut that is obviously for coupling to another coupling fitting and is supported on the body of the male fitting by a thrust ring. There is a stepwise increase in diameter at the broad end of the male seat and a constant diameter thereafter. This fitting shows all of the features of the male fitting required in parts A, B, C of claim 1 but fails to provide the flange portion of part D in exactly the same way as for Parker above.

34. A19175 has a tapered male seat with no evidence of a groove or O-ring and thus fails to provide all of the features required by parts A and B of claim 1.

35. A19177 has a tapered male seat having an annular groove and containing what is clearly an O-ring which is shown in its uncompressed state and clearly has a cross-sectional height greater than that of the groove. There is a nut that is obviously for threaded engagement with another coupling fitting and is supported on the body of the male fitting by a thrust ring. At the broad end of the male seat there is no further increase in diameter. This fitting shows all of the features of the male fitting required in parts A, B, C of claim 1 but fails to provide the flange portion of part D.

36. A19987 and A19151 are of such poor quality that I can come to no opinion on infringement.

37. A19977 is of marginal quality but appears to be very similar as regards coupling details to A19177 and thus fails for the same reason.

38. A19179 is of marginal quality but appears to relate to a component which, apart from some minor differences in the spigot, is the same as the Hiflex sample.

39. The Hiflex sample and the A19179 drawing appear to have a male part which is the same in its essentials as that of the VOSS sample i.e. it has the features of part A to D of claim 1: a tapered male seat, an uncompressed O-ring protruding from an annular groove in the seat and a classical flange at the broad end of the seat which is engaged on a shoulder on the side away from the taper by a shoulder on a nut that is clearly for attaching to a further coupling fitting. What is not explicit, either from the drawing of A19179 (which is solely of a male fitting) or from the sample itself (which is also only the male fitting), is the relationship of the seat-side face of the flange, the shoulder, to a mating female fitting. That is to say: will the face of the flange operate as a 'stop shoulder' in the manner required in part E of claim 1?

40. On close inspection of the Hiflex sample it is difficult to imagine that this sample is intended to operate in a way any different to the second VOSS coupling in that the seat of the male fitting is clearly to be received in a female fitting seat and the nut tightened against a thread associated with the female fitting. It is also clear that at some point, upon tightening or over-tightening, the free end of any female fitting seat would come into contact with and stop against the wall of the flange which will act as a stop shoulder and limit further travel of the male fitting within the female. Thus, on the balance of probabilities, I conclude that A19179 and the Hiflex sample would also meet part E of claim 1 if used as intended.

41. Claim 2 reads:

*"A coupling according to claim 1, wherein the tapered surfaces (16,22) are tapered at an angle of substantially 12° relatively to the axis of the bores (14,34)."*

42. Claim 3 has the same wording but specifies a 30° angle so I will consider both together.

43. There is no mention in the request of any specific angle for the taper and I therefore conclude that no case has been made with respect to claims 2 and 3.

44. Claim 4 reads:

*“A coupling according to any one of the preceding claims, wherein the male member (18) has a second external shoulder (32) facing away from the external tapered surface (22); and the screw threaded connection means comprises external screw threads (10) on the female member (6) and a nut member (40) which screws onto the screw threads (10) of the female member and engages the second external shoulder (32) of the male member.”*

45. As previously noted, the nut on the second VOSS coupling in the second drawing of exhibit J acts on the male fitting through a hose gripping arrangement rather than on a second shoulder. I conclude that the requirements of claim 4 are not met.

46. Also as previously noted, the sample connector attributed to VOSS, the sample attributed to Hiflex and A19179 do have a second shoulder that is directly engaged by the nut. I conclude that this does meet the requirements of claim 4.

## **Opinion**

47. I have concluded that the manufacture etc, according to the terms of section 60, of the following couplings would infringe the claims specified below:

- the second (outer) VOSS coupling in the second drawing of exhibit I – claim 1.
- the VOSS sample - claims 1 and 4.
- the Hiflex sample and A19179 drawing – claims 1 and 4.

48. I have declined to give an opinion in respect of claims 2 and 3 and in respect of the first drawing in exhibit I and the drawings A19151 and A19987.

49. I have also concluded that the manufacture, etc of the Parker sample, couplings according to drawings of exhibit H and drawings A56177, A19175, A19177 and A19977 would not infringe the patent.

### **Application for review**

50. Under section 74B and rule 77H, the proprietor may, within three months of the date of issue of this opinion, apply to the comptroller for a review of the opinion.

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### **NOTE**

*This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.*

James Barnes-Paddock  
Examiner