Title: GAS IMPERMEABLE TUBE JOINT AND METHOD OF FORMING SAME

Abstract: A method of forming a gas impermeable joint (12) in a fluid system includes: providing a tube (14) having a metallic barrier layer (18) disposed between an inner plastic layer (20) and an outer plastic layer (22); forcing at least one of the inner plastic layer (20) and the outer plastic layer (22) into contact with a plastic surface (32, 34; 80) of a component (16); and welding the at least one of the inner plastic layer (20) and the outer plastic layer (22) with the plastic surface (32, 34; 80) to form the gas impermeable joint (12). The welding may include: spin welding, hot plate welding, vibration welding, and ultrasonic welding. The metallic barrier layer (18) extends substantially to the component (16), thus improving the gas impermeability of the joint (12) between the tube (14) and the component (16).
# INTERNATIONAL SEARCH REPORT

**International application No.**

PCT/US04/41147

## A. CLASSIFICATION OF SUBJECT MATTER

<table>
<thead>
<tr>
<th>IPC(7)</th>
<th>US CL.</th>
<th>According to International Patent Classification (IPC) or to both national classification and IPC</th>
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<td>P16L 13/14</td>
<td>285/331, 423, 222.4, 21.1; 156/73.5</td>
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## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S.: 285/331, 423, 222.1-222.5, 21.1; 156/73.5; 228/2.1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tr>
<td>X</td>
<td>US 6,199,916 B1 (KLINGER et al) 13 March 2001 (13.03.2001), see col. 3, line 5 - col. 7, line 25, and figures.</td>
<td>1-6</td>
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<td>Y</td>
<td>US 5,524,673 A (NOONE et al) 11 June 1996 (11.06.1996), see col. 3, lines 10-30 and lines 64-65, and col. 5, lines 5-6.</td>
<td>7-8 and 10</td>
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<td>Y</td>
<td>US 6,074,717 A (LITTLE et al) 13 June 2000 (13.06.2000), see claim 1.</td>
<td>9</td>
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Special categories of cited documents:

- **A** document defining the general state of the art which is not considered to be of particular relevance
- **E** earlier application or patent published on or after the international filing date
- **L** document which may throw doubts on priority claims(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- **O** document referring to an oral disclosure, use, exhibition or other means
- **P** document published prior to the international filing date but later than the priority date claimed

Future documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search:

24 October 2005 (24.10.2005)

Date of mailing of the international search report:

05 DEC 2005

Name and mailing address of the ISA/US:

Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. 703-305-3230

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Form PCT/ISA/210 (second sheet) (April 2005)
Continuation of B. FIELDS SEARCHED Item 3:
EAST

see attached search history