

CHEMICAL SUPPLIER

BACKGROUND

1. Field of the Invention

5 The present invention relates to a chemical supplier, and more particularly, to a chemical supplier configured to prevent a chemical leak by allowing a male connector and a female connector which are connected to a hose for supplying chemicals to be coupled to each other at accurate locations.

10 2. Discussion of Related Art

Generally, in all companies which use hazardous chemicals, such as companies that manufacture semiconductors, semiconductor devices, liquid crystal displays (LCDs), and organic light emitting devices (OLEDs), pharmaceutical companies, paint companies, and the like, a variety of types of chemicals are used. Also, a variety of methods of safely supplying such chemicals are provided.

Such chemicals are transferred from a chemical tank of a tank lorry stopping outside a building to a chemical storage tank installed inside the building and then transferred to a chamber of the chemical storage tank in which a unit process is performed. As a conventional method of transferring chemicals from the tank lorry to the chemical storage tank, a method of a worker manually connecting a chemical supply hose to a connector is used, a detailed description of which is as follows.

A chemical hose for supplying chemicals and a nitrogen hose for supplying nitrogen are connected to the tank lorry. A chemical male connector and a nitrogen male connector are connected to ends of the chemical hose and the nitrogen hose, respectively. The respective male connectors are covered with caps to seal open

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ends thereof. In addition, the chemical storage tank includes a chemical female connector and a chemical female connector into which the male connector of the chemical hose and the male connector of the nitrogen hose are inserted, respectively. The chemical female connector and the nitrogen female connector are also covered
5 with caps to seal open ends thereof.

The worker withdraws the chemical hose and the nitrogen hose from the tank lorry and separates the caps coupled to the chemical male connector and the nitrogen male connector and the caps coupled to the chemical female connector and the nitrogen female connector. Subsequently, the chemical male connector is coupled
10 to the chemical female connector and the nitrogen male connector is coupled to the nitrogen female connector.

When nitrogen at a certain pressure is supplied to the tank lorry from a nitrogen storage tank provided inside the building through the nitrogen hose while the male connectors are coupled to the female connectors, the chemicals inside the
15 tank lorry are transferred to the chemical storage tank through the chemical hose due to the pressure of nitrogen.

However, according to the conventional method, since the worker manually couples/separates the chemical and nitrogen connectors and nitrogen at the certain pressure is supplied, there is a risk of a chemical leak and the worker may be exposed
20 to chemicals. As a related art for remedying the above problem, Korean Patent Registration No. 10-1572537 has been published.

In Korean Patent Registration No. 10-1572537, a chemical transit device called an automatic clean quick coupler (ACQC) unit is provided between a tank lorry and a chemical storage tank. Here, the chemical storage tank is generally
25 provided inside a building, and the ACQC unit performs a transit function between a

chemical tank of the tank lorry outside the building and the chemical storage tank inside the building.

According to the conventional ACQC unit, a chemical hose and a nitrogen hose are each mounted on a placing portion and then linearly moved by a first
5 transfer device and a second transfer device to connect a male connector of the chemical hose and a male connector of the nitrogen hose to a chemical female connector and a nitrogen female connector provided in the ACQC unit, respectively.

While the chemical male connector and chemical female connector are connected to each other and the nitrogen male connector and nitrogen female
10 connector are connected to each other as described above, nitrogen at a certain pressure is supplied to the chemical tank of the tank lorry through the ACQC unit and chemicals are discharged due to the pressure of the supplied nitrogen and stored in the chemical storage tank through the chemical hose.

When the male connector is automatically coupled to the female connector
15 using a transfer device as described above, a central axis of the male connector and a central axis of the female connector do not coincide with each other and may be eccentric. In this case, the male connector is not connected to the female connector in position.

Also, when the male connector is formed of a synthetic resin material such
20 as Teflon or the like, a sag phenomenon may occur with long-term use. In this case, the male connector is not coupled to the female connector in position.

In addition, when the male connector is coupled to the female connector while not firmly fixed to the placing portion, the male connector and the female connector are not coupled in position due to vibrations of the male connector from
25 movement.

Additionally, a plurality of flange members supporting the male connector are fastened to each other using a fastening member such as a bolt and nut or the like. Here, a processing tolerance that occurs in processing of a fastening hole in the plurality of flange members through which the fastening member passes is also a
5 factor that prevents the male connector and the female connector from being coupled in position.

Also, when the male connector and the female connector are not coupled in position, the male connector may collide with the female connector from behind, and the male connector, a driving part, or other parts may be damaged by the impact.
10 Here, when the male connector is damaged, a chemical leak may occur. This problem may also occur when the worker manually connects the male connector to the female connector.

SUMMARY OF THE INVENTION

15 The present invention is directed to providing a chemical supplier configured to guide central axes of a male connector and a female connector to coincide with each other so that the male connector and the female connector are coupled in position without damage caused by collision from behind or the like and a chemical leak is prevented.

20 According to an aspect of the present invention, there is provided a chemical supplier (100) including a chemical male connector (510) and a chemical female connector (210) which are connected to each other to supply chemicals and a connector guide portion configured to guide an outer circumferential surface of the chemical male connector (510) so that a central axis (C1) of the chemical female
25 connector (210) coincides with a central axis (C2) of the chemical male connector

(510) when the chemical male connector (510) is coupled to the chemical female connector (210).

The connector guide portion is provided on a side of a position at which the chemical male connector (510) is coupled to the chemical female connector (210).

5 The connector guide portion comprises guide surfaces 811 and 821 tilted toward a centripetal direction from a direction in which the chemical male connector (510) is coupled to the chemical female connector (210) to guide an outer circumferential surface of the chemical male connector (510).

 The connector guide portion comprises a first housing (810) including a first
10 guide surface (811) configured to guide an upper circumferential surface of the chemical male connector (510) and a second housing (820) including a second guide surface (821) configured to guide a lower circumferential surface of the chemical male connector (510).

 The connector guide portion comprises a plurality of guide rollers (930),
15 (950) rotated to guide an outer circumferential surface of the chemical male connector (510).

 The plurality of guide rollers (930), (950) comprise a plurality of upper guide rollers (930) spaced apart from each other to guide an upper perimeter of the outer circumferential surface of the chemical male connector (510) and a plurality of
20 lower guide rollers (950) spaced apart from each other to guide a lower perimeter of the outer circumferential surface of the chemical male connector (510).

 The chemical male connector (510) is integrally coupled with a mounting flange (520) inserted into and fixed to a connector insertion hole (522) and comprises a neck support portion (160) configured to support a neck portion (512) of the

chemical male connector (510) on one side spaced apart from the mounting flange (520) by which the chemical male connector (510) is supported.

5 A mounting groove (161) formed to have a shape corresponding to a lower outer circumferential surface of the neck portion (512) of the chemical male connector (510) and in which the lower outer circumferential surface of the neck portion (512) is mounted is formed in a top of the neck support portion (160).

The chemical male connector (510) is integrally coupled with a mounting flange (520) inserted into and fixed to a connector insertion hole (522), the mounting flange (520) is supported on a placing portion (150), and a clamp (170) configured to
10 fixedly support the mounting flange (520) above the placing portion (150) is further included.

The clamp (170) comprises a pivoting member (170a) provided to be pivotable around a hinge portion (171) on one side and including a holding piece (172) on a side opposite the side where the hinge portion (171) is located, a first
15 sidewall member (170b) fixedly supporting the hinge portion (171) above the placing portion (150), and a second sidewall member (170c) provided on a side facing the first sidewall member (170b) and including a holding hook (173) at a top end thereof to hold the holding piece (172).

The holding hook (173) is pivotably provided on one side of a pivot (174) to
20 be held by or released from the holding piece (172), and a push portion (175) connected to the holding hook (173) and extending therefrom is provided on the other side of the pivot (174).

The chemical male connector (510) is integrally coupled with a mounting flange (520) inserted into and fixed to a connector insertion hole (522), a hose flange
25 (560) including a side surface facing the mounting flange (520) is coupled to an end

of a chemical supply hose (500) connected to the chemical male connector (510), and a coupling flange (540) inserted into a coupling groove (511) formed along a circumferential perimeter of an end of the chemical male connector (510) passing through the connector insertion hole (522) to prevent the chemical male connector (510) from being detached therefrom is provided between the mounting flange (520) and the hose flange (560).

The chemical supplier comprise a plurality of fastening members (571) fastened through the mounting flange (520), the coupling flange (540), and the hose flange (560) and spaced apart in a circumferential direction and a plurality of position determination pins (572) fastened through the mounting flange (520) and the coupling flange (540) between positions where the plurality of fastening members (571) are fastened.

The position determination pins (572) are formed as reamer bolts.

BRIEF DESCRIPTION OF THE DRAWINGS

The above and other objects, features and advantages of the present invention will become more apparent to those of ordinary skill in the art by describing exemplary embodiments thereof in detail with reference to the accompanying drawings, in which:

FIG. 1 is a cross-sectional view illustrating a state in which a chemical hose is mounted in a placing portion in a chemical supplier according to the present invention;

FIG. 2 is a perspective view of the chemical supplier including a connector guide portion according to a first embodiment of the present invention;

FIG. 3 is a front view illustrating a case in which the chemical supplier shown in FIG. 2 is at a locking position;

FIG. 4 is a front view illustrating a case in which the chemical supplier shown in FIG. 2 is at an unlocking position;

5 FIGS. 5A and 5B are cross-sectional views illustrating an operation of the connector guide portion according to the first embodiment of the present invention;

FIG. 6 is a front view illustrating a case in which the chemical supplier including a connector guide portion according to a second embodiment of the present invention is at an unlocking position;

10 FIG. 7 is a perspective view of the connector guide portion shown in FIG. 6;

FIGS. 8A and 8B are cross-sectional views illustrating an operation of the connector guide portion according to the second embodiment of the present invention;

FIG. 9 is a perspective view illustrating a state in which a mounting flange, a
15 key code block, a coupling flange, and a gasket are coupled to a hose and a male connector according to the present invention;

FIG. 10 is an exploded perspective view illustrating the state of FIG. 9;

FIG. 11 is a perspective view illustrating a state in which a pivoting member of a clamp has pivoted to an unclamping position before the hose and the male
20 connector are mounted on the placing portion;

FIG. 12 is a side view illustrating a state in which the pivoting member of the clamp according to the present invention pivots between a clamping position and the unclamping position;

FIG. 13 is a perspective view illustrating a state of the hose and the male connector according to the present invention before being mounted on the placing portion;

FIG. 14 is a perspective view illustrating a state of the hose and the male
5 connector according to the present invention after being mounted on the placing portion;

FIG. 15 is a perspective view illustrating a state in which the hose and the male connector according to the present invention are mounted on the placing portion and then moved forward toward a female connector by a transfer unit;

10 FIG. 16 is a plan view illustrating the state of FIG. 14;

FIG. 17 is a cross-sectional view along line A-A of FIG. 16;

FIG. 18 is a transparent cross-sectional view illustrating a state in which a fastening member and a position determination pin according to the present invention are fastened; and

15 FIGS. 19A and 19B are front views illustrating the mounting flange and the coupling flange, respectively.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

Hereinafter, components and operations of exemplary embodiments of the
20 present invention will be described below with reference to the attached drawings.

Referring to FIG. 1, a chemical supplier 100 according to the present invention is an apparatus configured to automatically connect a chemical male connector 510 and a nitrogen male connector (not shown) which are coupled to ends of a chemical hose 500 and a nitrogen hose 600 which are connected to a chemical
25 tank (not shown) of a tank lorry to a chemical female connector 210 and a nitrogen

female connector (not shown) which are provided in a housing body 200, respectively.

The chemical supplier 100 includes the chemical male connector 510 and the nitrogen male connector inside a wall surface 700, a placing portion 150 configured to place the chemical male connector 510 and the nitrogen male connector and the chemical hose 500 and the nitrogen hose 600 connected thereto, a transfer unit 180 provided inside a transfer housing 105 and configured to transfer the chemical male connector 510 and the nitrogen male connector to the chemical female connector 210 and the nitrogen female connector, and components provided inside the housing body 200 and configured to distribute chemicals supplied through the chemical female connector 210, the nitrogen female connector, and the chemical hose 500 into a chemical storage tank (not shown) and clean the chemical female connector 210 and the nitrogen female connector.

A pair of such placing portions 150 may be provided to place the chemical hose 500 and the nitrogen hose 600. A pair of such transfer units 180 may be provided to transfer the chemical hose 500 and the nitrogen hose 600.

The transfer unit 180 may include a stage 181 on which the placing portion 150 is loaded and a driving portion configured to transfer the placing portion 150 back and forth on the stage 181 to transfer the chemical hose 500 and the nitrogen hose 600 toward the chemical female connector 210 and the nitrogen female connector, respectively.

The chemical hose 500 and the nitrogen hose 600 are transferred forward by the transfer unit 180 so that the chemical male connector 510 is inserted into and coupled to the chemical female connector 210 and the nitrogen male connector is

inserted into and coupled to the nitrogen female connector. In this state, chemicals are transferred between the chemical tank and the chemical storage tank.

The chemical female connector 210 includes an insertion groove 210a (refer to FIG. 5) in a front-rear direction. A chemical female connector cap 211 is inserted into the insertion groove 210a while chemicals are not transferred between the chemical tank and the chemical storage tank. When chemicals are transferred between the chemical tank and the chemical storage tank, the chemical female connector cap 211 which is inserted into the insertion groove 210a is separated and then chemicals are transferred.

Meanwhile, referring to FIGS. 2 to 4, the chemical supplier 100 according to the present invention includes a chemical locking device 300 and a nitrogen locking device 400.

The chemical locking device 300 is a component configured to fix the chemical male connector 510 when the chemical male connector 510 and the chemical female connector 210 are coupled and configured to fix the chemical female connector cap 211 when the chemical male connector 510 is not coupled to the chemical female connector 210 and the chemical female connector cap 211 is coupled to the chemical female connector 210.

The chemical locking device 300 and the nitrogen locking device 400 may have the same structure and each include a first locking portion 330 and a second locking portion 340 each displaced between a locking position where a position of a target to be locked (the male connector cap or the female connector cap) is fixed by a driving force of the driving portion and an unlocking position where the target to be locked is movable and one or more link members configured to transfer the driving

force of the driving portion to the first locking portion 330 and the second locking portion 340.

The chemical locking device 300 and the nitrogen locking device 400 may be configured to be automatically driven by the driving force of the driving portion
5 as well as being manually driven.

The first locking portion 330 includes a first locking member 331 and a first connection rod 332, and the second locking portion 340 includes a second locking member 341 and a second connection rod 342.

The first locking member 331 and the second locking member 341 may have
10 the same shape and be installed symmetrically, and the first connection rod 332 and the second connection rod 342 may have the same shape and be installed symmetrically. The first locking member 331 and the second locking member 341 are rotatably fixed to a rear cross section 210b of the chemical female connector 210 using a fixing member (not shown).

15 The first locking member 331 and the second locking member 341 have a cam shape. Here, as shown in FIGS. 2 and 3, when the first locking member 331 and the second locking member 341 are at the locking position, the first locking member 331 and the second locking member 341 come into contact with positions facing one side and the other side of the target to be locked so that the target to be
20 locked is locked in a fixed and immovable state.

Also, as shown in FIG. 4, when the first locking member 331 and the second locking member 341 rotate at rotational centers thereof and are released from the contact with the target to be locked, the target to be locked is unlocked in a movable state.

The chemical supplier 100 according to the present invention includes the chemical male connector 510 and the chemical female connector 210 which are connected to each other to supply chemicals and a connector guide portion 800 or 900 configured to guide an outer circumferential surface of the chemical male connector 510 so that a central axis C1 of the chemical female connector 210 coincides with a central axis C2 of the chemical male connector 510 when the chemical male connector 510 is coupled to the chemical female connector 210.

The connector guide portion 800 or 900 may be provided on a side of a position at which the chemical male connector 510 is coupled to the chemical female connector 210. Also, the connector guide portion 800 or 900 is provided on a side of an inlet of the chemical female connector 210 into which the chemical connector 510 is inserted and may be fixed to the rear cross section 210b of the female connector which will be described and fixed to a frame 110.

Referring to FIGS. 2 to 5B, the connector guide portion 800 according to a first embodiment of the present invention includes a first housing 810 having a first guide surface 811 configured to guide an upper outer circumferential surface of the chemical male connector 510 and a second housing 820 having a second guide surface 821 configured to guide a lower circumferential surface of the chemical male connector 510.

The first guide surface 811 and the second guide surface 821 may be formed as tilted surfaces tilted toward a centripetal direction from a direction in which the chemical male connector 510 is coupled to the chemical female connector 210.

Accordingly, while the central axis C1 of the chemical female connector 210 does not coincide with and deviates from the central axis C2 of the chemical male connector 510 as shown in FIG. 5A, even when the chemical male connector 510 is

coupled to a side of the chemical female connector 210, the outer circumferential surface of the chemical male connector 510 is guided by the first guide surface 811 or the second guide surface 821 as shown in FIG. 5B so that the chemical male connector 510 may be corrected to allow the central axes C of the chemical male connector 510 and the chemical female connector 210 to coincide with each other. Accordingly, the chemical male connector 510 and the chemical female connector 210 may be coupled to each other in position without damage caused by collision from behind or the like.

Referring to FIGS. 6 to 8B, the connector guide portion 900 according to a second embodiment of the present invention may include a plurality of guide rollers 930 and 950 configured to guide an outer surface of the chemical male connector 510 when the chemical male connector 510 is inserted into the chemical female connector 210.

The connector guide portion 900 may be provided on the side of the position at which the chemical male connector 510 is coupled to the chemical female connector 210.

The plurality of guide rollers 930 and 950 may include a plurality of upper guide rollers 930 located above a position where the chemical male connector 510 is inserted and configured to guide an upper outer surface of the chemical male connector 510 and a plurality of lower guide rollers 950 located below the position where the chemical male connector 510 is inserted and configured to guide a lower outer surface of the chemical male connector 510.

The plurality of upper guide rollers 930 are provided above the chemical male connector 510 and spaced apart at certain intervals along a partial section of a

circumferential perimeter. An upper housing 910 and a plurality of upper brackets 940 are provided to fix the upper guide rollers 930.

The upper housing 910 includes a pair of upper housing coupling bosses 911 protruding from both sides to couple the upper housing 910 to the frame 110.

5 The upper bracket 940 has one side to which the upper guide roller 930 is rotatably coupled and the other coupled to the upper housing 910.

The plurality of lower guide rollers 950 are provided below the chemical male connector 510 and spaced apart at certain intervals along a partial section of the circumferential perimeter. A lower housing 920 and a plurality of lower brackets 10 960 are provided to fix the lower guide rollers 950.

The lower housing 920 includes a pair of lower housing coupling bosses 921 protruding from both sides to couple the lower housing 920 to the frame 110.

The lower bracket 960 has one side to which the lower guide roller 950 is rotatably coupled and the other side coupled to the lower housing 920.

15 As shown in FIGS. 8A and 8B, when the chemical male connector 510 is inserted into the chemical female connector 210, the upper and lower outer circumferential surfaces of the chemical male connector 510 are guided by the upper guide rollers 930 and the lower guide rollers 950. Accordingly, the chemical male connector 510 may be easily inserted into the chemical female connector 210 without
20 being impacted and without damage caused by a collision from behind, and locking by the first locking portion 330 and the second locking portion 340 may be performed more precisely.

Hereinafter, the male connector 510, a mounting flange 520, a key code block 530, a coupling flange 540, a gasket 550, and a hose flange 560, which are
25 connected to the hose 500 or 600, will be described with reference to FIGS. 9 and 10.

However, since the same components are applied to the chemical hose 500 and the nitrogen hose 600, only components applied to the chemical hose 500 will be described and description of components included in the nitrogen hose 600 will be omitted.

5 The male connector 510 has a cylindrical shape including a step formed on an outer circumferential surface and in which a flow space is formed to allow chemicals to be transferred in a longitudinal direction. A coupling groove 511 formed to be concave is formed along a circumferential perimeter of one end of the male connector 510, and the other end is inserted into the female connector 210.

10 The mounting flange 520 is a component configured to allow the male connector 510 to be mounted in the placing portion 150 while coupled. The mounting flange 520 includes a connector insertion hole 522 formed in a central part of a body portion having an approximate donut shape and into which the male connector 510 is inserted and an insertion space portion 521 integrally formed below
15 the body portion.

 The key code block 530 supports a bottom of the mounting flange 520 and includes a key code to prevent other chemicals which are not designated chemicals from being wrongly inserted. The key code formed on the key code block 530 may include a plurality of holes vertically passing through the key code block 530. Here,
20 a plurality of protrusions may be formed on the placing portion 150 at positions corresponding to the plurality of holes and inserted into the plurality of holes. Both ends of a bottom of the key code block 530 are fixedly insertion-coupled into guide body portions 151 formed on both sides of a top surface of the placing portion 150.

 The coupling flange 540 is provided between the mounting flange 520 and
25 the hose flange 560 coupled to an end of the hose 500. The coupling flange 540 is

inserted into the coupling groove 511 formed along a circumferential perimeter of the end of the male connector 510 passing through the insertion hole 522 of the mounting flange 520 and prevents the male connector 510 from being detached.

The coupling flange 540 includes a pair of coupling flanges 540a and 540b
5 facing each other. Each of the coupling flanges 540a and 540b has a half donut shape so that when the pair of coupling flanges 540a and 540b are disposed to face each other, a chemical flow path 540c is formed therebetween to transfer chemicals.

Inner portions of the coupling flanges 540a and 540b include step portions 540d and 540e having stepped shapes, respectively, and inner ends of the step
10 portions 540d and 540e are inserted into the coupling groove 511 of the male connector 510.

The gasket 550 configured to maintain airtightness is provided between the hose flange 560 and the coupling flange 540.

The male connector 510 passes through the insertion hole 522 of the
15 mounting flange 520, the coupling flange 540 is inserted into the coupling groove 511 of the male connector 510, the gasket 550 and the hose flange 560 are pressed against each other, and the mounting flange 520, the coupling flange 540, the gasket 550, and the hose flange 560 are fastened using a plurality of fastening members 571 passing therethrough to be integrally coupled to one another. The fastening
20 members 571 may include a bolt 571a and a nut 571b screw-coupled to an end thereof. Also, the mounting flange 520 and the coupling flange 540 are fastened using a plurality of position determination pins 572.

Hereinafter, referring to FIGS. 11 to 17, components configured to stably fix and support the chemical male connector 510 will be described.

As described above, the chemical male connector 510 is integrally coupled with the mounting flange 520 inserted into and fixed to the connector insertion hole 522. As a component configured to stably fix and support the chemical male connector 510, a neck support portion 160 configured to support a neck portion 512 of the chemical male connector 510 is provided on one side spaced apart from the mounting flange 520 by which the chemical male connector 510 is supported.

The neck support portion 160 has a shape protruding upward from a top surface of the placing portion 150, and a mounting groove 161 having a shape corresponding to a lower outer circumferential surface of the neck portion 512 of the chemical male connector 510 and on which the lower outer circumferential surface of the neck portion 512 is mounted is formed above the neck support portion 160.

As described above, since the chemical male connector 510 is doubly supported by the neck support portion 160 and the mounting flange 520 provided at positions spaced apart forward and backward, even when the chemical male connector 510 is formed of a synthetic resin material such as Teflon or the like and used for a long time, a sag phenomenon may be effectively prevented. Accordingly, the chemical male connector 510 may maintain a level state without sag so that the chemical male connector 510 and the chemical female connector 210 may be coupled in position.

Also, as an additional configuration for stably fixing and supporting the chemical male connector 510, the chemical male connector 510 is integrally coupled with the mounting flange 520 inserted into and fixed to the connector insertion hole 522, the mounting flange 520 is supported by the placing portion 150, and a clamp 170 configured to fixedly support the mounting flange 520 above the placing portion 150 is further included.

Referring to FIG. 12, the clamp 170 includes a pivoting member 170a provided to be pivotable around a hinge portion 171 on one side and including a holding piece 172 on a side opposite the side where the hinge portion 171 is located, a first sidewall member 170b fixedly supporting the hinge portion 171 above the placing portion 150, and a second sidewall member 170c provided on a side facing the first sidewall member 170b and including a holding hook 173 at a top end thereof to hold the holding piece 172.

A fixing groove 170a-1 into which a top surface of the mounting flange 520 is inserted to fixedly support the mounting flange 520 not to move back and forth may be formed in an inner surface of the pivoting member 170a.

The holding hook 173 may be pivotably provided on one side of a pivot 174 to be held by or released from the holding piece 172, and a push portion 175 connected to the holding hook 173 and extending therefrom may be provided on the other side of the pivot 174.

Accordingly, when the mounting flange 520 is fixed by the clamp 170, as shown in FIG. 12, in a clamping position in which the push portion 175 is pushed and the holding hook 173 is rotated in one direction as shown by a dotted line, the pivoting member 170a is rotated as shown by a dotted line, and then the holding hook 173 is rotated by pulling the push portion 175 in an opposite direction as shown by a solid line to simply hold and couple the holding piece 172 and the holding hook 173. The pivot 174 may be configured to be supported by an elastic member (not shown) to restore the holding hook 173 and the push portion 175 to a state shown by a solid line.

Referring to FIGS. 13 and 14, when an assembly of the chemical male connector 510, the mounting flange 520, the key code block 530, the coupling flange

540, the gasket 550, and the hose flange 560 which are connected to the hose 500 or 600 is mounted on the placing portion 150, the neck portion 512 of the chemical male connector 510 is supported by the neck support portion 160. Also, when the holding piece 172 is clamped to be held by the holding hook 173 by rotating the pivoting member 170a of the clamp 170, the mounting flange 520 integrally coupled to the chemical male connector 510 may be stably fixed and supported.

When the chemical male connector 510 is mounted on the placing portion 150 and fixed by the neck support portion 160 and the clamp 170, as shown in FIG. 15, the chemical hose 500 and the chemical male connector 510 are moved forward toward the chemical female connector 210 by driving of the transfer unit 180.

FIGS. 16 and 17 are cross-sectional views illustrating a state in which the chemical male connector 510 is mounted on the placing portion 150 and fixed by the neck support portion 160 and the clamp 170.

Meanwhile, referring to FIGS. 10 and 18 to 19B, the mounting flange 520, the coupling flange 540, the gasket 550, and the hose flange 560 are coupled by the plurality of fastening members 571 spaced apart in a circumferential direction and the mounting flange 520 and the coupling flange 540 are coupled by the plurality of position determination pins 572 fastened through the mounting flange 520 and the coupling flange 540 among positions at which the plurality of fastening members 571 are fastened.

The mounting flange 520 includes fastening member through holes 571a-1 through which the plurality of fastening members 571 pass and position determination pin through holes 572a-1 through which the plurality of position determination pins 572 pass. The coupling flange 540 includes fastening member through holes 571a-2 through which the plurality of fastening members 571 pass and

position determination pin through holes 572a-2 through which the plurality of position determination pins 572 pass.

In one embodiment, the position determination pins 572 may be formed as reamer bolts. A reamer bolt is a bolt driven into and fastened to a hole finished by a reamer with high precision, and a bolt finished to precisely fasten axes of the hole and bolt is used. When the mounting flange 520 and the coupling flange 540 are fastened to each other by the position determination pins 572 processed with high precision as described above, a processing tolerance of the mounting flange 520 and the coupling flange 540 may be reduced to couple the chemical male connector 510 to the chemical female connector 210 at an accurate position.

Meanwhile, in the above-described embodiment, it has been described that the connector guide portion 800 or 900 is applied to the chemical supplier configured to automatically connect the male connector to the female connector, but the present invention is not limited thereto, and it may be applied to a chemical supplier in which a male connector and a female connector are manually connected by a worker. That is, the connector guide portion 800 or 900 is provided to be a periphery of the side of the inlet of the female connector to which the male connector is coupled. In this state, when the worker couples the male connector, to which a hose is connected, to the female connector, an outer circumferential surface of the male connector comes into contact with the guide surfaces 811 and 821 or the guide rollers 930 and 950 of the connector guide portion 800 or 900 and is guided so that a center of the male connector coincides with a center of the female connector.

Also, when an end of the transfer unit 180 is spaced apart from the female connector and a space is formed between the transfer unit 180 and the female connector, the male connector is first transferred a certain distance toward the female

connector using the transfer unit 180 and then the male connector is coupled to the female connector by lifting or horizontally pushing or pulling the male connector while it is placed on the placing portion of the transfer unit 180. Here, the connector guide portion 800 or 900 may also be applied to the chemical supplier.

5 As described above, the present invention is not limited to the above described embodiments, clear modifications of the present invention may be made by those skilled in the art without departing from the technical spirit of the present invention claimed by the appended claims, and the modifications fall within the scope of the present invention.

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 According to the present invention, a chemical supplier may include a connector guide portion configured to guide an outer circumferential surface of a male connector to allow central axes of the male connector and a female connector to coincide with each other so that the male connector and the female connector are
15 coupled at an accurate position without damage caused by a collision from behind to provide an effect of preventing a chemical leak.

 Also, a neck support portion configured to support a neck portion of the male connector is provided to prevent a sag phenomenon of the male connector so that the male connector and the female connector may be coupled at an accurate position.

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 Also, since a clamp configured to firmly fix a mounting flange, into which the male connector is fixedly inserted, to a placing portion may be included to prevent the mounting flange from shaking when the male connector and the female connector are coupled, the male connector and the female connector may be coupled at an accurate position.

Also, since processing tolerances of the mounting flange and a coupling flange may be reduced by fastening the mounting flange and the coupling flange to each other using a position determination pin processed with high precision, the male connector and the female connector may be coupled at an accurate position.

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CLAIMS

1. A chemical supplier comprising:

a chemical male connector (510) and a chemical female connector (210)

which are connected to each other to supply chemicals; and

5 a connector guide portion configured to guide an outer circumferential surface of the chemical male connector (510) so that a central axis (C1) of the chemical female connector (210) coincides with a central axis (C2) of the chemical male connector (510) when the chemical male connector (510) is coupled to the chemical female connector (210),

10 wherein the connector guide portion is provided on a side of a position at which the chemical male connector (510) is coupled to the chemical female connector (210).

2. The chemical supplier of claim 1, wherein the connector guide portion

15 comprises guide surfaces 811 and 821 tilted toward a centripetal direction from a direction in which the chemical male connector (510) is coupled to the chemical female connector (210) to guide an outer circumferential surface of the chemical male connector (510).

3. The chemical supplier of claim 2, wherein the connector guide portion

20 comprises a first housing (810) including a first guide surface (811) configured to guide an upper circumferential surface of the chemical male connector (510) and a second housing (820) including a second guide surface (821) configured to guide a lower circumferential surface of the chemical male connector (510).

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4. The chemical supplier of claim 1, wherein the connector guide portion comprises a plurality of guide rollers (930), (950) rotated to guide an outer circumferential surface of the chemical male connector (510).

5 5. The chemical supplier of claim 4, wherein the plurality of guide rollers (930), (950) comprise a plurality of upper guide rollers (930) spaced apart from each other to guide an upper perimeter of the outer circumferential surface of the chemical male connector (510) and a plurality of lower guide rollers (950) spaced apart from each other to guide a lower perimeter of the outer circumferential surface of the
10 chemical male connector (510).

6. The chemical supplier of claim 1, wherein the chemical male connector (510) is integrally coupled with a mounting flange (520) inserted into and fixed to a connector insertion hole (522) and comprises a neck support portion (160)
15 configured to support a neck portion (512) of the chemical male connector (510) on one side spaced apart from the mounting flange (520) by which the chemical male connector (510) is supported.

7. The chemical supplier of claim 6, wherein a mounting groove (161)
20 formed to have a shape corresponding to a lower outer circumferential surface of the neck portion (512) of the chemical male connector (510) and in which the lower outer circumferential surface of the neck portion (512) is mounted is formed in a top of the neck support portion (160).

8. The chemical supplier of claim 1, wherein the chemical male connector (510) is integrally coupled with a mounting flange (520) inserted into and fixed to a connector insertion hole (522), the mounting flange (520) is supported on a placing portion (150), and a clamp (170) configured to fixedly support the mounting flange (520) above the placing portion (150) is further included.

9. The chemical supplier of claim 8, wherein the clamp (170) comprises a pivoting member (170a) provided to be pivotable around a hinge portion (171) on one side and including a holding piece (172) on a side opposite the side where the hinge portion (171) is located, a first sidewall member (170b) fixedly supporting the hinge portion (171) above the placing portion (150), and a second sidewall member (170c) provided on a side facing the first sidewall member (170b) and including a holding hook (173) at a top end thereof to hold the holding piece (172).

10. The chemical supplier of claim 9, wherein the holding hook (173) is pivotably provided on one side of a pivot (174) to be held by or released from the holding piece (172), and a push portion (175) connected to the holding hook (173) and extending therefrom is provided on the other side of the pivot (174).

11. The chemical supplier of claim 1, wherein the chemical male connector (510) is integrally coupled with a mounting flange (520) inserted into and fixed to a connector insertion hole (522), a hose flange (560) including a side surface facing the mounting flange (520) is coupled to an end of a chemical supply hose (500) connected to the chemical male connector (510), and a coupling flange (540) inserted into a coupling groove (511) formed along a circumferential perimeter of an end of

the chemical male connector (510) passing through the connector insertion hole (522) to prevent the chemical male connector (510) from being detached therefrom is provided between the mounting flange (520) and the hose flange (560).

5 12. The chemical supplier of claim 11, comprising a plurality of fastening members (571) fastened through the mounting flange (520), the coupling flange (540), and the hose flange (560) and spaced apart in a circumferential direction and a plurality of position determination pins (572) fastened through the mounting flange (520) and the coupling flange (540) between positions where the plurality of
10 fastening members (571) are fastened.

 13. The chemical supplier of claim 12, wherein the position determination pins (572) are formed as reamer bolts.