

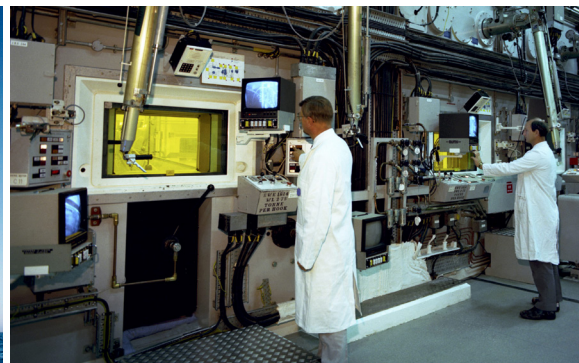


The Quick Connect  
Solution Provider

ULTRA HIGH-PRESSURE HYDRAULICS

# Application Guide

- for *Ultra High-Pressure Hydraulics* Stainless Steel Range



# UHP Stainless Steel Range

## THE UNIVERSAL BUILDING BLOCKS

CEJN adapters now extend into a comprehensive UHP Stainless Steel Range. Split into 3 groups, HP-MP-LP these performance parts complement CEJN's UHP couplings and hoses providing the universal building blocks of high pressure hydraulic systems.

A major part of CEJN's development processes is testing. CEJN production lines have integrated product integrity testing, so that each UHP coupling and hose assembly is put through their paces before delivery. CEJN has a long history of specifying and using adapters and blocks for their own testing. Now this knowledge is applied and formed into CEJN's stainless steel range for high pressure applications, built on industry standard compatibility cone and thread joints for lasting installations.

All the information including drawings and 3D CAD models needed by mechanical designers, is available on the CEJN website.

**For more information go to: [www.cejn.com](http://www.cejn.com)**



## CONTENT

ALWAYS DEPENDABLE	03
GENERAL APPLICATIONS EXAMPLE	04
APPLICATION EXAMPLE - R&D	06
APPLICATION EXAMPLE - PRODUCTION	07
GUIDE TO USAGE	08
USEFUL INFORMATION	09
HIGH PRESSURE (HP) & MEDIUM PRESSURE (MP)	10
LOW PRESSURE (LP)	11

# CEJN - Always Dependable

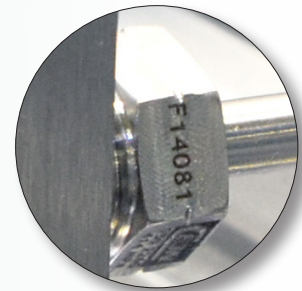
**QUALITY.** Hydraulic systems are often used in harsh environments under demanding conditions. With CEJN components, the material selection and the design process assure that the parts hold up in the roughest of applications. From many decades of testing hydraulic couplings, CEJN knows from hard earned experience what is required from stainless steel components in testing. CEJN is now able to share this product knowledge via the UHP Stainless Steel Range and offer a broader range of hydraulic connections from 69 MPa (10k PSI) to 414 MPa (60k PSI).

Whether building, modifying or repairing a complex test rig or laboratory equipment, or more portable types of UHP equipment, CEJN's wide range of stainless steel adapters can be part of that system.

## Traceability

### EVERY SINGLE COMPONENT IS MARKED

A key feature of CEJN's UHP Stainless Steel Range, is that every component is marked individually. This means that each part is traceable all the way back to the specific batch of material from the steel mill. Working pressure and part number are also clearly marked on each component.



## Material assurance

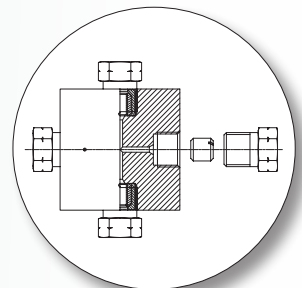
### WHAT MAKES THE CEJN UHP STAINLESS STEEL RANGE

Material traceability is important and means that the composition and properties of the stainless steel alloy used in the series are of documented quality in terms of performance, something that other offerings in the industry often miss. The material grade is 316L / EN1.4404 and is NACE certified.

## Compatibility

### INDUSTRY STANDARD COMPLIANT

The design makes it easy to join all major industry seals and threads, so that the widest possible range of integration is possible. Specifying CEJN for new equipment, to complement or rebuild existing systems is straight forward and with guaranteed CEJN quality.



# Application Examples

## WET CHRISTMAS TREE

This is the most critical equipment installed at the wellhead to contain and control the production or injection of fluid into the well. It consists of a set of valves acting as a safety barrier to the environment and also driving the well flow to a manifold or direct to a floating production unit. Additional functions include pressure relief, chemical injection, a conduit for control systems to monitor and control safety valves in down-hole. Installations can be at around 2500m and depending on the well surge, ranging from 14MPa (2k PSI) to 138MPa (20k PSI), can produce up to 20000 barrels a day. MP Stainless Steel fittings are a likely choice in the hydraulic system lines and panels, to control subsea valves, hydraulic connector, subsea control system and perform chemical injection, with actuating pressure ranging from 10MPa (1.5k PSI) to 69MPa (10k PSI).



## COMPONENT TESTING

Manifold and Christmas Tree manufacturers need to perform hydrostatic tests on the system sub-components before operating in deep waters. Hydraulic interconnections subjected to high pressure tests need to be in remote controlled safe and isolated areas (bunkers).

CEJN's UHP hoses, quick couplings and UHP Stainless Steel adapters ensure that the tests are equipped to run safely and well organized.

## EVALUATION OF THE OIL PLATFORM

This application consists of lifting the oil platform, built in dry dock, to calculate weight and center of gravity.

For this project, UHP Stainless Steel products and hoses were used to connect the hydraulic cylinders and hydraulic power unit, using a bespoke manifold frame.



## FLUSHING UNIT

Dedicated flushing units are used for cleaning internal areas of all the components in the hydraulic systems, which must operate free of impurities or contaminants. Several different fluid options can be used in cleaning the system, such as HW, ethylene glycol or synthetic fluids. The fluid is kept in a turbulent state to improve the removal of impurities. The equipment is assembled with control panels, triplex pump, filters, pipes, valves and also UHP stainless steel adapters for all the system connections. MP products are most commonly used for this application.

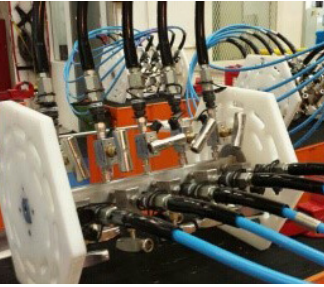
## HIGH PRESSURE CONTROL PANELS

The panels are assembled for controlling, regulating and distributing high pressure in several lines through valves, pressure gauges and regulators, which handle the downstream and upstream lines.

In this case, Stainless Steel high pressure connections are used for adapting different kinds of threads and connections in the panel instrumentation. MP or HP connections are ideal since they guarantee the efficiency of tests by preventing leaks.



The applications overviewed here use building blocks from the UHP Stainless Steel Range. High pressure testing of key components before assembly or as part of routine maintenance means that reliability and dimensional compatibility are important. CEJN's experience from high pressure product testing gives a unique insight into what these requirements are.



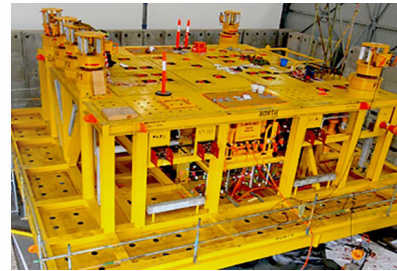
### MANIFOLD FOR COMPONENT TESTING

There are some critical components in the Christmas Tree that must be tested before being assembled in the final product. The high pressure unit is connected to the manifold responsible for simultaneously testing different lines, which minimizes test time.

The image shows an example of a manifold composed of valves, stainless steel UHP adapters, hoses and couplings providing simultaneous testing on different components.

### SUBSEA MANIFOLD

Subsea manifolds are used to gather or inject fluids from or to a Christmas Tree and a floating production unit. The assembly consists of valves, chokes, flowmeters, accumulators and sensors. The MP range of UHP Stainless Steel adapters are used in these hydraulic lines, to control subsea valves, hydraulic connectors, subsea control systems and perform chemical injection, with actuating pressures up to 69MPa (10k PSI).



### INSTALLATION OF HYDRAULIC HOSES AT PIT AREA

The testing of products used in deep waters are carried out to PITs (Product Integrity Test standards). Here, the operators simulate the real application and put the equipment in submerged working conditions.

The tests are done using nitrogen (N<sub>2</sub>) or fluids connected from the hydraulic booster units to the panel and are distributed in the hydraulic hoses. CEJN items needed for making the connections along the circuit are; hoses, pipes, stainless steel adapters and quick couplings.

### PRESSURE TEST UNITS

This equipment is used for static pressure tests in several applications. Powered by compressed air they can pressurize both liquids and gases at very high pressures and volumes.

UHP Stainless Steel connections in this type of equipment are used for the pump outlet, pressure gauges, bulkheads and pressure relief valves. MP or HP cone-type seals with threaded connections give guaranteed tightness of the system



### VALVE TEST BENCH

Valve test equipment for ensuring product efficiency includes pressure generating units and pressure controls. These can be either pneumatic or manual powered to reach the high pressure levels, so that the valve bodies and seating can be evaluated. Typically MP and HP connections found in the stainless steel range, such as crosses, tees, adapters and bulkheads, are used for instrumentation on discharge lines between the bench and the pressure generating unit.



APPLICATION EXAMPLE

# Research & Development

## TESTED & VERIFIED DESIGN

**CEJN TESTED.** Testing hydraulic system components is an in-depth and important step for product validation.

CEJN's own laboratory uses the UHP Stainless Steel Range during the validation testing of new products. The UHP quick couplings are pushed to the limits of their endurance and beyond through impulse and destructive burst testing.

The UHP Stainless Steel components are easy to move around and manoeuvre to set up for different product tests and series.



### MINIMISE LEAKAGE

When testing new coupling designs, the rest of the system needs to perform faultlessly, without any trace of leakage. CEJN knows what is needed from experience.



### EXTENDED LIFE SPAN

Couplings during the develop phase will undergo hundreds of thousands of impulses during testing. The life span of the other components must deliver even better performance.



### HEALTH & SAFETY

When building a testbench, the main objective is to create a safe environment for the employees to test the products without compromise - use CEJN parts for maximum safety.



### SAVE TIME

Standard industrial compatibility based on the 60° cone and thread system for both MP and HP connections.

# Production

## HOSE TESTING TO ENSURE QUALITY

### ASSEMBLY LINE-PRODUCT VERIFICATION.

CEJN UHP hoses are validated by visual inspection and pressure testing before delivery to the customer. The high pressure hydraulic test bench requires several cone and thread blocks, tubes and adapters from CEJN's UHP stainless steel range.

This application requires precision items, which withstand the wear from the intensive production takt. Hundreds of bespoke hoses are assembled for customers daily, so only the highest quality components match up to the demands of the product verification job.

APPLICATION EXAMPLE



### MINIMISE LEAKAGE

By using a 60° female and 59° male cones, CEJN insures that the seals in the thread and cone MP and HP systems stay tight under the highest pressure.



### EXTENDED LIFE SPAN

CEJN specifies and selects the grade of stainless steel carefully in their parts to extend the life span to the maximum.



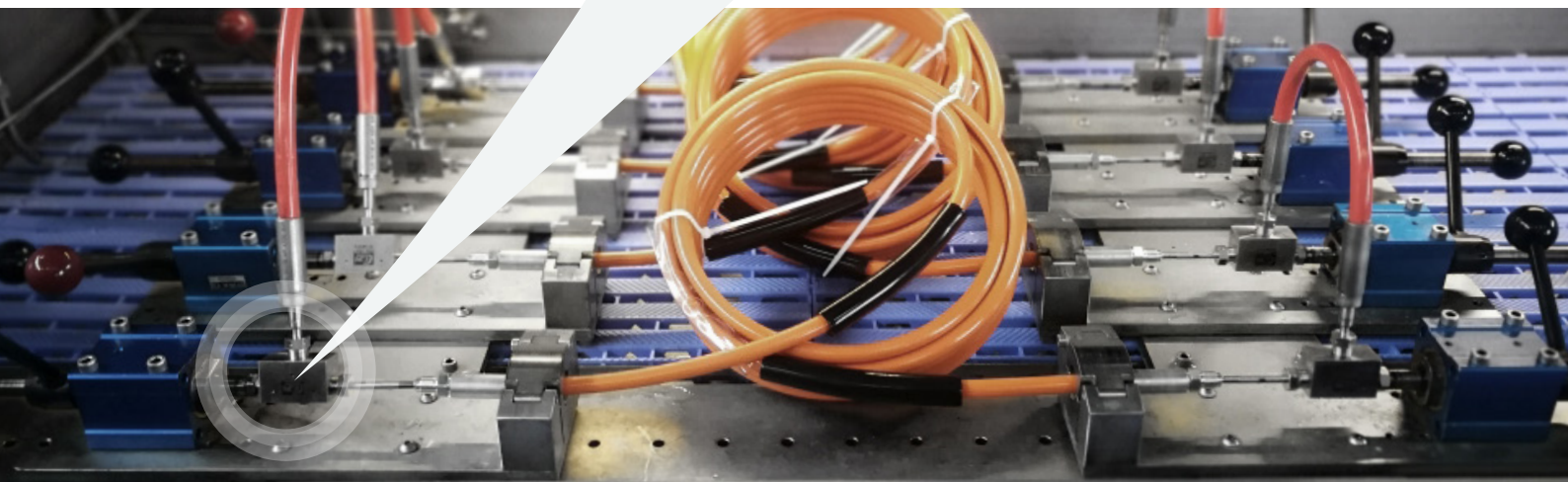
### PRECISION MADE

The thread and cone system gives a reliable seal if the surfaces and angles are smooth and precise.



### SAVE TIME

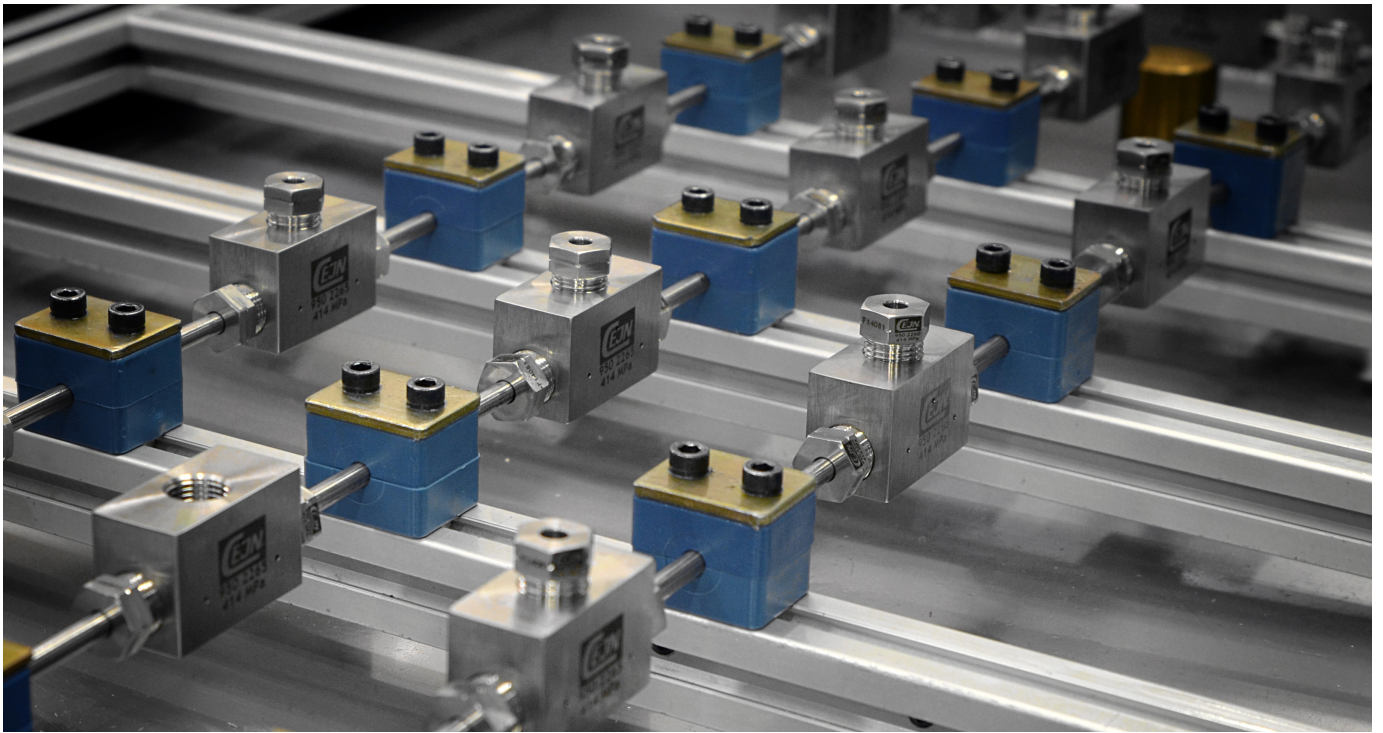
In a production situation, time is critical. When component reliability in operation can make the difference; the quality of CEJN's components is that difference.



# Guide to usage

**AN ADAPTER FOR EVERY APPLICATION.** The areas in which the UHP stainless steel range can be used are many. The key is the wide range of adapters, increasing the versatility and possibility to connect equipment. Where there is a high pressure hydraulic system these types of components will be installed. The industry standard cone and thread, together with dimensional compatibility, mean that upgrading existing systems presents no issue.

Designing a high pressure system is easy, as all the 3D CAD models and drawings are available for download. Complete specifications are available to assist building a high pressure system.



To enable easy selection of the correct components CEJN's stainless steel range is categorized into three groups based on pressure:

- LP (Low Pressure) up to 103 MPa (15k PSI)
- MP (Medium Pressure) up to 138 MPa (20k PSI)
- HP (High Pressure) over 138 up to 414 MPa (20k PSI - 60k PSI)

Within each of the three groups, they are further sorted in sections with similar properties. The data then fully shows individual product properties, making it easy to find the appropriate adapter to suit the tube or thread size.

# Useful Information

**KNOW WHAT THE SYSTEM IS.** Avoid confusion around what type of high pressure connection is in use, how it can be described and know how to install and recognize UHP Stainless Steel components.

This brief information is helpful when specifying or planning to repair a high pressure system.

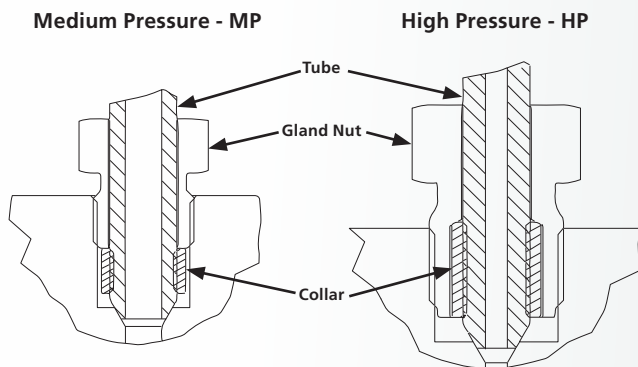
## Torque right

Note that despite HP and MP having similar dimensions they can have quite different torque values.

More torque guidance for other threaded connections like G (BSPP), JIC, NPT and Type M can be found at [www.cejn.com](http://www.cejn.com)

Tube/Collar Thread MP	Gland Nut Thread MP	Torque (Nm)	Torque (Lbf-ft)
1/4"	7/16"-20 UNF	27	20
3/8"	9/16"-18 UNF	41	30
9/16"	13/16"-16 UNF	75	55
3/4"	3/4"-14 NPSM	123	90
1"	1 3/8"-12 UNF	204	150

Tube/Collar Thread HP	Gland Nut Thread HP	Torque (Nm)	Torque (Lbf-ft)
1/8"	1/2"-20 UNF	20	15
1/4"	9/16"-18 UNF	34	25
3/8"	3/4"-16 UNF	68	50
9/16"	1 1/8"-12 UNF	150	110



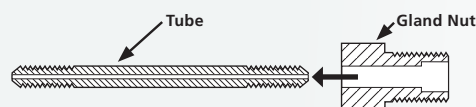
## Spot the difference on Gland Nuts

Depending on how the cone and thread connection interacts, you can easily spot if you have a medium or high pressure version of the fittings.

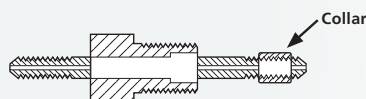
You can see on the image to the left that on the MP coupling the collar is placed **outside** the gland nut and in the HP coupling the collar is **inside** the gland nut.

## How to install UHP Stainless Steel Gland Nuts

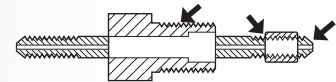
The most important step to insure a leakage free connection.



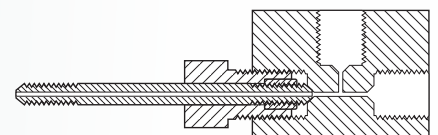
- 1.** Thread the gland nut over the tube with the hexagonal head first.



- 2.** Thread on the collar on the tube so that 1-2 turns of the pipe threads are visible, the threads are counter clockwise.



- 3.** Lube the threads on the gland nut, the end surface of the collar that goes against the bottom of the gland nut and the conical tip of the tube.



- 4.** Install the tube and nut into the block.

# Stainless Steel Range HP (over 20k to 60k PSI)

## HP Blocks

*Stainless Steel*

Industry standard blocks in cross, tee and elbow configurations. Compact designs, made from AISI 316L / EN1.4404 stainless steel for maximum life and safety weep holes on all the connection ports. All blocks provided with collars and gland nuts.



## HP Tubing

*Stainless Steel*

Industry standard tubes in 1/4", 3/8" and 9/16" sizes. Manufactured from cold drawn AISI 316L / EN1.4404 Stainless Steel for maximum life.



## HP Adapters

*Type M to HP in Stainless Steel*

Males threaded adapters with type M from 9/16" to 1-5/16" and HP from 1/4" to 1". Standard 60° cone type sealing with UNF threads. Manufactured from cold drawn AISI 316L / EN1.4404 Stainless Steel for maximum life.



## HP Collar and Gland Nuts

*Stainless Steel*

Additional collar and gland nuts are available. Suitable for CEJN's hose tube fittings with left hand threads.



## Adapters

*Stainless Steel*

Industry standard HP adapters. Compact designs, made from acid resistant, NACE certified, AISI 316L / EN1.4404 Stainless Steel for maximum life.



## HP Adapters

*Type M in Stainless Steel*

Type M adapters, plugs and caps from 9/16" 1-5/16". Standard 60° cone type sealing with UNF threads. Manufactured from cold drawn AISI 316L / EN1.4404 Stainless Steel for maximum life.



# Stainless Steel Range MP (up to 20k PSI)

## MP Blocks

*Stainless Steel*

Industry standard blocks in cross, tee and elbow configurations. Compact designs, made from AISI 316L / EN1.4404 stainless steel for maximum life and safety weep holes on all the connection ports. All blocks provided with collars and gland nuts.



## MP Tubing

*Stainless Steel*

Industry standard tubes in 3/8" and 9/16" sizes. Manufactured from cold drawn AISI 316L / EN1.4404 Stainless Steel for maximum life.



## MP Adapters

*MP to HP in Stainless Steel*

Adapters for MP and HP tubes from 1/4" to 9/16". Standard 60° cone type sealing with UNF threads. Manufactured from cold drawn AISI 316L / EN1.4404 Stainless Steel for maximum life.



## MP Collar and Gland Nuts

*Stainless Steel*

Additional collar and gland nuts are available. Suitable for CEJN's hose tube fittings with left hand threads.



## MP Adapters

*Stainless Steel*

Industry standard adapters for tube sizes from 1/4" to 1". Manufactured from cold drawn, NACE certified, AISI 316L / EN1.4404 stainless steel for maximum life.



## MP Adapters

*MP to type M in Stainless Steel*

Males threaded adapters with type M from 9/16" to 1-5/16" and MP from 1/4" to 1". Standard 60° cone type sealing with UNF threads. Manufactured from cold drawn AISI 316L / EN1.4404 Stainless Steel for maximum life.



# Stainless Steel Range LP (up to 15k PSI)

## LP Adapters

### *NPT in Stainless Steel*

Industry standard adapters for 1/8" to 1" NPT. Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life.



## LP Adapters

### *NPT to G in Stainless Steel*

Industry standard adapters for 1/4" to 1" NPT to G 1/8", 1/4", 3/8", 1/2" and 1" with 60° internal sealing cone. Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life.



## LP Adapters

### *NPT to HP in Stainless Steel*

Industry standard adapters for 1/8" to 1" NPT to HP tubes sizes 1/4", 3/8", 9/16" and 1". Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life and safety weep holes on all the connection ports.



## LP Adapters

### *JIC to NPT in Stainless Steel*

JIC standard adapters with 37° flare tube connection for JIC 04, 06, 08 and 16 to NPT tubes sizes 1/4", 3/8", 1/2", 3/4" and 1". Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life.



## LP Adapters

### *JIC to HP in Stainless Steel*

JIC standard adapters with 37° flare tube connection for JIC 04, 06 and 08 to HP tubes sizes 1/4", 3/8" and 9/16". Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life.



## LP Adapters

### *NPT to MP in Stainless Steel*

Industry standard adapters for 1/8" to 1" NPT to MP tubes sizes 1/4", 3/8", 9/16" and 1". Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life and safety weep holes on all the connection ports.



## LP Adapters

### *NPT to type M in Stainless Steel*

Industry standard adapters for 1/4" to 1" NPT to Type M 9/16", 3/4", 1" and 1,5/16". Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life.



## LP Adapters

### *JIC in Stainless Steel*

JIC standard adapters with 37° flare tube connection for JIC 04, 06, 08 and 16. Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life.



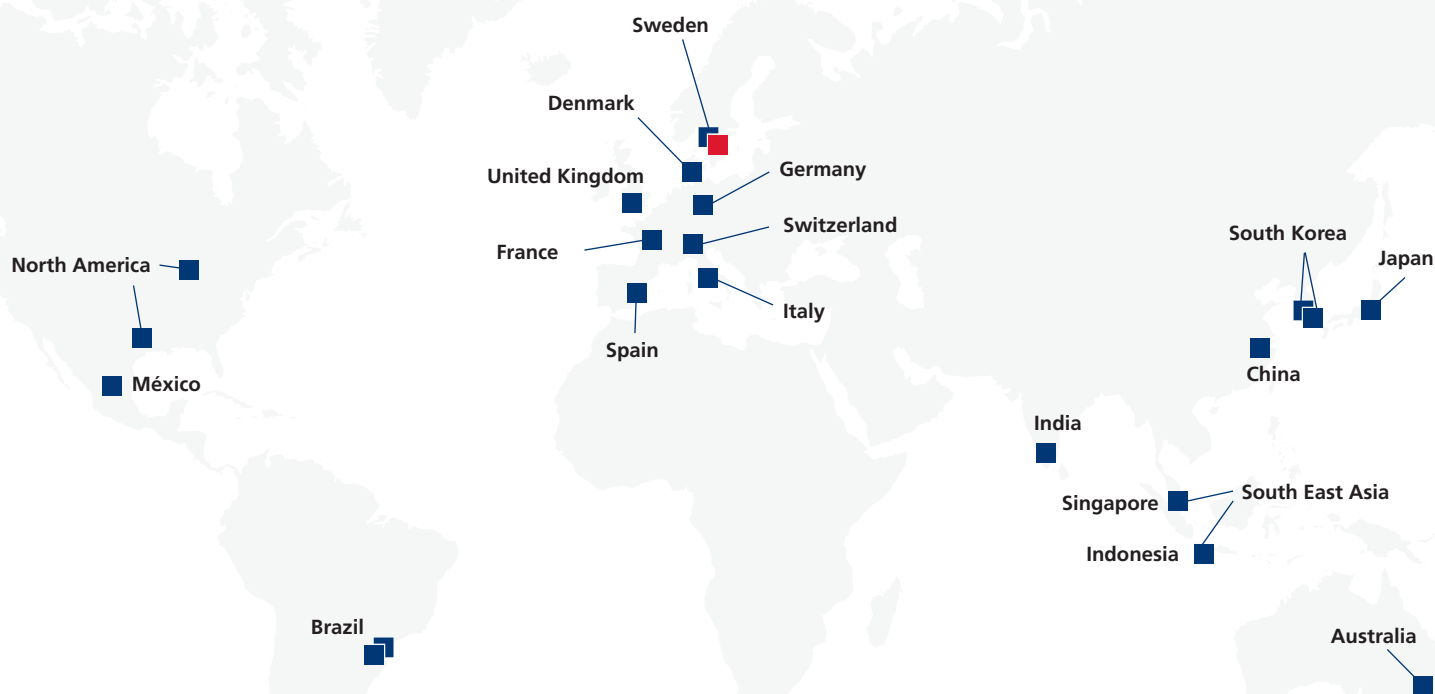
## LP Adapters

### *JIC to MP in Stainless Steel*

JIC standard adapters with 37° flare tube connection for JIC 04, 06, 08 and 16 to MP tubes sizes 1/4", 3/8", 9/16", 3/4" and 1". Compact designs, made from NACE certified AISI 316L / EN1.4404 stainless steel for maximum life.



- HEAD OFFICE
- SALES OFFICE



## *Made in Sweden since 1955*

We have been producing professional, high-quality and innovative quick connect couplings here at CEJN since our first patented coupling was launched in 1955. CEJN is an independent global niche company with its head office in the heart of Sweden. Over the years we have expanded to 22 locations worldwide and are supplying products and services to virtually every industry segment. At CEJN, we are united by our five core values: safety, environment, quality, innovation and performance. They are our cornerstones and define who we are, how we work, what we believe in and what we stand for.

*Contact your local sales office or visit [www.cejn.com](http://www.cejn.com) for more information.*