

# Hydrogen Fuelling Station Protocols Testing Apparatus

## 1 General

ISO 19880-1, “Gaseous hydrogen - Fuelling stations - Part 1: General requirements”, includes requirements for, and additional guidance on, the testing of fuelling protocols used at hydrogen fuelling stations.

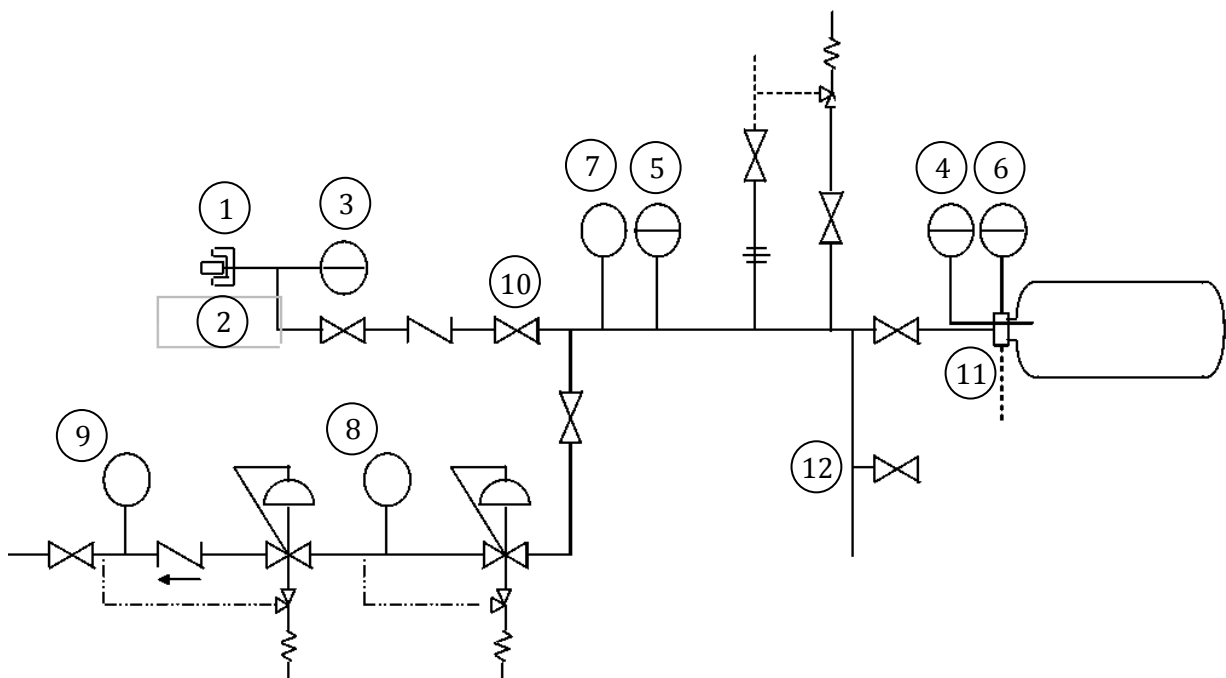
ISO 19880-1: 2020, Annex J, includes information on Hydrogen Station Testing Apparatus (HSTA) - specific equipment designed to enable the testing and evaluation of hydrogen fuelling station protocols in place of a hydrogen vehicle.

To supplement this Annex, this document provides Piping and Instrumentation Diagrams (P&IDs) for example HSTA used in Japan and the USA.

## 2 HSTA examples

### 2.1 Example HSTA layout (P&ID) from HySUT

Below is an example of a Hydrogen Station Test Apparatus P&ID (provided by HySUT) with sensors and valve layout from an HSTA used in the field. This particular example shows one fuelling vessel. The component layout and inventory should be investigated per local requirements and accompanying risk assessment.



1 = Receptacle

2 = Ir element

3 = Temperature sensor (1)

4 = Temperature sensor (2)

5 = Pressure sensor (1)

6 = Pressure sensor (2)

7 = Pressure gauge (1)

8 = Pressure gauge (2)

9 = Pressure gauge (3)

10 = Pressure regulator

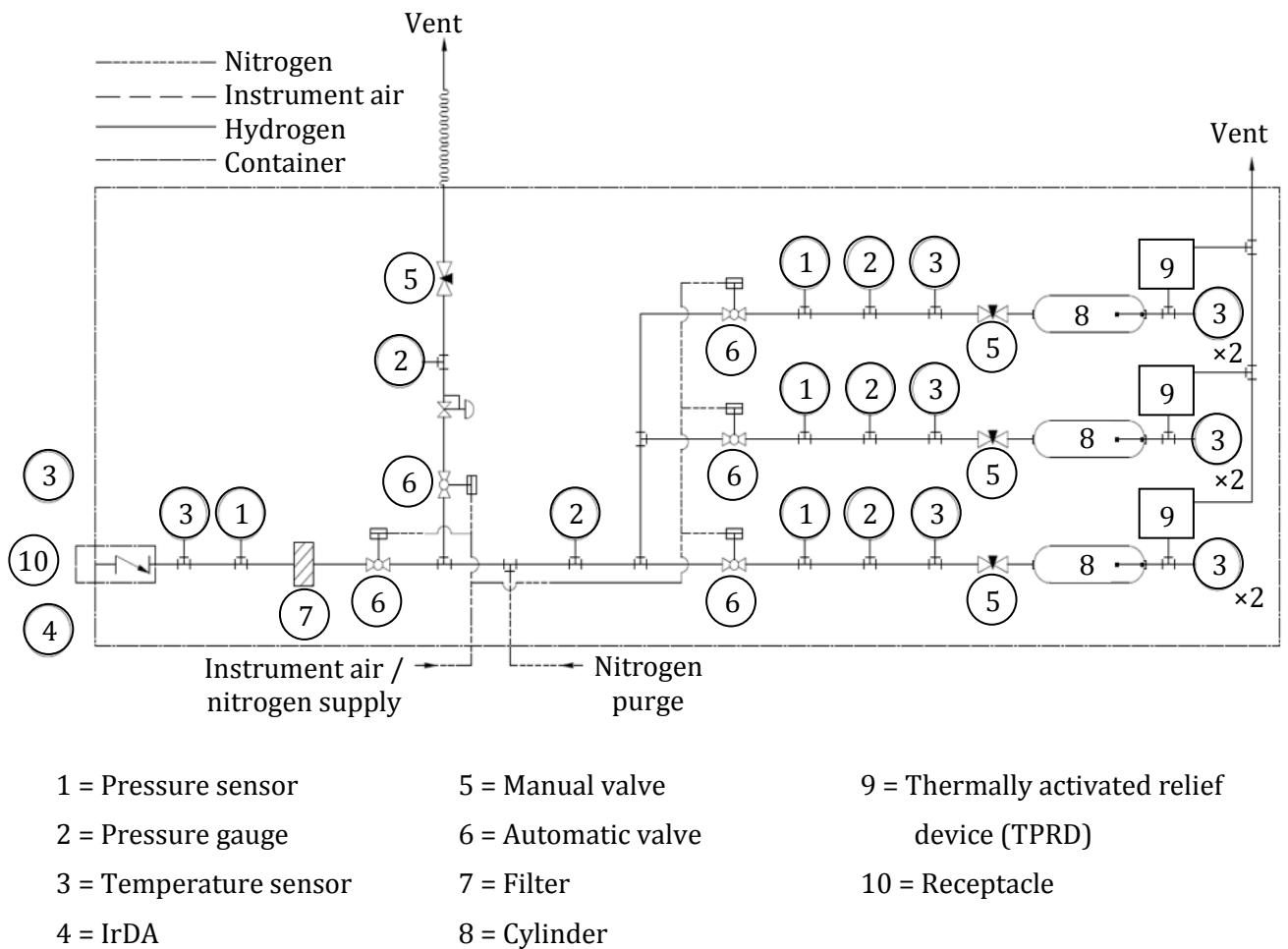
11 = Pressure relief device

12 = Only applicable if more than one cylinder

**Figure 1 — One example of an HSTA**

## 2.2 Example HSTA Layout (P&ID) from the US DOE and Sandia National Labs

Below is an example of a Hydrogen Station Test Apparatus P&ID call the HyStEP Device (provided by the US Department of Energy and Sandia National Labs under the H2FIRST project) with sensors and valve layout from an HSTA used in the field. This particular example shows three fuelling vessels that can be individually controlled to simulate CHSS fuelling from 3 kg, 6 kg or 9 kg. The component layout and inventory should be investigated per local requirements and accompanying risk assessment.



**Figure 2 — Another example of an HSTA**