INSTALLATION AND MAINTENANCE INSTRUCTIONS
DSH – Direct steam injection Humidifiers

GENERAL

- These instructions must be carefully read before any work involving products supplied by VALSTEAM ADCA ENGINEERING S.A. is undertaken.

- The installation procedure is a critical stage in the life of equipment, so care should be taken to avoid any damage.

Note:

- Current regional safety regulations should be take in to account and followed, while doing the installation and maintenance work.
- Handling, installation and maintenance work must be carried out by trained personnel. A supervisor must follow and check all activities.
- For the problems that cannot be solved with the help of these instructions, please contact the supplier or the manufacturer.
- The manufacturer reserves the right to change the design and material of this product without notice.

ATTENTION

- If malfunction of any other equipment or system operation failure may result in a dangerous overpressure, over temperature or even vacuum condition, a safety device must be included in the system to prevent such situations.
- At start up, the presence of small particles in the fluid (dirt, scale, weld splatters, etc) may cause an imperfect closure of the seat. If this occurs, proceed to an accurate cleaning.
- Do not touch the equipment without appropriate protection during working operation because it may conduct heat if the used fluid is at high temperature.
- Before starting maintenance be sure that the equipment is not pressurized or hot.
- The equipments must be used within the working temperature and pressure limits laid down for them, otherwise they may fail (refer to nameplate and/or IS- Information Sheet).
- Manual handling of products may present a risk of injury. You are advised to assess the risks taking into account the task, the individual, the load and the working environment.
- Before starting work ensure that you have suitable tools and/or consumables available. Use only genuine ADCA replacement parts.
- Do not remove the nameplate attached to the equipment. Serial number and other useful information is stamped on it.
- If the optional top vent connection is not being used, it must be closed with an appropriate carbon steel or stainless steel plug.
- During the assembly work, apply protective measures against dirt.
- When connecting flanges, the bolts should be mounted from the counter flange side with the hexagon nuts from the valve side and it must exist a perfect match between the connection flanges.
- Tighten flange connection bolts uniformly in a diagonal sequence.
- Correct installation of the equipment is full responsibility of the contractor
- These equipments are designed to be applied in places protected from exposure to weather.
- We recommend special constructions or protective measures for applications on the outside or in adverse environments like corrosion-promoting conditions (sea water, chemical vapors, etc).
- During maintenance or assembly, careful should be taken to avoid painting the valve stem.

TRANSPORT AND STORAGE

ATTENTION

- Handling and lifting of materials should be made with adequate equipments.
- Do not damage the paint job. It protects against corrosion during transportation and storage.
- The valves and equipments should be protected from impacts and forces during transportation and storage.
- The manufacturer doesn't assume the responsibility of damaged equipments due to inappropriate handling during the transportation and storage.

INSTALLATION

ATTENTION

- Account for over pressure conditions, according with the local laws or standards.
- The equipments must not be used with other purpose than the one they were built for (e.g. climbing aids or as connecting points for lifting gear).
- For the problems that cannot be solved with the help of these instructions, please contact the supplier or the manufacturer.

Installation area requirements:

- The installation area should have easy access and provide enough space for maintenance and removing operations.
- The pipework before and after the separator, must be sized in order to avoid that the max flow speed recommended, for the fluid in question, is exceeded.
- In order to allow installation and maintenance work without emptying the system, stop valves should be installed upstream of the DSH system.

Procedure:

- Prior to install check that the product is suitable for the intended application: materials and pressure/temperature ratings.
- Before installing remove plastic covers placed on flanges or connection ends. The equipments have an arrow or Inlet/Outlet designations. Be sure that they will be installed on the appropriate direction.
- Take care with jointing material to ensure that none may be permitted to block or enter the equipments.
- In case of using Teflon tape (for screwed connections), avoid rolling it till the edge, because it can get cut and migrate to the equipments interior, blocking or causing a defective sealing.
- An ADCA pipeline strainer should be installed upstream of the separator to protect from dirt which could damage the equipments or cause mal-functioning. The strainer must be installed with the sieve sideways, if the medium is steam, to prevent the collection of condensate.
- The equipments pipework should be properly supported and free from strain and it should not be subjected to undue surges of pressure.
- External stresses that may be induced by the system due to pipe expansion, etc, can affect this product. The necessary precautions are recommended during the systems design and equipment assembly.

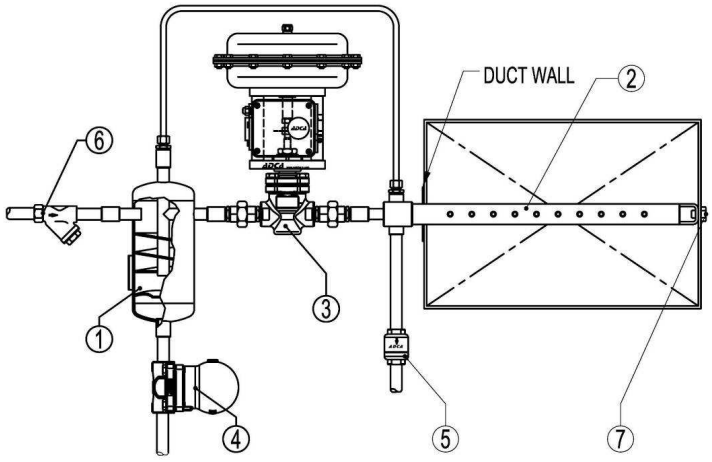
- The separator must be installed in horizontal position always with the drain discharge pointing downwards to ensure that the best results are obtained. A steam trap is necessary to automatically discharge the condensate. The steam supply to the humidifier must always be taken off the top of the steam main, never from the side or bottom.
- In order for the steam trap to remove condensate, it is essential that pressure in the condensate return line be well below the pressure in the supply line to the humidifier. If the condensate line is pressurized, we recommend the use of an Adcamat pumping system.
- Verify if the injection steam ports face against the air flow. If not, simple open the union, remove the nipple / elbow assembly from the tube, rotate 180 degrees and re-install the nipple / elbow assembly.
- To install, cut a hole in the duct or plenum slightly larger than the injection tube. The duct plates are furnished to tightly seal around the tube. Insert the injection tube, if it's horizontal, it should be mounted level. Support the outboard end of the tube by securing to the duct wall with support bolt.
- Vertical tube models must always be installed with the tube support bracket installed in the upward location to avoid trapping condensate in the outboard end of the injection tube.
- Whenever possible, install the injection tube in the centre of the duct. If the duct has a height of 250mm or less we recommend the use of an expanded duct section to prevent the restriction of the air flow.
- While the steam emitted from the injection tube is still visible it can collect on devices in the duct and be a potential source of trouble. It is preferable to locate downstream of these devices, but if not possible, the humidifier should be located far enough upstream for the steam to vanish before making such contact. The following spacing is recommended:

  - Not less than 3500 mm upstream from high efficiency filters. Locate high-limit duct humidity controller immediately upstream from the filter.
  - Humidifiers should not be placed less than 1000 mm upstream from fan inlets, tees, turning vanes, discharge grills or other devices.
  - To guard against faulty readings do not install humidifier less than 3000 mm upstream from temperature controller.
  - When installing in a multi-zone packaged air handling system, installation should be in the centre of the active air flow and as close to the discharge as possible.

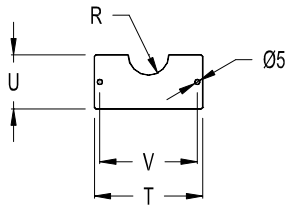
Typical installation:

MATERIALS		
POS.	**DESIGNATION**	**MATERIAL**
1	Steam separator	St.Steel
2	Injection tube	St.steel
3*	Control valve	(Under request)
4*	FLT float trap	Cast iron
5*	TSS22 thermostatic trap	St.steel
6	IS16 Y strainer	Cast iron
7	Support bolt	St.Steel

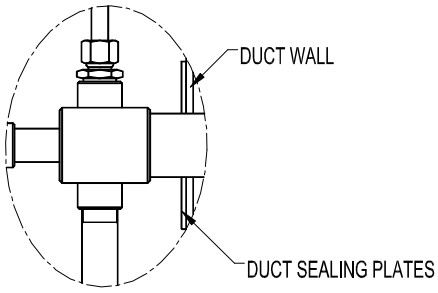
*Available spare parts



Duct sealing plates:



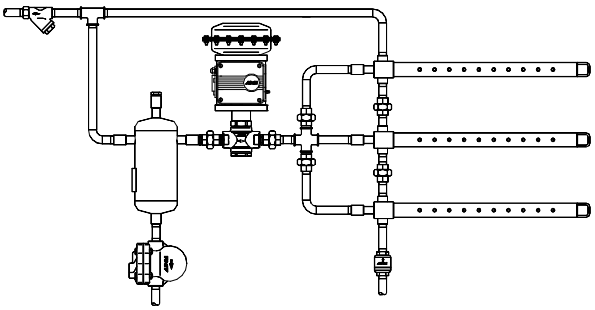
	T	U	V	R
DSH15-10	100	50	228	19
DSH20-20/DSH2520	110	55	100	25.4
DSH40-30	130	75	120	38.25



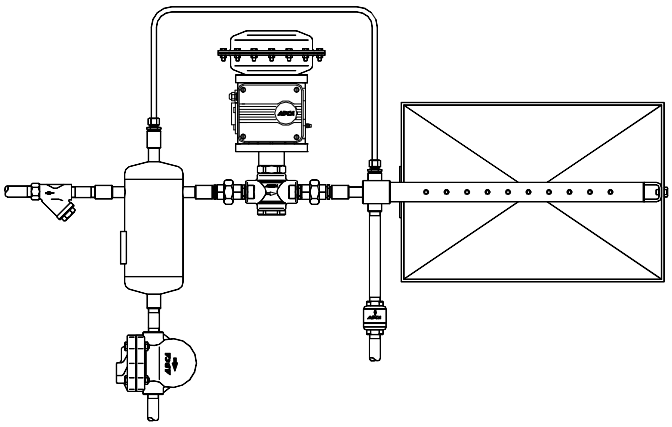
Detail "A"

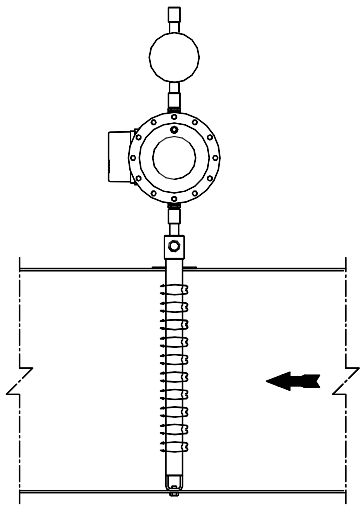
Alternative installation:

When using multiple tube pipe design, the injection tubes are piped and trapped separately to ensure that the additional resistance created by extra piping does not reduce the steam supply to the humidifier and also to provide extra trap capacity to handle the additional condensate created within the multiple injection tube steam jackets**.**



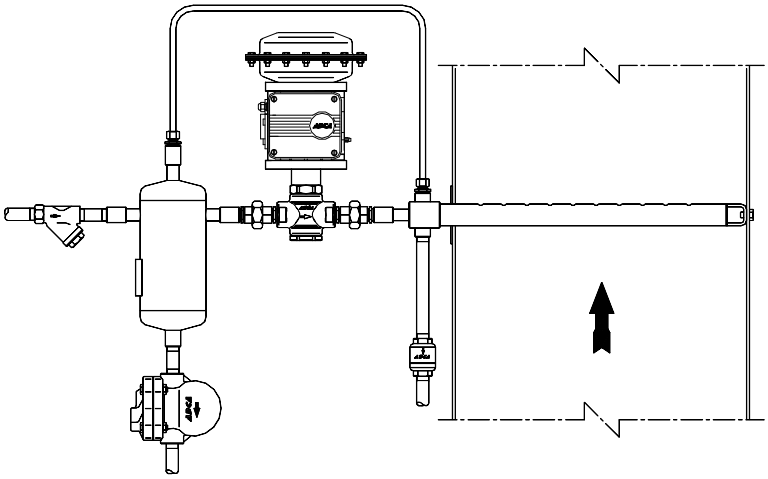
Horizontal duct – Horizontal lance





Plan View

Vertical duct – Horizontal lance



START UP

ATTENTION

- Current regional safety regulations should be take in to account and followed.
- Protective insulation and warning notice may be required.
- Until the start up of an existing or a new plant, the following must be checked:
  - All works are completed.
  - The equipments are correctly installed.
  - All the necessary safety devices (if applicable) have been installed.

Procedure:

1. All stop valves should be closed.
2. Open slowly the stop valves, in order to avoid water hammer damaging, until the input pressure reaches its limit.
3. The DSH system is ready.

Periodical checking:

- 24 hours after the start up, it is recommended to check the pipe connections for leaks and retighten the connections if necessary.

MAINTENANCE

- We recommend the separator and injection tube to be serviced as necessary. They don't need any specific type of maintenance. Regular inspection may be recommended by local authorities according to specific or general pipe and/or vessels assembly procedures.
- When reassembling make sure that all gasket faces are clean and always use a new gasket. Tighten flange connection bolts uniformly in a diagonal sequence (if applicable).
- Estimated lifetime under satisfactory working conditions: 5 years; after this period we recommend the wall thickness examination using appropriated inspection equipment. Pour quality water or corrosive fluids will reduce this period.
- For the control valves and steam traps: please see the specific IMI.

APPLICATION LIMITS	
Separator body design conditions	PN6
Max. operating pressure	4bar
Max. operating temperature	152ºC
Min. operating temperature	200ºC

CE Marking: This product has been designed for use on water, steam and other gases which are in Group 2 of the PED-European Pressure Equipment Directive 97/23/EC and it comply with those requirements. The product does not carry the CE mark.

PRODUCTS RETURNING

ATTENTION

- Information regarding any hazards and precautions to be considered because of contaminating fluids and residues or mechanical damage that may represent a health, safety or environmental risk, must be provided in writing by the distributors and costumers when returning products to Valsteam ADCA engineering.
- Health and safety data sheets regarding substances identified as hazardous or potentially hazardous must be provided with the information mention above.

ATTENTION

- **LOSS OF WARRANTY: Total or partial disregard of above instructions involves loss of any right to warranty.**