



LOSSES IN PIPES



DL DKL021

This system is designed to study the friction losses in pipes and losses in hydraulic elements such as valves, metering elements, accessories, etc. This trainer is very flexible and it allows the connection of new accessories and straight segments of pipes of different materials and roughness. The piping replacing is quick and simple using quick fittings: students just have to remove the desired segment unscrewing the fittings, place and fix a new one.

The pipe in the lower part of the panel collects residual water in order to avoid any possible damage to other equipment. In order to avoid water leaks, the trainer has ecological pressure taps that during connection or disconnections will not cause water losses since they are self-sealing. This equipment can be attached to the hydraulic bench or to the hydraulic group with flow meter.

PERFORMABLE EXPERIMENTS

- Measure and check of the main pressure losses in straight segments of many kinds of pipes. Possibility to test pressure losses in:
 - Two different inner diameter pipes: 21.2 and 13.6mm
 - Different materials testing.
- The proof of relation between pressure losses and speed flow in a pipe.
- Roughness measurement in pipes:
 - Galvanized steel
 - Cooper
- Measurement and check of secondary pressure losses in installation components. Possibility to test pressure losses in:
 - Short radius 90° elbow
 - Large radius 90° elbow
 - 45° elbow
 - Tee
 - Bent tee
 - Abrupt reduction
 - Abrupt widening
 - Smooth reduction
 - Plug valve
 - Check valve
 - Seat valve
 - Ball valve
 - Diaphragm valve
 - Diaphragm



FLUID MECHANICS



- Venturi pipe
- Rotameter
- Filter
- Etc.
- Determination of loss Coefficient “K” corresponding to each component listed above.
- Utilization, determination and tare of many metering elements such as:
 - Rotameter
 - Venturi pipe
 - Diaphragms: inner diameter 15mm and 13mm
 - Flow meter valve
 - Etc.
- Working pressure tests along the installation
- Employment of some kinds of pressure gauges
 - Water column
 - Digital differential pressure gauges
 - Bourdon type
- Plot of characteristic pump curve.

TECHNICAL DATA

Inner diameters:

- Main piping: inner diameter = 21.2mm; outer diameter = 25mm
- Reduction/ smooth widening.
 - Inner $\varnothing = 13.8$ mm ; outer $\varnothing = 16$ mm.
- Reduction/ abrupt widening
 - Inner $\varnothing = 45.2$ mm ; outer $\varnothing = 50$ mm.

Pressure gauges

- Water column pressure gauge, measure range 1m water column
- Digital differential pressure gauges (± 7000 mbar)
- Bourdon manometer, measure range 0 / 25m water column
- Bourdon vacuum gauge, measure range -76 cm Hg / 25 m water column

Distance between pressure test points:

- For straight segments 1m distance between n° 7 and n° 14
- 0.5 m between segment n° 12
- Between measuring point and any accessory, there are 40mm, except the following cases:
 - * Measuring point at 135mm under o above diaphragm (3)
 - * Measuring point at 125mm abrupt widening upstream (9) and abrupt narrowing downstream (3).
 - * Measuring point at 270mm smooth widening and narrowing (4/7).

Venturi

- Constrictor inner $\varnothing 12$ mm
- Pipe inner $\varnothing 21.2$ mm
- Outlet cone 7°
- Inlet cone 21°

Diaphragm 15

- Constrictor inner $\varnothing 15$ mm
- Pipe inner $\varnothing 21.2$ mm

Diaphragm 13

- Constrictor inner $\varnothing 13$ mm
- Pipe inner $\varnothing 21.2$ mm

Requirements:

Hydraulic bench DL DKL014 or Hydraulic group DL DKL011, not included in this item.