CAMLOCKS

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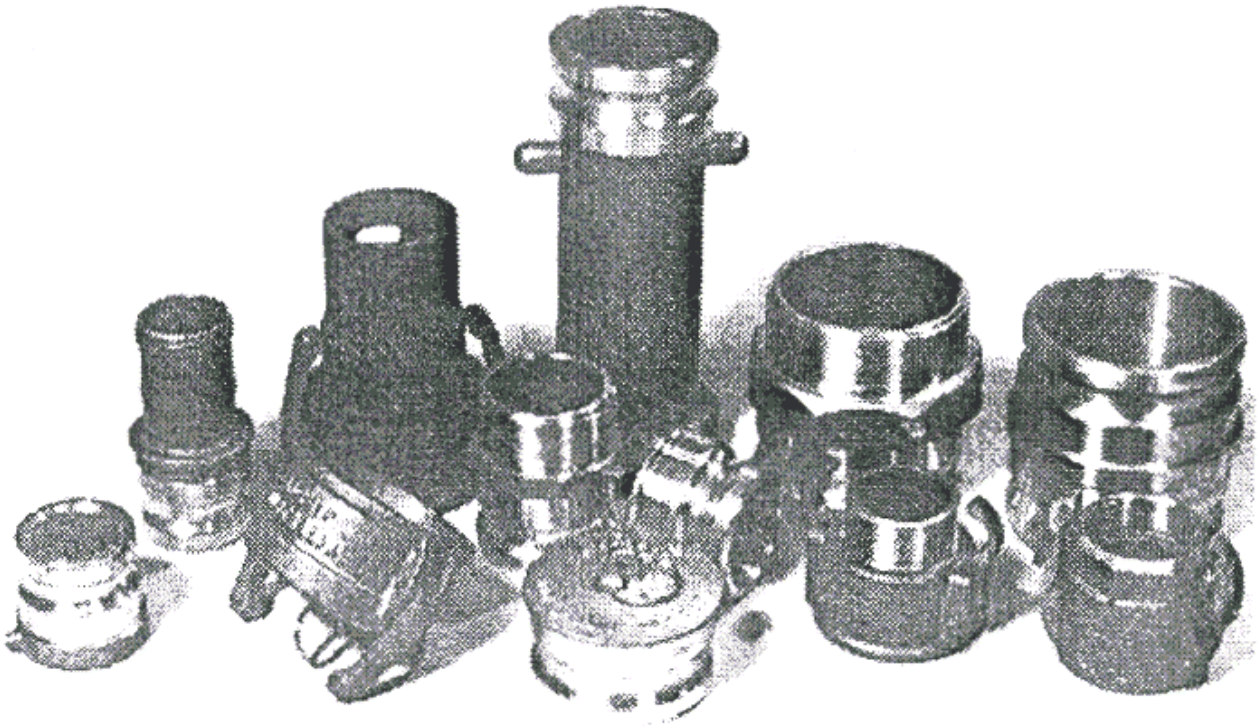

CAMLOCKS

Description: As the term suggests this is a product through the use of a cam lever and a groove mechanism is able to lock together and provide a easy and simple method of assembly and disassembly of a joint. The cam lever being located in the female portion and the groove in the male.

Camlocks have been a very successful invention. This basically comes down to relatively simple installation, reliability, reduction in labour time, flexibility in many applications & their rugged construction.

Standards: Camlocks must abide to either the Australian Standard or the NATO Standard. The above Standards are not interchangeable. The Australian Standard is predominantly used by Mobil and Mobil Distributors, but is rarely used in today's Petroleum Industry. The Australian Standard camlock has basically been phased out due to the majority of the industry using the Nato Standard. The specification for the Nato Standard camlock is in the USA Military Specification MIL-C-27487E.

Between the 2 standards there are only 2 sizes that are interchangeable. These are the 4" & 2 1/2", all the other sizes are not interchangeable. Liquip has developed a way to distinguish between the 2 Standards. All Australian Standard camlocks that are manufactured at Liquip contain 3 grooves on the male, the Nato does not have this marking.

Materials : Camlocks are available in a number of materials throughout the industry, they are as follows.

Aluminium

Bronze

Cast Iron

Mild Steel

Monel

Polypropylene

Stainless Steel

Over the next few pages is a copy of the 1997 camlock price list. This shows all camlocks available at Liquip.

Accessories : Liquip carry a number of different accessories. The first illustrations a standard Dust Cap, the other has the locking Arms. As you can see you would be able to place a lock of some description through the cams. The Dust cap for the API valve also has the option to have a lock or not. This type of locking device is controlled by a key.

Vibration while delivering has been known to cause the cams to shake loose and therefor a spillage occurs. To rectify this problem a Anti-Vibration safety clip is available in a range of sizes. This clip goes through the holes at the top of the camlock levers, causing the levers to stay closed. Another style of a locking or Anti-Vibration device is used on Liquips APINZ. This is a clip which is located next to the lever. As the lever is closed it slips behind the lever and locks into place. To open the operator must pull the clip back and unlock the lever. As mentioned above this is what Liquip stocks, other manufactures carry there own devices to achieve this.

Pressure Rating : This is a factor that must be considered. Below is a table that indicates a general guideline.

Inches/ PSI=(Pounds per Square Inch)

Size	Aluminium, Bronze Ductile Iron
1/2 (12mm)	150 (1000 kpa)
3/4 (20mm)	250 (1750 kpa)
1 (25mm)	250 (1750 kpa)
1 1/4 (32mm)	250 (1750 kpa)
1 1/2 (40mm)	250 (1750 kpa)
2 (50mm)	250 (1750 kpa)
2 1/2 (65mm)	150 (1000 kpa)
3 (80mm)	125 (850 kpa)
4 (100mm)	100 (700 kpa)
5 (125mm)	75 (500 kpa)
6 (150mm)	75 (500 kpa)
8 (200mm)	75 (500 kpa)

Another important fact that may need to be considered is the actual hole size of a camlock. The hole is only 90% of the actual nominal size. This can play a major factor in some cases.

Standardisation : A common problem that should never occur is the assumption that camlock parts such as pins, levers & seals are interchangeable between brands. It is a practice to only sell parts for the correct brand, this will ensure that no problems will arise.

Aviation Selective Camlocks : A number of camlock fittings have been developed for use in the Aviation Industry. Notches and pins are used to dedicate these fittings for the use of Aviation Gasoline (AV-GAS) or Aviation Turbine Fuel (JET-A1). The couplings are not interchangeable, thus preventing cross contamination of product. The camlocks are manufactured to the Nato Standard and are a heat treated Aluminium. Liquip carry a number of Aviation Selective camlocks, these are listed in the camlock price list.

Static Safe Camlocks : This is another range of specific camlocks. These have been developed to achieve continuity in the fabrication of code hoses. These couplings are also manufactured to the Nato Standard. The Standard witch covers these fittings is the AIP CP-17. This Standard states that the hose end shall allow both inner and outer spiral hose wires to be firmly electrically and mechanically connected to the end fitting. The camlock (NA80-9E) above shows the anchor block which allows disconnection of either the inner or outer wire so they may be tested separately.