Subsurface Sampler PNL 64

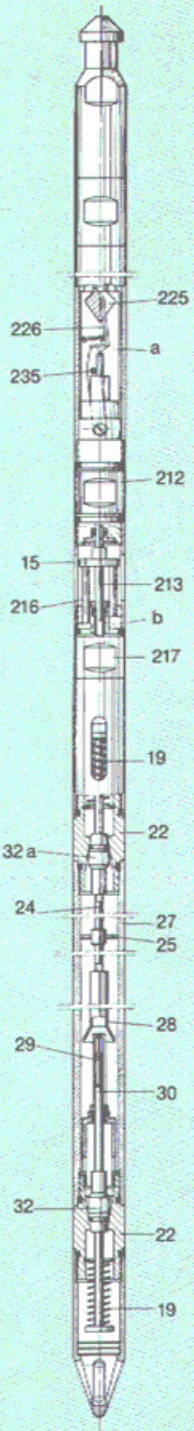


Fig. 1

For more than 45 years LEUTERT has been engaged in the development and manufacturing of high precision instruments for the Petroleum and Mining Industry, as well as water supply.

For production and reservoir testing of oil wells LEUTERT offers the a widely used subsurface sampler available today, the PNL 64. This instrument, although originally developed in the 1930's, now utilizes the continuous development and various modifications which, in most cases where initiated through the feedback of successfull experiences by users of the LEUTERT PNL 64 worldwide.

Ongoing present development is on a Positive Displacement Model, operation being made by original PNL 64 clockwork, or by motor on conductor line with the opportunity to observe pressure build-up at surface.

Application

The objective of reservoir fluid sampling is to collect from the well a sample that is representative of the reservoir fluid present at the time of sampling. This is achieved with the LEUTERT sampler PNL 64 by using a stainless steel tube, through which oil and gas can flow whilst lowering the instrument into the well to the desired sampling depth.

The PNL 64 is then closed mechanically by either a jar head, clock trip mechanism or an electric motor trigger. Then the sampler is pulled back to surface and the sample trapped is then evaluated in PVT laboratory analysis.

For safe transportation of the sample obtained by the PNL 64 it is usually required to transfer the sample into specially designed shipping bottles. For this procedure LEUTERT also supplies all necessary accessories such as mercury pumps, transfer systems and sample bottles, as well as other necessary tools and instruments.

Sample Chamber

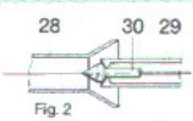


Fig. 2

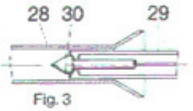


Fig. 3

This chamber consists of two valve nipples (22), valves (32), outer casing (27) and the valve closing gear (24–31). Operation as follows: The lower valve (32) is joined to the shaft (30) the spearhead of which is gripped by the collet chuck (29) when the valve is open (Fig. 2). The upper valve (32 a) is joined to the shaft (24), the guides (25) and the sleeve (28). When the upper valve is opened, the sleeve slides over and locks the collet chuck (29) (Fig. 3) and holds the lower valve open as long as it is itself open. The springs (19) are only powerful enough to assure a positive valve closure, if the pressure inside and outside the sample chamber is the same. When pulling out of the well, pressure on the outside of the sampler decreases, so that the higher pressure inside the sampler chamber then acts on the valves cross section keeping them tightly closed. The combination of springs and internal pressure is such that loss of fluid or gas from the sampler is only possible, if for some reason the external pressure exceeds the internal. In those rare cases, however, a positive lock assembly is available and should be employed.

Valve closing gear

This gear consists of the crosshead and shafts (15 and 216) passing through the nipple (217) the push rod (213) passing through the nipple (212) and triggering lever (226), which allows the valves to close when it comes to rest in the slot of the cam (225) rotated by the clock.

The function of the push rod is an important one, because it ensures reliable working of the triggering mechanism and valve closing gear. It is a double acting plunger, with one end in the pressure-free space (a) and the other in the pressure-free space (b). It can, therefore, always move easily, even if the whole instrument is subjected to pressure. The only load on the trigger (226) and thus on the clockwork is that of the upper valve spring (19).

The trigger and clock unit is independent of the sample chamber and can be used for different sample chambers.

Clockwork

Samplers with different pressure ratings can all employ the same clocks, which have been designed with rough oilfield conditions in mind and, given normal care and maintenance are never likely to breakdown.

Clock ranges available, in hours of total shut-off time: **2,5; 5; 10; 24; 36; 54; 90.**

The winding key allows setting of partial times of the respective total time of the clock.

Technical Data PNL 64

Volume (standard)	Diameter	Total Length	Total Weight
600 ccm	40 mm / 1 37/64 "	2,4 m / 94 "	37 kg / 82 lbs
1000 ccm	as above	3,4 m / 129 "	41 kg / 90 lbs

Total length is reduced by 0,45 m / 17,5 " when using the LEUTERT Jarhead in place of the clock.

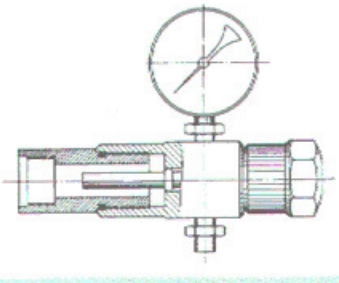
Pressure rating: Standard 700 bar / 10.000 PSI
up to 1400 bar / 20.000 PSI available on request.

Valve Opener

to release the sample from the chamber

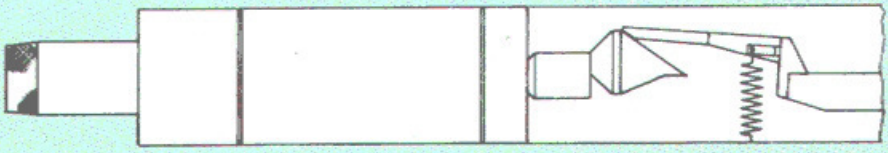
Special valve openers are required for this job. After the lower spear point and the triggering mechanism have been unscrewed, the valve openers are fitted in their place.

By noting the dial gauge attached, the increase in pressure can be seen when the sampler valve is opened. It is recommended to always have two valve openers available when planning the transfer of a sample at a field location.



Electric trigger for PNL 64

All LEUTERT samplers allow the replacement of the mechanical clock by our Electric Trigger. This allows the operator to actuate the tool downhole from the surface either below the LEUTERT PTE or direct via conductor line and our special Surface Control Panel.



Operating temperature max. 125°C / 257°F
Power supply 12 to 24 V / DC, 50 mA

Spring load
Release trigger