

# MODULAR SAMPLING TOOL TYP PNS89



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## AREAS OF APPLICATION

The modular sampling tool can be used to take liquid and gaseous samples in caverns/wells at different depths.

In case of gas samples, the chemical analysis and moisture content can be determined. While for liquid samples e.g. bacterial test can be performed. Both would be done by an external laboratory.

## FUNCTIONAL PRINCIPLE

The modular sampling probe allows for individual control of its modules from the surface measurement system. Mechanically, the tool consists of a valve motor that operates the sample bottle valve, a receptacle for the interchangeable sample containers, a clamping mechanism that secures the bottles, the metallic carrier housing itself, and the sample bottles housed within.

Due to the tools modular design, various sampling configurations can be implemented and adapted to the desired sample quantity. A conductivity sensor integrated at the bottom of the tool detects possible immersion in brine.

## SURVEY PROCEDURE

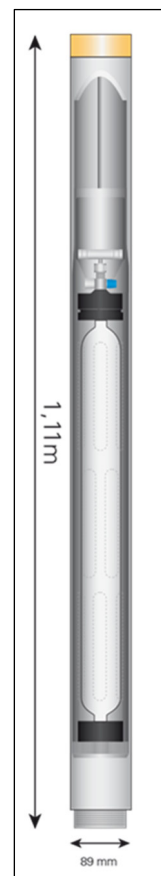
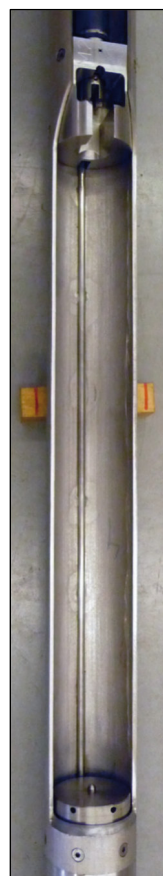
During RIH the temperature and CCL can be recorded. This allows for identification of couplings or the end of the inner pipe for reference.

After the depth correction at the depth reference point the samples can be taken at a desired individual depth. The designated sample bottle for the current depth is opened, the sample is retrieved into the evacuated bottle and the valve is closed. The tool then proceeds to the next sampling depth. Once all required samples are collected, the tool returns to the depth reference point for a final depth verification by CCL.

After POOH all sampling bottles are removed from the carrier and the content may be filled from the sampling bottles into other containers/bottles or directly transported to a laboratory for analysis.

## TECHNICAL SPECIFICATIONS

|                          |                     |
|--------------------------|---------------------|
| Diameter:                | 89 mm               |
| Length (with 5 modules): | 7.2 m               |
| Length of one module:    | 1.11 m              |
| Sampling volume gas:     | 0.5 l per bottle    |
| Sampling volume liquid:  | 1.4 l per bottle    |
| Weight:                  | 89 kg               |
| Temperature (max 85°C):  | Resolution: 0.01K   |
|                          | Accuracy: +/- 0.2 K |
| Further measured values: | CCL, Temperature    |



Images of the modular sampling tool (left to right)

- Tool configuration with upper part and first module
- Mounting device for changeable sampling bottle
- Sampling bottle gas with 0.5 litre volume in protective cage
- Cross-section of module section
- Sketch of complete system

