

IMPULS NEUTRON GAMMA TOOL

ING42SC 42/50mm



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AREAS OF APPLICATION

The ING42SC is a logging tool for interface determination in cavities. Interface determination surveys are of key importance in controlling the development of caverns. In the course of gas tightness tests, it makes an important contribution to ensuring the integrity of the borehole.

The ING42SC tool is used to determine the exact position of the interface between different fluids (e.g. hydrogen or nitrogen with brine or oil). Additionally pressure and temperature are recorded.

MEASURING PRINCIPLE

Determination of the depth of the interface in a cavern is made using the impulse-neutron-gamma technique. In this technique neutrons are emitted from a neutron source installed in the tool and these interact with the rock and the fluid (brine, nitrogen) in the cavern. The secondary gamma radiation which arises as a result is absorbed by two sodium iodide detectors (long and short measuring distance = significant and insignificant penetration depth of the radiation). The fluid in the cavern and hence the interface between them can be classified by the differing intensities of the detected gamma radiation.

TECHNICAL SPECIFICATIONS

Diameter:	42 mm or 50 mm
Length:	4.125 m
Weight:	18 kg
Neutron tube:	120 kV, 14 MeV neutron energy
Burst frequency:	25 Hz
Temperature (up to 90°C):	resolution: 0.01 K accuracy: +/- 0.2 K
Pressure gauge (up to 400 bar):	resolution: 0.1 bar accuracy: +/- 0.5 bar
Further measured values:	M-CCL/CCL
Sodium iodide detectors:	gamma 1: 110 mm gamma 2: 30 mm

OPTIONAL PRESSURE MODULE HPPEXT (HIGH PRECISION PRESSURE EXTENSION)

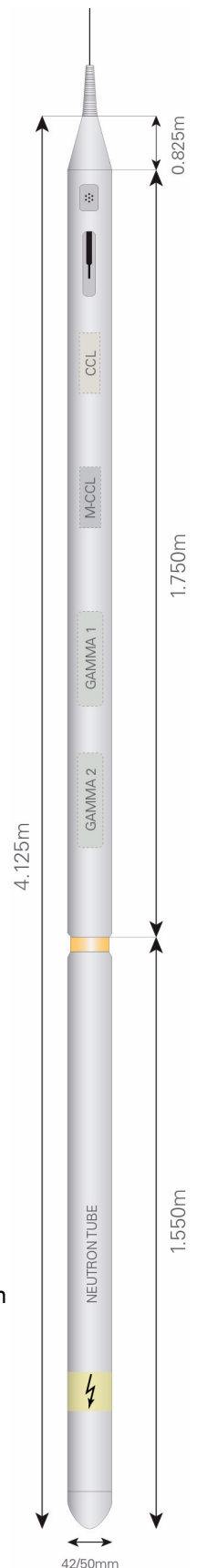
Diameter:	42 mm
Length:	0.9 m
Weight:	6 kg
HPP pressure gauge (up to 300 bar):	resolution: 0.001 bar accuracy: +/- 0.03 bar

SURVEY PROCEDURE

After running the tool into the well the ING42SC is tied-in to a depth reference point (cemented casing shoe) using the M-CCL or CCL or to a radioactive reference point by measuring the natural gamma radiation. Subsequently the depth of the interface is determined from the level shift in the total counts/sigma recordings.

After the interface level has been determined either the tool is kept at the required depth and the interface is adjusted by extracting or adding blanket medium until it coincides with the tool position, or the interface level is altered and repeatedly measured by logging until the depth is reached at which the interface is required. Before running the tool out of the well a depth correlation is again made by tying into the depth reference point (cemented casing shoe or radioactive reference).

Schematic representation
of tool type ING42SC

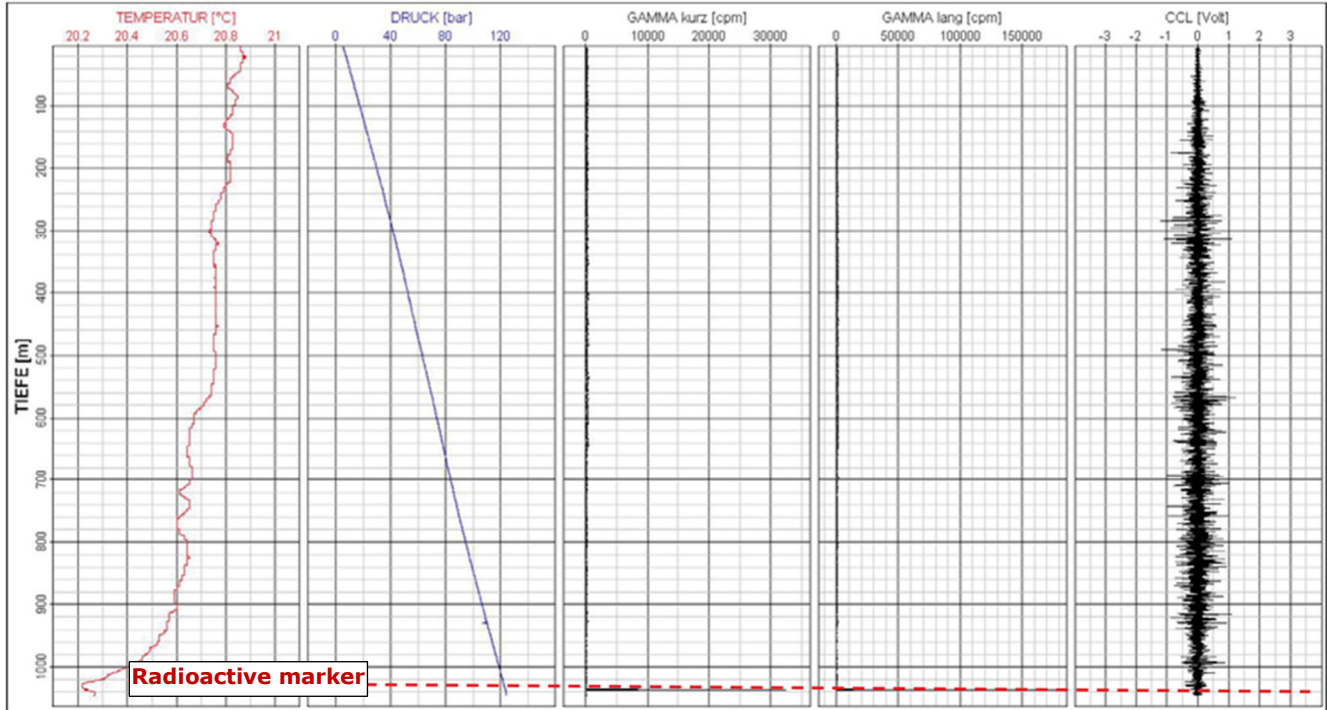


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EXAMPLES OF LOGGING AND DETERMINING THE INTERFACE DEPTH



Display of the physical conditions in a cavern measured using the ING42SC tool.

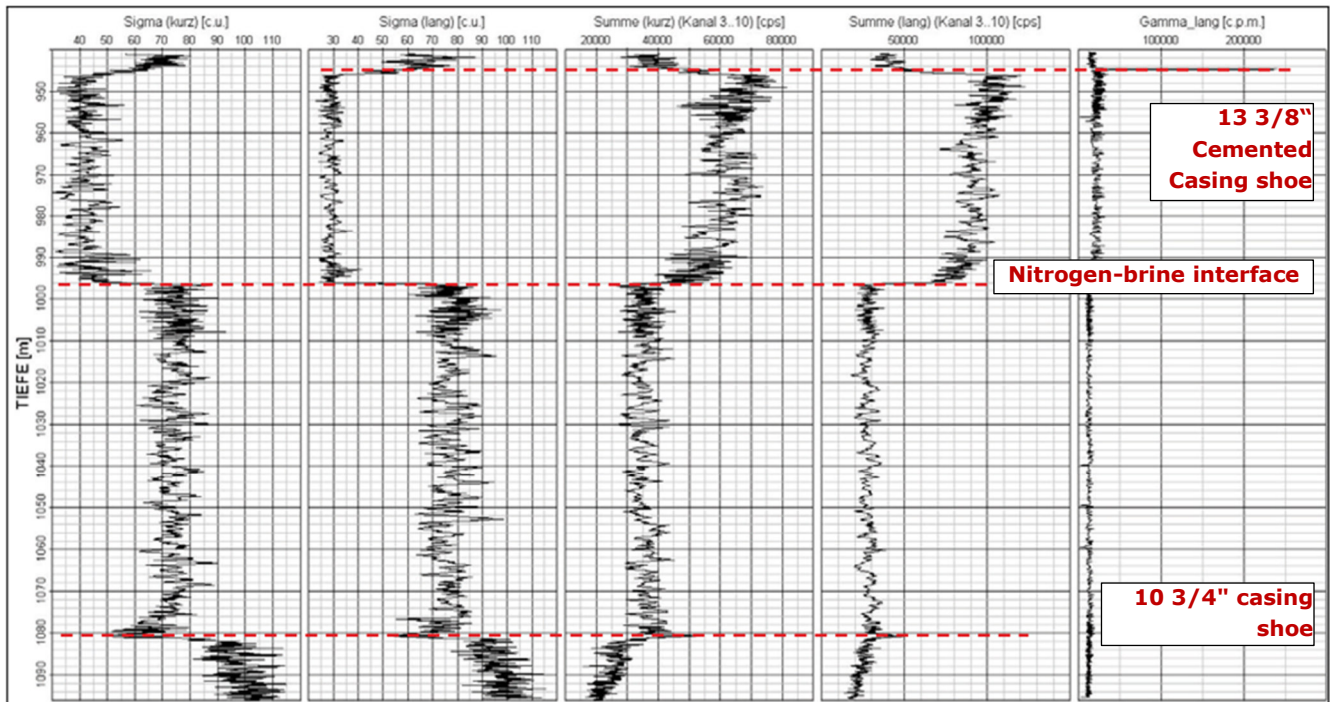


Diagram highlighting the identification of the interface level and the depth reference points.