Four Independent Arm Caliper (FIAC™)

The FIAC tool is a four-arm caliper which provides information on the borehole geometry of the wellbore. Unlike other X-Y caliper services, the FIAC has four independent caliper measurements.

The FIAC tool, run as a separate or combined service, provides an accurate measurement of the borehole diameter in four orthogonal directions with respect to the tool body. This survey is useful in: calculating cement volume, selecting packer seats for formation sampling, and identifying and locating washouts and bridges in the borehole, as well as identify borehole ovality.

The FIAC tool is a four independent arm caliper tool used to measure borehole diameter. Borehole size may range from 3.625-in. diameter to 22-inch diameter. The caliper arms are mounted at 90° angles to each other and provide a continuous X-Y (borehole axis is Z) borehole measurement. This tool is combinable with any other DITS™ standard tools.

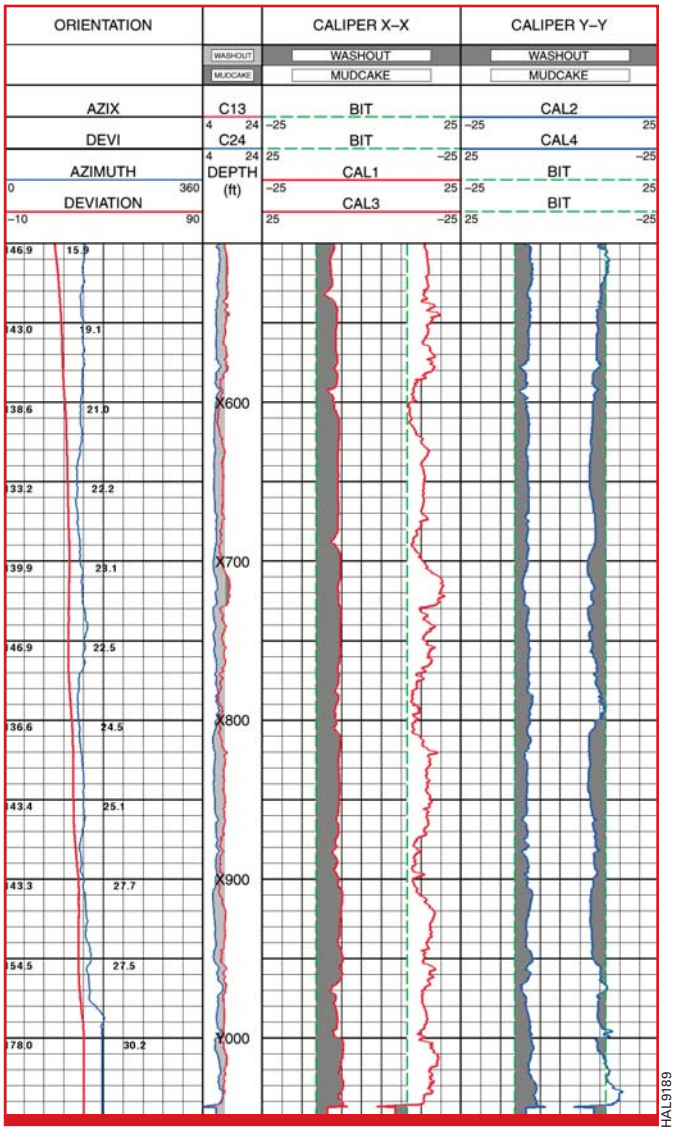
When the FIAC is combined with the SDDT™ navigation package, the borehole geometry information is oriented with respect to both magnetic north and the high side of the wellbore. The borehole azimuth, borehole deviation and relative bearing of the X and Y caliper data are presented in a continuous log presentation. This allows the correlation of the borehole geometry with the drilling process, such as correlation of the long axis of the borehole to the high-side / low-side of the well.

FIAC differs from the competition by providing four independent caliper measurements, whereas with types of other four arm calipers, the X-X and Y-Y arms are paired together to provide only two diameter measurements.

FIAC Features

FIAC contains the following features:

- Four independent caliper measurements to provide needed borehole geometry data
- Combined with a navigation package the borehole geometry profile can be oriented with respect to magnetic north as well as to the high side of deviated or horizontal wells



A Borehole geometry presentation is created by combining the FIAC and SDDT™ data. Orientation data from the SDDT navigation tool is presented in Track 1, the deviation and hole azimuth are presented as text values every 50 feet, and as continuous curves. The averaged X and Y calipers are presented in the depth track. The two independent X-X calipers are presented in Track 2 along with a bit size data. The two independent Y-Y calipers are presented in Track 3 along with the bit size data. This presentation illustrates an oval borehole with the long axis of the borehole aligned with the highside-lowside of the deviated well. The short axis of the borehole is smaller than bit size, indicating the presence of mud cake.

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FIAC Benefits

FIAC offers the following benefits:

- Borehole geometry information can be used to monitor hole size and shape with wellbore deviation and azimuth for basic geo-mechanical analysis
- Helps optimize drilling and mud systems by the evaluation of borehole geometry along with mud weight and type, bit type and ROP.
- More accurate borehole volume and annular volume determinations for the required cement volume
- Identification of packer seats for sampling and testing

Four Independent Arm Caliper (FIAC™)									
Length		Diameter		Maximum Pressure		Maximum Temperature		Weight	
(ft)	(m)	(in)	(mm)	(psi)	(Mpa)	(°F)	(°C)	(lb)	(kg)
13.9	4.2	3.63	92.2	20,000	137.9	400	204.4	310	140.6