Encapsulated gel breaker technical requirements

1. Application range
Evaluated the test method for the performance of the gel breaker agent used for acid fracturing fluid;
This standard applies to the performance and evaluation of hydraulic fracturing water-based gel fracturing fluid as well as oil-based gel fracturing fluid.

2. Terms and definitions
The effective content of capsule breaking agent: the percentage of the quality of the broken gel encapsulated to the capsule.
The release rate of the capsules: The quality of the broken gel which was released to the quality which was encapsulated by the capsule.
The release time of the capsule: In the condition, the time required for the release of ninety percent of the gel in the test Medium.

3 Instruments & equipments and Materials
3.1 Instrument and equipment
A) Electronic balance: 0.01g, analysis balance: 0.0001g;
B) Tackmeter: RV20 rotary viscometer or similar products, Pinkevitch capillary viscometer;
C) Electric heating constant temperature water bath: room temperature ~95°C, temperature control precision is ±1°C;
D) Electrothermal constant temperature drying box: room temperature ~300°C, the temperature control accuracy is ±1°C;
E) Standard sieve: pore size were 0.425mm and 0.850mm;
F) Press: working pressure 63MPa, accuracy is ±1MPa;
G) Extruded and broken type of test die:
H) The vibrating screen machine: 221 times /min ± 20 /min, vibration hit 147 times /min ± 15 times /min.

3.2 Materials
A) Ceramic: industrial grade product, particle size: 0.425mm~0.850mm;
B) Sodium sulfate: analysis of pure.

4. Fracturing fluid sample preparation
4.1 Preparation of water based fracturing fluid sample;
4.2 Preparation of oil based fracturing fluid sample.

5. Test method for the general properties of the gel breaking agent
5.1 Appearance
5.1.1 Liquid gel breaker appearance: adding 20ml~25ml liquid gel breaking agent into the color tube, in the non-direct natural light to observe its color, whether there is no stratification and precipitation phenomenon.
5.1.2 Solid gel breaker appearance: observe the sample color, whether there is no caking phenomenon.
5.2 Density measurement
The density is determined by the density meter;
5.3 Determination of pH value
Determination of PH with a wide range of PH paper;
5.4 The apparent viscosity of gel breaker
The determination of apparent viscosity of the gel was performed in accordance with the relevant regulations: the breaking temperature was lower than that of 30°C. Determination of apparent viscosity of gel at the test temperature.

5.5 Breaking time
5.5.1 Preparing a certain amount of gel breaker for fracturing fluid 100ml, into the closed container, arrange it in the electric heating thermostat in constant temperature, constant temperature for the reservoir temperature, and make the fracturing fluid gel breakers under the constant temperature.
5.5.2 At certain time to observe the change of the fracturing fluid viscosity, if visual apparent viscosity is low, determine

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the apparent viscosity according to the methods above.

5.5.3 Take the time as the horizontal coordinates, the apparent viscosity of the gel viscosity is plotted as a vertical Coordinate. When the apparent viscosity is 5.0mPa.s, refers to the constant gel beaker time.