

Visual determination

Semi-quantitative

IRB-BART™¹

Scope and application: For the determination of iron-related bacteria in brine solutions, produced waters and hydraulic fracturing waters.

¹ IRB-BART is a trademark of Droycon Bioconcepts Inc.



Test preparation

Before starting

Do not touch the inner surface of the tube or lid. Keep contamination out of the tube and lid. Use the aseptic technique.

Set the caps on a clean surface with the flat surface down.

Iron-related bacteria (IRB) primarily grows on surfaces and not directly in water. Make sure to get a representative sample.

Review the Safety Data Sheets (MSDS/SDS) for the chemicals that are used. Use the recommended personal protective equipment.

Dispose of reacted solutions according to local, state and federal regulations. Refer to the Safety Data Sheets for disposal information for unused reagents. Refer to the environmental, health and safety staff for your facility and/or local regulatory agencies for further disposal information.

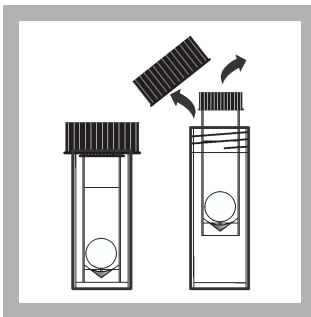
Sterilize the reacted sample before disposal. Refer to [Disposal](#) on page 3.

Items to collect

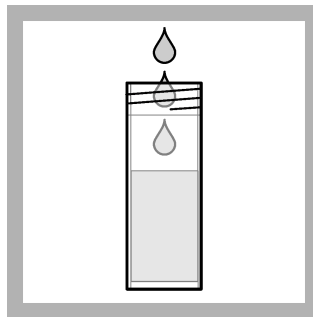
Description	Quantity
BART Test for iron-related bacteria (IRB)	1

Refer to [Consumables and replacement items](#) on page 4 for order information.

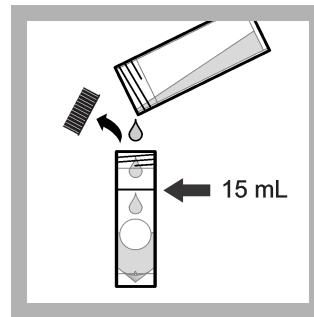
Test procedure



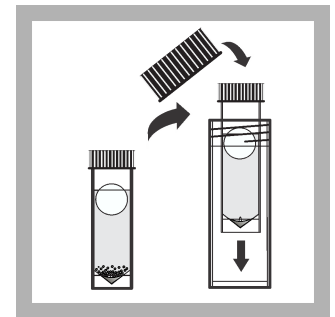
1. Remove the inner tube from the outer tube.



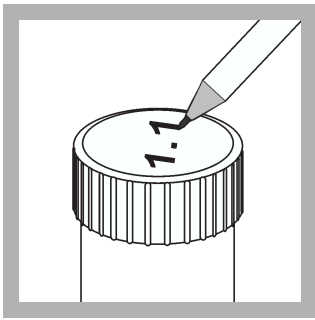
2. Pour at least 20 mL of sample in the outer tube.



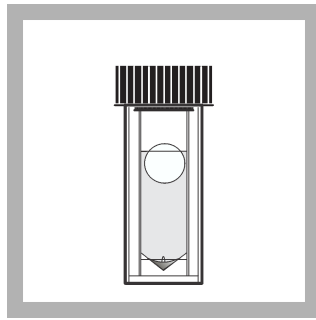
3. Fill the inner tube to the fill line with the sample that is in the outer tube. Tighten the cap on the inner tube. Discard the unused sample in the outer tube.



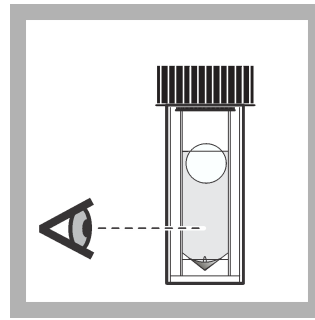
4. Put the inner tube in the empty outer tube. Tighten the cap on the outer tube. Do not shake or swirl the tubes after the sample is added. Let the ball float to the top with no help.



5. Write the date and sample name on the outer tube.



6. Keep the tube at room temperature and away from direct sunlight for 8 days. Do not move the tube.



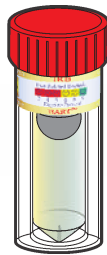
7. Examine the tube each day. Record the date when a reaction is first seen. Refer to [Test results](#) on page 2.

Test results

Presence/Absence

When iron-related bacteria are in the sample, a foam or a brown slime ring forms around the ball and/or there is a brown slime growth at the bottom of the tube. Refer to [Figure 1](#).

Figure 1 Negative versus positive test results



Negative (absent/non-aggressive)

The solution has no foam or brown slime.



Positive (present/aggressive)

Foam or a brown slime ring forms around the ball and/or there is a brown slime growth at the bottom of the tube.

Make an estimate of the bacteria population

If the test result is positive, make an estimate of the bacteria population and the aggressivity. Refer to [Table 1](#). A faster reaction occurs when the bacteria population is high.

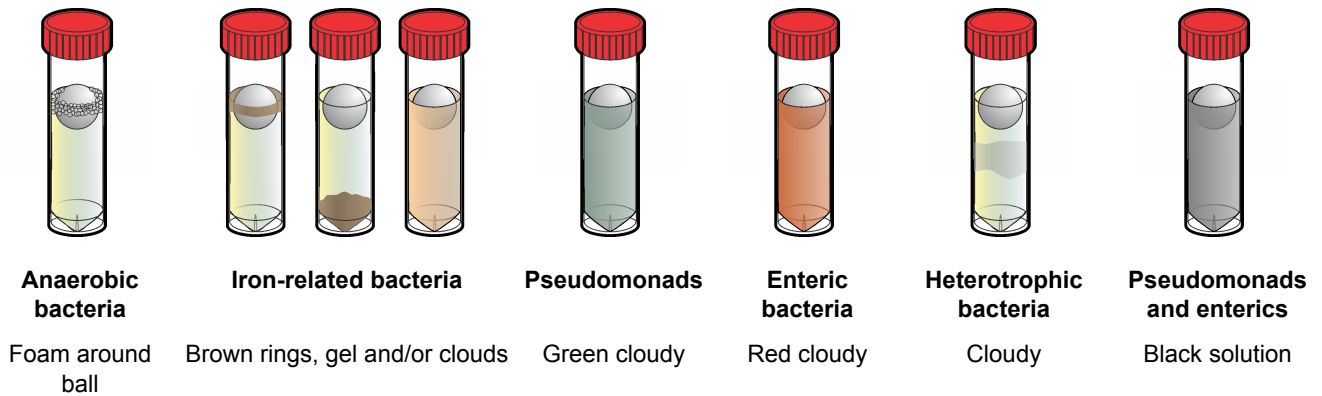
Table 1 Approximate bacteria population

Days to reaction	Approximate IRB population (cfu/mL)	Aggressivity
1	570,000	Very high
2	140,000	High
3	35,000	High
4	9000	Moderate
5	2200	Moderate
6	500	Moderate
7	150	Moderate
8	25	Low

Advanced test information

If the test result is positive, examine the tubes for dominant bacteria. Refer to [Figure 2](#). If the dominant bacteria is enteric or pseudomonads and has a high or very high aggressivity, a fecal coliform test is recommended on a fresh sample to determine if there is a hygiene risk.

Figure 2 Dominant bacteria



Summary of method

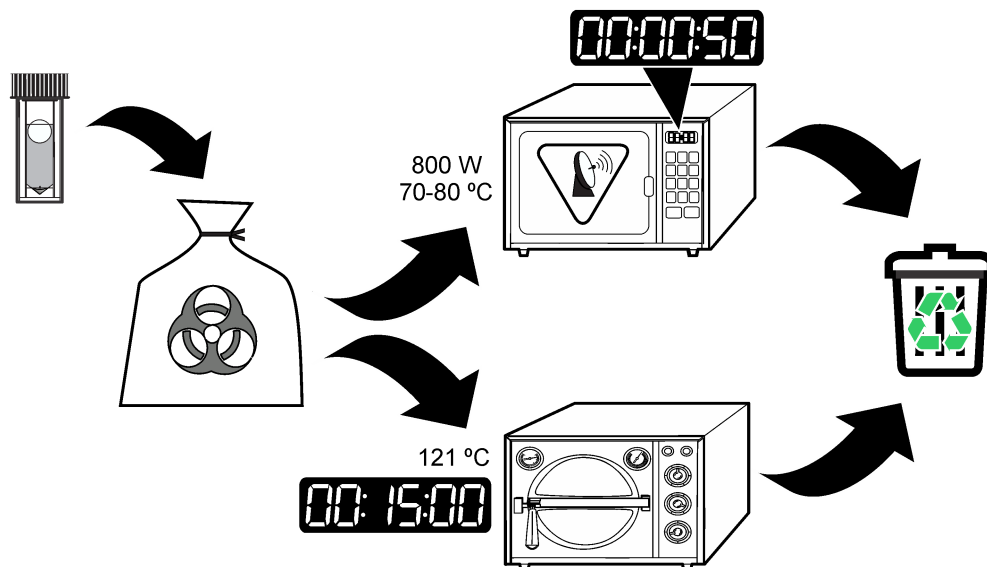
When iron-related bacteria (IRB) are in the sample, a series of reactions occur in the redox and nutrient gradients that develop in the IRB-BART tube during incubation. The iron-related bacteria use the nutrients and ferric iron in the tube to grow. The iron-related bacteria cause foam, clouding, slime and/or color changes.

The bacteria determined in this test include iron oxidizing and reducing bacteria, the sheathed iron bacteria, Gallionella, pseudomonads and enteric bacteria. These organisms can cause biofouling problems such as plugging, corrosion, cloudiness and color.

Disposal

Sterilize the reacted sample before disposal. Refer to [Figure 3](#).

Figure 3 Disposal



Consumables and replacement items

Required reagents

Description	Quantity/Test	Unit	Item no.
BART Test for iron-related bacteria (IRB)	1	9/pkg	2432309
BART Test for iron-related bacteria (IRB)	1	27/pkg	2432327



FOR TECHNICAL ASSISTANCE, PRICE INFORMATION AND ORDERING:
In the U.S.A. – Call toll-free 800-227-4224
Outside the U.S.A. – Contact the HACH office or distributor serving you.
On the Worldwide Web – www.hach.com; E-mail – techhelp@hach.com

HACH COMPANY
WORLD HEADQUARTERS
Telephone: (970) 669-3050
FAX: (970) 669-2932