Checking Where a Tile Joint Breaks

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A repair workshop joins two ceramic pieces with a layer of adhesive. Its test increases a pulling force until something breaks. The break can be within a tile or at the adhesive joint. Specimens have the same joint area and ceramic thickness.

Specimen	**Force at break (N)**	**Location of break**
Unjoined control tile	40	Within tile
Joined with P	25	At the joint
Joined with Q	40	Within tile

1 Which reading directly measures a joint failure?

(1) The 40 N unjoined control

(2) The 25 N break with P

(3) The 40 N break with Q

(4) Every reading

2 A student reports that the Q joint breaks at exactly 40 N. Select whether the record establishes the claim. Explain using the location of the break. [1]

Select one

☐ Establishes the claim

☐ Does not establish the claim

Answer and work

The workshop can reinforce the ceramic away from the joint so that the tile can withstand 65 N. In this model the reinforcement leaves the joint surfaces and the way the joint is pulled unchanged. The joint must withstand at least 50 N.

3 Describe a test of the Q joint that can decide whether it meets the 50 N requirement. State what to record. [1]

Answer and work

4 In the new test Q breaks at the joint at 56 N. Use both Q trials to explain why their reported forces differ. [1]

Answer and work