Batch	Agent1	Agent2
1	7.7	8.5
2	9.2	9.6
3	6.8	6.4
4	9.5	9.8
5	8.7	9.3
6	6.9	7.6
7	7.5	8.2
8	7.1	7.7
9	8.7	9.4
10	9.4	8.9
11	9.4	9.7
12	8.1	9.1

t-Test: Paired Two Sample for Means

	Agent1	*Agent2*
Mean	8.2500	8.6833
Variance	1.0591	1.0779
Observations	12.0000	12.0000
Pearson Correlation	0.9011	
Hypothesized Mean Difference	0.0000	
df	11.0000	
t Stat	-3.2639	
P(T<=t) one-tail	0.0038	
t Critical one-tail	1.7959	
P(T<=t) two-tail	0.0075	
t Critical two-tail	2.2010	
Difference in Mean	-0.4333	

m

Complete a two-tailed test of whether the population mean impurity differs between the two filtration agents, and interpret your findings.

The obtained related samples t = -3.2639 with 11 degrees of freedom.

The associated two-tailed p-value is p = 0.0075 , so the observed t is significant at the 5% level (two-tailed).

The sample mean numbers of Agent 1 and 2 were, respectively 8.25 and 8.6833.

The data therefore constitute significant evidence that the underlying mean number of agents was lesser for Agent 1, by an estimated 8.25 - 8.6833 = -0.4333 agents per batch.

The results suggest that Agent 2 should be preferred.

Suppose instead a one-tailed test had been conducted to determine whether Filter Agent 1 was the more effective. What would your conclusions have been?

The associated one-tailed p-value is p = 0.0038 , so the observed t is significant at the 1% level (one-tailed).

Therefore, Agent 2 should be preferred.