SENSISCREEN® LIQUID DISPENSE READY QUICK GUIDE

SensiScreen® assays for sensitive detection and identification of mutations in cancer

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CE IVD

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1. Introduction

This quick guide is meant for experienced users. Please review the full "Instructions for use" carefully before using the kit. The assay is comprised of one or more reference assays and one or more mutation assays. The reference assay is used for determination of total amplifiable DNA input and thus validity of the sample, whereas the existence of mutation(s) is identified by a positive signal in the mutation specific assay(s). Furthermore, an internal control is present in all the mixes to verify the PCR amplification has taken place.

2. Content

The kit comprises 20 or 50 reactions of reference reagents, mutation specific reagents and master mix. All reagents needed for the analysis of extracted human DNA are included and ready to be dispensed into real-time PCR tubes or plates.

3. Storage and Stability

The unopened product is stable at -20˚C for a minimum of 15 months, but no longer than the expiry date. **Important:** Keep frozen until use and thaw at room temperature. Avoid repeated freeze/thaw cycles.

4. DNA extraction

- Use human DNA from liquid or fresh frozen biopsies
- DNA can be extracted using any valid DNA extraction kit
- Follow the instructions for DNA extraction recommended by the kit supplier
- Determine the quantity and quality of DNA prior to real-time PCR. Do not use DNA of a low quality
- Use up to 5 ng DNA per reaction/tube

5. Kit preparation

Thaw all reagents and spin down.

6. Setup

- Prepare reactions by adding the components according to Table 1. For each patient sample, combine the reference and mutation-specific mixtures in separate qPCR-tubes or wells

Table 1: SensiScreen® Dispense Ready mix

Components	Vol./reaction
Reference or mutation specific mixture	7.5 µL
Master mix	12.5 µL
Patient DNA (up to 1 ng/µL)	5.0 µL
Total volume	**25 µL**

- Gently mix with a pipette, seal tube or well and spin down
- Perform real-time PCR using the program shown in Table 2

Table 2: SensiScreen® PCR protocol

Protocol	Temperature	Time	Cycles	Data (channel)
Hold	95˚C	2 min	1	-
Cycling	94˚C	15 sec	45	FAM™/SYBR® (470 nm/510 nm)
	60˚C	60 sec		HEX™/VIC™/TET™ (538 nm/551 nm)
				Measure fluorescence intensity at the end of each cycle

7. NOTES

- All test components should be stored as described in the “Instructions for use” (storage section)
- Do not mix reagents from different lots
- Always spin down before opening the lids
- For each sample, setup the mutation-specific assay(s) together with the corresponding reference assay in separate tubes or wells

8. DATA ANALYSIS

- Correct for "baseline drift" before setting the threshold. Please refer to the “Instructions for use” for details
- Set the threshold for PentaGreen™ at 10% of the fluorescence signal of the reference assay at cycle 45. Add any significant assay baseline fluorescence at cycle 20 to the threshold value
- Read the Ct value for the reference assay and validate that the reference sample is suitable for analysis according to Table 3

Table 3: Reference Ct validation

Ct for reference	Quality	Comments
Ct, reference <29	Not valid	The amount of input DNA is too high which might affect the assay. The analysis should be repeated with lower input of DNA or using the SensiScreen® FFPE version
29≤ Ct, reference ≤40	Acceptable	The amount of input DNA is acceptable for the mutation analysis. **Please note that the closer the reference Ct is to 29, the higher is the number of DNA templates analysed.**
Ct, reference >40	Not valid	The amount of amplifiable input DNA is too low. The analysis should be repeated with higher amount of input DNA

- A sample is positive for a given mutation if the reference Ct is valid (Table 3) and the Ct of the mutation assay is at or lower than 40 cf. Table 4.
- For mutation negative samples, it should be validated that amplification has taken place by examining the fluorescence from the internal control assay (yellow channel). An amplification curve (in contrast to a flat line) is evidence that amplification has taken place. Although the Ct value of the internal control assay will reflect the amount of DNA in the sample, there are no specific requirements to the signals in the yellow channel.

Table 4: Mutation analysis

ΔCt for assay	Conclusion	Comments
Ct ≤40	Positive	The sample is positive for the mutation if Ct ≤40 for the mutation assay
Ct >40	Negative	The sample is negative for the mutation if Ct >40 for the mutation assay

- Samples giving no signal for neither the assay (PentaGreen™) nor the internal control (PentaYellow™) are invalid. Rerun the real-time PCR
- Optional: For quantification of the mutation load in a sample, the ΔCt value can be calculated for each mutation-specific analysis and is calculated as the difference between the Ct value from the given mutation analysis subtracted the Ct value from the corresponding reference analysis. ΔCt can be calculated for all mutation assays having a Ct value lower than 40. The theoretical mutant allele frequency based on the calculated ΔCt value is described in Table 5.

$$\Delta Ct = Ct_{mutation} - Ct_{reference}$$

Table 5: Theoretical mutant allele frequency and absolute copy number in 5 ng sample approximated

ΔCt	Mutant allele frequency	Ct	Copies (using 5 ng DNA)
ΔCt 3	≈ 10 %	≈ 32	≈ 160
ΔCt 7	≈ 1 %	≈ 35	≈ 16
ΔCt 8	≈ 0.5 %	≈ 36	≈ 8
ΔCt 8.5	≈ 0.3 %	≈ 37	≈ 5
ΔCt 9	≈ 0.2 %	≈ 38	≈ 3
ΔCt 10	≈ 0.1 %	≈ 39	1-2

9. TROUBLESHOOTING

This short troubleshooting guide may assist in solving the most frequent encountered problems that can occur. Please refer to the "Instructions for use" for further troubleshooting.

- If no signal in neither PentaYellow nor PentaGreen is present, no amplification has taken place indicating that there is no amplifyable DNA in the patient sample (e.g. degraded DNA or contamination with PCR inhibitors). Check DNA quality and if possible, repeat PCR with higher DNA quality/input
- Too low Ct value in PentaGreen for the reference assay indicates that the amount of DNA is too high. If possible, repeat PCR with lower DNA input
- High Ct value in PentaGreen for the reference assay indicates that the amount of DNA is low. If possible, repeat PCR with higher DNA input
- Fluorescence drift could result from either sample or instrument instabilities or air bubbles