

Sample Collection Field Reference Guide For the Thermo Fisher Scientific Applied Biosystems™ RapidHIT™ ID System



Rapid DNA Center of Excellence

The purpose of this job aide is to provide guidance for sample collection and processing with the RapidHIT ID System and is not intended to replace local department or agency procedures or applicable laws that govern the use, collection, and processing of DNA evidence.

Investigators, laboratory personnel and/or evidence collection technicians should work together to define evidence collection and processing policies.

Applied Biosystems™ RapidHIT™ ID System Components

Step 1: Insert cheek swab or evidence sample into appropriate cartridge



ACE cartridge with purple label is used for buccal swabs

INTEL Plus cartridge with yellow label is used for blood and other crime scene type samples

Step 2: Insert cartridge into the RapidHIT™ ID and obtain DNA results in as little as 90 minutes



Step 3: Get Hit / No Hit Confirmation Report





Use Universal Precautions
when handling all biological
samples



Use caution when handling
sharp tools, objects, or edges



- 10% bleach
- Ethanol
- Bench paper
- Sterile swabs
- Sterile water
- Sterile cutting tools – scalpel or scissors
- Transfer tweezers
- Gloves
- Mask

Buccal Swab - ACE Cartridge

1. Open a new, sterile swab
2. Swab up and down inside of cheek as shown a total of six (6) times
3. Insert the swab into an **ACE** cartridge, leaving 1 cm space from the end of the swab to the bottom of the chamber
4. Bend the stick end of the swab at the top of the chamber to break off
5. Close the chamber



Expected DNA Yield (Success Rates)



Consider how much sample to consume to obtain a good result while leaving sufficient sample for subsequent testing.

Are other evidence tests needed, such as latent fingerprint development? Consider if, and when, to sample evidence for DNA.



Small, diluted or degraded / exposed stains may require more specialized DNA processing methods and should be discussed with a laboratory prior to processing.

Surface Preparation



Wear gloves and mask to prevent contamination and avoid biological hazards

1. Identify a secure, flat, working area
2. Wipe surface with 10% bleach solution, followed by ethanol (if available)
3. Cover surface with bench paper
4. Change gloves, clean surfaces and tools between handling different items

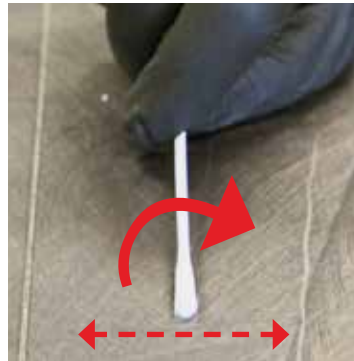


General Swabbing Techniques



- If no stains are visible on an item, swab those areas most likely to have come into contact with skin
- Be aware of other evidence tests needed such as latent fingerprint development

1. Open a new, sterile swab
2. Place one to three drops of sterile water on swab, rotating swab as drops are applied
3. Rub swab across sample surface side-to-side while rotating the swab and applying moderate pressure
4. Insert the swab into the cartridge, leaving 1 cm space from the end of the swab to the bottom of the chamber
5. Bend the stick end of the swab at the top of the chamber to break off
6. Close the chamber



A/B Swab Method



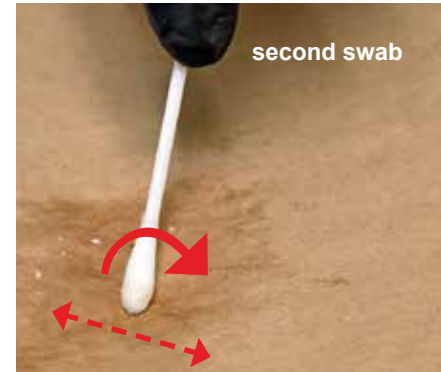
Collect 2 swabs consecutively:

A-Swab for accredited forensic DNA laboratory analysis

1. Open a new, sterile swab
2. Place one to three drops of sterile water on swab, rotating swab as drops are applied
3. Rub swab across sample surface side-to-side while rotating the swab
4. Package and label swab for transportation to forensic laboratory

B-Swab for Rapid DNA analysis

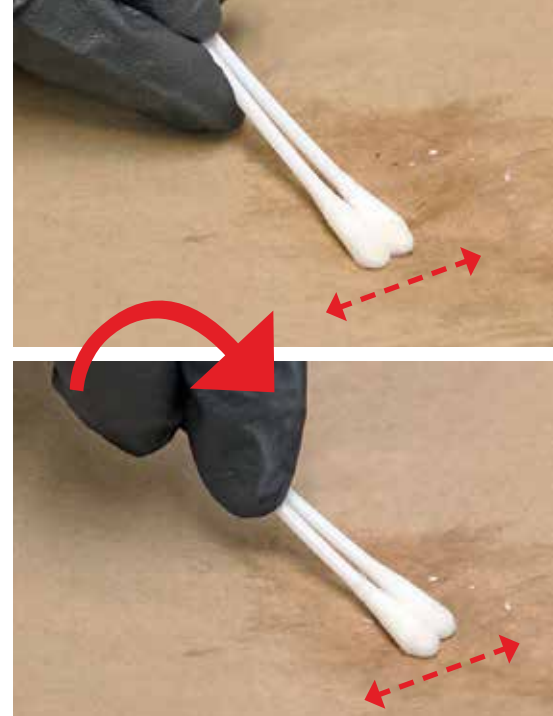
1. Open a new, sterile swab
2. Place one to three drops of sterile water on swab, rotating swab as drops are applied
3. Rub swab across sample surface side-to-side while rotating the swab
4. Insert the swab into an **INTEL Plus** cartridge, leaving 1 cm space from the end of the swab to the bottom of the chamber
5. Bend the stick end of the swab at the top of the chamber to break off
6. Close the chamber



Side-By-Side (Bouquet) Swab Method



1. Open 2 new, sterile swabs
2. Place one to three drops of sterile water on each swab, rotating swabs as drops are applied
3. Hold swabs with collection heads together
4. Rub swabs across sample surface side-to-side
5. Flip swabs and continue rubbing across sample surface
6. Package and label 1 swab for transportation to forensic laboratory
7. Insert second swab into an **INTEL Plus** cartridge, leaving 1 cm space from the end of the swab to the bottom of the chamber
8. Bend the stick end of the swab at the top of the chamber to break off
9. Close the chamber



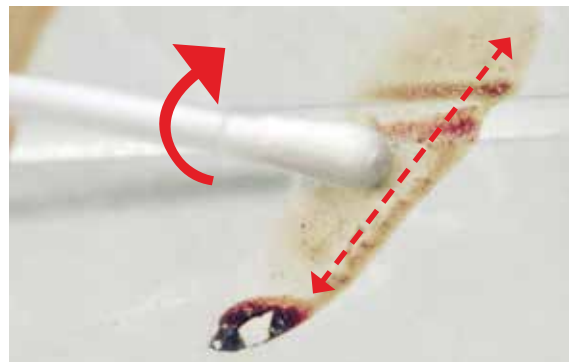
Liquid On Hard Surface

1. Open a new, sterile swab
2. Swab liquid blood
3. Insert swab into an **INTEL Plus** cartridge
4. Leave 1 cm space at the bottom of the chamber
5. Bend top of the swab to break it off
6. Close the chamber



Dried On Hard Surface Located Indoors

1. Open a new, sterile swab
2. Place one to three drops of sterile water on swab, rotating swab as drops are applied
3. Rub swab across sample surface side-to-side while rotating the swab
-  Look for transfer of blood stain onto swab
4. Insert swab into an **INTEL Plus** cartridge
5. Leave 1 cm space at the bottom of the chamber
6. Bend top of the swab to break it off
7. Close the chamber



Dried On Fabric Located Indoors - Cutting Method

1. Using sterile scalpel or scissors, cut approximately 5 mm square of cloth with blood
2. Place the cutting in an **INTEL Plus** cartridge
3. Ensure it is at the bottom of the chamber
4. Break off the swab end of a clean swab
5. Add the the stick end to the chamber to hold the cutting in place
6. Close the chamber



5mm²



stick end of
clean swab

cutting at
bottom

Dried On Fabric Located Indoors - Swabbing Method

1. Open a new, sterile swab
2. Wet swab with one to three drops of sterile water
3. Rub swab across the stain side-to-side while rotating the swab



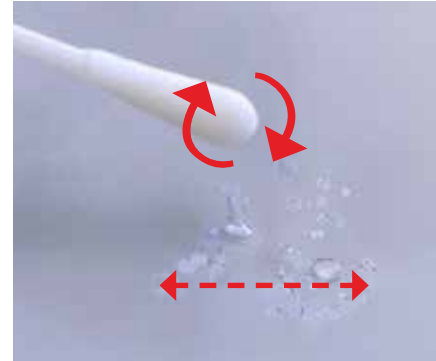
Look for transfer of blood stain onto swab - the color of the fabric may also transfer

4. Insert the swab into an **INTEL Plus** cartridge
5. Leave 1 cm space at the bottom of the chamber
6. Bend top of the swab to break it off
7. Close the chamber



Liquid On Hard Surface

1. Open a new, sterile swab
2. Swab liquid saliva
3. Rotate swab and wipe across surface to absorb saliva
4. Insert swab into an **INTEL Plus** cartridge, leaving 1 cm space at the bottom of the chamber
5. Bend top of the swab to break it off
6. Close the chamber

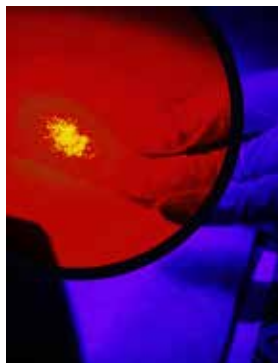


Dried On Fabric Located Indoors

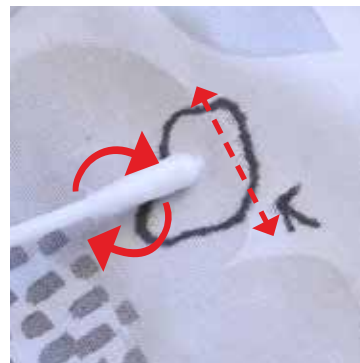


Verify presence of dried saliva with 455 nm alternate light source (ALS) and orange viewing goggles, and mark location on fabric

1. Open a new, sterile swab & wet with one to three drops of sterile water
2. Rub swab across the stain side-to-side while rotating the swab
3. Insert the swab into an **INTEL Plus** cartridge
4. Leave 1 cm space at the bottom of the chamber
5. Bend the top of the swab to break it off
6. Close the chamber



455 nm ALS
+ orange goggles



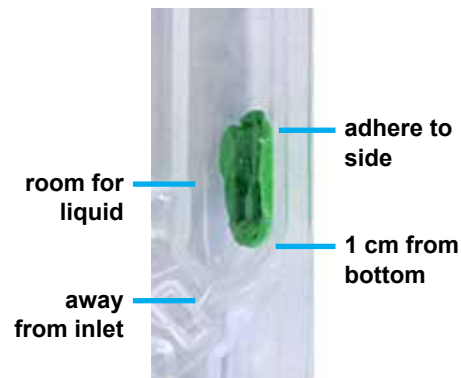
Chewed Gum

1. Using sterile scalpel or scissors, cut off $\frac{1}{3}$ — $\frac{1}{2}$ of the gum
2. Put gum into an **INTEL Plus** cartridge about 1 cm from the bottom of the chamber



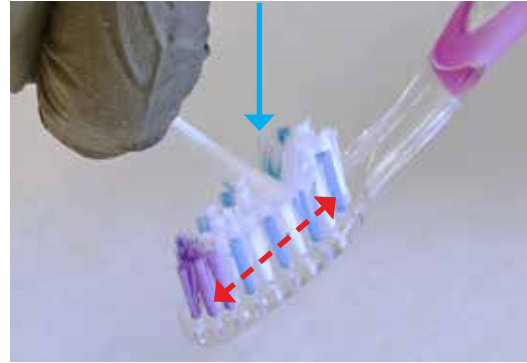
- Stick gum to the side wall of cartridge
- Gum should not touch the bottom of the chamber
- Leave room for liquid to flow past the gum

3. Close the chamber



Used Toothbrush

1. Open a new, sterile swab
2. Wet swab with one to three drops of sterile water
3. Push swab back and forth, deep between bristles
4. Insert the swab into an **INTEL Plus** cartridge
5. Leave 1 cm space at the bottom of the chamber
6. Bend the top of the swab to break it off
7. Close the chamber



Drinking Container

- Open a new, sterile swab
-  If liquid droplets are visible, use a dry swab
- If the surface is dry, wet swab with sterile water
- Hold the item at the bottom to avoid disturbing latent prints

Water bottle

1. Swab inside the spout and between the grooves where the cap screws on
2. If the bottle was found with cap on, also swab the grooves inside the cap

Soda can

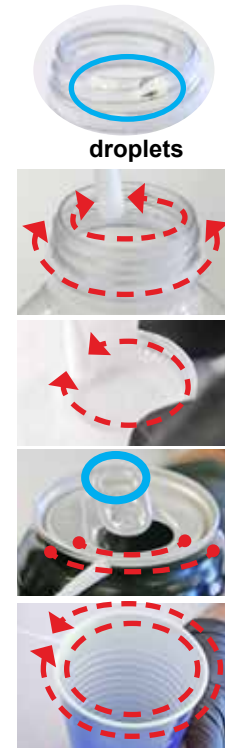
- Swab the top of the can around opening, the lip of the can below the opening, and the can tab

Cup, mug, or drinking glass

- Swab around the entire rim, inside and outside

Continue

- Insert the swab into an **INTEL Plus** cartridge
- Leave 1 cm space at the bottom of the chamber
- Bend the top of the swab to break it off
- Close the chamber

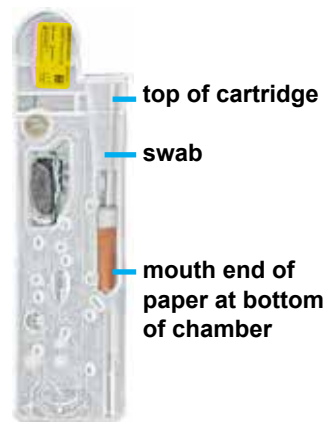


Cigarette Butt

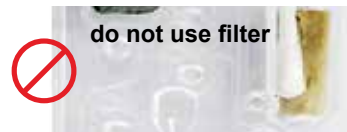
1. Using sterile scalpel or scissors cut the paper around the filter
2. Separate the paper from the rest of cigarette butt and filter
3. Cut the paper in half lengthwise and retain one half for further testing
4. Open a new, sterile swab
5. Wet swab with one to three drops of sterile water
6. Swab the outside of the second half of the paper
7. Place the swabbed paper and swab in an **INTEL Plus** cartridge with the mouth end at the bottom of the chamber
8. Use the swab to hold the paper in place at the bottom of the chamber
9. Bend the top of the swab to break it off
10. Close the chamber



Do not compact or crush the paper
Do not put the filter into the cartridge



do not crush paper



do not use filter

Root Present



Verify presence of fresh root on hair using magnifying glass or microscope

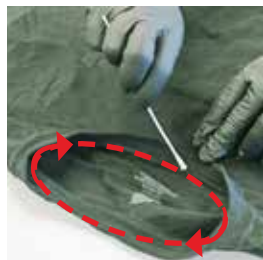
1. Place hair in an **INTEL Plus** cartridge with the root at the bottom of the chamber
2. Open a new, sterile swab
3. Use the swab to hold the root end in place at the bottom of the chamber
4. Bend the top of the swab to break it off
5. Close the chamber



Worn Clothing Located Indoors

Shirts

1. Open a new, sterile swab
2. Wet swab with one to three drops of sterile water
3. Swab around inside edge of collar
4. Turn sleeve inside-out and swab armpit



inside collar



inside armpit

Pants

1. Open a new, sterile swab
2. Wet swab with one to three drops of sterile water
3. Swab around waist band and any areas worn tight against the skin



inside waistband

Hats

1. Open a new, sterile swab
2. Wet swab with one to three drops of sterile water
3. Swab around entire sweatband



sweatband

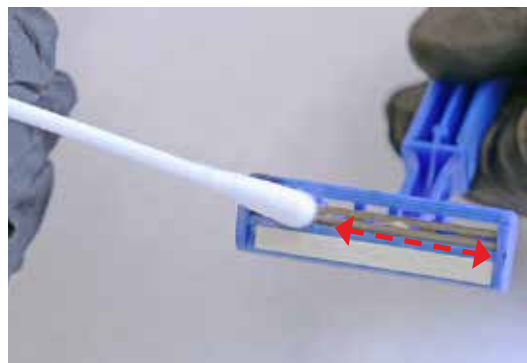


Continue

- Insert the swab into an **INTEL Plus** cartridge
- Leave 1 cm space at the bottom of the chamber
- Bend the top of the swab to break it off
- Close the chamber

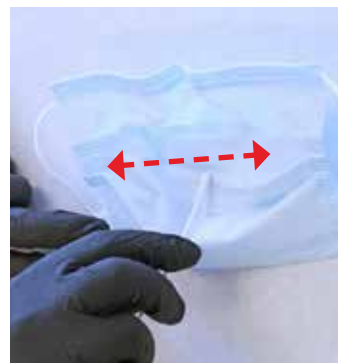
Used Razor

1. Open a new, sterile swab
2. Wet swab with one to three drops of sterile water
3. Push swab back and forth across the blades
4. Insert the swab into an **INTEL Plus** cartridge
5. Leave 1 cm space at the bottom of the chamber
6. Bend the top of the swab to break it off
7. Close the chamber



Face Mask, Extended Wear Time

1. Open a new, sterile swab
2. Wet swab with one to three drops of sterile water
3. Swab across the inside of the fitted nose piece
4. Swab across the mouth area on the inside of the mask
5. Insert the swab into an **INTEL Plus** cartridge
6. Leave 1 cm space at the bottom of the chamber
7. Bend the top of the swab to break it off
8. Close the chamber



Cell Phone



Handle by the edges to avoid disturbing latent prints

1. Open a new, sterile swab
 2. Wet swab with one to three drops of sterile water
 3. Swab around microphone, speaker, power and volume buttons, and edges too small for fingerprints
-  Try to get all of the areas onto one swab
4. Insert the swab into an **INTEL Plus** cartridge
 5. Leave 1 cm of space at the bottom of the chamber
 6. Bend the top of the swab to break it off
 7. Close the chamber



Tools and Weapons



Handle items carefully to avoid disturbing latent prints

1. Open a new, sterile swab
2. Wet swab with one to three drops of sterile water
3. Target areas likely to be handled for swabbing
4. Sample each section with a separate swab
5. Insert each swab into an **INTEL Plus** cartridge
6. Leave 1 cm space at the bottom of the chamber
7. Bend the top of the swab to break it off
8. Close the chamber



Bones

1. Sterilize a drill and 6 mm steel bit
2. Hold drill bit at a 180° angle onto the surface of the sample bone
3. Drill into the bone 2–6 cm
4. Using single-use tweezers, collect a small bone chip 1–2 cm long or 50–60 mg weight
5. Place bone chip directly into an **INTEL Plus** cartridge
6. Close the chamber
7. Store the remaining bone sample and chips at -20°C for further processing



Fresh Tissue

Swabbing method:

1. Open a new, sterile swab
2. Swab sample tissue
3. Insert swab into an **INTEL Plus** cartridge
4. Leave 1 cm space at the bottom of the chamber
5. Bend top of the swab to break it off
6. Close the chamber

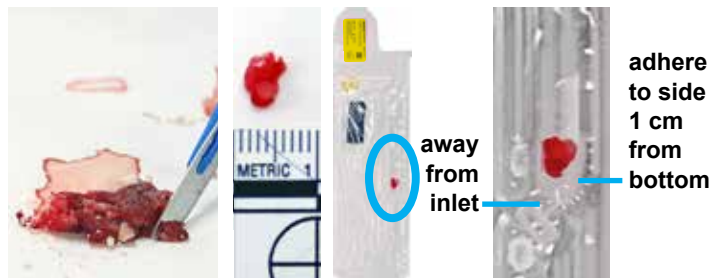
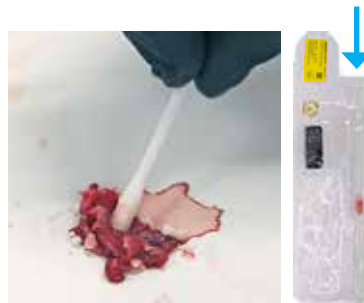
Cutting method:

1. Using sterile scalpel or scissors cut approx. 5 mm square piece of sample tissue
2. Using a new, sterile swab or single-use tweezers, place sample into an **INTEL Plus** cartridge about 1 cm from the bottom of the chamber



- Stick tissue to the side wall of cartridge
- Tissue should not touch the bottom of the chamber
- Leave room for liquid to flow past the tissue

3. Close the chamber



Notes

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In 2019, Thermo Fisher Scientific established the first Rapid DNA Center of Excellence in the country at the Global Forensic and Justice Center founding component, NFSTC, combining cutting-edge DNA technology with analysis expertise to advance forensic science. The Center houses Thermo Fisher's RapidHIT™ ID Systems in Largo, Florida.

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