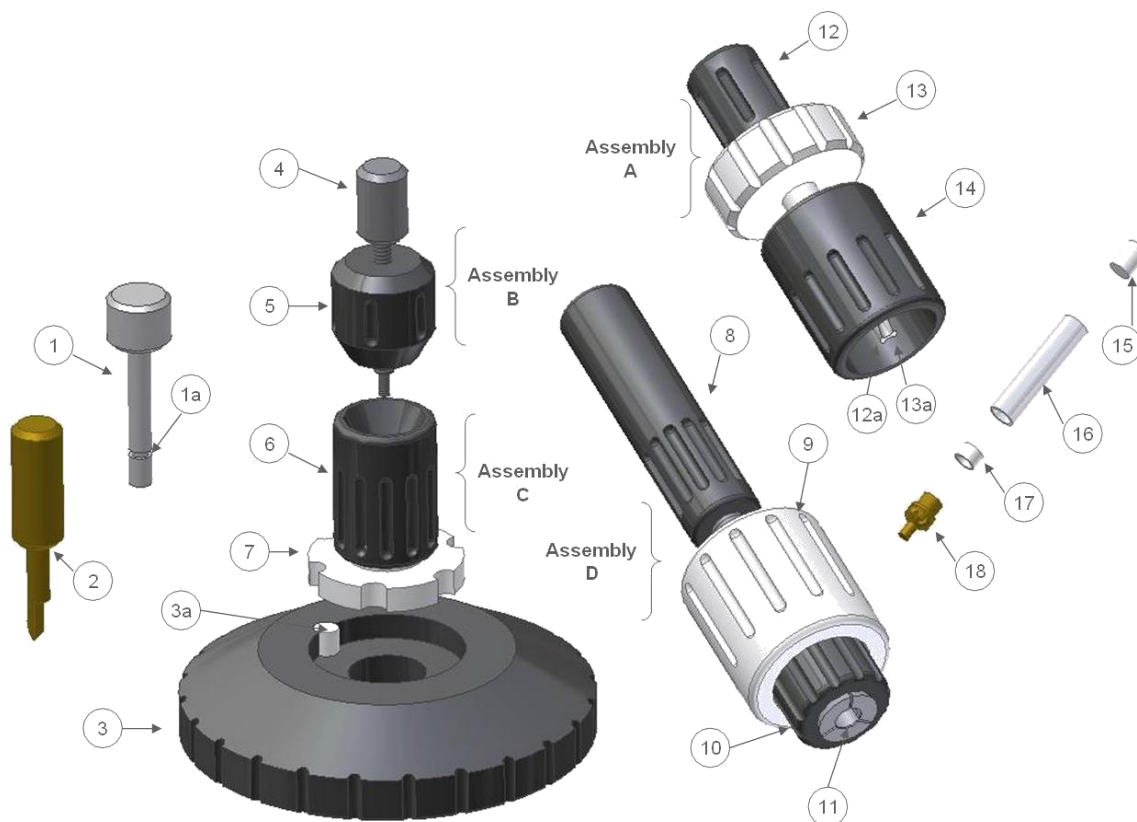


## Sample Packing System (SPS) Instructions for 5.0mm through 7.5mm Rotors



**Figure 1, SPS tool set.**

Item #	Description	Item #	Description
1	Sample tamper	12a	Drill bit
2	Sample scraper	13	Scraper sleeve knob
3	Sample scraper base	13a	Scraper drill sleeve
3a	Sample scraper base locking pin	14	Scraper body
4	Top cap extractor knob	15	Top cap
5	Top cap extractor body	16	Rotor Sleeve
6	Sample extractor body	17	Bottom cap
7	Collet	18	Drive cap
8	Extractor Handle	<b>Assembly A</b>	Sample scraper tool assembly
9	Drive cap extractor nut	<b>Assembly B</b>	Top cap extractor tool assembly
10	Compression nut	<b>Assembly C</b>	Sample funnel/collet assembly
11	Drive cap extractor tip	<b>Assembly D</b>	Drive cap extractor tool assembly
12	Scraper drill knob		

**PLEASE READ THE FOLLOWING INSTRUCTIONS COMPLETELY AND FAMILIARIZE YOURSELF WITH THE COMPONENTS OF THE SAMPLE PACKING SYSTEM BEFORE ATTEMPTING TO PERFORM ANY OF THE OPERATIONS DESCRIBED.**

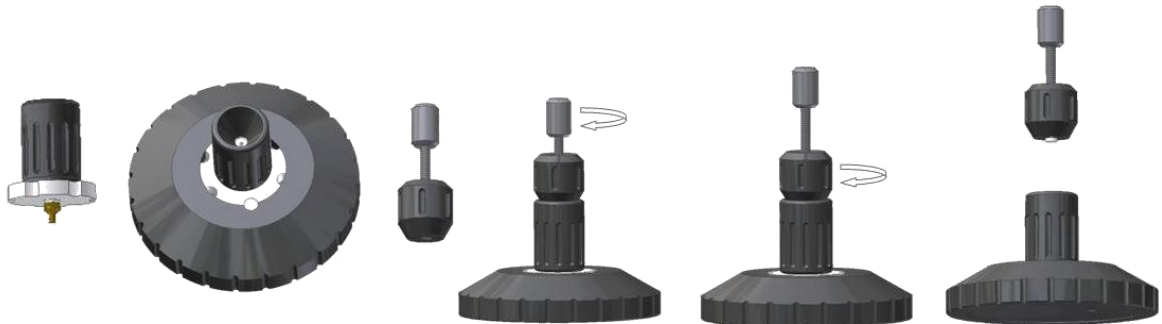
1. **Drive cap removal** (See figure 1 and 2).
  - 1.1. Loosen the **collet (7)** on the **sample extractor body (6)**.
  - 1.2. Insert the top of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (C)**. Push the **rotor sleeve (16)** into the **collet (7)** until it stops.
  - 1.3. Tighten the **collet (7)** until the rotor is secure.
  - 1.4. Loosen the **drive cap extractor nut (9)** on the **turbine cap extractor tool assembly (D)**.
  - 1.5. Loosen the **compression nut (10)**.
  - 1.6. Insert the **drive cap (18)** that is secured within the **sample funnel/collet assembly (C)** into the **drive cap extractor tip (11)**.
  - 1.7. Tighten the **compression nut (10)** until the **drive cap (18)** is secure.
  - 1.8. Tighten the **drive cap extractor nut (9)** until the **drive cap (18)** is extracted from the **rotor Sleeve (16)**.
  - 1.9. Loosen the **drive cap extractor nut (9)**.
  - 1.10. Loosen the **compression nut (10)** and remove the **drive cap (18)** from the **turbine cap extractor tool assembly (D)**.



**Figure 2, Drive cap removal.**

2. **Top cap removal** (See figure 1 and 3).

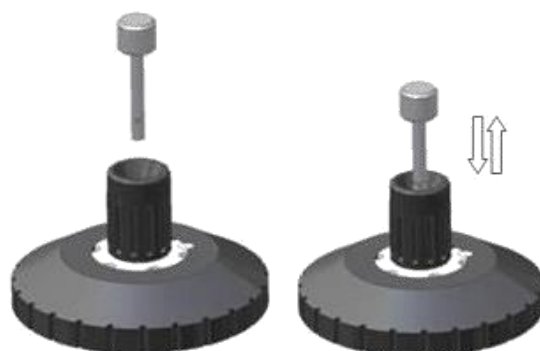
- 2.1. Loosen the **collet (7)** on the **sample extractor body (6)**.
- 2.2. Insert the top of the rotor into the bottom of the **sample funnel/collet assembly (C)**. Push the **rotor sleeve (16)** into the **collet (7)** until it stops.
- 2.3. Tighten the **collet (7)** until the **rotor sleeve (16)** is secure.
- 2.4. Insert the **sample funnel/collet assembly (C)** into the **sample scraper base (3)**.
- 2.5. Unscrew the **top cap extractor knob (4)** until its tip is flush with the end of the **top cap extractor body (5)**.
- 2.6. Insert the **top cap extractor tool assembly (B)** into the **sample funnel/collet assembly (C)**.
- 2.7. Screw the **top cap extractor knob (4)** into the **end cap (15)** of the **rotor sleeve (16)**.
- 2.8. Apply downward pressure and rotate the **top cap extractor body (5)** clockwise until the **top cap (15)** is removed from the **rotor sleeve (16)**.
- 2.9. Retreat the **top cap extractor body (5)** until the **top cap (15)** is accessible.
- 2.10. Unscrew the **top cap (15)** from the **top cap extractor tool assembly (B)**.



**Figure 3, Top cap removal.**

3. **Sample removal: method one** (See figure 1 and 4).

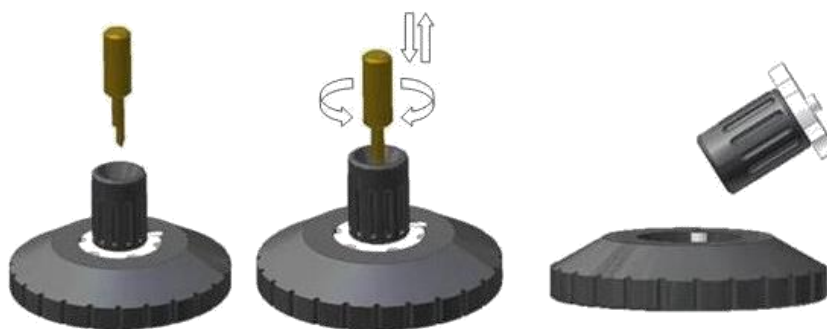
- 3.1. Remove the **top cap (15)** and **drive cap (18)** as described earlier.
- 3.2. Insert the **sample funnel/collet assembly (C)** into the **sample scraper base (3)**.
- 3.3. Insert the **sample tamper (1)** into the rotor.
- 3.4. Push down on the **sample tamper (1)** until the sample and **bottom cap (17)** is extruded into the **sample scraper base (3)**.



**Figure 4, Sample removal, method one.**

**4. Sample removal: method two** (See figure 1 and 5).

- 4.1. Remove the **top cap (15)** and **drive cap (18)** as described earlier.
- 4.2. Insert the **sample funnel/collet assembly (C)** into the **sample scraper base (3)**.
- 4.3. Insert the **sample scraper (2)** into the **rotor sleeve (16)**.
- 4.4. Rotate and push down on the **sample scraper (2)** in order to break the sample apart.
- 4.5. Remove the **sample funnel/collet assembly (C)** from the **sample scraper base (3)**.
- 4.6. Pour the loose sample into the **sample scraper base (3)**.
- 4.7. Repeat the above steps until all sample has been removed, or until you can use the **sample tamper (1)** as described in method 1.

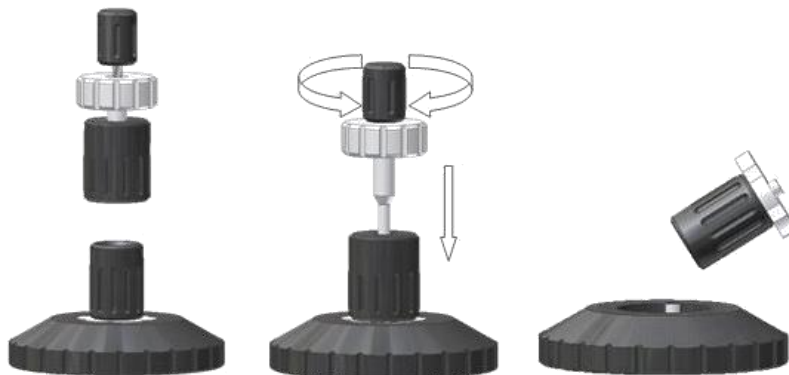


**Figure 5, Sample removal, method two.**

**5. Sample removal: method three** (See figure 1 and 6).

- 5.1. Remove the **top cap (15)** and **drive cap (18)** as described earlier.
- 5.2. Insert the **sample funnel/collet assembly (C)** into the **sample scraper base (3)**.
- 5.3. Insert the **sample scraper tool assembly (A)** into the **rotor sleeve (15)**.

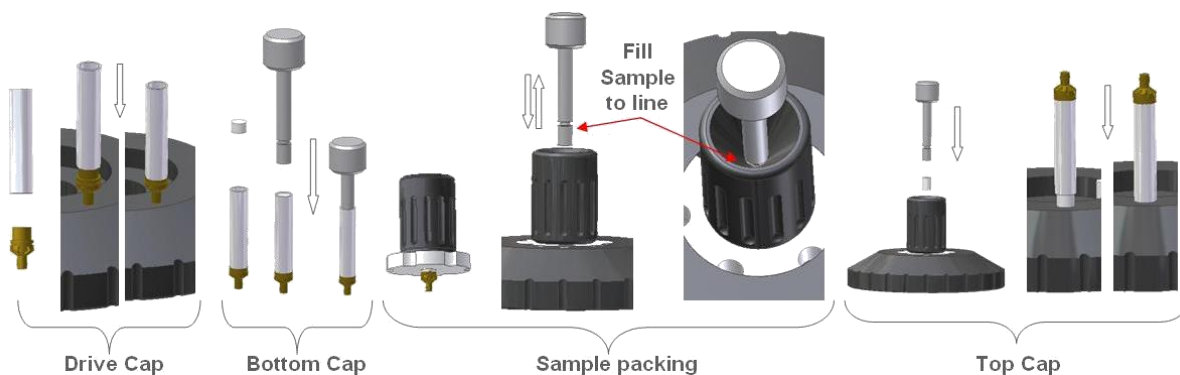
- 5.4. Rotate and push down on the **drill scraper knob (12)** in order to break the sample apart.
- 5.5. Remove the **sample scraper tool assembly (A)** and the **sample funnel/collet assembly (C)** from the **sample scraper base (3)**.
- 5.6. Pour the loose sample into the **sample scraper base (3)**.
- 5.7. Repeat the above steps until all sample has been removed, or until you can use the **sample tamper (1)** as described in method 1.



**Figure 6, Sample removal, method three.**

6. **Drive cap, bottom cap, sample, and top cap insertion.** (See figure 1 and 7).
  - 6.1. With the **rotor sleeve (16)** and **drive cap (18)** between your fingertips, insert the **drive cap (18)** into the **rotor sleeve (16)**. Press in the **drive cap (18)** until it is flush with the **rotor sleeve (16)**.
  - 6.2. If the **drive cap (18)** is not flush with the **rotor sleeve (16)**, then place the **drive cap (18)** onto the **sample scraper base (3)** and apply a downward pressure until the **drive cap (18)** is flush with the **rotor sleeve (16)**. **NOTE: You should not have to use excessive force or nitrogen cooling to insert the drive cap (18) into the rotor sleeve (16).**
  - 6.3. Insert the **bottom cap (17)** into the top of the **rotor sleeve (16)**.
  - 6.4. Use the **sample tamper (1)** to push the **bottom cap (17)** into the **rotor sleeve (16)**.
  - 6.5. Loosen the **collet (7)** on the **sample extractor body (6)**.
  - 6.6. Insert the top of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (C)**. Push the **rotor sleeve (16)** into the **collet (7)** until it stops.
  - 6.7. Tighten the **collet (7)** until the **rotor sleeve (16)** is secure.
  - 6.8. Insert the **sample funnel/collet assembly (C)** into the **sample scraper base (3)**.
  - 6.9. Insert a small amount of sample into the **rotor sleeve (16)**.
  - 6.10. Use the **sample tamper (1)** to compress the sample.

- 6.11. Repeat the previous two steps until the **sample tamper top cap marker (1a)** is flush with the **rotor sleeve (16)**.
- 6.12. Insert the **top cap (15)** into the **rotor sleeve (16)**.
- 6.13. Remove the **rotor sleeve (16)** from the **sample funnel/collet assembly (C)**.
- 6.14. Push the **top cap (15)** into the **rotor sleeve (16)** until it is flush with the end of the **rotor sleeve (16)**.
- 6.15. If the **top cap (15)** is not flush with the **rotor sleeve (16)**, then place the **top cap (15)** onto the **sample scraper base (3)** and apply a downward pressure until the **top cap (15)** is flush with the **rotor sleeve (16)**. **NOTE: You should not have to use excessive force or nitrogen cooling to insert the top cap (15) into the rotor sleeve (16).**



**Figure 7, Drive cap, bottom cap, sample, and top cap insertion.**

**7. Revolution NMR sample packing system assembly part numbers:**

AMP4041-001	5.0mm, 230ul, SPS
AMP4042-001	6.0mm, 240ul, SPS
AMP4009-001	7.0mm, 400ul, SPS
AMP4044-001	7.5mm, 450ul, SPS