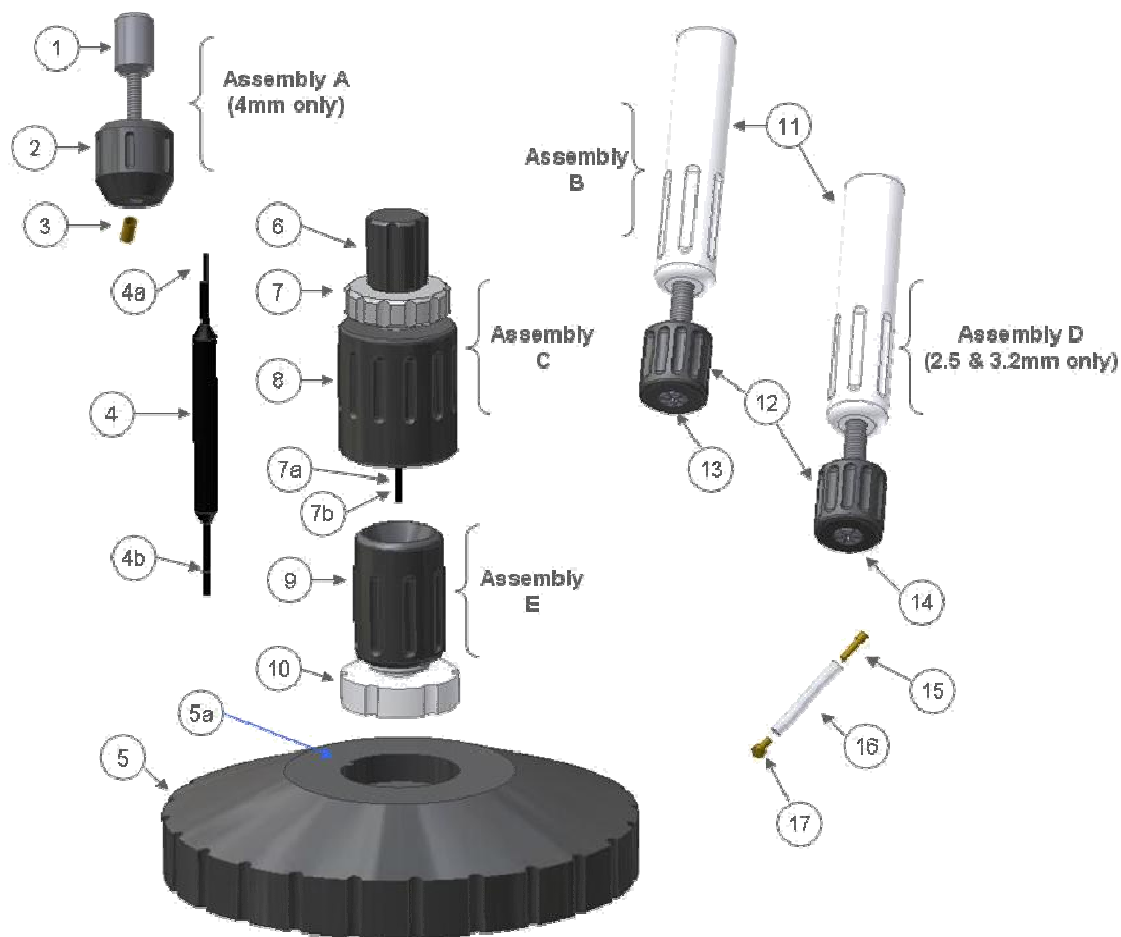


## Sample Packing System (SPS) Instructions for 2.0mm through 4.0mm Rotors



**Figure 1, Sample packing system.**

Item #	Description	Item #	Description
1	Top cap extractor knob	11	Extractor Handle
2	Top cap extractor body	12	Compression nut
3	Top cap (4.0mm only)	13	Drive cap extractor tip
4	Sample scraper/tamper	14	Top cap extractor tip
5	Sample scraper base	15	Top cap (2.5 & 3.2mm only)
5a	Sample scraper base locking pin	16	Rotor Sleeve
6	Scraper drill knob	17	Drive cap
7	Scraper sleeve knob	<b>Assembly A</b>	Top cap extractor tool assembly
7a	Scraper drill sleeve	<b>Assembly B</b>	Drive cap extractor tool assembly
7b	Drill bit	<b>Assembly C</b>	Sample scraper tool assembly
8	Scraper body	<b>Assembly D</b>	Top cap extractor tool assembly
9	Sample extractor body	<b>Assembly E</b>	Sample funnel/collet assembly
10	Collet		

**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 (10)** on the **sample extractor body (9)**.
- 1.2. Insert the top of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (E)**. Push the **rotor sleeve (16)** into the **collet (10)** until it stops.
- 1.3. Tighten the **collet (10)** until the rotor is secure.
- 1.4. Loosen the **compression nut (12)** on the **turbine cap removal tool assembly (B)**.
- 1.5. Insert the **drive cap (17)** that is secured within the **collet/sample extractor body assembly (E)** into the **drive cap extractor tip (13)**.
- 1.6. Tighten the **compression nut (12)** until the **drive cap (17)** is secure.
- 1.7. Pull and twist the **turbine cap extractor tool assembly (B)** away from the **sample funnel/collet assembly (E)** until the **drive cap (17)** is extracted from the **rotor Sleeve (16)**. Be careful not to spill your sample.
- 1.8. Pour any loose sample from the **rotor sleeve (16)** into the **sample scraper base (5)**.
- 1.9. Loosen the **compression nut (12)** until the **drive cap (17)** is released.



**Figure 2, Drive cap, and 2.5, & 3.2mm top cap removal.**

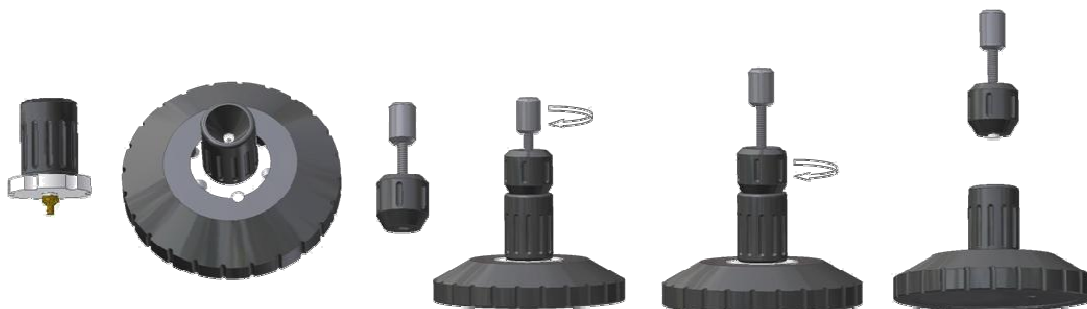
**2. Top cap removal for 2.5 & 3.2mm rotors** (See figure 1 and 2).

- 2.1. Loosen the **collet (10)** on the **sample extractor body (9)**.
- 2.2. Insert the bottom (Drive cap end) of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (E)**. Push the **rotor sleeve (16)** into the **collet (10)** until it stops.

- 2.3. Tighten the **collet (10)** until the **rotor sleeve (16)** is secure.
- 2.4. Loosen the **compression nut (12)** on the **top cap removal tool assembly (D)**
- 2.5. Insert the **top cap (15)** that is secured within the **sample funnel/collet assembly (E)** into the **top cap extractor tip (14)**.
- 2.6. Tighten the **Compression nut (12)** until the **top cap (15)** is secure.
- 2.7. Pull and twist the **top cap removal tool assembly (D)** away from the **sample funnel/collet assembly (E)** until the **top cap (15)** is extracted from the **rotor Sleeve (16)**.
- 2.8. Loosen the **compression nut (12)** until the **top cap (15)** is released. Be careful not to spill your sample.

3. **Top cap removal for 4.0mm rotors** (See figure 1 and 3).

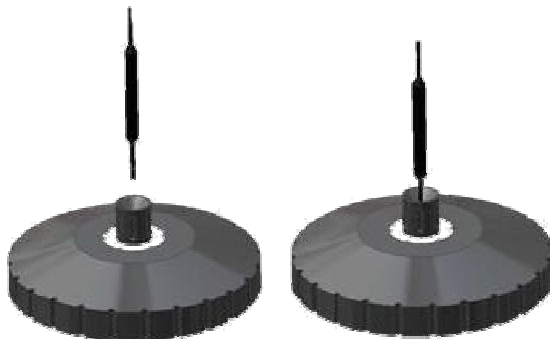
- 3.1. Loosen the **collet (10)** on the **sample extractor body (9)**.
- 3.2. Insert the top of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (E)**. Push the **rotor sleeve (16)** into the **collet (10)** until it stops.
- 3.3. Tighten the **collet (10)** until the **rotor sleeve (16)** is secure.
- 3.4. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
- 3.5. Unscrew the **top cap extractor knob (1)** until its tip is flush with the end of the **top cap extractor body (2)**.
- 3.6. Insert the **top cap extractor tool assembly (A)** into the **sample funnel/collet assembly (E)**.
- 3.7. Screw the **top cap extractor knob (1)** into the **top cap (15)** of the **rotor sleeve (16)**.
- 3.8. Apply downward pressure and rotate the **top cap extractor body (2)** clockwise until the **top cap (15)** is removed from the **rotor sleeve (16)**.
- 3.9. Retreat the **top cap extractor body (2)** until the **top cap (15)** is accessible.
- 3.10. Unscrew the **top cap (15)** from the **top cap extractor tool assembly (A)**.



**Figure 3, Drive cap removal for 4.0mm rotors.**

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

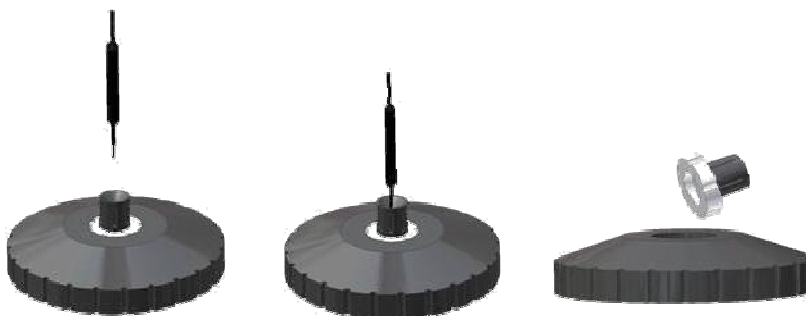
- 4.1. Remove the **top cap (3, 15)** and **drive cap (17)** as described earlier.
- 4.2. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
- 4.3. Insert the **sample tamper (4b)** into the **rotor sleeve (16)**.
- 4.4. Push down on the **sample tamper (4b)** until the sample is extruded into the **sample scraper base (5)**.



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

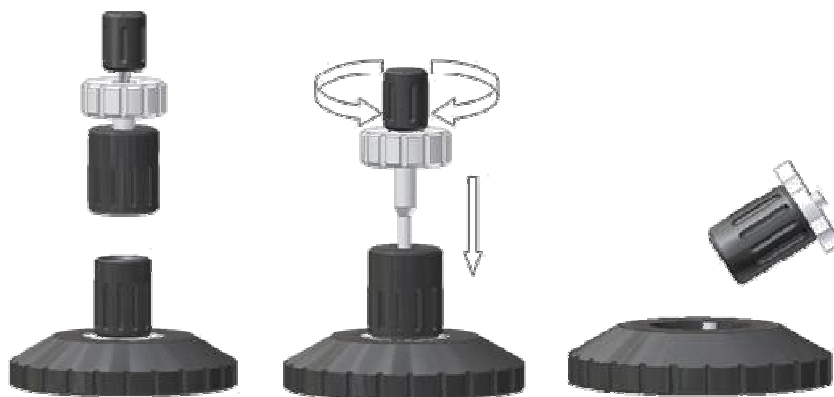
5. **Sample removal method two** (See figure 1 and 5).

- 5.1. Remove the **top cap (3, 15)** and **drive cap (15)** as described earlier.
- 5.2. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
- 5.3. Insert the **sample scraper (4a)** into the **rotor sleeve (16)**.
- 5.4. Rotate and push down on the **sample scraper (4a)** in order to break the sample apart.
- 5.5. Remove the **sample funnel/collet assembly (E)** from the **sample scraper base (5)**.
- 5.6. Pour the loose sample into the **sample scraper base (5)**.
- 5.7. Repeat the above steps until all sample has been removed, or until you can use the **sample tamper (4)** as described in method 1.



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

6. **Sample removal method three** (See figure 1 and 6).
  - 6.1. Remove the **top cap (3, 15)** and **drive cap (17)** as described earlier.
  - 6.2. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
  - 6.3. Insert the **sample scraper tool assembly (C)** into the **sample funnel/collet assembly (E)**.
  - 6.4. Rotate and push down on the **drill scraper knob (6)** in order to break the sample apart.
  - 6.5. Remove the **sample scraper tool assembly (C)** and the **sample funnel/collet assembly (E)** from the **sample scraper base (5)**.
  - 6.6. Pour the loose sample into the **sample scraper base (5)**.
  - 6.7. Repeat the above steps until all sample has been removed, or until you can use the **sample tamper (4)** as described in method 1.



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

7. **Drive cap, sample, and top cap insertion** (See figure 1 and 7).
  - 7.1. With the **rotor sleeve (16)** and **drive cap (17)** between your fingertips, insert the **drive cap (17)** into the **rotor sleeve (16)**. Press in the **drive cap (17)** until it is flush with the **rotor sleeve (16)**. If the **drive cap (17)** is not flush with the **rotor sleeve (16)**, then place the **drive cap (17)** onto the **sample scraper base (5)** and apply a downward pressure until the **drive cap (17)** is flush with the **rotor sleeve (16)**. **NOTE: You should not have to use excessive force or nitrogen cooling to insert the **drive cap (17)** into the **rotor sleeve (16)**.**
  - 7.2. Loosen the **collet (10)** on the **sample extractor body (9)**.
  - 7.3. Insert the top of the **rotor sleeve (16)** into the bottom of the **sample funnel/collet assembly (E)**. Push the **rotor sleeve (16)** into the **collet (10)** until it stops.
  - 7.4. Tighten the **collet (10)** until the **rotor sleeve (16)** is secure.
  - 7.5. Insert the **sample funnel/collet assembly (E)** into the **sample scraper base (5)**.
  - 7.6. Insert a small amount of sample into the **rotor sleeve (16)**.

- 7.7. Use the **sample tamper (4b)** to compress the sample.
- 7.8. Repeat the previous two steps until the **sample tamper top cap marker (4b)** is flush with the top of the **rotor sleeve (16)**.
- 7.9. Insert the **top cap (15)** into the **rotor sleeve (16)**.
- 7.10. Remove the **rotor sleeve (16)** from the **sample funnel/collet assembly (E)**.
- 7.11. Push the **top cap (15)** into the **rotor sleeve (16)** until it is flush with the end of the **rotor sleeve (16)**.
- 7.12. If the **top cap (15)** is not flush with the **rotor sleeve (16)**, then place the **top cap (15)** onto the **sample scraper base (5)** 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 (17) into the rotor sleeve (16).**

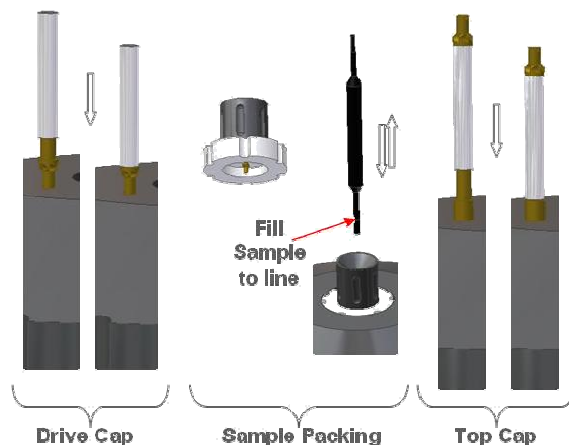


Figure 7, Drive cap, sample, and top cap insertion.

8. Revolution NMR sample packing system assembly part numbers:

AMP4131-001	2.0mm, 11ul, SPS
AMP4029-001	2.5mm, 11ul, SPS
AMP4031-001	3.2mm, 11ul, SPS
AMP4032-001	3.2mm, 22ul, SPS
AMP4033-001	3.2mm, 36ul, SPS
AMP4034-001	3.2mm, Allul, SPS
AMP4036-001	4.0mm, 52ul, SPS
AMP4037-001	4.0mm, 83ul, SPS