

Optima XE Series



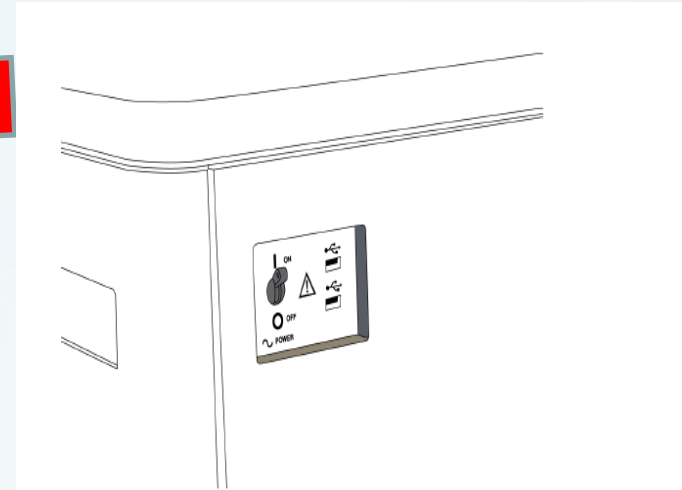
課程大綱

1. Instrument Introduction 儀器簡介
2. Instrument Operation 儀器操作
3. Rotor and Tubes Operation 轉子與離心管
4. Tube Tools 離心管工具
5. Balance 平衡
6. Maintenance 日常保養
7. RPM $\Leftrightarrow$ RCF 離心單位換算

儀器規格

- 最大轉速:100,000RPM
- 時間: 99hrs 59min or Hold
- 溫度: 0~40°C

開關



DOOR OPEN/CLOSE





Figure 1-2. The Rotor Chamber

操作面板

Optima XE / XPN 系列 操作手冊



轉速控制/顯示

時間控制/顯示

溫度控制/顯示

真空啟動/停止

運轉啟動

運轉停止

加速率控制

煞車率控制

操作程序

operation procedure

操作程序：

1. 打開電源開關。
2. 樣品平衡 -- 重量：0.01g 以下誤差
位置：對稱置入ROTOR, 使用swinging bucket請全數掛上。
3. 鎖緊ROTOR蓋子，將ROTOR置於離心槽內。
4. 關上門，按【真空啟動/停止】，機器開始抽真空。
5. 輸入所需要的參數：轉速：按【轉速控制/顯示】，輸入所要的轉速，1000~90000RPM, (以離心管最高速限為上限)。
時間：按【時間控制/顯示】，輸入所要的時間, 999Hrs and 59mins。
溫度：按【溫度控制/顯示】，輸入所要的溫度, 0~40°C。
6. 選擇加速率【ACCEL】0~9 and減速率【DECEL】0~10。
7. 待真空降到750 μ 以下，按【START】，機器開始運轉，並請務必等離心機到達所設定之轉速後再離開。
8. 等待所設定的時間參數計數到0儀器自動停止或者要中止運轉按下【STOP】，當ROTOR停止後按下【真空啟動/停止】，讓真空釋放。
9. 打開門及拿出ROTOR。

Pre-Cooling / Heat

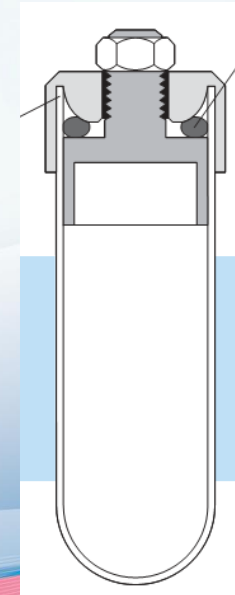
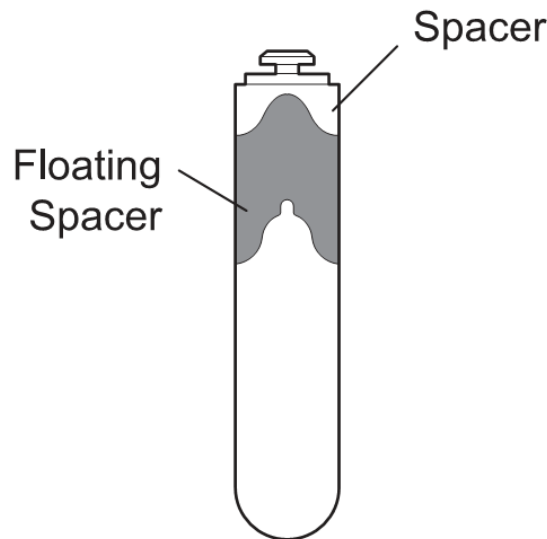
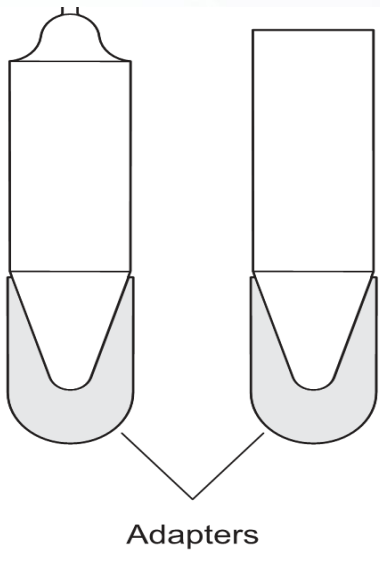
預冷/預熱

- 儀器離心槽 預冷 / 預熱
 - 設定所需溫度並關上門板，啟動真空鍵
<至少二十分鐘以上>
- 轉子預冷 / 預熱
 - 預冷:放置於冷房或4°C冰箱<至少兩小時以上>
 - 預熱:放置所需溫度環境<至少兩小時以上>

以上儀器簡介，開放問題提問

Rotor and Tubes

- 樣品容量與所需轉速（RPM & RCF）
- 選擇合適轉子（ROTOR）
- 選擇離心管 材質/類型/配件
 - Adapters/Spacers/Caps



Rotor Type



Fixed Angle Rotor



Swinging Bucket Rotor



Vertical Tube Rotor



Near Vertical Tube Rotor



Fixed Angle Rotors

Swinging Bucket Rotors

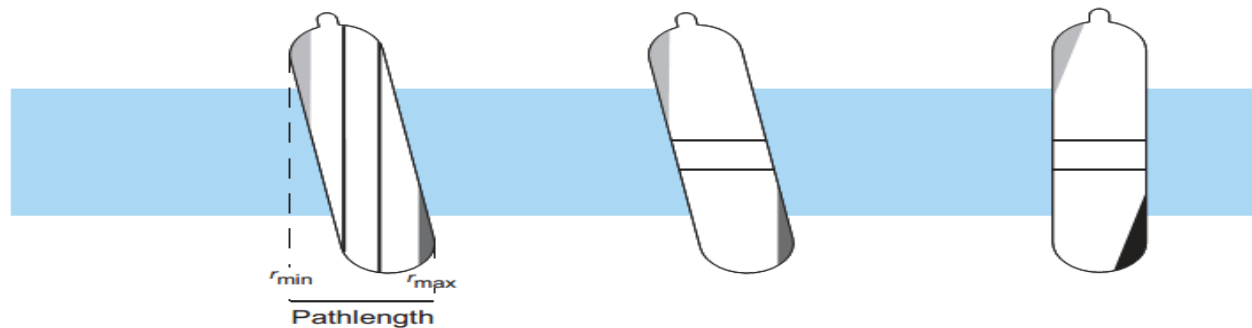
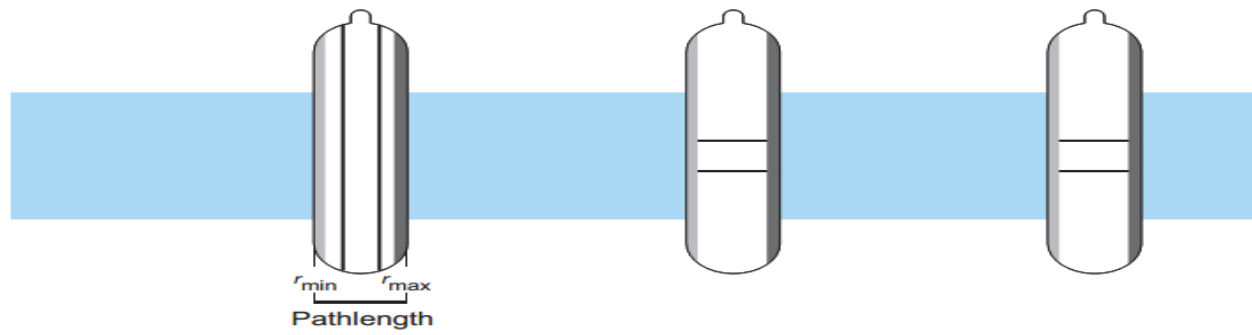
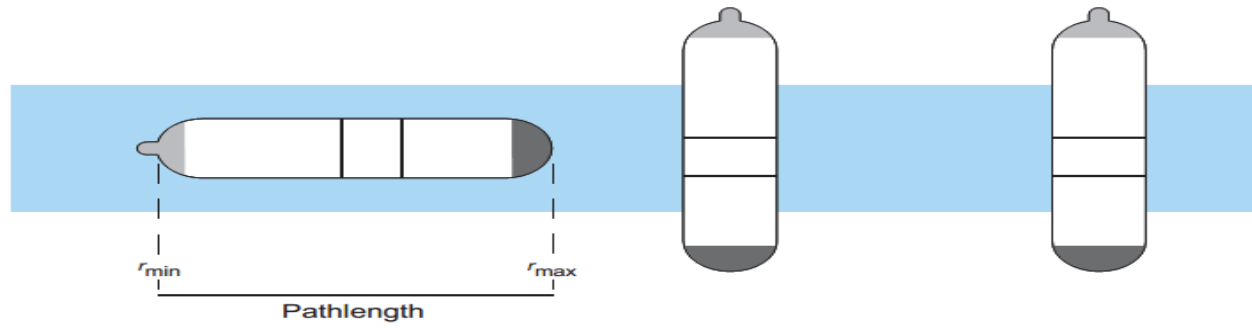
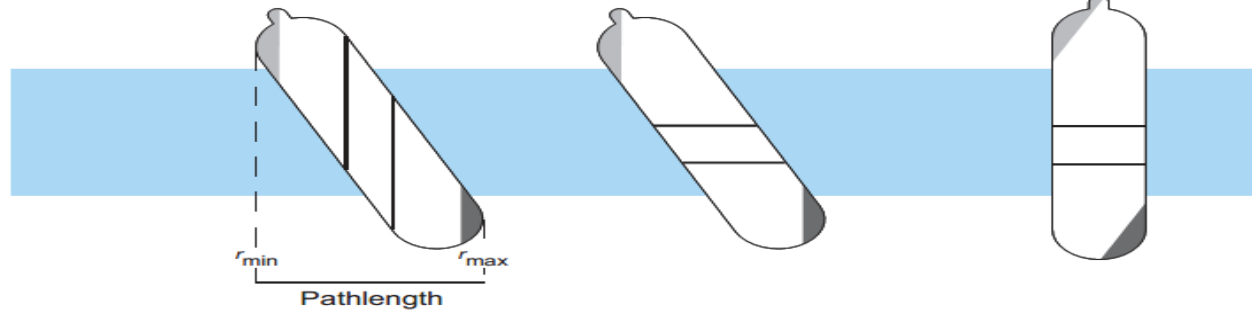
Vertical Tube Rotors

Near Vertical Tube Rotors

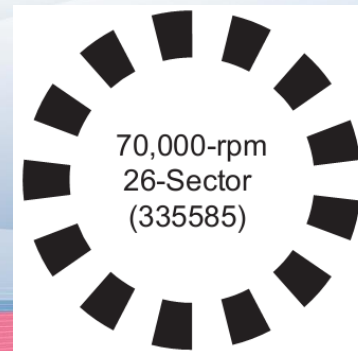
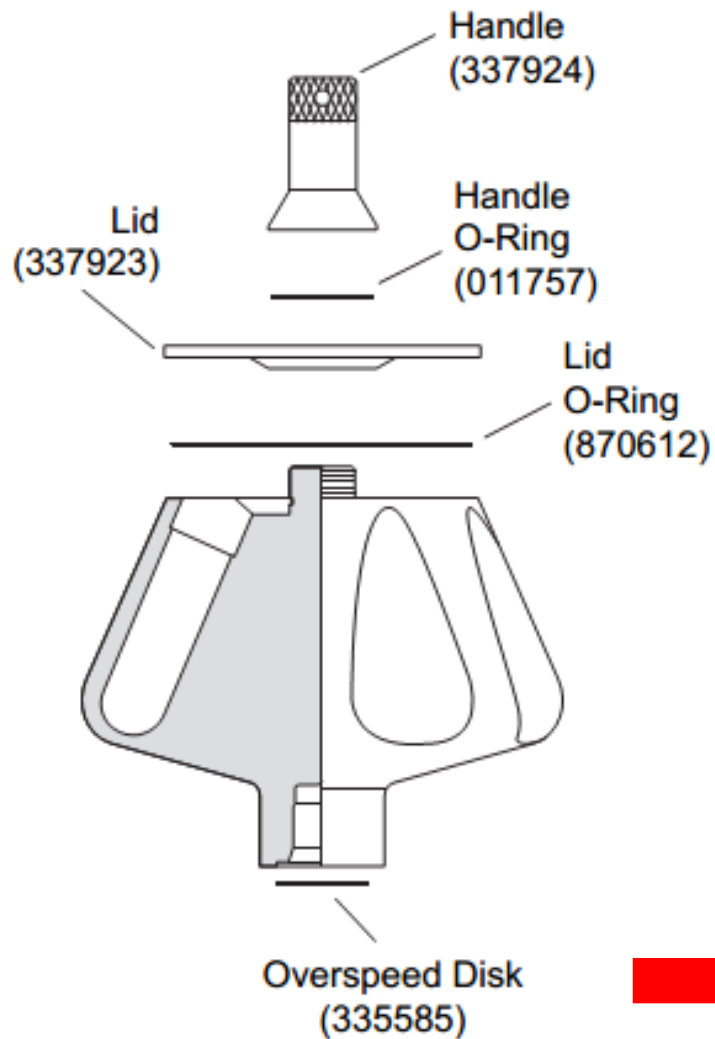
At Speed

At Rest in Rotor

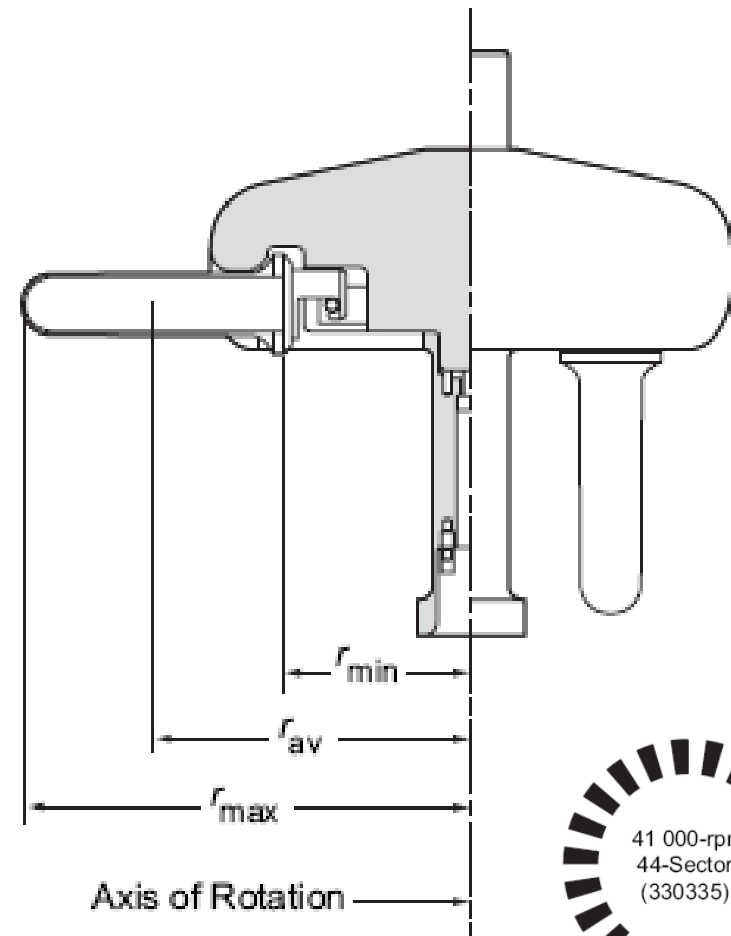
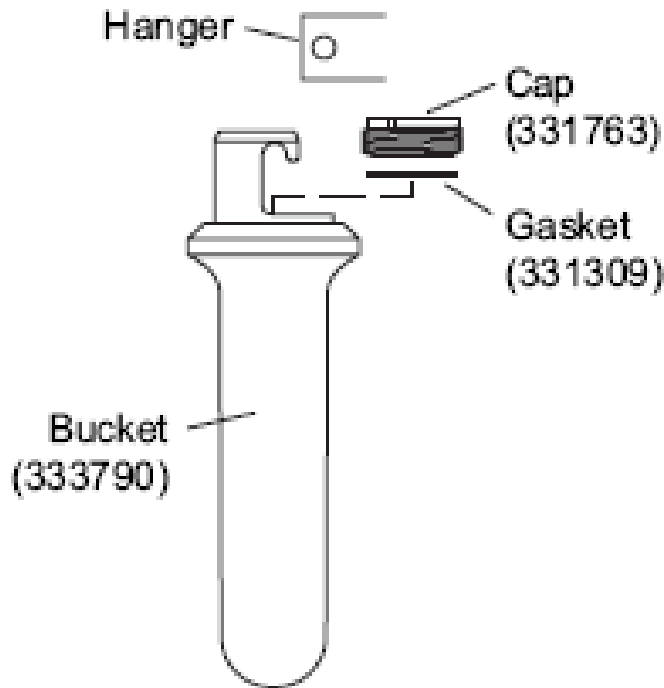
At Rest Outside Rotor



Fixed Angle Rotor



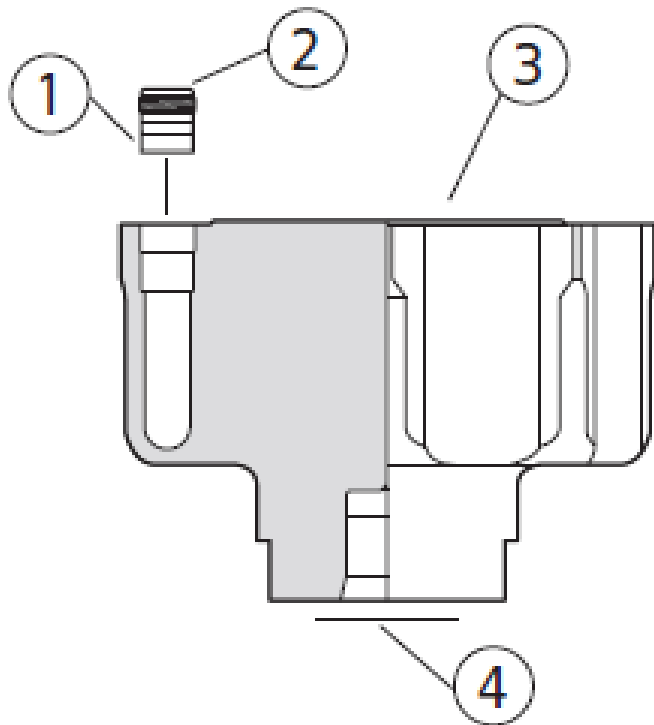
Swinging bucket rotor



每組Bucket配件
請對照編號

Vertical tube rotor

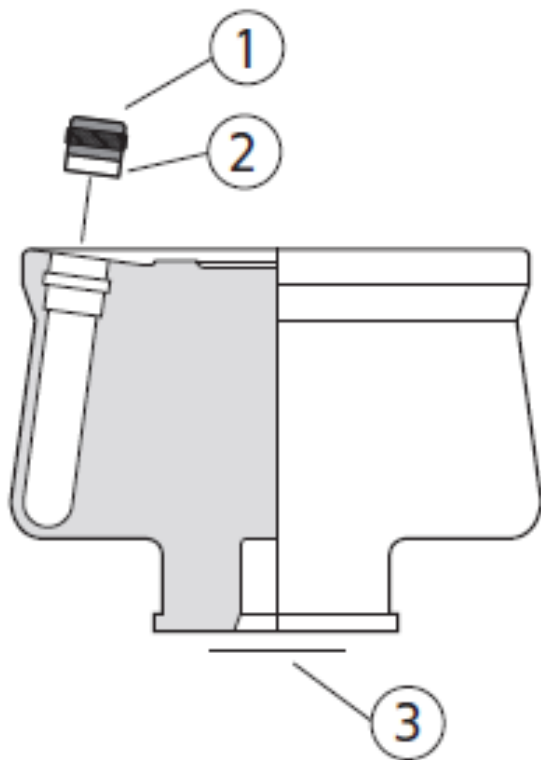
120 in-lb



1. Plug Gasket (349290)
2. Plug (368545)
3. Rotor Body
4. Overspeed Disk (355539)

Near Vertical tube rotor

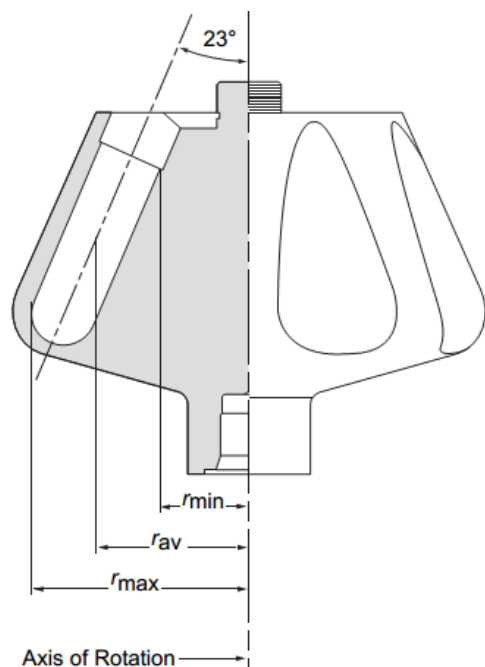
120 in-lb



1. Plug (392083)
2. Plug Gasket (349220)
3. Overspeed Disk (330338)

Type 70Ti

SPECIFICATIONS



★ Maximum speed	70 000 rpm
★ Density rating at maximum speed	1.2 g/mL
Relative Centrifugal Field* at maximum speed	
At r_{max} (91.9 mm)	504 000 × g
At r_{av} (65.7 mm)	361 000 × g
At r_{min} (39.5 mm)	217 000 × g
★ k factor at maximum speed	44
Conditions requiring speed reductions	see RUN SPEEDS
Number of tube cavities	8
Available tubes	see Table 1
Nominal tube dimensions (largest tube)	25 × 89 mm
Nominal tube capacity (largest tube)	39 mL
Nominal rotor capacity	312 mL
Approximate acceleration time to maximum speed	
(fully loaded)	8 1/2 min
Approximate deceleration time from maximum speed	
(fully loaded)	7 min
Weight of fully loaded rotor	9 kg (20 lb)
Rotor material	titanium

Note

- Balance :

$$g(\text{RCF}) : 504000 \times 0.001\text{g} = 504\text{g}$$

- Sample Density: 避免離心管破損，
樣本密度需在 **1.2g/ml** 以下

$$\text{reduced maximum speed} = (70\,000 \text{ rpm}) \sqrt{\frac{1.2 \text{ g/mL}}{\rho}}$$

- K Factors : Rotors Ex-change Time

$$\frac{t_a}{t_b} = \frac{k_a}{k_b}$$

Table 1. Available Tubes and Bottles for the Type 70 Ti Rotor. Use only the items listed here.

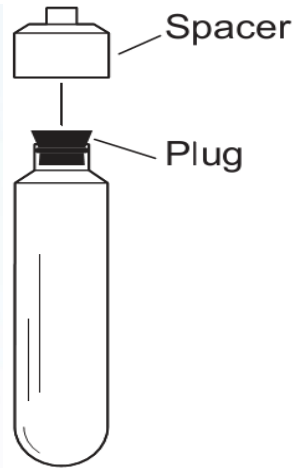
Tube				Required Accessory		Max Speed/ RCF/ k Factor
Dimensions	Description	Part Number	Max Fill Vol	Description	Part Number	
25 × 89 mm	Quick-Seal Ultra-Clear	344326 (pkg/50)	39 mL	red aluminum spacer	342699	70 000 rpm 504 000 × <i>g</i> 44
25 × 89 mm	Quick-Seal polyallomer	342414 (pkg/50)	39 mL	red aluminum spacer	342699	70 000 rpm 504 000 × <i>g</i> 44
25 × 89 mm	Ultra-Clear	344058 (pkg/50)	38.5 mL ^a	red aluminum cap	331151	60 000 rpm 371 000 × <i>g</i> 59
25 × 89 mm	thinwall polyallomer	326823 (pkg/50)	38.5 mL ^a	red aluminum cap	331151	60 000 rpm 371 000 × <i>g</i> 59
25 × 89 mm	stainless steel	301112	38.5 mL	aluminum cap	302133	40 000 rpm ^b 165 000 × <i>g</i> 135

Tube 使用注意事項

- 型態
- 材質
- 樣品化學性質
- 承裝容量
- 滅菌方式
- 外觀檢視

Tube Type

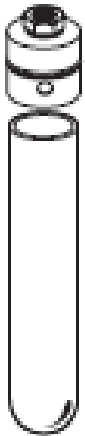
OptiSeal™ Tubes



Quick-Seal® Tubes



Thinwall Tubes



Bottles



Thickwall Tubes



Tube 使用注意事項

- 型態
- 材質
- 樣品化學性質
- 承裝容量
- 滅菌方式
- 外觀檢視

Tube Material

1. PA (Polyallomer) : 軟材質/半透明/可高壓滅菌/可耐醇類、DMSO與部分有機溶劑
2. PC (Polycarbonate) : 硬材質/透明
3. PP (Polypropylene) : 半透明/耐酸鹼/耐醇類
4. PE (Polyethylene) : 透明/半透明/耐酸鹼
5. Ultra-clear : 超透明薄壁/可穿透/不可高壓滅菌/不耐醇類、DMSO與有機溶劑

Tube 使用注意事項

- 型態
- 材質
- 樣品化學性質
- 承裝容量
- 滅菌方式
- 外觀檢視

Table 2.1 Characteristics and Chemical Resistances of Tube and Bottle Materials^a

Tube or Bottle Type	Optical Property	Puncturable	Sliceable	Reusable	Acids (dilute or weak)	Acids (strong)	Alcohols (aliphatic)	Aldehydes	Bases	Esters	Hydrocarbons (aliphatic)	Hydrocarbons (aromatic and halogenated)	Ketones	Oxidizing Agents (strong)	Salts
thinwall polyallomer	transparent	yes	yes	no	S	U	U	M	S	U	U	U	U	U	S
thickwall polyallomer	translucent	no	no ^b	yes	S	S	S	M	S	M	M	U	M	U	S
Ultra-Clear	transparent	yes	yes	no	S	U	U	S	U	U	U	U	U	U	M
polycarbonate	transparent	no	no	yes	M	U	U	M	U	U	U	U	U	M	M
polypropylene	translucent/ transparent	no	no ^b	yes	S	S	S	M	S	M	S	M	M	M	S
polyethylene	transparent/ translucent	yes	no	yes	S	S	S	S	S	S	U	M	M	M	S
cellulose propionate	transparent	no	no ^b	no	S	U	U	U	U	M	S	S	U	M	S
stainless steel	opaque	no	no	yes	S	U	S	S	M	S	S	S	M	S	M

S = satisfactory resistance

M = marginal resistance

U = unsatisfactory resistance

a. Refer to Appendix A for information about specific solutions.

b. Polyallomer, polypropylene, and cellulose propionate tubes with diameters of 5 to 13 mm may be sliced using the Centritube Slicer (part number 347960) and appropriate adapter plate.

Tube 使用注意事項

- 型態
- 材質
- 樣品化學性質
- **承裝容量**
- 滅菌方式
- 外觀檢視

Table 3.1 General Filling and Sealing Requirements for Tubes and Bottles

Tube or Bottle	Filling Level Requirements		
	Swinging Bucket Rotors	Fixed Angle Rotors	Vertical Tube Rotors
Polyallomer thinwall tubes thickwall tubes Quick-Seal tubes bottles	within 2 to 3 mm of top at least $\frac{1}{2}$ full full and heat sealed min to max (see rotor manual) with screw-on cap or cap assembly	full with cap $\frac{1}{2}$ full to max capless level or full with cap full and heat sealed $\frac{1}{2}$ full to max (see rotor manual) with screw-on cap or cap assembly	not used not used full and heat sealed not used
Ultra-Clear open-top tubes Quick-Seal tubes	within 2 to 3 mm of top not used	full with cap full and heat sealed	not used full and heat sealed
Polycarbonate thickwall tubes bottles	at least $\frac{1}{2}$ full at least $\frac{1}{2}$ full	$\frac{1}{2}$ full to max capless level or full with cap min to max (see rotor manual) with screw-on cap or cap assembly	not used not used
Stainless Steel tubes	any level	any level with cap or cap assembly	not used
Polypropylene tubes and bottles	at least $\frac{1}{2}$ full	$\frac{1}{2}$ full to max capless level or full with cap or cap assembly	not used
Polyethylene tubes	at least $\frac{1}{2}$ full	$\frac{1}{2}$ full to max capless level or full with cap	not used
Cellulose Propionate tubes and bottles	at least $\frac{1}{2}$ full	$\frac{1}{2}$ full to max capless level	not used

Open Top

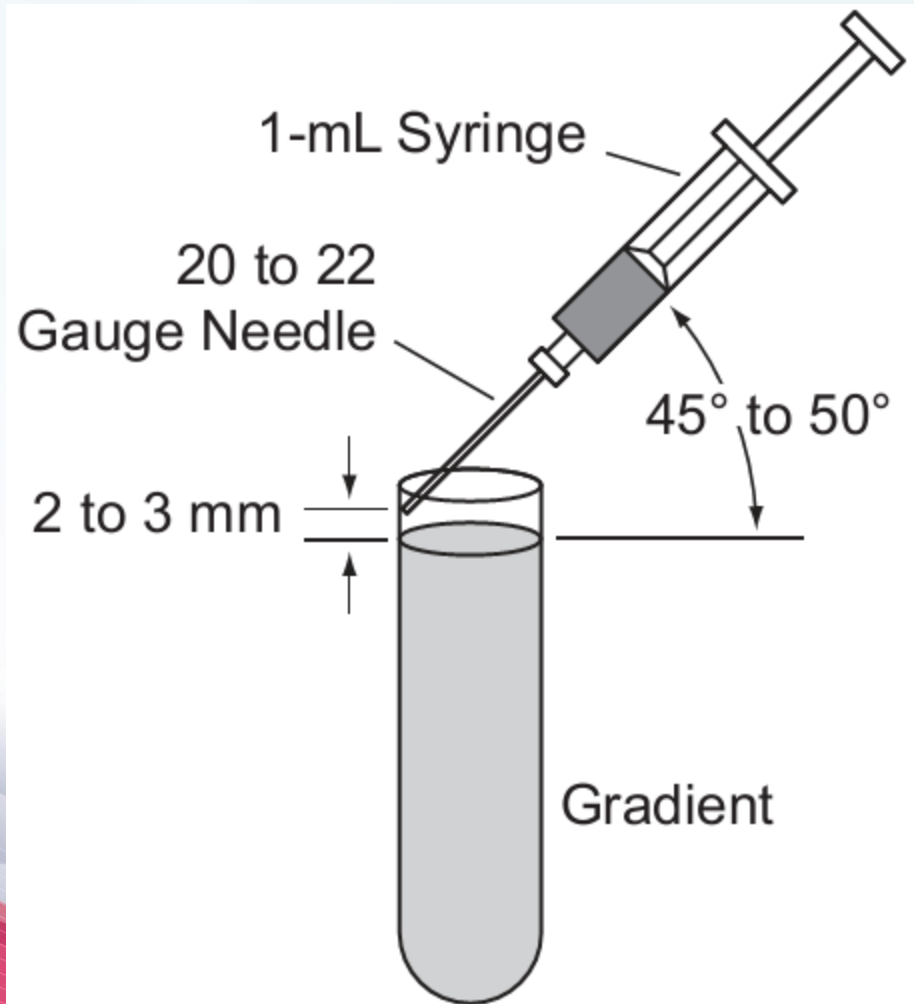
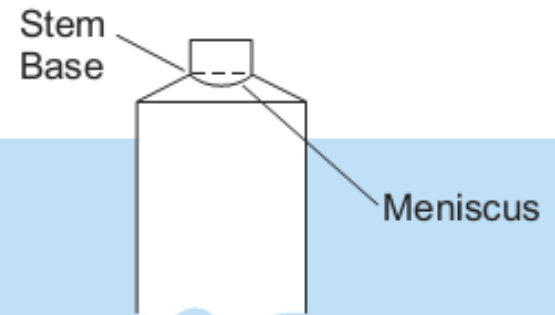
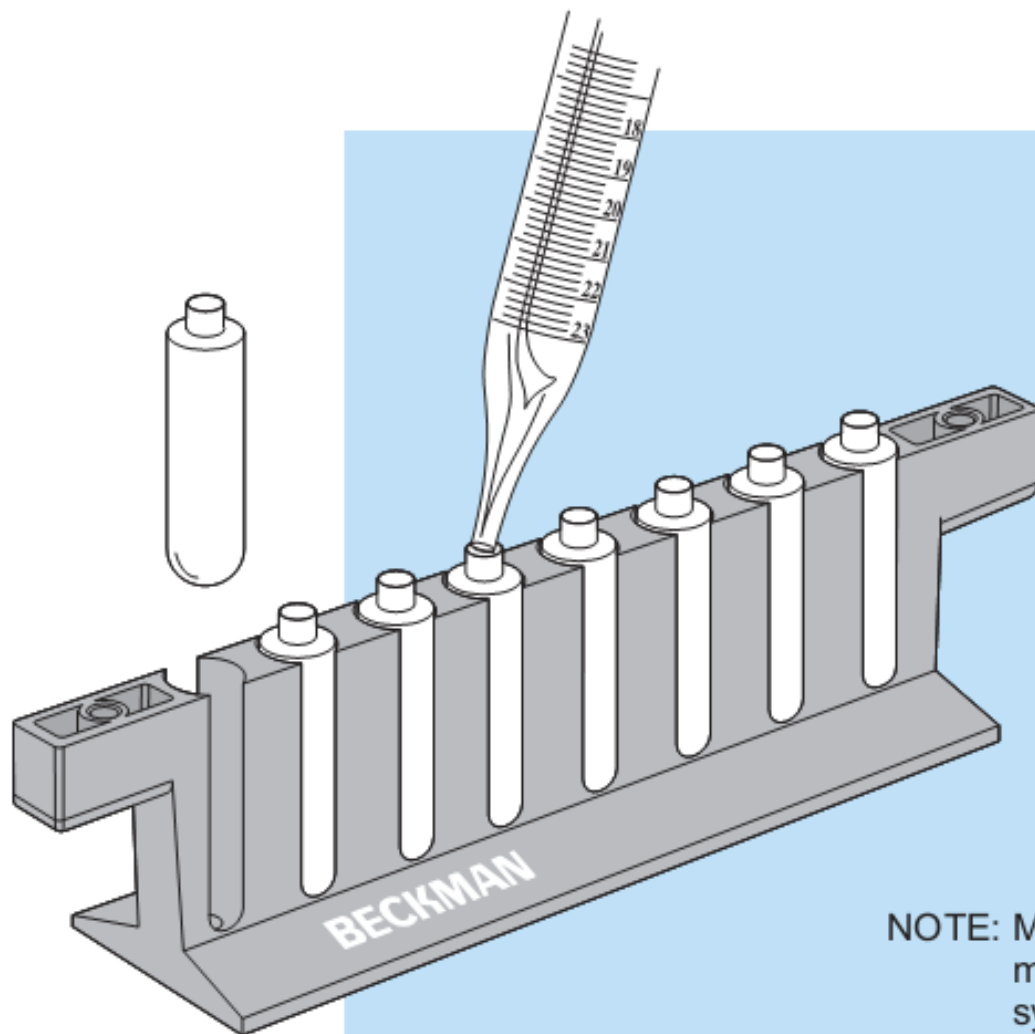
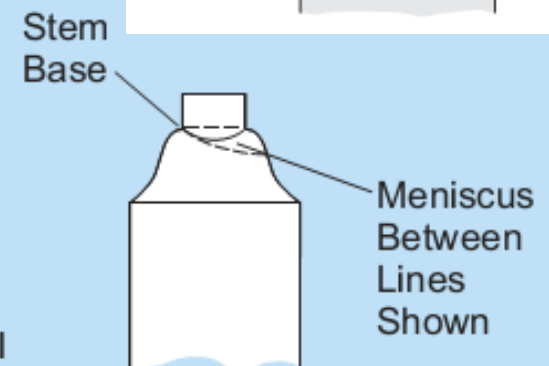


Figure 3.1 Filling OptiSeal Tubes*



Regular Top



Bell Top

NOTE: Meniscus may not be symmetrical

Tube 使用注意事項

- 型態
- 材質
- 樣品化學性質
- 承裝容量
- 滅菌方式
- 外觀檢視

Table 7.1 Tube and Bottle Sterilization and Disinfection^a

Tube/Bottle Material	Autoclave ^b (121°C)	UV Irradiation	Ethylene Oxide	Formal- dehyde	Ethanol (70%) ^c	Sodium Hypo- chlorite (10%)	Hydrogen Peroxide (10%)	Glutaral- dehyde (2%)	Phenolic Deriva- tives
polyallomer	yes	no	yes	yes	yes	yes	yes	yes	no
Ultra-Clear	no	no	yes	yes ^d	yes	yes	yes	yes	no
polycarbonate	yes ^e	no	yes	yes ^d	no	yes ^f	yes	yes	no
polypropylene	yes	no	yes	yes	yes	yes ^g	yes ^h	yes	no
polyethylene	no	no	yes	yes	yes ⁱ	yes	yes	yes	yes
cellulose propionate	no	no	no	no	no	yes	yes	yes	no
stainless steel	yes	yes	yes	yes	yes ^j	no	yes	yes	no

- a. This information is provided as a guide to the use of sterilization and disinfection techniques for tube materials. Cold sterilization results shown are for short-duration (10-minute) soak periods; reactions may differ with extended contact. Refer to Appendix A of this manual for information about specific solutions.

b. To avoid deformation, autoclave tubes or bottles open-end down in a tube rack at 15 psig for no more than 20 minutes (allow to cool before removing from tube rack). DO NOT autoclave capped or sealed tubes or bottles.

c. Flammable; do not use in or near operating centrifuges.

d. Do not use if there is methanol in the formula.

e. Tube life will be reduced by autoclaving.

f. Discoloration may occur.

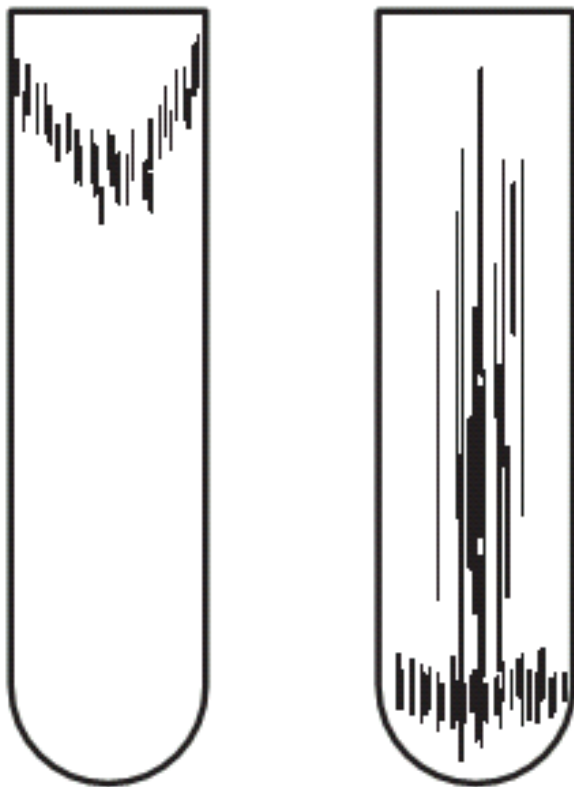
g. Can be used if diluted.

h. Below 26°C only.

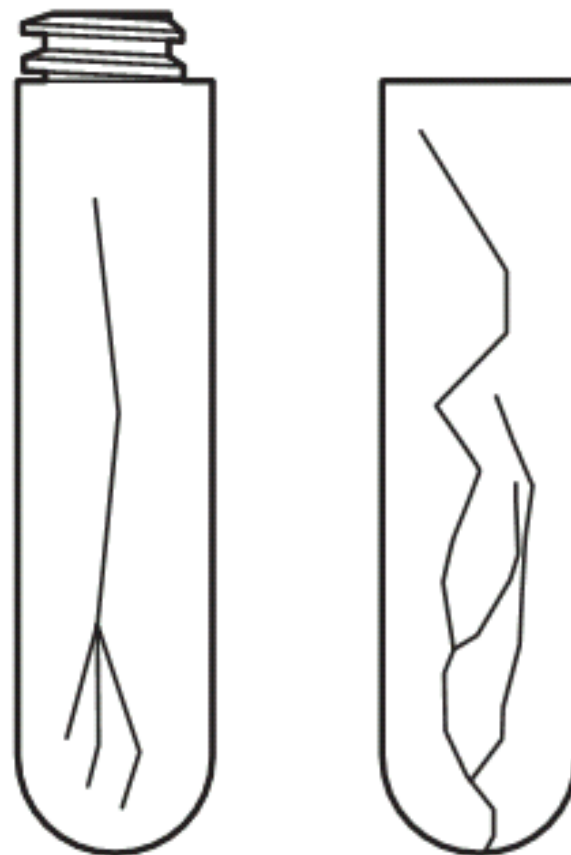
i. Below 21°C only.
- Autoclaveable :**
121°C,20 min,15 psi

Tube 使用注意事項

- 型態
- 材質
- 樣品化學性質
- 承裝容量
- 滅菌方式
- 外觀檢視



Crazing

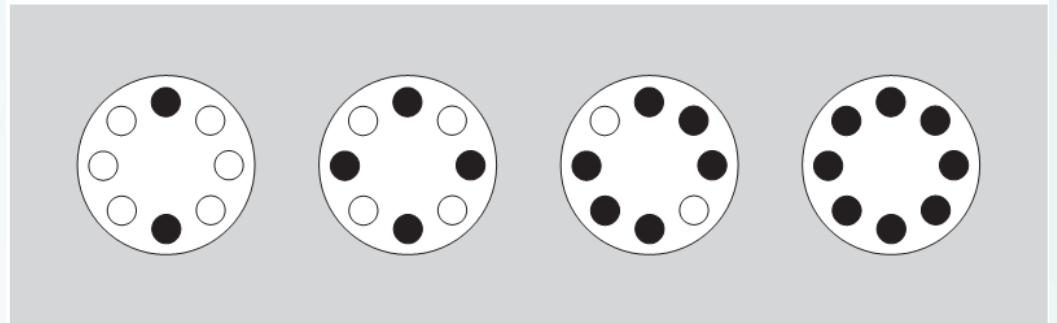


Cracking

Balance

- Rotor Sample 平衡步驟：

1. 平衡對稱放置



- ## 2. 重量平衡：Opposing tubes must be filled to the same level with liquid of the same density.

< 建議平衡至 **mg level** >

- Swinging Rotor的**Bucket**一定要**6個全數**掛上

Rotor & Tube Tools

NVT / VTi serial

120 in-lb

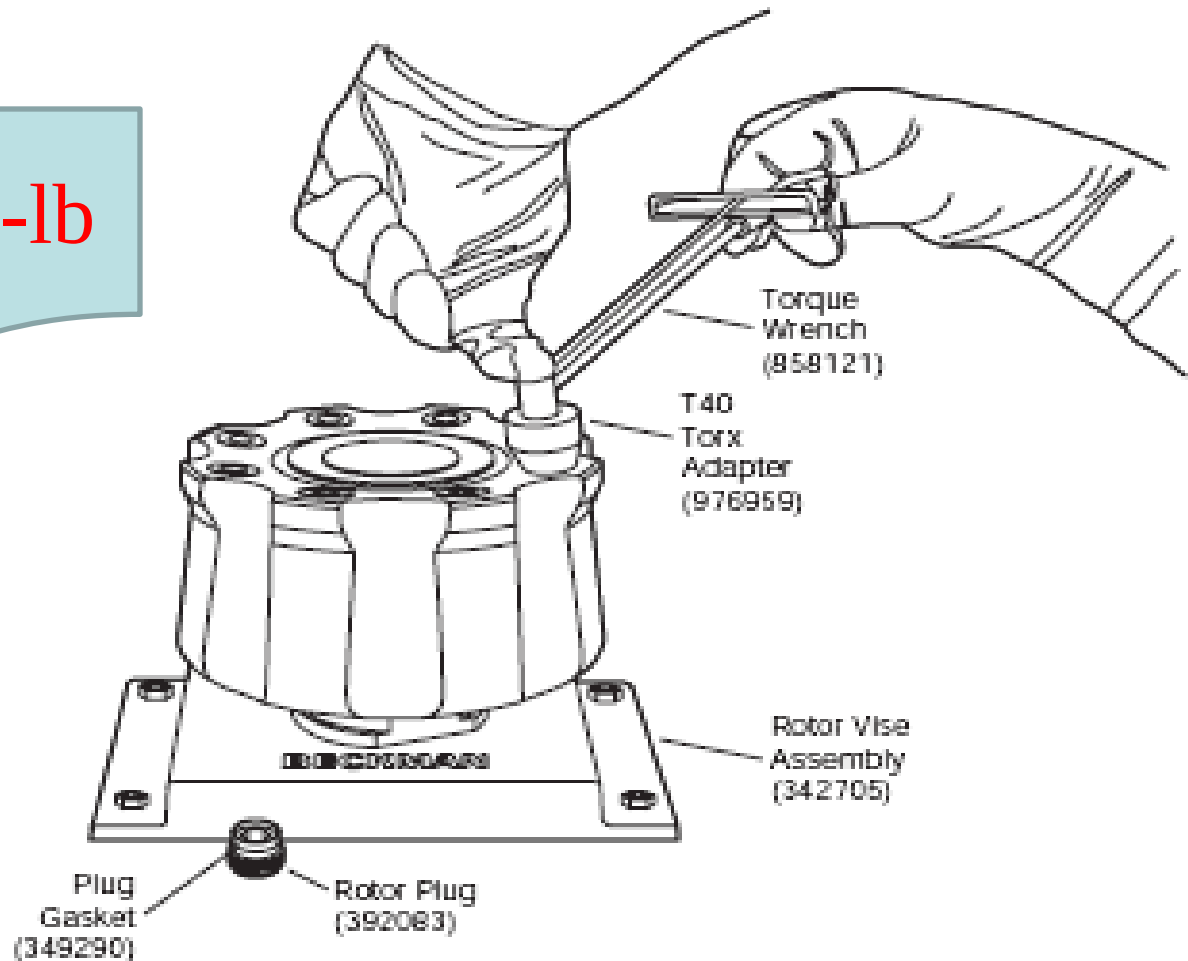
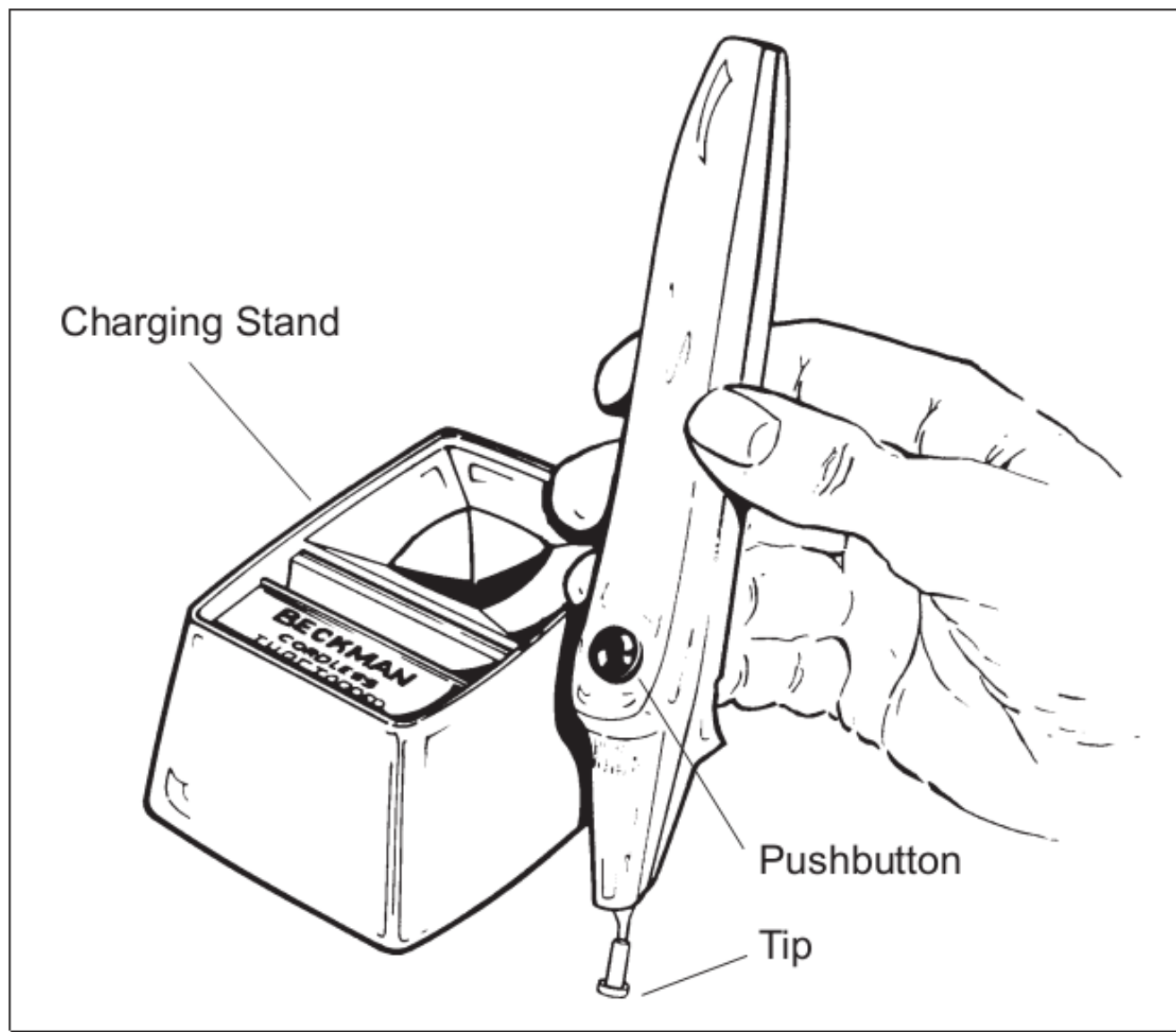


Figure 1. The NVT 65 Rotor and Rotor Vise Assembly

120 in-lb

Rotor	Rotor Plug Part No.	Torque Wrench ^b Part No.	Plug Adapter Part No.	Torque Value
NVT 100	368546	858121	976959	11 N•m (100 in.-lb)
NVT 90	368546	858121	976959	13.6 N•m (120 in.-lb)
VTi 90	368546	858121	976959	13.6 N•m (120 in.-lb)
(VTi 80)	342881	858121	976959	13.6 N•m (120 in.-lb)
NVT 65.2	368546	858121	976959	13.6 N•m (120 in.-lb)
NVT 65	392084	858121	976959	13.6 N•m (120 in.-lb)
VTi 65.2	368546	858121	976959	13.6 N•m (120 in.-lb)
VTi 65.1	392084	858121	976959	13.6 N•m (120 in.-lb)
(VTi 65)	355874	858121	976959	10 to 11 N•m (90 to 100 in.-lb)

Figure 3.2 The Cordless Quick-Seal Tube Topper



封管方式

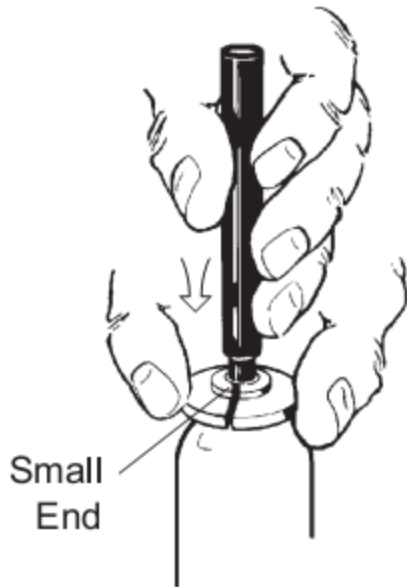
Seal Former



Seal Guide



Heat Sink



Removal Tool

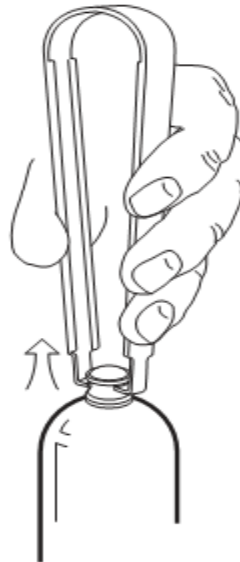
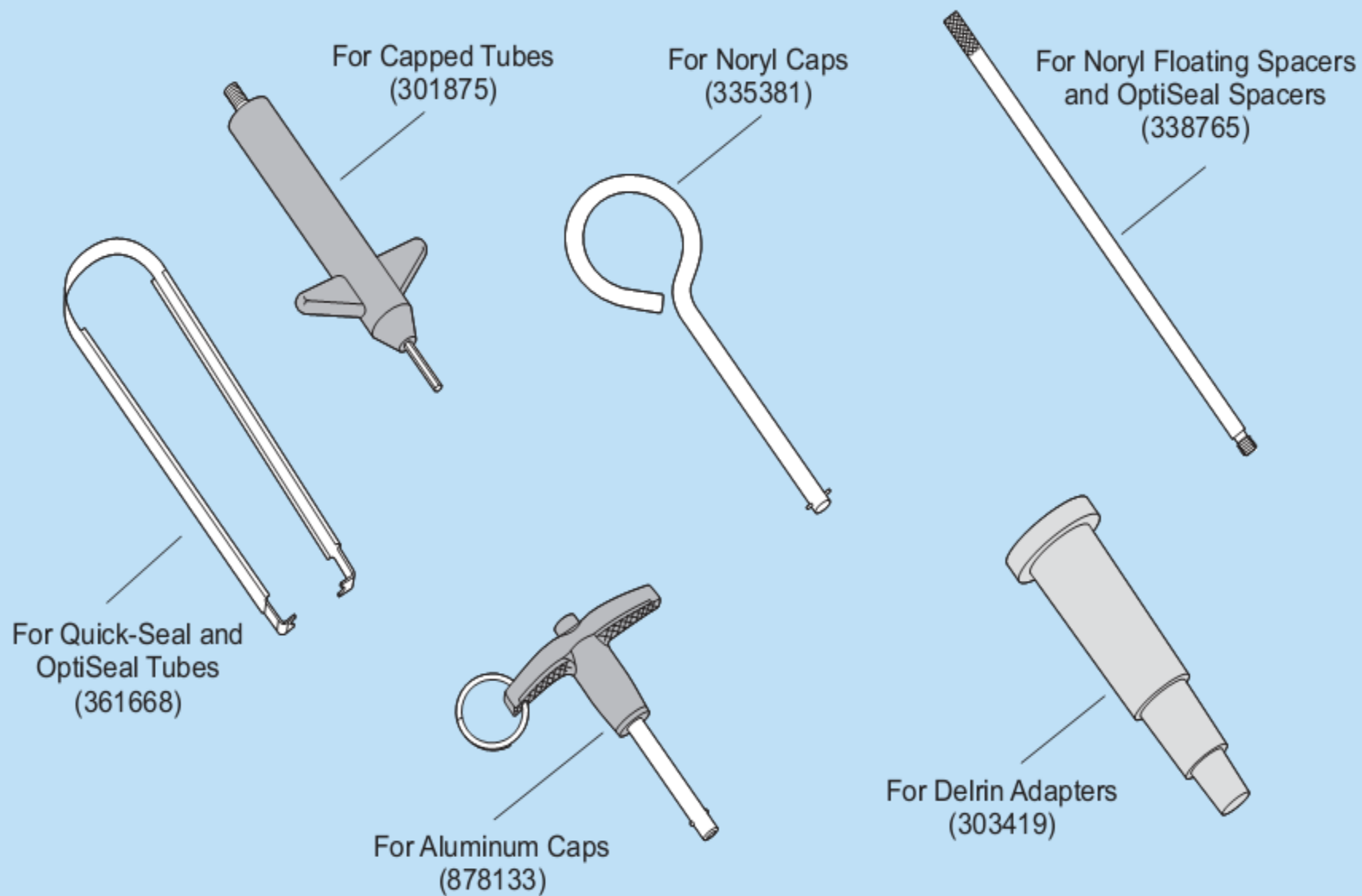
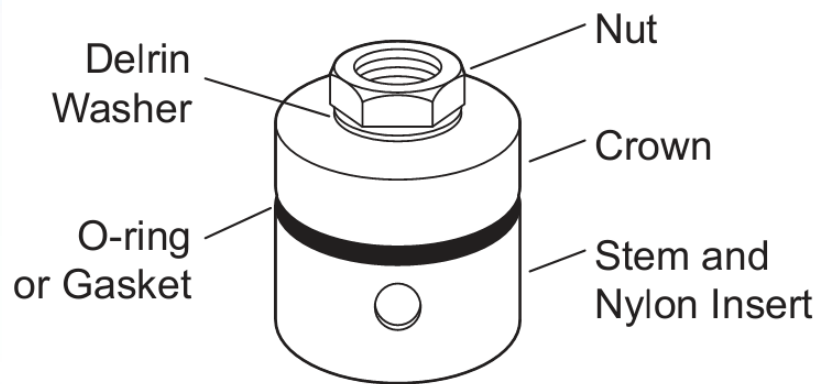


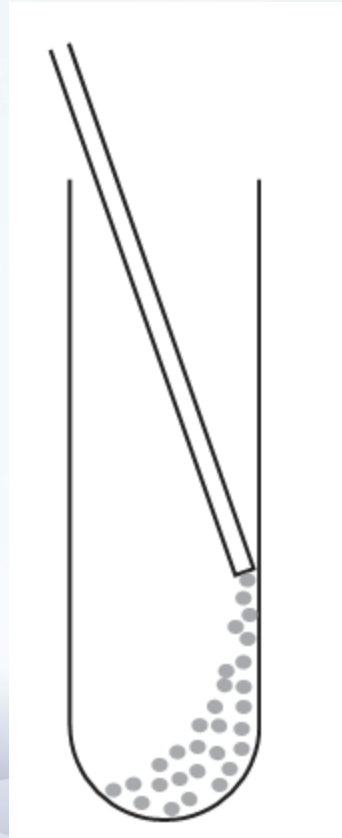
Figure 4.2 Removal Tools Used in Fixed Angle Rotors



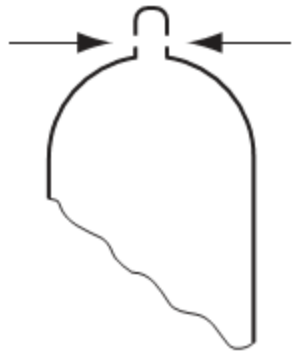


Samples 取樣

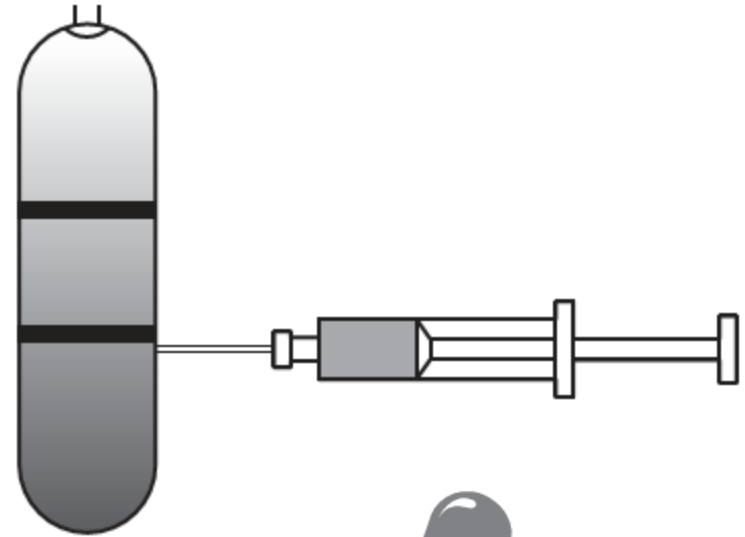
Open Top Tube 樣品取出



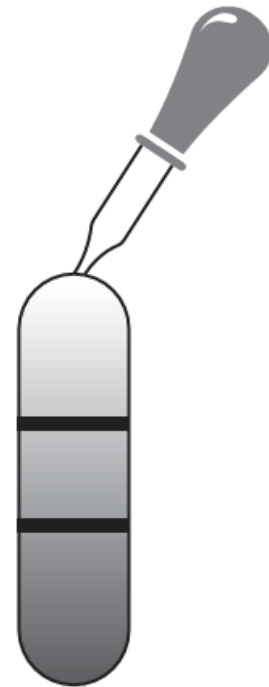
Quick Seal Tube 取出樣品



Cut Quick-Seal stem here to provide an air inlet



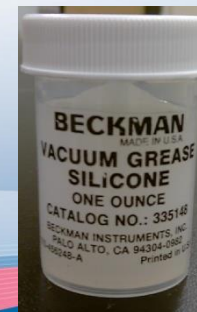
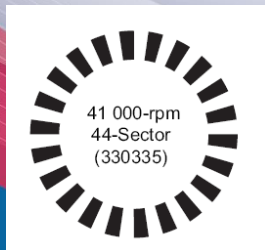
Sample out



基本保養

Maintenance

- 保持離心機槽內清潔
- Rotor 使用後,用軟毛刷與水清洗後倒放晾乾
- Rotor之O-ring需定期清潔和塗抹vacuum grease (請戴手套使用)
- Rotor Lid桿柄之螺紋處需定期清潔和塗抹spinkote lubricant (請戴手套使用)
- Rotor Over-speed Disk需保持清潔，避免刮傷



RPM $\Leftrightarrow$ RCF

$$\text{RCF}_{\text{max}} = 1.12 \, r_{\text{max}} \left(\text{RPM}/1000 \right)^2$$

Rotor & Tubes Info. Search

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Avanti® J-26 XP Rotors

Avanti® J-26 XP Rotors

Rotor Calculations

Run Time Conversion Using k-Factors

Inspection

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Part No	Title	Material	Q-Force	k-Factor	Max Speed	Price	Qty
334831	JA-20 Rotor, Fixed Angle, Aluminum, Biosafety Lid, 8 x 50 mL, 20,000 rpm, 48,400 x g	Anodized Aluminum	48,400 x g	770	20,000 rpm	Available on Quote	Request Quote

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Rotor Calculations

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Customer **FIRST** 2011

RPM&RCF換算

Airfuge® Rotors

Rotor Calculations

Run Time Conversion Using k-Factors

Inspection

Select a Rotor

Type 70 Ti



For a "Custom" Rotor

Selected Rotor Type 70 Ti

* Radius (min) 39.5 mm

* Radius (max) 91.9 mm

* Max. Rotor speed 70000 rpm

To calculate the Unknown quantities, enter the known value and select its "Compute from ..." button.
When entering RPM, RCF or k-Factor values, only numeric and decimal characters are allowed.

RPM 70000

Calculate

RCF (avg) 360562

Calculate

RCF (max) 504347

Calculate

k-Factor 43.7

Calculate

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Technical Documents

Safety Data Sheets (SDS/MSDS)

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Centrifugation

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Rotors

Product

Rotor Assembly FX6100

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