

**IEC CL40 - FL40 Series
User's Manual**



Analyze • Detect • Measure • Control™

**IEC CL40 - FL40 Series
User's Manual**



CL40 - FL40 Series

Carefully read this manual before operating your instrument.

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The validity of the guarantee is subject to the observation of the instructions and precautions described in this document.

MANUAL NUMBER

[illegible]

Packing List

<input type="checkbox"/>	11210922	CL40,	230V 50/60 Hz	<input type="checkbox"/>	11210940	FL40	230V 50/60 Hz
<input type="checkbox"/>	11210923	CL40	120V 60 Hz	<input type="checkbox"/>	11210941	FL40	120V 60 Hz
<input type="checkbox"/>	11210924	CL40	100V 50/60 Hz	<input type="checkbox"/>	11210942	FL40	100V 50/60 Hz
<input type="checkbox"/>	11210926	CL40R	230V 50/60 Hz	<input type="checkbox"/>	11210943	FL40R	230V 50/60 Hz
<input type="checkbox"/>	11210927	CL40R	120V 60 Hz	<input type="checkbox"/>	11210944	FL40R	120V 60 Hz
<input type="checkbox"/>	11210928	CL40R	100V 50 Hz	<input type="checkbox"/>	11210945	FL40R	100V 50 Hz
<input type="checkbox"/>	11210929	CL40R	100V 60 Hz	<input type="checkbox"/>	11210946	FL40R	100V 60 Hz

Item number		Quantity	Check
		Centrifuge	<input type="checkbox"/>
11290088	User manual	1	<input type="checkbox"/>
	CE Declaration of compliance	1	<input type="checkbox"/>
	Manual lid opening instructions	1	<input type="checkbox"/>
	Imbalance protection instructions	1	<input type="checkbox"/>
64227001	Mains cord	1	<input type="checkbox"/>
26227005	Toolbox:		
26339005	• Rotor removal tool	1	<input type="checkbox"/>
85241084	• Emergency unlooking tool	1	<input type="checkbox"/>
86000897	• 12 and 13 mm wrench	1	<input type="checkbox"/>
25055501	• 21 mm wrench	1	<input type="checkbox"/>

For missing parts call your nearest Thermo representative

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Great Britain



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Château-Gontier, 28th June 2005

Managing Director
Christian Galiana



Guarantee Terms

Thermo guarantees that this unit is free from defects in materials and workmanship when it leaves the factory, and will replace or repair the unit if it proves defective in normal use or during service for a period of ONE YEAR from the delivery.

This guarantee is invalid if the unit is incorrectly used, poorly serviced or neglected, mis-used or accidentally damaged.

There is no explicit guarantee other than as stated above.

For further information, assistance or service

United States of America

Tel.: +1 800 522 77 46

Fax: +1 866 984 37 66

Canada or Latin America

Tel.: +1 800 522 77 46

Fax: +1 866 984 37 66

China (Shanghai)

Tel.: +86 21 68 65 45 88

Fax: +86 21 6445 7907, +86 21 6445 7830

India (Mumbai)

Tel.: +91 22 5542 9494

Fax: +91 22 5542 9495

Japan

Tel.: +81 454 53 9220

Fax: +81 454 53 9222

Other Asia-Pacific Countries

Tel.: +852 28 85 46 13

Austria

Tel.: +43 (1) 80 14 00

France

Tel.: +33 1 69 18 77 77

+33 2 28 03 20 00

Belgium

Tel.: +32 24 82 30 30

Germany

Tel.: +49 61 84 90 69 40

Fax: +49 61 03 40 81 012

Finland

Tel.: +35 89 32 91 00

Italy

Tel.: +39 02 95 05 91

Netherlands

Tel.: +31 7 65 71 44 40

Russia/Cis

Tel.: +7 09 52 25 11 15

Spain and Portugal

Tel.: +34 9 32 23 31 54

Switzerland

Tel.: +41 (1) 4 54 12 12

United Kingdom and Ireland

Tel.: +44 87 06 09 92 03

Other Europe, Middle East, or Africa

Tel.: +49 61 8490 6940

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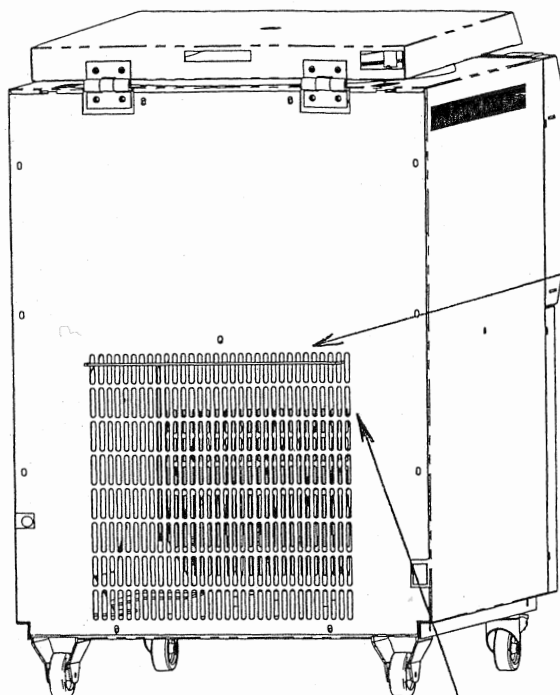
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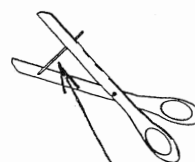
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1° COUPER LA CORDELETTE.
Cut the string.



CORDELETTE
String

2° RETIRER LA CORDELETTE
ET LE CAOUTCHOUC.
*Remove the string and the
Rubber ring.*

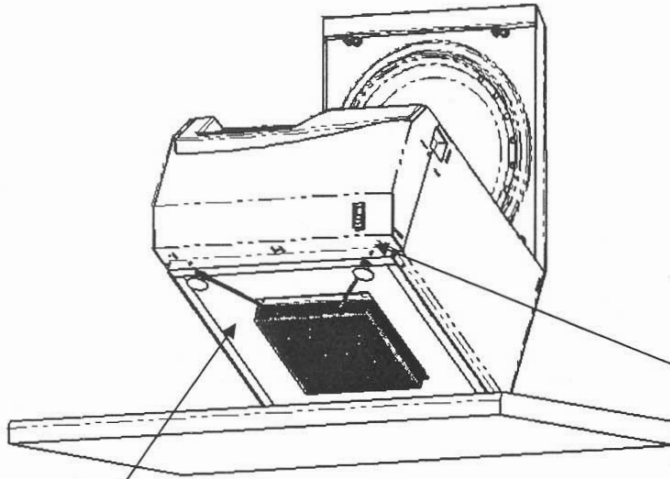
Pour prévenir les risques d'endommagement pendant le transport le système de balourd est immobilisé en usine.

A la réception de l'appareil, couper et retirer la cordelette fixée sur le panneau arrière.

*To prevent damage during transportation, the imbalance system is immobilized in the factory.
At the receipt, cut the string and remove.*

NOTICE de DEBLOCAGE du SYSTEME de BALOURD

Notice to release the imbalance system



1°) LIBERER LA CORDELETTE
en retirant cette vis de la face avant.
*Remove this scrow of front panel
and realese the string.*

2°) REMONTER et BLOQUER la VIS
Rechuck and block the scrow.

3°) RETIRER LA CORDELETTE
ET LE CAOUTCHOUC.
*Remove the string and the
Rubber ring.*

Pour prévenir les risques d'endommagement pendant le transport le système de balourd est immobilisé en usine.

A la réception de l'appareil, retirer la cordelette fixée entre la grille de protection du moteur et la face avant comme montré ci dessus .

*To prevent damage during transportation, the imbalance system is immobilized in the factory.
At the receipt , remove the string placed between the protective grid and the front panel.*

Chapter 1 Use and Function

User Manual

The user manual is part of the centrifuge, and contains important information for your safety and for the best use of the equipment

Always keep the manual close to the appliance and in a safe place, so that it is always available. Thermo strongly recommends that all users read this manual carefully.

Warning Symbols

The following symbols are provided to help the operator take advantage of the protection afforded by the equipment and to warn of potential danger.



On the main switch, allows centrifuge to operate. ▲



On the main switch, disconnects the centrifuge from the main power supply. ▲



Only **authorized personnel** can touch the parts close to this symbol and, in any case, only after switching off the main power supply. **Coming in contact with high voltages could cause severe injuries.** ▲



In this manual, this symbol means that you will find important **information for safety**, which if unobserved could result in damage to the appliance and/or harm to the operator. ▲



In this manual, this symbol means that you will find **important information about minimizing biological risk**: if unobserved the result could be harm to the operator. ▲

Description

The CL40 and FL40 centrifuges are designed for laboratory use.

They will separate the components of fluids into layers of varying density by subjecting them to high forces.

Centrifugal force provided by the centrifuge can also be used to drive solvents and low molecular weight solutes through the membrane of a filtering device. Retained macrosolutes will therefore be found above the membrane.

Relative Centrifugal Force (RCF) generated by a rotor is directly

proportional to its sedimentation useful radius and to the value of its speed squared.

A control system permits the user, through an extremely intuitive control panel, to set and control the speed, the g-force, the temperature (on the thermostated and refrigerated versions) and the run time, as well as to view different messages and warnings.

Refrigeration and Heating Systems

The CL40 and FL40 are ventilated unit. A permanent air circulation reduces the heat level in the bowl.

However the temperature in the bowl can reach 10 °C above the ambient temperature after hours of continuous operation.



The CL40R and FL40R are equipped with a powerful refrigeration system that allows samples to be processed at low temperature. The refrigerant, R134a, is free of CFC (Chloro-Fluoro-Carbons) in accordance with the Montreal Protocol directions for preservation of the ozone layer in the atmosphere.

The actual temperature in the bowl is continuously displayed on the front panel of the centrifuge. Under certain conditions (high speed, long duration runs) the sample temperature can be higher than the bowl temperature on the display. In this case, the user may compensate manually after empirical determination of the temperature differential.

Condensation drain on refrigerated units

The lid should remain closed when the refrigeration system is in use to avoid condensation.



The centrifuge has a rubber hose that allows condensation to be drained from the bowl. The drain hose exits at the back of the machine. Near the drain hose you can find the following label:

To remove condensation, please follow this procedure:

- Switch off the centrifuge and disconnect the power.
- Put a small basin under the hose.
- Unplug the hose.

- Drain the centrifuge bowl.
- Insert the plug back into the hose.

Attention Do not remove the plug from the drain hose during centrifugation. ▲

Drive System

A three phase brushless motor drives the rotating equipment. The rotor is contained in a sealed, armor plated centrifugation chamber.

The brushless motor requires no maintenance. A control system ensures the correct drive speed, which is continuously monitored.

Safety Interlock System

The CL40 and FL40 centrifuge series are equipped with an interlock system that assures two basic safety features:

- The run cannot be started if the lid is not correctly closed.
- The centrifuge lid cannot be opened if the rotor is running.

The centrifuge will not operate until the lid is closed and latched in place.

The lid remains latched until the rotor stops spinning. The lid access lamp indicates when the rotor has stopped: consequently the handle on the right hand side of the centrifuge can be used to open the lid.

If a power failure occurs, access to the samples in the centrifuge is possible via a manual lid opening procedure (see appropriate paragraph). For this operation a special tool (supplied with the centrifuge) is required.



Bypass the interlock system only under emergency conditions as the rotor could still be rotating.

Imbalance Detection System

The CL40 and FL40 centrifuge series are equipped with a load imbalance detector.

In case of excessive imbalance, the load imbalance indicator LED is illuminated and the brake is applied immediately. The rotor will be decelerated to rest in few seconds.

As soon as the motor stops, open the centrifuge and redistribute the samples to produce an equal weight on diametrically opposite sides.

If the message persists, despite your efforts to balance the load, call your Thermo Service representative.

Note Imbalance tolerance depends upon the rotor in use. The centrifuge will tolerate 15 gr. of imbalance with the M4 rotor equipped with standard buckets. Carefully balance the sample load to avoid actuating the imbalance detection system. If the protection has not been removed from the imbalance detection device during installation, the centrifuge will consider this as an imbalance situation and will not operate.

Relative Centrifugal Force

Relative Centrifugal Force (RCF), at the circumference of a rotor and bucket combination, is directly proportional to the speed (r.p.m.) and radius of the rotor. Therefore, a greater r.p.m. and/or a larger radius produces a greater RCF and improved faster separation of substances. The centrifuge control system carries out and displays the results of all calculations related to speed, radius and RCF.

Note : The value introduced for the radius can be adjusted to allow for position within the tube such as at a boundary. Maximum radii are quoted in the specifications tables. Use of improper radius will adjust the speed setting, automatically applying the wrong RCF.

Chapter 2 Specifications

Dimensions and Weight

	CL40	FL40	CL40R	FL40R
Product Dimensions				
Height - lid open (cm / in)	92/ 36.2	134/ 58.8	92/ 36.2	134/ 58.8
Height - lid closed (cm / in)	42/ 16.5	86/ 33.8	42/ 16.5	86/ 33.8
Width (cm / in)	58/ 22.8	58/ 22.8	85/ 33.5	58/ 22.8
Depth (cm / in)	66/ 26.0	66/ 26.0	66/ 26.0	66/ 26.0
Weight unpacked (kg / lb.)	80/176	95/209	106/233	115/253
Packing				
Height (cm / in)	50/ 19.7	99/ 38.9	50/ 19.7	99/ 38.9
Width (cm / in)	70/ 27.6	68/ 26.7	97/ 38.2	68/ 26.7
Depth (cm / in)	67/ 26.4	78/ 30.7	67/ 26.4	78/ 30.7
Weight packed (kg / lb.)	91/201	120/264	116/256	145/319

Centrifugation Specifications

		CL40	FL40	CL40R-FL40R
Max capacity	Swing-out	(4x750 mL) 3000 mL		(4x750 mL) 3000 mL
	Fixed Angle	(8x100 mL)		(8x100 mL)
Max density		1200 kg/m ³		1200 kg/m ³
Max load		3.6 kg		3.6 kg
Max speed	Swing-out (M4)	4000 rpm		4500 rpm
	Swing-out (QG2.5)	5400 rpm		5400 rpm
	Fixed Angle	7800 rpm		8000 rpm
Max RCF	Swing-out (M4)	3810 x g		4822 x g
	Swing-out (QG2.5)	4140 x g		4140 x g
	Fixed Angle	9862 x g		10375 x g
Max noise		< 66 dBA		< 62 dBA

		CL40	FL40	CL40R-FL40R
Microprocessor control		yes		yes
Programs (direct recall)		5		5
Speed set/display	Range	500 - 7800		500 - 8000
	Step	10 rpm at less than 1000 rpm		10 rpm at less than 1000 rpm
		100 rpm at above 1000 rpm		100 rpm at above 1000 rpm
Accuracy		± 20 rpm (display)		± 20 rpm (display)

		CL40	FL40	CL40R-FL40R
RCF set/display	Range	20 - 9900		20 - 10400
	Step	10 x g at less than 1000 x g		10 x g at less than 1000 x g
		100 x g at above 1000 x g		100 x g at above 1000 x g
Accuracy		± 20 x g (display)		± 20 x g (display)
Timer set/display		30 s - 99 min + continuous		30 s - 99 min + continuous
Temperature set/display		-		-9°C to +40°C -9°C to +60°C
Acceleration rates		5		5
Braking rates		5		5
Drive system		direct		direct
Brushless induction motor		yes		yes

Electrical specifications

	CL40	FL40	CL40R-FL40R
Nominal operating voltage 230V	230 V ±10%		230 V ±10%
120V	120 V ±10%		120 V ±10%
Power requirements (maximum)	1200 W		1500 W
Heat output (maximum)	3750 BTU / h		4435 BTU / h

Chapter 3 Installation

Environmental Conditions

General conditions accepted for centrifuge transport and storage are:

- Ambient temperature -20°C to +50°C.
- Relative humidity up to 90%.

General conditions accepted for operating the centrifuge safely are:

- Indoor use.
- Temperature: 5 °C to 40 °C.
- Maximum relative humidity of 85%.
- Maximum altitude: 2000 m
- Installation category: II
- Pollution degree: 2

Unpacking

Due to the weight of the machine, all lifting and transporting must be carried out using proper handling equipment (i.e. fork lift trolley) that complies with current regulations, and by people having undergone the necessary training.



Thermo strongly recommends that all operators comply with the local laws and regulations on safety and health in the workplace.

The machine must be supported from underneath. If it has to be transported without its pallet, for example on a staircase, professional handling assistance is required. ▲

- Unpack the centrifuge, carefully removing any possible accessories and the material supplied for ordinary operations and maintenance.
- Check the contents of the package using the packing list provided above.
- Keep the packaging until the centrifuge has been tested and found fully functional.

Positioning

The machine must be installed in a dust and corrosion free room.



Leave a 30 cm / 12 in. space free on each side of and behind the machine for safety reasons, proper ventilation and maximum cooling performances. ▲

Benchtop Units

Place the centrifuge on a bench top, which must be rigid, horizontal and sufficiently strong to support the centrifuge's weight and small vibrations.

Floor standing units

Place the centrifuge on a horizontal floor.



After proper positioning is defined, LOCK BOTH WHEELS by pushing with the foot on the wheel locks. ▲

Main Supply

Check mains and frequency: they must correspond to the values shown on the instrument identification label.

Cat N°	Content	Voltage	Frequency	Type
Keypad control				
11177560	CL40			
11177563	CL40R			10 A single
11177566	FL40			+ ground
11177569	FL40R			
11177561	CL40			
11177564	CL40R			
11177567	FL40			+ ground
11177570	FL40R			

For your safety, check that mains wiring is effectively grounded. Thermo declines all responsibility for any damages due to non-grounding of the machine. ▲



Remember that in order to respect the electrical safety standards related to protection against indirect contact, the supply of power to the instrument must be via a power socket fitted with a protection device ensuring automatic cut-off in the case of an insulation fault. A supply fitted with a circuit breaker of the correct rating complies with this requirement.

Lid Opening and Rotor Checking

Ensure that the centrifuge has been switched ON. Pull the handle on the centrifuge right side towards the front of the unit : the lid is automatically unlocked and opens.

In the case of a mains power outage, opening of the lid is prevented by the lid lock safety device. It is recommended to wait for the mains power to be switched back on so that this safety device enables the lid to be unlocked (refer to 3.6 for manual lid opening).



Carefully clean the inside of the centrifugation chamber removing any packing residues.

In fact, due to air turbulence, solid particles accidentally left in the centrifugation chamber create excessive wear of the chamber itself and of the outer rotating equipment surface. ▲

To install the rotor:

- Check that the motor shaft and rotor are clean
- Put the rotor on the motor shaft
- Secure the rotor on the shaft by turning the hexagonal nut counter-clockwise (with the supplied tool)
- Verify that the rotor cannot be removed by trying to pull it (gently) off the shaft.
- In case you are using a swing-out rotor:
- Gently grease the trunnions
- Put the buckets on the trunnions after verifying that the weight of the buckets is identical (the weight is engraved on the bottom of each bucket).

Manual Lid Unlocking Procedure

In the event of mains non-availability or power failure, opening of the lid is prevented by the lid locking safety device. It is recommended that the user waits for the mains to be switched back on so that this safety device enables the lid to be unlocked.

Manual lid unlocking must only be done by someone informed of the possible danger and of the necessary precautions.



Rotating parts are a risk as they could come in contact with the user or be ejected. There is particularly high risk of injury if:

- The user attempts to manually stop the rotor

- Any object falls inside the centrifugation chamber while the rotor is running. ▲

Manual lid unlocking may be necessary under a very limited number of conditions, such as the urgent recovery of critical samples that could be damaged if left in the centrifuge rotor.

In this case the lid can be opened by using the special tool supplied with the centrifuge.



Always set the power switch to the OFF position before performing this manual procedure, even in the case of a mains power outage. ▲

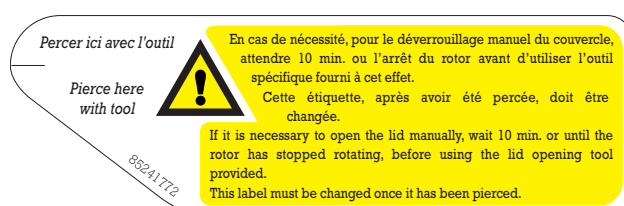
Should the emergency occur due to power failure during centrifugation wait at least 10 minutes for the end of the rotor rotation. In spite of the absence of noise, the rotor could still be rotating when you need to open the lid manually. Upon opening, lift the lid by hand and observe the rotor (be careful in this operation): if it is still rotating, close the lid and wait.



Figure 1. Insert the unlocking tool horizontally into the hole on the right hand side of the instrument.

Figure 2. While pressing up with your finger, to press down with the unlocking tool, pull the lid lever toward you: the lid opens upwards.

The protection sticker must be replaced after it has been pierced (item N° 85241772).



Performance and Accessories

M4 Swing-out Rotor - Cat. N°: 11175338

M4: swing-out rotor 4x750 mL

- 4500 rpm /4822 x g
- For 4-750 mL bottles
- Up to 148-5 mL tubes
- Up to 12 standard microplates
- Certified sealed accessories are available

11174154	Standard buckets (4)	Inserts: see table
	41193190 750 ml bottles (6)	
	85240471 Cushion (4) - for 750 ml bottles	
62813600	Standard buckets (4) PTFE coated	Inserts: see table
	41193190 750 ml bottles (6)	
	85240471 Cushion (4) - for 750 ml bottles	
11174218	Sealed buckets (4)	Inserts: see table
	41193190 750 ml bottles (6)	
	85240471 Cushion (4) - for 750 ml bottles	
	25144058 Spare sealing lid (certified biocontainment)	
	85241381 Spare seal	
62814801	Sealed buckets (4) PTFE coated	Inserts: see table
	41193190 750 ml bottles (6)	
	85240471 Cushion (4) - for 750 ml bottles	
	25144058 Spare sealing lid (certified biocontainment)	
	85241381 Spare seal	
11175372	Bucket - for CORNING 250 ml conical bottles	
11175378	Sealed bucket - for 250 ml conical bottles	
11175385	Sealed bucket with liner - for blood bags	
11175370	Bucket - for Nalgene 500 ml flat	
	11175371 Adapters (4) - for 250 ml conical bottle in 11175370	
	85240513 Adapters (4) - for 2 x 60 ml in 11175370	
11210823	Microplate carriers (4)	
	11174207 Rubber cushion - for flexible microtiter plates	
11174223	Sealed microplate carriers (4)	
	11174207 Rubber cushion - for flexible microtiter plates	
11174203 600 ml	Stainless steel bottles (4)	
	41176423 Lid - for 600 ml bottle	
Cytology accessories (for use with the insert 11174202):		
	11172499 Cytobuckets (2)	
	11203558 Cytobucket slides (50)	
	11203559 Cytobucket foam layers (50)	
	11203561 Tube of silicone	
	11203562 Blotting paper pad	

Inserts Available for the Following Buckets

- 11174154 Standard buckets (4)
- 11174218 Sealed buckets (4)
- 62813600 Standard buckets (4) PTFE coated
- 62814801 Sealed buckets (4) PTFE coated

Cat. N° (set of 4)	Color of insert or type	Insert Capacity	Rotor Capacity	Max Tube Ø [mm]	Max* tube height [mm]	Tube volume [mL]	Max Radius [mm]	CL40-FL40		CL40R-FL40R	
								Max Speed [rpm]	Max RCF [x g]	Max Speed [rpm]	Max RCF [x g]
11174204	Black / light blue	30	120	8.5	40	0.8	165	4000	2952	4500	3736
11174201	Black / light blue	30	120	11.5	40	1.5 / 2	160	4000	2862	4500	3622
11174206	Black / coral	12	48	16.5	40	4 flat	184	4000	3291	4500	4166
11174205	Black / beige	9	36	18	40	4 flat	184	4000	3291	4500	4166
11174216	Black	16	64	17	60	5 flat	173	4000	3095	4500	3917
11174157	Black / grey	37	148	12.5	100	5	172	4000	3077	4500	3894
11174193	Black / grey	decanting	-	12.5	-	5	172	4000	3077	4500	3894
11174158	Black / light blue	30	120	13.5	100	6	172	4000	3077	4500	3894
11174224	Black	19	76	13.5	107	5 / 7 ven	172	4000	3077	4500	3894
11210821	Black	27	108	13.5	107	5 / 7 vac	172	4000	3077	4500	3894
11174160	Black / red	19	76	16.5	107	7 / 10 vac	172	4000	3077	4500	3894
11174219	White	16	64	17	120	5 / 10 flat	180	4000	3220	4500	4075
11174208	Black / orange	12	48	16.5	125	10 flat	184	4000	3291	4500	4166
11174188	Beige	9	36	18	120	10 flat	172	4000	3077	4500	3894
11174161	Brown	7	28	17.7	134	15 vac	185	4000	3309	4500	4188
11177573	Black	12	48	18	122	15 con	188	4000	3363	4500	4256
11174190	Orange	12	48	16.5	125	15	184	4000	3291	4500	4166
11174163	Coral	12	48	22.2	108	20	177	4000	3166	4500	4007
11174532	Black	7	28	25.5	93.5	25 flat	173	4000	3095	4500	3917
11174186	Dark red	7	28	30	115	25 flat	172	4000	3077	4500	3894
11174164	Dark red	7	28	30	115	50	182	4000	3256	4500	4120
11174225	Black	3	12	35.5	120	50	184	4000	3291	4500	4166
11174529	Black	7**	28	30	116	50 con	185	4000	3309	4500	4188
11177572	Black	5	20	30	116	50 con	-	4000	3363	4500	4256
11174199	Light blue	4	16	30	120	50 flat	172	4000	3077	4500	3894
11174165	Dark blue	4	16	35	120	50	185	4000	3309	4500	4188
11174166	Dark green	2	8	45	118	100	185	4000	3309	4500	4188
11174167	Turquoise	1	4	63	134	250 flat	185	4000	3309	4500	4188
11174227	Black	1	4	65	-	300 flat	185	4000	3309	4500	4188
11174192	Navy blue	1	4	80.5	125	450	185	4000	3309	4500	4188
11174202	Black	1	4	-	-	Cytoblock	180	4000	3220	4500	4075
11174203	-	1	4	-	-	600 flat	190	4000	3399	4500	4302
See Corning for adapters		1	4	-	-	500 con	190	4000	3399	4500	4302
81005750	Bottle (set of 6)	1	4	100	133	750	178	4000	3184	4500	4098

Cat. N° (set of 4)	Color of insert or type	Insert Capacity	Rotor Capacity	Max Tube Ø [mm]	Max* tube height [mm]	Tube volume [mL]	CL40-FL40			CL40R-FL40R	
							Max Radius [mm]	Max Speed [rpm]	Max RCF [x g]	Max Speed [rpm]	Max RCF [x g]
11174169	-	1	4	Blood bag (pediatric)	-	-	190	4000	3399	4500	4302
11174223	Carriers	3	12	Microplates (sealed)	-	-	173	4000	3095	4300	3917
11210823	Carriers	4	16	Microplates	-	-	173	4000	3095	4500	3917
11175372	Buckets	1	4	Corning 250 mL	-	250 con	213	4000	3810	4500	4822
11175378	Sealed buckets	1	4	Corning 250 mL	-	250 con	213	4000	3810	4500	4822
11175385	Sealed buckets	1	4	Blood bags	-	-	190	4000	3398	4500	4301
11175370	Buckets	1	4	Nalgene 500 mL	-	500 flat	208	4000	3721	4500	4709

* All holes filled in sealed buckets. Smaller quantities of taller tubes may be accommodated by omitting the outer rings of holes.

** In open buckets only

Inserts Available for the 11175370 Bucket - for Nalgene 500 ml Flat:

Cat. N° (set of 4)	Color of insert or type	Insert Capacity	Rotor Capacity	Max Tube Ø [mm]	Max* tube height [mm]	Tube volume [mL]	CL40-FL40			CL40R-FL40R	
							Max Radius [mm]	Max Speed [rpm]	Max RCF [x g]	Max Speed [rpm]	Max RCF [x g]
11175371	-	1	4	-	-	250 con	208	4000	3721	4500	4709

Biocontainment Accessories



Biological spills outside biological safety cabinets will generate aerosols that can be dispersed in the air throughout the laboratory. This is particularly true when using ventilated centrifuges.

These spills can be very serious if they involve microorganisms or agents that have the potential for transmitting disease by infectious aerosols.

To reduce the risk of inhalation exposure in such an accident, Thermo recommends the use of the sealing lids, available for the M4, rotors, which are certified for biocontainment through worldwide recognized testing procedures performed in recognized external laboratories.

QG2.5 Swing-out Roto
Cat. N°: 11175382

QG2.5: Swing-out rotor
• 5400 rpm / 4140 x g
• 2 x 6 microplates
• 2 x column/filter blocks



Angle Rotors

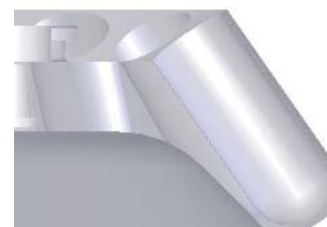
CD 1 angle rotor
• 8x100 mL tubes Ø 44.5 mm
• L min/max 106/115 mm.
• 8000 rpm / 9588 x g
• 35° angle
• round bottom



Cat. No.	Insert capacity	Max tube Ø (mm)	Accessory description
64662300	1	16.5 Set of 8	adaptors for 10 mL vac tubes

CD 2 angle rotor

- 10x50 mL tubes Ø 34mm
- L min/max 97/115mm
- 8000 rpm / 9302 x g
- 35° angle
- round bottom



Cat. No.	Insert capacity	Max tube Ø (mm)	Accessory description
64726601	1	30	Set of 10 isolators
64724502	1	29	Set of 10 adaptors for 50 mL conical tubes
11174535	1	26	Set of 8 adaptors for 38 mL tubes
11174536	1	24	Set of 10 adaptors for 30 mL Corex® tubes
64814700	1	17.5	Set of 10 adaptors for 15-20 mL tubes
64726602	1	16	Set of 10 adaptors for 15 mL vac tubes
11210769	1		Set of 10 adaptors for 15 mL conical

CD 3 angle rotor

- 40x15mL tubes Ø 18.5 mm
- L min/max 93/110mm
- 8000 rpm / 10375 x g
- 35° angle
- round bottom



Glassware

Capacity	Material	Bottom	Type	Standard tube Cat. No.	Graduated tube Cat. No.	Insert Cat. No.	Rotor model
12 ml	Glass	conical	O	41191314	41191315	11174163	
12 ml	Glass	round	C	41191212		11174163	
16 ml	Glass	round	O	41191110	41192111	11174163	
24 ml	PP	round	C	41193113		11174163	
20 ml	Glass	conical	C	41191238		11174165	
27 ml	Glass	conical	O	41191336	41192337	11174151	CD2
40 ml	Glass	round	C	41191232		11174165	CD2
47 ml	Glass	round	O	41191130	41192131	11174165	CD2
58 ml	PP	round	C	41193134		11174165	CD2
66 ml	Glass	conical	C	41191466		11174166	CD1
95 ml	Glass	round	C	41191262		11174166	CD1
104 ml	Glass	round	O	41191160		11174166	CD1
130 ml	PP	round	C	41193164		11174166	CD1
375 ml	Glass	round	O	41191186		11174192	
485 ml	PP	round	C	41193189		11174192	

PP: Polypropylene

O: Open

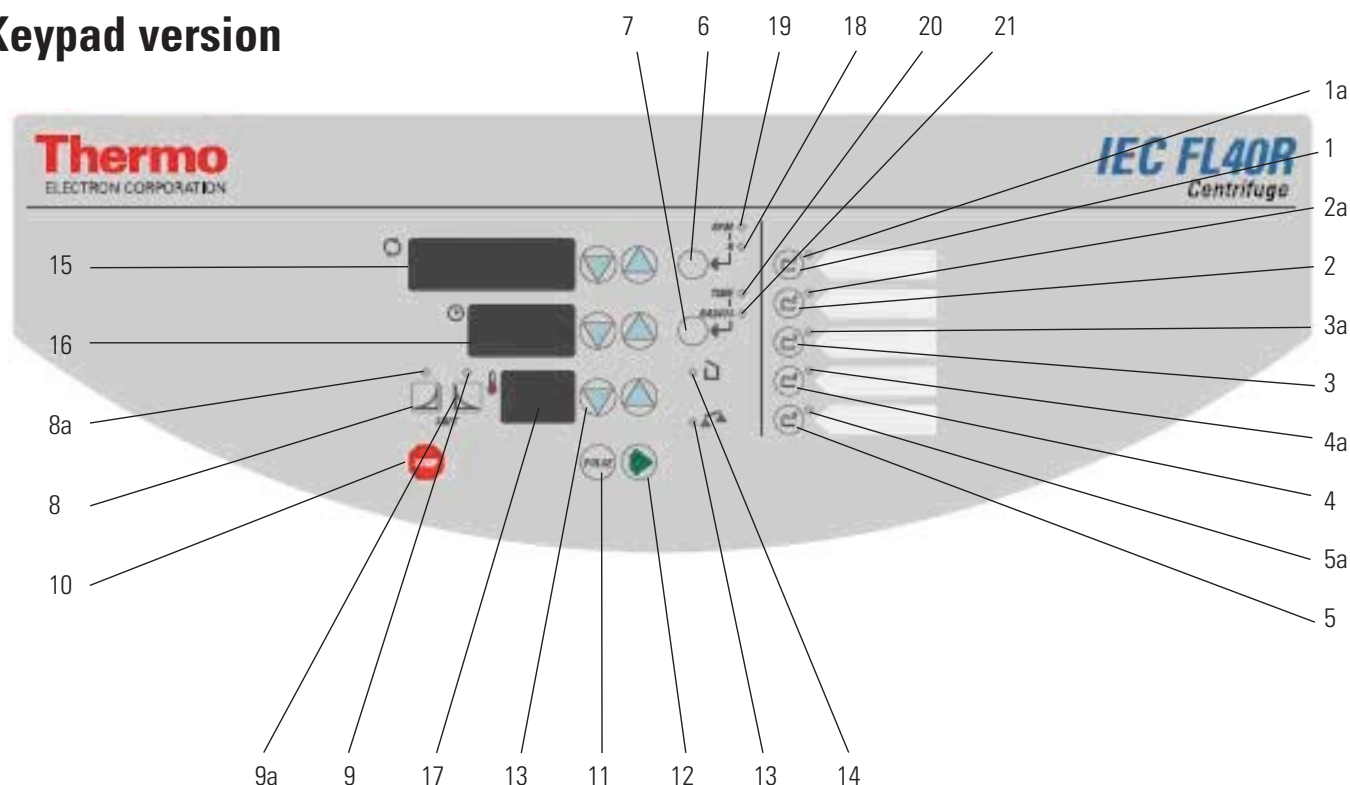
C: Capped

Chapter 4 Instructions for Use

Controls and Indicators

All the controls are located on the front panel. The front panel is an intuitive interface: no previous operational knowledge is necessary; every parameter can be set by pressing the cursor key (or rotating the knob) from the minimum to the maximum and viceversa. All parameters can be accessed and changed both during operation and while the machine is at rest.

Keypad version



Buttons

- 1 - 5 Program Keys
- 6 Speed/RCF Toggle
- 7 Time/Radius Toggle
- 8 Acceleration rate set
- 9 Deceleration rate set
- 10 Stop Run
- 11 Pulse Run
- 12 Start Run
- 13 Temperature set (CL40R, FL40R)

Display Screens

- 15 Upper Screen: speed/RCF
- 16 Middle Screen: time/radius
- 17 Lower Screen: accel./decel. rates/temp. (R mod.) (CL40R, FL40R)

LED Lights

- 1a Program 1 Indicator
- 2a Program 2 Indicator
- 3a Program 3 Indicator
- 4a Program 4 Indicator
- 5a Program 5 Indicator
- 8a Acceleration Indicator
- 9a Deceleration Indicator
- 13 Imbalance Indicator
- 14 Lid Opening allowed Indicator
- 18 Speed Indicator
- 19 RCF Indicator
- 20 Time Indicator
- 21 Radius Input Indicator



Display Screens

Screen	Description
Left screen (15)	This screen displays the set speed (rpm) or RCF (x g) for the given program when the centrifuge is at rest, depending on which parameter is selected. During a run, this screen displays actual speed or RCF.
Middle screen (16)	<p>This screen displays either the set run time or the centrifugal radius when the centrifuge is at rest, depending on which parameter is selected.</p> <p>During a run, this display shows only time remaining (timed runs) or time elapsed (during deceleration, 'hold' runs and 'pulse' runs).</p>
Right screen (17)	This screen displays either the acceleration or the deceleration profile selected for the given program. The value of the acceleration profile is displayed either during acceleration or when the acceleration set button (8) is pressed. The value of the deceleration profile is displayed either during deceleration or when the deceleration set button (9) is pressed.
Right screen (17) on the R units	<p>This screen displays either the acceleration or the deceleration profile selected for the given program. The value of the acceleration profile is displayed either during acceleration or when the acceleration set button (8) is pressed. The value of the deceleration profile is displayed either during deceleration or when the deceleration set button (9) is pressed.</p> <p>In addition, it shows the temperature in the bowl of the centrifuge. When the centrifuge is at rest, the set bowl temperature is displayed (°C). During a run, the actual bowl temperature is displayed (°C).</p>

Control Panel Functions

Function	Keystroke sequence and description
Start cycle	Press the start button (12).
Stop cycle, immediate	Press the stop button (10)
Pulse	Press the pulse button (11) and hold. The centrifuge will accelerate the rotor to the speed setting of the active program. When the button is released, the rotor will be decelerated to rest.
Set speed	When the LED next to 'RPM' (18) is illuminated, the upper display shows speed values. To increase/decrease the speed values, press on the corresponding up/down arrows.
Set RCF	When the LED next to 'G' (19) is illuminated, the upper display shows RCF values. To increase/decrease the RCF values, press on the corresponding up/down arrows. When using RCF as a control/display value, make sure the correct centrifugal radius is entered into the control system (see below). If an incorrect radius value is in the control system, the RCF value displayed will not be accurate.
Set run time	When the LED next to 'TIME' (20) is illuminated, the middle display shows time values. To increase/decrease the run time values, press on the corresponding up/down arrows.
Set centrifugal radius	When the LED next to 'RADIUS' (21) is illuminated, the middle display shows the value of the centrifugal radius in millimeters. To increase/decrease the centrifugal radius, press on the corresponding up/down arrows. This parameter can only be viewed and set while the centrifuge is at rest. It is essential that this value be correct for the RCF control/display function to be accurate. The correct value of the centrifugal radius depends on the combination of rotor/buckets/adapters being used. Set acceleration profile When the button (8) is pressed, the lower display (17) shows the number corresponding to the acceleration profile currently registered (1 to 5 : 5 being the fastest).
	To change the value, press the corresponding up/down arrows.
Set deceleration profile	When the button (9) is pressed, the lower display (17) shows the number corresponding to the deceleration profile currently registered (1 to 5 : 5 being the fastest). To change the value, press the corresponding up/down arrows.
Set temperature (R only)	To increase/decrease the temperature set values, press on the corresponding up/down arrows.
To pre-program the centrifuge	There are five available memory locations for pre-programmed protocols. Each corresponds to one of the five memory buttons (1-5). To enter/save a program into one of the locations, press the memory button corresponding to the desired program position. The corresponding LED (1a-5a) will be illuminated. While the LED is illuminated, enter the desired parameter values. These values are automatically saved in memory.
To lock a program	To lock a program, press and hold the corresponding button for several seconds until the corresponding LED begins to flash. Release the button, and the program is locked. Parameters of the program cannot be changed.
To unlock a program	To unlock a program (when a program is locked, the associated LED flashes), press and hold the corresponding button for several seconds until the associated LED stops flashing. Release the button, and the program is unlocked.

Control Panel Indicators

Indicator	Description
	<p>When the lid interlock indicator LED (14) is illuminated, the lid interlock is not active. The lid can be opened. The indicator will only be illuminated when the rotor is at rest and it is safe to open the lid.</p> <p>When the lid interlock indicator LED is not illuminated, the lid cannot be opened. The rotor is still in motion. This feature is in accordance with international safety standards.</p>
	<p>When the load imbalance indicator LED (13) is illuminated, the centrifuge run has been automatically ended due to excessive load imbalance. The rotor will be decelerated to rest, at which time the lid can be opened and the load can be re-balanced.</p> <p>When the lid is opened this indicator will go off.</p>

Description of Certain Events with Respect to the Control System

Start and acceleration phase

When the start button is pressed, the centrifuge will begin to accelerate the rotor. At this point the run timer will start and the middle display will begin to show remaining run time. The upper display will show either actual speed or actual maximum RCF values, whichever is currently selected. The lower display shows the given acceleration profile, and the LED corresponding to the acceleration button is illuminated.

Set error

During acceleration, the centrifuge automatically detects the rotor type and, therefore, its maximum allowed speed. If the operator sets a speed exceeding this, the centrifuge stops acceleration when the maximum allowed speed is reached, ensuring the operator's safety. The display will blink and an audible alarm will invite the operator to correct the speed setting to a proper value.

During the run

During the run, the upper display will show either actual speed or actual maximum RCF values, whichever is currently selected. The middle display will show either remaining time (timed run) or elapsed time ('hold' and 'pulse' runs).

During a run, the middle display will always show time. The user cannot change the display to show the given 'radius' value during a run.

Most set parameters can be changed during a run when the selected program is not locked. Set speed can be changed by selecting speed as the control parameter for the upper display, then by pushing the up or down arrow, or turning the knob. Set run time can be changed by pressing the up or down arrow corresponding to the middle display. Set deceleration profile can be changed by first selecting the deceleration profile (pushing the 'B' button) and then using the up/down arrows, or turning the knob.

Stop and braking (deceleration) phase

When the stop button is pressed (or when the run timer reaches zero), the centrifuge will begin to decelerate the rotor. At this point the run timer will stop and the middle display will begin to show elapsed braking time. The upper display will show either actual speed or actual maximum RCF values, whichever is currently selected. The lower display shows the given deceleration profile, and the LED corresponding to the acceleration button is illuminated.

End of run

At the end of a run, after the rotor has been decelerated to rest, the centrifuge will produce an audible 'beep' and the middle display will show the word 'End'. Pressing any button or opening the lid will bring the displays back to their normal 'at rest' configuration (display of set parameters).

Error Codes

Error code	Origin	State of the centrifuge	User's action
01, 02, 03	Incorrect speed measurement	Stop without braking. Lid opening impossible till complete stop.	Wait for the centrifuge to stop, try to launch the cycle again. If the problem remains, please contact THERMO service
04	Speed > 0 RPM at power ON.	All controls are disabled till the speed returns to 0 RPM.	Wait for the speed to return to 0 RPM. Press any key to exit the alarm mode.
CLOSE Lid	Lid open.	The centrifuge doesn't start if the lid isn't properly closed.	Close the lid and press "START" again.
06	Lid open in running mode	Stop with braking.	Wait for the centrifuge to stop, close the lid and try to launch the cycle again. If the problem remains, please contact THERMO service
07	Imbalance.	Stop with braking.	Check the correct balancing of the inserts, ensure that the trunnions are regularly lubricated if you use a swing-out rotor. If the problem remains, please contact THERMO service
08	Motor Overtemperature (Bad operating conditions or motor failure)	Stop with braking.	If the centrifuge is operated in good conditions and the problem remains, please contact THERMO service
09	Chamber Overtemperature (Bad operating conditions or cooling unit failure).	Stop with braking.	If the centrifuge is operated in good conditions and the problem remains, please contact THERMO service
10	Electronic malfunction.	All controls disabled.	Reset the device by powering it down.

Preparing the First Run of the Day

Before installation, the rotor should be thoroughly inspected for evidence of corrosion or other damage and for cleanliness.

Chemical and stress corrosion of metallic parts will eventually lead to disruption of the rotor with potential severe damage to the centrifuge.

Particles stuck inside the pockets can cause breakage of tubes and lead to major imbalance and / or loss of sample and contamination.

The central hole of the rotor and the drive spindle should also be clean and undamaged. These parts should be wiped clean before each use.



Carefully check the tightness of the rotor locking nut. Re-tighten if necessary. ▲

The centrifuge also should be observed to verify proper appearance of screws, lid hooks, latches and for evidence of corrosion.



In case of problems contact your Thermo Service representative, because any deviation from the above mentioned advice may have serious consequences for the safety of the appliance and of the operators. ▲



Normal use of the centrifuge could require the manipulation of biohazards. Users and service personnel must have specific training for each substance they use, according to the “Laboratory Biosafety Manual” from the World Health Organization. ▲

Sample Loading

The contents of each rotor pocket including sample, tube, cap and adapter (where used) must be of the same weight as the one diametrically opposite.

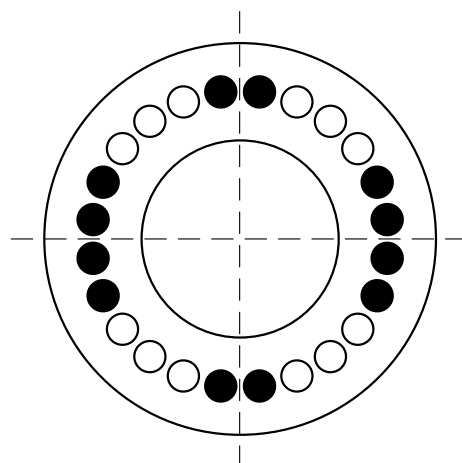


Imbalance of the rotor may cause major damage to the rotor and centrifuge. ▲

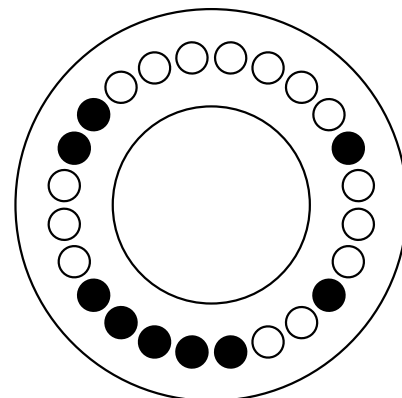
Do not attempt to introduce liquids into rotor pockets or into tubes already in the pockets.

Distribute the load correctly. Loads should be inserted two by two, samples of equal weight, at 180 degrees from the rotation axis and at equal distance (radius) from the center of rotation (see pictures).

When using fixed angle rotor, weight deviation between the tubes must not exceed ± 5 grams.



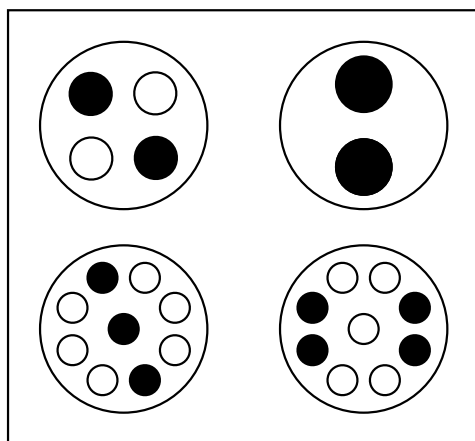
Correct



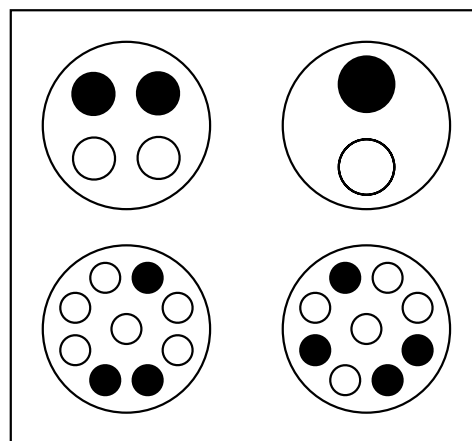
! Incorrect

When using a swing-out rotor, the samples are placed in plastic inserts. The load must be statically and dynamically balanced:

- Static balancing consists of balancing the weight of the 2 inserts which are in opposite locations in the rotor (± 15 to 20 grams).
- Dynamic balancing consists of placing the tubes in each insert symmetrically according to the axis of the trunnions.



Dynamic Balancing : Correct



! Incorrect

If less than the maximum complement of samples is loaded, the tubes must be placed in opposite pockets.

An odd number of tubes requires an additional blank, water-filled tube of identical total weight to balance.

Significant vibrations can damage the accessories, the unit and the samples. Most vibration is caused by incorrect loading of the tubes. For

this reason, the centrifuge is equipped with an imbalance detector.

In case of excessive imbalance, the load imbalance indicator LED is illuminated and the brake is applied immediately. The rotor will be decelerated to rest in few seconds.

As soon as the motor stops, open the centrifuge and redistribute the samples to produce an equal weight on diametrically opposite sides.

Also remember that the pins must be softly lubricated. Inadequate lubrication of the pins may cause incorrect swinging of the buckets resulting in imbalance phenomenon. See chapter 6.6 for details.

If the message persists, despite your efforts to balance the load, call your Thermo Service representative.

Chapter 5 Hazards, Precautions and Limitations of Use

IEC 1010-2-020

This centrifuge conforms to the IEC 1010-2-020 international standard, which specifies particular safety requirements for laboratory centrifuges.

According to the standard warnings, the operator must respect the following precautions:

- Mark a boundary area of 30 cm around the centrifuge.
- No person or hazardous material can stay within this boundary longer than necessary for operational reasons, while the centrifuge is operating.
- An emergency switch for disconnection of the mains, in case of malfunction, has to be available and familiar to all the persons operating the centrifuge. This switch has to be remote from the laboratory centrifuge, preferably outside the room in which the centrifuge is located, or adjacent to the exit from that room.

Cautions



- Moving or shifting the machine during centrifugation is dangerous.
- Using the centrifuge with rotating equipment showing evidence of corrosion and wear marks, manipulating and/or tampering with the electronic and mechanical parts are dangerous operations.
- Never try to bypass the lid lock safety while the rotor is spinning.
- Do not try to open the lid until the display returns to the stand-by mode.
- Only use a correctly grounded power source.
- Use only rotors and accessories designed for use in these centrifuges. ▲

Pay special attention to the following:

- Installation of the unit: proper ventilation, leveling of the centrifuge, rigidity and stability of the support.

- Rotor installation: verify that the rotor is locked in position before use.
- Cleaning of the accessories and of the rotor chamber is particularly necessary when corrosive products are present in the samples (saline, acids, bases).
- Load balancing.

IF ANY DANGEROUS EVENT OCCURS, KEEP YOURSELF FAR AWAY FROM THE INSTRUMENT AND SWITCH OFF THE MAIN POWER SOURCE

Speed Control

A view port located on the lid allows the measurement of the actual speed by a phototachometer.

Once a year, check for correct r.p.m. readout and speed control setting which should be within 100 r.p.m. of the actual.

Operational Limitations

The CL40 and FL40 series of centrifuges and their associated rotors offer a high level of RCF performance. In some cases the maximum possible RCF will exceed the one sustainable by the sample container.

The rotor RCF performance displayed is the maximum available in the rotor pockets. Depending on the sample containers or on other application needs, the maximum RCF which must be used is to be determined by the operator.



The centrifuge is not explosion proof.

Using this centrifuge with explosive samples is entirely at the user's own risk. Do not under any circumstances use the centrifuge in an explosive environment. ▲

Aerosol Risks

Due to the action of the turbulence created in the bowl, a centrifuge is an aerosol generator.

A ventilated centrifuge (like the CL40 or FL40) exhausts, into the room, air which has passed through its bowl. Thus the risk of the spread of aerosols is significant in a ventilated centrifuge.

In the case of samples presenting a biological or chemical risk, the operator must take suitable precautions to prevent or reduce this risk.

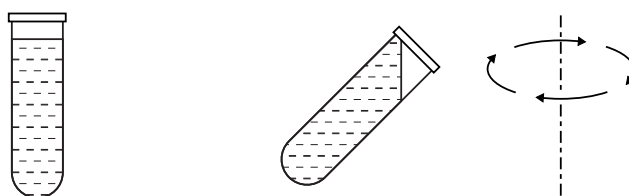


Thermo recommends the use of sealed buckets, available for both the M4, rotors, which are certified for bio-containment through worldwide recognized testing procedures performed in recognized external laboratories. ▲

Aerosols are produced naturally when using uncapped tubes or bottles. They are also produced when a container deforms or breaks provoking a small or large sample leak.

We draw your attention to the use of tubes in angle rotors. Even if the liquid level does not touch the cap when in a static state, it could do so during centrifugation and leak. You should therefore follow the instructions of the tube supplier concerning the fill level and sealing of the tube.

Once a biological risk is known or suspected, samples should be placed in a sealed container. Should such containers not be available, sealed accessories should be used, such as angle rotors with sealed lids.



Duration of aerosol presence

When aerosols are created in a centrifuge bowl, they persist in the air for a period of 3-5 minutes after the rotor stops moving. Indeed, the action of opening the lid itself causes the dispersion of aerosols into the environment.



When an elevated risk of aerosols or of breakage is perceived the accessories should be handled using gloves and opened in an environment ensuring the protection of the operator (safety cabinet, glove chamber, wearing a mask ...), even if they are apparently sealed. ▲

Chapter 6 Service and Maintenance



All cleaning operations should be performed with the centrifuge disconnected from the power outlet. ▲

Periodic Cleaning

Daily

No daily cleaning is required, except in the case of accidental tube breakage, or when there is a large amount of spillage in the bowl.

Weekly

Clean the bowl and the accessories with a cotton wool pad dipped in 70% alcohol.

Never use metallic brushes to clean accessories.



- After cleaning the accessories, rinse them in running water, preferably distilled water.
- Dry the rotor with a soft absorbent non-woven cloth or tissue. Drying may be finished off with a warm air jet (e.g. a hair dryer).
- Make sure that the pockets are well dried.
- Ideally, spray with Anti-Corrosion Spray (Cat N° 11175399)
- Store unused buckets upside down on a non-metallic grid to allow free passage of air.

Contamination Hazards

The centrifuge is likely to be used in medical research where hazardous substances, including radioactive chemicals, are frequently found.



ALWAYS USE THE APPROPRIATE DECONTAMINATION PROCEDURES WHEN THE ROTOR IS EXPOSED TO THESE CHEMICALS. ▲

Examples of commonly used techniques are outlined below. The information is given as a guideline only.

It is the responsibility of the owner to use the most suitable procedure. If decontamination procedures require the use of warming (i.e. autoclave) the rotating equipment should always be completely disassembled before being subjected to heat and after external chemical cleaning.

Seals should be decontaminated with the method most suitable for them.

Disinfection

Alcohol (70% ethanol or isopropanol) applied for 10 minutes is ideal for bacteria and viruses.

Autoclave for 20 minutes at 120°C to destroy micro-organisms.

Polypropylene components are autoclaveable.

Rotor lids must be disassembled from rotor bodies. 'O' rings, autoclaved separately, should be replaced when deformed.

Any part which has been subjected to temperatures above 130 °C must be discarded.

Hypochlorite "bleach" used at 0.1% concentration with 10 minutes immersion is effective against bacteria, spores and viruses but, as an oxidizing agent, is corrosive to metal alloys and must be thoroughly rinsed off of metal parts and the parts dried. It should never be used if there is surface damage to the rotor.

Formalin (37% formaldehyde in water) in contact for 10 minutes has a similar effect to chlorine bleaches.

Rotors should be thoroughly rinsed under running water for 5 minutes to remove all traces of formalin then dried completely.



Formaldehyde is toxic. ▲

Gluteraldehyde 2%, sold under many brand names such as Cidex and Glutarex, requires total immersion for 10 minutes to ensure sterility. Thorough rinsing and drying is essential to protect users.



Gluteraldehyde builds up to a toxic level in the fatty tissues of the body. Phenols are very corrosive and should never be used. ▲

Radioactive Decontamination

We recommend that all radioactive contamination be referred to your Radioactivity Safety Officer.

Rotors may be decontaminated by a mixture of equal volumes of:

- Distilled water,
- SDS diluted to 10%,
- Ethanol diluted to 70%.

The rotor should then be rinsed with ethanol followed by distilled water and then dried completely.

Thermo makes no claims as to the effectiveness of proprietary brands of decontaminating solutions.

Power Supply Circuit Breaker

If the main circuit breaker of the centrifuge cuts off the power to the instrument, do not attempt to switch it on before a Thermo Service representative has checked over the unit.

Rotor Removal

To remove the rotor from the motor shaft:

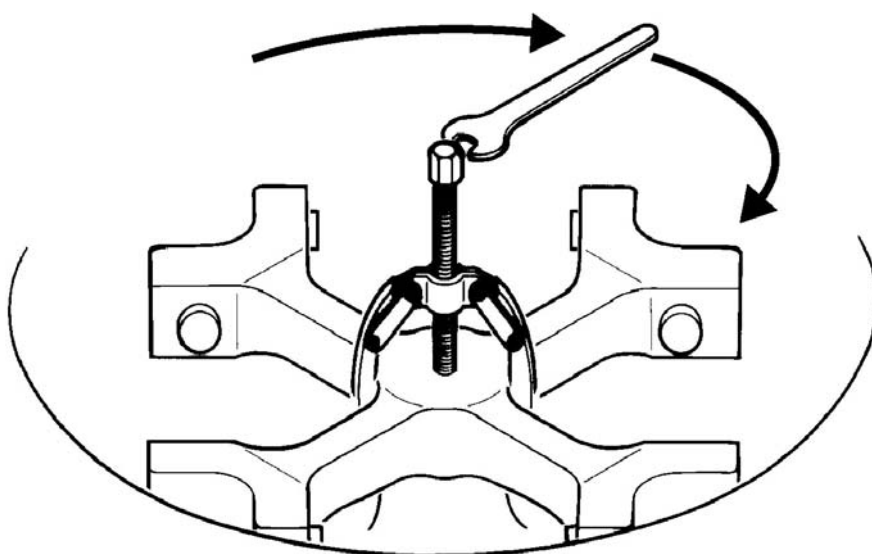
- Using the wrench supplied, remove the rotor lock nut by turning the wrench clockwise.
- Using the puller supplied, position its screw above the motor shaft and position the puller arms to catch beneath the rotor hub.
- With the wrench supplied, tighten the puller screw clockwise against the motor shaft until the rotor loosens.

Trunnion Lubrification

This operation is necessary to allow the buckets to swing freely. Clean the trunnions regularly with a dry wipe (as well as the part of the bucket that rotates on the trunnions). Then, put a very small quantity of grease on the curved face of the trunnion. Do not apply too much grease because it will eventually coat the bowl of the centrifuge as centrifugal force pulls the grease from the trunnions.



If the centrifuge is having imbalance problems, try this operation before calling Thermo service. In many cases, imbalance problems arise due to the fact that poorly maintained bucket-trunnion interfaces prevent the buckets from swinging freely. ▲



Chemical Compatibility Table for Rotors, Tubes and Accessories

S = Satisfactory	AL = Aluminum	BN = Buna N
D = Discoloration but OK	CAB = Cellulose acetate butyrate	CN = Cellulose Nitrate
P = Pure chemical OK	DL = Delrin	KY = Kynar
M = Moderate resistance	NO = Noryl	NY = Nylon
U = Unsatisfactory	PA = Polyallomer (= PPCO)	PC = Polycarbonate
X = Explosion risk !!!	PE = Polyethylene	PP = Polypropylene
O = No information	PPCO = Polypropylene Copolymer	PS = Polysulfone
d = Less resistance if T > 50°C	SS = Stainless steel	TF = Teflon
t = Unsatisfactory if T > 50°C	TZ = Tefzel	TI = Titanium
	VA = Viton A	

Material	AL	BN	CAB	CN	DL	KY	NO	NY	PA	PC	PE	PP	PS	SS	TF	TZ	TI	VA
Chemical	PPCO																	
Acetaldehyde	S	U	U	U	O	O	O	O	M	U	M	M	O	S	S	M	S	U
Acetamide	O	O	O	O	O	O	O	O	S	U	S	S	S	O	O	O	O	O
Acetic Acid (5%)	S	M	S	S	M	S	S	S	S	S	S	D	S	S	S	S	S	M
Acetic Acid (20 %)	S	O	O	O	O	O	O	O	S	M	S	S	S	O	O	O	O	O
Acetic Acid (60%)	S	U	U	U	U	S	S	M	S	U	M	D	S	S	S	S	S	U
Acetic Acid (80 %)	S	O	O	O	O	O	O	O	S	U	St	S	M	O	O	O	O	O
Acetic Acid (Glacial)	S	U	U	U	U	S	O	O	S	U	M	D	M	S	S	S	S	U
Acetic Anhydride	S	O	O	O	O	O	O	O	Sd	U	U	Sd	U	O	O	O	O	O
Acetone	S	U	U	U	M	M	O	U	S	U	S	M	U	S	S	M	S	U
Acetonitrile	O	O	O	O	O	O	O	O	Mt	U	S	Mt	U	O	O	O	O	O
Acetylene	S	O	O	O	O	O	O	O	S	O	S	S	U	O	O	O	O	O
Adipic Acid	O	O	O	O	O	O	O	O	S	S	St	S	S	O	O	O	O	O
Alanine	S	O	O	O	O	O	O	O	S	S	U	S	U	O	O	O	O	O
Allyl Alcohol	O	O	U	O	S	O	O	U	O	S	S	S	O	O	S	S	S	O
Aluminum Chloride	O	O	S	S	O	S	O	S	S	S	S	S	O	U	S	S	S	O
Aluminum Fluoride	O	O	O	O	O	S	O	S	S	U	S	S	O	O	S	O	S	O
Aluminum Hydroxide	S	O	O	O	O	O	O	O	S	Mt	Sd	S	S	O	O	O	O	O
Aluminum Nitrate	M	O	O	O	O	O	O	O	S	O	O	S	O	O	O	O	O	O
Aluminum Sulphate	S	O	O	O	O	O	O	O	Sd	O	S	Sd	O	O	O	O	O	O
Amino Acids	S	O	O	O	O	O	O	O	S	S	S	S	S	O	O	O	O	O
Ammonia	S	O	O	O	O	O	O	O	S	U	S	S	Sd	O	O	O	O	O
Ammonium Acetate	O	O	O	O	O	O	O	O	S	S	S	S	O	O	S	S	S	O
Ammonium Carbonate	S	U	S	S	O	S	O	S	S	U	S	S	S	S	S	S	S	O
Ammonium Chloride	M	O	O	O	O	O	O	O	St	O	St	St	O	O	O	O	O	O
Ammonium Hydroxide (10%)	O	S	U	O	O	O	O	S	D	U	S	D	S	S	S	S	S	S
Ammonium Hydroxide (conc)	O	U	U	O	O	O	O	S	D	U	S	D	O	S	S	S	S	U
Ammonium Oxalate	O	O	O	O	O	O	O	O	Sd	S	S	Sd	S	O	O	O	O	O
Ammonium Phosphate	U	O	O	O	O	O	O	O	S	M	S	S	O	O	O	O	O	O
Ammonium Sulphate	S	S	O	O	U	O	O	S	S	S	S	S	O	S	S	S	S	O
Ammonium Sulphide	O	O	O	O	O	S	O	O	S	U	O	S	O	O	S	O	O	O
n-Amyl Acetate	S	O	O	O	O	O	O	O	Sd	U	Sd	Sd	U	O	O	O	O	O
Amyl Alcohol	S	M	U	O	S	O	O	S	S	S	S	S	O	O	S	S	S	M
Amyl Chloride	S	O	O	O	O	O	O	O	U	U	U	U	U	O	O	O	O	O
Aniline	S	O	O	O	O	S	O	O	U	O	S	M	O	O	S	S	S	O

Material	AL	BN	CAB	CN	DL	KY	NO	NY	PA	PC	PE	PP	PS	SS	TF	TZ	TI	VA
Chemical	PPCO																	
Aqua Regia	U	U	U	O	U	O	O	O	U	U	U	U	O	O	S	S	S	M
Barium Chloride	U	O	O	O	O	O	O	O	S	O	S	S	O	O	O	O	O	O
Barium Hydroxide	U	O	O	O	O	O	O	O	S	O	S	S	O	O	O	O	O	O
Barium Sulphate	S	O	O	O	O	O	O	O	S	O	St	S	O	O	O	O	O	O
Benzaldehyde	S	O	O	O	O	O	O	O	Sd	Mt	S	Sd	M	O	O	O	O	O
Benzene	S	U	P	O	M	O	O	S	U	U	U	U	U	S	S	S	S	S
Benzoic Acid, Sat	St	O	O	O	O	O	O	O	Sd	Sd	S	Sd	M	O	O	O	O	O
Benzyl Acetate	O	O	O	O	O	O	O	O	Sd	Mt	S	Sd	U	O	O	O	O	O
Benzyl Alcohol	S	U	U	O	M	O	O	U	U	U	U	U	O	O	S	S	S	S
Boric Acid	U	O	O	O	O	O	O	O	S	U	Sd	S	U	O	O	O	O	O
Bromine	U	O	O	O	O	O	O	O	U	Mt	U	U	U	O	O	O	O	O
Bromobenzene	U	O	O	O	O	O	O	O	U	U	U	U	U	O	O	O	O	O
Bromoform	U	O	O	O	O	O	O	O	U	U	U	U	U	O	O	O	O	O
Butadiene	S	O	O	O	O	O	O	O	U	U	U	U	U	O	O	O	O	O
Butane	S	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
n-Butanol	S	S	U	O	S	O	O	U	O	M	S	S	M	O	S	S	S	S
n-Butyl Acetate	S	O	O	O	O	O	O	O	S	U	S	S	U	O	O	O	O	O
Butylene	S	O	O	O	O	O	O	O	O	O	S	O	O	O	O	O	O	O
Butyl Chloride	O	O	O	O	O	O	O	O	U	U	U	U	U	O	O	O	O	O
Butyric Acid	S	O	O	O	O	O	O	O	U	Mt	U	U	S	O	O	O	O	O
Caesium Acetate	M	O	O	O	O	O	O	O	S	S	S	S	S	O	S	S	O	O
Caesium Bromide	M	O	O	O	O	O	O	O	S	S	S	S	S	O	S	S	O	O
Caesium Chloride	M	O	S	S	O	O	O	O	S	S	S	S	S	S	S	S	S	O
Caesium Formiate	M	O	O	O	O	O	O	O	S	S	S	S	S	O	S	S	O	O
Caesium Iodide	M	O	O	O	O	O	O	O	S	S	S	S	S	O	S	S	O	O
Caesium Sulphate	M	O	O	O	O	O	O	O	S	S	S	S	S	O	S	S	O	O
Caesium Trifluoroacetate	M	O	M	U	O	O	O	O	S	S	S	S	S	M	S	O	O	O
Calcium Carbonate	U	O	O	O	O	O	O	O	S	O	St	S	O	O	O	O	O	O
Calcium Chloride	M	S	S	O	S	O	O	S	S	M	O	D	S	S	S	O	S	S
Calcium Hypochlorite	M	U	O	O	M	S	O	S	S	M	S	S	S	U	S	O	S	S
Calcium Sulphate	M	O	O	O	O	O	O	O	S	O	St	S	O	O	O	O	O	O
Carbazole	O	O	O	O	O	O	O	O	S	U	S	S	U	O	O	O	O	O
Carbon Sulphide	S	O	O	O	O	O	O	O	U	U	U	U	U	O	O	O	O	O
Carbon Tetrachloride	X	U	S	S	M	S	O	S	U	U	U	U	S	M	S	S	S	S
Cedarwood Essence	O	O	O	O	O	O	O	O	U	St	U	U	M	O	O	O	O	O
Chlorine, dry	M	O	O	O	O	O	O	O	St	Sd	St	St	O	O	O	O	O	O
Chlorine, moist	U	O	O	O	O	O	O	O	Mt	Sd	St	Mt	O	O	O	O	O	O
Chloroacetic Acid	U	O	O	O	O	O	O	O	Sd	Mt	S	Sd	U	O	O	O	O	O
p-Chloroacetophenone	O	O	O	O	O	O	O	O	S	U	S	S	U	O	O	O	O	O
Chlorobenzene	O	O	U	U	O	S	O	O	U	U	U	U	O	O	S	O	S	O
Chloroform	X	U	M	S	M	S	O	U	U	U	U	U	U	S	S	M	S	S
Chlorosulphonic	M	O	O	O	O	O	O	O	M	O	M	M	O	O	O	O	O	O
Chromic Acid (5 %)	U	O	O	O	O	O	O	O	S	M	S	S	U	O	O	O	O	O
Chromic Acid (10%)	M	U	U	U	U	S	S	O	S	M	S	S	U	U	S	S	S	S
Chromic Acid (50%)	U	U	U	S	U	S	O	O	D	U	S	S	U	U	S	S	M	S
Cinnamon Essence	O	O	O	O	O	O	O	O	U	St	U	U	M	O	O	O	O	O
Citric Acid (10%)	S	S	S	O	M	S	S	M	S	S	S	S	S	S	S	S	S	S
Copper Nitrate	U	O	O	O	O	O	O	O	S	O	S	S	O	O	O	O	O	O

Material	AL	BN	CAB	CN	DL	KY	NO	NY	PA	PC	PE	PP	PS	SS	TF	TZ	TI	VA
Chemical	PPCO																	
Copper Sulphate	U	0	0	0	0	0	0	0	S	0	St	S	0	0	0	0	0	0
Croesol	S	0	0	0	0	S	0	U	S	U	S	S	0	0	S	M	S	0
Cyclohexane	S	0	0	0	0	0	0	0	Mt	Sd	Mt	Mt	U	0	0	0	0	0
Cyclohexanol	S	0	U	0	0	0	0	S	S	M	S	S	0	0	S	0	S	0
Cyclohexanone	0	0	0	0	0	0	0	0	Mt	U	U	U	U	U	0	0	0	0
Cyclopentane	0	0	0	0	0	0	0	0	Mt	U	U	U	U	U	0	0	0	0
Decane	0	0	0	0	0	0	0	0	Mt	Mt	Mt	Mt	Sd	0	0	0	0	0
Dextran Sulphate	M	0	0	0	0	0	0	0	S	S	S	S	S	0	S	S	0	0
Diacetone	S	0	U	0	0	0	0	0	S	0	S	S	0	0	S	0	S	0
Diacetone Alcohol	S	0	0	0	0	0	0	0	S	0	S	S	0	0	0	0	0	0
o-Dichlorobenzene	0	0	0	0	0	0	0	0	Mt	U	Mt	Mt	U	0	0	0	0	0
p-Dichlorobenzene	0	0	0	0	0	0	0	0	Mt	U	Mt	Mt	U	0	0	0	0	0
Dichloroethane	0	U	U	U	S	0	S	S	U	U	U	U	0	0	S	S	S	S
Dichlorophenol	0	0	0	0	0	0	0	0	U	U	U	U	U	0	0	0	0	0
Diethylamine	S	0	0	0	0	0	0	0	St	U	U	St	Sd	0	0	0	0	0
Diethyl Benzene	0	0	0	0	0	0	0	0	U	Mt	U	U	U	0	0	0	0	0
Diethylene Glycol	S	S	S	S	S	S	0	U	S	S	S	S	S	0	S	S	S	S
Diethylene Glycol Ethyl Ether	0	0	0	0	0	0	0	0	S	Mt	S	S	M	0	0	0	0	0
Diethyl Ether	S	0	0	0	0	0	0	0	U	U	0	U	0	0	0	0	0	0
Diethyl Ketone	S	0	U	U	M	0	0	U	U	U	M	M	0	0	S	M	S	0
Dimethylacetamide	0	0	0	0	0	0	0	0	S	U	St	S	U	0	0	0	0	0
Dimethylformamide	S	0	0	0	0	0	0	0	S	U	S	S	0	0	S	M	S	0
Dimethylsulphoxide	S	0	0	0	0	0	0	0	S	U	0	S	0	S	S	M	S	0
Dioxane	S	U	U	0	M	S	0	0	M	U	M	M	0	0	S	S	S	U
Diphenyloxide	S	0	0	0	0	0	0	0	U	0	0	U	0	0	0	0	0	0
Dipropylene Glycol	0	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Distilled Water	S	S	S	S	S	0	S	S	S	S	S	S	S	S	S	S	S	S
Ethanol (50%)	S	S	S	S	M	S	S	U	S	M	S	S	S	S	S	S	S	S
Ethanol (95%)	S	S	U	U	M	S	S	U	S	U	S	S	S	S	S	S	S	S
Ethyl Acetate	M	U	U	U	M	S	0	U	M	U	S	U	U	0	S	S	S	U
Ethyl Benzene	0	0	0	0	0	0	0	0	Mt	U	St	Mt	U	0	0	0	0	0
Ethyl Benzoate	0	0	0	0	0	0	0	0	Sd	M	S	Sd	U	0	0	0	0	0
Ethyl Butyrate	0	0	0	0	0	0	0	0	St	U	St	St	U	0	0	0	0	0
Ethyl Chloride	S	0	0	0	0	0	0	0	St	U	St	St	U	0	0	0	0	0
Ethylene Chloride	S	0	0	0	0	0	0	0	St	U	St	St	U	0	0	0	0	0
Ethylene Glycol	S	S	S	S	S	S	0	U	S	S	S	S	S	0	S	S	S	S
Ethylene Oxide	0	0	0	0	0	0	0	0	M	Mt	M	M	S	0	0	0	0	0
Ethyl Ether	S	0	U	U	0	0	0	0	M	U	M	M	0	0	S	M	S	0
Ethyl Lactate	0	0	0	0	0	0	0	0	0	S	St	S	S	M	0	0	0	0
Ethyl Malonate	0	0	0	0	0	0	0	0	0	S	Mt	S	S	M	0	0	0	0
Fatty Acids	S	0	0	0	0	0	0	0	Sd	Sd	Sd	Sd	S	0	0	0	0	0
Ferric Chloride	U	S	0	0	M	S	S	S	S	0	S	S	0	U	S	S	S	S
Ferric Nitrate	M	0	0	0	0	0	0	0	S	0	St	S	M	0	0	0	0	0
Ferric Sulphate	S	0	0	0	0	0	0	0	S	0	S	S	0	0	0	0	0	0
Ficoll Paque	M	0	0	0	0	0	0	0	S	S	S	S	S	0	S	S	0	0
Fluorine	S	0	0	0	0	0	0	0	Mt	Sd	St	Mt	U	0	0	0	0	0
Fluorhydric Acid (10%)	U	U	M	M	U	S	0	S	S	M	S	S	S	U	S	S	U	0
Fluorhydric Acid (50%)	U	U	U	U	U	S	0	0	S	U	S	S	M	U	S	S	U	M

Material	AL	BN	CAB	CN	DL	KY	NO	NY	PA	PC	PE	PP	PS	SS	TF	TZ	TI	VA
Chemical	PPCO																	
Formaldehyde (20%)	S	O	O	O	O	O	O	O	S	Sd	S	S	Sd	O	O	O	O	O
Formaldehyde (40%)	M	M	O	S	O	S	S	S	S	S	S	D	S	S	S	S	S	S
Formaldehyde (50%)	S	O	O	O	O	O	O	O	S	Sd	S	S	Sd	O	O	O	O	O
Formic Acid (100%)	S	M	U	O	U	S	S	U	S	M	S	S	O	U	S	S	S	U
Freon TF	U	O	O	O	O	O	O	O	Sd	Sd	Sd	Sd	Sd	O	O	O	O	O
Fuel Oil	O	O	O	O	O	O	O	O	Sd	Sd	Mt	Sd	Sd	O	O	O	O	O
Glucose	S	O	O	O	O	O	O	O	S	O	S	S	O	O	O	O	O	O
Glutaraldehyde	O	O	O	O	O	O	O	O	Sd	Sd	S	Sd	Sd	O	O	O	O	O
Glycerine	S	O	O	O	O	O	O	O	S	S	S	S	S	O	O	O	O	O
Glycerol	S	O	O	S	O	S	S	O	S	S	S	S	S	S	S	S	S	O
Heptane	S	O	O	O	O	O	O	O	M	O	S	M	O	O	O	O	O	O
Hexane	S	O	O	O	O	O	O	O	S	O	M	S	O	O	O	O	O	O
Hydrazine	O	O	O	O	O	O	O	O	U	U	U	U	U	O	O	O	O	O
Hydrochloric Acid (5%)	U	O	O	O	O	O	O	O	S	S	S	S	S	O	O	O	O	O
Hydrochloric Acid (37 %)	U	O	O	O	O	O	O	O	Sd	U	S	Sd	S	O	O	O	O	O
Hydrochloric Acid (50%)	U	U	U	U	U	S	S	O	M	U	S	M	O	U	S	S	S	M
Hydrochloric Acid (conc.)	U	U	U	O	U	O	O	O	S	U	O	S	O	U	S	S	S	O
Hydrofluoric Acid (10%)	U	U	M	M	U	S	O	S	S	M	S	S	S	U	S	S	U	O
Hydrofluoric Acid (50%)	U	U	U	U	U	S	O	O	S	U	S	S	M	U	S	S	U	M
Hydrogen Peroxide (3%)	S	M	S	S	S	O	S	S	S	S	S	D	S	S	S	S	S	S
Hydrogen Peroxide (100%)	S	U	S	S	U	O	S	O	S	S	S	D	S	S	S	S	U	M
Iodine, Crystals	S	O	O	O	O	O	O	O	Mt	U	U	Mt	U	O	O	O	O	O
Isobutyl Alcohol	O	M	U	O	S	O	O	U	S	S	S	S	O	O	S	S	S	S
Isopropyl Alcohol	U	M	U	U	S	O	S	U	S	M	S	S	M	O	S	S	S	S
Isopropylbenzene	O	O	O	O	O	O	O	O	Mt	U	Mt	Mt	U	O	O	O	O	O
Kerosene	S	O	O	O	O	O	O	O	Sd	S	Mt	Sd	St	O	O	O	O	O
Lactic Acid (20%)	O	S	O	O	O	O	S	O	S	S	S	S	S	S	S	S	S	S
Lactic Acid (100%)	O	S	O	O	O	O	O	O	S	S	S	S	O	S	S	S	S	S
Lead Acetate (aq.)	U	O	O	O	O	O	O	O	S	S	St	S	O	O	O	O	O	O
Lemon Essence	U	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Lime, (conc.)	M	O	O	O	O	O	O	O	S	U	S	S	S	O	O	O	O	O
Magnesium Chloride	M	O	O	O	O	O	O	O	S	S	S	S	S	O	S	S	O	O
Magnesium Hydroxide	U	O	U	O	O	S	S	O	S	U	S	S	O	O	S	O	S	O
Magnesium Nitrate	M	O	O	O	O	O	O	O	S	O	Sd	S	O	O	O	O	O	O
Magnesium Sulphate	S	O	O	O	O	O	O	O	S	O	St	S	O	O	O	O	O	O
Manganese Salts	M	O	S	O	O	O	O	O	S	O	S	S	O	O	S	O	S	O
Mercury	O	O	O	O	O	O	O	O	S	U	S	S	S	O	O	O	O	O
Methanol (100%)	S	S	U	U	M	S	O	U	S	M	S	D	S	S	S	S	S	U
Methyl Acetate	S	O	O	O	O	O	O	O	M	U	M	M	U	O	O	O	O	O
Methyl Alcohol (100%)	S	S	U	U	M	S	O	U	S	M	S	D	S	S	S	S	S	U
Methyl Butyl Ketone	O	O	O	O	O	O	O	O	U	O	O	O	O	O	O	O	O	O
Methyl Ethyl Ketone	S	U	U	U	M	M	O	U	S	U	S	S	U	O	S	M	S	U
Methyl Isobutyl Ketone	St	O	O	O	O	O	O	O	S	U	S	S	U	O	O	O	O	O
Methyl Isopropyl Ketone	O	O	O	O	O	O	O	O	U	U	S	U	U	O	O	O	O	O
Methylene Chloride	X	U	U	U	S	S	O	U	U	U	M	U	U	S	S	S	S	M
Mineral Oil	O	O	O	O	O	O	O	O	Mt	U	Mt	Mt	Mt	O	O	O	O	O
Nickel Chloride	U	O	O	O	O	O	O	O	S	O	St	S	O	O	O	O	O	O
Nickel Salts	M	S	S	O	O	O	O	S	S	S	S	S	O	S	S	S	S	S

Material	AL	BN	CAB	CN	DL	KY	NO	NY	PA	PC	PE	PP	PS	SS	TF	TZ	TI	VA
Chemical	PPCO																	
Nickel Sulphate	U	0	0	0	0	0	0	0	S	S	St	S	0	0	0	0	0	0
Nitric Acid (10%)	M	U	S	S	U	S	S	M	D	S	S	S	S	D	S	S	S	S
Nitric Acid (20%)	U	0	0	0	0	0	0	0	S	Sd	S	S	St	0	0	0	0	0
Nitric Acid (50%)	M	U	M	M	U	S	S	M	D	M	M	M	0	D	S	S	S	S
Nitric Acid (95%)	M	U	U	0	U	0	0	U	M	U	U	M	U	S	S	S	S	S
Nitric Acid (conc.)	St	0	0	0	0	0	0	0	U	U	Mt	U	U	0	0	0	0	0
Nitrobenzene	0	0	0	0	0	0	0	0	U	U	U	U	U	0	0	0	0	0
Octane	0	0	0	0	0	0	0	0	S	Sd	S	S	Sd	0	0	0	0	0
Octyl Alcohol	S	0	0	0	0	0	0	0	0	0	S	0	0	0	0	0	0	0
Oleic Acid	S	U	S	S	S	S	0	S	S	S	S	S	S	S	S	S	S	M
Orange Essence	S	0	0	0	0	0	0	0	Mt	M	Mt	Mt	M	0	0	0	0	0
Oxalic Acid	M	M	S	S	0	S	0	S	S	S	S	S	S	S	S	S	M	S
Oxygenated Water (20%)	S	0	0	0	0	0	0	0	S	S	S	S	S	0	0	0	0	0
Oxygenated Water (50%)	S	0	0	0	0	0	0	0	S	S	S	S	S	0	0	0	0	0
Oxygenated Water (90%)	S	0	0	0	0	0	0	0	S	S	S	S	S	0	0	0	0	0
Ozone	0	0	0	0	0	0	0	0	Sd	Sd	S	Sd	S	0	0	0	0	0
Paraffin	S	0	0	0	0	0	0	0	S	0	S	S	0	0	0	0	0	0
Pentane	S	0	0	0	0	0	0	0	U	0	U	U	0	0	0	0	0	0
Perchlorethylene	S	0	0	0	0	0	0	0	U	U	U	U	U	0	0	0	0	0
Perchloric Acid	X	0	0	0	0	0	0	0	St	U	St	St	U	0	0	0	0	0
Perchloric Acid (10%)	U	0	0	0	U	S	0	0	S	U	M	M	0	U	S	S	S	S
Perchloric Acid (70%)	X	0	0	0	0	0	0	0	M	U	M	M	U	0	S	S	0	0
Petrol	S	0	0	0	0	0	0	0	St	M	St	St	M	0	0	0	0	0
Phenol (5%)	S	U	0	0	U	S	0	U	M	U	S	M	U	S	S	S	U	S
Phenol (50%)	U	0	0	0	0	0	0	0	U	U	U	U	U	0	S	M	0	0
Phenol, crystals	U	0	0	0	0	0	0	0	St	U	St	St	U	0	0	0	0	0
Phenol, liquid	U	0	0	0	0	0	0	0	U	U	U	U	U	0	0	0	0	0
Phenyl Ethyl Alcohol	0	0	U	0	0	0	0	S	S	0	S	S	0	0	S	0	S	0
Phosphoric Acid (10%)	0	M	S	S	U	S	S	0	S	S	S	S	S	S	S	S	0	S
Phosphoric Acid (conc.)	0	U	M	M	U	S	0	0	S	U	S	S	S	M	S	S	M	S
Picric Acid	S	0	0	0	0	0	0	0	U	U	U	U	U	0	0	0	0	0
Pine Oil	0	0	0	0	0	0	0	0	Sd	St	St	Sd	M	0	0	0	0	0
Potash, conc.	U	0	0	0	0	0	0	0	S	U	S	S	S	0	0	0	0	0
Potassium Bromide	U	0	0	0	0	0	0	0	S	S	S	S	0	0	0	0	0	0
Potassium Carbonate	M	0	S	S	0	S	S	S	S	U	S	S	0	S	S	S	S	0
Potassium Chlorate	M	0	S	S	0	S	S	S	S	S	S	S	0	S	S	0	S	0
Potassium Chloride	U	0	0	0	0	0	0	0	S	S	S	S	S	0	S	S	0	0
Potassium Hydroxide (5%)	U	M	S	M	U	0	0	S	S	U	S	S	S	S	S	S	M	S
Potassium Hydroxide (conc.)	U	M	U	U	U	0	0	0	S	U	S	S	0	S	S	S	U	M
Potassium Nitrate	S	0	0	0	0	0	0	0	S	0	S	S	0	0	0	0	0	0
Potassium Permanganate	S	0	0	0	0	0	0	0	S	S	S	S	D	0	S	S	0	0
Propane Gas	S	0	0	0	0	0	0	0	U	St	U	U	M	0	0	0	0	0
Propionic Acid	0	0	0	0	0	0	0	0	Sd	U	M	Sd	S	0	0	0	0	0
Propyl Alcohol	S	0	0	0	0	0	0	0	S	0	St	S	0	0	0	0	0	0
Propylene Glycol	S	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Propylene Oxide	0	0	0	0	0	0	0	0	S	St	S	S	S	0	0	0	0	0
Pyridine	U	0	0	0	0	0	0	0	M	U	S	M	0	0	0	0	0	0
Resorcinol, Sat'd., Sol	0	0	0	0	0	0	0	0	S	Sd	S	S	U	0	0	0	0	0

Material	AL	BN	CAB	CN	DL	KY	NO	NY	PA	PC	PE	PP	PS	SS	TF	TZ	TI	VA
Chemical	PPCO																	
Rubidium Bromide	M	0	0	0	0	0	0	0	S	S	0	S	0	0	0	0	0	0
Saccharose	U	0	0	0	0	0	0	0	S	S	S	S	S	0	0	0	0	0
Salicylic Acid, Sat	0	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Serum	S	0	0	0	0	0	0	0	S	S	S	S	S	0	S	S	0	0
Silver Acetate	0	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Silver Nitrate	U	0	0	0	0	0	0	0	S	S	S	S	S	0	S	S	0	0
Sodium Acetate	S	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Sodium Bisulphate	M	0	S	S	0	S	S	S	S	S	S	S	0	S	S	0	S	0
Sodium Borate	M	0	0	0	0	0	0	0	S	S	Sd	S	0	0	0	0	0	0
Sodium Bromide	U	0	0	0	0	0	0	0	S	S	0	S	0	0	0	0	0	0
Sodium Carbonate (2%)	M	S	S	S	S	S	S	S	S	S	S	D	0	S	S	S	S	S
Sodium Chloride (10%)	S	S	S	S	S	0	0	S	S	S	S	S	S	S	S	S	M	S
Sodium Chloride (Sat'd.)	S	S	0	0	S	0	0	S	S	0	S	S	0	S	S	S	S	S
Sodium Hydroxide (>1%)	U	M	S	S	U	S	0	S	S	U	S	S	S	S	S	S	S	S
Sodium Hydroxide (10%)	U	M	U	U	U	S	0	S	S	U	S	S	S	S	S	S	S	S
Sodium Hydroxide (conc.)	U	M	U	U	U	0	0	0	M	U	S	M	0	S	S	S	M	U
Sodium Hypochlorite (5%)	M	M	S	S	U	S	S	S	D	S	S	S	S	M	S	S	S	S
Sodium Iodide	M	0	0	0	0	0	0	0	S	S	0	S	0	0	0	0	0	0
Sodium Nitrate	S	0	0	0	0	0	0	0	S	0	Sd	S	0	0	0	0	0	0
Sodium Sulfate	S	0	0	0	0	0	0	0	Sd	0	Sd	Sd	0	0	0	0	0	0
Sodium Sulphide	S	S	S	0	0	S	0	S	S	U	S	S	0	S	S	S	M	S
Stearic Acid	S	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Sulphuric Acid (10%)	M	U	S	S	U	S	S	S	S	M	S	S	S	U	S	S	S	S
Sulphuric Acid (20%)	U	0	0	0	0	0	0	0	Sd	Sd	S	Sd	S	0	0	0	0	0
Sulphuric Acid (50%)	U	U	U	U	U	S	S	U	S	S	S	S	S	U	S	S	M	S
Sulphuric Acid (conc.)	U	U	U	U	U	S	0	U	D	U	M	D	U	M	S	S	U	S
Sulphuric Anhydride, dry or moist	S	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Tetrachloroethane	M	0	0	0	0	0	0	0	M	0	0	M	0	0	0	0	0	0
Tetrachlorethylene	0	0	0	0	0	0	0	0	U	0	S	U	0	0	0	0	0	0
Tannic Acid	M	0	0	0	0	0	0	0	S	0	Sd	S	0	0	0	0	0	0
Tartaric Acid	M	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Tetrahydrofuran	S	0	0	0	0	0	0	0	U	U	U	U	U	0	S	S	0	0
Thionyl Chloride	0	0	0	0	0	0	0	0	U	U	U	U	U	0	0	0	0	0
Toluene	S	U	P	S	M	S	0	U	U	U	U	U	U	S	S	S	M	M
Trichlorethylene	S	U	0	0	0	S	0	U	U	U	U	U	U	U	S	S	M	S
Trichloroacetic Acid	U	0	0	0	0	0	0	0	Mt	Mt	Mt	Mt	S	0	0	0	0	0
1,2,4 - Trichlorobenzen	0	0	0	0	0	0	0	0	U	U	U	U	U	0	0	0	0	0
Trichloroethane	S	U	S	0	M	S	0	S	U	U	U	U	M	0	S	S	S	S
Triethylamine	0	0	0	0	0	0	0	0	U	0	0	U	0	0	0	0	0	0
Triethylene Glycol	0	0	0	0	0	0	0	0	S	Sd	S	S	S	0	0	0	0	0
Tris Buffer (neutral)	S	0	0	0	0	0	0	0	S	S	S	S	S	0	S	S	0	0
Trisodium Phosphate	0	0	S	0	M	0	0	S	S	0	S	S	0	0	S	S	S	S
Triton X-100	S	0	0	0	0	0	0	0	S	S	S	S	S	0	S	M	0	0
Turpentine	S	0	0	0	0	0	0	0	Sd	Mt	St	Sd	U	0	0	0	0	0
Undecyl Alcohol	0	0	0	0	0	0	0	0	Sd	Sd	St	Sd	M	0	0	0	0	0
Urea	M	0	S	S	S	0	0	S	S	S	S	S	S	S	S	S	S	0
Urine	0	0	S	0	S	0	0	S	S	S	S	S	0	0	S	S	S	0
Vinylidene chloride	0	0	0	0	0	0	0	0	U	U	U	U	U	0	0	0	0	0

Chemical	Material	PPCO																	
		AL	BN	CAB	CN	DL	KY	NO	NY	PA	PC	PE	PP	PS	SS	TF	TZ	TI	VA
Xylene		S	U	P	O	M	S	O	U	U	U	U	U	U	S	S	S	S	S
Zinc Chloride		M	S	S	O	O	O	O	S	S	S	S	S	S	M	S	S	S	S
Zinc Hydrosulphite		U	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
Zinc Sulphate		U	O	O	O	O	O	O	O	Sd	O	S	Sd	O	O	O	O	O	O

* This table is intended as a guide only because of the difficulty in quantifying, cross-checking and monitoring the results under different conditions of temperature, pressure and purity relating to the solvents and samples dissolved therein. It is strongly recommended that you carry out your own trials, particularly before protracted work periods.

Chapter 7 Disposal of Product

The following disposal recommendations are valid for the machine (or its accessories) at the end of its useful life, or the parts that be disposed f because they are worn out or degraded during use.

Prior to disposal, the machine and accessories must be decontaminated. In this respect the user is required to submit the enclosed decontamination certificate, completed and signed, to the company or persons who are in charge of disposal.

The elements of the product that may become noxious during the life of the product are the folowing:

- Electric batteries and accumulators situated in the front panel of the machine among the other electrical and electronic componenets,
- Oil in the compressor of the refrigeration systems,
- Refrigerant

Disposal of these elements must be in accordance with applicable regulations and recommendations defined by the relevant regulatory bodies. In additions, these elements must be disposed of differently based on the different noxious substances they contain (possibly by a specialized disposal company).

Certificate of Decontamination and Cleaning



Read carefully the instructions below before sending an instrument, or parts of it, to Thermo Service Dept. or to any Authorized Technical Assistance Service. ▲

Mr / Mrs (name) Establishment

Department

Address Post / Zip code

City State / Country

Declares the cleaning and decontamination of the following:

Product type Serial N°

Rotor Serial N°

Rotor Serial N°

Accessory - Description Serial N°

Accessory - Description Serial N°

Nature of contamination

.....
.....

Decontamination Procedure used

.....
.....

Decontamination certified by:

Mr / Mrs Institution

Date Signature

When an instrument, or parts of it, requires servicing by Thermo personnel, the following procedure must be accomplished to ensure personnel safety:

- Clean the instrument and proceed to its decontamination from any kind of dangerous products.
- Compile this Decontamination Certificate with all the information required.

- Attach this Certificate to the instrument (or part) before sending it to Thermo Service or other authorized technical service.

Thermo personnel will not accept to work on instruments deprived of this Decontamination Certificate.

If an instrument is received at our Service facilities and, in our opinion, is a radioactive or biological hazard, the item will be refused and resent to the Customer. Disposition costs will be borne by the sender.

Instructions for decontamination and cleaning are explained in the User Manual. Additional certificates are available from your local technical or Customer Service representative. In the event these certificates are not available, a written statement certifying that the instrument or part has been properly decontaminated and outlining the procedures used will be acceptable.

For your convenience, use a copy of this page

