

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

INTRODUCTION

The purpose of this document is to:

1. Provide information on the shipper packing configurations used by the Blood Service to transport blood and blood products and actions you should take on receipt of a shipper from the Blood Service.
2. Provide instructions to non Blood Service institutions who use the Blood Service shippers for their own purpose either internally or externally.

Disclaimer

This document shows the packing configurations used by Blood Service staff when packing Blood Service shippers for transporting blood and blood products to Approved Health Providers. While the Blood Service considers that these procedures are appropriate for its own purposes, the Blood Service does not acknowledge or have control of the particular circumstances of end users.

Your attention is drawn to the following;

1. *End users must consider the transport requirements of Blood and Blood Products, the transport mechanism and environmental aspects in determining the appropriate packing configurations*
2. *End users should note that the Blood Service strongly recommends the use of temperature recording data loggers for transportation over long distances and/or where extended transit times may be experienced, as the shippers are only validated for the transport of blood or blood products over distances or timeframes according to Blood Service specifications contained herein.*

The Blood Service cannot accept responsibility for the viability of blood and blood products transported in a Blood Service shipper that was not packed by Blood Service staff.

Receipt of Shipper

The Blood Service National Shipper Configurations ensure that blood and blood products remain within the required temperature specification during transportation. There are several packing options, the use of which will depend on:

- The component type
- The ambient temperature
- The numbers of components

The Blood Service will use one of the configurations below. **Please ensure that all shipments received meet the criteria. If any shipper does not meet the criteria, take a manual surface temperature of the contents (place a thermometer between two units and leave for 2-5 minutes to allow the temperature to stabilise), quarantine the units and contact Blood Service I&D as soon as possible.**

Plastic liner bags or foil pouches will be used to line the shippers; they will be sealed with tamper-evident labels. If it appears that the shipper or bag has been tampered with, quarantine the units and contact Blood Service Inventory & Distribution as soon as possible.

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Preparation of Shippers

Always check that the shippers are clean, inside and out, before use. Where there are any visible signs of damage or contamination with blood residue, the packing material is to be discarded. Deface and/or remove all old labels on the outer carton prior to discard.

Material Required for Shipper Use

- Single insulated shipper (with foam inserts)
- Room temperature coolant packs (conditioned at +20 to +24 °C for 24hrs prior to use)
- Chilled coolant packs (conditioned at +2 to +6 °C for 24hrs prior to use)
- Frozen coolant packs (conditioned at approximately -19 °C for 24hrs prior to use)
- Plastic liner bag
- Foil pouch
- Tamper evident labels
- Cardboard dividers with holes
- Data Loggers

See Annex A for Supplier details

Storage of Coolant Material

Table 1 below describes the storage and pre-conditioning times for coolant packs.

Table 1		
Store coolant packs under the relevant conditions for a minimum of 24 hours as described below.		
Type:	Temperature:	Configurations used for:
Room Temperature	+20 °C to +24 °C	P1, P2
Chilled	Approximately +4 °C	R1, R2, R3, R4
Frozen-19 °C	Approximately -19 °C (domestic freezer)	R1, R4
Frozen -40 °C	Approximately -40 °C	F2
<p>NOTE: Where these coolants are referenced in this procedure, it must be noted that all coolants used are preconditioned to the above temperatures for a minimum of 24hrs.</p> <p>Failure to condition coolant packs appropriately may adversely affect internal shipper temperature.</p>		

Ambient Temperature Range

All configurations contained herein were validated using an external ambient temperature range of 4°C to 42°C

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

RED CELLS

Red cell components should be transported using one of **Packing Configurations R1, R2, R3 or R4**, the choice of which will depend on the anticipated transport time. If the transport time is estimated to approach or exceed the validated time, shown below, or if product is transported by independent courier e.g. bus or aircraft, a data logger must be included.

Configurations R1 to R4 are designed to maintain the components within a temperature range of 2°C to 10°C as recommended in the Council of Europe “Guide to the Preparation, Use and Quality Assurance of Blood Components”, 14th edition.

Table 2 lists the packing configurations and the validated transport time

Table 2		
Packing Configuration	Max No. of Components per Shipper	Validated Transport Time [#]
R1	8 red cell units (or equivalent using ballast)	2hr:40min
R2	12 red cell units (or equivalent using ballast)	2hr:45min
R3	Must be filled to 14 red cell units (or equivalent using ballast)	4hr:55min
R4	Must be filled to 10 red cell units (or equivalent using ballast)	7hr:26min

[#]If anticipated transport time exceeds the maximum transport time a data logger must be placed in the shipper within the components.

All configurations require a minimum number of units.


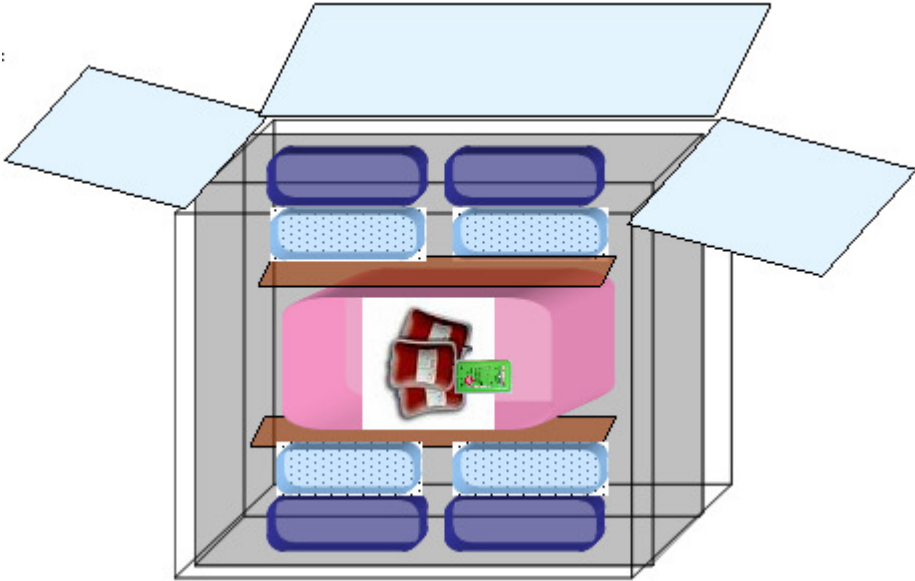

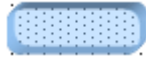






Where fewer red cell units are to be packed, **chilled coolant packs (approximately +4°C) must** be added as ballast. The minimum number of packs and ballast must not be less than the minimum required number of packs for the particular packing configuration.

These ballast packs should be placed outside the plastic liner to prevent contamination of the red cells should the coolant packs leak.

The packing diagrams below contain tables showing the correct number of ballast packs to use.


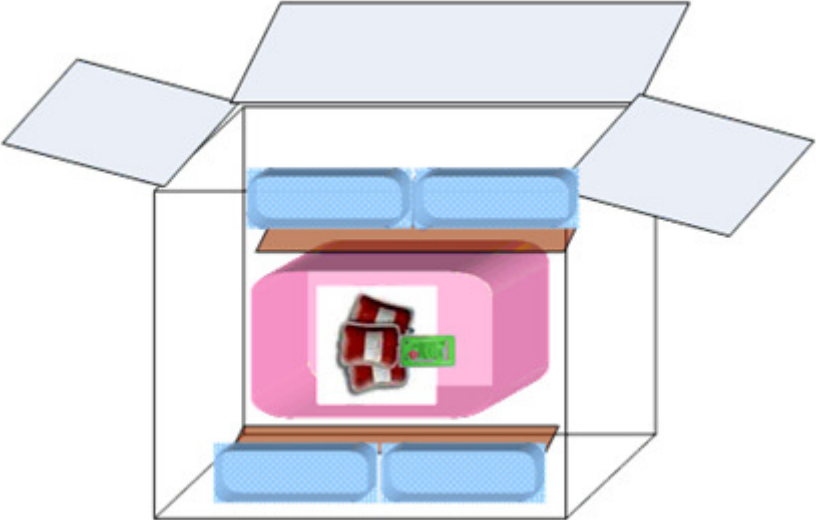





Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Red Cell Configuration R1

R1	No Components per shipper	Validated Transport Time#	Legend	Name	Quantity	Note										
	4 to 8 red cell units (if <4 use ballast)	2hr:40min		Foil pouch	1	Used to line box and contains all other items										
		Frozen -19°C	2	Bubble wrap to face down												
		Chilled coolants	2	Bubble wrap to face down												
		Cardboard divider	1	Used to stop contact with coolants												
		Chilled coolants as ballast (as per table to right →) Place ballast outside the plastic liner bag	<table border="1"> <thead> <tr> <th>Number of Red Cell Units</th> <th>Number of Ballast Packs</th> </tr> </thead> <tbody> <tr> <td>4 to 8</td> <td>0</td> </tr> <tr> <td>3</td> <td>1</td> </tr> <tr> <td>2</td> <td>2</td> </tr> <tr> <td>1</td> <td>3</td> </tr> <tr> <td>1 to 3 paediatric units</td> <td>4</td> </tr> </tbody> </table>		Number of Red Cell Units	Number of Ballast Packs	4 to 8	0	3	1	2	2	1	3	1 to 3 paediatric units	4
	Number of Red Cell Units	Number of Ballast Packs														
	4 to 8	0														
	3	1														
	2	2														
	1	3														
	1 to 3 paediatric units	4														
	Plastic liner bag	1	Used to contain red cells and logger if added													
	Cardboard divider	1	Used to stop contact with coolants													
	Chilled coolants	2	Bubble wrap to face up													
	Frozen -19°C	2	Bubble wrap to face up													
Notes:	# If anticipated transport time exceeds the maximum transport time a data logger must be placed in with the shipment.															


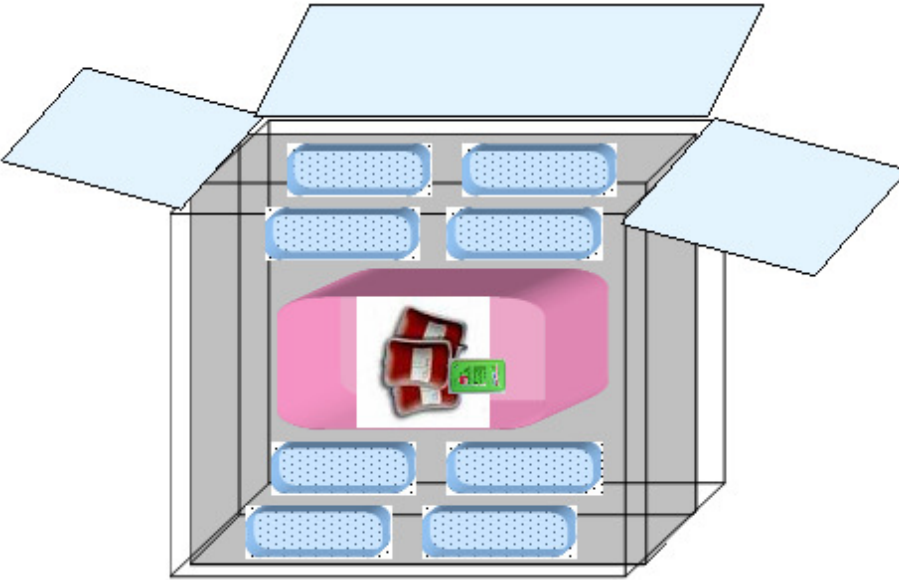
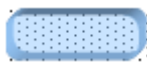
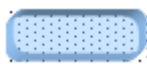

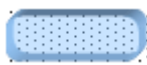
Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Red Cell Configuration R2

R2	No. of Components per Shipper	Validated Transport Time#	Legend	Name	Quantity	Note						
	1 to 12 red cell units	2hr:45min		Chilled coolants	2	Bubble wrap to face down						
				Cardboard divider	1	Used to stop contact with coolants						
				Chilled coolants as ballast (as per table to right →) Place ballast outside the plastic liner bag	<table border="1"> <thead> <tr> <th>Number of Red Cell Units</th> <th>Number of Ballast Packs</th> </tr> </thead> <tbody> <tr> <td>1 to 12</td> <td>0</td> </tr> <tr> <td>1 to 3 paediatric units</td> <td>4</td> </tr> </tbody> </table>	Number of Red Cell Units	Number of Ballast Packs	1 to 12	0	1 to 3 paediatric units	4	
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1 to 3 paediatric units	4											
				Plastic liner bag	1	Used to contain red cells and logger if added						
				Cardboard divider	1	Used to stop contact with coolants						
Notes:	# If anticipated transport time exceeds the maximum transport time a data logger must be placed in with the shipment.			Chilled coolants	2	Bubble wrap to face up						


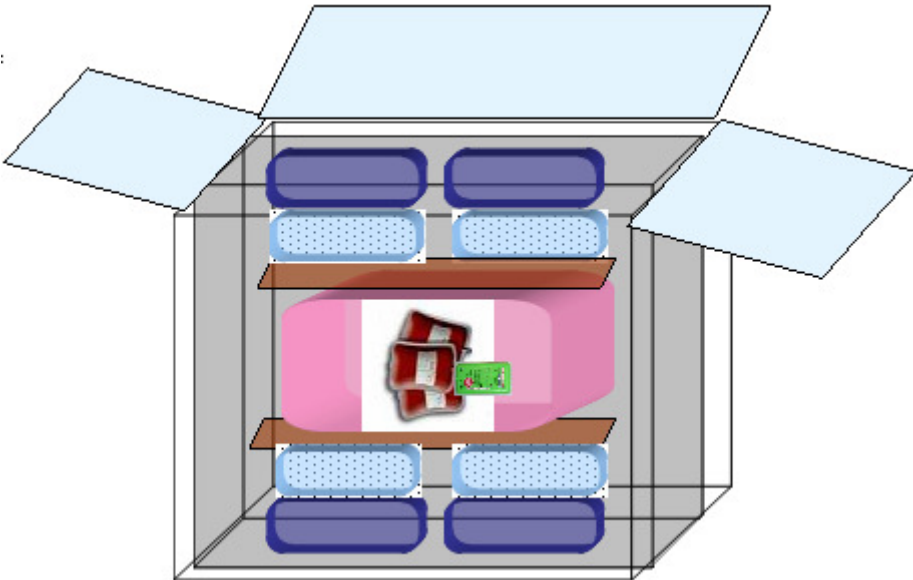








Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Red Cell Configuration R3

R3	No. of Components per Shipper	Validated Transport Time [#]	Legend	Name	Quantity	Note																		
	Up to 14 red cell units using ballast	4hr:55min		Foil pouch	1	Used to line box and contains all other items																		
		Chilled coolants	4	Bubble wrap to face down																				
		Chilled coolants as ballast (as per table to right →) Place ballast outside the plastic liner bag	<table border="1"> <thead> <tr> <th>Number of Red Cell Units</th> <th>Number of Ballast Packs</th> </tr> </thead> <tbody> <tr> <td>12, 13 or 14</td> <td>0</td> </tr> <tr> <td>10 or 11</td> <td>1</td> </tr> <tr> <td>8 or 9</td> <td>2</td> </tr> <tr> <td>6 or 7</td> <td>3</td> </tr> <tr> <td>4 or 5</td> <td>5</td> </tr> <tr> <td>3</td> <td>6</td> </tr> <tr> <td>2</td> <td>7</td> </tr> <tr> <td>1</td> <td>8</td> </tr> <tr> <td>1 to 3 paediatric units</td> <td>4</td> </tr> </tbody> </table>		Number of Red Cell Units	Number of Ballast Packs	12, 13 or 14	0	10 or 11	1	8 or 9	2	6 or 7	3	4 or 5	5	3	6	2	7	1	8	1 to 3 paediatric units	4
	Number of Red Cell Units	Number of Ballast Packs																						
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6 or 7	3																							
4 or 5	5																							
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1 to 3 paediatric units	4																							
	Plastic liner bag	1	Used to contain red cells and logger if added																					
	Chilled coolants	4	Bubble wrap to face up																					
Notes:	# If anticipated transport time exceeds the maximum transport time a data logger must be placed in with the shipment.																							

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Red Cell Configuration R4

R4	No. of Components per Shipper	Validated Transport Time [#]	Legend	Name	Quantity	Note																
	Up to 10 red cell units using ballast	7hr:26min		Foil pouch	1	Used to line box and contains all other items																
		Frozen -19°C	2	Bubble wrap to face down																		
		Chilled coolants	2	Bubble wrap to face down																		
		Cardboard divider	1	Used to stop contact with coolants																		
		Chilled coolants as ballast (as per table to right →) Place ballast outside the plastic liner bag	<table border="1"> <thead> <tr> <th>Number of Red Cell Units</th> <th>Number of Ballast Packs</th> </tr> </thead> <tbody> <tr> <td>10</td> <td>0</td> </tr> <tr> <td>8 or 9</td> <td>1</td> </tr> <tr> <td>7</td> <td>3</td> </tr> <tr> <td>5 or 6</td> <td>4</td> </tr> <tr> <td>3 or 4</td> <td>5</td> </tr> <tr> <td>2</td> <td>6</td> </tr> <tr> <td>1</td> <td>7</td> </tr> <tr> <td>1 to 3 paediatric units</td> <td>4</td> </tr> </tbody> </table>		Number of Red Cell Units	Number of Ballast Packs	10	0	8 or 9	1	7	3	5 or 6	4	3 or 4	5	2	6	1	7	1 to 3 paediatric units	4
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	Chilled coolants	2	Bubble wrap to face up																			
	Frozen -19°C	2	Bubble wrap to face up																			
Notes:	# If anticipated transport time exceeds the maximum transport time a data logger must be placed in with the shipment.																					

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

PLATELETS

Platelet components should be transported using either **Packing Configuration P1** or **P2** the choice of which will depend on the anticipated transport time. If the transport time is estimated to approach or exceed the validated time, shown below, or if product is transported by independent courier e.g. bus or aircraft, a data logger must be included.

Configurations P1 and P2 are designed to maintain the components within a temperature range of 20°C to 24°C as recommended in the Council of Europe “Guide to the Preparation, Use and Quality Assurance of Blood Components”, 14th edition.

Table 3 lists the packing configurations and the validated transport time

Table 3		
Packing Configuration	No. of Components per Shipper	Validated Transport Time [#]
P1	4 to 8 pooled or apheresis platelets (or equivalent using ballast)	53min
P2	2 to 8 pooled or apheresis platelets (or equivalent using ballast)	5hr:25min

[#]If anticipated transport time exceeds the maximum transport time a data logger must be placed in the shipper within the components.


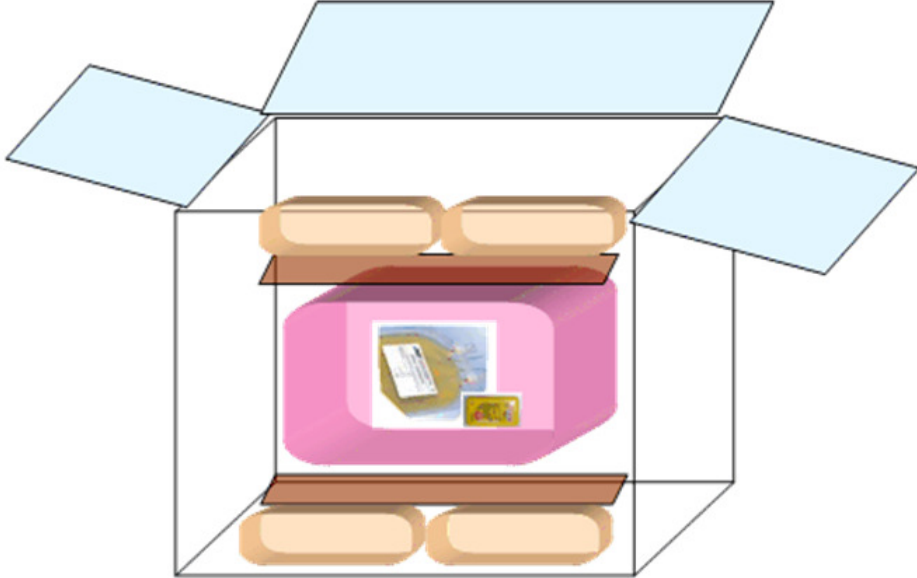





Both configurations require a minimum number of units. Where fewer platelet units are to be packed, **room temperature (+20 to +24 °C)** coolant packs **must** be added as ballast.

The minimum number of packs and ballast must not be less than the minimum required number of packs for the particular packing configuration. These ballast packs should be placed outside the plastic liner to prevent contamination of the platelets should the coolant pack leaks.

Details of the correct numbers of ballast packs are shown in the P1 and P2 diagrams below.


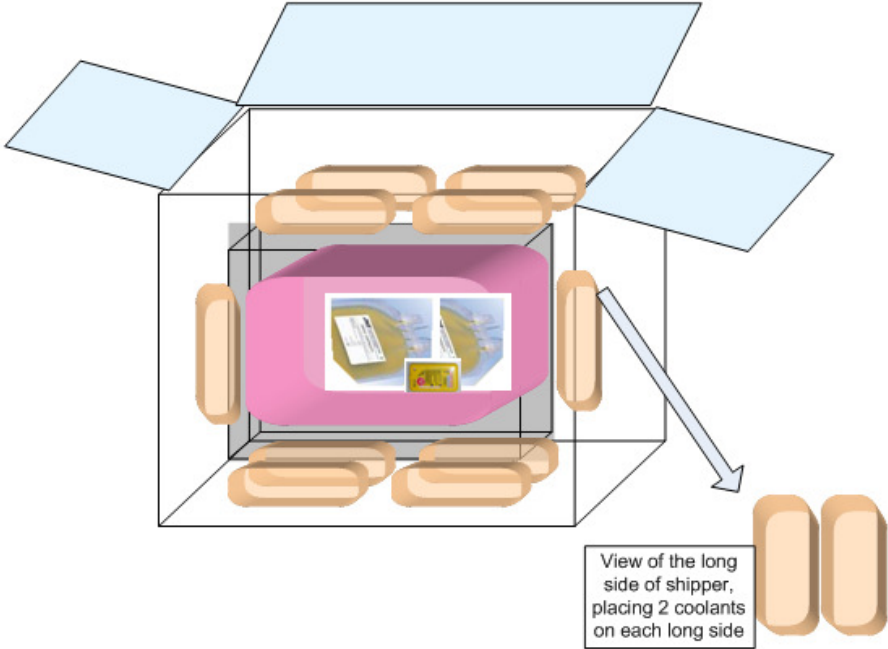





Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Platelet Configuration P1

P1	No. of Components per Shipper	Validated Transport Time#	Legend	Name	Quantity	Note									
	4 to 8 pooled or apheresis platelets If <4 then use ballast	53min		Room temperature coolants	2										
		Cardboard divider	1	Used to stop contact with coolants											
		Room temperature coolants as ballast (as per table to right →) Place ballast outside the plastic liner bag	<table border="1"> <thead> <tr> <th>Number of Platelet Units</th> <th>Number of Ballast Packs</th> </tr> </thead> <tbody> <tr> <td>4 to 8</td> <td>0</td> </tr> <tr> <td>3</td> <td>1</td> </tr> <tr> <td>2</td> <td>2</td> </tr> <tr> <td>1</td> <td>3</td> </tr> </tbody> </table>	Number of Platelet Units	Number of Ballast Packs	4 to 8	0	3	1	2	2	1	3		
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	3	1													
2	2														
1	3														
	Plastic liner bag	1	Used to contain platelets and logger if added												
	Cardboard divider	1	Used to stop contact with coolants												
Notes:	# If anticipated transport time exceeds the maximum transport time a data logger must be placed in with the shipment.		Room temperature coolants	2											

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Platelet Configuration P2

P2	No. of Components per Shipper	Validated Transport Time#	Legend	Name	Quantity	Note				
	2 to 8 pooled or apheresis platelets If <2 then use ballast	5hr:25 min		Room temperature coolants	4	On top of foil pouch				
 <p>View of the long side of shipper, placing 2 coolants on each long side</p>		Foil pouch	1	Used to line box and contains all other items						
		Room ¹ temperature coolants	6	Place 2 along each of the long sides and 1 at each short side of the box						
		Room temperature coolants as ballast (as per table to right →) Place ballast outside the plastic liner bag	<table border="1"> <thead> <tr> <th>Number of Platelet Units</th> <th>Number of Ballast Packs</th> </tr> </thead> <tbody> <tr> <td>2 to 8</td> <td>0</td> </tr> <tr> <td>1</td> <td>1</td> </tr> </tbody> </table>		Number of Platelet Units	Number of Ballast Packs	2 to 8	0	1	1
	Number of Platelet Units	Number of Ballast Packs								
	2 to 8	0								
	1	1								
	Plastic liner bag	1	Used to contain platelets and logger if added							
	Room temperature coolants	4	At bottom of shipper							
Notes:	<p># If anticipated transport time exceeds the maximum transport time a data logger must be placed in with the shipment.</p> <p>Configuration P2 requires 14 room temperature coolants: 4 coolants placed on the bottom, 2 on each of the longer sides, 1 on each of the shorted sides and another 4 coolants placed on the top.</p>									

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

FROZEN COMPONENTS (plasma, cryoprecipitate)

Frozen plasma components should be transported using either **Packing Configuration F1 or F2** the choice of which will depend on the anticipated transport time and the availability of dry ice.

Configurations F1 and F2 are designed to maintain the components at -25°C as recommended in the Council of Europe "Guide to the Preparation, Use and Quality Assurance of Blood Components", 14th edition.


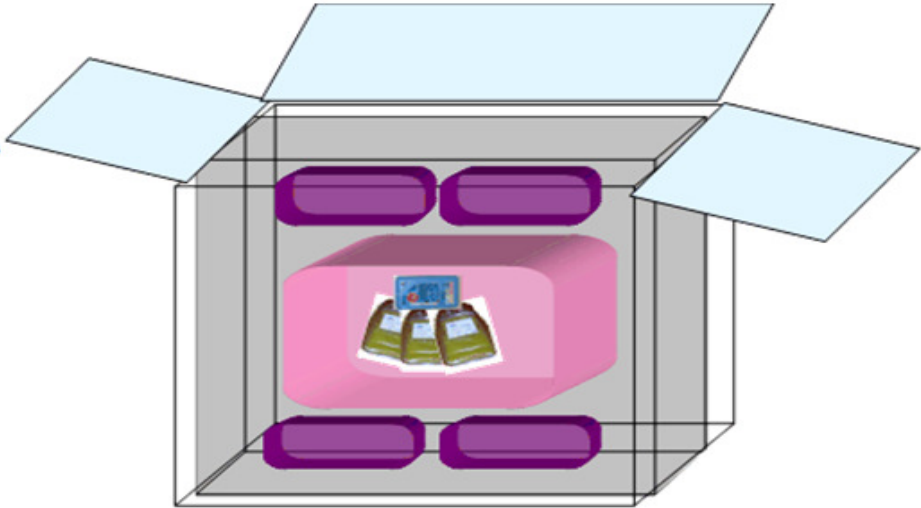



There are specific steps that must be taken when transporting shippers containing dry ice by road.

Refer to Appendix B for reference.

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Frozen Component Configuration F1


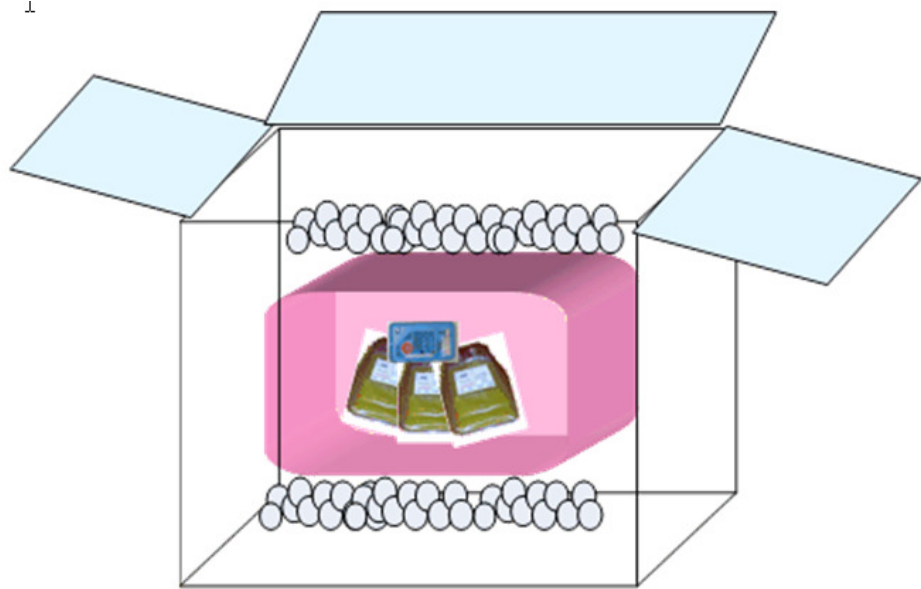


There is no minimum number of components for this configuration – ballast not required.

F1	No. of Components per Shipper	Validated Transport Time#	Legend	Name	Quantity	Note									
	See table insert on right	30min		Frozen -40°C coolants	2	Inside foil pouch									
				Foil pouch	1	Used to line box and contains all other items									
					<table border="1"> <thead> <tr> <th style="background-color: #cccccc;">No. of Components per Shipper</th> <th style="background-color: #cccccc;">Min</th> <th style="background-color: #cccccc;">Max</th> </tr> </thead> <tbody> <tr> <td>FFP Single dose / apheresis</td> <td>1</td> <td>5</td> </tr> <tr> <td>Cryoprecipitate</td> <td>5</td> <td>25</td> </tr> </tbody> </table>		No. of Components per Shipper	Min	Max	FFP Single dose / apheresis	1	5	Cryoprecipitate	5	25
	No. of Components per Shipper	Min	Max												
	FFP Single dose / apheresis	1	5												
Cryoprecipitate	5	25													
				Plastic liner bag	1	Used to contain red cells and logger if added									
				Frozen -40°C coolants	2	Inside foil pouch									
Notes:	# If anticipated transport time exceeds the maximum transport time a data logger must be placed in with the shipment.														

Receipt and Use of Blood Service Shippers by External Institutions to Transport Blood and Blood Products

Frozen Component Configuration F2

There is no minimum number of components for this configuration – ballast not required.

F2	No. of Components per Shipper	Validated Transport Time#	Legend	Name	Quantity	Note																		
	See table insert on right	17hr:50min		Dry Ice	1.8 Kg	On top plastic liner pouch																		
			<table border="1"> <thead> <tr> <th style="background-color: #cccccc;">No. of Components per Shipper</th> <th>Min</th> <th>Max</th> </tr> </thead> <tbody> <tr> <td>FFP - Single Dose or Apheresis</td> <td>1</td> <td>6</td> </tr> <tr> <td>Cryoprecipitate</td> <td>5</td> <td>30</td> </tr> <tr> <td>Cryoprecipitate - Apheresis (no packaging)</td> <td>1</td> <td>8</td> </tr> <tr> <td>Cryoprecipitate - Apheresis (cardboard box)</td> <td>1</td> <td>6</td> </tr> <tr> <td>Cryodepleted Plasma - Apheresis (750ml no packaging)</td> <td>1</td> <td>3</td> </tr> </tbody> </table>				No. of Components per Shipper	Min	Max	FFP - Single Dose or Apheresis	1	6	Cryoprecipitate	5	30	Cryoprecipitate - Apheresis (no packaging)	1	8	Cryoprecipitate - Apheresis (cardboard box)	1	6	Cryodepleted Plasma - Apheresis (750ml no packaging)	1	3
			No. of Components per Shipper	Min	Max																			
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			Cryoprecipitate - Apheresis (no packaging)	1	8																			
Cryoprecipitate - Apheresis (cardboard box)	1	6																						
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	Plastic liner bag	1	Used to contain red cells and logger if added																					
	Dry Ice	1.8 Kg	At bottom of shipper																					
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APPENDIX A DETAILS OF SUPPLIERS OF COMPOSITE PARTS

Item	Company	Phone
Pink plastic bags (shipper liners)	Valpak	(02) 9984 0777
Shipper carton (outer cardboard box)	Custom Cartons	(08) 8348 2999
Foil bags	Qualtape Australia	(03) 9729 8401
Polystyrene (Foam)	Coolfoam	(08) 8287 3666
Coolant Pack with bubble wrap on one face	Timscott Trading	(03) 9466 9766
Data Logger	Temprecord (NZ)	+64 9 274 9825

APPENDIX B TRANSPORT OF BLOOD PRODUCTS USING DRY ICE

The Blood Service strongly suggests your laboratory develop policies and procedures for the use of dry ice and, where necessary, offer training to appropriate staff.

The use of couriers will need to be considered as drivers should be aware of the hazards and what to do in an emergency. The use of dry ice in transporting items by vehicle can be hazardous to the vehicle driver, who may be unaware of the potential risk of exposure to CO2 gas.

Below are two references which may be helpful for formulating policies and procedures.

- www.iata.org
- AABB 14th Edition, pg 659