



Australian Government  
Department of Agriculture,  
Water and the Environment

Ministry for Primary Industries  
Manatū Ahu Matua



# Spray rates listing for flights into Australia and New Zealand

## Hold (Cargo Areas) Aerosol Spray Only

The Spray rates listing for flights into Australia and New Zealand are additional requirements as per the recommendations within the World Health Organization (WHO) aircraft disinsection methods and procedures.

This Spray rates listing for flights into Australia and New Zealand is to be read in conjunction with the Schedule of aircraft disinsection procedures for flights into Australia and New Zealand and World Health Organization (WHO) aircraft disinsection methods and procedures.

Any specific information contained in this Spray rates listing for flights into Australia and New Zealand and Schedule of aircraft disinsection procedures for flights into Australia and New Zealand is to be taken to override the World Health Organization (WHO) aircraft disinsection methods and procedures for aircraft operators to comply with disinsection requirements.

**Australia Only:** This will define the aircraft disinsection methods approved by the Director of Human Biosecurity, Department of Health under the *Biosecurity Regulation 2016* section 7 (2).

Version 4.1

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# Version control

Updates will occur automatically on the Department of Agriculture (the department) and New Zealand Ministry for Primary Industries (MPI) websites and this page will summarise the amendments as they occur. The specific sections updated are described below:

Version	Date	Author	Description of change	Sections
-	1998 - 2008	AQIS MAFBNZ	First issue	All
1.0	October 2009	Aimie Wilkinson and Doug Farr	Review	All
2.0	September 2012	DAFF/MPI	Review	All
2.1	June 2013	DAFF	Branding changes	All
2.2	December 2013	Department of Agriculture	Branding update Amendment to military spray rates	All Amendment to section 3.3
2.3	May 2014	Traveller and Vessels Section/MPI	Amend spray rates for Dash 8-400 & Fokker aircrafts	3.2
2.4	September 2015	Travellers and Vessels Section /MPI	Inclusion of new spray rates for Military Aircrafts	3.3
3	June 2016	Travellers and Vessels section/MPI	Review and update for new biosecurity legislation	All (apart from spray rates)
3.1	February 2017	Traveller and Vessels section/MPI	Addition of Alenia C27J Spartan Review of spray rates Review of full document for accessibility	Table 34 All
3.2	December 2018	Conveyances and Ports Section/MPI	Updated table 22 P-8A Poseidon and added a footnote	3
3.3	April 2019	Conveyances and Ports Section	Updated the A350-900 'Forward hold d-phenothrin 2% & permethrin 2% (grams)' spray rate	Table 2
3.4	October 2019	Conveyances and Ports Section/MPI	Updated: General formatting Smoke detector advice Spraying of compartments advice	All 2 and 3 4
3.5	January 2020	Conveyances and Ports Section/MPI	Updated B-52 Stratofortress (bomber) Bomb area is exempt from disinsection. Updated departments name	Table 22
3.6	June 2020	Conveyances and Ports Section/MPI	Add "spray rate also applies to on arrival spraying" to all Cabin TOD columns.	All Tables
3.7	June 2020	Conveyances and Ports Section/MPI	Add 3 to the rear hold spray for the Embraer 120.	Table 13
3.8	October 2020	Conveyances and Ports Section/MPI	Note 1: Applies to Passenger configured aircraft carrying cargo	Note 1: under Cargo section, page 2

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4	August 2021	Department of Agriculture, Water and the Environment and MPI	<p>The updated disinsection for cabin areas within the World Health Organization (WHO) aircraft disinsection methods and procedures is now in line with Australia and New Zealand compliance standards.</p> <p>Additional requirements to treat hold cargo areas with disinsection for Australia and New Zealand are detailed in this document - including points of difference and other information relevant to biosecurity controls, measures and compliance standards for Australia and New Zealand</p>	All
4.1	October 2021	Department of Agriculture, Water and the Environment and MPI	<p>Disinsection spray rates for aircraft have been recalculated to specific rates required / minimum amount to be used.</p> <p>Subheading added to document in making clear that it is to be used for Hold (Cargo Areas) Aerosol Spray Only.</p>	<p>All tables</p> <p>Subheading</p>

# Introduction

This spray rates listing for flights into Australia and New Zealand has been prepared in cooperation between the Australian Department of Agriculture, Water and the Environment (the department) and the New Zealand Ministry for Primary Industries (MPI) for the alignment of disinsection procedures for aircraft flying into Australia and New Zealand. This document must be read in conjunction with the Schedule of aircraft disinsection procedures for flights into Australia and New Zealand.

The spray rates listing for flights into Australia and New Zealand is different to the recommendations within the World Health Organization (WHO) aircraft disinsection methods and procedures because of our unique biosecurity status. The following are the points of difference that Australia and New Zealand authorities require:

1. Aircraft aerosol hold disinsection spray rates are higher than those recommended by the WHO as published in the document
2. Holds must be treated with either residual treatment or the combination aerosol:
  - Permethrin 2% and d-Phenothrin 2% (or 1*R*-trans-phenothrin 2%)
3. The use of disinsection treatment certificates as outlined within the appendix section of the Schedule of aircraft disinsection procedures for flights into Australia and New Zealand published by the department, on behalf of Australia and New Zealand
4. Other information relevant to biosecurity controls, measures and compliance standards for Australia and New Zealand

Airlines will need to contact MPI to ensure product acceptance in New Zealand. Disinsection products used within New Zealand must also be registered with the Environmental Protection Authority (EPA New Zealand).

Airlines will need to ensure that products used in Australia are registered by the Australian Pesticide and Veterinary Medicine Authority (APVMA). This may affect spray on arrival aircraft or aircraft that have not met Australia's disinsection requirements and are required to perform spray on arrival under the supervision of departmental officers.

As a minimum requirement, all aerosol cans, must be clearly labelled, in English, with a list of all active ingredients used. Alternatively, they must be accompanied with an English version of the MSDS (material safety data sheet) for each product used.

## Rate and method of application

A list of aircraft categories is available in the “Spray Rates Listing” section in this document. Spray rates apply to all aircraft series, unless otherwise stated.

The following spray rate calculator tools are available via:

- the department’s spray rate calculator tool for aerosol spray and requires users to have the cubic feet within the aircraft
- the WHO spray rate calculator tool is broken into two categories requiring the use of an excel spreadsheet that covers:
  - Aircraft Aerosol Spray Amount Calculator
  - Aircraft Residual Spray Amount Calculator

If an aircraft model is not listed, contact the department or MPI for additional information.

## Cabin

Aircraft cabin disinsection spray rates are as recommended in the World Health Organization (WHO) aircraft disinsection methods and procedures.

Some passenger aircraft transport freight in the main cabin, if the aircraft is not configured with cargo doors on the main deck continue to treat this aircraft as a passenger aircraft. Cargo should not obstruct access to cabin areas that will prevent normal and correct disinsection treatment to all required cabin spaces and surfaces.

## Hold(s)

Holds (cargo areas) must be treated with either residual treatment or the following combination aerosol spray with a single shot vertical ejection nozzle for main deck areas, forward hold and rear holds with Permethrin 2% and d-Phenothrin 2% (or 1*R-trans*-phenothrin 2%).

When amounts of hold spray are specified for either hold, an applicator must use the minimum requirement, for example:

- Hold spray used to be rounded up to the nearest 150 grams (e.g. If the minimum requirement is 180 grams, you must fully exhaust 2 x 150 grams hold spray)
- Fit a multi-shot nozzle to the can(s) used and apply the spray manually via the pressure hatches after hold doors are closed. When there are no pressure hatches, operators may direct the spray via an opening through a nearly closed hold door, being careful to avoid any spray loss to the exterior of the aircraft.

Any additional baggage cavities not mentioned, such as small nose cone storage areas on private aircrafts are to be sprayed for a minimum of 2 seconds each.

**Hold residual disinsection spray amounts** are as recommended in the World Health Organization (WHO) aircraft disinsection methods and procedures.

## Spray rates listing

This listing has been divided into four aircraft types:

- Section 1– Commercial Passenger Aircraft
- Section 2– Small Jets, Regional and Private Aircrafts (including Private Helicopters)
- Section 3– Military Aircraft
- Section 4– Freighter Aircraft



# 1 Commercial passenger aircraft

**This section relates to aircraft hold disinsection spray rates only.**

A combination aerosol spray with a single-shot vertical ejection nozzle containing Permethrin 2% and d-Phenothrin 2% (or 1*R-trans*-phenothrin 2%).

For all aircraft cabin disinsection and **hold residual** disinsection spray rates, can be found in the World Health Organization (WHO) aircraft disinsection methods and procedures.

**Table 1 Spray rates, commercial passenger aircraft—Airbus**

Aircraft manufacturer and model	Forward hold (g)	Rear hold (g)
A300-100/200	107	116
A300-600	108	116
A310	78	81
A318	12	23
A319	15	30
A320	22	40
A321	36	47
A330-200/800	120	133
A330-300/900	152	153
A340-200	120	133
A340-300	152	153
A340-500	151	136
A340-600	202	177
A350-900	160	154
A350-1000	195	179
A380	185	177

**Table 2 Spray rates, commercial passenger aircraft—Boeing**

Aircraft manufacturer and model	Forward hold (g)	Rear hold (g)
BBJ	15	9
BBJ2	39	22
Boeing 727-100	17	19
Boeing 727-200	28	33
Boeing 737-100	11	15
Boeing 737-200	15	20
Boeing 737-300	17	26
Boeing 737-400	24	31
Boeing 737-500	11	21
Boeing 737-600	11	20
Boeing 737-700	16	24

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Boeing 737-800	28	36
Boeing 737-900	34	40
Boeing 737-1000	36	42
Boeing 747-100/200	78	87
Boeing 747-300	78	87
Boeing 747-400	112	145
Boeing 747-800	38	96
Boeing 747 SP	45	61
Boeing 757	26	42
Boeing 767-200/200ER	58	65
Boeing 767-300/300ER	77	84
Boeing 767-400ER	96	100
Boeing 777-200ER/LR	114	112
Boeing 777-300ER/LR	152	150
Boeing 777-300(X)	164	161
Boeing 787-800	101	32
Boeing 787-900	126	117
Boeing 787-1000	139	130

**Table 3 Spray rates, commercial passenger aircraft—Bombardier**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
CRJ 900	6	18

**Table 4 Spray rates, commercial passenger aircraft—British Aerospace**

Aircraft manufacturer and model	Forward hold	Rear hold
Bae146-100/200/300	16	16
	5 a	5 a

a Electronic and hydraulic bay, adjacent to the holds.

**Table 5 Spray rates, commercial passenger aircraft—Embraer**

Aircraft manufacturer and model	Forward hold(g)	Rear hold (g)
170 E-Jet	12	8
175 E-Jet	14	10
190 E-jet	15	11
195 E-jet	18	18

**Table 6 Spray rates, commercial passenger aircraft—McDonnell Douglas**

Aircraft manufacturer and model	Forward hold(g)	Rear hold (g)	Separate bulk hold(g)
DC 8 - Series 60/70	52 a	48 a	-
DC9	29	18	-

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DC10/MD10	101	83	32
MD11	114	109	-
MD81/82/88	13 <b>b</b>	15 <b>b</b>	18
MD83	17 <b>b</b>	10 <b>b</b>	13
MD87	10 <b>b</b>	15 <b>b</b>	12
MD90	17	14	16

**a** Most of these holds have four belly holds. Spray at 40 grams per hold.

**b** These aircraft typically have forward, centre and rear holds. Spray at 20 grams per hold.

**Table 7 Spray rates, commercial passenger aircraft—Tupolev**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
TU-134	8	12
TU-154	12	16

## 2 Small jets, regional and private aircraft (including private helicopters)

**This section relates to aircraft hold disinsection spray rates only.**

A combination aerosol spray with a single-shot vertical ejection nozzle containing Permethrin 2% and d-Phenothrin 2% (or 1*R-trans*-phenothrin 2%).

If operators use single shot aerosols to spray the holds on any aircraft, please be aware that excess amounts of spray may activate the on-board smoke detectors.

For any holds requiring 20gms of spray or less, it is acceptable to use:

- a permethrin 2% aerosol as an alternative when using Pre-embarkation cabin method.
- a d-phenothrin 2% (or 1*R-trans*-phenothrin 2%) aerosol as an alternative when using Pre-departure or On-arrival cabin method.

When cargo holds can be accessed internally, they will have been accounted for in the amount of spray required for the cabin. Unless otherwise specified the amount of spray required for external holds refers to the total number of “external access only” holds.

For all aircraft cabin disinsection and **hold residual** disinsection spray rates, can be found in the World Health Organization (WHO) aircraft disinsection methods and procedures.

**Table 8 Spray rates, small jets, regional and private aircraft —Bombardier**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Challenger 300	-	-
Challenger 600	-	-
Challenger 601	-	-
Challenger 605	-	-
Challenger 850	-	-
Challenger 5000	-	-
CRJ 200	-	-
CRJ 700 (CL-6000)	4	18
Dash 8 (DHC-8)	-	-
Dash 8 (DHS-8) 300	-	-
Dash 8 (DHC-8) 400	4	16
Global 5000	-	-
Global Express	-	-
Learjet 24	-	-
Learjet 25	-	-
Learjet 31	-	-
Learjet 35	-	-
Learjet 36	-	-
Learjet 40	-	2
Learjet 45	-	2

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Learjet 55	1	1
Learjet 60	-	1
Learjet 85	-	4

**Table 9 Spray rates, small jets, regional and private aircraft —Cessna**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Citation I	1	-
Citation II/SP	1	-
Citation V	1	-
Citation VI	1	-
Citation VII	1	-
Citation X	1	3
Citation Bravo	1	-
Citation CJ1	1	-
Citation CJ2	1	-
Citation CJ3	1	3
Citation CJ4	1	3
Citation S/II	1	-
Citation Encore	1	2
Citation Encore +	1	-
Citation Excel	1	-
Citation Jet	1	-
Citation Mustang	1	2
Citation Sovereign	1	4
Citation Ultra	1	2
Citation XLS	1	4

**Table 10 Spray rates, small jets, regional and private aircraft —Dassault**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Falcon 7x	-	-
Falcon 10	-	2
Falcon 50	-	4
Falcon 100	-	-
Falcon 900	-	-

**Table 11 Spray rates, small jets, regional and private aircraft —Eclipse**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Eclipse 400/500	2	2

**Table 12 Spray rates, small jets, regional and private aircraft —Embraer**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
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120	-	12
135	-	13
140	-	13
145	-	13
Legacy 450(EMB550)	-	6
Legacy 500	-	6
Legacy 600	-	10
Legacy Shuttle	-	13
Phenom 100/300	1	3

**Table 13 Spray rates, small jets, regional and private aircraft—Fokker**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
F27 Friendship	- a	- a
F28	13	7
F50	- a	- a
F60 – militarised F50	- a	- a
F70	12	7
F100	16	8

a Hold included in cabin

**Table 14 Spray rates, small jets, regional and private aircraft—Galaxy Aerospace**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Galaxy	5	5

**Table 15 Spray rates, small jets, regional and private aircraft—Gulfstream**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
GII/GIII	-	-
GIV	-	6
GV	-	-
G100	-	-
G150	-	2
G200/250	-	5
G350/G450/G500/G550	-	-
G650	-	-

**Table 16 Spray rates, small jets, regional and private aircraft—Hawker Beechcraft**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Beechcraft 1900	-	-
Beechcraft Premier I	1	3
Hawker 400	1	2
Hawker 750	1	2

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Hawker 800	1	-
Hawker 900XP	1	-
King Air	2 a	2 a

a Over wing lockers

**Table 17 Spray rates, small jets, regional and private aircraft—Honda**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Honda Jet	2	2

**Table 18 Spray rates, small jets, regional and private aircraft—Israel Aircraft Industries**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Astra SP	3	3
Astra SPX	3	3
West wind II	2	2

**Table 19 Spray rates, small jets, regional and private aircraft—Pilatus**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
PC - 12 NG	-	-

### 3 Military aircraft

**This section relates to aircraft hold disinsection spray rates only.**

A combination aerosol spray with a single-shot vertical ejection nozzle containing Permethrin 2% and d-Phenothrin 2% (or 1*R-trans*-phenothrin 2%).

If operators use single shot aerosols to spray the holds on any aircraft, please be aware that excess amounts of spray may activate the on-board smoke detectors.

For any holds requiring 20gms of spray or less, it is acceptable to use:

- a permethrin 2% aerosol as an alternative when using Pre-embarkation cabin method.
- a d-phenothrin 2% (or 1*R-trans*-phenothrin 2%) aerosol as an alternative when using Pre-departure or On-arrival cabin method.

When cargo holds can be accessed internally, they will have been accounted for in the amount of spray required for the cabin. Unless otherwise specified the amount of spray required for external holds refers to the total number of “external access only” holds.

For all aircraft cabin disinsection and **hold residual** disinsection spray rates, can be found in the World Health Organization (WHO) aircraft disinsection methods and procedures.

**Table 20 Spray rates, military aircraft—Airbus**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
KC-30/A330 MRTT	120	133
A400M	-	-

**Table 21 Spray rates, military aircraft—Boeing**

Aircraft manufacturer and model	Forward hold	Rear hold
Osprey	-	-
B-52 Stratofortress (bomber) (a)	-	-
B757	26	42
C40 (B737-700)	16	19
KC B767	58	65
KC-135R Strat tanker	-	-
P-8A Poseidon (b)	- b	- b

- (a) The B-52 bomb area is exempt from disinsection. The cabin is to be treated and certified as per normal disinsection requirements.
- (b) The P-8A Poseidon surveillance aircraft forward and aft holds (lobes) only are exempt from disinsection treatment requirements and there is no requirement for the aerosol (used prior to departure) or certification of the treatment of these 2 areas to be presented on arrival. The cabin is to be treated and certified as per normal disinsection requirements.



**Table 22 Spray rates, military aircraft—Bombardier**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Learjet C21	-	-

**Table 23 Spray rates, military aircraft—EADS CASA/IPTN**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
CASA CN235	-	-

**Table 24 Spray rates, military Aircraft—Embraer**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
145 AEW	-	-
C-99A (Transport 145)	-	-
E-99	-	-
P-99 (Maritime)	-	-
R-99	-	-

**Table 25 Spray rates, military aircraft—Gulfstream**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
C-20 (A/D) Gulfstream III	-	-
C-20 (G) Gulfstream IV	-	-
C-37 Gulfstream V	-	-

**Table 26 Spray rates, military aircraft—Hawker Beechcraft**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
C-12	2 a	2 a

a Over wing lockers

**Table 27 Spray rates, military aircraft—Ilyushin**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
IL-62	-	-
IL-96	126	98
IL-II 76	-	-

**Table 28 Spray rates, military aircraft—Lock head**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
C5 Galaxy	-	-

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C130 Hercules	-	-
F16	-	-
F16C Viper	-	-
F22 Raptor	-	-
MH60R	2	2
L-101 Tristar	76	62
P3 Orion	10 <b>b</b>	10 <b>b</b>

**b** Spray bombs via external hatch with 10 grams of pre-spray

**Table 29 Spray rates, military Aircraft—McDonnell Douglas**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
C17 Globe master	-	-

**Table 30 Spray rates, military aircraft—Sikorsky**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
UH-60 Blackhawk	2	2
SH-60 Seahawk	2	2

**Table 31 Spray rates, military aircraft—Northrop Grumman**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
E-2C Hawkeye	-	-
C-2 Greyhound	-	-

**Table 32 Spray rates, military aircraft—Leonardo’s Aircraft Division**

Aircraft manufacturer and model	Forward hold(g)	Rear hold(g)
Alenia C-27J Spartan	-	-

## 4 Freighters

**This section relates to aircraft hold disinsection spray rates only.**

A combination aerosol spray with a single-shot vertical ejection nozzle containing Permethrin 2% and d-Phenothrin 2% (or 1*R-trans*-phenothrin 2%).

When disinsecting the cargo area on the main deck, extra care will be needed to ensure safe application, due to the higher concentration of combined active ingredients being used in hold formulation aerosols:

- Ensure the aerosol(s) are directed away from your body and walk away from area being disinsected.
- Avoid breathing the mist.
- Vacate the area on completion of spraying and allow at least five minutes for the spray to settle before re-entering the area.

For all aircraft cabin disinsection and **hold residual** disinsection spray rates, can be found in the World Health Organization (WHO) aircraft disinsection methods and procedures.

**Table 33 Spray rates, freighter aircraft—Airbus freighters**

Aircraft manufacturer and model	Main deck cargo area(g)	Forward Hold(g)	Rear hold(g)	Separate bulk hold(g)
A300-F4200	151	150	40	
A300-F4600	286			
A300-600ST Beluga	997			32
A310-200/300F	240			
A330-200F	212	150	150	
A330-300P2F	240	150	150	
A330-700XL Beluga	1170			32

**Table 34 Spray rates, freighter aircraft—Antonov freighters**

Aircraft manufacturer and model	Main deck cargo area(g)	Forward Hold(g)	Rear hold(g)
Antonov 124	539	-	-
Antonov 225	646	-	-

**Table 35 Spray rates, freighter aircraft—Boeing freighters**

Aircraft manufacturer and model	Main deck cargo area(g)	Forward Hold(g)	Rear hold(g)
Boeing 707-320C	120	35	36
Boeing 727-100	49	17	19
Boeing 727-200	70	28	33
Boeing 737	87	24	28
Boeing 747-100/200	265	78	87
Boeing 747-300/400	281	112	145

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Boeing 747-800	367	98	96
Boeing 747 Combi	105	104	144
Boeing 747LCF (DreamLifter)	975	80	80
Boeing 757	99	43	52
Boeing 767	252	77	84
Boeing 777	255	152	150
Boeing 787	389	139	130
KC 135	90	-	-

**Table 36 Spray rates, freighter aircraft—McDonnell Douglas freighters**

Aircraft manufacturer and model	Main deck cargo area(g)	Forward Hold(g)	Rear hold(g)
DC 8 - Series 60/70 a	202	a	a
DC 9	98	29	18
MD11	331	114	109

a Most of these aircraft have four belly holds sprayed at 40g/hold.

**Table 37 Spray rates, freighter aircraft—shorts freighters**

Aircraft manufacturer and model	Main deck cargo area(g)	Forward Hold(g)	Rear hold(g)
Belfast	150	-	-