CIVIL AVIATION AUTHORITY
OF NEW ZEALAND
Te Mana Rererangi Tūmatanui o Aotearoa

Advisory Circular AC61-16

Revision 6

5 April 2025

Pilot Licences and Ratings—Pilot Chemical Rating

General

Civil Aviation Authority advisory circulars (ACs) contain guidance and information about standards, practices, and procedures that the Director has found to be an **acceptable means of compliance** with the associated rules and legislation.

Consideration will be given to other methods of compliance that may be presented to the Director. When new standards, practices, or procedures are found to be acceptable, they will be added to the appropriate AC.

Purpose

This AC describes an acceptable means of compliance for meeting the Civil Aviation Rule requirements for the issue of a pilot chemical rating.

Related Rules

This AC relates to Part 61 *Pilot Licences and Ratings* – specifically Subpart P*, Pilot Chemical Rating.*

Change Notice

Revision 6 updates reference to the Civil Aviation Act 2023 (CA Act 2023), deletes the section on the Land Transport Rule: Dangerous Goods 2005, but adds a reference to it in Appendix 1, corrects typos and other minor errors, and adds a Version History.

Version History

The history of revisions is detailed in the table below:

Revision No.	Effective Date	Summary of Changes
AC61-1.16, Rev 0	6 October 1998	Initial issue
AC61-1.16, Rev 1	11 May 2006	Included amendments related to the reissue of Part 61 in regards to logbook entries for issue of a Pilot Chemical rating and removal of the outdated transition provision.

Published by
Civil Aviation Authority
PO Box 3555
Wellington 6140

Authorised by
DCE Aviation Safety

		Updated references to legislation in Appendix I.
AC61-16, Rev 2	9 May 2007	Re-numbered from AC 61-1.16 to AC 61-16 as part of project to standardise numbering of all ACs.
AC61-16, Rev 3	5 August 2014	Updated the list of course providers.
AC61-16, Rev 4	28 April 2016	Updated to align with Amendment 11 to Part 61.
AC61-16, Rev 5	18 August 2016	Updated the Chemical Rating Syllabus in Appendix 1.
AC61-16, Rev 6	5 April 2025	Updates reference to the CA Act 2023. Deletes the section on the Land Transport Rule: Dangerous Goods 2005, but adds a reference to it in Appendix 1. Corrects typos and other minor errors. Adds a Version History.

Table of Contents

Rule 61.751 Eligibility Requirements

Training course

In accordance with (IAW) **rule 61.751** to be eligible for a pilot chemical rating, a person must:

- hold at least a current private pilot licence in the appropriate category of aircraft, and
- have successfully completed a training course in agricultural chemical application, with assessment, conducted under the authority of a Part 137 agricultural aircraft operator certificate or a Part 141 aviation training organisation certificate.

Rule 61.753 Issue

Logbook endorsement

Rule 61.753 sets out the requirements for the issue of a pilot chemical rating. The person who completed the assessment (the certifying person) must be satisfied that the eligibility requirements of rule 61.751 have been met before issuing the pilot chemical rating.

All relevant details must have been covered in training, and training completed, and the applicant's understanding checked, either orally, in writing, or in practice, to the satisfaction of the certifying person who may issue the pilot a chemical rating by endorsing the applicant's pilot logbook with the following statement in accordance with rule 61.29*, Pilot logbooks – general requirements.*

> *This is to certify that [name of pilot] has satisfied the requirements of Civil Aviation Rules Part 61 for the issue of a pilot chemical rating.*

The holder of the pilot chemical rating may apply to the Director to have the rating endorsed on their pilot licence.

A pilot who holds a chemical rating granted under regulation 229 of the Civil Aviation Regulations 1953 is deemed to hold a chemical rating under Part 61 and thus is eligible for endorsement of pilot's logbook and pilot's licence as per rules 61.753(a) and (b).

Rule 61.755 Privileges

A current pilot chemical rating authorises the holder to dispense an agricultural chemical from an aircraft on an agricultural aircraft operation.

Rule 61.757 Currency Requirements

Refresher course

IAW **rule 61.757,** the holder of a pilot chemical rating must successfully complete a refresher course that is acceptable to the Director within 5 years from the date their rating was issued to be able to continue exercising the privileges of the rating, providing the certifying person has endorsed the holder's pilot logbook in accordance with rule 61.29.

Currently the only courses acceptable to the Director, are conducted under the authority of a Part 141 aviation training organisation certificate.

A pilot who has completed a refresher course within 90 days before the expiry date is deemed to have completed the course on the required date.

Appendix 1 Chemical Rating Syllabus

Section 1: Agricultural Chemicals

- The functional and chemical classifications of HSNO agricultural chemicals and substances.
- General characteristics of insecticides, biopesticides, miticides, fungicides, herbicides, fertilisers, agrichemical pesticides Vertebrate Toxin Agents (VTA).
- Substance formulations (and their physical properties and ingredient).
- Corrosive, flammable and oxidizing properties of agricultural chemicals.

Physical properties

- Solutions, suspensions, emulsions, dispersions, dusts, pellets, granulated materials and encapsulates.

Firefighting foams

- Fluorinated surfactants: aqueous film-forming foam - film forming fluoroprotein, and ł Fluorine-free firefighting foams.

Adjuvants, surfactants and additives

- Oils, spreaders, stickers, wetting agents, drift reduction agents, pH buffers and conditioners, anti-foamers.

Section 2: Equipment: Use/Application

Aerial application and handling of hazardous substances

- Risk assessments for mixing, handling or loading agrichemicals, insecticides, biopesticides, miticides, fungicides, herbicides, fertilisers, agrichemical pesticides VTA.
- Methods of application for hazardous substances for pest types; animals, insects, Arachnida (mites), plants, and substances.
- Identification of hazardous substances prohibited from aerial application.
- Calibration and testing of mixing and spreading equipment and use of formulae.
- Managing a loading site, risk assessments, communication with the pilot on wind speed, wing direction, new and other hazards.

Dispersal system components

- Dispersal of liquids, made up from tanks/hoppers, pumps either hydraulic, fan or ancillary engine driven, filtration system, flow meters.
- Dispersal of solids, made up from hoppers, buckets, either manually or variable release. Quality and type of solids applied, granule vs dry flowable, including VTA baits.

Calibration

- Calibration theory/practical based approach - why it is important to understand how to calibrate an aircraft, including: speed, pressure, nozzle type, droplet production and size, nozzle orientation and the use of spray modelling to confirm the data.
- The importance of pattern testing for aircraft that discharges solids, baits and liquids.

Weather

- Recording and use of digital recording wind vane/sensors with time base recording systems including hand held vane or other equivalent systems.
- Smoke or other visual indicators.

Application methods

- Nozzle type
- Selection and size
- Nozzle configurations
- Particle/droplet size, size range, and stability, i.e. volatility (liquid) and fragmentation (solid)
- Effective height of product release
- Operating pressures
- Flow rates
- Spray patterns
- Boom height and configuration
- Agitation
- Fan pitch
- Fan speeds
- Flight paths
- Track spacing
- Swath width and distribution
- Aircraft performance during application.

Drift mitigation

- Drift of agricultural chemicals and the hazards associated with drift outside target area and mitigating the effects to non-targets
- Drift modelling
- Drift reduction spraying equipment and techniques, including weather effects on drift
- Fogging ultra-low volume application techniques
- Dusting application techniques
- Low flying and ground effects performance
- Selection of airstrips and helipads

- Environmental effects considerations and mitigation of sensitive areas and non-target species, such as bees
- Aquatic agrichemical application
- Withholding periods.

Decontamination and disposal

- Understand the triple rinse method
- The use of approved recycling organisations
- Understand the procedures use for recycling process
- The disposal of dilute and concentrate agrichemicals
- Decontamination of mixing and application equipment.

Notifications

- Affected parties
- Public notifications
- Sensitive areas
- Warning signage.

Administrative

- Documentation
    - Spray plans
    - Record keeping
    - Tracking records of discharged agrichemicals
    - Permissions
    - Approvals and permits (Ministry, Departmental, Territorial Authorities, Regional and District Councils, local iwi authorities)
    - Client and operator contracts
    - Pre-operational agreements.
- General safety requirements
    - Accidents / incidents
    - Loss
    - Spillage or misapplication of hazardous substances.

Section 3: Equipment

- Effective use of equipment loading tables, buckets, spreaders, tanks, hoppers, cutting and mixing equipment
- Digital recording wind vane/sensors
- Hand-held vane sensors
- Smokers and other visual weather indicators
- Decontamination, disposal, and emergency spill kits
- Pressure systems
- Hazards associated with poorly performing or maintained equipment
- Airworthiness requirements.

Section 4: Toxicity

The toxicology of agricultural chemicals classified as insecticides, herbicides, miticides, fungicides and of VTA and biopesticides, including exposure routes of absorption, including at a minimum:

- Herbicides
- Dinitro
- Insecticides
- Organochlorines
- Organophosphorus
- Carbamate
- VTA (but not limited to Sodium monofluoroacetate (1080) Pindone and DRC1339)
- Biopesticides
- Microbial
- Biochemical
- Plant-incorporated-protectants (organisms such as, Bacillus thuringiensis sub-species kurstaki or Cydia pomonella).

Candidates should understand of the toxicology of fungicides, insecticides herbicides, fertilisers, pesticides, miticides, VTA and biopesticides organisms for health and wellbeing.

Candidates should understand the symptoms of poisoning and effects together with appropriate emergency and first aid measures.

Candidates should understand the value of health monitoring and medical surveillance (such as the red cell blood cholinesterase test) including reference to the workplace exposure standards and biological exposure indices.

Section 5: Emergency Preparedness

- Emergency procedures for an aerial operator who is in charge of a range of hazardous substances, which cover all aspects of the operations including:
    - transport
    - storage
    - loading sites, and
    - procedures for when the aircraft is on the ground.
- Understanding of what is required to prepare emergency procedures for a site, including testing the plan and providing a copy to the local fire department.

Section 6: Protective Measures for Personnel Handling Hazardous Substances

Safe handling of hazardous substances

- Protective clothing and equipment including its storage and maintenance
- Personal hygiene
- Food consumption
- Fatigue management
- Human factors
- Safety Management Systems (SMS)
- Hydration, dehydration, nutrition, and physical wellbeing
- Heat and cold stress.

Product labels

- Importance of chemical labelling
- Safety data sheets and haznote requirements
- Priority identifiers.

Safe loading zones

- Importance for safe loading and unloading zones, when handling substances
- Communication between ground crew, the pilot and others.

Section 7: Safety Management Systems and Risk Management

- Risks identified, assessed, reviewed; monitored, remedied
- Reasonably practicable steps undertaken to mitigate adverse effects, taking into account likelihood, degree of harm and consequences resulting from exposures to harm.
- Risk assessments that include but are not limited to assessments of:
    - application target site

- identification of sensitive areas
- weather conditions
- spray particle size
- toxicology
- buffer zones
- shelter belts
- human exposures, and
- loading site safety.

Candidates should understand the risks to human health and safety, the environment, including risks to the New Zealand biosecurity system, and the primary industry, animal welfare, and agricultural sectors.

Section 8: Global Navigation Satellite System & Global Positioning System

- Recording of aerial application using:
  - Differential Global Positioning System (DGPS)
  - Global Navigation Satellite System (GNSS)
  - Global Positioning System (GPS)
  - Geographic Information Systems (GIS).
- General uses
- Types and characteristics of DGPS, GNSS, GPS and GIS Systems
- Methods of recording primary and secondary track logs and waypoints using GPS or GNSS receivers
- Mapping of boundaries
- A - B lines (or base line)
- Setting the swath width
- Limitations.

Section 9: Legislation Approved Codes of Practices, Standards and Guidelines

Candidates should understand the application of the legislative and other instruments below in the aerial agrichemical industry. Understanding needs to include the ability to give a thorough explanation of the authorities, agencies, legislation, regulations, and approved codes of practice, standards and best practice guidelines that govern them:

- CA Act 2023
- Civil Aviation Rules, in particular Part 92, *Carriage of Dangerous Goods*
- ACs, in particular the ACs in the 92 series, and AC100-1, *Safety Management*

- Hazardous Substances and New Organisms Act 1996 and Hazardous Substances Regulations (including the New Zealand Standard Management of agrichemicals NZS8409: 2021 and any other published Approved Codes of Practice, Standards and Best Practice Guidelines)
- Resource Management Act 1991 (Territorial and Regional Authority Rules, including non and permitted activities).
- Conservation Act 1987
- Department of Conservation permissions process
- Agricultural Compounds & Veterinary Medicines Act 1997
- Health and Safety at Work Act 2015 and Health and Safety at Work (General Risk and Workplace Management) Regulations 2016
- Health Act 1956
- Powers of public health and environmental health officials
- Biosecurity Act 1993
- Land Transport Rule: Dangerous Goods 2005, which, while about dangerous goods and storage of agrichemicals in the context of land transport, is still useful background.

(Or any legislation superseding any of those listed).