

Revision 5

Pilot Licences and Ratings—Pilot Chemical Rating

18 August 2016

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 Civil Aviation Rule Part 61 *Pilot Licences and Ratings* – specifically Subpart P.

Change Notice

Revision 5 updates the Chemical Rating Syllabus in Appendix 1 of this AC.

Table of Contents

Rule 61.751	Eligibility Requirements.....	3
Training course	3
Rule 61.753	Issue	3
Logbook endorsement	3
Rule 61.755	Privileges	3
Rule 61.757	Currency Requirements	3
Refresher course	3
Land Transport Rule: Dangerous Goods 2005		4
Appendix 1	Chemical Rating Syllabus	5
Section 1: Agricultural Chemicals		5
Section 2: Equipment: Use/Application.....		5
Section 3: Equipment		8
Section 4: Toxicity		8
Section 5: Emergency Preparedness		9
Section 6: Protective Measures for Personnel Handling Hazardous Substances		9
Section 7: Safety Management Systems and Risk Management.....		9
Section 8: Global Navigation Satellite System & Global Positioning System		10
Section 9: Legislation Approved Codes of Practices, Standards and Guidelines		10

Rule 61.751 Eligibility Requirements

Training course

Rule 61.751 provides that 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 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 instructed, completed, and 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.

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 the holder's 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 eligible for endorsement of pilot's logbook and pilot's licence under 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

Rule 61.757 requires successful completion of a refresher course that is acceptable to the Director within the previous 5 years from the date of issue 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.

Land Transport Rule: Dangerous Goods 2005

While Land Transport Rule for Dangerous Goods 2005 and storage of agrichemicals does not form part of Part 61 requirements, it does not however preclude course providers from providing guidance information or instruction or other regulations.

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 IFluorine-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, Regional, Tangata Whenua)
 - 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. It must include the following.

- 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 red cell blood cholinesterase test) including reference to the workplace exposure standards and biological exposure indices.

Section 5: Emergency Preparedness

- Emergency procedures that cover all aspects for an aerial operator who is in charge of a range of hazardous substances, including transport, storage, loading sites, and when the aircraft is on the ground.
- Understand 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
- 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, and reasonably practicable steps are undertaken to mitigate adverse effects, taking into account likelihood, degree of harm and consequences resulting from exposures to harm.

Risk assessments should include but not limited to the following:

- application target site
- identification of sensitive areas
- weather conditions
- spray particle size
- toxicology
- buffer zones
- shelter belts

- human exposures
- loading site safety

Candidates should understand the risks to human health and safety, the environment, including NZ primary industry, animal welfare, and agricultural security.

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 following and their application in the aerial agrichemical industry, including an explanation of the authorities, agencies, legislation, regulations, and approved codes of practice, standards and best practice guidelines that govern them.

- Civil Aviation Act 1990
- Civil Aviation Rules
- ACs
- Hazardous Substances and New Organisms Act 1996 and Hazardous Substances Regulations (including the New Zealand Standard Management of agrichemicals NZS8409 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 (including Department of Conservation permissions)
- 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 (including Ministry of Health permissions)
- Biosecurity Act 1993

(Or any legislation superseding any of those listed).