

# AFRDI 142, RATED LOAD (RL) – A GUIDE FOR SPECIFIERS AND PRODUCT DESIGNERS

## INTRODUCTION

This document is aimed primarily at specifiers and product designers. It's intended to offer guidance only- it doesn't examine the standard in detail and isn't intended to be a substitute for it.

For specifiers it aims to act as an aid to selecting the right certification option for the right application.

For product designers as an aid to both selecting components and to performing simple prototype testing prior to sending a chair for full laboratory evaluation.

The guide doesn't provide the level of detail necessary for comprehensive engineering design. It will still be useful, however, if used as intended i.e. as a basic design brief.

It should also benefit those who may be faced with the task of choosing samples from an existing range of chairs—with a view to promoting the best of them for rated load testing. The ability to perform basic preliminary testing should enable those chairs clearly not strong enough to be quickly identified. While those chairs which pass preliminary assessment are not guaranteed to pass a full laboratory evaluation, their chances are much improved.

From a structural perspective, only static loads have been disclosed in this guide (and then only approximately). Fatigue loads and cycles have not been included (the number of cycles involved in most fatigue tests is well into the hundreds of thousands and requires specialist equipment).

In contrast to the fatigue methods used in AS/NZS 4438, the tests in AFRDI 142 are in significant part 'offset' i.e. not applied in the median plane of the chair. ISO 21015:2007 is a good guide for those wishing to perform fatigue testing in a similar manner.

It should be noted that:

- Testing can be dangerous. Most tests involve large loads. It should only be undertaken if it can be performed safely.
- Testing a chair in the way described below does not guarantee the chair will pass a full laboratory evaluation.
- The approximate loads disclosed in this document are based on the July 2023 release of AFRDI 142. They may be modified with new releases.

The standard itself is not available for purchase.



**Australasian Furnishing Research & Development Institute Limited**

ABN 44 009 579 908, trading as Furntech

School Road (University Campus) Newnham Drive PO Box 2042 Launceston Tasmania 7250 Australia

Tel (03) 6326 6155 Fax (03) 6326 3090

Website: [www.furntech.org.au](http://www.furntech.org.au) Email: [info@furntech.org.au](mailto:info@furntech.org.au)

## RATED LOAD – WHAT DOES IT MEAN?

The standard comes with six certification options:

- 135 SS
- 135 MS
- 160 SS
- 160 MS
- 185 SS
- 185 MS

The 'SS' and 'MS' tags are simply acronyms for Single Shift and Multi Shift. MS chairs are designed for up to 24/7 operations, SS chairs for standard office hours. Both, however, indicate a very durable chair. To give some sense of relativity between the new and the existing standard; AS/NZS 4438 is the current Australia/New Zealand standard for height adjustable office swivel chairs and it comes in four levels: 3, 4, 5 and 6, where increasing number indicates increasing severity—both in terms of loads and the number of times they're applied (load cycles). In almost every test the loads and load cycles used in the 135 SS designated option are significantly greater than those used in AS/NZS 4438 level 6. And each of the other Rated Load certification options is more severe again.

## LOADING POINTS

All loads are applied approximately as specified in ISO 21015:2007.

1 kN ≈ 100 kg

The 'median plane' is the plane that divides the chair into two symmetrical portions, front to back.

## STRENGTH (STATIC LOADS)

### **SEAT LOADS**

#### GENERAL

Loads are applied both on the axis of the chair (in line with the gas spring) and towards the front corner of the seat (approximately 150mm out from the median plane and 100mm in from the front edge).



**Australasian Furnishing Research & Development Institute Limited**

ABN 44 009 579 908, trading as Furntech

School Road (University Campus) Newnham Drive PO Box 2042 Launceston Tasmania 7250 Australia

Tel (03) 6326 6155 Fax (03) 6326 3090

Website: [www.furntech.org.au](http://www.furntech.org.au) Email: [info@furntech.org.au](mailto:info@furntech.org.au)

Standards, Testing and Product Certification for Commercial, Domestic and Nursery Furniture in Australia and New Zealand

---

135 SS/MS

The chair must be able to bear a central load (i.e. on the axis of the chair) of approximately 4.1 kN and a front corner load of approximately 1.8 kN.

---

160 SS/MS

The chair must be able to bear a central load (i.e. on the axis of the chair) of approximately 4.8 kN and a front corner load of approximately 2.1 kN.

---

185 SS/MS

The chair must be able to bear a central load (i.e. on the axis of the chair) of approximately 5.2 kN and a front corner load of approximately 2.3 kN.

---

**BACK LOADS**

---

GENERAL

Loads are applied to the backrest in the median plane approximately 300mm above the seat.

---

135 SS/MS

The backrest must be able to bear a load of approximately 0.8 kN in the rearward direction.

---

160 SS/MS

The backrest must be able to bear a load of approximately 0.9 kN in the rearward direction.

---

185 SS/MS

The backrest must be able to bear a load of approximately 1 kN in the rearward direction.

---

**ARM LOADS**

---

GENERAL

Loads are applied to the centre of the armrests and front of the armrests (approximately 75mm back from the front edge). Horizontal loads are applied anywhere along its length (but not closer than 75mm from its front or rear edge).



**Australasian Furnishing Research & Development Institute Limited**

ABN 44 009 579 908, trading as Furntech

School Road (University Campus) Newnham Drive PO Box 2042 Launceston Tasmania 7250 Australia

Tel (03) 6326 6155 Fax (03) 6326 3090

Website: [www.furntech.org.au](http://www.furntech.org.au) Email: [info@furntech.org.au](mailto:info@furntech.org.au)

## 135 SS/MS AND 160 SS/MS AND 185 SS/MS

An armrest must be able to bear a vertical downwards load of approximately 1.2 kN applied centrally, a vertical downwards load of approximately 0.65 kN applied at its front, and a horizontal outward load of approximately 0.5 kN.

## STABILITY

Stability tests are generally applied in accordance with the methods outlined in ISO 21015:2007.

Various tests have been adjusted in proportion to the increase in stability requirements considered necessary for chairs being used by larger people e.g.

1. the *Front edge overturning* test has been made more severe.
2. the *Rearward overturning for chairs with backrests that can be locked in position* has been made more severe.
3. the *Rearward overturning for chairs with backrest inclination* test has been made more severe.

For item 3 above it is recommended that for the 160 SS/MS and 185 SS/MS certification options an extra stability disk be used.

For item 1 it is recommended that for all certification options the hanging mass be increased by approximately 3 kg.

## IGNITABILITY/FLAMMABILITY AND DENSITY

The requirements for foam ignitability and density are the same as those of AS/NZS 4438 level 6. Mesh chairs are also subject to a similar ignitability test. Fabrics are not subject to any evaluation.

## ERGONOMICS

Although there are no requirements for ergonomic/dimensional assessment in the new Rated Load standard it is recommended that the requirements of AS/NZS 4438 be followed with modification where considered appropriate.

*August 2023*



**Australasian Furnishing Research & Development Institute Limited**

ABN 44 009 579 908, trading as Furntech

School Road (University Campus) Newnham Drive PO Box 2042 Launceston Tasmania 7250 Australia

Tel (03) 6326 6155 Fax (03) 6326 3090

Website: [www.furntech.org.au](http://www.furntech.org.au) Email: [info@furntech.org.au](mailto:info@furntech.org.au)