

# Tire Rolling Resistance Test Rig

## Specifications

		Specification	
		Passenger Car (PC)	Truck and Bus (TB)
Measurement/Control range	Tire load force	10 to 15000 N	50 to 60000 N
	Inflation pressure	10 to 400 kPa	100 to 1000 kPa
	Drum surface speed	5 to 120 km/h / to 270 km/h (option)	
	Spindle force (Rolling resistance)	±300 N	±500 N
	Tire stand stroke*1	200 to 500 mm	300 to 760 mm
	Tire stand	1 position / 2 position (option)	
Instrumentation accuracy	Tire load force	±10 N	±30 N
	Inflation pressure	±1 kPa	
	Spindle force	±0.3 N	±0.5 N
	Distance (Tire axis to the drum surface)	±0.5 mm	
	Temperature sensor	±0.2°C	
	Drum surface speed	±0.05 km/h	
	Time	±0.001 sec	
Control accuracy	Tire load force	±20 N	±45 N
	Inflation pressure	±3 kPa	
	Drum surface speed	±0.2 km/h	
	Tire diameter	φ 500 to 900	φ 700 to 1500
Test tire	Rim size	12" to 24"	18" to 24"
	Tire weight	60 kg	160 kg
	Load application	≤ 1 mrad (≤ 0.057°)	
Tire stand alignment	Camber angle	≤ 2 mrad (≤ 0.114°)	
	Slip angle	≤ 1 mrad (≤ 0.057°)	
	Diameter	2.0 m / 1.7 m (option)	
Drum	Width	600 mm	
	Frame material	Aluminum / Steel (option)	
Test surface roughness (Drum)	Surface roughness	6.3 S	
	Surface material	Stainless steel (SUS420J2)	
Measurement reproducibility (σ)	Rolling resistance coefficient	≤ 0.05 N/kN*2	≤ 0.06 N/kN*2
Measurement point	Ambient temperature	0.6 m from the center line of drum width	
Installation requirement	Installation environment temperature	5 to 35°C	
	Floor weight capacity	2000 kg/m <sup>2</sup> (aluminum cast drum)	2500 kg/m <sup>2</sup> (aluminum cast drum)
Utility	Power supply	AC380 to 460 V ±10% 50/60 Hz ±5% 120 kVA*3	AC380 to 460 V ±10% 50/60 Hz ±5% 180 kVA*3
	Air	Higher than 0.5 MPa	
Size	Main body	W: 4220 mm D: 1600 mm H: 2900 mm	W: 4420 mm D: 1600 mm H: 3000 mm
	Motor cabinet	W: 1800 mm D: 600 mm H: 2350 mm	W: 2200 mm D: 600 mm H: 2350 mm
	Operating cabinet	W: 570 mm D: 800 mm H: 1887 mm	
Other	Options	Constant temperature chamber	
		Calibration device	

\*1 Distance from the roller surface to the center of tire rotation.

\*2 Standard deviation of three consecutive tests is the reproducibility value. The temperature variation for the three tests must be within ±1°C. If the environment temperature cannot be controlled to meet this requirement, we offer a constant-temperature chamber as an option. Please feel free to contact us when this option is necessary.

\*3 Power supply specifications depend on the selected drum material.



**Safety Warning!**

● For proper use, read the instruction manuals carefully before use.

**AND**  
A&D Company, Limited

3-23-14 Higashi Ikebukuro Toshima Ku, Tokyo 170-0013 JAPAN  
Telephone: [81](3) 5391-6132 Fax: [81](3) 5391-6148  
http://www.aand.jp

A&D Technology, Inc.

4622 Runway Blvd, Ann Arbor, MI 48108 U.S.A  
Telephone: [1](734) 973-1111 Fax: [1](734) 973-1103  
http://www.aandtech.com

A&D Instruments, Ltd.

Unit 24/26 Blacklands Way Abingdon Business Park,  
Abingdon, Oxon OX14 1DY UNITED KINGDOM  
Telephone: [44](1235) 550420 Fax: [44](1235) 550485

A&D Technology Trading (Shanghai) Co., Ltd.

Room 101, No.1 Fu Hai Business Building, No. 289,  
Zhang Jiang Bi Sheng Road, Shanghai 201204, CHINA  
Telephone: [86](21) 3393-2340 Fax: [86](21) 3393-2347

A&D Europe GmbH

Im Leuschnerpark 4, D-64347 Griesheim, GERMANY  
Telephone: [49](6155) 605 250 Fax: [49](6155) 605 100

A&D Australasia Pty Ltd.

32 Dew Street, Thebarton, South Australia 5031 AUSTRALIA  
Telephone: [61](8) 8301-8100 Fax: [61](8) 8352-7409

A&D KOREA Limited

Manhattan Bldg. 8F, 35-2 Yoido-dong, Youngdeungpo-gu, Seoul, KOREA  
Telephone: [82](2) 780-4101 Fax: [82](2) 782-4280

● Appearances and/or specifications subject to change for improvement without notice.

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\*RRTR-ADCC-01-BP1-11901

High accuracy and stability achieved through  
Model Based Sensor (MBS) technology

Truck/Bus (TB): ±0.5 N Passenger Car (PC): ±0.3 N FX Accuracy



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# Tire Rolling Resistance Test Rig

## Features

- **High accuracy and robust measurement**  
Rolling resistance:  $PC \leq \pm 0.3 \text{ N}$   $TB \leq \pm 0.5 \text{ N}$   
Measurement reproducibility:  $\sigma \leq 0.05 \text{ N/kN}$
- **Test standards compliance**
- **Fully automated**
- **Energy saving from aluminum cast drum**

## High accuracy and robust measurement

### ■ Model Based Sensor (MBS)

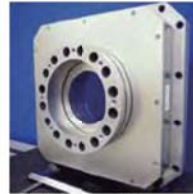
The core component for measuring rolling resistance uses A&D's in-house measurement technology with a digital sensor, which minimizes cross-talk error and measures 6 components of force with high accuracy.

### ■ Temperature monitoring and compensation

Three temperature sensors are installed in the system to monitor atmosphere, tire surface, and drum surface temperature. In addition, 6 components of force are digitally measured, and then optimal temperature compensation is applied to achieve the ideal measurement. A temperature chamber option is also available.

### ■ Highly rigid design

The drum and tire stands are designed to have high rigidity for precise tire alignment and measurement, which results in a high measurement reproducibility with  $\sigma \leq 0.05 \text{ N/kN}$ . This enables an optimized sample check for tire lots.



6 components sensor

## Test standards compliance

- The testing system supports international test standards required for tire testing. Standards include ISO 28580.
- All the test sequences are pre-programmed and fully automated.

## Fully automated testing

- In addition to standards tests, user specific test patterns can also be programmed.
- Up to 20 different test patterns can be scheduled.
- Test data including test condition information is saved in CSV format for flexible usage.

## Energy savings from the aluminum cast drum

- A&D introduced the world's first test drum using an aluminum cast drum.
- The aluminum cast drum reduces the inertia of the drum by almost half. Compared to a steel drum, system operating energy is reduced by 30%. (According to in-house testing)

## Measurement data

Measurement data with a standard tire.

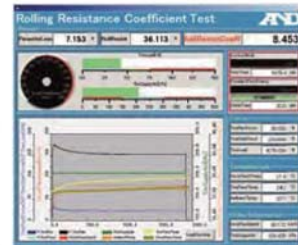
	Rotation direction	Calculation			Measurement						Skim test measurement				
		RR	RR temp. correct	RRC	Spindle force	Tire load	Distance (Drum surface - tyre axis)	Ambient temperature	Tire surface temperature	Drum surface temperature	Drum speed	Spindle force	Tire load	Distance (Drum surface - tyre axis)	Parasitic loss
		[N]	[N]	[N/kN]	[N]	[N]	[mm]	[°C]	[°C]	[°C]	[km/h]	[N]	[N]	[mm]	[N]
1	Normal	30.21	30.42	7.12	27.48	4272	286.87	25.9	28.8	26.4	80.02	3.94	100	308.50	5.15
	Reverse	30.64	30.98	7.25	27.49	4272	286.84	26.4	28.6	26.0	80.02	3.61	100	308.54	4.73
2	Normal	30.69	30.71	7.19	27.78	4272	286.95	25.1	28.4	26.0	80.02	3.86	100	308.53	5.06
	Reverse	30.78	30.87	7.23	27.55	4272	286.96	25.4	28.2	25.7	80.03	3.58	100	308.57	4.68
3	Normal	30.67	30.64	7.17	27.81	4272	287.06	24.9	27.6	25.1	80.03	3.91	100	308.56	5.12
	Reverse	30.77	30.69	7.18	27.62	4272	287.02	24.7	27.8	25.3	80.03	3.65	100	308.58	4.78

### RRC repeatability

	1	2	3	Ave.	$\sigma$
Normal	7.12	7.19	7.17	7.16	0.035
Reverse	7.25	7.23	7.18	7.22	0.034
Average	7.19	7.21	7.18	7.19	0.015

### Test tire information

<b>Size &amp; specifications</b>	<b>195/55R16 87V</b>
<b>RR (Data sheet)</b>	<b>30.8 [N]</b>
<b>RRC (Data sheet)</b>	<b>7.21 [N/kN]</b>



Main window

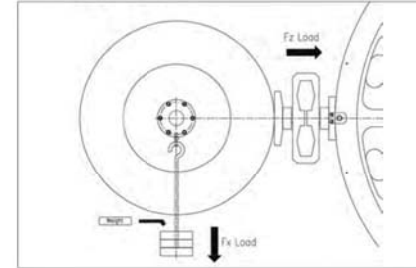


Drum

## Calibration device

A&D is well versed in force measurements and offers a high-quality calibration device that has been manufactured in-house for calibrating the system on site. The calibration device is available as an option and the user can calibrate the system themselves for easy maintenance, or an A&D engineer can visit the user's site for periodical calibration service.

### Calibration device



## Layout options

When installing the testing machine, space may be limited. However, the position of driving motor can be selected, which provides flexibility when installing the testing machine.

