

R. R. Moore

Rotating Beam Fatigue Testing System

The R. R. Moore, recognized as the standard for rotating beam fatigue testing, has been serving industry faithfully for more than 70 years. Over that time, the R. R. Moore has demonstrated an unsurpassed quality of machine design. The use of the rugged cast aluminum machine frame and heavy duty bearing housings are key components making a system built for many years of use.

Theory of Operation

The machine design is based on the rotating beam principle. The specimen functions as a simple beam symmetrically loaded at two points. When rotated one half revolution, the stresses in the fibers originally below the neutral axis are reversed from tension to compression and vice versa. Upon completing the revolution, the stresses are again reversed so that during one revolution the test specimen passes through a complete cycle of flexural stress (tension and compression).

Specimen Loading

The R. R. Moore machine can be equipped to test either straight shank or tapered-end specimens. The standard specimen length is $3\text{-}\frac{7}{16}$ in (87.3 mm). Specimens approximately 1 in (25.4 mm) longer or 1 in (25.4 mm) shorter can be used without affecting the calibration of the machine.

Straight shank specimens are held in place using precision specimen collets. Tapered-end specimens are machined to match the tapers within the spindles of the machine and held in place using threaded drawbars.

Stress is applied to the specimen by direct application of deadweights to ensure precise loading. Maximum fiber stress in a specimen having a 0.300 in (7.62 mm) diameter is 75,000 psi (517 Mpa). By decreasing the diameter, the value of the maximum fiber stress can be increased. An easy-to-use reference table within the operator's manual makes determination of the load weights needed to produce a particular stress a simple calculation.



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Load Frame Features

- The standard machine operates at an adjustable speed of 500 RPM to 10,000 RPM. Speed stability is $\pm 2\%$ of setpoint assuming a constant line voltage. If the line voltage fluctuates, the speed will change proportionally. A voltage stabilizer is available as an option to minimize brief voltage fluctuations.
- At the nominal rate of 10,000 RPM, the R. R. Moore machine completes 600,000 cycles per hour, 14,400,000 cycles per day.
- Integrated variable speed control provides the machine capability to operate at speeds from 500 RPM to 10,000 RPM. Speed control is important in testing certain alloys that heat up

when highly stressed, and it also allows certain correlations of results between high speed tests and previous lower speed tests.

Digital Display

An easy-to-read digital cycle counter with magnetic pickup device provides an accurate display of completed cycles in display increments of 1 cycle per count up to 99,999,999 counts. Push button controls are provided to reset the display count at the start of a test. The display is equipped with a battery back-up so that count data is not lost in the event of a power loss.

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Specifications

Model		RRM-A1	RRM-A2
Bending Moment Capacity	-	20 in-lb to 200 in-lb	25 kg-cm to 230 kg-cm
Capacity Increments	-	0.2 in-lb	0.254 kg-cm
Rotational Speed ¹	RPM	500 to 10,000	500 to 10,000
Load Weight Set ²	-	(8) 10 lb (1) 5 lb (2) 2 lb (1) 1 lb (1) 0.5 lb (2) 0.2 lb (1) 0.1 lb	(7) 5 kg (2) 2 kg (1) 1 kg (1) 0.5 kg (1) 0.2 kg (2) 0.1 kg (2) 0.05 kg
Minimum Effective Weight ³	-	10 lb	5 kg
Machine Weight ⁴	lb kg	90 41	90 41
Shipping Weight ⁵	lb kg	240 110	240 110
Nominal Shipping Dimensions ⁵ (height x depth x width)	in mm	39 x 13 x 20 990 x 330 x 510	39 x 13 x 20 990 x 330 x 510
Power Requirement ⁶	-	100 V to 120 V, 50/60 Hz	100 V to 120 V, 50/60 Hz

Notes:

- Speed regulation accuracy $\pm 2\%$
- Includes open-end wrench and allen wrenches for machine operation
- Of yoke and weight pan (items B, C, and E shown in picture at right)
- Does not include loading weights
- Does not include optional stand (RRM-D1) but does include standard weight set
- Transformer can be optionally supplied to step down 200 V to 240 V power. See RRM-B2 option below

Optional Accessories

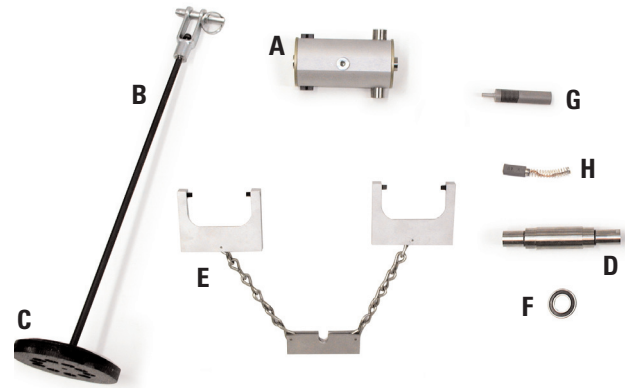
Catalog #	Description
RRM-B2	Transformer to allow operation on 200 V to 240 V single phase 50/60 Hz electrical power
RRM-C1	Set of two drawbars providing R. R. Moore machine with the capability to accept the spring type couplings, which are used when testing straight shank specimens. ¹
RRM-C1A	Set of two precision collets for 0.240 in (6.1 mm) diameter straight shank specimens
RRM-C1B	Set of two precision collets for 0.300 in (7.62 mm) diameter straight shank specimens
RRM-C1C	Set of two precision collets for 0.365 in (9.27 mm) diameter straight shank specimens
RRM-C1D	Set of two precision collets for 0.370 in (9.4 mm) diameter straight shank specimens
RRM-C2	Accessory set for tapered end specimens. Set includes the following items: <ul style="list-style-type: none"> Set of two (2) drawbars for tapered-end specimens Specimen extractor bolt Ring gauge for verification of proper specimen preparation Tapered end alignment verification specimen
RRM-D1	Equipment stand specially designed for the R. R. Moore machine. Stand measures 36 in (915 mm) high x 24 in (610 mm) deep x 36 in (915 mm) wide and includes leveling feet with vibration isolators. ³
RRM-E2	Constant voltage transformer for R. R. Moore with 60 Hz input ²
RRM-E3	Constant voltage transformer for R. R. Moore with 50 Hz input ²
RRM-FUR	Furnace system for R. R. Moore machine

Notes:

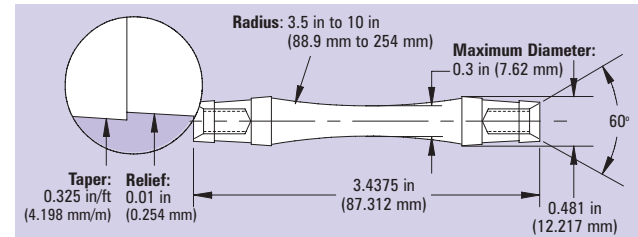
- A minimum of one set of specimen collets must be ordered with the RRM-C1 option to have a complete functional system.
- The stability of the incoming line voltage will directly affect the R. R. Moore's ability to accurately control speed. In cases where there are significant fluctuations in the line voltage or when speed control is critical, the use of a constant voltage transformer is recommended.
- When sold with the equipment stand (RRM-D1), shipping dimensions for the R. R. Moore system are 52.5 in (1335 mm) wide x 43.5 in (1105 mm) deep x 55 in (1400 mm) high and shipping weight is 218 kgs (480 lbs).

Replacement Parts

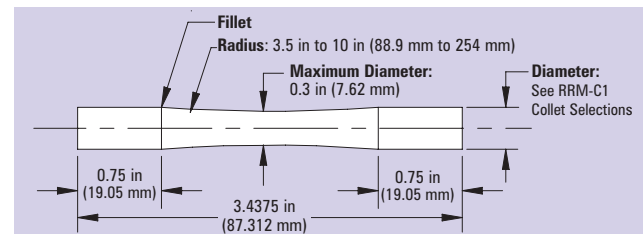
Photo Reference	Part Number	Description
A	219136-3	Bearing housing assembly
B	219138-2	Weight hanger assembly (less pan)
C	110373-2	Weight pan for RRM-A1
C	141052-1E	Weight pan for RRM-A2
D	110232-2	Bearing spindle
E	219133-2	Loading harness assembly
F	8810-2604	Bearing
G	219161-2A	Spring type motor coupler, $\frac{3}{8}$ in shaft
H	8970-9556	Motor brush
I	8920-9358	Digital counter display (not pictured)
J	8920-9360	Magnetic cycle pick-up (not pictured)
K	8934-9295	Variable speed control (not pictured)



Replacement parts (see table)



Tapered-end specimen



Straight shank specimen



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