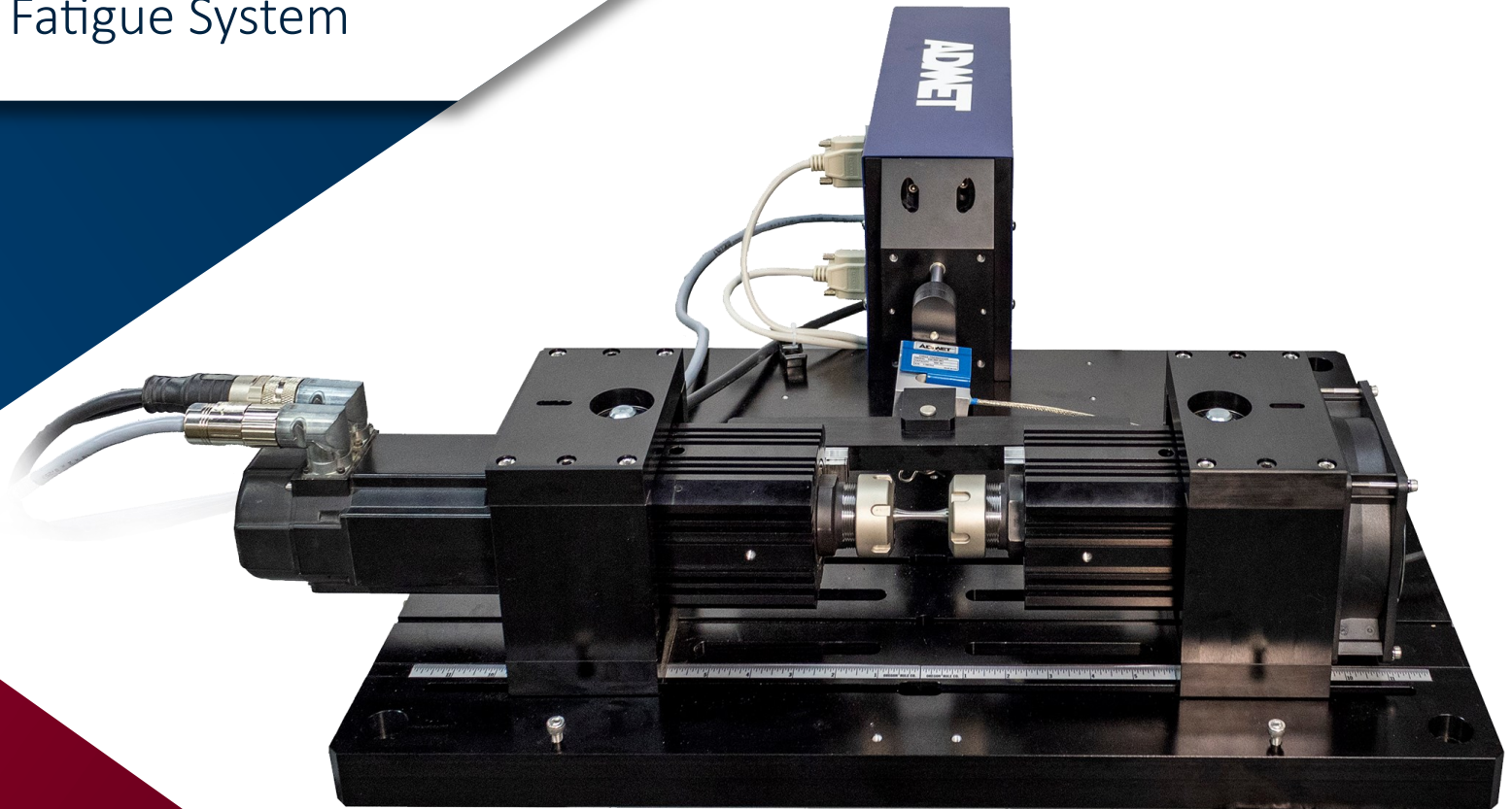




Since 1989. Made in the USA.

eXpert 9300 Series

Rotating Beam Fatigue System



eXpert 9300 Series

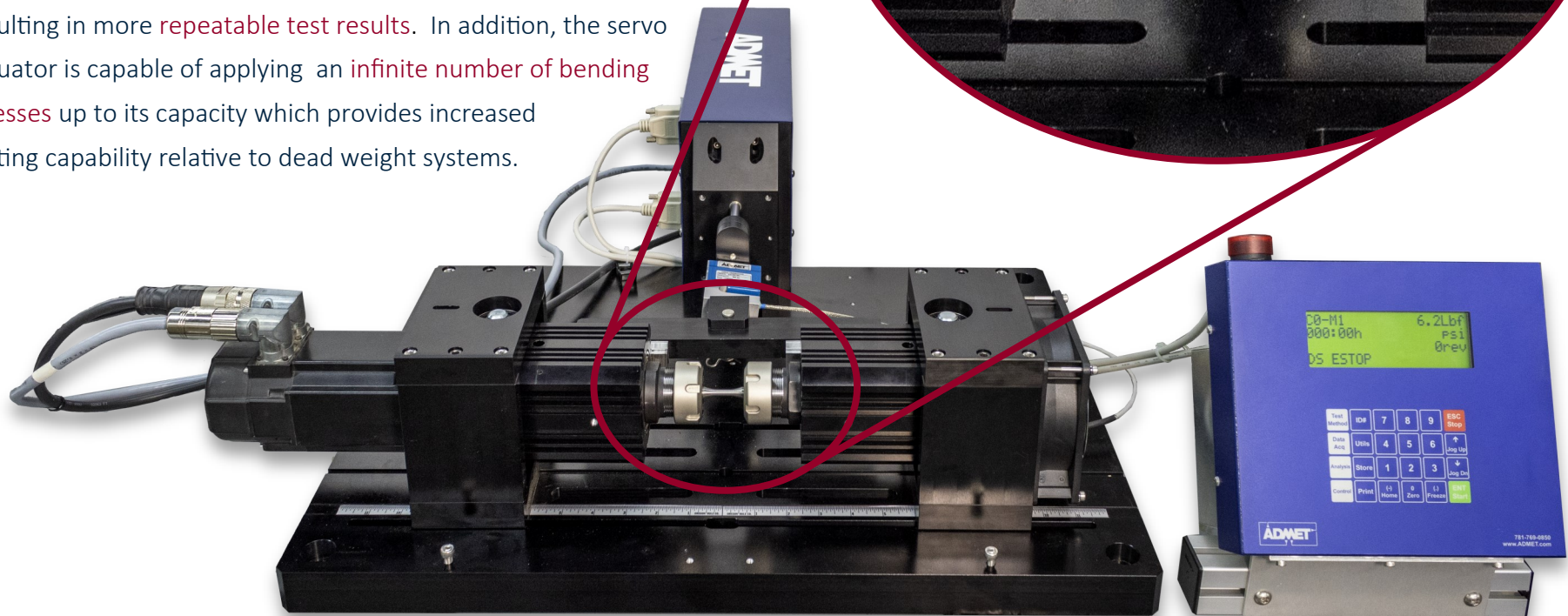
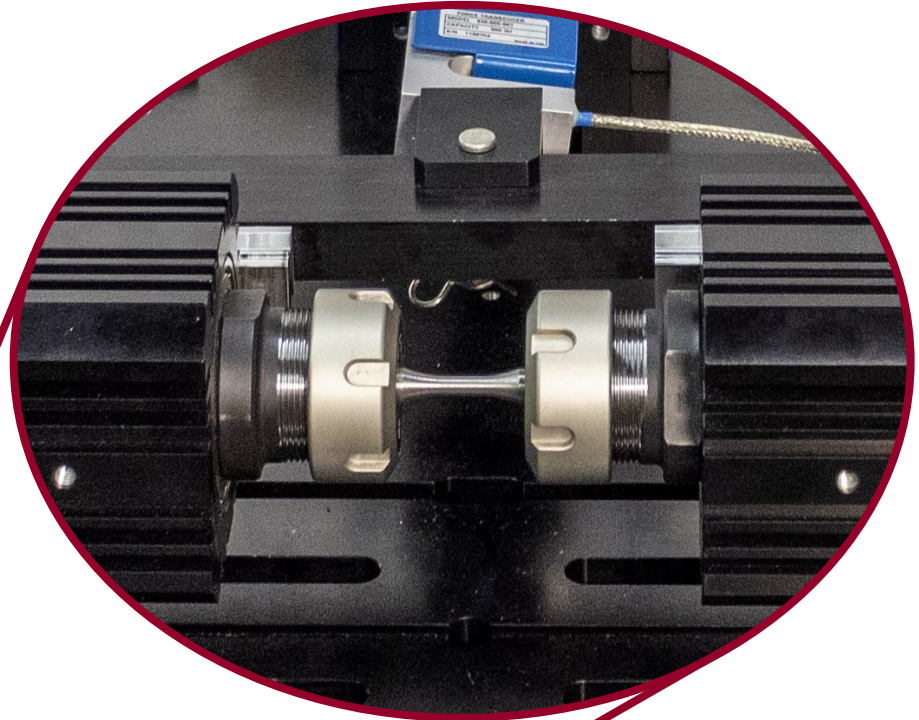


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Rotating Beam Fatigue System

The ADMET eXpert 9300 Series Rotating Beam Machine performs fully reversed fatigue tests on metallic samples at frequencies up to 100 Hz. It is a low cost compact table top unit compliant with the ISO 1143 Rotating Bar Bending Test Specification and is ideal for generating data necessary for constructing S-N (stress-life) diagrams.

The eXpert 9300 Series Machine features a four point bending mode closed loop servo actuator capable of producing bending moments per spindle of up to 50Nm (445 inlb). The four point loading configuration is superior to single point cantilever systems because it produces a constant bending moment along the entire length of the specimen, resulting in more repeatable test results. In addition, the servo actuator is capable of applying an infinite number of bending stresses up to its capacity which provides increased testing capability relative to dead weight systems.



eXpert 9300 Series

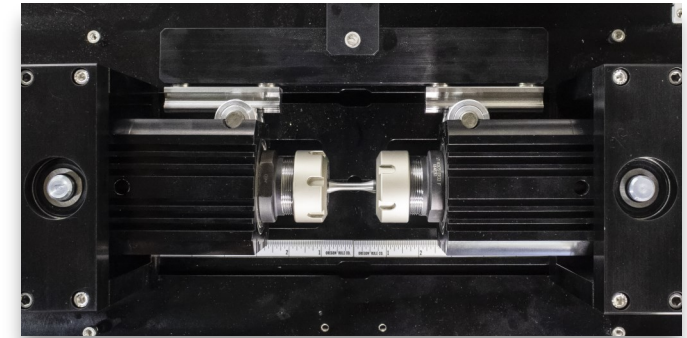


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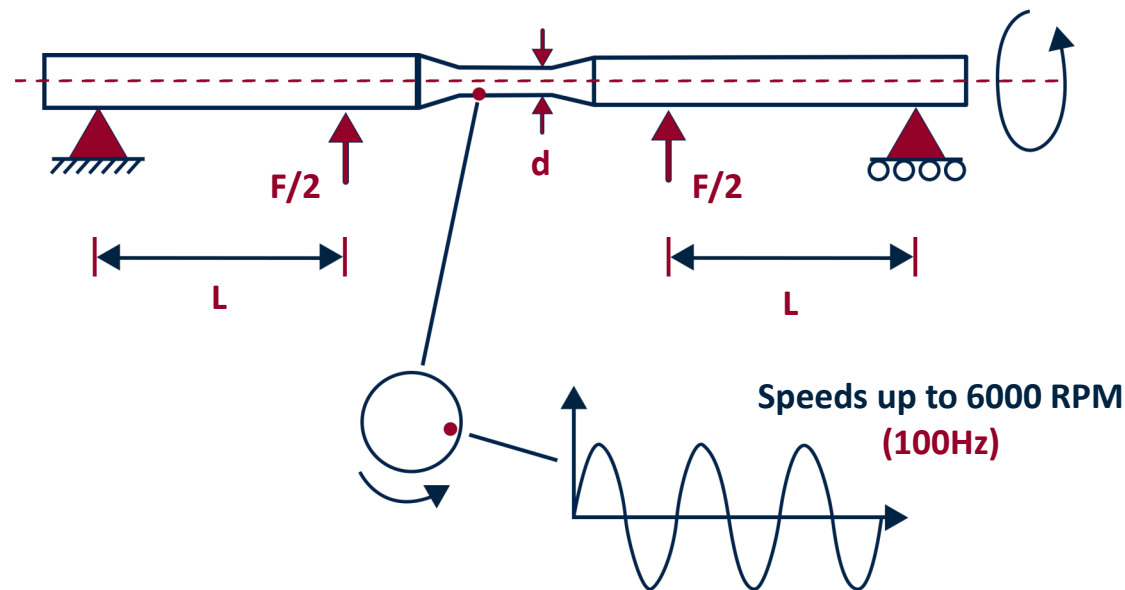
Rotating Beam Fatigue System

Principle of Operation

The schematic diagram shows how a pure bending moment is applied in the eXpert 9300 Series Rotating Beam Machine. Specimens with shank diameters up to 20mm are mounted into both the driven and passive spindles using ER32 collets. Each spindle pivots about a point and the driven spindle is fixed whereas the pivot for the passive spindle rides on a linear bearing parallel to the axis of rotation. Force, $F/2$, is applied to each spindle a distance, L , from the pivot point thereby inducing only a pure bending moment to the specimen. When the specimen is 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 tension and compression stresses.



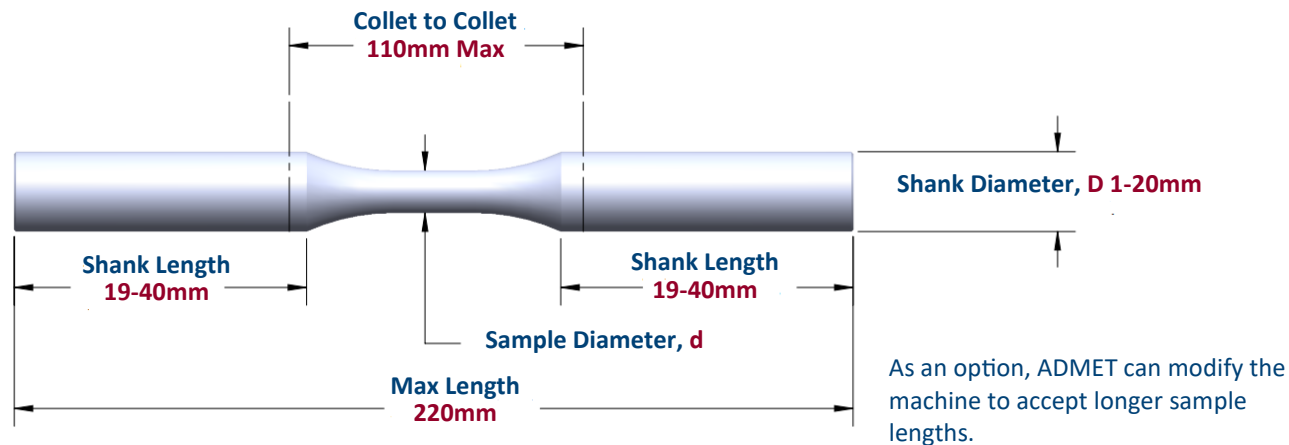
Overhead View



Rotating Beam Fatigue System

Test Sample Sizes

ADMET eXpert 9300 Series Rotating Beam Fatigue Testing Machines offer a low cost efficient means of constructing S-N (Stress-Life) curves. The machine is designed to accept cylindrical smooth straight shank specimens as outlined in the ISO 1143 test specification. ER32 collets are used to mount the test specimen into the passive and driven spindle and can accommodate 1mm to 20mm shank diameters. The maximum separation between collets is 110mm. The figure below lists the maximum sample dimensions that the eXpert 9300 Series Machine will accept.



The bending stress formula for the four point bending moment mode is:

$$\text{Bending Stress, } S = 16 \times F \times L / (\pi \times d^3)$$

Where,

S = applied bending stress in pascals.

F = total applied force in newtons (Note: The ISO 1143 specification defines, F, as the applied force to each spindle).

d = sample diameter in meters

L = force arm length (0.1m for eXpert 9300)

To get an idea of the range of bending stresses the eXpert 9300 Series Machine can apply, a 20mm and 5mm diameter sample subjected to a 50Nm bending moment (at each spindle) generates a bending stress of 64MPa (9.2ksi) and 4,074MPa (591ksi), respectively.

eXpert 9300 Series

Rotating Beam Fatigue System

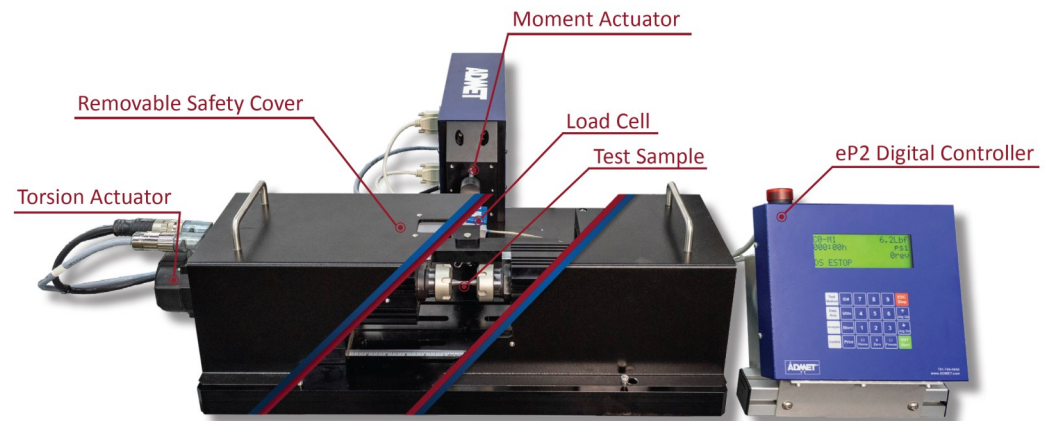


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eP2 Rotating Beam Digital Controller

The eP2 Digital Controller counts and displays cycles and will terminate the test upon sample break. It features a 4 line by 20 character display and 24 key keypad. Users access the eP2 Setup Menu via the keypad and enter the **maximum number of cycles, sample diameter and bending stress**. In addition to cycle count, the eP2 Controller displays **applied load, bending stress and spindle RPM**. The spindle RPM is adjusted during test via a potentiometer located on the eP2 Digital Controller.

The eXpert 9300 Series Machine includes a safety shroud equipped with proximity sensor allowing operation only when in place.



eXpert 9300—Rotating Beam Fatigue		Standard System
Moment Capacity (applied to each spindle)	Nm inlb	50 443
Rotational Speed	rpm	300 - 6000
Sample Diameter Range	mm in	1 - 20 0.04 - 0.79
Collet Separation (Up to)	mm in	100 3.94
System Size (Width X Depth X Height)	mm in	1,118 x 914 x 241 44x 36 x 9.5
System Weight (est.)	kgf lbf	45 100
Power		220 VAC, 1PH, 3PH, 10 Amp

ADMET's team of experienced engineers will work with you to deliver a system to meet your specific testing requirements. In addition to the standard eXpert 9300 Series Machine, ADMET offers both lower and higher capacity Rotating Beam Fatigue Testing Machines and spindle speeds that exceed 6,000 RPM. eXpert 9300 Series RBF Machines can be equipped with optional heating elements and fluid baths. ADMET also offers a dead-weight bending moment actuator in place of the active closed loop actuator. The base machine operates from 220VAC single phase power. An optional transformer can be supplied to operate from 110VAC.