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# Shock test approval opens way for military motor use

Dramatic video footage shows ABB's motors comfortably withstanding 30 "g" of force as they undergo severe shock testing at QinetiQ, the new science and technology division formed from the major part of DERA, the British Government's defence research and development organisation.

The video shows one of the motors flexing and bending but at no time does it break up or become a projectile, thereby passing the stringent shock tests required for use on Royal Navy ships. A sequence from the video can be viewed at [www.abbsp.co.uk](http://www.abbsp.co.uk).

The NES 814 test – which is the preferred specification for the UK MoD and stipulates the optimum method of testing for each platform - was used to establish whether ABB's aluminium ranges, in 56 to 250 frame size, qualify for use on Royal Navy vessels. Aluminium motors were chosen because of their lower weight and high elasticity, which allows the enclosure to flex without the risk of totally fragmenting.

In addition, the motors were tested to NES 1004 Data Sheet 28, which covers the minimum ruggedness requirement and Data Sheet 27, which requires the motors to be running before, during and after each test.

In an effort to reduce costs, the MoD is using as much standard equipment as possible, referred to as Commercial Off-The-Shelf (COTS). But all such equipment must be stringently tested to prove that it is fit for purpose. For motors, the minimum requirement is to withstand 15g, which is the level for motors installed on the weather deck and above. However, areas below the ship's waterline require much higher shock levels. As such, the tests were carried out with each motor mounted on 20mm thick plate – to represent a ship's deck - to which some 30g was then applied. The result is that ABB's motors, when fitted with shock mounts, can be used below the waterline and within 1 m of the hull.

"A key factor in selection is that replacement motors and spares must be available for at least 20 years," says Steve Ruddell, General Manager for ABB's motors & drives division. "I am confident we can meet both these demands."

ABB stresses the high quality of materials used in the manufacture of its motors, including extruded aluminium with a low copper content, which prevents corrosion while adding strength; bolt on cast iron nodular feet, flanges and end shields; and the use of type 63 heavy duty bearings.

"We do not cut corners on motor quality and these tests prove that our motors are very robust. If our standard motors can do this in fighting vessels, just think of the reliability this design will provide in traditional pump and fan applications," says Ruddell.

For many years, ABB's motors have been used in commercial marine applications. They are approved by all major classification societies.

ABB's logistics network was also a prime reason for selection. ABB Motor Service Partners provides service across the UK and ABB's international service network can give support in ports worldwide. Being standard components, ABB's aluminium motors are considerably less costly to service than the traditional bespoke motors that the MoD was using.

The first motors were fitted to high pressure compressors on board HMS Exeter, a Type 42 destroyer, recently in dock for a re-fit.

The acceptance of ABB motors for military use follows closely on the recent award to ABB of the supply of HV switchboards to a nuclear submarine.

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**Caption:** ABB aluminium motors, having undergone stringent tests to prove that the design can withstand 30 “g” of force, have been fitted on board one of the Royal Navy’s Type 42 destroyers.

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