Norbar is the only torque equipment manufacturer able to offer tool and measurement re-calibration services to the original factory standard on four continents. The accredited laboratories in Australia, USA, and Singapore use the same equipment and procedures as the factory’s UKAS accredited laboratory in the UK. Norbar’s Norbar laboratory is in operation in Shanghai.

GLOBAL SERVICE

Norbar’s Torque Calibration Services

Norbar Torque Calibration Services

Norbar has established a worldwide network of calibration laboratories with third party accreditation to a government approved body. These laboratories are located in UK (accredited by UKAS), Australia (NATA), USA (NVlAP), Singapore (SAC-SINGlAS) and China (TAF). All of the laboratories operate to BS EN 45001:2012 and ISO 17025:2005 which sets the standard for the technical competence of laboratories.

In addition to offering calibration of torque transducers, Norbar can provide calibration for measurement equipment. Norbar have supplied several airlines with beam and weight calibration equipment. Aerospace customers often require control over the entire calibration hierarchy for their torque measurement equipment. Norbar have supplied special tools, calipers and other weight calibration equipment to the Aerospace industry. Norbar’s tool data management solution, based on Torque Data Management Software (TDMS), provides a complete torque audit and torque measurement history.

USM – Ultra-Critical Load Measurement

USM-3 uses ultrasound to measure the change in length of bolts during fastening, a reliable, non-destructive method of testing. USM-3 can be used to test long to short fasteners in hard to access locations. USM-3 is the only instrument to be able to transfer the measurement from the test bolt to a reference bolt, providing significant more accurate load without costly data logging or the reduction of doubts which will change the fastener's off the print data-up-to.

The set of the various elements of load which determine the torque versus tension relationship can be easily extrapolated. In addition, the test can be used as a measuring point between internal or external ring slips, ring slippage and part load tightening using point load or torque.

USM-3 provides a highly versatile solution that is capable of verifying load in extremely complex situations. The ultimate accuracy for the USM is the only solution where one of testing campaigns described by NASA (Johnson Space Center) and International Space Station (ISS) space teams. The aging jet fighters and aircraft which have taken part in over 40 critical applications on the Space Shuttle (Mercury (Gemini), Apollo). Norbar’s USM-3 kits of instruments have been installed for on-site calibration purposes on the Space Shuttle’s expendable launch vehicles and satellites. These include Skylab and Galileo, U1P High Pressure (264 Gt) and Tefnut Magic. Norbar’s Calibration Chamber to Powell and HP Ducting (NASA) USM-3 is used for the high-speed tests that also include tests on the USM-3 and the tools listed in the previous section. The USM-3 is used for the following mounting on the Boeing 777 (Delta Airlines), 787 (Boeing), and 777 (Rolls-Royce Space Systems).
NORBAR IN THE AEROSPACE INDUSTRY

Given the often conflicting demands of aerospace for unparalleled safety whilst keeping weight to a minimum, no other industry has a greater need for the control of threaded fasteners. Norbar plays a crucial role in this industry for many of the world’s aircraft manufacturers, airlines and space programmes.

From our beginnings, providing torque wrenches for the Rolls Royce Merlin engines that powered most of Britain’s fighters and bombers in World War 2, Norbar has since been involved with every step on man’s journey to fly further, faster, higher – and more cost effectively.

TORQUE WRENCHES

In the 1940s it was recognised that having honed the cylinder bores of aircraft engines, this precision could be undone through the uneven tightening of the cylinder head. Norbar’s first torque wrenches were designed for this application and still used for this along with a host of other applications.

Precision is key to aerospace and Norbar torque wrenches are designed to hold their calibration over many thousands of tightening cycles. The mechanism itself operates in a direct drive and an adjustable operation is achieved by means of a push through square drive mechanism when this is needed. This means it can be calibrated without complete disassembly, whereas most competing torque wrenches are also relatively difficult to maintain in calibration in the clockwise and counterclockwise directions. Only a single direction of calibration is required with the Norbar system.

Unlike all metal torque wrenches that are very common in the aircraft industry, Norbar torque wrenches are easy to read, easy to use and comfortable to use. All of the plastics centre Norbar wrench handles are tested for their resistance to aviation hydraulic fluids. Many aircraft fasteners are impossible to reach with standard tools and there has been an example of aircraft loss due to the simple reason that a fastener could not be reached and was therefore never tightened correctly. Norbar offer an Engineer to Order (ETO) service to manufacture special fittings to reach these fasteners.

HAND OPERATED AND POWERED TORQUE MULTIPIERS

Norbar torque multipliers are geared devices that allow very high torques to be accurately produced from a compact tool package. Take for example Norbar’s HT-52 multiplier which can produce 1000 Nm from a package weight with a suitable torque wrench of around 3 kg – around half the weight of a typical 1000 Nm torque wrench. Given the tight confines of most airframes, the fact that this tool package utilises a wrench length of around 300mm will also be a major advantage.

Norbar’s ‘Chinook Kit’ was the first purpose built example but Norbar multipliers have since been adapted for several helicopter models.

The most common use for Norbar Handtorque™ multipliers is in the aircraft industry – a helium operated backdriving Norbar’s Drive max is the forcing arm elements that Norbar multiplier hammers have been adapted for several helicopter models.

Power multipliers operate using the torque wrench input of the Handtorque multiplier for a pneumatic or electric motor input. This gives a tool with near repeatable low levels of chatter (less than 2% r-r) and high-torque accuracy. These more sophisticated form these tools are fitted with a transducer measuring the torque at the output coupled with a control system that will shut-off the tool at a pre-determined torque. These tools achieve accuracies of better than 2% of reading.

Aircraft wheel rim bolting is an excellent application for Norbar’s Pneutorque® pneumatic torque multipliers. The use of a tool fitted with a transducer allows torque data to be retained for quality control purposes. Aircraft turbine maintenance requires a host of special offset torque multipliers for applications such as the main bearing retaining nut. A growing application for the Pneutorque multiplier is to provide the drive unit for an orbital line for the bearing retaining nut as it is critical that the bearing retaining nut is not over or under torqued. The use of the Pneutorque as the drive allows a very precise solution that the gearbox vendor’s personnel makes.

Pneutorque is also ideal for the disassembly of turbine stages. This is because although intended to a modest torque for assembly and startup, after the engine has seen service, the break out torque can be extremely high, often causing the tool to break. With Norbar’s special reaction fitting, a Pneutorque offers the perfect balance of torque and force which makes this component of the engine adjustable rather easy.

Professional torque wrenches are essential in F1® and other similar high speed equipment.

Precision tools for the aerospace industry.

Connection of hot air pipe (HP4) – Panavia Tornado

Connection of hot air pipe (HP4) – Panavia Tornado

Connection of hot air pipe (HP4) – Panavia Tornado

Number 3 Bearing Lock Nut Tool, GE CF6-80 engine

Number 3 Bearing Lock Nut Tool, GE CF6-80 engine

T-box™

Special spanner fitting for Fuel Cooled Oil Cooler (FCOC) – Panavia Tornado

Handoperated torque multiplier for F1® and other similar high speed equipment.