

INFORMATION RELATING TO THE LTI 20.20 SPEEDSCOPE.

LTI 20.20 "Speedscope" laser speed measuring equipment is required by the Secretary of State as with all such devices, to be Type Approved for enforcement use. The appropriate approvals in respect of the LTI 20.20 "Speedscope" are The Road Traffic Offenders (Prescribed Devices) Order 1993 and the Light Beam Speed Measuring Device Approval 1996. The latter came in to force on 1st April, 1996 and relates specifically to the LTI 20.20 "Speedscope"

To acquire such a Type Approval, equipment needs to be independently tested to extremely high standards of measuring accuracy and assessed for the effects of interference from Radio frequency and Electromagnetic fields.

It also needs to meet high standards in environmental factors such as extreme heat and cold and waterproofing.

It is Type Approved for use within the measurement ranges specified by the Manufacturer as 0 – 999.9 metres and 0 – 299 mph

The LTI 20.20 "Speedscope" has a speed measuring accuracy within +/- 1mph. Because it operates on laser light frequencies it is unaffected by Radio frequency and Electromagnetic fields.

It also meets all the standards in respect of the environmental factors.

The device uses as its measuring medium a beam of infrared laser light which has been approved to Class One laser standards and presents no health hazards.

The 3-milliradian beam, which has a maximum range of in excess of 1 kilometre in the United Kingdom version, has a width of approximately 1.2 metres at a range of 400 metres and is thus narrow and precise. At that range, however, the 'active' portion of the beam is somewhat smaller. The calculations carried out by the equipment uses the speed of light as the constant value.

The beam is aimed at the vehicle to be measured by means of a Sighting Scope mounted on the top of the equipment. The Scope has a x2 magnification. Contained in the Scope is a red sighting dot that is aligned to the axis of the beam. The operator has an audio/visual test procedure to ensure that the beam and red dot are accurately aligned. The red dot is an optical device that can only be seen through the Scope by the operator. It is not visible to the offending driver.

When the LTI 20.20 "Speedscope" is switched on the internal software will conduct self-diagnostic checks to ensure that all systems are functioning and that calibration is accurate. The successes of these checks are indicated to the operator by audible tones. Should any one of these checks fail then the equipment will display an 'ERROR' message, will not function and thus cannot be used for speed measurement. In addition to these checks, the camera system is sent to the manufacturer for annual calibration and servicing in accordance with Type Approval requirements. Subsequent to this servicing a calibration certificate is issued confirming that the equipment meets the criteria laid down by the Home Office Type Approval.

The combination of the beam width and scope alignments ensures that only the vehicle upon which the operator sights the equipment will be measured.

In accordance with the manufacturer's instructions the operator will sight the 'red dot' upon the target vehicle and holding the device steady, press the trigger on the LTI 20.20. "Speedscope" The equipment will then fire a stream of laser light pulses at the vehicle and take a series of measurements. The laser beam then reverts to the inert state until the operator wishes to measure the speed of another vehicle or, indeed, the same vehicle again.

The time taken to obtain those measurements and for refined software in the device to compute the results and present a speed-reading to the operator on the digital display is 0.3 seconds (300 milliseconds). At the same time it will compute and display the distance (range) from the operator at which the speed was measured. This latter value is, of course the range of the direct line of sight between the measuring device and the target vehicle.

Whilst making those calculations the software also examines the measuring data for inconsistencies and should it find any within extremely narrow parameters it will reject the readings and display an 'ERROR' message and not a speed. Thus it will not measure and display spurious readings. Additionally because of the nature of the beam combined with the error trapping safeguards it is not possible to obtain speed from any other than the targeted vehicle.

Other parameters checked by the system prior to calculation are, the power of the return signal, the laser frequency of the return signal, the timing interval and the optical path of that signal.

The digital display on the equipment is in whole numbers only and the equipment will automatically 'round down' the measured reading to the nearest whole figure. Thus a speed measured at 34.9mph will display as 34mph to the advantage of the driver.

Within the parameters above, readings taken directly from the line of travel (towards or away) will result in true measurements of the vehicle speed. If readings are taken at an angle to the direction of travel, e.g. from the roadside, then in accordance with the trigonometric principles of cosine there is a slightly lower reading in favour of the driver.

Thus from a table of cosine values it can be seen that a speed of 30mph measured from the direction of travel will measure as 29.54mph from a point 10 degrees from the direction of travel.

In summary therefore the LTI 20.20 is an extremely accurate speed measuring device operating well within the parameters required for Type Approval.

It will operate to the same level of accuracy throughout the whole range of 0 to 999.9 metres.

Its design includes error-trapping software that will prevent the operator obtaining inaccurate or spurious readings. Indeed in another application this device is approved for use by NASA in the Space Shuttle programme and is regularly used for speed and range measurements when docking on satellites.

Type Approval procedures require a Certificate of Conformity (Calibration Certificate) for the device to be issued annually by the manufacturer's agent.

That Certificate will indicate that when examined under test the device conformed in all respects to the standards for calibration accuracy.

The test routines carried out and documented in that process are laid down by the Home Office in their publication 'A Guide to Calibration requirements for Traffic Enforcement Equipment - Police Scientific Development Branch - Home Office Police Policy Directorate - Publication No 18/98.

In respect of range it requires: 'The device shall be used to make at least three different range measurements against 3 accurately measured distances of between 25 and 100 metres to a reflective target'

It is therefore calibration verified by measured points at 25, 75, and 100 metres , the details of which appear on the data sheet attached to the Calibration Certificate.

The LTI 20.20 is a linear measuring device utilising the speed of light as the constant value for calculation and employs the same calculation processes whatever the range and speed, be it 0 mph and 20 metres or 160 mph and 999 metres. ***Therefore if accurate at one measured point it will be accurate throughout the whole range. Thus three measured points are effectively a triple assurance. This is a well accepted scientific principle.***

In point of fact the LTI 20.20 Speedscope will measure to ranges well in excess of three kilometres, although the Type Approval limitation is to 999.9 metres simply because the readout display is only capable of four digits.

Given the nature of the technology, the device can be relied upon to give an accurate reading at ranges up to the Type Approved limit of 999.9 metres.

Further information regarding the Type Approval Process may be found at the following link:
<http://www.acpo.police.uk/asp/policies/Data/RPET%20Manual%20version%202-3.pdf>