

CPCS renewal test factsheet



Introduction to the CPCS renewal test

The industry-led CPCS Management Committee has determined that key safety-related knowledge must be checked on each category prior to the renewal of a CPCS Competent Operator (blue) card. The CPCS renewal test is the means by which blue cardholders will be tested on topics that reflect safety issues identified through consultation, that occur regularly on site.

For each topic identified there is a set of questions, from which a number will be included in the test and for which supporting information is provided in this factsheet. Each test will ask a total of 15 questions selected randomly to ensure all topics are covered.

The test will cover all categories within the scheme through modules. Some modules have been devised to cover a range of similar CPCS categories.

The CPCS renewal test is available on the CITB-ConstructionSkills Testing Services platform alongside the Health, safety and environment test.

The questions and answers will not be published but factsheets are available for each module to cover the topics.

How to use this factsheet

Prior to taking the test, cardholders are advised to carefully study the factsheet, which will prepare them in deciding the correct answer or answers to each given question. Correct answers are based on legislation or good practice adopted, in the majority of cases, by the construction and allied sectors.

It is acknowledged that variations may occur depending on the nature of the operation or on how the machine is used. However the correct answer to each question is based on common practices or manufacturers' requirements for the majority of machine types within each module, and applies to this test irrespective of how a machine may be used within a particular activity or sector. It is important, therefore, that this factsheet is studied carefully.

The questions are selected randomly and will not appear in the order that topics appear in this factsheet.

If the card holder does not answer all the questions correctly, the score report issued after completing the test will indicate the topic areas in which the questions were answered incorrectly. The cardholder should, prior to retaking the test, re-study all topic areas.

Scoring the test

To be successful in this module, cardholders need to correctly answer a minimum of 12 out of the 15 questions presented. However, because many of the questions are safety-related, in the majority of cases, a minimum number of questions per topic need to be answered correctly. Failure to do so, even if the overall minimum number of correct answers has been reached, may mean that the cardholder is unsuccessful on the test.

The top of each topic states the number of questions that will be presented for each topic and the minimum number of questions that must be answered correctly in order to pass the test.

Concessions

To avoid duplication of questions where similar categories are held, booking concessions are provided. This means that, if several similar categories are held, only one module needs to be booked. The following chart indicates if there is a booking concession for this category.

Concessions are provided to holders of the category of Excavator 360.

Other categories held:

Excavator 180

Demolition plant

Needs only to book:

Excavator 360

Demolition plant

Note: *The above concessions are an outline of what tests you may have to book; please refer to Module matcher for details of full concessions where more than one category is held.*

This factsheet has been designed to highlight only topics that have been identified through industry consultation area with safety issues or where good practice is often not complied with. The questions within the CPCS renewal test for this category also reflect this.

It is not intended as a training tool and cannot list all essential knowledge and understanding for this category. Operators must always follow manufacturers' requirements, industry good practice and be aware of their own limitations with the machine, and seek further guidance and help where needed.

Further information about the CPCS renewal test can be found at www.cskills.org/cpcs

Preparation for work *(Preparation)*

Topic scoring information: 3 correct answers required out of 5 questions presented to pass

- The excavator 360 is commonly used across a variety of sectors, including construction, demolition, piling and extractives and is available in a wide variety of sizes. The majority of excavators carry out work using a bucket, but numerous attachments are available that widen the scope of this machine, such as grabs, breakers and shears. 360 excavators are either tracked or wheeled and this factsheet covers both types.
- Daily and periodic checks form part of the operator's duties, for which they need to follow manufacturer's instructions. Where any defect is noticed by the operator, they need to report it immediately and before the machine is used, and seek the appropriate expertise who can decide whether the machine can be put to work. An operator could incorrectly diagnose what they consider to be a minor fault, such as a small leak from the latch cylinder in a quick-hitch coupler, where in fact it could be severe possibly leading to the injury as the machine's performance may significantly deteriorate or a component fail. For example, an oil leak in the quick-hitch coupler could cause a loss of pressure and release the attachment.
- As 360 excavators use a wide variety of tools and attachments, it is now common through ease-of-use to use a quick hitch coupler to connect an attachment to the machine's dipper arm. However, buckets and other attachments have been known to detach unintentionally during work, causing injuries and death. On semi-automatic types, a locking pin is used to prevent the latch or lock from opening and this needs to be inserted into the correct hole. Investigations into attachments that have become detached have shown that the locking pin was missing or inserted into the incorrect hole.
- The suitability of a working tool must be checked before it is attached to the machine using a quick-hitch coupler. Some tools, such as hydraulic breakers, - may not be recommended by some quick-hitch manufacturers, as vibration can cause rapid wear on the coupler's components, increasing the risk of failure. On fully automatic types, it is vital that the operator, immediately after coupling the attachment, ensures that full hydraulic pressure is applied to the coupler's latch. For all types, the operator must further exit the cab and check both visually and physically to ensure that all locking pins are inserted correctly and are retained and secure, or that latches are fully engaged and locked.
- If a tool that requires pressurised oil has been used, care must be taken when removing the tool, particularly when disconnecting the oil feed and return lines. High pressure oil may be within the hydraulic lines and must be exhausted or relieved and the engine stopped before the lines are disconnected. Manufacturers guidance as to depressurising the relevant part of the hydraulic system must be followed as unscrewing a coupler to release any oil pressure must not be undertaken as an injury can occur through the ejection of high pressure oil. Protective gloves should be worn as the oil and couplers could be very hot, and burn unprotected skin.
- On machines where a bucket or attachment is directly coupled to the machine's dipper arm, changing an attachment means that the holes of both the attachment and the dipper need to be aligned to allow the pins to be inserted, requiring a level of skill from the operator. It is common to use an assistant to guide the operator in aligning the holes. The operator remains responsible for the operation and must not allow the assistant, as has occurred, to insert their fingers into the pin holes to check alignment. Any small movement of the dipper or attachment can cause an injury.

Working efficiently

Topic scoring information: 0 correct answers required out of 1 question presented to pass

- 360 excavators are used by a wide number of plant hire companies and contractors, with fuel costs now forming a major part of production overheads. The operator can minimise the fuel they used by working the machine efficiently without the need to use maximum engine speed. In nearly all cases, manufacturers indicate in both the operator's manual and on the machine's rev counter the optimum engine speed or range that will ensure the engine, transmission and hydraulic systems to run efficiently.
- The majority of 360 excavators are now fitted with selectable working modes that optimise the engine speed and hydraulic settings for different types of work, such as grading or heavy excavation. Operators should familiarise themselves with each setting and select the one that ensures the machine is working most

efficiently for that operation. This reduces the fuel used, aids production and makes the machine easier to operate as there is generally better control of the hydraulics.

- Due to the reliability of modern machines, the operator should switch off the excavator's engine when they leave the cab, even for a short break, to further reduce the consumption of fuel.

Lifting and using attachments *(Working tasks)*

Topic scoring information: 3 correct answers required out of 5 questions presented to pass

- 360 excavators are commonly used to lift a suspended or slung load, for which certain precautions need to be taken. Before a load is to be lifted, the lifting operation needs to be properly planned and the operator or other relevant person needs to ensure that the machine is approved and equipped to lift a suspended load. The manufacturer's lifting capacities chart or data must be read in order to determine the maximum load that can be lifted at a particular reach and height. The reach is usually the horizontal distance from the centre of the slew ring to the vertical centre line of the lifting hook. The majority of lifting charts for 360 excavators also show the weight that can be lifted, both over the front and rear of the machine, and over the side. Due to the narrower chassis (tracked or wheeled) the lifting capacity is, in most situations, reduced. On wheeled machines, the lifting charts indicate lifting capacities in variety of situations when stabilisers are fitted. If the manufacturer's data is not known, guidance states that the excavator should not be used for lifting duties.
- Boom lowering control devices, commonly known as check valves, prevent the boom from lowering in case of hydraulic failure, such as a burst hose, and these need to be fitted along with an overload warning device on excavators where the maximum lifting capacity exceeds 1 tonne.
- According to regulations, all lifts have to be properly planned by a trained and experienced person and should take into account all factors in order to minimise a risk of an overturn or failure. When a lift is being planned, the weight of the lifting accessory (gear), such as the lifting chains, needs to be added to the weight of the load and including any packing. If the bucket is to remain attached to the machine, the lifting capacity needs to be reduced to take into account the weight of the bucket and the quick-hitch coupler, if fitted.
- When a lifting accessory, such as a two-legged chain, is attached to the hook mounted on a quick-hitch coupler, the operator needs to tilt the coupler (by extending the bucket ram) sufficiently to ensure that the chains hang freely and does not foul any part of the coupler.
- Before any attachments are fitted or used, their intended use, their weight and the required working radius needs to be known. Although the machine may be able to use an attachment at minimum radius, its weight may mean it can become unstable if it is used beyond the intended working reach. The operator must have had sufficient training on the attachment and be aware of any issues that can cause stability or damage to the machine, such as a swinging clamshell bucket.

Working safety and with others *(Working safely)*

Topic scoring information: 1 correct answer required out of 2 questions presented to pass

- When the operator needs to leave the cab, even if it just to check something externally, it is good practice and important that they switch off the engine and lower all equipment to ground level, even if it just to check something externally. It has been known for operators when leaving cab to keep the safety bar in the down or active position lever, and have inadvertently moved a lever and caused unintentional machine movement. Accidents have also happened when the operator has chosen to operate a lever from outside the cab, for example to change a bucket, leading to unintentional movement and injury.
- After entering the cab but before starting the engine, the operator must check that any clothing is not caught on the operating levers, as assistants or those within the operating radius have been injured as the machine starts to slew unintentionally when the engine was started.
- Assistants or banksman are commonly used to assist in excavating and lifting operations. The hazardous area for any 360 excavator whilst working is within the operating radius over 360 degrees. All assistants and others must be clear of the working area and be in a safe place when work is being carried out.

- When loading a machine such as dump truck or forward tipping dumper, the excavator operator should never load the machine unless the driver is in a safe place. In the case of a dump truck, the driver can stay inside a protective cab, but in the case of a forward tipping dumper, the operator must leave the driving seat and stand in a safe place so that they cannot be struck by the excavator's bucket or by any overspill from the bucket.
- If the excavator is working within a restricted or enclosed area, the operator must take into account both the working radius (reach and slew) and height of the boom, particularly where operations are close to pedestrians or moving vehicles, when appropriate methods to prevent contact must be taken. If a signaller/banksman or any other person enters the boom's working area, the operator must immediately stop all hydraulic movements until the area is clear. Workers and others have been trapped between the boom components and a structure.

Stability

Topic scoring information: 1 correct answer required out of 2 questions presented to pass

- Although 360 excavators are designed to be stable, operators need to be aware of the safe parameters as the machine can become unstable if they are exceeded. Although the majority of machines can travel with a suspended or slung load providing certain requirements are followed, uneven ground can cause the load to swing, making the machine less stable. If slewing a suspended load too fast, particularly if operating near to maximum radius, the momentum of the load can cause the load to overshoot its intended placing point, and has been known to strike structures or other machines.
- When travelling the machine up and down slopes, in principle the majority of the excavator's weight should be kept up hill. Travelling up an incline normally means extending the dipper and keeping the bucket close to the ground. If the boom and dipper are fully crowded back, the weight bias is towards the rear of the machine, and this has caused excavators to roll backwards. If the excavator is lifting a load whilst on a slope, or is travelling down a steep slope with a suspended load, the increase in radius means the machine is less stable and could overturn.