





Mini Excavator Purchasing Guide



Introduction to the Mini Excavator Buying Process

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Mini excavators remain the popular choice for a variety of tasks within a diverse range of industries. Manufactured by Bobcat, John Deere, Hitachi, Terex, Case, and CAT, among others, new models are Tier 4 certified and accept an abundant range of time-saving attachments. Whether you're looking to purchase or rent, the most cost-effective first step is to find a reliable dealer. Be on the lookout for these two aspects of dealer support:

1. Service Level Agreement (SLA)

Post-sale support takes shape in a quality service level agreement. The SLA stipulates the terms associated with any emergency repairs as well as your routine maintenance schedule, both of which are provided by the dealer or third-party technicians they contract with.

When comparing SLAs, make sure they include:

- **Specific parts** – Parts used for routine service and repair are listed in detail. The SLA will catalog acceptable substitutions if the manufacturer's preferred part is unavailable. It will also include any fees and additional costs not covered under the service plan for parts and labor.
- **Maintenance schedule** – This details the frequency of each type of maintenance on the mini excavator, including standard maintenance, extended maintenance (includes operating systems), and comprehensive maintenance (covers every part and system of the machine).
- **Customer support** – If the dealer you're considering does not provide 24/7 customer support, check the SLA for a guarantee on response-time. This will vary based on your geographical location and the size of the dealer. Ideally, it will be the next business day.

2. Understanding jobsite requirements

Working knowledge is another major benefit of a professional dealer. They ensure the machines you're using comply with all U.S. Environmental Protection Agency regulations as well as any local statutes governing the use of non-road engines and machinery. The dealer

may also be able to connect you with representatives of local regulating bodies and point you in the right direction for any permits associated with the mini excavator and your specific jobsite.

In the meantime, this purchasing guide covers the trends, types, specs, and attachments that continue to make the mini excavator so popular. We'll also provide more tips and advice on what to look for in a quality dealer to ensure you make the best purchase possible.

Trends

A recent [survey](#) conducted by Purchasing.com revealed a growing trend toward the number of used machines in certain market segments. To better understand the motivating factors of those interested in purchasing used heavy equipment, we compiled data from more than 71,000 inquiries made between 2011 and 2014.

The tendencies toward used machinery were centered on EPA requirements, with buyers rebuilding their fleets after the recession, as well as the inclusion of the newer real-time analytics that allow fleet managers and operators to monitor and fine-tune the machine's performance.

If you're comparing used mini excavators, there are a few main points to take into consideration: lifespan and operational hours, the physical condition of the machine, and EPA compliance.



Lifespan and operational hours

In general, most mini excavators are engineered with an operational lifespan of 10,000 hours on the high end. Heavily used machines, and those that have had less than the recommended maintenance, may start to give out and experience costly repairs around 8,000 hours of use.

When comparing used machines, give preference to those manufactured within the last three years and that have less than 2,000 operational hours logged on their hour meter. These models will include most of the recent technology, be anywhere from 25% to 50% cheaper than a new machine, and still have plenty of life left in them for full-time use.

- **CAUTION:** Hour meters can be tampered with. According to some reports, it's an easy process on certain models. Buying through a trusted source is one way to ensure you're getting what you pay for. You can also do some quick math, averaging the hours on the hour meter with the year of manufacture. Does the weekly average pair with the owner's claim for "light" or "part-time" use? What about the foot pedals – do they show more wear than would be normal for the hours logged? Finally, ask to see service

records. Most dealers should be able to provide a detailed log of all maintenance performed on the used machine they're selling you.

Physical inspection

Inspecting a mini excavator involves more than just kicking the tires (though that's important too). There are a number of specific signs of wear and tear to be aware of, indicating excessive use and costly repairs on the horizon. These include:

- **Connection points** – All connection points around the boom, stick and bucket should be solid and free of any give or movement. Pins and bushings should be tight, indicating the machine was properly cared for and, more than likely, greased regularly. Loose connections can lead to inaccuracies between the stick and the actual placement of the bucket.
- **Structural integrity** – Mini excavators that have cracks, bends, or sizable dents on the body of the machine or the boom may be compromised structurally. Cracks are particularly dangerous at the connection points. And don't forget to check the undercarriage. Large dents underneath the machine may also indicate compromises to its safety and performance capability.
- **Hydraulics** – Unless it's leaking badly, you may not be able to spot a slow leak under the machine. But slow leaks can be just as costly. So check under the hood for any leaks in the hydraulic pump as well as the hydraulic line hoses and cylinders.
- **Attachments** – These often represent the major source of productivity for a mini excavator. Whether the machine only comes with a standard bucket or a number of additional attachments, check each for wear and tear. In particular, be on the lookout for scalloping between the bucket's teeth which can impact its cutting force.
- **Tracks** – Though not a component of the excavator's mechanics, replacement tracks can still represent something of an investment – \$400 to \$3,000 per set on average. Inspect the remaining tread for wear and, in particular, cracks or uneven wear which can indicate a mechanical problem. Ideally, a used mini excavator should have rubber tracks with at least 40% to 50% of their wear left.

Emissions Tier (EPA)

Emissions standards, such as interim Tier 4 and Tier 4, are now required for all newly-manufactured non-road diesel engines produced in the United States. In short, the standards and subsequent engine modifications are intended to dramatically reduce the levels of harmful emissions commonly produced by these machines, such as particulate matter and Nitrogen Oxides.

But Tier 4 regulations only apply to newer models. Older excavators, like those on the used market, must adhere to Tier 1 to Tier 3 emission standards, phased in by horsepower rating

from 1996 onward. When buying used, make sure the machine you're considering is compliant within one of these three categories: (1) Tier 1 for engines from 1996 to 2000; (2) Tier 2 for engines from 2001 to 2006; or (3) Tier 3 for engines manufactured from 2006 to 2008.

Types

Mini excavators come in two types: tail swing, sometimes known as “conventional house,” and zero-tail swing. The one you select will largely be determined by your output requirements and available workspace. Here's how the two compare.

Tail swing excavators

Conventional house models feature a rear counterweight that stabilizes the excavator during operation and offsets added weight in the bucket. This counterweight extends 6 inches or more beyond the width of the tracks as the machine rotates during operation. The design can be problematic in tight work areas, particularly when it comes to rotating and placing spoil. However, they reportedly offer a number of different advantages largely due to the extra space.



According to leading manufacturers, tail swing models provide the greatest lift capabilities, including more lifting capacity as well as greater bucket and arm breakout force – all of which is attributed to the additional leverage achieved through the counterweight. Tail swing excavators also have slightly roomier cabs, offering some additional comfort and maneuverability to the operator. For these reasons, some dealers point to this option for the widest variety of construction applications.

Zero-tail swing excavators

Not to be outdone, zero-tail swing excavators provide comparable levels of performance when it comes to dig depth, reach, cutting height, and dump height. Plus, they can be substantially easier to navigate in tight work areas. Zero-tail swing models have a counterweight that rotates within the width of the excavator's tracks, making them far easier to operate down corridors and alongside walls or other immovable barriers.

Their design also provides an additional cost-saving benefit: ease of access. The service points on a zero-tail swing excavator are typically accessible at ground level, simplifying maintenance and service by keeping all major parts and components easily within reach.

Leading brands

As briefly listed in the introduction, there are easily more than a dozen brands currently producing mini or compact excavators. We've selected three of the most widely recognized to

give you a sample of how they compare, where they focus their research and development, and the industries and applications they cater to.

Bobcat

Mini excavators from Bobcat are known as the M-Series. They have been redesigned to provide a higher degree of performance through a smaller, more lightweight machine. Seemingly focused on a range of construction applications, they've bolstered digging performance through improvements to cycle times while upgrading the hydraulic system to deliver greater and more consistent levels of power to attachments.

M-Series machines are supported by integrated slew brakes that stabilize the load and keep it from shifting while working on inclines. This provides greater accuracy and frees the operator from having to manually engage the slew brake. Bobcat has also reengineered the design of the machine to provide a new x-frame undercarriage that delivers more ground clearance and makes cleanup easier.

New features on the M-Series include auto shift travel, auto idle, and fingertip controls.

John Deere

Specializing in compact and reduced tail swing designs, John Deere mini excavators are built to maximize fuel efficiency while minimizing noise. They feature direct-injected diesel engines, enabling them to be used in a variety of locations that may be sensitive to excessive noise.

Designed to accommodate a range of attachments, standard features include mechanical quick-coupler and auxiliary hydraulics. This versatility makes them well suited to farming, landscaping, and a variety of material handling applications.

Deere has also added improvements to the undercarriage in the form of hydraulics, allowing the operator to retract the undercarriage to less than 40 inches, easily navigating through doorways, alleys and other narrow passageways.

Notably, their cab designs have received best-in-class recognition for comfort and visibility.

CAT

Providing one of the slimmest profiles on the market, the smallest CAT mini excavators are little more than a seat, a set of controls, and a place to rest your feet. These compact dimensions make them popular among individuals for basic trenching, digging, and similar light-duty earth-moving tasks.

Far less intrusive than larger excavators and ideal for constricted spaces, they save a substantial amount of time when compared to manual labor. Further capitalizing on the narrow design, CAT models feature an extending undercarriage and blade that can be retracted, allowing the machine to navigate constricted passageways and provide access to areas that larger models would be unable to service.

Featuring a customizable stick length, they also include full pilot controls that eliminate the need for cable maintenance, improving ROI by lowering long-term costs.

Note: we've profiled the smallest model here for its standout design, but CAT produces a wide range of mini excavators with outputs all the way up to 65 hp.

Specifications

When comparing mini excavators, a few of the primary factors to consider are its digging depth, dump height, and operating weight. These three considerations almost always affect the type and size of machine you get as they directly impact the level of productivity on the jobsite.

Before committing to a particular model, pair your specific needs with the machine's capabilities to see how they match up. An undersized excavator will not have the power or functionality to accomplish a larger job effectively (not to mention safely). And while bigger may seem better, a machine that's too large may cause unwanted damage to the jobsite while burning through unnecessary amounts of diesel fuel.

With this in mind, here is a list of the top specs manufacturers use when comparing their mini excavators to a competing model. While some machines may fall outside of these ranges, they represent an average of those currently available on the market.

Bore

Typically used for underground utility construction and the installation of conduit or cable, directional bores are capable of drilling horizontally underground and average diameters of 3.7 to 4.5 inches in diameter for a mini excavator.

Net Power

This represents the total output the machine is capable of with the lower end reserved for light duties like landscaping and material handling while the higher end is dedicated to stump removal, trenching, heavy-duty construction, and mining applications. Expect to find horsepower that ranges between 10 hp and 50 hp.

Swing system

A swing system design allows the operator to hydraulically shift the boom within a certain range of degrees left or right. This is used for offset digging and trenching parallel with the machine's tracks. Common swing speeds are between 9.2 and 11 RPMs. Degree of swing often

varies by side, with 50° to 60° being common on the right swing and 60° to 80° common on the left.

Engine fuel

Given the horsepower that even light-duty tasks require, mini excavators are diesel fueled (thus the Tier 4 certification requirements) and include tank sizes that range from 2.6 gallons to 33 gallons depending on the size and output of the machine.

Maximum governed

Intended to maintain the torque load on the engine under varying demands, a common maximum governed RPM for mini excavators is around 2200 RPM.

Max digging depth

This is often one of the primary considerations when buying a mini excavator as it dictates the depth of the trench. Within the mini excavator category, expect to find max digging depths that range between 5.6 and 12 feet deep.



Max dump height

This is another primary consideration, especially when using the machine for materials handling on a construction site. Max dump heights extend from 6 to 13 feet.

Operating weight

Referred to as “mini” or “compact,” this segment of excavator typically weighs between 2,000 and 18,500 lbs and is chosen for the minimal impact it has on the work environment, especially crucial when operating on costly grounds.

Attachments

Attachments make or break the productivity and resulting ROI of a mini excavator, which is why name brand manufacturers and third-party producers continue to broaden their offerings while improving on existing attachments.

One of the most popular developments that’s now standard on almost all new attachments is the inclusion of a quick coupler. Designed to minimize the time required for switching tasks, quick attach coupling devices enable a single individual to swap attachments without the use of tools.

There are two main types of quick couplers: semi-automatic and automatic. They both perform essentially the same, allowing the operator to control the primary attachment

mechanism from the cab. They also include a safety device that guarantees the attachment is secured properly. And that's where you'll find the difference: semi-automatic requires the operator to manually engage the safety device at the coupler itself while the automatic variety uses an internal device activated remotely.

Here's a quick rundown on some of the most universally popular attachments that are frequently paired with a mini excavator, and what you can expect to pay for each.

- **Auger** – Simplifies the digging of holes from 6 to 48 inches with plumb-line accuracy into any type of soil. Options include direct drive augers that balance torque and RPMs or the gear-driven planetary auger for heavy-duty applications that demand maximum torque. **Expect to pay: \$1,700 to \$3,000**
- **Breaker** – Cut through concrete and other paved surfaces swiftly and neatly with this quick coupler attachment that's been refined to produce less noise and vibration. Breakers are typically available in impact energy classes that range from 60 to 1,000 lbs. **Expect to pay: \$2,700 to \$35,000**
- **Trencher** – Plow through rocky soil as easily as sand, digging from 2 to 5 feet deep and 4 to 12 inches wide. Some models also feature side-shift operation that allows trenching close to buildings or other immovable objects. **Expect to pay: \$4,700 to \$9,000**
- **Buckets** – Upgrade the standard bucket on a mini excavator to increase productivity by combining the earth moving capability of a bucket with additional functionality. Enhanced versions include grading buckets, trenching buckets, and tilt grading buckets. **Expect to pay: \$660 to \$1,500 for standard excavating and grading buckets; \$3,500 to \$14,000 for tilt grading versions**
- **Clamp** (a.k.a. hydraulic thumb) – This attachment enhances your standard bucket by allowing you to safely haul loose objects, branches, refuse, and similar debris. Clamping down on the load to prevent spills and movement, a clamp attachment works with a trenching bucket or three-line grapppler and can be adjusted to suit a variety of work conditions and materials. **Expect to pay: \$750 to \$900**
- **Flail mower** – For landscaping and farming applications, this heavy-duty mower cuts and mulches grass and brush up to 4 inches in diameter. Look for flail mowers that feature a rotor brake – it's a safety enhancement that stops the blades within seconds after the attachment has been turned off. **Expect to pay: \$8,500 to \$20,000**
- **Grading blade** – Designed to smooth the surface of just about any work area, grading blades can slope, grade, and contour an extensive variety of terrain. **Expect to pay: \$3,400 to \$14,100**

- **Grapple** – Similar to a clamp but more capable of hauling trees, piping, and other cylindrical objects, grapples are an all-in-one attachment that's popular for demolition, land clearing, and routine facilities maintenance. **Expect to pay: \$4,800 to \$16,900**
- **Packer wheel** – Pack the ground firmly and quickly after trenching with a packer wheel. Some feature an open-rim, sheep-foot design that packs the trench from bottom to top and up to 11 inches in width. **Expect to pay: \$1,500**
- **Plate compactor** – Similar to a packer wheel but designed for larger trenches, the plate compactor eliminates the need for hand packing through high-power impulses that deliver up to 2,200 impacts each minute. Base plate widths range from 12 to 34 inches wide and impulse force can be had from about 3,700 lbs up to 24,700 lbs. **Expect to pay: \$3,000 to \$8,000**
- **PowerTilt swing** – The PowerTilt swing attachment angles an excavator's bucket left or right. In doing so, it delivers a greater range of accessibility while preventing the operator from having to reposition the machine. They're also ideal for digging under or around manmade and natural obstructions like drainage ditches, foundations, and tree roots. **Expect to pay: \$2,300**
- **Ripper** – Tear through packed, frozen, or similarly unyielding ground quickly and easily with a ripper. Reinforced by a heavy-duty shank, it has a single-tooth design that easily penetrates a variety of work surfaces while slicing through underground obstructions like tree roots and even rebar. **Expect to pay \$2,500 to \$4,300**

Questions to Ask a Dealer

Whether your mini excavator is part of a larger fleet or just a one-time purchase intended to improve the productivity of a single operation, an ongoing relationship with a qualified dealer will be one of the most beneficial aspects of ownership.

As covered in the introduction, professional dealers provide a range of services and support through their service level agreement. They also supplement the initial purchase with consultation on expandability. This level of support may actually grow your business – advising you on additional types and sizes of material handling equipment that could boost your capability and profitability in equal measure.

The excavator dealership you select is just as important as the machine itself – more so, in fact. So before you commit to either, it's critical to evaluate all your options and find the dealer that

will meet your needs well into the future. Here are some of the main aspects of dealer support to consider:

Training resources

Unlike some of the more complex earth moving equipment, mini excavators are pretty easy to operate. But that doesn't mean that a little instruction on operational procedures and best practices related to safety won't improve your handling of the machine and the results you get. Ask if training is provided when comparing dealers. And if so, will they travel to your location or do you have to go to them?

It's also worth noting that some major manufacturers provide safety and operator training materials for mini excavators, Bobcat being a notable example. On the company website, you'll find free safety videos and additional information on the machines they produce. Bobcat also provides a training course kit (available for purchase) that includes DVDs, training handbooks, an administrator's guide, and even a few certificates of completion.

While specific training and licensing are not required for this particular machinery, these supplementary offerings can prove to be a highly valuable addition to purchase.

If your dealer does not provide excavator training but you want to include it as part of your employee training program regardless, there are a number of schools that will train people on the operation of a mini excavator. Unlike a manufacturer's program, these classes are not make- or model-specific. They provide a general overview of the machinery, and often provide instruction at your location or theirs (typically depending on the number of employees that require training).

Financing

Not everyone is going to buy a mini excavator outright. In fact, many are now leaning toward other forms of financing a purchase that ranges from \$20,000 to \$75,000. Many dealers offer rental options on the machines they carry, with some now renting more than they sell. But for certain businesses, leasing a mini excavator may be more profitable, especially when contracted for long-term use.

This type of financing allows companies and individuals to take advantage of the latest technology while enjoying depreciation-based tax credits, often swapping out the machines when new technology comes onto the market. Leased equipment can give start-ups the momentum they need to get going and also help those looking to expand or build their business without requiring a lump sum expenditure.

But it's important to weigh the terms offered by a dealer. Check with your existing bank for terms on business financing and business equipment loans. Common fixed-rate loans start around \$25,000 and allow you to borrow up to 80% of the purchase price of the machine. Plus, the loan is often secured by the excavator itself, simplifying the approval process somewhat.

So if you have an established relationship and good credit history, the terms you may qualify for may be able to minimize your cost of ownership.

Local EPA regulations

This is another aspect of dealer support that can potentially save you from costly fines and numerous compliance headaches when it comes to meeting U.S. emissions standards. The Environmental Protection Agency (EPA) has initiated standards in an attempt to curb emissions produced by a wide range of engines. This relates to you as all mini excavators rely on a non-road diesel engine, subject to the Tier 4 hydrocarbon (HC) limits currently being phased in through 2015.



The EPA's [website](#) provides an abundance of information on the regulation of non-road diesel engines. And while some business owners and individuals may want to familiarize themselves with all of this information personally, just as many don't have the time or capacity to personally track compliance on a wide range of equipment.

The responsibility for compliance remains yours. But the dealer you're considering will, at the very least, provide proof of compliance on every machine you purchase, whether it's new or used. Going a step beyond that, many dealers leverage their working knowledge of the machines and state-level regulations to supplement your needs. This may include access to local environmental regulations, assistance with compliance, and either the necessary contacts or the actual permits and forms when applicable.

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