ESSENTRA COMPONENTS

Quick guide

HOW TO PROTECT **HEAVY-ENGINE** COMPONENTS

Diesel fuel produces higher torque than pure petrol. This is critical for low-speed pulling power over rough terrain, which is why heavy engines are powered by diesel. Compared to a petrol engine, a diesel engine runs at a much slower RPM (revolutions per minute). Not only does this reduce engine wear and tear, but it can move through gears quicker, using less fuel than a petrol engine and reducing costs.

CONTAMINATION: THE ENEMY OF HEAVY ENGINEERING

In the heavy engineering industry, ensuring reliability is the first priority. This goes for every stage of the engine's life, which includes:

- Manufacturing
- Painting or powder coating (masking)
- Transportation
- Storage
- End use

Water and dirt can threaten the integrity of your heavy engine, causing corrosion and rust, filter blockage and wear on pumps and injectors.

Diesel engines naturally contain some water, but this occurs through condensation and as long as it's below 0.05%, it's harmless. The danger is when unacceptable levels of water enter. Where excessive water goes, so does microbial growth, which ruins fuel quality.

Dust in particular attacks moving parts in the fuel system. This affects starting, causes idling, leads to poor performance and can even result in engine failure.

Engine paint can present another potential hazard. Painting a diesel engine can provide protection against corrosion and rust – in addition to adding an aesthetic touch – but the job must be done properly.

DOES CONTAMINATION HARM **ELECTRIC HEAVY ENGINEERING EQUIPMENT**

Yes. Electric construction and mining vehicles are especially gaining in popularity, so special attention needs to be given to protecting critical components. EV motors don't have the same number of rotating parts common in diesel engines, but they do have oil pumps and connectors that need protecting. The damage that contaminants can create in diesel engines is the same for EV motors: corrosion, abrasive wear and tear and poor lubrication.

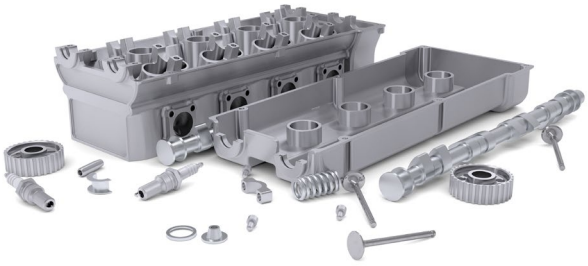
HEAVY ENGINE COMPONENTS

Let's look at the engine components that need protection.

CYLINDER BLOCK AND HEAD ASSEMBLIES

The engine's cylinder block is critical for providing lubrication, temperature control and stability. Also called the engine block – or simply "block," it is fundamental to the structure of the engine and involves multiple components that need protection.

The cylinder head assembly sits on top of the cylinder block, housing components that include the intake and exhaust valves, combustion chamber, and springs and lifters. Air and fuel flow through the passages – called ports or tracts – in the cylinder head, while permitting the exhaust gases to flow out.



OIL PAN

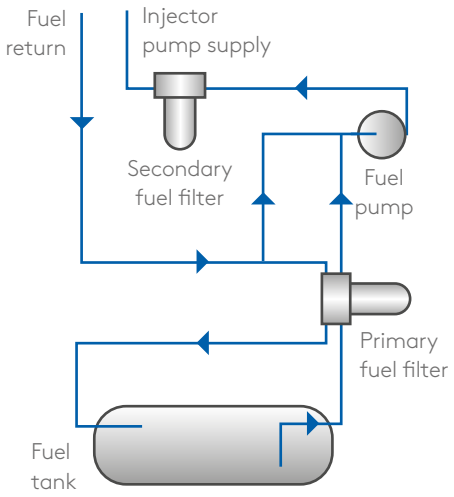
The oil pan holds the oil that is circulated under pressure over the crank shaft and other moving parts, such as rotating bearings, the sliding pistons and the engine's camshaft. In essence, the oil pan is part of the engine's lubrication system while helping to cool the engine.

FLY WHEEL

Attached to a rotating shaft, the flywheel acts as an energy-storing device. It maintains consistent energy where the normal energy source is intermittent. The flywheel stores rotational energy when torque is applied, and when the torque is absent, it ensures smooth delivery of power applying torque to the drive shaft. The result is an engine with consistent power output.

FUEL SYSTEM ASSEMBLY

The fuel system delivers fuel to the engine. In heavy engine vehicles, the system comprises of the fuel tank, pump, filter and injectors, although you're likely to find a carburettor instead in older diesel engines. The illustration here is typical of the fuel system assembly in a construction vehicle. It's critical that each component is protected at each stage of your processes if the system is to perform up to expectations.



CAPS, PLUGS AND TAPES

Critical components must be protected against ingress to deliver the performance you demand. Caps, plugs and tapes have different applications, but they all serve one purpose: to provide protection, whether it's against dirt, dust and liquid ingress, damage, the masking process or all of these.

There are many different varieties of caps and plugs, but generally, these are the types you'll find:

CAPS FOR HEAVY ENGINE PROTECTION

Caps fit outside diameters (O.D.) snugly on critical profiles.

- Push-fit caps are quick to apply
- Pull-tab caps are fast to remove without the need for tools
- Masking caps have wide flanges to make removal easy
- Threaded caps are used on threaded O.Ds. on the engine
- Tapered caps can be used as either a cap or plug and fits multiple diameters due to its taper design

PLUGS FOR HEAVY ENGINE PROTECTION

Plugs fit inside diameters to protect parts such as ports and hose fittings.

- Masking plugs mask threaded and plain through holes. Silicone caps and silicone plugs are ideal for high-temperature masking, but EPDM tapered plugs are an economical option at slightly reduced temperatures
- Pull plugs provide tab for quick and easy removal
- Threaded plugs are used on threaded holes in the engine and can be quickly removed with a pull tab. These can also be push-fit plugs for easy insertion
- Tapered plugs can sometimes be used as caps and provide a snug fit against multiple diameters

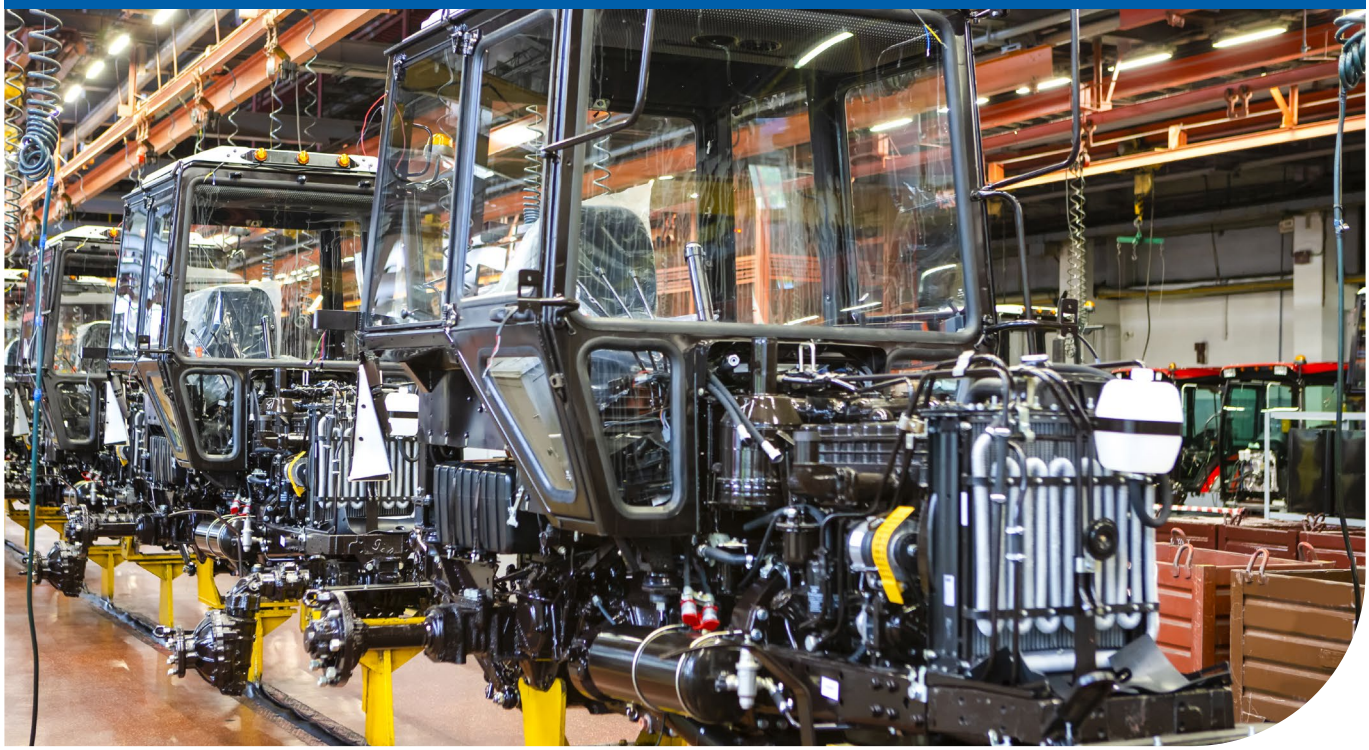
MASKING TAPE FOR HEAVY ENGINE PROTECTION

If you need to mask irregular shapes, then masking tapes and discs might be the right solution.

Removing masking tape is fast, easy and leaves no residue. You can also choose different coloured masking tape. Colours are based on tape thickness, not identification.

WHAT ARE OTHER SOLUTIONS FOR HEAVY ENGINE PROTECTION?

This guide is only concerned with engines, but it's worth noting that heavy engineering vehicles often rely on end-use solutions such as fire protection sleeves and hose-wear protectors. To learn more about protecting other parts of vehicles with heavy engines, don't miss Quick Guide: hydraulics and pneumatics protection in specialist vehicles.



MANUFACTURING

Protection for the critical threads and ports of a heavy engine needs to be reliable. But when we're talking about manufacturing, protection also needs fast application and removal so that the production process doesn't slow down. Consider these solutions:

THREADED PLASTIC CAPS – METRIC

View online

Fast application for protecting exposed threaded components from dust, dirt, moisture and damage. Made of LDPE, a flexible, soft material that also provides toughness and good impact resistance.

Perfect for: Cylinder block assembly

DIE-CUT MASKING TAPE

View online

Time-saving application for awkward spaces that caps and plugs can't cover. These masking tapes remove quickly and cleanly, leaving no residue. Withstands temperatures of up to +260°C. Available in yellow or green.

Perfect for: Cylinder block assembly

CENTRE PULL PLUGS

View online

Quick centre pull-tab easily removes the tapered plug, which plugs. multiple inner diameters. Two materials offered: LDPE and TPR.

Perfect for: Cylinder head assembly

THREADED CAPS AND PLUGS

View online

Protect and keep dirt, dust or debris out of imperial or metric threaded ports or fittings. Includes knurled head designs for a sure grip and easy application and removal. Available in materials ranging from HDPE and LDPE to nylon.

Perfect for: Cylinder head assembly, Flywheel, Fuel system assembly

SIDE-PULL PLUGS

View online

Side pull plugs offer an easy and quick side pull-tab to remove the part. The tapered plug design allows these parts to plug multiple inner diameters. Two materials offered: PE for basic protection needs and TPR to protect threaded holes and is acid-resistant.

Perfect for: Flywheel

DRIVESHAFT PROTECTION CAPS

View online

Ideal for driveshafts, which are sometimes attached to the engine. The caps protect the driveshaft and the bearings surrounding it.

Perfect for: Flywheel

TRANSPORTATION & STORAGE

You can't control rough handling, accidents or the threat of corrosion once your heavy engine leaves the manufacturing plant. You can still provide protection, however, with these high-quality caps and plugs.

TAPERED CAPS AND PLUGS

View online

Versatile protection made of LDPE can cap multiple outside diameters or plug multiple inside diameters. Also ideal for EVs.

Perfect for: Cylinder block assembly, Cylinder head assembly

PLASTIC THREADED PLUGS

View online

Locks into place with a simple push for threaded protection. The strong and flexible pull-tab enables quick removal. Available in two styles: with a centre pull feature or the side pull tab, as featured here. Made of LDPE. Also ideal for EVs.

Perfect for: Cylinder block assembly, Cylinder head assembly

FLUID ABSORPTION PLUGS

View online

Snaps easily into place, controlling excess fluid in an assembly that's been drained of its oil for transportation or other processes. Also ideal for EVs.

Perfect for: Cylinder block assembly, Cylinder head assembly

PUSH-IN PLUGS

View online

LDPE plugs protect exposed holes. Fast application and removal, with convexed sides designed to ensure a secure fit. Also ideal for EVs.

Perfect for: Cylinder block assembly, Cylinder head assembly

THREADED SEALING PLUGS

View online

Metric Threaded Sealing Plug threads onto a M27 x 2.0 Metric thread to provide a secure fit and positive seal. The yellow nylon material absorbs paint and withstands temperatures from -40°C to 160°C. Also ideal for EVs.

Perfect for: Cylinder block assembly, Cylinder head assembly, Oil pan

PARALLEL PROTECTION PLUGS

View online

Ideal for threaded applications. TPE material resists shredding and acids used to remove rust from metal before painting or powder coating operations are performed. Also available in LDPE. Ideal for EVs.

Perfect for: Cylinder block assembly, Cylinder head assembly. Also for Oil pans in Masking

BANJO BOLT CAPS

View online

A protection cap and retaining washer all in one unit, protecting against damage and dirt ingress. Holds everything together through from assembly to storage. Easy to grip, even when wearing gloves. Made of LDPE.

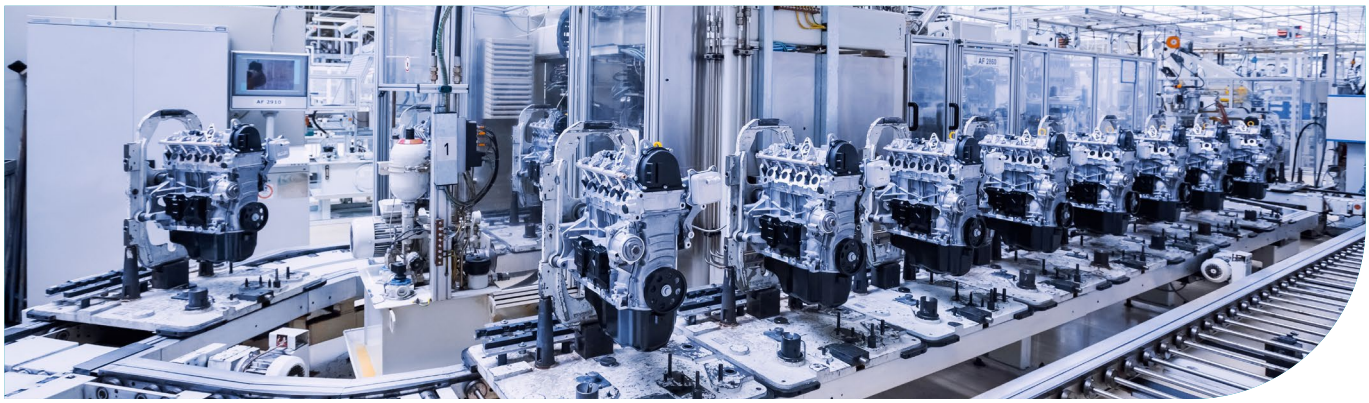
Perfect for: Fuel assembly system

ROUND VINYL END CAPS

View online

Protect outside diameters of threaded or non-threaded tubing, rods, or pipes PVC material can stretch onto larger dimensions for a tight fit without tearing, splitting or shredding.

Perfect for: Fuel assembly system



MASKING

You have to find the balance between keeping costs down while not sacrificing on the quality of the paint job. Poor quality or ill-applied masking products add time to the schedule and drains money to correct the problems. Get it right the first time with these masking solutions:

MASKING TAPE

View online

Masking tapes that withstand temperatures up to +260°C. Ideal for awkward shapes that a cap or plug can't accommodate. Quick adhesion to save time and removes cleanly, leaving no residue. Available in different colours and materials.

Perfect for: Cylinder head assembly

MASKING FLANGELESS PLUGS

View online

High-temp silicone tapered plugs with pull tab for easy installation and removal. The tapered design protects multiple hole diameters. Materials available include silicone and economical reduced-temperature EPDM.

Perfect for: Cylinder block assembly, Flywheel

THREADED O-RING PLUGS FOR UNF THREADS

View online

Apply or remove by hand, hex wrench or screwdriver. The O-ring provides a watertight seal for superior leak protection.

Perfect for: Oil pan

FLEXIBLE END CAPS

View online

Economical and flexible PVC material withstands temperatures of up to 210°C. Excellent chemical resistance and can be used in powder coating, e-coating, plating and general paint-line applications.

Perfect for: Cylinder block assembly

EASY-PULL MASKING CAP

View online

Provides a tight fit and easy removal. Push-fit caps made from PVC are ideal for end-tip profiles. Prevents paint ingress, and stands up to temperatures of up to +210°C.

Perfect for: Cylinder block assembly, Flywheel, Fuel system assembly

MASKING PULL PLUGS

View online

Mask threaded and plain through-holes. Easy to apply with pull tab and remove when the hole diameter is tight. Silicone or economical EPDM materials are flexible to allow slight variation in the sizes to mask.

Perfect for: Cylinder block assembly, Cylinder head assembly, Fuel system assembly

THREADED SEALING CAPS – METRIC THREADS

View online

The internal neoprene rubber sealing disk limits fluid leaks and prevents dust and dirt ingress. Hand tightening is recommended but the cap can be applied or removed by wrench or socket at a low torque. Made of HDPE.

Perfect for: Oil pan

STRETCH FIT COVER CAPS

View online

Masks awkward shapes with an expandable elasticated end or by stretching through the elasticity of the material. This makes for a looser hold, making it best for light masking needs and general protection during transport and storage.

Perfect for: Cylinder block assembly, Flywheel

FLEXIBLE END CAPS

View online

Made of TPE to provide good flexibility and acid resistance to protect threads or unthreaded ends. The hanging tab is designed to work with support hooks.

Perfect for: Fuel system assembly

END USE

Protection still plays a role long after customers have taken possession of your heavy engines. Handing off a high-quality product so that it still gives satisfaction years later is your goal. Here's how to do that:

GREASE NIPPLE CAPS

View online

Protects grease nipples from dirt ingress when not engaged with its mating part. An economical and effective solution, the cap is knurled to assure an easy grip. Fitted with a retaining washer to stay in place.

Perfect for: Oil pan

T-BOLT HOSE CLAMP

View online

Provides a reliable seal on larger diameters to stand up to vibration. Sized to SAE standards. The hex nut enables you to apply or remove it with standard tools. Made of 301 standard steel.

Perfect for: Fuel system assembly

DOWNLOAD **FREE CADS** AND **TRY BEFORE YOU BUY**

Download free CADs and request free samples, which are available for most of our solutions. It's a great way to ensure you've chosen exactly what you need. If you're not quite sure which product will work best for you, our experts are always happy to advise you. Whatever it is you need, you can depend on fast despatch.

Request your free samples or download free CADs now.

ESSENTRA COMPONENTS

QUESTIONS?

Email us at **sales@essentracomponents.co.uk** or speak to one of our experts for further information on the ideal solution for your application **0345 528 0474.**