



Atlas Copco Construction Equipment Australia Job Safety Analysis

Product Type **Atlas Copco XAMS 486, Diesel Powered Air Compressors**

Recommended Safety Equipment: Hearing Protection

Operator Competency: Adequate induction and training to be provided to 1st time users.

Operation	Hazards Identified	Risk Assessed	Risk Controls
General safety precautions			
General safety	Air pressure, hot parts, moving parts	Serious injury, damage to property	<ul style="list-style-type: none"> • The owner is responsible for maintaining the unit in a safe operating condition. Unit parts and accessories must be replaced if missing or unsuitable for safe operation. • Whenever there is an indication or any suspicion that an internal part of a machine is overheated, the machine shall be stopped but no inspection covers shall be opened before sufficient cooling time has elapsed; this to avoid the risk of spontaneous ignition of oil vapour when air is admitted. • Normal ratings (pressures, temperatures, speeds, etc.) shall be durably marked. • Operate the unit only for the intended purpose and within its rated limits (pressure, temperature, speeds, etc.). • The machinery and equipment shall be kept clean, i.e. as free as possible from oil, dust or other deposits. • To prevent an increase in working temperature, inspect and clean heat transfer surfaces (cooler fins, intercoolers, water jackets, etc.) regularly. See the maintenance schedule. • All regulating and safety devices shall be maintained with due care to ensure that they function properly. They may not be put out of action. • Care shall be taken to avoid damage to safety valves and other pressure relief devices, especially to avoid plugging by paint, oil coke or dirt accumulation, which could interfere with the functioning of the device.

			<ul style="list-style-type: none"> • Pressure and temperature gauges shall be checked regularly with regard to their accuracy. They shall be replaced whenever outside acceptable tolerances. • Safety devices shall be tested as described in the maintenance schedule of the instruction manual to determine that they are in good operating condition. • Mind the markings and information labels on the unit. • In the event the safety labels are damaged or destroyed, they must be replaced to ensure operator safety. • Keep the work area neat. Lack of order will increase the risk of accidents. • When working on the unit, wear safety clothing. Depending on the kind of activities these are: safety glasses, ear protection, safety helmet (including visor), safety gloves, protective clothing, and safety shoes. Do not wear the hair long and loose (protect long hair with a hairnet), or wear loose clothing or jewellery. • Take precautions against fire. Handle fuel, oil and anti-freeze with care because they are inflammable substances. Do not smoke or approach with naked flame when handling such substances. Keep a fire extinguisher in the vicinity. • Periodically carry out maintenance works according to the maintenance schedule. • Never operate the unit at pressures or speeds below or in excess of its limits as indicated in the technical specifications.
<u>Transporting and installation</u>			
Lifting with a crane or hoist	Falling or dropping unit from crane or hoist	Serious injury, damage to property	<ul style="list-style-type: none"> • All loose or pivoting parts, eg doors and towbars, must be securely fastened • Do not attach cables, chains or ropes directly to the lifting eye. Use a lifting shackle or crane hook. • Never allow sharp bends in lifting cables, chains or ropes. • Never lift the unit over people or residential areas • Never leave a load hanging from a crane or hoist • To lift heavy parts, a hoist of ample capacity, tested and approved according to local safety regulations, shall be used. • Lifting hooks, eyes, shackles, etc., shall never be bent and shall only have stress in line with their design load axis. The capacity of a lifting device diminishes when the

			<p>lifting force is applied at an angle to its load axis.</p> <ul style="list-style-type: none"> • For maximum safety and efficiency of the lifting apparatus all lifting members shall be applied as near to perpendicular as possible. If required, a lifting beam shall be applied between hoist and load. • A hoist has to be installed in such a way that the object will be lifted perpendicular. If that is not possible, the necessary precautions must be taken to prevent load-swinging, e.g. by using two hoists, each at approximately the same angle not exceeding 30° from the vertical.
Towing - Connecting to vehicle	Manual handling, possible back strain, crush points	Serious injury to personnel, damage to property	<p>Before towing:</p> <ul style="list-style-type: none"> • Check the towbar, the brake system and the towing eye • Check the coupling of the towing vehicle • Check the towing and breaking capability of the towing vehicle • Ascertain that the towing eye can swivel freely on the hook • Check that the wheels are secure and that the tyres are in good condition and inflated correctly • Attach safety chain and if fitted safety breakaway cable to towing vehicle (if applicable) • Remove wheel chocks, if used and release the parking brake
Towing	Disconnection from towing vehicle, pedestrians and other traffic	Serious injury to personnel, damage to property	<p>When towing:</p> <ul style="list-style-type: none"> • Never exceed the maximum towing speed of the unit • Check local speed regulations.
Towing - Disengaging from vehicle	Manual handling, possible back strain, crush points	Serious injury to personnel, damage to property	<p>To disconnect</p> <ul style="list-style-type: none"> • Place unit on level ground • Apply parking brake before disconnecting from towing vehicle • Disconnect the safety chain and safety break cable (if applicable) • If unit has no brakes, chock wheels in front and behind wheels
<u>Use and operation</u>			
Fuelling the unit	Risk of fire and explosion	Serious injury to personnel, damage to property	<ul style="list-style-type: none"> • Never refuel while the unit is running • Keep fuel away from hot parts such as air outlet pipes and the engine exhaust • Do not smoke while fuelling • When fuelling from an automatic pump an earthing cable should be connected to discharge static electricity • Never spill or leave oil, fuel, coolant or cleaning agents in

			or around the compressor.
Daily inspections	Air pressure, hot machinery	Serious injury to personnel	<ul style="list-style-type: none"> • Before removing the oil filler plug, ensure that the pressure is released by opening an air outlet valve. • Never remove a filler cap of the cooling water system of a hot engine. Wait until the engine has sufficiently cooled down.
Operating	Untrained or inexperienced operator,	Serious injury to personnel	<ul style="list-style-type: none"> • The supervisor, or the responsible person, shall at all times make sure that all instructions regarding machinery and equipment operation and maintenance are strictly followed and that the machines with all accessories and safety devices, as well as the consuming devices, are in good repair, free of abnormal wear or abuse, and are not tampered with.
Working Environment	Fire hazards, exhaust fumes, noise	Serious injury to personnel	<ul style="list-style-type: none"> • When the unit has to operate in a fire-hazardous environment, each engine exhaust has to be provided with a spark arrestor to trap incendiary sparks. • Locate the unit away from walls. Take all precautions to ensure that hot air exhausted from the engine and driven machine cooling systems cannot be recirculated. If such hot air is taken in by the engine or driven machine cooling fan, this may cause overheating of the unit; if taken in for combustion, the engine power will be reduced. • All doors shall be shut during operation so as not to disturb the cooling air flow inside the bodywork and/or render the silencing less effective. A door should be kept open for a short period only e.g. for inspection or adjustment.
Confined spaces	Exhaust fumes	Serious injury to personnel	<ul style="list-style-type: none"> • Do not operate unit in a confined space. If it is to be operated in an area with restricted ventilation, install an extractor or duct the exhaust to the outside atmosphere.
Working processes that produces fumes, dust, vibration or hazardous gases	fumes, dust, vibration or hazardous gases	Serious injury to personnel	<ul style="list-style-type: none"> • Never operate the unit in surroundings where there is a possibility of taking in flammable or toxic fumes. • Take necessary steps to eliminate hazards • Remember that where there is visible dust, the finer, invisible particles will almost certainly be present too; but the fact that no dust can be seen is not a reliable indication that dangerous, invisible dust is not present in the air.

			<ul style="list-style-type: none"> • If there is a risk of inhaling hazardous gases, fumes or dust, the respiratory organs must be protected and depending on the nature of the hazard, so must the eyes and skin. • When operating in a dust-laden atmosphere, place the unit so that dust is not carried towards it by the wind. Operation in clean surroundings considerably extends the intervals for cleaning the air intake filters and the cores of the coolers.
Moving parts, such as fans and shafts	Rotating machinery	Personal injury	<ul style="list-style-type: none"> • Stationary housing guards are provided on all rotating or reciprocating parts not otherwise protected and which may be hazardous to personnel. Machinery shall never be put into operation, when such guards have been removed, before the guards are securely reinstalled.
Noise	Hearing damage	Personal injury	<ul style="list-style-type: none"> • Noise, even at reasonable levels, can cause irritation and disturbance which, over a long period of time, may cause severe injuries to the nervous system of human beings. • When the sound pressure level, at any point where personnel normally has to attend, is: <ul style="list-style-type: none"> – below 70 dB(A): no action needs to be taken, – above 70 dB(A): noise-protective devices should be provided for people continuously being present in the room, – below 85 dB(A): no action needs to be taken for occasional visitors staying a limited time only, – above 85 dB(A): room to be classified as a noise-hazardous area and an obvious warning shall be placed permanently at each entrance to alert people entering the room, for even relatively short times, about the need to wear ear protectors, – above 95 dB(A): the warning(s) at the entrance(s) shall be completed with the recommendation that also occasional visitors shall wear ear protectors, – above 105 dB(A): special ear protectors that are adequate for this noise level and the spectral composition of the noise shall be provided and a special warning to that effect shall be placed at each entrance. • Do not remove any of, or tamper with, the sound-damping material. Keep the material free of dirt and liquids such as fuel, oil and cleansing agents. If any sound-damping material is damaged, replace it to

			prevent the sound pressure level from increasing.
Connecting and using air hoses	High Air pressure,	Serious injury to personnel	<ul style="list-style-type: none"> • Close the compressor air outlet valve before connecting or disconnecting a hose. • Ascertain that a hose is fully depressurized before disconnecting it. • Before blowing compressed air through a hose or air line, ensure that the open end is held securely, so that it cannot whip and cause injury. • The air line end connected to the outlet valve must be safeguarded with a safety cable, attached next to the valve. No external force may be exerted on the air outlet valves, e.g. by pulling on hoses or by installing auxiliary equipment directly to a valve, e.g. a water separator, a lubricator, etc. Do not step on the air outlet valves. • Never move a unit when external lines or hoses are connected to the outlet valves, to avoid damage to valves, manifold and hoses. • Distribution pipework and air hoses must be of correct diameter and suitable for the working pressure. Never use frayed, damaged or deteriorated hoses. Replace hoses and flexibles before the lifetime expires. Use only the correct type and size of hose end fittings and connections.
Using for breathing air	Suffocation,	Serious injury to personnel	<ul style="list-style-type: none"> • Do not use compressed air from any type of compressor, without taking extra measures, for breathing purposes as this may result in injury or death. For breathing air quality, the compressed air must be adequately purified according to local legislation and standards. Breathing air must always be supplied at stable, suitable pressure.
Maintenance and repairs			
General maintenance	High air pressure, oil temperature, hot surfaces, manual handling, suffocation, crush points,	Serious injury to personnel, damage to property	<ul style="list-style-type: none"> • Maintenance, overhaul and repair work shall only be carried out by adequately trained personnel; if required, under supervision of someone qualified for the job. • Use only the correct tools for maintenance and repair work, and only tools which are in good condition. • Parts shall only be replaced by genuine Atlas Copco replacement parts. • Prior to stripping an engine or other machine or undertaking major overhaul on it, prevent all movable parts from rolling over or moving. • Make sure that no tools, loose parts or rags are left in or

			<p>on the machine. Never leave rags or loose clothing near the engine air intake.</p> <ul style="list-style-type: none"> • When washing parts in or with a cleaning solvent, provide the required ventilation and use appropriate protection such as a breathing filter, safety glasses, rubber apron and gloves, etc. • Never use flammable solvents for cleaning (fire-risk). • Take safety precautions against toxic vapours of cleaning liquids. • Never use machine parts as a climbing aid. • Observe scrupulous cleanliness during maintenance and repair. Keep away dirt, cover the parts and exposed openings with a clean cloth, paper or tape. • When repair has been completed, the machine shall be barred over at least one revolution for reciprocating machines, several revolutions for rotary ones to ensure that there is no mechanical interference within the machine or driver. Check the direction of rotation of electric motors when starting up the machine initially and after any alteration to the electrical connection(s) or switch gear, to check that the oil pump and the fan function properly. • Use only lubricating oils and greases recommended or approved by Atlas Copco or the machine manufacturer. Ascertain that the selected lubricants comply with all applicable safety regulations, especially with regard to explosion or fire-risk and the possibility of decomposition or generation of hazardous gases. Never mix synthetic with mineral oil. • Protect the engine, alternator, air intake filter, electrical and regulating components, etc., to prevent moisture ingress, e.g. when steam-cleaning. • Never use a light source with open flame for inspecting the interior of a machine. • Before clearing the unit for use after maintenance or overhaul, check that operating pressures, temperatures and speeds are correct and that the control and shutdown devices function correctly.
General maintenance	Air pressure,	Serious injury to personnel, damage to property	<ul style="list-style-type: none"> • Before dismantling any pressurized component, the compressor or equipment shall be effectively isolated from all sources of pressure and the entire system shall be relieved of pressure. Do not rely on non-return valves (check valves) to isolate pressure systems. In addition, a

			warning sign bearing a legend such as "work in progress; do not open" shall be attached to each of the outlet valves.
General maintenance	Unplanned starting of the unit	Serious injury to personnel, damage to property	<ul style="list-style-type: none"> • All maintenance work, other than routine attention, shall only be undertaken when the unit is stopped. Steps shall be taken to prevent inadvertent starting. In addition, a warning sign bearing a legend such as "work in progress; do not start" shall be attached to the starting equipment. • On engine-driven units the battery shall be disconnected and removed or the terminals covered by insulating caps.
Welding	Fire and explosion	Serious injury to personnel, damage to property	<ul style="list-style-type: none"> • Never weld on or perform any operation involving heat near the fuel or oil systems. • Fuel and oil tanks must be completely purged, e.g. by steam-cleaning, before carrying out such operations. • Never weld on, or in any way modify, pressure vessels. • Disconnect the alternator cables during arc welding on the unit. • When performing any operation involving heat, flames or sparks on a machine, the surrounding components shall first be screened with non-flammable material.
PPE	Hot surfaces, dust and fumes, chemical solvents,	Serious injury to personnel, damage to property	<ul style="list-style-type: none"> • When hot parts have to be handled, e.g. shrink fitting, special heat resistant gloves shall be used and, if required, other body protection shall be applied. • When using cartridge type breathing filter equipment, ascertain that the correct type of cartridge is used and that its useful service life is not surpassed. • When washing parts in or with a cleaning solvent, provide the required ventilation and use appropriate protection such as a breathing filter, safety glasses, rubber apron and gloves, etc. • Safety shoes should be compulsory in any workshop and if there is a risk, however small, of falling objects, wearing of a safety helmet should be included.
Batteries	Acid splash, fire,	Serious injury to personnel, damage to property	<ul style="list-style-type: none"> • When servicing batteries, always wear protecting clothing and glasses. • The electrolyte in batteries is a sulphuric acid solution which is fatal if it hits your eyes, and which can cause burns if it contacts your skin. Therefore, be careful when

			<p>handling batteries, e.g. when checking the charge condition.</p> <ul style="list-style-type: none"> • Install a sign prohibiting fire, open flame and smoking at the post where batteries are being charged. • When batteries are being charged, an explosive gas mixture forms in the cells and might escape through the vent holes in the plugs. Thus an explosive atmosphere may form around the battery if ventilation is poor, and can remain in and around the battery for several hours after it has been charged. Therefore: <ul style="list-style-type: none"> - never smoke near batteries being, or having recently been, charged, - never break live circuits at battery terminals, because a spark usually occurs. • When connecting an auxiliary battery (AB) in parallel to the unit battery (CB) with booster cables: connect the + pole of AB to the + pole of CB, then connect the - pole of CB to the mass of the unit. Disconnect in the reverse order.
Pressure vessels	High air pressure	Serious injury to personnel	<p>Maintenance/installation requirements:</p> <ul style="list-style-type: none"> • The vessel can be used as pressure vessel or as separator and is designed to hold compressed air for the following application: <ul style="list-style-type: none"> - pressure vessel for compressor, - medium AIR/OIL, and operates as detailed on the data plate of the vessel: <ul style="list-style-type: none"> - the maximum working pressure is in bar, - the maximum working temperature T_{max} in °C, - the minimum working temperature T_{min} in °C, - the capacity of the vessel V in l. • The pressure vessel is only to be used for the applications as specified above and in accordance with the technical specifications. Safety reasons prohibit any other applications. • National legislation requirements with respect to re-inspection must be complied with. • No welding or heat treatment of any kind is permitted to those vessel walls which are exposed to pressure. • The vessel is provided and may only be used with the required safety equipment such as manometer, overpressure control devices, safety valve, etc.

			<ul style="list-style-type: none"> • Draining of condensate shall be performed regularly when vessel is in use. • Installation, design and connections should not be changed. • Bolts of cover and flanges may not be used for extra fixation.
Safety valves	High air pressure	Serious injury to personnel	<ul style="list-style-type: none"> • All adjustments or repairs are to be done by an authorized representative of the valve supplier (see Preventive maintenance schedule for the compressor – included in Instruction manual supplied with compressor).

The policy of Atlas Copco is to provide the users of their equipment with safe, reliable and efficient products. Factors taken into account are among others:

- The intended and predictable future use of the products, and the environments in which they are expected to operate,
- Applicable rules, codes and regulations,
- The expected useful product life, assuming proper service and maintenance,
- providing the manual with up-to-date information.

Before handling any product, take time to read the relevant instruction manual. Besides giving detailed operating instructions, it also gives specific Information about safety, preventive maintenance, etc.

Keep the manual always at the unit location, easy accessible to the operating personnel.

See also the safety precautions of the engine and possible other equipment, which are separately sent along or are mentioned on the equipment or parts of the unit.

These safety precautions are general and some statements will therefore not always apply to a particular unit.

Only people that have the right skills should be allowed to operate, adjust, perform maintenance or repair on Atlas Copco equipment. It is the responsibility of management to appoint operators with the appropriate training and skill for each category of job.

Operator

An operator is trained in all aspects of operating the unit with the pushbuttons, and is trained to know the safety aspects.

Mechanical Tradesmen

A mechanical technician is trained to operate the unit the same as the operator. In addition, the mechanical technician is also trained to perform maintenance and repair, as described in the instruction manual, and is allowed to change settings of the control and safety system. A mechanical technician does not work on live electrical components.

Electrical Tradesmen

An electrical technician is trained and has the same qualifications as both the operator and the mechanical technician. In addition, the electrical technician may carry out electrical repairs within the various enclosures of the unit. This includes work on live electrical components.

Specialists from the Manufacturer

This is a skilled specialist sent by the manufacturer or its agent to perform complex repairs or modifications to the equipment.

In general it is recommended that not more than two people operate the unit, more operators could lead to unsafe operating conditions. Take necessary steps to keep unauthorized persons away from the unit and eliminate all possible sources of danger at the unit.

When handling, operating, overhauling and/or performing maintenance or repair on Atlas Copco equipment, the mechanics are expected to use safe engineering practices and to observe all relevant local safety requirements and ordinances. The following list is a reminder of special safety directives and precautions mainly applicable to Atlas Copco equipment. These safety precautions apply to machinery processing or consuming air. Processing of any other gas requires additional safety precautions typical to the application and are not included herein.

Neglecting the safety precautions may endanger people as well as environment and machinery:

- endanger people due to electrical, mechanical or chemical influences,
- endanger the environment due to leakage of oil, solvents or other substances,
- endanger the machinery due to function failures.

All responsibility for any damage or injury resulting from neglecting these precautions or by non-observance of ordinary caution and due care required in handling, operating, maintenance or repair, also if not expressly mentioned in this instruction manual, is disclaimed by Atlas Copco.

The manufacturer does not accept any liability for any damage arising from the use of non-original parts and for modifications, additions or conversions made without the manufacturer's approval in writing.

If any statement in this manual does not comply with local legislation, the stricter of the two shall be applied. Statements in these safety precautions should not be interpreted as suggestions, recommendations or inducements that it should be used in violation of any applicable laws or regulations.

This Job Safety Analysis is a general guide to the safe use of the compressor; a risk assessment must be done before each specific use of the compressor to take into account local work area conditions and risks.