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HAZARD IDENTIFICATION RISK ASSESSMENT AND CONTROL

COMPANY: **WACKER AUSTRALIA PTY. LTD.**
 PLANT/EQUIPMENT: **MOTORIZED DRIVE UNIT FOR FLEXIBLE SHAFT SUBMERSIBLE PUMPS AND INTERNAL VIBRATORS**
 PLANT/TASK DESCRIBED: **PUMPING OF WATER WITH OR WITHOUT SOLIDS, VIBRATING CONCRETE.**

OPERATING SAFETY

Familiarity and proper training are required for the safe operation of equipment; Equipment operated improperly or by untrained personnel can be dangerous! Read operating instructions and Safety Guidelines to familiarise yourself with the location and proper use of all instruments and controls. **WEAR APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AT ALL TIMES!**

HAZARD IDENTIFICATION	RISK ASSESSMENT	PRACTICABILITY (It is practicable to remove or mitigate the hazard or risk?)		RISK CONTROL
		YES	NO - Why not?	
INJURY DUE TO: BURNS ON EXHAUST PROTECTION GUARD OR ENGINE COOLING FINS	MEDIUM RISK			IMPRINT ON GUARD: DO NOT TOUCH EXHAUST GUARD OR ENGINE COOLING FINS; 
CONTACT WITH ROTATING COUPLING INSIDE BELL HOUSING	MEDIUM RISK	✓		NEVER OPERATE DRIVE UNIT WITHOUT PUMP CONNECTED!! DO NOT PUSH FINGERS INTO BELL HOUSING OPENING!! BELL HOUSING DESIGNED WITH LONG GUIDING SLEEVE TO AVOID ACCIDENTAL CONTACT BY FINGERS OF THE OPERATOR. ALWAYS SWITCH OFF ENGINE BEFORE CONNECTING OR DISCONNECTING FLEXIBLE SHAFT!!
OPERATOR SLIPPING, TRIPPING, FALLING	MEDIUM RISK		ENVIRONMENT IN WHICH MACHINES ARE OPERATED CANNOT BE CONTROLLED BY THE SUPPLIER	BE CAREFULL WHEN PLACING DRIVE UNIT, PUMP AND DELIVERY HOSE INTO OPERATING POSITION OR OPERATE VIBRATOR!
LIFTING OF DRIVE UNIT	MEDIUM RISK	✓		DO NOT LIFT BY YOURSELF!! PROTECTIVE FRAME ALLOWS SUFFICIENT NUMBER OF PERSONS TO LIFT MACHINE SAFELY.
LIFTING OF PUMP	LOW RISK	✓		DO NOT LIFT BY YOURSELF WHEN TRANSPORTING: USE ROPE ATTACHED TO LIFTING EYE PROVIDED TO LIFT PUMP BODY OUT OF TRENCH.

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		YES	NO - Why not?	
INJURY DUE TO: INCORRECT STARTING OF DRIVE UNIT	LOW RISK			1. SEE OPERATING INSTRUCTION MANUAL!! 2. WEAR P.P.E.!
PLANT TIPPING, ROLLING OVER	LOW RISK	✓		PROTECTIVE FRAME ON SWIVEL DISH PROVIDES SECURE BASE. ALWAYS BE SURE MACHINE IS PLACED IN SECURE POSITION!
EXPLOSION OR FIRE	MEDIUM RISK		WHEN REFUELING MACHINE, FLAMMABLE LIQUIDS ARE EXPOSED AND VAPOURS ARE PRESENT, WHICH CANNOT BE AVOIDED.	ALWAYS USE APPROPRIATE CARE WHEN HANDLING PETROL OR DIESEL AND READ INSTRUCTION MANUAL!
PUMPING OF CORROSIVE CHEMICALS OR WATER CONTAINING TOXIC SUBSTANCES	MEDIUM RISK		WACKER PUMPS ARE DESIGNED TO PUMP WATER ONLY THERE IS NO TECHNICAL WAY TO REMOVE THIS HAZARD, AS THE SUPPLIER CANNOT CONTROL THE ACTIONS OF THE USER.	DO NOT PUMP FLAMMABLE FLUIDS, FUELS, CORROSIVE CHEMICALS OR FLUIDS CONTAINING TOXIC SUBSTANCES. THESE FLUIDS CAN CREATE POTENTIALLY DANGEROUS HEALTH AND ENVIRONMENTAL HAZARDS.
CONTACT WITH VIBRATING HEAD OF INTERNAL VIBRATOR	LOW RISK		HAZARD REMOVAL NOT POSSIBLE AS IT IS THE VIBRATORS PURPOSE TO REMOVE AIR FROM CONCRETE WITH VIBRATION.	DO NOT TOUCH OR HOLD VIBRATING HEAD OF INTERNAL VIBRATOR, WHEN ENGINE IS RUNNING! WEAR P.P.E!
SUFFOCATE OR SUFFER ILL HEALTH DUE TO: EXHAUST FUMES & FUEL VAPOURS, ESPECIALLY WHEN USED IN CONFINED SPACES	HIGH RISK		EXHAUST FUMES AND PETROL VAPOURS ARE UNAVOIDABLE.	ALWAYS OPERATE & REFILL IN WELL VENTILATED AREAS ONLY!

SAFETY INSTRUCTIONS

READ, UNDERSTAND AND FOLLOW THESE SAFETY GUIDELINES TO AVOID DAMAGE TO EQUIPMENT, OPERATOR INJURY OR DEATH.

1. Petrol and Diesel Fuels are flammable. Unsafe handling will cause injury and perhaps death.

- ◆ **DO NOT** Smoke while operating equipment.
- ◆ **DO NOT** Smoke when refuelling engine.
- ◆ **DO NOT** Refuel hot or running engine.
- ◆ **DO NOT** Refuel engine near open flame.
- ◆ **DO NOT** Spill fuel when refuelling engine.

- ◆ **ALWAYS** Refill fuel tank in well ventilated area.
- ◆ **ALWAYS** Replace fuel tank cap after refuelling.

2. Equipment operated improperly or by untrained personnel is dangerous. Damage to equipment, injury to operator and bystanders is possible.

- ◆ **DO NOT** Use equipment in applications for which it is not intended.
- ◆ **DO NOT** Allow improperly trained personnel to operate equipment.
- ◆ **DO NOT** Touch hot muffler, engine cylinders or cooling fins. Burns will result.
- ◆ **DO NOT** Operate laterally on grade greater than 25deg. On steep inclines and slopes drive unit may drift, causing unit to roll slowly.

- ◆ **ALWAYS** Read, understand and follow instruction book procedures before attempting to operate equipment.
- ◆ **ALWAYS** Be sure operator is familiar with proper safety precautions and operation techniques, before using the equipment.
- ◆ **ALWAYS** Wear protective clothing when operating equipment. Goggles or safety glasses will protect against eye damage caused by flying debris, for instance.
- ◆ **ALWAYS** Keep hands, feet and loose clothing away from moving parts of equipment.
- ◆ **ALWAYS** Check behind machine before backing up.
- ◆ **ALWAYS** Use common sense and caution when operating WACKER equipment.

SAFETY INSTRUCTIONS

3. Safety devices and guards are designed with the operator safety in mind. They are intended to protect operator from moving parts and other potential safety hazards. Do not try to defeat their purpose.

- ◆ **DO NOT** Attempt to clean or service equipment which is running.
- ◆ **DO NOT** Operate equipment with safety devices or guards removed.
- ◆ **DO NOT** Operate equipment without air cleaner.
- ◆ **DO NOT** Remove air cleaner or air cleaner cover while operating equipment.
- ◆ **DO NOT** Tamper with engine governor mechanism. Engine must not be run at speeds other than those specified in Technical Data section.

- ◆ **ALWAYS** Operate equipment with all safety devices and guards in place and in working order.

4. Safety does not stop when equipment operation is completed. Improperly stored equipment can be damaged or be a source of injury.

- ◆ **DO NOT** Leave a running machine unattended.
- ◆ **ALWAYS** Be sure equipment will not tip over, roll, slide or fall when not being operated.
- ◆ **ALWAYS** Turn engine or motor OFF when equipment is not being operated.
- ◆ **ALWAYS** Close fuel valve when equipment is not being operated.

5. In order for equipment to operate properly for a long time, periodic maintenance and occasional repairs are necessary. If maintenance is not carried out or repairs are not made, equipment may act erratically and cause more damage and perhaps become a safety hazard.

- ◆ **ALWAYS** Replace safety devices and guards after repairs and maintenance.
- ◆ **ALWAYS** Keep area around muffler free of debris in order to reduce the chance of an accidental fire.
- ◆ **ALWAYS** Do periodic maintenance as recommended in instruction book.
- ◆ **ALWAYS** Clean debris from engine cooling fins.
- ◆ **ALWAYS** Replace worn or damaged components with spare parts designed and recommended for servicing of WACKER equipment.

TECHNICAL DATA FOR CONCRETE VIBRATORS

Technical Data				
	FWP 25	FWP 40	FWP 57	FWP 65
Head Dia. in mm :	25	40	57	65
Head Length in mm :	300	430	457	500
Head Weight in Kg :	0.8	3	5	8
Vibrations per minute :	13000	12000	12700	11500
Compaction area Dia. in mm :	600	800	1000	1200
Compaction rater per hour in m ³ :	5	12	25	32



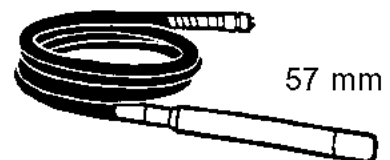
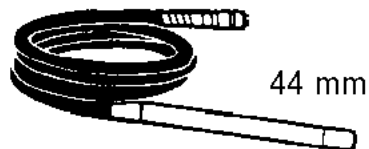
Flextool



CONCRETE VIBRATOR PENDULUM TYPE

VP38 - VP44 - VP57

OPERATING INSTRUCTIONS



WARNING

To reduce the risk of injury, all operators and maintenance personnel must read and understand these instructions before operating, changing accessories, or performing maintenance on Flextool power equipment. All possible situations cannot be covered in these instructions. Care must be exercised by everyone using, maintaining or working near this equipment.

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INTRODUCTION

Thank you for your selection of Flextool equipment. Flextool have specialised in the design and manufacture of quality products since 1951.

We have taken care in the design, manufacture and testing of this product. It is covered by a six month warranty. Should service or spare parts be required, prompt and efficient service is available from our branches.

General Safety Instructions for the Operation of Power Equipment

The goal of Flextool is to produce power equipment that helps the operator work safely and efficiently. The most important safety device for this or any tool is the operator. Care and good judgement are the best protection against injury. All possible hazards cannot be covered here, but we have tried to highlight some of the important items, individuals should look for and obey Caution, Warning and Danger signs placed on equipment, and displayed in the workplace. Operators should read and follow safety instructions packed with each product.

Learn how each machine works. Even if you have previously used similar machines, carefully check out each machine before you use it. Get the "feel" of it and know its capabilities, limitations, potential hazards, how it operates, and how it stops.

FUNCTIONS AND CONTROLS

This vibrator is designed for the compaction of concrete by immersion of the vibrator head. Compaction improves the strength and finish of concrete by driving out entrapped air. High frequency vibration allows the efficient compaction of low slump concrete mixes.

The vibrator head is driven by a rotating flexible drive shaft that transmits the drive from a coupling, engaged with a separate portable drive unit.

The vibrator head uses a unique principle to produce vibration. A single self aligning ball bearing supports a rotor at one end. The other end of the rotor is hardened and free to roll inside the hardened barrel (38, 44 mm) or nose cap (57 mm). When driven, the difference in diameters of the rotor and its mating surface, coupled by friction and centrifugal force, causes the rotor to describe an epicyclic motion and roll around inside the barrel or nose cap. Each time the rotor rotates once on its own axis it rolls almost four times around the axis of the vibrator head. As a result, the low flexible shaft speed of 3,000 r/min produces a high frequency vibration of 11,000 vibration/min. The rotor motion is like a conical pendulum with the greatest vibration produced at the nose of the vibrator head.

Vibrator models are available with a range of vibrator head diameters and flexible shaft lengths. For effective vibration select the largest diameter vibrator head that the job will accommodate. The flexible shaft should be selected with the shortest standard length (3, 6 or 9 m) that best suits the most common applications. Non standard flexible shaft lengths are available to order.

The vibrator is fitted with a quick action 60 mm (2.36 in) diameter flexible shaft coupling for operation from a drive unit fitted with a 45 mm (1.75 in) diameter 3-tooth dog drive.

A petrol or diesel drive unit with a minimum of 3.7 kW (5 hp) or an electric drive unit with a minimum rating of 2.2 kW (3 hp) is required.

ACCESSORIES

Nose caps with resilient polyurethane tips are available to extend the life of form boards and improve off-the-form finish.

Drive units are available with petrol, diesel, air and electric motor drives.

Extension flexshafts (3 & 6 m) extend the length of an existing vibrator flexshaft and are available to enable vibrating within formwork to a depth of 12 m.

HAZARDS AND RISKS

NEVER allow any person to operate equipment without adequate instruction.

ENSURE all operators read, understand and follow the operating instructions.

SERIOUS INJURY may result from improper or careless use of this machine

! MECHANICAL HAZARDS

DO NOT operate the machine unless all protective guards are in place.

DO NOT leave the equipment in operation while it is unattended.

ENSURE that the equipment will remain stable and will not move or fall while in operation.

EXERCISE CARE when handling vibrators. Exposure to vibration or repetitive work actions may be harmful to hands and arms.

DO NOT hold the vibrator head in your hands while it is running. Hold the vibrator by the flexible shaft to isolate your hands from the vibration.

NEVER stand on the vibrating head while it is operating.

DO NOT place your foot on the vibrator head while it is running unless it is done momentarily and the vibrator head is resting on a resilient support such as a car tyre.

ENSURE that repairs to machinery are carried out by COMPETENT personnel.

! ELECTRICAL HAZARDS

THE RISK OF SERIOUS OR LETHAL INJURY from electrical shock may arise from the combination of electricity and moisture.

! FIRE & EXPLOSION HAZARDS

PETROL is extremely flammable and explosive under certain conditions.

! CHEMICAL HAZARDS

CARBON MONOXIDE exhaust gases from internal combustion motor driven units can cause death in confined spaces.

! NOISE HAZARDS

EXCESSIVE NOISE can lead to temporary or permanent loss of hearing.

WEAR an approved hearing protection device to limit noise exposure, as required by Occupational Health and Safety regulations. Noise levels in excess of 85dB(A) may be produced by engines and vibrators.

PROTECTIVE CLOTHING

ALWAYS wear protective clothing and footwear to prevent the skin coming into contact with wet concrete.

PROTECTIVE FOOTWEAR should be worn to reduce injuries from penetration through the sole, contact with cutting objects, slipping, contact with wet concrete and electrical hazards.

GOGGLES for eye protection may also be necessary.

USE waterproof protection for hands and knees (if kneeling) when concreting. If your clothing becomes wet from concrete contact make sure you change the clothing. Do not walk about waiting for it to dry.

USE GLOVES when handling and inspecting the flexible shaft outer casing. Excessive wear of the rubber cover can expose the wire braided reinforcement, allowing it to project and cause injury.

! ADDITIONAL HAZARDS

Slip/Trip/Fall is a major cause of serious injury or death. Beware of the flexible shaft and water left on the walking or work surface.

Exercise caution and ensure that the perimeter of elevated formwork or platforms is protected.

Exercise care when working in the vicinity of unprotected holes or excavations

ADDITIONAL INFORMATION

Refer to the drive unit operation instructions for additional safety and operation information on the appropriate drive unit. These are supplied free of charge by mail or fax.

OPERATION

Information regarding compaction of concrete using immersion vibrators is available in a FLEXTOL FACT SHEET.

Check that a petrol or diesel engine is running at 3,000 r/min. If it is not, the frequency of the vibrator head will be incorrect. If the speed is low, compaction will not be as quick or as efficient as it should. If the speed is excessive, wear of the motor, flexshaft and vibrator will be greater. Continued operation at higher speed may result in failure of the vibrator and flexshaft components.

Do not engage the drive coupling in a motor that is already running.

For information on correct starting procedures refer to the engine manufacturers operation manual.

Before engaging the flexshaft with a petrol drive unit start the motor using the recoil starter, increase the speed to full throttle and allow it to warm up for a few minutes.

If using an electric motor, switch on and check the motor rotation is in an anti-clockwise direction when viewing its drive dog front on.

Stop the motor.

Turn the bell housing trigger 180 degrees. Insert the flexshaft coupling fully into the housing of the drive unit and release the trigger. Push the coupling into the housing and twist the flexible shaft until the drive dogs are fully engaged and the trigger returns to the horizontal position.

The motor may now be started.

It is not uncommon for a pendulum-type vibrator head to fail to vibrate when the motor is switched on or started. If the vibrating head does not commence vibrating immediately, tap the tip of the vibrator head sharply against a solid surface or try rattling the vibrator head.

Do not operate the flexshaft in a coiled condition. Avoid sharp bends in the flexshaft, particularly when it is in use.

Do not use a pendulum-type immersion vibrator head as an external vibrator by applying it to the outside of formwork.

Do not operate the vibrating head out of concrete for extended periods. Do not leave it running while you wait for fresh supplies of concrete to be placed. Vibrator heads are designed to be cooled by the concrete in which they are immersed.

CARE AND PREVENTIVE MAINTENANCE

Vibrators must be handled with care, and be properly maintained in order to avoid unnecessary breakdowns. Check regularly for signs of wear and rectify any faults immediately.

Hire operators should examine and test run the vibrator on return from hiring.

The exterior of the flexshaft and the vibrator head are subject to abrasion and wear. If the vibrator is operated unchecked, concrete will eventually enter the vibrator head or the flexshaft. Naturally, the cost of repairing, a vibrator which has been allowed to deteriorate in this way will be greater.

Regular inspection of the vibrator and the flexible shaft will avoid these problems.

Check the 3-tooth dog on the drive coupling to ensure that it is fully meshed and not worn.

Check the flexible shaft for kinks and external damage by laying it out straight on a workbench or the floor. Although it still operates a badly kinked flexible shaft may result in a broken inner core.

Check the outer casing rubber cover for damage where it enters the ferrule at the vibrator head. Damage is caused by operators using a crane to retrieve a vibrator trapped in concrete reinforcing bars.

CLEANING AND STORAGE

It is advisable to wash the vibrator head and flexshaft with clean water after use each day and before storing. This will ensure that concrete does not accumulate on the exterior.

SERVICE

Vibrating heads are fitted with left hand screw threads on the nose cap, barrel and flexible shaft casing.

Dismantle the vibrating head and the flexible shaft every 500 working hours. Inspect for wear before re-assembling. Apply a thin coating of grease to the core assembly inserting it into the casing assembly from the drive coupling end.

The most critical part of the vibrator is the seal which excludes the flexible shaft and bearing grease from the vibrator head. The ingress of grease into the vibrator head will prevent its operation. The mating surfaces of the rotor and barrel (38, 44 mm) or nose cap (57 mm) must be clean and dry.

Replace the seal and all o-rings at each overhaul.

Pendulum-type 38, 44 & 57 mm epicyclic action vibrators have a rotor supported by a single ball bearing. The bearing and the adjacent seal should be lightly greased only. All other components (barrel, rotor and nose cap) should be internally clean and free from finger prints and grease.

Polish the mating surface of the rotor and barrel (38, 44 mm) or nose cap (57 mm) with fine emery cloth and wipe with a cloth moistened with methylated spirits to ensure optimum cleanliness.

It is recommended that only genuine FLEXTOOL replacement bearings are used. These are specially manufactured to meet the arduous operating conditions.

SPECIFICATIONS

Frequency

11,000 vib/min

Amplitude in Air	VP38	VP44	VP57
	1.7 mm	1.8 mm	2.1 mm

Flexshaft Dia

Std 13 x 32 mm

HD 13 x 35 mm

Weight	VP38	VP44	VP57
3 m Flexshaft	14 Kg	14 Kg	16 Kg
6 m Flexshaft	20 Kg	22 Kg	24 Kg
9 m Flexshaft	29 Kg	30 Kg	32 Kg

TROUBLESHOOTING

Symptom	Possible Causes and Correction
Vibrator does not vibrate.	<p>Flexible shaft is rotating</p> <ul style="list-style-type: none"> • Tap the tip of the vibrator head sharply against a solid surface or try rattling the vibrator head. • Check electric motor direction of rotation using arrow on bell housing. Three phase motors can run in reverse due to incorrect phase rotation. Single phase motors can run in reverse due to incorrect internal connection after rewinding. If rotation is incorrect check that the core ends have not unscrewed. • If the vibrator head has just been serviced the mating surfaces of the rotor and the barrel (38, 44 mm or nose cap 57 mm) may not be clean. • Check the vibrator barrel for wear or fine cracks that allow the ingress of moisture. • Grease has leaked into the vibrator head. Check for over greasing of the core or over speed of the petrol motor. Replace seal, remove core and wipe excess grease from the core with a clean cloth.
Rotor / Core / Barrel is broken Grease in vibrator barrel	<p>Flexible shaft is not rotating</p> <ul style="list-style-type: none"> • Check that the vibrator coupling is fully engaged in the drive unit bell housing • Petrol drive unit motor is running in excess of 3,000 r/min. • Outer casing or inner reinforcing spring is kinked or collapsed. • Petrol drive unit motor is running in excess of 3,000 r/min. • Core has been over greased. <p>Replace seal, remove core and wipe excess grease from the core with a clean cloth</p>

WARRANTY

FLEXTOOL products are covered by warranty for a period of six (6) months from the date of purchase against defects in material or workmanship provided that:

- the product concerned has been operated and maintained in accordance with the operating instructions.
- has not been damaged by accident, misuse or abuse.
- has not been tampered with or repaired by any unauthorised person.

The owner is responsible for the cost of transportation to and from the authorised repairer and the unit is at the owners risk while in transit to and from the repairer.

SPARE PARTS AND SERVICE

FLEXTOOL (AUST.) PTY. LTD. A.C.N. 004 502 961

Melbourne Head Office

P.O. Box 1102

191 Wellington Street

Collingwood Vic. 3066

Australia

Tel: (03) 9419 6300

Fax: (03) 9417 1391

Sydney

29 Crescent Street

Rozelle N.S.W. 2039

Tel: (02) 9818 5722

Fax: (02) 9818 3276

Brisbane

17 Ross street

Newstead Qld. 4006

Tel: (07) 3252 2306

Fax: (07) 3252 5359

Adelaide

68 Daws Road

Edwardstown S.A. 5039

Tel: (08) 8374 4300

Fax: (08) 8374 4194

Perth

3 / 47 Tate Street

Bentley W.A. 6102

Tel: (08) 9451 2077

Fax: (08) 9350 5011

Free Call

Outside the above metropolitan areas..

Tel: 1800 801 108