

INSTALLATION & OPERATING MANUAL



STREBEL SU SP-D1 PRESSURISATION UNIT

Note: THESE INSTRUCTIONS MUST BE READ AND UNDERSTOOD BEFORE INSTALLING, COMMISSIONING, OPERATING OR SERVICING EQUIPMENT.

THE ELECTRONIC PRESSURISATION UNITS ARE INTENDED FOR USE ONLY IN COMMERCIAL/LIGHT INDUSTRIAL APPLICATIONS.

THIS PRESSURISATION UNIT COMPLIES WITH THE ESSENTIAL REQUIREMENTS OF THE MACHINERY DIRECTIVE 2006/42/EC, THE LOW VOLTAGE DIRECTIVE 2014/35/EC AND THE ELECTROMAGNETIC COMPATIBILITY DIRECTIVE 2004/108/EC.

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1.0 GENERAL REQUIREMENTS

PLEASE READ THESE INSTRUCTION CAREFULLY BEFORE CARRYING OUT ANY ASPECT OF INSTALLATION.

FAILURE TO INSTALL THE UNIT TO THE INSTRUCTION WILL LEAD TO LOSS OF GUARENTEE AND COULD LEAD TO DAMAGE TO THE UNIT / INSTALLATION AND POSSIBLE INJURY TO PERSON(S).

THE UNIT MUST BE USED SOLELY FOR THE PURPOSE FOR WHICH IT WAS DESIGNED. IF IN DOUBT OF ITS SUITABILITY, PLEASE CONTACT THE MANUFACTURERS

1.1 Related Documents

Pressure Systems Safety Regulations 2000

It is the law that pressure system appliances are installed by competent persons in accordance with the above regulations. Failure to install appliances correctly could lead to prosecution. It is in your own interest and that of safety, to ensure that this law is complied with.

The installation of the pressurisation unit and expansion vessel MUST be in accordance with the relevant requirements of the Pressure System Regulations, Building Regulations, IEE Regulations and the bylaws of the local water undertaking.

It should also be in accordance with any requirements of the local authority and the relevant recommendations of the following documents: -

Applicable standards and documents are:

BS7074	Application, selection and installation of expansion vessels and ancillary equipment for sealed water systems
BS6644	Installation of Gas Fired Hot Water Boilers 60 kW to 2MW.
BS6880	Code of Practice for low temperature hot water heating systems of output greater than 45 kW
BS6759-1	Specification for safety valves for steam and hot water
BS EN 60335-1	Safety of Household and similar electrical appliances
HSE Guidance note PM5:	Automatically controlled steam and hot water boilers.

1.2 Mains Water Connections

All connections to local water mains must comply with WRAS Regulations including any local requirements. **The System temporary fill connection must be as per water supply bylaws and must be removed after initial filling.**

1.3 Expansion Vessels

System expansion vessels must be specified in accordance with BS4814 or BS6144. Strebel Ltd have a range of products available on request including guidance of vessel sizing. The expansion vessel should be set when empty at 0.1 bar below the cold fill pressure setting.

1.4 Safety Relief Valve

Must comply with BS6759 part 1 and be sized and installed in accordance with BS6644 and BS7074.

2.0 PRODUCT DESCRIPTION

The pressurisation unit is designed to maintain the minimum pressure requirement of modern low/medium temperature, hot water sealed system. The pressurisation unit also provides replacement water for losses from the system.

The pressurisation unit is housed in a powder coated steel cabinet with hinged door. Housed in each cabinet is a single peripheral turbine pump, connecting pipework and pressure control components. The cabinet also houses the header tank, with a float valve. In the front of the cabinet is the system's electronic control.

The electronics have many functions including self-diagnostics all of which can be found on page 9.

3.0 TECHNICAL DATA

The basic overall dimensions are shown below in Figure 1.

Figure 1 - Basic Overall Dimensions

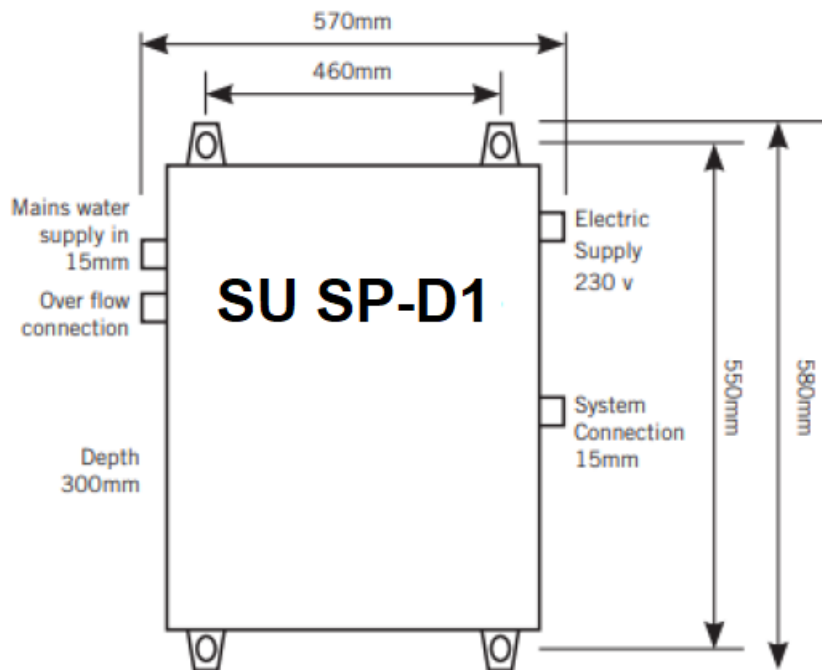
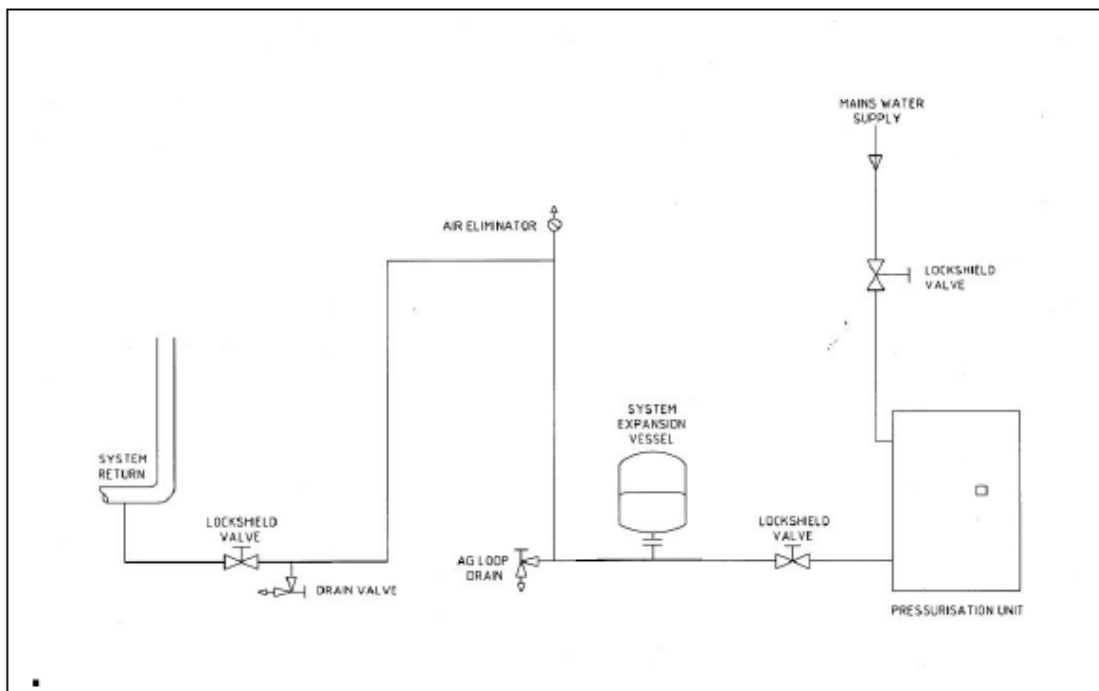


Figure 2 – Technical Data

<u>General</u>		<u>Single Pump</u>
Minimum cold fill pressure	bar	0.5
Maximum cold fill pressure	bar	3.0
Maximum operating pressure	bar	7.0
Maximum Flow Rate	l/min	35
Maximum water flow rate @ Maximum cold fill pressure	l/min	0.1
Weight (empty)	kg	23.5
Weight (full)	kg	30.5
Tank Capacity	litres	7.0
<u>Factory Pre-Set Values</u>		
Cold fill pressure	bar	1.6
System low pressure switch	bar	1.0
System high pressure switch	bar	2.8
<u>Electrical Data</u>		
Electrical Supply		230V AC 50Hz 1Ph
Start current	amps	9.0
Run current	amps	2.0
<u>Connection Data</u>		
Mains Inlet		½" Male BSP
Overflow		32mm Plastic
Connection to System		15mm Compression

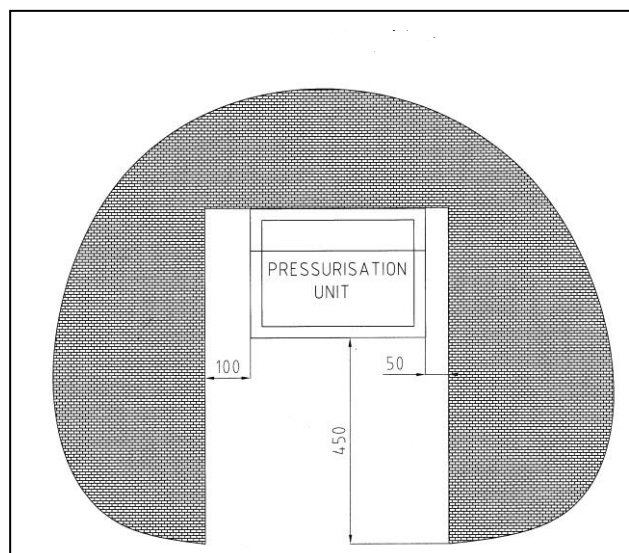
4.0 INSTALLATION

Figure 3 - Ideal layout of a typical sealed system



4.1 Location

Figure 4 - Recommended Clearance Dimensions



The SU SP-D1 should be wall mounted in a dry, well-ventilated position, protected from extremes of heat and cold. The unit should be secured with fixings, to suite the wall type, utilising the four mounting points provided.

Allowance for access must be provided for as per diagram above for servicing.

4.2 Pipework Connections

Isolating valves should be fitted to both the feed water supply, and the system connection. It is recommended that a quick fill loop is fitted to facilitate initial filling.

- 1) Mains water connection - ½" BSP 15mm Pipe Connection to Float Valve

The float valve feeds a 7 litres plastic break tank, complying with the requirements for a type "A" air gap. The valve is supplied with a flow restrictor, which may be fitted to reduce over spill in the event of valve failure.

- 2) Overflow Connection - 32mm Plastic

Overflow must be piped to where it will be safe but visible, so it will be noticed and corrected.

- 3) System Connection – 15mm Compression

The system connection is via a 15 mm compression fitting.

The unit must be connected to the system by an antigravity loop. The antigravity loop must be made in pipework no smaller than the expansion vessel connection and have a minimum height of 2 metres. It should include a lock-shield (or lockable) valve at the system connection point for servicing and an automatic air vent fitted at the highest point of the loop. The antigravity loop must not be lagged but can be fitted with an optional kit to prevent freezing. The pipework and fittings must be pressure tested to 1.5 times the safety valve lift pressure.

4.3 Electrical Connection

All wiring to the pressurisation unit must be in accordance with the IEE regulations, and any local regulations, which apply. Note: If in any doubt a qualified electrician should be consulted.

The unit is supplied fitted with a 1m flying lead for connection to the 240v 50Hz mains supply. Mains connection must be via a fused isolator rated at 13 Amps and positioned locally to the unit.

4.4 Filling the System

The unit is designed to maintain the system at the design pressure and automatically make up any water loss; **therefore, the unit must NOT be used to fill the system.**

The following procedure must be adhered to:

1. Open isolating valve fitted to the system return.
2. Connect temporary supply from mains cold water to the system.
3. During filling, ensure all system automatic air vents are allowed to vent freely. After filling, the automatic air vents should be left to operate normally.
4. Fill the system until the pressure reached 0.1 bar below the designed cold fill pressure, and then remove temporary supply.

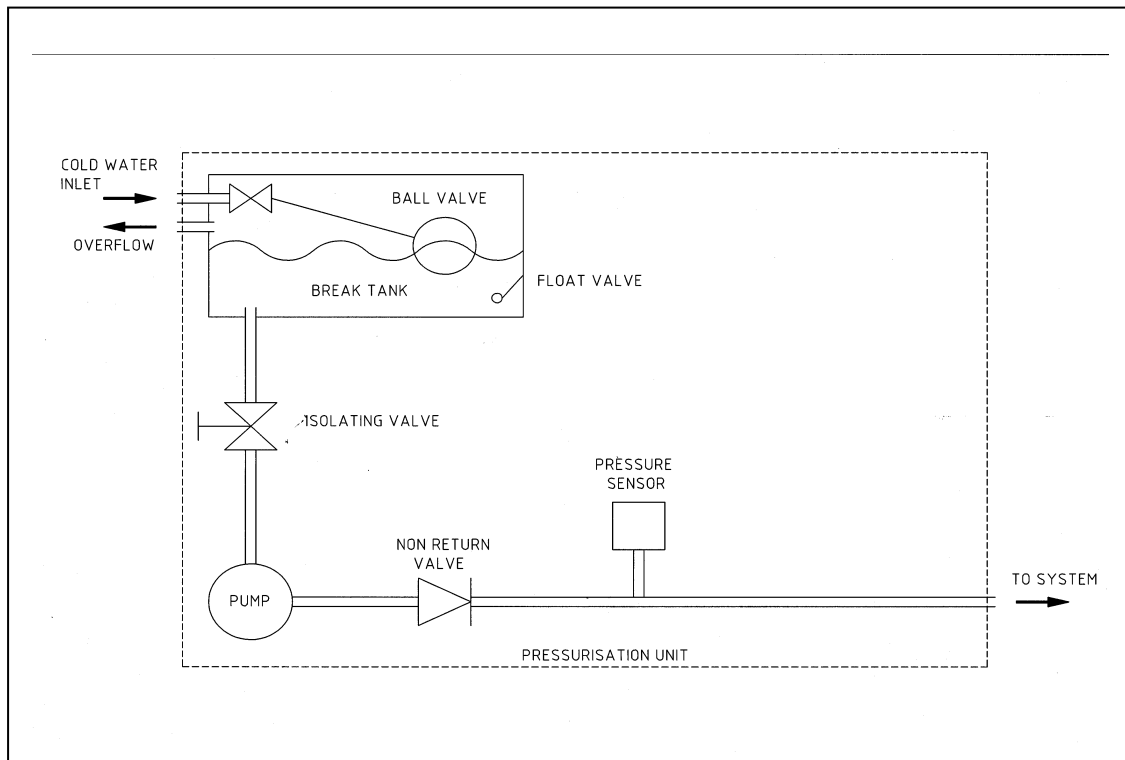
4.5 Before Start Up

1. Check the break tank is full of water.
2. Ensure the pump has been primed by completing filling with water before it is turned on. Loosen the 14mm air vent fitted to the pump. When water spears, tighten the air vent.

Dry running will damage the mechanical seal and the impellor. Through the side cap placed near the discharge pipe, fill up with water, both the suction pipe and the pump body. This operation must be carried out with great care, so that no water bubbles are entrapped.

5.0 OPERATION OF THE PRESSURISATION UNIT

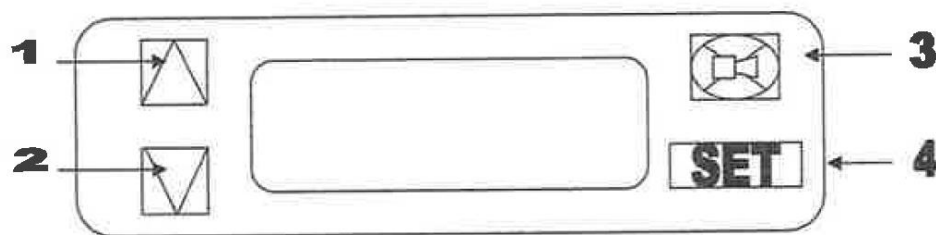
Figure 5 – Schematic Layout



5.1 Unit Operation

A drop in system pressure due to, for example, loss of water, will cause the pump to maintain the pressure. As the level of water in the tank reduces a ball valve allows new water into the tank. When the pressure sensor indicates that the correct pressure has been reached the pump stops.

5.2 Set Up Guidelines



KEY 1: Has the **UP** function, i.e., increases the parameter value.

KEY 2: Has the **DOWN** function, i.e. decreases the parameter value, reset the alarm and the hours of activity of the pump.

KEY 1 & 2: Is the keypad **LOCK / UNLOCK** function, i.e. by pressing both keys at the same time and holding for 5 seconds (= Pon or Pof) unlocks or locks the access to the parameter menu.

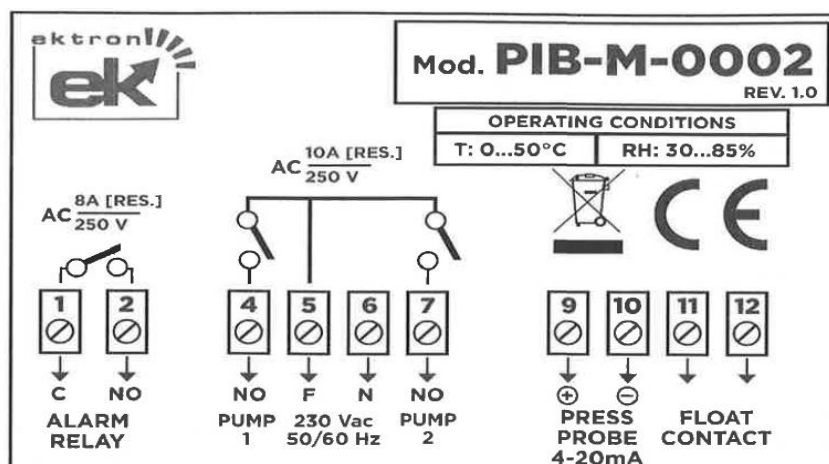
KEY 3: Serves as the **ALARM STOP** function – buzzer (inside) & external alarm. Once the key has been pressed, the alarm will stay on for 2 seconds and then start again until the problem has been solved. The length of the pause cannot be regulated by the end user. By stopping the alarm, the pump is reactivated.

SET KEY: Used for setting the **PARAMETER VALUES:**

- Press and hold the set key for 5 seconds.
- The display will show the first parameter for 5 seconds and then its current value.
- To change this value, press either the UP or DOWN key.
- To confirm the new value, press and hold the set key for 5 seconds.
- The value will blink for 3 seconds which confirms it has been saved.
- The device will then automatically pass on to the next parameter and then shows its current value.
- This sequence will continue for all parameters, and when reaching the last parameter, it will start over from parameter one.
- To directly reach a required parameter (i.e. to skip one or more parameters), press the SET key repeatedly after the first parameter is displayed.
- To exit the menu, after parameter changes has been made, do not press any buttons for more than 10 seconds, after which it will display the system pressure, then turn power off and back on to ensure changes have been accepted.

6.0 PARAMETERS

ID	Description
SP	Cold Fill Setpoint
dif	Differential.
LPr	Low Pressure > (minimum set point 0.1 Bar). If this controller is to be used to fill the system on commissioning, positive pressure above this setpoint must be attained before LPr auto resets and allows the pump to run.
HPr	High Pressure >
Prt	Maximum Pump Activity
PrA	Pump Pulse > Range is 1 to 1000, where 1 = 10 Hours. Default set at 200 = Pulse every 12 weeks.
drA	Pump Pulse Duration > Range is from 1 to 99 seconds.
crE	Alarm Relay Contacts > (0 = N/O / 1 = N/C) After selecting N/O or N/C, the controller should be turned off for the setting to take instant effect.
naL	Number of Occurred Alarms
Hr1	Hours of Pump Activity



7.0 COMMISSIONING

The unit is supplied factory set and tested to suit the system parameters. If the application falls within these parameters, the unit requires minimal commissioning checks.

7.1 Mechanical Installation

Check that the Unit and expansion vessel have been installed correctly. Check also that all lock shield or lockable valves are correctly set.

7.2 System Flushing

Ensure that the system has been flushed and all foreign matter has been removed, including pipe scale.

Note: Should this material come into contact with the expansion vessel diaphragm it could result in premature failure of the expansion vessel assembly.

7.3 Electrical Installation

Before working on the Pressurisation unit ensure all electrical circuits connected to it are isolated.

7.4 System Expansion Vessel

To set or check the expansion vessel charge pressure the lock-shield between the pressurisation unit and the vessel must be closed. The charge pressure must be checked with the expansion vessel empty.

Note: the expansion vessel charge pressure should be set at 0.1 bar less than the cold fill pressure. A suitable gauge should be used to check the charge pressure. The Schrader valve is fitted near the top of the expansion vessel.

If the charge pressure is too high, it can be reduced by depressing the centre of the Schrader valve or by using a pressure gauge with an integral air release valve.

If the charge pressure is too low a slight increase can be provided using a car foot pump otherwise an oil free compressor or nitrogen bottle is recommended, the drain cock fitted on the base of the expansion vessel must be open to allow any water in the vessel to escape.

When the correct pressure is set the Schrader valve protective cap must be replaced.

Check the integrity of the pipework. Ensure the lock-shield valve between the Pressurisation unit and the expansion vessel is open and the drain valve is closed. Ensure the air purge plug is fitted (near the top of the expansion vessel).

7.5 Initial Setting

- 1) Check water inlet supply.
- 2) Make sure that the pressurisation Unit is connected to the system and has a suitable isolation valve.
- 3) Make sure that the mains lead has been connected to a suitably fused switched isolator.

7.6 Filling the Unit

- 1) Open isolation valve between tank and pump.
- 2) Undo the priming screw on pump head with screwdriver. Prime until water appears [please note you may get bursts of air then water then air, so wait until only water comes out] . Close the screw and turn on the pump (keeping system isolation valve closed). Pump should run for a few seconds until set pressure is reached.

- 3) Check for any leaks within the unit, and if OK open system isolation valve.
- 4) The unit will now monitor the system and keep it at the required cold fill pressure allowing for differential programmed into the electronics.

8.0 ALARMS

In the event of the pressurisation unit going into fault mode, the related message will appear on the display:

LLL	Low Liquid Level Alarm
HPr	High Pressure Alarm
LPr	Low Pressure Alarm
Prt	Maximum Pump Activity Time
PF1	Pump Failure 1
dif	Differential.

The alarm will go off:

- When the current pressure value exceeds either the upper or lower limit value – the relay and the buzzer is activated.
- When the pump operates for too long (the time in the related parameter can be set from 0 ... 999 minutes with 10 minute steps) – the relay and the buzzer is activated.
- By a power failure, i.e. the pump does not absorb current – the relay and the buzzer are activated.
- When the level of the liquid is low – the buzzer is activated, and the pump is stopped.

The level sensor = The contact is open if liquid is present ; the contact is closed if there is no liquid.

9.0 SERVICING SCHEDULE

The following is a recommended servicing schedule for the pressurisation unit and expansion vessel. If remedial action is required.

9.1 12 Monthly Service

- 1) Check the expansion vessel charge pressure, A significant drop in charge pressure could be due to a faulty vessel diaphragm, replacement of diaphragm should be considered.
- 2) Check the ball float valve diaphragm for integrity and replace if necessary. Also check the plastic float for soundness.
- 3) Check the expansion vessel for signs of external corrosion. If any deterioration is observed, then it is recommended that the frequency of inspection be increased.
- 4) Check the operation of the safety circuits if utilised on the Unit.
- 5) Briefly run the pump to check for rotor seizure. This could occur if the pump is not operated for extended periods. This can be accomplished by slightly opening the expansion vessel drain valve to initiate a leak.

NOTES

PRESSURISATION UNIT COMMISSIONING REPORT

SITE ADDRESS SITE CONTACT SITE TELEPHONE No		<u>CUSTOMER ADDRESS</u> CUSTOMER CONTACT CUSTOMER TELEPHONE No	
ENGINEER SIGNATURE:		<u>DATE:</u>	
<u>UNIT TYPE/MODEL</u>		COMMENTS:	
SERIAL NUMBER			
EXPANSION VESSEL TYPE			
CAPACITY			
SERIAL NUMBER			
COLD FILL PRESSURE			
HIGH PRESSURE CUT OUT SETTING			
LOW PRESSURE CUT OUT SETTING			
<u>WORKING PRESSURE RANGE</u> (PUMP CONTROL)			
BOILER SAFETY VALVE RATING			
CUSTOMER SIGNATURE SIGN: PRINT		COMPANY STAMP APPROVED BY: PRINT:	

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