

# BVM Corporation

## SERIES “G” ELEVATOR

100, 150,175, 250, 350 & 500 Tons

Part number: \_\_\_\_\_

Serial Number: \_\_\_\_\_



### Safety

**CAUTION:** Practice safety in the operation and maintenance and use only approved safety methods, materials and tools. Keep hands away from any pinch point or undesignated areas; use only the provided handles for operating the elevator.

**WARNING:** Elevators which have experienced wear beyond established wear criteria set by OEM, or are found to have cracks must be replaced or repaired by a BVM authorized repair facility.

**WARNING:** Only original BVM parts may be used. Elevators are produced from cast alloy heat treated steel and must not be welded in the field. Improper welding can cause cracks and brittleness in heat-affected areas which can result in dramatic weakening of the part and possible failure. Repairs involving welding and/or machining should be performed only by a BVM authorized repair facility. Using an Elevator that has been improperly welded or repaired is dangerous.

**NOTE:** The owner and user together with the manufacturer should jointly develop and update inspection, maintenance, repair and remanufacture procedures consistent with equipment application, loading, work environment, usage and other operational conditions. These factors may change from time to time as a result of new technology, equipment history, product improvements, new maintenance techniques and changes in service conditions. Alternatively, BMV recommends using the Periodic inspection and maintenance Categories and Frequencies as mentioned in API RP8B Table 1.

### Load test

**WARNING:** BMV elevators are load tested after manufacture or repair. Load testing is mandatory on elevators which have not been load tested before. Load testing is required on elevators which

**have been overloaded, for example jarring operations or operations that have induced elevators to high accelerations or high impact loads.**

## MAINTENANCE

Visually inspect the elevator for loose and missing parts.

1. Check condition of the latch spring.
2. Check condition of latch lock spring.
3. Check for proper latch and latch lock performance.
4. Open elevator and check hinge pin for wear by checking the vertical play between the body and door.
5. Check latch pin for wear by checking the vertical play between the latch and body.

Close elevator and check that the latch and latch lock mechanisms function properly. Open and close elevator several times, check for proper latch and latch lock function each time.

Check for proper operation of latch stop mechanism. Latch should not stop against the Body when engaged.

## LUBRICATION

Lubricate on a regular basis when in use:  
 Oil or grease hinge, latch and latch lock pin.  
 Grease hinge and latch pin through grease nipples.  
 Grease underside of link arms. Grease springs.  
 Grease link retainer fasteners.  
 Lubricate regularly during usage and storage to prevent corrosion from attacking any part

## OPERATION

BVM's "G" type elevators are conventional center latch taper type elevators for handling drill pipe.

BVM's center latch elevators are constructed in two halves of practically the same weight for proper balance and easier opening and closing.

Safety features include guarded operating handles to help prevent accidents to operators and an extra handle at the rear of the elevator for easier, safer operation. All elevators are equipped with a latch and latch lock combination.

All elevators have a shielded safety latch mounted on the door. The shield protects the latch from accidentally opening. Both latch and lock operate from a single handle, and automatically relatch when the door is closed.

All elevators are manufactured in strict accordance with API specifications including API 8C.

## INSPECTION (PER api-rp8b)

### Daily Inspection (Cat. II – elevator in use)

1. Check for any worn and damaged parts.
2. Check for loose and missing parts.
3. Check condition of the latch spring and the latch lock spring.
4. Check for wear of the hinge pins for vertical play between latch, body and door
5. Open and close the elevator 5 times slowly and 5 times quickly. Check that the elevator works flawlessly without interference
6. Check state of lubrication
7. Check for any visible cracks
8. Check for any corrosion on all pins and springs
9. Check good condition of all primary and secondary retention

### Semi-annual inspection (Category III)

1. Try to open the latch by prying the latch between body and latch with a steel bar or screw driver, the latch lock must prevent the latch from being opened (figure 1a)
2. Open and close the elevator 5 times slowly and 5 times quickly. Check that the elevator works flawlessly without interference
3. Check that the latch is not forced outward when elevator body is wedged – top and bottom (Fig. 1b).
4. Check that the lock hook has clearance on all sides around the lug pin (Fig 1c).
5. Check the clearance between latch and lug – top and bottom (Fig. 2).

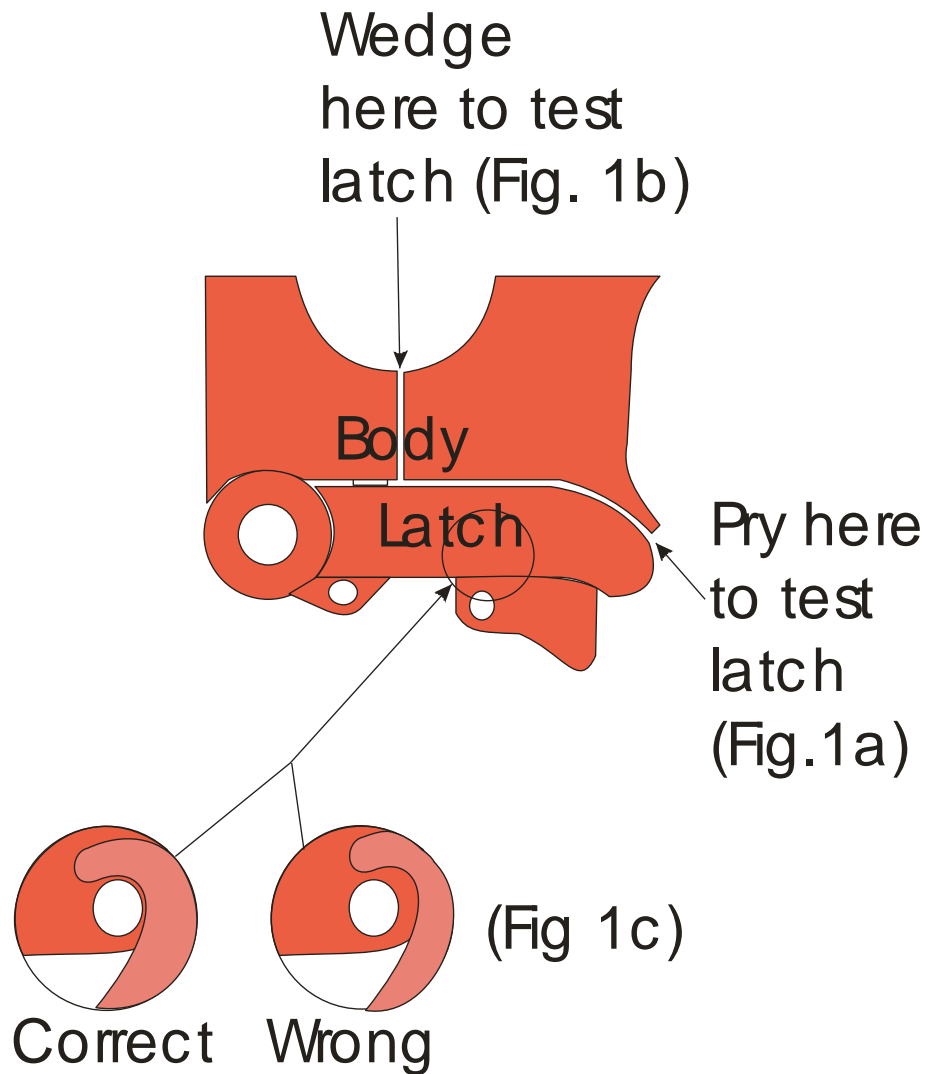
6. Check that the latch and Lug faces are parallel (Fig. 2)
7. MPI the lifting ears.

- Hinge Pin
- Latch Pin
- Latch  
(See critical areas drawings for cast parts)

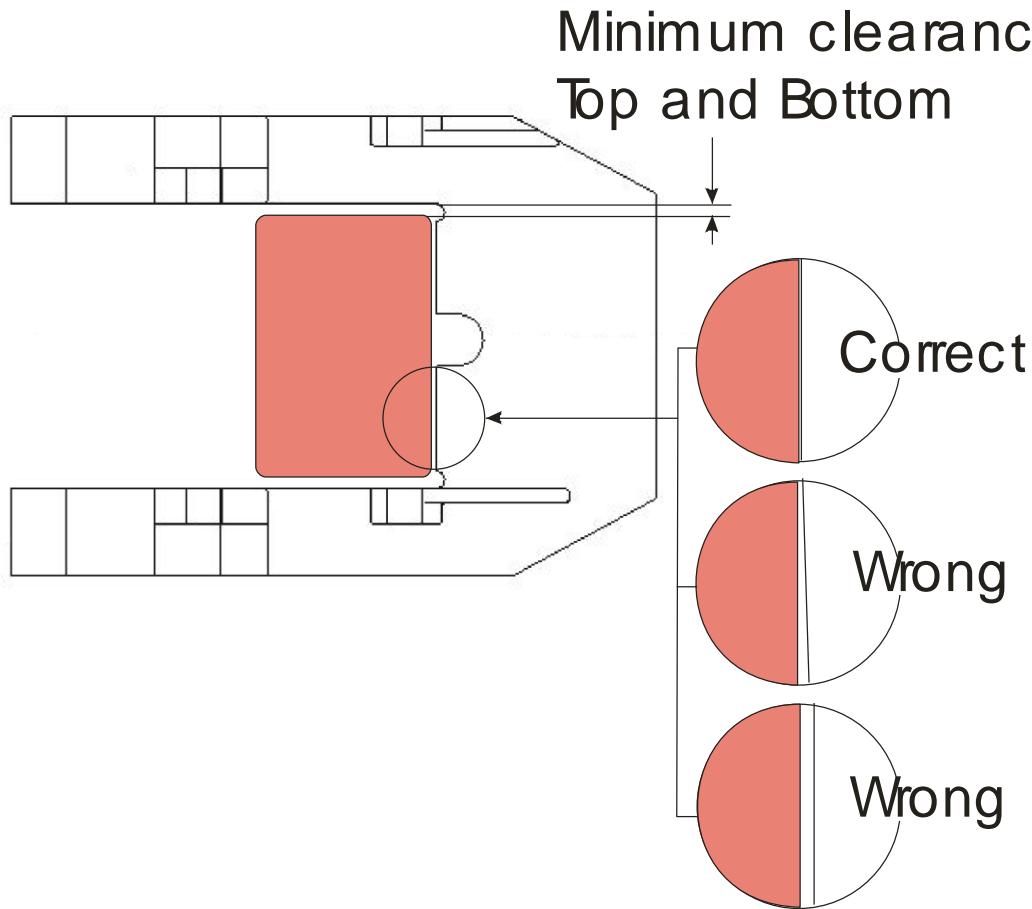
**Annual Inspection (Category IV)**

Conduct Category III inspection.

1. MPI inspect the following parts:
  - Body
  - Door



**Figure 1**

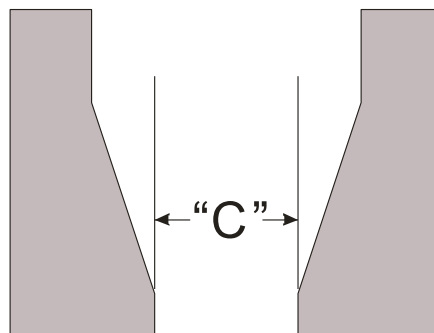


**Figure 2**

**Bore size wear data – Drill Pipe Elevator**

**Procedure**

1. Measure the center bore of the elevator ( “C” Figure 3)
2. Determine the Nominal bore size
3. Maximum wear of center bore is Nominal size +0.25”



**Figure 3**

**Wear data – General**

The inspection data and maximum wear tolerances are only valid if the equipment is in otherwise good condition and has not been mis-used, does not exhibit excessive wear, cracks or other defects. Additionally any weld repairs – not done at a BVM authorized repair facility – shall require examination and re-certification by a BVM authorized repair facility before being used further. These data and tolerances only apply to certain critical components and cannot on their own determine the overall condition of the equipment or its suitability for continued use.

## **Magnetic Particle Inspection (MPI)**

### **Annual inspection**

1. Remove all oil, grease, sand, paint and loose rust that may interfere with the inspection
2. Carry out MPI according to ASTM E709.
3. Examinations should be carried out with a continuous method and sufficient overlap to ensure 100% coverage of the area or part under inspection.

### **Evaluation**

Relevant indications: Only those indications with major dimensions greater than 1/16 Inch (1.6mm) and associated with a surface rupture shall be considered relevant. Relevant indications are indications that results from, discontinuities within the test part. Non relevant indications are indications that results from excessive magnetizing current, structural design or permeability variances within the test parts. Any indication believed to be non-relevant shall be regarded as relevant and shall be re-examined to determine whether an actual defect exists. Linear indications shall be considered as those having a length of more than three times the width. Rounded indications shall be considered as those having a length less than three times the width. A lined indication shall be considered as a group of three more indications which touch an imaginary straight line connecting any two of the group.

## **For equipment certified in accordance with API 8A & 8C**

### **PSL 1**

<b>Type</b>	<b>Discontinuity description</b>	<b>Max. degree critical areas</b>	<b>Max. degree noncritical areas</b>
I	Hot tears,cracks	None	Degree 1
II	Shrinkage	Degree 2	Degree 2
III	Inclusions	Degree 2	Degree 2
IV	Internal chills and chaplets	Degree 1	Degree 1
V	Porosity	Degree 1	Degree 2

Note: Only BVM authorized repair facilities are allowed to repair elevators with indications outside the acceptance criteria.

### **Routine functional test prior to operation**

Check the elevator daily prior to use.

Visually inspect the elevator for loose and missing parts.

- Visually inspect the elevator for cracks. Remove from service in case of cracks.
- Visually inspect the elevator for corrosion. Replace corroded parts.
- Check the condition of the hinge pins, latch pins and latch lock pins
- Check springs for nicks, burrs, pitting or cracks. Ensure springs are not painted and properly greased.
- Open the elevator and check the hinge pin and latch pin for wear
- Close the elevator and check the proper functioning of the latch for at least 10 times
- Check the elevator for proper operation of the latch stop mechanism. Latch should not stop against the body when engaged

### **Routine lubrication prior to operation**

The following lubrication should be completed daily and/or prior to use.

Procedure

- Grease hinge pin, latch and latch lock pin
- Grease any part via existing grease nipples
- Grease underside of link ears
- Grease top bore and taper surface
- Grease springs
- Grease link retainer fasteners

### **Operation**

Procedure

1. The door is opened by gripping the latch lock and pulling outward. This automatically releases the latch lock assembly and latch so the elevator can be positioned on the pipe.
2. When the elevator is properly closed around the pipe, the latch locks automatically.
3. The latch spring is designed to latch the elevator and hold it closed under normal operating conditions.
4. The latch lock provides additional security and assures the latch will remain closed under normal, loading conditions.

**WARNING: When picking up pipe, ensure the doors are pointing upwards, preventing the full pipe load from being transferred via the latch and latch lug.**

### **Recommendations**

1. Make sure to use the lifting handles provided for opening, closing and handling the elevator. Keep hands away from all other areas when the elevator is in use.
2. Check the latch and latch lock for full engagement when closed around the pipe

### **Trouble shooting**

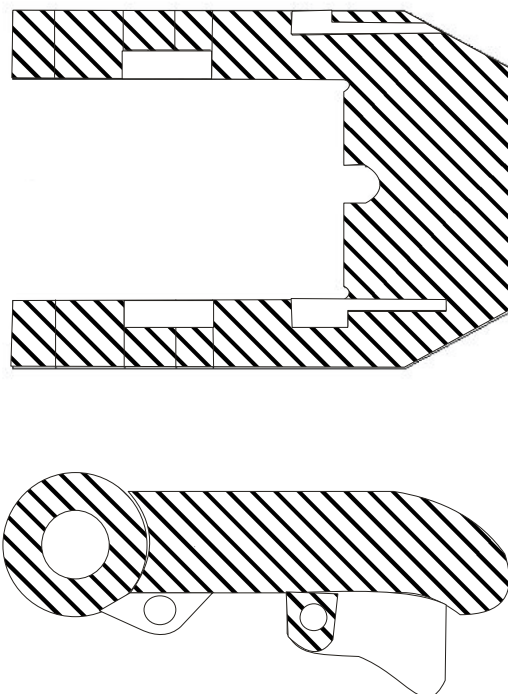
When problems cannot be solved, contact an authorized BVM repair facility.

**Overview possible problems**

<b>Problem</b>	<b>Possible cause</b>	<b>Possible solution</b>
Elevator does not close or is difficult to close	Parts bent or damaged. Pipe too big	Check elevator. Use different size elevator
Elevator does not hang Level	Length of links not equal	Use same length slings
Elevator does not open	Yielding due to overload Elevator corroded	Replace Elevator Open elevator by force, clean and lubricate. Check elevator for excessive wear.
Bent pins	Elevator is overloaded	Replace Elevator
Elongated holes	Elevator is overloaded Elevator holes worn	Replace Elevator Check amount of wear. If within acceptance criteria use as is, when over acceptance criteria, replace Elevator

**Critical Wear Area Drawings**

**Latch Critical Wear Areas**



**Figure 4**

### Elevator Body Critical Wear Areas

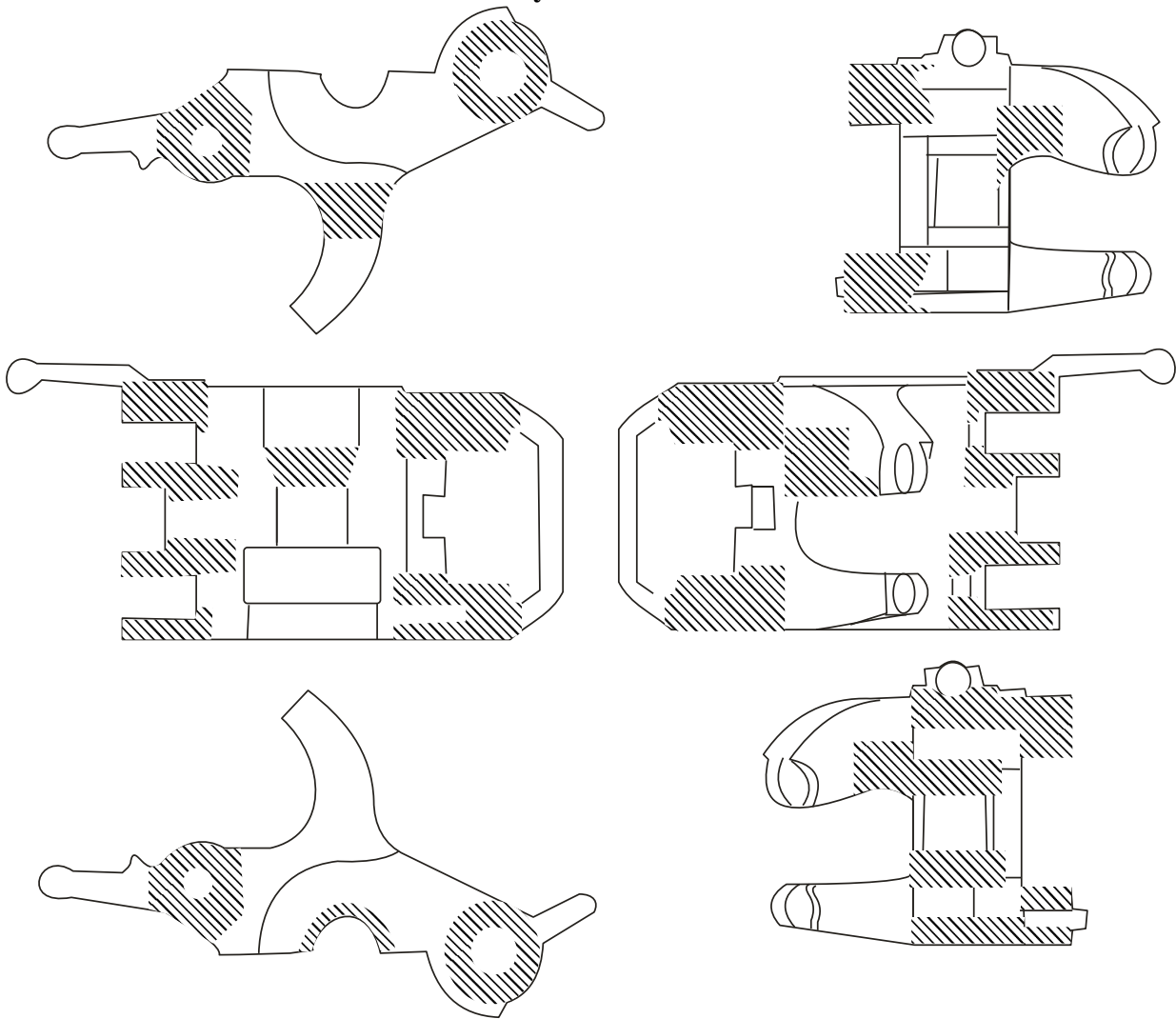


Figure 5



ELEVATOR TYPE	MG	RG	MGG	MGG	GG	HGG
RATED CAPACITY	100 TON	150 TON	175 TON	250 TON	350 TON	500 TON
PART NUMBER	30157	30156	13884	35005	31068	70013
SIZE						
HINGE PIN SIDE						
TOTAL CLEARANCE 'A'	0.030"	0.030"	0.030"	0.030"	0.035"	0.045"
HINGE PIN MIN DIA NEW	1.496"	1.809"	1.996"	2.037"	2.495"	3.495"
BORE DIA NEW MAX	1.505"	1.818"	2.001"	2.315"	2.505"	3.505"
BORE DIA USED MAX	1.520"	1.834"	2.020"	2.333"	2.526"	3.526"
LATCH PIN SIDE						
TOTAL CLEARANCE 'A'	0.025"	0.030"	0.030"	0.030"	0.035"	0.035"
LATCH PIN MIN DIA NEW	1.122"	1.247"	1.496"	1.684"	1.869"	2.246"
BORE DIA NEW MAX	1.132"	1.260"	1.505"	1.693"	1.880"	2.255"
BORE DIA USED MAX	1.145"	1.270"	1.520"	1.708"	1.895"	2.275"

**Assembly Drawing and List of Parts** – see attachment.