

# STANDARD OPERATING PROCEDURE (SOP) DENVER D-12 FLOTATION MACHINE

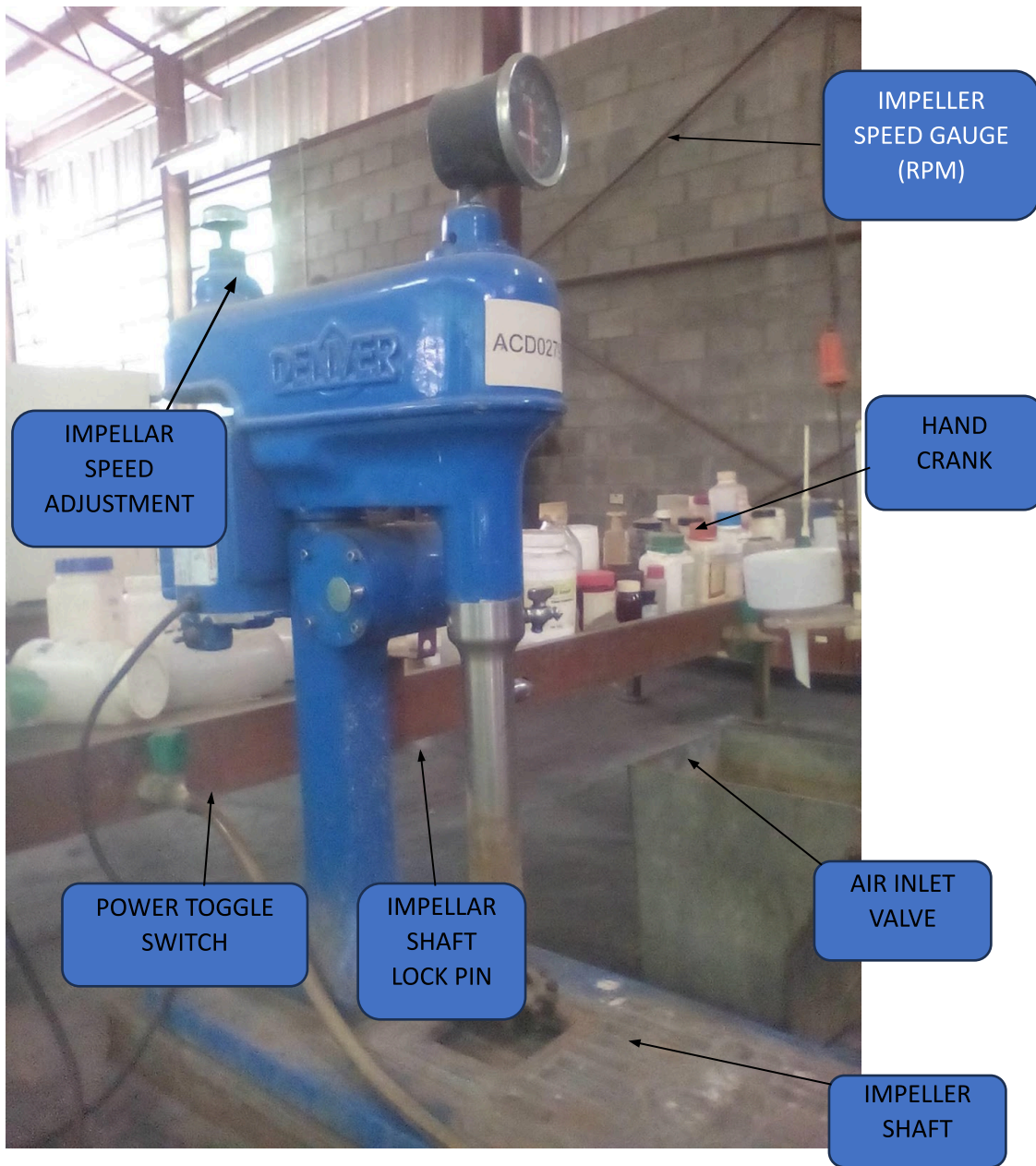


FIGURE. 1

## **OBJECTIVE**

This Standard Operating Procedure (SOP) is specifically designed for the purpose of safe operation of the LABORATORY equipment '**DENVER D-12 FLOTATION MACHINE**'. The equipment operator must read through the procedure carefully and should fully understand it before operating the equipment and or otherwise consult the senior laboratory personnel for any clarifications prior to operation.

## **HAZARDS**

- Slurry in motion – Slurry may spill out of the flotation cell
- Compressed air – Use of compressed air under very high pressure
- Ergonomics – Improper stance during sample loading and unloading may cause muscle strain or back injury
- Noise – Medium noise level created by the machine could induce stress or hearing impairment over an extended period of exposure

## **SAFETY – Personal Protective Equipment (PPE)**

The following safety gears must be worn when operating the **DENVER FLOTATION MACHINE**. It is a standard safety requirement that every person who is participating in the laboratory experiments or engage in any other activities in the laboratory **MUST** wear appropriate safety gears (PPE) as listed below for this particular experiment;

- Dust mask
- Clear safety glass
- Safety boots
- Rubber hand gloves
- Ear muffs/plugs

## **APPARATUS AND MATERIALS REQUIRED**

- 1.0, 2.5, 5, 10 L Flotation cell
- pH meter
- Compressed air supply
- 50 – 100 ml volumetric flasks
- Bench top electronic balance
- Metal scoop
- Spatula
- Sample trays
- Lab funnels
- Prepared mineral ore sample
- Note pad

## **REAGENTS REQUIRED**

- pH modifier, Calcium Oxide (Lime)
- **Flotation reagents**
  - Collectors
  - Frothers
  - Promotors
  - Depressants
  - pH modifier, Lime (CaO)
- Process water
- Distilled water

## **STANDARD OPERATING PROCEDURE (SOP)**

### **Prestart Checks**

1. Ensure that the work environment is clear of any obstructions that may cause safety hazard concerns in the work area
2. If compressed air is required for a particular flotation test, remove and connect poly tube nipple to the air valve socket
3. Ensure that the impeller and the hood are clean and no residual particles remain from the previous flotation test
4. Switch on the power supply to the flotation machine at the bench top socket/GPO

### **OPERATION OF THE FLOTATION MACHINE**

5. Pull locking pin out with left hand and with the right hand, turn hand crank counter clockwise to raise the to raise the impeller shaft to create sufficient clearance to fit an appropriate size flotation cell in the cell slot. Release locking pin to lock the shaft in the raised position. (refer to fig.1)
6. Place the required flotation cell into the cell slot below the impeller shaft as shown (fig.1)
7. Pull the locking pin out and lower the impeller shaft into the flotation cell by turning the hand crank clockwise. Release the locking pin to lock the impeller shaft in place
8. Place the sample into the flotation cell with calculated volume of water
9. Switch ON the power to the flotation machine with the toggle switch located at the base of the motor (Fig.1)
10. Adjust the impeller speed to between 900 – 1200 RPM as required
11. Add your flotation reagents one at a time. Each reagent addition should have a conditioning time according to the laboratory test procedure
12. When all the flotation reagents have been added into the flotation cell for a required conditioning time, place a pan/tray under the weir of the flotation cell to collect your flotation concentrate
13. Introduce air into the agitated pulp/slurry by turning the air valve (fig.1) half clockwise
14. A dark froth surface will be formed with valuable minerals attached to the air bubbles  
**If the agitation speed is too high you will observe air bubbles breaking down dislodging the valuable minerals back into the pulp/slurry. Readjust the impeller speed to obtain sufficient froth bed for better recovery**
15. Scrape off the froth into the tray below the weir of the flotation cell. The concentrate scraping time depends on the operator's test procedures  
**If the froth level is too low add water to the required level for ease of scraping off the froth surface**

16. Once the flotation test work is completed according to the test procedures, switch OFF the flotation machine and the main power supply switch
17. Raise the impeller shaft from the flotation cell by turning the impeller shaft hand crank and lock it safely in place
18. Remove the flotation tailings in the cell into a bucket for filtering and drying
19. Lower the impeller shaft down to the bench level and lock it safely
20. HOUSEKEEPING – Please ensure to do housekeeping around the work area before leaving the laboratory