

**OFFICE OF THE DIRECTOR OF FACTORIES: TELANGANA: HYDERABAD.****Circular Memo No. FACT- MAH/OHS/5/ 2026****26-03-2026**

Sub: OSH Code - 2020 and Telangana Factories Rules, 1950 -  
Safety alert for Induction Furnaces - Strict compliance - Instructions -  
Issued.

Ref: Occupational Safety, Health and Working Conditions Code,  
2020.

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Safety Alert on Induction Furnaces is communicated herewith for  
informing and ensuring compliance from all the concerned factories by  
the officers.

**SAFETY ALERT - INDUCTION FURNACE ACCIDENT**

(Molten Metal Leakage due to Bottom Burn-Through)

**1. Incident Summary**

A dangerous occurrence was reported in the month of March, 2026 at a  
steel plant involving molten metal gushing out from the bottom of an  
induction furnace (Crucible).

- Occurred during melting operation (~09:05 AM)
- Auxiliary power failure (breaker trip)
- Emergency cooling water system failed (valve jammed)
- Furnace coil at bottom damaged/melted
- Resulted in molten metal leakage and steam generation
- No injuries occurred, but the incident had high potential for  
catastrophic explosion.

**2. Key Observations from Site**

- Severe bottom burn-through of lining
- Evidence of molten metal solidification outside furnace
- Coil exposure and structural damage
- Cooling water leakage visible → risk of steam explosion
- Poor reliability of emergency systems

**3. Root Cause (Indicative)**

The incident appears to be due to a combination of failures:

- Lining thinning / failure not detected in time

- Cooling system failure + delayed response
  - Mechanical failure of emergency valve (poor maintenance)
  - Lack of effective interlocks and trip systems
  - Inadequate preventive maintenance and inspection
4. Critical Lessons for Industry

- “Water + Molten Metal = Explosion”
  - Even minor leakage can lead to fatal accidents.
  - Emergency systems must work instantly—not after effort
  - Lining failure always gives warning signs—ignore at your peril
5. Immediate Actions to be taken (For All Units)

#### **A. Lining & Furnace Integrity**

- Install Lining Thickness Monitoring System (LTMS)
- Maintain minimum residual lining thickness limits
- Conduct daily visual + thermal inspection for cracks, bulging, hot spots etc
- Avoid overheating beyond refractory limits
- Maintain proper slag chemistry( avoid aggressive slags)
- Maintain lining life records( heat wise tracking)
- Relining before critical wear limit

#### **B. Cooling System Safety**

- Ensure 100% functional emergency cooling system
- Test all valves daily before operation
- Provide redundant cooling lines
- Continuous water flow monitoring( flow, pressure, temperature)
- Periodic coil insulation testing
- Check for scaling, corrosion, vibration damage

#### **C. Electrical & Interlocks**

Provide auto trip interlocks for:

- Low water flow
- High temperature
- Power failure

No manual override permitted

#### **D. Emergency Preparedness**

- Emergency tilting functional at all times
- Backpower for tilting during power failure
- Keep dry sand (NOT water) ready

- Ensure clear escape routes
- Conduct mock drills for molten metal leakage

### **E. Operational Controls**

Strict SOP for:

- Preheating
  - Charging
  - Melting
  - Use Gradual charging, avoid overloading
  - Avoid dropping heavy scrap abruptly
  - Maintain safe distance during charging
  - Use remote and mechanised charging
- Assign responsible shift engineer for furnace safety

### **F.Raw Material Control**

- Ensure 100% dry scrap
- Ban sealed containers, oil drums, batteries
- Avoid rainy exposure storage

### **G.Personal Protective Equipment**

- Heat resistant Aluminized suits
- Face shield and helmet
- Leather gloves, safety shoes
- Spats and leggings
- Safety goggles for IR Protection

### **H. Training**

- Hazard Identification
- Charging Practices
- Emergency Handling

### **6. DOs & DON'Ts**

#### DO

- Check lining condition before each heat
- Verify cooling system functionality
- Act immediately on alarms

#### DON'T

- Operate furnace with suspected lining thinning
- Ignore hot spots / abnormal readings
- Use force-operated or jammed valves without repair

### **7. Compliance Requirement**

All induction furnace units are advised to:

Conduct immediate safety audit

Submit compliance report on:

- Lining monitoring system
- Cooling system reliability
- Interlocks and SOPs

## **8. Conclusion**

This incident highlights serious systemic gaps that can lead to fatal accidents. All units must treat this as a warning and implement corrective measures immediately.

**Issued in the interest of safety of workers and prevention of major accidents.**

Digitally signed by  
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