INTER PLANT STANDARD IN STEEL INDUSTRY		
IPSS	**CODE OF PRACTICE FOR RECLAMATION OF BLAST FURNACE HOT BLAST VALVES**	**IPSS:3-02-019-07**
	Corresponding IS does not exist	Formally : IPSS:3-02-019-07

0. FOREWORD

0.1 Interplant standardization in steel industry was initiated under the aegis of the Indian Standards Institution (ISI) and the Steel Authority of India Limited (SAIL). This IPSS was prepared by the standard committee on Operation and Maintenance, IPSS 3:2 and firstly published in 2003. Lastly, this has been revised by the standard committee in July 2018 with the active participation of the representatives from major Indian steel plants and leading consultants.

0.2 This standard for steel industry, primarily aims at reclamation of defective Hot Blast Valves by in-house developed technology.

0.3 This standard is intended to provide guidelines for reclamation of Hot Blast Valves of Blast Furnace, which can not be further used due to score marks on guide pipe surfaces, leakage of cooling water from body / disc, visible cracks on the body of the valve, leakage of hot blast through the gap between seat & disc i.e. due to scoring on seating by erosion. Upon further increase of these defects, it will seriously affect the furnace operation.

1. SCOPE

1.1 This Inter Plant Standard covers the repair and reclamation of Hot Blast Valves of Blast Furnaces. Following are the important parameters (typical) which are prescribed in the specification of Hot Blast Valve:

a)	Nominal Diameter	1300 mm
b)	Max Hot Blast Pressure	5 Kg/Cm^2
c)	Max Hot Blast Temp	1500 ^{o}C
d)	Differential Pressure	0.1 Kg/Cm^2
e)	Cooling system	Water Cooling System
f)	Overall dimensions	
	Length (along with body flanges)	600 mm
	Width (at valve body)	1200 mm
	Height	4650 mm
g)	Mass of the valve, Kg	9600 Kg

h) Insulation (Inside) Refractory

Above dimensions are indicative only and it may vary from manufacturer to manufacturer.

2. COMPOSITION OF FABRICATED HOT BLAST VALVE

2.1 The typical composition of fabricated Hot Blast Valve shall be as follows:

a) Body, bonnet, flanges — Carbon Steel, IS 2002, Gr-2

b) Pipes at inlet and outlet — Stainless Steel, AISI 304

c) Ring for disc and seat — ASTM 182, Gr-F1

d) Refractory — Castable White Heat K

3. IDENTIFICATION OF HOT BLAST VALVE DUE FOR RECLAMATION

3.1 Physical Inspection of Valves:

It is recommended that all the valves of each Blast Furnace stove should undergo through visual inspection at a regular interval as decided by the Maintenance Engineer.

The visual inspection shall cover checking of following points:

a) Leakage through glands and flanges

b) Condition of the external surface of the guide pipe

c) Condition of compensator pipes

d) Condition of valve body for any visible cracks

e) Leakage from Seating: - Isolate the stove and depressurize it. Observe whether there is any pressure increases in stove side. Increase in pressure indicates that there is a leakage through valve seating and the valve is not holding

In-situ repair can be done in case of observations a), b) & c). In case of any observation as mentioned in d) & e), the valve is to be taken our for repair.

3.2 **Leakage observations**:

3.2.1 Hot air leakage from glands - It will result in loss of gland packing / mechanical seal and if unattended for prolonged duration, may result in damage to the guide pipe.

3.2.2 Hot air leakage from flanges - It will result in erosion of flanges and if unattended for prolonged duration, may result in deformation of the flanges.

3.2.3 Periodical pressure survey of the valve cooling system shall be carried at inlet pipes from the installed pressure gauges.

Readings during the pressure survey shall include:

- Pressure and temperature of water at the inlet side of the valve

- Flow of water at the outlet pipe in the collector
- Temperature of water at the outlet pipe

Above readings shall be taken in a co-ordinated manner simultaneously.

The differential temperature shall be compared with the design parameter. Excessive outlet temperature indicates damage in that particular cooling element like disc or body.

4. DISMANTLING OF VALVE

4.1 Following sequence shall be adopted for dismantling of valve:

a) Dismantle the valve completely

b) Take out the body and place it separately.

c) Dismantle the refractory lining of the body

d) Clean the surfaces of seat

e) Take out lid from the valve

f) Remove the cooling connection flanges from disc cooling pipes and crosshead beam by loosening the check nuts and take out the disc with pipes from lid.

g) Dismantle the glands of disc cooling pipes

h) Dismantle the disc with cooling pipes from lid

i) Dismantle the refractory from both sides of the disc

5. CHECKING, TESTING AND REPAIR OF VARIOUS PARTS AFTER DISMANTLING

5.1 Body shall be checked for any scaring on seating due to erosion . If any cracks or pitting beyond 3 mm are noticed on the body other than seating area, then a new body is to be used. If scare marks are of less than 3mm, damaged area shall be built up with L&T make strain rode - Dia 3.15 mm electrode or equivalent and thereafter proper machining shall be done. Then the valve body elements are subjected for acid cleaning with 10% concentrated HCL acid to remove the scaling of inside cooling jacket. After ensuring complete removal of scale / dirt, the body is subjected to a hydraulic test at pressure of 12 Kg / Cm^2 for 10 minutes. If any pressure drop is observed due to leakage from welding joint or from elsewhere, then the body is to be depressurized to carry out necessary rectification of the observed defect and again pressure test shall be continued till it holds the pressure and passes through the hydraulic test.

5.2 Lid cooling jacket also to be cleaned with acid solution and tested hydraulically at a pressure of 10 Kg / Cm^2 in similar way as mentioned above.

5.3 Disc seating area is to be inspected for any scaring / erosion. If any damage in the seat is noticed, the following procedure shall be followed:

5.3.1 Fill the water in the disc and place it in horizontal position in a tray having water upto a depth of 70 mm. Then welding of the damaged portion may be done with L&T XHD 2222 dia 3.15 mm electrode or equivalent and the welding is to be done in a controlled way to avoid any distortion of the disc. After necessary built up of the surface, the disc shall be sent for machining.

5.3.2 After machining, acid cleaning of the disc shall be carried out and then it is to be tested for hydraulic pressure up to 12 Kg / Cm^2 for its fitness (same procedure mentioned in 5.1 to be followed).

5.4 Revisioning of the gland is to be done by changing the gland packing and damaged cast iron rings if any, and filled with heat resistant special grease like silicon base greases etc.

5.5 Spikes for refractory lining is to be provided for supporting refractory lining.

5.5.1 Before giving clearance for refractory lining, the body seating and disc seating in assembled condition is to be checked to measure the seating gap by fixing wooden wedge from one side and check the gap by filler gauge on the other side and ensure that feeler gauge of 0.03 mm shall not pass through the gap. (shown in the drg.)

5.5.2 After confirming fitness of the valve, clearance will be given for the refractory lining of the valves.

5.5.3 Drying of refractory lining will be followed as per the instructions of refractory supplier / Refractory Engg. Department.

5.6 Valve in assembled condition shall be kept ready for service.

6. FACILITIES REQUIRED

a) Welding and cutting machines

b) Planner machine

c) Hydraulic testing facility upto 12 Kg / Cm^2

d) Acid pickling facilities including flushing pump

e) Patterns for refractory casting

f) Fuel gas arrangement for drying of refractory lining

g) Handling Facilities of min 10 T capacity

7. GENERAL ARRANGEMENT OF HOT BLAST VALVE

7.1 Refer enclosed Drawing for General Arrangement of Valve.

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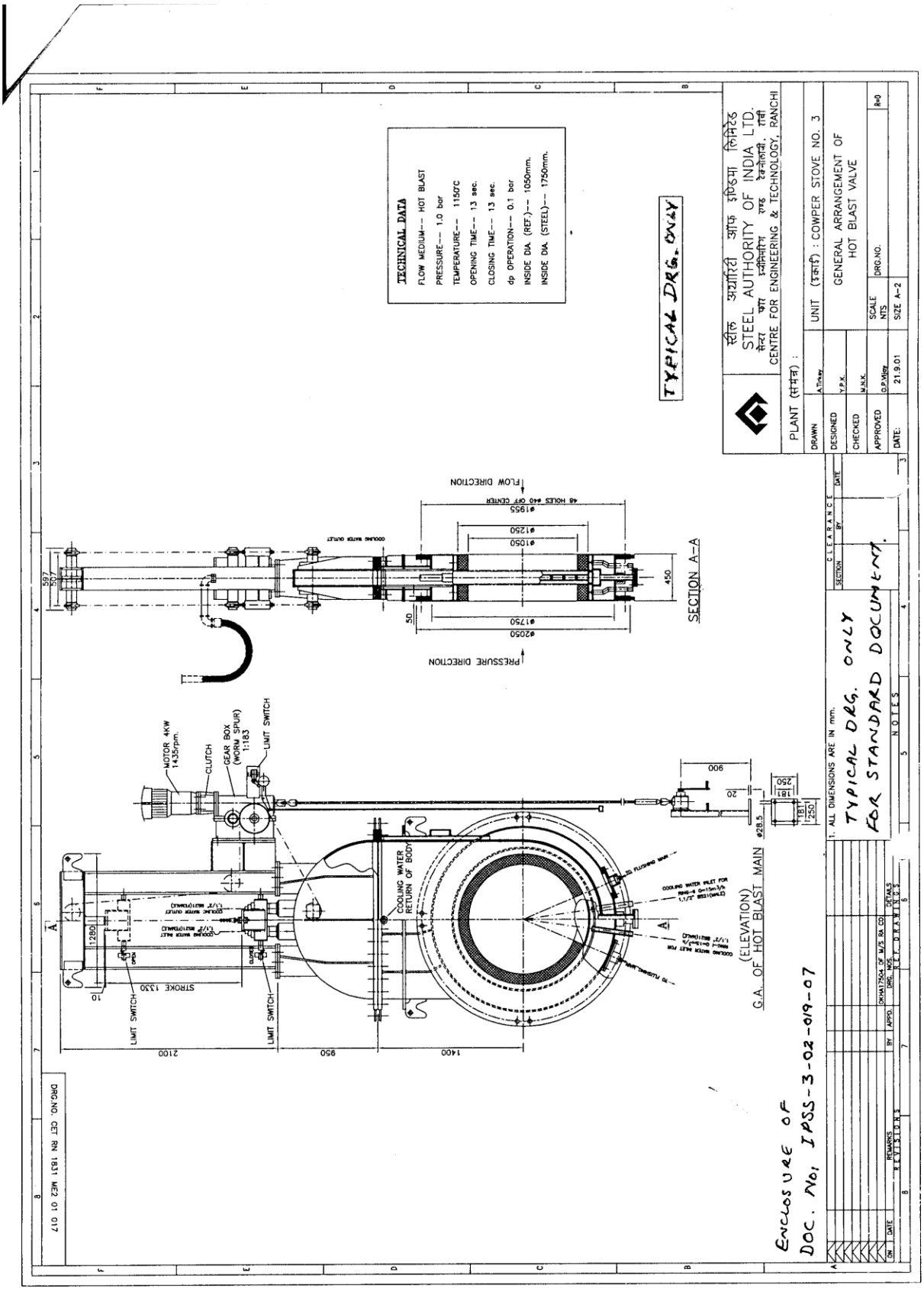
TECHNICAL DATA
FLOW MEDIUM-- HOT BLAST
PRESSURE-- 1.0 bar
TEMPERATURE-- 1150°C
OPENING TIME-- 13 sec.
CLOSING TIME-- 13 sec.
dp OPERATION-- 0.1 bar
INSIDE DIA (REF.)-- 1050mm.
INSIDE DIA (STEEL)-- 1750mm.
TYPICAL DRG. ONLY
स्टील अथॉरिटी ऑफ इण्डिया लिमिटेड
STEEL AUTHORITY OF INDIA LTD.
CENTRE FOR ENGINEERING & TECHNOLOGY, RANCHI
PLANT (संयंत्र) :
UNIT (इकाई) : COWPER STOVE NO. 3
GENERAL ARRANGEMENT OF HOT BLAST VALVE
SECTION A-A
FLOW DIRECTION
PRESSURE DIRECTION
48 HOLES ø40 OFF CENTER
ø1955
ø1250
ø1050
ø2050
ø1750
MOTOR 4KW 1435rpm.
CLUTCH
GEAR BOX (WORM SPUR) 1:183
LIMIT SWITCH
COOLING WATER RETURN OF BODY
STROKE 1330
LIMIT SWITCH
LIMIT SWITCH
2100
950
1400
G.A. OF HOT BLAST MAIN (ELEVATION)
1. ALL DIMENSIONS ARE IN mm.
TYPICAL DRG. ONLY FOR STANDARD DOCUMENT.
ENCLOSURE OF DOC. No: IPSS-3-02-019-07
DRG.NO. CET RN 1831 ME2 01 017