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भारतीय मानक मसौदा

निर्वात उत्पादक की अभिकल्पना और चयन हेतु डाटा शीट

(आई एस 10678 का पहला पुनरीक्षण)

Draft Indian Standard

DATA SHEET FOR DESIGN/SELECTION OF VACUUM PRODUCER

(First Revision of IS 10678)

ICS 53.040

**Earth Moving Equipment and Material
Handling Sectional Committee, MED 07**

**Last date for receipt of comments is
17 December 2022**

FOREWORD

(Formal clause to be added later)

This Indian Standard was adopted by the Bureau of Indian Standards in 1983, after the draft finalized by the Earth Moving Equipment and Material Handling Sectional Committee (MED 07) had been approved by the Mechanical Engineering Division Council.

This Standard was first published in 1983. The first revision of this standard incorporates modifications found necessary as a result of the experience gained with the use of the standard and to bring the standard in line with the present good practices being followed in the country and abroad.

It lays down the data required for design/selection of vacuum producers. This Indian Standard also lays down the data required for the selection/design of ejectors. This data sheet may be used by manufacturer and purchaser alike for giving details of the equipment manufactured by manufacturer or required by purchaser to the purchaser/manufacturer.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

DATA SHEET FOR DESIGN/SELECTION OF VACUUM PRODUCER

(First Revision of IS 10678)

1 SCOPE

This standard lays down the data required for design/selection of vacuum producers.

2 DATA SHEET

2.1 General

- a) Service
- b) Type of vacuum producerSteam/Hydraulic
- c) Designation Steam ejector/Hydrovactor
- d) Location

2.2 Steam Ejector

2.2.1 Operating Conditions

- a) Motive fluid pressure kPa
- b) Motive fluid temperature °C
- c) Entrained fluid
- d) Entrained fluid composition
- e) Suction pressure kPa
- f) Entrained fluid density kg/m²
- g) Ejector load kg/h
- h) Entrained fluid molecular mass/specific heat ratio
- j) Discharge pressure KPa
- k) Discharge velocity m/s
- m) Number of stages
- n) Number of ejectors per stage

- p) Inter-stage condenser Barometric/Surface
- q) Inter-stage condenser cooling water/condensate pressure kPa
- r) Inter-stage condenser cooling water/condensate temperature °C
- s) Quantity of motive fluid required kg/h
- t) Quantity of cooling water/condensate required kg/h
- u) Maximum sound level dB(A)

2.2.2 Design Conditions

Sl. No.	Parameter	Units	First Stage	Second Stage	Third Stage	Fourth Stage	Fifth Stage
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	<i>Ejector Load</i>	kg/h					
	a) Motive fluid consumption	kg/h					
	b) Motive fluid pressure	kPa					
	c) Motive fluid temperature	°C					
ii)	<i>Motive Fluid Inlet Pipe and Flange Details</i>						
	a) Inlet size	mm					
	b) Press class and facing of flange	–					
iii)	<i>Suction Side</i>						
	a) Pressure of fluid	kPa					
	b) Temperature of fluid	°C					
	c) Size	mm					
	d) Pressure class and facing of flange	–					
iv)	<i>Discharge Side</i>						
	a) Pressure of mixture	kPa					
	b) Temperature of mixture	°C					
	c) Size	mm					
	d) Pressure class and facing of flange	–					
v)	Cooling water/condensate consumption	kg/h					
vi)	Cooling water/condensate temperature	°C					
vii)	Barometric Condenser: Number of contact stages	–					
viii)	Surface condenser: Outside tube area	m ²					

2.2.3 Materials of Construction

Sl No.	Equipment	Material	Hardness
(1)	(2)	(3)	(4)
i)	<i>Steam Ejector</i>		
	a) Motive fluid chest		
	b) Motive fluid nozzles		
	c) Suction chamber		
	d) Diffuser		
	e) Nozzle plate		
	f) Inter-stage valve		
ii)	<i>Barometric Condenser</i>		
	a) Shell		
	b) Baffles		
	c) Nozzles		
iii)	<i>Water Removal Pump</i>		
	a) Casing		
	b) Impeller		
	c) Wearing ring		
	d) Shaft		
iv)	<i>Surface Condenser</i>		
	a) Shell		
	b) Tube sheet		
	c) Tubes		
	d) Baffles		
	e) Water boxes and water cover		

2.3 Hydrovactor

2.3.1 Operating Conditions

- a) Capacity t/h
- b) Air flow rate at rated vacuum m²/h
- c) Number of nozzles in hydrovactor
- d) Diameter of each nozzle mm
- e) Velocity of air/entrained mixture at hydrovactor throat m/s

2.3.2 Design Conditions

- a) Capacity of hydrovactor t/h

- b) Design vacuum at rated capacity
- c) Quantity of water required m²/h
- d) Pressure of water required at hydrovactor kPa
- e) Expected minimum service life
 - 1) Throat
 - 2) Nozzles

2.3.3 Materials of Construction

Sl No.	Equipment	Material	Hardness
(1)	(2)	(3)	(4)
i)	Inlet liner		
ii)	Nozzle tips		
iii)	Throat section		
iv)	Tail piece		

2.4 Data Common to Steam Ejector/Hydrovactor.....

2.4.1 Test Results

- a) Hydrostatic test pressure kPa
- b) Pneumatic test pressure kPa
- c) Inspection by purchaser

2.4.2 Manufacturer

2.4.3 Approximate Masses

- a) Steam ejector/Hydrovactorkg
- b) Condensers k

2.4.4 Documents to be Furnished

- a) Characteristic curve of vacuum producer
- b) Dimensional drawing of vacuum producer with material of construction and hardness of various parts