

₹ 200

ISSN - 2249-555X

Volume : 1

Issue : 9

June 2012



Journal for All Subjects

[www.ijar.in](http://www.ijar.in)

Listed in International ISSN Directory, Paris.



ISSN - 2249-555X

# Indian Journal of Applied Research

## Journal for All Subjects

### Editor-In-Chief

**Dr A Kumar**

Director, College Development Council (CDC)  
Director, Internal Quality Assurance Cell (IQAC)  
Professor in Management,  
Department of Business Administration, Faculty of Management,  
Bhavnagar University,

### Editorial Advisory Board

**Dr. S. N. Pathan**  
Maharashtra

**Dr. SM. Ramasamy**  
Gandhigram

**Dr. M. M. Goel**  
Kurukshetra

**Dr. S. Ramesh**  
Tamil Nadu

**Dr Ramesh Kumar Miryala**  
Nalgonda.

**Dr. B. Rajasekaran**  
Tirunelveli

**Dr. A. R. Saravankumar**  
Tamilnadu

**Dr. Roy M. Thomas**  
Cochin

**Dr. G. Selvakumar**  
Salem

**Dr. Apurba Ratan Ghosh**  
Burdwan

**Dr. Shrawan K Sharma**  
Uttarakhand

**Dr. Sudhanshu Joshi**  
Uttarakhand

**Prof. (Dr.) B Anandampilai**  
Pudhukottai

#### Advertisement Details

Position	B/W (Single Color)	Fore Color
Full Inside Cover	₹ 6000	₹ 12500
Full Page (Inside)	₹ 5000	-

#### Subscription Details

Period	Rate	Discount	Amount Payable
One Year (12 Issues)	₹ 2400	Nil	₹ 2400
Two Year (24 issues)	₹ 4800	₹ 200	₹ 4600
Three Year (36 issues)	₹ 7200	₹ 300	₹ 6900
Five Year (60 issues)	₹ 12000	₹ 600	₹ 11400

You can download the Advertisement / Subscription Form from website [www.ijar.in](http://www.ijar.in). You will require to print the form. Please fill the form completely and send it to the **Editor, INDIAN JOURNAL OF APPLIED RESEARCH** along with the payment in the form of Demand Draft/Cheque at Par drawn in favour of **INDIAN JOURNAL OF APPLIED RESEARCH** payable at Ahmedabad.

1. Thoughts, language vision and example in published research paper are entirely of author of research paper. It is not necessary that both editor and editorial board are satisfied by the research paper. The responsibility of the matter of research paper/article is entirely of author.
2. Editing of the Indian Journal of Applied Research is processed without any remittance. The selection and publication is done after recommendations of atleast two subject expert referees.
3. In any condition if any National/International University denies accepting the research paper published in IJAR, then it is not the responsibility of Editor, Publisher and Management.
4. Only the first author is entitle to receive the copies of all co-authors
5. Before re-use of published research paper in any manner, it is compulsory to take written permission from the Editor-IJAR, unless it will be assumed as disobedience of copyright rules.
5. All the legal undertaking related to Indian Journal of Applied Research is subject to Ahmedabad Jurisdiction.
7. The research journal will be send by normal post. If the journal is not received by the author of research papers then it will not be the responsibility of the Editor and publisher. The amount for registered post should be borne by author of the research paper in case of second copy of the journal.

**Editor,**

**Indian Journal Of Applied Research**

8-A, Banans, Opp. SLU Girls College, New Congres Bhavan, Paldi,  
Ahmedabad-380006, Gujarat, INDIA

Contact.: +91-9824097643 E-mail : [editor@ijar.in](mailto:editor@ijar.in)

## INDEX

Sr. No.	Title	Author	Subject	Page No.
1	Cost of capital: an empirical case study of hindustan unilever limited	Dr. Vinod K. Ramani	Accountancy	1-2
2	Self Revolution	Mohanapriya.P	Arts	3-4
3	Wound healing activity of Cestrum elegans	V. Subhaa, Dr. D. Sukumarb, Dr. V. Elangoc	Chemistry	5-6
4	Anti Bacterial Activity of Apigenin 7-0-(6"caffeoyl) neohesperidoside from chrysanthemum indicum	M.Jerome Rozario, Dr.A.John Merina, Dr.V.Srinivasana	Chemistry	7-10
5	Adsorption Studies of Cu (II) and Cr (VI) from metal solution using crosslinked chitosan-g-acrylonitrile copolymer	Shankar.P, Gomathi T., Vijayalakshmi.K, Sudha P.N	Chemistry	11-13
6	An Insight into Derivative Markets: Indian Perspective	Dr. C.Shobha, Dr. T. Hanumantha raya	Commerce	14-16
7	Vision and Planning	Dr. J. K Sehgal	Commerce	17-18
8	An Analytical Study of Employee's Productivity in Some Selected Nationalized Banks of India	Dr. Jyotindra M. Jani, Manish B. Raval	Commerce	19-20
9	New Products of Tourism in India	Dr. M. K. Maru	Commerce	21-22
10	Inventory Management in Sugar Mills - A Comparative Study	Promila	Commerce	23-25
11	Price -Mix Strategy of Jammu and Kashmir Co-Operatives Supply and Marketing Federation Limited in Jammu District of J&K State	Tarsem Lal	Commerce	26-28
12	Warehouse Management Information System: A New Perspective in Supply Chain Management	Dr. Vipul Chalotra	Commerce	29-30
13	A Study on Consumer Satisfaction of Aavin Milk in Salem City	Dr.A.Vinayagamoorthy, Mrs. M.Sangeetha, C.Sankar	Commerce	31-33
14	Hybrid Attribute Selection Process for Decision Tree Based Classification Algorithms	Mr. A. Jebamalai Robinson, Mrs. S. C. Punitha, Dr. P. Ranjit Jeba Thangaiah	Computer Science	34-36
15	Visualizing the validation of UML diagrams	Lavleen Kambow	Computer Science	37-38
16	Effectiveness of coconut palm insurance scheme in the coastal belts of India-A SWOT analysis	Prof. (Dr.) D. Rajasenan, Bijith George Abraham	Economics	39-41
17	An Analysis of the Efficiency of Selected Public and Private Banks in India during 2005-2011	Dr.Dinesh Kumar, Sanjeev	Economics	42-44
18	Measurement of Emotional Development of the Students	Dr. Nivedita K. Deshmukh	Education	45-46
19	A comparative study of effect of method of lecture and dramatization of Marathi teaching	Dr. Nivedita K. Deshmukh	Education	47-48
20	Peer pressure-problems and solutions	V.Vaithyanathan, Dr.P.Sivakumar	Education	49-50
21	Language Anxiety In Indian L2 Learners: Male or Female Learners - Who Scores High?	S. Gandhimathi, Dr.R.Ganesan	Education	51-52

22	Topological Characteristics of ECG Signal using Lyapunov Exponent and RBF Network	Abinash Dahal, Deepashree Devaraj, Dr. N. Pradhan	Engineering	53-55
23	Development of slicing package of solid model for cone and sphere in rapid prototyping	Dineshkumar M. Patel, Prof. P.D.Solanki	Engineering	56-58
24	Hardware modeling Simulation with COSSAP	Krunali Amrutlal Ratanpara, Devendra Soni, Shrenik Rajesh Golwelkar	Engineering	59-61
25	Coordination Of Pss And Statcom To Enhance The Power System Transient Stability	Lalit K. Patel, Kaushik M. Sangada, Sunil S. Changlani , Ankit M. Patel	Engineering	62-64
26	Cooling Performance Analysis of Heat Sink	Mr. Pritesh S. Patel, Prof. Dattatraya G. Subhedar, Prof. Kamlesh V. Chauhan	Engineering	65-67
27	Thermal Modeling and Analysis of Friction Stir Welding	Rankit Patel, Prof. Bindu Pillai	Engineering	68-70
28	Review on shrinkage defect – A case study	Mr. Ravi N. Kalotra, Mr. Gajanan Patange, Mr. J.K. Gohil	Engineering	71-75
29	Stream Function Formulation of Lid Driven Cavity	Mr. Zankhan C. Sonara, Prof. Dattatraya G. Subhedar, Mr. Kartik Patel	Engineering	76-78
30	Implementation of ABT (Availability Based Tariff) - its Treatment & Proceedings	Dilip m.Bhankhodiya, Dipak t. Vaghela	Engineering	79-82
31	Active Filters for Power Quality Improvement	Dipak t. Vaghela, Dilip m. Bhankhodiya	Engineering	83-87
32	Design and Analysis of Air Bearing using Orifice and Feed Hole Pocket	Nileshkumar T. Raval, Prof. M.Y.Patil	Engineering	88-90
33	Drip irrigation technique enhancing water and fertiliser use efficiency in cauliflower	Dr. S.S. Yadav, Dr. R.S. Meena	Engineering	91-92
34	Experimental and FEA Evaluation of Hybrid Joint Strength of Single Lap joint.	S. S. Kadam, P. A. Dixit	Engineering	93-96
35	CFD Analysis of Mixed Flow Submersible pump Impeller	Mitul G Patel, Subhedar Dattatraya, Bharat J Patel	Engineering	97-100
36	EVA: An Innovative Parameter for Shareholders' Wealth Measurement	Shri. Arvind A. Dhond	Finance	101-103
37	Profitability and consistency analysis of Textile Sector in India	Dr. K. S. Vataliya, Rajesh Jadav	Finance	104-107
38	Harmonious Relationship between Art and Music Critical vision (comparison)	Dr. Marwan Imran	Fine Arts	108-109
39	Land Use Pattern and Crop Combination Region in Satara District : A Geographical Study	Dr. Rathod S. B., Mane-Deshmukh R. S.	Geography	110-111
40	Garlic---Benefits and Uses	Dr. Sneh Harshinder Sharma	Geography	112-114
41	An Assessment of Thermal Comfort Zones in Terms of Tourists: A case study of Karveer Tehsil	Mr. Prashant Tanaji Patil, Miss. Mane madhuri maruti, Miss. Mugade Nisha Ramchandra	Geography	115-117

42	Hematological changes due to the impact of Lead nitrate on economically important estuarine fish <i>Mystus gulio</i>	Dr.S.Palani Kumar	Horticulture	118-119
43	Stress Management level in the employees of Manufacture Industries By considering key parameters with reference to Bhavnagar city	Dr. K. S. Vataliya, Adv. Ajay H. Thakkar	Human Resource	120-122
44	The Case of ABC Group-A Case on Performance Appraisal System	Shivani Sah	Human Resource Management	123-124
45	A Study On Performance Appraisal of Employees in Health Care Industry in a Private Multi-Speciality Organization	Dr. C. Swarnalatha, T.S. Prasanna	Human Resource Management	125-126
46	(Upnyas - Jansi ki Rani Laxmibai (vrundavanlal varma)	Dr. Sneh Harshinder Sharma	Literature	127-128
47	"Educational Technology for Professional Development of English Teachers: A Case Study of the College Teachers of English in Jammu Province"	Dr. Wajahat Hussain	Literature	129-130
48	The Reality of Sultana's Dream: A step towards success Rokeya Sakhawat Hossein	Riju Sharma, Ruchee Aggarwal	Literature	131-132
49	Road blocks of Match Industry in Andhra Pradesh: Certain Issues and Concerns	Anuradha Averineni	Management	133-134
50	Government's Assistance Towards the Development of Small Scale Industries in India with Special Reference to Krishnagiri District	B. Mohandhas, Dr. G. Prabakaran	Management	135-140
51	Effects of Role Stress on Employee Job Satisfaction and Turnover	Dr. T.G.Vijaya, R.Hemamalini	Management	141-144
52	"MNP – A major concern of Telecom Operators in Gujarat"	Mohsinali Momin, Dr. Deepak H. Tekwani	Management	145-147
53	A Study on Fiscal Support Provided by Vijaya Bank to Msme in Coimbatore City	Mrs. G. Murali Manokari, Mr. G. Lenin Kumar, Mrs. G. Sathiya	Management	148-150
54	Competencies for HR Professionals	GAYATHRI. M	Management	151-153
55	Cost and Strategic Management - Application, Framework and Strategies for the Growth of Sme Sector	Manisha gaur	Management	154-156
56	Development of Management Education System in India	Mr. Goudappa Malipatil	Management	157-158
57	Study on Volatility and Return of Major Indices of Indian Stock Market with Reference to Sensex And Nifty	Mr. Mukesh C .Ajmera	Management	159-160
58	A Need for an Epitome Shift in Management Education A study on Conceptual Teaching practices	Mrs. Vanishree K. Jamashetti, Mr. Sanjeev Rathod	Management	161-162
59	Personal Social Responsibility – A novel thought	Parul Jain, Dr. N.C Pahariya	Management	163-164
60	Green Marketing – A Consumer's Perspective in the Indian Scenario	Nidhi Srivastava, Preeti Pillai	Management	165-166
61	Challenges and Opportunities of Mobile Banking - An Indian Scenario	Sandhya.Ch.V.L	Management	167-169
62	A pragmatic study of civilizing amortment among The diverse countries	Mr. Vimal P. Jagad, Mr Mukesh .C Ajmera	Management	170-171
63	Celebrity Endorsement in India An Effective Tool of Sales Promotion	Piyush Shah, Dr. N C Pahariya	Management	172-176

64	A Study of Prominent Character Strengths and Their Relationship with Well Being Among Business Management Students	GarimaKamboj, DikshaKakkar	Management	177-180
65	Coffee Consumption in India: An Exploratory Study	Shri. Arvind A. Dhond	Marketing	181-183
66	Applicability of Retail Service Quality Scale (RSQS) in India	M. Ramakrishnan, Dr. Sudharani Ravindran	Marketing	184-186
67	Account Holders perceptions towards Self Service Technologies: a study of selected Private Sector Banks	Dr A Kumar, Prof Ankur Gangal	Marketing	187-189
68	Impact of Sales Promotion on Sales figures of Select International FMCG Brands	Dr.Sharif Memon	Marketing	190-193
69	Factors Affecting Green Product Design: Marketing Professional's Perspective	D. S. Rohini Samarasinghe	Marketing	194-196
70	The Impact of 'Ambience' and Variety on Consumer Delight: A Study on Consumer Behaviour in Ahmedabad	Dr A Kumar, Prof Vineeta Gangal	Marketing	197-200
71	Co-Relation of Social Justice with Human Rights: A Review	Dr. Monica Narang	Marketing	201-202
72	Study of Iron Status and Free Radical Activity in Plasmodium Falciparum and Plasmodium Vivax Malaria Infection	Sangita M. Patil, Ramchandra K. Padalkar	Medical Sciences	203-205
73	GOAL SETTING TENDENCIES, COMMUNICATION SKILLS AND WORK MOTIVATION VIS-À-VIS AGE DIFFERENCE – A STUDY ON PUBLIC SECTOR ORGANIZATION	Dr. Swaha Bhattacharya, Dr. Monimala Mukherjee	Psychology	206-208
74	Role of NGOs in Social Mobilization in the context of SGSY	Dr.Veershetty C. Tadalapur	Sociology	209-211
75	Age at menarche and its secular trend in rural and urban girls of bathinda district	Jyoti Sharma, Dr. Ajita	Sports Science	212-213
76	Effect Of Resin Finishing On Stiffness And Drape Of Khadi Fabric	Dr. Suman pant, Ms. Noopur Sonee	Textiles	214-216



## Design and Analysis of Air Bearing using Orifice and Feed Hole Pocket

\* Nileshkumar T. Raval \*\* Prof. M.Y.Patil

\* PG Student, Mechanical Engg.(Cad/Cam), L.D.College Of Engineering, Ahmedabad

\*\* Asst. Professor, Mechanical Engg. Dept., L.D.College Of Engineering, Ahmedabad

### ABSTRACT

Air bearings are extensively used in precision machines and equipment in recent years. Unlike conventional bearings, there is no physical contact between the sliding surfaces. The moving surface can glide smoothly on the other surface, minimizing the control effort to achieve high accuracy and precision. Finally, a three-dimensional (3D) model was built for Computational Fluid Dynamics (CFD) analysis to verify the theoretical result. A test set-up was designed to measure and study the performance of different kind of air bearings for future air bearing development. The stiffness and forces of various geometric designs of aerostatic thrust bearings were investigated under different operating conditions. The results also provided helpful design guidelines for gas-bearing in high-precision machine applications. When value of pressure increased from 5 bars to 7 bars, forces and stiffness value decreased for geometries.

**Keywords : Stiffness, Load Capacity, Feed Pocket, CFD Analysis**

### 1 INTRODUCTION:

Rolling element bearings developed in the last century were a revolutionary improvement over the plain bearings that had been pushed to their limits in applications like electric motors and automobile wheels. Air bearings represent the next logical step in bearing design. Air bearings in general have a proven track record having been employed in coordinate measuring machines. The many technical advantages of air bearings such as near zero friction and wear, high speed and high precision capabilities, and no oil lubrication requirements are powerful advantages for today's machine designers.

#### The operating principle of Air Bearings

Any air bearing uses a thin film of pressurized air between machine elements to support a load so there is no solid-to-solid contact. Traditional orifice-type air bearings send pressurized air through a small hole in the bearing itself and then direct it further through the gap between the bearing and machine element.

### 2 METHODOLOGY: THEORETICAL ANALYSIS

Single orifice-type, circular-pocket air bearing is considered for the analysis. The entire flow can be divided into two parts—flow through the orifice and flow through the bearing surface, as shown in Figure 1.

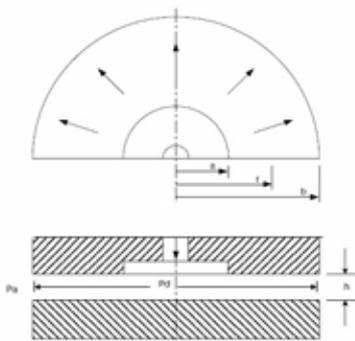


Figure 1. Air thrust bearing with central feed hole and pocket.

#### A. Flow through the orifice

In considering the flow through the orifice, following assumptions have been made

- There are no pressure losses upstream of the throat of the jet, i.e. the pressure at the entry to the jet is the supply pressure  $P_0$ .
- The pressure immediately downstream of the jet is the static pressure in the throat of the jet.

Considering the flow through a nozzle of the same throat diameter as the jet, the relationship between supply pressure and static pressure at the throat is given by :

$$\frac{P_d}{P_0} = \left[ 1 - \frac{\gamma - 1}{2} \left( \frac{v}{a_0} \right)^2 \right]^{\frac{\gamma}{\gamma - 1}} \quad (1)$$

where  $P_d$  is the static pressure at the throat,  $P_0$  is the supply pressure,  $v$  is the velocity at the throat,  $a_0$  is the speed of sound, and  $\gamma$  is the ratio of specific heats for the air.

Assuming isentropic expansion, the mass flow through a jet is given by:

$$m = C_D A \rho_0 \left[ \frac{\gamma^2 R T_0}{\gamma - 1} \left\{ \left( \frac{P_d}{P_0} \right)^{\frac{2}{\gamma}} - \left( \frac{P_d}{P_0} \right)^{\frac{\gamma + 1}{\gamma}} \right\} \right]^{\frac{1}{2}} \quad (2)$$

where  $C_D$  is the coefficient of discharge,  $A$  is the area of the throat,  $\rho_0$  is the air density at supply condition,  $R$  is the gas-constant, and  $T_0$  is the temperature.

#### B. Flow through the bearing surface

In almost all practical bearings, the flow in the bearing clearance is laminar and pressure losses occur due to viscous shearing in the gas film. Following assumptions have been made to simplify the problem, inertia forces due to acceleration can be neglected compared to frictional forces due to viscous shearing; laminar flow conditions exist at all points in the gas film; pressure is constant over any section normal

to the direction of flow, and there is no slip at the boundaries between the fluid and the plates.

Under these assumptions, and assuming isothermal conditions in the gas film, the mass flow rate through the bearing surface can be given by:

$$m = \frac{\pi h^3 (P_d^2 - P_a^2)}{12 \mu RT \log_e \left( \frac{b}{a} \right)}$$

where  $h$  is the air gap,  $P_a$  is the ambient pressure,  $\mu$  is the viscosity of air,  $b$  is the bearing radius, and  $a$  is the pocket radius,

**C. Load capacity**

The load capacity can be defined as the total load supported by the bearing surfaces. It can be obtained by integrating the pressure over the whole of the bearing surface. The total load capacity can be given by:

$$W = (P_d - P_a) \cdot \frac{\pi (b^2 - a^2)}{2 \log_e \left( \frac{b}{a} \right)}$$

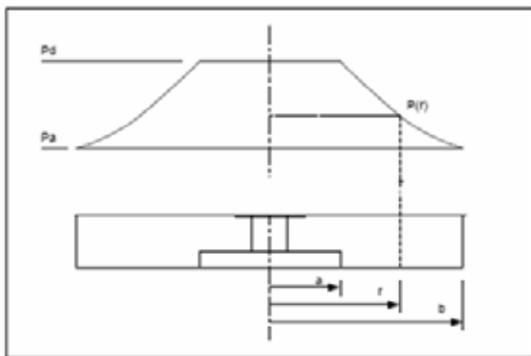


Figure 4. Load carried by circular thrust bearing.

**D. Stiffness**

Stiffness can be defined as the rate of change of load capacity with respect to change in air gap,

$$K = - \frac{dW}{dh} \tag{5}$$

Higher stiffness means less compliance. This means there will be small change in air gap corresponding to large variation in load.

**DIFFERENT DESIGNS OF AIR BEARING**

With using of design parameters like air bearing outer diameter, air supply hole diameter, orifice diameter, feed pocket diameter, supply pressure air bearing is designed.

CREO and SOLID WORKS 2011 soft-wares are used for making model of different air bearing.

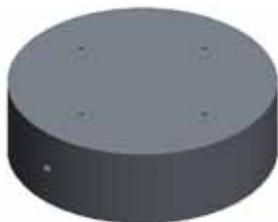
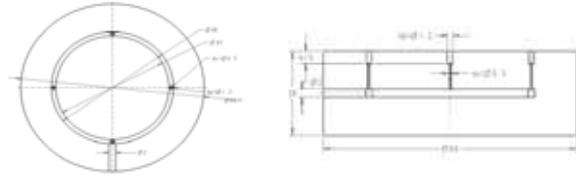


FIGURE 2.3D MODEL OF 4AB60\_AIR BEARING



Another variation in air bearing design was with rectangular pocket dimension, which was equivalent to circular pocket diameter. Now another variation in design with combination of circular and rectangular pockets.

There are three cases 4AB60\_, 6AB60\_, 8AB60\_ but best optimized case is described here. we give only description for case 4AB60\_

**4AB60RC\_1**

- Description of air bearing name 4AB60RC\_1  
4 stands for 4 nos. of orifices  
AB stands for Air Bearing  
60 stands for 60 mm. bearing outer diameter

R stands for rectangular feed pocket with 1.08 mm side and depth of feed pocket with height 3 mm.

C stands for circular feed pocket with 1.2 mm diameter and depth of feed pocket with height 3 mm.

**CASE 1: 4AB60\_**

**Table 1: Description of 4AB60\_ type air bearing**

	ORIFICE DIAMETER (mm.)	POCKET DIAMETER/ SIDE (mm.)	POCKET HEIGHT (mm.)	
4AB60C_1	0.5	1.2	3	
4AB60C_2	0.5	1.2	2	
4AB60C_3	0.5	1.2	1	
4AB60C_4	0.5	1.4	1	
4AB60C_5	0.5	1.4	2	
4AB60C_6	0.5	1.4	3	
4AB60R_1	0.5	1.08	3	
4AB60R_2	0.5	1.08	2	
4AB60R_3	0.5	1.08	1	
4AB60R_4	0.5	1.27	1	
4AB60R_5	0.5	1.27	2	
4AB60R_6	0.5	1.27	3	
4AB60RC_1	0.5	1.08	1.2	3
4AB60RC_2	0.5	1.08	1.2	2
4AB60RC_3	0.5	1.08	1.2	1
4AB60RC_4	0.5	1.27	1.4	1
4AB60RC_5	0.5	1.27	1.4	2
4AB60RC_6	0.5	1.27	1.4	3

**3. RESULTS AND DISCUSSION**

**Table 2: Results for Forces and Stiffness of 4AB60\_ type air bearing with 5, 6, 7 bar pressure values.**

Sr No.	Description	5 bar	6 bar	7 bar	5 bar	6 bar	7 bar
		Force (N) Maximum			Stiffness (N/mm)		
1	4AB60C_1	581.04	412.7	300.9	154.944	103.175	94.03125
2	4AB60C_2	389	397.4	299.2	103.733333	99.35	93.5
3	4AB60C_3	464.6	405.5	331.3	123.893333	101.375	103.53125
4	4AB60C_4	172.4	146.8	120.8	45.9733333	36.7	37.75
5	4AB60C_5	149.6	121.5	96.86	39.8933333	30.375	30.26875
6	4AB60C_6	174.7	146.8	116.3	46.5866667	36.7	36.34375
7	4AB60R_1	1250	901	739.6	333.333333	225.25	231.125

8	4AB60R_2	943.5	945	756.2	251.6	236.25	236.3125
9	4AB60R_3	1239	1179	928.4	330.4	294.75	290.125
10	4AB60R_4	993.5	934.5	734.4	264.933333	233.625	229.5
11	4AB60R_5	742.8	684.9	564.2	198.08	171.225	176.3125
12	4AB60R_6	687.1	648.4	530.2	183.226667	162.1	165.6875
13	4AB60RC_1	974.2	730.3	645.6	259.786667	182.575	201.75
14	4AB60RC_2	748.3	532	605	199.546667	133	189.0625
15	4AB60RC_3	619.6	555.2	427.5	165.226667	138.8	133.59375
16	4AB60RC_4	525.6	443.6	508.6	140.16	110.9	158.9375
17	4AB60RC_5	574.8	471.3	509.6	153.28	117.825	159.25
18	4AB60RC_6	755.7	627.9	565.4	201.52	156.975	176.6875

As shown in table supply pressure was increased from 5 bar to 7 bar, Force value were decreased for one design of bearing. Also as shown in table for one kind of bearing when supply pressure was increased value of stiffness also decreases. So we can conclude that for one kind of air bearing at pocket end force value and stiffness values decrease when supply pressure increased.

Among all air bearings with circular pockets 4AB60C\_1 air bearing with 3 mm pocket depth has maximum force and stiffness values.

Among all air bearings with rectangular pockets 4AB60R\_3 air bearing with 1 mm pocket depth has maximum force and stiffness values.

Among all air bearings with combination of circular and rectangular circular pockets 4AB60RC\_1 air bearing with 3 mm pocket depth has maximum force and stiffness values.

#### CONCLUSION:

If pressure is increased from 5 bar to 7bar force value decreases at same moment stiffness value also decreases. If pocket height of air bearing increases at same moment force value also increases and stiffness value will be variable.

#### REFERENCES

- [1] Kuang-Chao Fan , Chi-Chung Ho , Jong-I Mou(2002), "Development of a multiple- | micro hole aerostatic air bearing system" Journal Of Micromechanics And | Microengineering (2002) 636–643 | [2]Nenzi Wang and Yau-Zen Chang(2004), "Application of the genetic algorithm to the multi-objective optimization of air bearings" Tribology Letters, Vol. 17, No. 2, August 2004 | [3] Shengkai Yu, Bo Liu, Jin Liu(2005), "Analysis and optimization of dynamic response | of air bearing sliders to disk waviness" Tribology International 38 (2005) 542–553 | [4]Jean-S' ebastienPlante, John Vogan, Tarek El-Aguizy, Alexander H. Slocum(2005), "A design model for circular porous air bearings using the 1D generalized flow method" Precision Engineering 29 (2005) 336–346 | [5]QideZhang ,XueChuan Shan , GuoxiaoGuoa, Stephen Wong(2005), "Performance analysis of air bearing in a micro system" Materials Science and Engineering A 423 (2006) 225–229 | [6]Y.F. Hana, B. Liu, X.Y. Huang(2006), "High air-bearing stiffness slider design" Journal of Magnetism and Magnetic Materials 303 (2006) e76–e80 | [7]GyunghoKhim, Chun-Hong Park, Husang Lee, Seung-Woo Kim(2006), "Analysis of additional leakage resulting from the feeding motion of a vacuum-compatible air bearing stage" Vacuum surface engineering surface instrumentation & vacuum technology Vacuum 81 (2006) 466–474 | [8]DaejongKim , SoongookPark(2008), "Hydrostatic air foil bearings: Analytical and experimental investigation" Tribology International 42 (2009) 413–425 | [9] UchihiroNishio, KeiSomaya, ShigekaYoshimoto(2011), "Numerical calculation and experimental verification of static and dynamic characteristics of aerostatic thrust bearings with small feedholes" Tribology International | [10]J. P. Khatait, W. Lin and W. J. Lin, "Design and development of orifice-type aerostatic thrust bearing" SIMTech technical reports Volume 6 Number 1 Jan-Jun 2005 | BOOKS | 1. R. S. Khurmi , J. K. Gupta , A Textbok of Refrigeration and Air Conditioning, 1st Edn, S. Chand | Eurasia Publishing house (P) Ltd., 2005, pp 583-584. |



**Sara Publishing Academy**  
Indian Journal Of Applied Research  
Journal for All Subjects



**Editor,**  
**Indian Journal Of Applied Research**  
8-A, Banans, Opp. SLU Girls College,  
New Congres Bhavan, Paldi, Ahmedabad-380006.  
Contact.: +91-9824097643 E-mail : [editor@ijar.in](mailto:editor@ijar.in)