

## Experimental Investigation on Permeability and Porosity of Indian Gassy Coal Samples from Raniganj Coalfield

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In general, the critical reservoir parameters which control the flow behaviour in porous media are permeability and porosity. The permeability measurements of five different gassy coal samples from Raniganj coalfield of India were carried out by using two different techniques i.e., steady state method and pressure transient (pulse decay) method. Similarly, determination of porosity was carried out for the same samples using Helium porosimetry technique and Buoyancy method. Experimental setups were fabricated and used for the measurements. The gas permeability of coal samples was measured using helium as flowing fluid. In both the methods, permeability values (K) of all samples vary within a very small range thereby proving the effectiveness of both techniques in measuring permeability of porous rock samples. In steady state analysis, plots for flow rate (F) and inlet pressure follows a power relationship whereas permeability and applied pressure also has a good non-linear relationship. An exponential relationship between permeability and flow rate was observed with respect to applied pressure. The permeability value is exorbitantly high for some samples compared to other computed values which may be due to presence of some weak planes/hidden-fractures in it.

The permeability values determined by both the methods for the selected coal samples lie between 0.034mD and 6.653mD. Differences in the effective porosity values determined by the two methods vary within a small range of 0.01% to 0.56%. The inter-relationship between effective porosity and permeability was also examined. The gas permeability co-efficient and effective porosity for the selected coal samples under this study holds a good exponential type relationship.

### Biography:

Samir Kumar Pal is currently working as a Professor in the Department of Mining Engineering, Indian Institute of Technology Kharagpur, India where he obtained his Bachelor, Master and Doctoral degrees. In the course of his career, he has been closely involved with many sponsored and consultancy projects. Much of his work has been on improving the understanding, design and performance in the broad area of mining, mainly through the practical field applications. He is a Fellow of the Institute of Engineers (India) and an active member of the Mining, Geological and Metallurgical Institute (MGMI) of India. Prof. Pal is an author and co-author of over 65 journal papers and 5 book chapters; along with this he presented his works in several national and international conferences. He has received many external and professional awards and has widespread recognition for most of his works.