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STUDY OF RADON CONTENT IN THE AIR IN VARIOUS ZONES

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Abstract. *The paper presents the results of assessing the level of radon-222 and radon-220 in various types of premises in the Kabardino-Balkarian Republic. The factors influencing its concentration have been determined. Exposure to high concentrations of radon is associated with an increased risk of lung cancer, so it is important to systematically measure indoor radon levels and take appropriate measures to reduce it. Research results show that indoor radon levels can vary significantly depending on factors such as soil type, degree of building insulation, availability of ventilation systems, etc. Cases of exceeding recommended radon standards in certain rooms have been found, which underlines the need for systematic monitoring and measures to ensure the safety of the air environment inside buildings.*

Keywords: radon-222, radon-220, permissible concentration, monitoring, air safety, environmental safety.

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|---|-----|----------|-------|-------|------|--------|--------------------|
| 1 | 002 | 27.01.23 | 18:09 | +21,0 | 6±6 | 10±10 | |
| 2 | 003 | 27.01.23 | 21:09 | +20,8 | 5±15 | 45±145 | |
| 3 | 004 | 28.01.23 | 00:09 | +20,8 | 11±7 | 51±36 | 1,88 (1,03...4,50) |
| 4 | 005 | 28.01.23 | 03:09 | +20,8 | 8±9 | 33±38 | |
| 5 | 006 | 28.01.23 | 06:09 | +20,8 | 0±1 | 1±1 | |
| 6 | 008 | 28.01.23 | 12:09 | +20,9 | 6±8 | 13±18 | |
| 7 | 009 | 28.01.23 | 15:09 | +21,2 | 0±1 | 1±1 | |
| 8 | 010 | 28.01.23 | 18:09 | +21,3 | 8±6 | 9±7 | 0,04 (0,00...2,50) |

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|----|-----|----------|-------|-------|-------|--------|--------------------|
| 9 | 011 | 28.01.23 | 21:09 | +21,4 | 8±8 | 30±32 | |
| 10 | 012 | 29.01.23 | 00:09 | +21,4 | 9±13 | 77±116 | |
| 11 | 013 | 29.01.23 | 03:09 | +21,5 | 1±2 | 1±2 | |
| 12 | 015 | 29.01.23 | 09:09 | +21,5 | 0±1 | 1±1 | |
| 13 | 016 | 29.01.23 | 12:09 | +22,0 | 8±16 | 89±179 | |
| 14 | 017 | 29.01.23 | 15:09 | +22,1 | 10±7 | 15±11 | 0,29 (0,00...2,50) |
| 15 | 018 | 29.01.23 | 18:09 | +22,1 | 5±8 | 6±10 | |
| 16 | 019 | 29.01.23 | 21:09 | +22,0 | 0±1 | 1±1 | |
| 17 | 020 | 30.01.23 | 00:09 | +21,8 | 0±1 | 1±1 | |
| 18 | 021 | 30.01.23 | 03:09 | +21,7 | 12±10 | 31±25 | 0,82 (0,14...4.20) |
| 19 | 022 | 30.01.23 | 06:09 | +21,6 | 4±18 | 37±168 | |
| 20 | 023 | 30.01.23 | 09:09 | +21,8 | 2±3 | 2±3 | |
| 21 | 024 | 30.01.23 | 12:09 | +22,5 | 2±20 | 34±411 | |

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|-----|-----|----------|-------|-------|----------------|----------------|--------------------|
| 1. | 001 | 02.02.23 | 16:12 | +24,2 | 46±12 | 89±26 | 0,53 (0,28...0,89) |
| 2. | 002 | 02.02.23 | 19:12 | +23,6 | 50±19 | 103±43 | 0,60 (0,24...1,27) |
| 3. | 003 | 02.02.23 | 22:12 | +23,5 | 39±18 | 54±25 | 0,19 (0,00...0,93) |
| 4. | 004 | 03.02.23 | 01:12 | +23,5 | 41±18 | 86±40 | 0,62 (0,21...1,44) |
| 5. | 005 | 03.02.23 | 04:12 | +23,5 | 37±18 | 83±43 | 0,71 (0,24...1,78) |
| 6. | 006 | 03.02.23 | 07:12 | +23,5 | 45±19 | 91±42 | 0,58 (0,18...1,38) |
| 7. | 008 | 03.02.23 | 13:12 | +24,0 | 42±21 | 139±77 | 1,22 (0,64...2,60) |
| 8. | 009 | 03.02.23 | 16:12 | +23,8 | 28±22 | 103±86 | 1,41(0,55...5,90) |
| 9. | 010 | 03.02.23 | 19:12 | +23,8 | 31±22 | 121±91 | 1,49 (0,68...4,60) |
| 10. | 011 | 03.02.23 | 22:12 | +23,5 | 49±20 | 121±56 | 0,82 (0,39...1,67) |
| 11. | 012 | 04.02.23 | 01:12 | +23,5 | 53±22 | 109±49 | 0,60 (0,21...1,37) |
| 12. | 013 | 04.02.23 | 04:12 | +23,3 | 42±23 | 101±58 | 0,78 (0,26...2,10) |
| 13. | 014 | 04.02.23 | 07:12 | +23,2 | 40±21 | 111±63 | 0,99 (0,44...2,40) |
| 14. | 015 | 04.02.23 | 10:12 | +23,3 | 49±21 | 110±51 | 0,71 (0,29...1,57) |
| 15. | 016 | 04.02.23 | 13:12 | +23,5 | 47±22 | 106±52 | 0,71 (0,26...1,67) |
| 16. | 018 | 04.02.23 | 19:12 | +23,3 | 44±20 | 71±34 | 0,34 (0,00...1,16) |
| 17. | 019 | 04.02.23 | 22:12 | +23,3 | 36±18 | 60±32 | 0,38 (0,00...1,38) |
| 18. | 020 | 05.02.23 | 01:12 | +23,3 | 35±18 | 62±32 | 0,43 (0,00...1,42) |
| 19. | 021 | 05.02.23 | 04:12 | +23,3 | 30±22 | 78±59 | 0,88 (0,21...3,70) |
| 20. | 022 | 05.02.23 | 07:12 | +23,3 | 33±17 | 73±40 | 0,70 (0,21...1,92) |
| 21. | 023 | 05.02.23 | 10:12 | +23,2 | 31±18 | 69±43 | 0,71 (0,17...2,30) |
| 22. | 024 | 05.02.23 | 13:12 | +23,3 | 30±18 | 70±44 | 0,75 (0,19...2,40) |
| 23. | 025 | 05.02.23 | 16:12 | +23,3 | 38±19 | 85±45 | 0,69 (0,22...1,79) |
| 24. | 026 | 05.02.23 | 19:12 | +23,3 | 31±21 | 104±73 | 1,23 (0,51...3,70) |
| 25. | 027 | 05.02.23 | 22:12 | +23,3 | 33±17 | 64±35 | 0,53 (0,07...1,64) |
| 26. | 028 | 06.02.23 | 01:12 | +23,2 | 31±18 | 75±46 | 0,78 (0,22...2,30) |
| 27. | 029 | 06.02.23 | 04:12 | +23,2 | 20±19 | 69±70 | |
| 28. | 030 | 06.02.23 | 07:12 | +23,3 | 22±18 | 78±65 | 1,30 (0,47...5,70) |
| 29. | 031 | 06.02.23 | 10:12 | +23,2 | 27±17 | 60±39 | 0,71(0,14...2,50) |
| 30. | 032 | 06.02.23 | 13:12 | +22,1 | 11±24 | 87±194 | |
| 31. | 033 | 06.02.23 | 16:12 | +22,1 | 20±13 | 30±20 | 0,26 (0,00...1,93) |

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755 ± 361 / 3.

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1. Darby S., Hill D., Deo H. Residential radon and lung cancer – detailed results of a collaborative analysis of individual data on 7148 persons with lung cancer and 14208 persons without lung cancer from 13 epidemiologic studies in Europe // *Scand. J. Work Environ Health*. 2006. V. 32. P. 1-84.
2. Darby S., Hill D., Auvinen A., Barrios-Dios J.M., Baysson H., Bochicchio F. Radon in homes and risk of lung cancer: collaborative analysis of individual data from 13 European case-control studies // *British Medical Journal*. 2005. V. 330. P. 223–226.
3. Krewski D., Lubin J.H., Zielinski J.M., Alavanja M., Catalan V.S., Field R.W. Residential radon and risk of lung cancer. combined analysis of 7 north American case-control studies // *Epidemiology*. 2005. N 16. P. 137–145.
4. Lubin J.H., Wang Z.Y., Boice J.D., Xu Z.Y., Blot W.J., De Wang L. Risk of lung cancer and residential radon in China: pooled results of two studies // *Int. J. Cancer*. 2004. V. 109, N 1. P.132–137.
5. Neri A., Stewart S.L., Angell W. Radon control activities for lung cancer prevention in national comprehensive cancer control program plans, 2005–2011 // *Prev. Chronic. Dis*. 2013. V. 10. P. 132.
6. Neri A., McNaughton C., Momin B., Puckett M., Gallaway M.S. Measuring public knowledge, attitudes, and behaviors related to radon to inform cancer control activities and practices // *Indoor. Air*. 2018. V. 28. N 4. P. 604–610.
7. Alavanja M.C., Lubin J.H., Mahaffey J.A. Residential radon exposure and risk of lung cancer in Missouri // *Am. J. Public. Health*. 1999. V. 89. P.1042–1048.
8. Field R.W., Steck D.J., Smith B.J. Residential radon gas exposure and lung cancer: the Iowa radon lung cancer study // *Am. J. Epidemiol*. 2000. V. 152. P. 895–896.
9. Sandler D.P., Weinberg C.R., Archer V.E. Indoor radon and lung cancer risk: a case–control study in Connecticut and Utah // *Radiat. Res*. 1999. V. 151. P. 103–104.
10. - -3-01 " " . : , 2008. 33 .