$$c_{in_2}=c_{i11}\left(\prod_{j=2}^{n}\lambda_{ij}\right)\sum_{j=1}^{n}\left[\exp(-\lambda_{ij}t_B)\prod_{\substack{k\neq j\\k=1}}^{n}\frac{1}{\lambda_{ik}-\lambda_{ij}}\right].$$

Calculations performed for the VK-50 fast reactor show that the value of A can attain ~0.6. Installation of an antiaerosol filter at the end of the tube is recommended on that account.

ANGULAR DISTRIBUTIONS OF NEUTRONS BEHIND AN IRON SHIELD

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The Monte Carlo method has been used to calculate the angular distribution behind an iron shield of fast and intermediate neutrons from an infinite plane source of fission neutrons. The algorithm of the calculation uses the method of conditional probabilities, which takes account of absorption by and the emergence of neutrons from a layer by introducing the statistical weight. The algorithm of the calculation was described earlier [1].

Angular distributions of fast (E > 1.0 MeV) and intermediate (0.1 MeV ≤ E ≤ 1.0 MeV) neutrons were calculated for shield thicknesses of 0.5, 1, 5, 10, 20, 30, and 40 cm for isotropic, cosine, and monodirectional sources of fission neutrons.

The results show that the angular distribution of the neutron flux behind thin shields (< 5 cm) results from unscattered and singly scattered neutrons. Behind shields more than 20 cm thick the angular distribution is determined by multiply scattered neutrons and is approximated by a function of the form exp (A cos θ), where A is an angular parameter and θ is the angle of emergence of the neutron from the shield.

The dependence of A on the shield thickness and the angular distribution of the source neutrons is shown in Table 1.

Thus the angular distributions of fast and intermediate neutron fluxes behind iron slab shields more than 20 cm thick are weakly dependent on the shield thickness and the angular distribution of the source neutrons, and are approximated by the function exp (A cos θ) with A ~ 1.8 for fast, and A ~ 0.9 for intermediate neutrons.

TABLE 1. Values of A for the Angular Distribution of Intermediate and Fast Neutrons

Shield thickness, cm	Isotropic source		Cosine source		Monodirectional source	
	intermediate neutrons	fast neutrons	intermediate neutrons	fast neutrons	intermediate neutrons	fast neutrons
10	0,1	—	0,2	—	—	—
20	0,65	1,7	0,6	1,6	0,8	—
30	0,75	1,8	0,7	1,7	0,9	1,75
40	0,8	1,8	0,9	1,8	0,9	1,7

LITERATURE CITED

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