Circular Tank Slab

The slab for the circular tank is not a "structural slab". We may be able to consider it to be a "base slab". Given the evidence below, I would use a minimum steel ratio of 0.0025 for the temperature and shrinkage reinforcing. The concrete clear cover should still be 3″ on the bottom and 2″ on the top, as per ACI350§7.7.1.

A very good design would be a 6″ slab with one layer of reinforcing, #4@12″ each way.

H.4 — Reinforcement

H.4.1 — Slabs-on-grade shall be reinforced in one or two layers. Membrane slabs shall be reinforced with one layer. The minimum reinforcement shall not be less than the requirements for temperature and shrinkage for structural slabs as described in other sections of this code. Prestressed reinforcement, if used, shall not be less than the amount required to impart a final compression of 200 psi in the slab.

H.4.4 — Reinforcement shall have a concrete cover of not less than 1-1/2 in. between the bars or wires and the top surface of the concrete for slabs-on-grade, and 1 in. for membrane slabs. The cover between the bottom of the slab and the reinforcement for both slabs-on-grade and membrane slabs shall not be less than 1-1/2 in. when the subgrade is stabilized so that it will not be displaced by the placement of concrete or when the subgrade is covered with a plastic vapor barrier. The cover shall not be less than 2 in. when the subgrade has not been stabilized or when a vapor barrier is not present. Slabs greater than 8 in. in thickness shall have the same concrete cover requirements as for structural slabs-on-soil. Reinforcement shall be maintained in correct vertical position by support chairs or concrete cubes.

7.12 — Shrinkage and temperature reinforcement

7.12.1 — Reinforcement for shrinkage and temperature stresses normal to flexural reinforcement shall be provided in structural slabs and walls where the flexural reinforcement extends in one direction only.

7.12.2.1 — For members subjected to environmental exposure conditions or required to be liquid-tight, the area of shrinkage and temperature reinforcement shall provide at least the ratios of reinforcement area to gross concrete area shown in Table 7.12.2.1:

Concrete sections that are at least 24 in. may have the minimum shrinkage and temperature reinforcement based on a 12 in. concrete layer at each face. The reinforcement in the bottom of base slabs in contact with soil may be reduced to 50 percent of that required in Table 7.12.2.1.

TABLE 7.12.2.1—MINIMUM SHRINKAGE AND TEMPERATURE REINFORCEMENT

Length between movement joints, ft	Minimum shrinkage and temperature reinforcement ratio	
	Grade 40	Grade 60
Less than 20	0.0030	0.0030
20 to less than 30	0.0040	0.0030
30 to less than 40	0.0050	0.0040
40 and greater	0.0060*	0.0050*

*Maximum shrinkage and temperature reinforcement where movement joints are not provided.

Note: This table applies to spacing between expansion joints and full contraction joints. When used with partial contraction joints, the minimum reinforcement ratio shall be determined by multiplying the actual length between partial contraction joints by 1.5.

7.7 — Concrete protection for reinforcement

7.7.1 — Cast-in-place concrete (nonprestressed)

The following minimum concrete cover shall be provided for reinforcement, but shall not be less than required by 7.7.6:

	Minimum cover, in.
(a) Concrete cast against and permanently exposed to earth	3
(b) Concrete exposed to earth, liquid, weather, or bearing on work mat or slabs supporting earth cover:	
Slabs and joists	2
Beams and columns:	
Stirrups, spirals, and ties	2