



# TECHNICAL MANUAL

## Steel Silo Erection Technical Manual

Bolted Corrugated Grain Bin — Installation & Acceptance

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## Bolted Corrugated Grain Bin — Installation & Acceptance

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### 1. Scope & References

This manual covers on-site erection of Manxing bolted corrugated steel grain bins (FB / HB series). It defines foundation, anchoring, shell assembly, tolerances, bolting, sealing and final acceptance.

- Applicable standards: GB 50007 (foundation), GB 50205 (steel structure), ISO 5971 (silos), AWSA D1.1 (welding where applicable).
- Covers bins of 100–15,000 t capacity; hopper-bottom bins follow additional leg/cone procedure in section 3.4.
- Work shall be supervised by a Manxing-certified erection lead.

### 2. Foundation & Anchor Bolts

The foundation is a reinforced ring beam with cast-in anchor bolts on the bolt circle specified in the project drawing. Concrete strength  $\geq$  C25/30 before loading.

| Item                      | Requirement                                |
|---------------------------|--------------------------------------------|
| Concrete strength         | $\geq$ C25/30, 28-day cured                |
| Ring beam tolerance       | $\pm 10$ mm on centre, $\pm 5$ mm on level |
| Anchor bolt projection    | Per drawing, +6 / –0 mm                    |
| Bolt circle diameter      | Per drawing, $\pm 3$ mm                    |
| Cure time before erection | $\geq 7$ days (or per engineer)            |

- Rebar inspection signed off
- Anchor bolt positions verified against drawing
- Foundation top surface cleaned and levelled
- Setting-out marks and centre cross established

### 3. Shell Erection Sequence

- 1 Place the bottom ring sheets on the foundation, align to anchor bolts, fit washers and nuts finger-tight only.
- 2 Assemble each subsequent ring from bottom to top, staggering vertical seams by  $\geq$  one sheet; keep bolts finger-tight until the full course is set.
- 3 Install stiffeners/ladders per drawing as the wall rises; do not back-fill before roof is on.
- 4 For hopper-bottom bins, erect the support legs and cone first, then the cylindrical section above.
- 5 Fit roof structure, manhole, vents and fill pipe; then torque all bolts to spec.
- 6 Install aeration manifold, temperature cables and level indicator as options.

**Note:** Never climb inside an un-roofed bin; secure the wall against wind before leaving each shift.

## 4. Dimensional Tolerances

| Parameter                         | Tolerance                |
|-----------------------------------|--------------------------|
| Overall verticality (full height) | $\leq H/500$ , max 30 mm |
| Bin roundness (out-of-round)      | $\leq D/500$ , max 25 mm |
| Sheet overlap / seam              | Per drawing, no gaps     |
| Roof slope / seating              | Flush, $\leq 3$ mm step  |

## 5. Bolt Torque Specification

All structural bolts are high-strength galvanized. Torque in two passes: 50% then 100% of target. Re-check after 24 h and after first fill.

| Bolt | Grade | Torque (N·m) |
|------|-------|--------------|
| M10  | 8.8   | 45           |
| M12  | 8.8   | 80           |
| M16  | 8.8   | 160          |
| M20  | 8.8   | 320          |
| M24  | 10.9  | 620          |

## 6. Welding & Sealing

- Field welds (where permitted) to AWSA D1.1; remove slag and inspect for porosity.
- Apply butyl/PU sealant on horizontal seams and at roof/sheet junctions to ensure weather-tightness.
- Touch-up coating on any damaged galvanized surface per the Coating Specification.

## 7. Acceptance Checklist

- Verticality and roundness within tolerance
- All bolts torqued and marked
- Roof, vents, manhole and fill pipe fitted and sealed
- Aeration / temperature / level systems tested
- Foundation and anchor bolts documented with photos
- Erection report signed by customer and Manxing lead

This technical manual is issued for the named customer's installation, commissioning and operation. Manxing engineering reserves the right to revise procedures; always use the latest revision. Contact Manxing service for field support and certified drawings.