



Tower Assembly Instructions

For ARE Slip-jointed Wind Towers



Preface

This manual includes the introduction and assembly of ARE's slip-jointed wind towers.

Users are required to read this manual carefully before installation.

This manual covers the primary procedures and key points for the installation. Please contact American Resource & Energy for assistance.

American Resource & Energy

Phone: 651-330-1263

Email: support@arewindtowers.com

www.arewindtowers.com

Optional Equipment

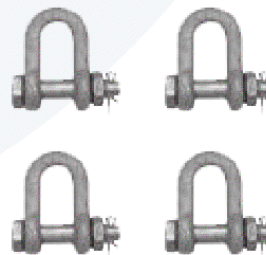
Two 5-ft. lifting straps



Two chain hoists



Four shackles



Safety regulations

- Operator must read this manual carefully before installation and operation.
- Operator must wear a helmet and take adequate safety protection measures during installation.
- ARE towers must not be installed during severe weather conditions, which include rain, thunder or lightning.
- Maximum allowable wind speed for installation or maintenance is 6m/s.
- Operator should NEVER, under any circumstance stand under a tower while it is being raised or lowered.



Step 1:
Line up tower sections on the ground in sequential order.

Step 2:
For all towers, repeat joining process, align the assembly welds for length of tower. Joint base section with second tower section.

Soapy water applied on the joint overlap will ease jointing.



Step 3:
Wrap straps around each tower section to create chain blocks, which will be used to pull sections together and seat the two tower sections.

IMPORTANT:
Tower sections must exceed 1.5x the diameter of the tower section.

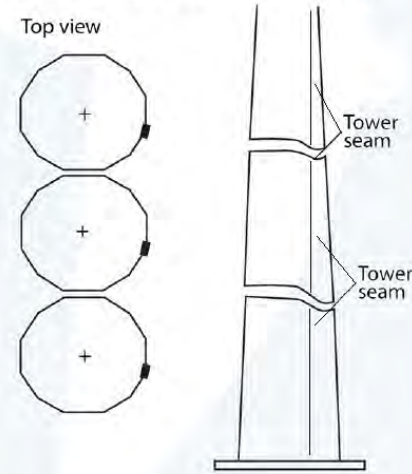
Example: If the tower diameter is 2 ft., the minimum joint overlap must be a minimum of 3 ft.

To ensure proper overlap, measure the distance of the tower opening from left to right. Multiply this measurement by 1.5.

Measure this distance from the top of the first section and mark tower.

Example: If tower is 12 in. across, joint minimum is 18 in.

ALTERNATING LENGTHS FOR TOWER*



Step 4:

If using metal jacking brackets with straps & chain pulley/hoist or winch to join larger tower sections, attach pulley chains to opposing brackets on each side of tower, pulling tower sections together evenly.



Step 5:

To join sections without jacking brackets, wrap nylon straps around opposing tower sections, attaching chain hooks to nylon straps and pulling tower sections together.



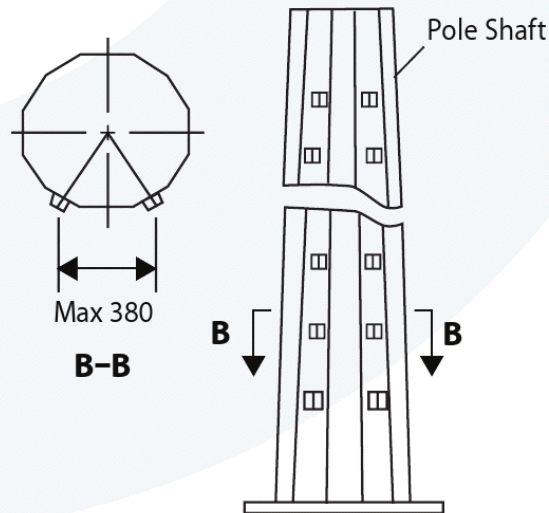
IMPORTANT:

For towers with more than two sections, repeat jointing process, aligning sections on weld seam for length of tower.

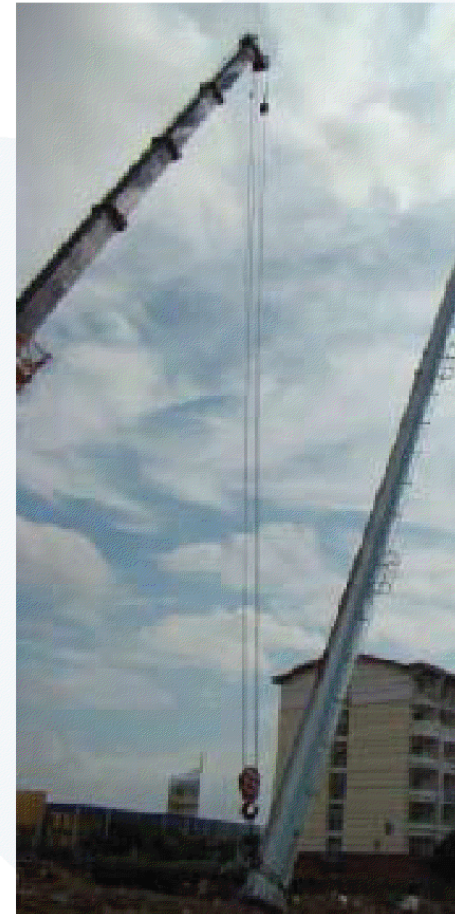
Note:

If your tower includes step bolts, install all bolts into Tower clips at this time.

STEP BOLT BRACKETS



6



Step 6:
Once turbine is connected to tower, raise tower using ARE's Ground Control™ motorized system, ARE's vertical gin pole or crane.

NOTE:
Crane size and capacity shall be determined by crane operator or crane company based on the weight and size of pole and turbine and site conditions.

Recommended Pretension Torque for Anchor Bolts

| Bolt Size | Recommended Torque |
|---------------------------------|-----------------------|
| M 12 (0.47 in) | 60N-m (43lb. ft.) |
| M 16 (0.63 in) | 120N-m (89lb. ft.) |
| M 20 (0.79 in.) | 275N-m (203lb. ft.) |
| M 24 (0.94 in.) | 500N-m (369lb. ft.) |
| M 27 (1.06 in.) | 700N-m (516lb. ft.) |
| M 30 (1.18 in.) | 910N-m (671lb. ft.) |
| M 33 (1.3 in.) ASTM F1554 GR 55 | 820N-m (605lb. ft.) |
| M 36 (1.42 in.) | 1320N-m (974lb. ft.) |
| M 39 (1.54 in) | 1600N-m (1180lb. ft.) |
| M 42 (1.65 in.) | 1810N-m (1335lb. ft.) |
| M 45 (1.77 in) | 2100N-m (1549lb. ft.) |
| M 48 (1.89 in.) | 2400N-m (1770lb. ft.) |

All bolts are grade 8.8 except for the M33 anchor bolts, which are ASTM F1554 GR 55

If a suitably sized torque wrench is not available the turn-of-nut tightening method may be used. Refer to ARE's "Turn-of-Nut Tightening Guide" for further instructions.