

Lifting & Spreader Beams

Model BEF - Spreader Beam End Fittings



Shown full assembled with customer supplied rigging and bar.

INSTOCK PROGRAM

PRODUCT FEATURES:

- Build your own spreader beam.
- Designed to work with a range of shackle sizes, both top and bottom.
- Complies with ASME standards when assembled to specifications using A53 Grade B, schedule 40 pipe.



SPECIFICATIONS

| Model No. Spread (ft.) | Capacity (tons) | | | | | | | | | | | | | | | Weight (lbs.) Per Pair | | | | | |
|---------------------------|-----------------|---|-----|-----|----|-----|----|-----|----|----|----|----|----|----|----|---------------------------|----|----|----|----|----|
| | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 15 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | | 30 | 32 | 34 | 36 | |
| BEF-2-1/2 | 7.5 | 7 | 6.5 | 5.5 | 4 | 2.9 | 2 | 1.8 | - | - | - | - | - | - | - | - | - | - | - | - | 18 |

NOTE: Capacity based on minimum 45° top rigging angle.
Other sizes available, consult factory.

Assembly Information

The Caldwell Model BEF is designed to use A53 Grade B, schedule 40 pipe as the central structural element between the end fittings. This structural material is readily available at most steel service centers. The Caldwell Model BEF-2 1/2 requires a 2-1/2" nominal size, the Model BEF-5 requires a 5" nominal size, and the BEF-8 requires an 8" nominal size A53 Grade B, schedule 40 pipe.

Other requirements are:

- The length of pipe used for this central element must be straight within 1/4" end to end.
- The pipe should have the ends cleanly cut square with its centerline.
- The A53 Grade B, schedule 40 pipe should not have any weld joint irregularities.
- Each end of the A53 Grade B, schedule 40 pipe must have the correct diameter holes drilled through both walls and both ends must be in line.
- The A53 Grade B, schedule 40 pipe used in this application does not need to pass any pressure testing.

The retaining bolts used to secure the Caldwell Model BEF 2-1/2 and 5 to the A53 Grade B, schedule 40 pipe must be a Grade 5 Hex Head Cap Screw 5/8-11 with minimum length of 4-1/2" and 8" respectively. The bolt for the BEF-8 is a Grade 5 Hex Head Cap Screw 1-8 with a minimum length of 11-1/2".

NOTE: Complete assembly instructions are provided with each set of end fittings.

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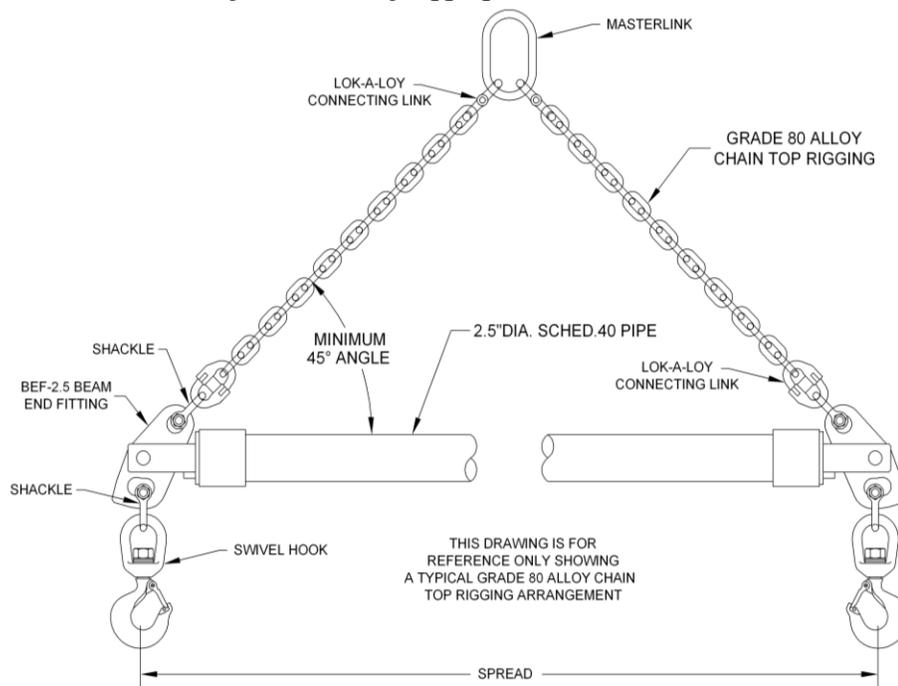
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TECHNICAL DATA SHEET FOR MODEL BEF-2.5 BEAM END FITTINGS

The Caldwell Model BEF Beam End Fittings are designed to allow qualified riggers to build SPREADER BEAMS meeting ASME B30.20 standards in a range of spread lengths and capacities, and ASME BTH-1 Design Category B and Service Class 0. Each SPREADER BEAM, built to the specifications listed in this technical document, using the Caldwell Model BEF is classified as a "Structural Lifting Device" and meets design margins as specified in ASME B30.20. The SPREADER BEAM supports a load up to the SPREADER BEAM'S rated capacity as described in the tables listed in this document when used correctly. Use either wire rope or chain top rigging with the SPREADER BEAM.



Top Rigging *minimum* angle is 45°. Angles less than 45° causes an overload condition for the spreader system.

By observing the following operational procedures you can assure reliable handling of the loads you wish to lift.

1. **INSPECT THE LIFTER FOR DAMAGE OR EXCESS WEAR BEFORE EACH USE.** Check for structural bending, excess wear at load points and pins, cracked or broken welds, or deformed hooks. If this inspection reveals any defect, place unit out of service and report this to the designated person.
2. **NEVER, EXCEED RATED CAPACITY.**
3. **POSITION LIFTER SO THAT LOAD IS PROPERLY BALANCED AND LEVEL.**
4. **DO NOT LIFT PEOPLE. DO NOT LIFT OVER PEOPLE. DO NOT LIFT HIGHER THAN NECESSARY. DO NOT LEAVE LOAD UNATTENDED WHEN SUSPENDED.**

TECHNICAL DATA SHEET FOR MODEL BEF-2.5 BEAM END FITTINGS

Using TABLE 1. It is possible to select either a rated capacity or a spread length to initiate the design of a spreader beam.

Example 1: If a spreader beam up to 5.5 Ton capacity is needed, Table 1 shows that a spread of up to 8ft. can be accommodated and this spreader beam will meet all of the structural strength requirements of ASME B30.20 when using 2 1/2" nominal diameter schedule 40 pipe.

Example 2: If a beam with a spread of 15 ft is required, Table 1 shows that a capacity of up to 1.8 Ton can be attained.

In each of these examples it will also be very important to follow all other specifications regarding material, straightness and rigging hardware size as described in this document.

The Caldwell Model BEF-2.5 Beam End Fitting has a capacity range of 1.8 Ton (3,600 lbs) at a 15 ft spread up to 7.5 Ton (15,000 lbs) at a 4 ft spread.

The Caldwell Model BEF-2.5 Beam End Fitting has been designated to accept a range of rigging shackles on both the top and bottom rigging connect points. The top rigging connect points have been designed to accept a rigging angle of 45-60 degrees and can accommodate the Crosby Bolt Type Anchor Shackles or equivalent, with a capacity of up to 6.5 Ton (13,000 lbs). The bottom rigging connect points are designed to accept Crosby Bolt Type Anchor Shackles or equivalent, with a capacity of up to 4.5 Ton (9,000 lbs).

TABLE 1. Shows the maximum capacity for a range of spread lengths.

| Model BEF-2.5 Maximum Capacity at Listed Hook Spread | | | | | | | | |
|--|---|---|-----|-----|----|-----|----|-----|
| Spread (in feet) | 4 | 5 | 6 | 8 | 10 | 12 | 14 | 15 |
| Capacity (tons) | 7.5 | 7 | 6.5 | 5.5 | 4 | 2.9 | 2 | 1.8 |
| Pipe Size | 2 1/2" Nominal Size Schedule 40 ERW Pipe (A53, Grade B, Schedule 40 Pipe) 2.875" OD, .203" Wall | | | | | | | |

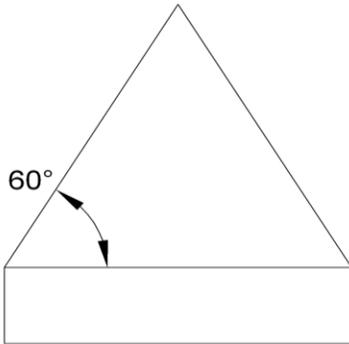
Table 1.

WARNING: DO NOT EXCEED THE MAXIMUM CAPACITY DEFINED AT EACH SPREAD LENGTH.

TECHNICAL DATA SHEET FOR MODEL BEF-2.5 BEAM END FITTINGS

The top rigging capacity must be sized to account for the top rigging angle and must be capable of lifting the beam capacity plus the additional weight of the beam. The beam weight is equal to 20 pounds (The weight of two beam end fittings) plus 6 pounds per foot of pipe (The weight of a 2-1/2" nominal size Schedule 40 ERW pipe {A53, Grade B, Schedule 40 Pipe}, 2.875" OD, .203" Wall).

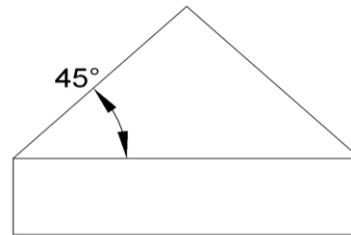
60° Rigging Angle



Rated Capacity for 6 X 19 Extra Improved Plow with Independent Wire Rope Core

| Wire Rope Sling Diameter | 60° Rigging Angle | 45° Rigging Angle |
|--------------------------|-------------------|-------------------|
| 1/4" | 2,200 lbs. | 1,800 lbs. |
| 5/16" | 3,400 lbs. | 2,800 lbs. |
| 3/8" | 5,000 lbs. | 4,000 lbs. |
| 7/16" | 6,800 lbs. | 5,400 lbs. |
| 1/2" | 8,800 lbs. | 7,200 lbs. |
| 9/16" | 11,000 lbs. | 9,000 lbs. |
| 5/8" | 13,600 lbs. | 11,000 lbs. |
| 3/4" | 19,400 lbs. | 15,800 lbs. |

45° Rigging Angle



Rated Capacity for Grade 80 Alloy Chain

| Grade 80 Alloy Chain Size | 60° Rigging Angle | 45° Rigging Angle |
|---------------------------|-------------------|-------------------|
| 7/32" | 3,600 lbs. | 3,000 lbs. |
| 9/32" | 6,100 lbs. | 4,900 lbs. |
| 3/8" | 12,300lbs | 10,000 lbs. |
| 1/2" | 20,800 lbs. | 17,000 lbs. |

Top Rigging Capacity Chart Table 2.

Example: If a spreader beam of 5.5 Ton capacity with a spread of 8 ft. and a minimum of 45° top rigging angle is needed, the top rigging capacity must be sized as follows: The required length of the 2 1/2" nominal size schedule 40 ERW pipe (A53, Grade B, Schedule 40 Pipe) from Table 4 is 89 inches or approximately 7.5 ft long.

The Beam capacity = 11,000 lbs.

The beam weight is 20 lbs + (6 lb/ft X 7.5 ft) = 65 lbs.

The total top rigging minimum capacity is 11,000 lbs + 65 lbs. = 11,065 lbs.

Based on the chart in Table 2 for a 45° top rigging angle it is required to use 1/2" Grade 80 alloy chain or 3/4" 6X19 Extra Improved Plow with Independent Wire Rope Core wire sling.

TECHNICAL DATA SHEET FOR MODEL BEF-2.5 BEAM END FITTINGS

Top rigging component configuration depends on the crane hook size and type of top rigging used. These top rigging components need to be sized to a rated capacity equal to or greater than the capacity of the Grade 80 alloy chain or 6X19 Extra Improved Plow with Independent Wire Rope Core wire sling that is used. If there are questions on proper sizing of rigging components, contact The Caldwell Group or your rigging supplier.

TABLE 3: Shows the recommended sizes and capacity for the hardware tabulated by spreader beam capacity in tons. Hardware must be rated at least the minimum capacity defined in TABLE 3 for either the Top Rigging or Bottom Rigging based on the tabulated spreader beam capacity.

Caldwell Model BEF-2.5 Spreader System Rigging Hardware Selection Table

Top Rigging

Bottom Rigging

| Spreader Cap. (in Tons) | Crosby Shackle Description | Part Number |
|----------------------------|-------------------------------|-------------|
| 1 | 1T BTAS | S-2130 |
| 1.5 | 1 ½T BTAS | S-2130 |
| 2 | 1 ½T BTAS | S-2130 |
| 2.5 | 2T BTAS | S-2130 |
| 3 | 3 ¼T BTAS | S-2130 |
| 3.5 | 3 ¼T BTAS | S-2130 |
| 4 | 3 ¼T BTAS | S-2130 |
| 4.5 | 3 ¼T BTAS | S-2130 |
| 5 | 4 ¾T BTAS | S-2130 |
| 5.5 | 4 ¾T BTAS | S-2130 |
| 6 | 4 ¾T BTAS | S-2130 |
| 6.5 | 4 ¾T BTAS | S-2130 |
| 7 | 6 ½T BTAS | S-2130 |
| 7.5 | 6 ½T BTAS | S-2130 |

| Crosby Shackle Description | Part Number | Crosby Hook Description | Part Number |
|-------------------------------|-------------|----------------------------|-------------|
| 1T BTAS | S-2130 | 1T Swivel Hook | 322C |
| 1 T BTAS | S-2130 | 1T Swivel Hook | 322C |
| 1 T BTAS | S-2130 | 1T Swivel Hook | 322C |
| 1 ½T BTAS | S-2130 | 1 ½T Swivel Hook | 322A/322C |
| 1 ½T BTAS | S-2130 | 1 ½T Swivel Hook | 322A/322C |
| 2T BTAS | S-2130 | 2T Swivel Hook | 322A/322C |
| 2T BTAS | S-2130 | 2T Swivel Hook | 322A/322C |
| 3 ¼T BTAS | S-2130 | 3T Swivel Hook | 322A |
| 3 ¼T BTAS | S-2130 | 3T Swivel Hook | 322A |
| 3 ¼T BTAS | S-2130 | 3T Swivel Hook | 322A |
| 3 ¼T BTAS | S-2130 | 3T Swivel Hook | 322A |
| 3 ¼T BTAS | S-2130 | 4 ½T Swivel Hook | 322A |
| 4 ¾T BTAS | S-2130 | 4 ½T Swivel Hook | 322A |
| 4 ¾T BTAS | S-2130 | 4 ½T Swivel Hook | 322A |

* BTAS indicates Bolt Type Anchor Shackle.

Table 3.

TECHNICAL DATA SHEET FOR MODEL BEF-2.5 BEAM END FITTINGS

The Caldwell Model BEF-2.5 is designed to use Schedule 40 ERW pipe (A53, Grade B, Schedule 40 Pipe) as the central structural element between the end fittings. This structural material is readily available in most locations. Caldwell Model BEF-2.5 requires a 2 1/2" nominal size Schedule 40 ERW pipe (A53, Grade B, Schedule 40 Pipe), 2.875" OD, .203" Wall. The length of pipe used for this central structural component must be straight within 1/4" end to end. This is required to prevent catastrophic failure of the pipe from buckling due to an offset load on the pipe. If an inspection reveals that the pipe is damaged or bent, place the unit out of service and report it to a designated person.

The ends must be cut cleanly and square with the centerline of the pipe. The Schedule 40 E pipe (A53, Grade B, Schedule 40 Pipe) should not have any weld joint irregularities. The Schedule 40 ERW pipe (A53, Grade B, Schedule 40 Pipe) used in this application does not need to have passed any pressure testing.

Each end of the Schedule 40 ERW pipe (A53, Grade B, Schedule 40 Pipe) must have through hole drilled as shown in Figure 1.

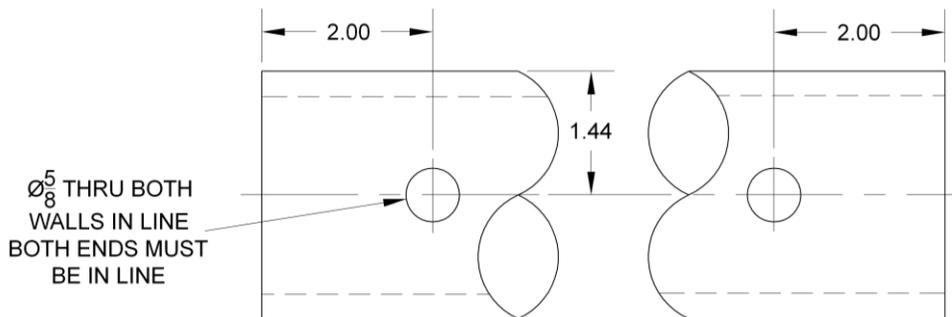


Figure 1.

The retaining bolt used to secure the Caldwell Model BEF-2.5 to the Schedule 40 ERW pipe (A53, Grade B, Schedule 40 Pipe) must be a Grade 5 Hex Head Cap Screw 5/8-11 with a minimum length of 4 1/2".

TABLE 4. defines the minimum sling length for each spread and the length of the Schedule 40 ERW pipe (A53, Grade B, Schedule 40 Pipe) used to create the spread.

| Caldwell Model BEF-2.5 Spreader System Top Rigging Sling Leg Length | | |
|---|------------------------------------|--|
| Spread Length (in feet) | Minimum Sling Leg Length (in feet) | Schedule 40 ERW Pipe (A53, Grade B, Schedule 40 Pipe) Length (in inches) |
| 4 | 3 | 41 |
| 5 | 4 | 53 |
| 6 | 5 | 65 |
| 7 | 5 | 77 |
| 8 | 6 | 89 |
| 9 | 7 | 101 |
| 10 | 8 | 113 |
| 11 | 8 | 125 |
| 12 | 9 | 137 |
| 13 | 10 | 149 |
| 14 | 10 | 161 |
| 15 | 11 | 173 |

Table 4.

TECHNICAL DATA SHEET FOR MODEL BEF-2.5 BEAM END FITTINGS

Precautions:

1. Never attempt to lift loads beyond the specified maximum capacity.
2. Verify the top rigging is at a minimum angle of 45 degrees. If this angle is lower than 45 degrees the spreader system is at risk of being overloaded.

Inspection & Maintenance:

1. Inspect all welds or cracks.
2. Inspect all rigging and hardware for wear and fit.

Additional requirements to fully conform to ASME B30.20:

1. Rated Load Marking (ASME B30.20 Section 20-1.2(a))
The rated load of the lifting device shall be marked on the main structure where it is visible. If the lifting device is made up of several lifters, each detachable from the group, these lifters shall also be marked with their individual rated loads.
2. Identification (ASME B30.20 Section 20-1.2 (b))
A nameplate or other permanent marking shall be affixed displaying the following information:
 1. Manufacturer's name and address
 2. Serial Number
 3. Lifter Weight, if over 100 lbs (45 kg)
 4. Rated Load

NOTE: IF TAGS OR DECALS BECOME DIFFICULT TO READ, CONTACT THE CALDWELL GROUP FOR REPLACEMENT TAGS AND DECALS.

ASME BTH-1
DESIGN CATEGORY: B
SERVICE CLASS: 0