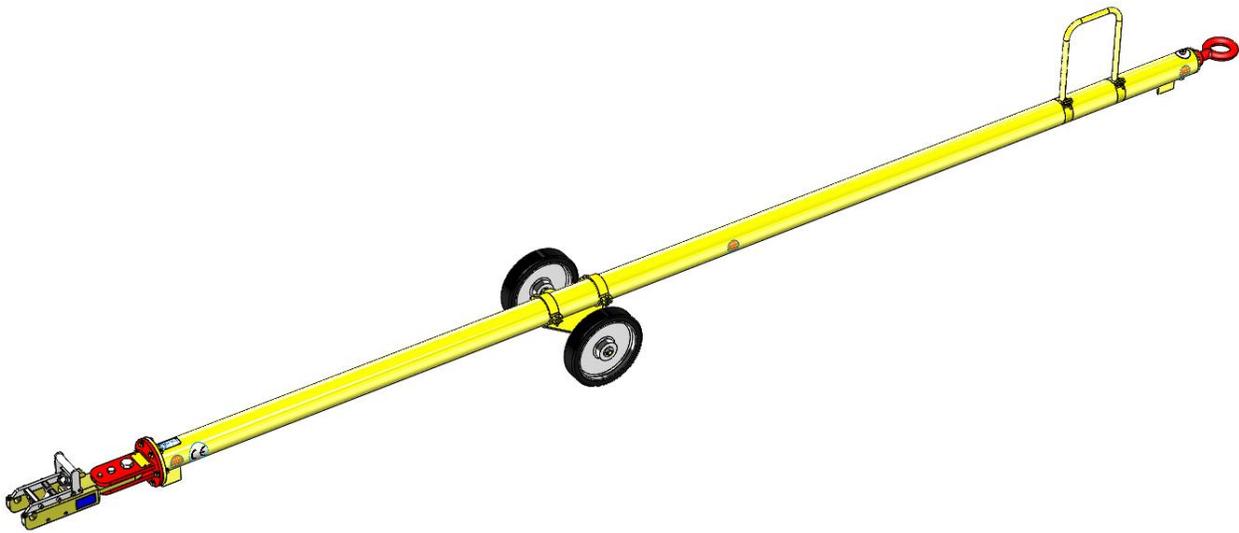


HALL Technical Services, LLC

EMB 170/175/190/195 TOWBAR MANUAL

Towbar Specifications, Usage, Preventive Maintenance, and Parts



Phone 724-752-2000
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Ellwood City, PA 16117



Revision 03

Rev. 01 – Adjusted Part Numbers. -BJL
Rev. 02 – Soft Start Change, Part Number Corrections - DHW
Rev. 03 - Remove TB-LUBE, Correct replacement handle part number - DHW



0. Index

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1. Specifications

1.1. For use with Embraer 170 / 175 / 190 / 195 aircraft

1.1.1. Listed in Embraer 170/175 AMM only (September 2018)

1.1.2. Top Level Part Numbers in *italics* in list below will not be listed in Embraer 170/175 AMM.

1.2. Physical Specifications

Part Number	Description	Weight	Length
TB-EMB17X	Towbar (19" x 20.5")	226 lb	17'-8 7/8"
TB-EMB17X-SS	Towbar w/ soft start (19" x 20.5")	241 lb	17'-10 7/8"
<i>TB-EMB17X-HL</i>	<i>Towbar w/ hydraulic lift kit (27"x 20.5")</i>	<i>290 lb</i>	<i>17'-8 7/8"</i>
<i>TB-EMB17X-HL-SS</i>	<i>Towbar w/ lift kit & soft start (27"x20.5")</i>	<i>305 lb</i>	<i>17'-10 7/8"</i>
TB-EMB17X-200	Pushbar complete	136 lb	15'-11 5/8"
TB-EMB17X-20S	Pushbar w/ soft start complete	151 lb	15'-11 5/8"
TB-EMB17X-100	Towbar Head with Adapter	50 lb	21 3/16"

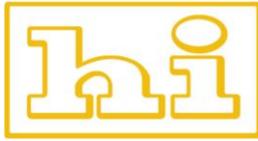
1.3. Shear Pin

Shear Pin	TB-EMB17X-SP	Shear Value: 14,050 lbs
-----------	--------------	-------------------------

NOTE: Shear pins are produced in controlled batches; only use Hall Industries shear pins. Shear pin testing and manufacturing records are permanently stored for reference.

1.4. Warranty:

All parts are guaranteed against defects for one year. If at any time this manual is not followed it will void the warranty (preventive maintenance logs are required for all warranty replacement parts). All replacement parts must be genuine Hall Industries parts.



2. Safety

To ensure safe operation, please read the following statements and understand their meaning. This manual contains safety precautions which are explained below.

WARNING!

Warning is used to indicate the presence of a hazard which will or can cause minor personal injury or property damage if the Warning Notice is ignored.

CAUTION!

Caution is used to indicate the presence of a hazard which will or can cause minor personal injury or property damage if the Caution Notice is ignored.

WARNING!

A damaged or bent towbar should not be used. Towbar should be repaired or replaced.

BENT TOWBARS CAN NOT BE REPAIRED AND MUST BE REPLACED.

WARNING!

Do not drop towbar toweye onto foot. Be careful when removing toweye from tug hitch to not let the towbar drop. Slowly lower towbar onto ground.

3. Operating Procedures

**ALWAYS FOLLOW AIRCRAFT MANUFACTURERS PROCEDURES
FOR PUSHBACK AND TOWING OPERATIONS**

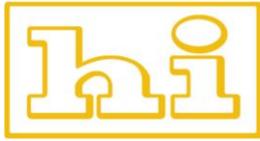
3.1. Responsibility & Training

- 3.1.1. Operator of the tug must understand that it is his/her responsibility to move the aircraft safely in accordance with the aircraft manufacturers operational procedures.
- 3.1.2. Employer of tug operator is responsible for providing sufficient operator training to ensure safe operation of towbar for pushback and towing operations. This training program should cover safety procedures concerning the use of towbars in and around all aircraft types to be serviced at a particular location.

The following are recommendations.

3.2. Inspect the Towbar prior to each use:

- 3.2.1. Visually inspect towbar tube for cracks at welded joints.



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- 3.2.2. Visually inspect lunette eye assembly for damage and loose or missing hardware.
- 3.2.3. Visually inspect wheel carriage for damage and loose or missing components.
- 3.2.4. Visually inspect adapter to tube flange bolts.
- 3.2.5. Check head latch mechanism for proper travel and locking action in both forward and back positions. Inspect for damage and loose or missing components.
- 3.2.6. Visually inspect shear pin for damage and that it is the correct shear pin.
- 3.2.7. Visually inspect that Pivot and Capture bolt nuts are present on underside of adapter.

WARNING: DO NOT attempt to tow an aircraft with a damaged towbar.

3.3. Use the correct size Aircraft Tow Tractor:

An important consideration for safe movement of an aircraft is using the correct category of tug for pushback and towing operations. Incidents are more likely to occur when using a tug that is either too large or too small for a particular aircraft. Consult the Aircraft Manufacturers Ground Towing Requirements chart to obtain tug draw bar pull and total wheel traction requirements based on aircraft and environmental conditions.

Category	Aircraft Maximum Takeoff Weight	Tug Draw Bar Pull
1	Up to 50,000 kg (110,000 lbs.)	14,000 kg (8,800 lbs.)
2	Up to 150,000 kg (330,690 lbs.)	212,000 kg (26,455 lbs.)
3	Up to 260,000 kg (573,196 lbs.)	318,000 kg (39,683 lbs.)
4	More than 260,000 kg (573,196 lbs.)	440,000 kg (88,184 lbs.)

Source: IATA "Airport Handling Ground Support Equipment" Specification AHM 955: "Functional Specification for an Aircraft Tractor"

3.4. Attach towbar to aircraft first, then to tug.

3.5. Towbar should be horizontal to ground or up to 2" (5cm) higher at the aircraft end.

3.6. Do not exceed a 90 degree angle between towbar and pushback tractor. Damage to towbar or aircraft can occur.

3.7. Always start a pushback with the tug in-line with the towbar.

3.8. Attach the Towbar to the Aircraft

- 3.8.1. Pull back latch and lock in open position.
- 3.8.2. Line up towbar to nose pin of aircraft and slide head over the aircraft nose pin.
- 3.8.3. Release the lock pin then push latch forward and over the top of the nose pin until the lock pin locks into the closed position. Make sure that the lock pin is engaged (handle down) and is keeping the latch in the forward position.



3.9. Attach the Towbar to the Tow Tractor

- 3.9.1. Lift to the level of the push backs hitch.
- 3.9.2. Position the push back tractor and install the hitch pin.
- 3.9.3. Tow or push the aircraft only if the tow bars tires are not touching the ground.

3.10. Push the Aircraft

ALWAYS FOLLOW AIRCRAFT MANUFACTURERS PROCEDURES FOR PUSHBACK AND TOWING OPERATIONS

NOTE: If at any time the shear pin yields or breaks, carefully bring the aircraft to a stop. Follow aircraft manufacturers and/or airline nose landing gear inspection procedures prior to installing a new shear pin to continue the operation.

The following information is provided as general guidance only.

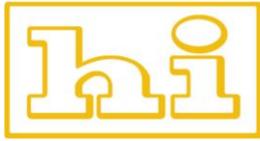
- 3.10.1. Prior to moving, make sure that full swivel release pins are released (if applicable).
- 3.10.2. Double check that all the tie downs and chocks are removed.
- 3.10.3. Double check that aircraft brakes are released.
- 3.10.4. Tow slow, max speed is a brisk walk (Approximately 5 MPH). This will help to minimize the chance of a jack-knife.
- 3.10.5. Do not exceed Aircraft nose wheel angle of towing limits. If not marked or not known, do not exceed 30° from center. Be extra cautious on snow and ice.
- 3.10.6. If you are driving make sure that you have plenty of help; “wing walkers” are helpful and may be required per airline or aircraft manufacturer procedures.
- 3.10.7. Make sure the operator / driver has direct contact with the pilot at all times while moving the aircraft.

NOTE: Thousands of dollars in damage can occur in a few seconds while towing. Most incidents are due to operator negligence / error. Accidents can be fatal.

3.11. Disconnect the Towbar from the Tug

3.12. Disconnect the Towbar from the Aircraft

- 3.12.1. Pull the locking pin upwards and pull back on the towbar latch handle to move the latch into the open position. Carefully lower the tow bar to the ground (use hydraulic lift if installed), and then move push back tractor and towbar clear of the aircraft.



4. Maintenance

Maintenance, service and support should be performed by qualified mechanics only. The towbar cannot be modified in any way without the written approval of Hall Technical Services. Any modifications done without written approval voids all warranties and releases Hall Technical Services, its suppliers, distributors, employees, or financial institutions from any liability from consequences that may occur.

Any questions about operation, maintenance, application and/or functionality of the towbar not answered by this manual should be directed to HALL Technical Services.

NOTE: Hall Industries recommends using this maintenance procedure monthly (or as required by airlines maintenance procedures). Replace worn or damaged parts as needed.

4.1. Replace Shear Pin

4.1.1. Shear pin should spin freely by hand and the nut should not be tight to the head. A very small gap (0.005"-0.010" feeler gage) between the nut and the head is desirable. See *Figure 1* below.

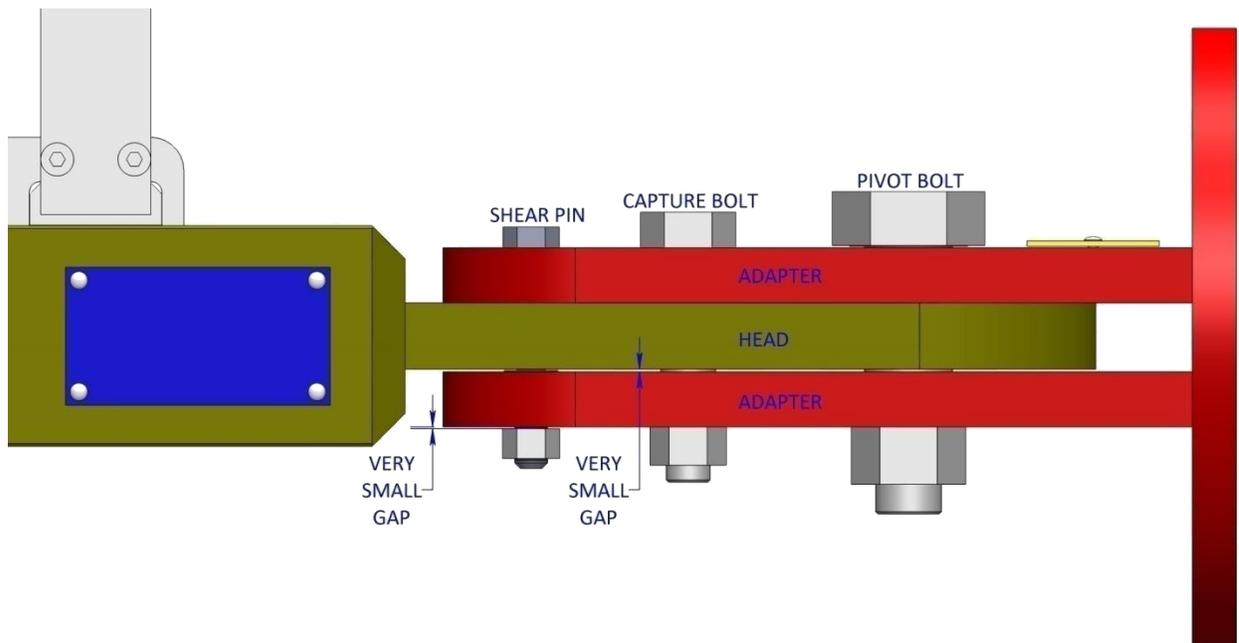


Figure 1. Inspection of shear pin and head/adapter clearance.

4.2. Check Shear Pin Bushings. They should not be worn, cracked, or otherwise damaged.

NOTE: Always replace bushings as a set. Never replace only one bushing.



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- 4.3.** Check clearance between head and adapter. With the shear pin removed, the head must be able to slide and pivot within the adapter plates by hand, but sometimes with some difficulty. A very small gap should exist between the head and the adapter (see Figure 1 above). Both the Capture and Pivot bolts are shoulder bolts and the nuts should be able to be tightened up to the shoulder. However, if the adapter is excessively clamping the head slightly loosen Capture and Pivot bolt nuts by 1/8 of a turn to free up the head.
- 4.4.** Check adapter/tube flange bolts (TB-8898-12) for tightness. Torque to 92 in-lbs.
- 4.5.** Check wheels and wheel carriage for bent, broken, or worn parts and security. Lubricate pivot points using dry spray lubricant (WD-40 Dry Lube or similar).
- 4.6.** Check head assembly for operation of lock mechanism; look for bending, security, etc. Lubricate pivot points and sliding contact areas using dry spray lubricant (WD-40 Dry Lube or similar).
- 4.7.** Inspect jaw assembly for looseness and worn or damaged parts.
- 4.8.** Check latch mechanism to ensure proper travel back and forth, and that the locking pin locks in both the open and closed positions. Lubricate pivot points.
- 4.9.** Check tow eye and hardware (tug attachment) for condition and security.
- 4.10.** Check main body tube for bending or cracking.
- 4.11.** Clean, repaint or touch-up paint as required.
- 4.12.** Inspect tags and labels. If damaged or missing replace (see the drawings in the attachment section for labels and placements).
- 4.13.** If the towbar is equipped with optional hydraulic lift, check the fluid reservoir (in the down / collapsed position). Add hydraulic oil (MIL-PRF-5606H) if necessary.



5. Replacement Parts - Kits & Assemblies

Part Number	QTY in Kit	Description
<hr/>		
TB-EMB17X-SP-KIT		Bushing Kit
TB-8312-B3	2	Shear Pin Bushing
TB-EMB170-101	1	Shear Pin Bushing
TB-EMB17X-SP	1	Shear Pin
<hr/>		
TB-8898-EYE-KIT		4" Tube-Toweye kit
WHO110000SS0000	1	Flat Washer
TB-8898-20	1	Curved Washer
TB-8898-21	1	Shoulder Bolt
CN08C0000SS0000	1	Castle Nut
CP4280048SS0000	1	Cotter Pin
HRJ-145-12-7	1	Eye Bolt
<hr/>		
TB-8898-12-19		Eye Bolt Assembly (Legacy 4 bolt style)
HRJ-145-12-7	1	Eye Bolt
HRJ-145-12-8	1	Tug Eye Retainer Bar
TB-8898-12-9	1	Tug Eye Collar
TB-8898-17-LW	4	Nordlock Washer
TB-8898-17	4	Drilled Head Bolt

6. End of Life Statement

This towbar is designed to provide years of reliable service, but at some point in time it may be necessary to retire the unit from service. To protect our environment specific guidelines and requirements should be followed.

The towbar is primarily constructed of plated or painted carbon steel with a few minor components made of aluminum alloy 6061 and contains no hazardous materials. Please follow country, regional or local requirements for materials recycling.



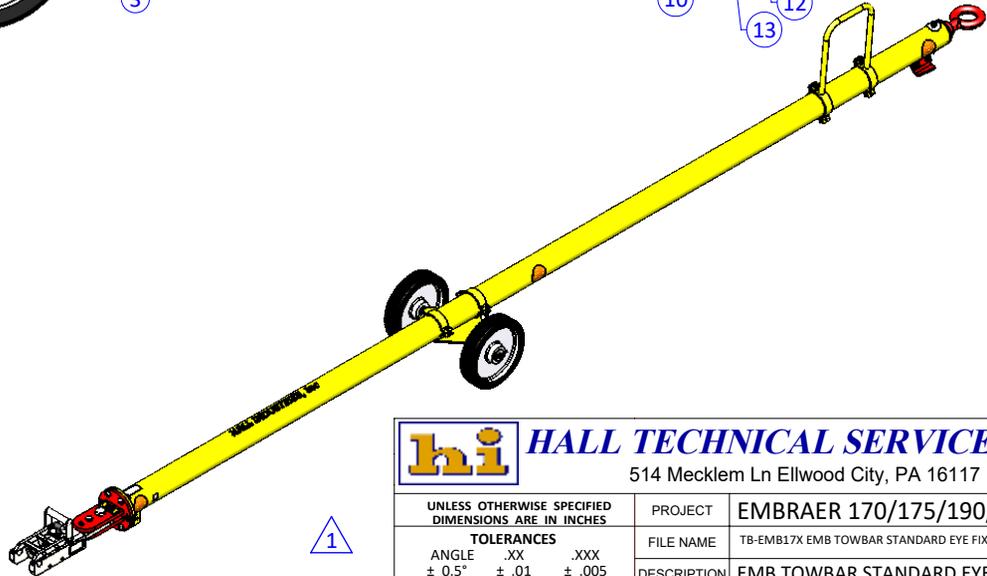
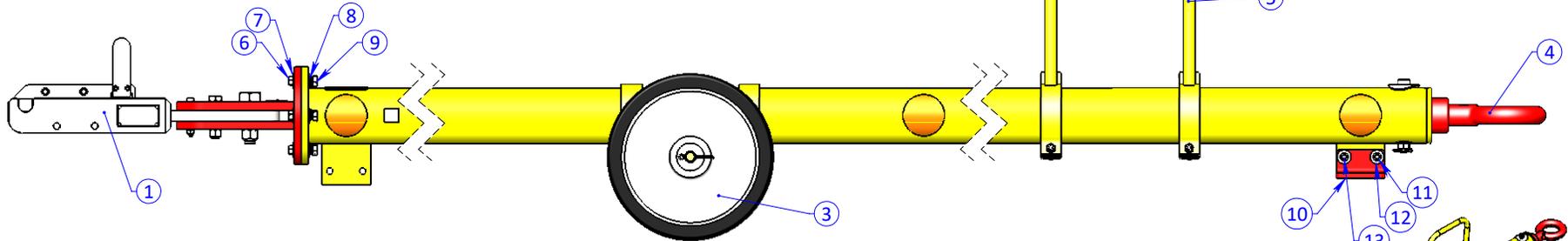
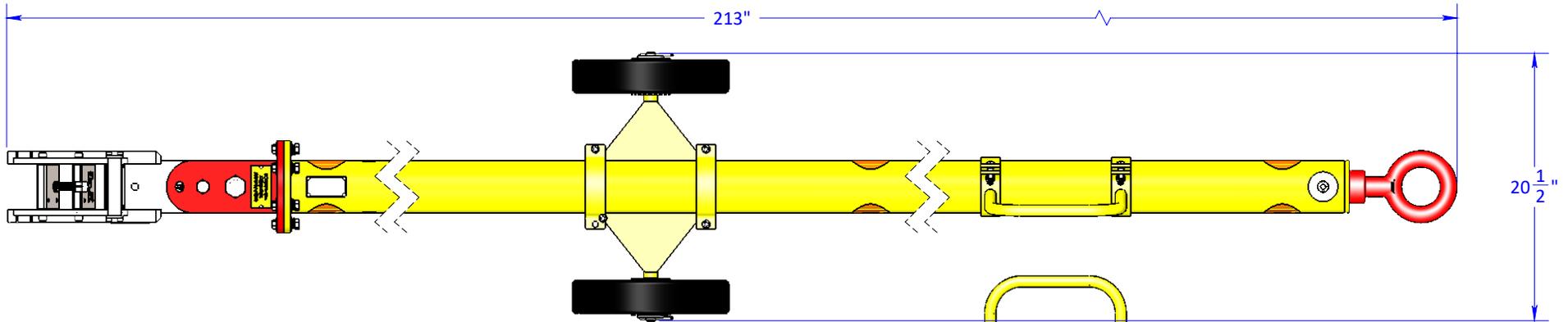
7. Attachment List

7.1.	TB-EMB17X	Towbar Complete Assembly
7.2.	TB-EMB17X-SS	Towbar with Soft Start Complete Assembly
7.3.	TB-EMB17X-HL	Towbar with Hydraulic Lift Complete Assembly
7.4.	TB-EMB17X-HL-SS	Towbar with Hydraulic Lift & Soft Start Assembly
7.5.	TB-EMB17X-200	Pushbar Complete
7.6.	TB-EMB17X-20S	Pushbar Complete, Soft Start
7.7.	TB-EMB17X-20L	Pushbar Complete, Hydraulic Lift
7.8.	TB-EMB17X-2SL	Pushbar Complete, Soft Start & Hydraulic Lift
7.9.	TB-SS4-8898	Soft Start Toweye Assembly
7.10.	TB-EMB17X-100	Head Assembly
7.11.	4"OD-LIFT	4" O.D. Towbar Hydraulic Lift <i>(optional, is not part of listed towbar)</i>
7.12.	TB-EMB170-210	Fixed Wheel Carriage
7.13.	TB-8898-10	Handle Assembly
7.14.	TB-EMB17X-SP-KIT	Shear Pin Kit
7.15.	TB-8898-EYE-KIT	Standard Eye Kit
7.16.	AV1009-0001	4" Bolt On Drag Plate
7.17.	CE Marking	Declaration of conformity

NOTES:

1. LISTED IN EMBRAER 170/175 AMM
2. TOWBAR REFLECTORS P/N STK-AM-R

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	DRAG PLATE, PART LEVELS	11/12/2019	DHW	MRE



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB17X-100	EMB170 HEAD ASSEMBLY	1
2	TB-EMB170-220	STD TUBE COMPLETE, 4" TB	1
3	TB-EMB170-210	FIXED WHEEL CARRIAGE	1
4	TB-8898-EYE-KIT	4" TUBE EYE KIT W/ HARDWARE	1
5	TB-8898-10	HANDLE ASSEMBLY, 4" TB	1
6	TB-8898-12	HHCS 7/16"-14 X 1.75" L	6
7	TB-8898-15	WASHER, USS, 7/16"	12
8	TB-8898-14	7/16" LOCK WASHER	6
9	TB-8898-13	NUT, 7/16"-14	6
10	TB-7378-DP	DRAG PLATE	1
11	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	2
12	90108A417	WASHER, 3/8" USS	4
13	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8	2

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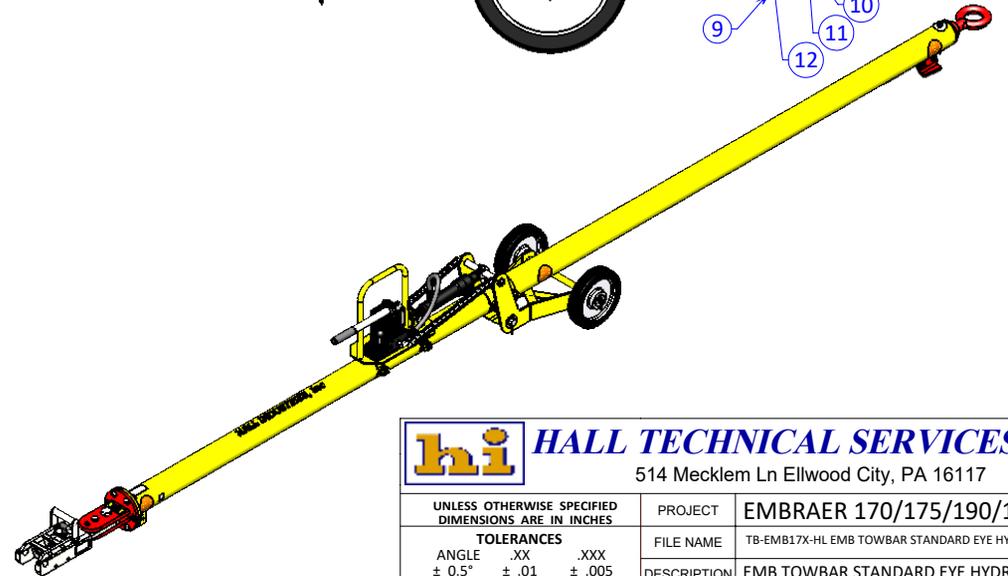
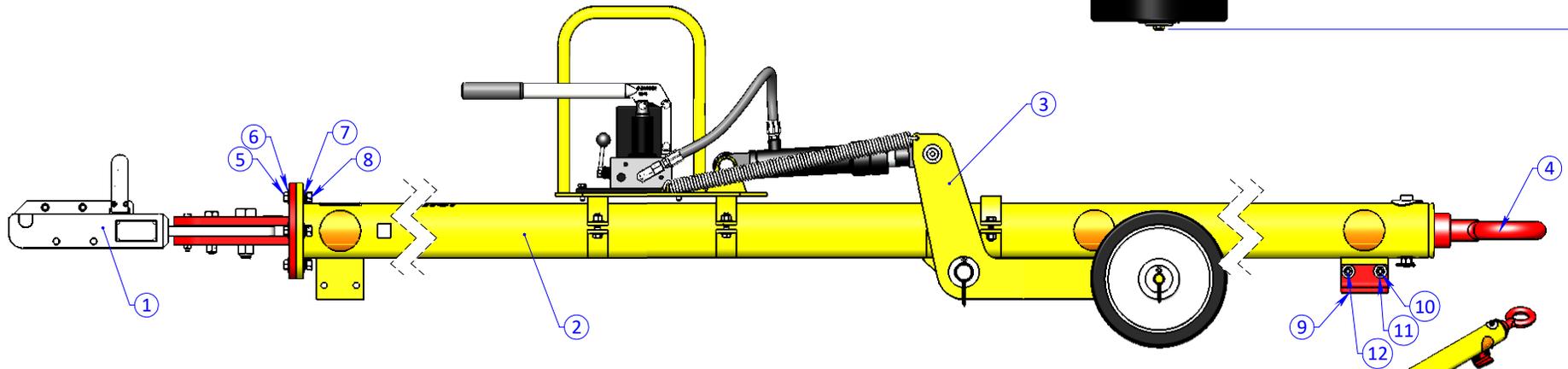
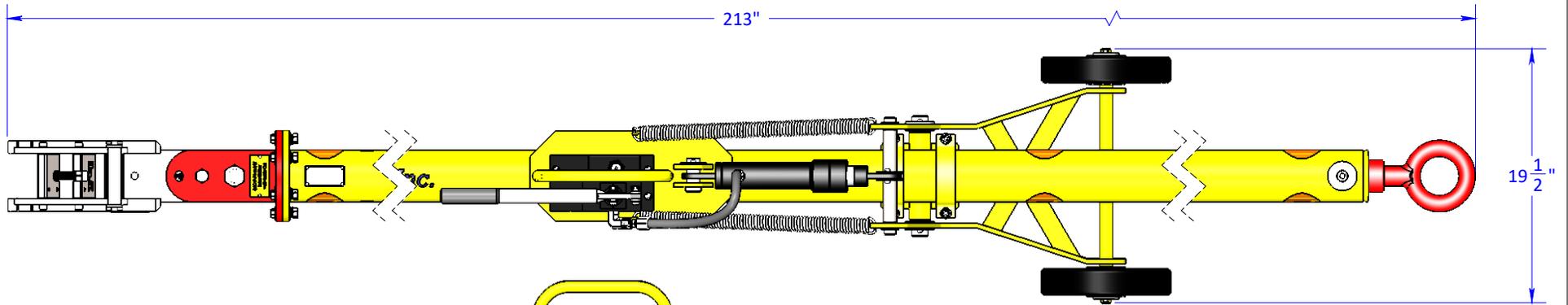
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	EMBRAER 170/175/190/195
TOLERANCES ANGLE .XX .XXX ± 0.5° ± .01 ± .005 X<12"=± 1/32" X>12"=± 1/16"		FILE NAME	TB-EMB17X EMB TOWBAR STANDARD EYE FIXED WHEEL
CHECK DC		DATE	11/17/2010
DRAWN BJE		DATE	11/17/2010
SIZE	DWG/PART NO.	REV	
A	TB-EMB17X	1	
WEIGHT: 170.27 LBS		SHEET 1 OF 1	

NOTES:

1. NOT LISTED IN THE EMBRAER 170/175 AMM
2. TOWBAR REFLECTORS P/N STK-AM-R

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB17X-100	EMB170 HEAD ASSEMBLY	1
2	TB-EMB170-220	STD TUBE COMPLETE, 4" TB	1
3	4"OD-LIFT	LIFT KIT, TOWBAR, 4"	1
4	TB-8898-EYE-KIT	4" TUBE EYE KIT W/ HARDWARE	1
5	TB-8898-12	HHCS 7/16"-14 X 1.75" L	6
6	TB-8898-15	WASHER, USS, 7/16"	12
7	TB-8898-14	7/16" LOCK WASHER	6
8	TB-8898-13	NUT, 7/16"-14	6
9	TB-7378-DP	DRAG PLATE	1
10	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	2
11	90108A417	WASHER, 3/8" USS	4
12	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8	2

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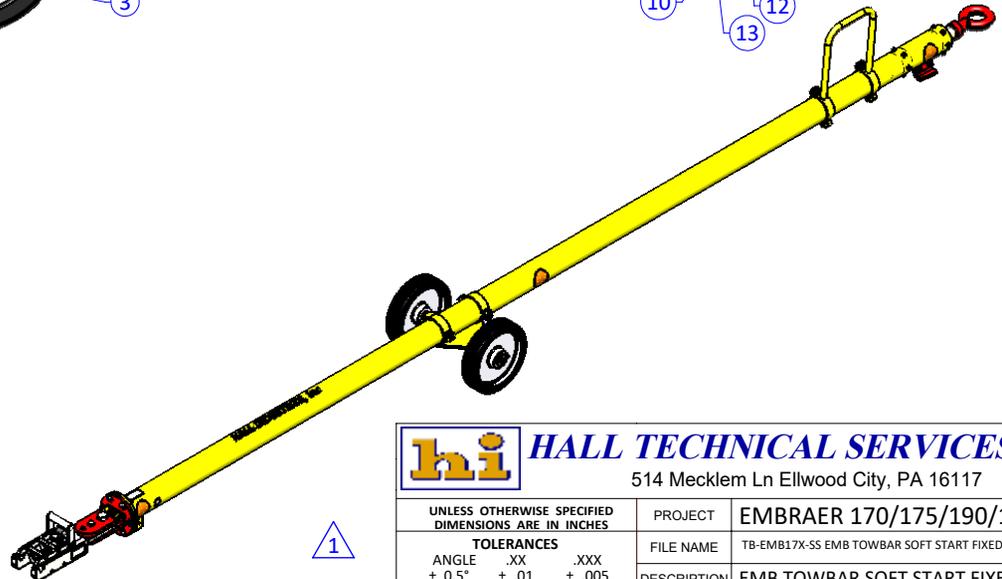
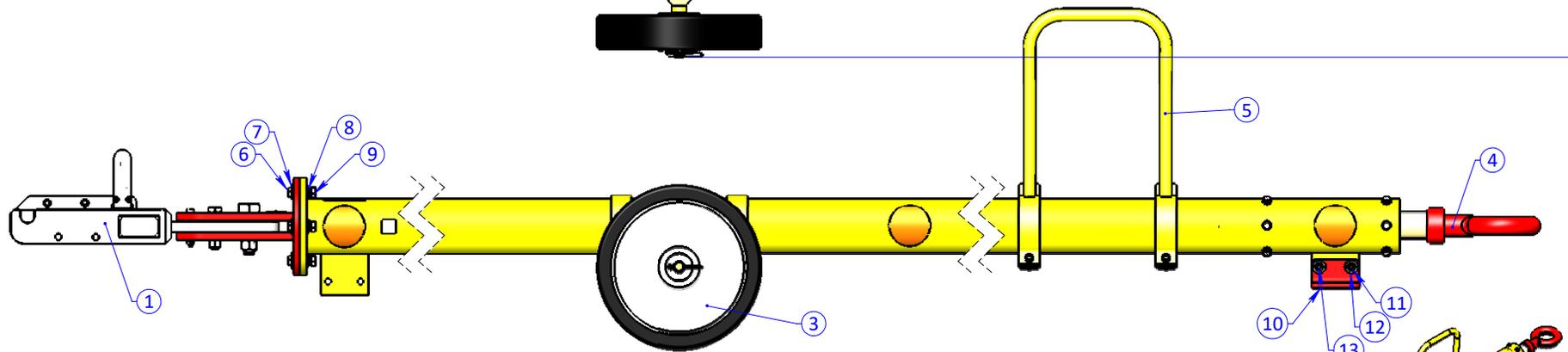
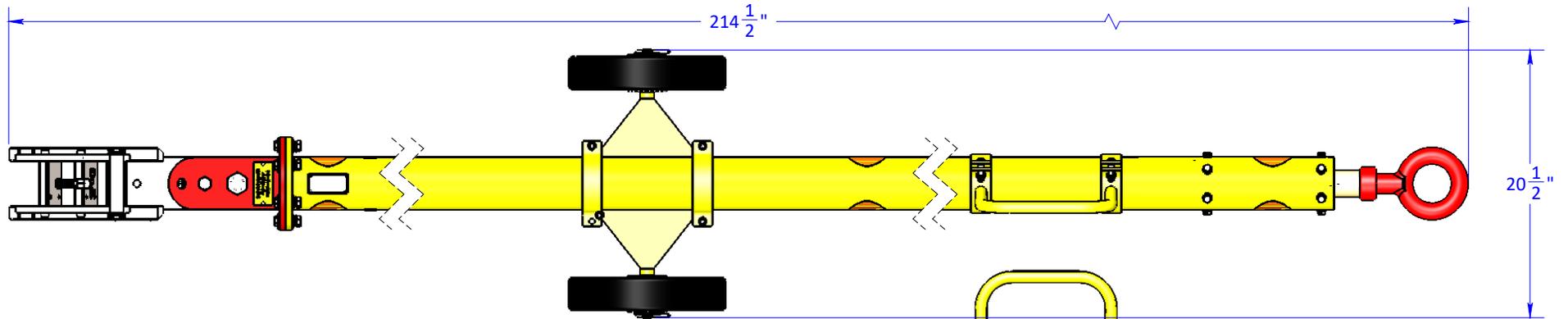
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	EMBRAER 170/175/190/195	
TOLERANCES		FILE NAME	TB-EMB17X-HL EMB TOWBAR STANDARD EYE HYDRAULIC LIFT	
ANGLE	.XX .XXX	DESCRIPTION	EMB TOWBAR STANDARD EYE HYDRAULIC LIFT	
± 0.5"	± .01 ± .005	CHECK	DATE	11/12/2019
X<12"=± 1/32" X>12"=± 1/16"		MRE	DATE	11/12/2019
		DRAWN	DATE	11/12/2019
		DHW	DATE	11/12/2019
SIZE	DWG/PART NO.	REV		
A	TB-EMB17X-HL	0		
WEIGHT: 234.00 LBS		SHEET 1 OF 1		

NOTES:

1. LISTED IN EMBRAER 170/175 AMM
2. TOWBAR REFLECTORS P/N STK-AM-R

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	DRAG PLATE, PART LEVELS	11/12/2019	DHW	MRE



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB17X-100	EMB170 HEAD ASSEMBLY	1
2	TB-EMB170-22S	SS TUBE COMPLETE, 4" TB	1
3	TB-EMB170-210	FIXED WHEEL CARRIAGE	1
4	TB-SS4-8898	SOFT START 4 INCH	1
5	TB-8898-10	HANDLE ASSEMBLY, 4" TB	1
6	TB-8898-12	HHCS 7/16"-14 X 1.75" L	6
7	TB-8898-15	WASHER, USS, 7/16"	12
8	TB-8898-14	7/16" LOCK WASHER	6
9	TB-8898-13	NUT, 7/16"-14	6
10	TB-7378-DP	DRAG PLATE	1
11	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	2
12	90108A417	WASHER, 3/8" USS	4
13	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8	2

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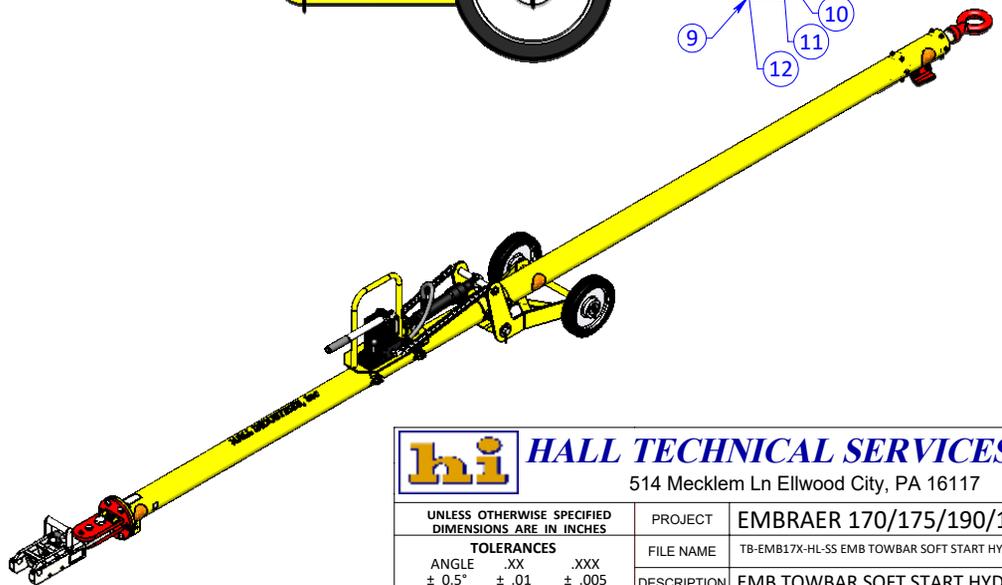
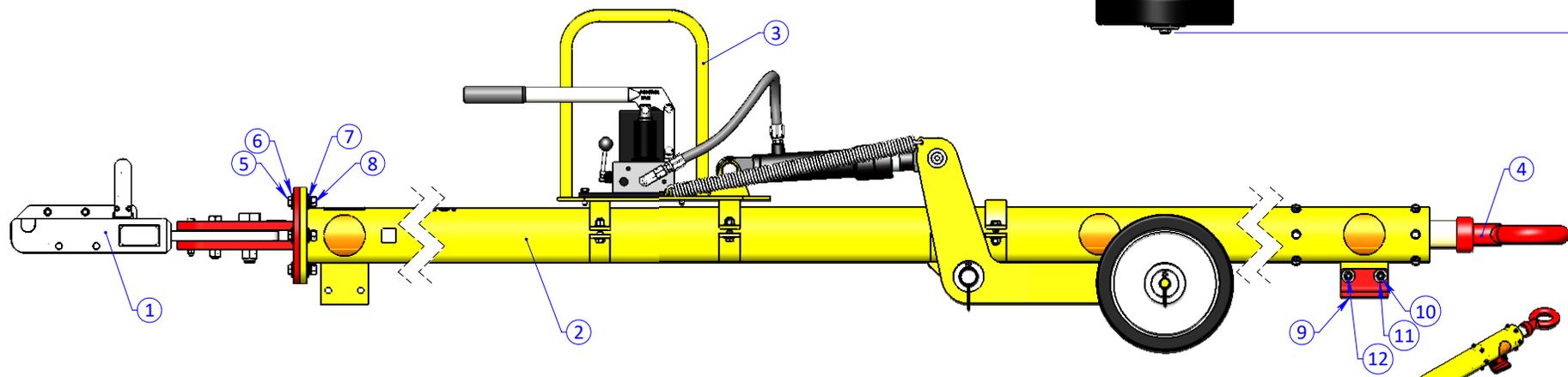
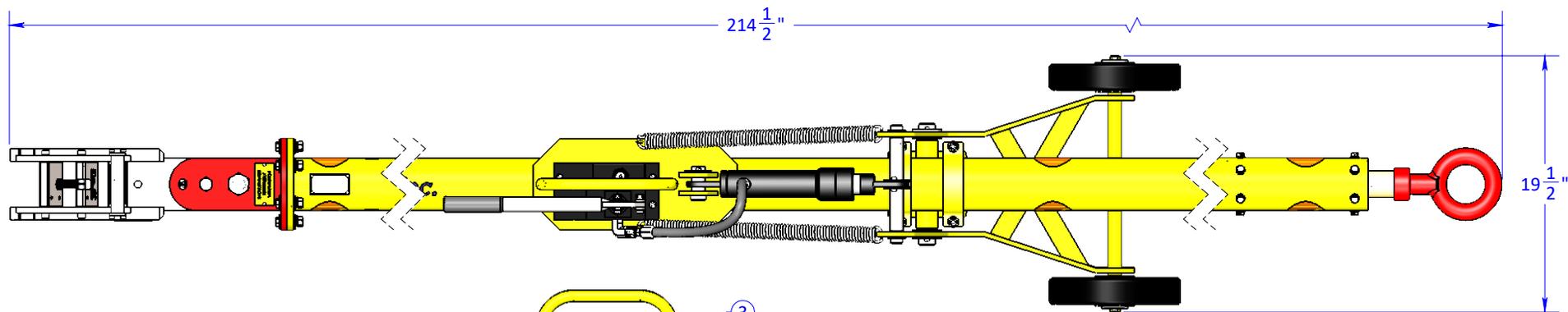
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	EMBRAER 170/175/190/195	
TOLERANCES		FILE NAME	TB-EMB17X-SS EMB TOWBAR SOFT START FIXED WHEEL	
ANGLE .XX .XXX		DESCRIPTION	EMB TOWBAR SOFT START FIXED WHEEL	
± 0.5° ± .01 ± .005		CHECK	DATE	DATE
X<12"=± 1/32" X>12"=± 1/16"		MRE	11/12/2019	11/12/2019
SIZE	DWG/PART NO.	DRAWN	DATE	REV
A	TB-EMB17X-SS	DHW	11/12/2019	1
WEIGHT: 234.00 LBS			SHEET 1 OF 1	

NOTES:

1. NOT LISTED IN THE EMBRAER 170/175 AMM
2. TOWBAR REFLECTORS P/N STK-AM-R

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB17X-100	EMB170 HEAD ASSEMBLY	1
2	TB-EMB170-22S	SS TUBE COMPLETE, 4" TB	1
3	4"OD-LIFT	LIFT KIT, TOWBAR, 4"	1
4	TB-SS4-8898	SOFT START 4 INCH	1
5	TB-8898-12	HHCS 7/16"-14 X 1.75" L	6
6	TB-8898-15	WASHER, USS, 7/16"	12
7	TB-8898-14	7/16" LOCK WASHER	6
8	TB-8898-13	NUT, 7/16"-14	6
9	TB-7378-DP	DRAG PLATE	1
10	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	2
11	90108A417	WASHER, 3/8" USS	4
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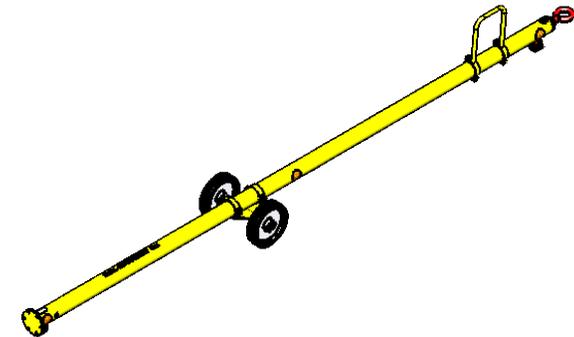
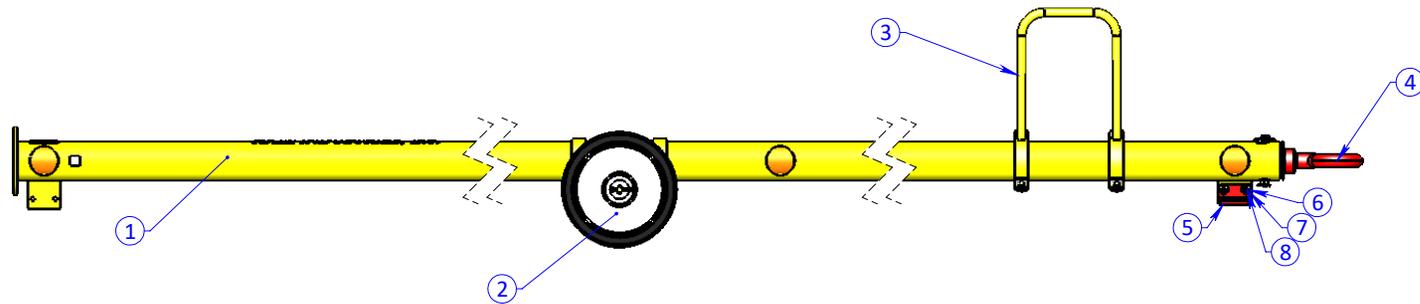
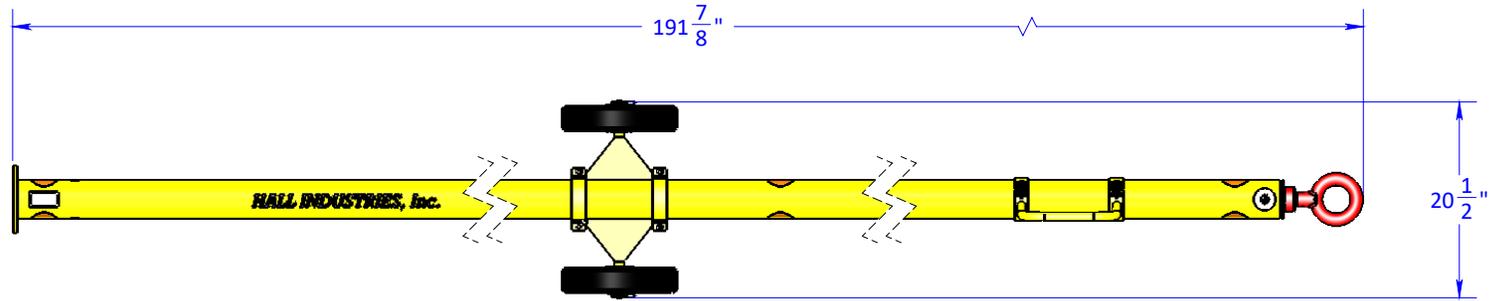
hi HALL TECHNICAL SERVICES LLC
514 Mecklem Ln Ellwood City, PA 16117

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	EMBRAER 170/175/190/195	
TOLERANCES		FILE NAME	TB-EMB17X-HL-SS EMB TOWBAR SOFT START HYDRAULIC LIFT	
ANGLE .XX .XXX		DESCRIPTION	EMB TOWBAR SOFT START HYDRAULIC LIFT	
± 0.5° ± .01 ± .005		CHECK	DATE	SIZE DWG/PART NO.
X<12"=± 1/32" X>12"=± 1/16"		MRE	11/12/2019	A TB-EMB17X-HL-SS
DATE	DATE	DHW	11/12/2019	REV 0
		WEIGHT: 234.00 LBS		SHEET 1 OF 1

NOTES:

1. LISTED IN EMBRAER 170/175 AMM
2. TOWBAR REFLECTORS P/N STK-AM-R

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	DRAG PLATE AND SUB ASSEMBLIES	11/14/2019	DHW	MRE



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB170-220	STD TUBE COMPLETE, 4" TB	1
2	TB-EMB170-210	FIXED WHEEL CARRIAGE	1
3	TB-8898-10	HANDLE ASSEMBLY, 4" TB	1
4	TB-8898-EYE-KIT	4" TUBE EYE KIT W/ HARDWARE	1
5	TB-7378-DP	DRAG PLATE	1
6	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	2
7	90108A417	WASHER, 3/8" USS	4
8	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8	2



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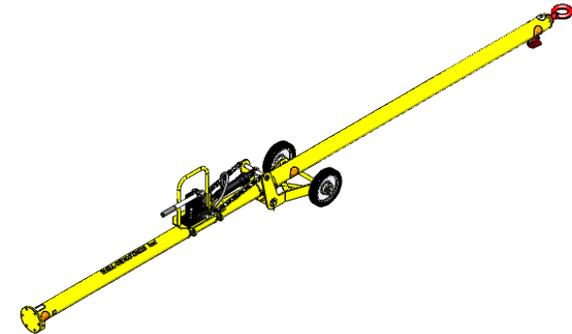
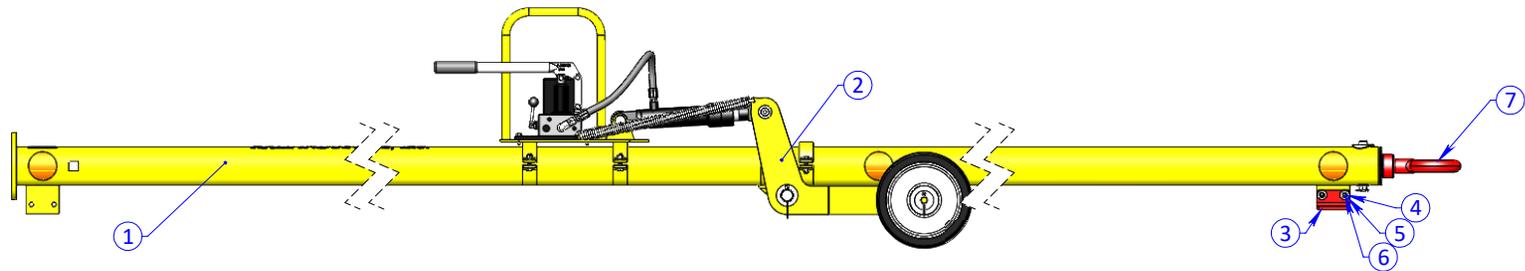
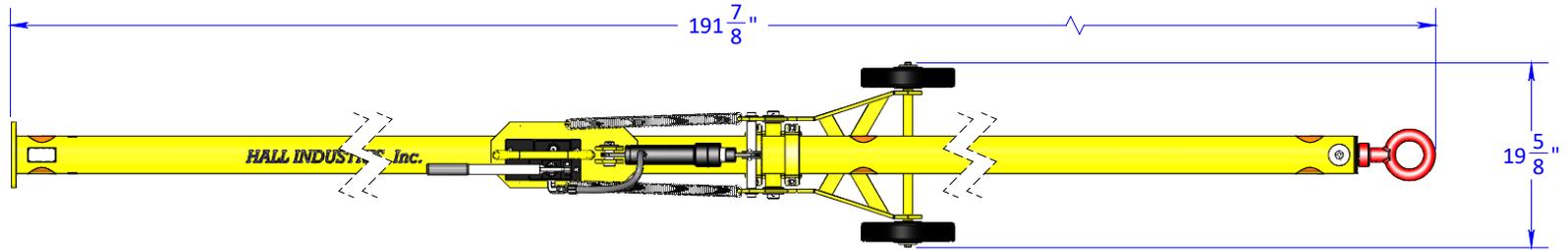
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	EMBRAER 170/175/190/195	
TOLERANCES		FILE NAME	TB-EMB17X-200 PUSHBAR STANDARD EYE FIXED WHEEL	
ANGLE	.XX .XXX	DESCRIPTION	TUBE ASSEMBLY FIXED WHEEL STANDARD EYE	
± 0.5°	± .01 ± .005	CHECK	DATE	SIZE DWG/PART NO.
X<12"=± 1/32" X>12"=± 1/16"		MCKENNA	11/27/2012	A TB-EMB17X-200
		DRAWN	DATE	REV
		BJE	11/27/2012	1
			WEIGHT: 170.27 LBS	SHEET 1 OF 1

NOTES:

1. NOT LISTED IN EMBRAER 170/175 AMM
2. TOWBAR REFLECTORS P/N STK-AM-R

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB170-220	STD TUBE COMPLETE, 4" TB	1
2	4"OD-LIFT	LIFT KIT, TOWBAR, 4"	1
3	TB-7378-DP	DRAG PLATE	1
4	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	2
5	90108A417	WASHER, 3/8" USS	4
6	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8	2
7	TB-8898-EYE-KIT	4" TUBE EYE KIT W/ HARDWARE	1

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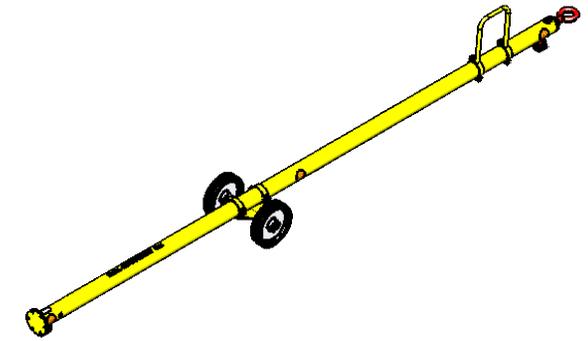
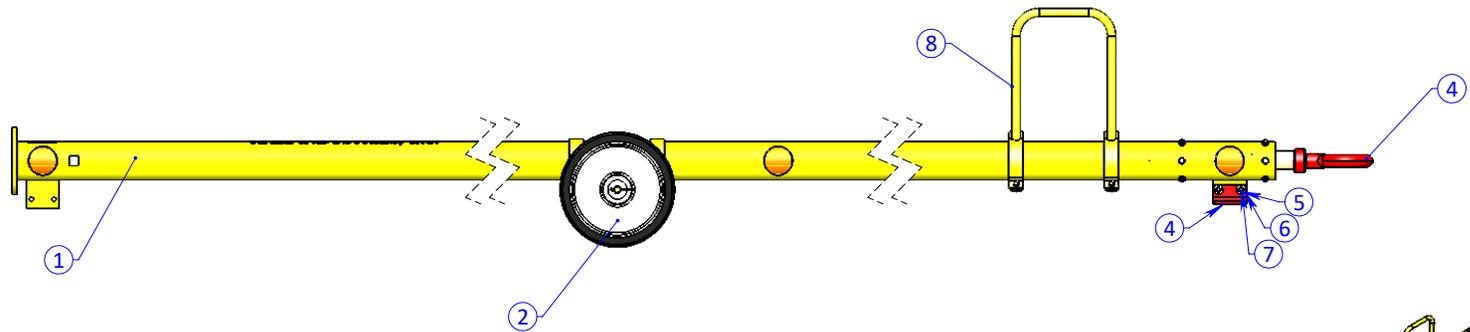
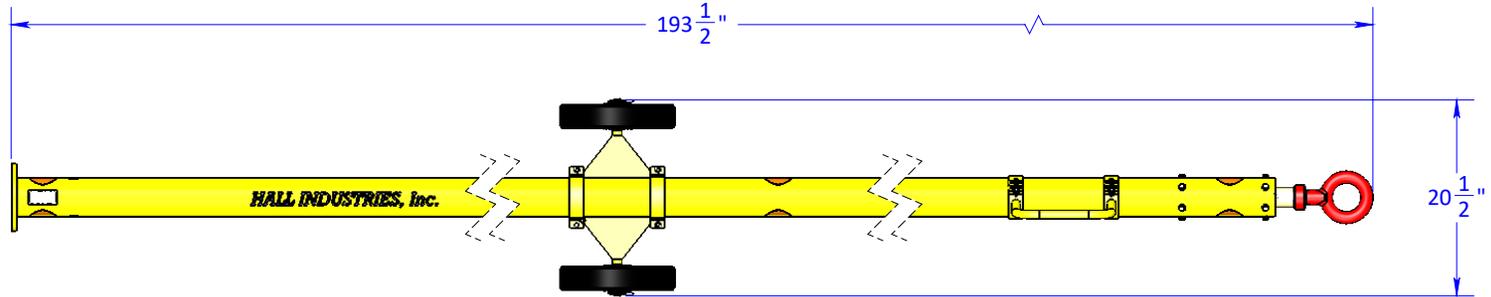
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514 Mecklem Ln Ellwood City, PA 16117

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	EMBRAER 170/175/190/195	
TOLERANCES		FILE NAME	TB-EMB17X-20L PUSHBAR STANDARD EYE HYDRAULIC LIFT	
ANGLE .XX .XXX		DESCRIPTION	TUBE ASSEMBLY STANDARD EYE HYDRAULIC LIFT	
± 0.5° ± .01 ± .005		CHECK MRE	DATE	11/14/2019
X<12"=± 1/32" X>12"=± 1/16"		DRAWN DHW	DATE	11/14/2019
SIZE	DWG/PART NO.	REV		
A	TB-EMB17X-20L	0		
WEIGHT: 212.04 LBS			SHEET 1 OF 1	

NOTES:

1. LISTED IN EMBRAER 170/175 AMM
2. TOWBAR REFLECTORS P/N STK-AM-R

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	DRAG PLATE AND SUB ASSEMBLIES	11/14/2019	DHW	MRE



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB170-22S	SS TUBE COMPLETE, 4" TB	1
2	TB-EMB170-210	FIXED WHEEL CARRIAGE	1
3	TB-SS4-8898	SOFT START 4 INCH	1
4	TB-7378-DP	DRAG PLATE	1
5	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	2
6	90108A417	WASHER, 3/8" USS	4
7	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8	2
8	TB-8898-10	HANDLE ASSEMBLY, 4" TB	1



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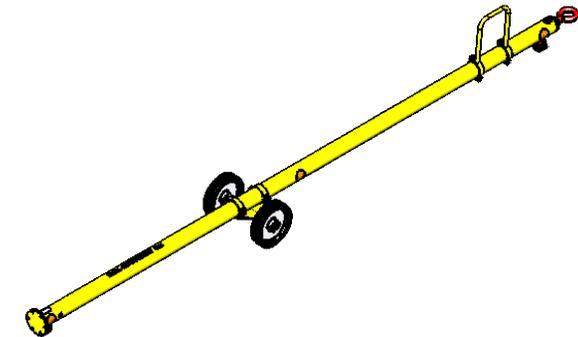
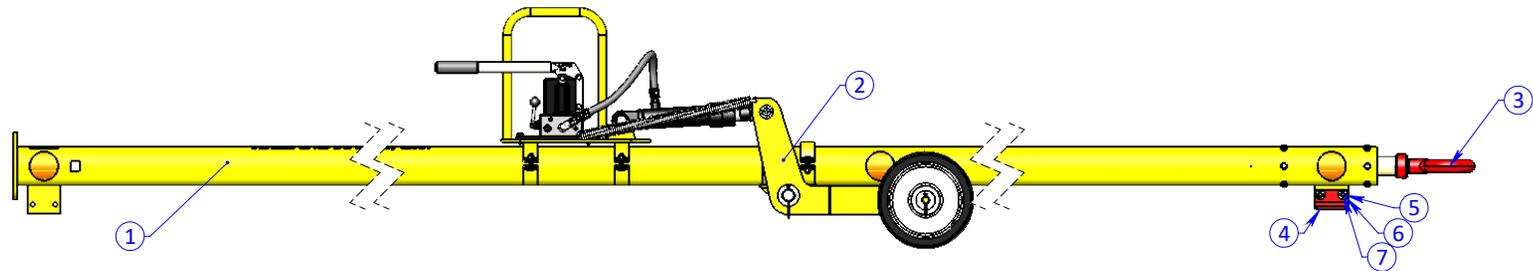
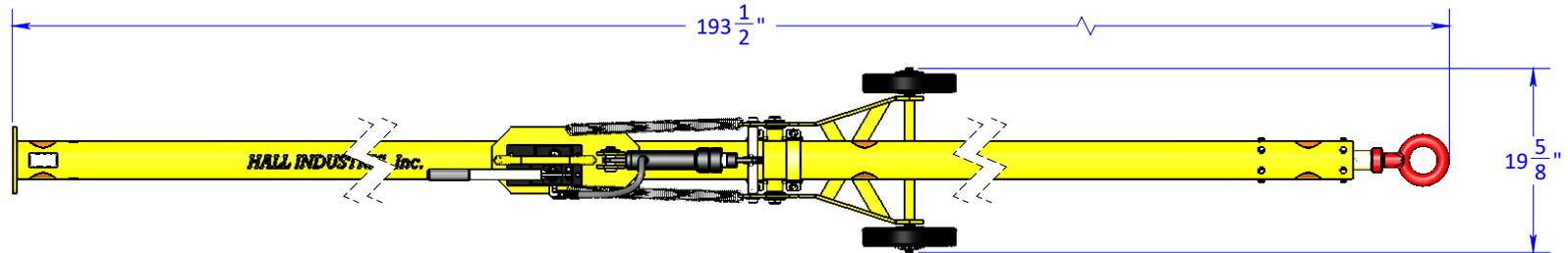
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 HALL TECHNICAL SERVICES LLC 514 Mecklem Ln Ellwood City, PA 16117	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES	PROJECT: EMBRAER 170/175/190/195
TOLERANCES ANGLE .XX .XXX ± 0.5° ± .01 ± .005 X<12"=± 1/32" X>12"=± 1/16"	FILE NAME: TB-EMB17X-20S PUSHBAR SOFT START FIXED WHEEL DESCRIPTION: TUBE ASSEMBLY FIXED WHEEL SOFT START
CHECK DATE MCKENNA 11/27/2012	SIZE DWG/PART NO. A TB-EMB17X-20S
DRAWN DATE BJE 11/27/2012	REV 1
WEIGHT: 170.27 LBS SHEET 1 OF 1	

NOTES:

1. NOT LISTED IN EMBRAER 170/175 AMM
2. TOWBAR REFLECTORS P/N STK-AM-R

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB170-22S	SS TUBE COMPLETE, 4" TB	1
2	4"OD-LIFT	LIFT KIT, TOWBAR, 4"	1
3	TB-SS4-8898	SOFT START 4 INCH	1
4	TB-7378-DP	DRAG PLATE	1
5	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	2
6	90108A417	WASHER, 3/8" USS	4
7	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8	2

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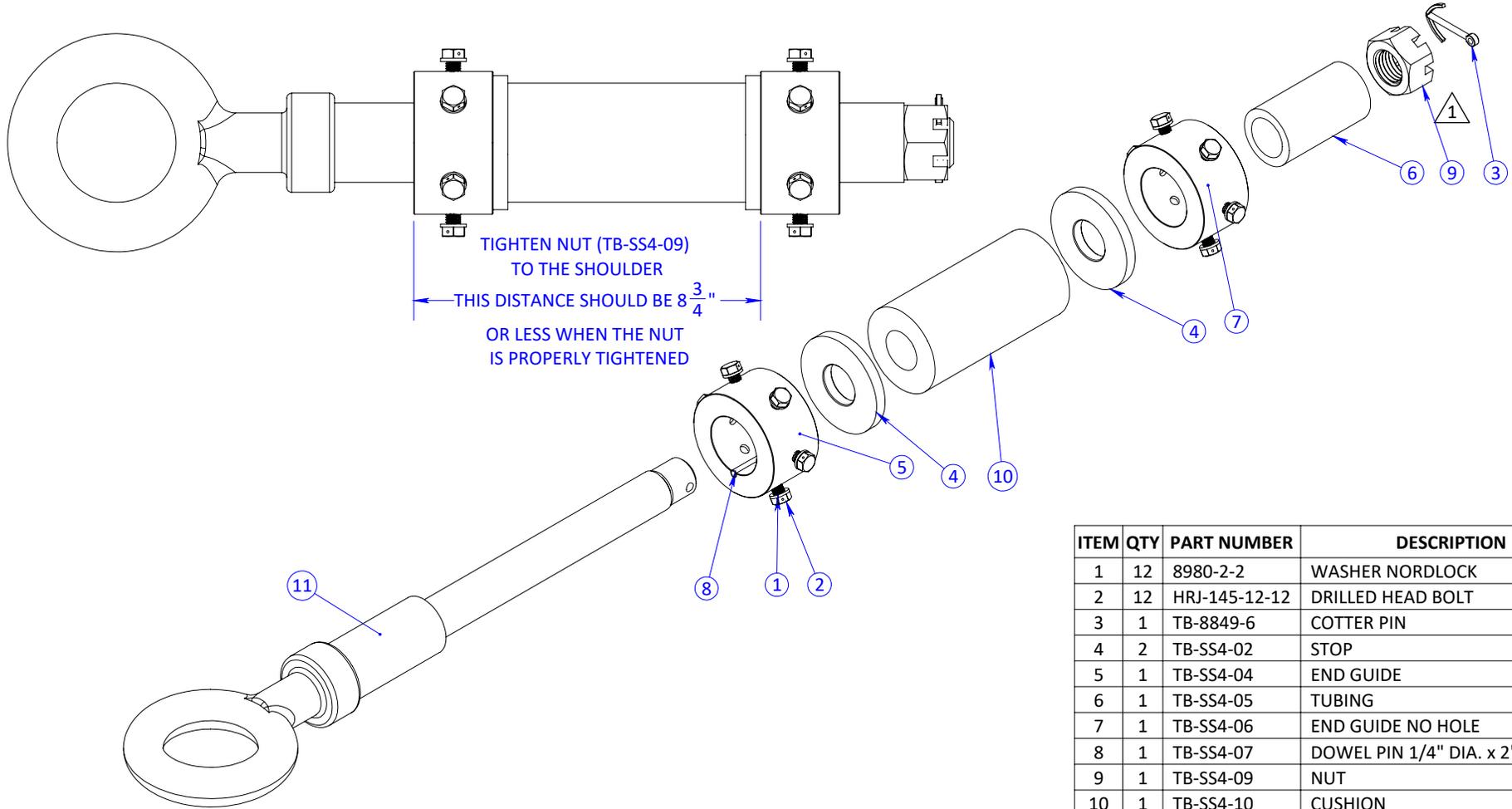
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 HALL TECHNICAL SERVICES LLC 514 Mecklem Ln Ellwood City, PA 16117		PROJECT: EMBRAER 170/175/190/195	
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		FILE NAME: TB-EMB17X-2SL PUSHBAR SOFT START HYDRAULIC LIFT	DESCRIPTION: TUBE ASSEMBLY SOFT START HYDRAULIC LIFT
TOLERANCES ANGLE .XX .XXX ± 0.5° ± .01 ± .005 X<12"=± 1/32" X>12"=± 1/16"		SIZE: A DWG/PART NO.: TB-EMB17X-2SL	REV: 0
CHECK MRE DATE 11/14/2019 DRAWN DHW DATE 11/14/2019	WEIGHT: 170.27 LBS	SHEET 1 OF 1	

NOTES:

1. USE ANTI-SEIZE ON ALL THREADED HARDWARE.

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	CHANGE PART NUMBER	3/25/2013	VTM	SAK
2	ADD CASTLE NUT AND COTTER PIN	9/4/2013	BJE	SAK
3	ADD SAFETY CABLE, UNIVERSAL FOR EMB AND 8898	11/14/2019	DHW	MRE



ITEM	QTY	PART NUMBER	DESCRIPTION
1	12	8980-2-2	WASHER NORDLOCK
2	12	HRJ-145-12-12	DRILLED HEAD BOLT
3	1	TB-8849-6	COTTER PIN
4	2	TB-SS4-02	STOP
5	1	TB-SS4-04	END GUIDE
6	1	TB-SS4-05	TUBING
7	1	TB-SS4-06	END GUIDE NO HOLE
8	1	TB-SS4-07	DOWEL PIN 1/4" DIA. x 2" LONG SS
9	1	TB-SS4-09	NUT
10	1	TB-SS4-10	CUSHION
11	1	TB-SS4-11	EYE & SHAFT
12	4	TB-8898-18-A	SAFETY CABLE (NOT SHOWN)
13	4	TB-8898-18-W	CABLE WASHER (NOT SHOWN)



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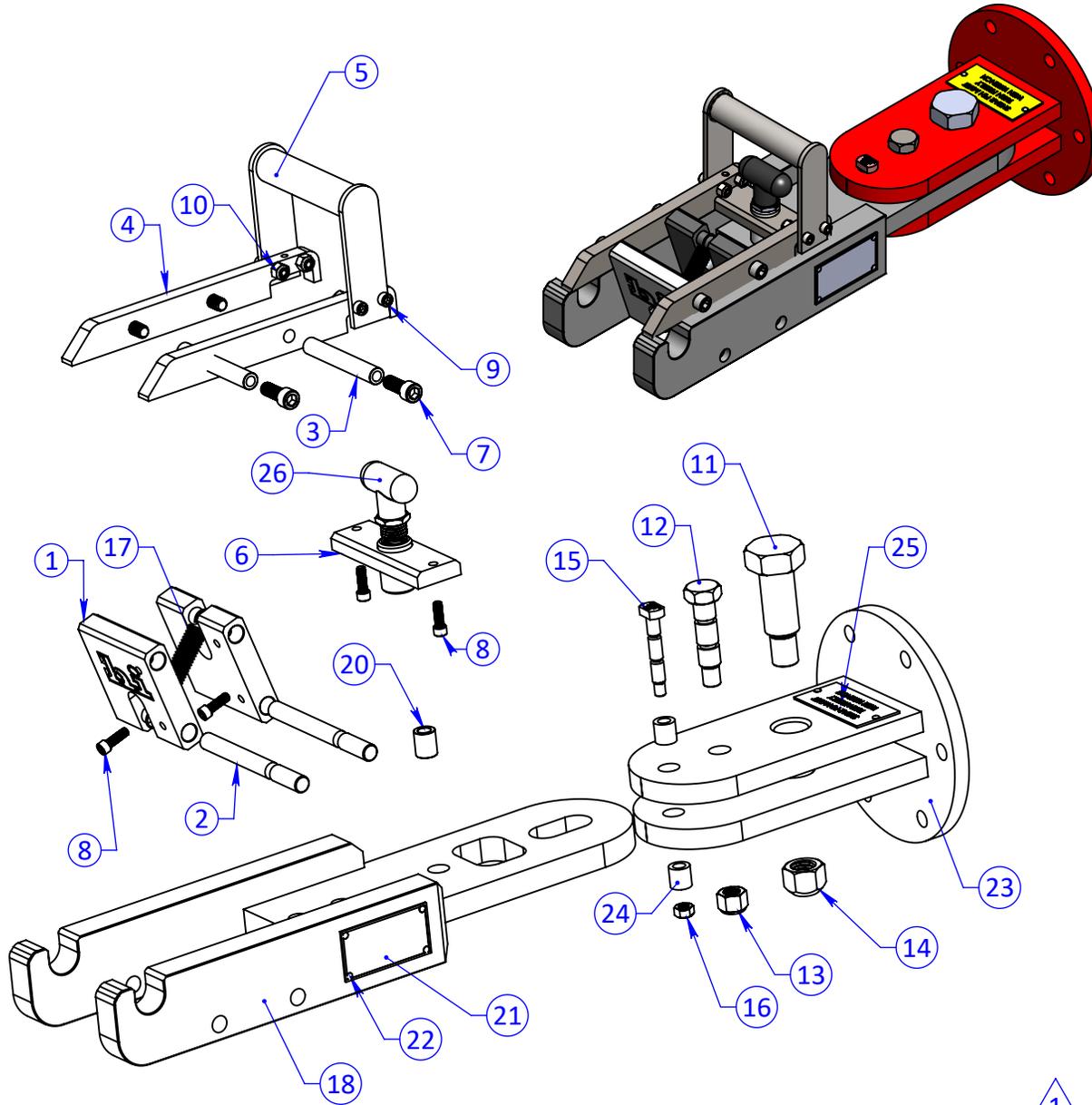
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	AV ~ SS EYE	
TOLERANCES		FILE NAME	TB-SS4-8898 SOFT START ~ FOR MANUAL	
ANGLE .XX .XXX		DESCRIPTION	SOFT START 4 INCH	
± 0.5° ± .01 ± .005		CHECK	DATE	SIZE DWG/PART NO.
X<12"=± 1/32" X>12"=± 1/16"		SAK & VTM	4/25/2013	A TB-SS4-8898
DRAWN	DATE	BJE	4/25/2013	SCALE 1:5 WEIGHT: 28.17 LBS SHEET 1 OF 1

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NOTES:

- ITEM 15 TB-EMB17X-SP COMES WITH ITEM 16 HRJ-145-11-2A WHEN PURCHASED INDIVIDUALLY



REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	TAG / CE CHANGES	11/12/2019	DHW	MRE

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB170-141	GRAB LINK	2
2	TB-EMB170-170W	LOWER SPACER	2
3	TB-EMB170-170	SPACER	2
4	TB-EMB170-151	LATCH ARM	2
5	TB-EMB170-153	HANDLE	1
6	TB-EMB170-155	LATCH ARM CROSS PIECE ASSY	1
7	SH06C0040AY	3/8"-16 X 1" L SOCKET HEAD CAP SCREW	4
8	TB-EMB170-153-A	SHCS, 1/4"-20 X 3/4" L, SS	4
9	TB-EMB170-153-B	1/4"-20 X 1" L SOCKET HEAD CAP SCREW	4
10	TB-EMB170-153-C	NYLOCK HEX NUT, 1/4"-20, SS	4
11	TB-EMB170-103	PIVOT BOLT	1
12	TB-EMB17X-104	CAPTURE BOLT	1
13	TB-8312-B8	1/2"-13 STOVER LOCKNUT, GRADE C, ZP	1
14	TB-8312-B5	.75-10 STOVER LOCK NUT	1
15	TB-EMB17X-SP	SHEAR PIN	1
16	HRJ-145-11-2A	5/16"-24 TOP LOCK NUT	1
17	TB-EMB170-102	SPRING	1
18	TB-EMB170-110	HEAD WELDMENT COMPLETE	1
19	TB-EMB170-110	HEAD WELDMENT	1
20	TB-EMB170-101	BUSHING, SHEAR PIN	1
21	TB-TAG-METAL-CE	TAG METAL CE	1
22	TB-8849-14	DRIVE RIVET	4
23	TB-EMB170-190	ADAPTER COMPLETE	1
24	TB-8312-B3	BUSHING	2
25	TB-8312-BA-TAG	YELLOW TORQUE TAG	1
26	TB-EMB170-154	HANDLE ASSEMBLY	1

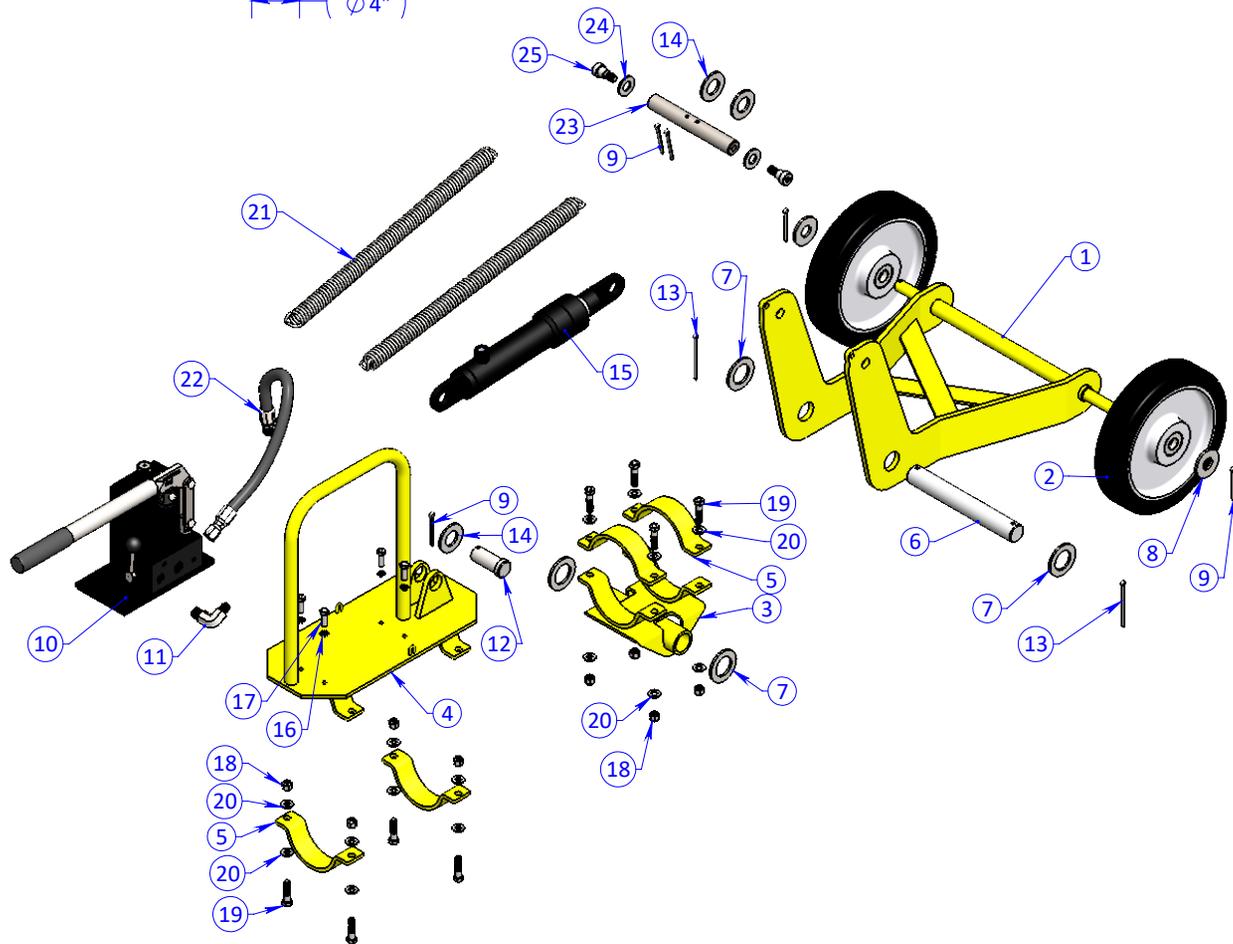
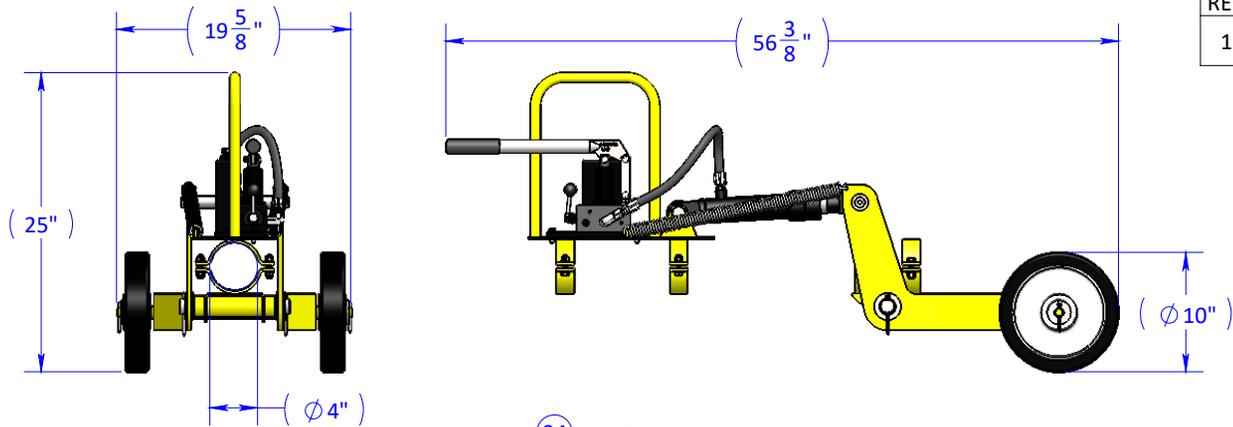
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 514 Mecklem Ln Ellwood City, PA 16117

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	EMB170/190 TOWBAR	
TOLERANCES		FILE NAME	EMB170 TB-EMB17X-100 HEAD ASSY EXP	
ANGLE	.XX .XXX	DESCRIPTION	EMB170 HEAD ASSEMBLY	
± 0.5"	± .01 ± .005	CHECK	DATE	SIZE DWG/PART NO.
X<12"=± 1/32" X>12"=± 1/16"		SHUMAKER	3/5/2004	A TB-EMB17X-100
		DRAWN	DATE	REV
		MCKENNA	3/1/2014	1
		SCALE 1:5	WEIGHT: 49.04 LBS	SHEET 1 OF 1

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REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	PIVOT PARTS, PAINT COLORS, REMOVED SUBASSEMBLIES	10/18/2019	DHW	BJL

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	LIFT-3	WHEEL ARM WELDMENT	1
2	TB-8898-7	WHEEL, 10"	2
3	LIFT-5	PIVOT ARM WELDMENT, 4"	1
4	LIFT-15	PUMP MOUNTING BRACKET, 4"	1
5	TB-8898-4	CLAMP, 4"	4
6	LIFT-4	LOWER PIVOT SHAFT	1
7	LIFT-11	FLAT WASHER, 1-1/4" SAE	4
8	TB-8898-8	FLAT WASHER, 3/4" USS	2
9	TB-8898-9	COTTER PIN, 3/16"DIA X 2"L	5
10	TB-8714-24	HYDRAULIC HAND PUMP	1
11	TB-8714-43	90 DEG. ELBOW, HYD. FITTING	1
12	LIFT-14	CYLINDER BASE PIVOT PIN	1
13	TB-8714-28	COTTER PIN, 3/16"DIA X 3"L	2
14	TB-8986-9	FLAT WASHER, 1" SAE	3
15	TB-8714-20	HYDRAULIC CYLINDER	1
16	TB-8714-2	NORD-LOCK WASHER, 5/16" / M8	4
17	TB-8714-1	HHCS, 5/16"-18 X 1" GR.5	4
18	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8	8
19	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8	8
20	TB-8312-B10	FLAT WASHER, 3/8" SAE	16
21	TB-8714-10	RETURN SPRING	2
22	TB-8714-23	HYDRAULIC HOSE, LIFT KIT	1
23	LIFT-2R1	PIVOT PIN	1
24	HRJ-145-11-5	FLAT WASHER, 5/8" SAE	2
25	LIFT-8	SS SHOULDER BOLT, 1/2"-13	2



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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	AV1009
TOLERANCES		FILE NAME	4in OD-LIFT 4 IN HYDRAULIC LIFT KIT
ANGLE .XX .XXX		DESCRIPTION	LIFT KIT, TOWBAR, 4"
± 0.5° ± .01 ± .005		CHECK	DATE
X<12"=±1/32" X>12"=±1/16"		BJL	10/18/2019
DRAWN	DATE	SIZE	DWG/PART NO.
DHW	10/18/2019	A	4"OD-LIFT
SCALE 1:32		WEIGHT: 79.00 LBS	SHEET 1 OF 1

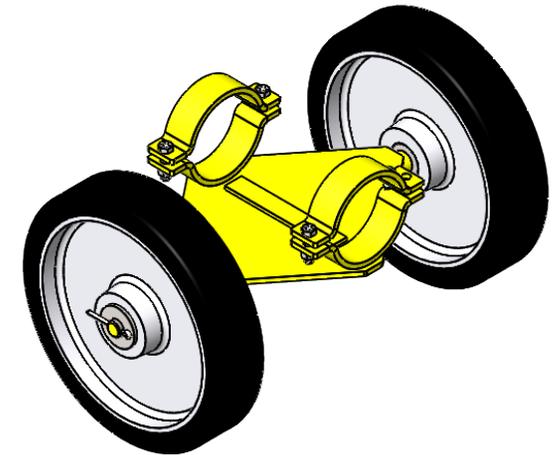
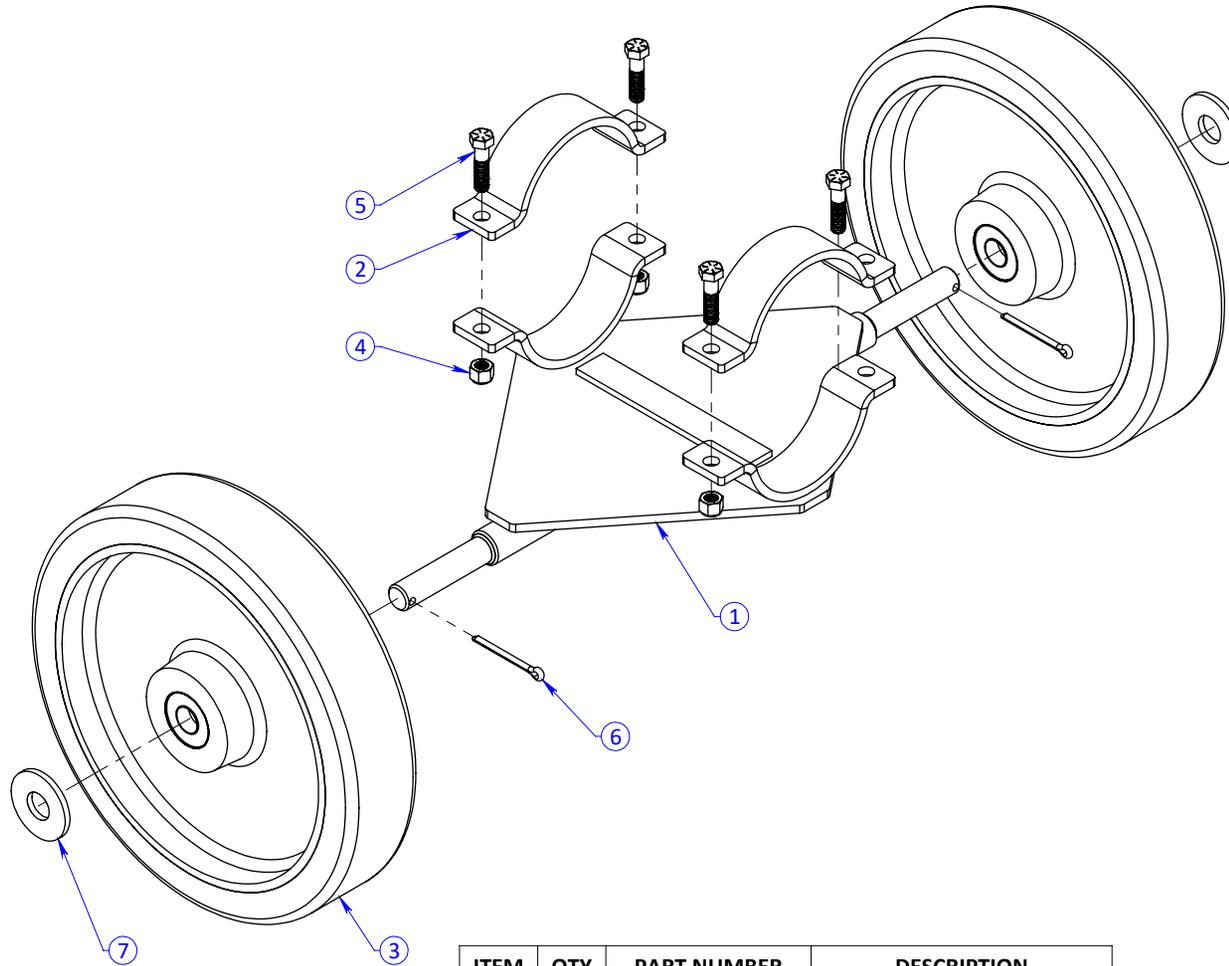
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NOTES:

1. PRINT FOR ASSEMBLY PURPOSES ONLY.

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	REMOVE TAG FROM WHEEL CARRIAGE	12/17/2018	BJL	BMS



ISO VIEW
COLLAPSED STATE
SCALE 1 : 8

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TB-EMB170-210-W	WHEEL CARRIAGE WELDMENT, LOW PROFILE
2	2	TB-8898-4	CLAMP, 4"
3	2	CRJ-WHEEL	WHEEL, 12"
4	4	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8
5	4	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8
6	2	TB-8898-9	COTTER PIN, 3/16"DIA X 2"L
7	2	TB-8898-8	FLAT WASHER, 3/4" USS



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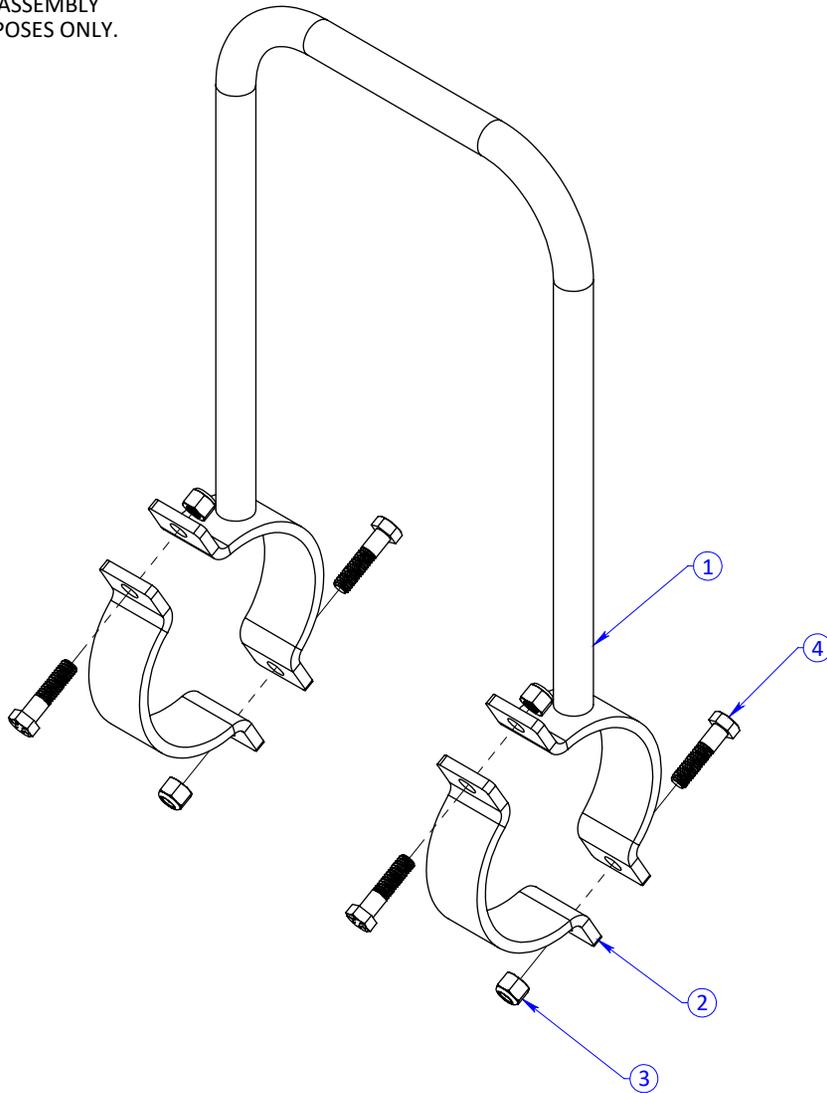
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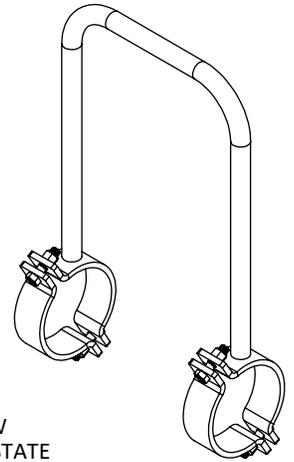
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	AV1009
TOLERANCES		FILE NAME	TB-EMB170-210 FIXED WHEEL CARRIAGE
ANGLE	.XX .XXX	DESCRIPTION	FIXED WHEEL CARRIAGE
± 0.5°	± .01 ± .005	CHECK	DATE
X<12"=± 1/32" X>12"=± 1/16"		DC	11/18/2010
		DRAWN	DATE
		BJE	12/17/2018
SIZE	DWG/PART NO.	SCALE 1:12	WEIGHT: 33.47 LBS
A	TB-EMB170-210	SHEET 1 OF 1	REV 1

NOTES:

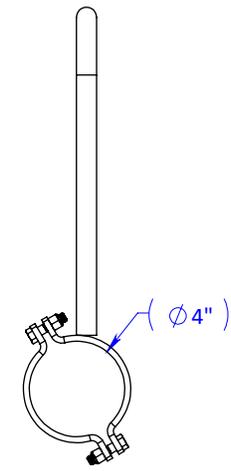
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REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	DWG TO REFLECT CLAMP ANGLE	5/24/2012	BJE	CS
2	FASTENER ORIENTATION; REF DIM.	12/18/2018	BJL	DHW



ISO VIEW
COLLAPSED STATE
SCALE 1 : 8



ORTHO VIEWS
COLLAPSED STATE
SCALE 1 : 8

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TB-8898-11	HANDLE, 4" TB
2	2	TB-8898-4	CLAMP, 4"
3	4	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8
4	4	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8

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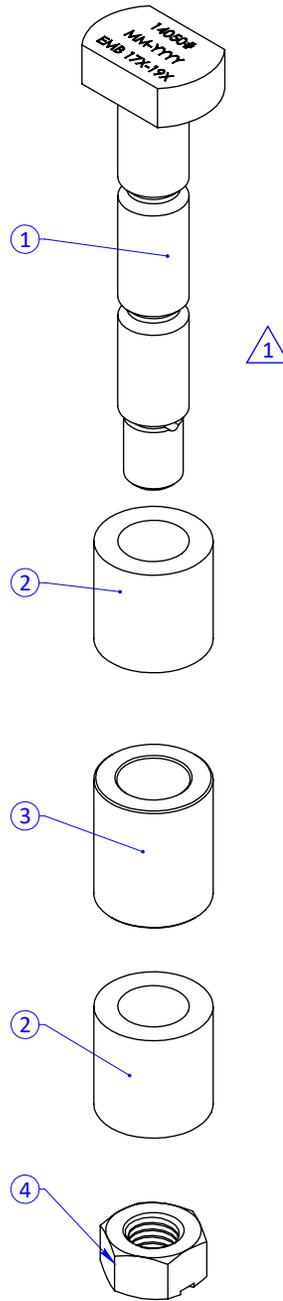
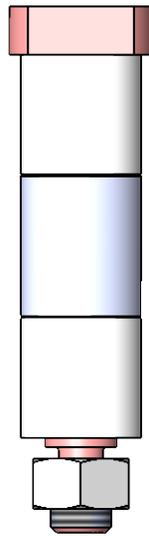
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514 Mecklem Ln Ellwood City, PA 16117

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	AV1009	
TOLERANCES		FILE NAME	TB-8898-10 HANDLE ASSEMBLY, 4in TB	
ANGLE	.XX .XXX	DESCRIPTION	HANDLE ASSEMBLY, 4" TB	
± 0.5°	± .01 ± .005	CHECK	DATE	11/20/2010
X<12"=± 1/32" X>12"=± 1/16"		DC	DATE	12/18/2018
		DRAWN	DATE	12/18/2018
		BJE	DATE	12/18/2018
SIZE	DWG/PART NO.	SCALE	WEIGHT	SHEET
A	TB-8898-10	1:8	3.76 LBS	1 OF 1
REV	2			

NOTES:

1. IT IS RECOMMENDED TO REPLACE ALL BUSHINGS TOGETHER, WHEN ONE REQUIRES REPLACEMENT

14050#
MM-YYYY
EMB 17X-19X



REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	REDUCED SHEAR PIN QTY TO 1	11/13/2019	DHW	MRE

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TB-EMB17X-SP	SHEAR PIN	1
2	TB-8312-B3	BUSHING	2
3	TB-EMB170-101	BUSHING, SHEAR PIN	1
4	HRJ-145-11-2A	5/16"-24 TOP LOCK NUT	1

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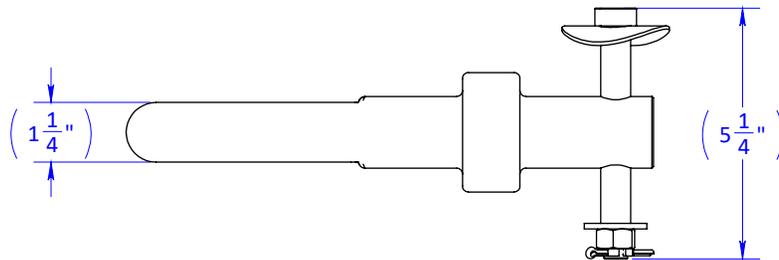
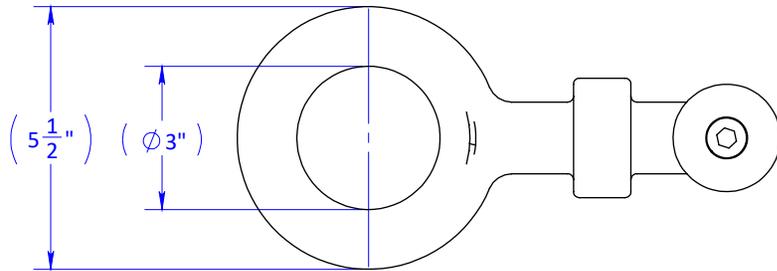
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	EMB TOWBAR	
TOLERANCES		FILE NAME	TB-EMB17X-SP-KIT SHEAR PIN KIT	
ANGLE	.XX .XXX	DESCRIPTION	SHEAR PIN KIT	
± 0.5°	± .01 ± .005	CHECK	DATE	SIZE DWG/PART NO.
X<12"=± 1/32" X>12"=± 1/16"		MRE	11/13/2019	A TB-EMB17X-SP-KIT
		DHW	11/13/2019	SCALE 1:1 WEIGHT: 0.21 LBS SHEET 1 OF 1

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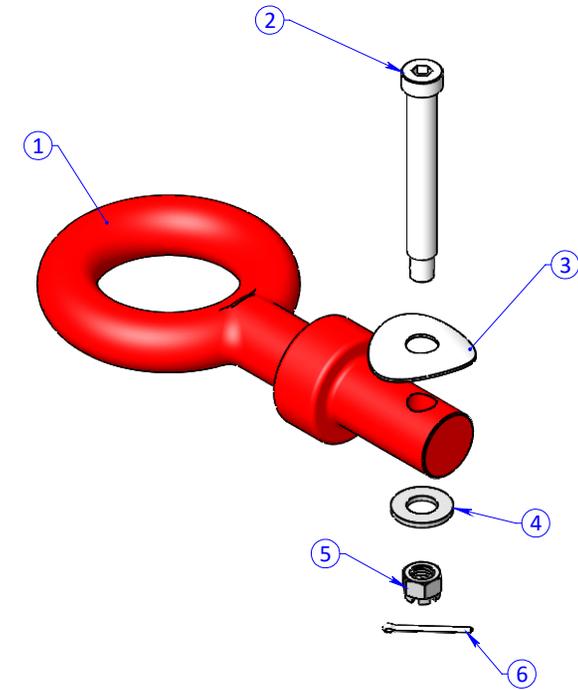
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NOTES:

1. PACKAGE TOGETHER IN BOX / BAG



REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	HRJ-145-12-7	EYEBOLT	1
2	TB-8898-21	SHOULDER BOLT	1
3	TB-8898-20	CURVED WASHER	1
4	WH0110000SS0000	WASHER, SS	1
5	CN08C0000SS0000	CASTLE NUT, SS	1
6	CP4280048SS0000	PIN, COTTER	1

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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	4" TOWBAR	
TOLERANCES		FILE NAME	TB-8898-EYE-KIT 4 IN TOWEYE KIT WITH HARDWARE	
ANGLE .XX .XXX		DESCRIPTION	4" TUBE EYE KIT W/ HARDWARE	
± 0.5° ± .01 ± .005		CHECK MRE	DATE	11/12/2019
X<12"=± 1/32" X>12"=± 1/16"		DRAWN DHW	DATE	11/12/2019
SIZE	DWG/PART NO.	SCALE	WEIGHT	SHEET
A	TB-8898-EYE-KIT	1:4	9.00 LBS	1 OF 1
REV	0			

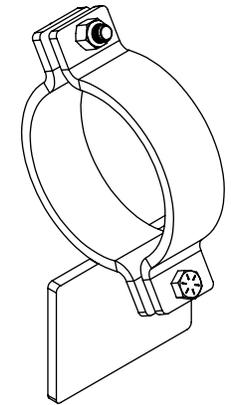
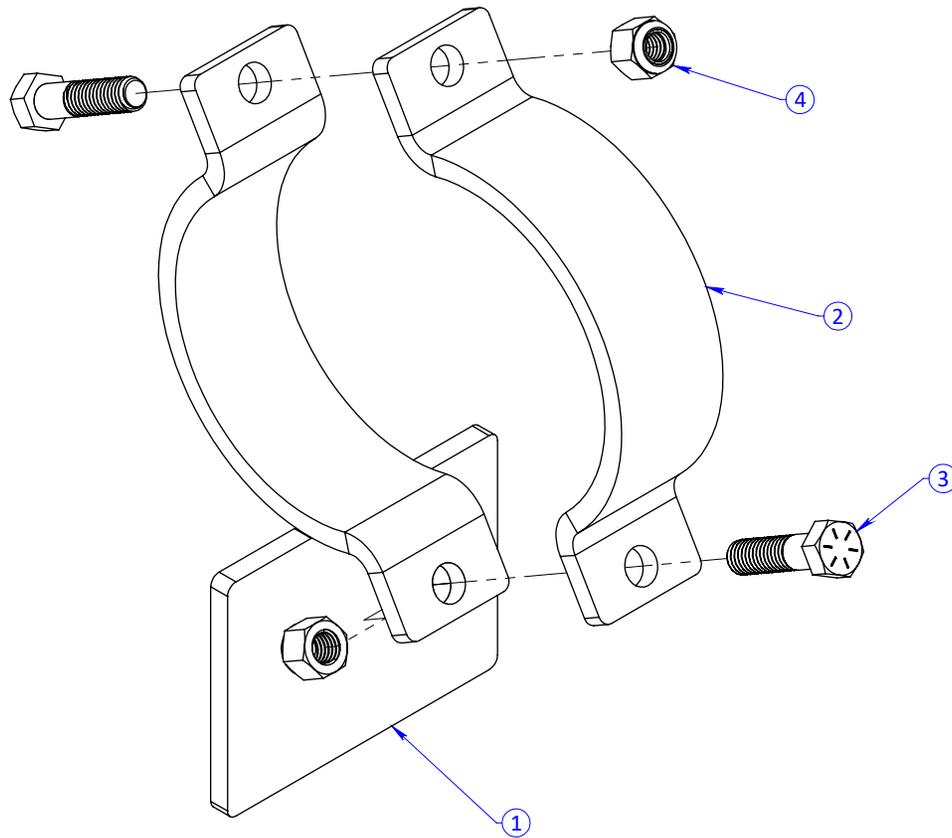
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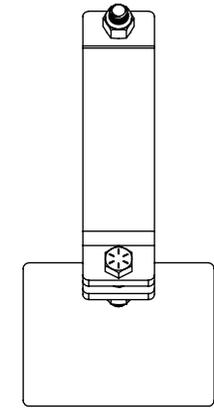
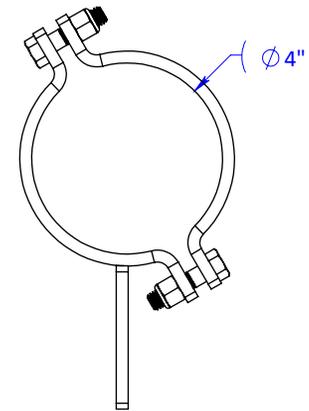
NOTES:

- FOR ASSEMBLY PURPOSES ONLY.

REVISIONS				
REV	DESCRIPTION	DATE	BY	CHK
1	UPDATE	12/18/2018	BJL	DHW



ISO VIEW
COLLAPSED STATE
SCALE 1 : 4



ORTHO VIEWS
COLLAPSED STATE
SCALE 1 : 4

ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	AV1009-3000	DRAG PLATE WELDMENT, 4" TB
2	1	TB-8898-4	CLAMP, 4"
3	2	TB-8898-5	HHCS, 3/8"-16 X 1-1/2" GR.8
4	2	TB-8898-6	NYLOCK NUT, 3/8"-16 GR.8

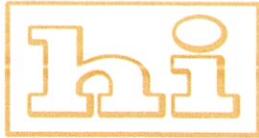
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UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES		PROJECT	AV1009
TOLERANCES		FILE NAME	AV1009-0001 BOLT-ON DRAG PLATE, 4in TB
ANGLE	.XX .XXX	DESCRIPTION	BOLT-ON DRAG PLATE, 4in TB
± 0.5"	± .01 ± .005	CHECK	-
X<12"=± 1/32" X>12"=± 1/16"		DATE	-
DRAWN	DATE	SIZE	DWG/PART NO.
BJE	6/27/2012	A	AV1009-0001
SCALE 1:4		WEIGHT: 2.57 LBS	SHEET 1 OF 1



HALL Technical Services LLC

Declaration of Conformity

Manufacturer:

Hall Technical Services, LLC

514 Mecklem Ln.

Ellwood City, PA USA 16117

724-752-2000

The undersigned hereby declares, on behalf of HALL Technical Services, LLC, that the below referenced products, to which this declaration relates, are in conformity with the provisions of the following European directives pertaining to Ground Service Equipment compliance and Mechanical Safety:

- EN 1915-1:2013
- EN 1915-2:2001+A1:2009
- EN 1915-3:2004+A1:2009
- EN 1915-4:2004+A1:2009
- EN 12312-7:2005+A1:2009
- EN 12100:2010
- Machinery Directive 2006/42/EC

Type of Equipment: Aircraft Ground Service Equipment

Product Description: Tow Bar

Model Numbers:

- TB-EMB17X
- TB-EMB17X-SS

The Technical Report No. AVEMB170-CE Revision 01, dated 2018-06-07, required by this Directive, is maintained at the corporate headquarters of HALL Technical Services, LLC, 514 Mecklem Lane, Ellwood City, PA 16117.

BY: 

TITLE: Vice President of Engineering & Sales

DATE: JUNE 25, 2018