SASFORKS
engineered tough

SAS™ CRUSHING™ FORKS

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OPERATOR MANUAL

FOR SAFELY LIFTING & MOVING SALVAGE CARS & LIGHT TRUCKS FROM THE SIDE.

========= MANUAL v4 =====

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SAS™ CRUSHING™ FORKS

LIMITED INTENDED USE OF THIS EQUIPMENT:

SAS™ CRUSHING™ FORKS wheel loader attachment is designed for lifting and moving scrap end of life cars and trucks for purpose of recycling activities.

●FORKS are not for lifting people.

●FORKS are not for lifting any object above a person(s).

●FORKS are not for suspending a load (ie: car, truck) while a person is working on or around the load.

Some wheel loaders may require modification to pressures, valves, cylinders, or other modifications for installation and to operate in a safe and desirable manner. This attachment is considered a non-OEM attachment and has not been approved by any specific excavator manufacturer. Customer is responsible to read the wheel loader's manual and warranty documents, if any, and identify any impact installation and use of this attachment may have on the wheel loader's warranty. Read this manual completely before installation or use.

INTRODUCTION LETTER (PAGE 3)
SAFETY

TO THE OWNERS, MANAGERS, AND OPERATORS OF LOADERS EQUIPPED WITH SAS™ CRUSHING™ FORKS

Safety is the most important issue in the workplace. Observing safety guidelines, equipment capacities and using common sense will provide a work environment that is safe and efficient for employees, management and customers. It is important that you and your operators read and understand the information included in this manual prior to use of this equipment.

Safety warnings are highlighted through out this manual. Understanding the significance of these symbols is important. The following is a definition of each symbol you will encounter in this manual:

The Caution Symbol is intended to draw your attention to important safety information, hazard or precaution.

The Danger Symbol indicates a hazardous situation that if not avoided will result in serious injury or death

The Warning Symbol indicates a hazardous situation that if not avoided could result in serious injury or death

The Caution Symbol indicates a hazardous situation that if not avoided could result in minor injury or potential property damage

The Notice Symbol indicates worst credible severity of harm is property damage.

The following information presented in this Operator Manual for SAS FORKS™ is intended to be a guide only, and is not meant to encompass all issues that may need to be addressed for your particular type of business operation.

If you encounter any additional information that would be helpful to us or others, please contact us.

Thank you for your business,

SAS LLC.
S.A.S. OF LUXEMBURG, LLC.
133 Center Dr Hwy 54 · PO Box 260
LUXEMBURG, WI 54217 U.S.A.

Phone:
U.S.A. 1-920-845-2198

Email:
buyit@sasforks.com

GENERAL SAFETY GUIDELINES (PAGE 4)

Operation of equipment should only be performed by qualified and trained individuals. All persons operating or working in the area of operation should read this manual and a copy of this manual should be kept with the equipment. To be considered qualified you must:

- Understand the written instructions supplied by the manufacturer of the device, the manufacturer of the wheel loader, all company rules and any applicable OSHA regulations.
- Completed training including actual operation of the device.
- Know and follow the safety rules and regulations of the jobsite.

Operation of equipment by un-qualified or un-trained individuals can result in serious injury or death. Verify all operators have received proper training on operation of this equipment.

Not designed to be operated in an explosive environment. Only use this equipment in well ventilated areas, a sufficient distance away from flammable or explosive gases, liquids or other hazards to avoid risk of ignition. Operating this equipment in an explosive environment may cause an explosion and fire resulting in injury, death, and substantial property damage.

Operation of equipment under the influence of illegal, prescribed or over the counter drugs can result in potential injury or property damage. Consult your physician before operation of this equipment while on medication.

Inspect the device and perform all preventative maintenance before operation at the start of every shift. Failure to perform inspections or proper maintenance can result in equipment failure resulting in serious injury or property damage.

Read operators manual and follow all safety procedures for the equipment this device is attached to. Failure to follow Manufacturers recommendations can result in serious injury and property damage.

This equipment is operated by high pressure hydraulics. Hydraulics are a stored power source and as such must be treated as energized at all times. Be certain pressure has been relieved prior to handling, inspecting or performing maintenance on this unit. Follow lockout tag out procedures and release all stored energy before servicing equipment. Failure to release energy or disable hydraulic energy can result in serious injury or death. High pressure fluids can also discharge at great velocity. Be certain to wear safety glasses while inspecting, operating and maintaining equipment.

This equipment has numerous moving components. Do not wear loose fitting clothing, rings, jewelry or other items that may become entangled. Be aware of resulting pinch points and keep clear during operation, inspection and maintenance. Pinch points exist between CRUSHING FORKS and vehicle (items being lifted), AND between CRUSHING FORKS and wheel loader, failure to keep clear while in operation can result in serious injury or death.

Do not exceed posted weight limits on equipment or loader. Exceeding rated load limits will result in equipment damage, loss of steering control, serious injury or death.

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GENERAL SAFETY GUIDELINES (PAGE 5)

PROTECTIVE EQUIPMENT & CLEAR OPERATING SPACE RECOMMENDED

- Safety glasses with side shields
- Leather gloves
- Hard hat
- Fire extinguishing equipment
- Spill kit (i.e. oil dry, absorbent towels, etc. as required by your company)
- Other such safety equipment to protect personnel from injury.
- Clear operating space: All personnel should be at least 30 feet (9 meters) away from operating wheel loader with SAS™ FORKS.

WARNING

Do not work under the fork or any object lifted by this equipment. An unexpected movement, shift in the object, or hydraulic failure may cause the forks and object drop. Serious injury or death may occur.

PERSONNEL TRAINING & PREPARATION

Prior to installation or use of this equipment all personnel should review the appropriate equipment & safety manuals and be trained by qualified personnel. Hazards, pinch points, and potential injury risks should be thoroughly covered to ensure personnel avoid these hazards at all times. Signed documentation certifying individual training is a must. Periodic refresher training meetings are highly recommended.

SITE PREPARATION RECOMMENDED

- SAS™ FORKS should only be used in areas that are placarded for use and movement of heavy equipment. Additionally, depending on application use, if necessary, equipped with proper fluid containment measures, to ensure capture and containment of residual fluids in accordance with any local, state, federal, building or environmental regulating body.
- No Smoking, Safety Glasses & Hard Hat required signage is recommended.

VEHICLE PREPARATION PRIOR TO USING SAS™ FORKS TO BREAK OUT ENGINES

- *If operator intends* to pry or break out engines or other vehicle components:
- All batteries, mercury switches, air conditioning Freon, engine oil, transmission fluid, fuel, antifreeze and other fluids should be removed.
- Engines, transmissions, and other components will be damaged, and only be suitable for metals recycling, not as cores or resalable operable parts.

WARNING

Vehicles contain several hazardous elements that pose explosion and fire hazards, such as electric batteries containing battery acid and gasoline. Be sure these are safely removed prior to using SAS™ FORKS. Failure to remove may result in explosion, fire hazard & injuries.

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GENERAL SAFETY GUIDELINES (PAGE 6)
SAS™ CRUSHING™ FORKS

CE SPECIFIC NOTICES

EMERGENCY STOP FUNCTION

Note: SAS CRUSHING FORKS itself does not have moving parts, but by way of operation of wheel loader lift and dump functions, FORKS will move. To immediately stop the motion of this equipment:

1. Operator is to release joystick and joystick button(s).

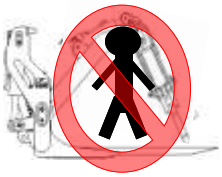
Additional secondary alternative measures to immediately stop the motion include:

2. Moving wheel loader's hydraulic function lever to neutral position
3. And apply parking brake, turn off ignition key of wheel loader to shut off engine

All three emergency stop options above ultimately stop flow of hydraulic fluid.
Notice: Even after emergency stop function is followed, there is residual stored hydraulic pressure in the system. See following:

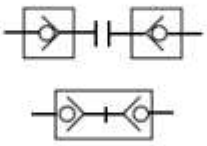
THIS EQUIPMENT IS OPERATED BY HIGH PRESSURE HYDRAULICS

Hydraulics are a stored power source and as such must be treated as energized at all times. Be certain pressure has been relieved prior to handling, inspecting or performing maintenance on this unit. Follow lockout tag out procedures and release all stored energy before servicing equipment. Failure to release energy or disable hydraulic energy can result in serious injury or death. High pressure fluids can also discharge at great velocity. Be certain to wear safety glasses while inspecting, operating and maintaining equipment.



STAY CLEAR

- Do not lift persons with this equipment.
- People should always stand a safe distance away from this equipment.
- Do not go near or under this equipment or any object lifted by this equipment.



ENERGY ISOLATION

The symbol at the left indicates hydraulic hose coupling quick release self sealing.
Note: SAS CRUSHING FORKS itself does not have stored hydraulic pressure, but wheel loader hoses and cylinders will.
SAS CRUSHING FORKS, if elevated above ground may have stored gravity forces. To safeguard against gravity downward pressures of load and forks, always lower load and forks to ground when not actively transporting a load.

POWER FAILURE

Section not applicable to SAS CRUSHING FORKS

SOUND

Section not applicable to SAS CRUSHING FORKS

VIBRATIONS

Section not applicable to SAS CRUSHING FORKS

OPERATING TEMPERATURE

This equipment is best suited to operate in temperatures between –10°F to 120°F with minimum allowable temperature –25°F and maximum temperature 150°F

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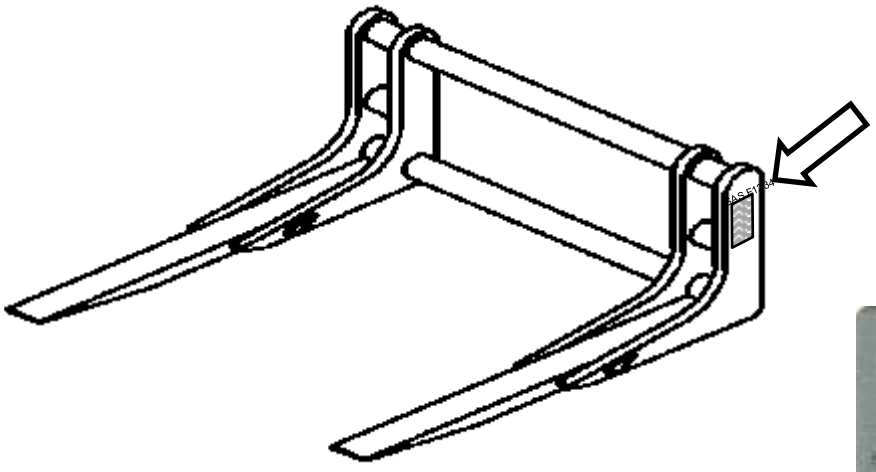
SAFETY LABELING (PAGE 7)
SAS™ CRUSHING™ FORKS

Serial Number Locations:

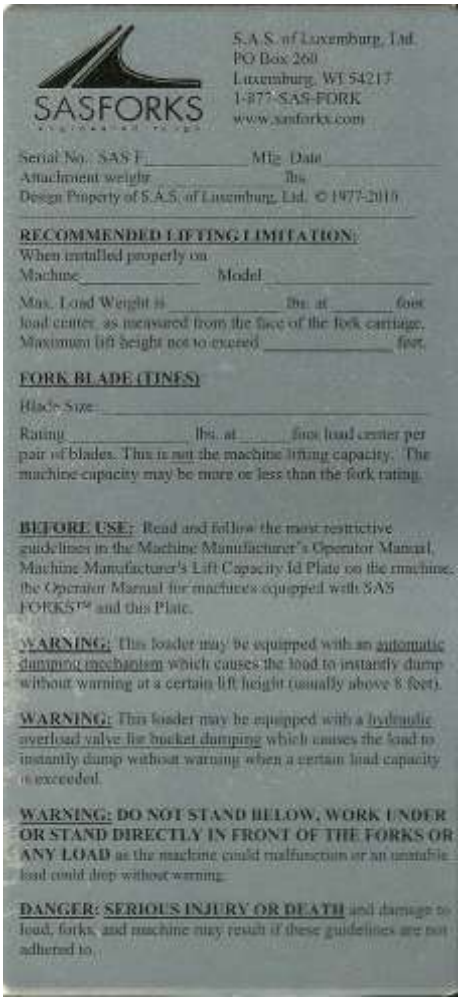
Stamped in steel on left side immediately above the SAS FORKS welded logo plate.
Stamped in aluminum id plate

Serial Number Format:

SAS Fxxxx



ID plate Safety Information: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Serial No. SAS F_____ Mfg. Date _____
Attachment weight _____ lbs.
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RECOMMENDED LIFTING LIMITATION:
When installed properly on
Machine_____ Model _____
Max. Load Weight is _____ lbs. at _____ foot load center, as measured from the face of the fork carriage. Maximum lift height not to exceed _____ feet.

FORK BLADE (TINES)
Blade Size: _____
Rating _____ lbs. at _____ foot load center per pair of blades. This is not the machine lifting capacity. The machine capacity may be more or less than the fork rating.

BEFORE USE: Read and follow the most restrictive guidelines in the Machine Manufacturer's Operator Manual, Machine Manufacturer's Lift Capacity Id Plate on the machine, the Operator Manual for machines equipped with SAS FORKS™ and this Plate.

WARNING: This loader may be equipped with an automatic dumping mechanism which causes the load to instantly dump without warning at a certain lift height (usually above 8 feet).

WARNING: This loader may be equipped with a hydraulic overload valve for bucket dumping which causes the load to instantly dump without warning when a certain load capacity is exceeded.

WARNING: DO NOT STAND BELOW, WORK UNDER OR STAND DIRECTLY IN FRONT OF THE FORKS OR ANY LOAD as the machine could malfunction or an unstable load could drop without warning.

DANGER: SERIOUS INJURY OR DEATH and damage to load, forks, and machine may result if these guidelines are not adhered to.

Replacement Label Items: Order:

A) Aluminum ID plate Safety Information: p/n: ID PLATE

B) Weld on Protective steel logo around ID plate p/n: LOGO PLATE LARGE

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INSTALLATION (PAGE 8)
SAS™ CRUSHING™ FORKS

⚠WARNING

►Installation of SAS FORKS on wheel loader may require interfacing with high pressure hydraulic system. Installation should only be performed by qualified individuals, such as an experienced Heavy Equipment Service Technician. Failure to follow these instructions and precautions in wheel loader manufacturer's service manual can result in serious damage to equipment and/or result in injury or death.
►Failure of hydraulic system or high pressure fluid leaks can result in serious injury
►Use caution while installing, testing & operating this unit. Be aware of and avoid: -Pinch Points, -High Pressure hydraulic fluids or stored energy, -People in the area.

NOTICE **Installation of purchased attachment may void machine manufacturer warranty, if any.**

STEP 1 - PREPARATION:

- Establish a safe work area. A flat surface clean work area without trip hazards.
- Park wheel loader on firm level ground. Lower exiting attachment to rest on ground.
- *If quick coupler mounted attachment:* Disengage coupler locking & back away from attachment
- *If direct pin mounted attachment:*
- Set parking brake and turn engine off.
- Follow wheel loader manufacturer's instructions to depressurize hydraulic system.
- Do not work under lifted object, loader arms, quick coupler or forks. Avoid pinch & crush hazards.
- Remove existing pinned on attachment.
- Inspect pins & bushings in machine arms, replace as necessary.

STEP 2 - INSTALLATION:

- Apply grease to pins, bushings and pin holes on SAS FORKS.
- Align pin holes, insert pins and secure pins properly.
- Grease all pin zerk points.

STEP 3 - (IF USING QUICK COUPLER) VERIFY LOCKING PINS ENGAGEMENT:

- Align upper hooks on forks with solid upper shaft on quick coupler and position to connect both.
- Align lower engagement holes on forks with Locking Pins on quick coupler.
- Engage hydraulics to actuate cylinder within Quick Coupler to extend Locking Pins.
- Visually verify Locking Pins are extended fulling into the exterior pin holes on the Quick Coupler.

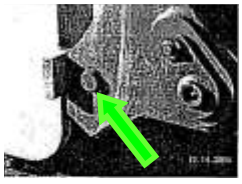
⚠WARNING Solid Upper Shaft & Locking Pins must be fully engaged to hold forks/ bucket/ tool. Failing to properly engage and verify may result in forks/ bucket/ tool falling off causing property damage, injury or death.

Example illustrations:

Refer to your wheel loader OEM manual to determine actual proper attachment verification method.

Quick Coupler PIN recessed unlocked position.

Quick Coupler PIN fully extended engaged in attachment



STEP 4 -(IF DIRECT PIN MOUNTED-NO COUPLER) TEST ROLL FORWARD AND ROLL BACK:

- During this test of motion, ensure smooth lifting & tilting of SAS FORKS. Watch for undesirable contact between wheel loader lift arms and forks.
- Begin test by moving control levers slowly: A. With forks near ground level, fully roll back.
  B. With forks lifted high, fully rotate to dump position.
- If interference is experienced, installation of forks roll back or dump stops may be required.
- Contact SAS FORKS™ if you experience interference issues to discuss stop options.

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DAILY PRE-OPERATION INSPECTION (PAGE 9) GUIDELINES

Daily pre-operation inspection is recommended for safe use of SAS™ CRUSHING™ FORKS. List below is a summary related to the SAS™ CRUSHING™ FORKS. This is not an exhaustive list of items to inspect. Refer to machine manufacturer's operator manual for additional items that need to be inspected prior to machine operation. It is responsibility of Owners and Operators to ensure safe operation of equipment in the field. Any unsafe items should be professionally repaired prior to operation of machine. Equipment with unsafe conditions must be immediately tagged and locked out of service.

1) SECURE MACHINE (WHEEL LOADER).

- Park wheel loader on firm level ground. Lower forks attachment & Quick Coupler to ground.
- If equipped with grapple attachment, lower grapple arm to lowest resting position.
- Set wheel loader parking brake and/or block wheels.
- Turn off engine.
- Move hydraulic control levers back and fourth to relieve built up pressure in system. Refer to wheel loader manufacturer manual for best practice.

2) ENSURE PERSONAL SAFETY

- Wear appropriate Personal Protective Equipment (PPE). At a minimum wear safety glasses. Recognize and follow worksite specific additional PPE, such as safety toe boots, hard hat, leather gloves, etc.

- Do not attempt to grease pins when machine is running, as you could be crushed in operating linkage, resulting in serious injury or death.

- Do not use a hand to attempt to locate or diagnose a high pressure hydraulic leak, only use a board (or cardboard), as high pressure fluid can instantly cut and penetrate skin, which would require immediate professional surgical medical attention. Any delay in medical treatment may result in amputation of impacted skin and personal limb, serious injury or death.

3) HYDRAULIC FITTINGS AND HOSES.

- Inspect hydraulic fittings and hoses for wear, kinked, cracked, swelling, or leaking.
- Tighten as needed, replace damaged parts immediately. Do not operate if deficiencies.

4) LINKAGE, CONNECTING & LOCKING PINS.

- Inspect each pin to ensure properly engaged, fastening hardware, and good condition.
- Inspect quick coupler Locking Pins, fastening hardware. Tighten or replace as needed.
- Inspect quick coupler Locking Pin Engagement Holes to be sure hole & pocket are clean from dirt, gravel and stones, as this will prevent attachment engagement with Locking Pins.
- Grease Locking Pins, linkage pins and joints to ensure smooth operation & to reduce wear.
- Do not operate machine if linkage pin or retaining plate of bolt is worn, loose or missing.

5) SAS FORKS INSPECTION.

- Inspect framework, framework welds for signs of cracking or damage.
- Inspect skid plates on bottom of SAS CRUSHING FORKS carriage. (See page 13 details)
- Inspect blades & blade welds for signs of cracking or damage. (See page 15 details)
- Do not operate machine if any cracks. Contact SAS Forks & submit photos for repair advice

6) CONTINUE WITH OTHER ATTACHMENT & WHEEL LOADER INSPECTION DETAILS.

DAILY PRE-OPERATION INSPECTION (PAGE **10**) (SUGGESTED MINIMUM INSPECTION GUIDELINES)

Pre-Operation Inspection Sample Checklist

> Inspection Required at start of each shift.
> Responsible Person: First employee to use machine on each shift, each day.
> Fix safety problems immediately or tag and lock out this unit so no one uses it.
> Notify your supervisor about any problems and arrange for immediate service.
> Notes repairs completed on this sheet or attach proof of safe operating condition.
> Park in area not obstruct building exit. set parking brake, lower forks tips on ground, shut off lights.
> When this page is full, turn page into office for filing request a blank form.
> Office / Supervisor: Keep completed sheet and associated records of repairs on file

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Check mark or X=item OK **S**=needs Service

Machine (unit#) Model:							
Inspection Date:							
Performed by who:							
Hour meter:							
Engine Off & Keys Out							
Parking Brake Set							
Engine Oil Level							
Hydraulic Fluid Level							
Antifreeze Level							
Fan / Alternator Belts							
Fuel System Leaks							
Tire Condition							
Tire Pressure							
Tire Lug Bolts Tight							
Lift Arms / Chains							
Lift & Pivot Arm Pins Secure							
Grease Pins							
Hydraulic Hoses No Damage							
Quick Coupler Hoses No Leak							
Quick Coupler Pins Secure							
Quick Coupler Free of cracks							
Attachment (forks/bucket/etc)							
Locking Pins Engaged							
Attachment Free of cracks							
Fork tip & carriage skid plates							
Seat Belt Operation							
Fire Ext. Charged							
Parking Brake							
Dash Warning Lights							
Fuel Level							
Engine start- No Noises							
Horn							
Lift operation							
Steering System							
Brake System							
Reverse Warning							
Special Note:							

ELECTRIC – HIGH VOLTAGE BATTERY EQUIPPED VEHICLES POSE SPECIAL HAZARDS

⚠WARNING Any damage to high voltage batteries, either from accident or mishandling could cause a risk of fire, electrocution, property damage and serious injury. Practice safe moving & storage of electric vehicles.

Per U.S. Dept. of Transportation National Highway Traffic Safety Administration;
"There is potential for delayed fire with damaged lithium-ion batteries."
Source: Interim Guidance for Electric and Hybrid-Electric Vehicles Equipped With High Voltage Batteries.
https://www.nhtsa.gov/sites/nhtsa.gov/files/interimguide_electrichybridvehicles_012012_v3.pdf

DEVELOP SAFE VEHICLE LIFTING AND MOVING PLAN FOR ELECTRIC VEHICLES:

a. Review all materials within this SAS Forks operator manual & actually follow safest practices.
b. A knowledgeable person should assess vehicle and determine if safety precautions such as having a qualified person disconnect 12 volt battery and remove high voltage disconnect is prudent safety precaution for your facility.
c. Read and be up to date on notices, warnings and procedures that may be issued or updated from time to time from electric vehicle and battery manufacturers, and regulating authorities.

Sample resources (not all inclusive):www.nhtsa.gov ; www.safercar.gov ; www.ems.gov ; www.evsafetytraining.org
https://www.nhtsa.gov/sites/nhtsa.gov/files/interimguide_electrichybridvehicles_012012_v3.pdf

VARIABLES IMPACTING SAFE LIFTING & MOVING ELECTRIC VEHICLES (not all inclusive)

d. Introduction by new manufacturers and new models, with structural design differences.
e. Existing vehicle condition, type of vehicle damage.
f. Consider variables lifting operations to identify and use best method to reduce risks.
g. Sharp tipped forks could easily penetrate battery enclosures posing great fire or explosion risk.

VEHICLE DESIGN CONSIDERATIONS: Historical Internal Combustion Engine (ICE) and ELECTRIC vehicle design would lead to the opportunity to complete safe lifting with SAS Forks, specifically;

h. Vehicle manufacturers engineer undersides of vehicles components to withstand random impacts of potential debris on roadways at highway speeds, without damage or impact to components such as fuel tanks and high voltage battery enclosures.

Per a National Fire Protection Association video for tow operators;
"The high voltage battery is protected by the vehicle's structure or often enclosed in a metal case."
Source: Electric & Hybrid Vehicles: Prepare to Respond - Tow Operator Edition - Section 1 – Introduction – video: (@ 3:54)
https://www.nfpa.org/Training-and-Events/By-topic/Alternative-Fuel-Vehicle-Safety-Training/Tow-operator-training

i. Vehicle manufacturers engineer front and rear suspension crossmembers which are somewhat lower to ground than fuel tanks, high voltage batteries & associated high voltage wires.
j. Vehicle manufacturers engineer side rocker panel structure which are somewhat lower to ground than fuel tanks, high voltage batteries, and associated high voltage wires.

If electing to lift & move ELECTRIC vehicles with SAS Forks take into consideration foregoing, also:

k. Ensure forks do not contact battery, will not lift on battery or battery enclosure.
l. Lower forks near ground to ensure forks do not contact vehicle structure or battery enclosure.
m. After forks are fully extended under vehicle; then slowly lift vehicle.
   Side lifting ensure 6' & 7' forks only contact heavy rocker panel frame structure.
   Front lifting ensure 15' forks only contact heavy suspension cross member structure.
n. Slowly transport vehicle to avoid vehicle moving or shifting on forks.
o. Slowly lower vehicle. Be sure forks are on ground, and not in contact with battery enclosure or lower structure when setting and backing out of vehicle.
p. After electric vehicle is placed, perform visual inspect to ensure no battery damage has occurred.

OPERATION GUIDELINES (PAGE 12)
SAS™ CRUSHING™ FORKS

LIFT CAPACITY

Observe most restrictive weight capacity provided by the equipment manufacturer, in manufacturer's operator manual, cab id plate, and SAS FORKS ID plate. Attempting to lift loads in excess of lowest rated capacity will result in an unsafe condition. Damage may occur to wheel loader, equipment, forks, or even cause loss of steering control, and tip over wheel loader.

LIFT HEIGHT

Observe most restrictive lift height provided by equipment manufacturer, in manufacturer's operator manual, cab id plate, and SAS FORKS ID plate. Lift height limitations are to protect operator and ensure stability of equipment. In wheel loaders equipped with 'dirt digger linkages', load may suddenly dump without any control or warning, if maximum lift height is exceeded.

⚠WARNING **Do not** raise forks to maximum height & point forks up. Electrocution may result if contact is made with a power line. Equipment damage, injury or death may result.

LIFT & CARRY ANGLE

To reduce the possibility of vehicles dropping, falling or tipping off the forks, pick up vehicle on forks evenly, centering load on forks from right to left. Tip fork blades back about 5°. This will prevent vehicle from sliding off end of forks under normal slow operating conditions. Drive loader at a reasonable slow speed to prevent jarring of vehicle from bumps in road. Monitor load stability.

⚠WARNING Vehicles dropping, falling or tipping off forks is dangerous, and can result in vehicle damage, equipment damage, injury and/or death if a person is crushed.

PEOPLE AND PEDESTRIANS

Operator is responsible to maintain a safe operating distance from all people. A minimum recommended distance from operating loader and vehicle load is 30 feet. If a person comes within this safety zone, carefully stop loader and inform person to stay at least 30 feet away for safety.

BACKING SAFETY WARNING

When backing up (reverse) with loader/forklift, a safety beep shall sound to warn all people that you are backing up. If this safety beep is found inoperable, immediately fix prior to further use.

TURNING WHILE CARRYING A LOAD

During transport of a load, keep load close to ground, (ie: 2 feet or less) On articulated equipment, such as a wheel loader, it maybe unsafe to turn (*articulate)* if load is more than 2 feet above ground. Best way to lift loads at heights above 2 feet, is to position equipment with wheels straight, then complete high lift without turning machine.

⚠WARNING Articulating wheel loader right or left with load at a height of more than 2 feet above ground may cause tip over, resulting in equipment damage, load damage, injury or death.

⚠WARNING **Do not** stand below, work under or stand directly in front of the forks or any load, as the machine could malfunction or an unstable load could drop without warning. A crushing hazard would exist, which may result in serious injury or death.

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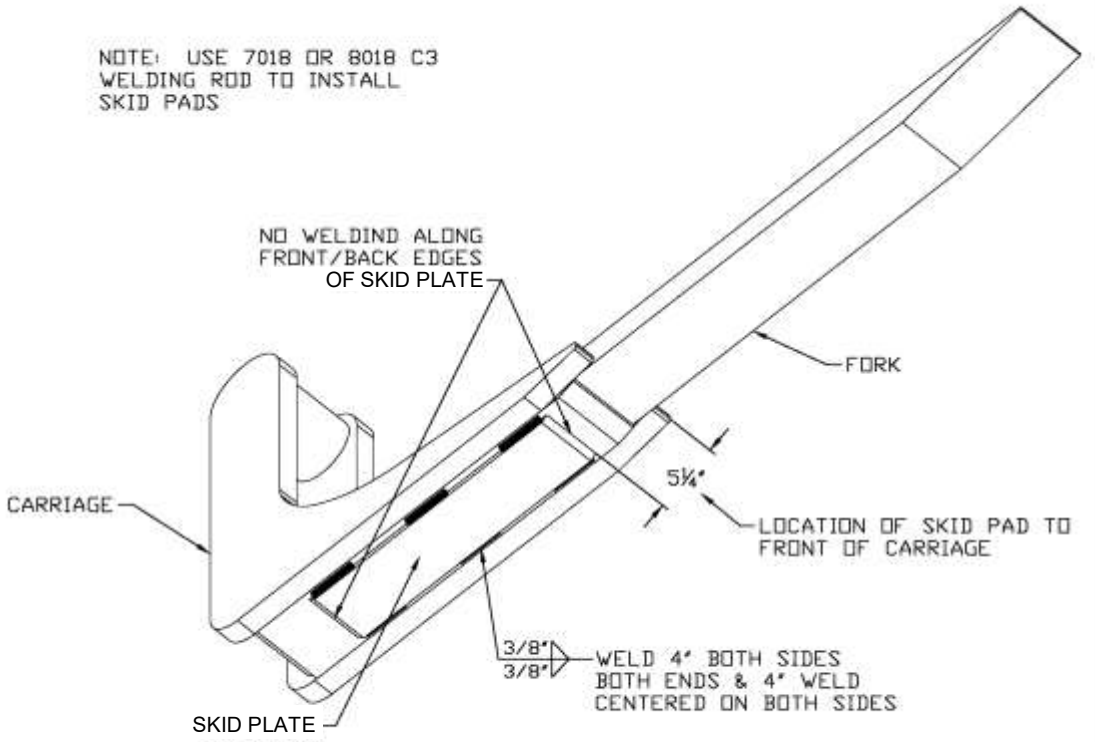
SKID PLATES & WELD NOTICE (PAGE 13)
SAS™ CRUSHING™ FORKS



MAINTENANCE: For maximum life of fork carriage, skid plates should not be worn thinner than 1/8"
Periodic inspection of the skid plates is needed. To order call 920-845-2307 ext 101

Replacement Skid Plates:	Order Part Number:
Standard 6" wide blade, size: 1/2" x 5" x 29"	# SKID PLATE LARGE
Optional 8" wide blade, size: 1/2" x 5" x 29"	# SKID PLATE LARGE
Optional 10" wide blade, size: 1/2" x 11" x 29"	# 0304HYUNL770-7A
Optional 12" wide blade, size: 1/2" x 12" x 29"	# 0313MICBL480-4P-6076

⚠WARNING Carriage Skid Plates: Failure to keep skid plates on the carriage will result in structural damage to the carriage base plate and could result in tearing out one or both blades and necessitating the purchase of a new carriage. Do not use forks without skid plates in place. Skid plate and fork failure can result in equipment damage, injury or death.

DO NOT MAKE UNAUTHORIZED WELDS TO SAS FORKS™

To prolong the life of the SAS FORK™ assembly, do not weld on the forks except as shown in this diagram. Improper welding repairs can result in equipment failure resulting in injury or death. If repairs are needed on forks contact S.A.S. of Luxemburg, LLC.

NOTICE RECOMMENDED PRECAUTIONS TO TAKE PRIOR TO WELDING

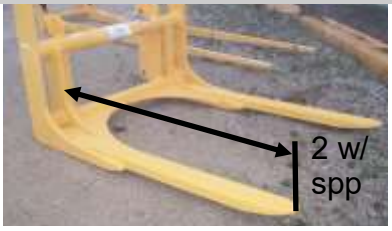
Weld repairs should only be performed by qualified individuals.

Completely disconnect SAS CRUSHING FORKS from wheel loader before welding. Do not weld if connected to wheel loader due to risk of damage to electrical system or on board electronics. Connect the welder ground directly to the part being welded. Avoid attaching ground across any pivot points; this may cause an arc to form damaging the pivot point.

S.A.S. of Luxemburg, LLC, 133 Center Drive Hwy 54, PO Box 260, Luxemburg, WI 54217 USA
Phone: 920-845-2198 • 1-877-SAS-FORK • Fax: 920-845-2309 • Web: www.sasforks.com

REPLACEMENT FORGED BLADES (PAGE 14)
SAS™ CRUSHING™ FORKS

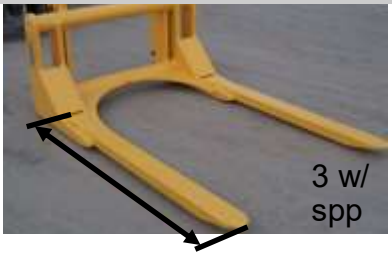
CURVED CARRIAGE MODELS



●*Order* replacement blades: Email: parts@sasforks.com or Call 920-845-2307 ext 101
Provide forks serial number (SAS Fxxxx). Blade thickness & width must match fork serial no.
Determine thickness (measure thickness near carriage, where likely not worn down)
Standard: 3: thick (options, 2.5" thick, 3.0" thick, 3.5" thick, 4.0" thick)
Determine width (measure near carriage, where blade exits carriage)
Standard: 6" wide (options, 8" wide, 10" wide 12" wide)
Determine length (Models CR#1 and CR#2, with curved carriage, shown above)
Useable blade length is measured from face of upright carriage to tip.
Standard: 72" useable blade, 78" material length
(options, 84" useable blade, 90" material length
(options, 96" useable blade, 102" material length
Taper: Standard: 12" for prying (option, 40" for speed)

●*Order* Stress Relief Bars required for installation: 2 per blade (qty 4 per pair of blades)
Part number: SM-STRESS BAR-CR

ANGLED CARRIAGE MODELS



Order replacement blades: Email: parts@sasforks.com or Call 920-845-2307 ext 101
Provide forks serial number (SAS Fxxxx) Blade thickness & width must match fork serial no.
Determine thickness (measure thickness near carriage, where likely not worn down)
Standard: 3: thick (options, 2.5" thick, 3.0" thick, 3.5" thick, 4.0" thick)
Determine width (measure near carriage, where blade exits carriage)
Standard: 6" wide (options, 8" wide, 10" wide 12" wide)
Determine length (Models CR#3 and CR#4, with angled carriage, shown above)
Useable blade length is measured from face of upright carriage to tip.
Standard: 72" useable blade, 90" material length
(option, 84" useable blade, 102" material length
Taper: Standard: 12" for prying (option, 40" for speed)

●*Order* Stress Relief Bars required for installation: 2 per blade (qty 4 per pair of blades)
Part number: SM-STRESS BAR-CR

SAS CRUSHING FORKS—FORGED BLADE WELD (PAGE 15)

ALIGN BLADES:

- INSERT BLADES INTO FORK POCKET. VERIFY THE BLADES ARE BACK AGAINST THE FORK STOPS.
- VERIFY THAT THE GAP BETWEEN THE BOTTOM OF THE BLADE & FORK SUPPORT IS LESS THAN ⅛" ON THE BACK OF EACH BLADE. IF GAP IS LARGER THAN A ⅛" :
  - SHIMS NEED TO BE INSERTED BETWEEN TOP OF BLADE & FORK HOLD DOWN (SHIM NEEDS TO BE 4" X BLADE WIDTH)
- LEVEL TIPS TO ± ¼". IF TIPS ARE OFF:
  - FIRST CHECK STRAIGHTNESS OF EACH BLADE. STRAIGHTEN IF NECESSARY.
  - IF BLADES ARE STRAIGHT AND TIPS ARE STILL OUT OF TOLERANCE, SHIMS NEED TO BE INSERTED BETWEEN TOP OF BLADE & FORK HOLD DOWN TO GET WITHIN ± ¼" AT TIPS (IF THERE ARE ALREADY SHIMS ADDED FROM THE ABOVE STEPS, REMOVE AND USE ONE THICKER SHIM TO GET TIPS LEVEL)
  - WELD SHIM TO FORK HOLD DOWN WITH A SINGLE PASS 1" STITCH-CENTERED (NOT BLADE).
  - CENTER STRESS BARS IN LOCATION (B), MAKING SURE BARS ARE TIGHT AGAINST SHOES & BLADES.
- TACK BLADES AND STRESS BARS IN PLACE.

PRE-HEAT PROCEDURE:

THE PREHEAT TEMPERATURE SHOULD BE ABOVE 600° F & NOT TO EXCEED 850° F, TO AVOID THIS:

- USE A SOFT FLAME AND DO NOT LEAVE UNATTENDED
- USE A 600° F TEMP STICK FREQUENTLY ON HEATED SURFACE UNTIL IT MELTS

WELD PROCEDURE:

- WELD WITH MET110 or MC100 IN AREA'S SHOWN
- INTERPASS TEMPERATURES NOT TO EXCEED 850° F
- DO NOT LET COOL UNDER 600° F

POST-HEAT PROCEDURE:

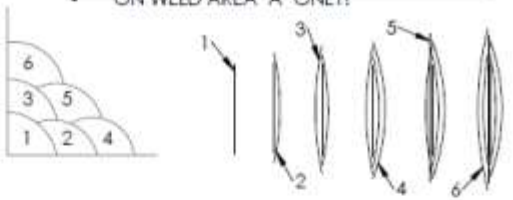
- USE SOFT FLAME ON WELDED AREA KEEPING TEMPERATURE BETWEEN 600° F & 850° F FOR 1 1/2 HOURS
- WRAP WELDED AREA WITH BLANKET & ALLOW TO COOL SLOWLY FOR 4-5 HOURS

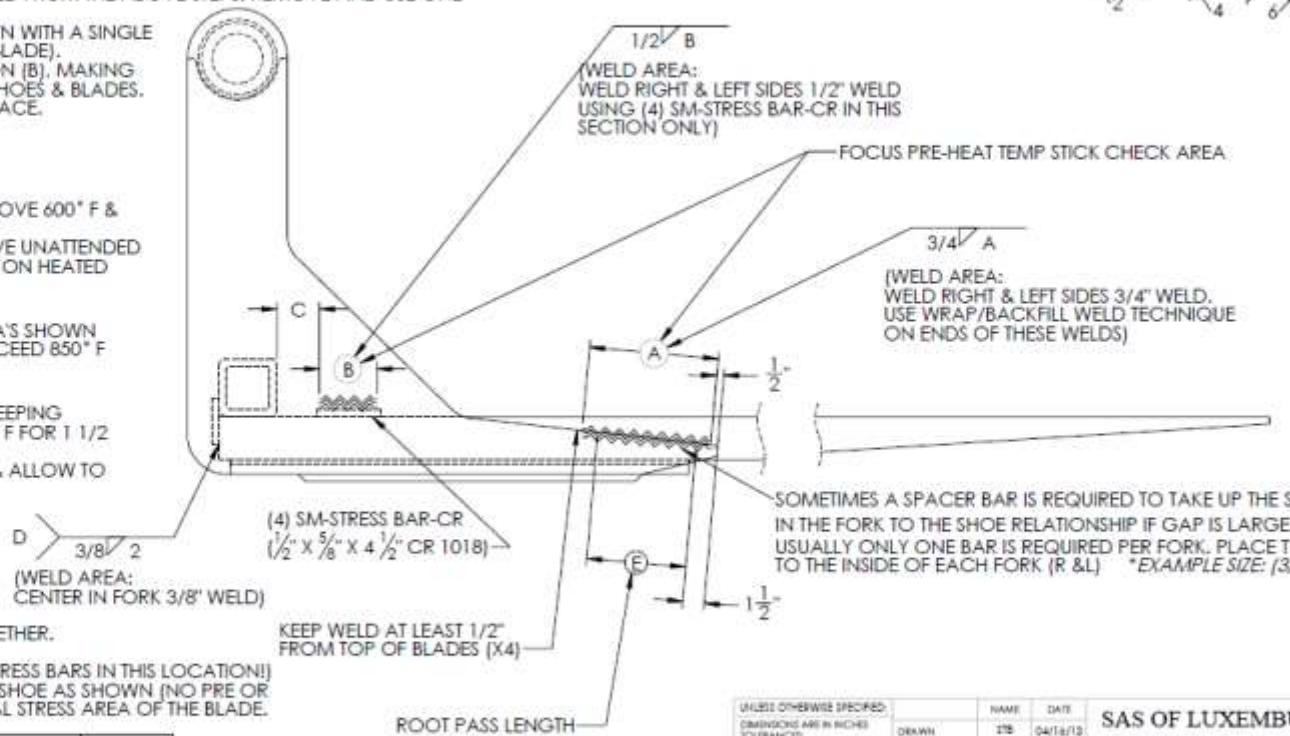
RECOMMENDED PROCEDURE:

1. PRE-HEAT "A" & "B" WELD AREA'S TOGETHER.
2. WELD "A" AREA.
3. WELD "B" AREA (MAKE SURE TO USE STRESS BARS IN THIS LOCATION!)
4. WELD "D" AREA AT BOTTOM REAR OF SHOE AS SHOWN (NO PRE OR POST HEAT REQUIRED)-NOT A CRITICAL STRESS AREA OF THE BLADE.

WRAP/BACKFILL WELD TECHNIQUE:

- ON WELD AREA "A" ONLY!





BLADE THICKNESS	A	B	C	E
2 1/2"	5"	4 1/2"	3"	3"
3"	9"	4"	3"	7"
3 1/2"	11"	4"	2"	9"
4"	14"	3 1/2"	2"	12"
SPECIAL	9"	9 1/2"	1/2"	X

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ± 1/16
ANGULAR: MACH ± 0.5°
BEND ± 1°
TWO PLACE DECIMAL ± 0.03
THREE PLACE DECIMAL ± 0.005
INTERPRET GEOMETRIC TOLERANCING PER: ANSI SPEC
MATERIAL: FORGED BLADES
FINISH: 120,000 MIN YIELD
DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	ITB	04/16/13
CHECKED	CDJ	04/16/13
ENG APPR.	AMA	04/16/13
MFG APPR.		
Q.A.		
COMMENTS:		

Print Date
04/16/2013

SAS OF LUXEMBURG, LTD

TITLE:
CRUSHING BFF
WELD PROCEDURE

SIZE	DWG. NO.	REV
B	BFF-300-06-192-00-42T	

SCALE: 1:8 WEIGHT: 890.34 SHEET 2 OF 2

LIMITED WARRANTY (PAGE 16)
SAS™ CRUSHING™ FORKS

SAFETY
Buyer accepts responsibility to; (1) Ensure that all personnel that will use and/or work in area of purchased product will read safety ID plate and Operators Manual For SAS (product) FORKS™ and the Machine Manufacturer's Operators Manual, prior to use; and (2) Ensure that all personnel follow the safety guidelines outlined on these materials. (3) To determine and compare the weight of the original machine's attachment, to the new SAS FORKS™ or other attachment purchased herein, and reduce the lift capacity as needed to accommodate the increase in the attachment weight if any. (4) Observe the most restrictive weight capacity specified on any machine and/or attachment. (5) Buyer has duty to inspect equipment & attachment regularly.
S.A.S. OF LUXEMBURG, LLC. IS NOT RESPONSIBLE FOR SAFETY IN THE FIELD.

GOALS OF THE S.A.S. OF LUXEMBURG, LLC. LIMITED WARRANTY PROCEDURE
·ASSURE MINIMUM CUSTOMER DOWNTIME by resolving the problem correctly on a timely basis.
·ASSURE END-USER CONFIDENCE while maintaining an equitable Warranty expense for both your company and SAS.
·PRODUCT IMPROVEMENT. We have an engineering staff ready to assist you. Call us at 1-877-SAS-FORK (1-877-727-3675)
Please call SAS before attempting any repair, modification, or questionable job applications.

LIMITED WARRANTY FOR SAS FORKS™

For products that S.A.S. of Luxemburg, LLC. (SAS) manufactures, SAS warrants that such products conform to all specifications for materials and workmanship for the period of time indicated below, after delivery, when used in compliance with the SAS FORKS™ Operator Manual.

PRODUCT	LIMITED WARRANTY PERIOD	ITEM	COVERED
CRUSHING FORKS™	1 year from original ship date	CARRIAGE & FRAME	DEFECTS IN MATERIALS & WORKMANSHIP

No warranty on other products not listed above, unless specified on the face of the original invoice.
No warranty against abrasion wear, claw chip wear, fork tip damage, blade bending, fusible link separation, bent fork mounting shafts, hoses, cables, or wires.

SAS does not warrant the products that it does not manufacture. Rather, all warranties, if any, for these products are supplied by the manufacture. SELLER EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES, WHETHER EXPRESSED OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

CALL FOR WARRANTY CONSIDERATION: To be considered for warranty repairs or replacement buyer must notify SAS of any warranty claim within 10 days after such claim arises, and prior to expiration of the warranty period and prior to the performance of any repairs being done, otherwise buyer waives all rights to such claim.
· Obtain the SAS Fork serial number & call SAS at 920-845-2198. Clearly describe the problem and the operation that was taking place when it occurred.
· Buyer is to return defective assembly, freight prepaid, or photographic evidence clearly showing the problem area and details of failure to SAS for review. When necessary, a factory representative may evaluate the problem in the field.

WHAT SAS WILL DO: SAS will examine the defective product, and the details of the failure. If SAS determines that the failure of materials or workmanship was proven to be within the terms of this limited warranty, SAS will, at it's option, repair or replace, FOB the factory, in Luxemburg, WI, USA, the defective product. If the product cannot be returned to the factory, SAS may approve field repair of defective product. SAS will approve an appropriate amount of hours and cost for the repair before authorizing repairs to begin. No provisions will be made for incidental damages, mileage, travel time, overtime, downtime, or special freight charges.

CONDITIONS THAT WILL VOID YOUR WARRANTY: Failures, which in our determination were the result of:
· Improper installation.
· Misapplication - See SAS FORKS™ Operator Manual.
· Misuse or Improper operation – See SAS FORKS™ Operator Manual.
· Exceeding the weight and/or lift limitation posted on the Identification Plate attached the SAS FORKS™.
· Negligence or Failure to perform routine inspection and/or maintenance as outlined in the SAS FORKS™ Operator Manual.
· Unauthorized modification, welding, burning, grinding, installation of non-factory skid plates, etc. (unless otherwise specified in the SAS FORKS™ Operator Manual or as provided in a written authorization directly from SAS factory Engineers.).
· Continued use after a malfunction of the hydraulic system in the forklift or loader.
· Accidental damage.

LIMITED WARRANTY REMEDIES: Buyer must notify SAS of any warranty claim within 10 days after such claim arises; otherwise buyer waves all rights to such claim. Unless agreed otherwise in writing. Buyer's sole remedy for breach of warranty is, at seller's option, the repair of the defect, or the providing of a replacement part F.O.B. seller's office. **Seller will not be responsible for costs of shipping, travel time, travel expense, dismantling or reassembling the product**. Further, seller will not be liable for any direct, indirect, consequential, incidental, or special damages arising out of a breach of warranty. These remedies are exclusive, and all other warranty remedies are excluded.

PROPRIETARY RIGHTS: All designs and other proprietary rights provided by SAS to Buyer are to remain the property of S.A.S., and Buyer shall honor all proprietary legends. Buyer agrees not to copy the design of S.A.S.™ Forks & SAS Scorpion or hire a third party to copy. S.A.S. may use product modification ideas suggested by user, without any obligation to originator of modification suggestion. If S.A.S. chooses to implement such product modification such becomes property of S.A.S. of Luxemburg, LLC.

LIMITATION OF LIABILITY: The seller's price is based on the enforceability of this limitation of liability, and the buyer understands that the price would be substantially higher without this limitation. Seller shall have no liability to buyer for lost profits or for special, consequential, exemplary, or incidental damages of any kind, whether arising in contract, tort, product-liability, or otherwise, even if advised of the potential damages in advance.
· In no event shall seller be liable to buyer for any damages whatsoever in excess of the contract price.
· In the event that any warranty or warranty remedy fails of its essential purpose, or is held to be invalid or unenforceable for any reason, in consideration of the other provisions of this agreement, the parties understand and agree that all limitations of liability under this provision will nevertheless remain in effect.

SEVERABILITY: Any legally unenforceable provision may be severed from this agreement, and the remaining terms and conditions will be enforced as a whole.

SALES TERMS: SAS FORKS SALES TERMS document is included as part of this document. See www.sasforks.com/SalesTerms.pdf