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## Focus on Safety

### Care of Polycarbonate Windows in Tigercat Operator's Stations

– Robin Barker, engineering administrator

Most windows used in the operator's stations of Tigercat forestry machines are made from a polycarbonate resin thermoplastic. This material is a replacement for glass when improved strength, durability and safety is required. The thickness of the material used in a particular cab window is determined by a number of factors including the size of the window opening, the proximity to a safety hazard, the type and severity of the hazard and the requirements of applicable safety standards such as Falling Object Protection (FOPS) or Operator Protection (OPS).

Polycarbonate windows used in Tigercat operator's cabs range in thickness from 9-32 mm (0.375-1.25 in). Properly designed and installed, polycarbonate windows do not require external steel mesh safety guards. This results in enhanced operator visibility.

Polycarbonate manufacturers provide very detailed procedures for suppliers to follow when cutting the material into the required window shapes. A high quality of workmanship

is necessary to avoid scratches, nicks or notches both on the window edge and surface. Small defects can lead to cracking in the polycarbonate if the window is highly stressed during impact.

The manufacturers of polycarbonate material also provide guidance in the proper mounting of the windows to the cab structure. Each polycarbonate window in a Tigercat machine is fully supported around the edges by smooth, flat surfaces. The window is cushioned with rubber edge moldings and secured along all sides with bolted steel retaining strips.

Careful design and quality control of the manufacture and installation of polycarbonate windows ensures good, long term performance in forestry and logging applications. Polycarbonate material is expected to resist heavy impact from large branches and falling tree tops and to absorb high levels of energy when contacted by high velocity thrown objects such as wood chips, disc saw blade teeth or broken harvester head saw chain.

The outer surfaces of Tigercat polycarbonate cab windows are specially treated with a hard coating to provide enhanced resistance to abrasion and ultra-violet (UV) radiation.

The extreme operating environment seen in logging applications heightens the need to regularly inspect and properly maintain polycarbonate cab windows as an essential piece of operator protective equipment.

### Inspection and Maintenance

Daily inspection and maintenance is essential to confirm that the window's ability to protect the operator has not been compromised.

- Inspect all windows daily and immediately after any impacts.
- Check for any damage to the window material or steel structure in the area of the window mounting.
- The edges of the polycarbonate window must be evenly and fully supported on a flat surface around the entire window opening at all times. Bent or dented skylight structures must be replaced immediately. Bent or dented cab structures must be evaluated immediately for possible repair or replacement.

- The edges of the polycarbonate window must be free from cracks or chips and must not be pinched or stressed. Windows with these defects must be replaced immediately.
- Cracks, chips or scarring anywhere on the window's surface will decrease its impact strength. Windows with these defects must be replaced immediately.
- Bent, dented or missing window retaining parts must be replaced immediately.
- Rubber materials used in mounting the window must be maintained in good condition.
- Identification of the polycarbonate originally used by Tigercat is hot stamped in a corner of the window to identify its composition. Do not use any replacement window without proof of its material composition. Do not substitute with any other materials.
- Skylights, cab structures, windows and window retaining parts must not be modified or replaced with components that are not approved by Tigercat.

### Resistance to Chemicals

The resistance of polycarbonate material to chemical exposure varies widely. Fortunately, polycarbonate materials have good resistance to diesel fuel, grease, hydraulic oil, kerosene and engine oil. Other chemicals can seriously weaken the polycarbonate. Do not permit these chemicals to come into contact with polycarbonate windows:

- acetone
- air conditioning refrigerant
- ammonia
- anti-freeze
- benzene
- brake fluid
- carbon tetrachloride
- cutting oils
- gasoline
- lacquer thinner
- toluene
- turpentine
- xylene

### Fire Precautions

Polycarbonate window material is the least combustible safety glazing plastic but will ignite when exposed to an ignition source in excess of 427°C (800°F). When working around

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cont. on pg. 12



cont. from pg. 11 polycarbonate windows, observe similar fire precautions to those in place for wood.

Unlike the tempered glass sliding side windows on the drive-to-tree feller buncher cab, the polycarbonate windshield and skylight do not require external steel mesh guarding. It is important to visually inspect polycarbonate windows daily. Cracks, chips and scarring will compromise the window's ability to withstand a significant impact.

### Resistance to Water

Polycarbonate material has good resistance to water up to approximately 65°C (150°F). Above this temperature the effect of water is time-temperature related. Exposing polycarbonate to repeated steam cleanings or high temperature pressure washing may result in crazing, a phenomenon that causes clouding of the surface. Crazing can ultimately result in a loss of physical strength and may precede a fracture.

### Cleaning Instructions

- 1 Rinse the window thoroughly with lukewarm water
- 2 Using a soft cloth, cellulose sponge or chamois, gently wash the window with a mild solution of soap or detergent in lukewarm water. Do not scrub or use brushes or squeegees.

Brand name soaps and detergents recommended for cleaning polycarbonate are:

- Fantastik
- Formula 409
- Hexcel F.O. 554
- Joy
- Lysol
- Mr. Clean
- Neleco-Placer
- Pine-Sol
- Top Job

- 3 Rinse the window thoroughly with lukewarm water.
- 4 Dry the window with a moist soft cloth, cellulose sponge or chamois to prevent water spotting.
- 5 To remove grease or oil, first rub lightly with a good grade of VM&P Naphtha or isopropyl alcohol followed by the same rinse, wash, rinse and dry procedure described in steps 1 to 4. Do not use gasoline.

### Cautions

- Do not use abusive cleaning procedures either by hand or pressure washing on polycarbonate windows.
- Do not use brushes, razor blades, scrapers, squeegees or other sharp tools on polycarbonate windows.
- Do not clean polycarbonate windows when the daytime temperature is high or in direct sunlight.
- Do not use abrasive or highly alkaline cleaners on polycarbonate windows.

Failure to follow these cleaning instructions will shorten the service life of polycarbonate and may cause visual hazing, loss of light transmission and delamination of the polycarbonate hard surface coating.

### Concealing Hairline Scratches

The appearance of scratches and minor abrasions on the surfaces of polycarbonate windows can be minimized by using a mild automotive polish such as Johnson's Paste Wax, Novus Plastic Polish #1 and #2 or Mirror Glaze Plastic Polish. Be certain to clean the polycarbonate window as outlined above prior to application of an automotive polish. ■

