

Safeaero 220

The future of de-icing



SAFEAERO
i Trelleborg AB

SAFEAERO 220

The one-person operated de-icer

The **SAFEAERO 220** with its enormous operational radius (nozzle reach horizontal over 13m and vertical over 20m) and its very compact size, make it the ideal de-icer to perform de-icing operations on aircrafts ranging from turboprops up to the new Airbus A380.

The uniqueness of this product lies in the fact that this machine was designed specifically for one person operation. This eliminates communication problems between operator and driver and operating costs are significantly lower than a truck mounted two person operated de-icer.

The compact and low profile design along with a completely enclosed cabin and large windows provides excellent visibility. The car-like driving and operating system provides an easy, safe and efficient de-icing

environment under all conditions. Under-wing de-icing can also be easily performed from the operator's cabin.

A "stepless" proportional mixing system allows the operator to choose the exact mixture of ADF and water depending on the weather conditions. This means the glycol consumption can be reduced to a minimum, which saves costs and protects the environment.

For maintenance and service, a full diagnostic and faultfinding system is integrated into the onboard computer.

The **SAFEAERO 220** is CE certified and follows IATA recommendations for de-icers and European safety standards for ground support equipment.



Under-wing de-icing from cabin

Engine/Transmission

The **SAFEAERO 220** vehicle has as standard equipment a single four-cycle water-cooled diesel engine. The engines offer adequate power required for all functions and operate well below the maximum power rating. The exhaust system is equipped with a spark arrestor. The starting and stopping of the engine is simply accomplished by way of a single ignition key. The vehicle is equipped with hydrostatic drive, for smooth acceleration and driving comfort. The steering is electro hydraulic. A drag link steering mechanism is used with wheel position indicator at the steering wheel.



Excellent operational overview

Chassis/Brakes

The **chassis is specially designed for the SAFEAERO 220**. It is equipped with a spring-loaded front axle, with an excellent turning radius (only 7,2 m) and is equipped with automatic hydraulic locking cylinders to be used during the de-icing and anti-icing operation.

The rear axle is firm without springs. The vehicle has two-wheel drive on front axle.

The brakes are electro-pneumatically operated with spring-loaded parking brakes on the rear axle for maximum safety. An optional differential lock on the drive axle is available.

Operator's cabin

The cabin is specially designed for the de-icer operators. Emphasis is placed on good ergonomics and simple operation and manoeuvring, instrument positioning and operator's view.

A large touch screen monitor provides the operator with all necessary information.

The cabin is completely enclosed and provides space for one operator and one instructor.

The cabin is provided with forced air heating and ventilation.

The cabin has large windows, giving the operator maximum view in all directions. The window frames are narrow to allow maximum operator visibility.

The windows have parallel operating wipers. Window washing equipment includes a 12 litre fluid tank.

The cabin is fitted at the end of the telescope arm and can be slewed $\pm 90^\circ$. It is automatically levelled when elevating and lowering the telescopic boom.

The cabin is equipped with an "autopark" switch making it easy for the operator to return to the parking position from any position of the boom and/or cabin.



Outstanding comfort for operator

Operator's controls

The operator's seat is adjustable, with spring suspension and has an electrical heating system.

The control sticks are conventionally positioned and provided with the following:

Left side joystick

- Main boom out/in
- Main boom up/down
- Main boom swing right/left
- Cabin swing right/left
- Autopark
- Flow rate adjustment

Right hand joystick

- Spray nozzle right/left
- Spray nozzle up/down
- Fluid spray on/off
- Spray jet characteristics
- Spray nozzle telescope arm out/in
- Spray nozzle telescope arm up/down



Car-like driving

The desired flow rate of de- and anti-icing fluids is adjustable in four different steps also by touch screen buttons.

Computer/controller system

Among the leading innovations is a computerized system with a touch screen monitor. The heart of this system is a Pentium processor which controls all functions of the de-icer. This system provides a full diagnostic and fault-finding feature for all main systems and components.

The touch screen monitor is the main interface between the operator and the de-icer and provides an excellent overview for the operator and the maintenance personnel.

If the de-icer is equipped with the optional CMS de-icing coordinator system, the processor manages all communication between the de-icing control station and the de-icer.



State-of-the-art computer technology



Mixing system for maximum savings

The mixing system for water and ADF is equipped with:

- Automatic mixing alarm if the mixture deviates more than -0/+3% from the set value.
- Mixture setting either "stepless" from 3 to 97% for maximum saving of ADF or a fixed mixture setting of separate choices e.g. 0/25/50/75/100% is also available.
- A double mixing system is available which allows mixing between water and Type I as well between water and Type II/IV fluids
- The mixing ratio is automatically adjusted according to the temperature (two temperature sensors mounted on de-icer) or can be entered manually

The computer screen in the cabin indicates the actual mixing ratio, shows the flow rate and total consumption of fluid and a printer registers time and fluid consumption.

Telescoping boom

The telescopic boom has two sections and can be positioned from a horizontal level to an angle of 70°. Maximum nozzle swing reach right/left is 13 meters. The telescopic boom is controlled by hydraulic proportional valves for smooth and precise movements.



Spray nozzle

The revolutionary "4 MODE NOZZLE CONTROL" helps to reduce the glycol consumption, eases the work of the operator and provides the following options

- proportional control of nozzle by joy-stick
- speed control of nozzle by joy-stick
- automatic swipe function of nozzle
- under-wing function of nozzle

The spray nozzle is fitted on a telescopic arm outside the cabin, with a maximum reach of 8,3 m from the center of the cabin. The nozzle is operated from the cabin and is fully adjustable. The fluid flow rate is adjustable between 20 and 220 l/min.

The fluid jet shape is adjustable from a concentrated beam to a cone shaped spray. Fluid pressure at pump is up to 15 bar and spraying distance is approximately 25 m.

A hand operated spray gun with 10m hose on automatic hose reel is placed in front part of the vehicle.

Tanks

An electrical heater sufficient to maintain a fluid of +85°C at an ambient temperature of -15°C is installed in the tank.

The heat loss is approx. 1°C per hour at the ambient temperature of -15°C without any heating system connected.

The tanks have sufficient expansion volume and ventilation to prevent overflow and pressure increase. Filling capacity 1000 l/minute.

The tanks are equipped with automatic overfill protection, inspection manhole, internal baffle plates, draining plugs and a pressure filling system placed on the right side. Top filling including safety rails can be installed as an option.

Striking advantages

- One person operated
- Car-like driving
- Outstanding comfort for operator
- Under-wing de-icing from cabin
- Revolutionary nozzle control system
- State-of-the-art computer technology
- Stepless mixing system 3-97%
- Operational range from Turboprops up to A380



Emergency systems

A battery powered emergency pump is connected to the hydraulic system. Start/stop switches are positioned in a separate cabinet. The switches can be reached from the outside of the vehicle and inside the operator's cabin.

Four emergency stop switches are installed, three outside of the vehicle and one in the cabin.

Operating safety

No operator communication problem as SAFEAERO 220 is fully optimized for one-person operation. Ultrasonic sensors for added collision avoidance.

Excellent operator visibility in all directions through overhead viewing heated windows and front and rear mounted video cameras.

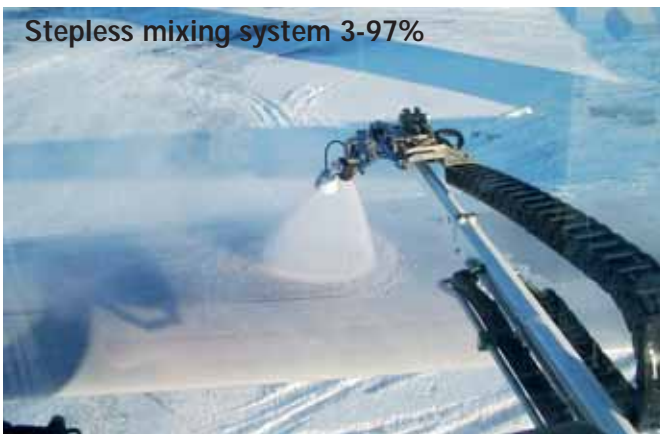
Operational efficiency

Outstanding manoeuvrability thanks to the custom designed chassis and enormous operational action radius of spray nozzle.

Under-wing spraying capability and de-icing with aircraft engines running.

Efficient glycol utilization thanks to the computers precise setting from 3 to 93% ADF.

Stepless mixing system 3-97%



CMS de-icer coordination system

A management/coordination system has been developed for full control and action of the de/anti-icing procedure mainly for using SAFEAERO 220 as the de-icing equipment.

For more detailed information please see our folder.

Revolutionary nozzle control system



TECHNICAL DATA SAFEAERO 220

Dimensions

Width	2,85 m
Length	8,55 m
Height	3,5 m
Total weight without fluid	16800 kg
Tank capacity (1,2 or 3-tank version)	8400 l
Wheel base	3,8 m
Turning radius	7,2 m*
Turning between walls, required distance	18 m
Inside cabin height	1,7 m
Eye height of operator	14,5 m
Maximum height of nozzle above ground	20 m
Maximum nozzle swing reach right/left	13 m
Maximum cabin rotation	± 90°
Nozzle telescope arm length from center of cabin	4- 8 m
Nozzle turning up/down	+70°-120°
Nozzle turning lateral	±70°
Ground clearance	250 mm

Speed

Driving speed	Approx. 40 km/h
Driving speed with raised or extended boom	Max.6 km/h

Pumping Capacity

De-icing flow rate	50 -220 l/min
Anti-icing flow rate	20-100 l/min

Wind stability

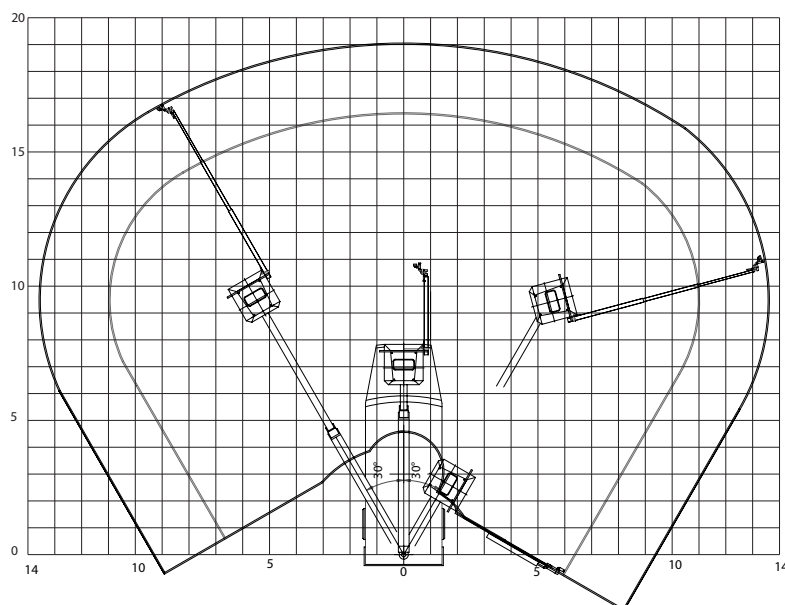
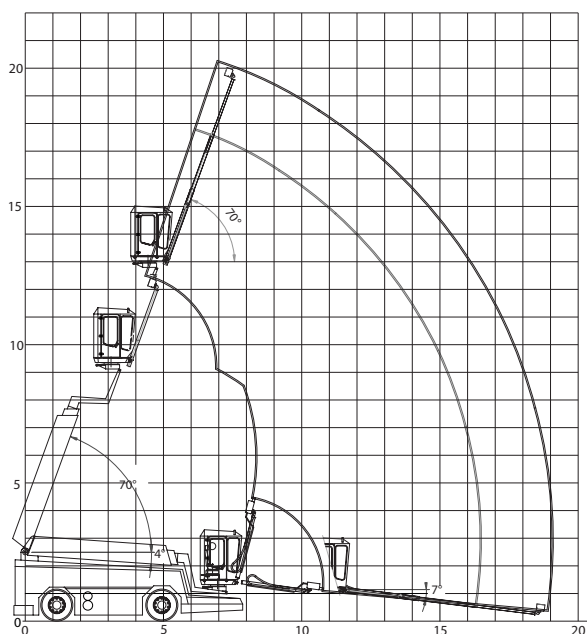
Maximum velocity	20,6m/sec
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Cabin

Maximum load capacity	205 kg
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*Measured from centre tread of front wheels

All technical data are subject to change without notice.



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