

ICETECH

ICETECH
DRY ICE BLAST EQUIPMENT



IceBlast KG20



IceBlast KG6



IceBlast KG6 Basic



MANUAL FOR KG20 • KG6 • KG6 BASIC

UK • US



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GENERAL INFORMATION

The dry ice blasting machine and its accessories have been developed with the aim of supplying cleaning equipment which will minimise consequential cleaning costs, and which also combines the best characteristics of sand blasting and steam cleaning.

The dry ice process provides the dry cleaning process familiar in steam cleaning where thermal effects loosen impurities. The dry ice blasting machine now developed offers equipment which with a totally dry cleaning process not only removes impurities from the surfaces being cleaned; it also leaves no waste products. The blasting/cleaning medium itself evaporates. This means that in most cases the process can be used for cleaning machinery – without dismantling, and as a rule without having to cover adjacent plant.

Cleaning in Industry

In industrial processes it is often impossible to avoid production apparatus from getting dirty, with the consequent impairment of production reliability, product quality, and the safety of personnel.

Thus, regular and preventive cleaning of production apparatus becomes part of many company plans to achieve problem-free production.

Production and maintenance crews all over the world therefore constantly seek cleaning methods which increase product quality, which are cost-saving, and which at the same time are environmentally sound. In today's high-tech and often highly automated plant, traditional cleaning methods are not always the optimum.

They place extra load on machines, personnel and the environment, or involve extensive dismantling to ensure that cleaning will not cause damage. Dry ice blasting provides a gentle, dry and efficient cleaning process that leaves no waste products behind it, i.e. undesired substances that might penetrate into or be deposited on machine components.

This means that cleaning by dry ice blasting becomes an excellent alternative to cleaning with traditional equipment.



“ Dry Ice pellets are non-toxic, non-abrasive and free of moisture. Therefore, dry ice blasting is applicable for a large number of industries. ”

DRY ICE BLASTING – HOW IT OPERATES

Method

Dry ice blasting equipment uses small CO₂ “particles” as the blasting medium – in the following called Dry Ice pellets. (CO₂ – the chemical denomination for carbon dioxide). Liquid CO₂ is expanded in a special unit to CO₂ snow. This substance is then subjected to high pressure and is forced through a matrix to create hard and uniform pellets of approx. 3 mm in diameter and 10 mm long.

These Dry Ice pellets have a temperature of -79°C/110°F and when used for dry ice blasting immediately change from solid to gaseous form on contact with the object being cleaned, i.e. the pellets heat up on impact. This change, from solid to gaseous form, and the accompanying tremendous expansion in volume, are among the factors which result in the loosening of impurities.

The transportable dry ice blasting machine contains a dry ice container and a dispensing unit which forces the dry ice through a hose to the blasting gun.

In the gun, the air stream is accelerated and with it the velocity of the Dry Ice pellets. They leave the nozzle of the blasting gun at very high velocity and gain high kinetic energy (movement energy) before striking the impurities.

The Cleaning Effect of Dry Ice Pellets

The cleaning effect of dry ice is based on three principles –

- The thermal effect
- The kinetic effect
- Volume expansion

- **Thermal Effect:**

Dry Ice pellets have a temperature of -79°C/110°F and impurities are therefore cooled down drastically: They shrink and loosen.

- **Kinetic Effect:**

When Dry Ice pellets leave the blasting gun nozzle they have high kinetic energy; an important characteristic in removing deposits.

- **Sublimation Effect:**

When a Dry Ice pellets impacts the object being cleaned it is immediately transformed from solid to gaseous form and its volume increases by a factor of approx. 700. In the process, deposited dirt become loose and brittle and is torn away from the underlying surface.

In some cases the thermal effect will be the most significant (e.g. where deposits of bitumen, resin, glue are involved), in other cases the kinetic effect will be the most significant (e.g. on brittle deposits).

“ Drastic reduction of waste problems.
No abrasive effect. ”



SAFETY REGULATIONS

General

This manual contains instructions and safety regulations which must be followed on starting, operating and servicing the dry ice blasting machine.

It is important that the manual be kept so that the operators always know its exact location.

It is also important that the owner makes sure that operators understand and follow the contents of the manual.

Personnel Qualifications

Personnel responsible for installation, servicing and maintenance must be suitably qualified to perform these functions. If personnel are not in possession of sufficient knowledge they must be instructed and trained. Such training can be arranged in cooperation with the manufacturer of the machine.

The owner of the machine must ensure that the person appointed to operate the dry ice blasting machine fully understands and is able to follow the SAFETY REGULATIONS laid down in the following pages.

The regulations must also be located on the machine and should be carefully studied.

Security and Risk

The machine is constructed to comply with the standards and clauses contained in the terms of sale. Therefore, provided the manufacturer's instructions are followed, the machine will not pose any risk to operators.

It is important that operators carefully follow the safety regulations located on the machine or contained in the manual. Operators must read and understand the contents of the whole manual before starting the machine.

The signs located on the machine are to remind operators that use without risk depends on their following all regulations, including those describing work clothing.



Precautions during Blasting

Air, CO₂ gas and Dry Ice pellets leave the gun nozzle at a very high velocity (up to 300 m/s).

Therefore,

- do not aim the nozzle at persons or in the direction of places where other people work
- remember that the Dry Ice pellets can be thrown back from the object being cleaned,
- do not aim the nozzle in directions where damage might result.

The machine must not be used in "fun" and the gun nozzle must **never** be aimed at persons or other living creatures.



“ Dry ice blasting has some important advantages over other cleaning methods. ”



CO₂ Concentrations

The Dry Ice pellets are CO₂ in solid form. At normal atmospheric pressure, CO₂ can only exist in solid form at temperatures of $-79^{\circ}\text{C}/110^{\circ}\text{F}$ or lower. When it is used as a blasting medium it becomes heated and changes into gaseous form. As CO₂ has a higher specific gravity than ordinary atmospheric air, inhaled air will contain CO₂ – especially if the blasting process takes place in small or partly closed rooms. In such conditions there is a risk of the oxygen content of inhaled air being replaced by CO₂. Therefore make sure that the room where such a risk might be present is well ventilated.

Note that:

- Low CO₂ concentrations (3-5%) result in headaches and rapid breathing.
- CO₂ concentrations of 7-10% produce headaches and nausea, and may lead to unconsciousness.
- Higher CO₂ concentrations lead to unconsciousness and, in the worst case, suffocation.

As stated above, high CO₂ concentrations can displace oxygen and result in unconsciousness. Therefore, avoid using the blasting equipment in spaces/rooms where ventilation is limited.

Important!

In rooms, closed tanks, etc. with limited ventilation, the presence of a CO₂ detector is recommended. This can be installed to interrupt blasting before the CO₂ concentration exceeds a prescribed limit.

“ In many cases cleaning is possible without dismantling. The frequency of production stops is therefore often drastically reduced. ”





Static Electricity

Serious discharge of static electricity can occur. Always make sure that objects to be cleaned are adequately earthed and that this connection remains stable throughout the whole cleaning process. The dry ice blasting machine is earthed, from machine cabinet to blasting gun, and through the main electricity connection on the rear side of the machine – provided that the machine has been installed as described under STARTING THE MACHINE pages 16.



Danger of Thrown Loose Objects

There is a risk of dry ice and small objects being thrown back. Therefore small objects must be firmly secured before blasting – and loose objects must not be left in the area where the cleaning process is to take place.

The operator must always wear approved protective goggles or a protective shield when working with the blasting equipment. This also applies to other personnel in the vicinity of the workspace.



Danger of Burns

At atmospheric pressure, CO₂ in solid form has a temperature of -79°C/110°F or lower and can give rise to serious burning on skin contact.

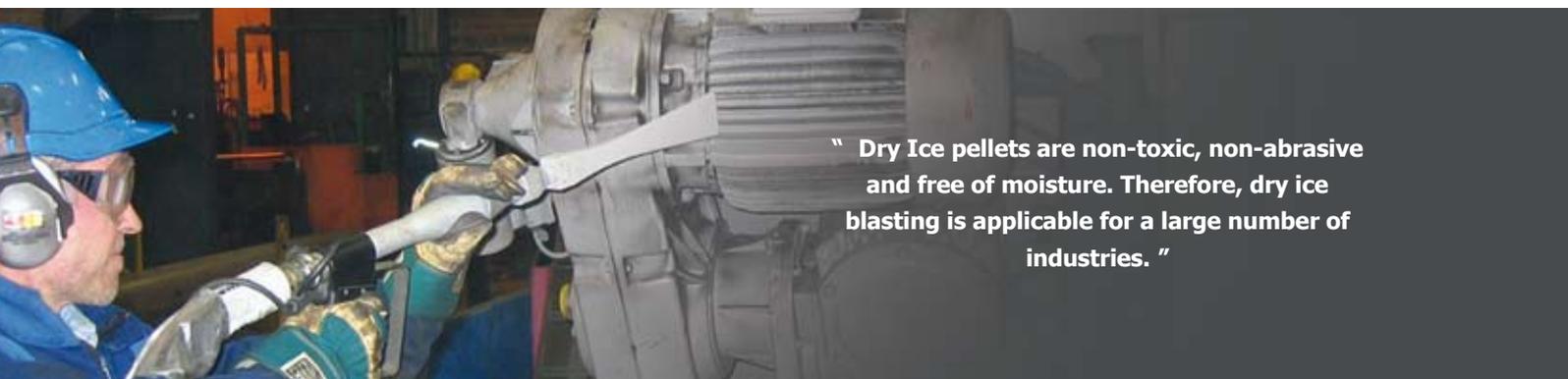
Important!

Therefore, always read the health and safety data sheet provided by the dry ice supplier, and follow the instructions given.



Noise

In order to avoid noise stress, operators must always wear approved ear protection when working with the blasting equipment. Because of the high air velocities in the gun nozzle during dry ice blasting, the level of noise in the area where operators work can reach 85-115 dB(A). Other personnel in the vicinity must also be offered ear protection if the noise exceeds 80 dB(A). Ear protection is recommended under all circumstances. It is important that the work area be marked with the mandatory signs (blue) showing the ear protection symbol where the use of ear protection is required.



“ Dry Ice pellets are non-toxic, non-abrasive and free of moisture. Therefore, dry ice blasting is applicable for a large number of industries. ”



Danger of Congelation

When using the blasting equipment, the operator must wear gloves in order to eliminate the risk of congelation by contact between dry ice and unprotected skin.

Read the health and safety data sheet of the dry ice supplier and follow the instructions given.



Danger of Congelation

When using the blasting equipment, the operator must wear long-sleeved industrial clothing in order to eliminate the risk of congelation by contact between dry ice and unprotected skin.

Read the security card of the dry ice supplier and follow the instructions given.



Dust

Certain types of dust have a tendency to pulverize during the cleaning process, and if the amount of dust developed exceeds 6 mg/m³ (fine dust) the operator must wear a dust mask.

“ When using the blasting equipment, the operator must wear gloves in order to eliminate the risk of being burned. ”



USING THE MACHINE

The machine is designed to direct a jet of Dry Ice pellets onto the object to be cleaned and thus remove impurities from its surfaces.

As the velocity of the cleaning jet is very high and the temperature of the dry ice (the cleaning medium) very low, the operator must be very careful to aim **only** toward the object being cleaned. Furthermore, the operator must take every precaution to prevent either dry ice from the cleaning jet or cleaned-off impurities from the object striking any persons or any other plant.

The machine must not be used in surroundings where there is a danger of explosion. Despite excellent earthing of both machine and cleaning object, static electricity can be generated and create sparking.

The control cabinet (which houses the electrical controls) must only be opened when the mains connection has been cut off.

The connection between the electrical supply socket on the blasting gun and the socket on the front of the machine must only be made **after** the blasting hose for air/dry ice has been connected at both ends. When removing the blasting hose from the machine the electrical supply must be cut off **before** hose separation.

MACHINE OPERATION

Via a dispensing system, the machine takes dry ice from a built-in dry ice tank and into an air stream which propels it through a hose to the nozzle. The nozzle is fitted into a gun on which a trigger switch is mounted for cutting off or starting the air/ice stream.

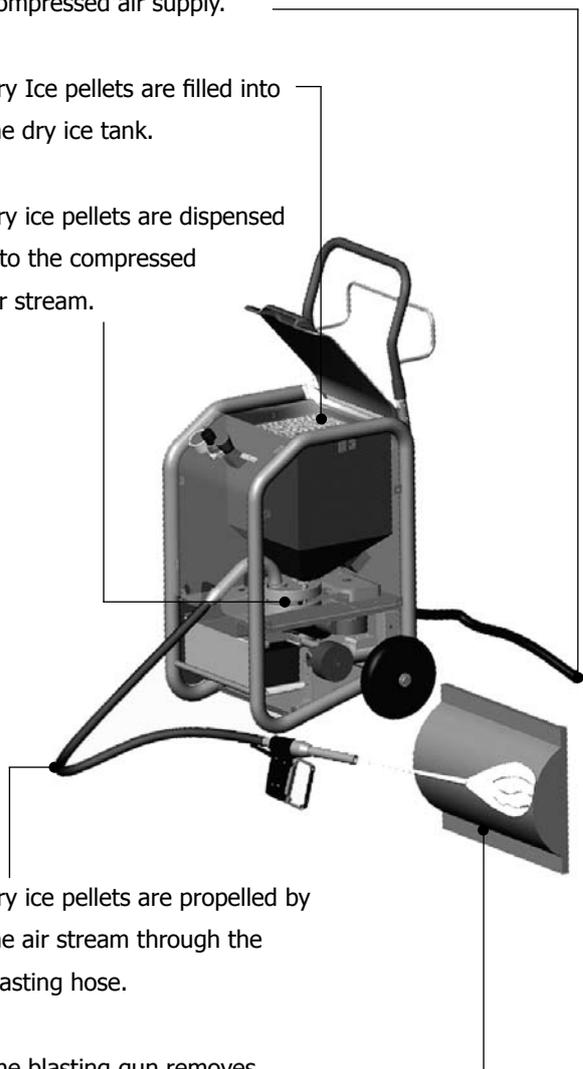
Compressed air supply.

Dry Ice pellets are filled into the dry ice tank.

Dry ice pellets are dispensed into the compressed air stream.

Dry ice pellets are propelled by the air stream through the blasting hose.

The blasting gun removes deposits of impurities.



“ CO₂ evaporates back into the atmosphere, and cleaned-off dirt is the only remaining waste. There are no additional blasting media. ”

On/Off

The emergency switch connects or disconnects the voltage to the control circuit of the machine.

The machine is only voltage free when the battery plug on the battery is removed.

On: The machine can be operated from the trigger switch on the blasting gun.

Off: The trigger switch on the blasting gun remains inoperative, and the battery indicator is switched off.

KG6 Basic:

No adjustment of the dry ice consumption

Fixed predefined consumption rate.

KG6: Dry Ice Dispensing

The knob is graduated from 0 to 10 and allows the adjustment of dry ice consumption. The scaling of the knob indicates only how much the knob is turned in relation to the initial starting position.

kg: 15 to 40 | lbs: 33 to 88

KG20: Dry Ice Dispensing

Dry ice quantity per hour.

Can be adjusted by pressing  or .

kg: 16 to 55 | lbs: 36 to 122

Filling up with Dry Ice

The dry ice tank in the machine must be filled as necessary with dry ice from an insulated container delivered by the dry ice supplier.

The machine works with the dry ice tank cover open, or closed. Filling can thus be carried out while the machine is in operation.

The safety regulations supplied by the dry ice supplier must be followed when handling the dry ice.

Adjustment of Air Pressure (working pressure)

The knob for adjusting the air pressure must be pulled out and turned to the intended pressure (as shown on the pressure gauge beside the knob).

After adjustment, press the knob in again to lock it against unintentional turning.

The adjusted air pressure shown on the gauge is an indication of the velocity at which dry ice (dry ice pellets) strikes the object being cleaned. The reading can then be compared with the results achieved (the effectiveness of the blasting jet) to decide whether further adjustment is necessary.



“ The combination of extremely high cleaning speeds and a wide range of nozzles means that even normally inaccessible parts can be rapidly cleaned. ”

DRY ICE MACHINE



- 1** Handle with hose suspension.
- 2** Handle for lid above the dry ice tank. The lid can be held open manually for refilling.
- 3** Control panel.
- 4** Dry ice dispensing unit doses dry ice into the blasting air stream.
- 5** Female connection for the blasting hose (carrying the air stream with its content of dosed dry ice).

- 6** Main valve for the blasting air stream.
When the machine is ready for operation the valve opens for blasting air every time the trigger switch on the blasting gun is activated.
When the trigger is released, the valve cuts off the air stream.
- 7** Regulator which adjusts the working pressure to the value set by the air pressure knob on the control panel.

- 8** Filter/regulator for vibrator and main valve for blasting air (must be adjusted to a value determined by experience – but min. 4.5 bar/65 psi and max. 5.5 bar/79 psi).

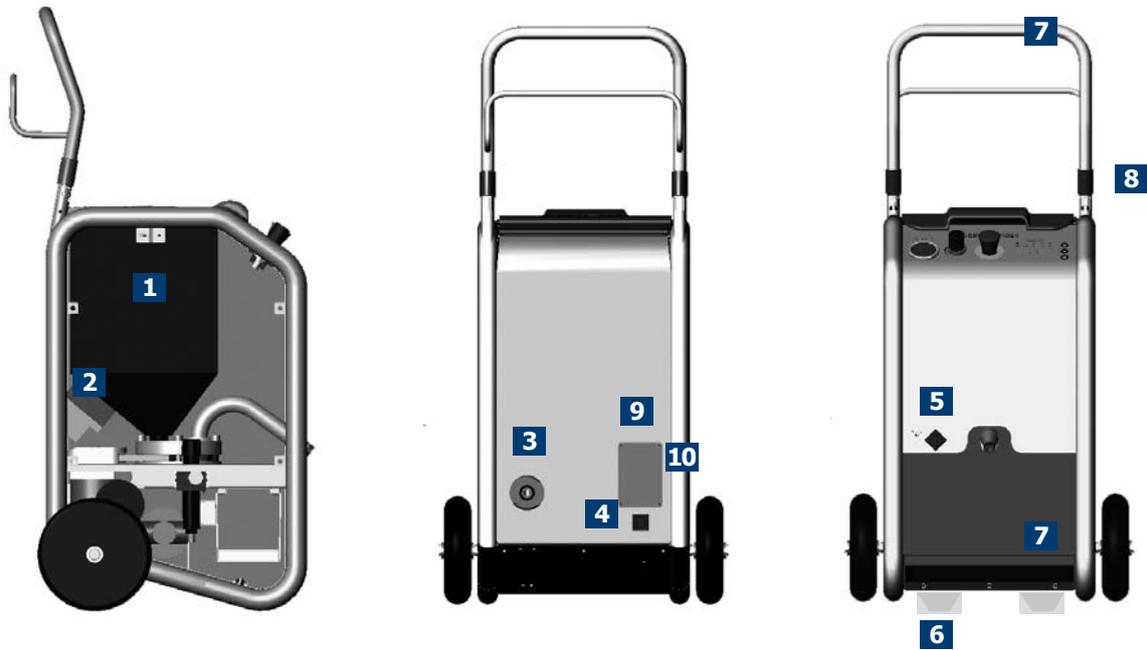
- 9** 24 V handy rechargeable interchangeable battery.

- 10** Vibrator speed:
The speed of the vibrator (which prevents the dry ice from bridging/clogging) can be adjusted on the throttle valve. The pressure must be adjusted to a value which is known to prevent bridging/clogging.

- 11** Control box.

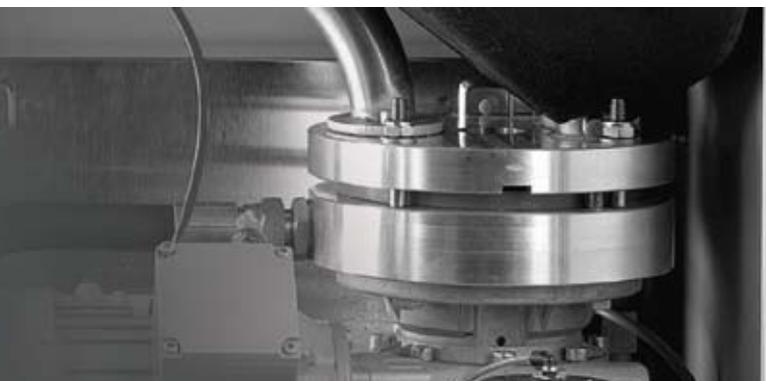
“ The equipment is designed to meet the wishes of users. It is light, mobile, reliable and easy to operate. ”

DRY ICE MACHINE



- 1 Dry ice tank.
- 2 Compressed-air-driven vibrator on the dry ice tank.
- 3 Connector for the primary air supply.
- 4 Plug for battery charger.
- 5 Electrical socket for the plug on the blasting hose (transfers signals from the trigger switch on the blasting gun to the machine control).
- 6 When lifting with a forklift, the forks must be inserted under the machine frame. The cabinet bottom plate must not be loaded in any way. Ensure that the wheels do not become damaged. When using a crane for lifting, a yoke with straps under the cabinet frame must be used.
- 7 When lifting manually, grasp the handle **and** underneath the front of the cabinet **simultaneously**.
- 8 During transport, storage, etc. the height of the machine can be reduced by folding down the handle.
- 9 Serial number.
- 10 Butterfly nut for earth connection wire.

“ The high operational reliability and efficiency of the machine is ensured by the use of high-quality components throughout. ”



CONTROL PANEL

1 Blasting/working pressure display

Manometer shows in bar, (overpressure in kp/cm^3). The machine shall be connected to a main air supply which delivers a max of 10 bar/145 psi, the air pressure cannot be adjusted to a higher value than the supply pressure.

2 Adjustment of Blasting Pressure

Knob for adjusting the air pressure (the working pressure) to be used. Adjust the pressure that gives the correct cleaning effect when the gun is activated.

This pressure determines the velocity at which the dry ice strikes the object being cleaned.

3 Emergency stop

The machine stops when the emergency stop is activated by pressing it in. The stop is in the correct operating position when pulled out.

4 Digital control display

User-friendly control display, with error-log indication.

5 Push button for control display function

For adjusting ice consumption, operation time and to turn on and off the light gun.

6 Pellet Consumption

Potentiometer for adjusting pellet consumption.

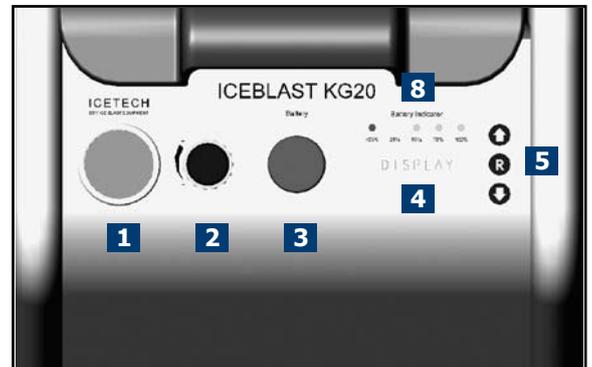
7 Air Pressure

Manometer showing air supply pressure.

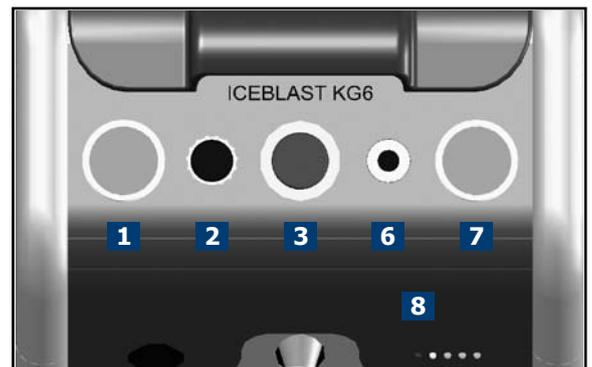
8 Battery indicator

The battery indicator displays the battery level currently, ensuring easy check-up of battery status during operation.

CONTROL PANEL KG20



CONTROL PANEL KG6



CONTROL PANEL KG6 Basic



“ The control panel is well arranged and includes adjustment and digital display of dry ice consumption, adjustment and display of blasting pressure. ”

BATTERY CHARGING

The battery indicator is composed of 5 diodes:

- <25% red
- 25% yellow (recharge battery)
- 50% green
- 75% green
- 100% green (fully charged)

KG20 + KG6:

The machine stops automatically if the battery capacity is below 18%. Recharge the battery before use.

KG6 Basic:

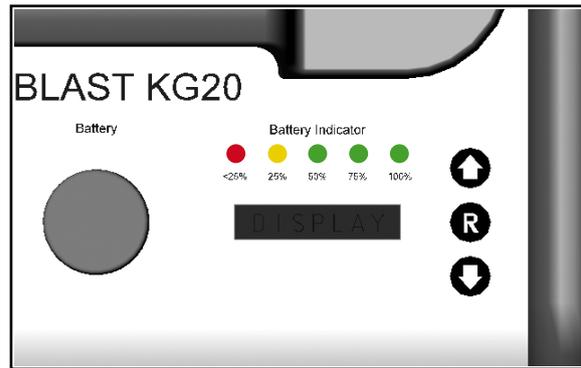
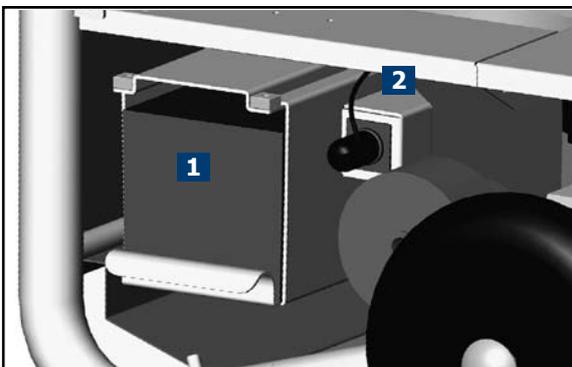
The battery must be recharged immediately if the red diode of the battery indicator is on. The battery should be recharged every 7th day in order to maintain optimum battery efficiency.

1 Battery

24 V handy interchangeable battery.

2 Battery plug

On change of battery: Unplug the battery plug and remove the battery to be recharged. Insert the new fully charged battery. Always check to ensure that the battery plug is fixed correctly.



3 Battery Recharging

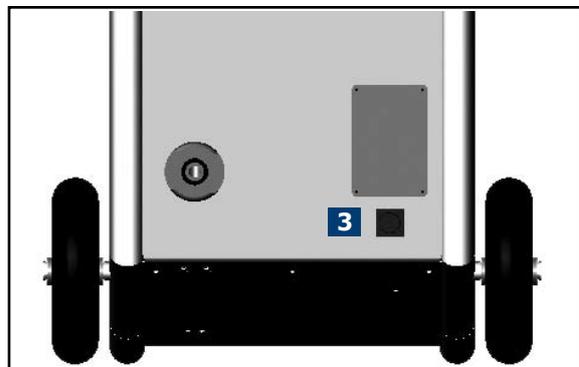
Connect the charger to the plug on the back of the machine and to 100V/220V. Recharging starts automatically and the indicator turns yellow. The indicator turns green when the battery is fully recharged. The red diode on the battery charger indicates that the charger is on.

Unplug the charger from the machine and the 100V/220 supply when the battery is fully charged. The machine is ready for use.

If the effective operating time is considerably reduced, even after normal recharge, the battery may be worn out. Replace it by a new battery.

IMPORTANT!!!

Before putting the machine into operation, the battery must be charged for 6 hours. After that, recharging will normally last approx. 5 hours. The battery indicator on the machine displays the status of the battery.

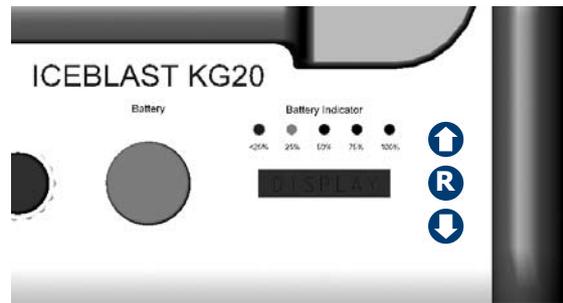


“ The battery indicator displays the battery level currently, ensuring easy check-up of battery status during operation. ”

KG20 Control Functions

Machine Start-Up

- 1 Turn on the machine by deactivating the emergency stop. Subsequently the blasting gun must be activated by pressing the trigger.
- 2 If the machine is fitted with a light gun, press  and  simultaneously to turn on and off the light on the light gun.
- 3 **Switch between menu**
Press  to switch between "C.O.T." - "T.O.T." - "Service".



"Blasting active"

The motor is active.

"Motor Failure"

The motor does not work.

"Motor Overload"

The motor is overloaded.

See Trouble Shooting Pages 21-22

"Valve Overload"

The valve is overloaded.

See Trouble Shooting Pages 21-22

"!!!!Service!!!!"

Machine to be serviced.

"Volume"

Ice quantity per hour.

Can be adjusted by pressing  or  .
kg: 16.1 to 55 | lbs: 35.8 to 122

"C.O.T."

Current **O**peration **T**ime. Can be reset by pressing  and holding it for approx. 10 sec.

"T.O.T."

Total **O**peration **T**ime.

"Service"

Time remaining until service is required.



" User-friendly control display, for adjusting and with error-log indication (only KG20). "

BLASTING HOSE

The outside protection sleeve might become inflated if the internal hose is leaking.

NOTE: If this fault occurs stop the machine immediately.



- 1 Air coupling (male) for insertion into the female air coupling on the front of the IceBlast machine.
- 2 Electrical male plug for insertion into the female socket on the front of the IceBlast machine.
- 3 Electrical socket (female) for connecting the blasting hose to the Ice Gun (transmits electrical signal from the gun to the machine control).

- 4 Pneumatic coupling (female) for connecting the blasting hose to the Ice Gun.

STANDARD ICE GUN

Blasting Ice Gun with insulated handle.



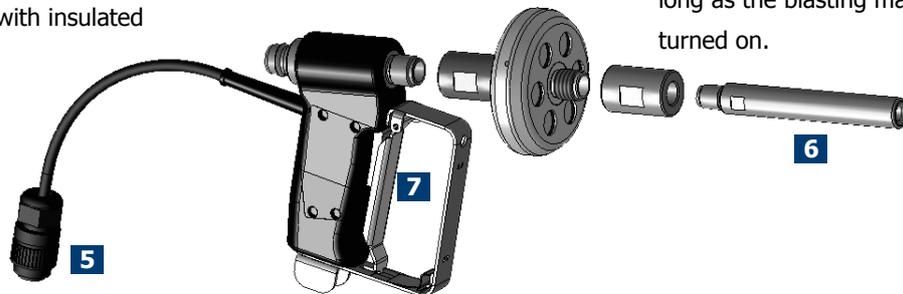
- 5 Electrical Ice Gun plug (male), for electrical socket (female) on the blasting hose.

- 6 Standard Ø7 mm blasting nozzle - Interchangeable.

- 7 Gun trigger switch. Starts/ stops the flow of air and dry ice to the Ice Gun as long as the blasting machine is turned on.

LIGHT GUN

Blasting Light Gun with insulated handle.



“ The blasting gun is ergonomically designed. The gun is built up of modules and can be adapted to suit any task. ”



STARTING THE ICEBLAST MACHINE

Setting Up

- 1 Connect the battery charger.
- 2 Turn on the battery charger.
- 3 The recharge starts automatically and the diode on the battery charger turns yellow. The diode turns green when the battery is fully recharged. The red diode on the battery charger indicates that the charger is on. Unplug the charger from the machine and the 100V/220 supply when the battery is fully charged.
- 4 Fasten the earth connection wire in the butterfly nut on the back of the machine in order to prevent static electricity. Connect the terminal to some place already adequately earthed.
- 5 Make sure the machine is on a level, horizontal foundation.
- 6 Connect the primary air coupling to the main air connection on the rear of the machine cabinet.
- 7 Plug the blasting hose into the socket on the front of the machine cabinet. Check that the hose is securely connected.
- 8 Make the electrical connections at both ends of the blasting hose with the corresponding sockets on the blasting gun and on the front of the machine cabinet.

Dry Ice Check

Dry ice for the cleaning process must be applied into the built-in dry ice tank. This can be done while the machine is in operation. It is recommended that the dry ice tank be run empty for each filling to enable the operator to see whether "snow" or lumps appear in the dry ice. These can prevent a continuous supply of dry ice to the dispensing system. Never leave the machine with the cover open. Dry ice must be handled in accordance with the safety regulations issued by the dry ice supplier, and the operator must wear personal protection equipment as described in the above SAFETY REGULATIONS.

The Working Posture of the Operator

Before activating the blasting gun switch, the operator must stand in a working posture that prevents loss of balance from blasting gun recoil. When used at the highest blasting pressure, with the largest nozzle diameter, the recoil energy can reach as much as 6 kp. Close off the working area and set up possible mandatory signs pertaining to ear protection and safety goggles.

Starting

When the machine has been set up, the following procedure shall be followed before the cleaning process is begun:

- 9 Check carefully to ensure that the dispensing system at the outflow of the dry ice tank is dry and clean.
- 10 Open the main pressure air supply (slowly).
- 11 Emergency switch is turned to ON



- 12** Activate the trigger switch on the blasting gun for a few seconds for activating the battery indicator / digital control display.
- 13** Check that the battery is fully charged (Battery indicator).
- 14** Adjust the blasting pressure (the working pressure).
- 15** Activate the trigger switch on the blasting gun for a few seconds to allow air to flow through the system.
- 16** Place the dry ice pellets into the dry ice tank.
- 17** Adjust the consumption of dry ice.
- 18** Start blasting.

SHUTTING DOWN THE ICEBLAST MACHINE

When the cleaning task has been completed, the following procedure must be carried out before the machine is dismantled or stored:

- Empty the dry ice tank.
- Activate the trigger on the blasting gun for a few seconds in order to empty the system of possible dry ice residue.
- Close the main compressed air supply.
- Activate the trigger switch on the blasting gun again for a few seconds in order to depressurise the system.
- Make sure that the emergency stop is in off position -when pushed in.

- Disconnect the main air supply.
- Avoid kinking the blasting hose, especially when rolling it up.

EMERGENCY STOP

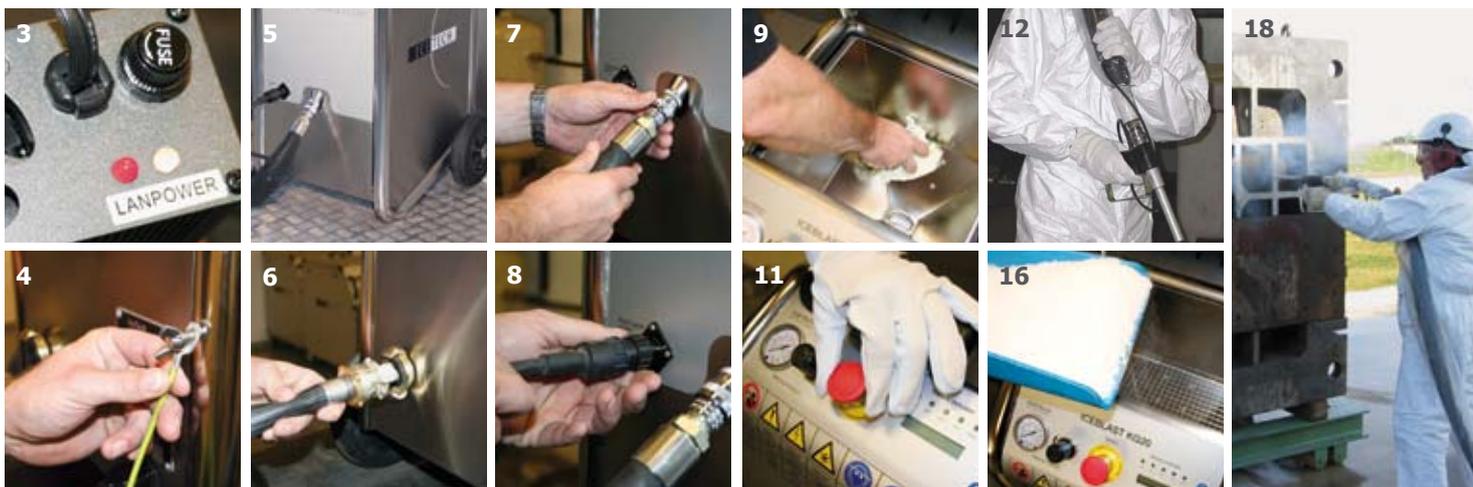
Activation of the emergency stop immediately stops the blasting air stream and dry ice dispensing. Before the machine can be restarted, the following procedure must be carried out:

- The emergency stop must be put back to the correct operating position.
- The blasting air stream can now be restarted by activating the trigger switch on the blasting gun.

FAILURE/FAULTS

If when using the machine the operator notices that the outer protection sleeve on the blasting hose looks or feels inflated in any way, the machine must be stopped immediately.

- Close the main air supply immediately.
- Activate the trigger switch on the blasting gun until the system is depressurised.
- Activate the EMERGENCY STOP.
- Remove the main air connections from the machine.
- Remove the blasting hose and send it for repair and pressure testing at the manufacturer's test facilities.
- The dry ice tank might be empty, but the system must not be blasted through until a new/ repaired blasting hose has been connected.



The outer hose sleeve protects the operator from any exposure caused by wear and tear of the inner hose. No pressure is permissible in the outer sleeve during operation. Therefore, any sign of inflation means that the inner hose is in some way defective. For safety reasons the machine must then be stopped immediately and shut down as described above. If a defective blasting hose is used, the operator risks serious injury from being hit by Dry Ice pellets.

The operator must not try to repair the blasting hose. It must be sent to the manufacturer for repair for two reasons:

- A) The manufacturer has special tools for making perfect repairs.
- B) In accordance with regulations, a renewed pressure test must be carried out on the hose and a new pressure test certificate issued.

Never disconnect the blasting hose when the machine is connected to main electricity and air supplies, otherwise activation of the blasting gun trigger switch will result in blasting air being discharged through an open connection instead of through the gun nozzle. The operator will then lose control of the air stream and might be seriously injured.

The main electrical connection supplies the battery charger with 100 V/230 V + 0 + earth (CEE17 plug with earth). The control circuit uses 24 V.

In the OFF position, the emergency switch cuts off voltage to the control circuits, but does not make the machine voltage-free.

The machine is only voltage-free when the battery is disconnected. Therefore, the control cabinet must

not be opened, and the electrical junction box on the dosing unit motor must remain closed until the battery has been removed.

If electrical supply failure occurs the machine will not start. If the blasting air stream is disconnected the dry ice dosing unit stops.

Air supply failure stops the blasting air stream during operation. The air stream decreases and disappears completely when the pressure in the system falls below 0.5 bar. The main valve for blasting air closes when the control pressure is below this value. The dosing unit motor will continue to run for as long as the trigger switch on the blasting gun is activated. Therefore, in order to prevent the dispensing unit from being damaged the trigger must be released no later than when the main valve shuts off the blasting air stream.

A mesh guard is fitted in the dry ice tank to prevent operators from coming into contact with moving parts of the dispensing unit during operation. If the guard is removed, all machine functions stop. On refitting the guard the machine becomes ready to start without further intervention.

Machine stop caused by guard removal is thus not an emergency stop demanding machine restart. It is solely a safety device that automatically activates when the guard is removed. This stop function must in no way be modified or bypassed.

“ The operator must not try to repair the blasting hose. It must be sent to the manufacturer for repair ”



MAINTENANCE

Daily Before Starting the Machine

- 1 Examine the hose for cracks and other damage. Examine the whole length of the hose to see whether there are areas which are softer than others, and which indicate that the inner hose is worn or fractured.
- 2 Pay special attention to points where the hose may have become kinked during operation.
- 3 If any kind of damage is noted, it must be dealt with by an IceTech technician who will have the appropriate tools and equipment to ensure that repaired equipment complies with safety regulations.
- 4 Examine electrical plugs for damage and replace them if necessary.
- 5 Check to ensure that the batteries are fully charged.

After 100 Hours' Operation

- 1 Examine connections for wear and tear or other damage. Tighten up or replace them as necessary.
- 2 Check the dispensing system for damage and leaks.
- 3 Pour a small amount of Dry Ice pellets into the funnel and activate the blasting gun trigger switch. If back-pressure air at the bottom of the funnel is noted, an IceTech technician must be contacted to adjust the dispensing system.

After 500 Hours' Operation

- 1 Replace the dispensing disc.
- 2 Replace the upper and lower wear insert at the dispensing disc.
- 3 Check, adjust and tighten the dispensing system.
- 4 Test the hose.
- 5 Replace the diaphragm in the pilot-controlled pressure regulator.

(After 500 hours of operation, all maintenance must be carried out by an IceTech technician).

“ Examine the hose for cracks and other damage before starting the machine ”



DE-INSTALLATION, REPAIR

Repair

The repair/replacement of the following parts can be made by the customer's qualified personnel:

- Electrical plugs on the blasting hose and gun.
- Couplings on the blasting hose and blasting gun.
- Sockets on the front of the machine cabinet and on the rear where the main air is connected.

When repairs/replacements are made, only spare parts identical to the original parts, or spare parts supplied by the manufacturer of the machine may be used.

In order to comply with the terms of the warranty, and for safety reasons, repairs other than those stated above require special equipment and therefore must be made by the manufacturer.

The liability of the manufacturer under the terms of the CE endorsement as regards safety may become invalid if users make repairs with spare parts not identical to the original parts, if repairs are carried out by unqualified personnel, or if because of a lack of special equipment repairs are unsatisfactory. In such cases, the liability of the manufacturer will be solely confined to manufacturing faults/errors made prior to the machine being delivered and before repairs/replacements have been made.

SPARE PARTS

Standard Spare Parts Package (Users)

- 1 set of couplings for hose
- 1 set of plugs for hose



“ The control system is module-built from standard CE-approved units. The control system is encased in a dust-tight and watertight stainless cabinet. ”



TROUBLE SHOOTING 1/2

FAULT	CAUSE	REMEDY
The machine does not start.	No supply of electricity.	Check that the battery is fully charged and correctly connected. For more information: See page 13.
	The emergency stop is activated (pressed inwards).	Release the emergency button (pull outwards and make sure it can turn).
	The blasting gun has not been activated.	Activate the blasting gun.
The machine is turned on but it does not blast.	No supply of compressed air.	Check the machine is properly connected to a source of compressed air and that the air actually flows into the machine. The air hose must be inflated and rigid, and that the pressure must be verified in the manometer on the front panel.
	No electrical connection between the gun and the blasting hose AND/OR between the blasting hose and the machine.	Make sure the electrical plug of the gun is correctly attached to the electrical socket of the blasting hose, and make sure the plug at the other end of the blasting hose is correctly plugged into the socket on the front of the machine.
	Loose connections, defective plugs, damaged cables.	Check all connectors, cables, replace defective parts or correct loose connections.
	The flow of air and dry ice is blocked because the blasting hose is kinked or extremely inflexed.	Straighten up the blasting hose.
	“Motor Failure” “Motor Overload” “Valve Overload”	The motor needs replacement – call for a service engineer. Press the emergency stop button. Pull it out again after 5 seconds. Call for a service engineer.

“ Dry Ice Pellets evaporate immediately on striking the object. ”



TROUBLE SHOOTING 2/2

FAULT	CAUSE	REMEDY
<p>The machine blasts but there is no projection of dry ice.</p>	<p>The machine's tank is empty.</p>	<p>Refill the tank with dry ice pellets.</p>
	<p>The passage of dry ice to the dozing system is blocked, probably because of clumps or "cakes" of dry ice pellets.</p>	<p>Empty the tank, remove the clumps or cakes, blast inside the tank with plain air in order to remove remaining obstacles and humidity that might eventually turn into ice and produce more blockages.</p>
	<p>The tank is not vibrating so the dry ice does not flow to the dozing system. The pneumatic vibrator is either frozen or defective.</p>	<p>Empty the pellet tank and let the vibrator unfreeze (or warm it up with hot air). Make sure that the internal air pressure supplied to the vibrator is at least 4.5 bar/ 65 psi, and that the throttle valve is sufficiently open. For more information see page 10.10 The vibrator needs replacement if it is defective or malfunctions in any way - or if none of the above measures should manage to solve the problem.</p>
	<p>The dozing system is blocked because the dozing disc is not rotating.</p>	<p>If the problem were caused by a mechanical blockage of the disc due to a foreign object that might have fallen into the tank , then the system will have to be dismantled and the disc would have to be examined and replaced if damaged.</p>
<p>Continuous loss or leakage of air.</p>	<p>Rust or other impurities blocking the main valve or the pilot pressure regulator.</p>	<p>Open the mentioned units, clean or remove impurities, lubricate the piston inside the pilot pressure regulator, examine rubber membranes and replace if damaged.</p>
<p>The blasting hose gets inflated or bulks.</p>	<p>The hose is defective or broken.</p>	<p>The hose must be replaced IMMEDIATELY.</p>



“ With the proper IceTech nozzle accessories you can perform powerful and sensitive cleaning with an exceptionally low air consumption. ”

NOZZLE SELECTION AND AIR COMSUMPTION

Nozzle Diameter and Spread Angle

Nozzle selection should be based on finding the best combination of nozzle diameter and effectiveness of blasting jet for the cleaning process concerned – the aim being to maintain a desired and stable air velocity from the nozzle. Furthermore, the selection of nozzle spread angle will depend on how strong or weak a cleaning effect is desired for a given dry ice consumption. A small spread angle gives a concentrated jet with a high cleaning effect on a small surface and thus a comparatively slow workflow. A large spread angle results in a jet which for the same consumption of dry ice cleans a larger surface with a lesser cleaning effect, but gives a faster workflow.

Initially, it is most important to select the size of nozzle which will provide the desired air velocity using the available compressor capacity. The subsequent choice involves optimising the combination of cleaning effect, dry ice consumption and the time required for the cleaning process itself. Refer to the table below to see the relationship between air consumption, size of nozzle and the desired pressure in the nozzle (~ velocity of the Dry Ice pellets) for guidance on possible combinations.

Air Consumption Table

The marked areas in the table indicate the combinations used for most cleaning tasks.

However, a blasting pressure of up to 16 bar/232 psi for KG50 and KG30 (10 bar/145 psi for KG12) can be used. These are the maximum supply pressures of the machine and should only be used if the task demands maximum air velocity.

Example of Use of the Table

If the desired cleaning effect suggests a blasting pressure of 7 bar/102 psi, and the available compressed air supply is 5 m³/min (176 ft³/min) at this pressure, the table will indicate a size 8 nozzle.

This uses 4.8 m³/min (169 ft³/min) while a size 9 nozzle using the same pressure has a consumption of 6.1 m³/min (215 ft³/min), which is higher than the available quantity of air.

If, on the other hand, with the quantity of air available a somewhat higher cleaning effect (nozzle velocity) is desired, the table will show that it can be achieved using a size 7 nozzle.

This will increase the blasting pressure to 8 bar/116 psi without exceeding the available capacity, i.e. 8 bar/116 psi will use 4.1 m³/min (145 ft³/min), a figure not exceeding the available 5 m³/min (176 ft³/min).

“ Environmentally friendly
Dry ice blasting is completely non-toxic and
no hazardous chemicals are used.
Costs connected with the disposal of blasting
media, chemicals or solvents are saved. ”



AIR CONSUMPTION TABLE

Air consumption in m³ free air/min - ft³/min
 at the pressures indicated (working pressure, bar/psi)
 Ø = Nozzle diameter
 KG 6 Pneumatic + 0.5 m³ (0.7 + 0.5 = 1.2 m³)

AIR CONSUMPTION TABLE	Bar»	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
	Ø 5	0.7	0.9	1.2	1.4	1.6	1.9	2.1	2.3	2.6	2.8	3.0	3.3	3.5	3.7	4.0
	Ø 6	1.0	1.3	1.7	2.0	2.4	2.7	3.0	3.4	3.7	4.0	4.4	4.7	5.1	5.4	5.7
	Ø 7	1.4	1.8	2.3	2.7	3.2	3.7	4.1	4.7	5.1	5.7	6.2	6.6	7.1	7.4	7.7
	Ø 8	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.1	6.7	7.3	7.9	8.4	9.1	9.7	10
	Ø 9	2.3	3.0	3.8	4.6	5.3	6.1	6.9	7.7	8.4	9.4	10.1	10.8	11.7	12.1	13
	Ø 10	2.8	3.7	4.7	5.7	6.6	7.6	8.5	9.6	10.4	11.3	12.4	13.4	14.3	15.3	16

Air consumption in m³ free air/min

AIR CONSUMPTION TABLE	psi»	29	44	58	73	87	102	116	131	145	160	174	189	203	218	232
	Ø 5	25	32	42	49	56	67	74	81	92	99	106	116	124	131	141
	Ø 6	35	46	60	71	85	95	106	120	131	141	155	166	180	191	201
	Ø 7	49	64	81	95	113	131	145	166	180	201	219	233	251	261	272
	Ø 8	64	85	106	127	148	169	191	215	237	258	279	297	321	342	353
	Ø 9	81	106	134	162	187	215	244	272	297	332	357	381	413	427	459
	Ø 10	99	131	166	201	233	268	300	339	367	399	438	473	505	540	565

Air consumption in ft³/min

- KG 6/20
- KG 30
- KG 12
- KG 50



“ A broad range of accessories can be supplied for the blasting gun, ensuring maximum efficiency. ”

Technical Data

IceBlast KG20S V1 Complete

Dim. mm/inch

Length: 480 / 18.8

Width: 520 / 20.4

Height: 1030 / 40.5
incl handle

Height: 850 / 33.4

w/ handle folded down

Weight

kg: 58

lbs: 127.8

Dry Ice Capacity

kg: 20

lbs: 44

Dry Ice Consumption

kg/h: 16 - 55

lbs/h: 36 - 122

infinitely adjustable

Supply Pressure

bar: min. 5 - max. 10

psi: min. 72 - max. 145

Blasting Pressure

bar: min. 2 - max. 10

psi: min. 29 - max. 145

Prepared for Light Gun

Air Consumption

m³: 1 - 5

cfm: 35 - 175

depending on nozzle combination

Compressed Air Connection

3/4" claw coupling

The compressed air must be kept clean and free of oil, foreign bodies and water

Power Consumption

110/230 V

AC 50-60 Hz

24 V handy rechargeable, interchangeable battery, and battery charger

Single Hose System

Noise

Noise level 60-120 dB(A) depending on blasting pressure, nozzle combination and material surface

User-Friendly Control Display w/ Error-Log Indication

Including

- Standard Ice Gun, with nozzle and nozzle holder
- Blasting hose KG20, complete, 5 m /16 ft
- Air supply hose, 3/4", 10 m / 32 ft

IceBlast KG20S V1 Complete w / Light Gun

Including

- Light Gun, with nozzle and nozzle holder
- Blasting hose KG20, complete, 5 m /16 ft
- Air supply hose, 3/4", 10 m / 32 ft

" The system produces no waste products. Only the coating that has been removed remains to be disposed of, and this can usually be swept or vacuumed from the floor. "



Technical Data**IceBlast KG6S V2 Complete****Dim. mm/inch**

Length: 480 / 18.8

Width: 520 / 20.4

Height: 930 / 36.6

incl handle

Height: 650 / 25.6

w/ handle folded down

Weight

kg: 50

lbs: 110

Dry Ice Capacity

kg: 6

lbs: 13

Dry Ice Consumption

kg/h: 15 - 40

lbs/h: 33 - 88

infinitely adjustable

Supply Pressure

bar: min. 5 - max. 10

psi: min. 72 - max. 145

Blasting Pressure

bar: min. 2 - max. 10

psi: min. 29 - max. 145

Not Prepared for Light Gun**Air Consumption**m³: 1 - 5

cfm: 35 - 175

depending on nozzle combination

Compressed Air Connection

3/4" claw coupling

The compressed air must be kept clean and free of oil, foreign bodies and water

Power Consumption

110/230 V

AC 50-60 Hz

24 V handy rechargeable, interchangeable battery, and battery charger

Single Hose System**Noise**

Noise level 60-120 dB(A) depending on blasting pressure, nozzle combination and material surface

User-Friendly Control Display**Including**

- Standard Ice Gun, with nozzle and nozzle holder
- Blasting hose KG6, complete, 5 m / 16 ft
- Air supply hose, 3/4", 10 m / 32 ft



“ Dry ice blasting is non-abrasive and therefore surfaces are treated very gently. Wear and tear resulting from the use of steel brushes, scrapers and other blasting materials is avoided. ”

Technical Data

IceBlast KG6S Basic Complete

Dim. mm/inch

Length: 480 / 18.8

Width: 520 / 20.4

Height: 930 / 36.6

incl handle

Height: 650 / 25.6

w/ handle folded down

Weight

kg: 50

lbs: 110

Dry Ice Capacity

kg: 6

lbs: 13

Dry Ice Consumption

kg/h: 20 or 40

lbs/h: 44 or 88

Fixed consumption rate

Predefined by customer

Supply Pressure

bar: min. 5 - max. 10

psi: min. 72 - max. 145

Blasting Pressure

bar: 0 - 10

psi: 0 - 145

(non-adjustable)

Not Prepared for Light Gun

Air Consumption

m³: 1 - 5

cfm: 35 - 175

depending on nozzle combination

Compressed Air Connection

3/4" claw coupling

The compressed air must be kept clean and free of oil, foreign bodies and water

Power Consumption

110/230 V

AC 50-60 Hz

24 V handy rechargeable, interchangeable battery, and battery charger

Single Hose System

Noise

Noise level 60-120 dB(A) depending on blasting pressure, nozzle combination and material surface

User-Friendly Control display

Including

- Standard Ice Gun, with nozzle and nozzle holder
- Blasting hose KG6, complete, 5 m / 16 ft
- Air supply hose, 3/4", 10 m / 32 ft

“ No waste disposal.

The system produces no waste products. Only the coating that has been removed remains to be disposed of, and this can usually be swept or vacuumed from the floor. ”





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