

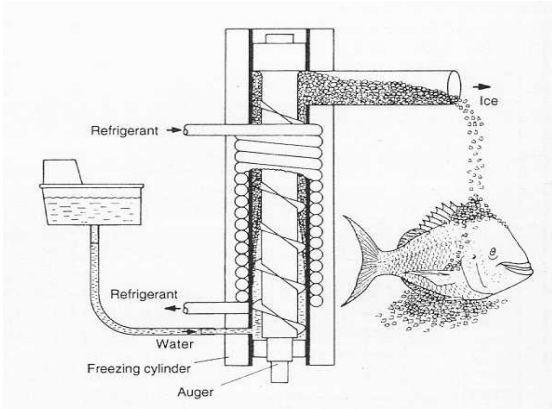


# Operating Instructions

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The Ziegler chip-ice machine is delivered ready for operation and has only to be connected to power and water supply (provide melt-water drain for machines including storage bin). No operating personnel is required. The ice machine works fully automatically.



Water flows by gravity from the water chamber in the ice machine into the freezing cylinder.

An evaporating coil (with ozone friendly refrigerant R 404 A) surrounds the cylinder freezing the water inside at an evaporation temperature of  $-12^{\circ}\text{C}$  up to  $-18^{\circ}\text{C}$ .

An auger continuously scrapes thin layers of ice from the inner cylinder wall and conveys it upwards. There the ice is compacted, frozen further and subsequently broken off.

By this procedure the refrigeration energy can freeze the following water without loss. (If the ice layer would become 1 or 2 mm thick, an unnecessary amount of energy would have to be used for freezing due to the high insulating capacity of ice.)

**The ideal ice thickness of 6 - 7 mm** at low energy consumption can be achieved thanks to the idea of subsequently compacting the ice.

The ice being frozen on the inner wall of the cylinder, the refrigeration system of Ziegler chip-ice machines is completely sealed. The rotating auger does not form part of the refrigeration circuit. Therefore leakages in the refrigeration system caused by rotating parts cannot occur.

## The ideal ice temperature is $-0,5^{\circ}\text{C}$

Ziegler chip-ice has the ideal temperature of  $-0,5^{\circ}\text{C}$ . It is irregular and crystalline in structure and always stays loose. In contrast with other types of ice it can be stored without being sub-cooled and never freezes up.

Ziegler chip-ice is frozen within the patented freezing cylinder at an evaporation temperature of  $-12^{\circ}\text{C}$  up to  $-18^{\circ}\text{C}$ . Due to the special procedure maximum refrigeration capacity is obtained at a very low energy consumption.

### Cooling energy:

The uninterrupted line shows the accumulated energy per kg of ice (refrigerating energy). Only when ice having a temperature of  $0^{\circ}\text{C}$  melts to water of  $0^{\circ}\text{C}$ , the considerable refrigeration capacity of ice is released (vertical line). The cooling capability of water is lower (left line), ice of low temperatures does hardly cool at all (right line).

The cooling capacity of water per  $^{\circ}\text{C}$  is (left line)

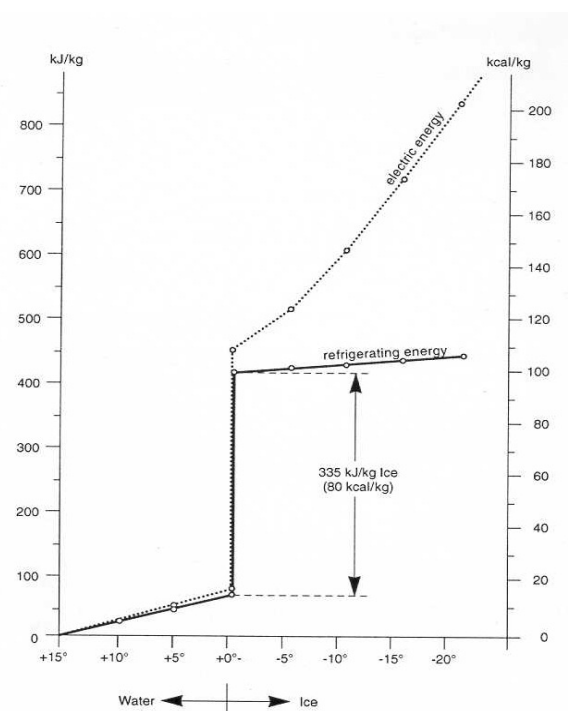
**Ice temperatures below  $0^{\circ}\text{C}$  give only 1 Kcal / kg, 0,5 Kcal / kg.**

### Energy consumption:

The broken line shows the minimum electric energy consumption necessary for every ice production.

**Up to an ice temperature of  $0^{\circ}\text{C}$  energy input and the refrigerating energy produced are closely correlated.**

Only when ice is unnecessarily cooled to temperatures below  $0^{\circ}\text{C}$ , the energy required rises disproportionately.




## 1. Temperatures:

Ambient:	normal	max.	min.
ZBE 30 to ZBE 350	20 °C	42 °C	+ 5 °C
ZBE 375	35 °C	45 °C	+ 5 °C

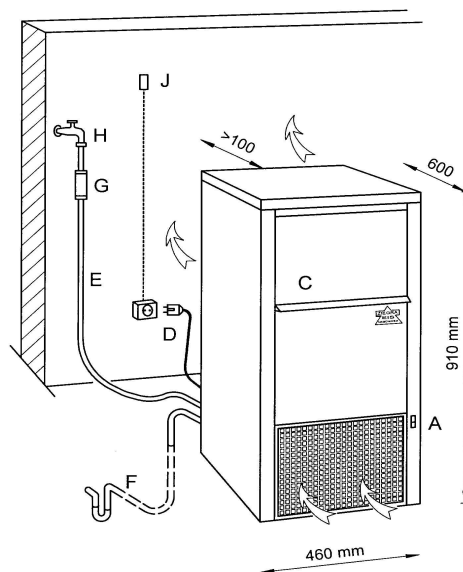
### Water:

ZBE 30 to ZBE 350	15 °C	> 5 °C
ZBE 375	25 °C	> 5 °C

## 2. Installation site

Distance from rear wall at least 10 cm (ZBE 150-ZBE 375: 20 cm). The ventilation apertures of the machine must not be covered. Provide sufficient room ventilation. 

The ice production capacity may decrease at high ambient- or water temperature or insufficient ventilation of the machine. At low temperatures the machine may switch off or even freeze up.



**ZBE 30-10    ZBE 70-35    ZBE 110-35**  
**ZBE 150 bis ZBE 375:** see specification

## 3. Water connection:

The machine operates with normal potable water or fully demineralized (distilled) water.  
 With harder water > 14° d.H.: install a water softener.  
 < 6° d.H.: consult Ziegra  
 If the water is slightly saline, or comes from a well or is outside 7,2 - 9,5 pH: consult Ziegra.

supplied with m/c: 2 m high-pressure hose an 3/4" sleeve for water inlet  
 Provide at side: Water pressure: 1 - 5 bar stop valve and strainer  
 If long supply lines necessary, insulate, if possible.

### Melt-water drain

supplied with m/c: 2 m hose, 14 mm dia.  
 Provide at side: Mount hose and fasten with clamp.

The drain pipe must be at a lower level than the machine outlet. Otherwise the melt water will not drain off from the storage bin.

## 4. Electrical connection

fuses 16 A, slow

230V-1-50 Hz    Machine incl. 2 m cable and plug or on request for ZBE 350 und ZBE 375:  
 400V-3-50 Hz    Make firm installation to main power supply. Provide main switch. 3-phase machines have a phase sequence relay.

Other voltage according to order, type plate, wiring diagram.

## 5. Storage bin:

Wash out thoroughly with warm water.

## 6. Start

Ice production starts after app. 2 min.

## 7. Machines without bin only:

Fasten tube to the ice discharge by means of clamp.

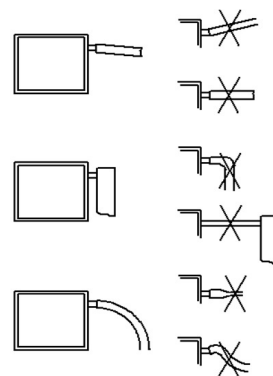


**The ice must leave the outlet freely and without clogging**  
 Otherwise the freezing unit and gearbox will be overloaded.

**Extension of ice discharge tube:**  
**Enlargen diameter, no sharp curbs. Only use tubes with smooth inner surface (without edges).**

**Ice must slide downwards only,**  
 not horizontally or upwards.

**Further advice in the extra folder "Installation Ice discharge"**



**1. On-off switch** at the front

**2. Cut-out of machine when storage bin is full:**

**ZBE 30 - ZBE 110:** Thermostat in bin

The thermostat switches the machine off when the bin is full and on again when ice has been removed.

The switch-off point is adjusted for longer ice contact, not for a momentary contact.

**The thermostat does not operate at temperatures below +5° C**

For such applications ask for special execution.

**ZBE 150 - ZBE 375:**

switch the machine off, when ice dams up in the ice discharge hose and when the bin is full. Automatic restart after removal of ice.

**Special models:**

e.g. for sauna, on request

**3. Water pressure switch or Water level control**

switch the machine off in case of too low water pressure or water shortage.

Automatic restart when the water supply has been restored.

**4. Compressor**

Automatic motor cut-out in compressor connecting box.

**5. High pressure switch**

The machine is switched off, if there is e. g. excess in the refrigeration system caused by too high ambient temperature or soiled condenser.

**6. Gear Motor**

Overload cut-out in switch box.

**7. Automatic water drain**

(not provided in all machines)

In order to reduce nucleation in stagnant water, a solenoid valve closes the water inlet as soon as the machine is out of operation, another opens the water drain thus emptying the water chamber and the freezing unit.

**8. Capacity control (ZBE 350 and ZBE 375):**

The capacity control protects the evaporator and the compressor against overburdening by too low ambient- or watertemperature.



**switch off machine  
disconnect from power supply, close water supply**

## Maintenance

**For a failure-free operation:**

**Every 3 - 6 months**

**Clean the water chamber and float valve**

**Clean condenser with soft brush or vacuum cleaner**

ZBE 30 - ZBE 110: lift grid  
and take it off  
ZBE 150 - ZBE 375: remove lid  
and front panel

**General check** Any water leaks?  
The machine runs quite?

**Every 2 - 5 years**

check cylinder bearing.

## Hygiene

**For hygienic ice:**

**At frequent intervals**

Clean all parts getting in contact with water or ice thoroughly with a commercial cleaning agent:

**Water-bearing parts,**  
small filter in the water hose, water chamber  
and float valve

**All parts getting in contact with ice:**

ice hose into storage  
ice-discharge interior or exterior.  
Ice-storage  
melt water grid  
melt-water drain  
ice scoop

**Small parts**

After being thoroughly cleaned  
can also be given into dishwasher

**Scaled parts**

clean mechanically and with antilime agent,  
replace if required

**Ask for further Options:**

**Water drainage**

when machine stops

**Automatic flushing system**

e.g. once a day

**Hygiene kit:**

A set of all water bearing parts which cannot  
be cleaned satisfactorily for replacement.



Repairs of electrical parts and refrigeration circuit only carried out by a qualified technician!

## Trouble Shooting

Malfunction	Cause	Remedial Action
<b>Melt-water in storage bin</b> does not flow off	<ul style="list-style-type: none"> <li>* Melt-water drain blocked</li> <li>* Machine is sited below drain level</li> </ul>	Clean, rinse with water Raise machine or lower drain Install melt water pump (ask Ziegra)
<b>Water-Leakage</b> Water runs into machine or onto floor	<ul style="list-style-type: none"> <li>* Hose connections loose or defective</li> <li>* Lid of water chamber loose</li> <li>* Melt-water drain loose</li> <li>* Fissure in water chamber</li> </ul>	Fasten, insert new seals or replace Reset correctly Fasten clamp Replace
Water leaks from the ice maker	Shaft seal in cylinder defectiv	Ⓙ Replace
<b>Water pressure switch or Waterlevel control</b> has switched off	No water in water chamber	Check water supply Water pressure: min 1 bar - max 5 bar Clean water filter and float valve
<b>High pressure switch</b> has switched off	<ul style="list-style-type: none"> <li>* Air in refrigeration circuit (insufficiently evacuated after repair)</li> </ul>	Ⓙ Change filter drier evacuate circuit refill refrigerant
	* ambient temperature too high	Machine must not be placed in the sun or too warm ambience. Improve ventilation.
	* condensor soiled	Clean with brush or compressed air.
	* ventilator motor defective	Ⓙ Check / replace
<b>Machine does not work</b> <b>General electrical faults</b>	<ul style="list-style-type: none"> <li>* Absence of current</li> <li>* Intermittent contact</li> <li>* Water pressure switch defective</li> <li>* Water level switch does not work</li> <li>* Ice switch does not work</li> </ul>	Check socket and fuses Ⓙ Check electrical connections, also in control panel replace Check, adjust metal tongue if necessary Check, see below
<b>Overload cut-out</b> has switched off	Motor overload caused by <ul style="list-style-type: none"> <li>* electric capacitor of gear motor defective</li> <li>* gear defective</li> <li>* cylinder bearing damaged</li> <li>* machine freezes up</li> <li>* ice breaker misadjusted (ZBE 30 - ZBE 110)</li> <li>* overload cut-out defective</li> </ul>	Ⓙ replace Ⓙ replace replace see "machine freezes up" see "cleaning of freezing unit" Ⓙ replace
<b>Storage bin thermostat does not</b> switch or switches too early	<ul style="list-style-type: none"> <li>* Ambient temperature too low</li> <li>* Thermostat defective or setting incorrect</li> </ul>	Choose different locations or increase ambient temperature. Instant remedy: warm thermostat by hand. replace or Re-Set off: approx. 1 min. after ice contact on: at +5° C
<b>Ice switch</b> does not work	jammed (or defect)	adjust (or replace)



Malfunction	Cause	Remedical Action
<b>Machine operates, but no ice production</b>		
<b>Drive motor and refrigeration unit work</b> (ventilator runs)	Loss of refrigerant	Ⓣ Check refrigeration circuit (bubbles in sight glass). Eliminate leakage, replace filter drier, evacuate circuit, refill refrigerant.
<b>Refrigeration unit stopped</b> or works at intervals (drive motor runs)	<ul style="list-style-type: none"> <li>* No water in water chamber</li> <li>* Motor cut-out defective</li> <li>* Compressor defective</li> </ul>	See water pressure or water level switch above Ⓣ Check / replace Check / replace
<b>Decreased ice production</b> <b>Poor ice quality</b>	<ul style="list-style-type: none"> <li>* Condenser soiled or insufficient cooling-water flow</li> <li>* Ambient temperature too high</li> <li>* Insufficient amount of refrigerant, bubbles in sight glass</li> <li>* Lime deposit on auger or cylinder</li> <li>* Ice breaker is misadjusted -ZBE 30-110</li> <li>* Machine runs in intervals</li> </ul>	Clean with brush or compressed air, never with a wire brush. Water-cooled machines: bottle brush, antilime agent Provide better ventilation, move machine away from wall. Ⓣ Remove leak, evacuate circuit, replace filter drier, refill with indicated quantity of refrigerant. Clean freezing unit with hot water and antilime agent (Ziegra cleaning agent), clean mechanically, if required. see installation sheet freezing unit  see above (refrigeration unit stopped)
<b>If Ice maker is connected to a central refrigeration unit:</b> Machine runs in intervals	<ul style="list-style-type: none"> <li>* no sufficient refrigerant</li> <li>* Suction pressure too low</li> <li>* pressure fluctuation</li> </ul>	Ⓣ check the cooling system of the central refrigeration unit Data must comply to the ZIEGRA prescription (If not at hand, ask Ziegra)
<b>Rumbling or loud squeaking noise</b> <b>Strong vibrations</b> <b>Machine freezes up</b>	<ul style="list-style-type: none"> <li>* Air bubble in pipe between water chamber and freezing unit</li> <li>* Lime deposit on auger or cylinder</li> </ul>	Remove air bubble  Clean freezing unit with hot water and antilime agent, clean mechanically, if required.
Occasional gentle squeaking noises are a typical sign for good and hard ice, but do not indicate a failure.		
<b>Cracking noise in the freezing unit</b>	Cylinder bearing defective	Ⓣ Replace
<b>Ice comes out of machine in pressed form</b> ("sausages")	After leaving the cylinder the ice is pressed due to wrong installation of the ice discharge tube, the extension, or due to sharp bends.	Even small edges or bends can be the cause (see page 2)

**Depending on water quality a layer of solids may form a while in the freezing cylinder or on the auger.**

Vibrations or noises in the freezing cylinder, e.g. "rumbling" and production of powdery ice may be a symptom of such deposits.

As the freezing unit has to be completely clean inside in order to ensure proper freezing and an even upward conveying of the ice on the auger, this layer has to be removed.

**Remove tenacious deposits on the auger with steel wool.**

**However, these deposits often are of calcareous nature, which can be removed with an antilime agent, e.g. ZIEGRA cleaning agent:**

- o Switch the ice machine off, close the water tap and wait 1-2 hours until the ice in the freezing unit has totally melted.
- o Detach the water-inlet pipe at the bottom of the freezing unit, drain the water from the water chamber and the freezing unit into a container.
- o Connect a hose of appr. 80 cm with funnel at the water inlet of the freezing unit.

- o **Mix cleaning agent with hot water:  
1/3 bottle agent in 3/4 litre water of appr. 50°C**

- o Fill the freezing unit with cleaning agent up to the ice discharge level.

- o Allow the cleaner to react for 10 - 15 minutes.  
A maximum of 30 minutes must not be exceeded.  
The cleaner first removes the lime deposit  
and then may slightly effect the metal of the cylinder/auger, if having too long contact.  
**Do not apply the cleaning agent unnecessarily.**



- o Drain cleaning agent and flush freezing unit thoroughly with water.

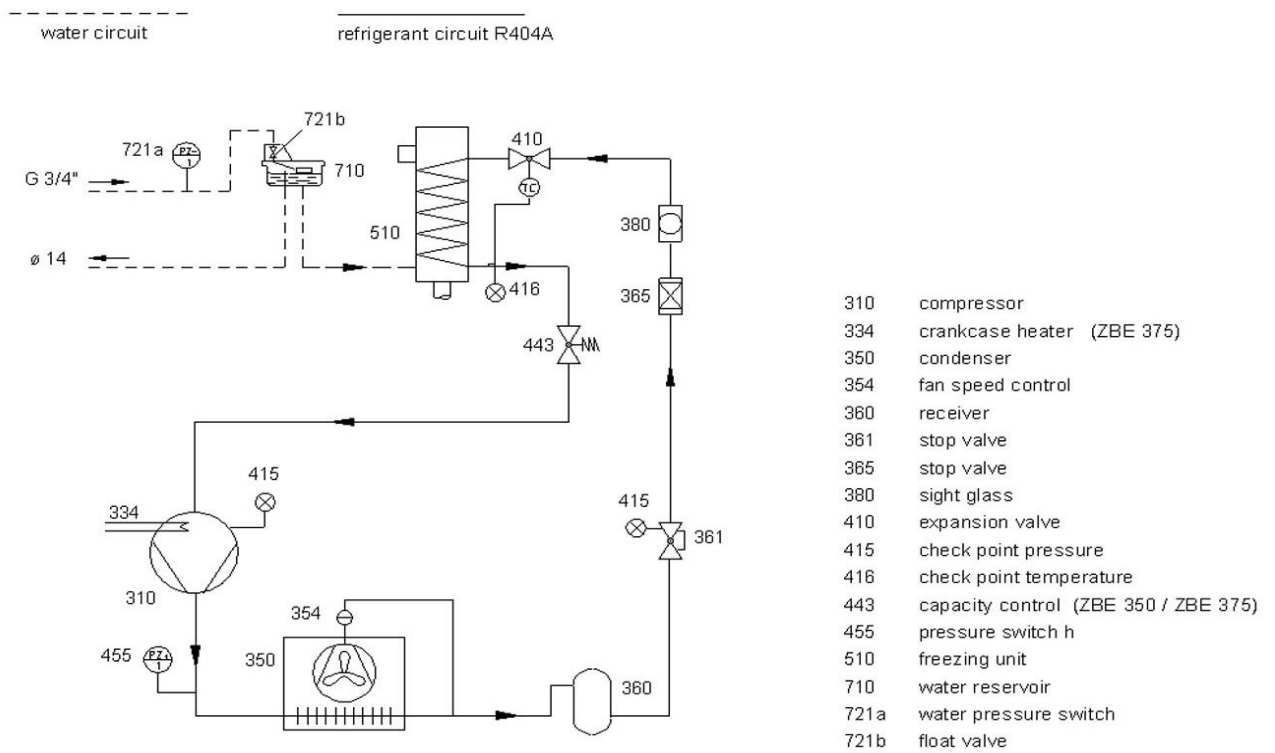
- o Connect water inlet pipe and switch the machine on.



As the ice may still contain residues of the cleaning agent, we recommend not to use the ice production of the first minutes of operation, though the cleaning agent is admissable for food machinery.

**When deposits occur frequently, we recommend the installation of a filter system for the water. We can offer a three stage filter system, please contact us.**







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