Witzel
Vacupress

INFRARED-OVENS ..03

. . . NEXT GENERATION

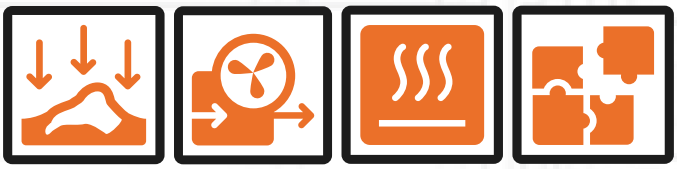
BASIC INFORMATION ABOUT INFRARED-OVENS

THE TECHNOLOGY BEHIND IT

During the last years Infrared-Ovens gained a growing importance in the O&P field and its workshops. Infrared heating is replacing the traditional convection style ovens or heating plates.
The reason is not far to seek. Infrared-Ovens combine a whole array of benefits in just one unit. Infrared-heat is radiant heat which acts directly. Different to convection style ovens where air is heated up to heat indirectly, Infrared-heat is applied directly to the material - without any indirection and thus much faster and more energy-efficient.

Due to this direct mode of operation there is no need for any preheating of Infrared-Ovens. The result is a distinctive reduction of the energy consumption. Another benefit of this technology is the tremendous speed it heats the thermoplastics. Just 10 - 12 minutes processing time (started from the cold oven) for a 10 mm test socket material (e.g. PETG) in a blister forming tray or a 1 x 1 meter sized Polyethylene of 4 - 5 mm thickness speak for itself. During continuous running these values are further undercut. Further the way the infrared rays enter the material have a positive effect on its characteristics.

The practical experience approves that thermoplastics material which have been heated in an Infrared-Oven mould smoother and pull better than materials which have been heated in a traditional way.



ABOUT THE DIFFERENCE BETWEEN INFRARED-OVENS AND CONVECTION OVENS

Convection ovens and Heating plates heat thermoplastic materials indirectly by use of electrical heating resistors which heat circulated air, resp. a metal contact plate. These in turn heat the material itself. Either the circulated air in a convection oven as well as the metal contact plates of a heating plate need preheating times of up to one hour. In practice this means that these units are running the whole work day of 8 hours or more.

Infrared-Ovens however work with direct radiant heat The electrical heating coils generate Infrared rays which heat the material surface directly and without any indirection. By the enormous shortening of the heating processes, Infrared-Ovens increase the efficiency of the workshop and offer a significant energy saving potential by lapse of any preheating and idle running times.

A positive side effect of the short heating times is the low heating-up of the oven housing and thus less heat emission. Further the heat insulation of the new series ..03 has been improved to reduce the heat emission any more.

ENERGY SAVING POTENTIAL OF AN IR1303

Unit	Power consumption /kW	actual / idle running time of the heating elements / h		Consumption kW / day
IR1303 Infrared-Oven	8,5	4h	(3 x 10 min. x 9h)	34,0
Traditional Convection Oven	6,8	9h	(incl. Preheating, Oven runs whole day	61,2

Average potential in energy savings for Infrared-Ovens:
-energy savings per day = 27,20 kWh
-energy savings per year (240 work days / year) = 6720,00 kWh

-Reduction of energy costs per year (1 kWh = 0,22€) = 1436,16 €

Tech-Tip:
All Witzel Infrared-Ovens shut down the Infrared-tubes automatically when the oven door is opened. This saves even more energy and prolongs the life time of your oven.

SPECIAL FEATURES OF WITZEL INFRARED-OVENS

The fact that Infrared-Ovens heat the material directly, but not the air around in the oven is a particular challenge for the technology of such a system. The air inside the oven of course heats up as well, but always just indirectly, caused by the hot side walls or the hot material. Thus the air temperature inside the oven is always different to the material temperature and thus a traditional temperature sensor like it is used in convection ovens cannot act exactly in such a unit.

Different to others, all Witzel Infrared-Ovens are equipped with an elaborated technology which allows to measure the exact surface temperature of the material. An optical sensor records the surface temperature of the material to be heated. In combination with a microprocessor operated PID Controller the user has the perfect control on the heating process. Thus overheated materials and burned plastics belong to the past.

Elaborate test runs and our own experiences in the O&P field have led to a system which combines the enormous power of infrared-heat with an optimized Thermostat-control. This system unifies a maximum of heating power with perfect control of the processing. Witzel Infrared-Oven are build for multi-purpose use. Flat plastics can be heated as well as Blister forming trays for prosthetic sockets.

INNOVATIVE INFRARED-OVENS

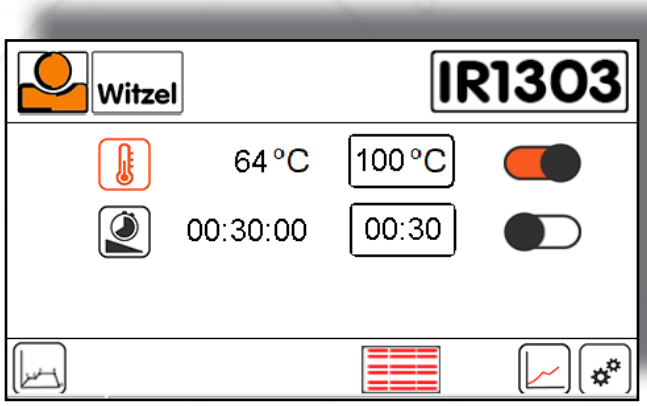
FOR THE O&P FIELD

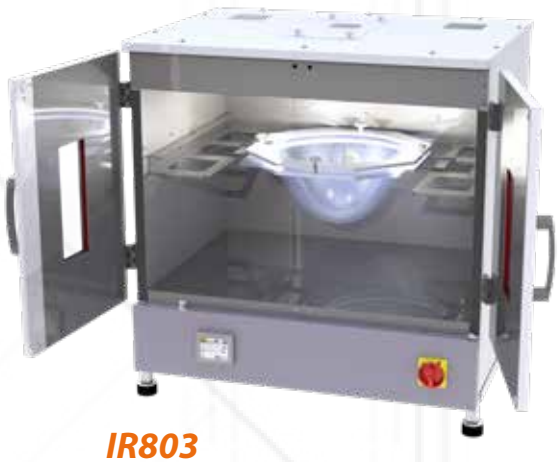
When developing the Witzel Infrared-Ovens we took special care of an even heating result at the entire heating area. Who doesn't know the experience of uneven heating results in his convection oven or the cold edges of the old heating plate.

During extensive test runs on all Witzel Infrared-Ovens we have been able to optimize the spreading of the Infrared-tubes to that effect. Custom made Infrared-tubes, manufactured for the special needs of our Ovens guarantee an even heating all over the effective heating area. Infrared-tubes with different capacities ensure an optimized heating of the edges as well.

IR1303

For the latest generation of infrared ovens, in addition to a new software user interface and simplified handling of the ramp function, the material trolley has also been equipped with an integrated cradle for the blister forming thermoforming frames.





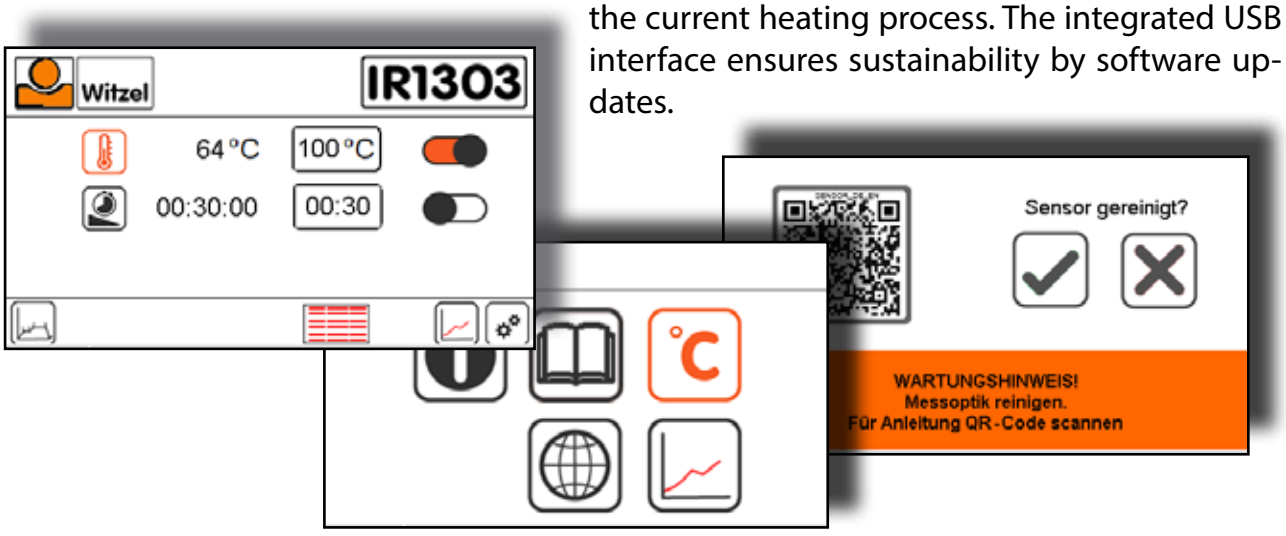
IR803

The latest Witzel Infrared-Ovens of the ..03 series with software improvements and practical new features

- ✓ Easy operation by central Touch panel with new, updated user interface
- ✓ Roll-about tray with fully integrated cradle for Blister forming frames
- ✓ Individual maintenance info with access to online manuals via QR-Code scan
- ✓ Space saving sliding door for all ovens with Roll-about tray
- ✓ Precise thermostat control by measuring the material temperature
- ✓ User-defined heating process memory
- ✓ Graphic trend visualization for heating process control

Controller with 3,5“ TFT full colour touch panel

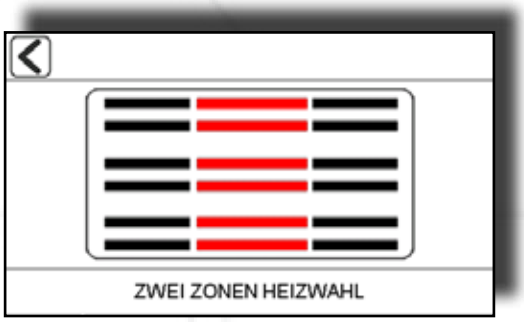
The new designed controller of the ..03 series with an easy to use 3,5“ touch panel is the central control unit of the oven. Beside the easy input of the desired SET temperature the main menu displays the current temperature of the material. Starting at the mean menu other features like the timer or heating ramps can be easily accessed as well as the graphic trend of the current heating process. The integrated USB interface ensures sustainability by software updates.



Thermostat-control by the material temperature

The temperature control of all Witzel Infrared-ovens is handled by an optical sensor which measures the accurate temperature of the material surface in process. The exact number is processed by a PID algorithm in combination with an especially developed calibration. This allows to process all Thermoplastics which are common in the O&P field.

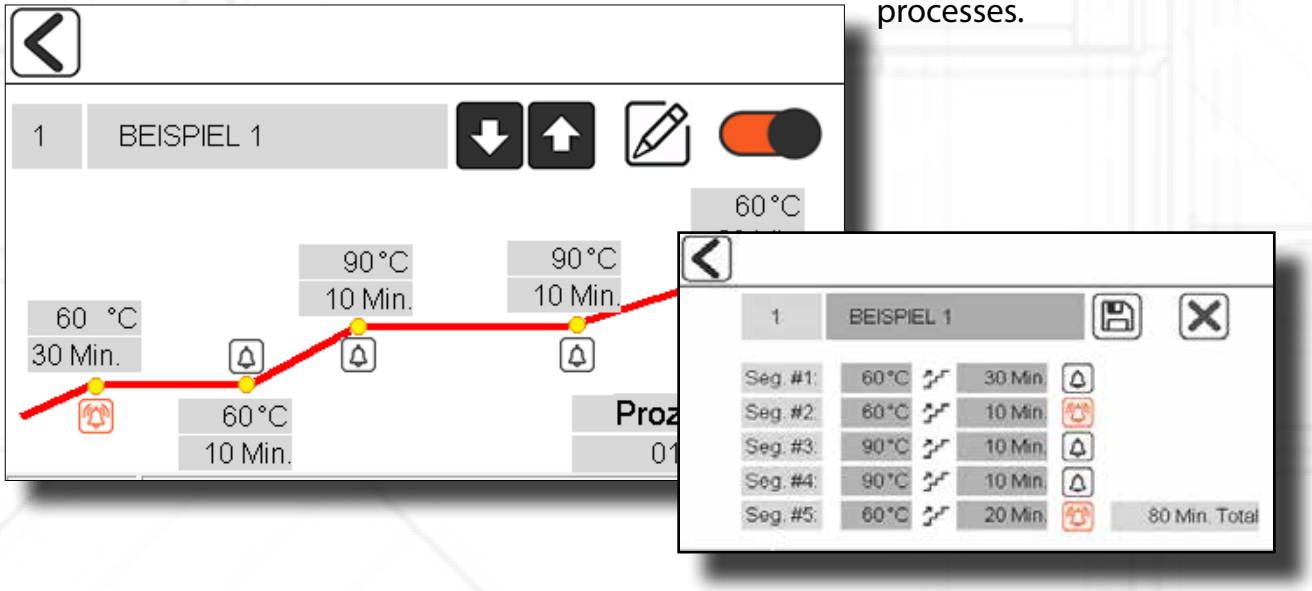
Energy saving heating selection feature



The large IR1303 and IR1303 XTR offer a standard heating selection feature which allows to activate a smaller or larger area of the 18, resp. 24 IR tubes. Thus the energy consumption can be reduced when heating smaller material pieces.

Customized heating processes with timer and heat-ramp feature

Today`s high end materials require individual solutions. The new developed microprocessor controller of the ..03 series enables the user to design and store his own customized heating processes.



Pre-Preg Vacuum-hose duct

Pre-Preg material processing require a vacuum supply inside the oven. For those tasks and others the vacuum-hose duct option is available (standard at IR1303). It allows to insert a vacuum hose at the left side of the oven housing.

IR803 Infrared-Oven

Main purpose:
Prosthetics, Orthotics, plastic sheets up to 75x45 cm

Heated area dimensions (Teflon):
-teflon coated shelf 80x55 cm
-for Blister forming frames 45x45 cm

Heating:
8 Infrared-Tubes with single reflector

Controller:
SPS with 3,5“ Touch panel and optical Temperature sensor

Electrical Connection:
400V, 50-60 Hz, 3,7 kW (16A CEE) /
Export versions available

IR1001 COMPACT Infrarot-Ofen

Main purpose:
Orthotics , plastics sheets up to 95x75 cm

Heated area dimensions (Teflon):
-Pull-out-tray 95x75 cm
(for plastic sheets)

Heating:
12 Infrared-Tubes with single reflector

Electrical Connection:
400V, 50-60 Hz, 7,7 kW (16A CEE)
Export versions available

IR1003 Infrared-Oven

Main purpose:
Orthotics , Prosthetics

Heated area dimensions (Teflon):
92 x 72 cm, Roll-About Tray, moveable and height adjustable for Blister-Forming Trays

Heating:
12 Infrared-Tubes with single reflector

Controller:
SPS with 3,5“ Touch panel and optical Temperature sensor

Electrical Connection:
400V, 50-60 Hz, 5,9 kW (16A CEE)
Export versions available

IR1303 Infrared-Oven

Main purpose:
Orthotics , Prosthetics

Heated area dimensions (Teflon):
124 x 104 cm, Roll-About Tray, moveable and height adjustable for Blister-Forming Trays

Heating:
18 Infrared-Tubes with single reflector adjustable in 2 zones (6 / 18)

Controller:
SPS with 3,5“ Touch panel and optical Temperature sensor

Electrical Connection:
400V, 50-60 Hz, 8,3 kW (16A CEE)
Export versions available

IR1303 XTR Infrared-Oven

Main purpose:
Orthotics , Prosthetics

Heated area dimensions (Teflon):
124 x 154 cm, Roll-About Tray, moveable and height adjustable for Blister-Forming Trays

Heating:
24 Infrared-Tubes with single reflector adjustable in 2 zones (6 / 24)

Controller:
SPS with 3,5“ Touch panel and optical Temperature sensor

Electrical Connection:
400V, 50-60 Hz, 11,1 kW (32A CEE)
Export versions available

IR2103 DUAL Infrared-Oven

Main purpose:
Orthotics , Prosthetics

Heated area dimensions (Teflon):
214 x 104 cm, or usable as 2x 107 x 104 cm
Roll-About Tray, moveable and height adjustable for Blister-Forming Trays

Heating:
28 Infrared-Tubes with single reflector
can be controlled separately as 2 Ovens with 14 IR-Tubes each
Controller:
SPS with 3,5“ Touch panel and optical Temperature sensor

Electrical Connection:
400V, 50-60 Hz, 12,9 kW (32A CEE)
Export versions available

FAQ - Frequently asked questions

Which kind of materials can be heated with Witzel Infrared-Ovens?

Generally every thermoplastic material available in the O&P field can be processed. During the development of the Witzel Infrared-Ovens we took special care that the optical sensor does work with clear plastics as well as with colored ones.
Caused by the Infrared-rays which enter the material, the materials which were heated in an Infrared-Oven mould better than the ones heated traditionally. Further the colors of applied Thermotransfer-papers are more clear and bright.

Do I need a special Blister forming tray to process prosthetic sockets with my Witzel Infrared-Oven?

No, you can go on using your existing Blister forming tray without any limitation. It is just important to observe the correct distance between material and Infrared-tubes. For your guidance all Witzel Infrared-Ovens have a circumference edge inside the housing. If applicable just adjust the legs of your tray or the height of the cradle to the height of this circumference edge. Thus you ensure an even heating result.

Wouldn`t it still be helpful to preheat my Witzel Infrared-Oven?

No! Infrared-heat doesn`t heat air, but just objects. The air inside the oven is just heated up indirectly by the hot sidewalls or the hot tray and material. Thus our Witzel Infrared-Ovens don`t measure the air temperature inside the oven but surface temperature of the material to be heated itself. Preheating the empty oven gives an advantage non-gaugeable. But it is a waste of expensive energy and shortens the lifetime of the Infrared-tubes. This is exactly the reason why all Witzel Infrared-Ovens shut down the Infrared-tubes automatically when the door is opened.

Is there a blower fan available for Witzel Infrared Ovens?

No! As mentioned Infrared-heat heats just materials and not air. Thus the air inside the oven is always cooler than the material. Thus a blower fan in an Infrared-Oven is a kind of a cooling blower and has a more negative than positive effect on the heating process.

My materials are shrinking a lot when heating up. What can I do to prevent it?

Generally every plastic has some shrinking caused by its "memory". Depending on the manufacturing method this unwanted character is more or less distinctive. At the O&P field there are several materials available which are additionally marked "non shrinking". On the other hand there are often budget-friendly PP or PE materials available which are not sufficient for the O&P field because of their enormous shrinking. These materials cannot be processed in any "open" oven like Infrared or Convection Ovens are. Just "closed" systems like heating plates are able to provide the needed pressure to hold the material and prevent it from the shrinking during heating up.

Why does my material not heat evenly?

The most common fault when using Infrared-Ovens is a wrong distance between material and Infrared-tubes. As mentioned Infrared-heat is radiant-heat. During development we took special care on the even heating of our Infrared-Ovens - up to the edges. A special spreading of the Infrared-tubes and different capacities of the tubes ensure an optimal functionality. To get best results it is unconditionally necessary to place the material at the right distance to the Infrared-tubes. For your guidance all Witzel Infrared-Ovens have a circumference edge inside the housing. From IR1001 on all Witzel Infrared-Ovens are equipped with a height adjustable Roll-About-Tray.
Note for Blister forming trays: If applicable adjust the legs of your tray or the height of the cradle to the height of this circumference edge. Thus you ensure an even heating result.

What is the difference between "even" and "porous" Teflon coatings?

Witzel Infrared-Ovens are equipped with replaceable porous Teflon-coatings as standard. Porous means that the Teflon-coating is air-permeable. This offers the advantage that air which is underneath the flat plastics during the heating process can escape. Thus you don`t have the unwanted "maps" at the underside of the heated material. Another benefit of the porous Teflon comparing to the even one is that it has less adhesion when lifting the heated material. Especially soft materials can be lifted much easier and don`t get stretched that much.

When heating 2 mm PP sheets the edges roll up. What can I do to prevent this?

Interestingly this phenomenon does not show up with every 2 mm PP. It looks like it depends of the manufacturer of the plastic. Also the direction of rolling can have an effect on it. Should this problem arise you can easily prevent it by putting a piece of Teflon coating on top of the 2 mm PP when placing it at the oven tray (The Teflon should be a little larger than the material). The Infrared-heat passes the Teflon without any problems and already the low weight of the Teflon prevents the roll up of the edges. If necessary you can raise the temperature by one or two degree and prolong the heating time a little bit if the Teflon should reduce the heat a little bit.

We work with our Infrared-Oven for some time. Since a few days our material is burned, resp. we feel that it overheats, even if the correct temperature is set and displayed and worked fine in the past.

Witzel Infrared-Ovens are all equipped with an optical temperature sensor which measures the surface temperature of the material. This optical sensor is located in the center of the top of the oven, next to the Infrared-tubes and "looks" onto the material from the top. Dust and other influences can pollute the optic and then the controller does not work properly any longer. This leads to an overheating even if the temperature is set correctly. The optical sensor should be cleaned according to the manual instruction. Depending on the settings it should be controlled every three month and cleaned up if necessary.

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