

Lighting systems and components for the domestic appliance industry Summary of contents







	Cold Refrigerator lighting with LED or Edison screw lamps · 73.101 [00] 52 · 22.225 [00] 53 · 22.230 [00] 53 - 54 · 22.234 [00] 54
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General information	[00] 57-62
BJB worldwide	[00] 63-69



Welcome to the "Perfect BJB Dinner" with our employees Frank, Nicole, Dennis and Daniela. In this catalogue you will not only discover how to make a delicious evening meal, but also how our domestic appliance lighting solutions assist and support the work in the kitchen.

For a perfect dinner: Lighting solutions from BJB.

Welcome to BJB, the leading supplier of domestic appliance lighting systems and components worldwide. Welcome also to the perfect BJB dinner with our employees Nicole, Daniela, Frank and Dennis. In the process of preparing a delicious dinner, these four will also demonstrate the features and advantages of our lighting solutions.

You will see that when good lighting is integrated into domestic appliances it assists the work in the kitchen and creates a pleasant atmosphere. Whether it is a saddle of lamb in the oven, a refreshing drink in the refrigerator or the clean dishes in the dishwasher, with good lighting you see more.

All the lighting solutions we offer in this catalogue are developed in Germany by experienced engineers and manufactured in modern, certified production facilities. We conform to international standards and also meet the highest safety standards. Because quality is our strength, we can guarantee the outstanding func-



The family have to be able to see their favourite dish.

tionality and long service life of our components and systems without reservation.

It is no coincidence that BJB supplies the majority of manufacturers in the domestic appliance industry worldwide, comprising many well-known brands. With eight subsidiaries on three continents and representatives in 50 countries, we are present throughout the world and always in close proximity to our customers.

And now we hope you will enjoy the perfect BJB dinner. If you have any questions or suggestions concerning either our products or our recipes, please do not hesitate to contact us. With BJB you are choosing the expertise of a global market leader with over 140 years of experience in the field of lighting technology.



Ready or not?





components for domestic appliances encompasses the categories "Hot", "Wet" and "Cold". This is how we describe the environmental conditions under which these products are used. These then determine the necessary technical characteristics of the product.

As well as oven lamp assemblies, which we have been producing since 1979, we also provide lighting solutions for cooker hoods, refrigerators, freezers, washing machines, driers and dishwashers. As light sources we use general service incandescent lamps, halogen lamps or LED solutions. Depending on your requirements, you can choose the appropriate product from a wide range.

One further point, our development team will be pleased to assist you with project-specific or product-specific solutions. If you would like special lighting effects, require specific levels of illumination or want to use a particular type of light source, we will develop an individual product for you. Talk to us. We always enjoy a new challenge.

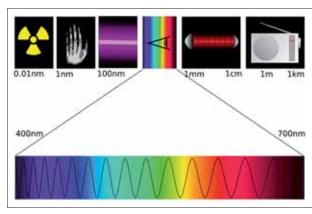
Good light is more than just bright or dim.

What effect does light have?

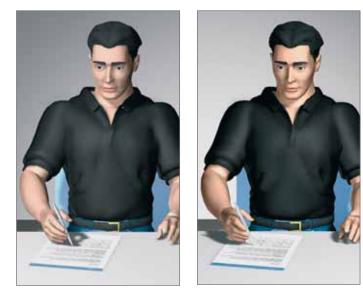
It is well-known that human beings take in 80 % of all information via their eyes. To do this they need light. Good light is not only important for purposes of orientation and safety, it also has a major influence on our well-being. Seen from this perspective, light always has an objective and a subjective component. Objectively, we want to see what is in the fridge and find what we are looking for quickly. Subjectively, we want to recognise and assess whether the chicken in the oven is succulently and deliciously roasted. See, recognise, assess, act. Without good light, this basic process is not possible.

Good light integrated into domestic appliances produces customer satisfaction. Bad light may lead to dissatisfaction with the entire product. From this point of view, it is therefore perfectly reasonable to describe good light as an effective sales promotion instrument.

Indeed, it is not difficult to inspire customers with good light. One merely has to know – and heed – a few basic quality rules of lighting technology. We have listed the most important of these below. If further detailed professional knowledge is required, our lighting specialists will be pleased to help. Now, let's see what really counts.



The human eye only perceives a small part of the electromagnetic spectrum as light.



Annoying shadows can be avoided by changing the angle of incidence or by using alternative light sources.

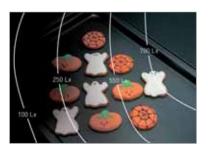
Good lighting will stand up to any comparison.

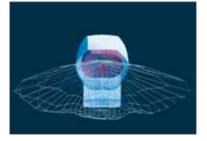
Illuminance

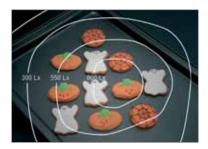
Illuminance, measured in lux, is the quantity of luminous flux falling onto a surface. For us, the question is how much light actually strikes the places we want to see. What power rating must lamps have to achieve the necessary values? What is the influence of the area surrounding the space to be illuminated?

All these questions can be answered through calculation and measurement. The illustration opposite shows how different the illumination of a baking tray can be in various zones. The results are different depending on where the oven lamp assembly is fixed and which reflectors and light sources are used,.

When light fittings are used in cooker hoods, it is also important to have the correct degree of illuminance in the cooking area. In other words, the right level has to be achieved. Neither too light nor too dark.







Dazzle

Dazzle not only reduces visual performance, subjectively it is perceived to be unpleasant. It can also lead to discomfort and tiredness. It is caused by excessive differences in light density or when the absolute light density is too high in relation to the degree of adaptation of the eye. All these aspects have to be considered and avoided when designing light fittings for domestic appliances.

This is achieved by means of screening or the use of light directing elements such as reflectors, which increase the illuminating area and thereby reduce dazzle to an acceptable level. A decisive factor in avoiding dazzle is to identify the critical emmission range of the light source from the outset and to incorporate appropriate counter-measures into the design, for example by developing special reflectors.



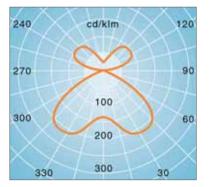
Example of oven lamp with optimised reflector.

Light - where, how and for how long?

Light intensity distribution

Is there enough light in all parts of the refrigerator? Is there adequate illumination for everything to be seen well? These questions refer to the level of illumination, which concerns the light distribution within a space rather than the illumination of a surface.

The design of the reflector plays a decisive role here. This is the chief factor in determining the shape of the light distribution curve. Ideally, it should be adjusted by a specialist to the space which is to be illuminated, thereby ensuring an optimum light quality in the relevant domestic appliance.



Light output

Higher light output and, consequently, improved energy efficiency are increasingly the focus of interest in energy policy discussions. As a result, the general service incandescent lamp, which is now over 100 years old, is coming under increased criticism due to the fact that it converts only 5 % of its energy intake into visible light. Laws to ban the use of this light source are being prepared in a number of countries, or have already come into force. Substantially higher levels of efficiency are achieved with halogen lamps, for example. However, due to the various manufacturing technologies in use, there are still considerable quality differences which have to be considered when developing a lighting solution. There has also been rapid technical progress in the field of LED and for certain applications, these are increasingly being seen as an alternative to conventional lamps.

Service life of lamps

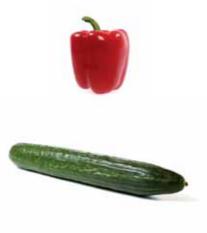
As in the case of light output, there are also considerable differences in the service life of lamps. One reason for this is the technology used, but manufacturer-related causes may also play a role. Good quality general service incandescent lamps have a service life of approximately 1,000 hours, halogen lamps twice as long, and modern LEDs can last 50,000 hours or more depending on the application.

Good solutions can be recognised by the quality of the light.

Colour rendering

Good light reproduces the colours of objects in as lifelike and natural a form as possible. For example, it is responsible for making a pepper look red in the refrigerator or a cucumber green. The quality of colour rendering depends on how evenly the spectral colours of a light source are distributed. Technically, one refers to the CRI (colour rendering index). The reference value here is natural light with a value of Ra = 100. Very good results are achieved with halogen lamps, and general service incandescent lamps are also a good choice in some cases.

Modern LEDs also achieve a high CRI rating, which is comparable to that of halogen lamps.





A dish like this saddle of lamb can only be cooked to perfection if the lighting is good. A look at the timer is not sufficient to make a final judgement on the quality of a dish. This is why manufacturers worldwide so often employ high-quality lighting components from BJB in their domestic appliances.

Hot: Lighting solutions for cooking and baking.

In this chapter you will find lighting solutions for ovens, microwaves and cooker hoods. We have been developing and producing numerous versions of components and systems for these applications since 1979. As a result, we can now say that BJB probably has the widest range of oven lamp models and unparalleled expertise in this field.

In addition to the classic general service incandescent lamp, we are increasingly using mains voltage or low voltage halogen lamps. Here, as in other fields, special G4 low voltage halogen lamps produce excellent lighting results.

Similar results are also achieved using mains voltage G9 halogen lamps.

High quality domestic appliances in particular are often equipped with lighting solutions based on halogen lamps.

In general, our products can be installed securely and easily, are temperature resistant and designed in accordance with applicable international standards and regulations (IEC 60598/VDE 0711). A further advantage for our customers is BJB's worldwide presence and, therefore, the central availability of all standard products in our distribution warehouses. What we offer, we can also deliver.

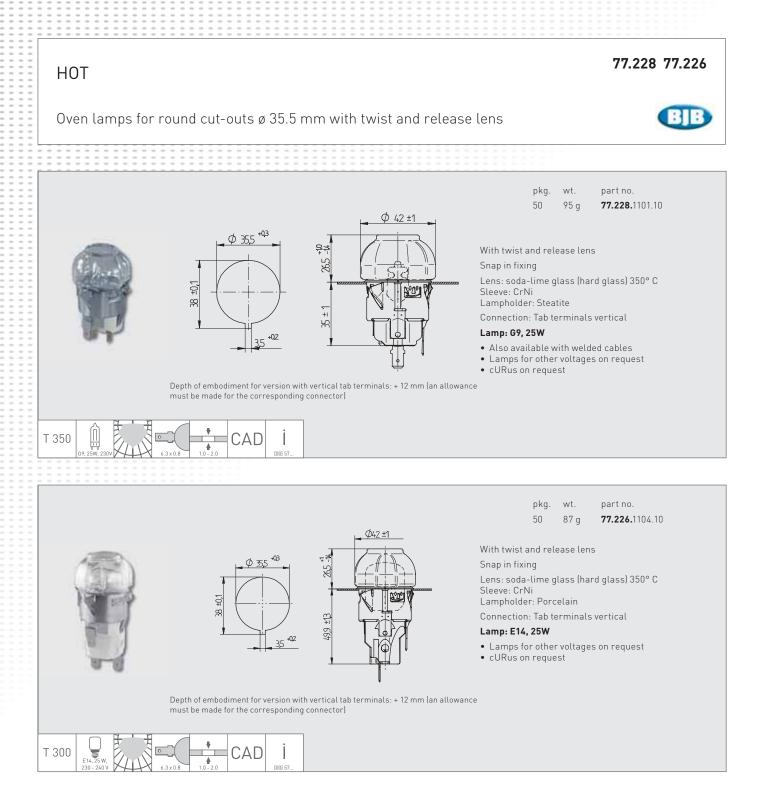
However, if you are looking for special

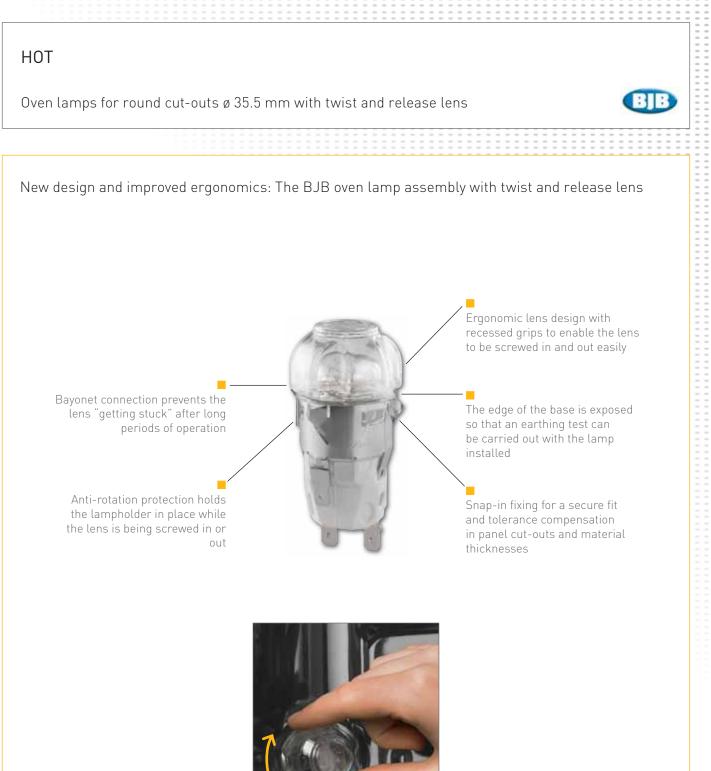
components for your domestic appliances which are not included in this catalogue, we will be pleased to help you with the development of an individual solution.



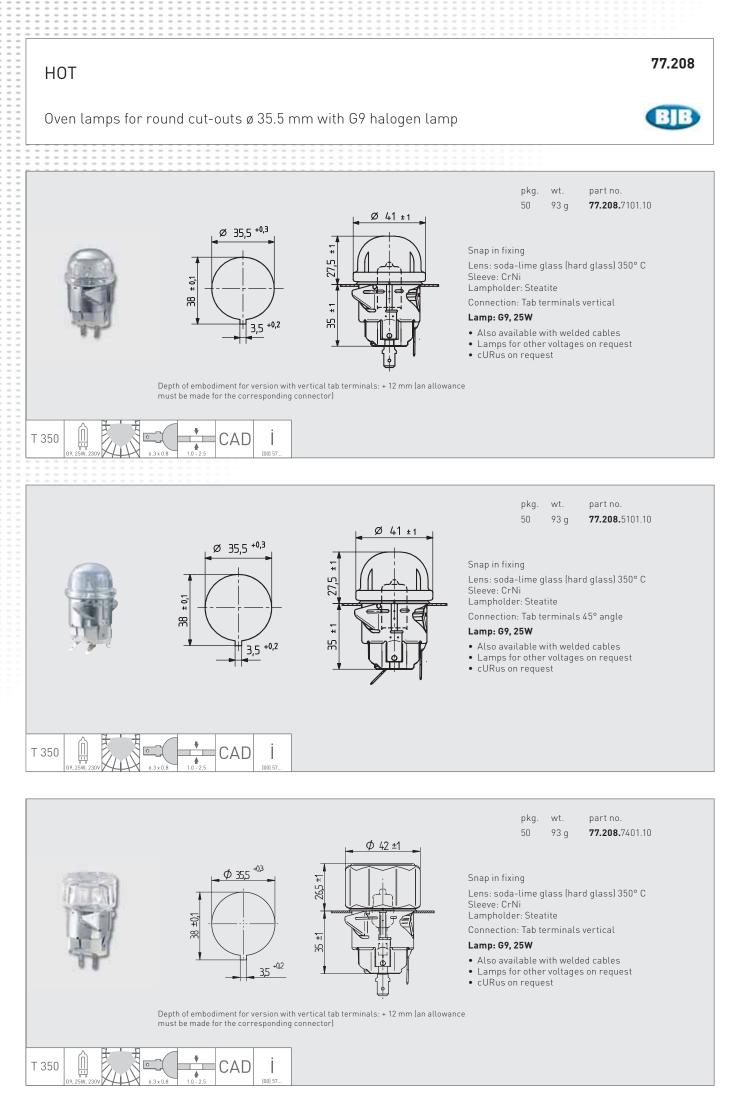
A particularly innovative lighting concept is this indirect light source which emits bright halogen light all the way through to the back of the oven. It was developed in cooperation with Neff. Essential features of the design are the reflectors in the oven door, which reflect the light from a low-voltage halogen lamp and ensure even illumination on all three levels.

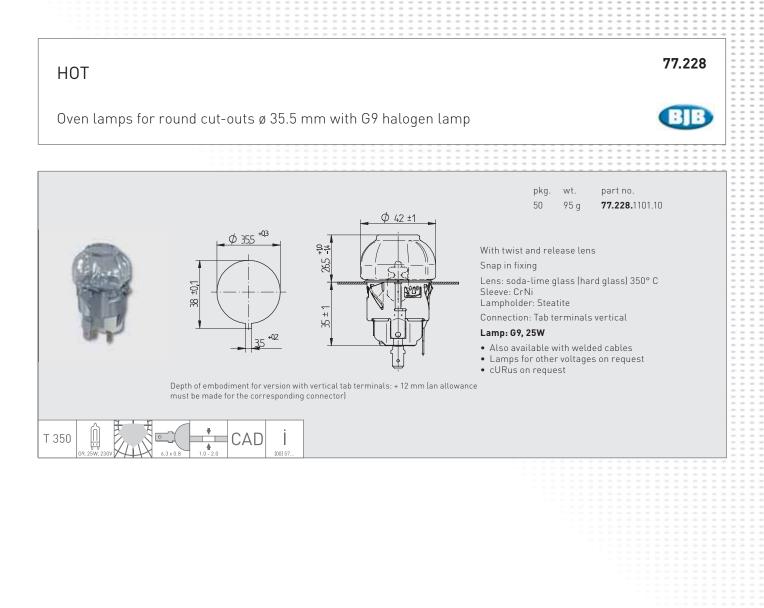


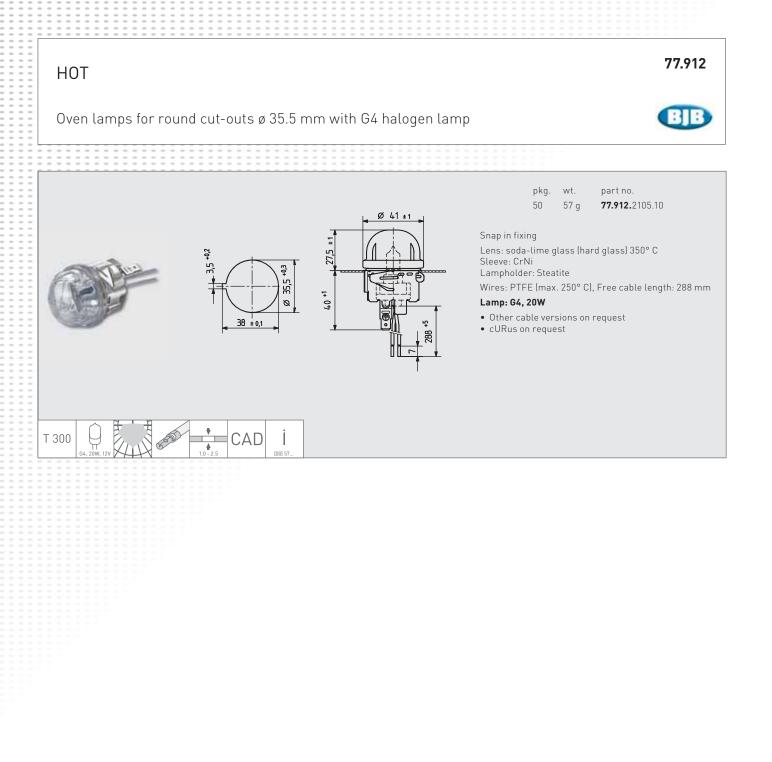


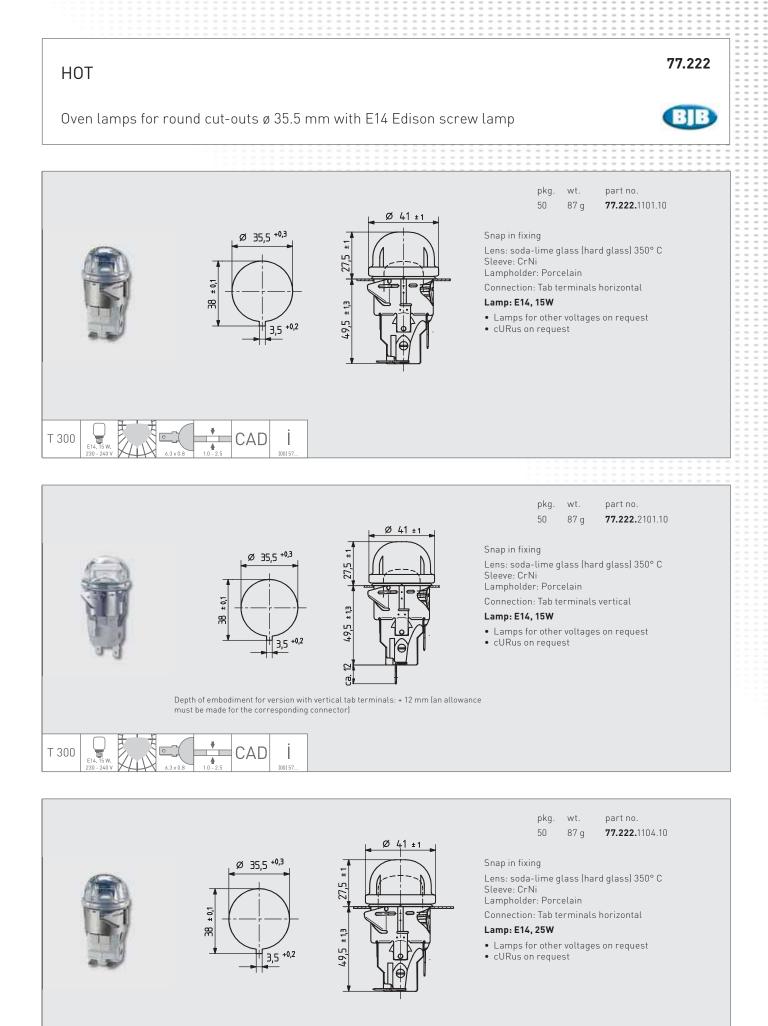


The new twist and release lens from BJB is equipped with a practical bayonet connection. A slight twist is enough to insert it firmly and securely into its holder. Advantage: It can easily be screwed out again to change the lamp, even after long periods of operation.







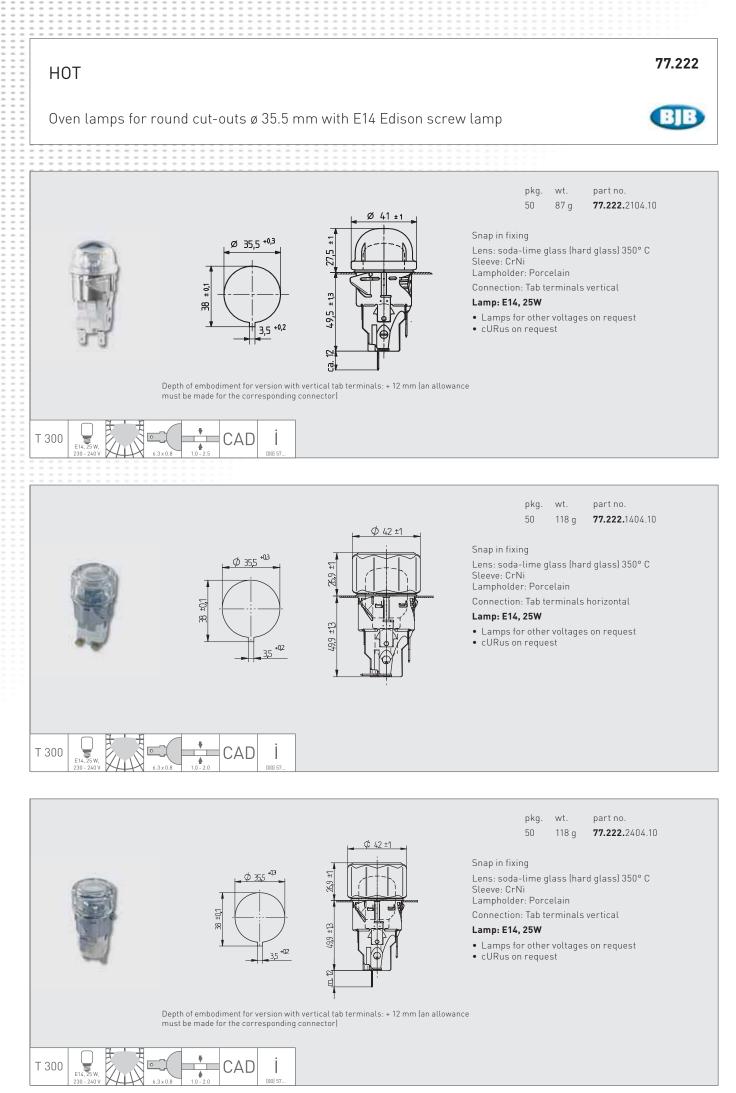


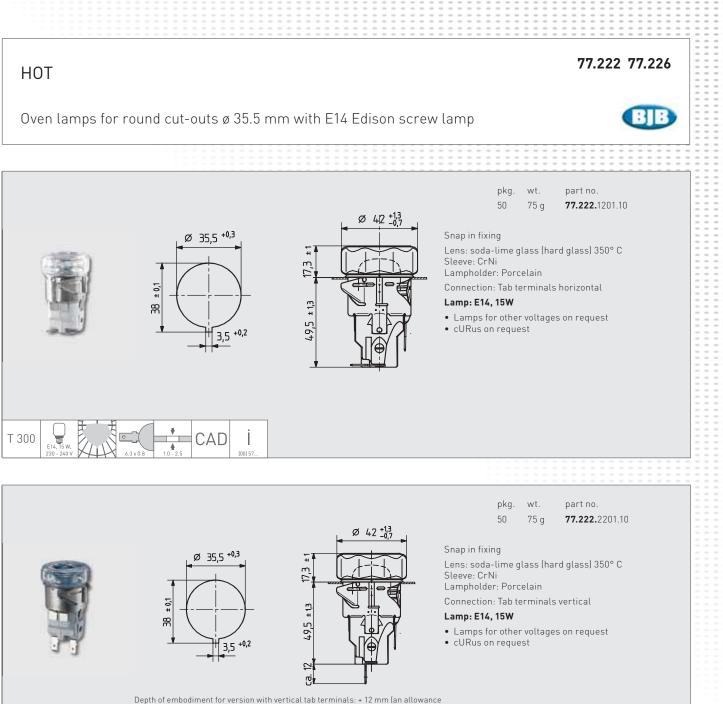
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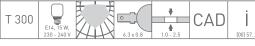
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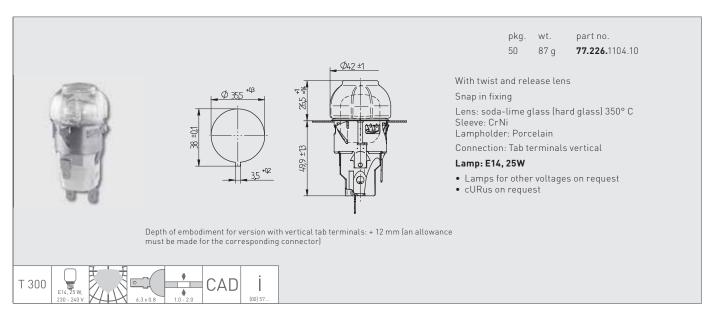


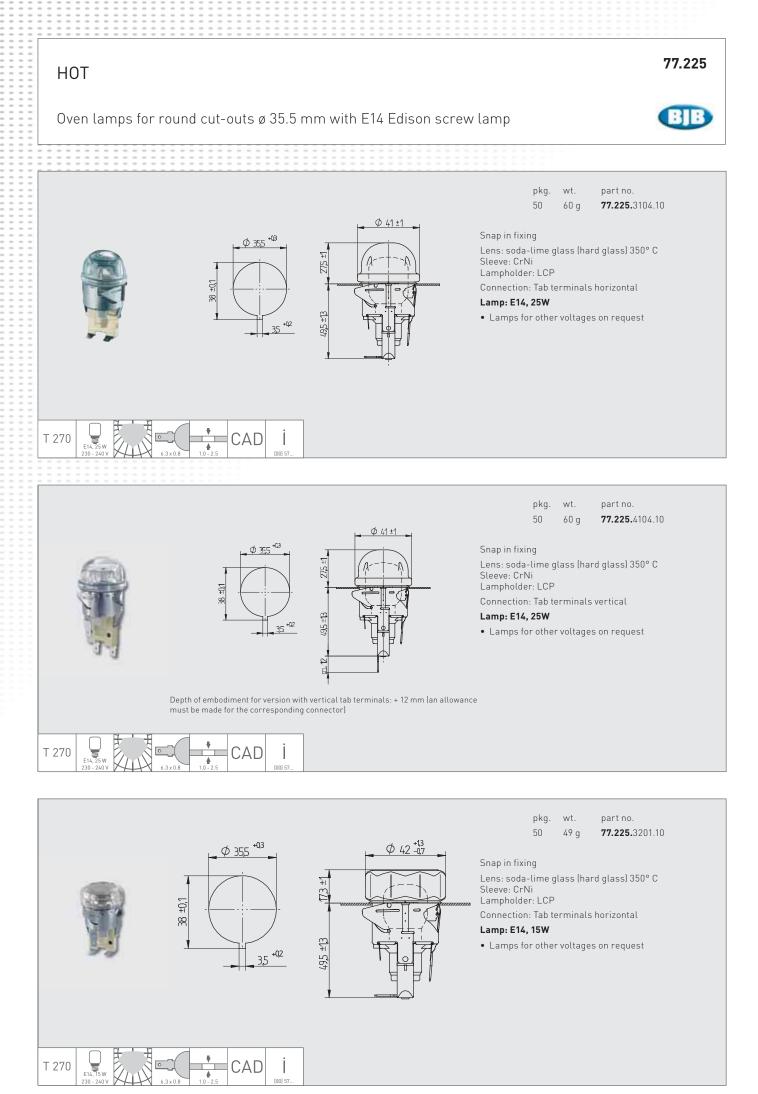


must be made for the corresponding connector)

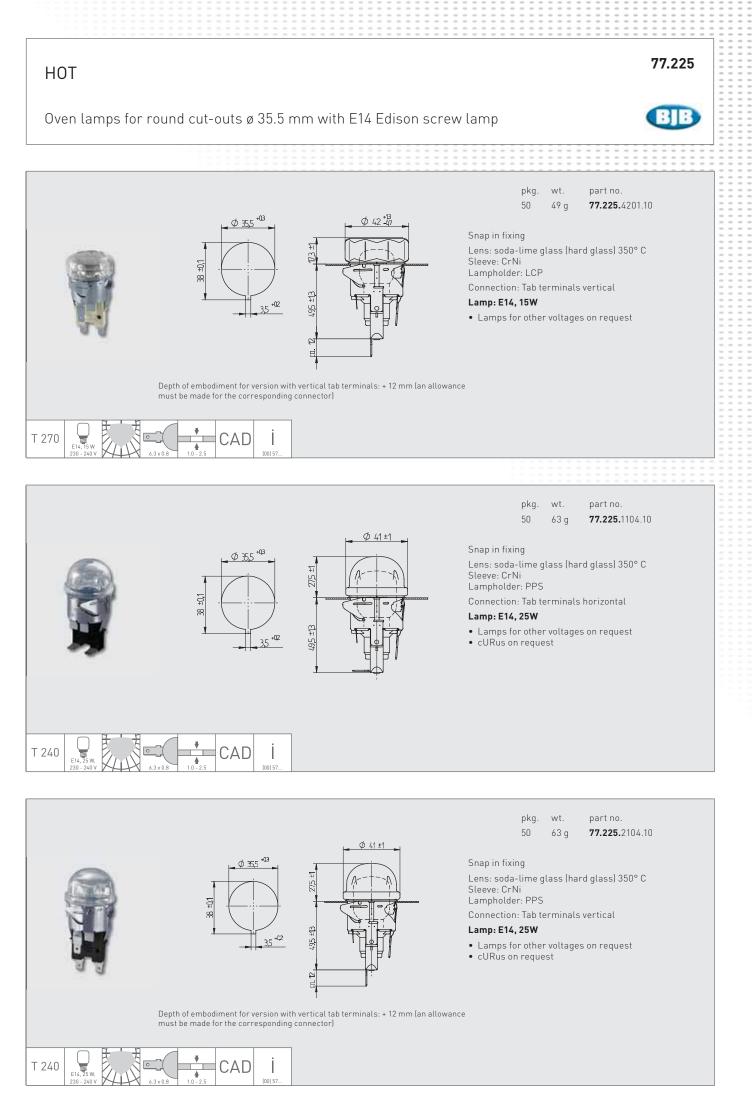


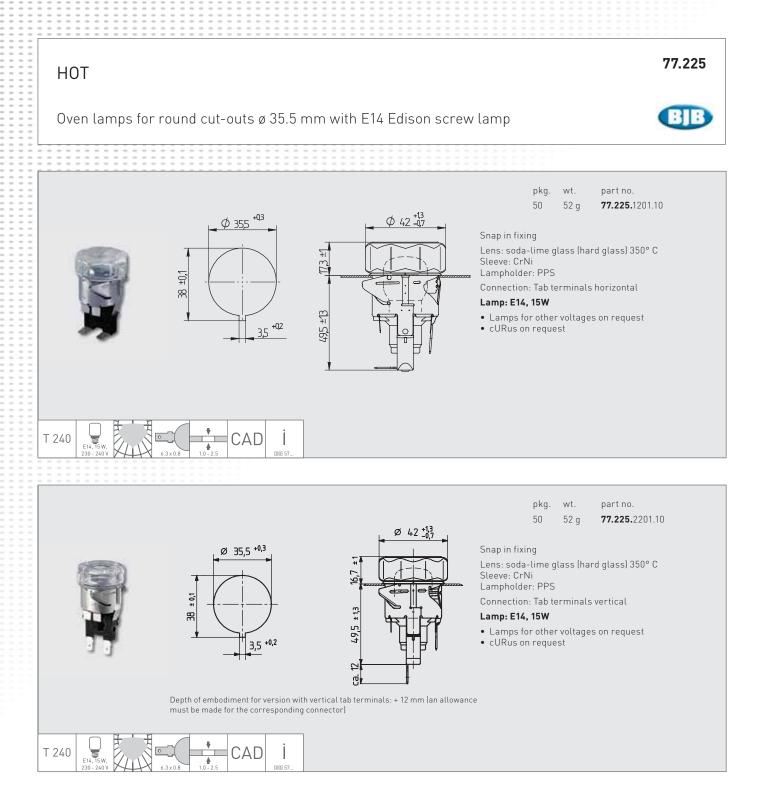
Depth of embodiment for version with vertical tab terminals: + 12 mm (an allowance

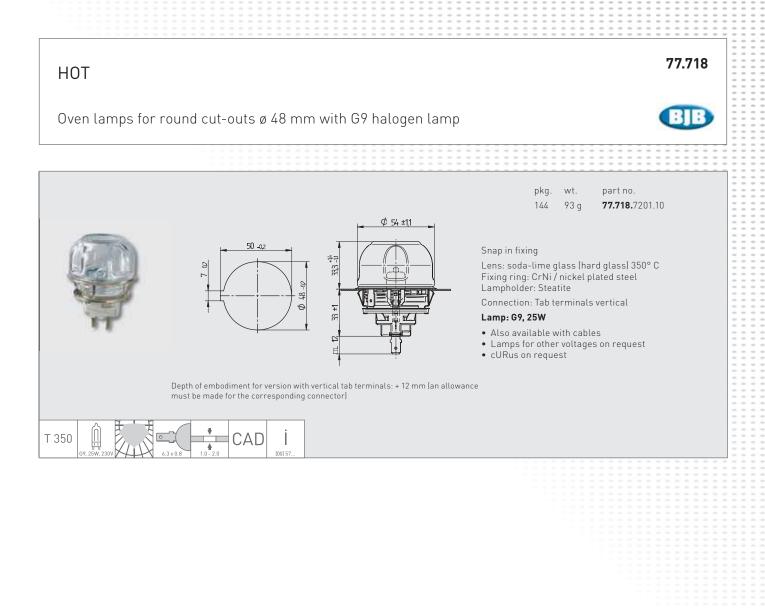


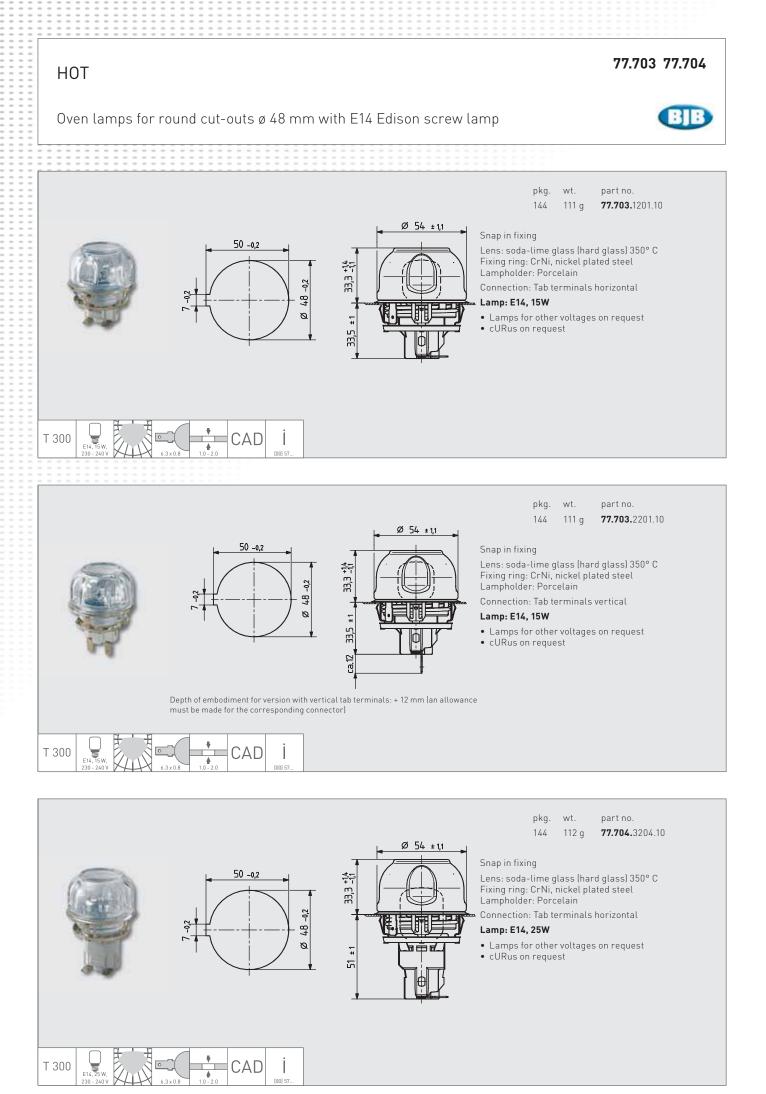


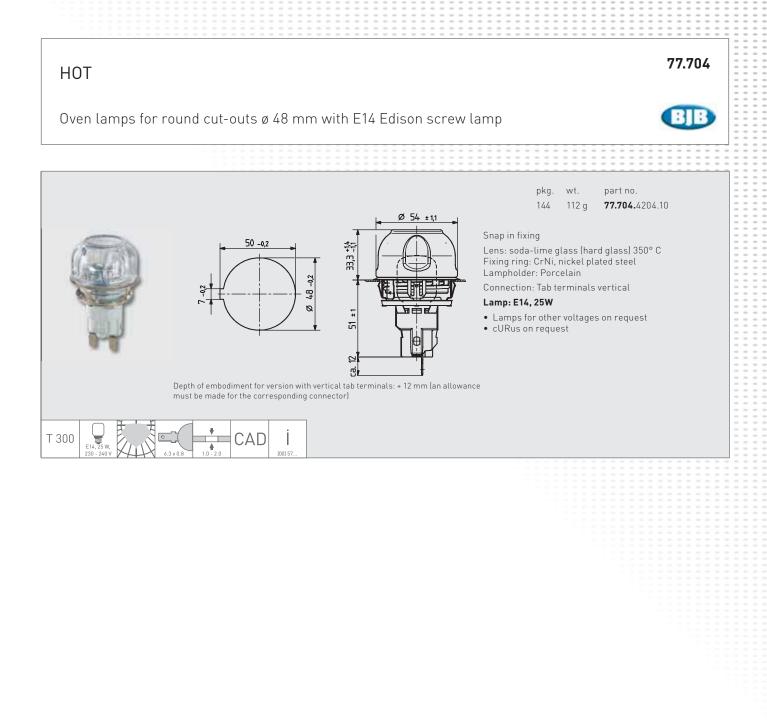
This page is only valid in connection with the general information and notes of the complete catalogue, issue 2008-2011 2008-2011

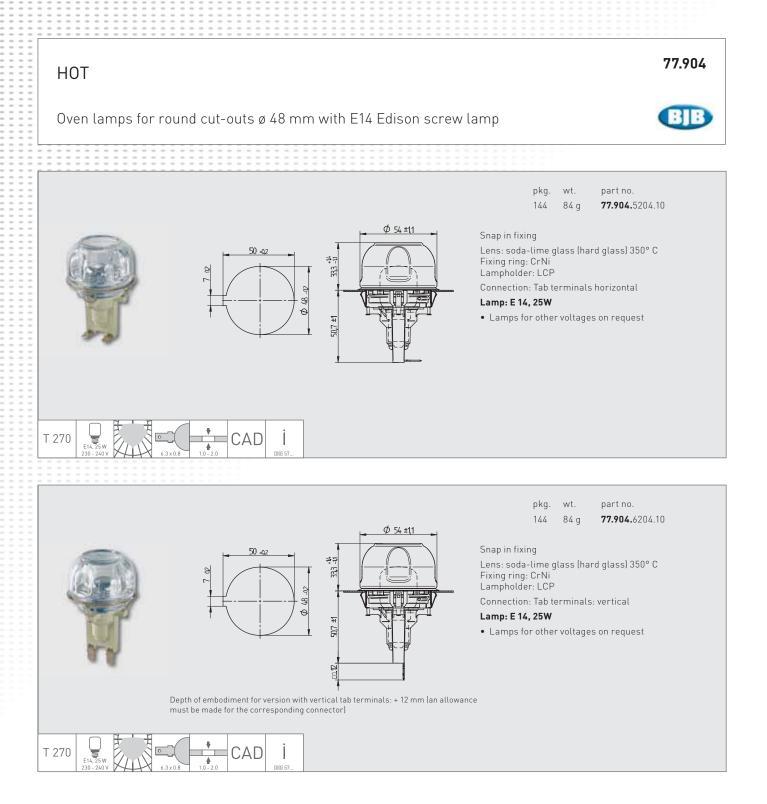


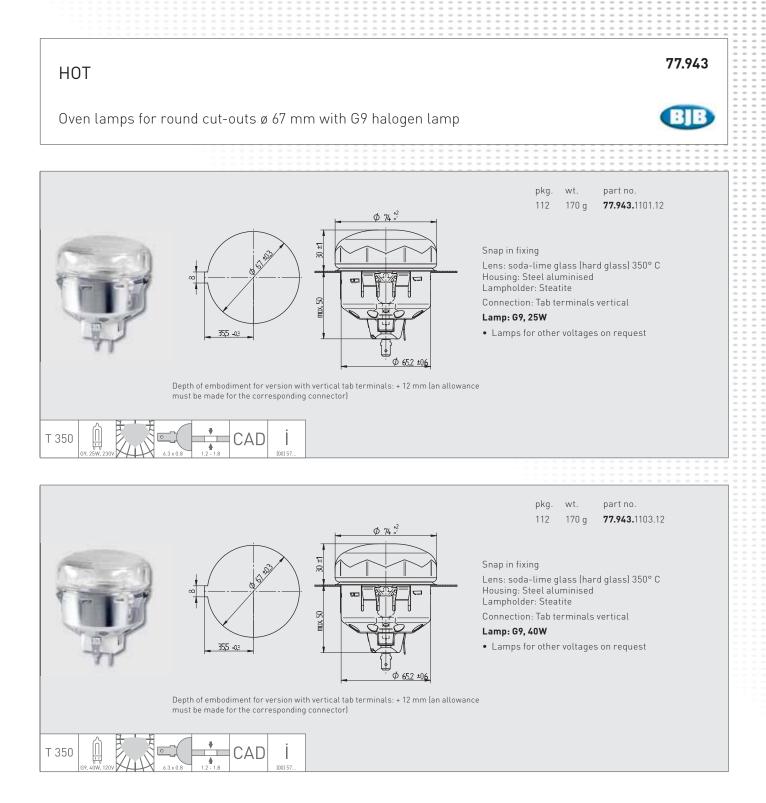


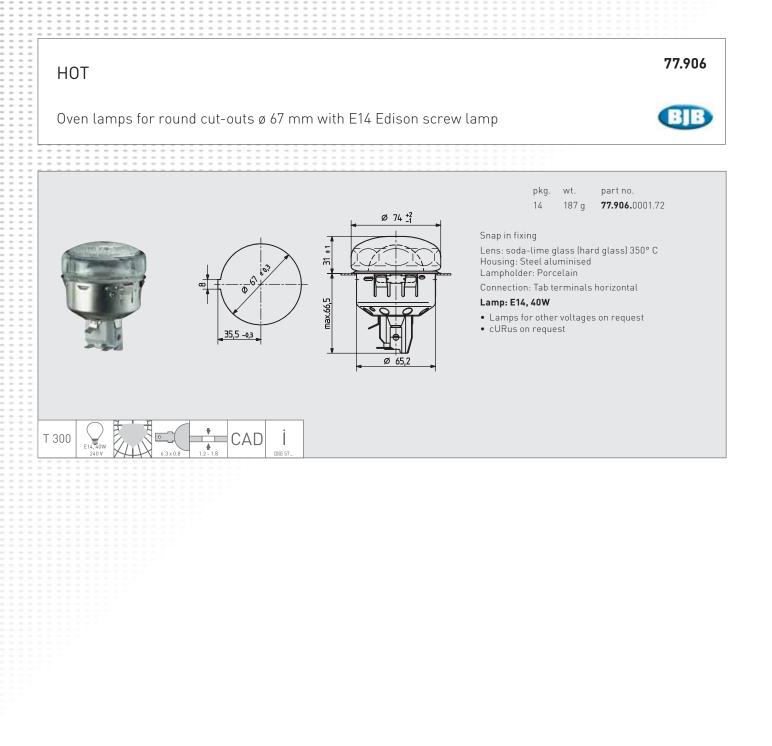


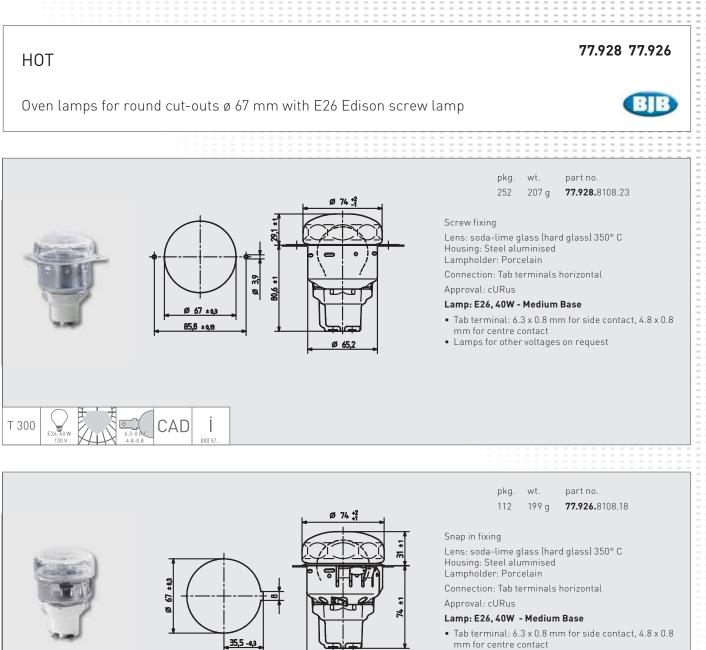












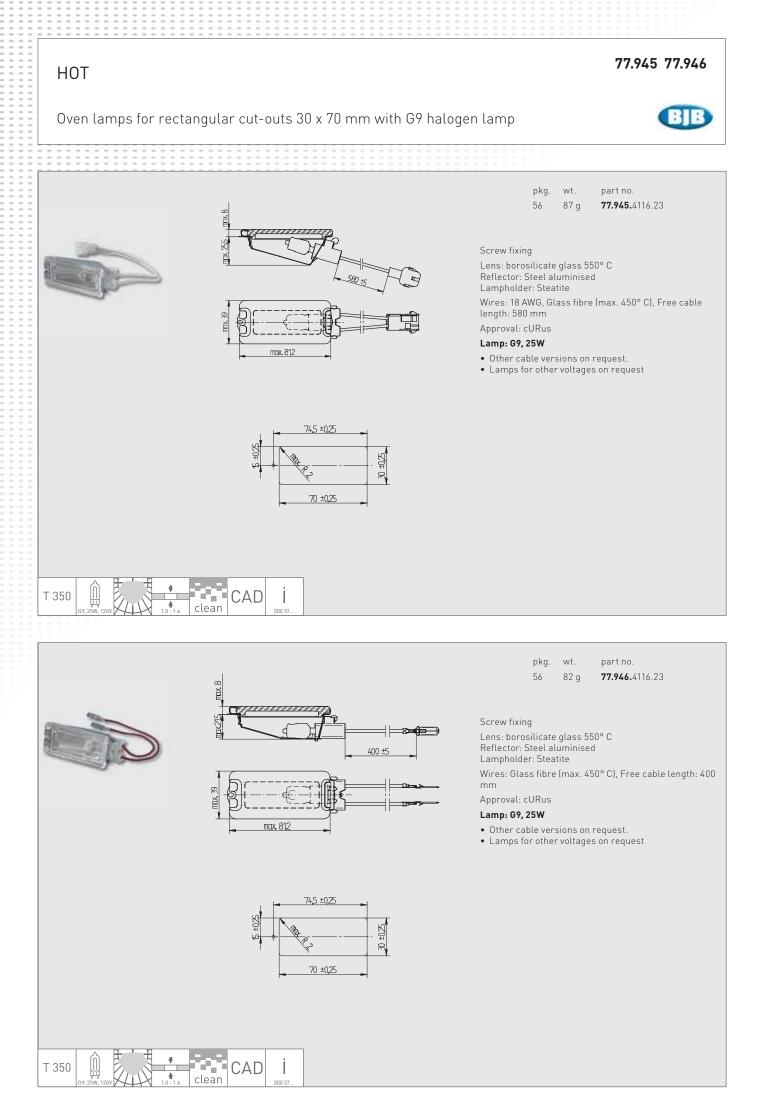
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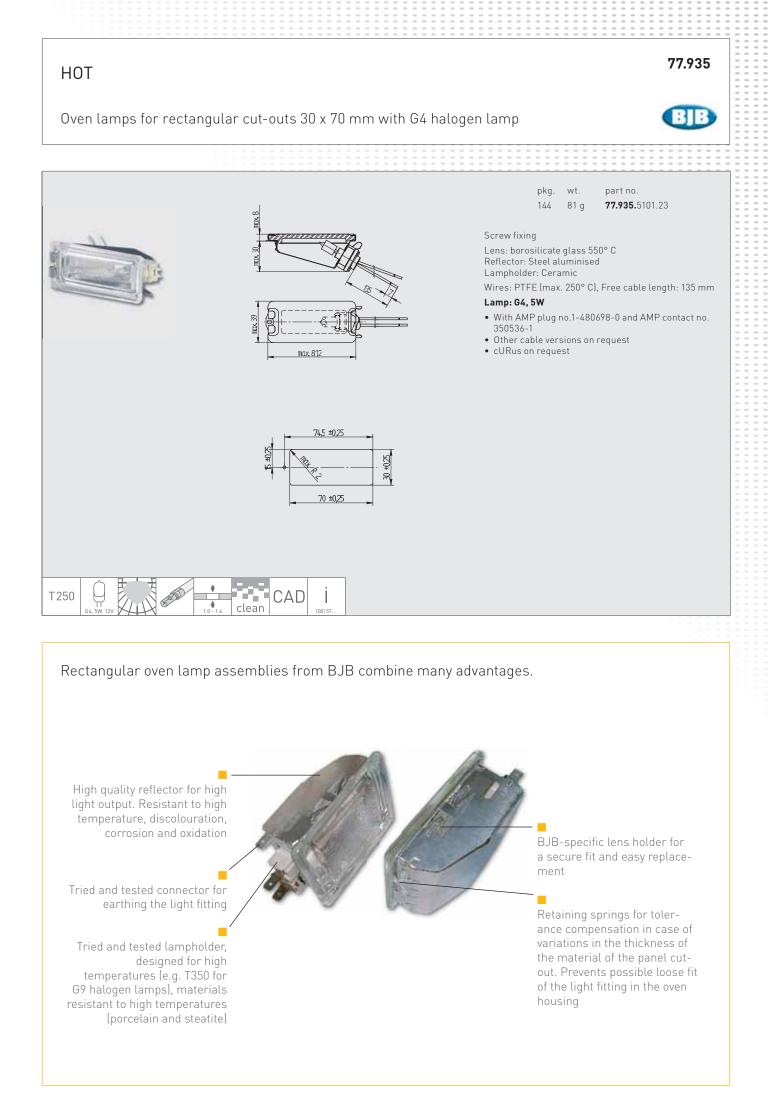
• Lamps for other voltages on request

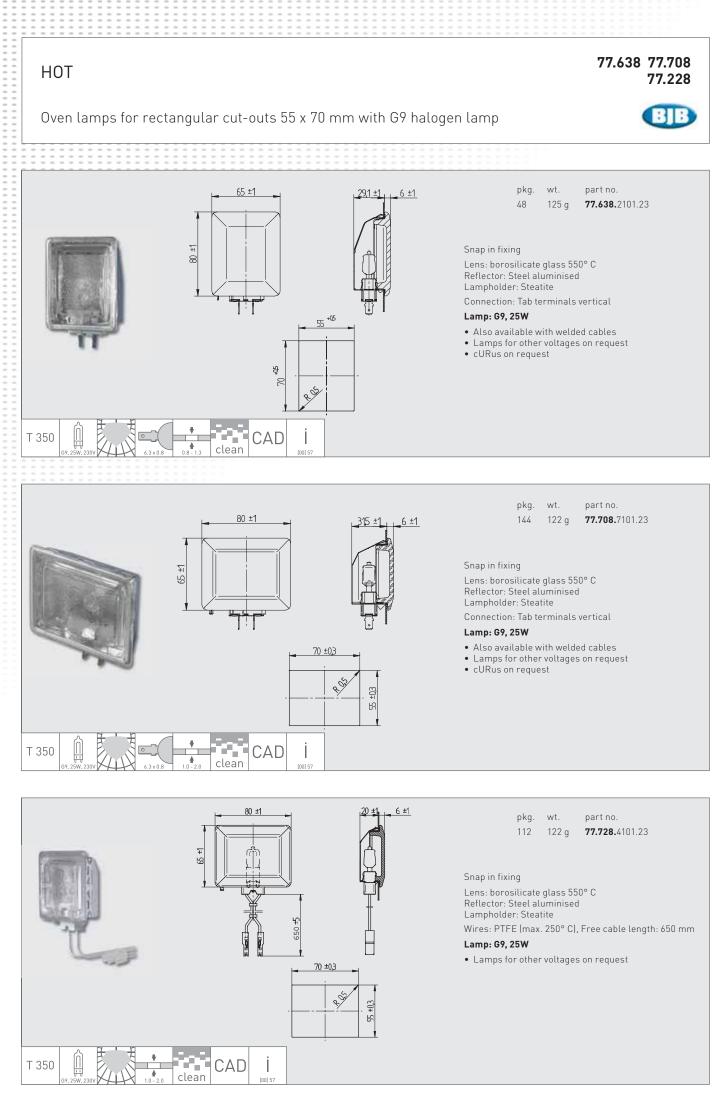
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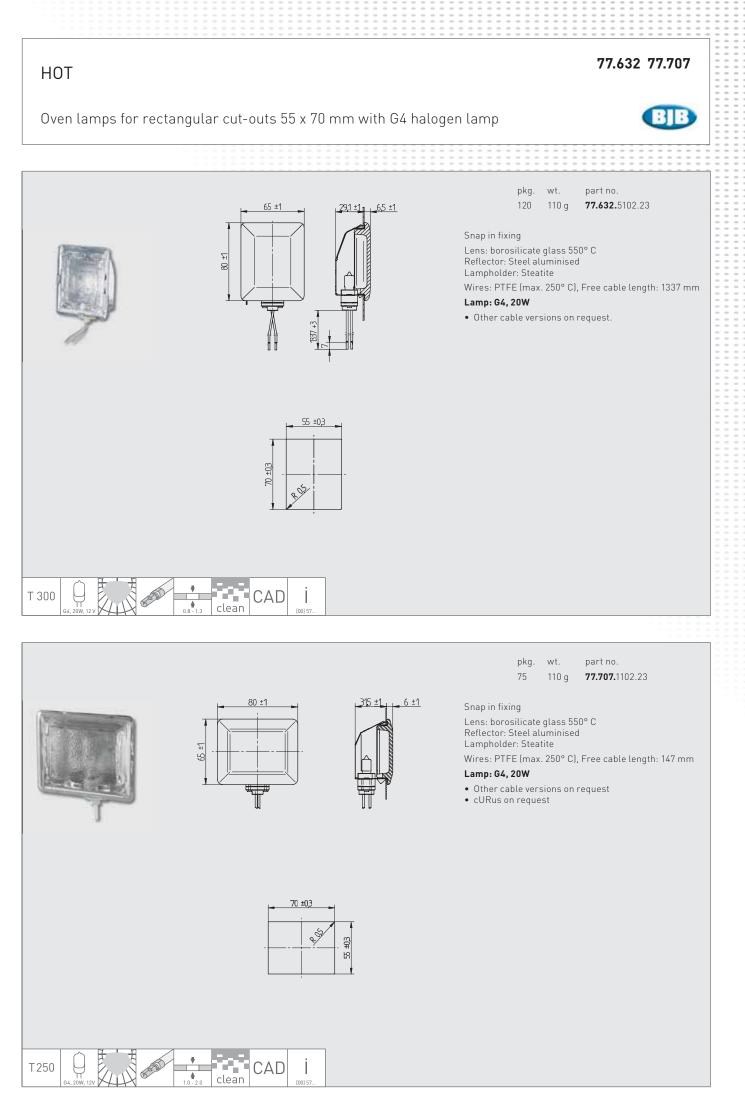
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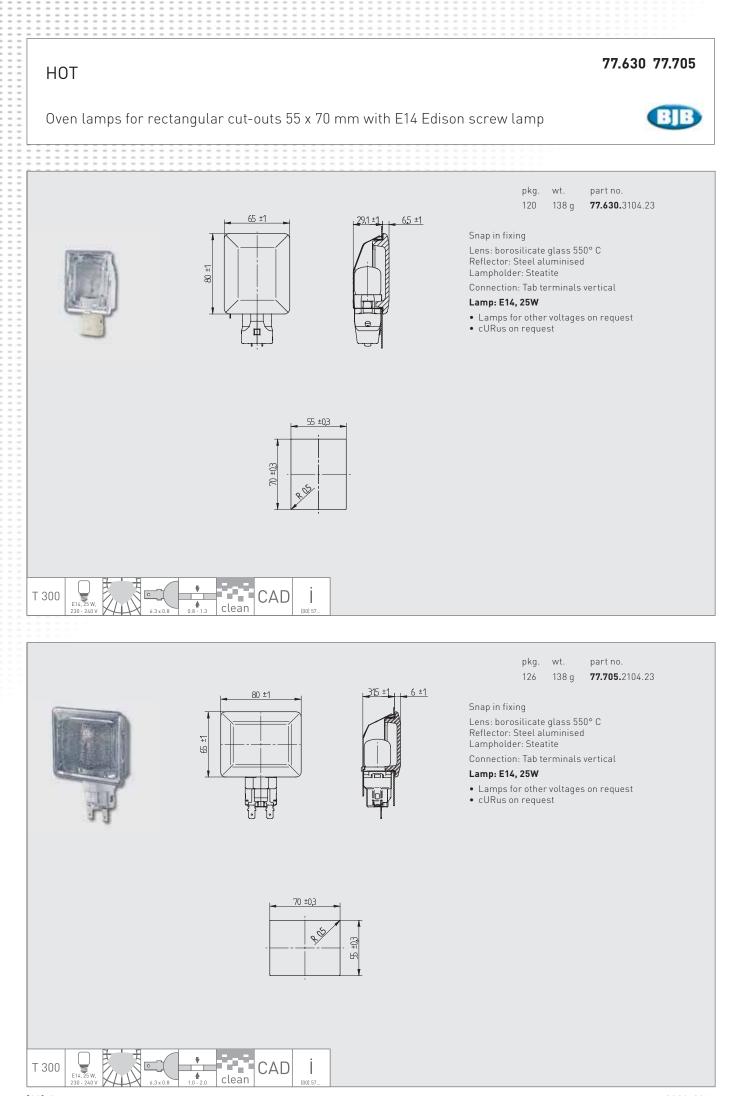
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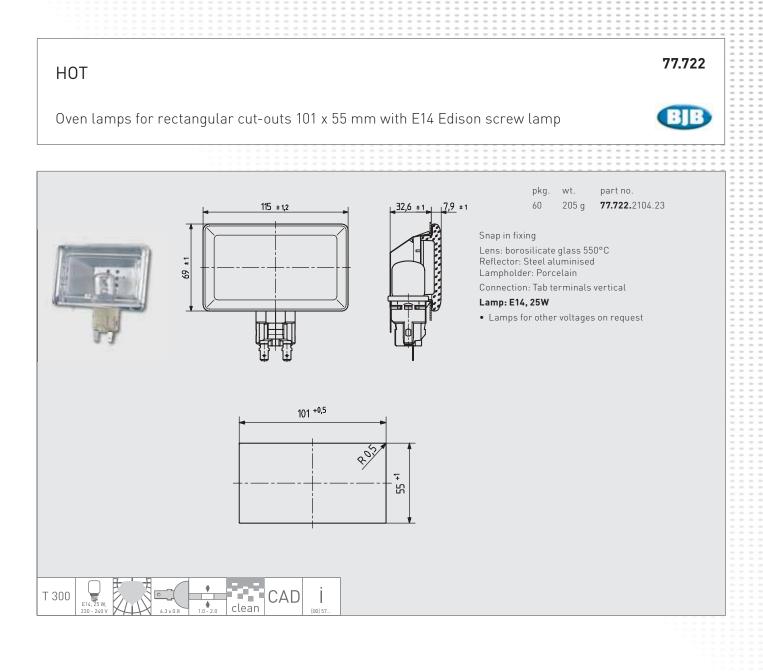


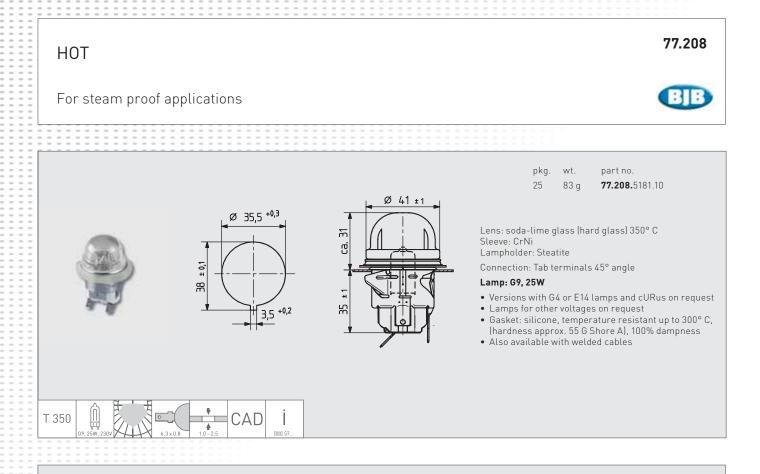










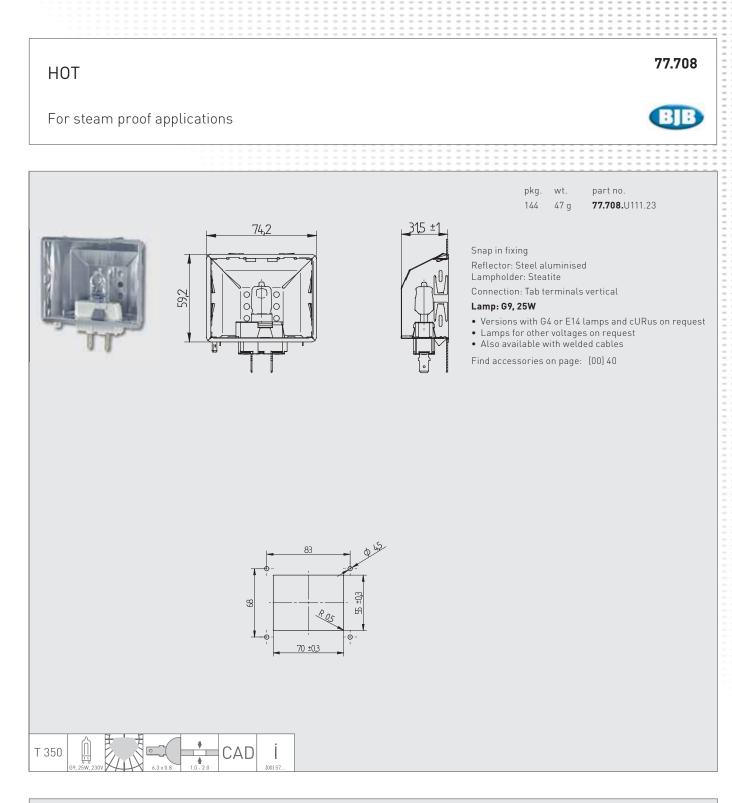


Exploded view of system Shown here with PPS lampholder



Example of application

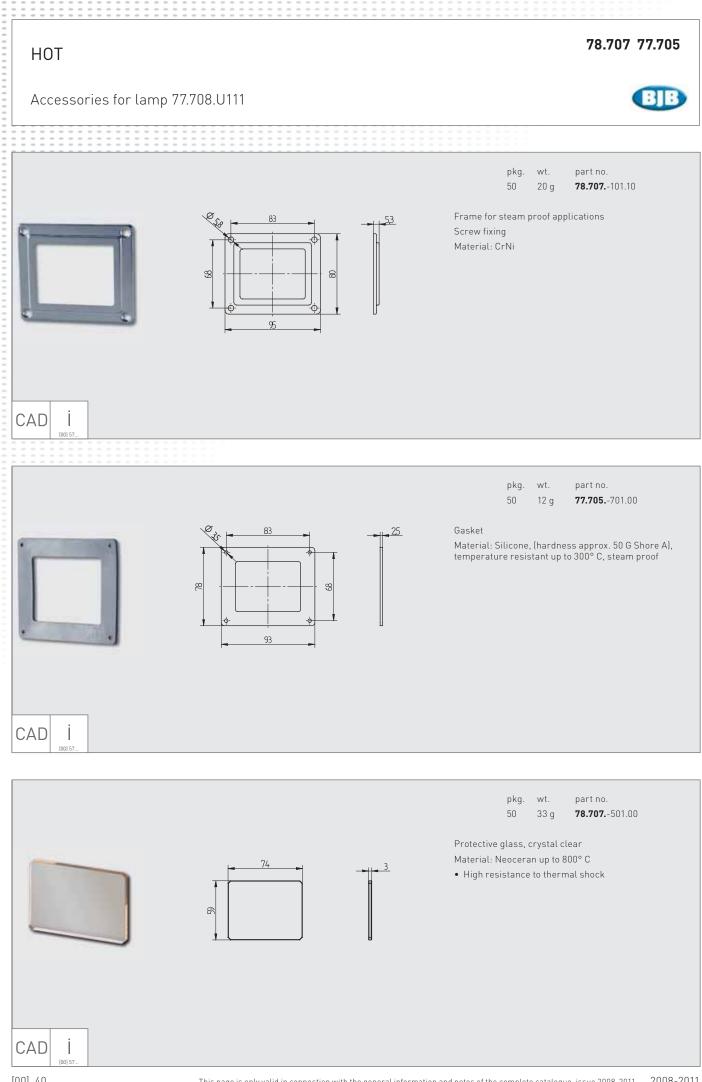




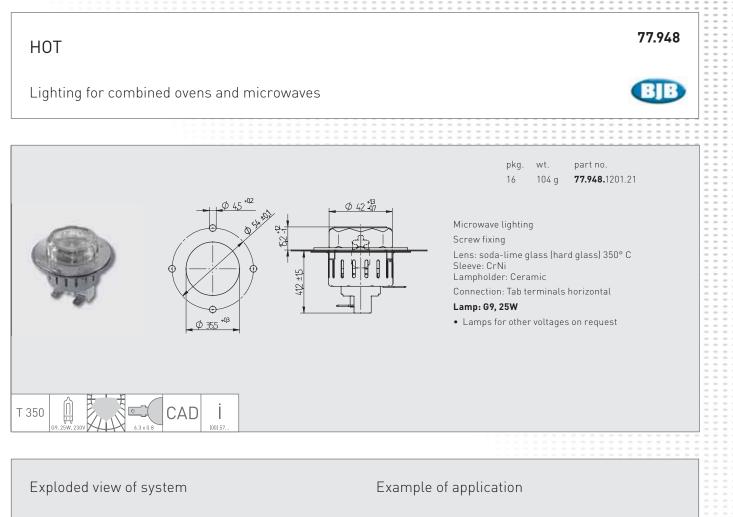


Example of application with G4 lamp

Housing Gasket Lens Frame 77.707.U103 77.705.-701 78.707.-501 78.707.-101



[00] 40









Here Nicole and Dennis are preparing the starter for our perfect dinner on a well-illuminated work surface. In this case, the light sources are integrated directly into the cooker hood. For this purpose, BJB supplies both ready-to-install products and other components for all types of light source.

Hot: Light fittings for cooker hoods.



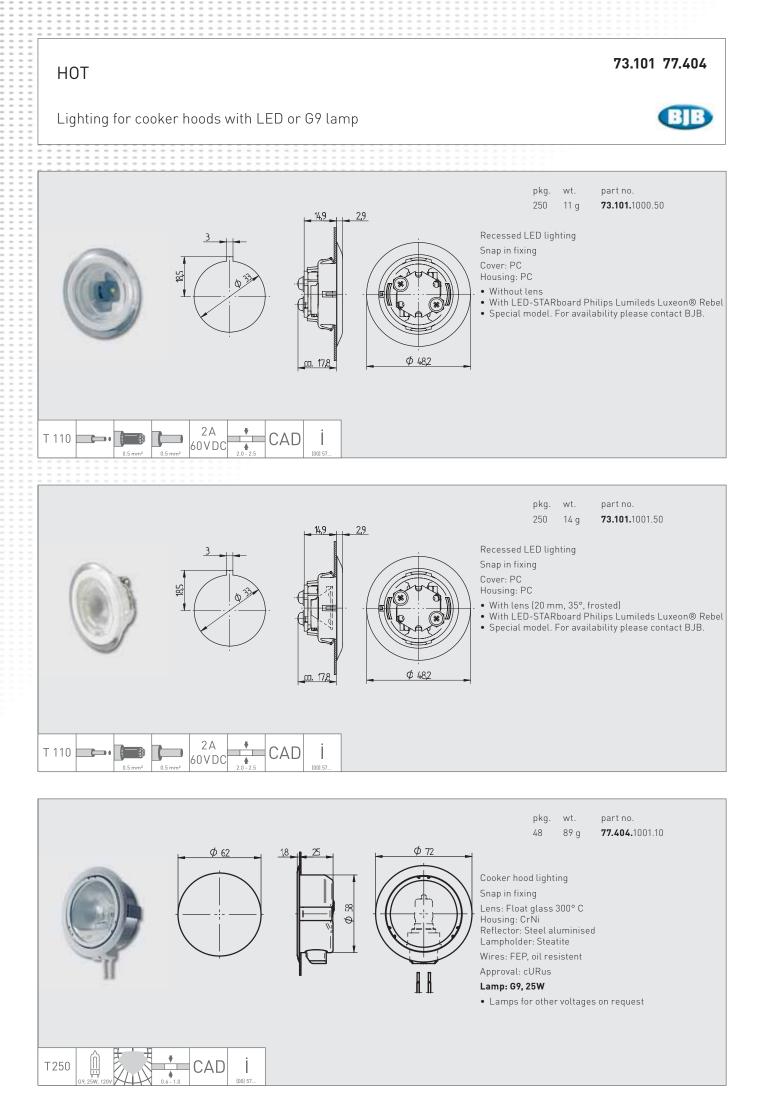


The possible applications for lighting solutions in cooker hoods are extremely varied. In addition to the snap-in recessed light fittings shown below, there are many other components from our range which can be used.

In our main catalogue you will find many lampholders which are suitable for these purposes. With components for general service incandescent lamps, for fluorescent/compact fluorescent lamps, for halogen lamps and for LEDs. Developers can give free rein to their imaginations.

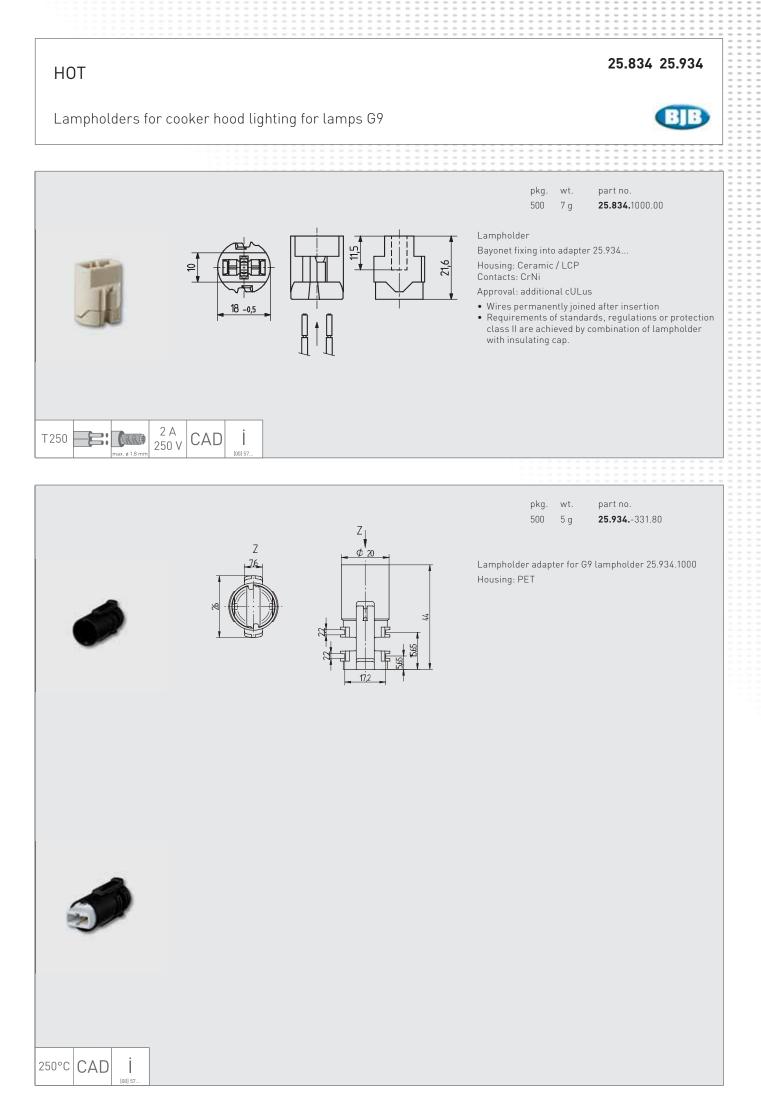
Specifically for the changeover from general service incandescent lamps to alternative lighting solutions, we offer our lampholder adapter 25.934.-331 for G9 lamps. This practical product is very easy and quick to use and there is no need to make changes to the basic design.

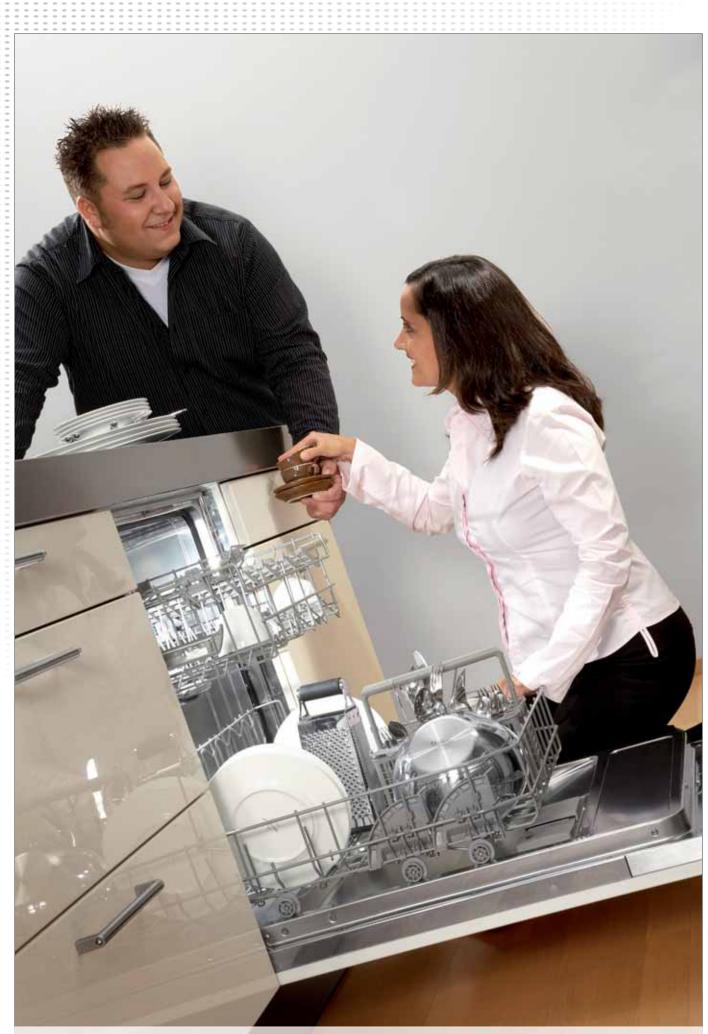
All in all, the numerous BJB components provide our customers with a modular system with which they can realise a conceivable solution.



[00] 44

This page is only valid in connection with the general information and notes of the complete catalogue, issue 2008-2011 2008-2011





As you can see here, good housekeeping also requires clean dishes. This process is made visible with BJB lighting solutions for dishwashers. In addition to the actual lighting technology, moisture and strong mechanical stresses present further challenges for BJB to overcome in the development of these products.

Wet: Lighting solutions for washing machines, driers and dishwashers.



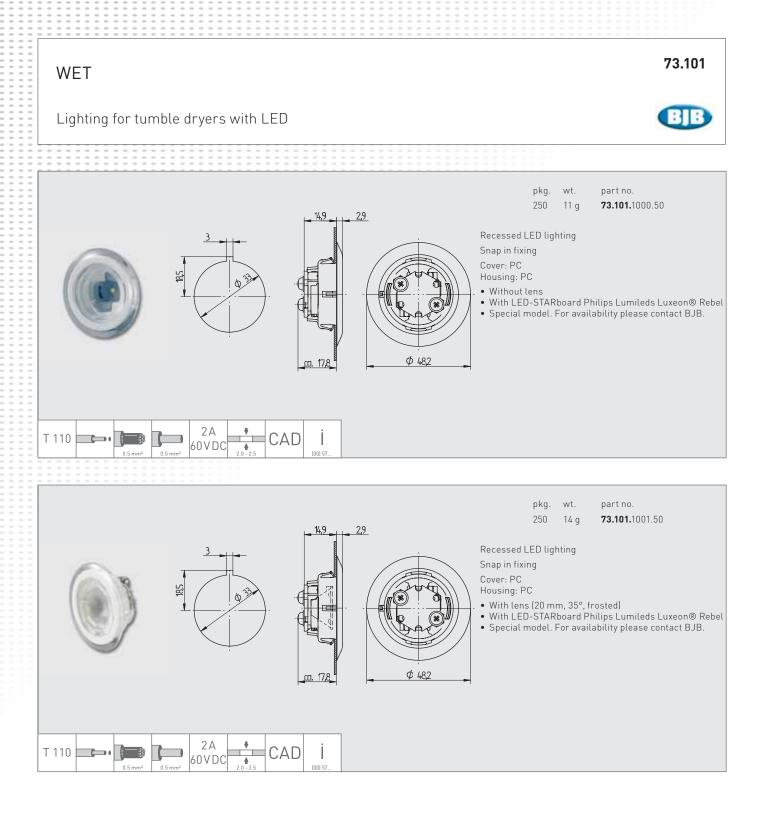
Even in dishwashers, washing machines and driers, one would like to see what is happening. For this reason, lighting systems are also being employed to an increasing extent in these appliances. We frequently use LED technology here, but also offer a system for general service incandescent lamps.

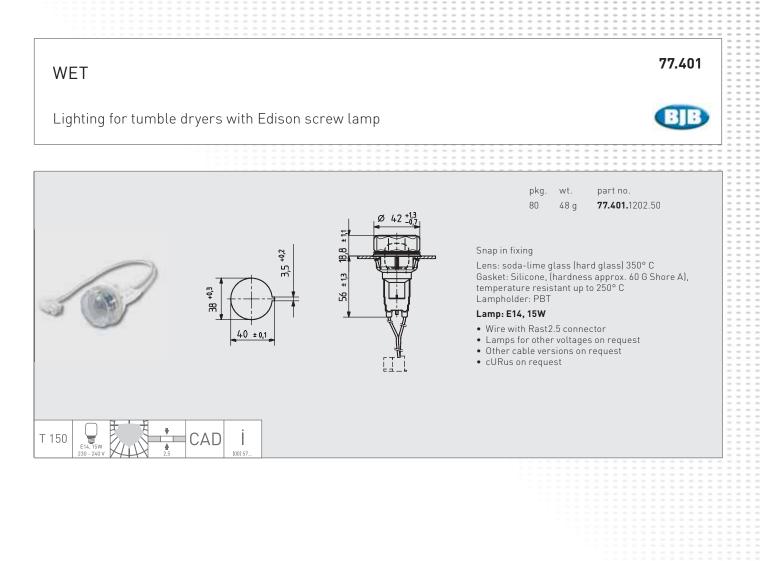
Washing machines and driers present special challenges because the lighting system does not only have to be resistant to moisture and humidity, but also has to withstand strong vibrations during operation. Simple materials are not suitable for such applications. Reliable, durable products can only be developed when first-class components and materials are used. This has always been our policy at BJB and remains so today.













No refrigerator without light. But nowadays a single light is often no longer enough. Particularly in the case of large appliances, it is preferable to use several light sources. In this way, everything is evenly illuminated and with an appropriate colour temperature. With its wide range of products, BJB offers suitable components for all requirements, from general service incandescent lamps to innovative LED technology.

Cold: Lighting solutions for refrigerators and freezers.



Example with designation of cooling zones by means of LED background lighting



Refrigerators and freezers contain many different things. Dairy products, meat, fruit, vegetables and drinks, to name but a few. In this case, as well as even illumination, the colour rendering quality is also important. To achieve good values here, general service incandescent lamps, halogen lamps or LEDs can be used. In certain cases it may even make sense to equip different zones with their own light fittings and also to use different types of light source.

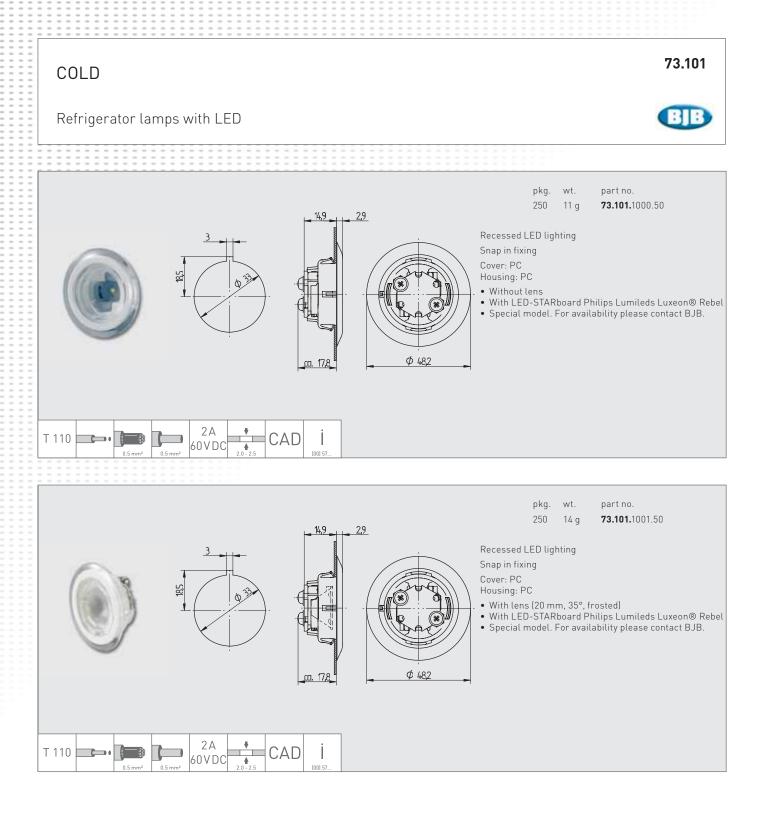
Today, LEDs are in the top category of lighting solutions for refrigerators, and there are many different versions available in a wide variety of colour temperatures. Halogen lamps are popular due to their long service life, good light quality and high energy efficiency. Especially in small appliances, general service incandescent lamps are an economical solution.

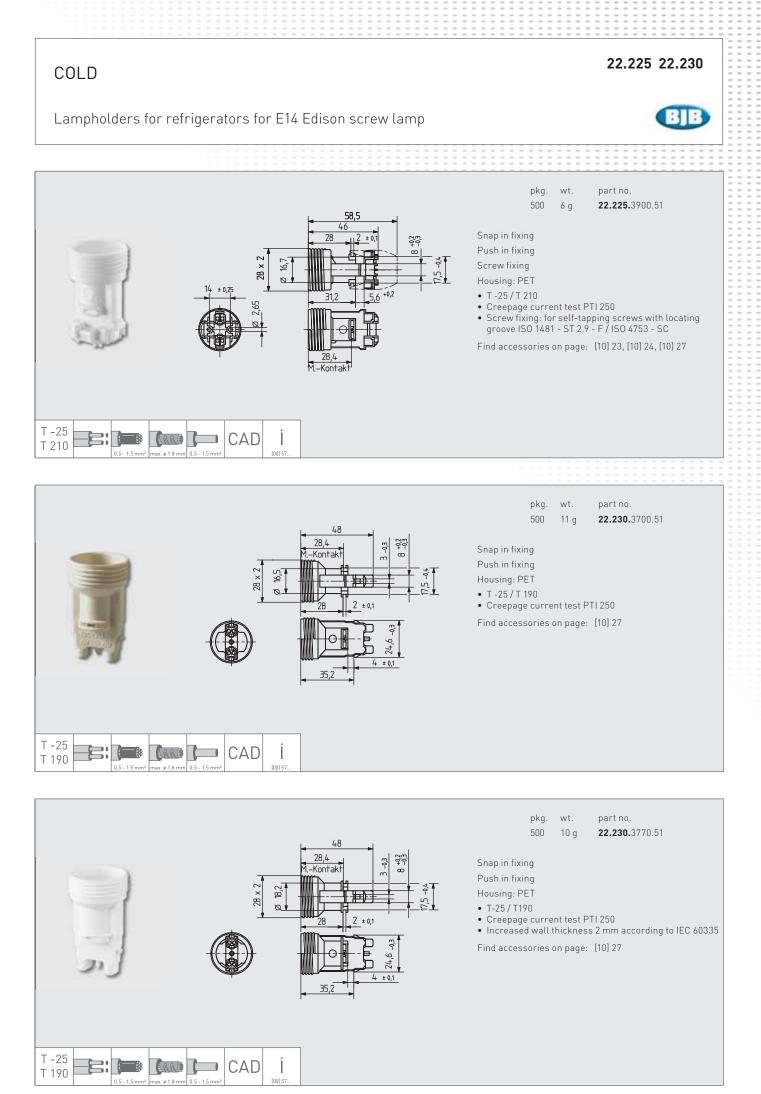


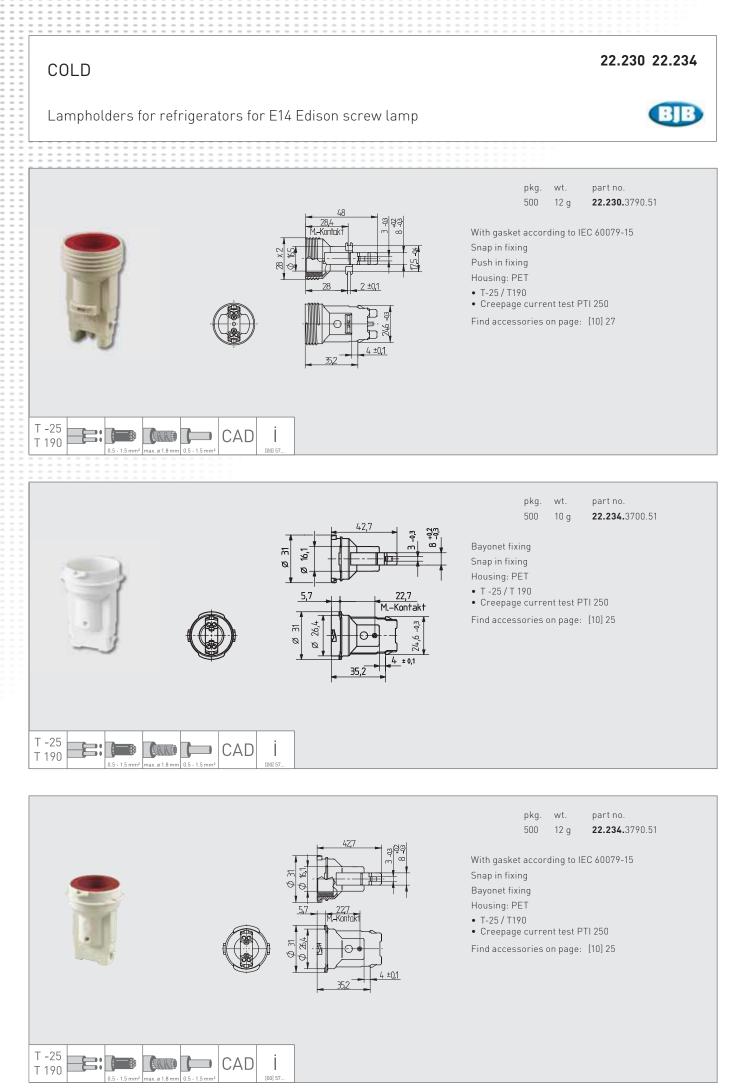












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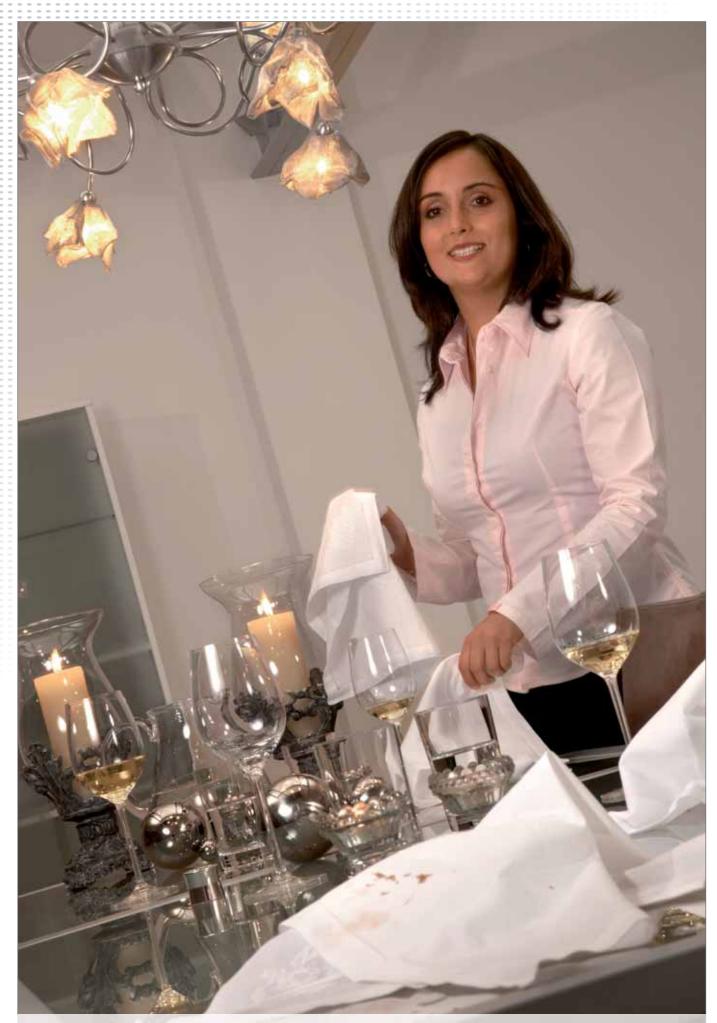
A perfect dinner to the end. With BJB lighting solutions for domestic appliances

Our four amateur cooks are enjoying the "perfect dinner" with visible satisfaction. And along the way you have learnt quite a lot about our products and systems for illuminating domestic appliances.

But perhaps you have other requests? Or some questions remain unanswered? No problem. Simply contact us and describe your ideas and requirements.

We will be happy to assist you in working out a "perfect" lighting solution for your domestic appliances. Whether it is a cooker, cooker hood, microwave, refrigerator, freezer, dishwasher, washing machine or drier: We provide good lighting for every domestic appliance. Talk to us, we look forward to receiving your enquiries.



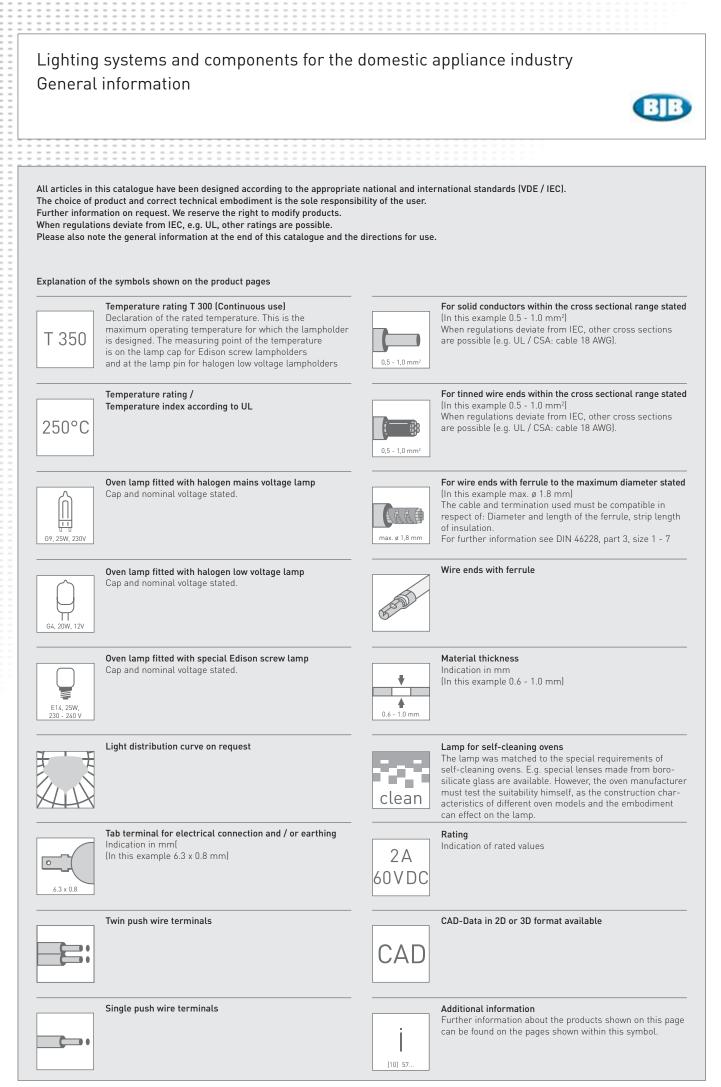


Even a perfect dinner eventually comes to an end. It only remains to say that everyone involved had a very enjoyable evening. If our short story, illustrated by our employees Frank, Nicole, Daniela and Dennis, has given you a slightly better insight into the advantages and characteristics of our lighting solutions for domestic appliances, then we are particularly pleased.









Properties of materials used for BJB products



Insulating materials for lampholders

Ether

Benzol

Fuel mixes

Mineral oils

Hydrocarbon chloride

Cleaning benzin (aroma free)

Animal and vegetable oils

Thermal properties	Thermoplastic	lastic													
	PC	PBT	PET	PA	POM	PPS	LCP								
permissible continuous thermal stress in °C to the IEC standards for lampolders	up to 110°C	up to 180°C	up to 210°C	120°C*	approx. 85°C	up to 250°C	up to 270°C								
*Limited temperature according to IEC 60598															
Chemical															
properties															
Weak acids	+	+/0	0	-	+	+	+								
Strong acids	0/-	-	0/-	-	0/-	-	0								
Weak alkalies	-	0	0	+	+	+	+								
Strong alkalies	-	-	0/-	-	+/0	-	0/-								
Alcohol	0/-	+	+/0	+/0	+	+/0	+/0								
Ketones	-	-	0/-	+	0	0	+								
Esters	-	0	0/-	+	+/0	0	0								

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+ = resistant 0 = limited resistance - = not resistant

In applications the chemical resistance is dependent on many parameters, therefore this data can only be sonsidered as recommended value.

-

+

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+/0

+

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+

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+

Cable Information

B

Technical properties Insulation material PVC Silicone FEP PTFE, PFA Glass silk **Conductor material** Cu/Cu tin plated Nickel or Cu with Cu tin plated Cu tin plated Cu nickel plated 27% nickel plated **Temperature resistance** -30°C - +105°C Properties -60°C - +180°C -100°C - +180°C -190°C - +250°C -60°C - +450°C Thermal resistance + +++ _ + ++ Electrical strength ++ +++ +++ + $^{++}$ Mechanical strength 0 ++ ++ ++ Chemical resistance ++ ++ + ++ Notched charpy impact strength + + ++ 0 Fracture strength, abrasion resistance -+ + ++ 0 Abrasion + + + Flexibility + ++ 0 0 Weather-, ozone- and ageing resistance + + + + Not inflammable + + ++ Halogen free _ + _ + Light resistant (also UV) 0 + + + Pyrolysis + Price ++ + 0 0 Applicability for ignition voltage + ++ + ++ Usual characteristics (examples) Nominal cross section 0.5 mm² 0.75 mm² 1.0 mm² 0.5 mm² Outer diameter 2 mm 2.4 mm 1.6-1.8 mm 1.8-2.0 mm 2.5 mm Nominal voltage 300 V 300 / 600 V

0 = adequate + = good ++ = better +++ = very good - = bad -- = very bad

In applications these properties are dependent on many parameters, therefore this data can only be sonsidered as recommended value.

Comparison of AWG cross sections to metric cross sections for multi stranded, fine stranded and finest stranded wires

AWG	approx. mm²
23	0.34
22	0.35
20	0.5
19	0.75
18	1
16	1.5
14	2.5
12	4
10	6

Technical information for embodiment of our products

BJB lampholders are in accordance with IEC regulations and are designed to IEC 60061-2 publication.

Where no electrical data is stated then:

- according to IEC 60238 / VDE 0616 part 1, Edison lampholders E14 rated 250 V / 2 A conform to overload capacity category II, E27 rated 250 V / 4 A voltage and E40 conform to voltage overload capacity category III ,
- according to IEC 60400 / VDE 0616 part 3 fluorescent lampholders and starter holders rated 250 V / 2 A conform to voltage overload capacity category II
- Halogen lampholders designed according to IEC 60838 / VDE 0616 part 5, conform to voltage overload capacity category II
- Bayonet lampholders according to the requirements IEC 61184 / VDE 0616 part 2 conform to voltage overload capacity category II,
- Lampholder outer threads conform to IEC 60399.

When regulations devitate from IEC, e.g. UL, other ratings may be possible. Please consult us before use.

Through our work with the relevant standardisation committees, we ensure our lampholders are developed and tested to the latest specifications.

All technical product drawings shown in this catalogue indicate only the main important dimensions and tolerance values. As a rule only where this is of importance for the intended application.

All measurements stated without tolerances are nominal.

- Limit values are:
- · DIN 16901, size 130 for moulded parts
- DIN ISO 2768-m for metal parts
 DIN 40680, medium for ceramic parts

Weights of single items stated in this catalogue

are rounded up or rounded down to the nearest gram, therefore the final weight of a pack quantitiy may differ. The weights shown are only a guide and should not be used for order or shipping specification purposes. The choice of product and correct technical embodiment in accordance with the corresponding regulations (e.g. IEC 60598 / VDE 0711, IEC 60335 / VDE 0700) is the sole responsibility of the user.

Specific attention must be given to:

- Temperature limits which must be observed in accordance with the corresponding regulations (e. g. T-markings);
- The necessary creepage and clearance distances as well as distances through insulation;
- The connecting cable and wires, which must have the correct heat and UV resistance, mechanical strength, voltage rating and a current carrying capacity corresponding to the conditions of the intended application;
- Protection against contact with live parts;
- Connectors, e.g. tab terminals, which must be selected in accordance with the requirements of their intended use

(e.g. temperature, current carrying capacity, corrosion resistance);

 The influence of control gear, transformers, starters / ignitors and other circuit components, must always be taken into consideration.

The catalogue also contains technical information, to which attention must be paid during project development, construction and electrical installation or when operating lighting installations. This information must be passed on, e.g. in an installation instruction. To ensure snap fix products locate correctly and securely, consideration must also be given to the cut-out and where applicable, attention must be paid to special requirements (e.g. degree of burr, direction of punching, radii, etc.).

Consideration must also be given to the area required around the cut-out, to allow correct insertion. Different components may require to be inserted at different angles.

During fixing, it must be ensured that the fixing surface is correctly sized.

Information regarding light fitting wall thickness, should always be interpreted as inclusive of a coating, unless stated otherwise.

If there is a requirement for one of our products to be embodied in a way other than shown in our catalogue, please contact us.

Attention must also be given to the IEC lamp standards, as well as the technical instructions of the lamp manufacturers in respect of the embodiment and correct operation of lamp.

In accordance with our policy of continual product development and improvement, we reserve the right to make design modifications.

Due to the amount of information involved in compiling this catalogue, it is not always possible to avoid printer's errors or minor mistakes. Although every care is taken, BJB accepts no responsibility for the accuracy of the contents. If in doubt, or if you require confirmation of specific information, please contact us.

Edition 2008



Stripping and releasing of cables

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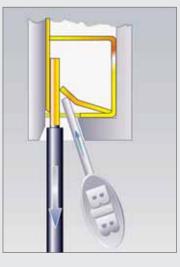
2,5 0 12 +1 8 +1 8 +1

Stripping of conductors

Pushwire contacts for solid core and tinned wires:

0.5 - 1.5 mm² = 8 + 1.0 mm 2.5 mm² = 12 + 1.0 mm

Should other terminations need to be used e.g. ferrules, you will find the relevant information in the product description.



Methods of releasing wires

Pushwire contacts with a key or oval hole in the housing:

The release probe, which we can gladly provide upon request, is placed behind the conducting wire, thereby opening the leaf spring. The wire can be pulled out.

[when pressing the leaf spring down, extreme care must be taken in order that the contact does not become distorted]*.

Simplest way:

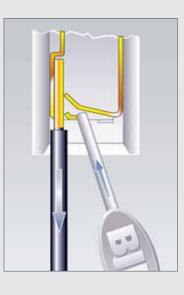
Pull out the release probe and the wire at the same time.

Pushwire contacts with a round hole or release slot in the housing:

A release probe or screwdriver is inserted into the release slot and a slight pressure applied to the leaf spring (when pressing the leaf spring down, extreme care must be taken in order that the contact does not become distorted)*. The wire is easily removed.

* Under light fitting production conditions, we recommend not to use unassembled lampholders again.

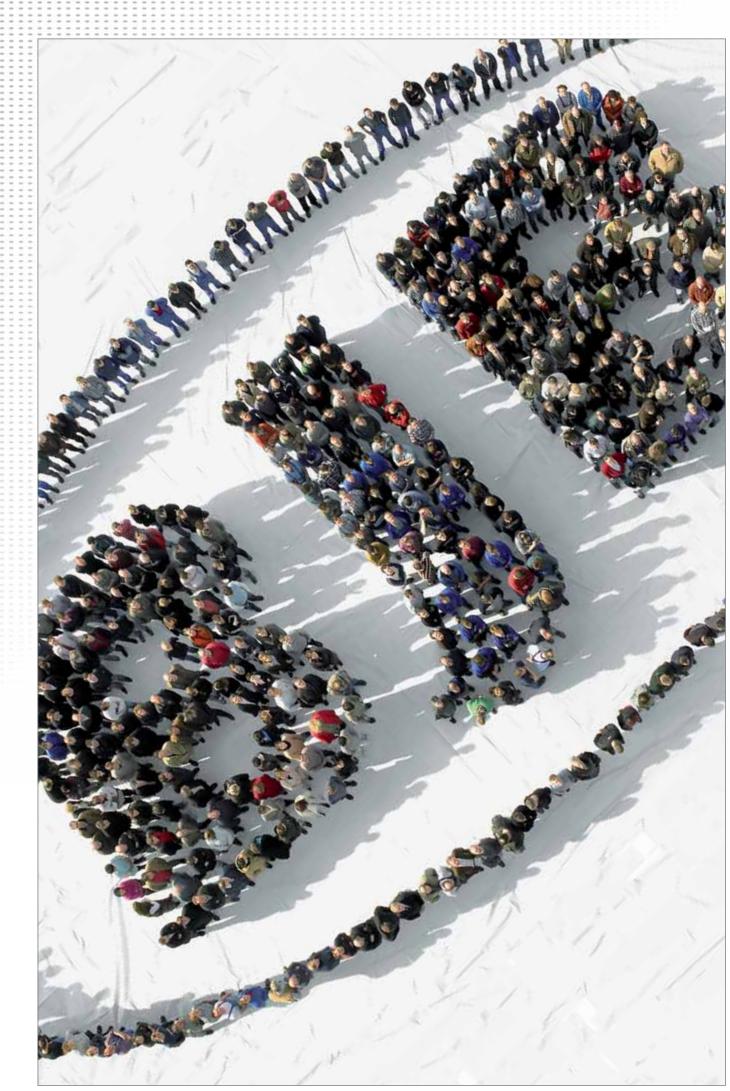






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