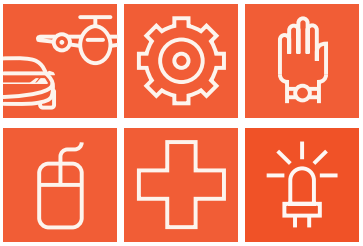
Recommended pick and place tools of LEDs

Application Note

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Recommended pick and place tools of LEDs

Application Note No. AN037



Valid for:
all SMT LEDs

Abstract

SMT devices are developed for assembly by automatic placement machines. To achieve a damage-free processing of LEDs, appropriate and individual pick and place tools (the nozzles) must be used.

The following pages provide information about important parameters that should be considered for LED assembly. Furthermore a recommended nozzle design for each SMT LED in the portfolio is given.

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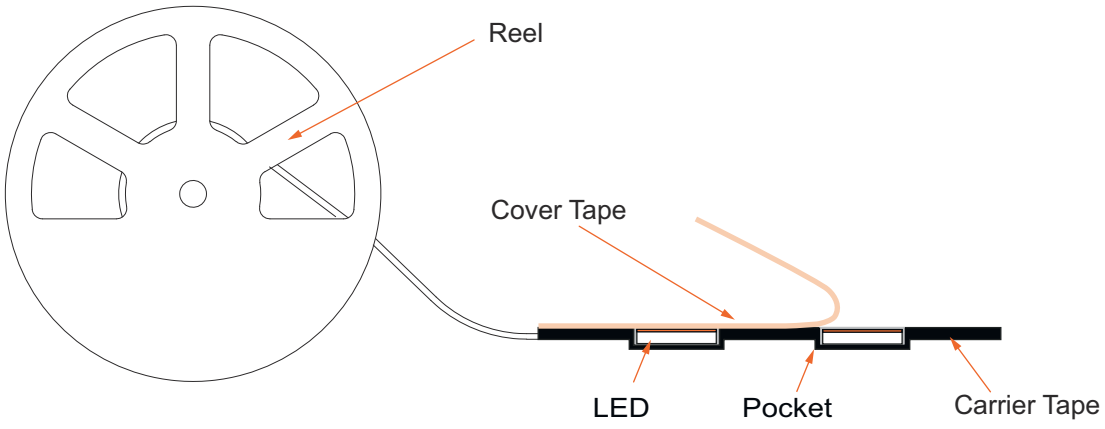
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1 Automated LED placement

Most LEDs from ams-OSRAM are delivered on tape and reel. Figure 1 shows the principle structure of LEDs in tape on reel with cover tape.

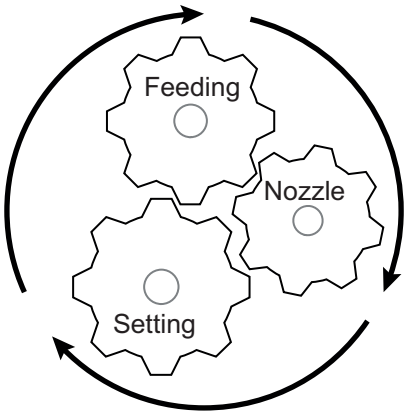
Figure 1: LEDs on tape and reel



Automated placement systems usually offer the best placement accuracy for LEDs. In this process, a placement head picks up the LEDs from the feeder and places them on the PCB. To avoid damage to the LED, the placement process must be strictly controlled by using an appropriate pick and place tool and to ensure that the process parameters conform with the

package characteristics. An initial production run is recommended to ensure that all settings are correct. There are some key factors which define a good assembly process. The three most important parameters are the settings for component feeding (Feeding), the system parameters (setting) and the nozzle used (Figure 2). The correct individual coordination of these interacting factors is the prerequisite for a good placement process.

Figure 2: Important interacting parameters

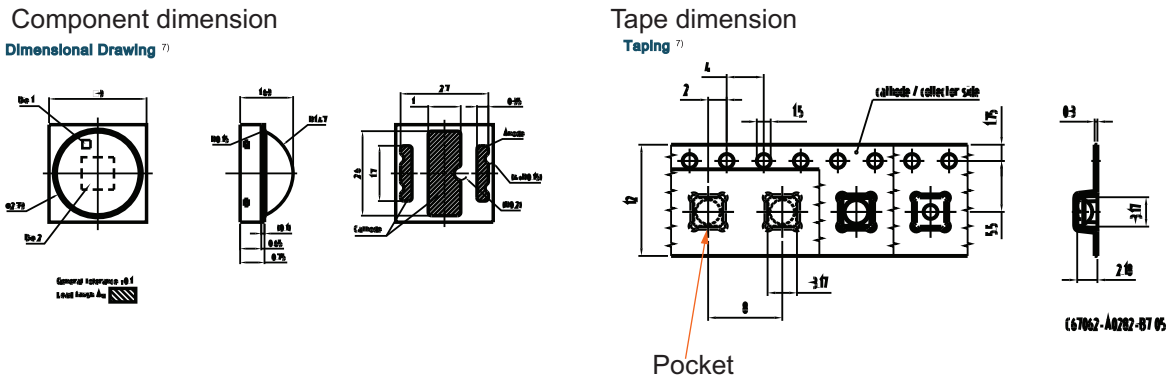


1.1 System parameter settings

Defined and proper process parameters can reduce this risk of damage to the LED. The default settings of the machine may be a good starting point.

One of the first parameter that should be defined is the pickup position. Therefore the data concerning the component and pocket dimensions should be taken into account. These can be found in the corresponding data sheet for the component. Figure 3 shows an example of a data sheet entry. After the inital setting it is recommended to check the final settings again before each production.

Figure 3: Data sheet entry for component and pocket dimensions

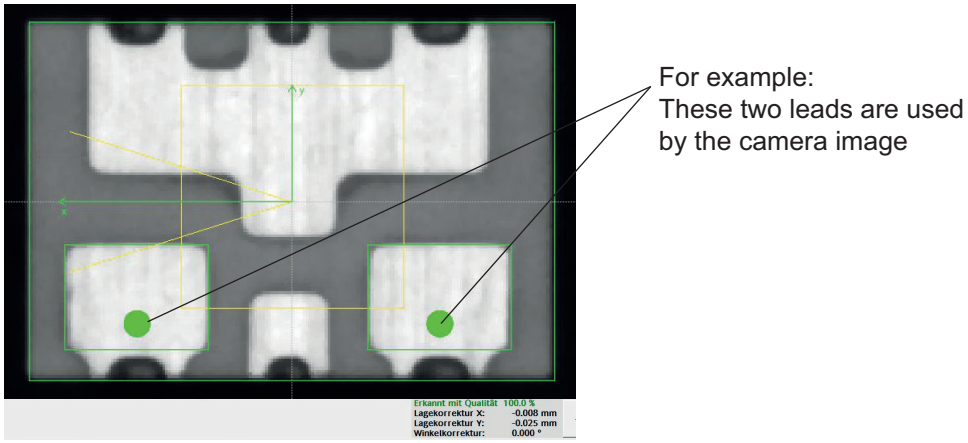


1.1.1 Vision System

A high component placement accuracy can be achieved with component placement machines that use vision systems. This enables exact placement of the LEDs at their beforehand programmed positions. Reference points, so-called fiducials, which are located on the PCB, are used for orientation. These are recognized by the vision system camera before starting the assembly process. Furthermore, most vision systems have special contrast illumination and algorithms in order to recognize the contours and component-specific markers more easily for further improving the assembly precision. The vision system uses the "look-up" method, which means that the component is viewed from the bottom side. For this, the component is first picked up from the tape and then the bottom side of the component is checked with a camera. With the help of an image processing system (into which the LED-specific data have been programmed) the footprint and the polarity are detected. This can significantly improve the quality of the assembly.

For a good placement result, especially with more complex footprints, it is recommended to use a pick-and-place machine with integrated vision system. Figure 4 shows an example of how to teach-in the footprint to the ASM Assembly Systems GmbH & Co. KG Vision System. For recognition purposes, it is recommended to teach in the pads of the component backside and not the outline of the part.

Figure 4: Teaching the ASM Assembly Systems GmbH & Co. KG Vision System



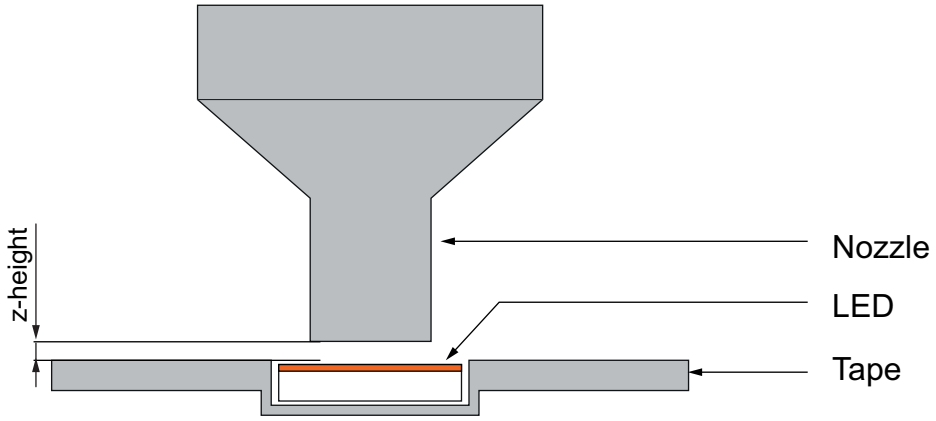
Z-height

Regarding the pickup of the components from the carrier tape, the Z-height (see Figure 5) also influences the process. This allows two different ways of picking up the components with the nozzle:

- With contact
- Contact-less (harvesting method)

In order to reduce the mechanical stress on the component to a minimum and to avoid possible damage to the LED, it is important to place the nozzle correctly when picking up the component from the tape. Particularly with lightweight components, it should be noted that the vacuum of the nozzles can lift the component before the nozzle has reached it final position. To avoid errors, it is essential to check the component-specific z-height.

Figure 5: Nozzle pick-up with z-height definition



Placement force

The placement force applied to the top of the package should be kept to minimum. For example, it can be tested with the standard default setting (2.0 N in most cases) at the beginning and should be then further reduced, if possible.

1.2 Tape feeder

Automatic placement machines are usually equipped with specific feeder units (pneumatic or electric) which transport the tape. Electric feeders have the advantage that they generate less vibration during the placement process and are therefore preferably recommended for the pick and placement of LEDs. Figure 6 shows an electric feeder.

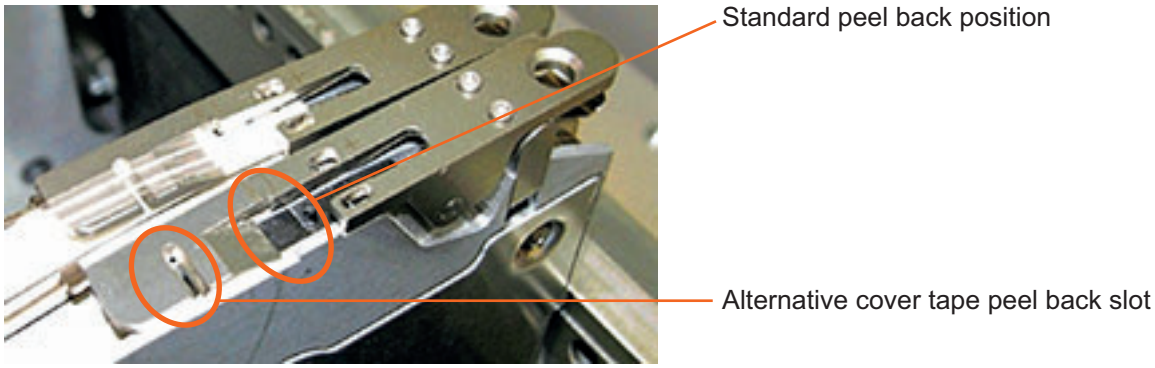
Figure 6: Electric feederl



In some cases, the indexing process, the process when the tape in the feeder is moved to the next pick-up position, can cause problems. It may happen that some LEDs in the pocket get misaligned, tilted or twisted. It is also possible for the LEDs to “jump” out of the tape pocket, resulting in pick-up errors, wrong placement position and damage of the LED package or bond wire. To avoid this the nozzle pick-up position should be directly after the cover tape peel off position. It is recommended that tape pockets are not be left open or uncovered before pick-up.

Additionally, the angle at which the cover tape is peeled back should be as small as possible to reduce the pulling force of the LED during indexing. Depending on the feeder design and construction there is an optional peel back slot / position with reduced risk of misaligned LEDs, see Figure 7.

Figure 7: Feeder peel back position



1.3 Nozzle set-up

Nozzles are individually manufactured for the various placement machines and are usually only developed for a specific component shape or component geometry. The right nozzle selection, combined with a proper set-up, helps to pick the components from the tape for a proper placement without risk of pre-damage or tilting. Therefore, ams OSRAM provides an overview of most products in the portfolio with corresponding nozzle recommendation in chapter "2 Overview of recommended nozzle designs". Since most of the in-house tests are performed with a system from ASM Assembly Systems GmbH & Co. KG, mainly nozzles from this company are recommended. If nozzles of other manufacturers are used, it is always important that the geometry is according to the recommended nozzle. If you have any questions, please contact ams OSRAM.

Non touch area

For some products non touch areas are defined and they vary depending on the design of the LED. Non touch area describes the area, in which the nozzle is not allowed touch the LED. It is important that this non-touch area is taken into account if a nozzle other than the recommended one is used.

2 Overview of recommended nozzle designs

For the processing of LEDs it must be ensured that the process parameters are conform to the package characteristics during assembly. If nozzles or nozzle designs other than the recommendations are used, it must be strictly observed that especially the critical and optical relevant area (area over die/s and wire bond/s) is not loaded.

If further information or support regarding the processing of LEDs is needed please contact ams OSRAM.

A catalog with a linkage of the tools to the associated LED product family is listed in Table 1. This table shows the LED product families and the recommended nozzle design with the nozzle number and a dimension drawing of the nozzle. Alternative nozzles are indicated for some products. Since most products were tested with SIPLACE pick and place machines, SIPLACE nozzles are often recommended. If other types of pick and place machines are used in the field, please use modified tools according to the given dimensions and body structure for the mounting.

Table 1: Recommended nozzle designs for the SMT portfolio

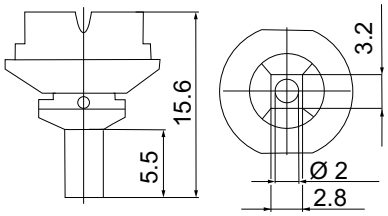
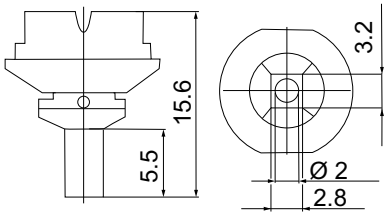
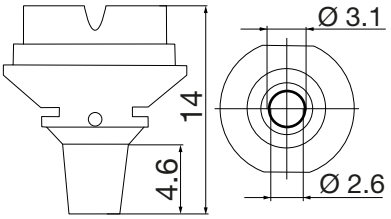
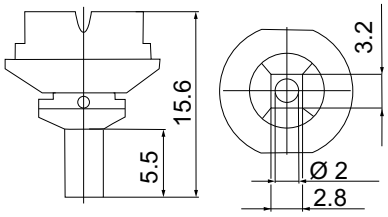
Product family	Recommended nozzle design
Advanced Power TOPLED™ Lx GxxP	SIPLACE 3121424  
Power TOPLED™ Lx E6xx / Lx Exxx / Lxx T67x SFH 4240x / SFH 4250x	SIPLACE 3121424  
Power TOPLED™ Lens Lx E63x / Lx E65x SFH 4258x / SFH 4259x / SFH 4248x / SFH 4249x	SIPLACE 3082992  
TOPLED™ Lx T67x / Lx T68xx SFH 320 FA / SFH 320 / SFH 4243x / SFH 4257	SIPLACE 3121424  

Table 1: Recommended nozzle designs for the SMT portfolio

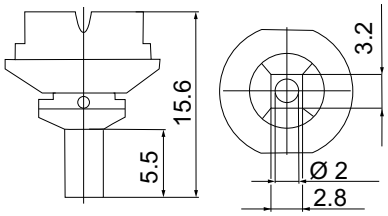
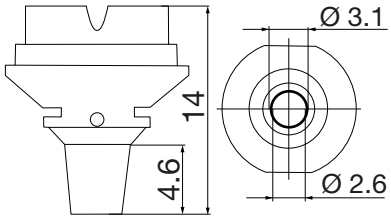
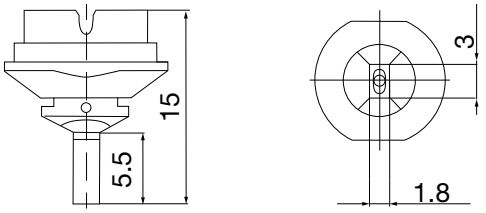
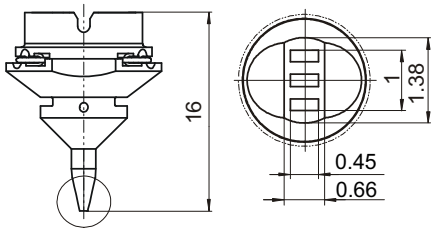
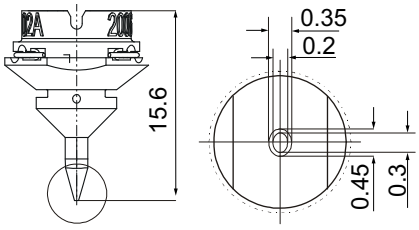
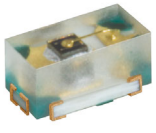
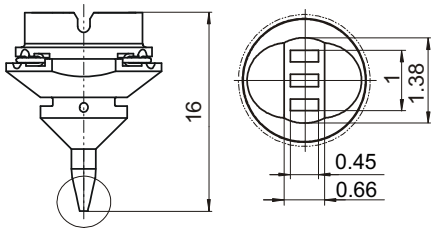
Product family		Recommended nozzle design
TOPLED™ Reverse Gullwing SFH 3211 FA SFH 2270 R		SIPLACE 3121424 
TOPLED™ Lens SFH 3219		SIPLACE 3082992 
TOPLED™ E3014 LUW JLSH KW DCLMS11.PC		SIPLACE 03090143 
TOPLED™ E1608 Kx DELxS1		SIPLACE 03057850 
Chip LED CT ELLN51.14		SIPLACE 03054154 
Chip LED SFH 4053B SFH 4043B		SIPLACE 03057850 

Table 1: Recommended nozzle designs for the SMT portfolio

Product family	Recommended nozzle design
Chip LED SFH 2704	SIPLACE 00346523-03
Chip LED 0402 Lx QHxG KR EGLP41.22	SIPLACE 03057850
Chip LED Lens SFH 4045 SFH 4047x	SIPLACE 03057850
Chip LED Lens SFH 4059 / SFH 4059B	SIPLACE 03091123
Chip LED Lens SFH 4059SR / SFH 4059BSR	SIPLACE 03054915
Chip LED 0603 Lx Q3xx Lx Q976	SIPLACE 03054915

Table 1: Recommended nozzle designs for the SMT portfolio

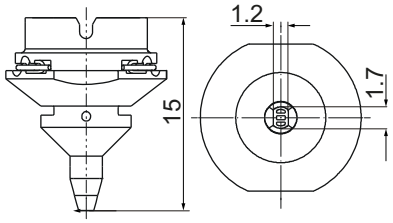
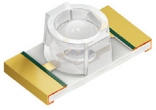
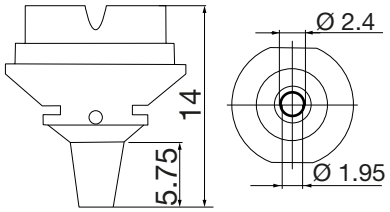
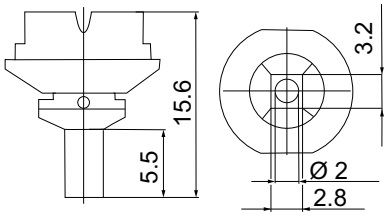
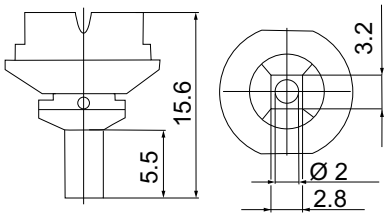
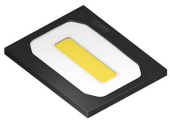
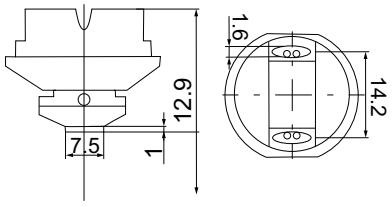
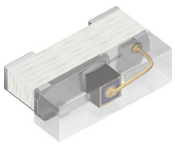
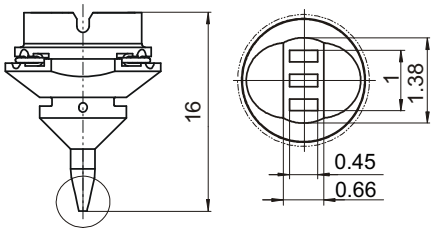
Product family		Recommended nozzle design
Chip LED 0805 Lx R97x		SIPLACE 03054915 
Chip LED with Lens SFH 4052 SFH 4056		SIPLACE 3085131 
DISPLIX™ P2828 KRTBLFLP71.32 KRTB LFLM71.32		SIPLACE 3121424 
DISPLIX™ P3333 KRTBLSLPS1.32 KRT LSLPS1.32		SIPLACE 3121424 
EVIYOS™		SIPLACE 03232785-01 
FIREFLY™ Lx VHxx SFH 4030x SFH 4060x		SIPLACE 03057850 

Table 1: Recommended nozzle designs for the SMT portfolio

Product family	Recommended nozzle design
FIREFLY™ E1608 Cx DELSS1.x2	SIPLACE 03057850
Micro SIDELED™ Lx Y87x LW Y1SG KRBTQCLP61 SFH 4254 / SFH 3204 CUW Y3SH.B2 KRTB AILMS1	SIPLACE 03054915
Mini TOPLED™ Lx M67x / Lx Mxxx LCB M67x SFH 4247	SIPLACE 03054915
Mini TOPLED™ Lx MxSG	SIPLACE 03054923
MULTILED™ SFH 7018	SIPLACE 3120648
Multi Chip LED LRTB R48G	SIPLACE 3146362

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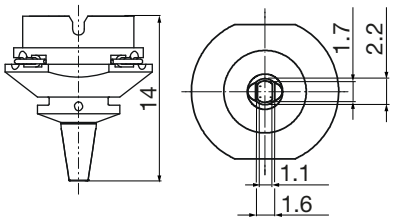
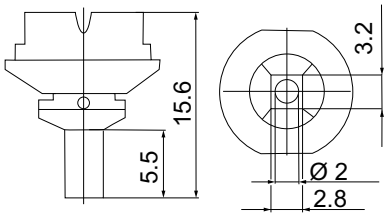
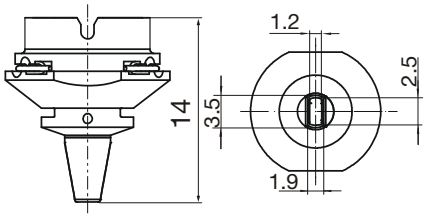
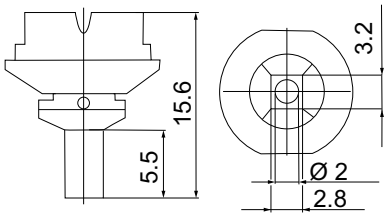
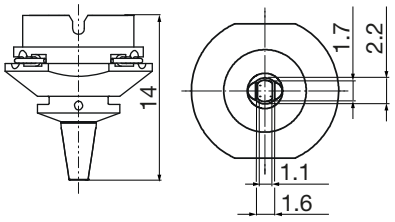
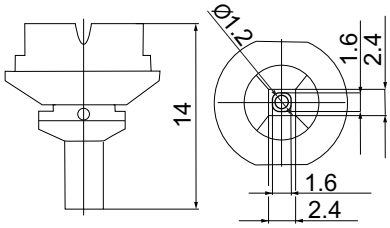
Product family	Recommended nozzle design
Multi Chip LED LTRB RxSx	SIPLACE 03054923  
Multi TOPLED™ Lxx T67x LxG T77x SFH 7252 / SFH 331 / SFH 7251 / SFH 7250x	SIPLACE 3121424  
OSIRE™ E3323 KRTBDWLM32.32 KRTBDWLM31.32	SIPLACE 03057035  
OSIRE™ E3635 LRTBGVSR	SIPLACE 3121424  
OSIRE™ E5515 KRTBAELPSx.32	SIPLACE 03054923  
OSIRE™ E3030 KRTBDSLP31.33	SIPLACE 03120648-01  

Table 1: Recommended nozzle designs for the SMT portfolio

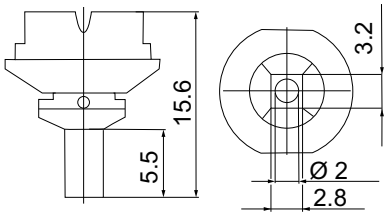
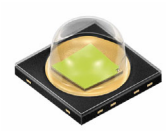
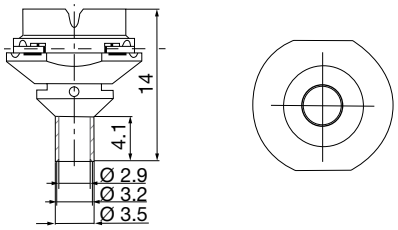
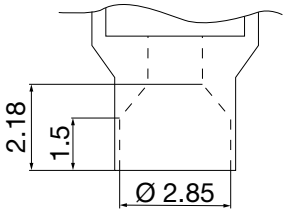
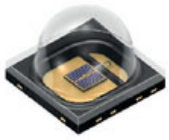
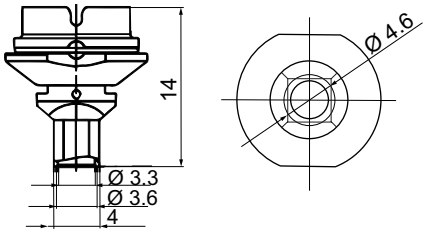
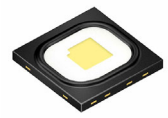
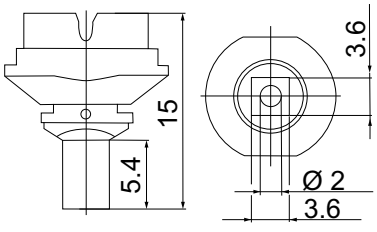
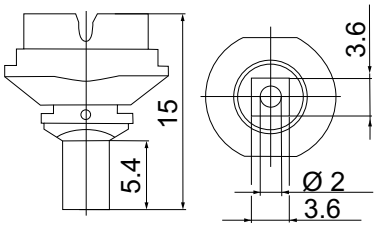
Product family	Recommended nozzle design
OSIRE™ E3731i 	SIPLACE 3121424 
OSLON™ Black Lx H9GP SFH 47xx 	SIPLACE 3090409  Essemtec paraquda SP26/BN15 
OSLON™ Black SFH 4713x / SFH 4714x / SFH 4715x / SFH 4716x / SFH 4717x / SFH 4718x / SFH 4722x / SFH 4728 / SFH 4725x / SFH 4726x / SFH 47267x/ SFH 4727x / SFH 47278x / SFH 4728x 	SIPLACE 3245614 
OSLON™ Black Flat LUW HxxP Lx H9PP 	SIPLACE 3124628 
OSLON™ Black Flat KW H2L531.TE 	SIPLACE 3124628 

Table 1: Recommended nozzle designs for the SMT portfolio

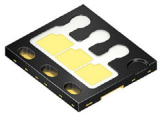
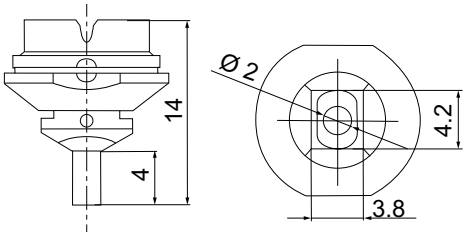
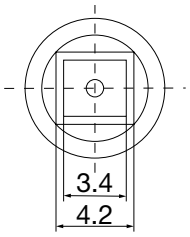
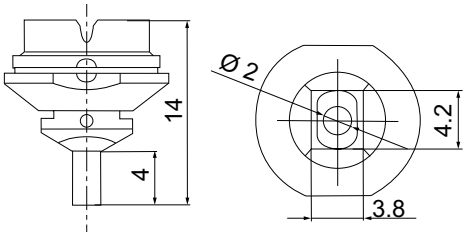
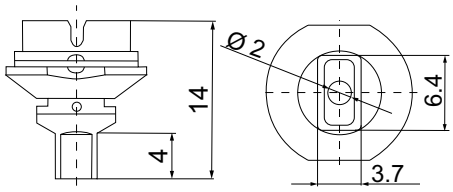
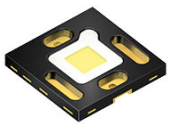
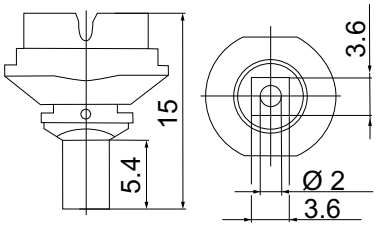
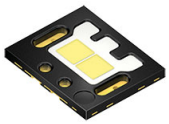
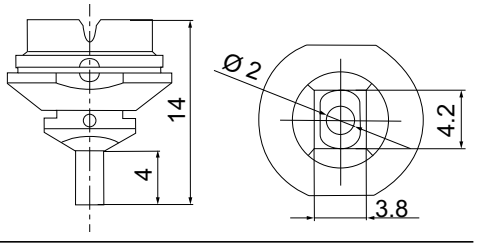
Product family		Recommended nozzle design
OSLON™ Black Flat KW H3L531.TE		SIPLACE 3110067  Essemtec paraquda SP26/BN36 
OSLON™ Black Flat KW H4L531.TE		SIPLACE 3110067 
OSLON™ Black Flat KW H5L531.TE		SIPLACE 3110071 
OSLON™ Black Flat S KW HHL532.TK KW HHL533.TK		SIPLACE 3124628 
OSLON™ Black Flat S KW2 HIL532.TK KW2 HIL533.TK		SIPLACE 3110067 

Table 1: Recommended nozzle designs for the SMT portfolio

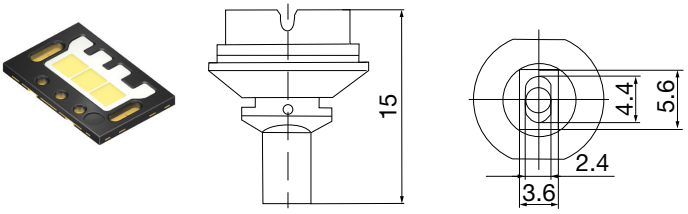
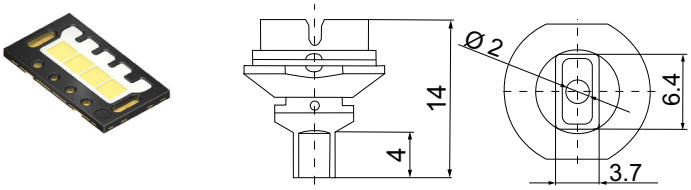
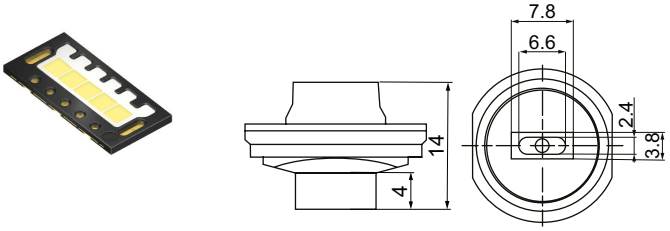
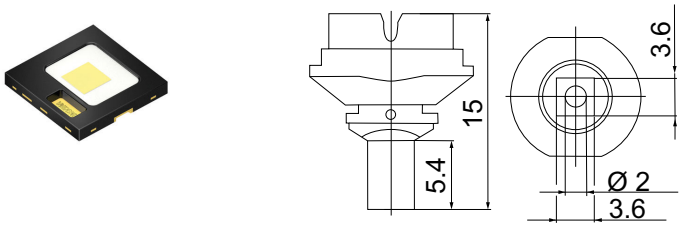
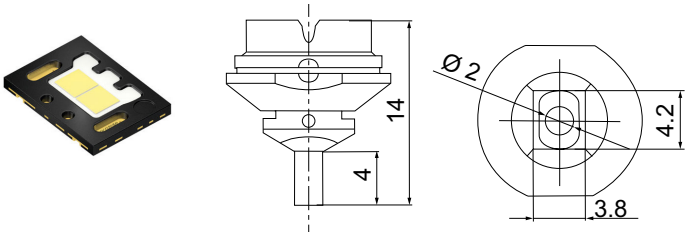
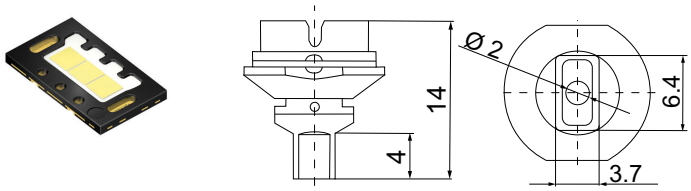
Product family	Recommended nozzle design
OSLON™ Black Flat S KW HJL531.TE KW3 HJL533.TK	SIPLACE 3081896 
OSLON™ Black Flat S KW HKL531.TE KW4 HKL533.TK	SIPLACE 3110071 
OSLON™ Black Flat S KW HLL531.TE	SIPLACE 03271548 
OSLON™ Black Flat X KW HHL631.TK	SIPLACE 03120648-01 
OSLON™ Black Flat X KW2 HNL632.TK	SIPLACE 3110067 
OSLON™ Black Flat X KW3 HML631.TK	SIPLACE 3110071 

Table 1: Recommended nozzle designs for the SMT portfolio

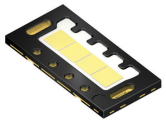
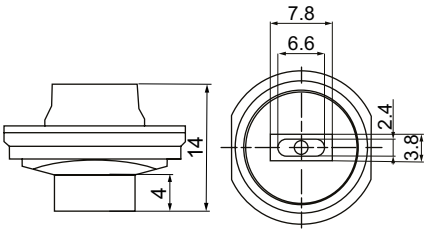
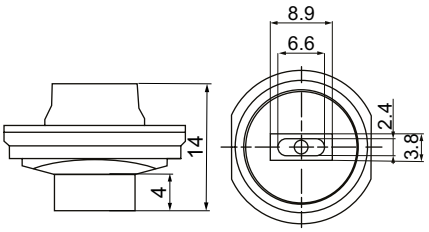
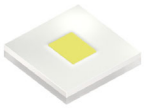
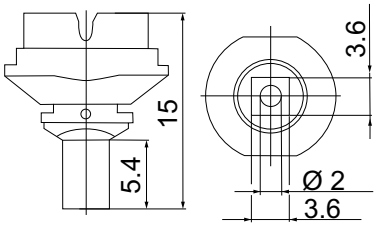
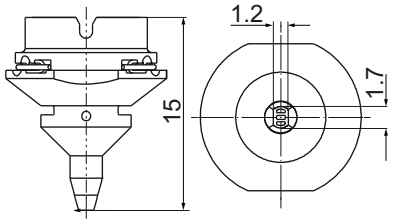
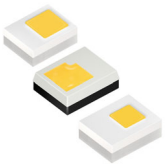
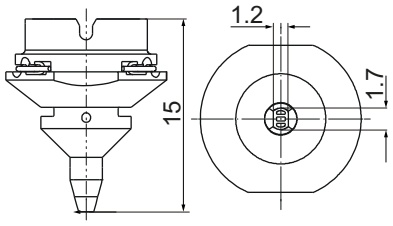
Product family	Recommended nozzle design
OSLON™ Black Flat X KW4 HPL631.TK	SIPLACE 3271548  
OSLON™ Black Flat X KW5 HQL631.TK	SIPLACE 3271553  
OSLON™ Boost KW CULPM1	SIPLACE 3124628  
OSLON™ Compact CM LUW CEUN.CE	SIPLACE 03054915  
OSLON™ Compact PM / OSLON™ Compact CL / OSLON™ PL single / OSLON™ Boost HM LCY CEUP LUW CEUP.xx KW CELNm1.TG KY CELNMx.FY KW CELMM1.TG	SIPLACE 03054915  

Table 1: Recommended nozzle designs for the SMT portfolio

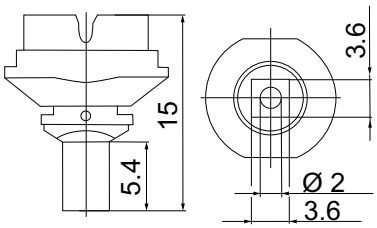
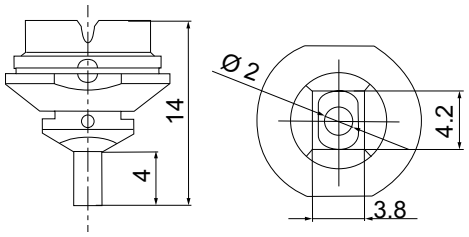
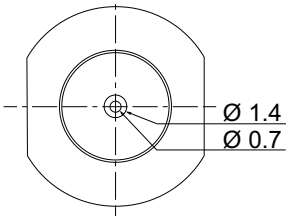
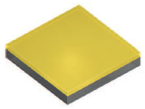
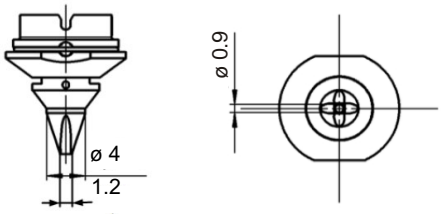
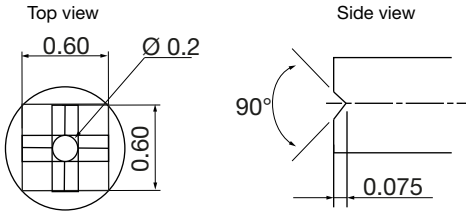
Product family	Recommended nozzle design
OSLON™ Compact PL KW2 CFLNM1.TG 	SIPLACE 3124628 
OSLON™ Compact PL KW4 CHLNM1.TG 	SIPLACE 3110067-01 
OSLON™ PURE 1414 Gx VJPEx.xx 	Juk-0354/23 or PAN-0355/23  Alternative nozzle: SIPLACE 03146577
OSLON™ PURE 1010 	SIPLACE 03146577  JUK-0166/18 

Table 1: Recommended nozzle designs for the SMT portfolio

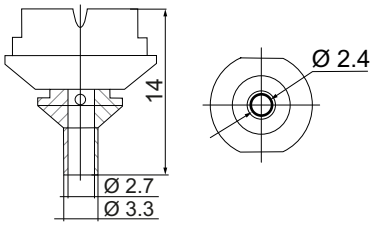
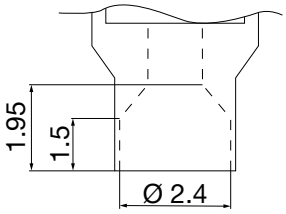
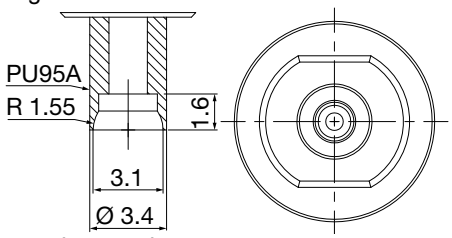
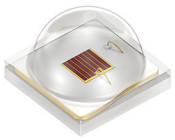
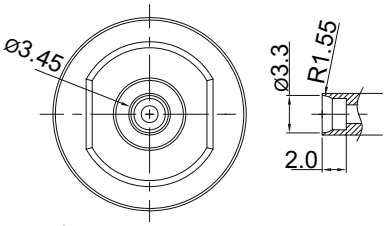
Product family	Recommended nozzle design
OSLON™ SX / OSLON™ LX / Lx Cxxx / Lxx Cxxx 	SIPLACE 3086301  Essemtec paraquda SP26/BN04 
OSLON™ Signal Lx CRBP.01 	ChingYi: P/N: JUK-0400/19  Alternative nozzle: SIPLACE 3090409
OSLON™ Optimal GF CSSRML.24 GH CSSRML.24 	ChingYi: P/N: JUK-0312/22  Alternative nozzle: SIPLACE 3090409

Table 1: Recommended nozzle designs for the SMT portfolio

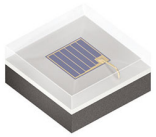
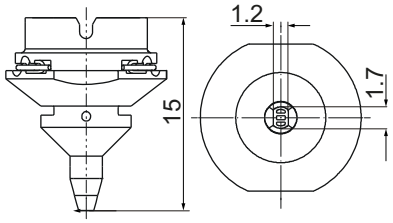
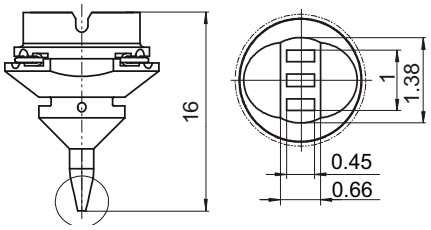
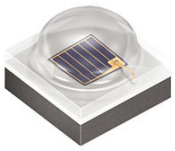
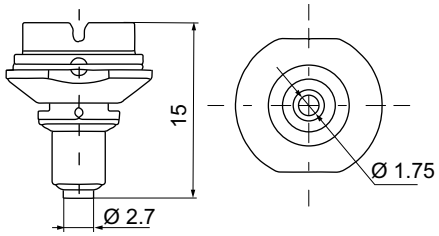
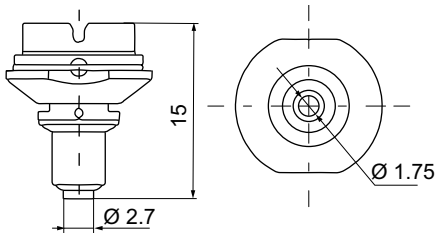
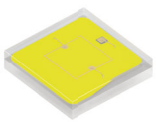
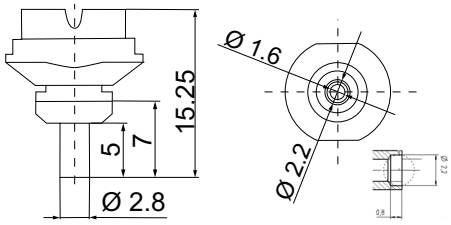
Product family		Recommended nozzle design
OSLON™ P1616 SFH 4170x SFH 4180x		SIPLACE 03054915  SIPLACE 03057850 
OSLON™ P1616 SFH 4172x SFH 4182x		SIPLACE 3148796 
OSLON™ P1616 SFH 4171x SFH 4181x		SIPLACE 3148796 
OSLON™ Square Flat KW CSLPM2.xx		SIPLACE 3112054  Alternative nozzle: SIPLACE 3121424

Table 1: Recommended nozzle designs for the SMT portfolio

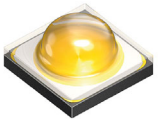
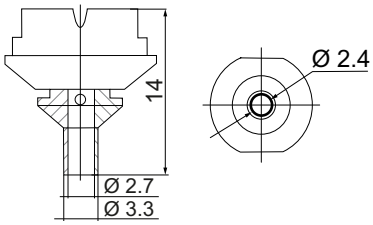
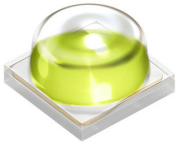
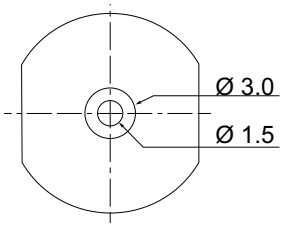
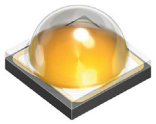
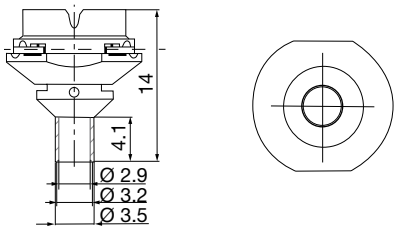
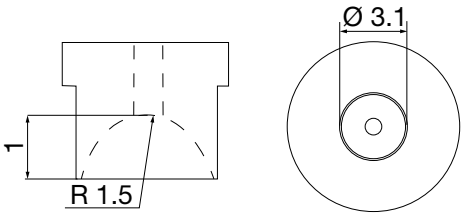
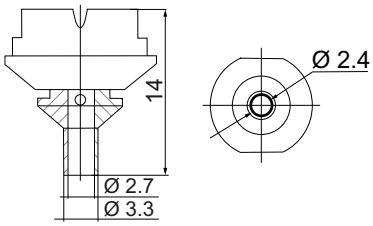
Product family		Recommended nozzle design
OSLON™ Square GW CSSRM1.xx LCW CQAR.xx		SIPLACE 3086301 
OSLON™ Square Gx CSBRMx.xx		ChingYi: PAN-0636/20 ChingYi: P/N: JUK-0635/20  Alternative nozzle: SIPLACE 03103323
OSLON™ Square GW CSSRM2.xx GW CSSRM3.xx		SIPLACE 03090409  ChingYi: P/N: JUK-0381/15  Alternative nozzle: SIPLACE 03122708-04
OSLON™ SSL 80 White / Colors GW CS8PM1.xM LCW CR7P.xC Cx CS8pMx.xx Lx Cx7P		SIPLACE 3086301 

Table 1: Recommended nozzle designs for the SMT portfolio

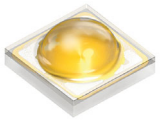
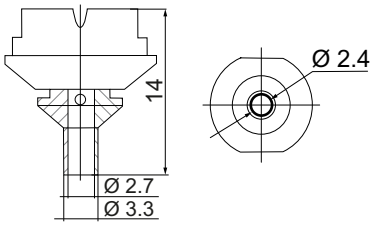
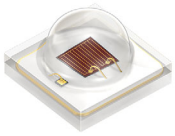
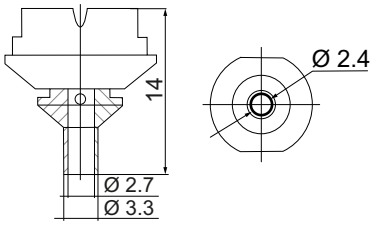
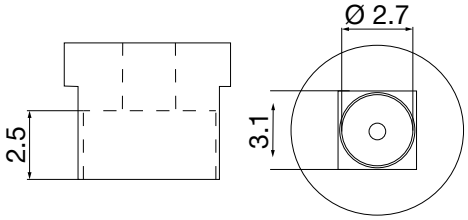
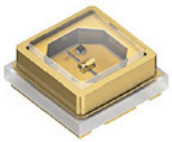
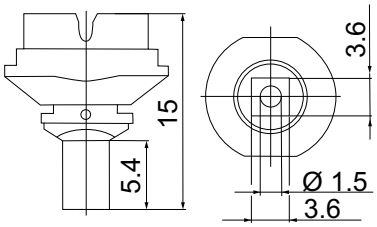
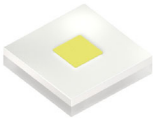
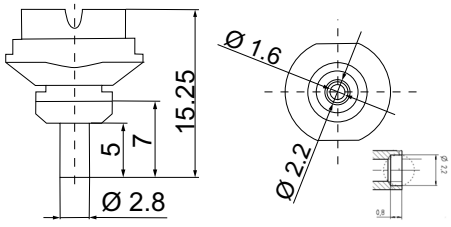
Product family	Recommended nozzle design
OSLON™ SSL 150 White / Colors GW CSHOM1.xM LCW CRDP.xC Gx CSHPMx.xx Lx CxDP 	SIPLACE 3086301 
OSLON™ SSL 120 Gx CSSPM1.xx 	SIPLACE 3086301  ChingYi: P/N: JUK-0778/16 
OSLON™ UV 3535 	SIPLACE 3077709 
OSRAM OSTAR™ Projection Compact KW CSLxx1 	SIPLACE 3112054  Alternative nozzle: SIPLACE 3121424

Table 1: Recommended nozzle designs for the SMT portfolio

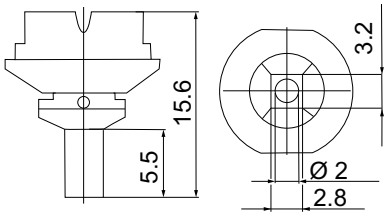
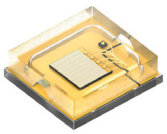
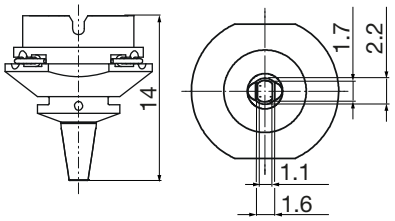
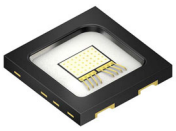
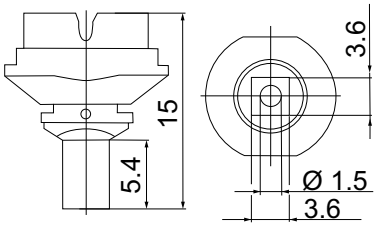
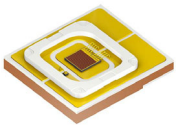
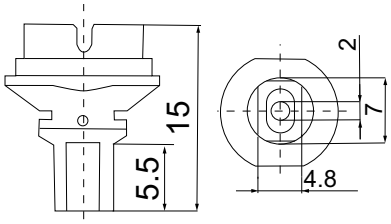
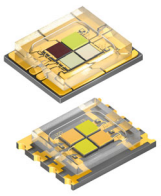
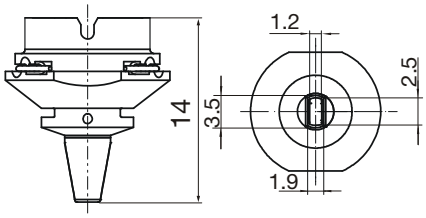
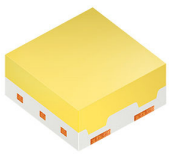
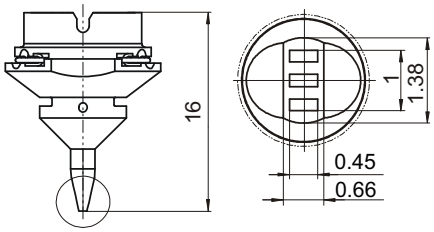
Product family		Recommended nozzle design
OSRAM OSTAR™ Projection Compact KRTTB CRLM1.33		SIPLACE 3121424 
OSRAM OSTAR™ Projection Compact LE x Q9Wx LE BA Q6WM LCR H9RN LE x Q8WP LE x Q7WP		SIPLACE 03054923 
OSRAM OSTAR™ Projection Power Kx HHLSUx.xx		SIPLACE 3077709 
OSRAM OSTAR™ Projection Power LE x P0MQ LE xx P0AQ		SIPLACE 3081899 
OSRAM OSTAR™ Stage LE RTDUW S2Wx LE x Q8WP		SIPLACE 2035 
OSTUNE™ E1515 KW SIURA1.CC		SIPLACE 03057850 

Table 1: Recommended nozzle designs for the SMT portfolio

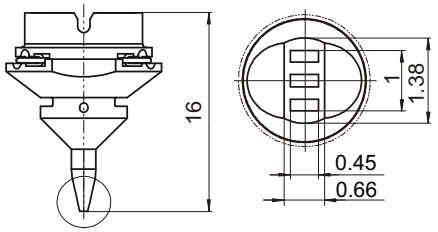
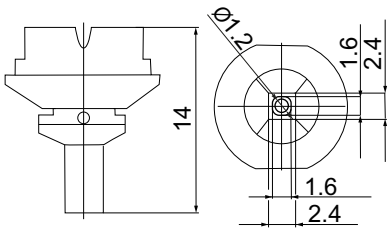
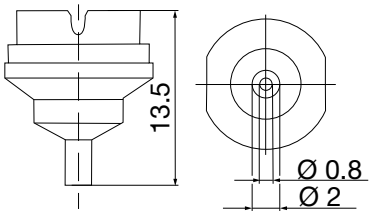
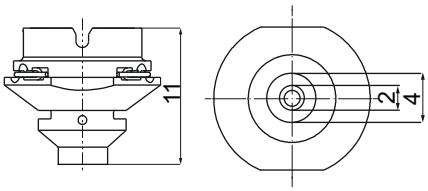
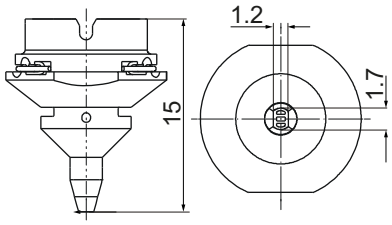
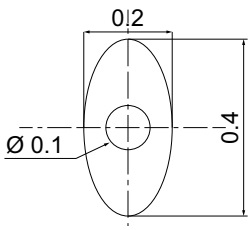
Product family		Recommended nozzle design
OSTUNE™ E1608 KW SIURA1.CC		SIPLACE 03057850 
OSTUNE™ E3030 KW DSLx31.xx		SIPLACE 03120648-01 
PointLED™ Lx P4xx		SIPLACE 3096148 
Power SIDELED™ Lx B6SP		SIPLACE 03059921 
SIDELED™ Lx A67x SFH 4256x SFH 325 SFH 4244x SFH 4255		SIPLACE 03054915 
SMARTLED™ PURE 0201 Kx TATPE1.xx		Juk-509 

Table 1: Recommended nozzle designs for the SMT portfolio

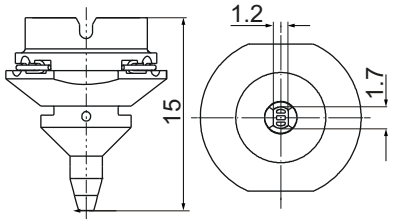
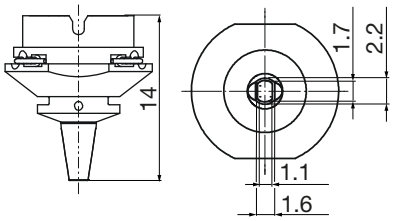
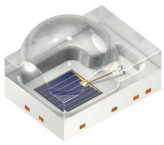
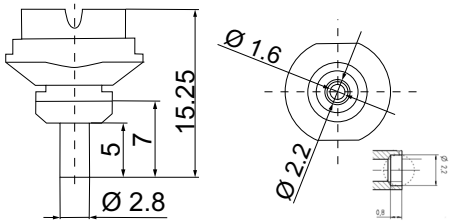
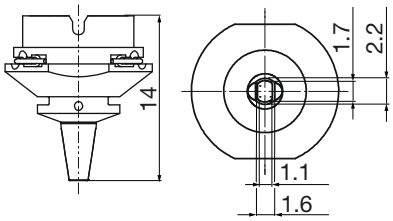
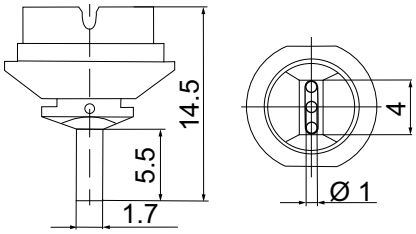
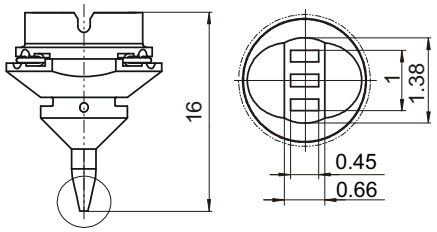
Product family		Recommended nozzle design
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SYNIOS™ P2720 Kx DMLx31 SFH 4770S / SFH 4775S		SIPLACE 03054923 
SYNIOS™ P2720 Lens SFH 4795BS		SIPLACE 3112054 
SYNIOS™ E2314 KW DNLS31.RA		SIPLACE 03054923 
SYNIOS™ E4014 KW DPLS3x		SIPLACE 03085846-02 
SYNIOS™ P1515 Kx SITQA1.23		SIPLACE 03057850 

Table 1: Recommended nozzle designs for the SMT portfolio

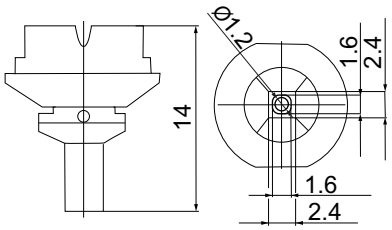
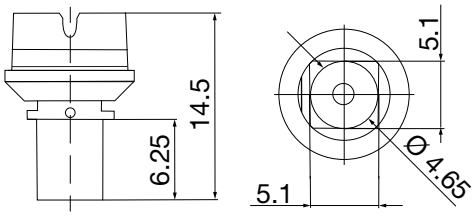
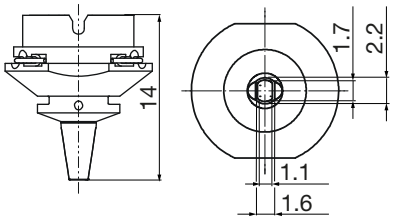
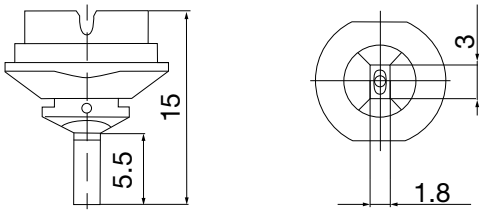
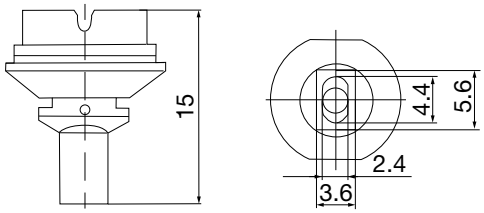
Product family		Recommended nozzle design
SYNIOS™ S2222 KT DDLM31.13		SIPLACE 3120648-01 
DURIS™ E5050 GW J9LHSx.4M		SIPLACE 3083400 
DURIS™ E 2835 GW JBLMSxEM		SIPLACE 03054923  Alternative nozzle: ChingYi: P/N: JUK-0344/17
DURIS™ E 3 GW JCLPSx.Ex LUW JNSH.xC		SIPLACE 3090143  Alternative nozzle: ChingYi: P/N: JUK-0436/15
DURIS™ E 5 GW JDSxS1.xC GW JDSxSx.EM		SIPLACE 3081896  Alternative nozzle: ChingYi: P/N: JUK-0436/15

Table 1: Recommended nozzle designs for the SMT portfolio

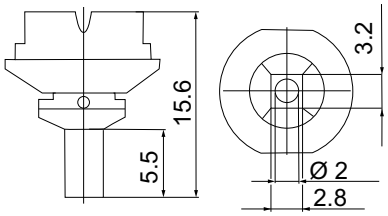
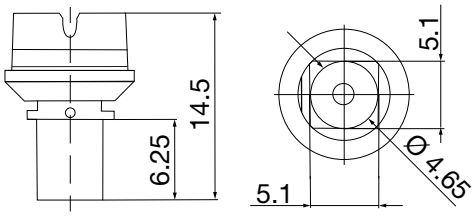
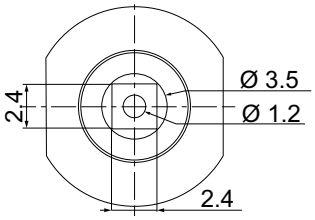
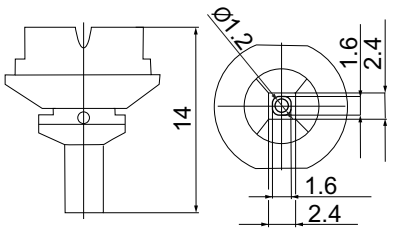
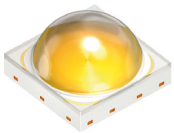
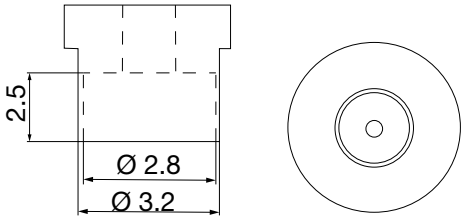
Product family		Recommended nozzle design
DURIS™ S 5 Gx PSLx31.xx GW PSLPS1.xC GW PSLRS1.xC		SIPLACE 3121424  Alternative nozzle dimensions: Outer dimension: Ø 3.0mm Inner dimension: Ø 1.5mm
DURIS™ S 8 GW P9Lx3x.xM		SIPLACE 3083400  Alternative nozzle dimensions: Outer dimension: Ø 5,0mm Inner dimension: Ø 3,2mm
OSCONIQ™ C 2424		ChingYi: P/N: JUK-0530/19  SIPLACE 3120648-01 
OSCONIQ™ P 3737 GW PUSRA1.PM		ChingYi: P/N: JUK-0461/15  Alternative nozzle: SIPLACE 3090409

Table 1: Recommended nozzle designs for the SMT portfolio

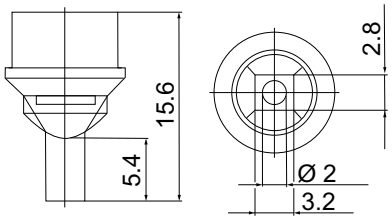
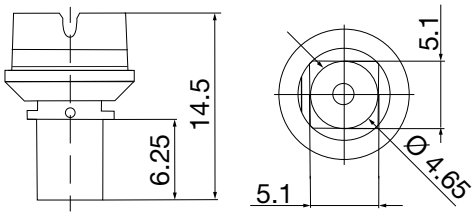
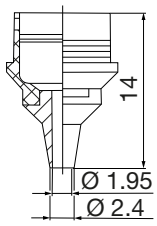
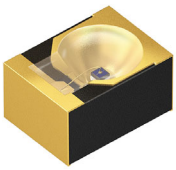
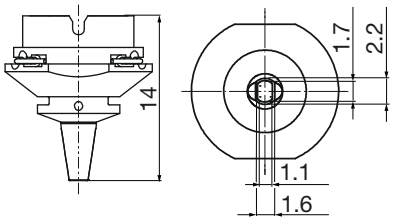
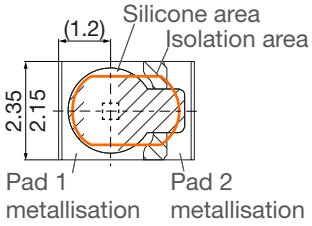
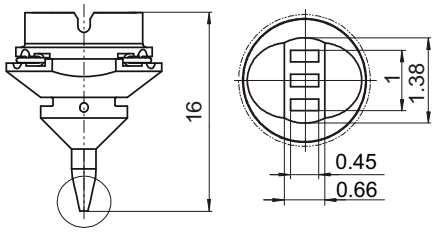
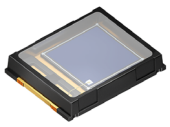
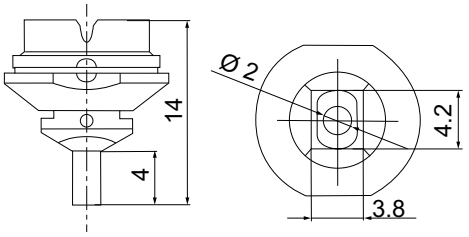
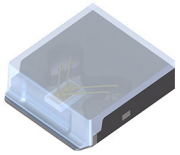
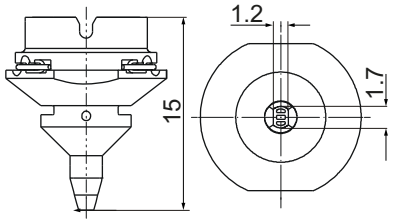
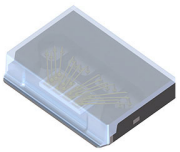
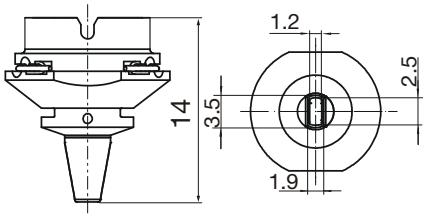
Product family	Recommended nozzle design
OSCONIQ™ S 3030 	SIPLACE 03055425 
OSCONIQ™ S 5050 	SIPLACE 3083400 
OSCONIQ™ P 2226 GWDASPA1.EC Gx DASPA1.xx 	SIPLACE 0328149 
MIDLED™ Toplooker SFH 4651 SFH 4641 SFH 4650 SFH 4640 SFH 3600 	SIPLACE 03054923  Recommended Nozzle-Design 
MIDLED™ Sidelooker SFH 4656 SFH 4646 SFH 4655 SFH 4645 SFH 4647 SFH 3605 	SIPLACE 03057850 

Table 1: Recommended nozzle designs for the SMT portfolio

Product family		Recommended nozzle design
IR TOPLED™ D5140 SFH 2200 / SFH 2201 / SFH 2202 / SFH 2240		SIPLACE 3110067 
SMT Laser SPL S1L90A_3 SPL S1L90H_3		SIPLACE 03054915 
SMT Laser SPL S4L90A_3		SIPLACE 2035 

3 General recommendation

Before the assembly process, the nozzle tip should be checked to ensure that it is clean and free of dust. Residues could interact with the LED surface during pickup and placement. The equipment used should be well maintained to avoid faults.

4 Solution proposals for potential issues

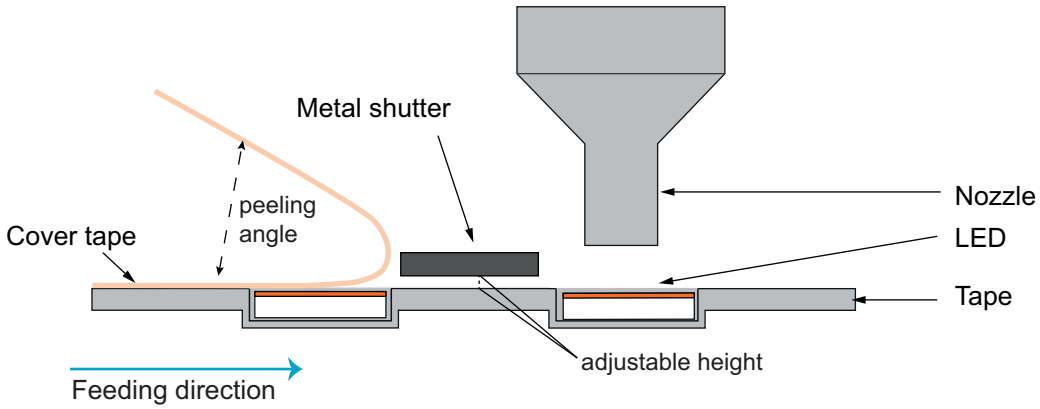
4.1 Components tilting due to vibration

As already mentioned, electric feeders are preferred because they reduce the move out of components in tape pocket due to their lower vibration. A further reduction in vibration can be achieved by installing a special spacer adapter in the feeder unit to adjust for the dedicated tape pocket height.

4.2 Feeder with metal shutter

It is possible to use feeders with a metal shutter. This metal shutter releases the LED-pocket or closes it mechanically by moving back and forward. One setting option is to specify how many LEDs are released (Figure 8). However, it must be ensured that this metal shutter does not touch the components, as otherwise mechanical damages may occur.

Figure 8: Feeder with metal shutter



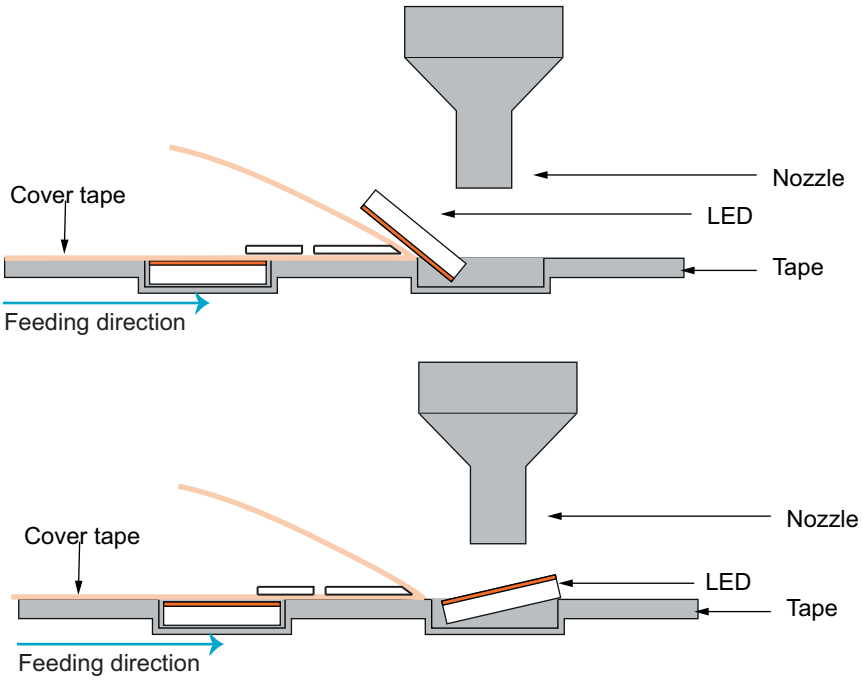
4.3 Stick on tape

As the potting material for LEDs often silicones are used, which might be "sticky" depending on the ambient temperature and humidity. They can be lifted during covertape removal (Figure 9).

This can lead to the following problems:

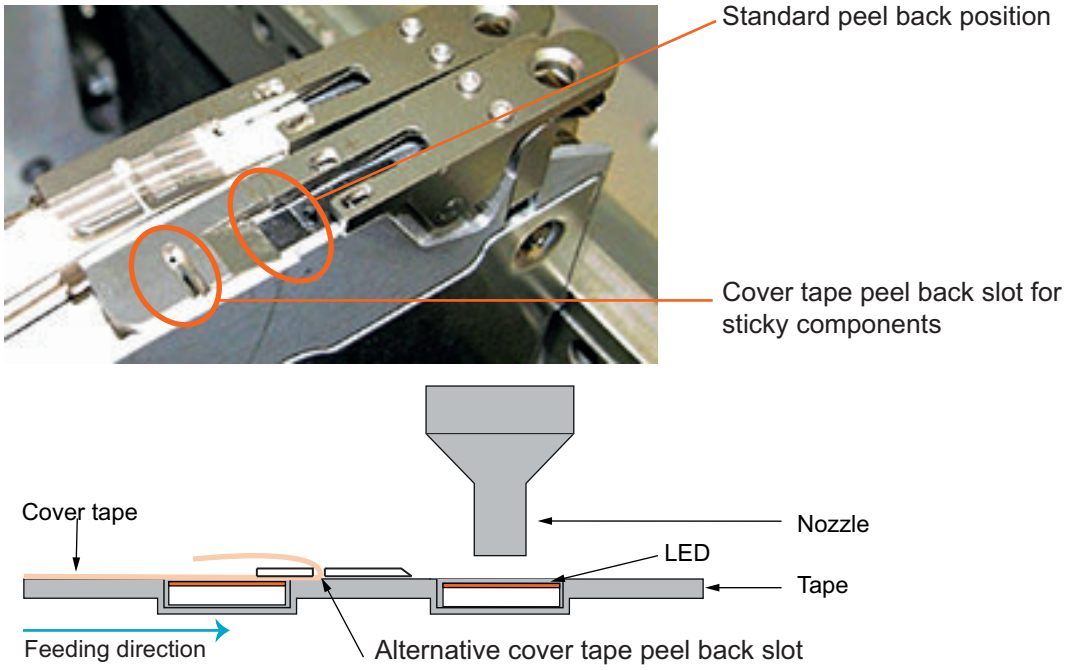
- The LED touches the nozzle while it is lifted from the tape
- The LED falls back "tilted" into the tape and cannot be picked up accurately by the nozzle

Figure 9: Lifted LED during cover tape removal



In these cases it is recommended to use the alternative pull back position of the cover tape as shown in Figure 10. Furthermore, we recommend controlling the humidity and providing an antistatic environment, e.g. with an ionizer. It is recommended to use electrical feed to control feeding speed and reduce any vibration of the carrier tape.

Figure 10: Feeder peel back position



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