

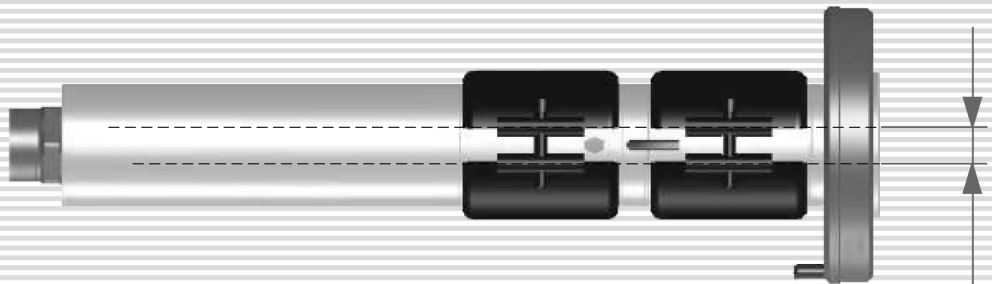


BARNES™
MOLDING SOLUTIONS

HOT RUNNER TECHNOLOGY

SR16 Hot Runner Nozzle Manifold Nozzles Sliding Fit

Products / Technical Guide



Ø8-16

Illustrations simplified, schematically drawn and not to scale.

Product type

- Hot runner nozzle, SR (support ring)
- Manifold nozzle sliding fit
 - Utilizes heat pipe technology to ensure uniform temperature
 - Patented seal technology
 - Replaceable threaded tips

Available with eight Controlled Vestige (CV) tip options including valve gates for zero vestige applications. See table at right.

Available gating types

- Full flow
- Cone point
- Valve gate:
 - VG12 & VG23 tapered gate
 - VG12S & VG23S Straight gate

Major Dimensions (mm)

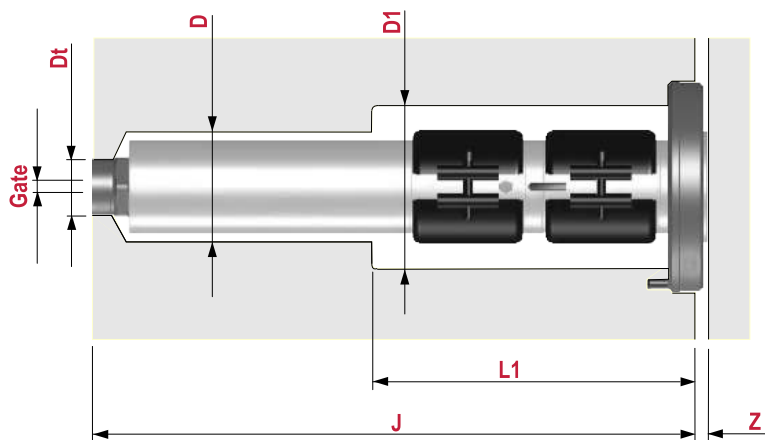
J Nozzle length	75-375
Nozzle flow bore	8-16Ø
D	Ø46
D1	Ø68
Dt	Ø24
Also available Ø1.00 inch	
Z	6
L1	59(J 75-149.9) 134(J 150-375)

Heating

- Externally heated, 240V/500W and 600W
- One heater for operation
- Installed spare heater and TC when space permits (J 150-375)

Application

- Suitable for all filled and unfilled materials

 page no. of related data sheets

Available tip styles for SR16 Nozzles

Gating of nozzle tip

	Full flow thermal gate	Cone point thermal gate	Valve Gate
Witness Mark	CV-10 Gate:1.5-5.2Ø Dt:24Ø 	CV-11 Gate:1.3-3.5Ø Dt:24Ø 	VG-12 Gate:3.9Ø Dt:24Ø 
			VG-12S Gate:5Ø Dt:24Ø 
No Witness Mark	CV-20 Gate:1.5-5.2Ø Dt:24Ø 	CV-21 Gate:1.3-3.5Ø Dt:24Ø 	VG-23 Gate:3.9Ø Dt:24Ø 
			VG-23S Gate:5Ø Dt:24Ø 

Illustrations simplified, schematically drawn and not to scale.

1. Cut out for the nozzle

J Length from back of cavity plate to Gate location

General tolerances: DIN ISO 2768-mK

Surfaces: $\frac{3.2}{\nabla} \left(\frac{1.6}{\nabla} \frac{0.8}{\nabla} \right)$

Values of the dimension J can be found in the data sheet for the selected nozzle type.

2. Cut out for connections

→ electrical power
→ thermocouple

3. Alignment pin

The alignment pin prevents the nozzle from rotating.

4. Cut out for the nozzle tip

- A)** Through bore nozzle tip (CV10, CV11, VG12 and VG12S)
b) Blind bore nozzle tip (CV20, CV21, VG23 & VG23S)

Dt Tip Ø

H Hot runner gate Ø

Depending on the selected nozzle type, different cut outs are required for the nozzle tip.

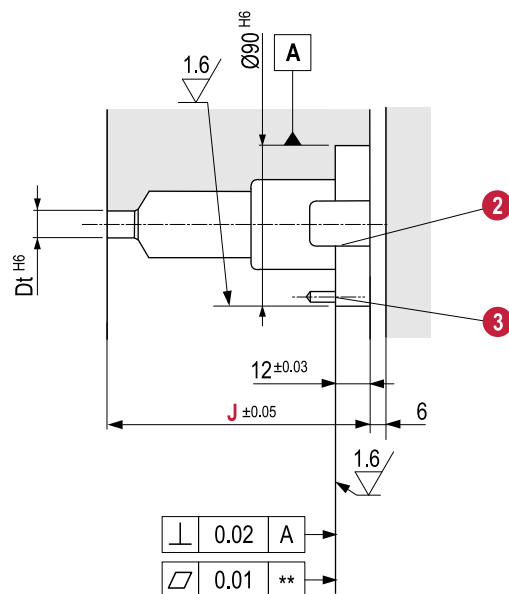
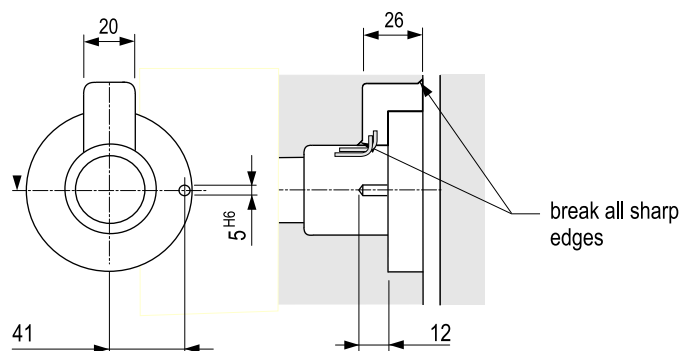
The dimensions of the cut out for the nozzle tip used can be found in the nozzle data sheet.

1) Applies to valve gate nozzles.

1

* drawn offset

** to all other pocket surfaces

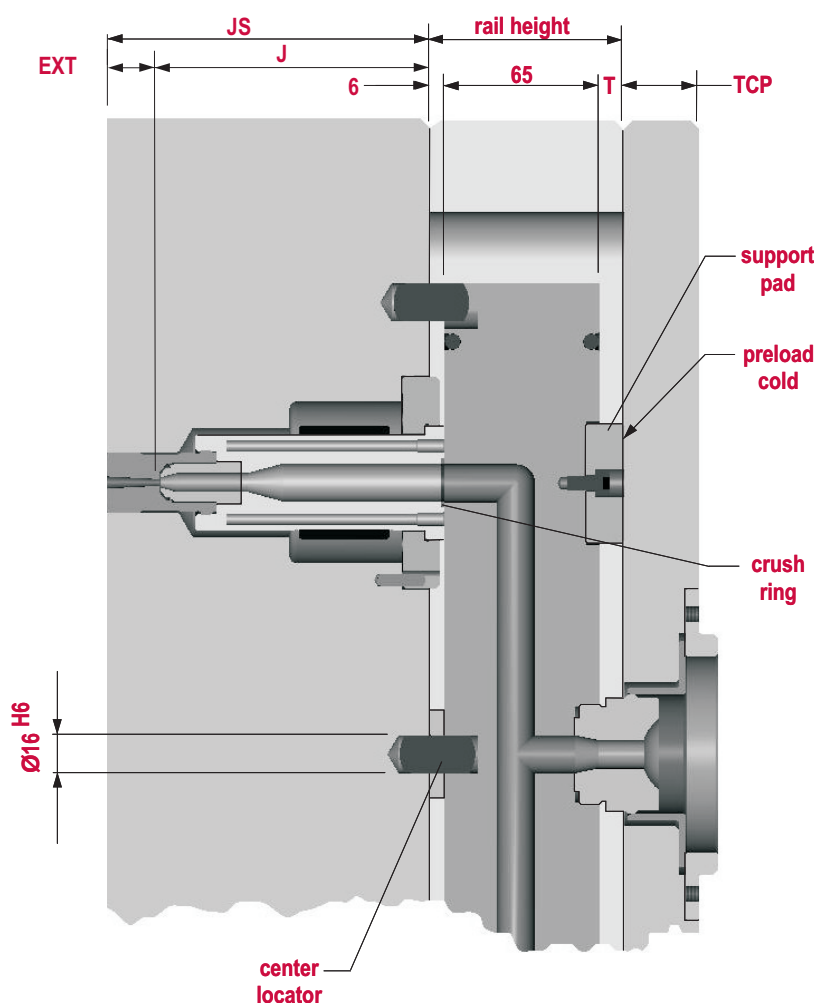
**2****3**

SR16 Series

SR16 manifold criteria:

- SR16 hot runner systems are designed with preload between the thrust pads and the mold plates in the cold condition. As the manifold heats an additional sealing force is created
- Thrust pads are made of a low conductivity material and should only be replaced with an equivalent Synventive part
- Excessive contact with the mold will cause heat sinks and affect system performance. Contact with the mold must be limited to specified areas.
- Support ring nozzles do not line up with sub-runners in the manifold in the cold condition. As the manifold heats up the manifold sub-runner locations expand to the correct location.
- Minimum rail height:
 - 81 (thermal gates)
 - 93 (valve gates)
- T :
 - = Rail height - 6 - 65 (thermal Gate)
 - = 22 (Valve Gate)
- Minimum T (thermal gates) = 10

Illustrations simplified, schematically drawn and not to scale.



Variable	Description
T	Top Air Gap
J	Depth to Zero Extension
TCP	Top Clamp Plate
JS	Depth to Parting Line
EXT	Extension

Illustrations simplified, schematically drawn and not to scale.

SR16 CV10

- General:
- Filled and unfilled materials
 - Easy orifice changes by straight reaming
 - Heat pipes for isothermal operation

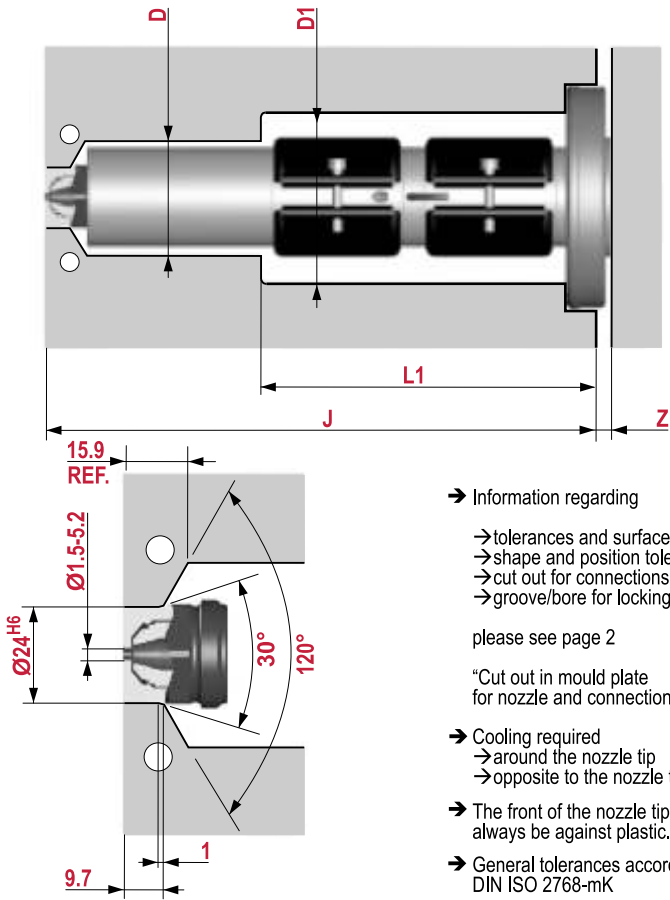
- Nozzle Criteria:
- Orifice Ø1.5-5.2
 - J length 75-375
 - Open flow bore
 - Patented seal

- SR16 contour criteria:
- When gating on an angled mold contour the vestige height may be increased depending on the angle
 - K is the increase in land required to maintain a 1.6 wall, 6 wall and/or 4 minimum contact

$\theta \leq 6^\circ$;
K=0
E=12TAN θ
L=2-(Ø Orifice/2)*TAN θ

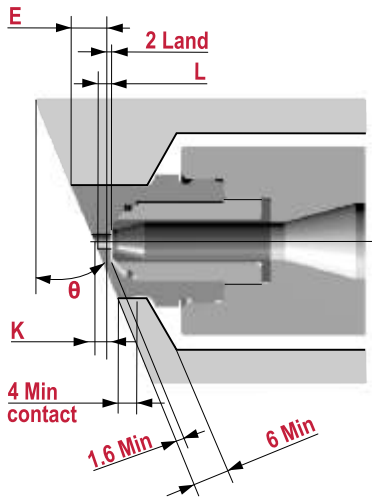
$6^\circ < \theta \leq 26^\circ$;
K=4.2TAN θ +1.6/COS θ -2
E=K+12TAN θ
L=2+K-(Ø Orifice/2)*TAN θ

$\theta > 26^\circ$;
K=23TAN θ -9.9
E=K+12TAN θ
L=2+K-(Ø Orifice/2)*TAN θ



- Information regarding
- tolerances and surfaces
 - shape and position tolerances
 - cut out for connections
 - groove/bore for locking pin
- please see page 2
- “Cut out in mould plate for nozzle and connections”
- Cooling required
- around the nozzle tip
 - opposite to the nozzle tip
- The front of the nozzle tip must always be against plastic.
- General tolerances according to DIN ISO 2768-mK

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band (38 long)	75	149.9	1	500W/240V
Band (51 long)	150	375	2 (one spare)	600W/240V (each)



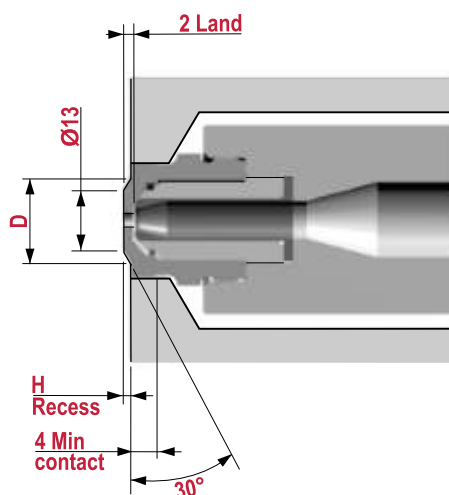
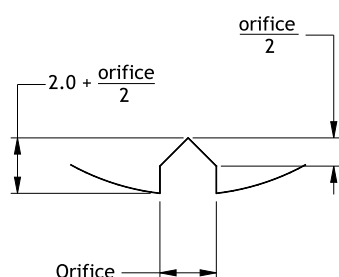
Angled Mold Contour

Illustrations simplified, schematically drawn and not to scale.

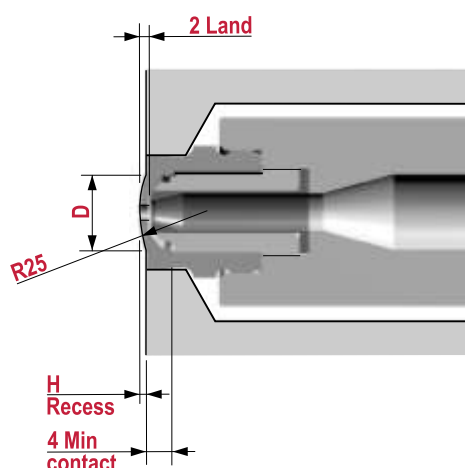
SR16 CV10

SR16 recess criteria:

- Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers
- Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface
- For most materials CV10 vestige height is equal to $2 + (\text{orifice } \varnothing / 2)$. If the vestige height, relative to the possible gate recess depth (h), is too great, use of a CV11 tip is recommended


Conical Recess

H (recess depth)	1.0	1.5	2.0	2.5	3.0
D	16.5	18.2	19.9	21.7	23.4


Spherical Recess

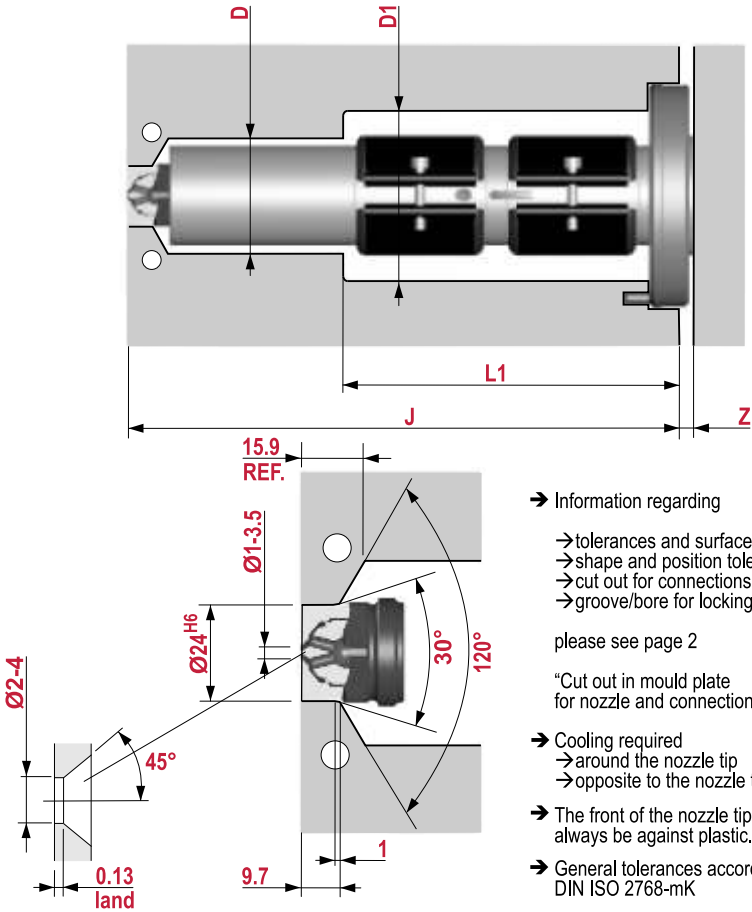
H (recess depth)	1.0	1.5	2.0	2.5	3.0
D	14.0	17.1	19.6	21.8	23.5

Illustrations simplified, schematically drawn and not to scale.

SR16 CV11

- General:
- Filled and unfilled materials
 - More heat in gate area for semi-crystalline materials
 - Heat pipes for isothermal operation

- Nozzle Criteria:
- Orifice Ø1.3-3.5
 - J length 75-375
 - Patented seal



- Information regarding
- tolerances and surfaces
 - shape and position tolerances
 - cut out for connections
 - groove/bore for locking pin
- please see page 2
- "Cut out in mould plate for nozzle and connections"
- Cooling required
- around the nozzle tip
 - opposite to the nozzle tip
- The front of the nozzle tip must always be against plastic.
- General tolerances according to DIN ISO 2768-mK

- SR16 contour criteria:
- When gating on an angled mold contour the vestige height may be increased depending on the angle
 - K is the increase in land required to maintain a 0.13 land, 1.6 wall, 6 wall and/or 4 minimum contact

$\theta \leq 7^\circ;$

$$K = (\text{Ø Orifice} / 2) * \text{TAN} \theta$$
$$E = (24 + \text{Ø Orifice}) / 2 * \text{TAN} \theta$$
$$L = 0.13$$

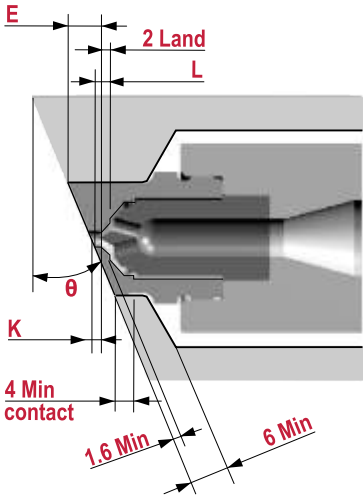
$7^\circ < \theta \leq 27^\circ;$

$$K = 4.2 \text{TAN} \theta + 1.6 / \text{COS} \theta + (\text{Ø Orifice} - 1) / 2 * \text{TAN} \theta$$
$$E = K + 12 \text{TAN} \theta$$
$$L = 0.13 + K - (\text{Ø Orifice} / 2) * \text{TAN} \theta$$

$\theta > 27^\circ;$

$$K = 23 \text{TAN} \theta - 9.9$$
$$E = K + 12 \text{TAN} \theta$$
$$L = 2 + K - (\text{Ø Orifice} / 2) * \text{TAN} \theta$$

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band (38 long)	75	149.9	1	500W/240V
Band (51 long)	150	375	2 (one spare)	600W/240V (each)



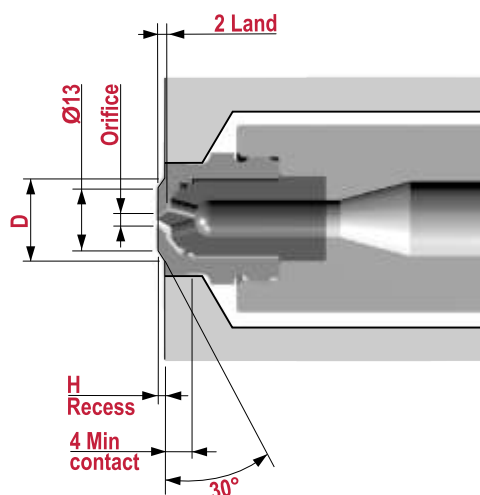
Angled Mold Contour

Illustrations simplified, schematically drawn and not to scale.

SR16 CV11

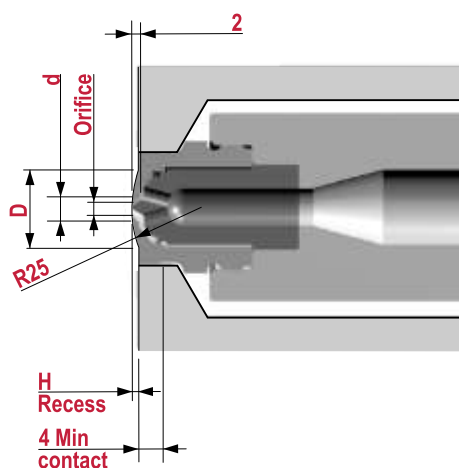
SR16 recess criteria:

- Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers
- Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface



Conical Recess

Orifice	1.0	1.5	2.0	2.5	3.0	3.5
H (recess depth)	0.59	0.76	0.93	1.09	1.26	1.43
D	15.04	15.63	16.22	16.78	17.36	17.95



Spherical Recess

Orifice	1.0-1.2	1.2-1.4	1.4-1.6	1.6-1.8	1.8-2.0	2.0-2.2
H	0.65	0.72	0.79	0.86	0.93	1.00
d	1.45	1.65	1.85	2.05	2.25	2.45
D	11.33	11.91	12.47	13.00	13.51	14.00
Orifice	2.2-2.4	2.4-2.6	2.6-2.8	2.8-3.0	3.0-3.2	3.2-3.5
H	1.06	1.12	1.18	1.26	1.32	1.40
d	2.65	2.85	3.05	3.25	3.45	3.65
D	14.41	14.80	15.18	15.67	16.03	16.50

Illustrations simplified, schematically drawn and not to scale.

SR16 CV20

- General:
- Filled and unfilled materials
 - Easy orifice changes by straight reaming
 - Heat pipes for isothermal operation
 - No witness mark on part
 - Easier removal of frozen material around tip for color change

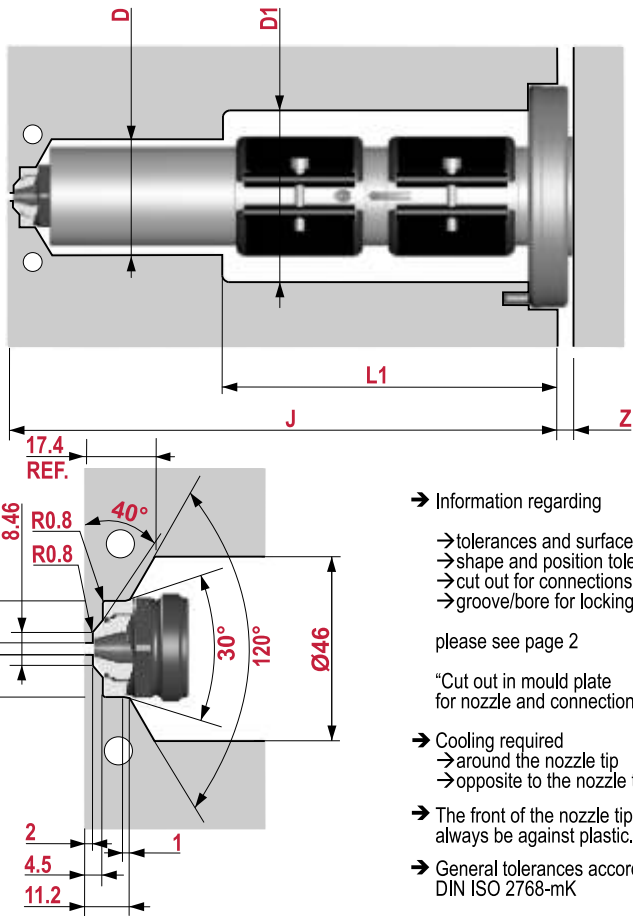
- Nozzle Criteria:
- Orifice Ø1.5-5.2
 - J length 75-375
 - Open flow bore
 - Patented seal

- SR16 contour criteria:
- When gating on an angled mold contour the vestige height may be increased depending on the angle
 - K is the increase in land required to maintain a 1.6 wall, 2 wall and/or 6 wall thickness

$\theta \leq 6^\circ;$
 $K=0$
 $L=0.13$

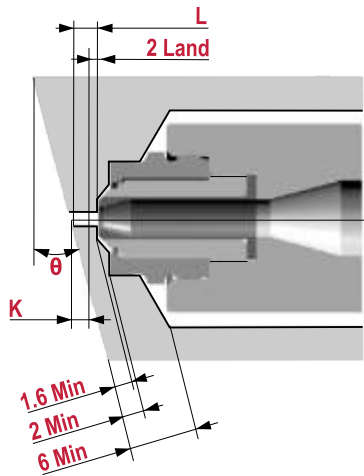
$6^\circ < \theta \leq 16^\circ;$
 $K=4.2 \tan \theta + 1.6 / \cos \theta - 2$
 $L=2+K-(\varnothing \text{ Orifice} / 2) * \tan \theta$

$\theta > 16^\circ;$
 $K=12 \tan \theta + 2 / \cos \theta - 4.5$
 $L=2+K-(\varnothing \text{ Orifice} / 2) * \tan \theta$



- Information regarding
- tolerances and surfaces
 - shape and position tolerances
 - cut out for connections
 - groove/bore for locking pin
- please see page 2
- "Cut out in mould plate for nozzle and connections"
- Cooling required
- around the nozzle tip
 - opposite to the nozzle tip
- The front of the nozzle tip must always be against plastic.
- General tolerances according to DIN ISO 2768-mK

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band (38 long)	75	149.9	1	500W/240V
Band (51 long)	150	375	2 (one spare)	600W/240V (each)



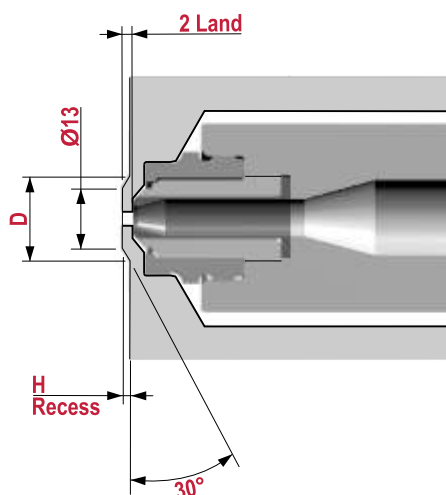
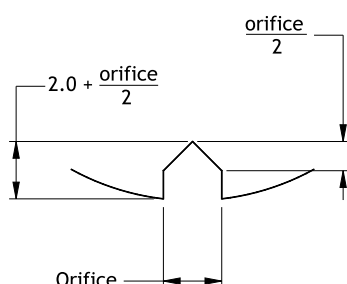
Angled Mold Contour

Illustrations simplified, schematically drawn and not to scale.

SR16 CV20

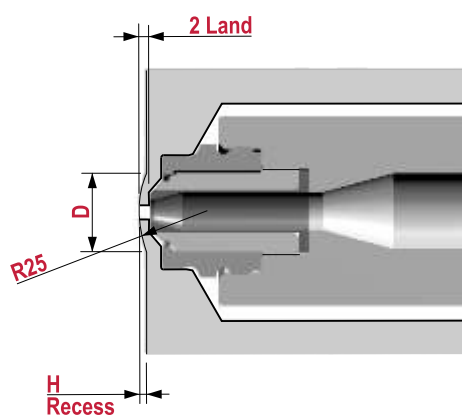
SR16 recess criteria:

- Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers
- Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface
- For most materials CV10 vestige height is equal to $2 + (\text{orifice } \varnothing / 2)$. If the vestige height, relative to the possible gate recess depth (h), is too great, use of a CV11 tip is recommended



Conical Recess

H (recess depth)	1.0	1.5
D	16.5	18.2



Spherical Recess

H (recess depth)	1.0	1.5
D	14.0	17.1

Illustrations simplified, schematically drawn and not to scale.

SR16 CV21

General:

- Filled and unfilled materials
- More heat in gate area for semi-crystalline materials
- Heat pipes for isothermal operation
- Easier removal of frozen material around tip for color change

Nozzle Criteria:

- Orifice Ø1.3-3.5
- J length 75-375
- Patented seal

SR16 contour criteria:

- When gating on an angled mold contour the vestige height may be increased depending on the angle
- K is the increase in land required to maintain a 0.13 land, 1.6 wall, and/or 7 wall thickness

$$\theta \leq 6^\circ;$$

$$K = (\text{Ø Orifice}/2) * \text{TAN} \theta$$

$$L = 0.13$$

$$6^\circ < \theta \leq 16^\circ;$$

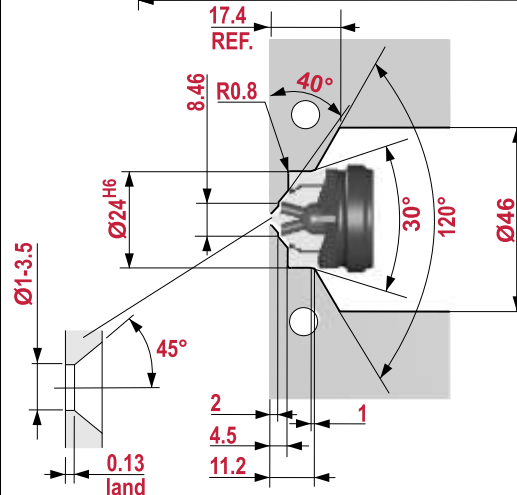
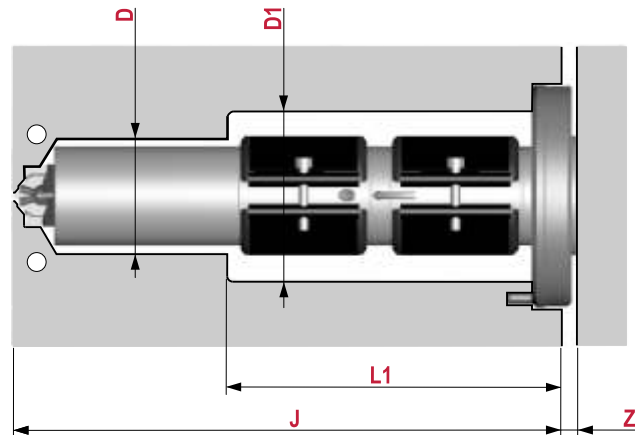
$$K = 4.2 \text{TAN} \theta + 1.6 / \text{COS} \theta + (\text{Ø Orifice} - 1) / 2 * \text{TAN} \theta - 2$$

$$L = 0.13 + K - (\text{Ø Orifice}/2) * \text{TAN} \theta$$

$$\theta > 16^\circ;$$

$$K = 12 \text{TAN} \theta + 2 / \text{COS} \theta - 4.5$$

$$L = 0.13 + K - (\text{Ø Orifice}/2) * \text{TAN} \theta$$



→ Information regarding

- tolerances and surfaces
- shape and position tolerances
- cut out for connections
- groove/bore for locking pin

please see page 2

"Cut out in mould plate for nozzle and connections"

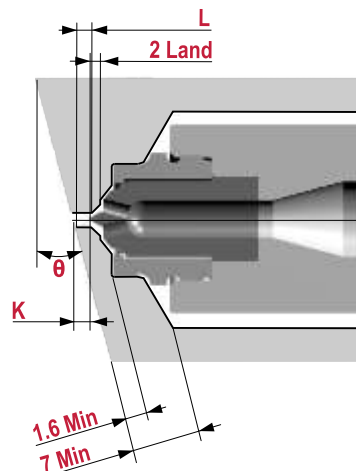
→ Cooling required

- around the nozzle tip
- opposite to the nozzle tip

→ The front of the nozzle tip must always be against plastic.

→ General tolerances according to DIN ISO 2768-mK

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band (38 long)	75	149.9	1	500W/240V
Band (51 long)	150	375	2 (one spare)	600W/240V (each)



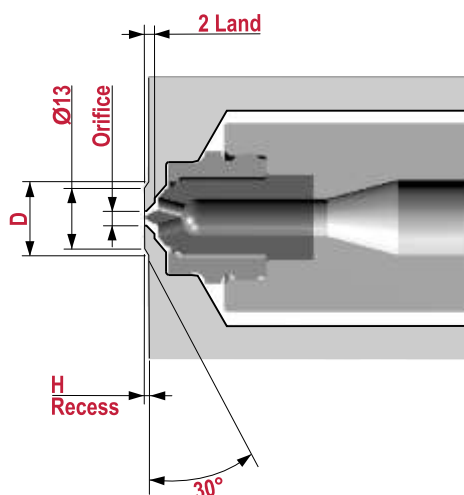
Angled Mold Contour

Illustrations simplified, schematically drawn and not to scale.

SR16 CV21

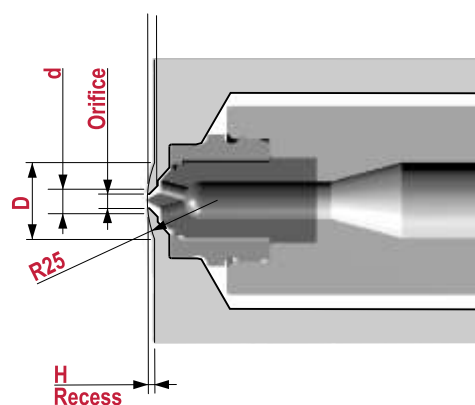
SR16 recess criteria:

- Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers
- Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface
- Maintain 0.13 land when machining gate recess or contour



Conical Recess

Orifice	1.0	1.5	2.0	2.5	3.0	3.5
H (recess depth)	0.59	0.76	0.93	1.09	1.26	1.43
D	15.04	15.63	16.22	16.78	17.36	17.95



Spherical Recess

Orifice	1.0-1.2	1.2-1.4	1.4-1.6	1.6-1.8	1.8-2.0	2.0-2.2
H	0.65	0.72	0.79	0.86	0.93	1.00
d	1.45	1.65	1.85	2.05	2.25	2.45
D	11.33	11.91	12.47	13.00	13.51	14.00
Orifice	2.2-2.4	2.4-2.6	2.6-2.8	2.8-3.0	3.0-3.2	3.2-3.5
H	1.06	1.12	1.18	1.26	1.32	1.40
d	2.65	2.85	3.05	3.25	3.45	3.65
D	14.41	14.80	15.18	15.67	16.03	16.50

Illustrations simplified, schematically drawn and not to scale.

SR16 VG12

- General:
- Filled and unfilled materials
 - Tapered valve pin to eliminate gate flash
 - Heat pipes for isothermal operation

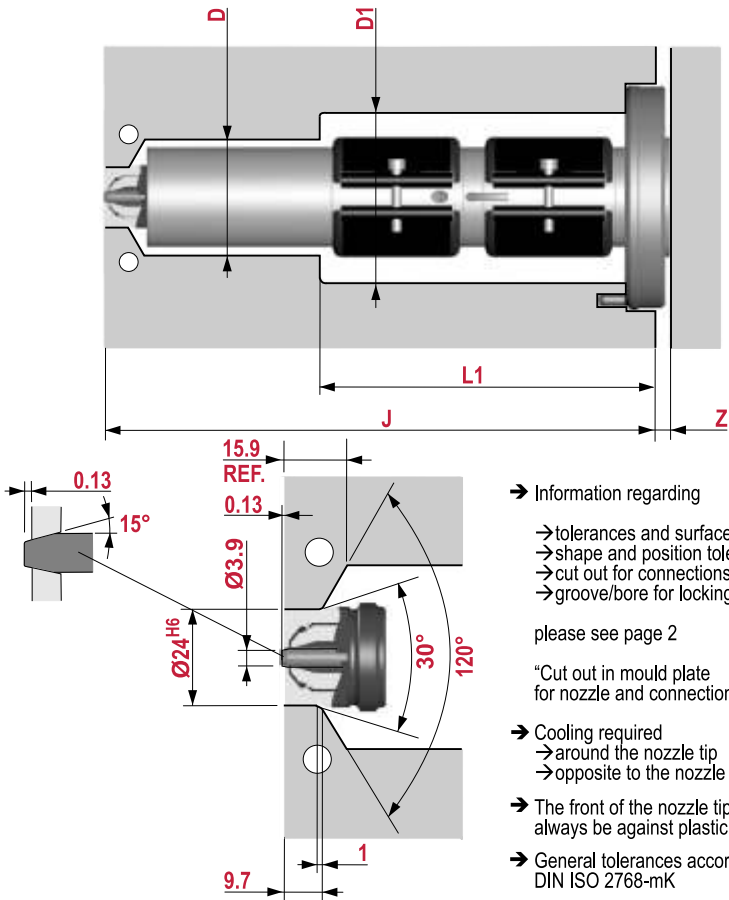
- Nozzle Criteria:
- Orifice Ø3.9
 - J length 75-375
 - Patented seal

- Sr16 contour criteria:
- When gating on an angled mold contour the vestige height may be increased depending on the angle
 - K is the increase in land required to maintain a 1.6 wall, 6 wall and/or 4 minimum contact

$\theta \leq 6^\circ;$
 $K=0$
 $E=12TAN\theta$

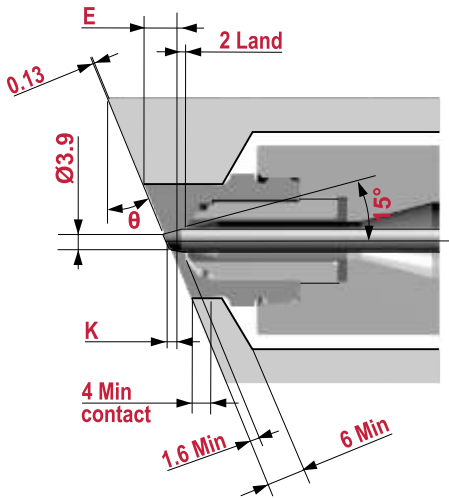
$6^\circ < \theta \leq 27^\circ;$
 $K=4.2TAN\theta+1.6/COS\theta-2$
 $E=K+12TAN\theta$

$\theta > 27^\circ;$
 $K=23TAN\theta-9.9$
 $E=K+12TAN\theta$



- Information regarding
 - tolerances and surfaces
 - shape and position tolerances
 - cut out for connections
 - groove/bore for locking pin
- please see page 2
- “Cut out in mould plate for nozzle and connections”
- Cooling required
 - around the nozzle tip
 - opposite to the nozzle lip
- The front of the nozzle tip must always be against plastic.
- General tolerances according to DIN ISO 2768-mK

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band (38 long)	75	149.9	1	500W/240V
Band (51 long)	150	375	2 (one spare)	600W/240V (each)



Angled Mold Contour

Illustrations simplified, schematically drawn and not to scale.

SR16 VG12S

General:

- Filled and unfilled materials
- Straight valve pin for non-adjustable actuators and glass filled materials
- Heat pipes for isothermal operation
- No witness mark on part

Nozzle Criteria:

- Orifice Ø5
- J length 75-375
- Patented seal

Sr16 contour criteria:

- When gating on an angled mold contour the vestige height may be increased depending on the angle
- K is the increase in land required to maintain a 1.6 wall, 6 wall and/or 4 minimum contact

$$\theta \leq 6^\circ;$$

$$K=0$$

$$E=12\tan\theta$$

$$6^\circ < \theta \leq 27^\circ;$$

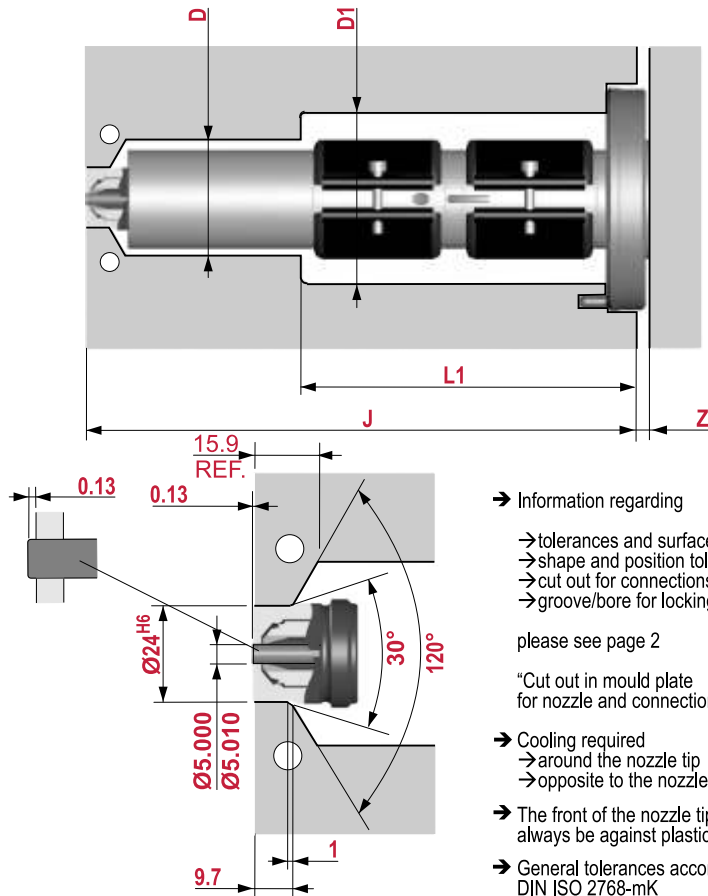
$$K=4.2\tan\theta + 1.6/\cos\theta - 2$$

$$E=K+12\tan\theta$$

$$\theta > 27^\circ;$$

$$K=23\tan\theta - 9.9$$

$$E=K+12\tan\theta$$



→ Information regarding

- tolerances and surfaces
- shape and position tolerances
- cut out for connections
- groove/bore for locking pin

please see page 2

"Cut out in mould plate for nozzle and connections"

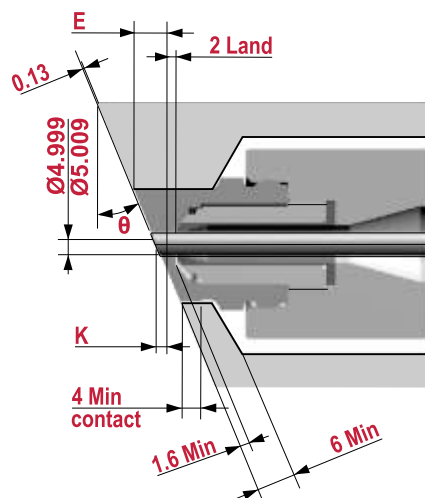
→ Cooling required

- around the nozzle tip
- opposite to the nozzle tip

→ The front of the nozzle tip must always be against plastic.

→ General tolerances according to DIN ISO 2768-mK

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band (38 long)	75	149.9	1	500W/240V
Band (51 long)	150	375	2 (one spare)	600W/240V (each)



Angled Mold Contour

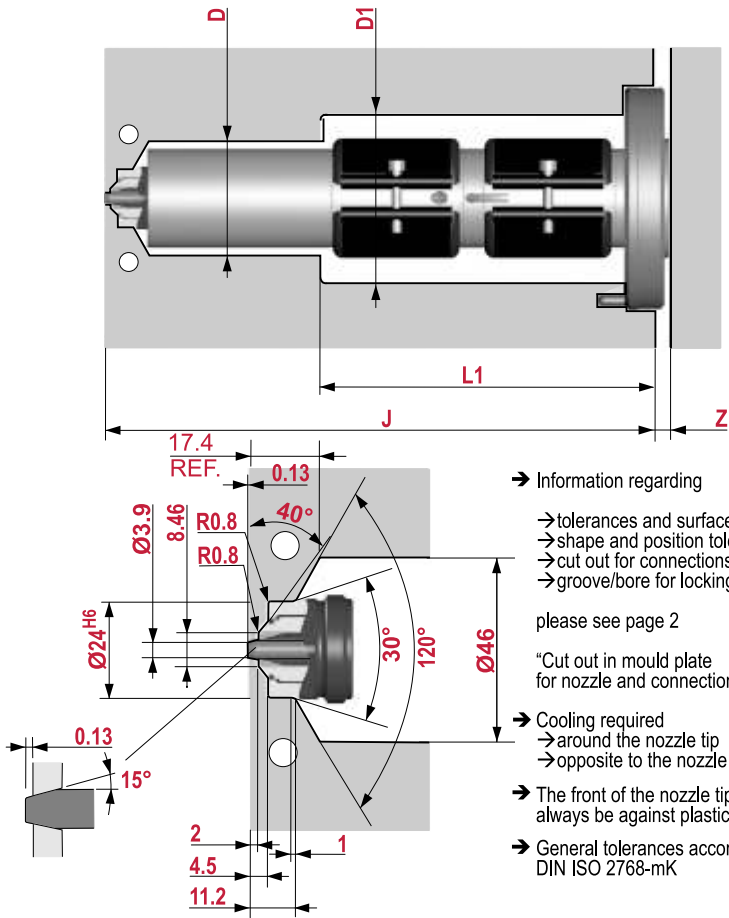


Illustrations simplified, schematically drawn and not to scale.

SR16 VG23

- General:
- Filled and unfilled materials
 - Tapered valve pin to eliminate gate flash
 - Heat pipes for isothermal operation
 - No witness mark on part

- Nozzle Criteria:
- Orifice Ø3.9
 - J length 75-375
 - Patented seal

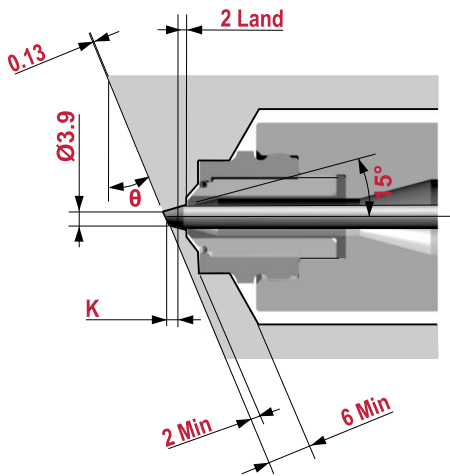


- Information regarding
- tolerances and surfaces
 - shape and position tolerances
 - cut out for connections
 - groove/bore for locking pin
- please see page 2
- “Cut out in mould plate for nozzle and connections”
- Cooling required
- around the nozzle tip
 - opposite to the nozzle tip
- The front of the nozzle tip must always be against plastic.
- General tolerances according to DIN ISO 2768-mK

- SR16 recess criteria:
- When gating on an angled mold contour the vestige height may be increased depending on the angle
 - K is the increase in land required to maintain a 2 wall and/or 6 minimum wall.

$\theta \leq 6^\circ;$ $K=0$
 $6^\circ < \theta \leq 16^\circ;$ $K=4.2 \tan \theta + 1.6 / \cos \theta - 2$
 $\theta > 16^\circ;$ $K=12 \tan \theta + 2 / \cos \theta - 4.5$

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band (38 long)	75	149.9	1	500W/240V
Band (51 long)	150	375	2 (one spare)	600W/240V (each)



Angled Mold Contour

Illustrations simplified, schematically drawn and not to scale.

SR16 VG23S

General:

- Filled and unfilled materials
- Tapered valve pin to eliminate gate flash
- Heat pipes for isothermal operation

Nozzle Criteria:

- Orifice Ø3.9
- J length 75-375
- Patented seal

SR16 recess criteria:

- When gating on an angled mold contour the vestige height may be increased depending on the angle
- K is the increase in land required to maintain a 2 wall and/or 6 minimum wall.

$$\theta \leq 6^\circ;$$

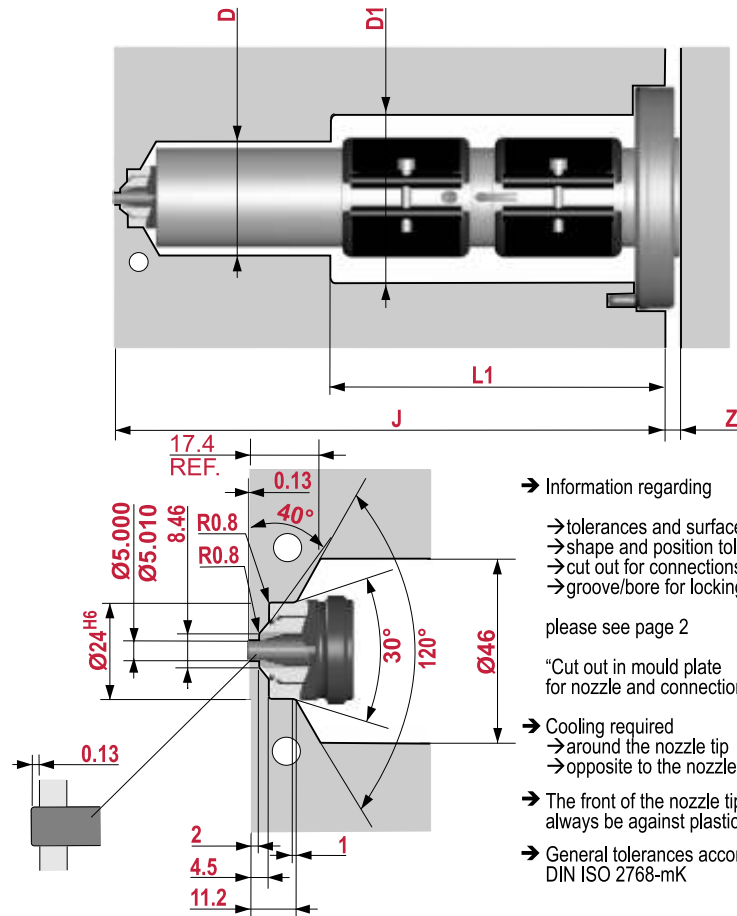
$$K=0$$

$$6^\circ < \theta \leq 16^\circ;$$

$$K=4.2 \tan \theta + 1.6 / \cos \theta - 2$$

$$\theta > 16^\circ;$$

$$K=12 \tan \theta + 2 / \cos \theta - 4.5$$



→ Information regarding

- tolerances and surfaces
- shape and position tolerances
- cut out for connections
- groove/bore for locking pin

please see page 2

"Cut out in mould plate for nozzle and connections"

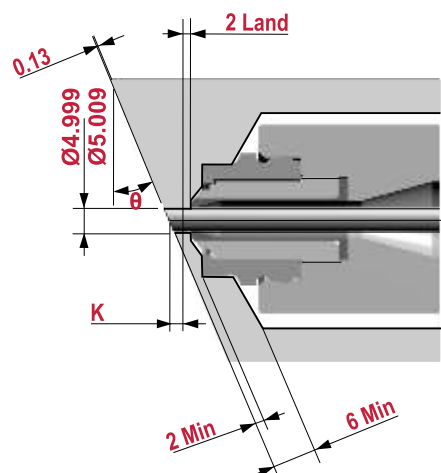
→ Cooling required

- around the nozzle tip
- opposite to the nozzle tip

→ The front of the nozzle tip must always be against plastic.

→ General tolerances according to DIN ISO 2768-mK

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band (38 long)	75	149.9	1	500W/240V
Band (51 long)	150	375	2 (one spare)	600W/240V (each)



Angled Mold Contour



BARNES™
MOLDING SOLUTIONS



Barnes Molding Solutions is the expert cluster for molds, hot runners, and controls for industrial plastic injection molding. Our brands Foboha, Männer, Synventive, Thermoplay, Priamus and Gammaflux are leaders in their field. We have a comprehensive and in-depth understanding of the automotive, medical, packaging and electronics industries. We support our customers with sophisticated high-performance technologies through to customized turnkey solutions.



barnesmoldingsolutions.com

Synventive®
molding solutions

THERMOPLAY®
HotRunnerSystems

männer®
SOLUTIONS FOR PLASTICS

FOBOHA®

PRIAMUS®

Gammaflux®