

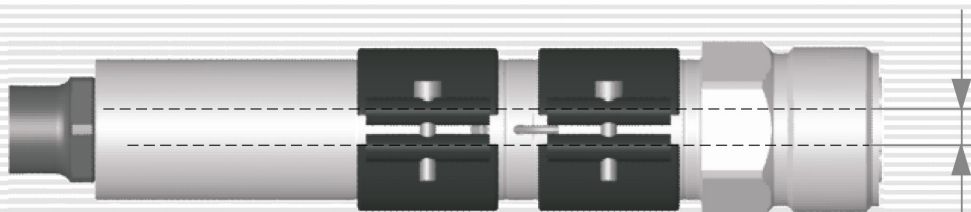


BARNES™
MOLDING SOLUTIONS

HOT RUNNER TECHNOLOGY

T20 Hot Runner Nozzle Manifold Nozzles Threaded

Products / Technical Guide



Ø10-20

Illustrations simplified, schematically drawn and not to scale.

Product type

- ➔ Hot Runner Nozzle, T (threaded)
- ➔ Utilizes heat pipe technology to ensure uniform temperature
- ➔ Patented seal technology
- ➔ Replaceable threaded tips

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

Available gating types

- ➔ Full flow: CV10 & CV20
- ➔ Cone Point: CV11, CV11CM, CV21, CV21CM
- ➔ Valve gate:
 - VG12 & VG23 tapered gate
 - VG12S & VG23S straight gate

Major Dimensions (mm)

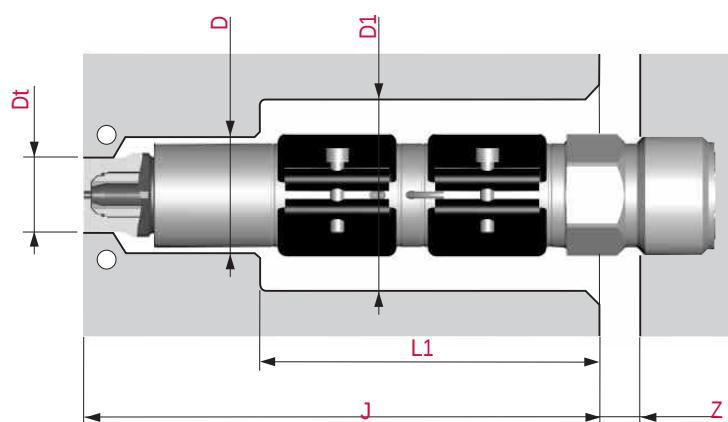
J Nozzle length	
Band heated	160-380
Helical heated	160-500
Nozzle flow bore	Ø10-20
*D	Ø50(band), Ø65(helical)
*D1	Ø85(band), Ø70(helical)
Dt	Ø32

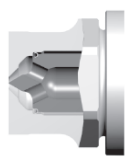
Heating

➔ Available with replaceable band or helical heaters and thermocouples. If band heated, one band heater is required for operation but an installed spare may be provided if space allows.

Application

- ➔ Suitable for all filled and unfilled materials

 page no. of related data sheets

Available tip styles for T20 Nozzles
 Gating of nozzle tip

	Full flow thermal gate	Cone point thermal gate	Valve Gate
Witness Mark	CV-10 Gate: Ø2-Ø6 Dt: Ø32 	CV-11 Gate: Ø2-Ø4 Dt: Ø32 	VG-12 Gate: Ø3.9 Dt: Ø32 
		CV-11CM Gate: Ø4 Dt: Ø32 	VG-12S Gate: Ø5 Dt: Ø32 
No Witness Mark	CV-20 Gate: Ø2-Ø6 Dt: Ø32 	CV-21 Gate: Ø2-Ø4 Dt: Ø32 	VG-23 Gate: Ø3.9 Dt: Ø32 
		CV-21CM Gate: Ø4 Dt: Ø32 	VG-23S Gate: Ø5 Dt: Ø32 

Illustrations simplified, schematically drawn and not to scale.

Band Heater

→ One heater required for operation. If mold thickness allows a spare band heater will be installed.

→ J Minimum = 160

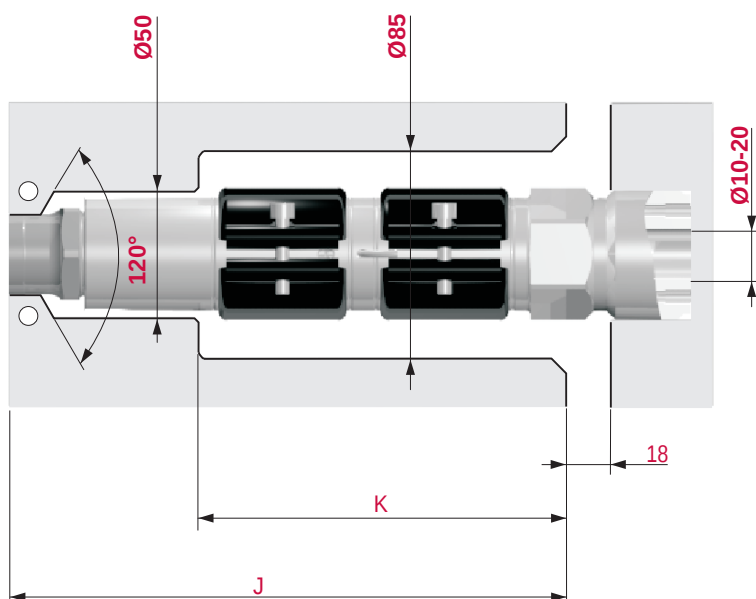
→ J Maximum = 380

→ K = 80 for single heater
145 for installed spare heater

L1 = 48 (J 75-149.9)
= 122 (J 150-375)

- ★ When the distance from the manifold center locator to the hot runner nozzle center line exceeds 500 the Ø50 clearance hole must be increased to Ø55 and the Ø85 hole increased to Ø90.

When using the CV11CM and CV21CM tip styles the Ø85 heater clearance hole depth increases eliminating the Ø50 clearance hole. See pg. 9/20 and pg. 15/20.



Helical Heater

→ When J is greater than 425 two heaters are required for operation.

→ J Minimum = 160

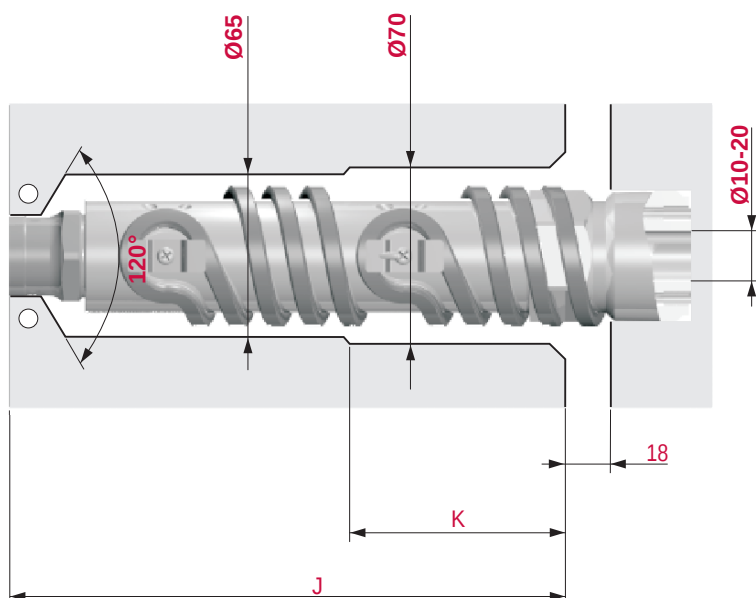
→ J Maximum = 500

→ J 160-425, K = 0

J 425-500, K = J/2

L1 = 0 (J 160-500)
= J/2 (J 425-500)

- ★ When the distance from the manifold center locator to the hot runner nozzle center line exceeds 500 the Ø65 clearance hole must be increased to Ø70.



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

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

4. Cut out for the nozzle tip

- A) Through bore nozzle tip (CV10, CV11, CV11CM, VG12 and VG12S)
b) Blind bore nozzle tip (CV20, CV21, CV21CM 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.

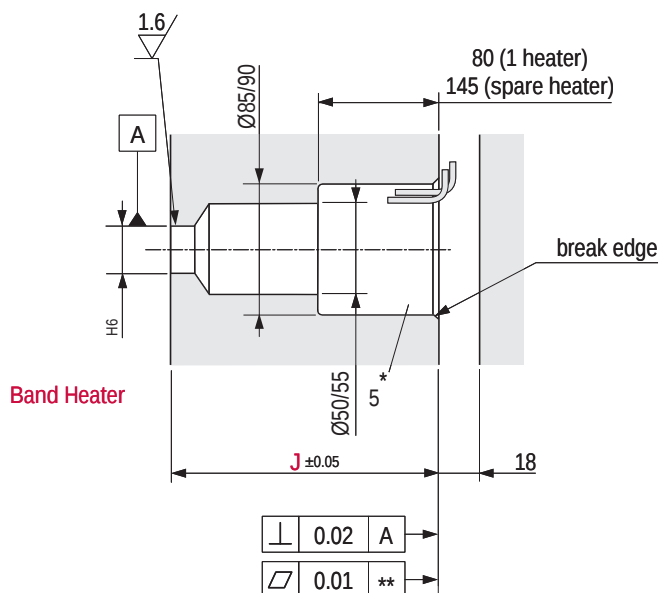
The dimensions of the cut out for the nozzle tip used can be found in the nozzle data sheet.

1) Applies to valve gate nozzles.

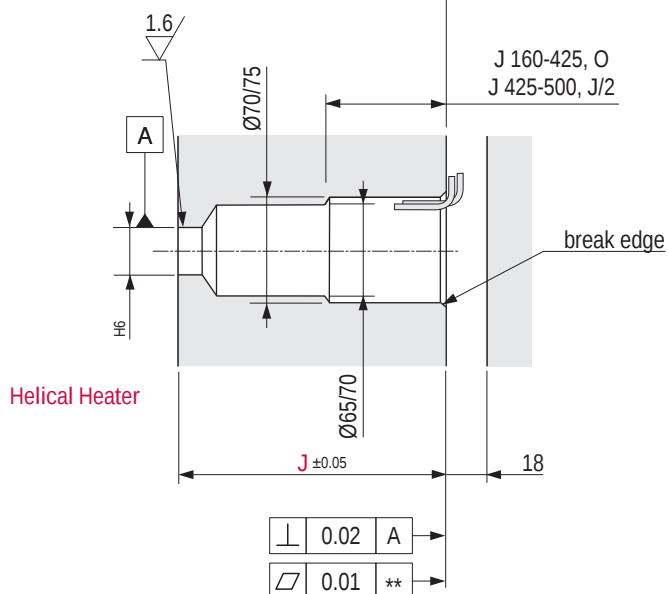
1

* drawn offset

** to all other pocket surfaces



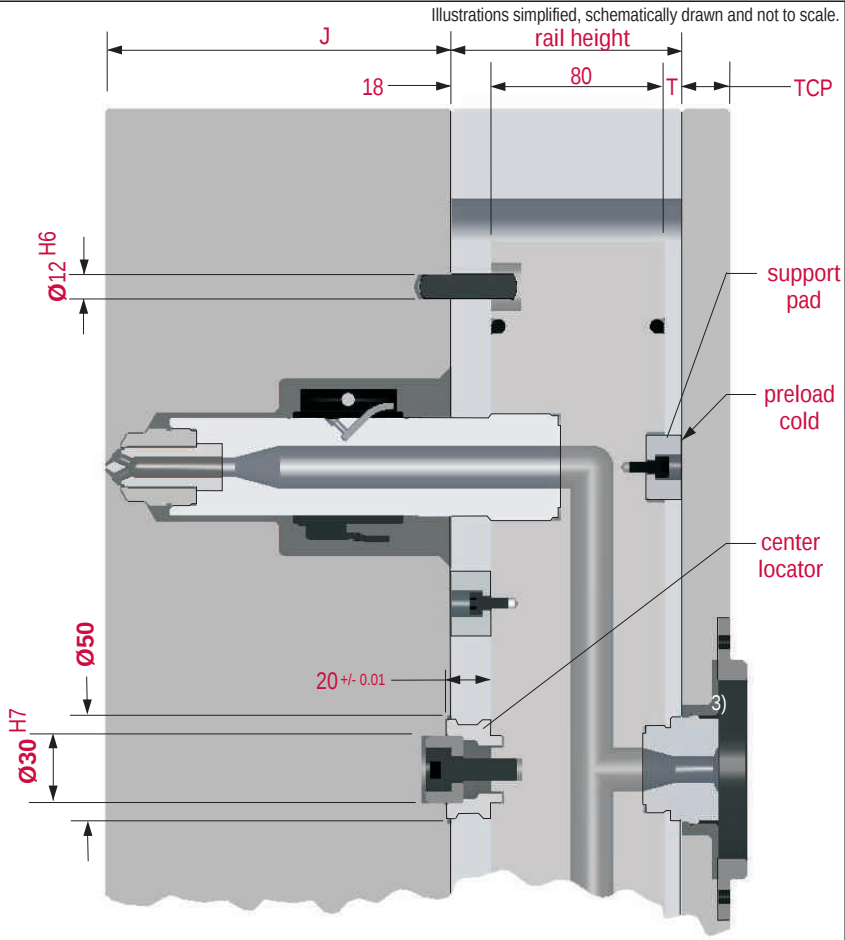
2



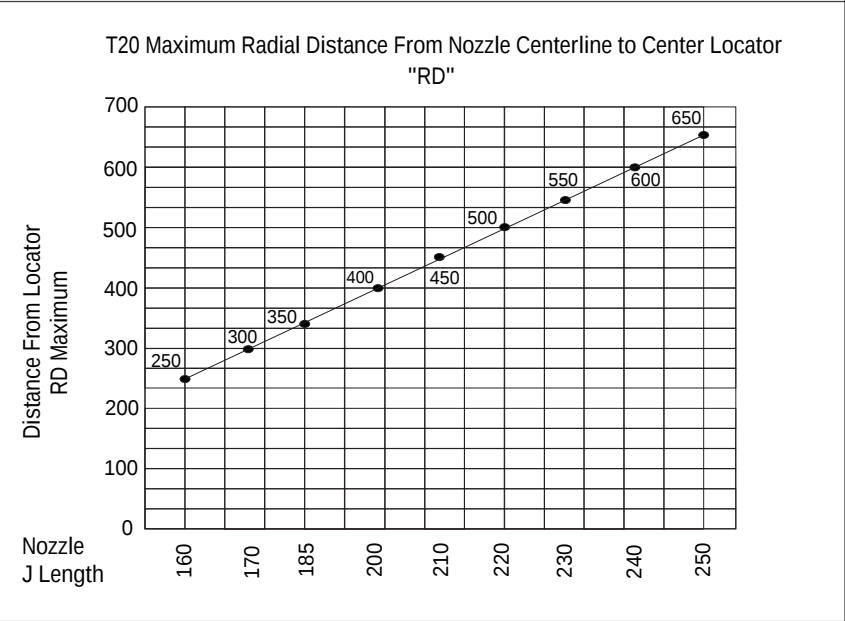
T20 Series

- T20 manifold criteria:
- T20 manifold systems do not require preload because they are threaded directly into the manifold.
 - The systems typically have a clearance between the thrust pads and mold plates in the cold condition. As the manifold heats and expands the thrust pads make contact with the plates.
 - 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.
- Minimum rail height:
108 (thermal gates)
120 (valve gates)
- $T = \text{Rail height} - 18 - 80$ (thermal gate)
= 22 (Valve Gate)
- Minimum T (thermal gates) = 10
→ Minimum T (valve gates) = 22

- RD is the radial distance from the manifold center locator to the manifold nozzle center line.
- For longer RD dimensions consult with Synventive.
- Threaded nozzles line up with the gate locations in the mould in the cold condition. As the manifold heats and expands the nozzles flex. The distance from the center locator (RD) determines the amount of nozzle flex. The table to the right defines the maximum allowable distance from the nozzle to the center locator.



Variable	Description
T	Top Air Gap
J	Mold Depth
TCP	Top Clamp Plate



T20 CV10

General:

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

Nozzle Criteria:

- Orifice $\varnothing 2\text{-}\varnothing 6$
- J length - See Chart
- Open flow bore
- Patented seal

- RD is the radial distance from the manifold center locator to the manifold nozzle center line.
- For longer RD dimensions consult with Synventive.

T20 contour criteria:

- When gating on an angled mold contour the vestige height may be increased depending on the angle
- K is the increase in vestige height required to maintain a 1.6 wall, and/or 5 minimum contact.

$$\theta \leq 14^\circ;$$

$$K=0$$

$$E=16\tan\theta$$

$$L=3-(\text{Orifice}/2)*\tan\theta$$

$$14^\circ < \theta \leq 27^\circ;$$

$$K=5.7\tan\theta+(1.6/\cos\theta)-3$$

$$E=K+(16\tan\theta)$$

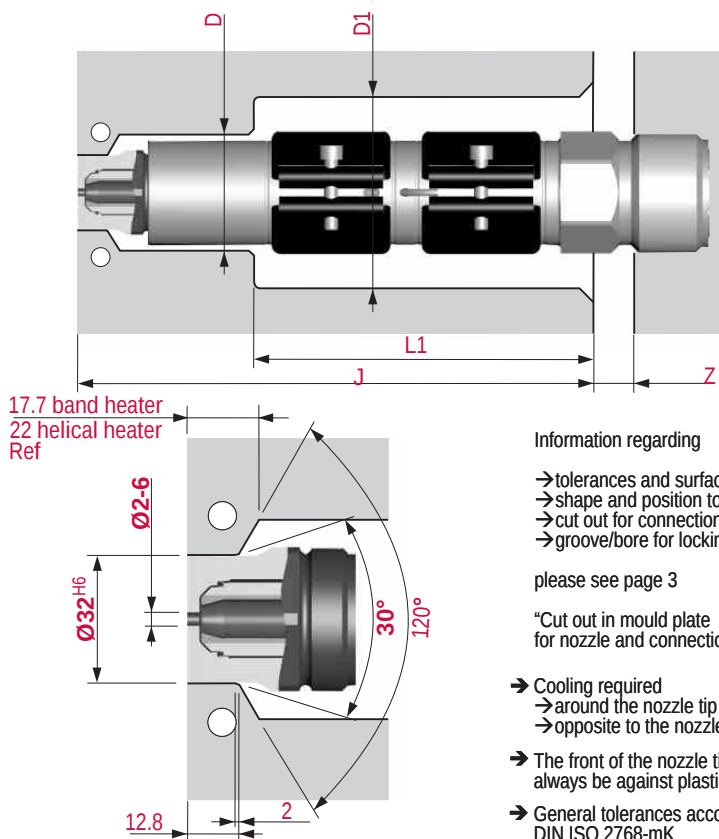
$$L=3+K-(\text{Orifice}/2)*\tan\theta$$

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

$$K=16(\tan\theta)-6.5$$

$$E=32(\tan\theta)-6.5$$

$$L=3+K-(\text{Orifice}/2)*\tan\theta$$



Information regarding

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

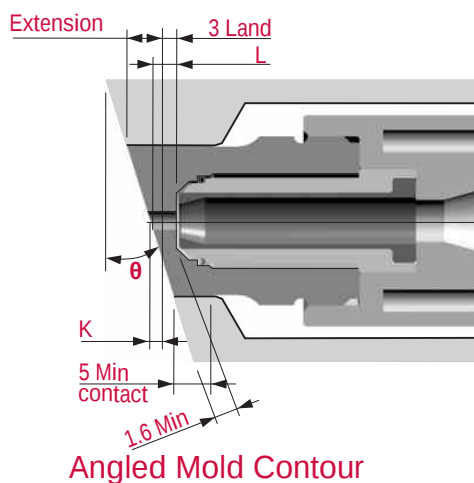
please see page 3

"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

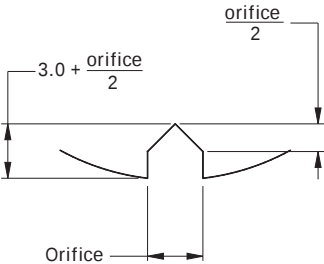
RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)

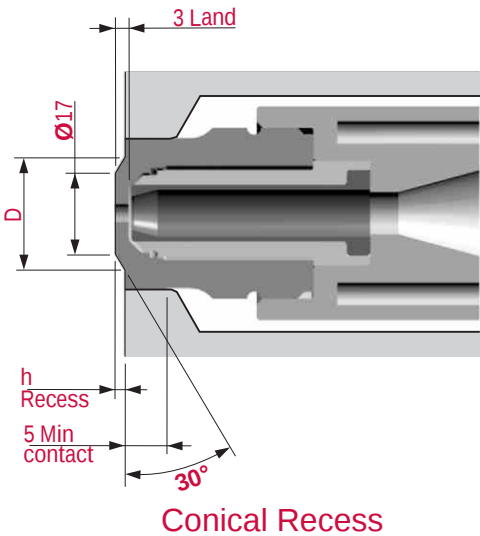


T20 CV10

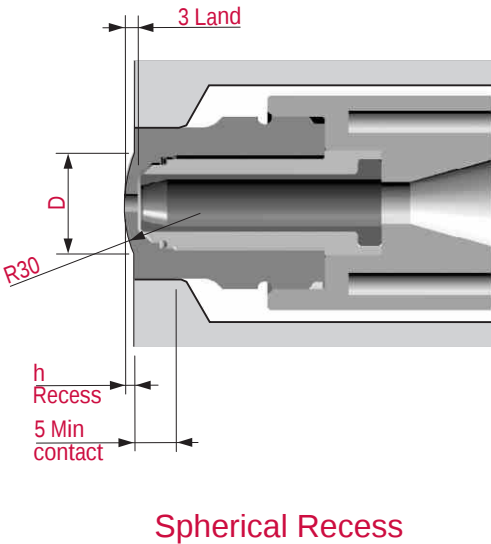
- T20 recessed gate mold contour criteria:
- ➔ Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers.
 - ➔ Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface.
 - ➔ For most materials CV10 vestige height is equal to $3.0 + \text{orifice}/2$. If the vestige



Illustrations simplified, schematically drawn and not to scale.



h (recess depth)	1.0	1.5	2.0	2.5	3.0
D	20.5	22.2	23.9	25.7	27.4



h (recess depth)	1.0	1.5	2.0	2.5	3.0
D	15.4	18.7	21.5	24.0	26.2

T20 CV11

General:

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

Nozzle Criteria:

- Orifice Ø2-Ø4
- J length - See Chart
- Patented seal

- RD is the radial distance from the manifold center locator to the manifold nozzle center line.

T20 contour criteria:

- When gating on an angled mold contour the vestige height may be increased depending on the angle
- K is the increase in vestige height required to maintain a 0.13 land, 1.6 wall, and/or 5 minimum contact

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

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

$$E = ((32 + \text{Orifice})/2) * \tan \theta$$

$$L = 0.13$$

$$16^\circ < \theta \leq 27^\circ;$$

$$K = 5.7 \tan \theta + (1.6 / \cos \theta) + (\text{Orifice} - 2)/2 - 3$$

$$E = K + (16 \tan \theta)$$

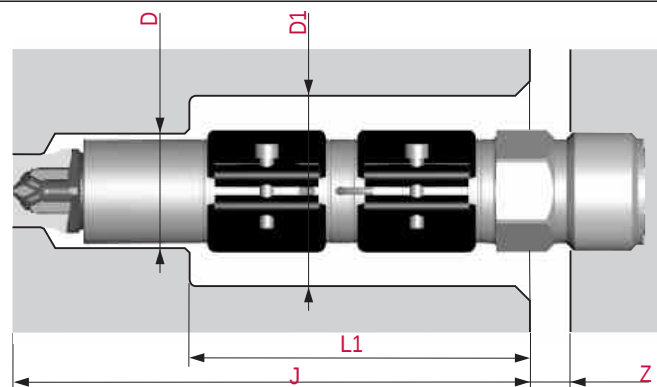
$$L = 0.13 + K - (\text{Orifice}/2) * \tan \theta$$

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

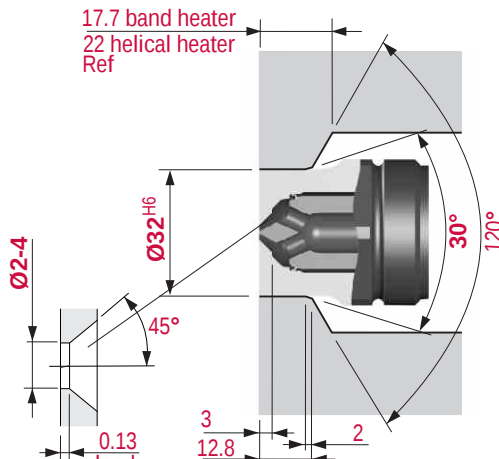
$$K = ((30 + \text{Orifice})/2) * (\tan \theta) - 6.5$$

$$E = K + 16 \tan \theta$$

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



17.7 band heater
22 helical heater
Ref



→ Information regarding

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

please see page 3

"Cut out in mould plate for nozzle and connections"

→ Cooling required

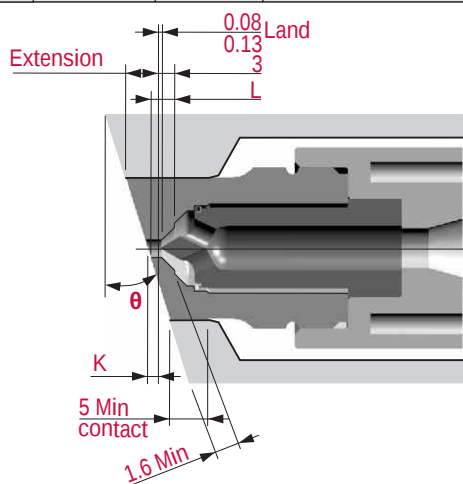
- around the nozzle tip
- opposite to the nozzle tip

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

- General tolerances according to DIN ISO 2768-mK

RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250

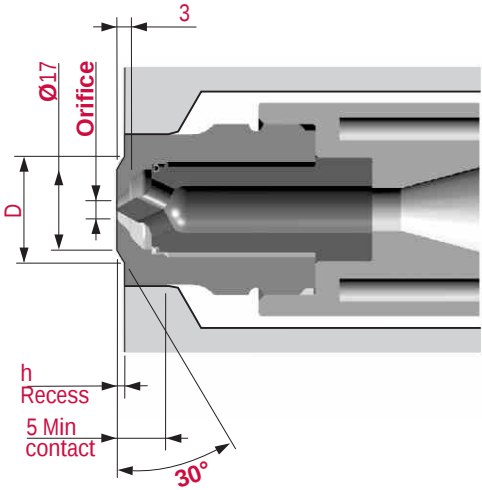
Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)

**Angled Mold Contour**

T20 CV11

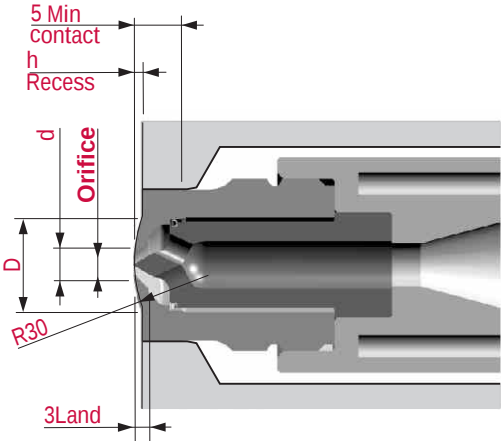
- T20 recess criteria:
- ➔Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers
 - ➔Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface

Illustrations simplified, schematically drawn and not to scale.



Conical Recess

Orifice	2.0	2.5	3.0	3.5	4.0
h (recess depth)	0.93	1.09	1.26	1.43	1.59
D	20.22	20.78	21.36	21.95	22.51



Spherical Recess

Orifice	2.0-2.2	2.2-2.4	2.4-2.6	2.6-2.8	2.8-3.0
h	1.00	1.06	1.12	1.18	1.26
d	2.45	2.65	2.85	3.05	3.25
D	15.55	16.02	16.48	16.93	17.50
Orifice	3.0-3.2	3.2-3.4	3.4-3.6	3.6-3.8	3.8-4.0
H	1.32	1.40	1.46	1.52	1.60
d	3.45	3.65	3.85	4.05	4.25
D	17.92	18.46	18.87	19.26	19.77

T20 CV11CM

General:

- Filled and unfilled materials
- Developed for PA and PBT materials.
- Heat pipes for isothermal operation
- The front face of the tip must be in contact with plastic.
- Cooling is required in the gate area.

Nozzle Criteria:

- Orifice Ø4
- J length - See Chart
- Patented seal

- RD is the radial distance from the manifold center locator to the manifold nozzle center line.

T20 contour criteria:

- When gating onto an angled mold contour the vestige height may be increased depending on the angle
- K is the increase in vestige height required to maintain a 0.13 land, 1.6 wall and/or 5 minimum contact.

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

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

$$E = ((32 + \text{Orifice})/2) * \tan \theta$$

$$L = 0.13$$

$$16^\circ < \theta \leq 27^\circ;$$

$$K = 5.7 \tan \theta + (1.6 / \cos \theta) + (\text{Orifice} - 2/2) - 3$$

$$E = K + (16 \tan \theta)$$

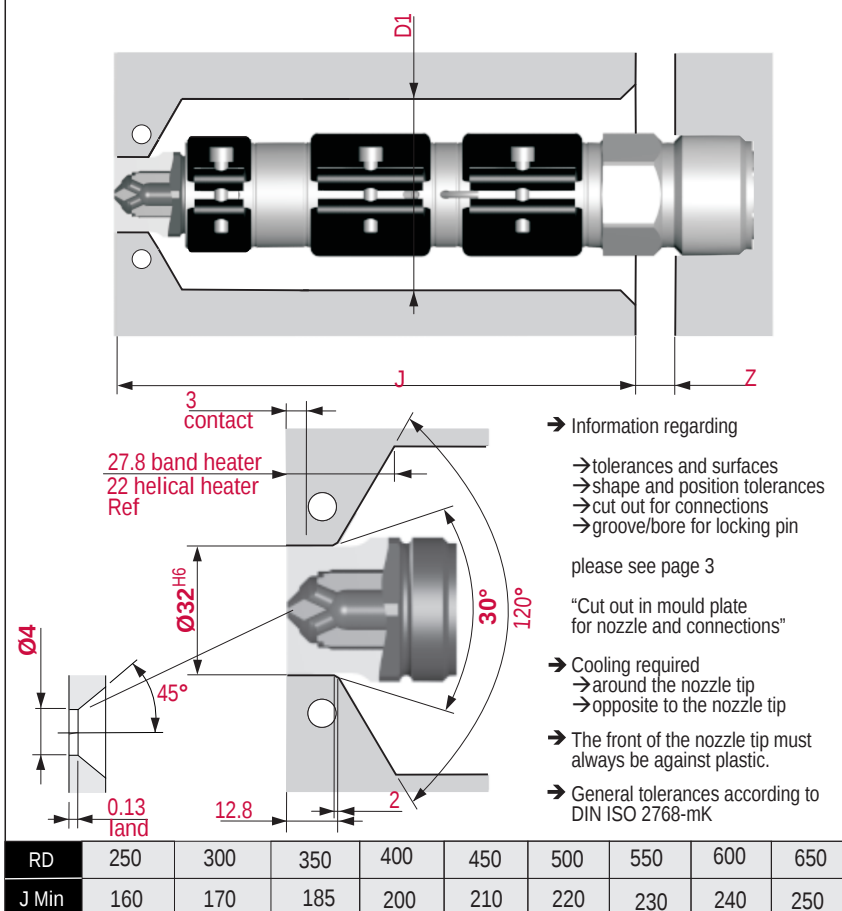
$$L = 0.13 + K - (\text{Orifice}/2) * \tan \theta$$

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

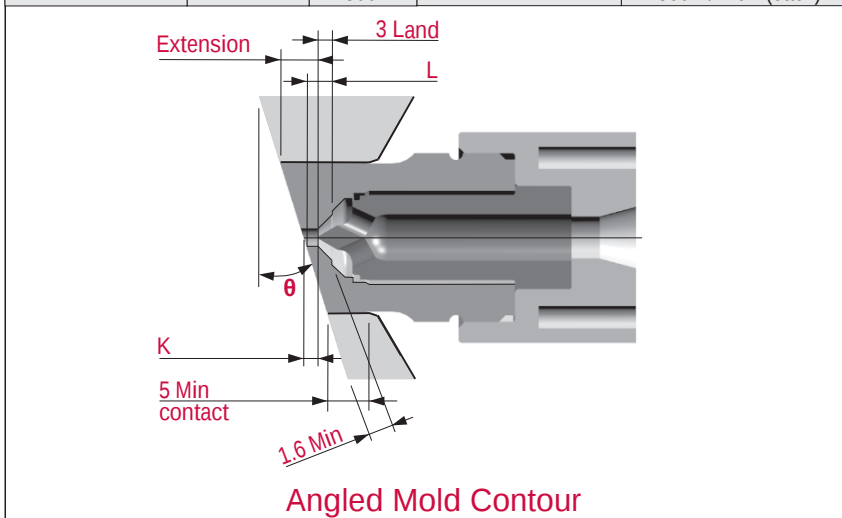
$$K = ((30 + \text{Orifice})/2) * (\tan \theta) - 6.5$$

$$E = K + 16 \tan \theta$$

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



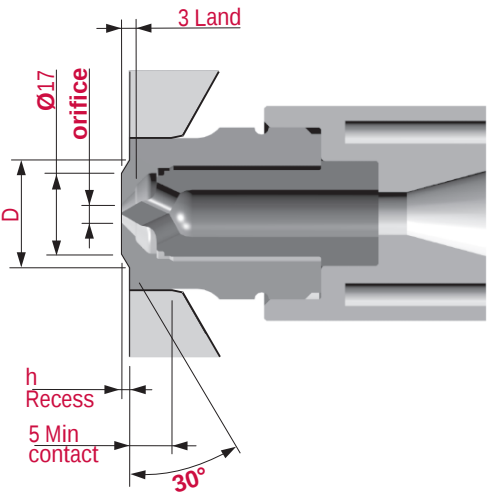
Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Band (tip)	160	380	1	450W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)



T20 CV11CM

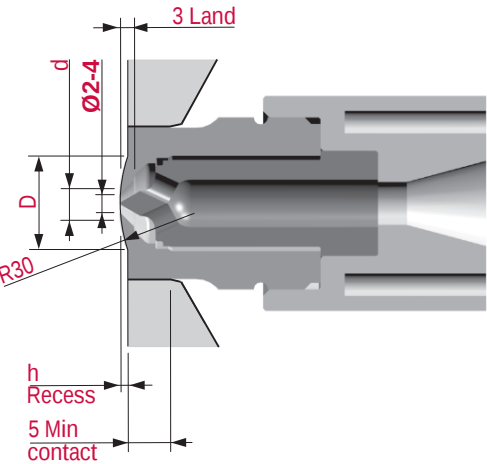
- T20 recess criteria:
- ➔Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers
 - ➔Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface

Illustrations simplified, schematically drawn and not to scale.



Conical Recess

Orifice	4.0
h (recess depth)	1.59
Orifice	22.51



Spherical Recess

Orifice	4.0
h	1.60
d	4.25
D	19.77

T20 CV20
General:

- Filled and unfilled materials.
- Easy orifice size changes by straight reaming.
- Heat pipes for isothermal operation
- No witness mark on part
- Open flow bore
- Easier removal of frozen material around tip for color change.
- Cooling is required in the gate area.

Nozzle Criteria:

- Orifice Ø2-Ø6
- J length (see chart)
- Open flow bore
- Patented seal

- RD is the radial distance from the manifold center locator to the manifold nozzle center line.
- For longer RD dimensions consult with Synventive.

T20 angled mould contour criteria:

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

$$\theta \leq 11^\circ;$$

$$K=0$$

$$L=3-(\text{Orifice}/2)*\text{TAN}\theta$$

$$11^\circ < \theta \leq 30^\circ;$$

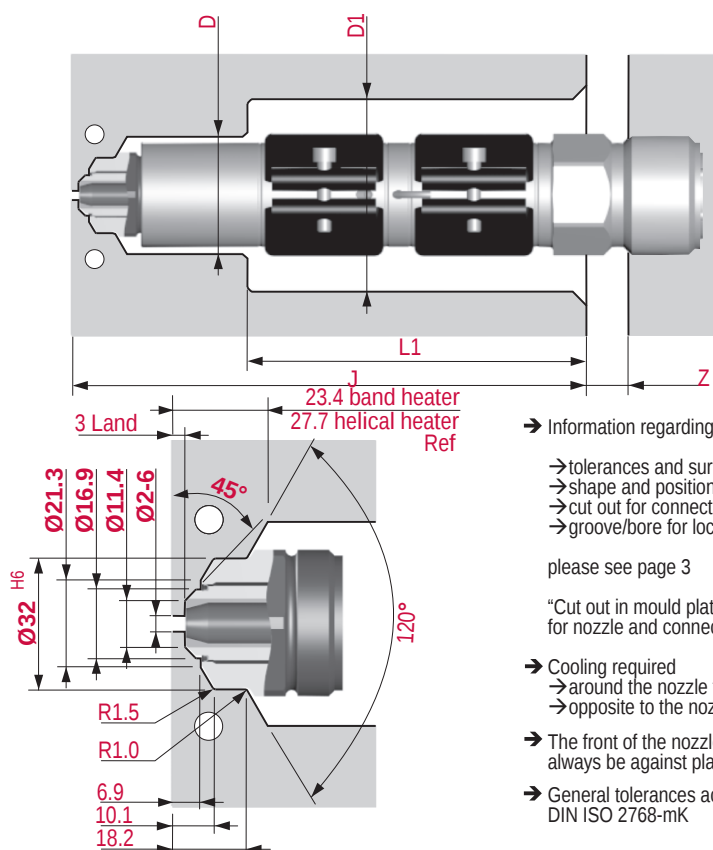
$$K=5.7\text{TAN}\theta+(1.6/\text{COS}\theta)-3$$

$$L=3+K-(\text{Orifice}/2)*\text{TAN}\theta$$

$$\theta > 30^\circ;$$

$$K=16\text{TAN}\theta+(4/\text{COS}\theta)-10.1$$

$$L=3+K-(\text{Orifice}/2)*\text{TAN}\theta$$


Information regarding

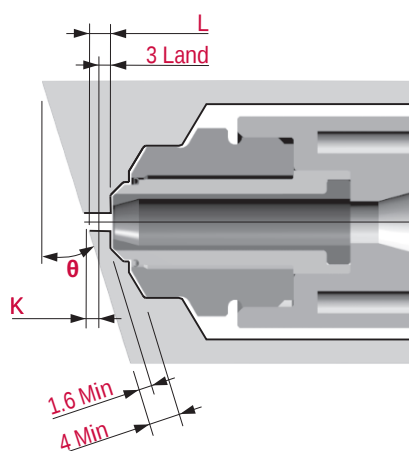
- tolerances and surfaces
- shape and position tolerances
- cut out for connections
- groove/bore for locking pin

please see page 3

"Cut out in mould plate for nozzle and connections"

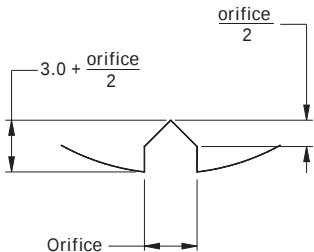
- Cooling required
 - around the nozzle tip
 - opposite to the nozzle tip
- The front of the nozzle tip must always be against plastic.
- General tolerances according to DIN ISO 2768-mK

RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250
Heater Style	J Min	J Max	Heater Qty	Watts/Volts					
Band	160	380	1	750W/240V					
Helical	160	220	1	500W/240V					
Helical	220	425	1	750W/240V					
Helical	425	500	2	500W/240V (each)					

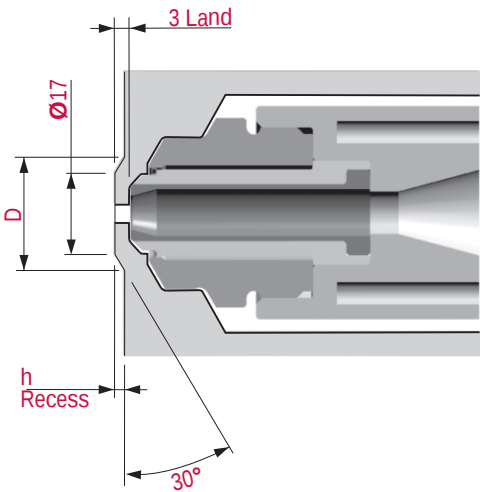

Angled Mold Contour

T20 CV20, Recessed

- T20 recessed mould contour 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 CV20 vestige height is equal to $3 + (\varnothing\text{Orifice} / 2)$. If the vestige height relative to the possible gate recess depth (h) is too great, use of a CV11 tip is recommended.

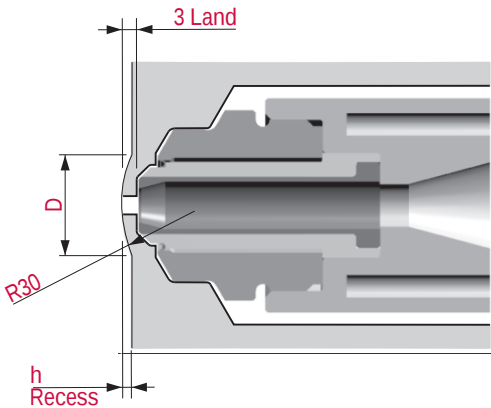


Illustrations simplified, schematically drawn and not to scale.



Conical Recess

h (recess depth)	1.0	1.5	2.0	2.5	3.0
D	20.5	22.2	23.9	25.7	27.4



Spherical Recess

h (recess depth)	1.0	1.5	2.0	2.5	3.0
D	15.4	18.7	21.5	24.0	26.2

T20 CV21
General:

- Filled and unfilled materials
- No tip witness mark on part
- 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 Ø2.4
- J length - See Chart
- Patented seal

- RD is the radial distance from the manifold center locator to the manifold nozzle center line.

T20 contour criteria:

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

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

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

$$L = 0.13$$

$$16^\circ < \theta \leq 30^\circ;$$

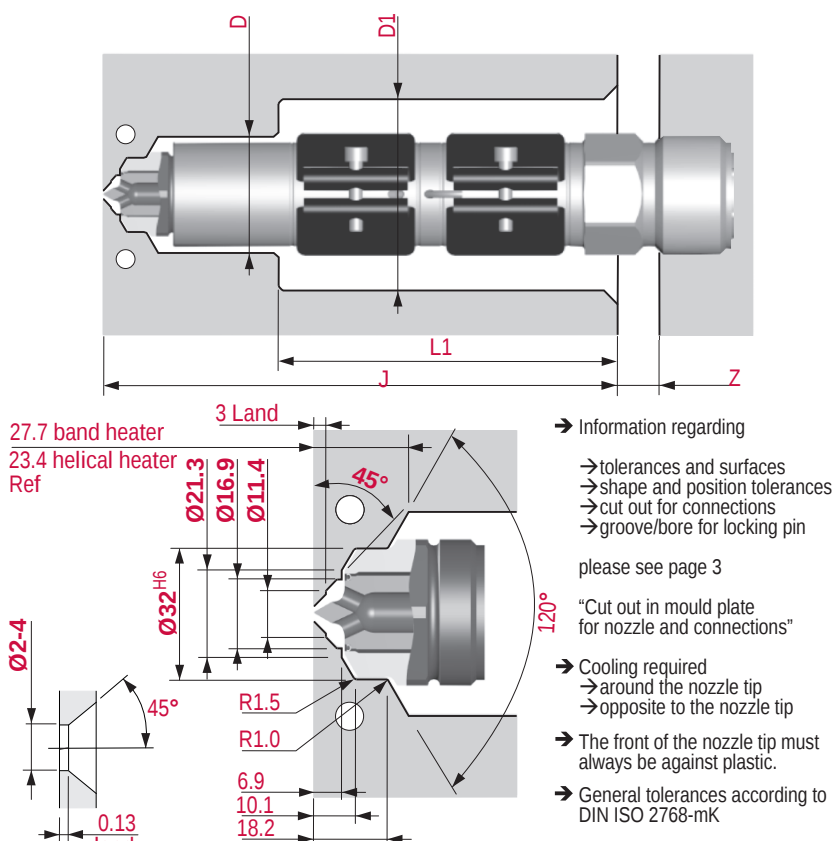
$$K = 5.7 \tan \theta + (1.6 / \cos \theta) + (\text{Orifice} - 2/2) * \tan \theta - 3$$

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

$$\theta > 30^\circ;$$

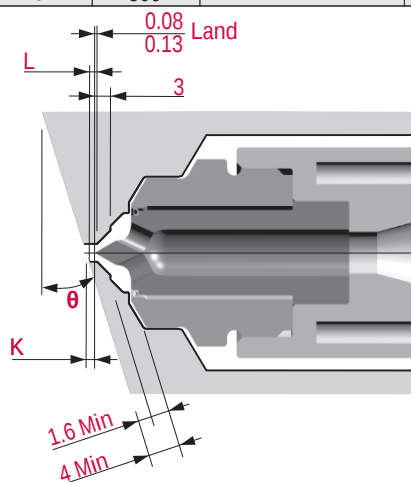
$$K = 16 \tan \theta + (4 / \cos \theta) - 10.1$$

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



RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250

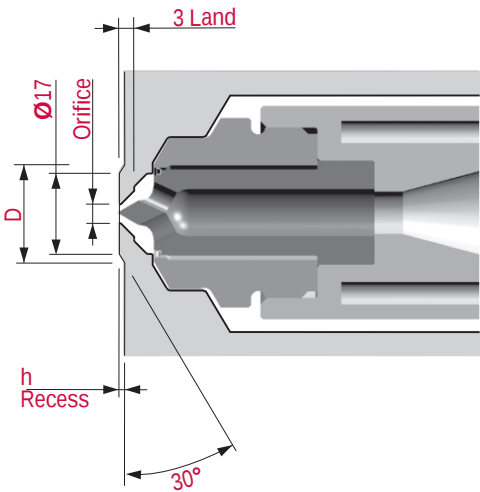
Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)


Angled Mold Contour

T20 CV21

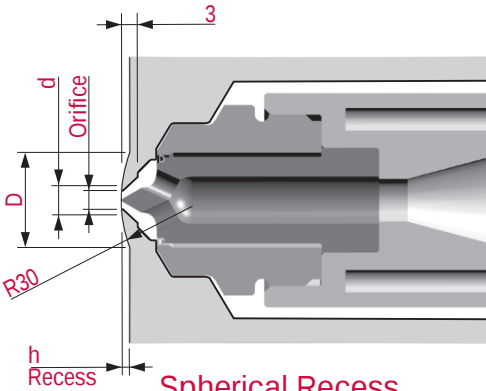
- T20 recess criteria:
- ➔Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers
 - ➔Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface
 - ➔Maintain 0.13 land when machining gate recess or contour.

Illustrations simplified, schematically drawn and not to scale.



Conical Recess

Orifice	2.0	2.5	3.0	3.5	4.0
h(recess depth)	0.93	1.09	1.26	1.43	1.59
D	20.22	20.78	21.36	21.95	22.51



Spherical Recess

Orifice	2.0-2.2	2.2-2.4	2.4-2.6	2.6-2.8	2.8-3.0
h	1.00	1.06	1.12	1.18	1.26
d	2.45	2.65	2.85	3.05	3.25
D	15.55	16.02	16.48	16.93	17.50
Orifice	3.0-3.2	3.2-3.4	3.4-3.6	3.6-3.8	3.8-4.0
h	1.32	1.40	1.46	1.52	1.60
d	3.45	3.65	3.85	4.05	4.25
D	17.92	18.46	18.87	19.26	19.77

T20 CV21CM
General:

- Filled and unfilled materials
- No tip witness mark on part
- Developed for PA and PBT materials.
- Heat pipes for isothermal operation
- Easier removal of frozen material around tip for color change
- Cooling is required in the gate area.

Nozzle Criteria:

- Orifice Ø4
- J length - See Chart
- Patented seal

→ RD is the radial distance from the manifold center locator to the manifold nozzle center line.

T20 contour criteria:

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

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

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

$$L = 0.13$$

$$16^\circ < \theta \leq 30^\circ;$$

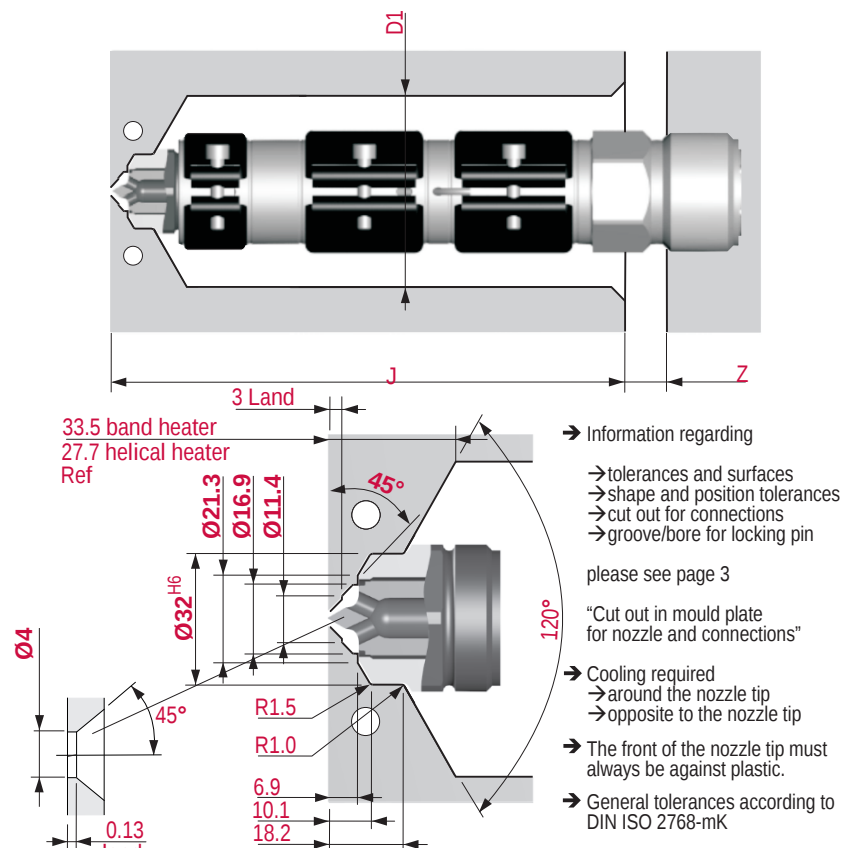
$$K = 5.7 \tan \theta + (1.6 / \cos \theta) + (\text{Orifice} - 2/2) * \tan \theta - 3$$

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

$$\theta > 30^\circ;$$

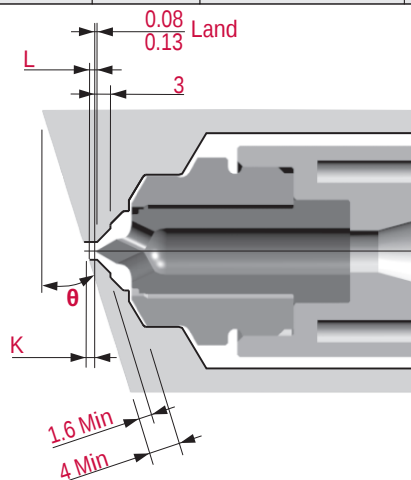
$$K = 16 \tan \theta + (4 / \cos \theta) - 10.1$$

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



RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250

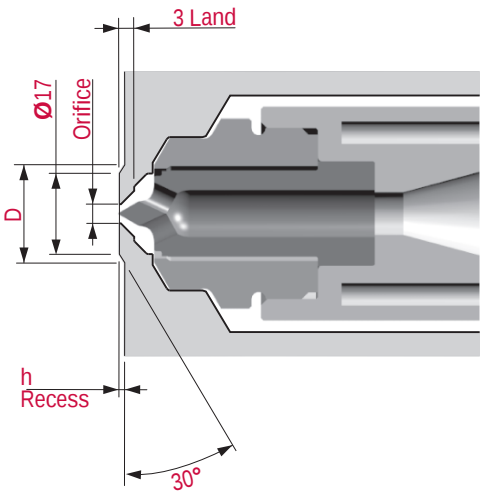
Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)


Angled Mold Contour

T20 CV21CM

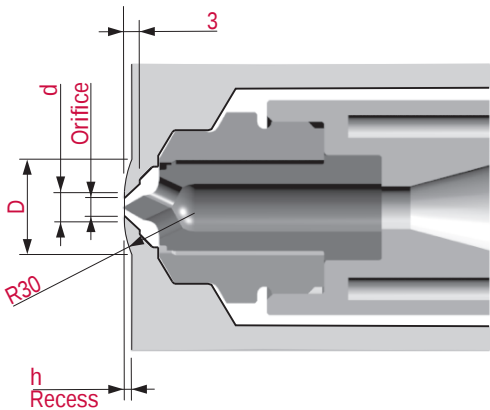
- T20 recess criteria:
- ➔Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers
 - ➔Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface
 - ➔Maintain 0.13 land when machining gate recess or contour.

Illustrations simplified, schematically drawn and not to scale.



Conical Recess

Orifice	4.0
h (recess depth)	1.59
Orifice	22.5



Spherical Recess

Orifice	4.0
h	1.60
d	4.25
D	19.77

Illustrations simplified, schematically drawn and not to scale.

T20 VG12, Tapered

General:

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

Nozzle Criteria:

- Orifice Ø3.9
- J length (see chart)
- Patented seal

- RD is the radial distance from the manifold center locator to the manifold nozzle center line.
- For longer RD dimensions consult with Synventive.

T20 VG12 angled mold criteria:

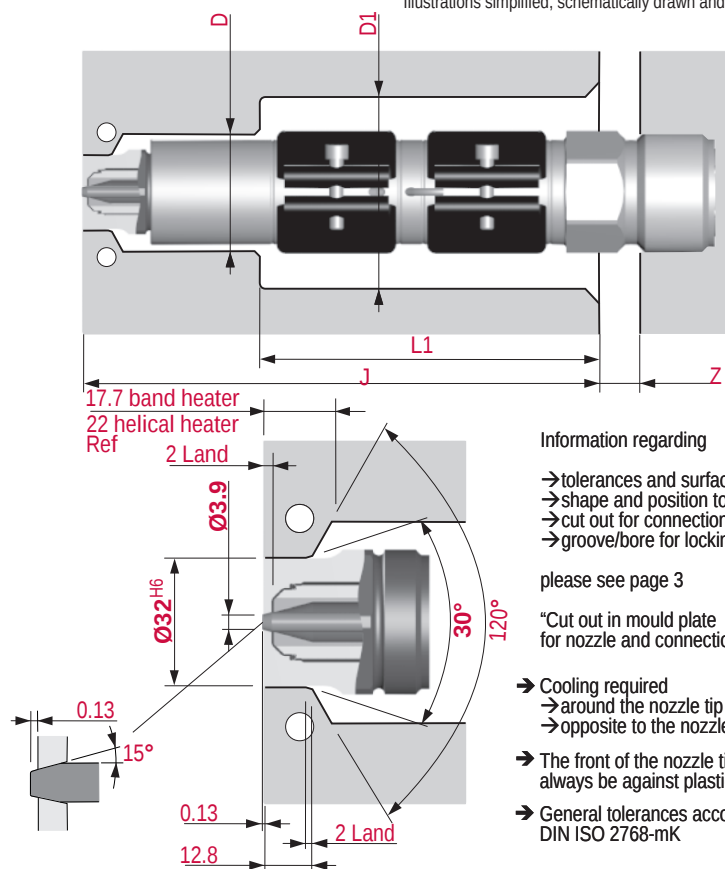
- When gating on an angled mold contour the vestige height may be increased depending on the angle
- K is the increase in orifice land required to maintain a 1.6 minimum wall thickness and/or 5 minimum contact

 $\theta \leq 4^\circ$;

 $K=0$
 $E=16\tan\theta$
 $4^\circ < \theta \leq 27^\circ$;

 $K=5.7\tan\theta + (1.6/\cos\theta) - 2$
 $E=K+16\tan\theta$
 $\theta > 27^\circ$;

 $K=16\tan\theta - 6$
 $E=K+32\tan\theta - 6$

 Maximum $\theta = 32^\circ$


Information regarding

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

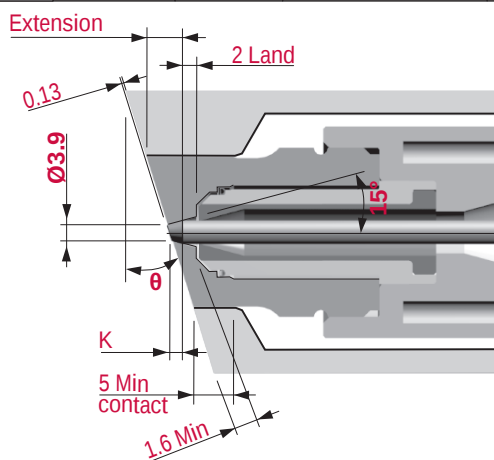
please see page 3

"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

RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)


Angled Mold Contour

T20 VG12S, Straight

- General:
- Filled and unfilled materials
 - Heat pipes for isothermal operation
 - Straight valve pin in gate for non-adjustable actuators and glass filled materials.

- Nozzle Criteria:
- Orifice Ø5
 - J length (see chart)
 - Patented seal

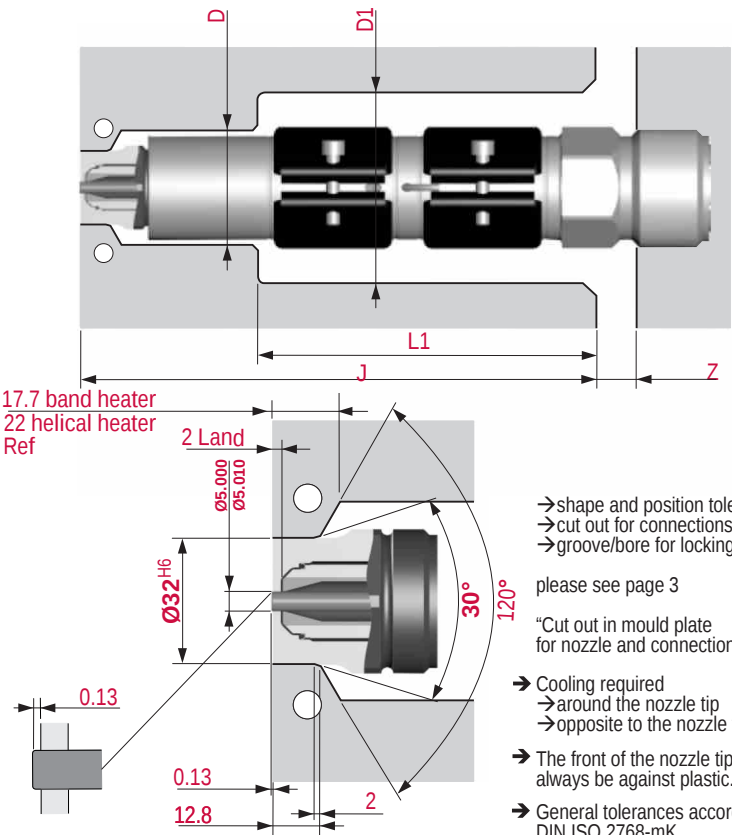
- RD is the radial distance from the manifold center locator to the manifold nozzle center line.
- For longer RD dimensions, consult with Synventive

- T20 VG12S contour criteria:
- When gating on an angled mold contour the vestige height may be increased depending on the angle
 - K is the increase in vestige height required to maintain a 1.6 minimum wall thickness and/or 5 minimum contact.

$\theta \leq 4^\circ$;
K=0
E=16TAN θ

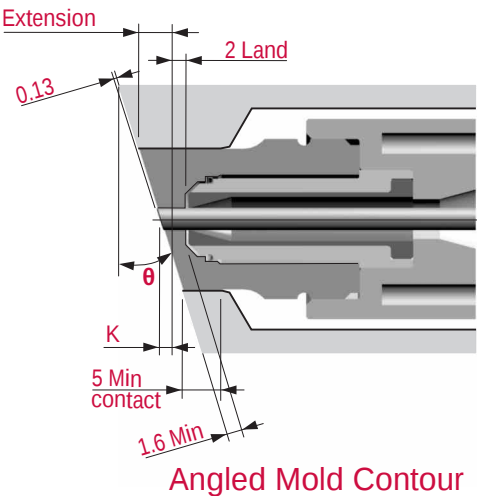
$4^\circ < \theta \leq 27^\circ$;
K=5.7TAN θ +(1.6/COS θ)-2
E=K+16TAN θ

$\theta > 27^\circ$;
K=16TAN θ -6
E=K+32TAN θ -6



RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)



T20 VG23, Tapered
General:

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

Nozzle Criteria:

- Orifice Ø3.9
- J length (see chart)
- Patented seal

- RD is the radial distance from the manifold center locator to the manifold nozzle center line.

T24 VG23 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 minimum wall thickness and/or 4 minimum contact.

$$\theta \leq 4^\circ;$$

$$K=0$$

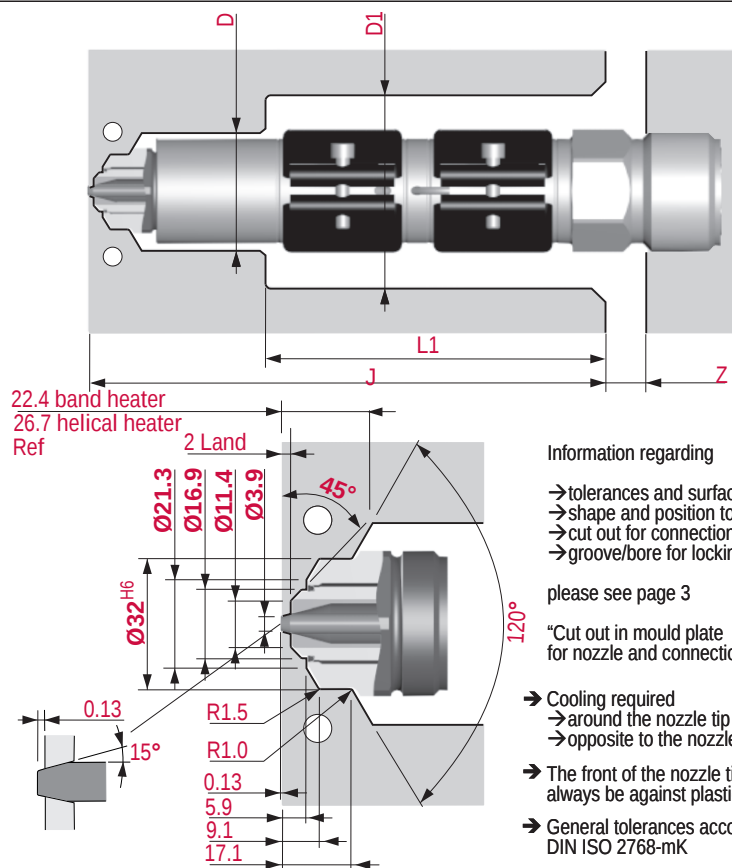
$$4^\circ < \theta \leq 24^\circ;$$

$$K=5.7 \tan \theta + (1.6 / \cos \theta) - 2$$

$$\theta > 24^\circ;$$

$$K=16 \tan \theta - 6 + (4 / \cos \theta) - 9.1$$

$$\text{Maximum } \theta = 40^\circ$$


Information regarding

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

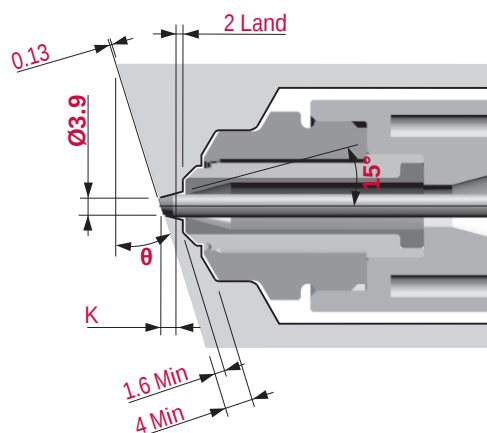
please see page 3

"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

RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)


Angled Mold Contour

T20 VG23S, Straight

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

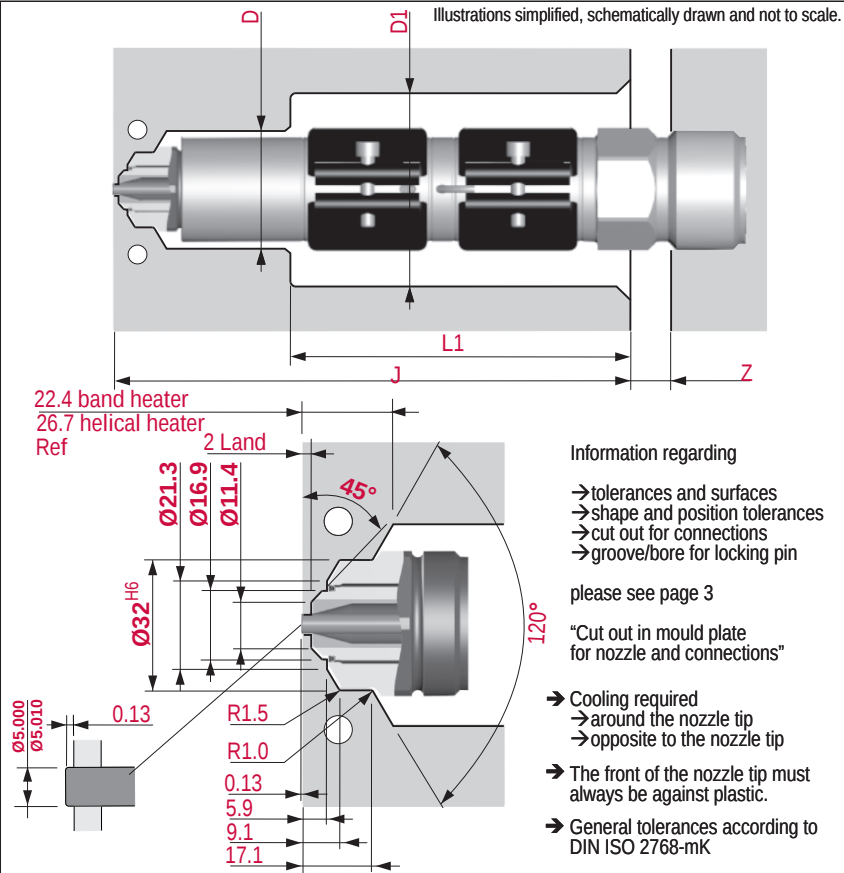
- Nozzle Criteria:
- Orifice Ø5
 - J length (see chart)
 - Patented seal

→ RD is the radial distance from the manifold center locator to the manifold nozzle center line.

- T24 VG23S angled mold 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 minimum wall thickness and/or 4 minimum contact.

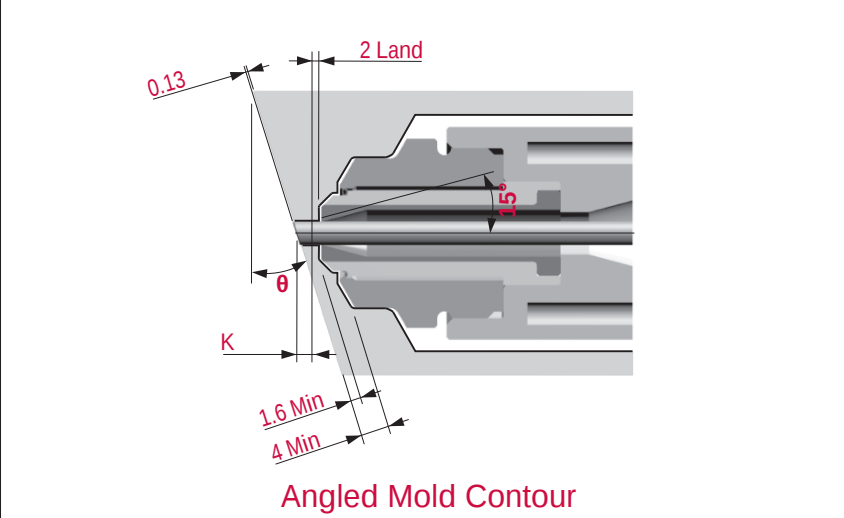
$\theta \leq 4^\circ;$ $K=0$
 $4^\circ < \theta \leq 24^\circ;$ $K=5.7 \tan \theta + (1.6 / \cos \theta) - 2$
 $\theta > 24^\circ;$ $K=16 \tan \theta - 6 + (4 / \cos \theta) - 9.1$

Maximum $\theta = 40^\circ$



RD	250	300	350	400	450	500	550	600	650
J Min	160	170	185	200	210	220	230	240	250

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	500W/240V
Helical	220	425	1	750W/240V
Helical	425	500	2	500W/240V (each)





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