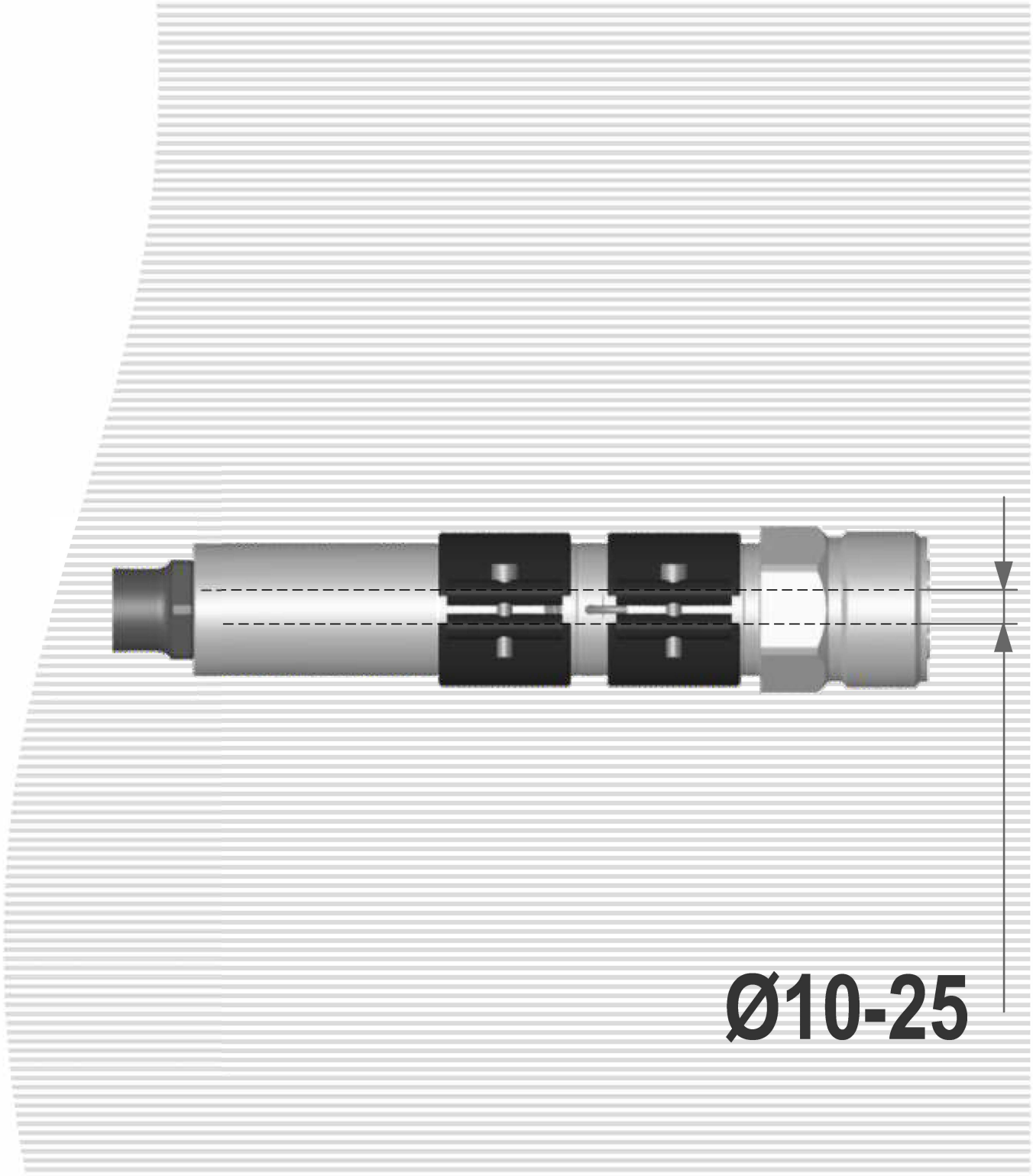
T24 Hot Runner Nozzle

Manifold Nozzles, Threaded Fit



C Company
P Products
T Technology
A Application

Synventive
molding solutions

Synventive molding solutions

Series T24

Manifold nozzles, threaded fit, open / closed / valve gate

Product type

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

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

Available gating types
➔Full flow: CV10 & CV20
➔Valve gate:
VG12 & VG23 tapered gate
VG12S & VG23S straight gate

Major Dimensions (mm)

J	Nozzle length	
	(band heated)	160-380
	(helical heated)	160-1000
	Nozzle flow bore	Ø10-25
*	D	Ø57
*	D1	Ø89
	Dt	Ø32

* When the distance from the manifold center locator to the hot runner nozzle center line exceeds 500 the Ø57 clearance hole must be increased to Ø62 and the Ø89 hole increased to Ø94.

Heating

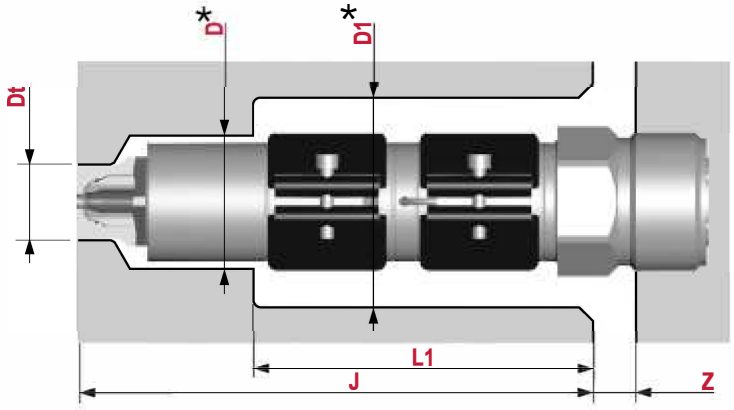
➔Available with replaceable band or helical heaters and thermocouples. If band heated, one band heater is required for operation but an installed spare may be provided if space allows.

Application

➔Suitable for all filled and unfilled materials

8 page no. of related data sheets

Illustrations simplified, schematically drawn and not to scale.



Available tip styles for T24 Nozzles
Gating of nozzle tip

	Full flow thermal gate	Valve Gate tapered shut-off	Valve Gate straight shut-off
Witness Mark	CV-10 Gate:Ø3-Ø8 Dt:Ø32 → 5	VG-12 Gate:Ø6.4 Dt:Ø32 → 9	VG-12S Gate:Ø8 Dt:Ø32 → 10
			
No Witness Mark	CV-20 Gate:Ø3-Ø8 Dt:Ø32 → 7	VG-23 Gate:Ø6.4 Dt:Ø32 → 11	VG-23S Gate:Ø8 Dt:Ø32 → 12
			

C

E

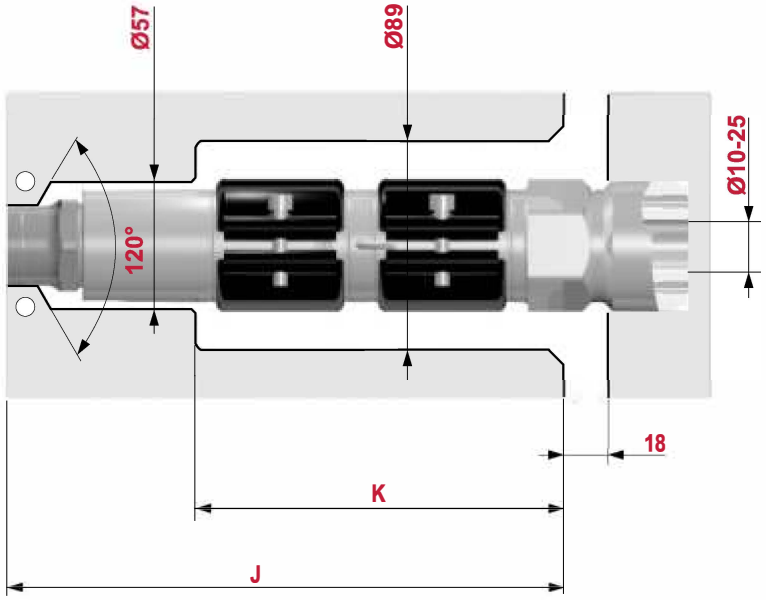
For design and application information, see the Synventive Hot Runner Guide.

S

Band Heater

➔Externally heated 240V/750W.
➔J Minimum = 160
➔J Maximum = 380
➔One heater required for operation. If mold thickness allows a spare band heater will be installed.
➔K = 80 for heater
K = 145 for installed spare heater

* When the distance from the manifold center locator to the hot runner nozzle center line exceeds 500 the Ø57 clearance hole must be increased to Ø62 and the Ø89 hole to Ø94.

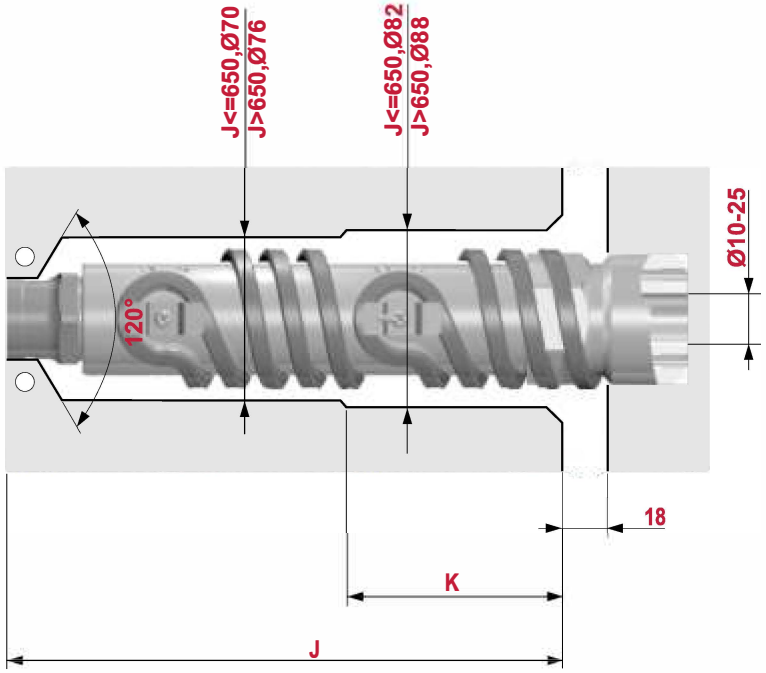


C

Helical Heater

➔Externally heated 240V/550W and 240V/850.
➔When J is greater than 650 two heaters are required for operation.
➔J Minimum = 160
➔J Maximum = 1000
➔J 160-425, K = 0
J 425-100, K = J/2

* When the distance from the manifold center locator to the hot runner nozzle center line exceeds 500 the Ø70 clearance hole must be increased to Ø75, Ø76 to Ø81, Ø82 to Ø87 and the Ø88 hole increased to Ø93.



E

Synventive molding solutions

Series T24

Cut out in mould plate for nozzle and connections

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: 3.2 (1.6 0.8)

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, VG12 and VG12S
b) Blind bore nozzle tip (CV20, 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.

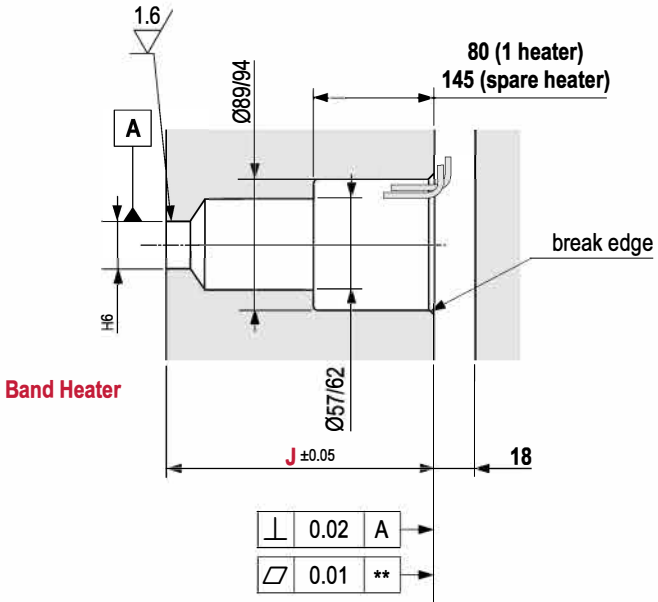
The dimensions of the cut out for the nozzle tip used can be found in the nozzle data sheet.

1) Applies to valve gate nozzles.

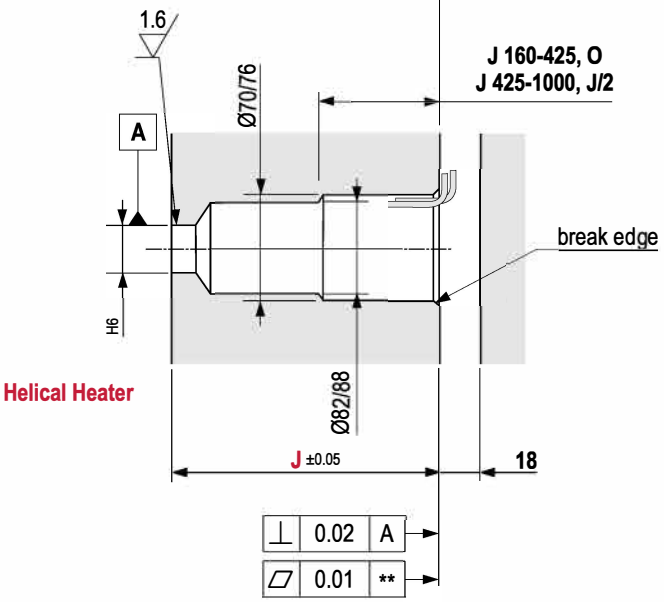
1

* drawn offset

** to all other pocket surfaces



2



For design and application information, see the Synventive Hot Runner Guide.

T24 Series

T24 manifold criteria:

➔T24 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 mould 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 mould will cause heat sinks and affect system performance. Contact with the mould must be limited to specified areas.

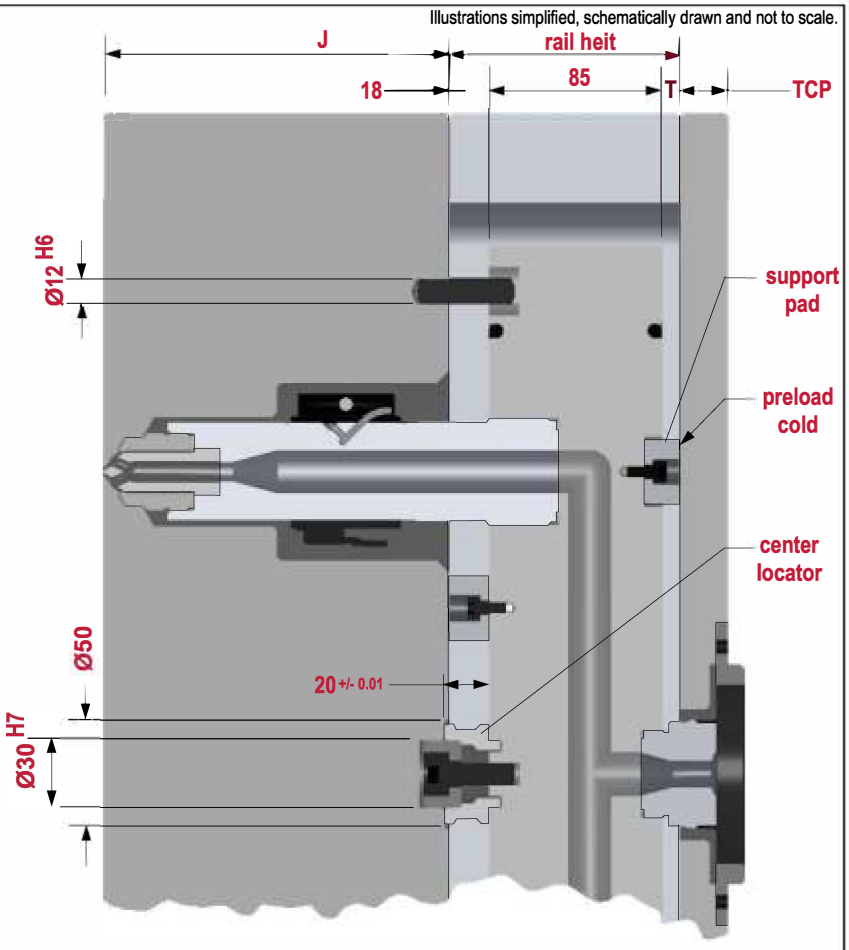
➔Minimum rail height:
113 (thermal gates)
125 (valve gates)

➔T = Rail height - 18 - 80 (thermal gate)
= 22 (Valve Gate)

➔Minimum T (thermal gates) = 10

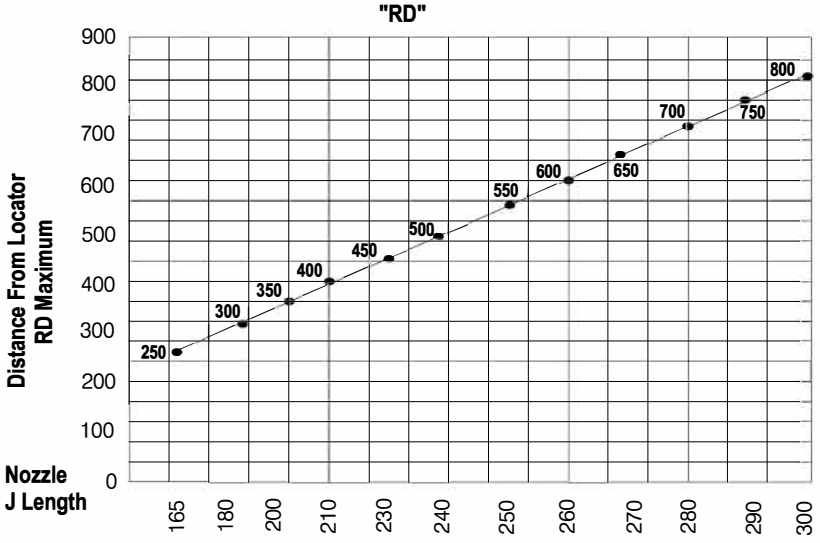
➔Threaded nozzles line up with the gate locations in the mold in the cold condition. As the manifold heats and expands the nozzles flex. The distance from the center locator (RD) determines the amount of nozzle flex. The table to the right defines the maximum allowable distance from the nozzle to the center locator.

Illustrations simplified, schematically drawn and not to scale.



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

T24 Maximum Radial Distance From Nozzle Centerline to Center Locator "RD"

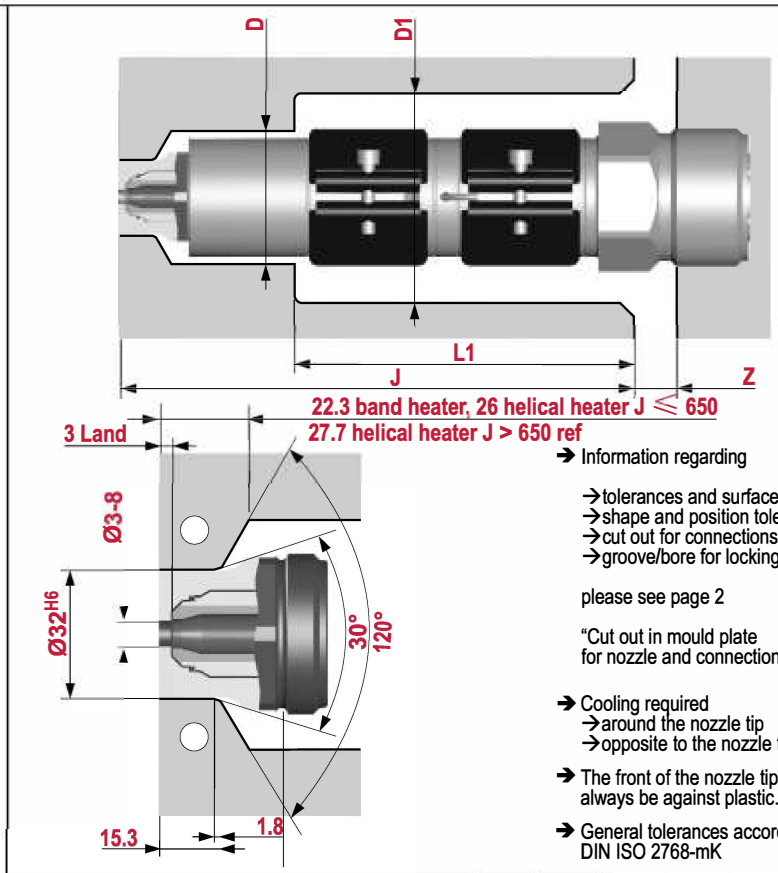


For design and application information, see the Synventive Hot Runner Guide.

T24 CV10

General:
- ➔Filled and unfilled materials
- ➔Easy orifice changes by straight reaming
- ➔Open flow bore
- ➔Heat pipes for isothermal operation
- ➔The front face of the tip must be in contact with the plastic.
- ➔Cooling is required in the gate area.

Nozzle Criteria:
- ➔Orifice Ø3-Ø8
- ➔J length - See Chart
- ➔Open flow bore
- ➔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

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

RD	250	300	350	400	450	500	550	600	650	700	750	800
J Min	165	180	200	210	230	240	250	260	270	280	290	300

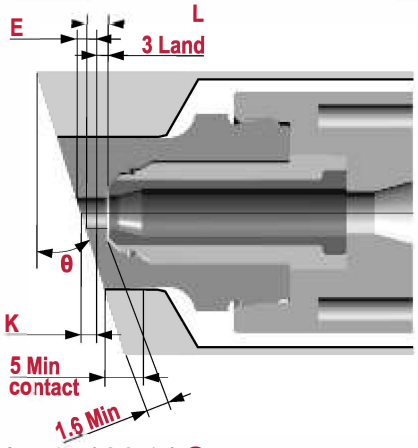
T24 contour criteria:
- ➔When gating on an angled mold contour the vestige height may be increased depending on the angle
- ➔K is the increase in vestige height required to maintain a 1.6 wall, and/or 5 minimum contact.

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	550W/240V
Helical	220	425	1	850W/240V
Helical	425	650	2	550W/240V (each)
Helical	650	1000	2	850W/240V (each)

θ≤14°;
K=0
E=16TANθ
L=3-(Ø Orifice/2)*TANθ

614°<θ ≥27°;
K=5.7TANθ+1.6/COSθ-3
E=K+16TANθ
L=3+K-(Ø Orifice/2)*TANθ

θ>27°;
K=16TANθ-6.5
E=32TANθ-6.5
L=3+K-(Ø Orifice/2)*TANθ



Angled Mold Contour

Illustrations simplified, schematically drawn and not to scale.

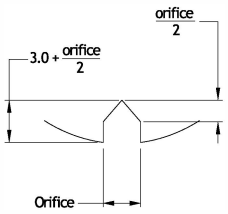
T24 CV10

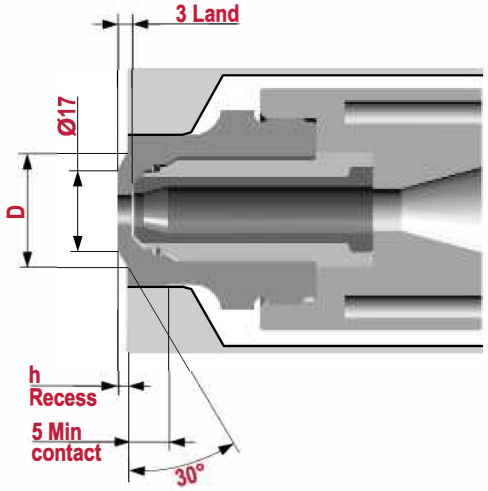
T24 recessed gate mold contour criteria:

➔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.

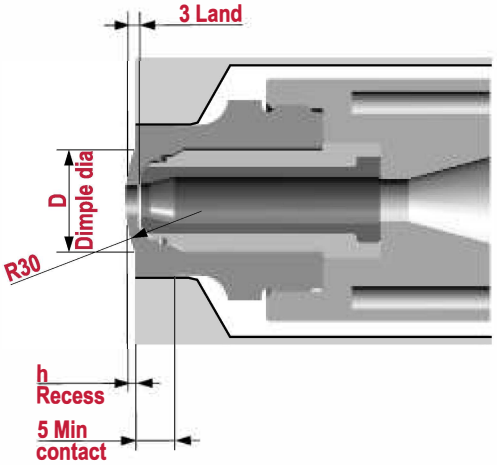
➔For most materials CV10 vestige height is equal to 3.0 + orifice/2





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

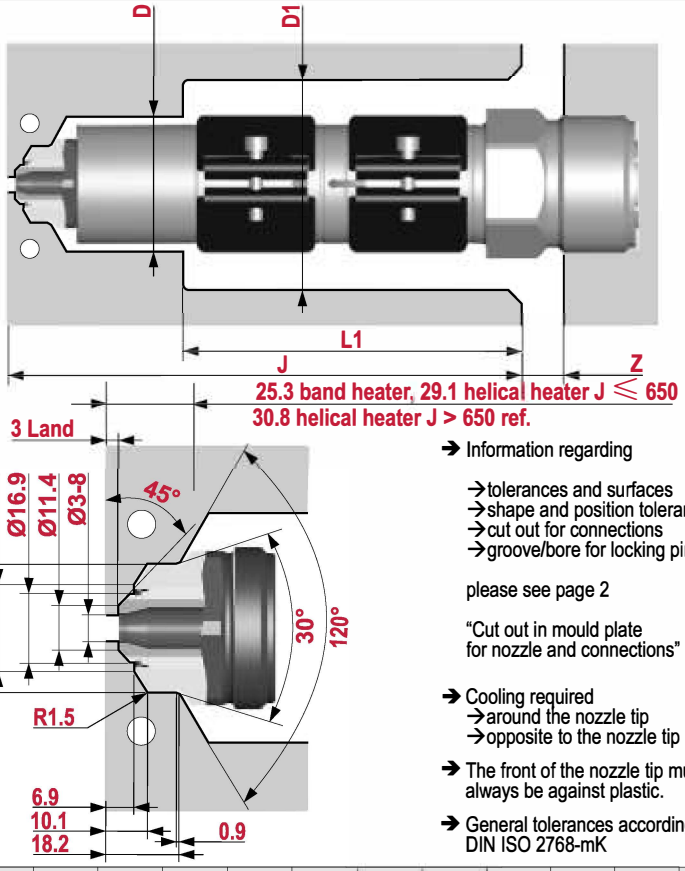
h (recess depth)	1.0	1.5	2.0	2.5	3.0
D	15.4	18.7	21.5	24.0	26.2

For design and application information, see the Synventive Hot Runner Guide.

T24 CV20

General:
- ➔Filled and unfilled materials
- ➔Easy orifice size 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 Ø3-Ø8
- ➔J length (see chart)
- ➔Open flow bore
- ➔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

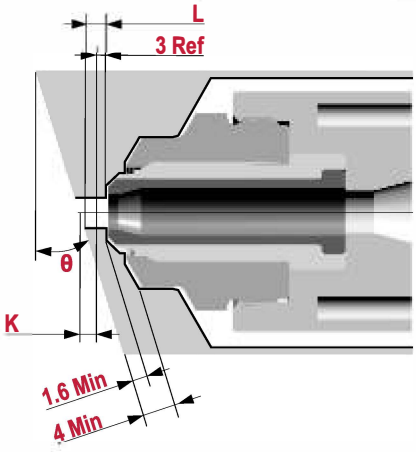
➔RD is the radial distance from the manifold center locator to the manifold nozzle center line.

RD	250	300	350	400	450	500	550	600	650	700	750	800
J Min	165	180	200	210	230	240	250	260	270	280	290	300

T24 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 minimum wall thickness.

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	550W/240V
Helical	220	425	1	850W/240V
Helical	425	650	2	550W/240V (each)
Helical	650	1000	2	850W/240V (each)

θ≤11°;
K=0
L=3-(Ø Orifice/2)*TANθ
11°<θ ≥30°;
K=5.7TANθ+1.6/COSθ-3
L=3+K-(Ø Orifice/2)*TANθ
θ>30°;
K=16TANθ+4/COSθ-10.1
L=3+K-(Ø Orifice/2)*TANθ



Angled Mold Contour

For design and application information, see the Synventive Hot Runner Guide.

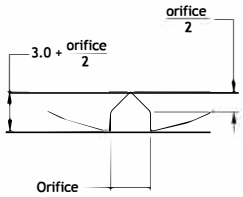
T24 CV20, Recessed

T24 recessed mold contour criteria:

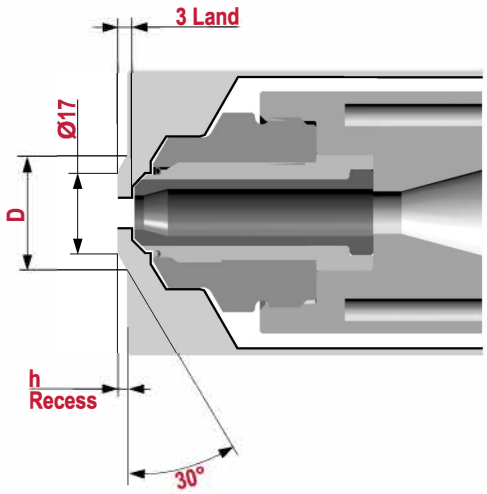
➔Values in tables are for materials not having glass fibers. Consult Synventive for vestige height when using glass fillers

➔Recessed gates are used to reduce vestige height above the part surface or keep the vestige below the part surface

➔For most materials CV20 vestige height is equal to 3 + orifice /2.

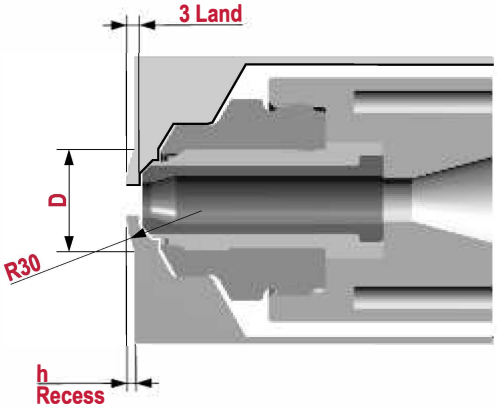


Illustrations simplified, schematically drawn and not to scale.



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

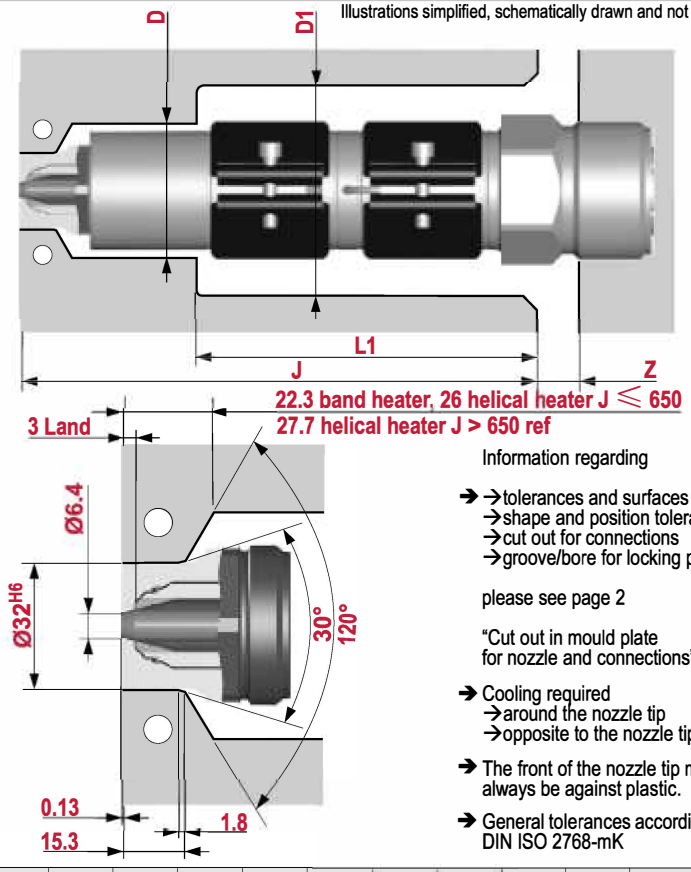
For design and application information, see the Synventive Hot Runner Guide.

T24 VG12, Tapered

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

Nozzle Criteria:
➔Orifice Ø6.4
➔J length (see chart)
➔Patented seal

Illustrations simplified, schematically drawn and not to scale.



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

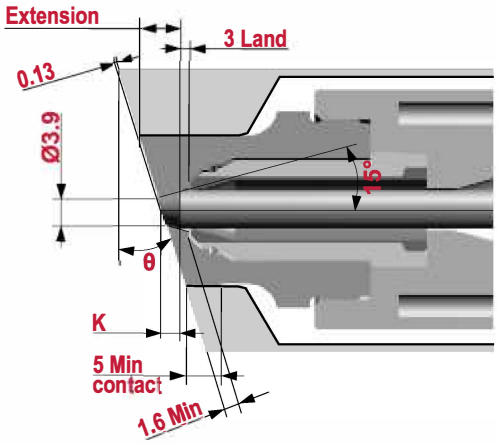
➔RD is the radial distance from the manifold center locator to the manifold nozzle center line.

RD	250	300	350	400	450	500	550	600	650	700	750	800
J Min	165	180	200	210	230	240	250	260	270	280	290	300

T24 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

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	550W/240V
Helical	220	425	1	850W/240V
Helical	425	650	2	550W/240V (each)
Helical	650	1000	2	850W/240V (each)

θ⩽13°;
K=0
E=16TANθ
θ>13°;
K=5.7TANθ+1.6/COSθ-3
E=K+16TANθ



Angled Mold Contour

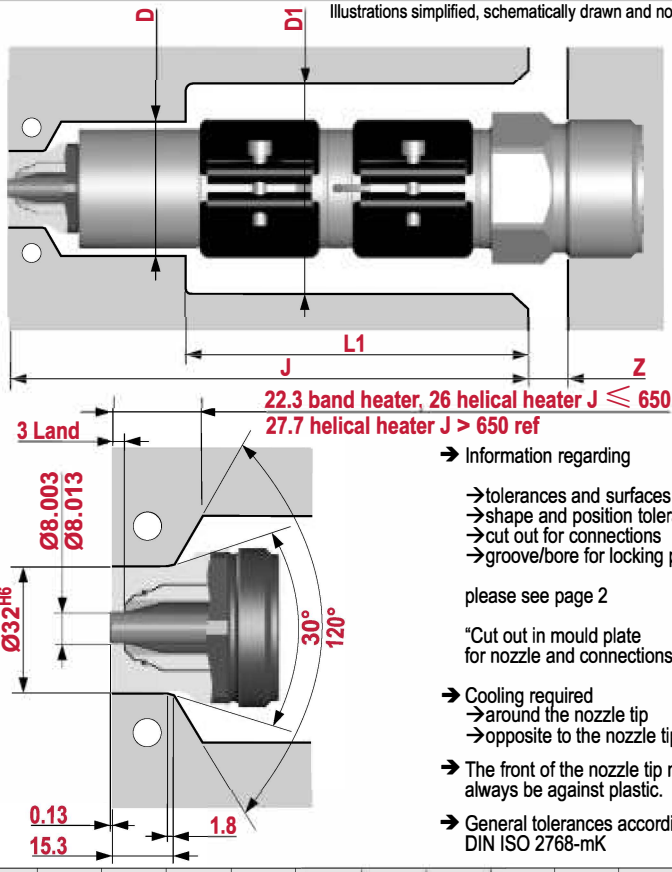
For design and application information, see the Synventive Hot Runner Guide.

T24 VG12S, Straight

General:
- ➔Filled and unfilled materials
- ➔Straight valve pin for non-adjustable actuators and glass filled materials
- ➔Hat pipes for isothermal operation
- ➔Cooling is required in the gate area.

Nozzle Criteria:
- ➔Orifice Ø8
- ➔J length (see chart)
- ➔Patented seal

Illustrations simplified, schematically drawn and not to scale.



- ➔ 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

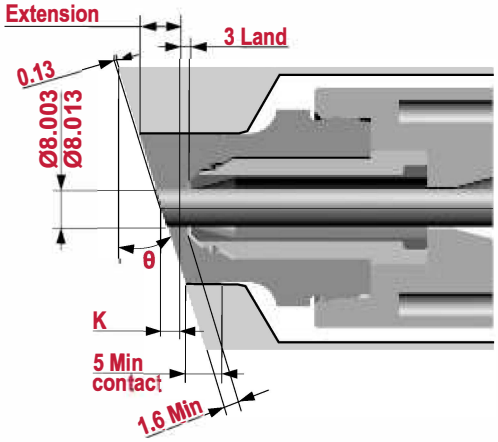
RD	250	300	350	400	450	500	550	600	650	700	750	800
J Min	165	180	200	210	230	240	250	260	270	280	290	300

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

T24 VG12S 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.

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	550W/240V
Helical	220	425	1	850W/240V
Helical	425	650	2	550W/240V (each)
Helical	650	1000	2	850W/240V (each)

θ⩽13°;
K=0
E=16TANθ
θ>13°;
K=5.7TANθ+1.6/COSθ-3
E=K+16TANθ



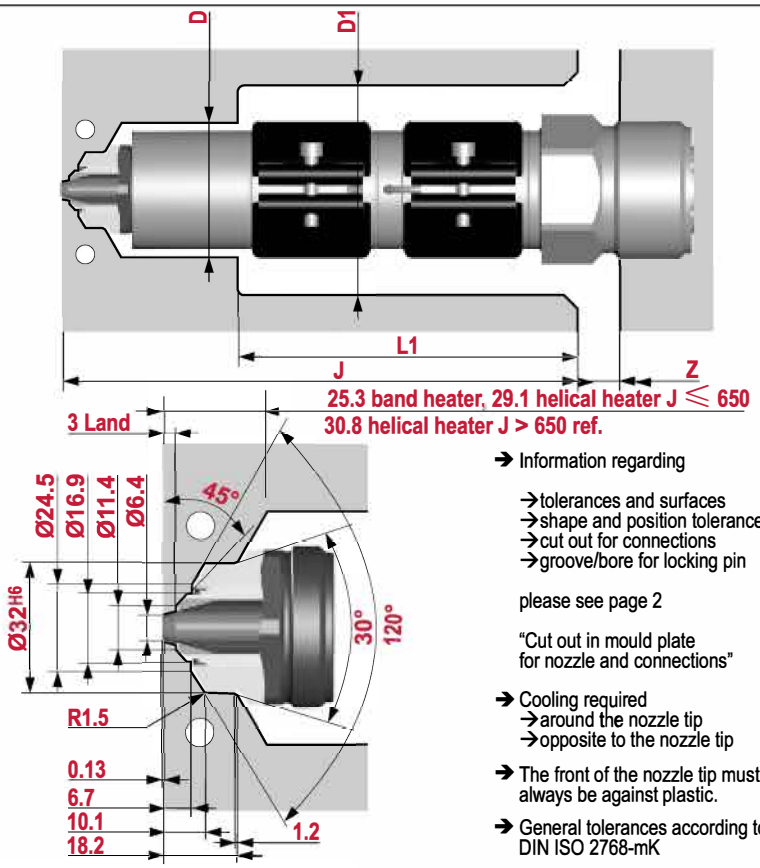
Angled Mold Contour

For design and application information, see the Synventive Hot Runner Guide.

T24 VG23, Tapered

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

Nozzle Criteria:
➔Orifice Ø6.4
➔J length (see chart)
➔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

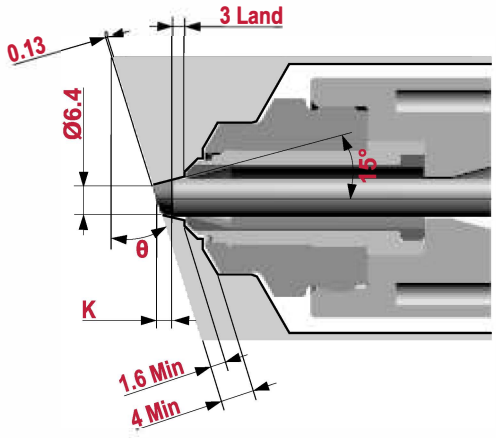
➔RD is the radial distance from the manifold center locator to the manifold nozzle center line

RD	250	300	350	400	450	500	550	600	650	700	750	800
J Min	165	180	200	210	230	240	250	260	270	280	290	300

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 wall thickness

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	550W/240V
Helical	220	425	1	850W/240V
Helical	425	650	2	550W/240V (each)
Helical	650	1000	2	850W/240V (each)

θ⩽13°;
K=0
L=3-(Ø Orifice/2)*TANθ
13°<θ ⩾24°;
K=5.7TANθ+1.6/COSθ-3
θ>24°;
K=16TANθ+4/COSθ-10.1



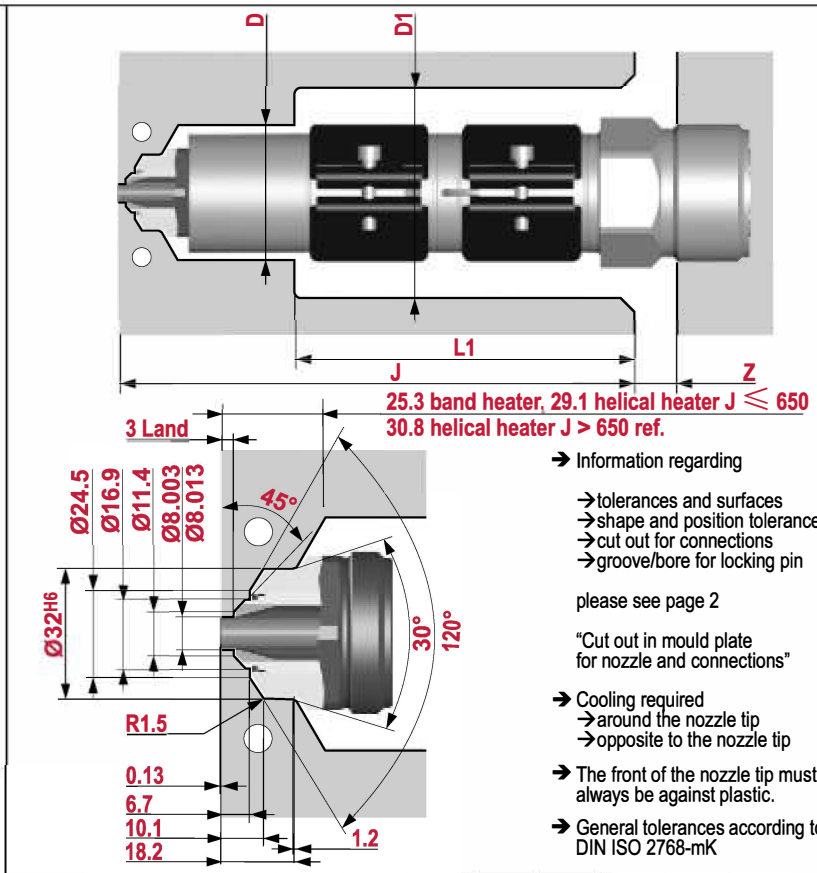
Angled Mold Contour

For design and application information, see the Synventive Hot Runner Guide.

T24 VG23, Straight

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

Nozzle Criteria:
➔Orifice Ø8
➔J length (see chart)
➔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

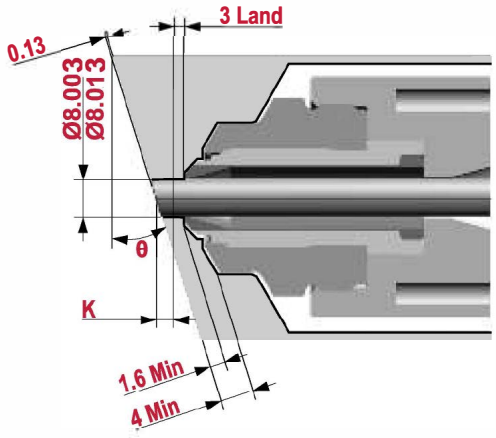
➔RD is the radial distance from the manifold center locator to the manifold nozzle center line

RD	250	300	350	400	450	500	550	600	650	700	750	800
J Min	165	180	200	210	230	240	250	260	270	280	290	300

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 wall thickness

Heater Style	J Min	J Max	Heater Qty	Watts/Volts
Band	160	380	1	750W/240V
Helical	160	220	1	550W/240V
Helical	220	425	1	850W/240V
Helical	425	650	2	550W/240V (each)
Helical	650	1000	2	850W/240V (each)

θ≤13°;
K=0
L=3-(Ø Orifice/2)*TANθ
13°<θ ≥24°;
K=5.7TANθ+1.6/COSθ-3
θ>24°;
K=16TANθ+4/COSθ-10.1



Angled Mold Contour

For design and application information, see the Synventive Hot Runner Guide.