

DOKUMENTACIJA ORODJA ZA BRIZGANJE PLASTIKE / TOOL SPECIFICATION FOR PLASTIC PARTS

Namen tega dokumenta je, da se upoštevajo vsi standardi pri izdelavi orodja za BSH Hišni aparati d.o.o. v nadaljevanju naročnik. Vsa odstopanja od standarda morajo biti potrjeni s strani naročnika.

The purpose of this document is to consider all standards of manufacture the tool for BSH Hisni aparati d.o.o. further as consignee. All deviations from this standard must be confirmed from consignee.

Prosim preberite ta dokument v celoti in potrdite, da ga razumete in je orodje izdelano po tem dokumentu.

Please read this Tool book carefully, confirm that you understood all and that the tool is manufactured according to this document.

Če orodje ne bo izdelano po naših zahtevah, ga bomo vrnili nazaj v popravilo ali pa ga bo popravil drug orodjar na vaše stroške.

If the tool will not be made according to our specifications we will return it for improvement or will use another tool maker to improve it on your costs.

Pred pričetkom konstrukcije orodja mora dobavitelj oziroma orodjar posredovati DFM analizo in jo uskladiti z naročnikom. (predstavnikoma oddelka RD in IE). Podatki se dostavijo v elektronski obliki na BSH Partner Portal.

Before starting tool design supplier or tool maker must send DFM analysis and harmonize it with subscriber.

Data are send in electronic form to BSH Partner Portal.

Poleg DFM analize je potrebno poslati še mold flow analizo (zvijanje, krčenje, hladni zvari, vpadna mesta, hlajenje..) razen če je le ta izvedena s strani naročnika. / Beside DFM analysis you must send mold flow analysis (contracting, warpage, weld lines, sink marks, cooling..) except if it is already made by consignee.

Ver.	Opis / Description	Datum / Date	Potrdil / Approved by
1.0	Začetna verzija / Initial version	29.5.2018	FCPN-CPI
2.0	Posodobitev dokumenta / Document update	15.1.2019	FCPN-CPI
3.0	Posodobitev dokumenta / Document update	27.10.2021	FCPN-OSPI
4.0	Posodobitev dokumenta / Document update	12.4.2024	FCPN-OSPI
5.0	Posodobitev dokumenta / Document update	23.12.2024	FCPN-CPI

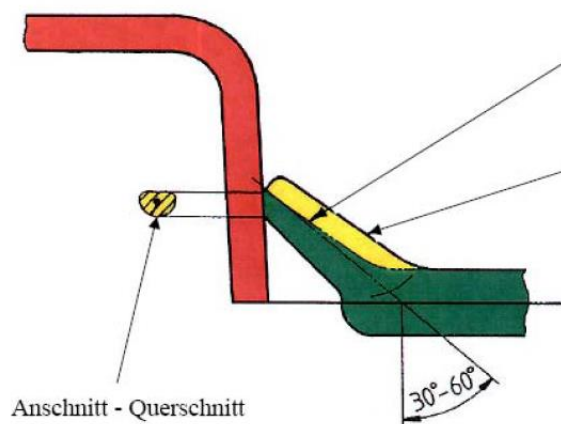
1. DOLIVNI SISTEM / INJECTION SYSTEM
2. TEMPERIRNI SISTEM / COOLING SYSTEM
3. IZMETALNI SISTEM / EJECTING SYSTEM
4. ZAHTEVE IZDELKA / PART DEMANDS
5. ODVIJANJE TRNOV / UNSCREW CORES
6. STRANSKO ODPIRANJE / OPENING SIDE CORES
7. DELOVANJE ORODJA / MOULD FUNCTION
8. VGRADNE MERE ORODJA / MOULD DIMENSIONS
9. ZAHTEVE ORODJA / MOULD REQUEST
10. KVALITETA GRAVURNIH DELOV / QUALITY OF MAIN INSERTS
11. VPENJANJE ORODJA / MOLD CLAMPING
12. OZNAKE NA ORODJU / MARKS ON MOULD
13. REZERVNI DELI / SPARE PARTS
14. PAKIRANJE / PACKAGING
15. DOKUMENTACIJA / DOCUMENTATION

1. DOLIVNI SISTEM / INJECTION SYSTEM

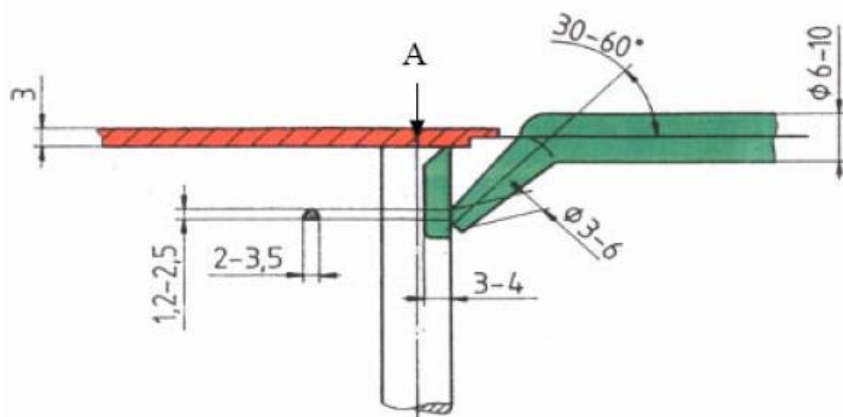
Uporabi se lahko eden od spodaj naštetih dolivov, ki pa se določi v tehničnih zahtevah oziroma pri pregledu DFM analize

It can be used one of this gate type which is defined in technical demands or in DFM analysis

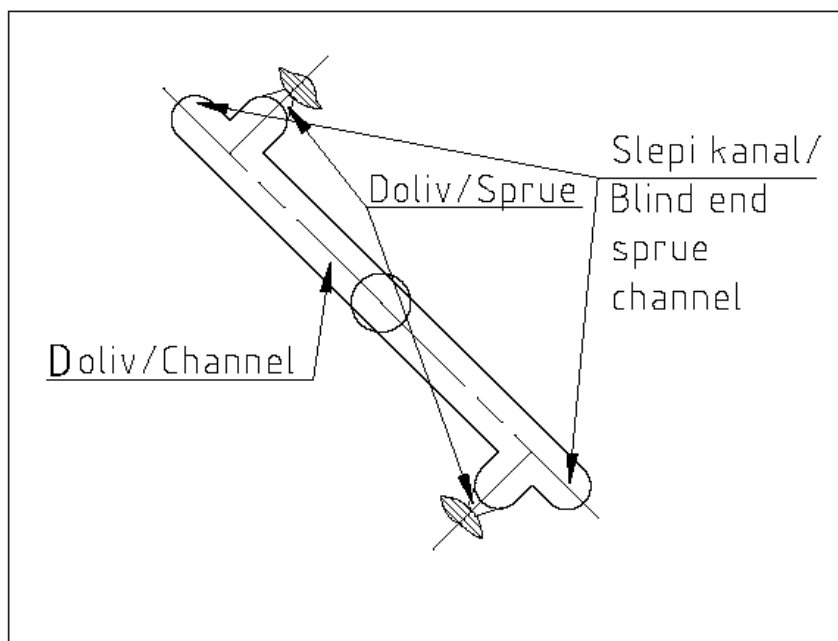
- Navadni dolivni kanal / Simple sprue channel
- Filmski dolivek / Film sprue
- Tunelni dolivek z zaporo (STAUBODEN) / Tunnel sprue with » dead end«



- Tunelni kavljast dolivek / Tunnel with hook
- Točkasti dolivek z vmesno ploščo - tri ploščni sistem / Point sprue with three plate system
- Doliv z vrtljivo šobo / Sprue with turning bush for runner
- Doliv na izmetač / Sprue on ejector



- Enojna toplokanalna šoba / Single hot runner system
- Toplokanalni razvod za tehnične materiale / steklena vlakna / Hot runner system for technical materials
- Toplokanalni razvod za hitro menjavo barve / Hot runner system for quick colour change
- Topla šoba z zaporno iglo / Hot runner with valve pin
- Slepi dolivni kanal / Blind end sprue channel



- Kaskadno brizganje / Injecting with cascade

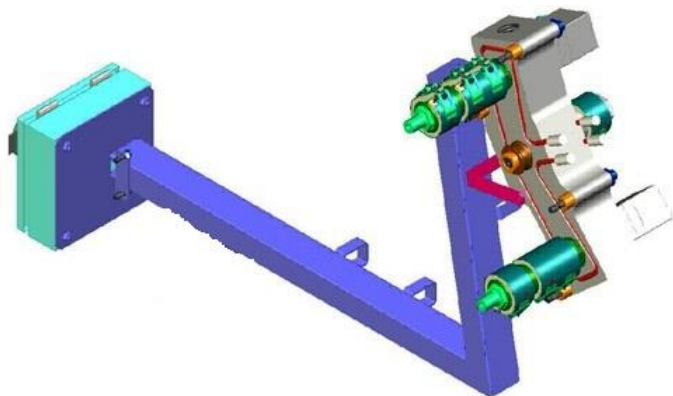


1x Multispojka / Multi clutch K101.09-08
 8x Hitra spojka 3/8 brez ventila / Connector 3/8 without valve M101.09 PFF 17
 8x Priključek kotni / Male elbow connector L08-02S-10

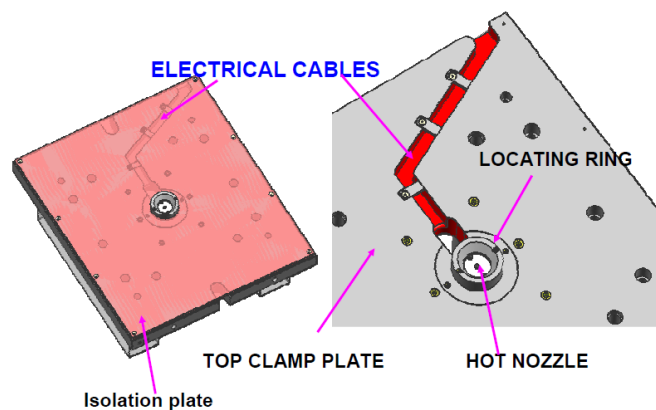
Dobavitelj / Supplier: ROBOS d.o.o. , RTC Couplings

- Toplo kanalni sistem s kanalom za zaščito kablov in vtičnice /
- Hot runner system with protection for cables and sockets

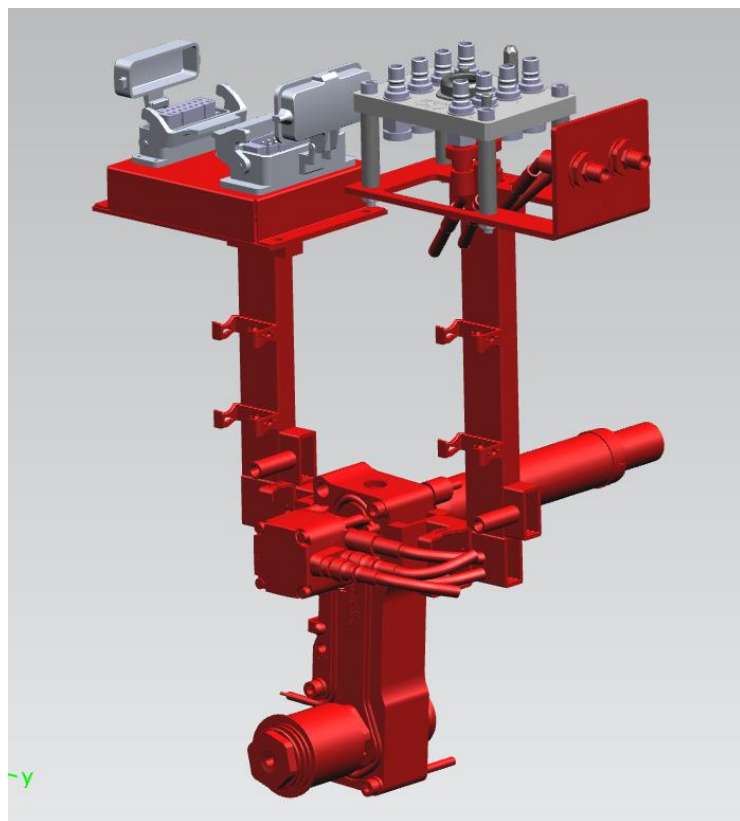
Varianta / Variant 1



Varianta / Variant 2



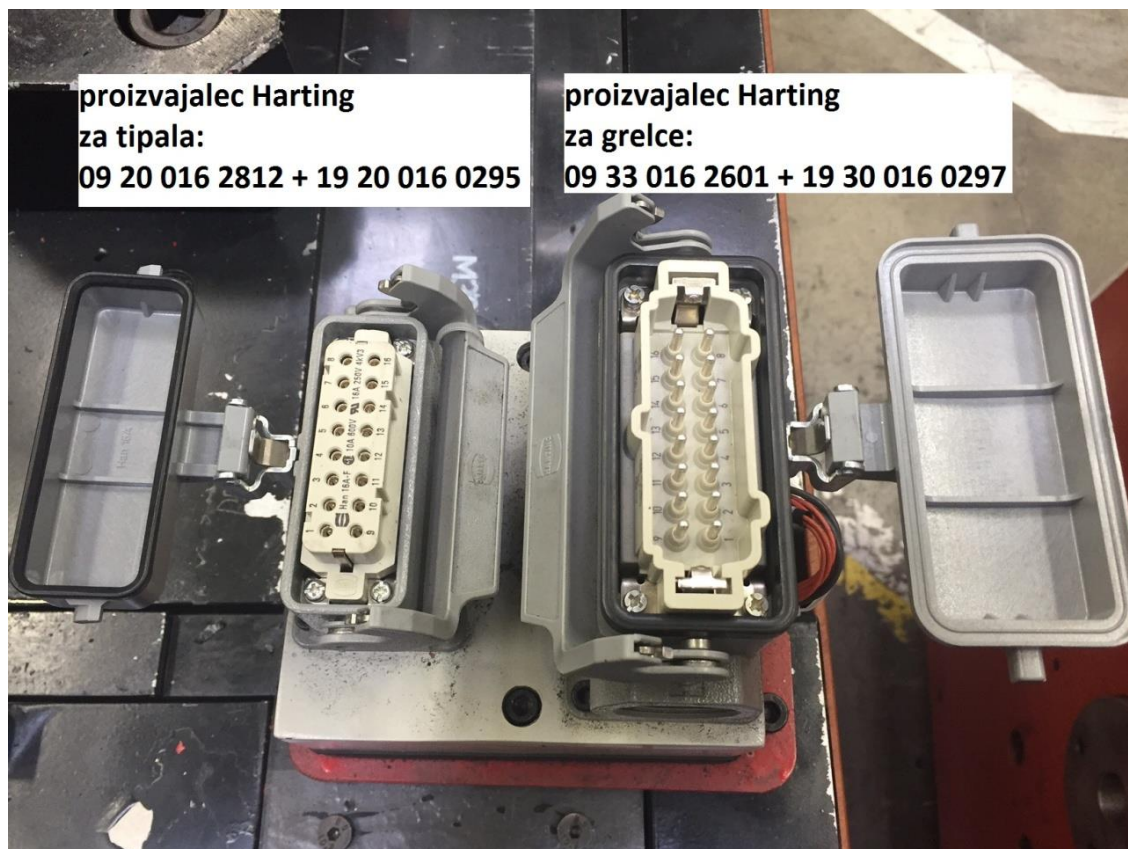
Varianta / Variant 3 – z zaporno iglo , dodatno TST sklopka / with valve gate + TST clutch



1x Multispojka / Multi clutch K101.09-08
 8x Hitra spojka 3/8 brez ventila / Connector 3/8 without valve M101.09 PFF 17
 8x Priključek kotni / Male elbow connector L08-02S-10

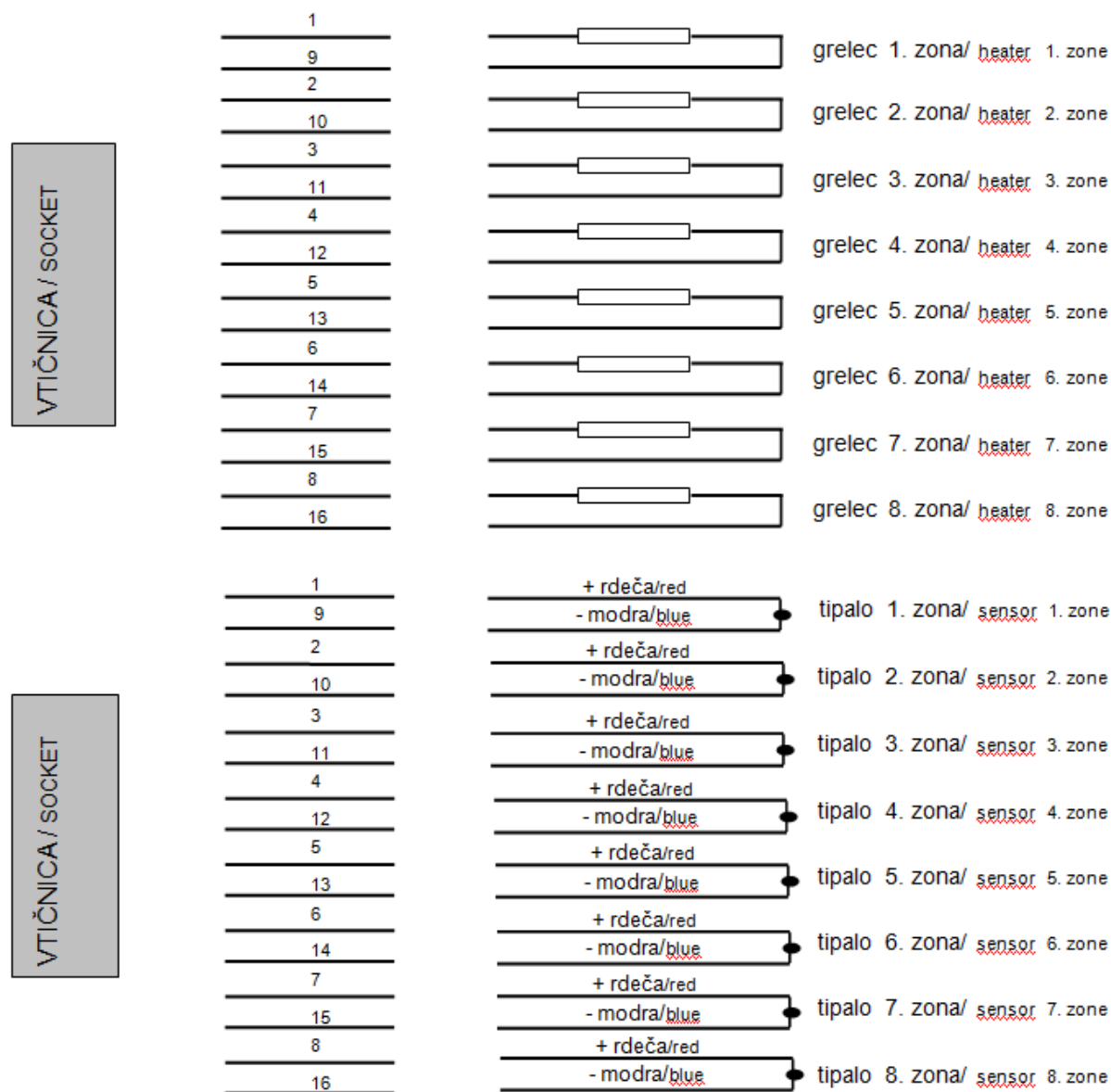
Dobavitelj / Supplier: ROBOS d.o.o. , RTC Couplings

- 16 polni vtičnici za TKS / 16 pins electro sockets for hot runner system



Na orodja z enojno toplo šobo ali toplokanalnim razvodom je potrebno montirati dve 16 - polni vtičnici. Vtičnici namestiti na zgornji del orodja, vodnike pritrditi in zaščititi pred mehanskimi poškodbami.

On moulds with single hot runner or hot runner block must be mounted two 16 – pole socket. Socket must be mounted on top of the mould , cables must be fixed and protected against mechanical damages.



TIP VTIČNICE/ SOCKET TYPE:

HARTING:09 33 016 2601 + 19 30 016 0297

TIP VTIČNICE/ SOCKET TYPE:

HARTING: 09 20 016 2812 + 19 20 016 0295

2. TEMPERIRNI SISTEM / COOLING SYSTEM

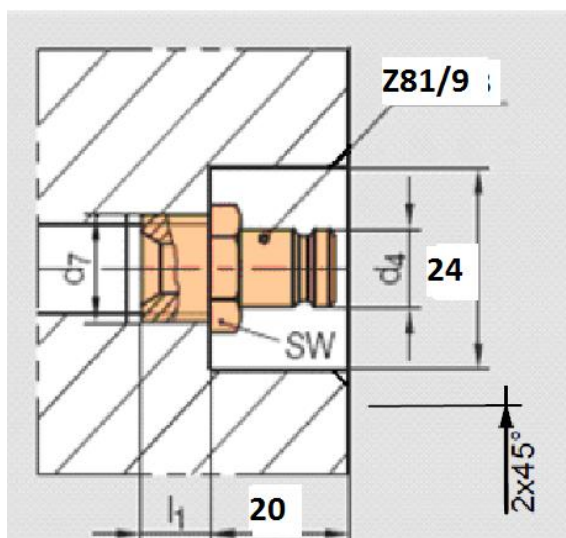
Hlajenje orodja mora biti potrjeno s strani BSH / Cooling must be confirmed from BSH side

Pri pregledu konstrukcije orodja je potrebno predložiti 3D hlajenja + izdelek za dolivno in izmetalno stran, drsnike, poševne izmetače..., vsak hladilni tokokrog mora biti obarvan z drugačno barvo.

For tool design checking you have to send us 3D cooling + part for cavity, core, sliders, lifters.....

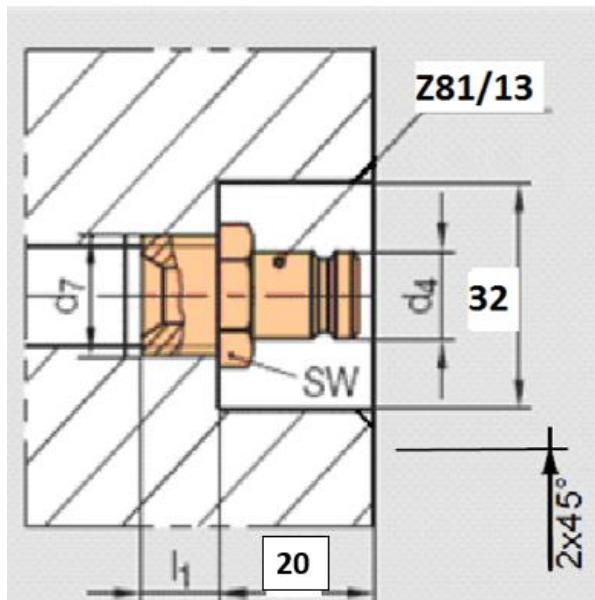
Each cooling circle must be in different color.

- Intenzivno hlajenje / Intensive cooling
 - Hlajenje v gravurni plošči / Cooling in base plate
 - Hlajeno vsako gnezdo – ločeno / Cooling each nest separately
 - Hlajeni trni - oblikovne igle / Cooling pins
 - Hlajeno s hladilno patrono / Cooling with Cu insert
 - Hlajeni gibljivi vložki / Cooling of moving insert cores
 - Hlajeno območje dolivne puše / Cooling of sprue area
 - Topla šoba v hlajeni puši / Hot runner in cooled bush
 - Hlajenje gravurnih vložkov / Cooling the core/cavity insert
 - Hlajenje vmesne plošče / Cooling of between plate
-
- Priklučki M 10x1 poglobljeni 20 mm / Φ 24 / Water connections M 10x1 hollow 20 mm / Φ 24



Uporabiti za orodja do 500kg
Used for tools till 500kg

- Priključki M 16x1,5 poglobljeni 20 mm / Φ 32 / Water connections M 16x1,5 hollow 20 mm / Φ 32

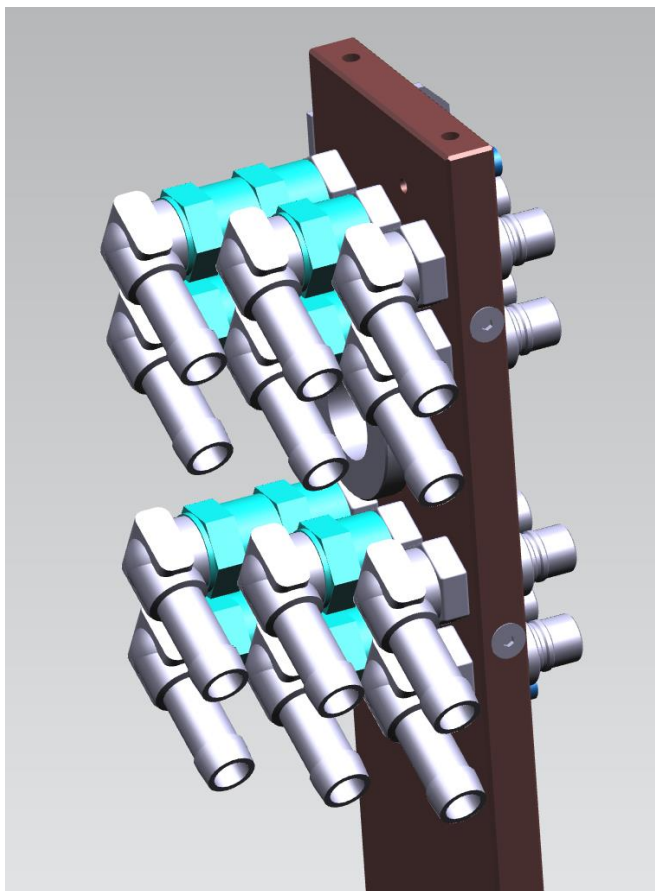
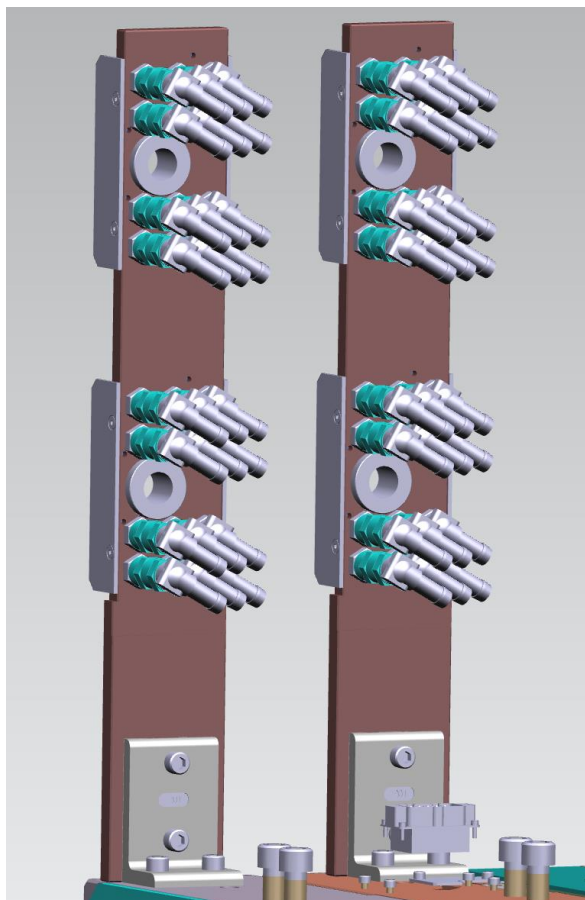


Uporabiti za orodja nad 500kg
Used for tools over 500kg

- Priključki nameščeni samo na zadnji in spodnji strani orodja / Connectors only at the back and bottom side
- Hlajenje z oljem (za temperiranje nad 160°C) / Cooling with oil (for heating over 160°C)
- Multi sklopka TST za hitri priklop vode / Quick coupling TST for water connection

Dobavitelj / Supplier: ROBOS d.o.o., TST Tamsan

Osnovna plošča / Main plate	TST	MK 109.12	4 kos / pcs
Prikljucek brez ventila / connector without valve	TST	MK 109 DU 17	48 kos / pcs
Podaljsek / additional piece	TST	109 EN 17	48 kos / pcs
Kotni prikljucek / angle connector	TST	109 EB 17.12	48 kos / pcs



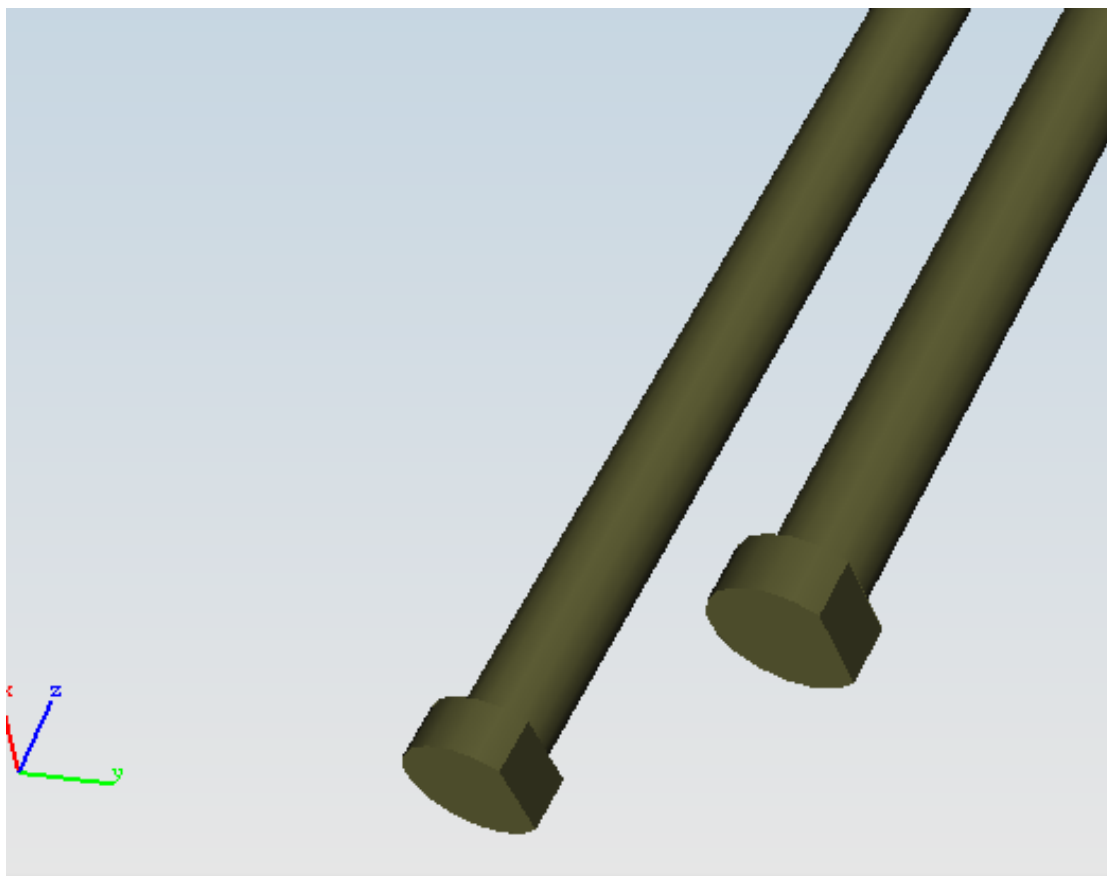
3. IZMETALNI SISTEM / EJECTING SYSTEM

Izmetavanje orodja mora biti potrjeno s strani BSH / Ejecting must be confirmed from BSH side

Pri pregledu konstrukcije orodja je potrebno predložiti 3D izmetavanja + izdelek

For tool design checking you have to send us 3D ejecting + part

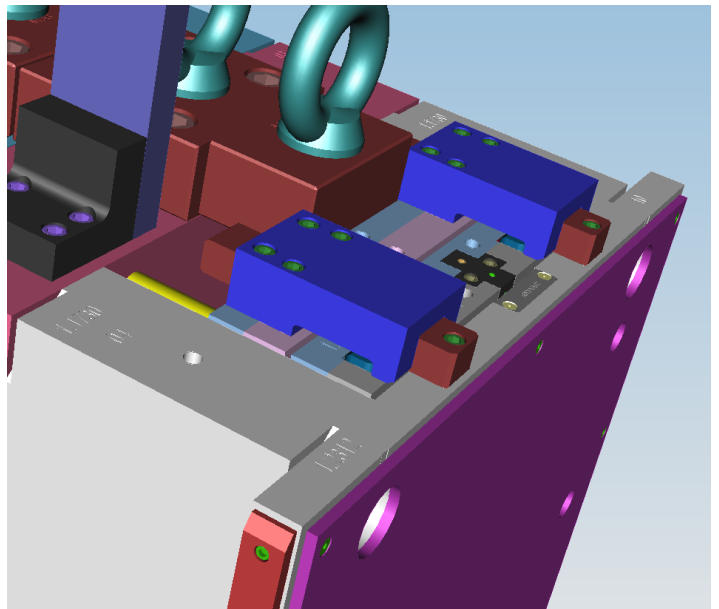
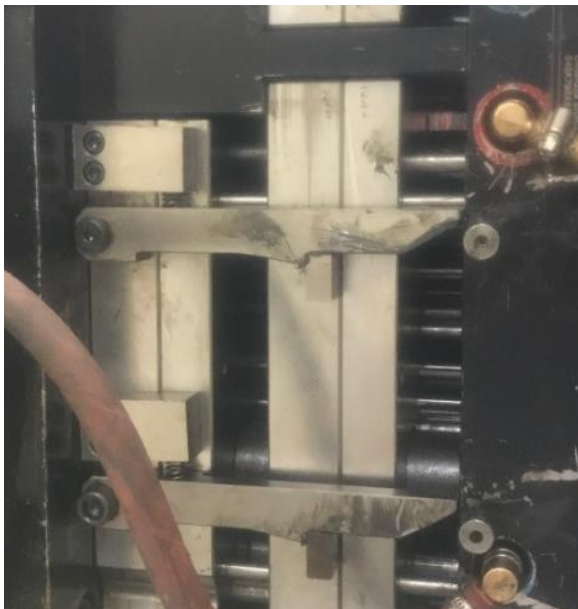
- Oblikovna izmetala zavarovana proti vrtenju / Oblique ejectors blocked for rotation



- Vlečna snemalna plošča – 4 x STRACK / Flat latch lock – 4 x STRACK

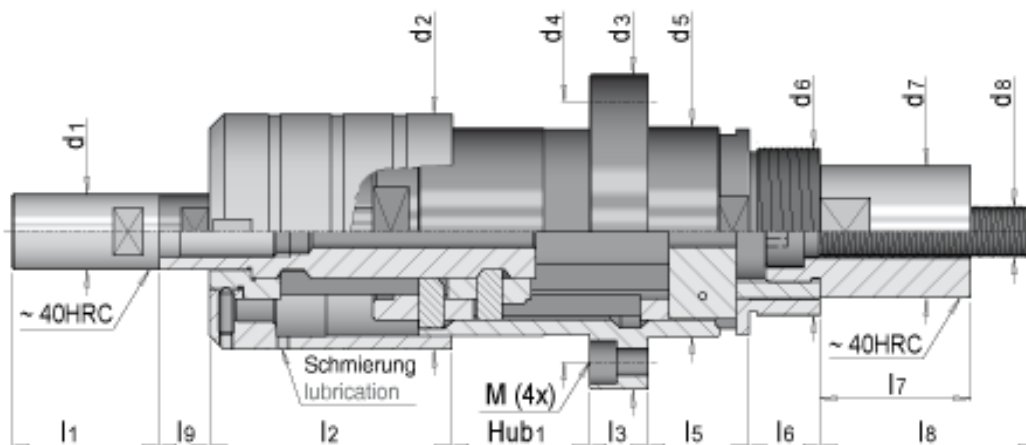


- Dvojno izmetavanje / Double ejecting

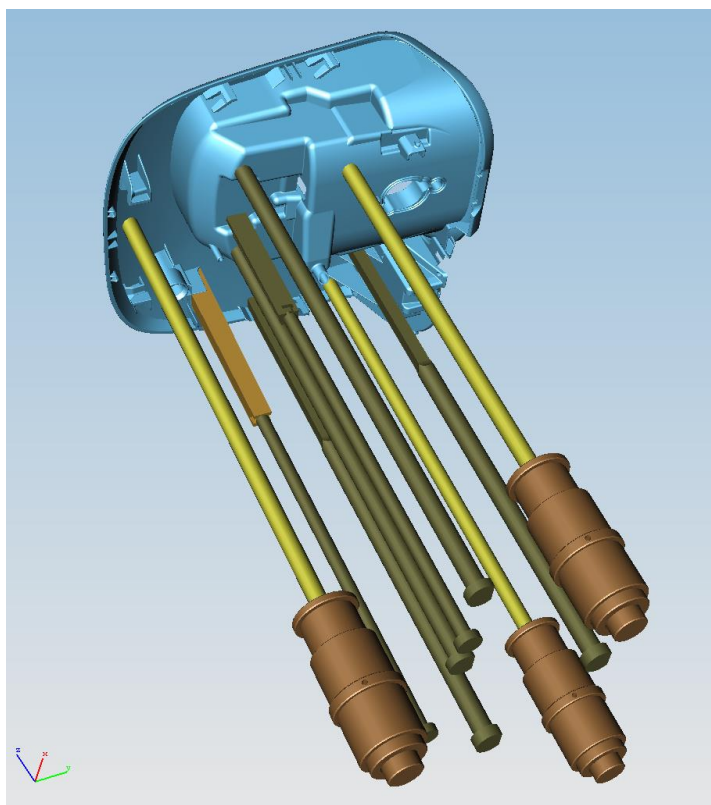


BSH Hišni aparati d.o.o. Nazarje

- Dvojno izmetavanje / Double ejecting

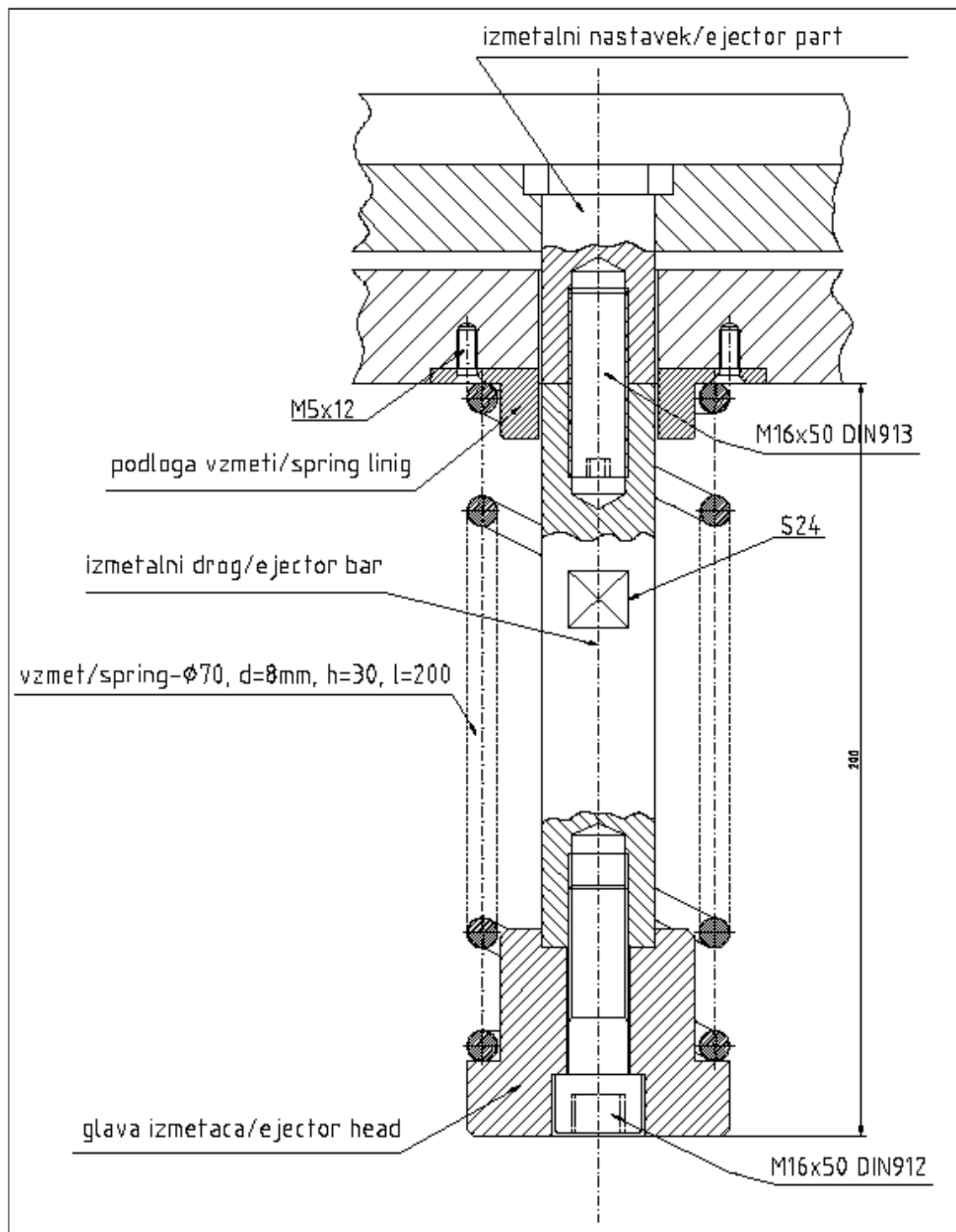


- Izmetavanje z vzvodom (petelin) / Ejecting with accelerator



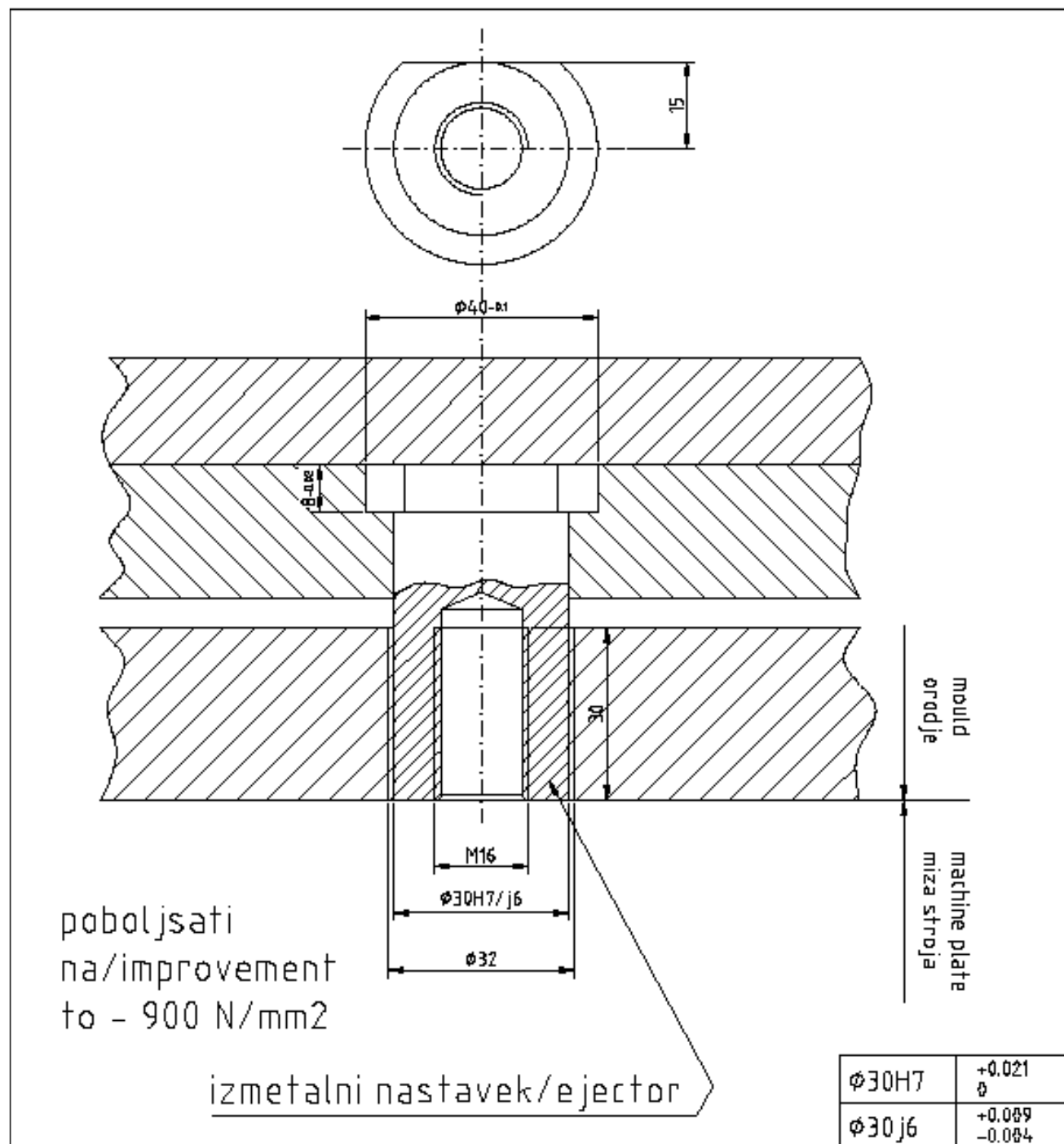
- Povratne igle / Push back ejectors

- Vračanje izmetal z vzmetmi / Ejectors back with spring

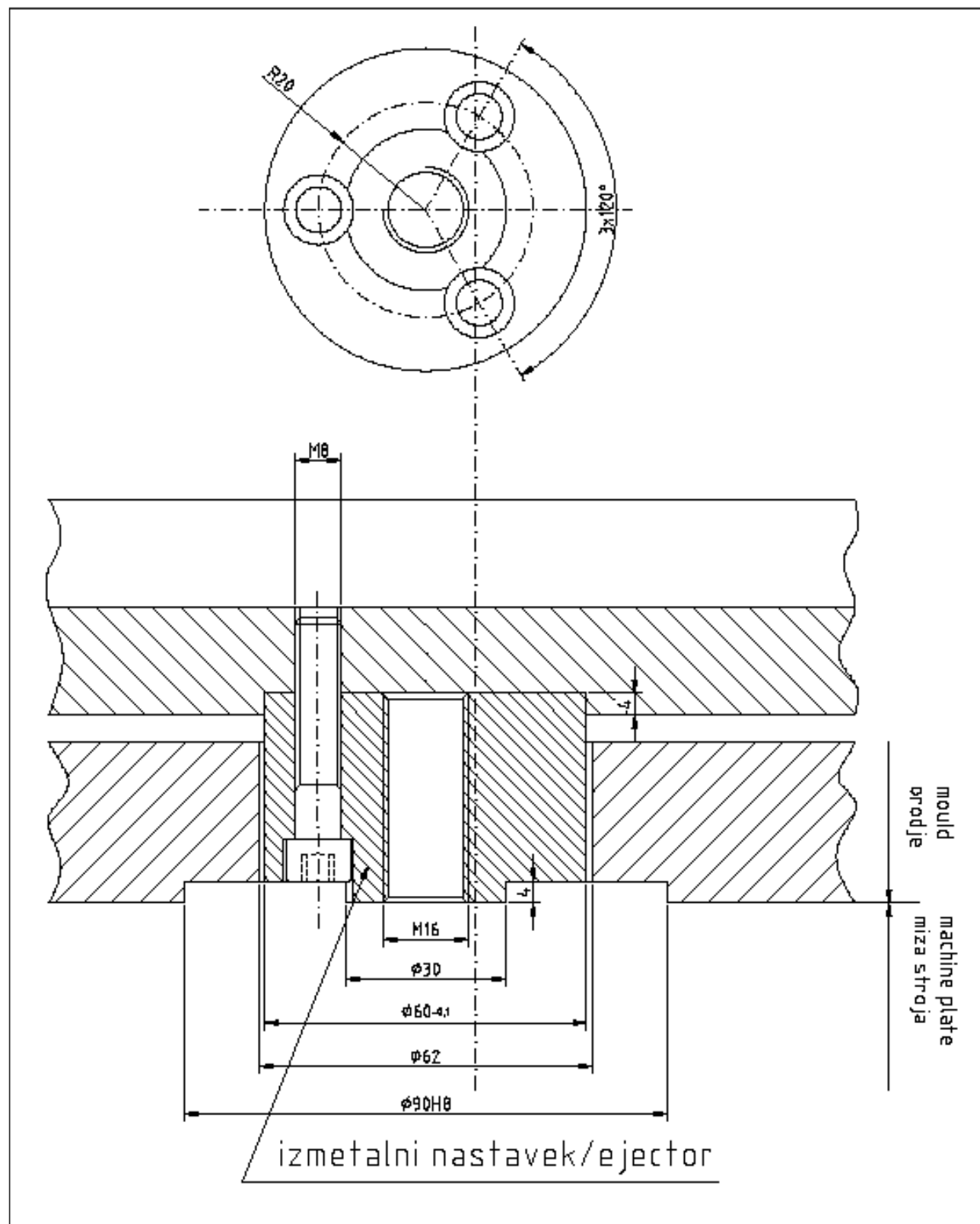


- Vračanje izmetal s strojem / Ejectors back with injection machine

VARIANTA 1 / VARIANT 1



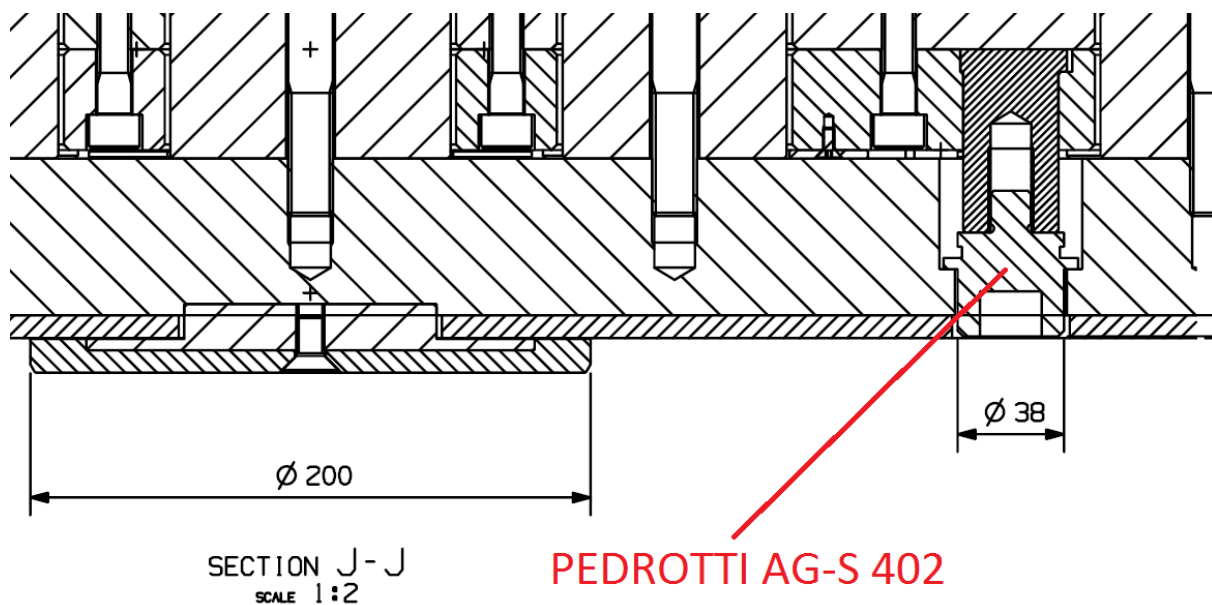
VARIANTA 2 / VARIANT 2



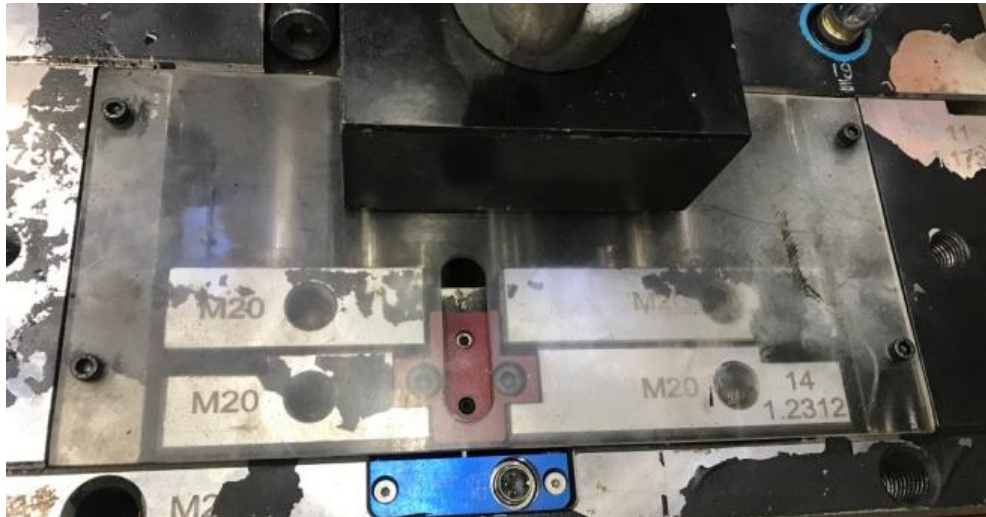
- Varovanje izmetal s končnimi stikali STRACK Z7600 / Protecting ejectors with end switches STRACK Z7600



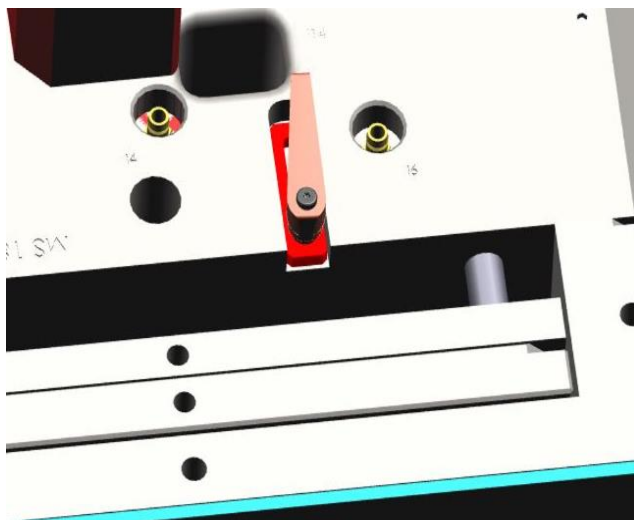
- Mehanska zaščita stikal / Mechanical protection of switches
- Izmetalni sistem mazati izključno z mastjo SYN-SETRAL 300
Ejection sistem lubricate only with grease SYN-SETRAL 300
- Izmetalna sklopka Pedrotti (samo za 2K orodja) / Ejecting clutch Pedrotti (only for 2K tools)



- Mehanska zaščita izmetalnega paketa pred tujki / Mechanical protection of ejecting system from other parts

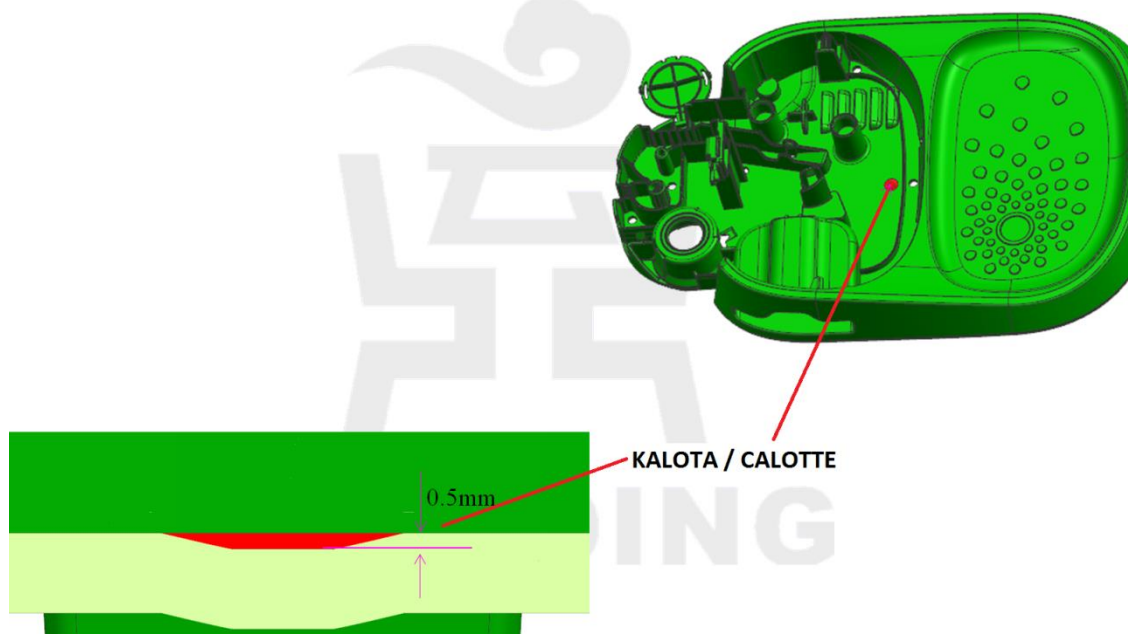


- Varovanje izmetalnega paketa pred premikanjem med transportom / Mechanical protection of ejecting system to prevent movement during transport



4. ZAHTEVE IZDELKA / PART DEMANDS

- Dolivna točka poglobljena / Gate point hollow in the part



- Snemalni koti / Draft angles

12 = polirano / polished							
			snemalni kot / draft angle				
VDI Ref.	Ra μm	Rz μm	PA	PC	ABS	PP	POM
12	0,40	1,5	0,5	1,0	0,5	1,0	1,0
15	0,56	2,4	0,5	1,0	0,5	1,0	1,0
18	0,80	3,3	0,5	1,0	0,5	1,0	1,0
21	1,12	4,7	0,5	1,0	0,5	1,0	1,0
24	1,60	6,5	0,5	1,5	1,0	1,5	1,5
27	2,24	10,5	1,0	2,0	1,5	2,0	2,0
30	3,15	12,5	1,5	2,0	2,0	2,0	2,0
33	4,50	17,5	2,0	3,0	2,5	3,0	3,0
36	6,30	24,0	2,5	4,0	3,0	4,0	4,0
39	9,00	34,0	3,0	5,0	4,0	5,0	5,0
42	12,50	48,0	4,0	6,0	5,0	6,0	6,0
45	18,00	69,0	5,0	7,0	6,0	7,0	7,0

- Datumski žig (mesec, leto) / Date mark (month, year)
- Zaporedna številka gnezda / Successive nest number

5. ODVIJANJE TRNOV / UNSCREW CORES

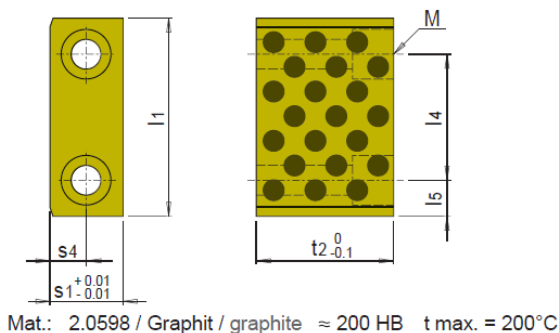
Uporaba odvijanja trnov se določi v tehničnih zahtevah / Usage of unscrew cores is defined in technical demands

- Navojno vreteno / Screwed spindle
- Pnevmatiski cilinder in zobata letev / Pneumatic cylinder and toothed rack
- Hidravlični cilinder in zobata letev / Hydraulic cylinder and toothed rack
- Določitev pozicije s končnimi stikali / Define position with limit switches
- Trni vležajeni s krogličnimi ležaji / Core with bearings
- Trni vležajeni z drsnimi ležaji / Core with sliderings

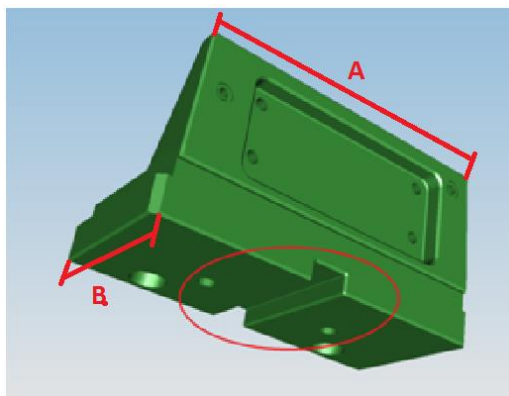
6. STRANSKO ODPIRANJE / OPENING SIDE CORES

Izvedbo stranskega odpiranja predlaga orodjar v DFMA / Type of opening is suggested from tool maker

- Z odmičnimi trni / With moving pins
- S hidravličnimi cilindri / With hydraulic cylinder
- Stranska vložka voditi / Side cores guide
 - v G.CuZn15Si z grafitom / in G.CuZn15Si with graphite
 - v kaljenih vodilih z mazalnimi kanali / in hardened guidings with grease channels



- s sredinskim drsnim vodenjem (če je širina A večja od dolžine B) / with middle guidance (if width A is bigger than length B)

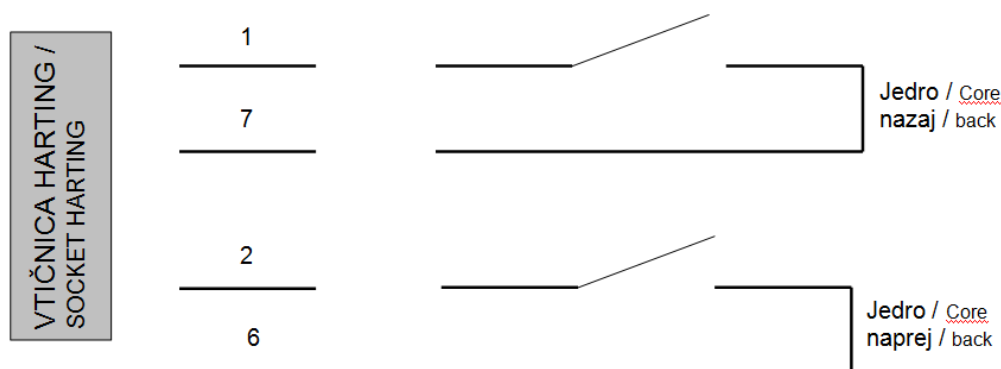


- Varovanje stranskih jeder z mehanskimi stikali / Protection of side cores with mechanical switches

Pri orodjih s hidravličnimi stranskimi jedri je potrebno izvesti elektro varovanje z mehanskimi stikali. Vtičnico namestiti na zgornji del orodja, vodnike pritrditi in zaščititi pred mehanskimi poškodbami.

On moulds with hydraulic side cores electro protection of mechanical switches must be mounted.

Socket must be mounted on upper part of mould , cables must be fixed and protected against mechanical damages.



TIP VTIČNICE/ SOCKET TYPE:	TIP STIKALA/ SWITCH TYPE:
HARTING	TELEMECANIQUE
Ohišje/Housing 19 30 010 1270	XCMD2102L1
Vložek / Insert p9 33 010 2701	



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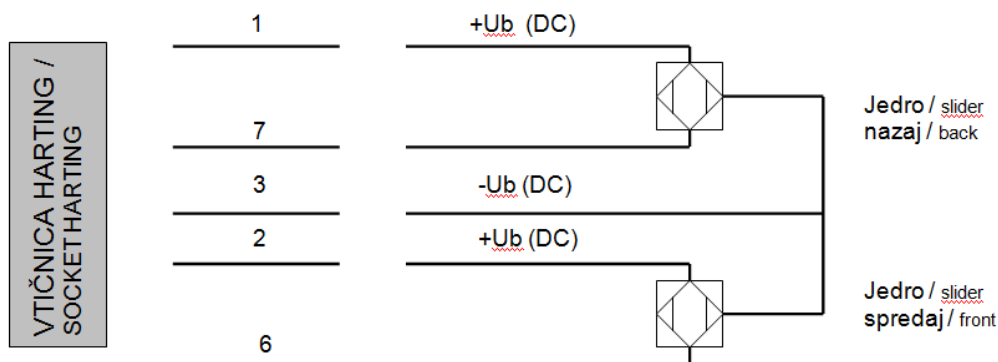
- Notranjo povezavo več cilindrov speljati na razvodnik 1 VH in 1 IZ / Connection of more hydraulic cylinders must be connected on distributor 1VH (IN) and 1IZ (OUT)
- Hidravlične hitre spojke tip ENERPACK CH 604 3/8" moški / Hydraulic connector tipe ENERPACK CH 604 3/8" Montirati obvezno na zadnjo stran orodja / Must be mounted on back side of the mold.
Razdalja med priključkoma min. 70mm / Distance between connectors min. 70mm.



- Varovanje stranskih jeder z induktivnimi PNP stikali / Protection of side cores with inductive switches PNP

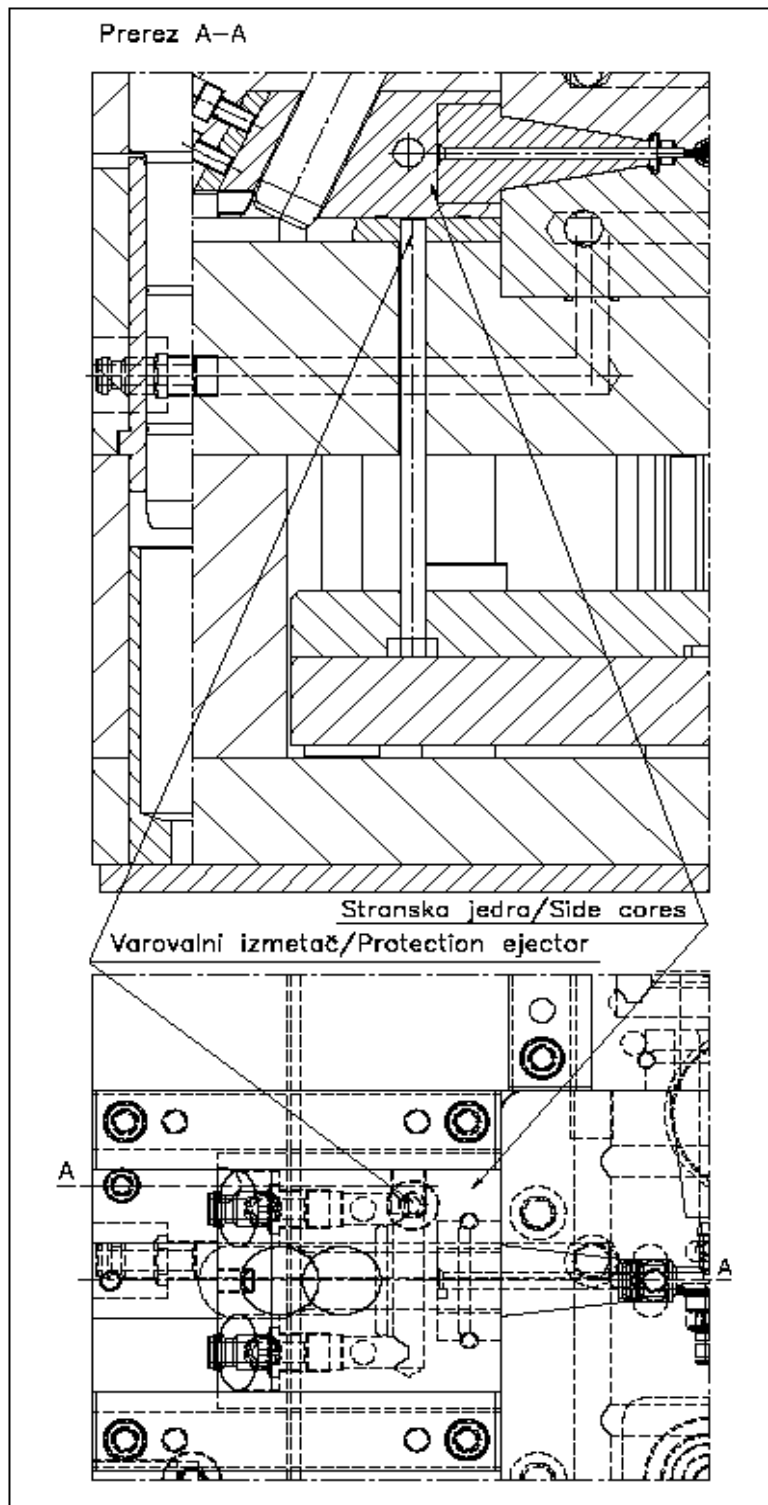
Pri orodjih s hidravličnimi stranskimi jedri je v določenih primerih možno izvesti elektro varovanje z induktivnimi PNP stikali. Vtičnico montirati na zgornji del orodja, vodnike pritrditi in zaščititi proti mehanskim poškodbam.

Moulds with hydraulic side cores could have in some cases electrical protection with inductive PNP switches. Socket must be mounted on top of the mould, cables must be fixed and protected against mechanical damages.



TIP VTIČNICE / SOCKET TYPE: HARTING Ohišje 19 30 010 1270 Vložek 09 33 010 2701	TIP STIKALA / SWITCH TYPE: DCT 8 4609 PNP 24 V
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- Mehanska zaščita stikal pred poškodbo / Mechanical protection of switches against damage
- Mehansko varovanje izmetačev, če so pod stranskimi jedri / Mechanical protection of ejectors if they are below side cores



- Možnost nadzora pozicije stranskih jeder tudi pri zaprtem orodju / Possibility to control position of hydraulic cores in mold closed position.



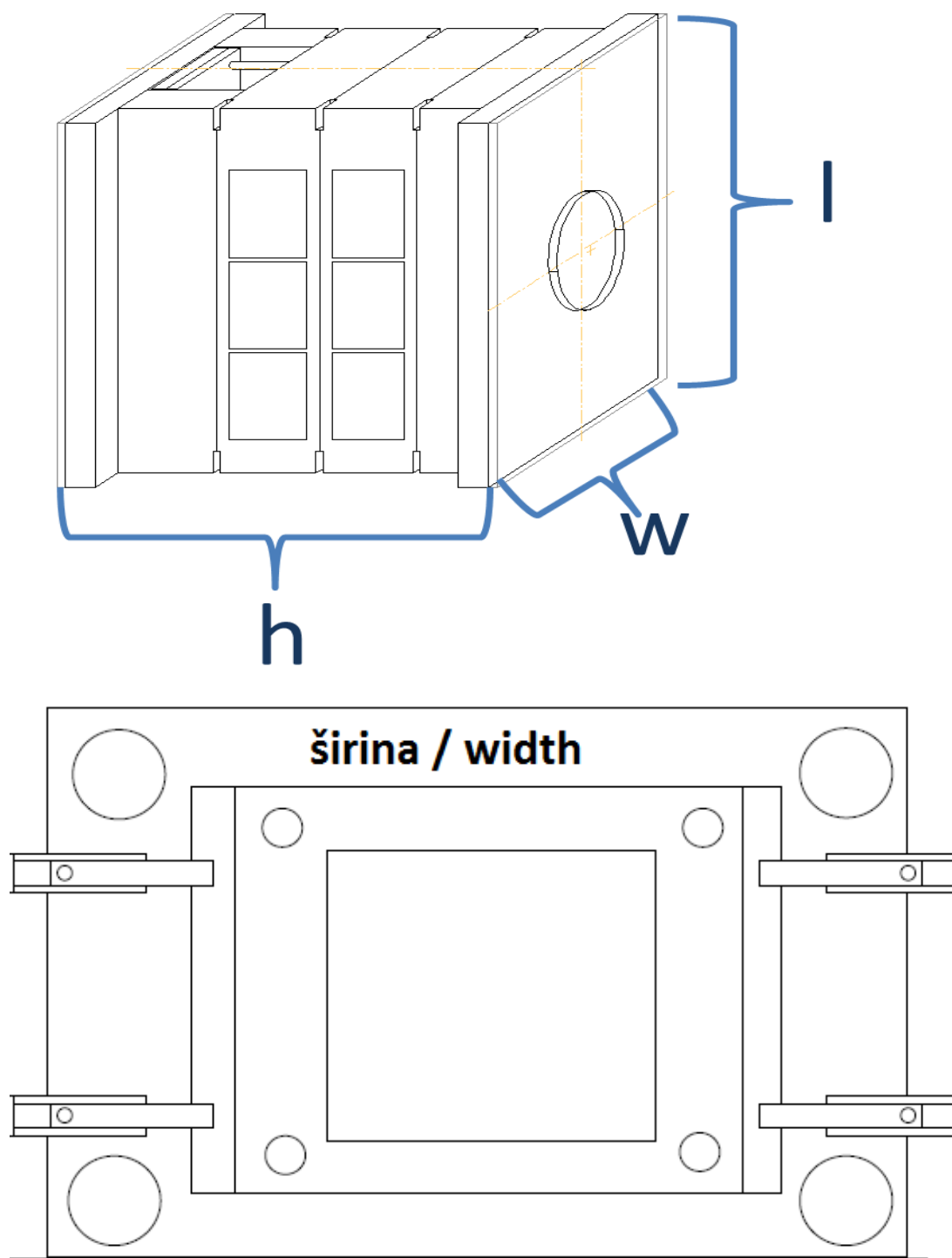
7. DELOVANJE ORODJA / MOULD FUNCTION

- Avtomatsko delovanje orodja / Automatic function
- Določiti v tehničnih zahtevah / Defined in technical demands
 - Strežna naprava - manipulator / With robot
 - 2K orodje / Mould with second component
 - brizganje s pomočjo hidravlike / injecting with hydraulic
 - brizganje s pomočjo vrtljive mize / injecting with turning table

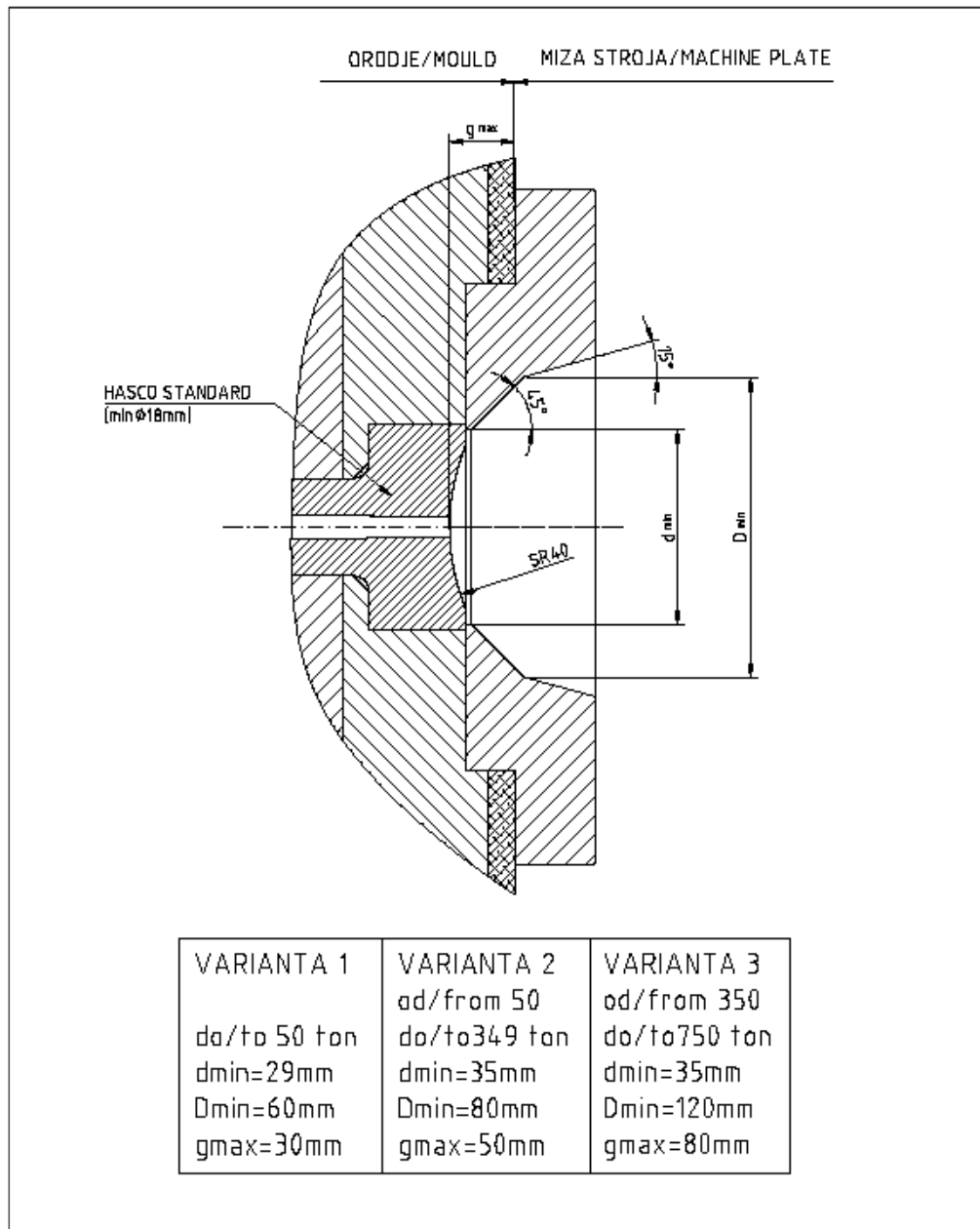
8. VGRADNE MERE ORODJA / MOULD DIMENSIONS

- Dimenzije orodja oz. vpenjalnih plošč / Dimensions of the mold or clamping plates

(l – višina orodja/height , w – vgradna širina/ input width , h – vgradna višina/input height)



- Odprtina za dolivno šobo / Hole for the machine nozzle



- Centrirni obroč dolivna stran po tabeli / Centering ring on injection side according to tabelle
- Centrirni obroč izmetalna stran po tabeli / Centering ring on ejector side according to tabelle
- Centrirni obroč najmanj 15 mm iz orodja / Centering ring minimum 15 mm out of the mould
- Tehnični podatki stroja priloženi / Technical data of machine attached
- Vstopni Φ dolivne šobe po dogovoru / Φ injection nozzle according to agreement
- 2K orodje – vhoda za dolivni šobi po vertikali izenačeni / Mould with 2K – both injection nozzles must be vertically equalized

9. ZAHTEVE ORODJA / MOULD REQUEST

- Življenjska doba / Life span

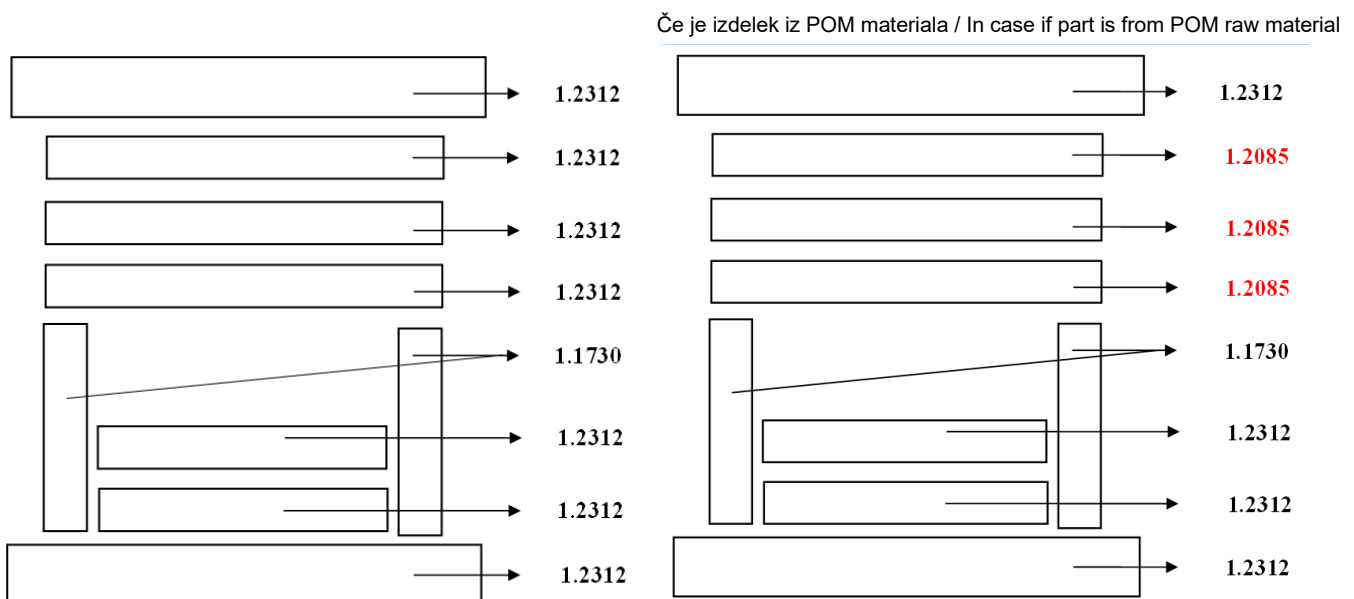
- | | |
|------------------------|---------------------------|
| ➤ ABS, SAN, PP | 2.000.000 brizgov / shots |
| ➤ POM, PC, TRITAN, PBT | 1.500.000 brizgov / shots |
| ➤ PA6GF, PARA IXEF... | 1.000.000 brizgov / shots |

- Varjenje

Med izdelavo orodja dobavitelj ne bo popravljaj napak ali izvajal sprememb orodja z varjenjem, razen če se bo naročnik (običajno predstavnik IE) s tem pisno strinjal.

In manufacturing time supplier will not repair mistakes or make modifications with welding, unless if subscriber (usually representative IE) will agree with this writtenly.

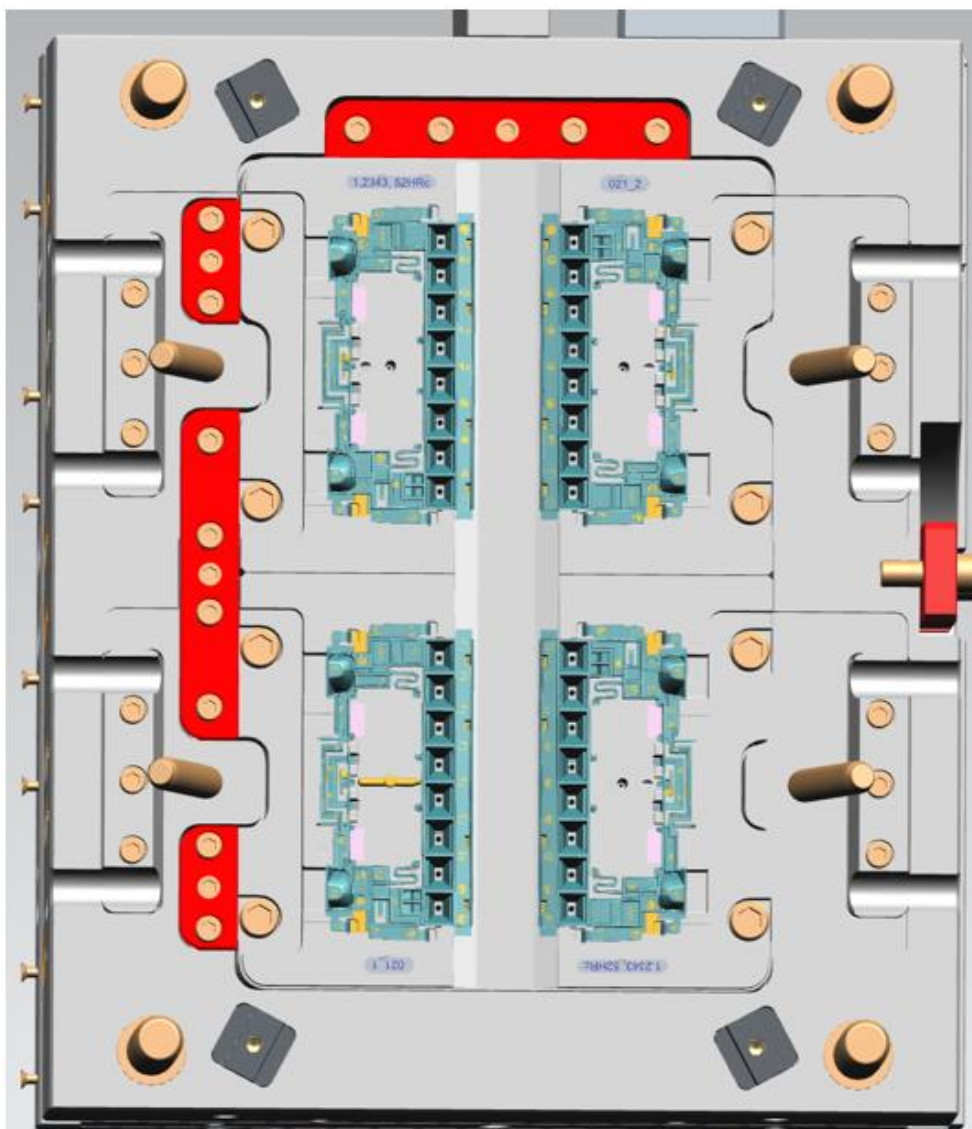
- Material ohišja po skici / Housing steel material as sketch

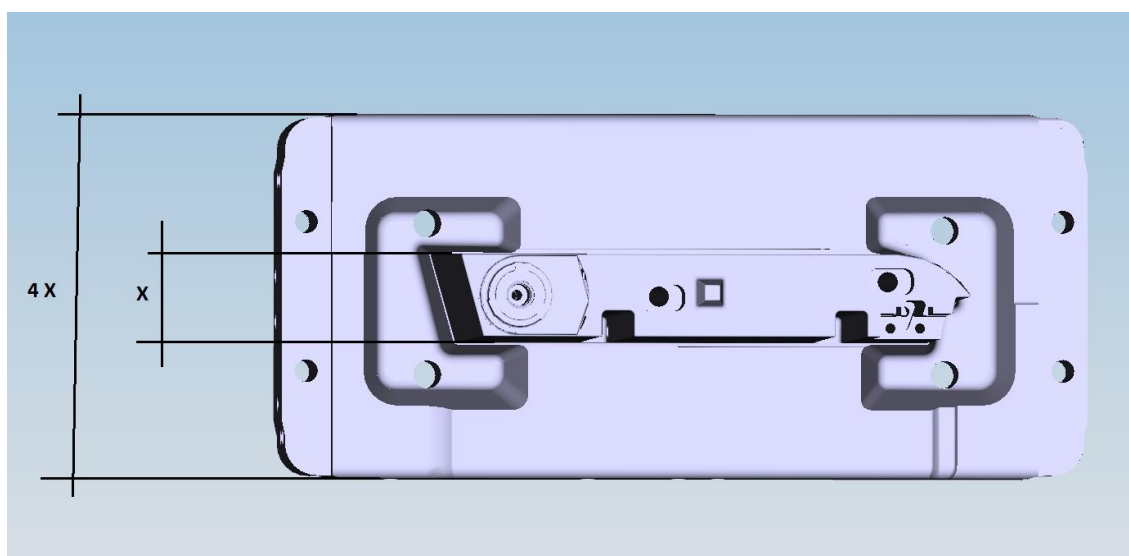
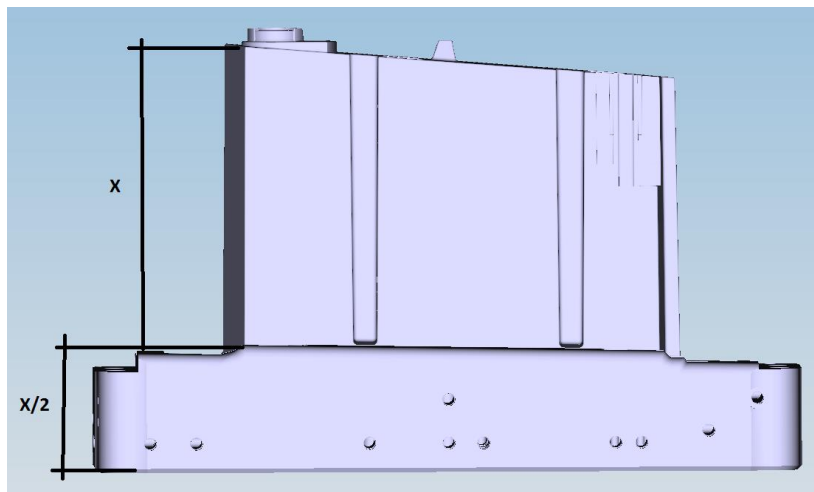
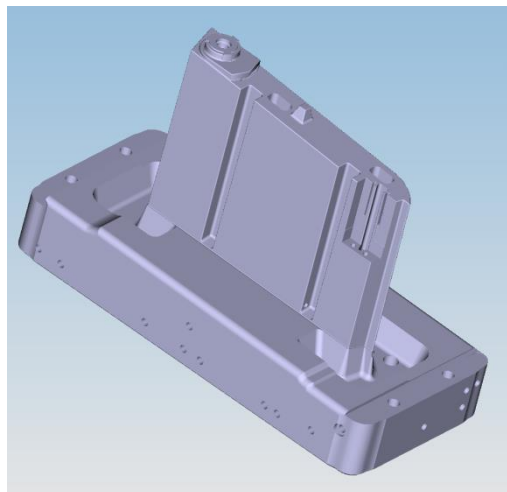


- Material gravurnih vložkov

- Za material ABS, SAN uporabimo 1.2343ESU / For ABS or SAN use 1.2343ESU
- Za POM uporabimo M310, M333 / For POM use M310 or M333
- Za PA s steklenimi vlakni W360 / For PA with fibre glass use W360
- Izbrati po priporočilih dobavitelja materiala / Use according to raw material supplier proposal
- Določiti pri pregledu konstrukcije / Define at mold design checking

- Izdelek v centru orodja in stroja / The part must be in the centre of mold and machine
- Vložki vpeti s pomočjo letev / Inserts fixed with wedges
- Vgradnja vseh vložkov po sistemu Poka Yoke / All inserts must be fixed according to Poka Yoke
- V primeru visokih vložkov mora le ta imeti močno peto / In case of very high insert it must have strong base.

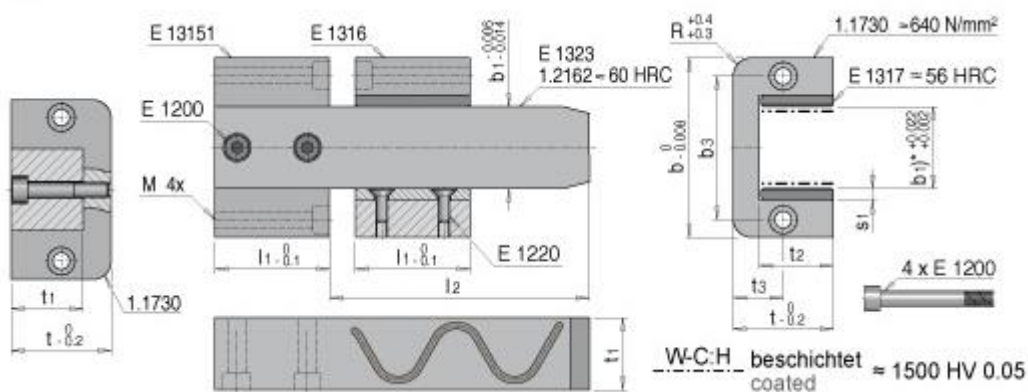
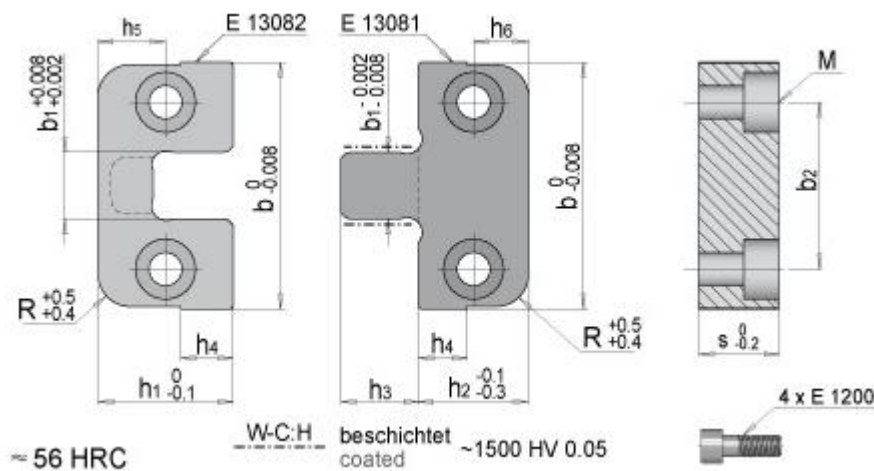
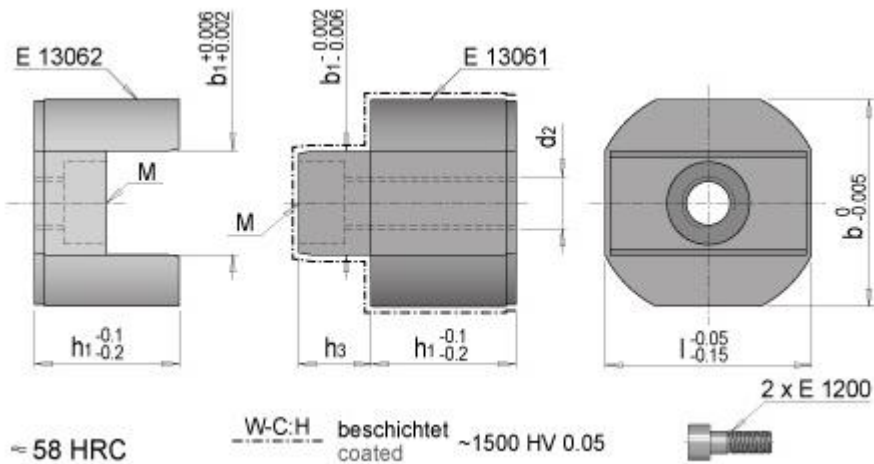




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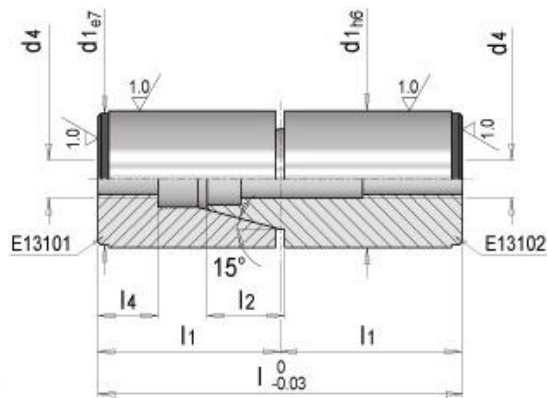
- Dodatno centriranje gravure /Interlock unit

➤ Ploščato /Flat



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➤ Konično /Conoid

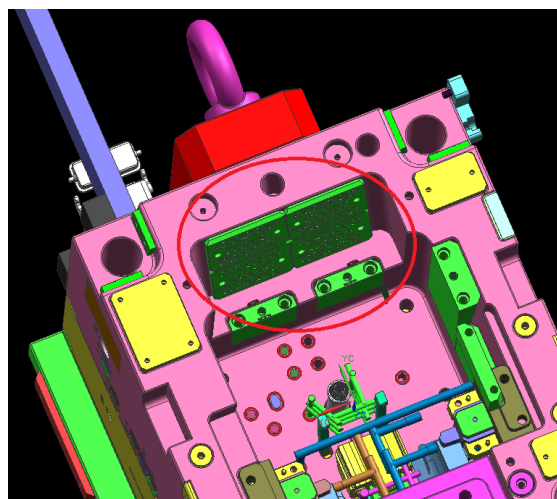
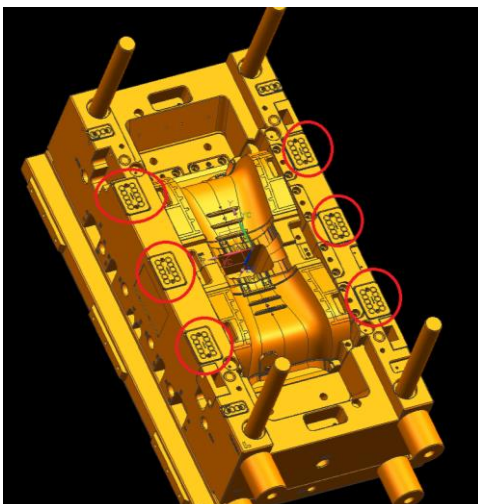


➤ Medsebojno centriranje stranskih jeder / Interlock unit of side cores

- Izmetalne plošče vodene kroglično / Ejector plates guided with ballbearing

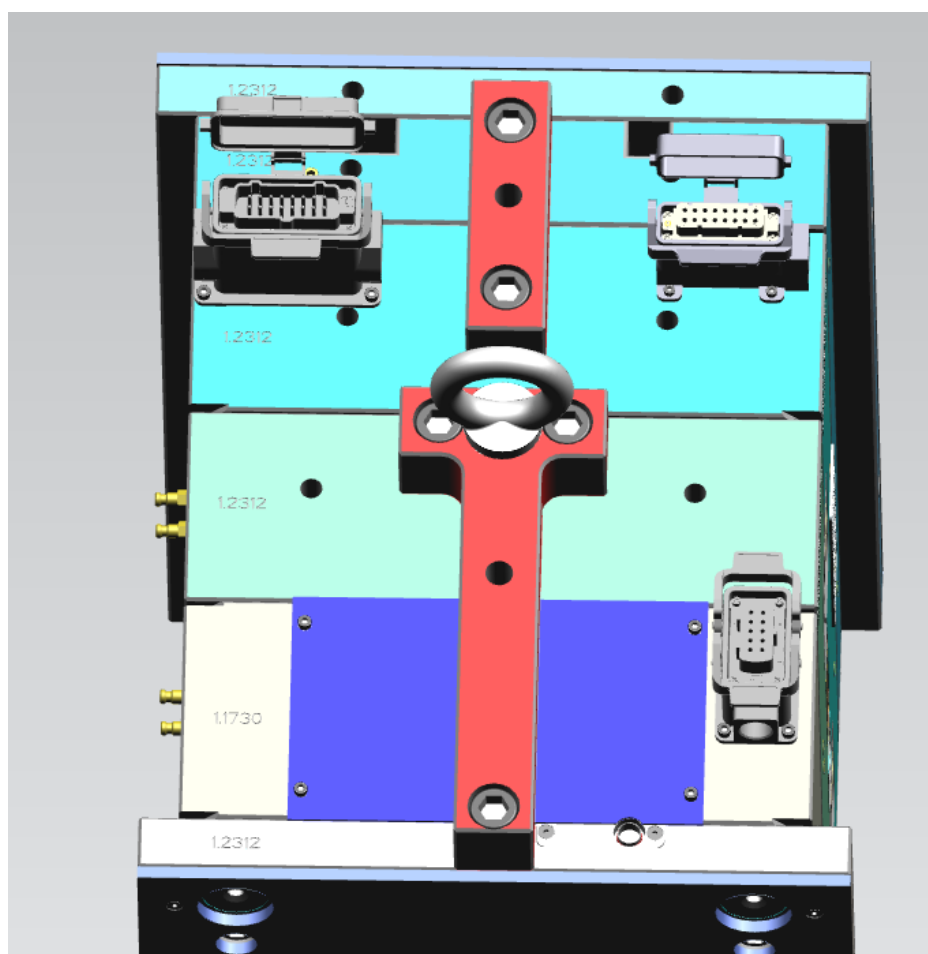
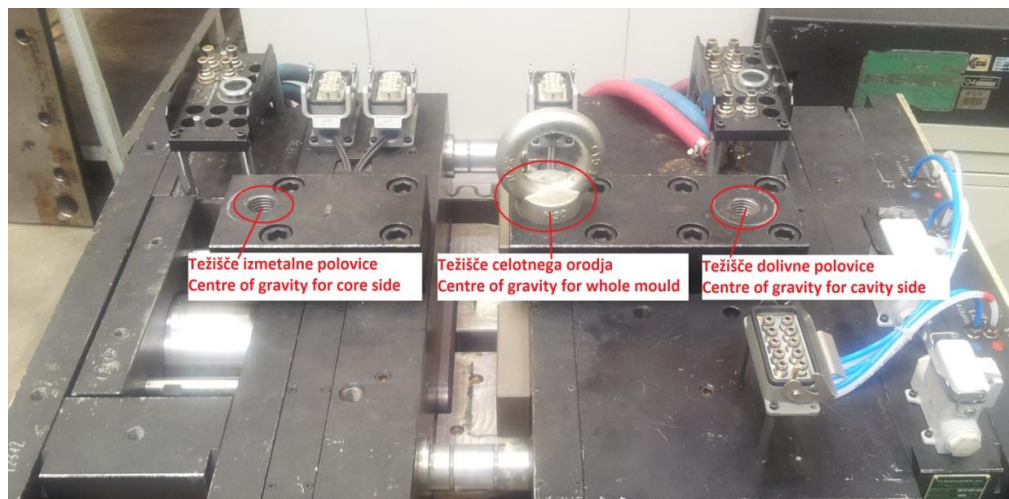


- Očesni vijak DIN 580 / Eye screw DIN 580
- Kaljene drsne ploščice privijačene na ohišje z zadnje strani / Harden wear plates fixed on mold base from back side
- Naležne-tlačne ploščice / Pressure plates



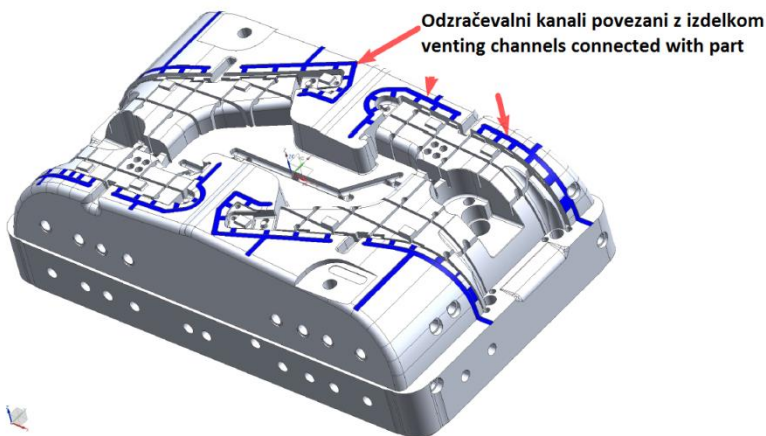
BSH Hišni aparati d.o.o. Nazarje

- Obešanje orodja: vsaka polovica orodja in skupaj na dvigalu v navpični legi / Mold lift: Both parts of mould must be balanced on the crane.



BSH Hišni aparati d.o.o. Nazarje

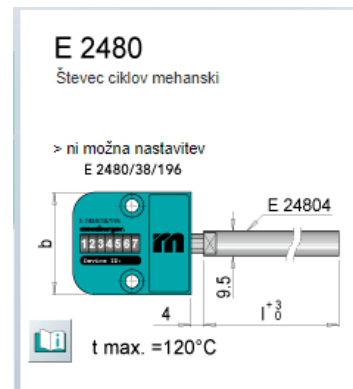
- Izolacijska plošča na obeh straneh / Isolation plate on the both side
- Orodje, ki se greje na 120°C ali več mora biti v celoti izolirano / Tool which is heated on 120°C or more must be completely isolated with isolation plates
- Izdelati odzračevalne kanale / Make venting channels



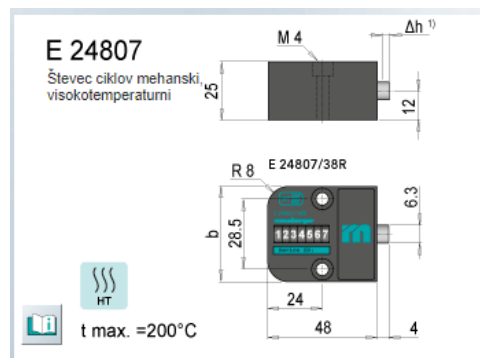
- Gibljivi odzračevalni vložki / Movable venting inserts
 - Kritični elementi orodja zamenljivi / Critical parts of mould must have possibility of change
 - Vsi zunanji robovi orodja posneti 2/45° / All outside edges must have chanfer 2mm / 45°
 - Na delitvi orodja zareze za ročno odpiranje z vzvodi / On mould partition ply slot must be done
 - Gnezdi razporejeni vodoravno / Nests on mould must be in horizontal position
 - Mehanska zaščita vseh kablov in stikal / Mechanical protection of all cables and switches
 - Vsi vgrajeni elementi morajo biti označeni tako da ni možna napačna vgradnja / Each element must be marked in a way that false assembly is impossible.
- Števec ciklov HASCO A5714 / 80 X 34 X 27 / Counter of cycles HASCO A5714 / 80 X 34 X 27



- Izdelati sedež za števec ciklov HASCO A5714 / Make groove for counter of cycles HASCO A5714
- Pri visokih temperaturah uporabiti izolacijsko ohišje HASCO A5722 / For high temperatures use frame HASCO A5722
- Za orodja dimenzij do 300x300mm se lahko uporabi mehanski števec A5730 ali E 2480
For tools with dimensions till 300x300mm you can use counter A5730 or E2480



Za orodja z visokimi temperaturami se uporabi števec A5730HT ali E 24807 / For high temperature tools you can use counter A5730HT or E 24807



- Barvanje orodja / Painting the mold



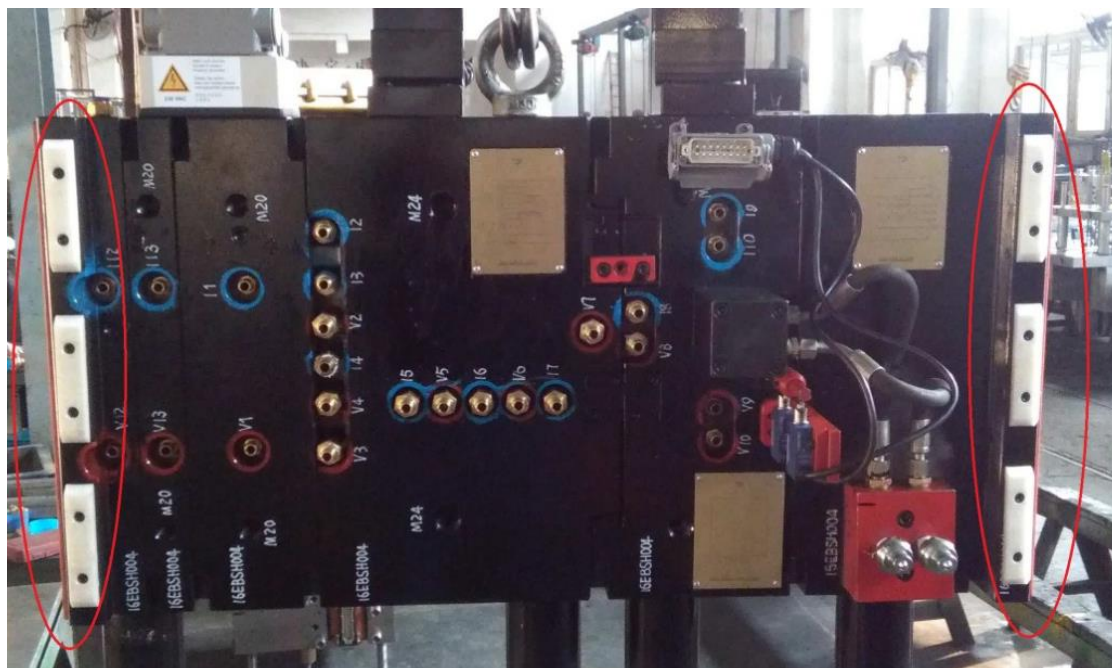
Vse zunanje površine orodja morajo biti prebarvane s ČRNO barvo, tudi oba droga za obešanje za vsako polovico, tretji povezovalni drog za celo orodje pa prebarvan z RDEČO barvo. Priključki za vodo so prebarvani VHOD - RDEČA barva IZHOD - MODRA barva Prebarvana je luknja + 5mm obroč okrog luknje

All outside surface must be painted in BLACK colour, also both bars for each half of the mold, the third bar is painted with RED colour. Water connections are painted IN - RED colour OUT - BLUE colour Painted is hole and also 5mm circle around the hole

RDEČA / RED - RAL 3020

MODRA / BLUE - RAL 5015

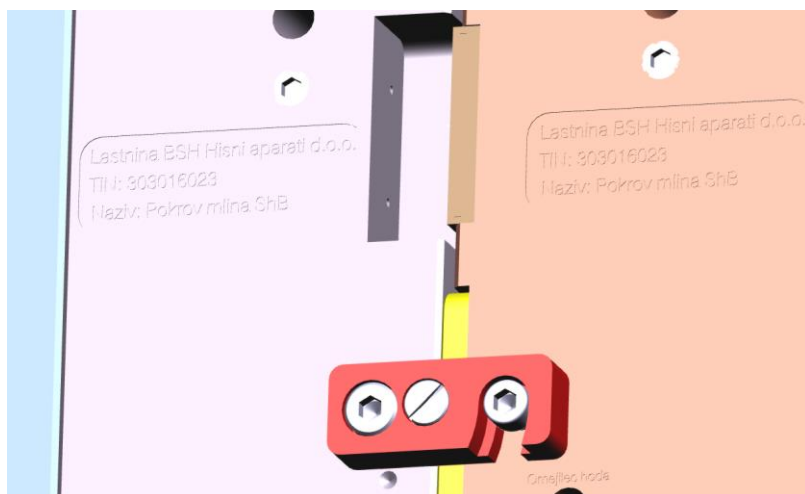
- Zaščita ohišja s teflonskimi letvami / Protection of mould with plastic bars



- Zaklep orodja med transportom / Mold locking for transport

Izvedba v primeru orodja s sproščenimi vzmetmi /
Option for mold with free springs

Normalna izvedba / Mold with normal lock



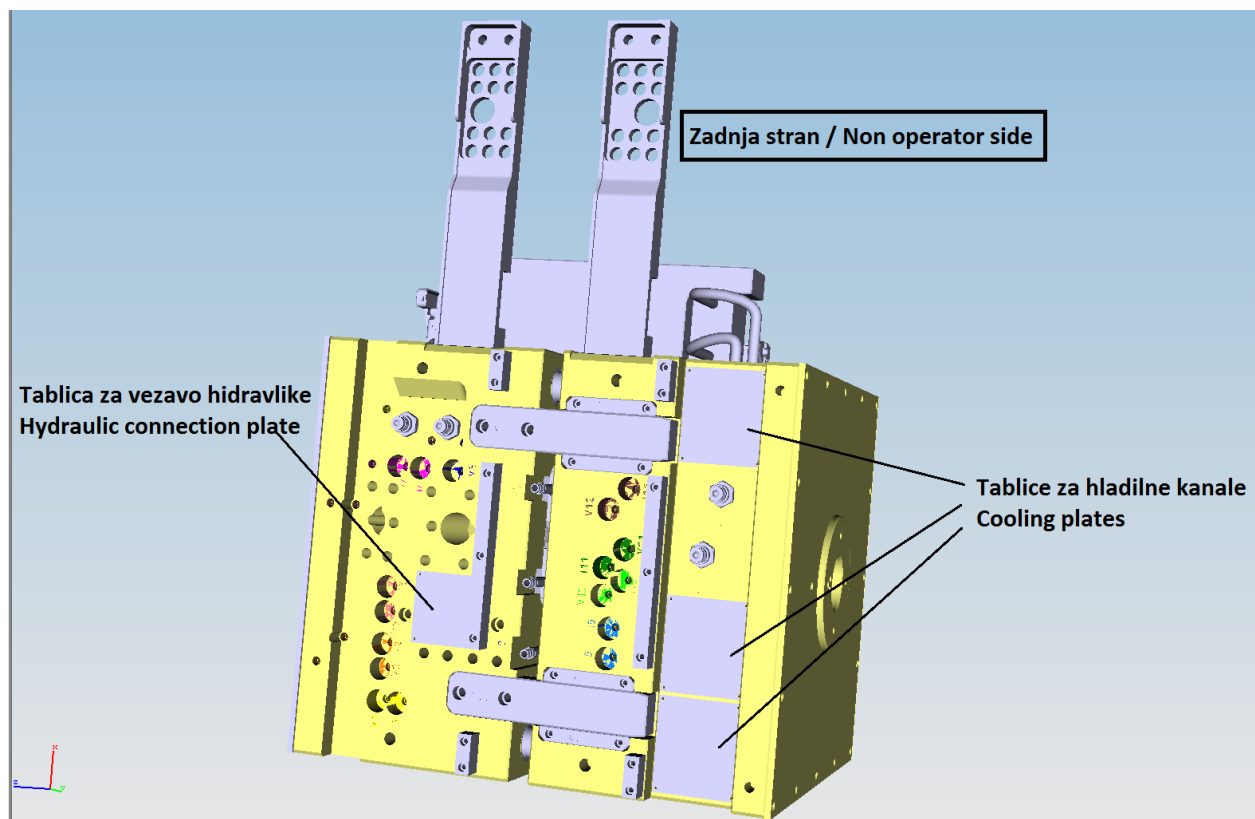
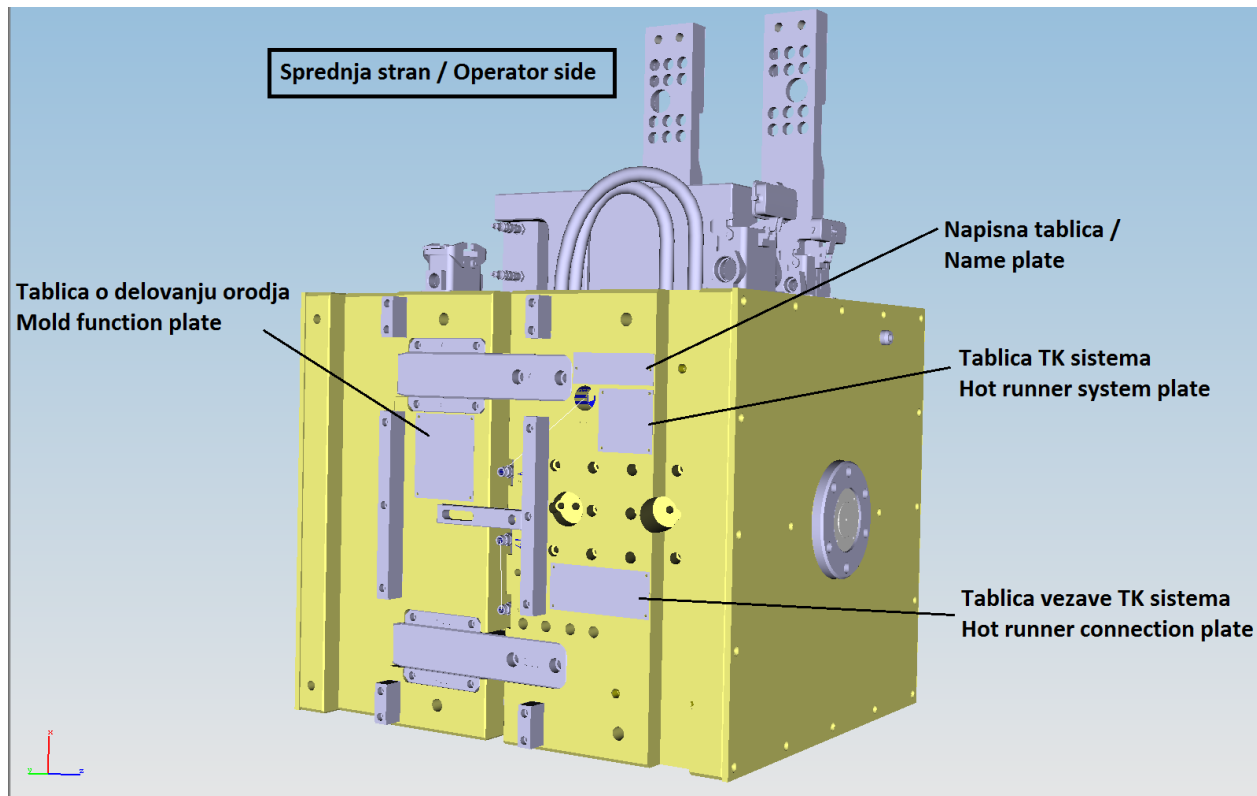
10. KVALITETA GRAVURNIH DELOV / QUALITY OF MAIN INSERTS

- Površina po načrtu / Surface according to drawing
- Kaljeni (predlog trdote poda orodjar) / Hardening (hardness is suggested from tool maker)
- Nitrirani trni (vsi transparentni materiali) / Nitride insert cores (for all transparent raw materials)
- Poševni oblikovni izmetači nitrirani / Oblique ejectors (lifters) nitrided
- Posebna prevleka za specialne materiale (predlog orodjarja) / Special coating for special raw materials (suggestion from tool maker)
- Določiti pri pregledu konstrukcije / Define at mold design checking

11. VPENJANJE ORODJA / MOLD CLAMPING

- Max. višina robov za vpenjanje 46mm (do 2000 kN), max. 76mm (nad 2000 kN) /
Max. height of fixing edges 46mm(till 2000kN), max.76mm (over 2000kN),
- Utori za vpenjanje porezkani po celi višini / Grooves for fixing on complete height of mould
- Širina utora za vpenjanje 20mm (do 1000kN), 25mm (1500kN), 30mm (do 3000kN), 45mm (nad 5000kN) /
Width of fixing grooves 20mm (till 1000kN) 25mm(1500kN), 30mm (till 3000kN) 45mm (over 5000kN)
- Štrleče dele na spodnji strani orodja zaščititi z vgradnjo nogic, vsaka polovica 4 noge /
Sliders or water connectors on mold bottom side protect with legs – each half 4 legs
- Vpenjanje orodja samo s strani / Clamping of the mold only from side

12. OZNAKE NA ORODJU / MARKS ON MOULD

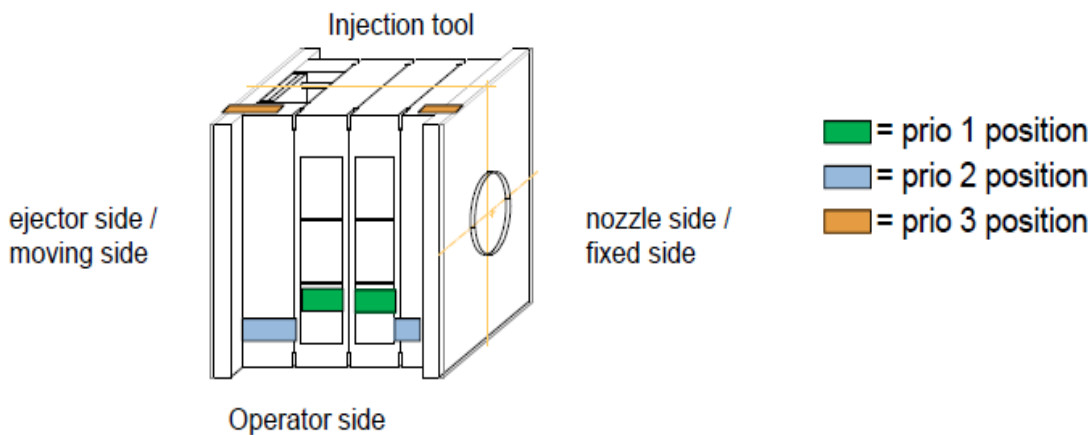


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- Ploščica po skici / Name plate like on sketch

BSH Hišni aparati, d.o.o. Nazarje		40 - 80 mm
Naziv izdelka / Name of product:		
Št. načrta / No. of plan:	Leto izdelave / Year of making:	
Šifra orodja / Mould code:	Teža / Weight:	
Proizvajalec / Producer:	Dim. orodja / Dim. mould: b/l x l/w x h/h	
100 – 140 mm		

- Dodatne označbe na orodju / Additional marking on mold
 - Lastništvo: Lastnina BSH Hišni aparati d.o.o. / Property: Property of BSH Hisni aparati d.o.o.
 - Šifra orodja / TIN – Tool indenty Number => TIN: XXXXXXXXXX
 - Naziv izdelka / Part name: XXXXXXXXXXXXXXXXXXXX



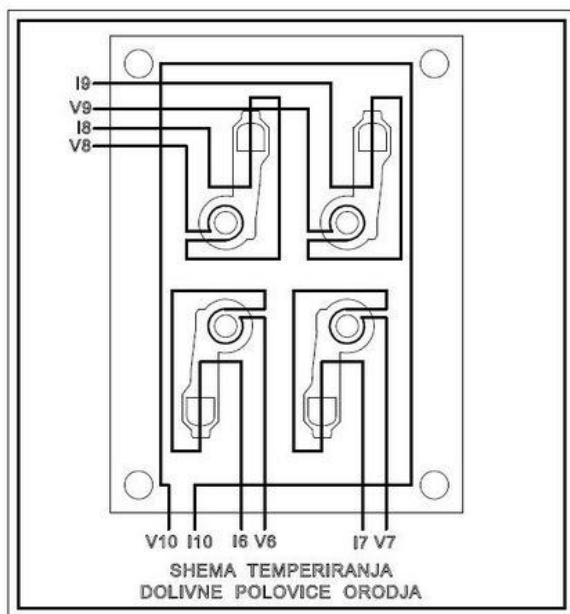
Primer / Example:



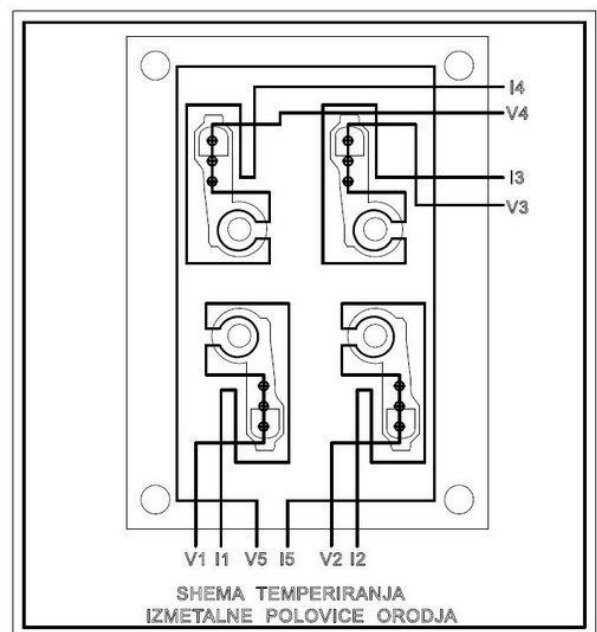


- Vstop in izstop vode označeni (oznake V1 / I1; V2 / I2; V3 / I3 ... ob priključkih) / Marking input and output water connection (V1 / I1; V2 / I2; V3 / I3 .. near connections)
- Ploščica s tokokrogi hladilnih kanalov / Cooling plates separate for cavity and core

Na tablici mora biti narisani izdelek in vsi hladilni tokokrogi ! You have to draw the part and all cooling channels

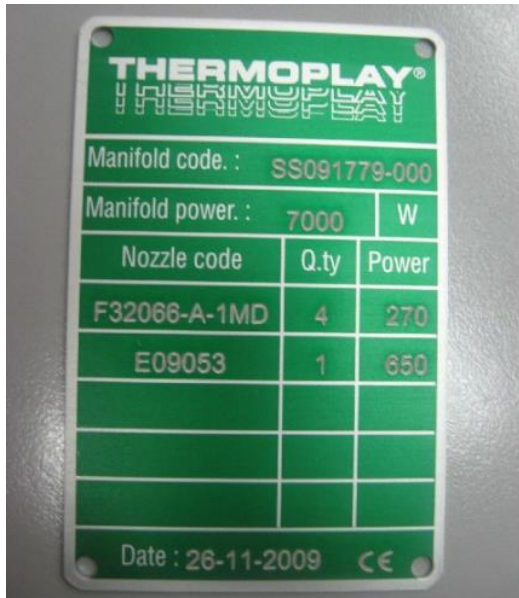


Cavity cooling plate

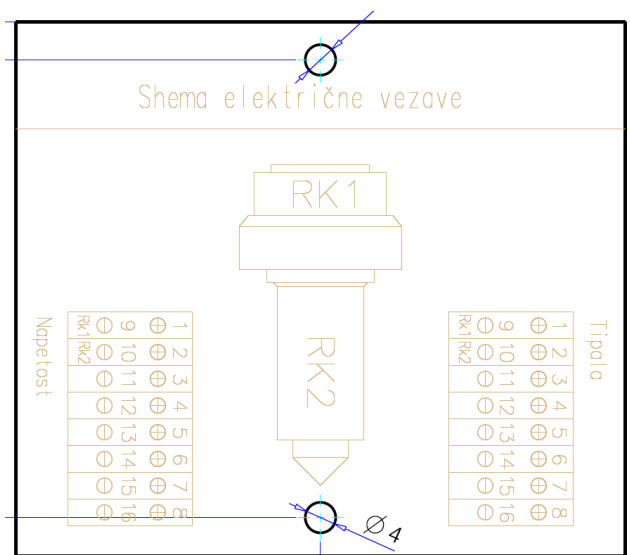
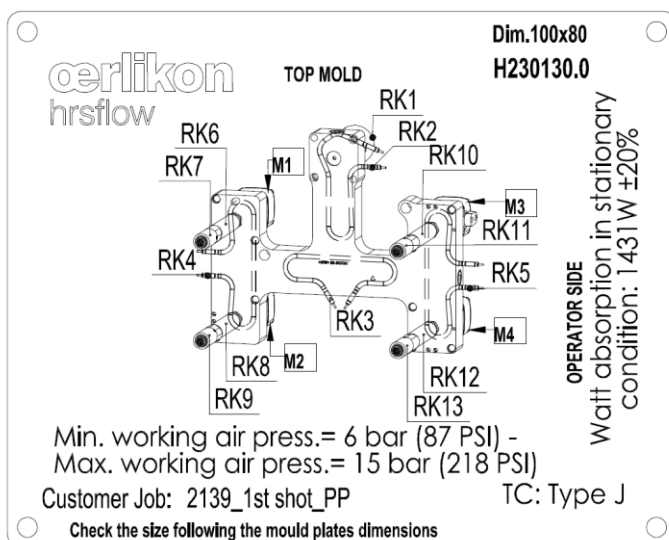


Core cooling plate

- Ploščica z oznako dobavitelja toplokanalnega sistema / Original plate from supplier for hot runner system



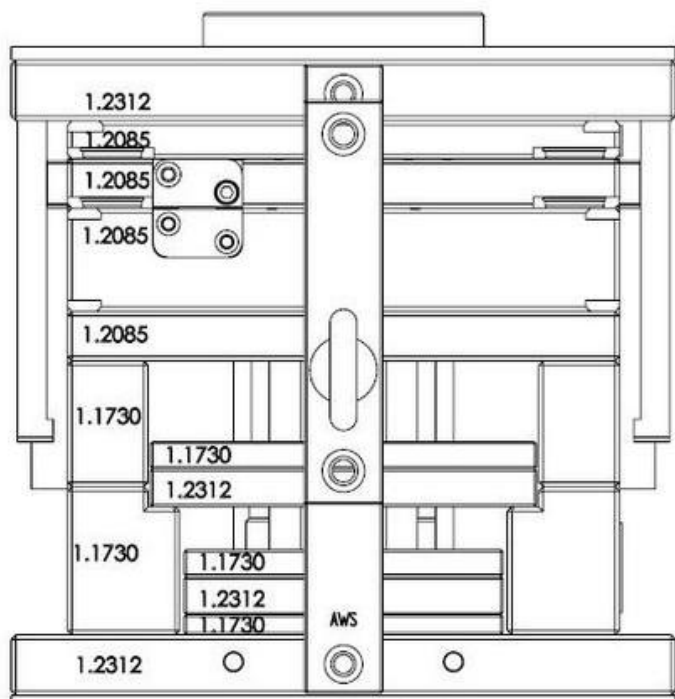
- Ploščica z vezavo grelnih teles / Hot runner connection plate (electrical)



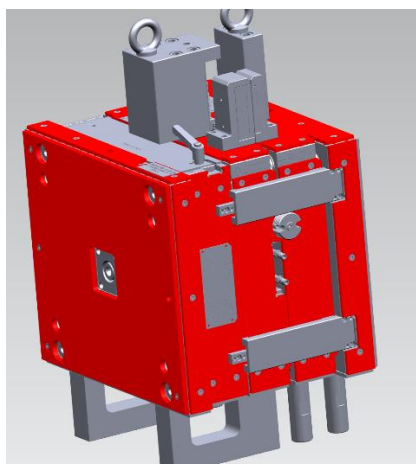
- Ploščica s potekom delovanja / Plate with mold function

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- Na vseh elementih orodja obvezno oznaka materiala / All elements of mould must have marking for type of material



- Orodja segreta nad 80 stopinj morajo biti v celoti izolirana / Tools heated over 80 degrees must be complete isolated



13. REZERVNI DELI / SPARE PARTS

- Izmenljivi oblikovni trni /Exchangeable inserts
- Izmetalne igle $\leq 3\text{mm}$ / Ejectors $\leq 3\text{mm}$
- Vsi ploščati izmetači / All flat ejectors
- Vsi oblikovni izmetači / All lifters
- Tesnila / Sealing parts (O rings)
- Kritični trni / Critical inserts
- Pedrotti sklopke 2K orodje / Pedrotti clutches 2K tool
- Vsi grelci in tipala TKS , konica šobe, zaporna igla / All heaters and thermocouples of HRS , nozzle head, nozzle pin
- Vzmeti / Springs
- Določiti po zasnovi konstrukcije / Define after plan of construction

14. PAKIRANJE / PACKAGING

Orodje mora biti ustrezno pakirano na primerni paleti in zaščiteno pred možnimi poškodbami med transportom. Vsi preostali deli orodja morajo biti ustrezno pakirani in zaščiteni, da se med transportom ne gibljejo in ne poškodujejo orodja oziroma drugih delov.

The mold has to be packed in a suitable way to protect it from damage during the transport. Any additional items have to be packed in a way that they are not moving during transport and do not damage neither mould or other items.

Zraven orodja je potrebno priložiti še sledeče / Together with mold the following items have to be delivered:

- Določeno število očesnih vijakov za transport orodja / A sufficient number of eyebolts for mold transportation
- Rezervni deli določeni v zapisniku pregleda konstrukcije / Spare parts as specified in mold design report
- Fotografija orodja pred pakiranjem / Photo of the mold before packaging
- Dokumentacija orodja / Documentation of the mold

15. DOKUMENTACIJA / DOCUMENTATION

Pri predaji orodja je potrebno predložiti kompletno dokumentacijo orodja /

Together with mold you have to give all documentation

- Sestavnico in vse detajlne risbe 1x na papirju / All drawings printed on paper 1x
- CD z 2D načrti DWG in PDF , 3D model STEP, x_t, IGES / All 2D files DWG and PDF , 3D file STEP,x_t, IGES (vsaka datoteka mora imeti pozicijo in naziv elementa , each file must have position and element name)
- Sestavna risba s kosovnico / Assembly drawing with BOM

Sestavna risba mora vsebovati naslednje podatke / Assembly drawing must have this datas:

- Naziv izdelka / Part name
- Številka načrta izdelka / Part drawing number
- Dimenzije orodja (š x d x v) / Mould dimension (W x L x H)
- Teža orodja / Mould weight
- Število gnezd / Nr. of Nest
- Skrčec materiala izdelka (%) / Part shrinkage (%)
- Proizvajalec orodja / Mold maker
- Priimek konstruktorja orodja / Surname of mould designer

Kosovnica je na sestavnici ali posebnem listu, vsebuje pa / BOM is on Assembly drawing or separate, it must contain:

- Pozicija / Position
- Število delov / Number of Parts
- Naziv / Name
- Material, standard / Material, standard
- Proizvajalec, dobavitelj / Manufacturer, supplier
- Opombe (toplotna obdelava, trdota ...) / Notes (heat treatment, hardness...)
- Številka detajlne risbe / Number of detail drawing

- Detajlna risba mora imeti šifro orodja, pozicijo in naziv /
Detail drawing must be with mold number, position and part name
- Dokumentacija mora biti ažurirana in kompatibilna s programskim orodjem NX v.10 /
Documentation must be up to date and compatible with software Unigaphic NX v.10
- Tehnična navodila za delovanje orodja in redno vzdrževanje (definirati kaj spada pod redno vzdrževanje)
Technical instructions for mould function and regular maintenance (define regular maintenance)
 - Definirati kaj je potrebno narediti/preveriti pri dnevnem vzdrževanju
Define what must be done/check at daily maintenance
 - Definirati kaj je potrebno narediti/preveriti pri periodičnem vzdrževanju (servis)
Define what must be done/check at periodical maintenance (service)
 - Definirati na koliko brizgov je potrebno izdelati servis kompletnega orodja
Define on how many shots each service of whole tool must be done
 - Definirati katera mazalna sredstva je potrebno uporabiti pri vzdrževanju orodja
Define which grease resources must be used for tool service
- Shema električne vezave grelcev in stikal / Electric scheme for connection heaters and switches
- Shema električne vezave končnih stikal / Electric scheme for limit switches
- Shema hidravlične vezave / Hydraulic layout
- Parametri vzorčnega brizganja / Injection parameters of samples
- Poročilo o meritvah pretoka vode (minimalen zahtevan pretok je 8l/min) / Report for water flow in cooling channels (Demand is minimum 8l/min)
- Certifikat o kaljenju gravurnih vložkov / Certificate of hardening for all inserts