



Danbro Tool & Die Inc. Die Standards

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1. SIMULATION REPORT

The Simulation report must include the following information:

- Thinning, wrinkles, and spring back analysis,
- FLD diagrams.
- Die action sections
- Total tonnage per station.
- Blank size used on simulation report.
- Steel spec of the part.
- Engineering level of the part.
- If the part has thinning or wrinkles problems, write down proposal to Improve.
- Sim native File.

Formability (Non Linear)



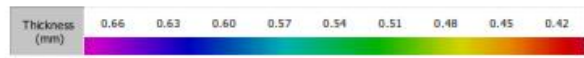
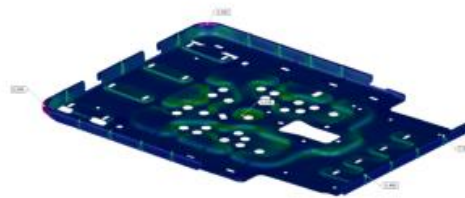
2710_run_10a.afd

Operation Step:	M-70 Springback
Distance To Bottom:	0.00 mm
Print Comment:	

01-02-2019, 11:27:04



Thickness / Hotforming: Total Thickness



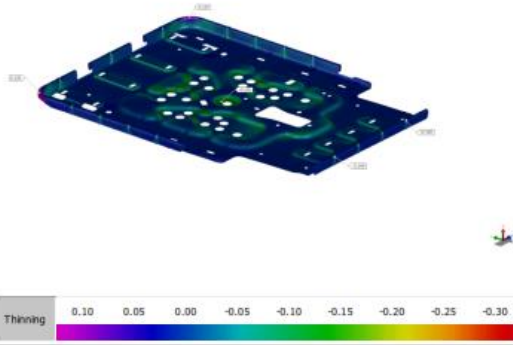
2710_run_10a.afd

Operation Step:	M-70 Springback
Distance To Bottom:	0.00 mm
Print Comment:	

01-02-2019, 11:25:27



Thinning / Hotforming: Mechanical Thinning

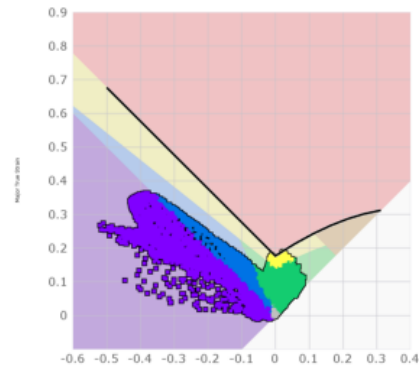


2710_run_10a.afd

Operation Step	M-70 Springback
Distance To Bottom	0.00 mm
Print Comment	

01-02-2019, 11:24:01

Forming limit (Linear)

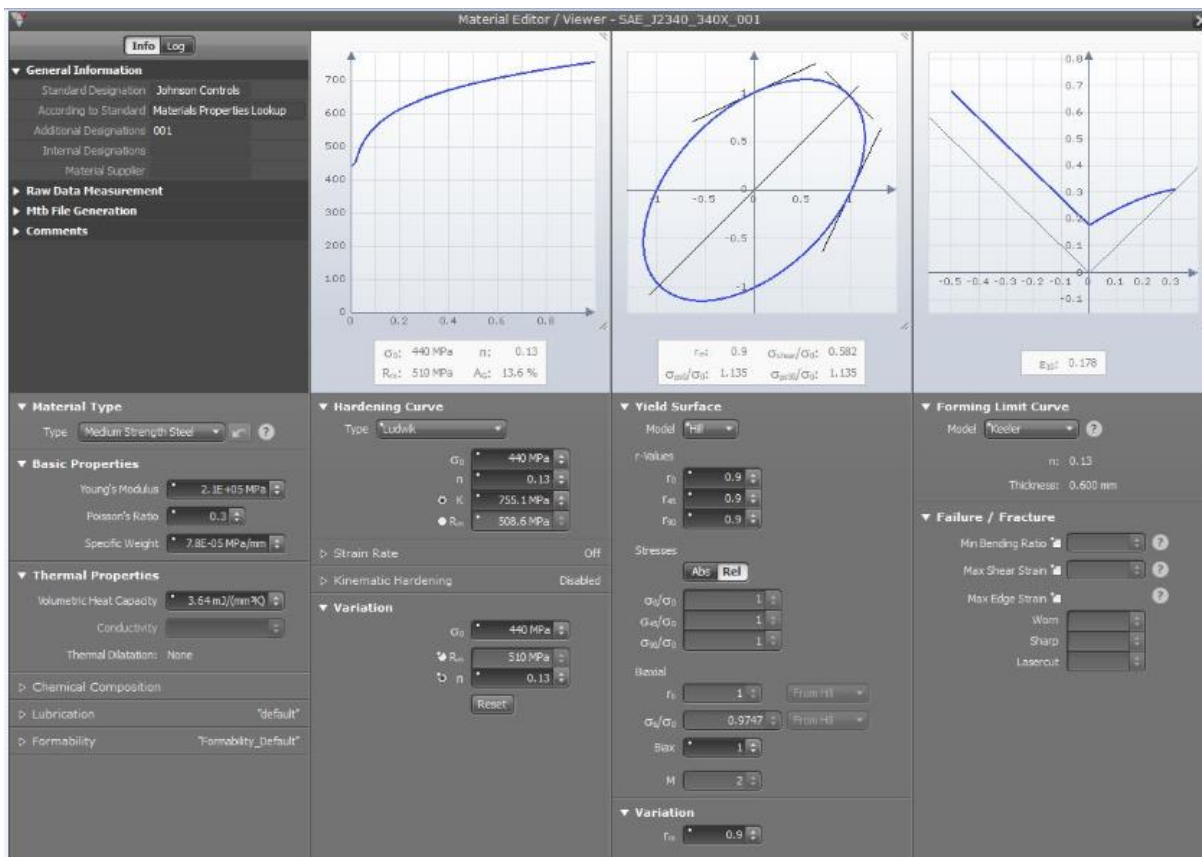


	Thinning	Compress	Insuff Stretch	Safe	Risk of Splits	Excess Thinning	Splits
Area	1.42 %	5.42 %	58.52 %	30.20 %	0.03 %	0.00 %	0.00 %
Limits	0.01	< 0.02		20.00 %	> 0.30		0.00 %

2710_run_10a.afd

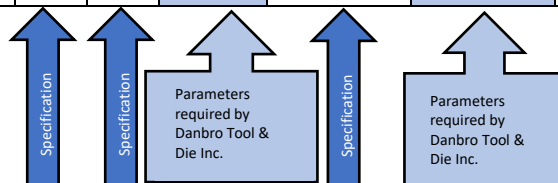
Operation Step	M-70 Springback
Distance To Bottom	0.00 mm
Material:	SAE_J2340_340X_001
Print Comment:	

01-02-2019, 11:20:22

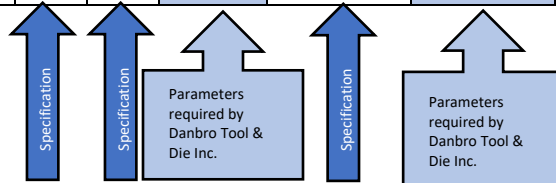


- Use Yield & Tensile Strength values indicated in the Table showed below.

TABLE WITH REQUIREMENTS FOR SIMULATION										
Sheet Steel										
Hot and C old Rolled High Strength Steel - Yield Strength Based										
GMW6409M Cold Rolled Steel										
GMW-3032-M-STs Designation	Yield Strength		Yield Strength MIN +75%	Tensile Strength (MPa) MIN	Tensile Strength MIN +75%	Total Elong in 50 mm % MIN	Total Elong in 80 mm % MIN	Total Elong in 50 mm (JIS No5) % MIN	Rm ⁵⁶⁷ MIN	n value ⁵
	MIN	MAX								
CR 1	140									
CR 2	140	260	230	270	360	34				0.18
CR 3	140	210	193	270	323	38			1.7	0.20
CR 4	140	185	174	270	304	40			1.8	0.22
CR 5	110	180	163	260	313	42			1.9	0.24
GMW6409M Hot Rolled Steel										
HR 1	180	290	263	270	353					
HR 2	180	290	263	270	353	34				0.18
HR 3	180	290	263	270	353	38				0.20
GMW3032M Hot Rolled and Cold Rolled Steel										
180 P	180	240	225	300	345	35	33	39	1.41	0.22
180 B2	180	240	225	300	345	35	33	39	1.41	0.21
180 B0	180	240	225	300	345	35	33	39	1.41	0.19
210 P	210	270	255	320	365	33	31	37	1.41	0.21
210 B2	210	270	255	320	365	33	31	37	1.21	0.19
210 B0	210	270	255	320	365	33	31	37	1.21	0.18
240 B2	240	300	285	340	385	30	28	34	1.21	0.19
240 B0	240	300	285	340	385	30	28	34	1.21	0.18
270 B2	270	330	315	365	410	28	26	32	1.11	0.17
270 B0	270	330	315	365	410	28	26	32	1.11	0.17
300 B2	300	360	345	390	435	26	24	30	1.01	0.16
300 B0	300	360	345	390	435	26	24	30	1.01	0.16
GMW3032M Cold Rolled High Strength Low Alloy - Mechanical Properties										
CR270	270	350	330	330	390	26	24	30		0.17
CR300	300	380	360	370	430	24	22	28		0.16
CR340	340	420	400	410	470	22	20	26		0.15
CR380	380	460	440	450	510	20	18	24		0.14
CR420	420	520	495	480	555	18	16	22		0.13 ⁴
CR500	500	600	575	560	635	16	14	20		0.11 ⁴
CR550	550	650	625	610	685	14	12	18		0.10 ⁴



GMW3032M Hot Rolled High Strength Low Alloy - Mechanical Properties										
HR270	270	350	330	330	390	29	27			0.17
HR300	300	380	360	370	430	27	25			0.16
HR340	340	420	400	410	470	25	23			0.15
HR380	380	460	440	450	510	23	22			0.14
HR420	420	520	495	480	555	22	20			0.13
HR500	500	600	575	560	635	20	18			0.11
HR550	550	650	625	610	685	18	16			0.10
GMW3399M Hot Rolled Dual Phase - Mechanical Properties										
HR 490T / XXXY DP	To Be Determined									
HR 580T / 320Y DP	300	450	412.5	580	692.5	21	22	19		0.20
HR 780T / 380Y DP	380	610	552.5	780	952.5	15	16	14		0.18
GMW3032M Hot Rolled High Strength Low Alloy - Mechanical Properties										
HR 450T / 310Y HE	310	380	362.5	450	502.5		25			TBD
HR 590T / 440Y HE	440	620	575	590	725		14	17		0.10
HR 780T / 600Y HE	600	800	750	780	930		12	15		0.09
HR 980T / XXXY HE	To Be Determined									
GMW3399M Cold Rolled Dual Phase- Mechanical Properties										
CR 450T / 250Y DP	250	330	310	450	510		27	30		0.18
CR 490T / 290Y DP	290	390	365	490	565		24	27		0.17
CR 590T / 340Y DP	340	440	415	590	665		20	22		0.16
CR 780T / 420Y DP	420	550	517.5	780	877.5		15	17		0.11
CR 980T / 550Y DP	550	730	685	980	1115		8	10		N/A
CR 1180T / 820Y DP	820	1130	1052.5	1180	1412.5		3	4		N/A
GMW3399M Cold Rolled TRIP - Mechanical Properties										
CR 590T / 380Y TR	380	480	455	590	665		26	29		0.21
CR 690T / 400Y TR	400	510	482.5	690	772.5		24	27		0.21
CR 780T / 420Y TR	440	560	530	780	870		20	20		0.19



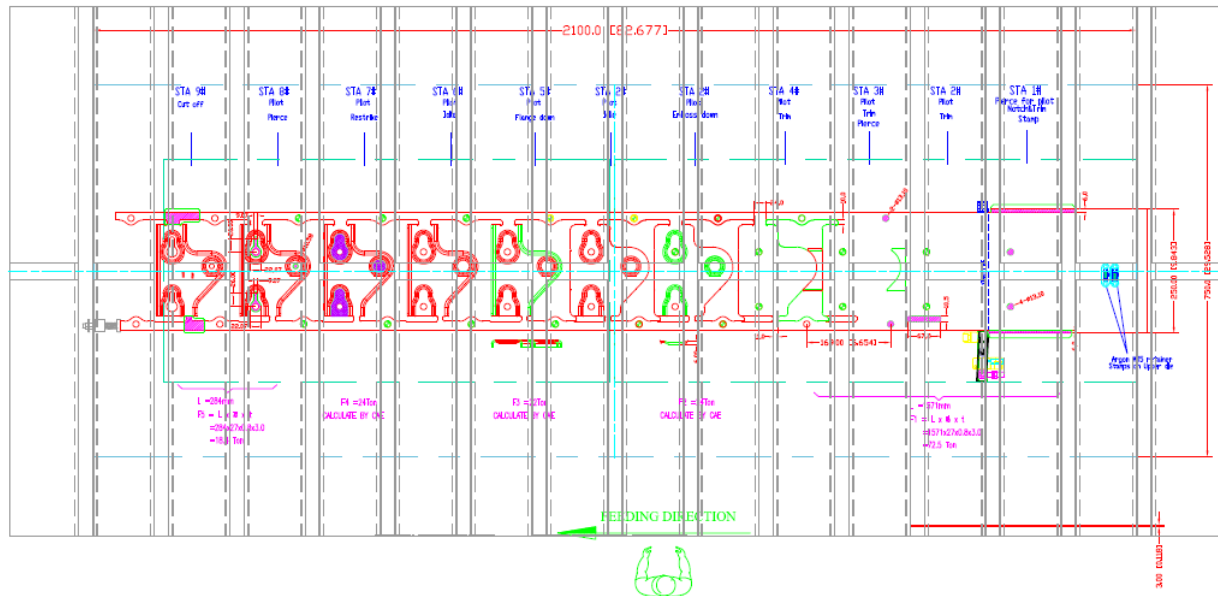
2. LAYOUT PROCESS

Strip layout or transfer process must be in 2D DWG, PDF and 3D STEP file.

Layout must show:

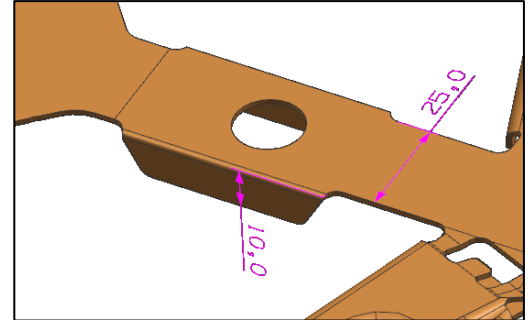
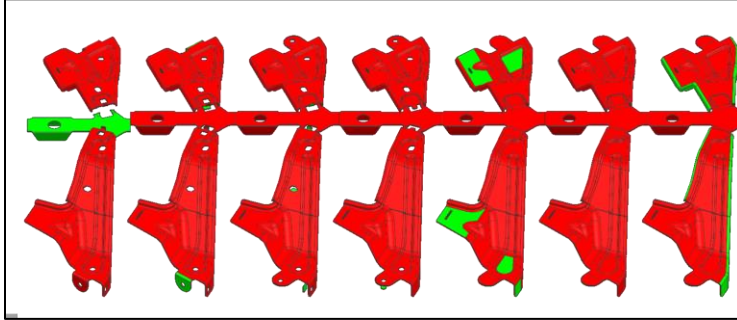
1. All the Dimensions in METRIC SYSTEM.
2. Total tonnage and Tonnage by each single station.
3. Feed direction.
4. Date stamp location.
5. Sensors for pitch and cut-off.
6. Shut Height, feed height, Transfer pass line, width, pitch, material thickness, lifting, pilot hole $\varnothing$ and critical dimensions as show.
7. Part Mismatch layout.
8. Forming, trim and pierce indicated with different colors.
9. Show Bolster of selected press.

The estimated press force is 160.9 Ton.

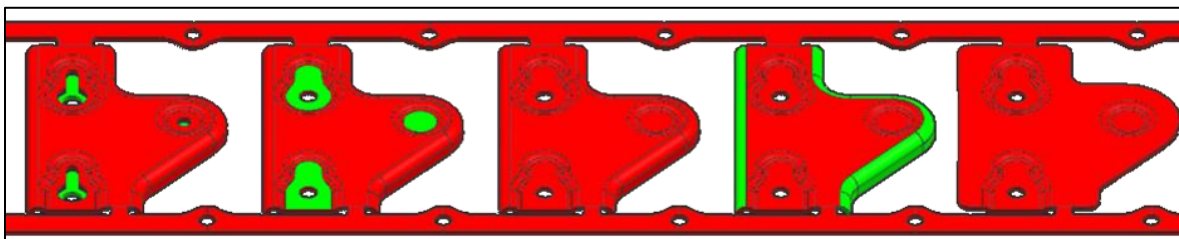
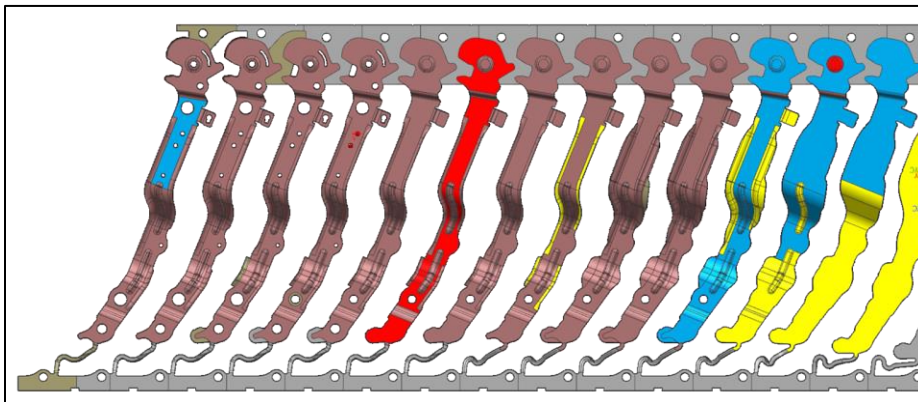


1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100		1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22
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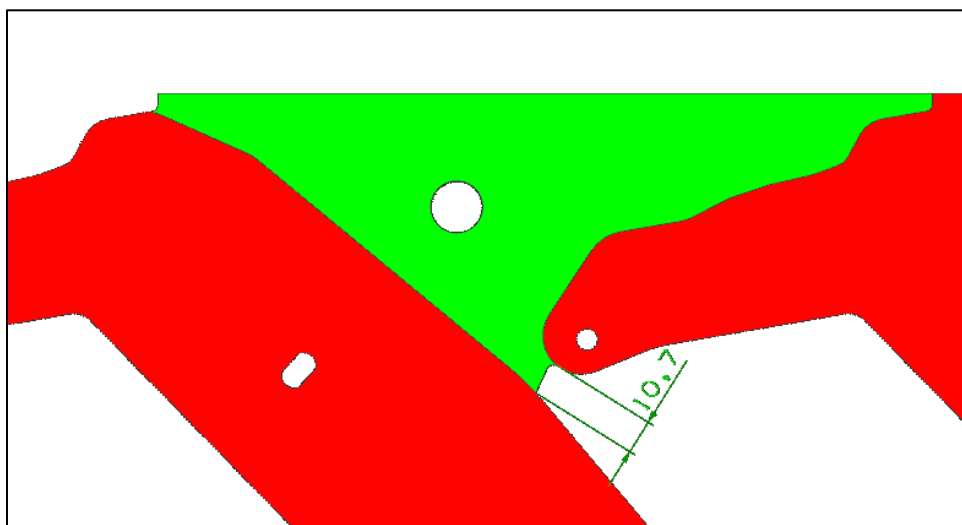
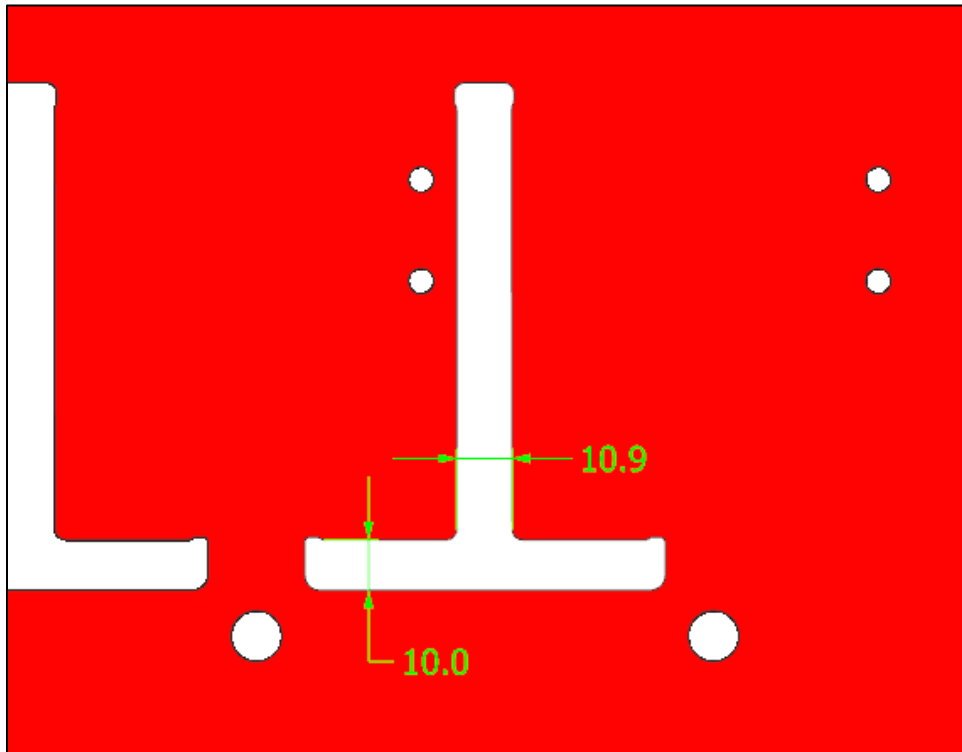
- Center Carrier must be strong adding a U flange 10mm height for stability.



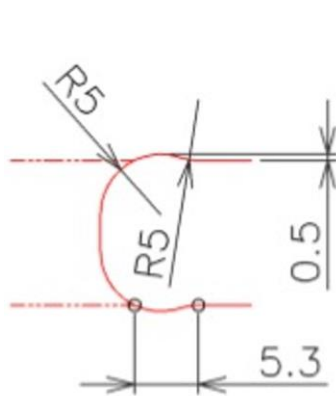
- Lat carrier must be strong and wide enough for stability.



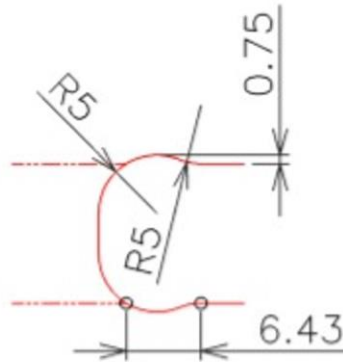
- Trim punches must be 10mm wide as minimum when material thickness is between 0.8 and 3.5mm, for thicker gauge use 3 times the material thickness as minimum width.



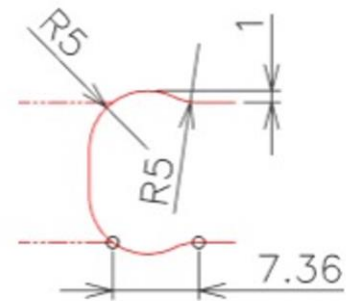
- By-pass notches to be designed to avoid double cutting condition. Follow below standard when trim tolerance is allowed.



Detailed notch
0.5mm-2.5mm material thickness

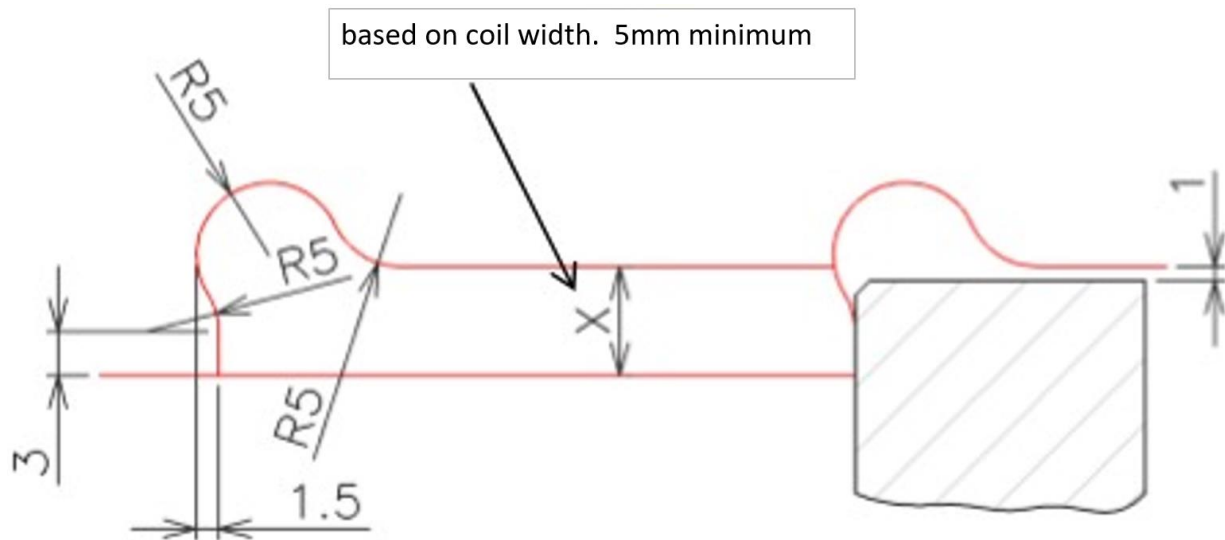


Detailed notch
2.6mm-4mm material thickness



Detailed notch
> 4.1mm material T.

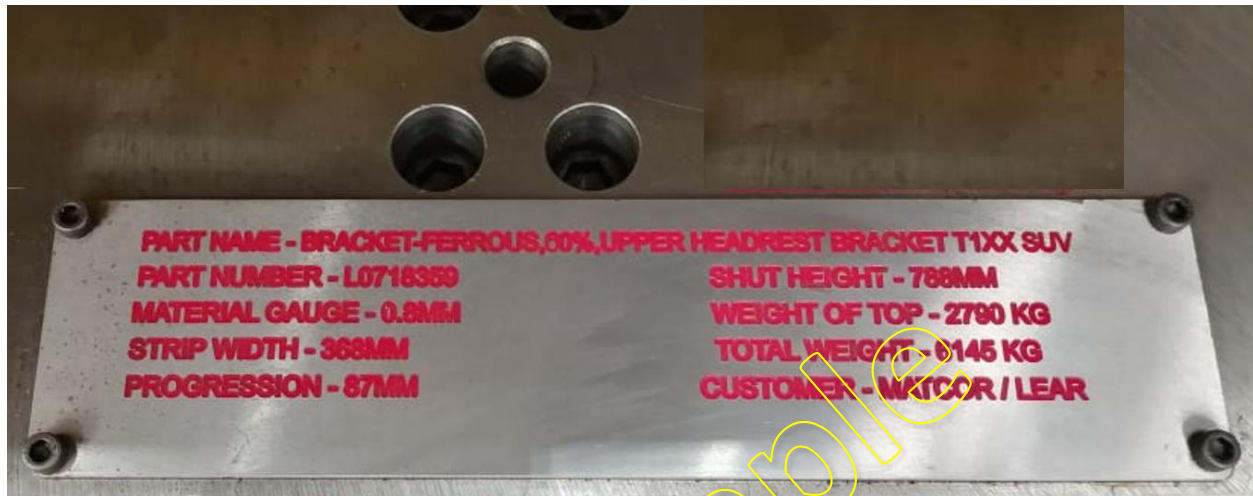
- Coil edge cut to follow below standard.



3. GENERAL DIE DESIGN

- All the Die designs, layout process, and simulations must be reviewed and authorized by the Tooling Engineer and Tool Room manager, before the kick off.
- Below are listed the materials to be use in **Danbro Tool & Die Inc.** dies:
 - Lower & Upper Shoes SAE 1018 / SAE 1020
 - Risers / Parallels / Keys SAE 1018 / SAE 1020
 - Lifters/Stock Guides/ Stripper AISI 4140
 - Special Punch-Retainer AISI 9840 / AISI 4140
 - Backing Plates 4140 Pre hard.
 - Trim Punches, blades & buttons AISI D2 or DC53 if need to stamp high strength material (58-62° HRC)
 - Forming Inserts AISI D2 or DC53 if need to stamp high strength material (58-62° HRC).
- All Designs must be in 3D and **Metric System**.
- Designs shared with Danbro should be in STEP and Native Format.
- **Die Designs for parts with 1.5mm thickness or thicker must be made of steel plate (no casting).**
- **Pierce punches** 90.0mm length and ball lock heavy duty (M2 steel), use headed type when material thickness is thicker than 3mm or for high strength material 550MP or higher (DAYTON PS4 steel)
- Extruding punches use DAYTON PS4 coating by DAYTON XNP type.
- **Button die** 25.0mm height Dayton brand, made of highspeed Steel (M2).
- Nitrogen Gas Spring, DADCO brand:
Small MICRO series/ Medium L series/ Large 90.10-90.8 series.
HYSON or KALLER brand can be used if tooling engineer ask for.

- Nitro cylinders should be charged to a max of 80% .75% is better for cylinder life
- Wear plates, guide blocks, keepers, Danly/Lamina brand, or equivalent according NAAMS Standards (Do not use special Sizes)
- For stripper pads and lifters use Standard Lifters or Dadco brand retainers according Tooling engineer (retainer size and styles are indicated in upper die Design section.)
- All progressive & blanking dies must be run off in a press with coil feeder, no strip feeding.
- Transfer Dies must be run off under one RAM (all sets at same time).
No exceptions will be made.
- All the Blanks Shape Must have Poka-yoke to avoid any mistake orientation when is loaded in the Blank Destaker and feed the blank to the Forming/Draw Station.
- Include this information marked in lower plate (progressive and blanking dies):
 1. Part Name
 2. Part Number
 3. Shut Height
 4. Pitch
 5. Strip Width
 6. Material thickness
 7. Weight of Top half of die
 8. Weight of Bottom half of die
 9. Total Die Weight.
 10. Property of



- For Sensors and connector, Danbro will share information at die design stage.

Example:

Sensors NPN M12 X 1

Balluf brand

Code: BES 516-329-G-E5-C-S4

Connector pin

PHOENIX CONTACT Brand

Code: HC-B 24-ESTS-1771749

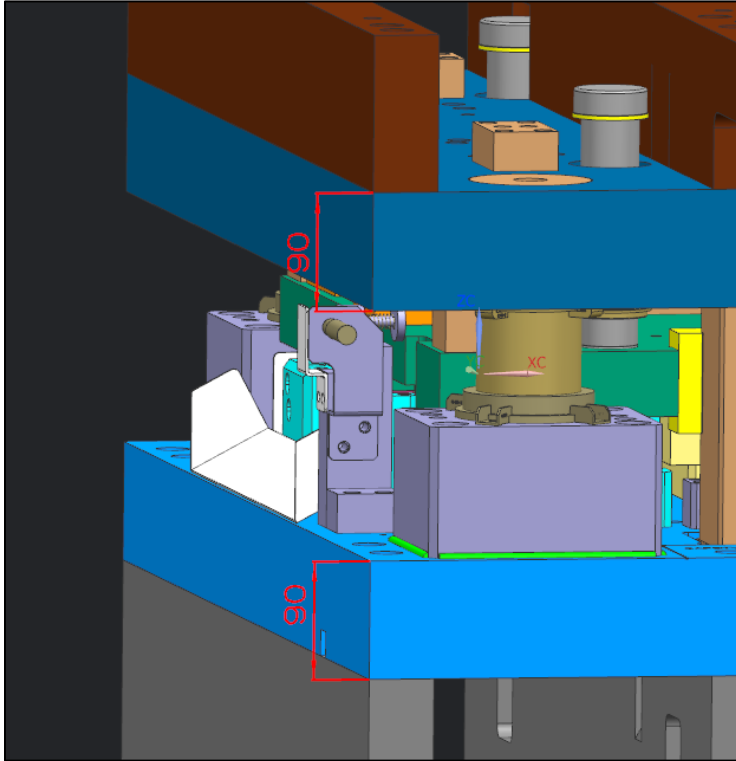
Mounting Box

PHOENIX CONTACT Brand

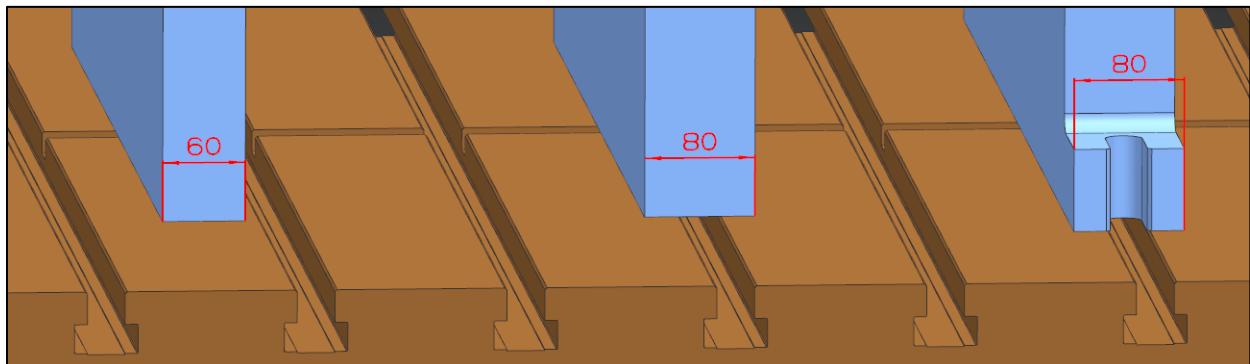
Code: HC-B 24-SMQ-67/M1M25-1586976

Progressive dies require one mechanical stop at the rear side of the Die (to avoid over-progression), **sensor** for coil present (stop for pitch), and other at the end of die, in order to detect miss feed.

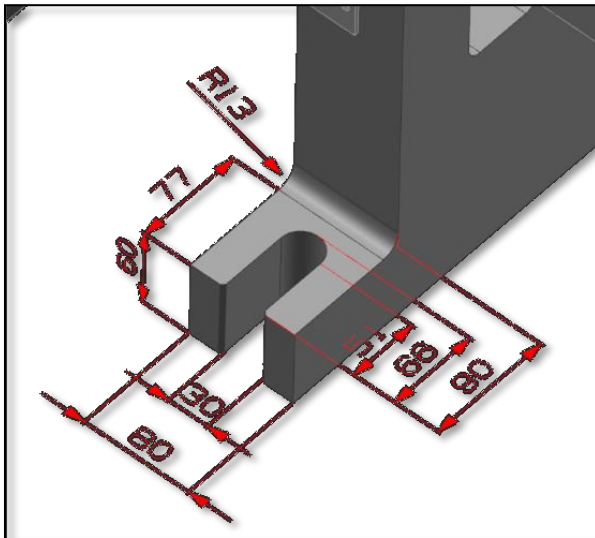
- Die shoe thickness must be 90mm (80mm can be used for small dies).



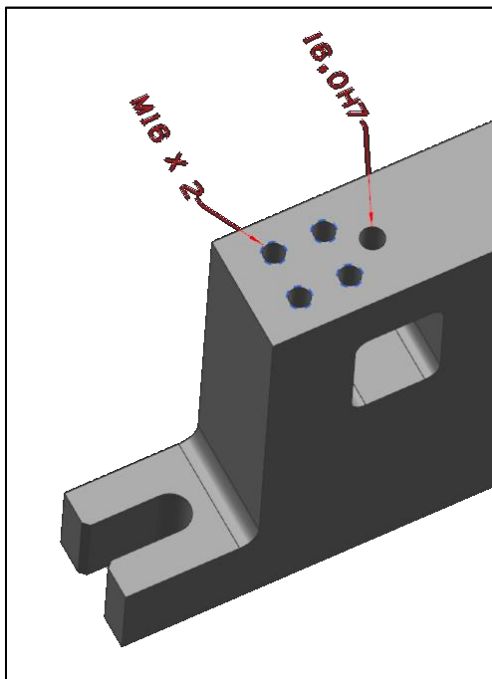
- Parallels:
 - Clamping parallel thickness must be 80mm,
 - for no clamping parallels 60mm to 80mm can be used (80mm wide must be if the parallel is over T-slot)



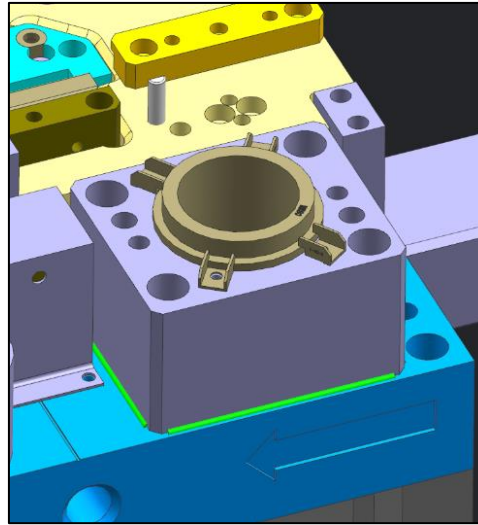
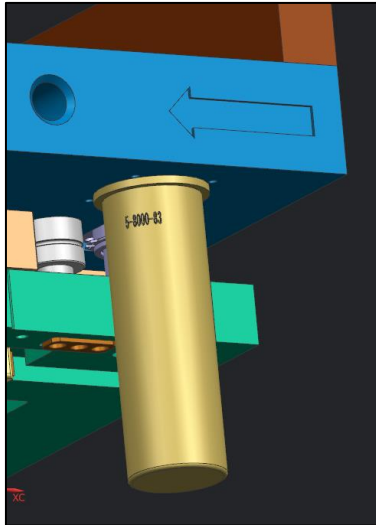
- Clamping feet dimensions will be provided by Danbro Tool & Die Inc. according to the presses and clamps.
Example below:



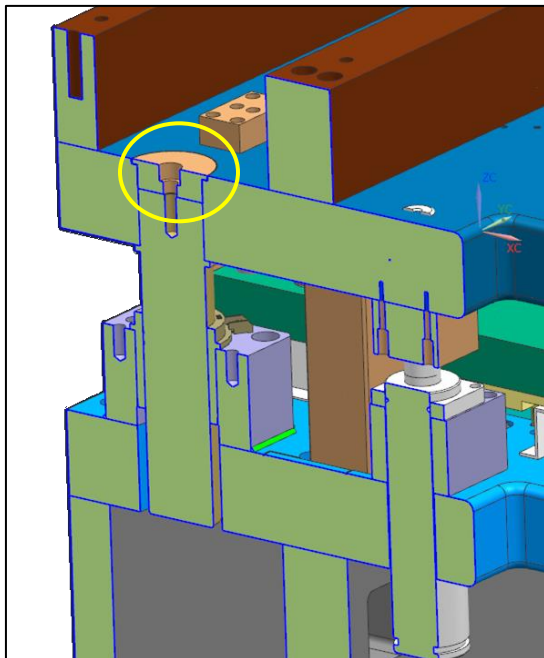
- Clamping parallel must be hold by 4 M16 screws and one Dowell pin each side.



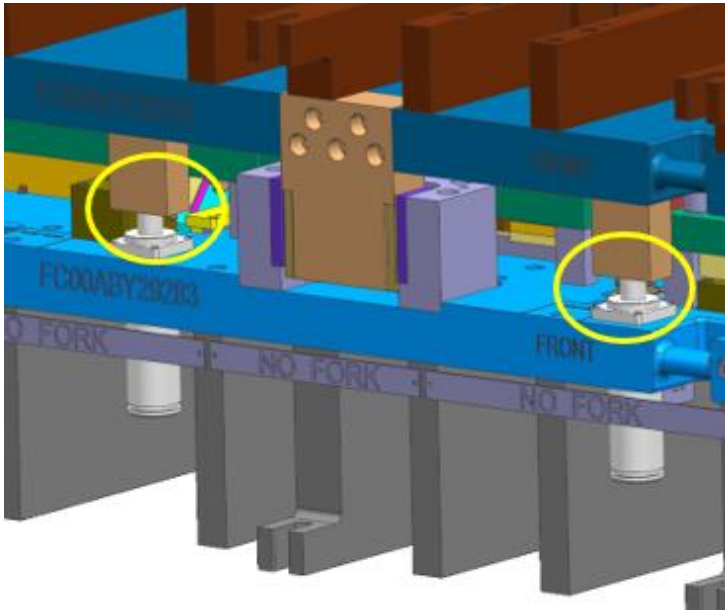
- Use bronze bushings and solid guide posts $\varnothing 80\text{mm}$ for mid and large size dies, $\varnothing 63\text{mm}$ for small dies:



- Use safety keeper for guide post.



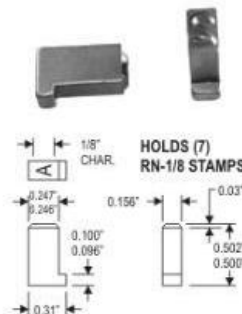
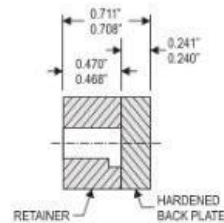
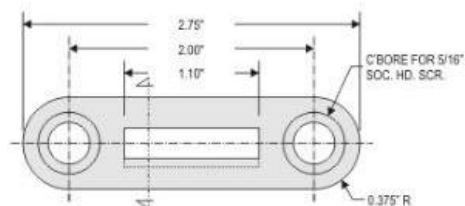
- Add storage cylinders.



- Retainer for date stamp, Argon (brand) Spec RN1/8
(Size depend of Customer requirement)
http://www.argontool.com/standard_stamps1.htm

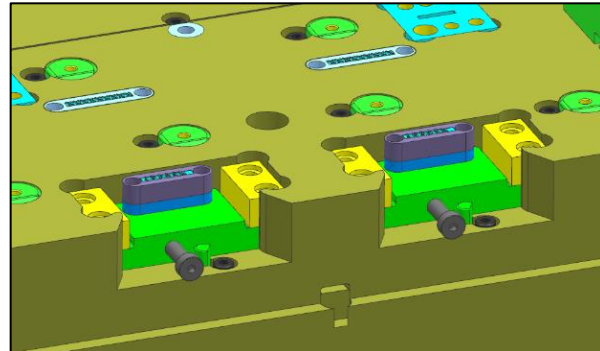
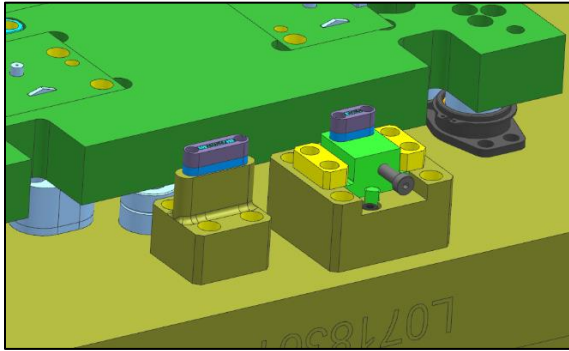
92-845-1516 RETAINER SET

ARGON TOOL & MFG.

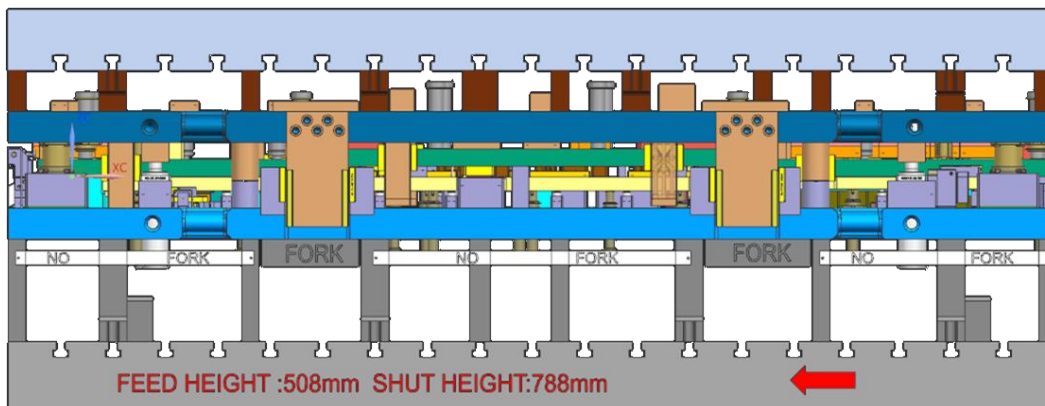


www.argontool.com (248)583-1605

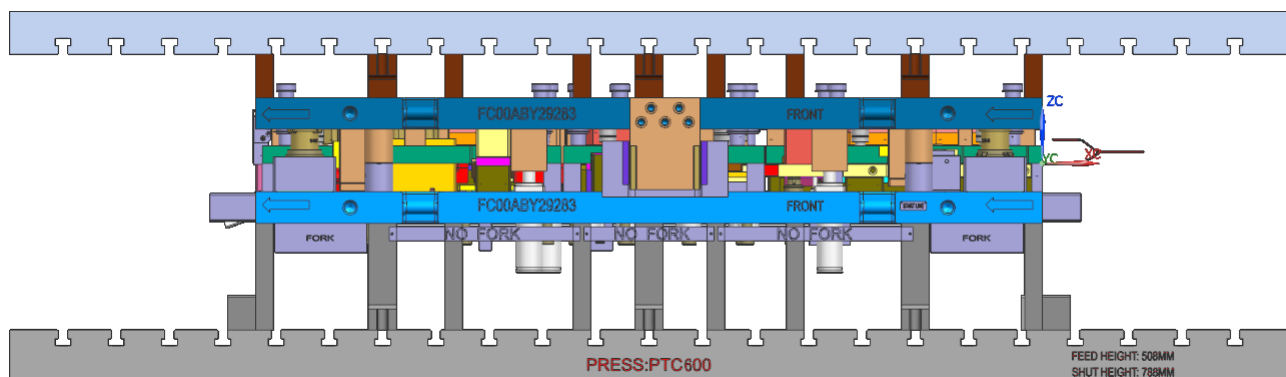
- Use quick change style holder for date stamp, and fixed stamp holder for part number (It can be in upper or lower die depending on customer requirements).



- Use 4 heel blocks for large dies.



- Use 2 heel blocks for medium and small dies.

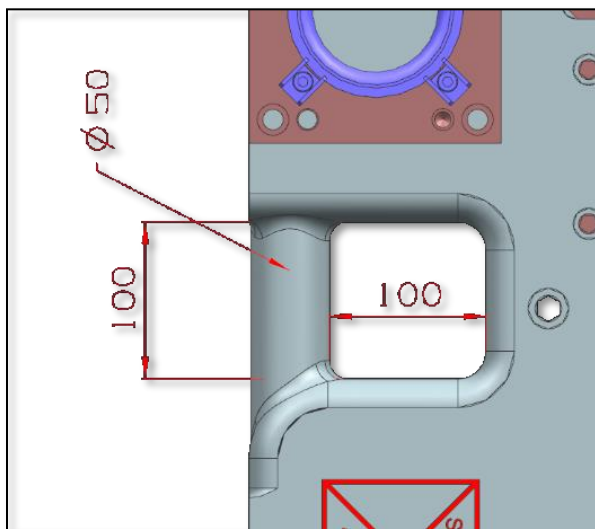


- All the Bolts used in Danbro DIES need to be GRADE 9.8 ~ 12.9
Example HOLO-KROME, UNBRAKO, BRIGHTON BEST, MISUMI.

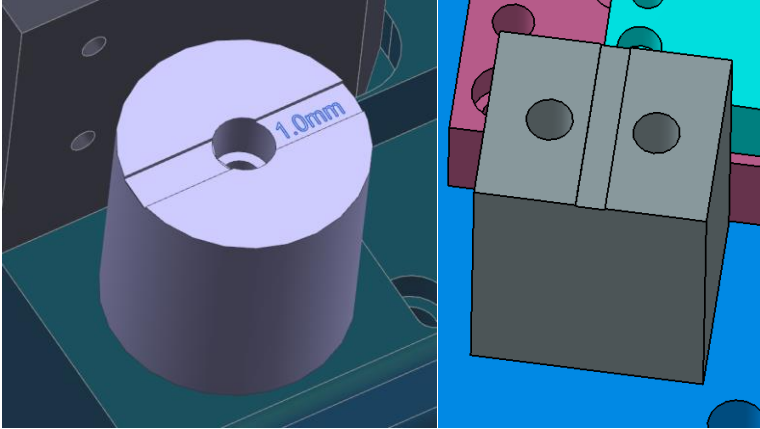


(No flat or low head allowed under any circumstances)

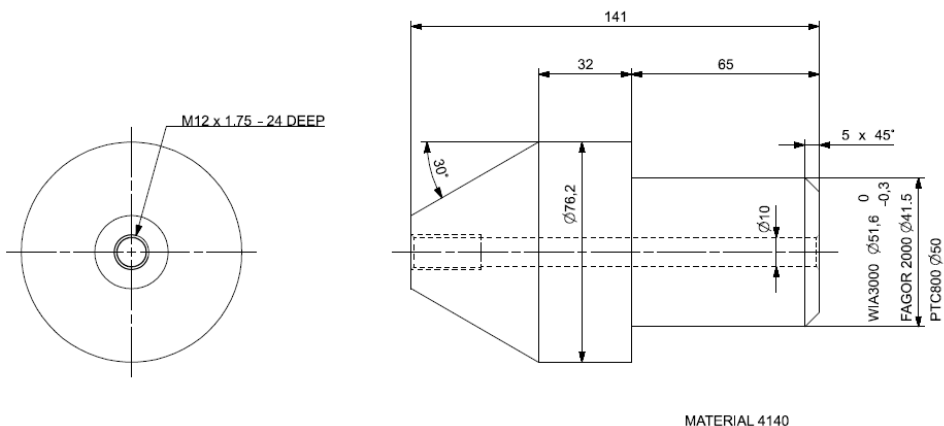
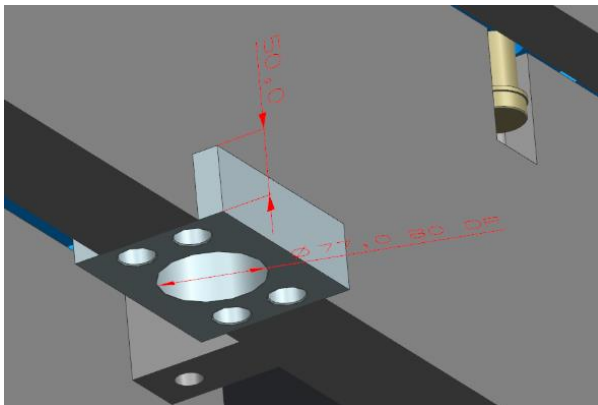
- Upper/Lower Parallel Bars must be Bolted using M16 Minimum.
- All inserts need to have enough lifting holes.
- All inserts have to be Identifying with Material Type, Detail Number, die number.
- All pocketed steels or doweled steels must have lifting holes.
- If lifting bars are required, they must be machined on die shoe.



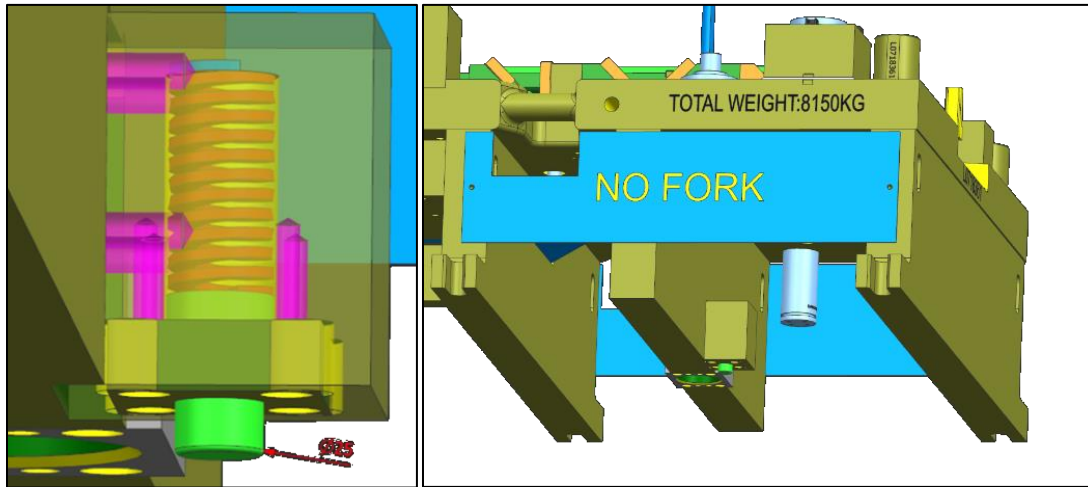
- Limit blocks must have **1mm lead check** for adjust and **bolted with M12**, and have to be placed over parallels.



- For die location on the Bolster, Danbro Tool & Die Inc. will provide location system information according to the press.
Example for moving bolster with pin locators below:

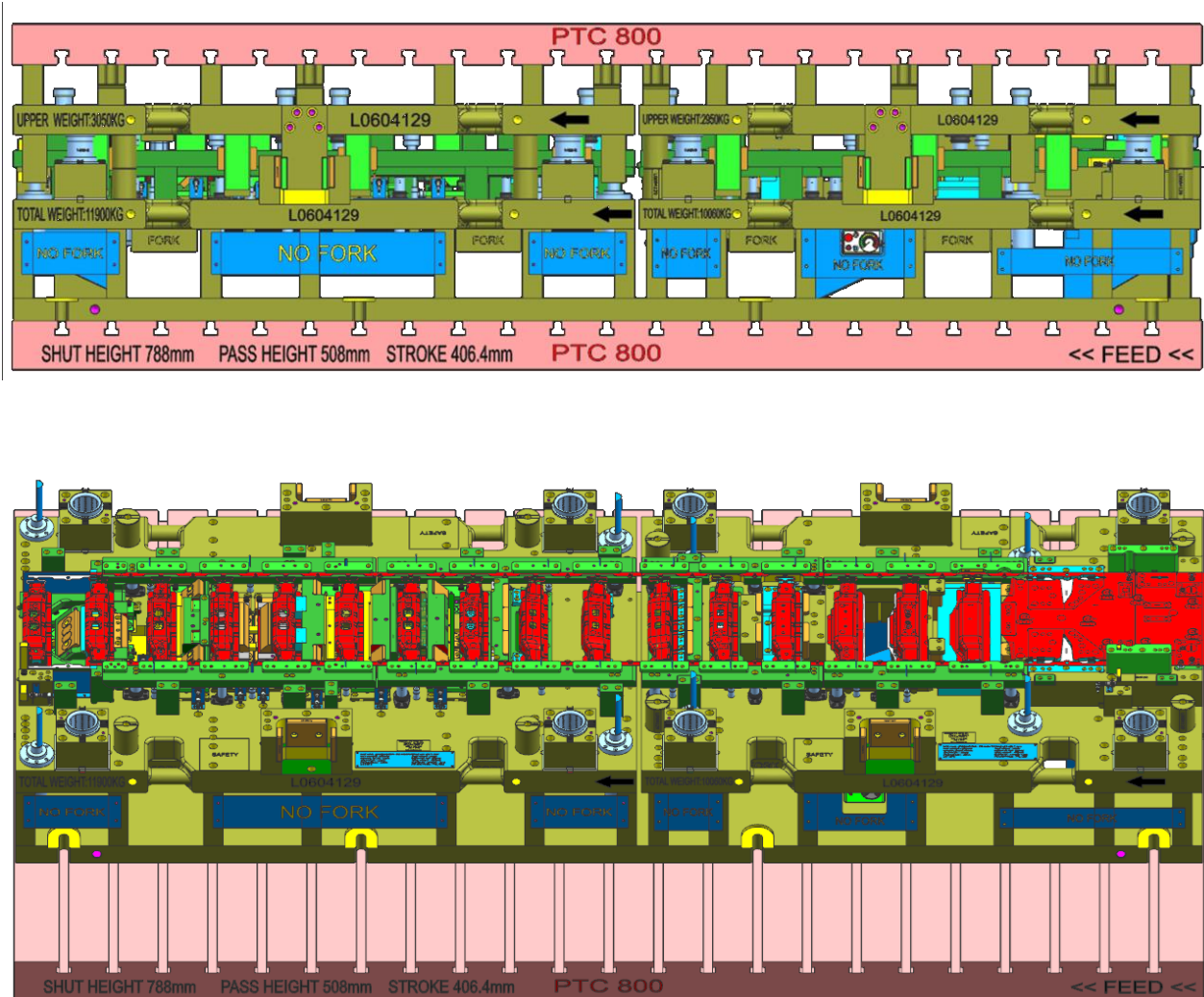


Example for fixed bolster below:



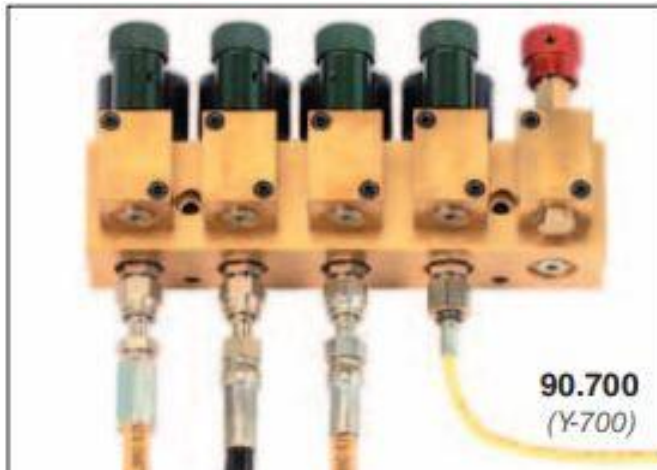
- Any insert over 250 x 250 mm or exceeding 15 kg weight must be split.
- **Heat treatment** certified is requested for each insert.
For Critical Forming areas use **coating DUPLEX VARIANTIC**, any alternative coating process must be approved by Project Tooling Engineer.
- All components and inserts have to be free of welding, shims are allowed but only one shim by component and fixed by a screw.
- **All Die Guide**, as well as Symmetrical pads must have an Error Proof.
- Include Reference holes with coordinates in x-y-z on each Die Set.
- Never use Manifolds plates with Nitro Gas Spring integrated.
- Draw station where **Nitrogen gas springs** are used must have linked system with control panel, also when forming steels are mounted on stripper pad linked system and control panel must be used.

- **Die size:** dies longer than 3000mm, need to be separated, unless agreed by Danbro Tooling Engineer.



- **Die Weight:** dies weigh more than 15 Metric ton need to be separated, unless agreed by Danbro Tooling Engineer.

- Use control panel with 6.0 mm quick disconnect fitting. Place it in front and back of tool and use Y-700 Hose only.

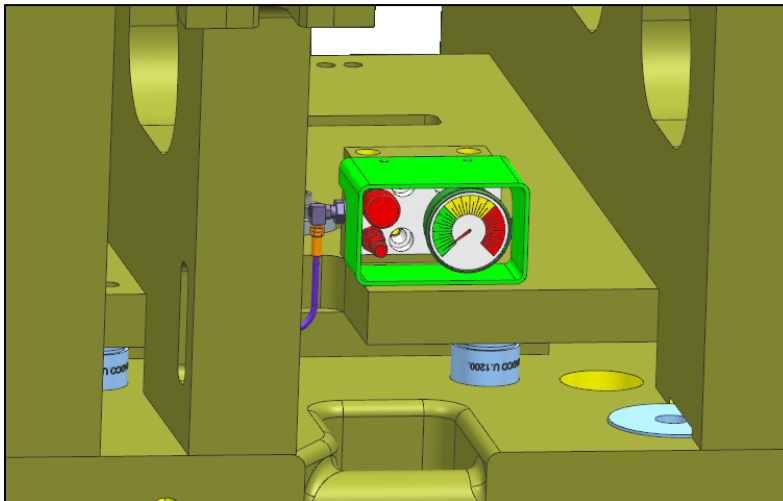


MINIFLEX®

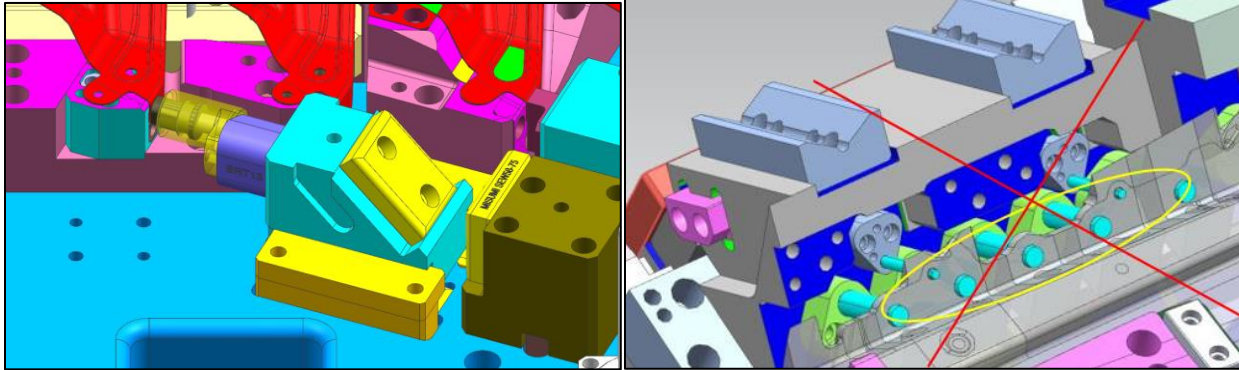
90.700 (Y-700) Hose

- + Offers the smallest possible bend radius available for flexible hose
- + Compatible with mini-fittings for the *MINILink*® System and DADCO Zip-fittings.
- Only permanent crimped adapters available
- Cannot be linked with a surge tank

- **For transfer dies** All Shut Heights tolerances of die sets have to be common ± 0.5 mm. (T)
For **Die Set Location** 2 pin locators **per station are needed**;
1 to the front &, 1 more to the rear of die.
- The Control Panel Must Be Protected between parallels and add a safety guard.



- Use true strip MOELLER or DAYTON brand strippers for cam piercing



- For material thicker than 2.5mm Nitro Strip can be used according to tooling engineer requirement.



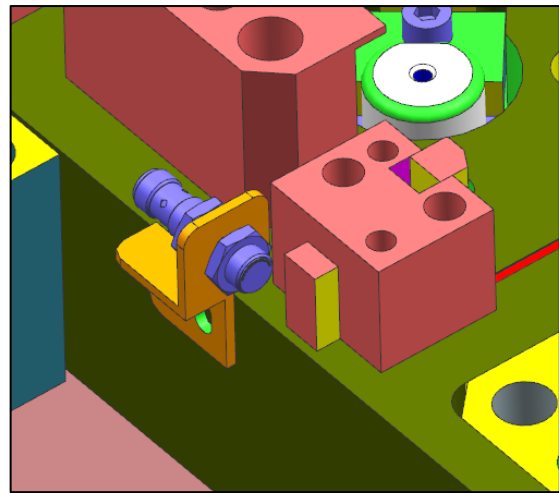
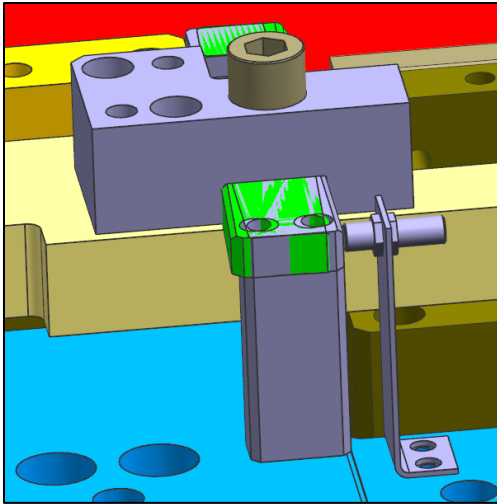
Heavy duty - adjustable force nitrogen gas spring stripper

Direct mounting to standard retainers for ball-lock and ISO headed punches

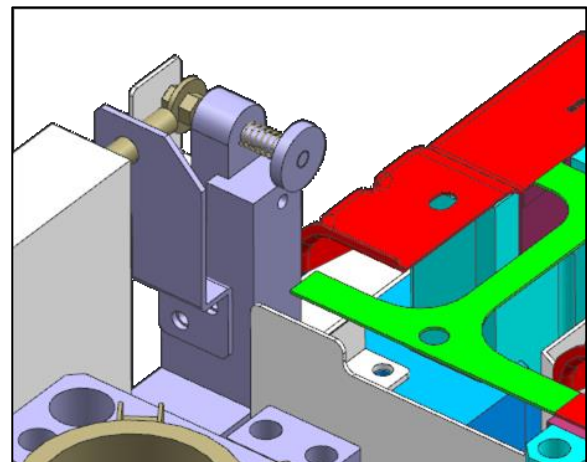
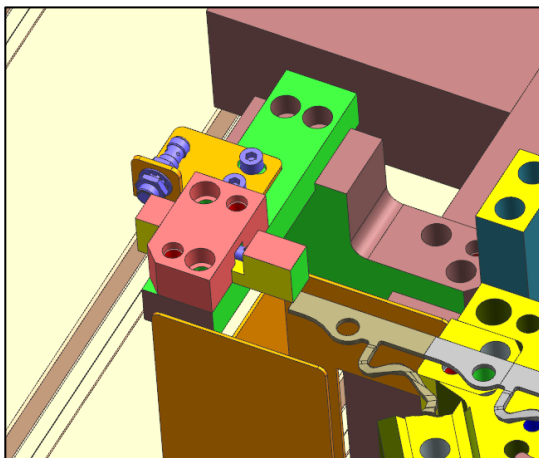


LOWER DIE

- Add sensor and finger according to the process.

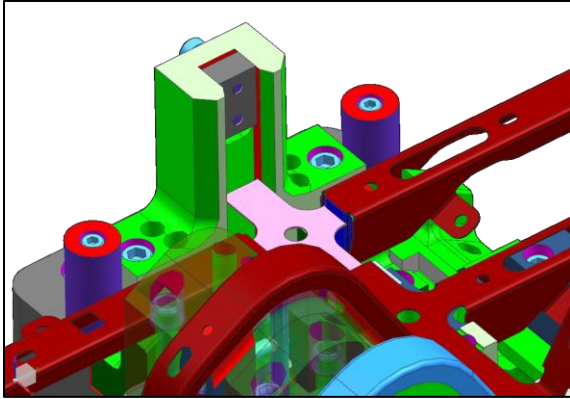


- For lateral carrier use this type of sensor fingers.



- Add sensor covers and pipes to protect the sensor cables

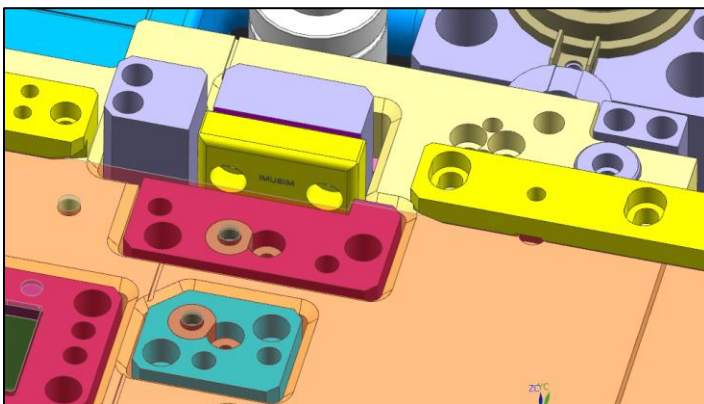
- For center carrier use this type of sensor finger with “V” guide block.



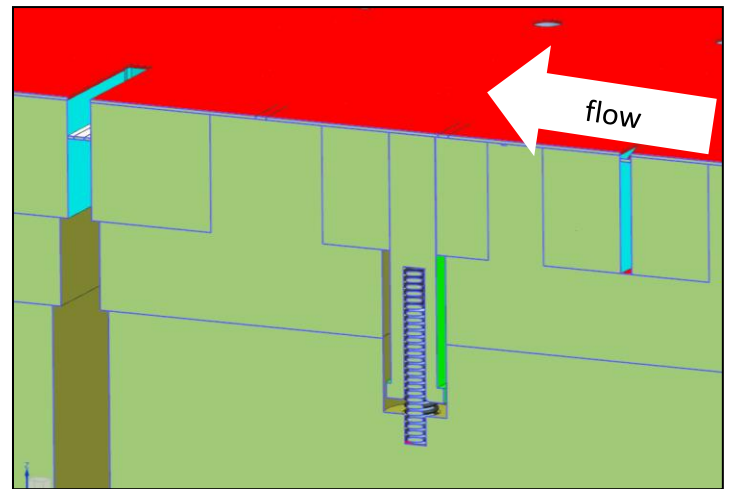
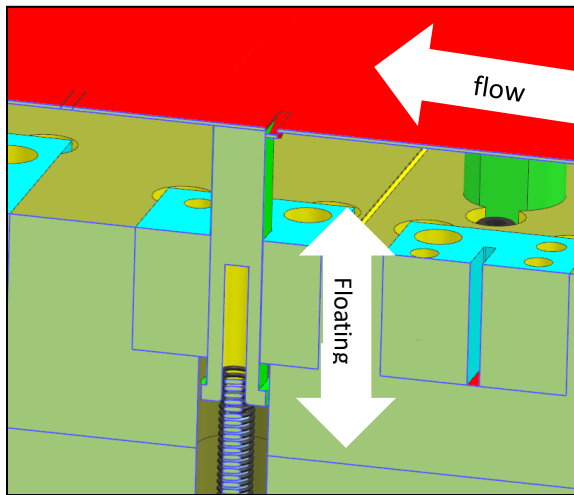
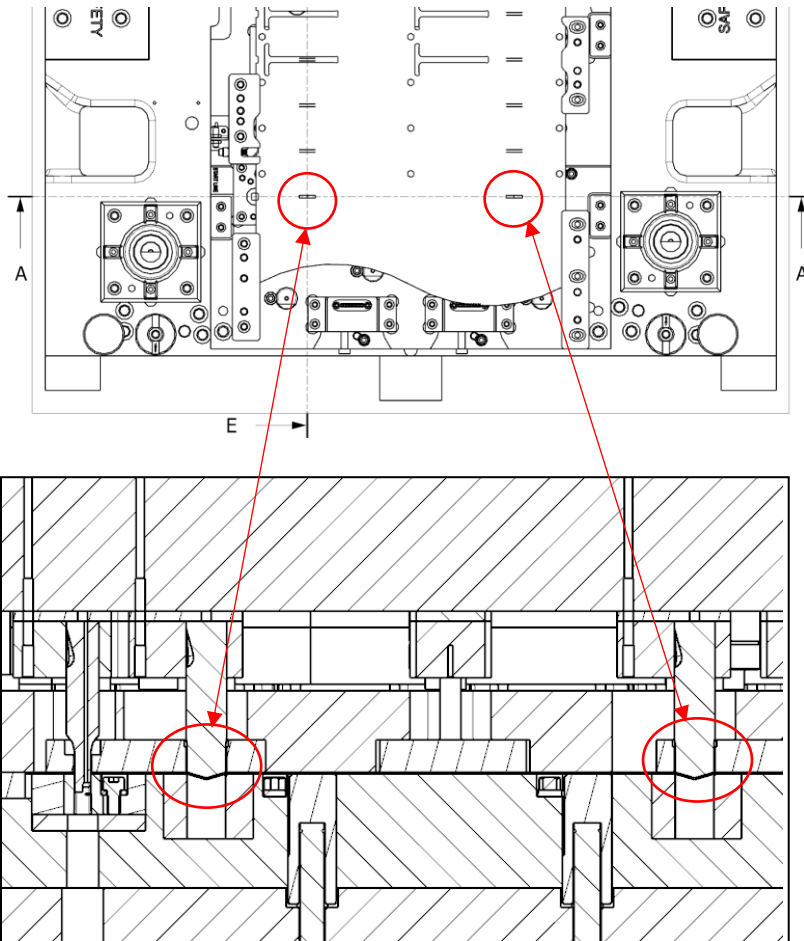
- Progressive dies require at least one solid stop block at the rear of the Die (to avoid over-progression).



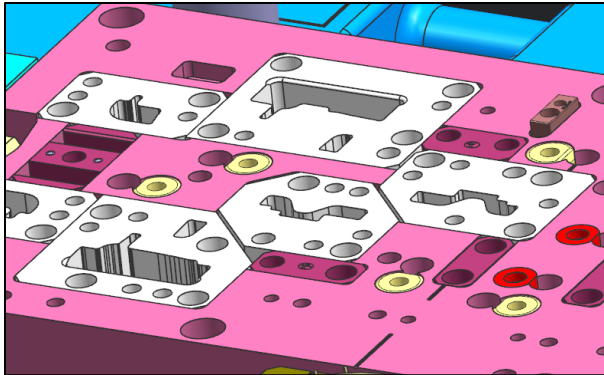
- If a single plate is used as lifter, stop block must be pocketed in die shoe never on the lifter.



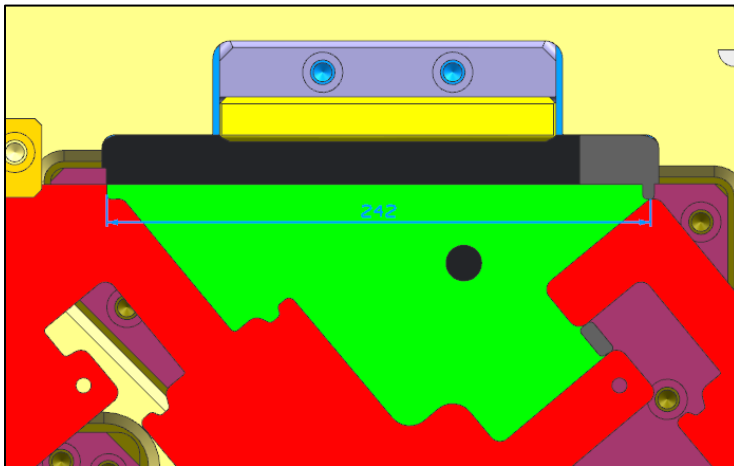
- Use FADE AWAY STOP when French stop is not feasible, as shown below.



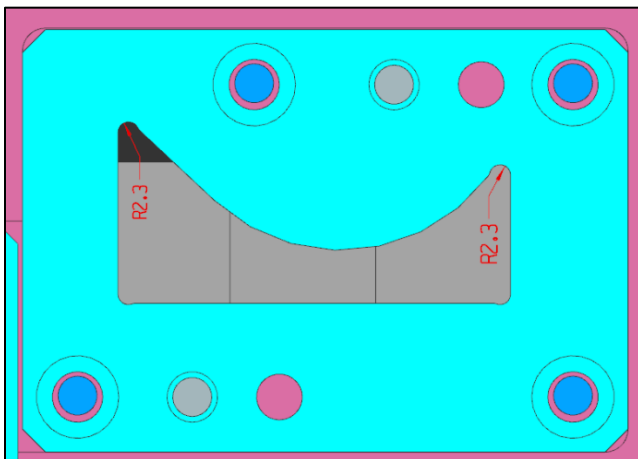
- Lower trim steels must be inserted in pocket.



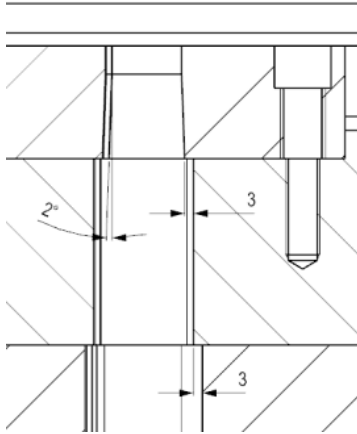
- Maximum Scrap length must be 300.0 mm.(T)



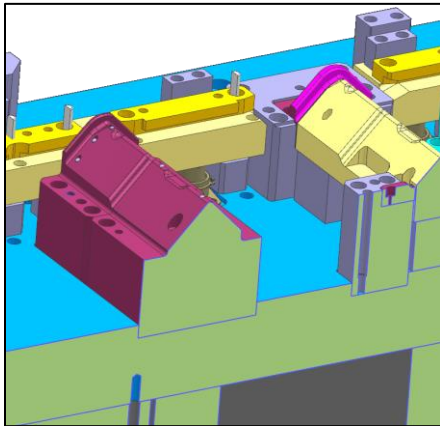
- For blades “Inner Sharp Corners are not allowed” use at least 2.0mm Radius.



- The Scrap falls for blades and button dies must be machined 2 Degrees and open 3mm gap to avoid Scrap Jam.



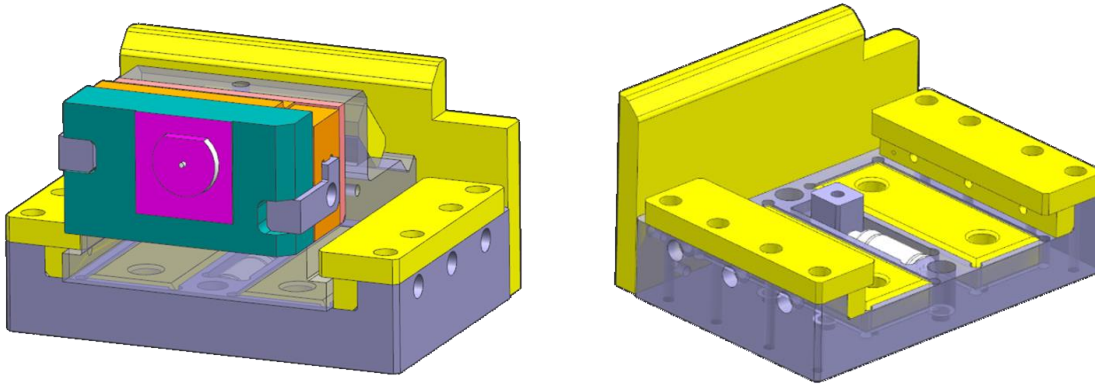
- Forming steels must be pocketed.



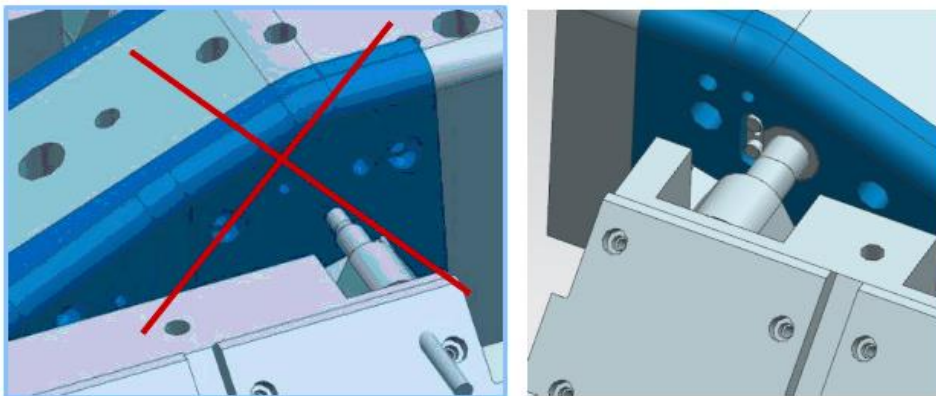
- Bottoming Marks to be installed in all draw & restrike section (argon brand) (Transfer Dies Only).



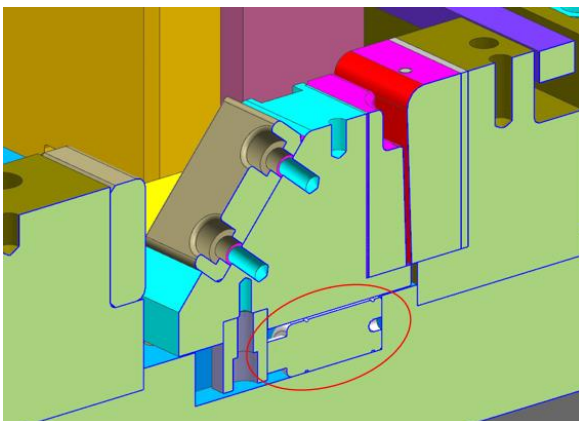
- All cam slide design must be adjustable for easy maintenance.



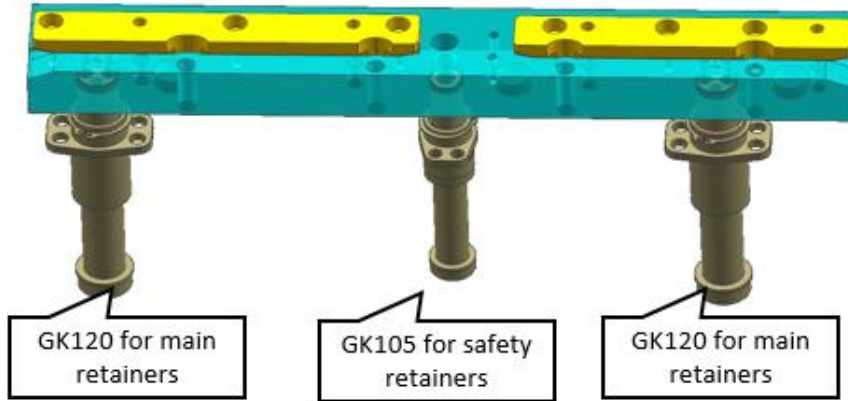
- If cam trim and piercing are made together, use standard button dies whenever is possible for easy maintenance.



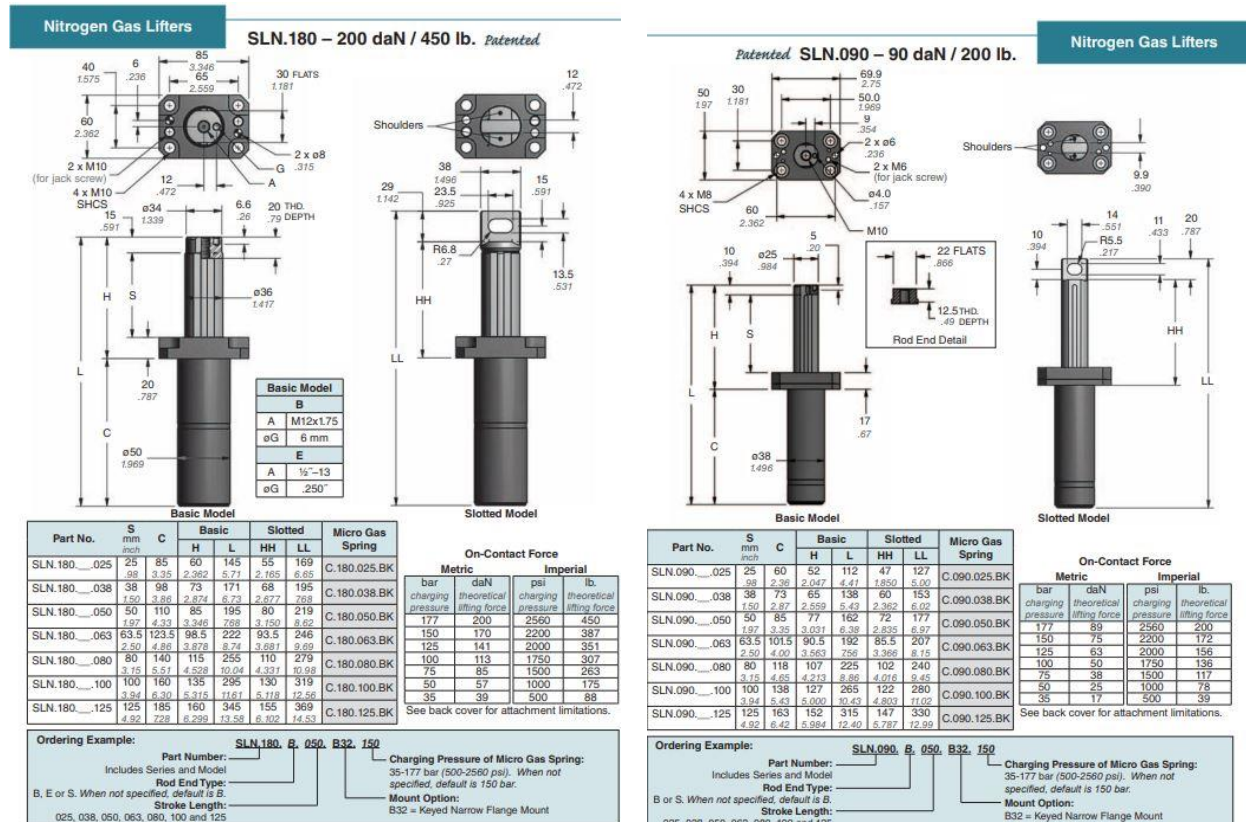
- Coil springs are not acceptable in any CAMs, nitro gas springs must be used.



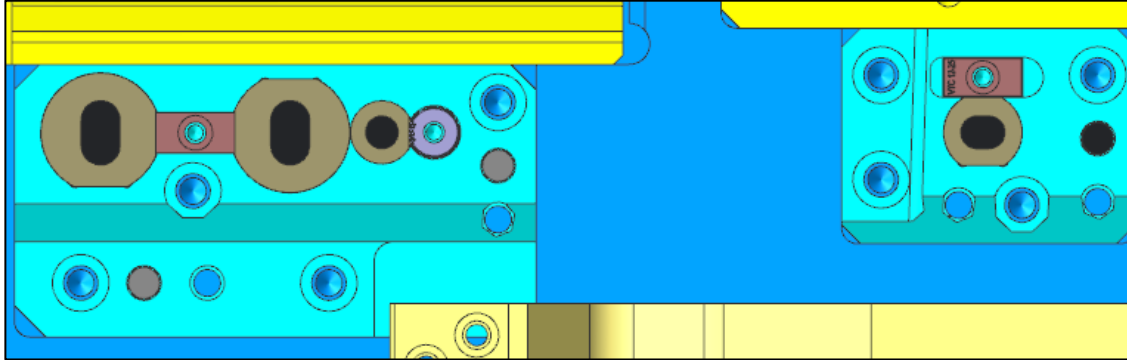
- For lifter bars use standard lifter as show below



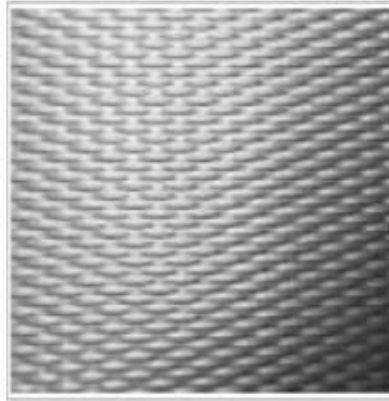
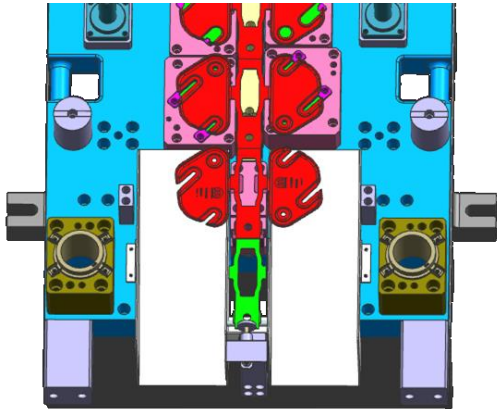
- DADCO brand can also be used for lifter bars.



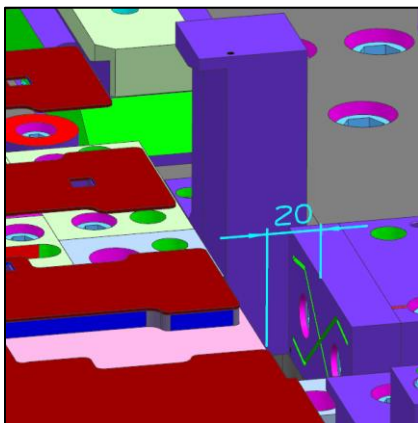
- For non-round holes (slot holes, square holes, etc..) use a flat face as error proof as show below.



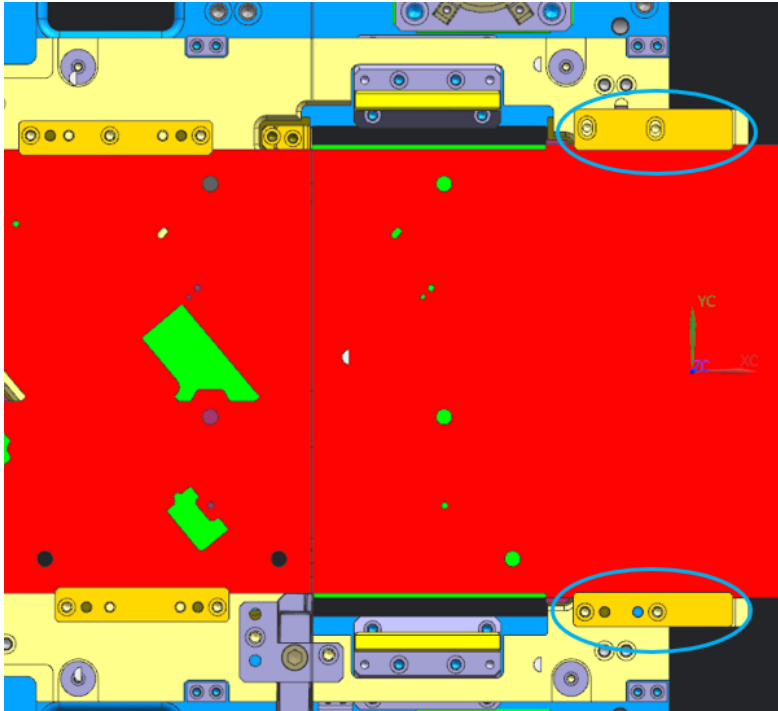
- Part chute thickness must be 3.0mm, also bubble sheet is required.



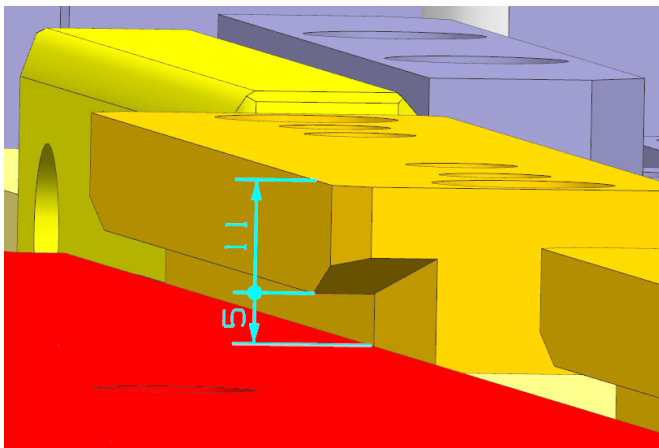
- Progressive and blank dies must be ready to run when coils arrived wider, consider (on trim just before French or solid stop) 20mm between original coil width edge and backing plate as show below.



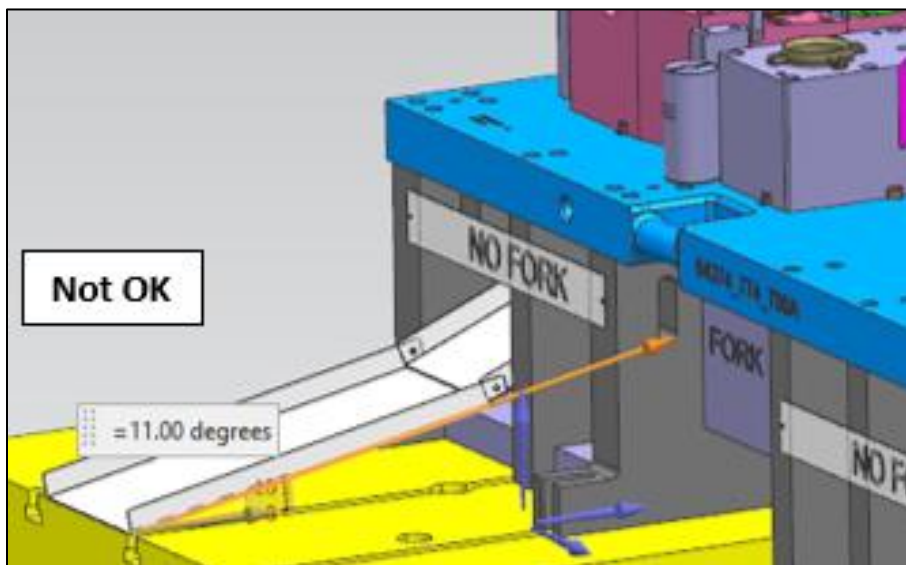
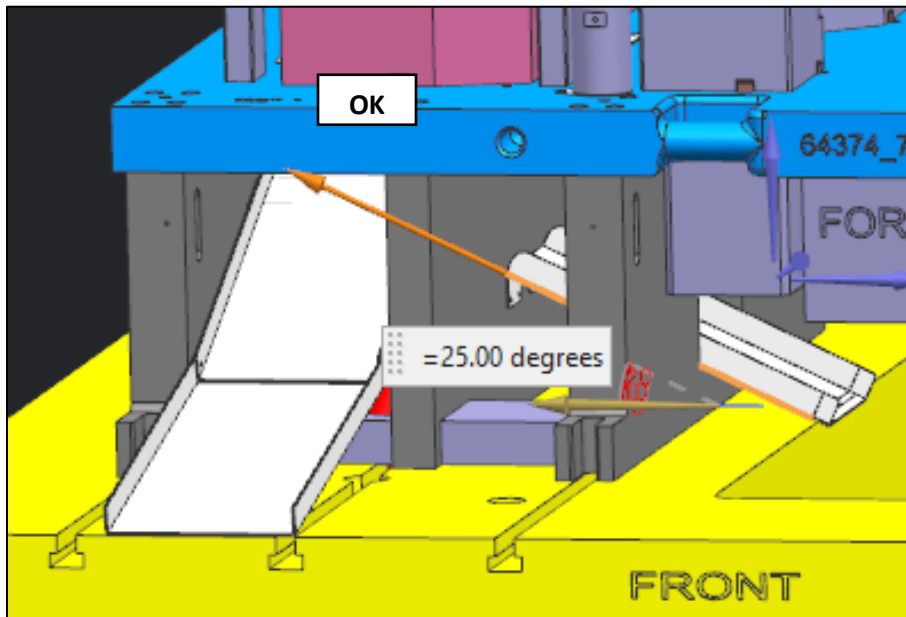
- **Stock guides**
 - Adjustable guides ($\pm 8.0\text{mm}$ of nominal coil width) must be placed on rear side of the die, and fixed guides on front side of die.



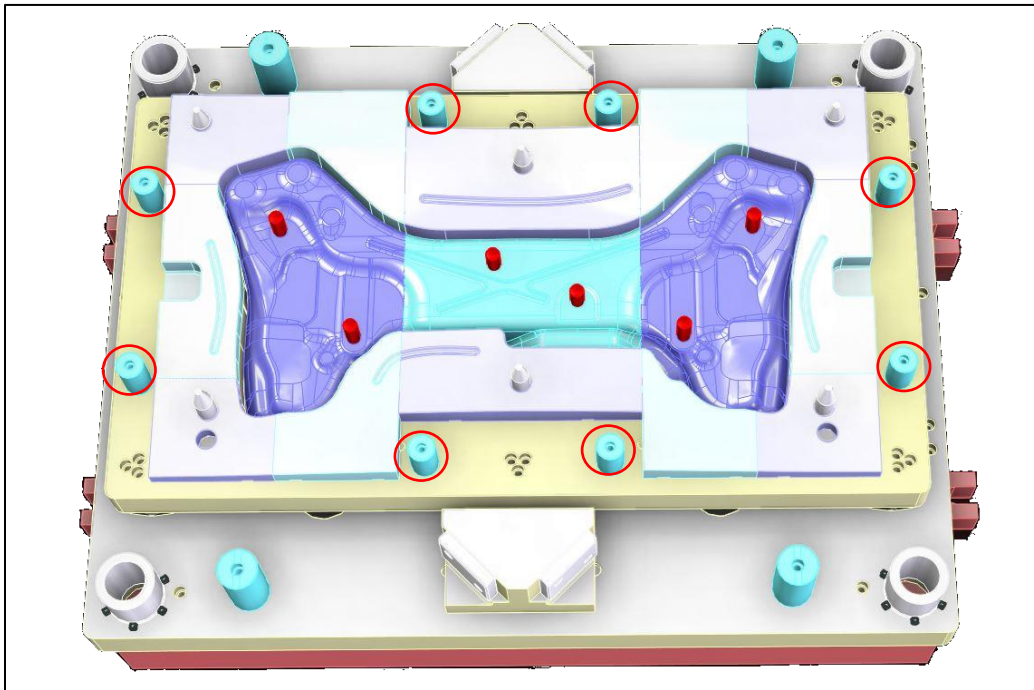
- Dimensions to be use for coil guides.



- **All the Scrap Chutes** must be strong enough 3.0mm thickness and need to be Bolted to the Parallel Bars
- Scrap to be directed to center bolster holes when available.
- Minimum angle accepted in scrap chutes is 25°.
- If 25° is not possible to achieve, tooling engineer needs to approve it.



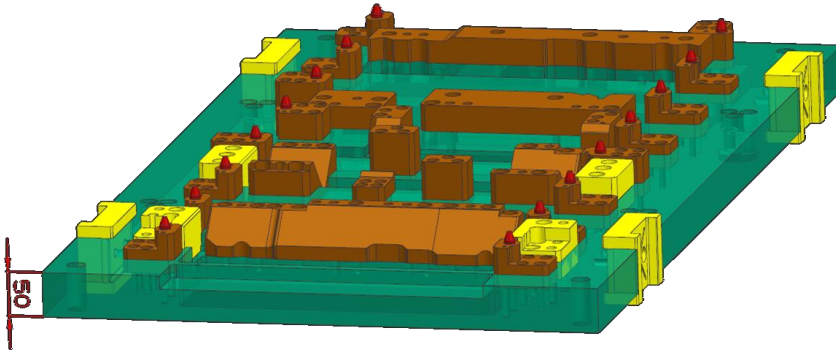
- All the Blank Holder must have equalizer Blocks.



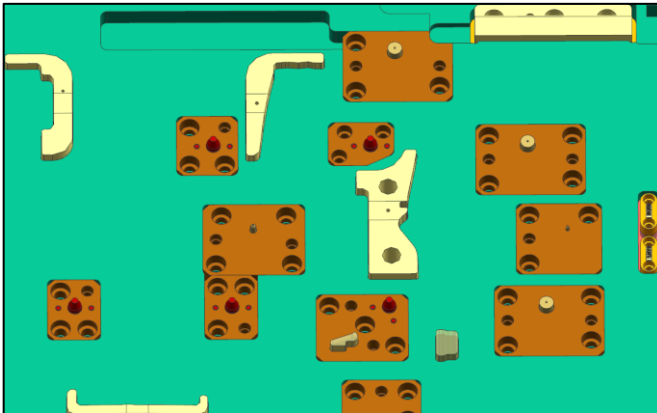
- In Transfer Die, Blank Holder must be Coated with **DUPLEX VARIANTIC**, any alternative coating must be approved by Project Tooling Engineer

UPPER DIE

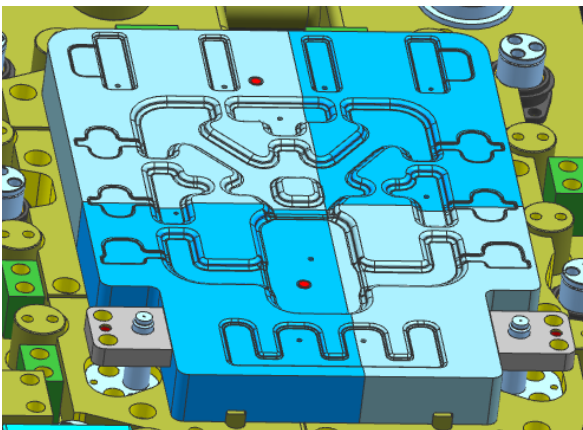
- Use at least 50mm thickness for stripper pads.



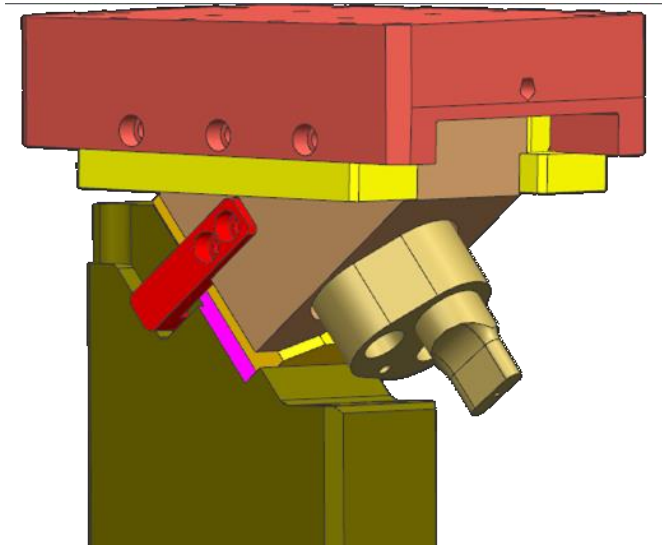
- Stripper pad windows plates must be pocketed with jack screws.



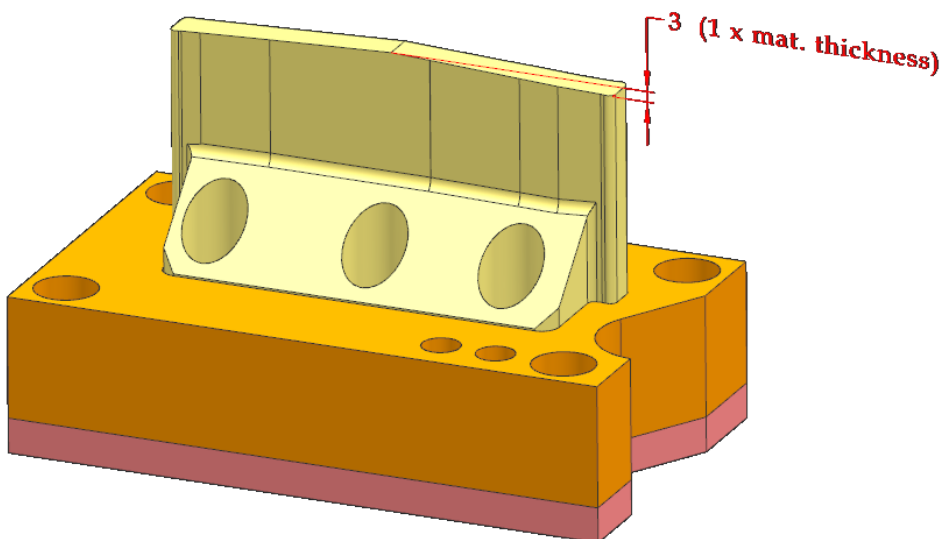
- All the Forming steels bigger than 300mm Should be split in parts for easy maintenance.



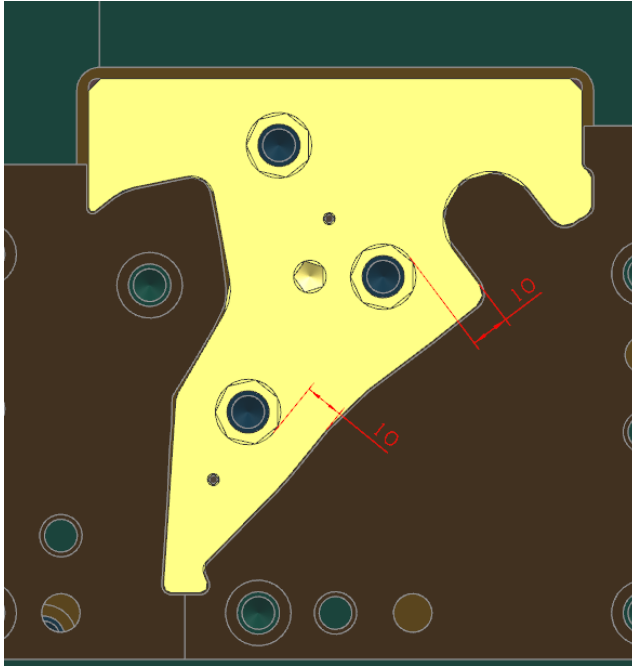
- **Lifting holes** for stripper pads and big components must be no smaller than M16.
- Cam slides must have 2 positive pullbacks or Return Guides. Two bolts required for each one.



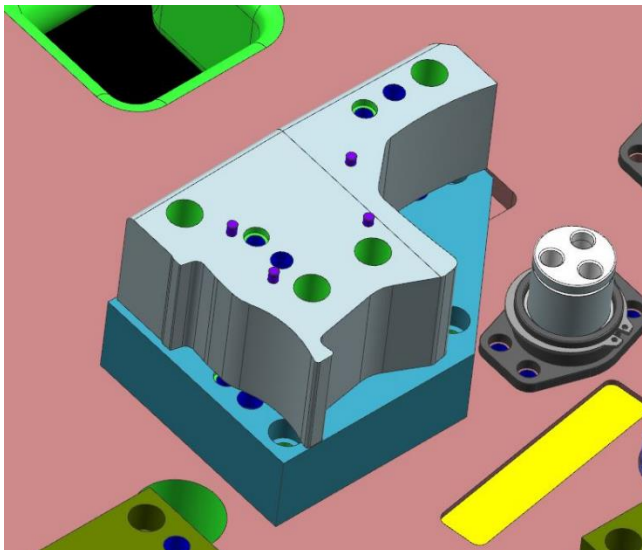
- Trim punches must be sharpened with scissors angle 1 material thickness height.



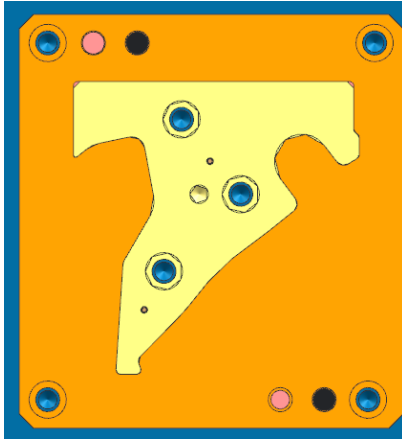
- Minimum distance allowed from trim edge to holes must be 10mm



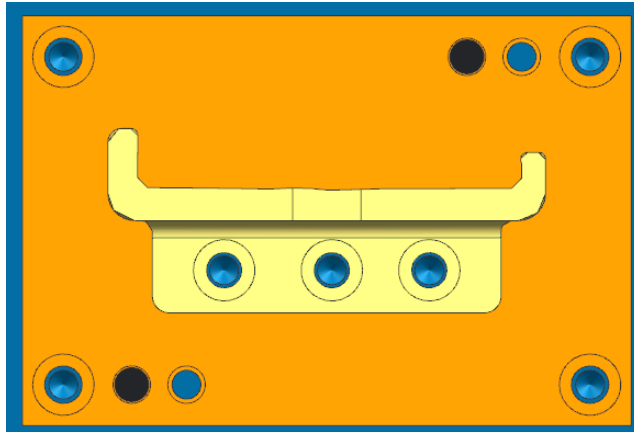
- All the Big and tall punches must be mounted on a base plate.



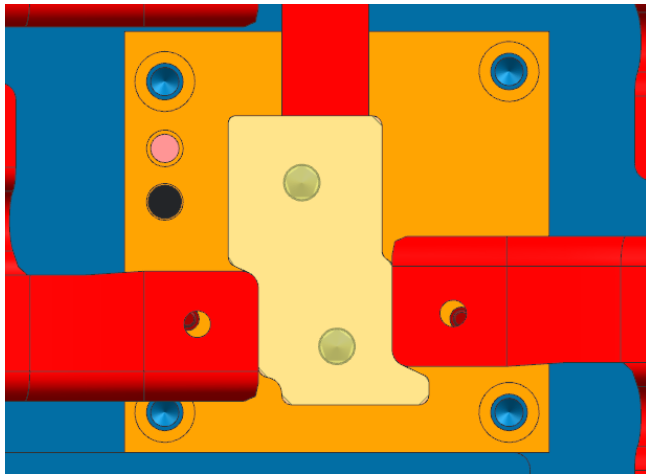
- Type of trim punches allowed.



Screw from top



Screw from shank



Screw from bottom

Allowed Only when screw from top or shank is not feasible.

-

Quotation

- 40 of 78

- Standard lifters GK180 or bigger can be use.



- For DADCO brand GRS.50 (light duty) and GRS.50HD (heavy duty) can be used.

Guide Retainer Sets

GRS.50 – Flange Mount

Pin Extension Code	XS		PL		Pin Extension Code	XS		PL	
	mm	inch	mm	inch		mm	inch	mm	inch
0200	20.0	0.787	100.0	3.937	0800	80.0	3.150	160.0	6.299
0300	30.0	1.181	110.0	4.331	0850	85.0	3.346	165.0	6.496
0400	40.0	1.575	120.0	4.724	0900	90.0	3.543	170.0	6.693
0450	45.0	1.772	125.0	4.921	0950	95.0	3.740	175.0	6.890
0500	50.0	1.969	130.0	5.118	1000	100.0	3.937	180.0	7.087
0550	55.0	2.165	135.0	5.315	1100	110.0	4.331	190.0	7.480
0600	60.0	2.362	140.0	5.512	1200	120.0	4.724	200.0	7.874
0650	65.0	2.559	145.0	5.709	1300	130.0	5.118	210.0	8.268
0700	70.0	2.756	150.0	5.906	1400	140.0	5.512	220.0	8.661
0750	75.0	2.953	155.0	6.102	1500	150.0	5.906	230.0	9.055

Velocity Estimate (m/sec)	0.30		0.40		0.50		0.60		0.70		0.80		0.90		1.00	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
22	22	0.866	22	0.866	22	0.866	22	0.866	22	0.866	22	0.866	22	0.866	22	0.866
55	55	2.165	55	2.165	55	2.165	55	2.165	55	2.165	55	2.165	55	2.165	55	2.165
110	110	4.331	110	4.331	110	4.331	110	4.331	110	4.331	110	4.331	110	4.331	110	4.331
165	165	6.496	165	6.496	165	6.496	165	6.496	165	6.496	165	6.496	165	6.496	165	6.496
220	220	8.661	220	8.661	220	8.661	220	8.661	220	8.661	220	8.661	220	8.661	220	8.661
275	275	10.826	275	10.826	275	10.826	275	10.826	275	10.826	275	10.826	275	10.826	275	10.826
330	330	12.991	330	12.991	330	12.991	330	12.991	330	12.991	330	12.991	330	12.991	330	12.991
385	385	15.156	385	15.156	385	15.156	385	15.156	385	15.156	385	15.156	385	15.156	385	15.156

FM – Flange Mount

GRS.50.HD – Flange Mount

For heavy duty applications

GRS.50.AC

Optional Plate Adapter

Pin Extension Code	XS		PL		Max Travel (mm)
	mm	inch	mm	inch	
0550	55.0	2.165	160.0	6.299	30.0
0650	65.0	2.559	170.0	6.693	40.0
0750	75.0	2.953	180.0	7.087	50.0
0850	85.0	3.346	190.0	7.480	60.0
0950	95.0	3.740	200.0	7.874	70.0
1050	105.0	4.134	210.0	8.268	80.0
1150	115.0	4.528	220.0	8.661	90.0
1250	125.0	4.921	230.0	9.055	100.0
1350	135.0	5.315	240.0	9.449	110.0
1450	145.0	5.709	250.0	9.843	120.0
1550	155.0	6.102	260.0	10.236	130.0

Velocity Estimate (m/sec)	0.50		0.60		0.70		0.80		0.90		1.00	
	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch	mm	inch
250	250	9.843	250	9.843	250	9.843	250	9.843	250	9.843	250	9.843
500	500	19.686	500	19.686	500	19.686	500	19.686	500	19.686	500	19.686
750	750	29.529	750	29.529	750	29.529	750	29.529	750	29.529	750	29.529
1000	1000	39.372	1000	39.372	1000	39.372	1000	39.372	1000	39.372	1000	39.372
1250	1250	49.215	1250	49.215	1250	49.215	1250	49.215	1250	49.215	1250	49.215
1500	1500	59.058	1500	59.058	1500	59.058	1500	59.058	1500	59.058	1500	59.058
1750	1750	68.901	1750	68.901	1750	68.901	1750	68.901	1750	68.901	1750	68.901
2000	2000	78.744	2000	78.744	2000	78.744	2000	78.744	2000	78.744	2000	78.744
2250	2250	88.587	2250	88.587	2250	88.587	2250	88.587	2250	88.587	2250	88.587
2500	2500	98.430	2500	98.430	2500	98.430	2500	98.430	2500	98.430	2500	98.430

FH – Flange Mount

Ordering Example:

GRS.50 J 0200 FM

Part Number: Includes Series and Model

Guide Retainer Mount Option: FM = Flange Mount

Guide Rod Option: J = 4x M12, Metric; K = 4x 1/2"-13, Imperial; M = 4x M12, Metric with Rod End Dowel; E = 4x 1/2"-13, Imperial with Rod End Dowel

Pin Extension Code: 20.0 mm to 150.0 mm
Example: 0200 mm = 20.0 (XS Dimension)

Ordering Example:

GRS.50.HD J 0550 FH

Part Number: Includes Series and Model

Guide Retainer Mount Option: FH = Flange Mount

Guide Rod Option: J = Metric; M = Metric, with Rod End Dowel

For optional plate adapter add AC

Pin Extension Code: 55.0 mm to 155.0 mm
Example: 0550 = 55.0 (XS Dimension)

- Transfer dies use **2 Pre-Holding Push Pin** on each station. (Provided by Tool shop.)

PRE-HOLDING PUSH PIN SETS

— STANDARD TYPE —

PAFZ (Standard)
PAFZU (Underfoot)

① Case
② Pushing pin
③ Mounting flange

④ Case
⑤ Pushing pin
⑥ Mounting flange

⑦ Case
⑧ Pushing pin
⑨ Mounting flange

⑩ Case
⑪ Pushing pin
⑫ Mounting flange

⑬ Case
⑭ Pushing pin
⑮ Mounting flange

⑯ Case
⑰ Pushing pin
⑱ Mounting flange

⑲ Case
⑳ Pushing pin
㉑ Mounting flange

㉒ Case
㉓ Pushing pin
㉔ Mounting flange

㉕ Case
㉖ Pushing pin
㉗ Mounting flange

㉘ Case
㉙ Pushing pin
㉚ Mounting flange

㉛ Case
㉜ Pushing pin
㉝ Mounting flange

㉞ Case
㉟ Pushing pin
㊱ Mounting flange

㊲ Case
㊳ Pushing pin
㊴ Mounting flange

㊵ Case
㊶ Pushing pin
㊷ Mounting flange

㊸ Case
㊹ Pushing pin
㊺ Mounting flange

㊻ Case
㊼ Pushing pin
㊽ Mounting flange

㊾ Case
㊿ Pushing pin
① Mounting flange

② Case
③ Pushing pin
④ Mounting flange

⑤ Case
⑥ Pushing pin
⑦ Mounting flange

⑧ Case
⑨ Pushing pin
⑩ Mounting flange

⑪ Case
⑫ Pushing pin
⑬ Mounting flange

⑭ Case
⑮ Pushing pin
⑯ Mounting flange

⑰ Case
⑱ Pushing pin
⑲ Mounting flange

⑳ Case
㉑ Pushing pin
㉒ Mounting flange

㉓ Case
㉔ Pushing pin
㉕ Mounting flange

㉖ Case
㉗ Pushing pin
㉘ Mounting flange

㉙ Case
㉚ Pushing pin
㉛ Mounting flange

㉜ Case
㉝ Pushing pin
㉞ Mounting flange

㉟ Case
㊱ Pushing pin
㊲ Mounting flange

㊳ Case
㊴ Pushing pin
㊵ Mounting flange

㊶ Case
㊷ Pushing pin
㊸ Mounting flange

㊹ Case
㊺ Pushing pin
㊻ Mounting flange

㊼ Case
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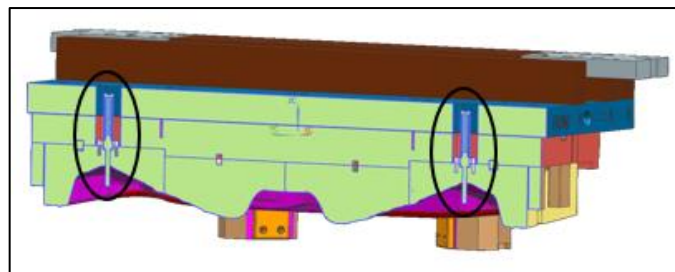
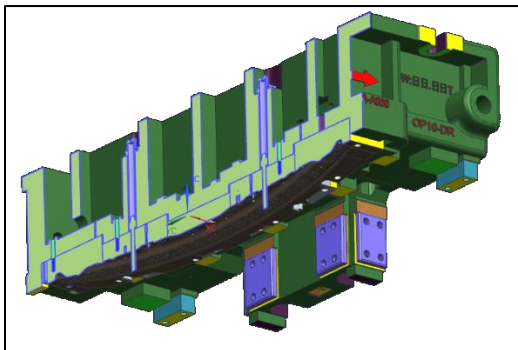
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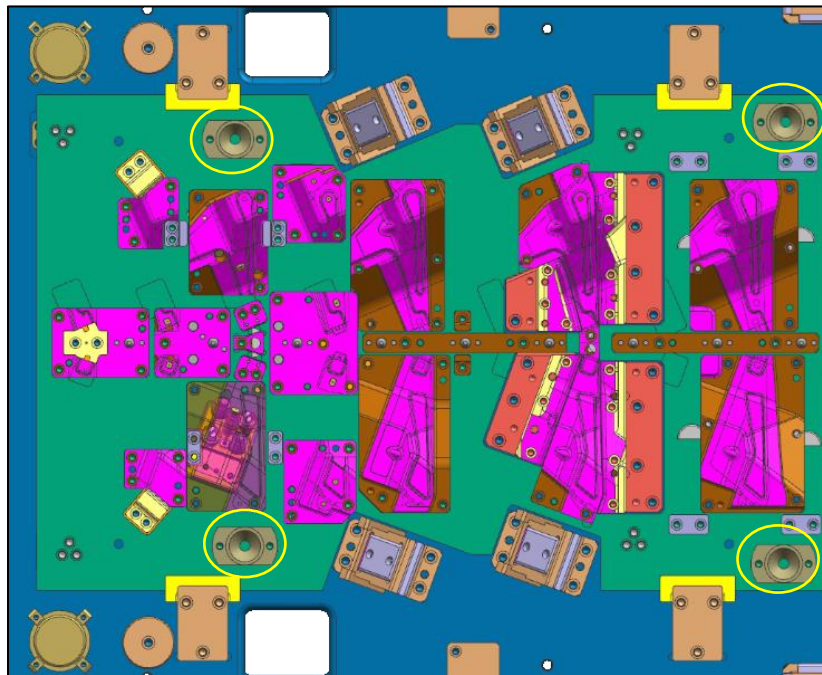
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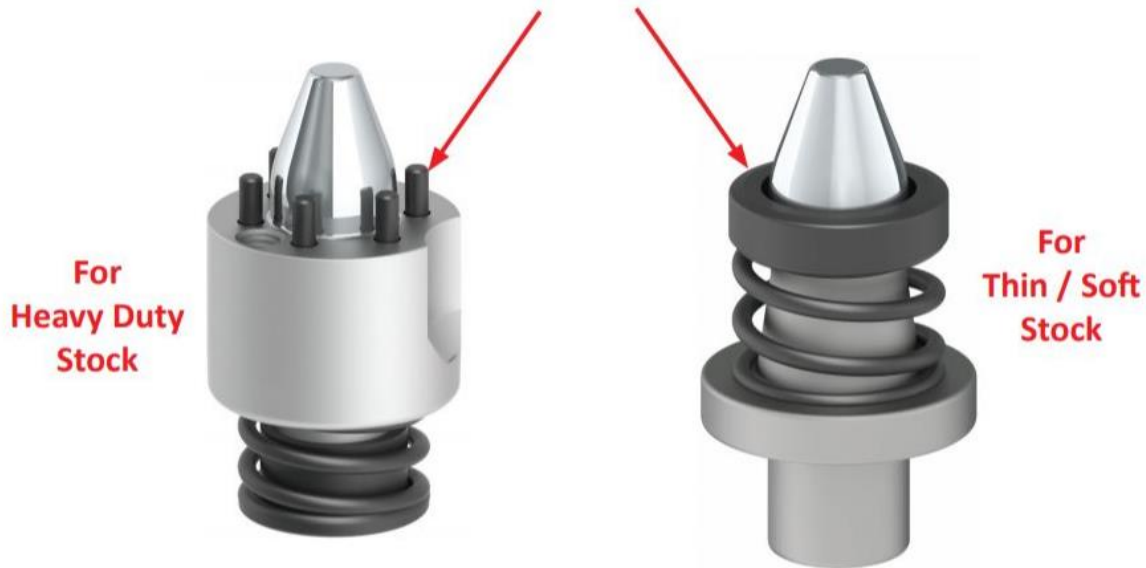
㊿ Case



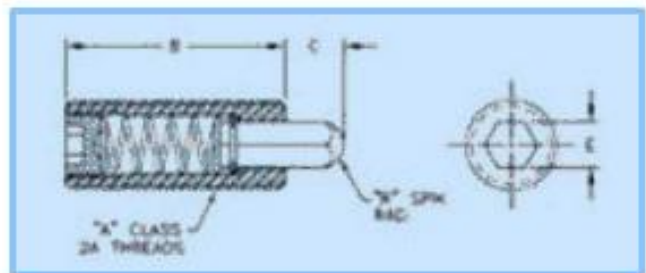
- If aerial cam mounted on stripper pad is needed, centering cones must be used.



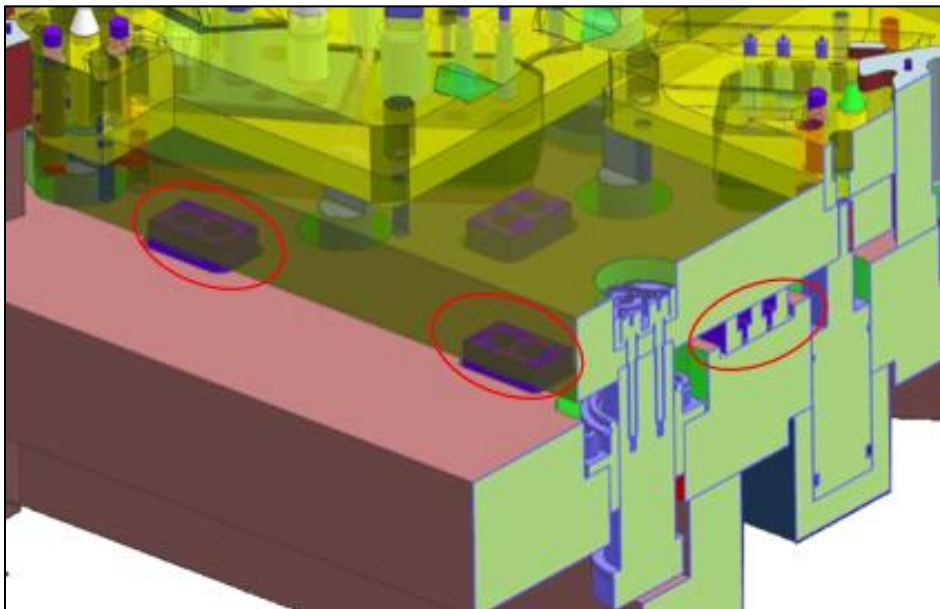
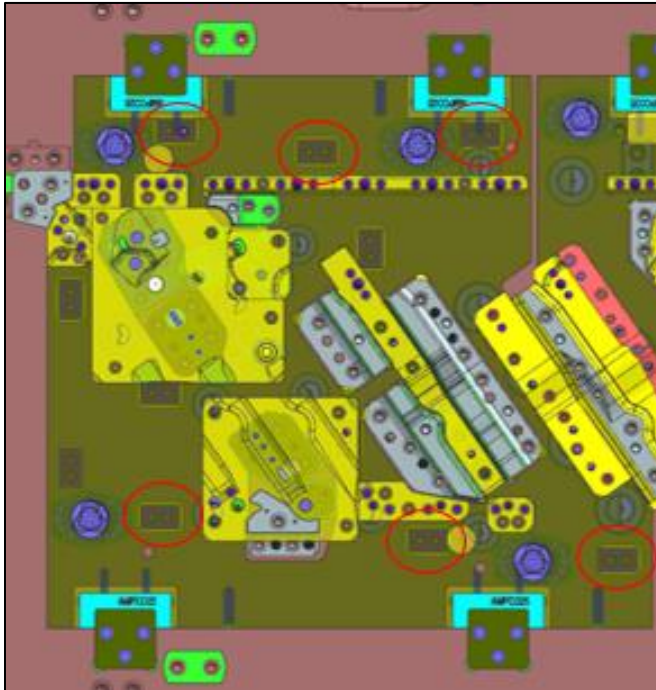
- Pilot pins with ejectors must be used.



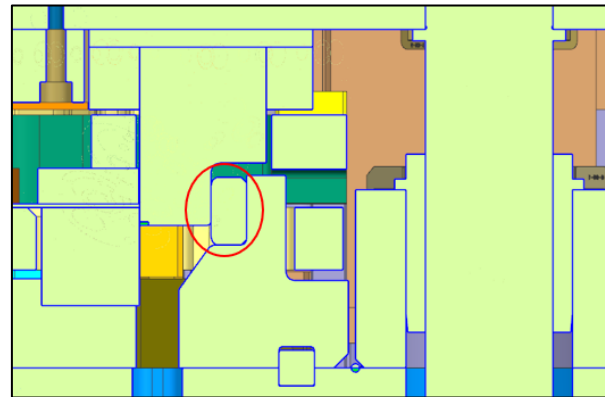
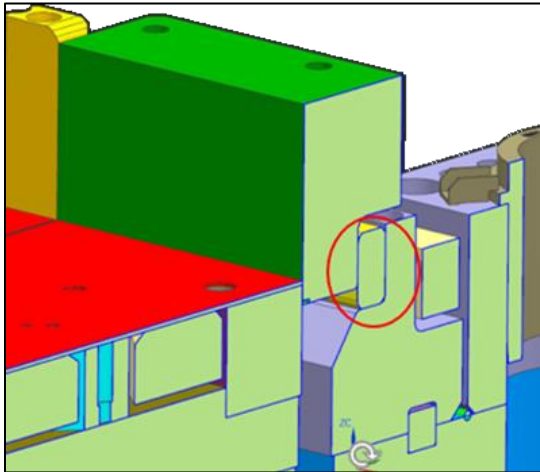
- If Spring plunger is needed (Must be hexagon Tip M10 minimum) Misumi brand.



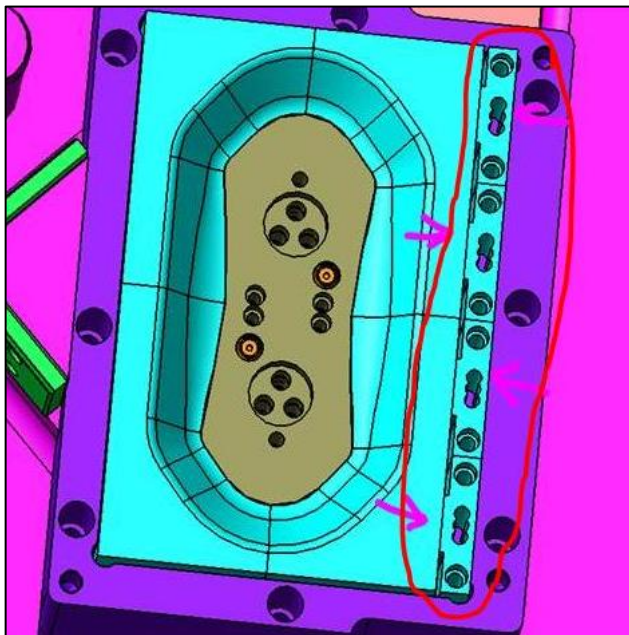
- Stripper pads must be backed up with limit blocks when forming with pad.



- All the trim Punch must have a Bronze Backing Plate 20mm size, and need to back up 10mm prior to cut.



- All the Forming Inserts Must Have a “**Fuse**” to avoid damages in case of double blank.
(due to the slots on the keys if double blank is processed the forming steel doesn't break because the key is going to be compressed).

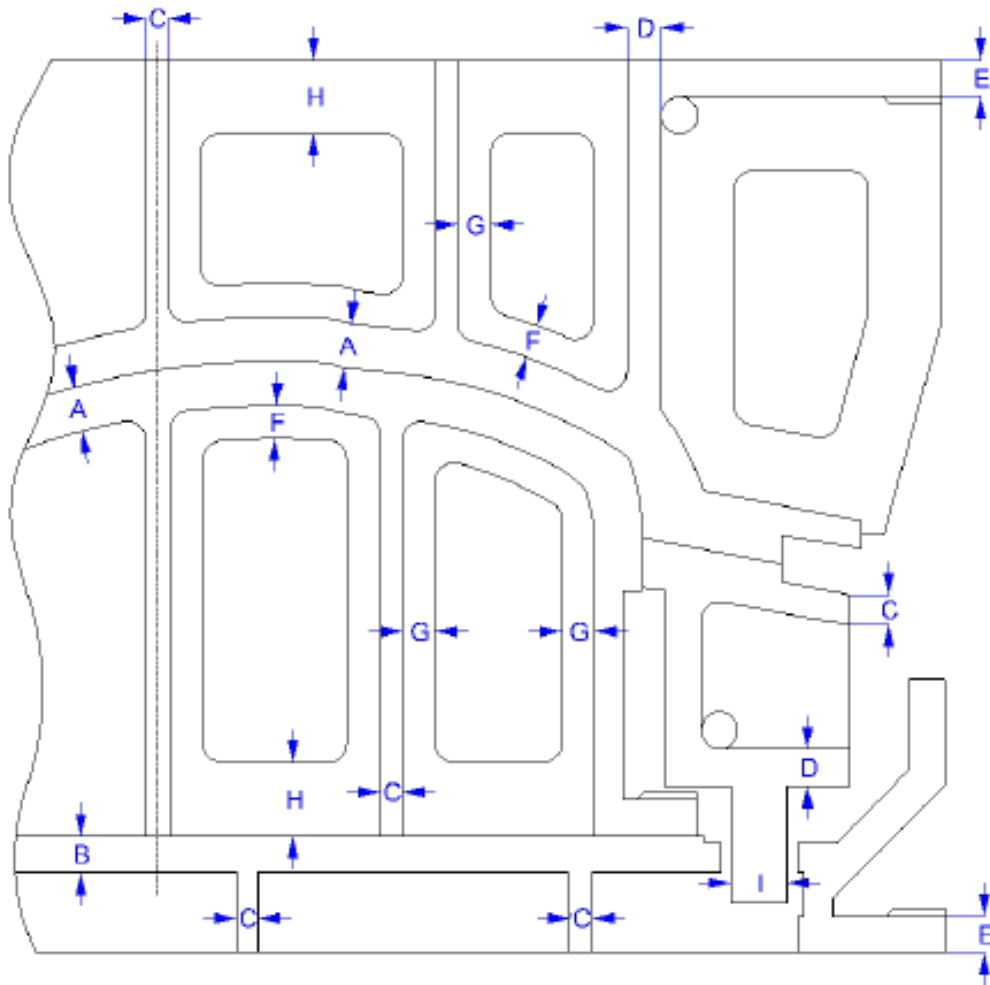


- All pockets for lifters or pilot holes on the base plate, must have a drainage hole.
- All the Forming & Restrike Operations must have a Lube Holes 8mm Diameter prepared and machined inside to use using Hose 6.35mm (1/4") and Quick connection in Upper Shoe.
- Once the Die is ready and Buy Off is Complete, the Tool Shop Supplier **MUST** Scan and update die design all trim and forming steels.
- The Cost of Coating **MUST** BE considered into the Supplier Quotation.
- Early sample parts must be stamped by Forming Die Complete, trim and holes by Laser Cut, expected 80% Minimum vs. Checking Fixture or Dimensional Report.
- Buy Off Samples Parts **MUST** BE at 100% vs. Checking Fixture and sit in all nets at Free State Method, before shipping.
- 300 pcs buy off sample parts need to be shipped with die; Cost should be included in die cost at time of quotation, unless otherwise instructed by Danbro.

4. CASTING DIE DESIGN.

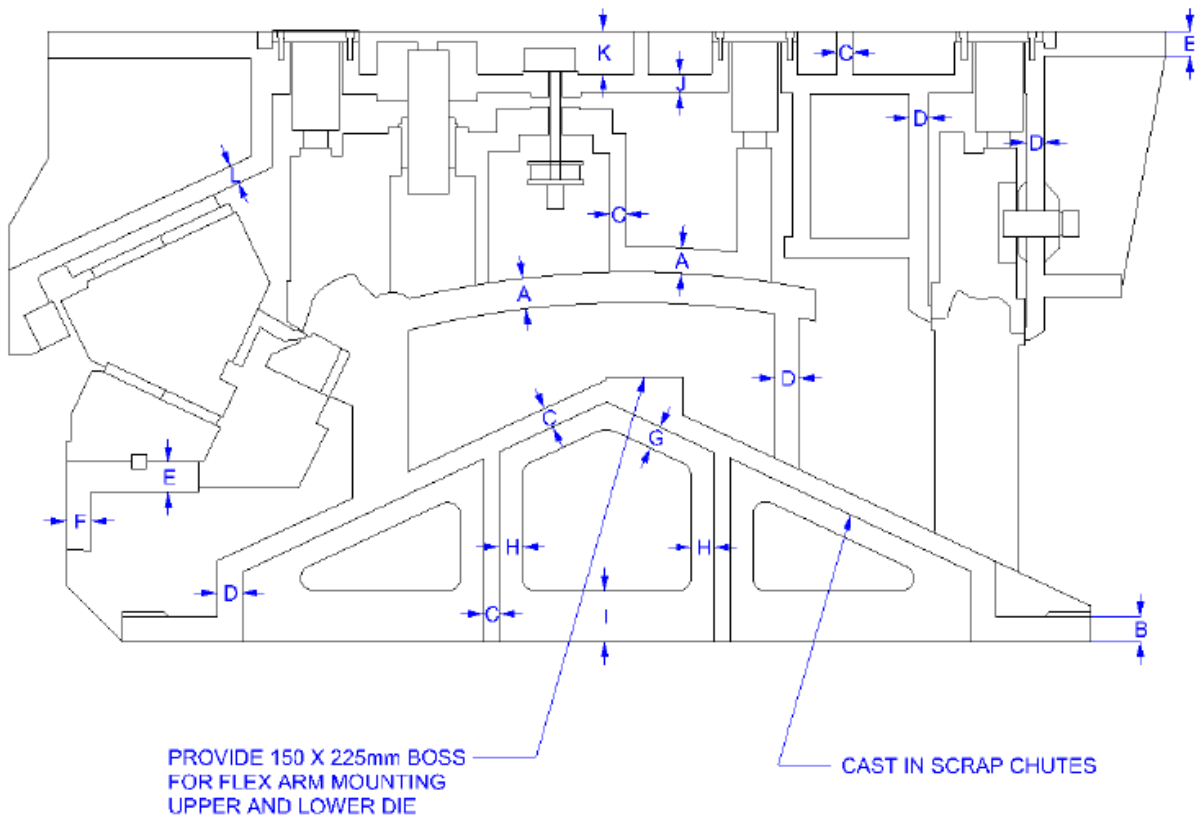
DIE SHOES / RISERS	GM-238
DRAW DIE PUNCHES	GM-241-M, GM-246-M, GM-190-M
BINDERS	GM-241-M / GM-246-M
FORM AND FLANGE	GM-190-M
PADS-FORM AND FLANGE	GM-238-M, GM-241-M, GM-246-M
PIERCE PUNCHES	M2
BUTTONS	A2
TRIM STEELS	D2
CAM DRIVER	GM-238-M
CAM SILIDE INSERTED	GM-238-M, GM-245-M
CAM SLIDE NON- INSERTED	GM-241-M

- DRAW DIE CASTING CONSTRUCTION**



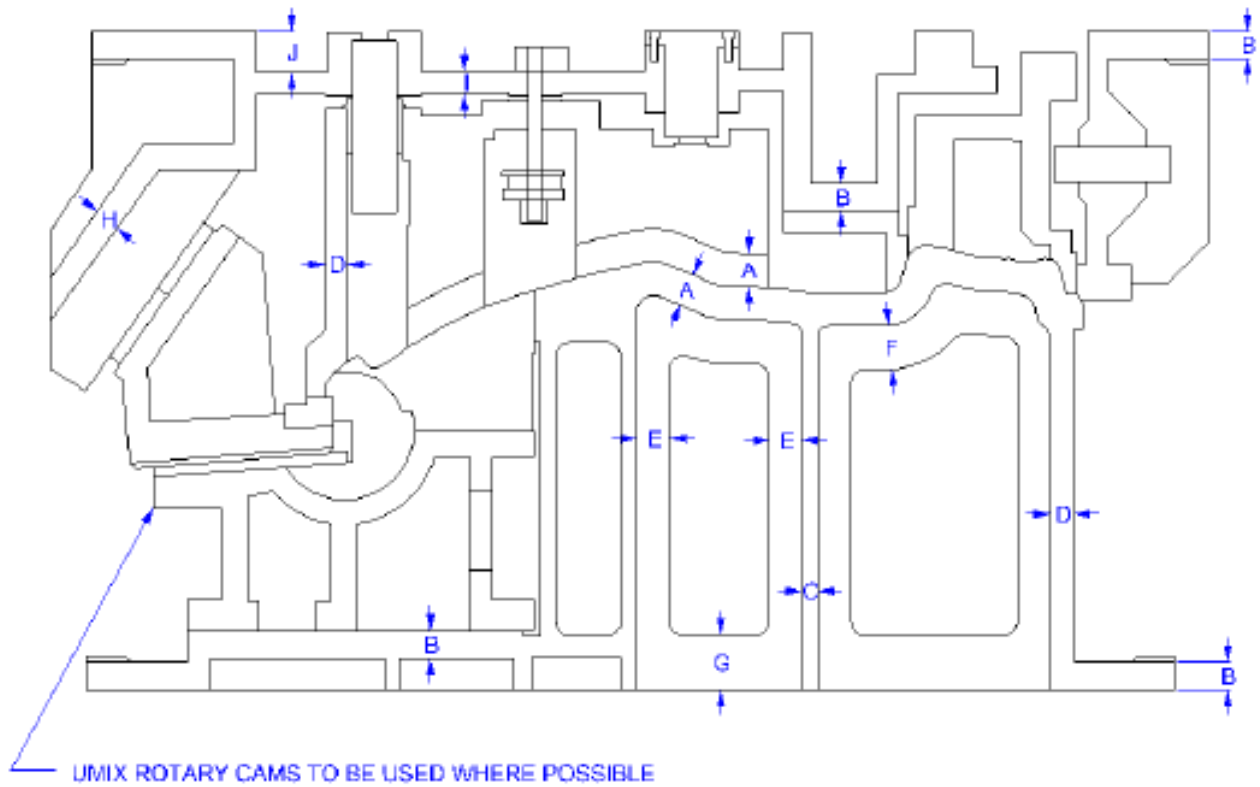
	A	B	C	D	E	F	G	H	I
mm	60	50	30	40	50	80	60	100	80

• **TRIM DIE CAST CONSTRUCTION**



A	B	C	D	E	F	G	H	I	J	K	L
60	50	30	40	60	50	80	60	100	40	20	40

- FLANGE AND RE-STRIKE DIE CASTING CONSTRUCTION**

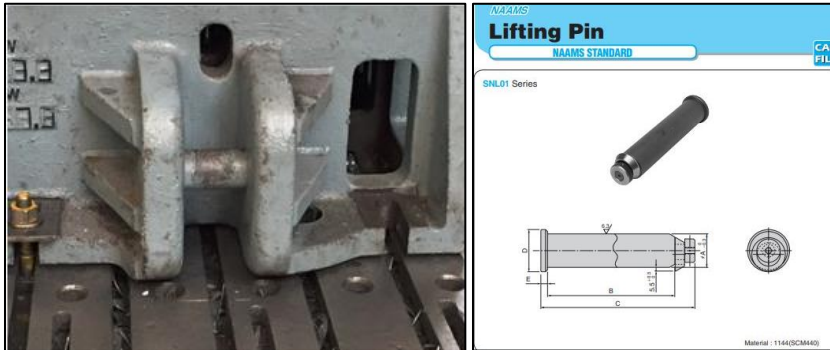


A	B	C	D	E	F	G	H	I	J
60	50	30	40	60	80	100	40	40	20

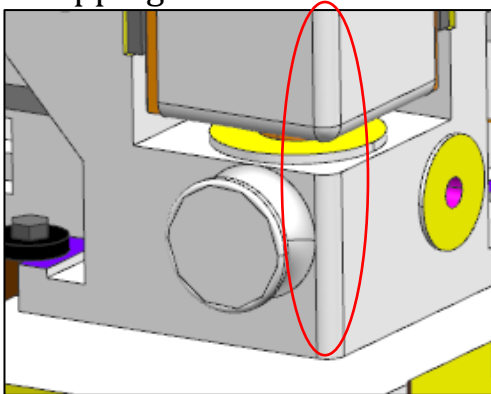
- **Lifting**

Tooling engineer will advise if the die use lift lugs with pin or lifting knobs.

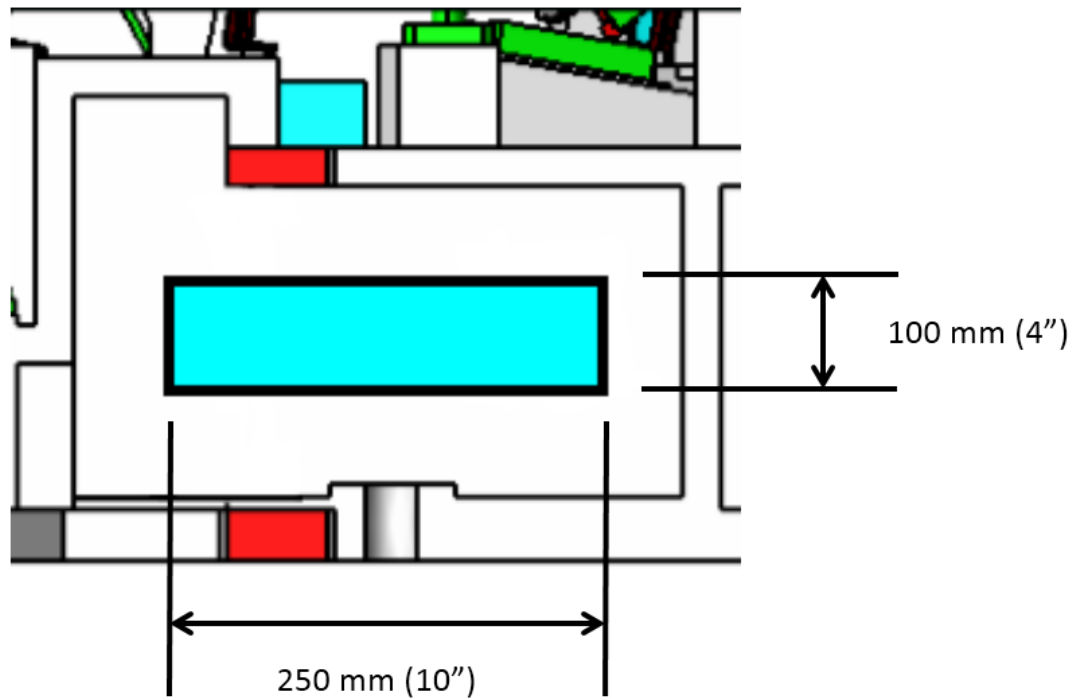
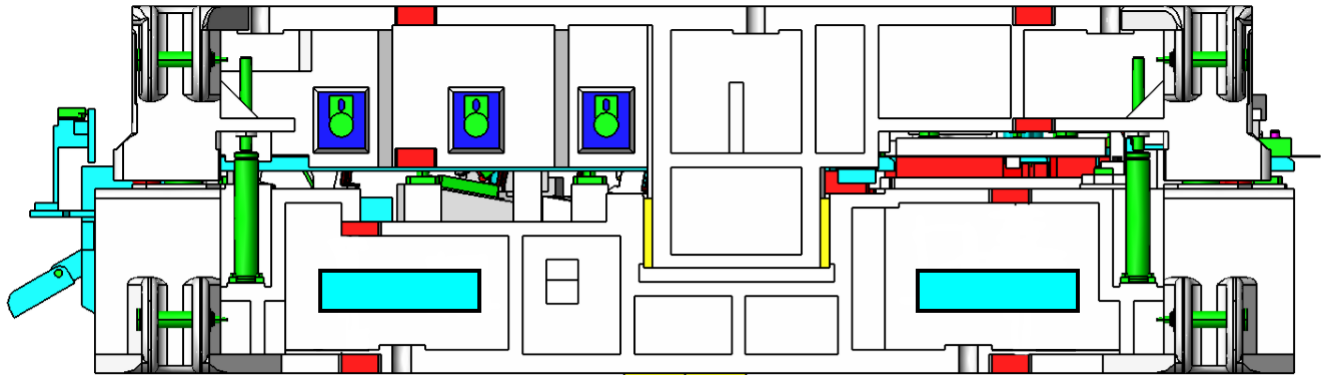
- **Use Lifting Pin according NAAMS standard and keep 85.0 mm free all-around the pin for crane hook access.**



- **Add a radius at edge where the Chain or cable is in contact when lifting or flipping.**



- All the Casting Dies Must Have Access to use Shakers to recover all the Scrap generated in all the Trim and Pierce stations, with the minimum dimension shown in the drawing below.



5. AUTOMATION

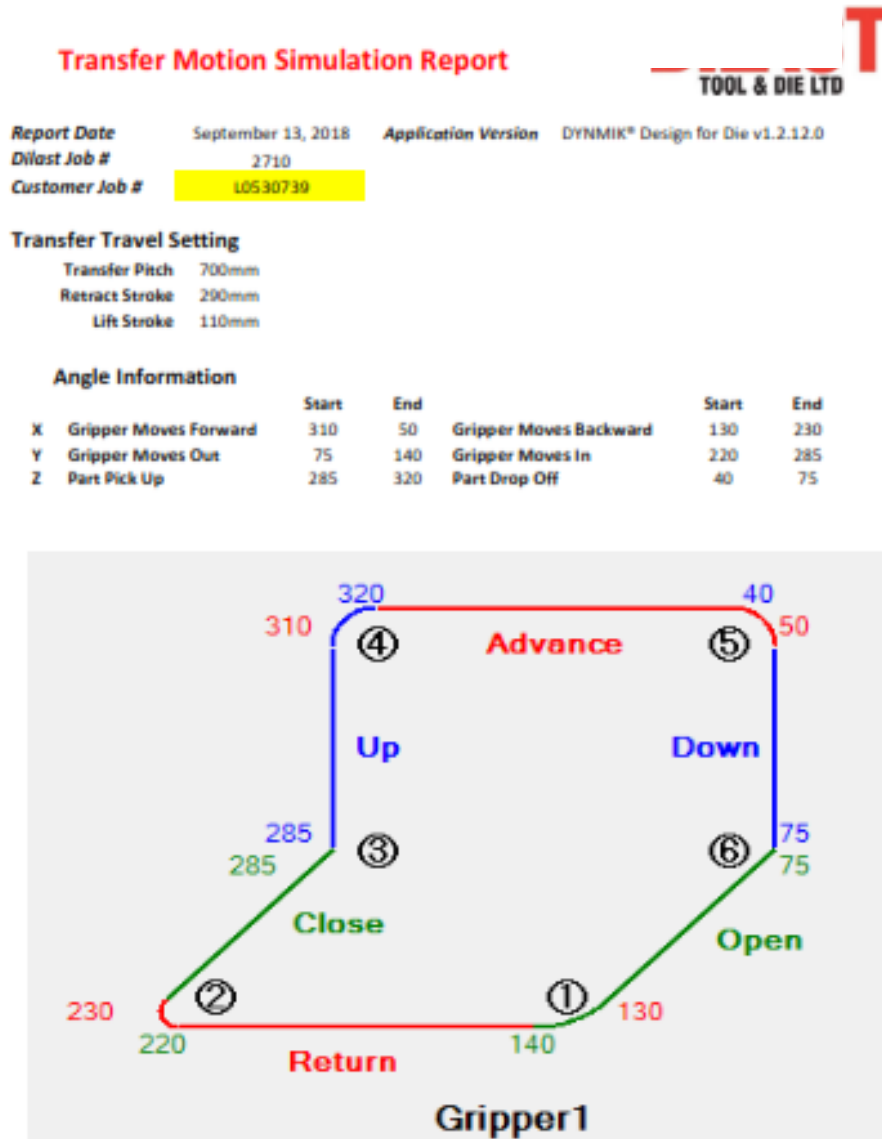
1. Fingers or clamps Should be 65mm wide x 65 mm deep x 65mm Height of clearance all around, when die is closed, however during Design Review is necessary define the Cavity depending on the Part design.

PHD brand grippers to be used to check clearance.

2. Restrictions to transfer dies:

- a) Different shut height, pass height & distance pitch, between stations is not acceptable.
- b) Fingers entrance area should be considered (65mm minimum under the part).
- c) Each station must have a fast positioning for the part (Guides, Pilots & Locators).
- d) Eliminate any flip over during transference of the part and/or part angle changes between stations (any question ask the tooling engineer).
- e) Keep the part always stable after being processed (without movement).
- f) Heel blocks or guide post must not have interference with the part when is in transference to the next station?
- g) Part out must be only over the conveyor, not possible to the front or back of press.
- h) Do not use pneumatic lifters.
- i) Die designer must Focus in Avoid lifters, in order to keep stable part and increase the SPM.

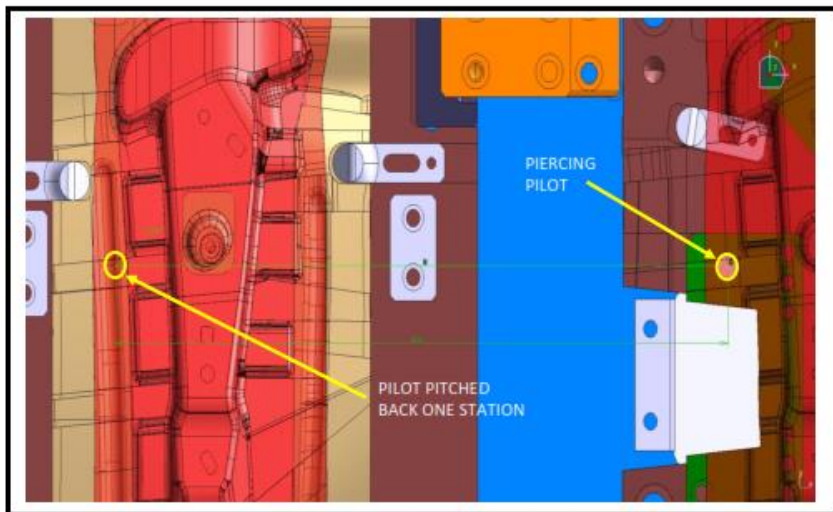
- **KINEMATICS SIMULATION must be Developed during the Design**
 - **Kinematics simulation report must be prepared as show below.**



- If there are interferences or any issue, proposals must be given by SIM supplier as show below.



Timing Chart: No violation chart has been saved or imported.
Crank Angle: 100
Press Stroke: 0 Lift: 0 Clamp: 173 Pitch: 101.506
Violation Type:
Items Affected:

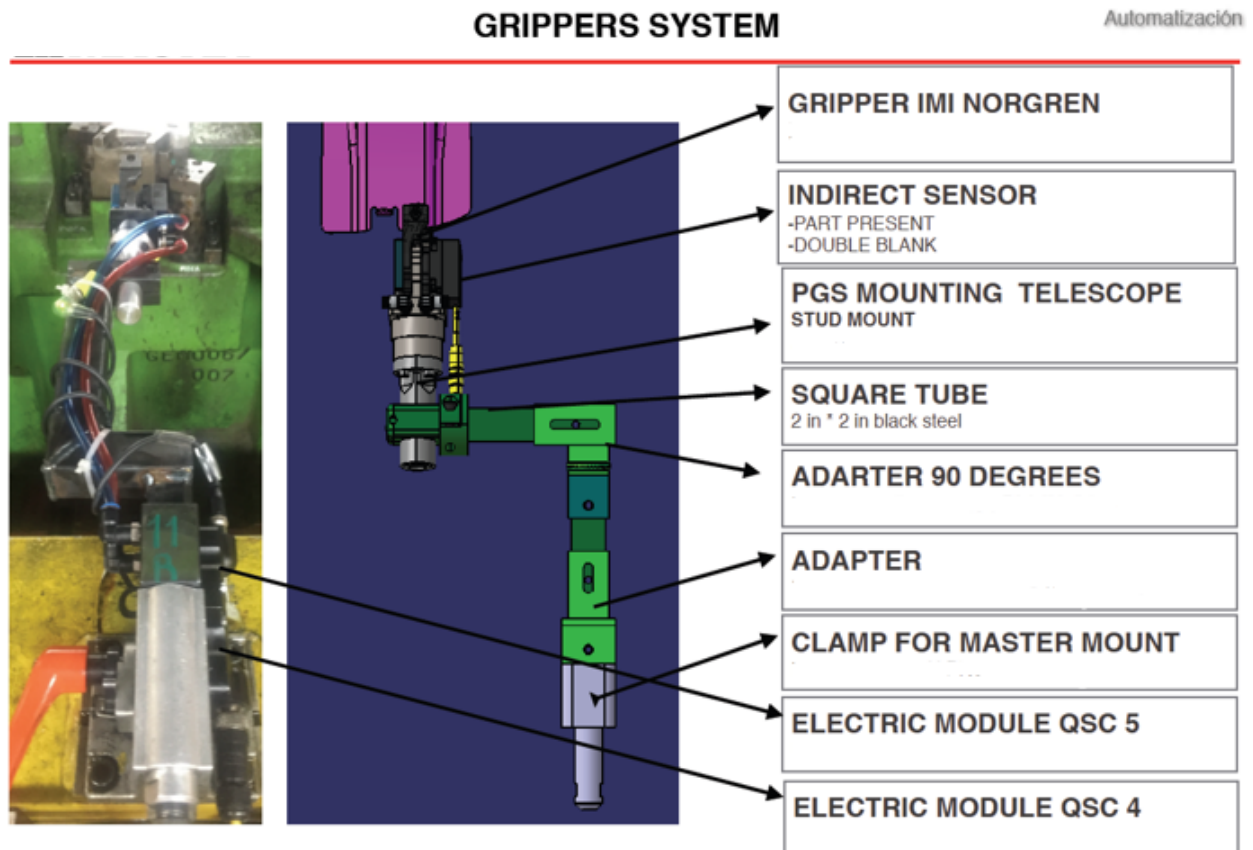


Comment(s):

The draw beads are not included in part variations. The pilot is going to end up in the draw bead. Piercing and piloting in the middle of a draw bead can be problematic and create poor die conditions. Also there isn't clearance in lower die for draw beads in the two trim stations. Please review.

- **GRIPPERS SYSTEM:**

Complete gripper information and CAD 3D will be provided by Danbro Tool & Die Inc. for die design and 3D motion simulation.



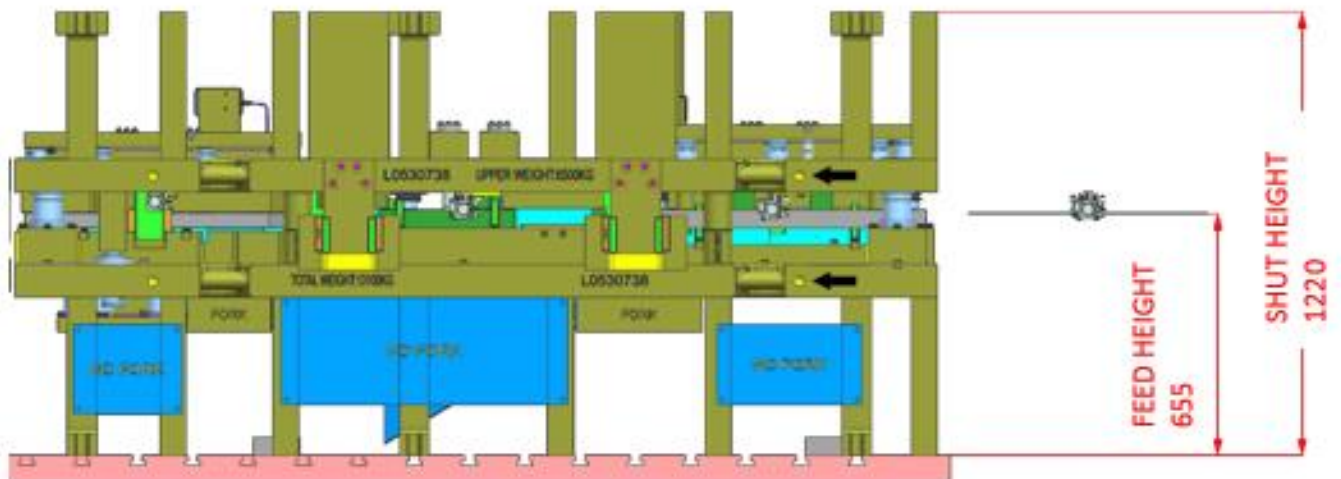
6. PRESS SPECIFICATION

Danbro Tool & Die Inc. will provide it presses information (3D file and all information needed for die design) as example below.

WIA 3000 TON.

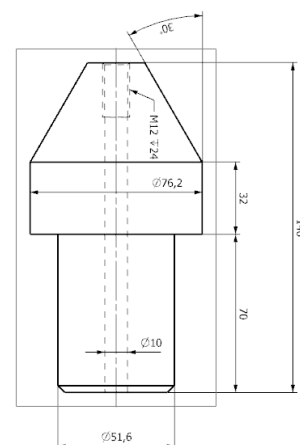
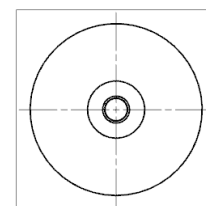
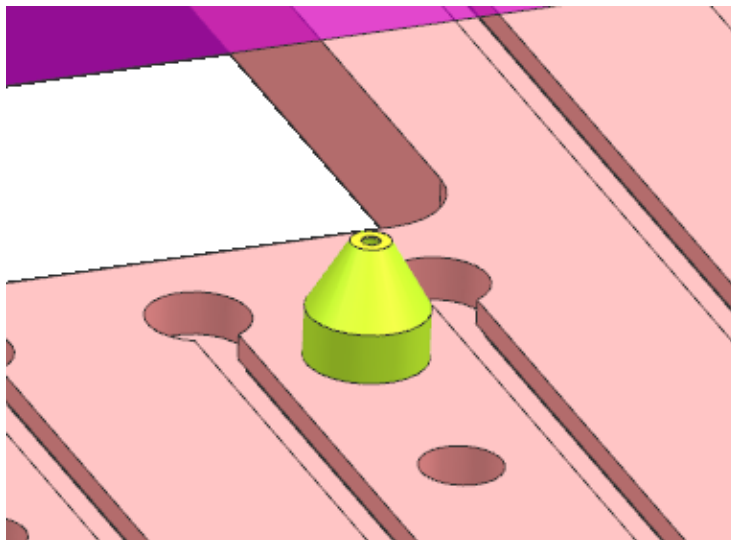
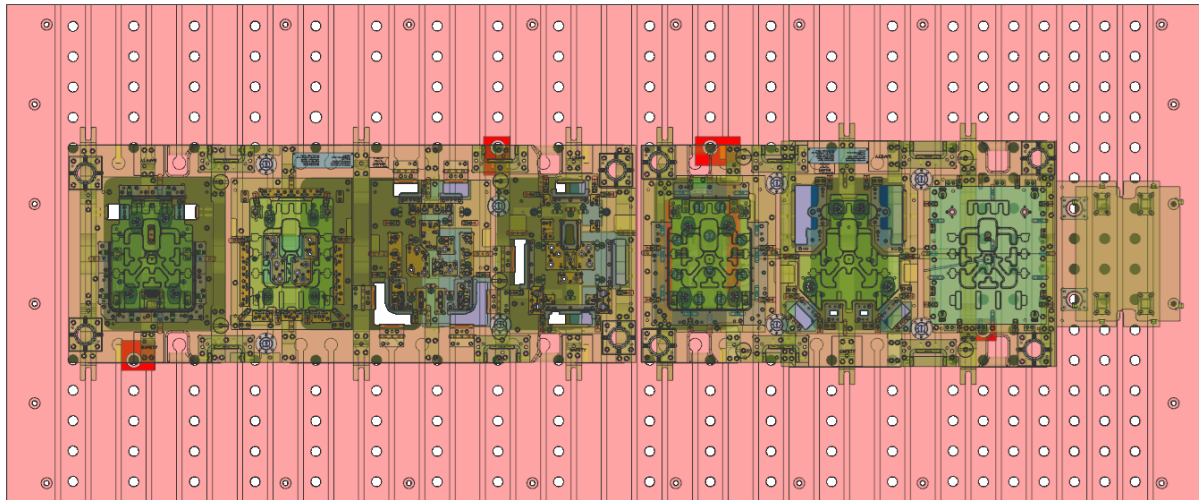
Press height information

SHUT HEIGHT	1220
FEED HEIGHT	655
STROKE	762
SLIDE ADJUSTMENT	350



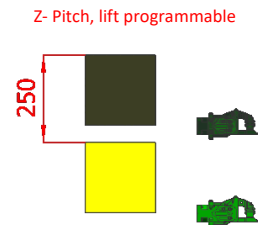
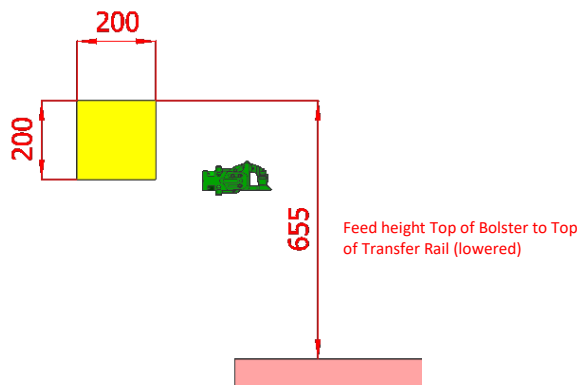
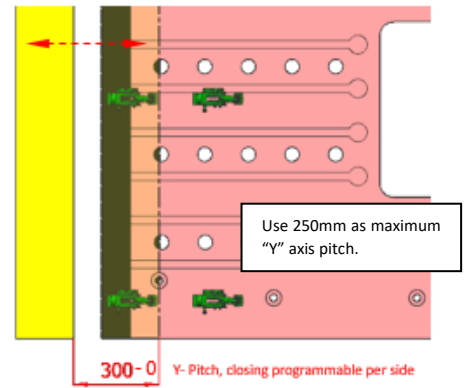
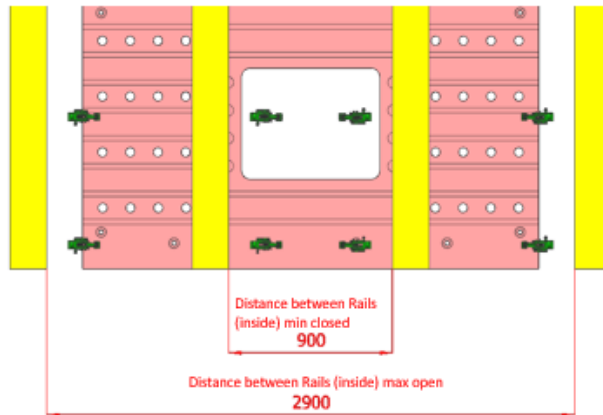
WIA 3000 TON.

Die location information.



WIA 3000 TON.

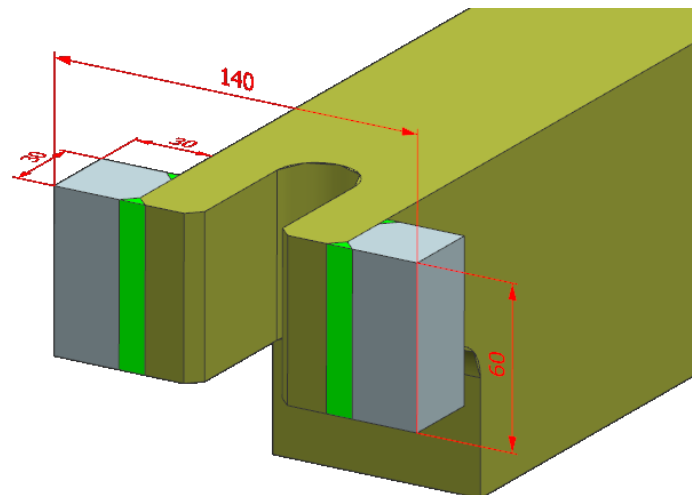
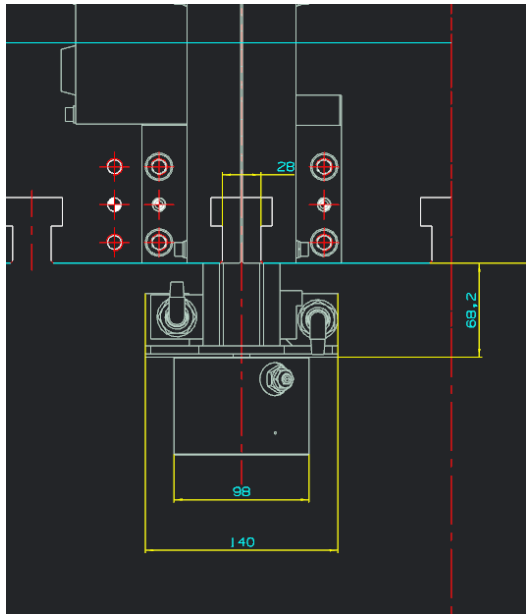
Transfer bar information.



WIA 3000 TON.

Automatic Clamp information.

4	Die Clamp Specification		
1	Automatic Upper Die travelling Clamps		
1	Type	Type	Included Automatic
2	Brand		Pascal
2	Qty. of Die Clamps	SET	36 (18 per each side)
3	Capacity	Ton	10
4	Clamping Circuits	SET	2 Hydraulic circuits
5	Clamping Stroke	mm	8mm (4+4)
6	Travelling	Type	Electromecanic
7	Clamping Height for Upper Die	mm	60
2	Manual hydraulic Upper Die Clamps		
1	Qty.	Ton	N/A
2	Capacity	Ton	
3	Maker		
3	Manual hydraulic Lower Die Clamps		
			N/A



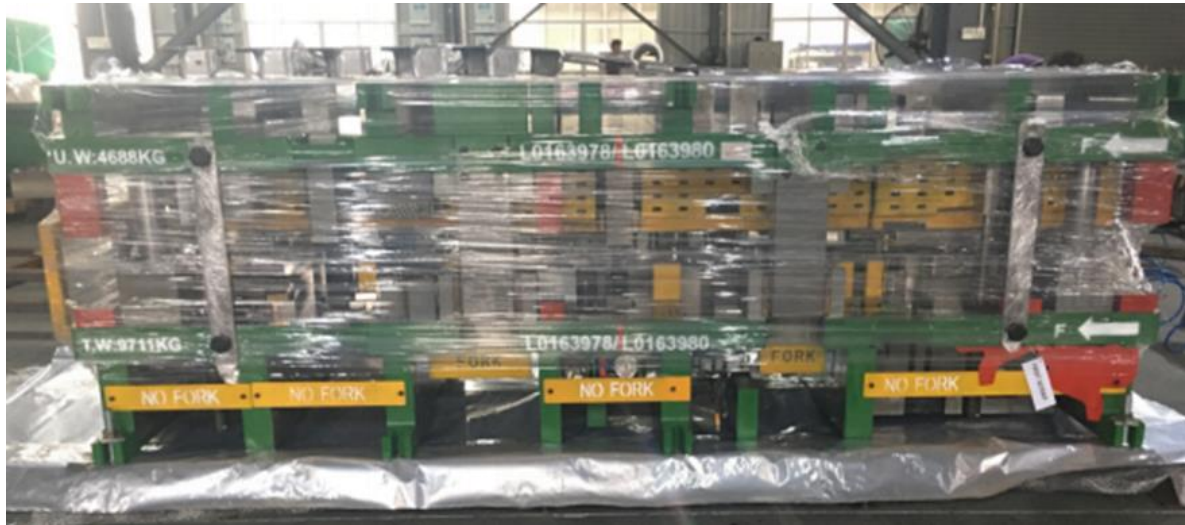
7. DIE PAINT & IDENTIFICATION

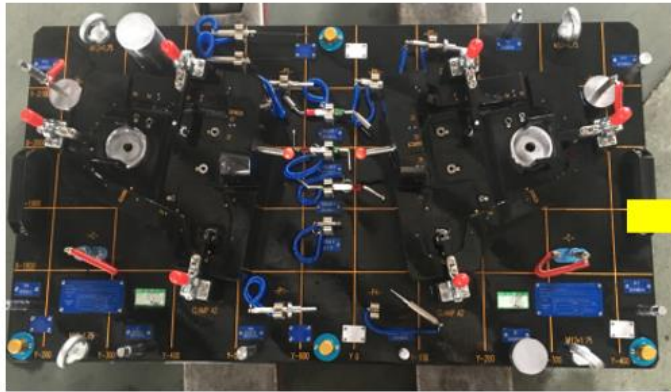
Color code will be provided by Danbro Tool & Die Inc. PART NUMBER to be painted on 4 sides of die and Upper & Lower .



8. PACKAGING INFORMATION

All the Dies Must be packed according to the pictures below.





Opened container is needed for easy die and checking fixtures discharge.



9. BUY OFF REQUIREMENTS

- Supplier Must provide all information required listed below.

-  1. GD&T
-  2. FORMABILITY SIMULATION
-  3. STRIP LAYOUT
-  4. DIE DESIGN
-  5. DIE DESIGN CHECKLIST
-  6. BOM
-  7. BLUE PANEL 80%
-  8. HARDNESS ROAD MAP
-  9. KINEMATICS SIMULATION
-  10. CAPABILITY STUDIO
-  11. 5 PARTS FULL LAYOUT SCAN AND CMM REPORT
-  12. DIE BUY OFF CHECKLIST
-  13. CHECKING FIXTURE DESIGN
-  14. RUN OFF IN PRESS VIDEO
-  15. TIS (TOOL INFORMATION SHEET)

– **GD&T:** Include files containing information relating to GD&T's and all the information with engineering level updated.

DATUMS		PAGE		SIZE		DRAWING NUMBER		ONE STATUS		PAGE NUMBER	
FACE	DATUM	DESCRIPTION	DIRECTION	ST	REV	PRE		R	OD4		
Y	A	TARGETS AT 42	Y/A								
Y	B	HELL	W/O, C/C								
Y	C	SLIP	W/O								

SECTION A-A

REAR VIEW ROTATED

DATE: 2024.04

SIZE: A3

DRAWING NUMBER: L0295243AA

ONE STATUS: R

PAGE NUMBER: 004

PAGE: 7

OF: 8

MEASUREMENT POINTS

DATE: 2024.04

SIZE: A3

DRAWING NUMBER: L0295243AA

ONE STATUS: R

PAGE NUMBER: 004

PAGE: 8

OF: 8

CALL-OUTS AND FLAGS

DATE: 2024.04

SIZE: A3

DRAWING NUMBER: L0295243AA

ONE STATUS: R

PAGE NUMBER: 004

PAGE: 6

OF: 8

GENERAL NOTES & MATERIALS

DATE: 2024.04

SIZE: A3

DRAWING NUMBER: L0295243AA

ONE STATUS: R

PAGE NUMBER: 004

PAGE: 5

OF: 8

INDEX

VIEW 1

DATE: 2024.04

SIZE: A3

DRAWING NUMBER: L0295243AA

ONE STATUS: R

PAGE NUMBER: 004

PAGE: 1

OF: 8

REVISION BLOCK

DATE: 2024.04

SIZE: A3

DRAWING NUMBER: L0295243AA

ONE STATUS: R

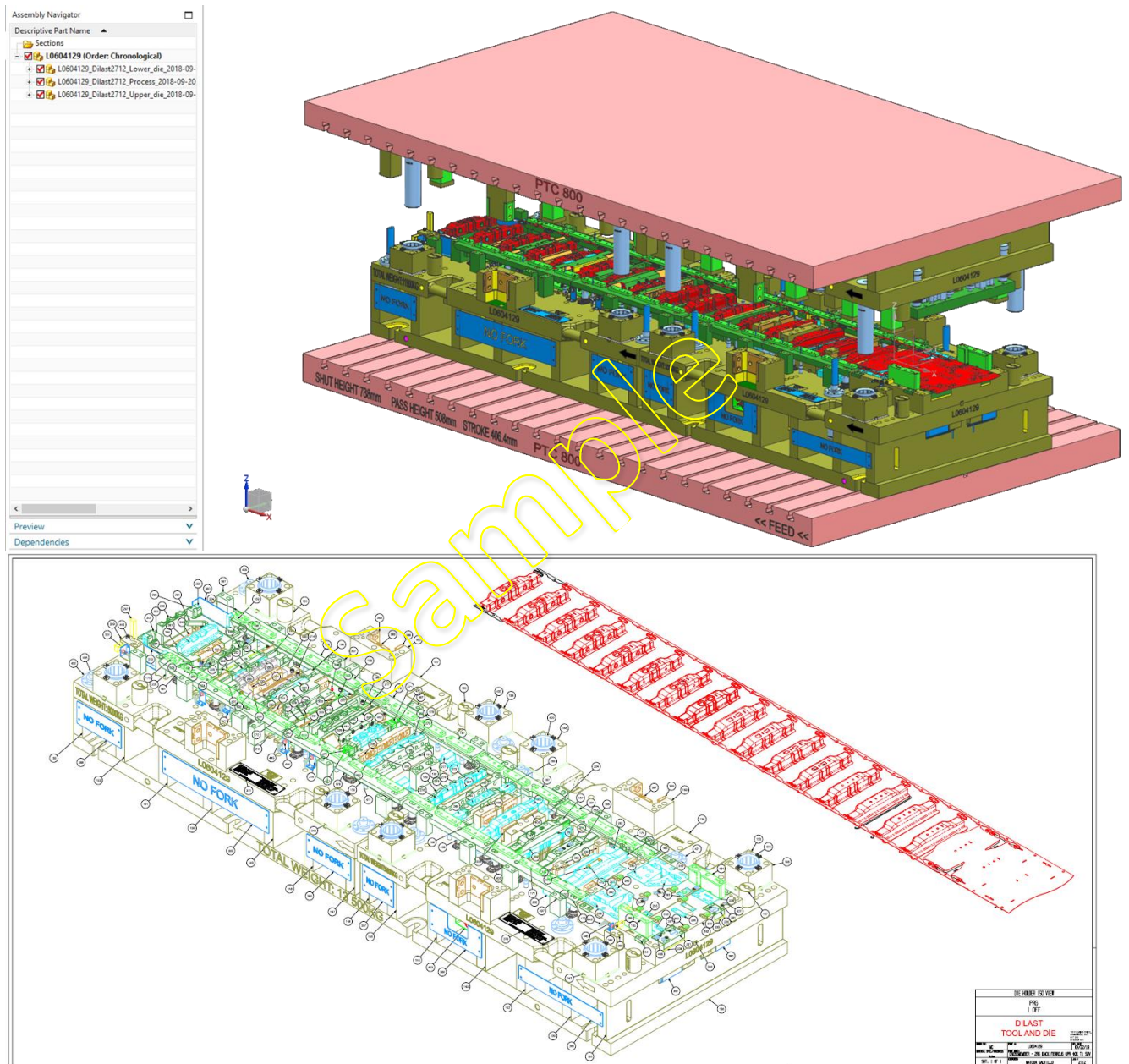
PAGE NUMBER: 004

PAGE: 2

OF: 8

- DIE DESIGN:

1. Contains the die design updated after Buy-off, supply die design in both STEP and native format.
2. 2D PDF with dimensions, sections and balloons should be provided for quick reference.
3. All the components must be called by groups (Upper Die, Lower Die, Strip Lay Out, bolster, Ram Press, Gripper, etc..) in 3D and metric system.



- DIE DESIGN CHECK LIST:

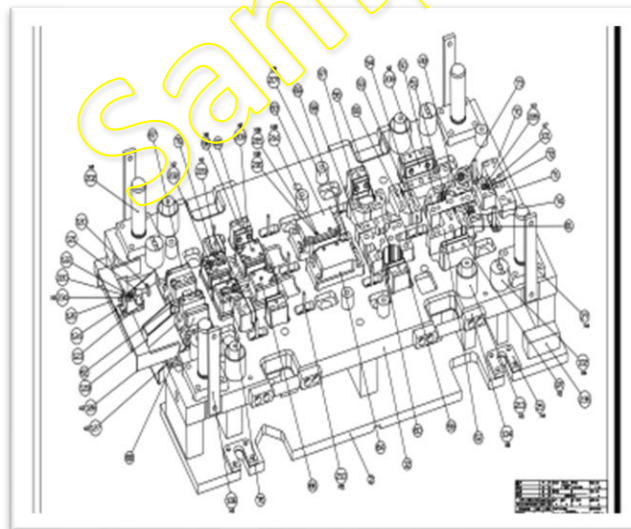
include the die design check list that was made by the tooling engineer responsible for the die, save the updated die design check list, with the originals notes in case they were added in the last check list, in PDF format.

BOM: Must be included the bill of material authorized and updated die design, following this **EXCEL FORMAT**, with an explosion drawing with details number as a visual aid. (Include manufactured and standard parts).

A	B	C	D	E	F	G	H	I	J	K	L
73	70	467	Cr12	95	196	10	1	Punch backing			STEEL
74	71	468	1050	79	163	24	1	Punch backing			STEEL
75	72	501	Cr12	47.8	15.8	12.2	4	Stamp retainer			STEEL
76	73	502	Cr12	142	115	35	1	Punch holder			STEEL
77	74	503	Cr12	136	95	35	1	Punch holder			STEEL
78	75	504	Cr12	90	120	35	1	Punch holder			STEEL
79	76	505	P20	89	84	136	1	Punch holder			STEEL
80	77	506	Cr12	100	95	35	1	Punch holder			STEEL
81	78	507	Cr12	95	196	35	1	Punch holder			STEEL
82	79	508	1050	79	113	58.7	1	Punch holder			STEEL
83	80	601	DC53	-	-	-	40	Stamps			STEEL
84	81	605	D2	40	35	70	1	Form punch			STEEL
85	82	712	1050	140	78	223	2	Heel block			STEEL
86	83	713	1050	Φ50.00	93	-	4	Upper stopper			STEEL
87	84	714	1050	Φ50.00	68	-	4	Upper other			STEEL
88	85	715	1050	59	40	48	4	Upper other			STEEL
89	86	717	1050	10	89	25	1	Upper other			STEEL
90	87	718	1050	Φ19	28	-	1	Upper other			STEEL
91	88	720	1050	50	61	12	4	Keeper			STEEL
92	89	721	CR12	50	50	130	4	Keeper			STEEL
93	90	722	1050	Φ76.00	24	-	4	Upper other			STEEL
94	91	723	Cr12	20	100	100	2	Inner other			STEEL

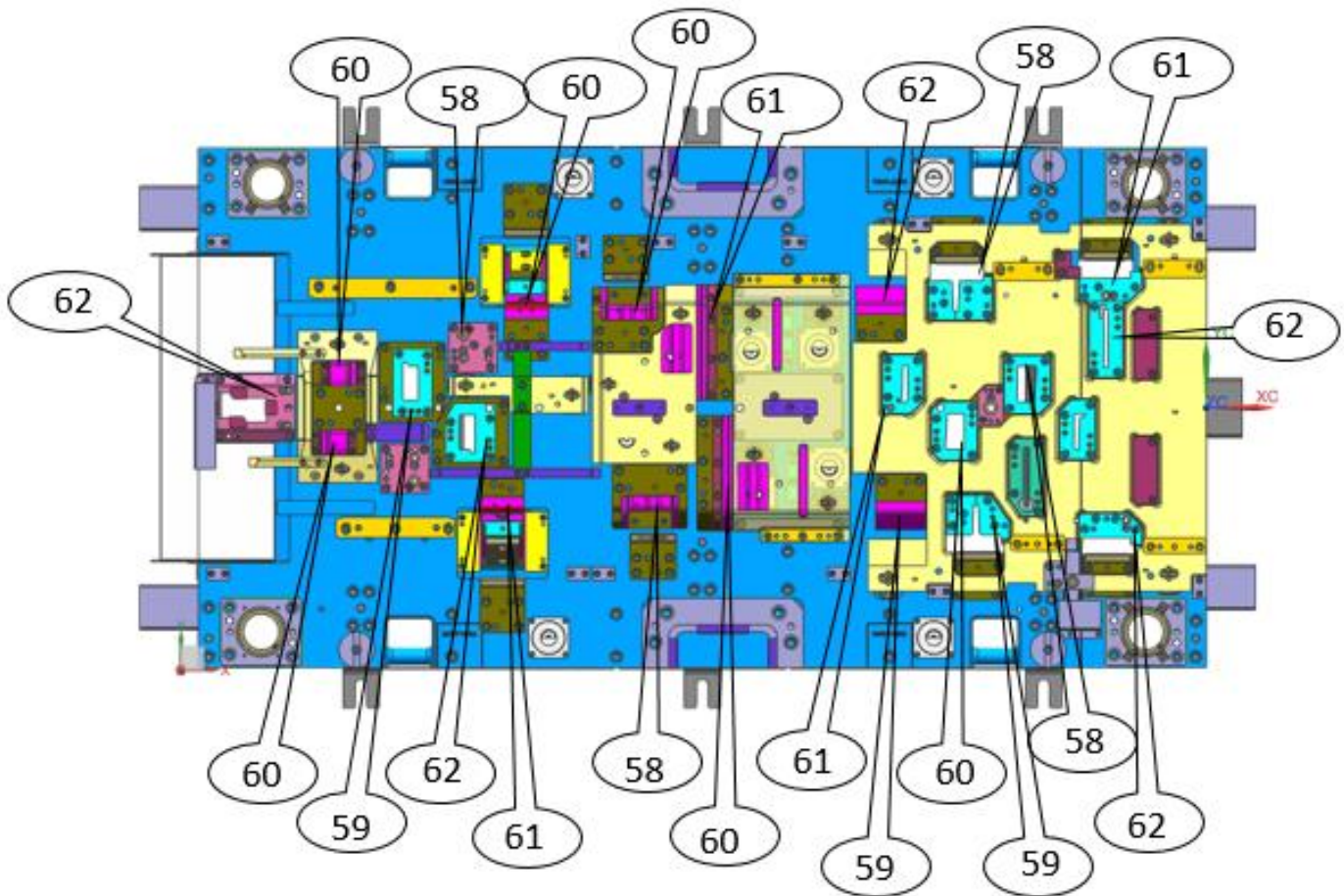
STEEL XW-42 AMPCO 18 DANLY DADCO DAYTON MISUMI Standard lifter

PROMEDIO: 50.5 RECUENTO: 100 SUMA: 5050



– HARDNESS ROAD MAPS FOR DIE OPERATIONS:

Example: Hardness road map. (Units Hardness Rockwell C)

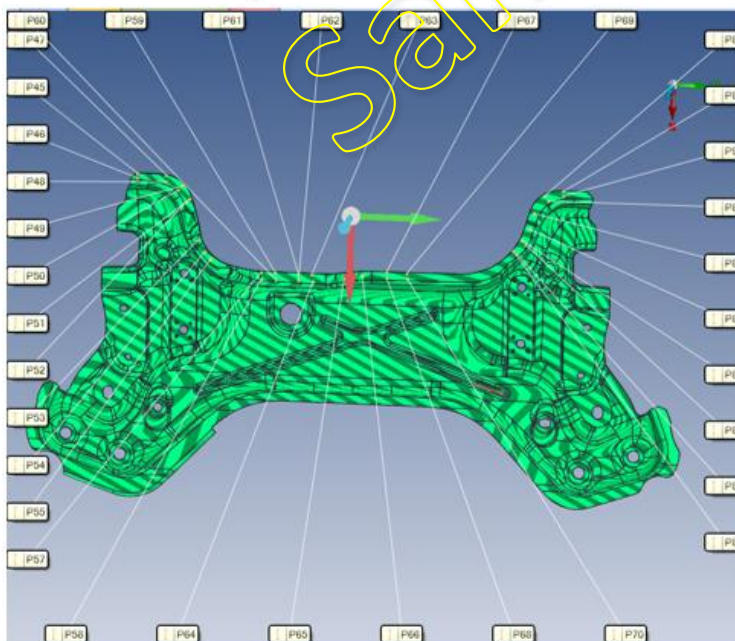


– CAPABILITY STUDY (SUPPLIER):

Part quality must be achieved 100% in the checking fixture, supplier must include the necessary documentation to prove the 30 pieces capability study obtaining at least a CP and CPK of 1.67, this result must be the same at final buyoff.

CAPABILITY REPORT								
Part number:	111173				Date:	18-Oct-13		
Part Name:	SILL-U/B #5 CR				Eng. Level:	AA		
Program:	GAMMA							
Characteristic:	PARTE							
Piece No.	Circle:CR4				Circle:CR6			
	X-axis	Y-axis	Z-axis	Diameter	X-axis	Y-axis	Z-axis	Diameter
1	-0.09	-0.20	0.305	0.151	-0.063	-0.316	0.226	0.133
20	0.09	-0.19	0.294	0.157	0.094	-0.267	0.352	0.140
21	0.05	-0.18	0.294	0.157	0.037	-0.220	0.163	0.175
22	-0.03	-0.26	0.283	0.135	-0.006	-0.349	0.222	0.157
23	-0.02	-0.25	0.254	0.157	-0.016	-0.369	0.189	0.165
24	0.08	-0.19	0.281	0.190	0.070	-0.311	0.131	0.173
25	0.05	-0.21	0.255	0.171	0.041	-0.292	0.233	0.176
26	0.06	-0.19	0.246	0.140	0.075	-0.260	0.253	0.141
27	0.07	-0.17	0.257	0.122	0.012	-0.235	0.175	0.145
28	0.06	-0.22	0.242	0.131	0.032	-0.274	0.161	0.117
29	0.01	-0.19	0.283	0.128	0.009	-0.278	0.190	0.126
30	0.00	-0.10	0.201	0.127	-0.023	-0.175	0.141	0.170
Descriptive Statistics								
Upper Spec	0.50	0.50	0.50	0.25	0.50	0.50	0.50	0.25
Nominal								
Lower Spec	-0.50	-0.50	-0.50	-0.25	-0.50	-0.50	-0.50	-0.25
average	-0.01	-0.21	0.25	0.15	-0.01	-0.29	0.21	0.16
X-DoubleBar	-0.01	-0.21	0.25	0.15	-0.01	-0.29	0.21	0.16
Range	0.21	0.18	0.19	0.07	0.21	0.19	0.22	0.07
Est. Sigma	0.05	0.04	0.05	0.01	0.05	0.05	0.05	0.02
Arith. Sigma	0.06	0.04	0.04	0.02	0.05	0.05	0.05	0.02
Cp	3.38	3.94	3.58	6.32	3.65	3.52	3.46	4.91
Cpk	3.33	2.26	1.78	2.54	3.59	1.44	1.99	1.83
Pp	2.67	3.94	3.80	5.06	3.23	3.28	3.47	4.57
Ppk	2.64	2.26	1.89	2.04	3.18	1.35	2.00	1.71

Road Map 50712050.



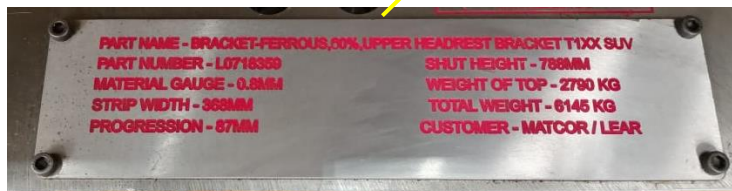
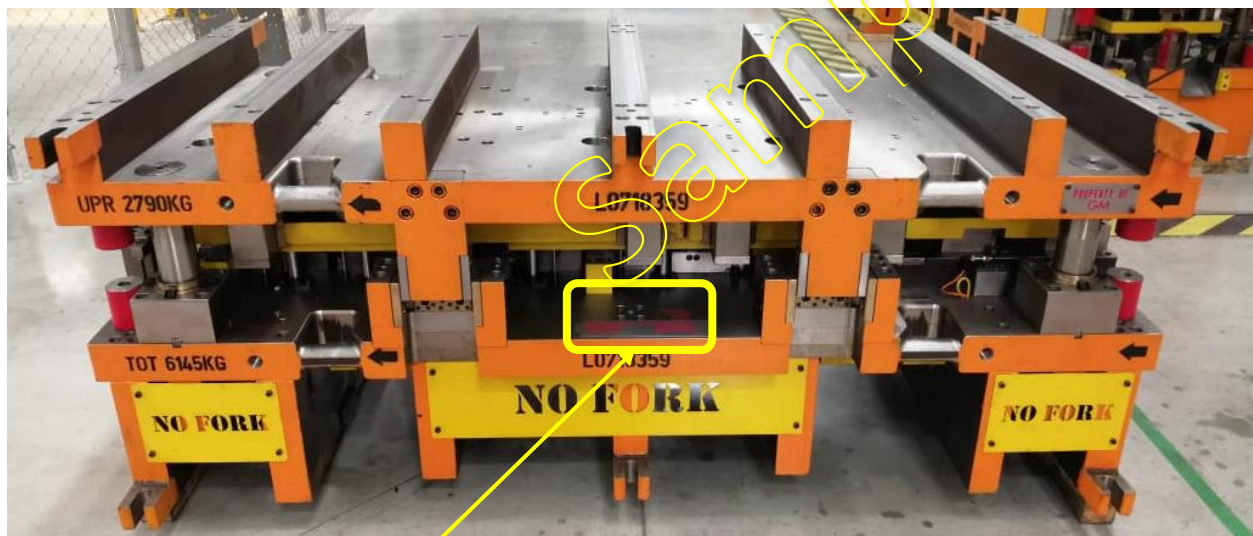
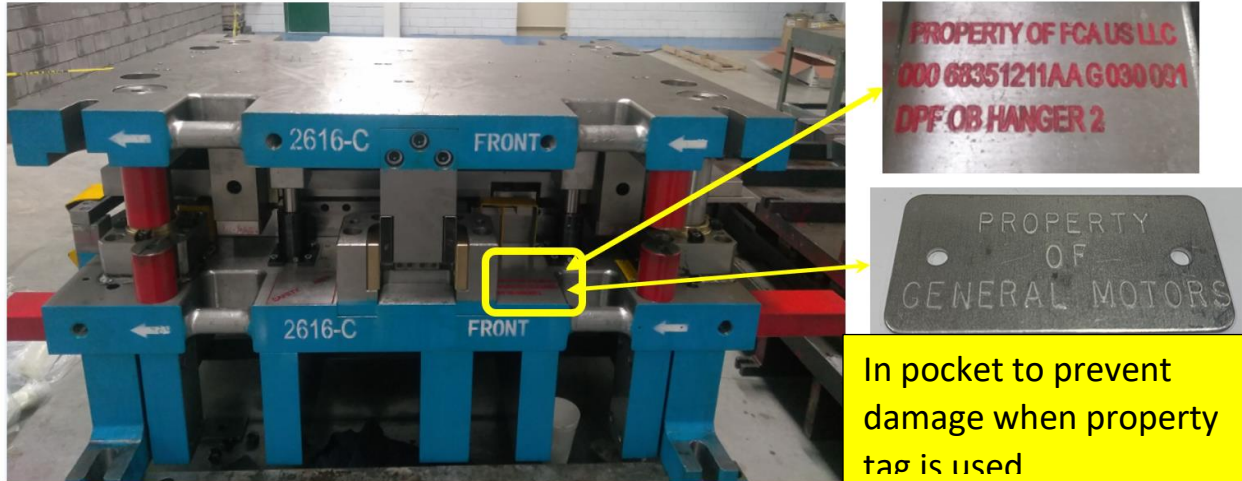
- DIE BUY OFF CHECK LIST:
(can be downloaded from Danbro supplier portal)
Must be included in PDF with signatures.

DIE BUY OFF CHECK LIST			DANBRO Tool & Die	
PART NUMBER:	PROJECT:	SPM:		
PART NAME:	DIE PROCESS:	TONNAGE:		
PITCH:	WIDTH:	THICKNESS:		
1 DYNAMIC	YES	NO	NOTES	
1- HAS THE DIE PLOTS AND / OR LOCATORS IN EACH STATION ?				
2- HAS THE DIE FRENCH STOP (OR SIMILAR), SENSOR FINGERS AND FINAL SENSORS?				
3- ARE THE TRIM AND PIERCE HOLES FREE OF SCRAP ACCUMULATION?				
4- DOES THE DIE HAVE ENOUGH PLUNGERS AND EJECTORS TO AVOID PART BE PULLED UP BY STRIPPER PAD?				
5- IS THE DIE SPEED (SPM) THE APPROPRIATE ? IS THE PRESS SPM APPROPRIATE? WRITE IT				
6- IS THE PROCESS STABLE ?				
7- ARE THE SENSORS SYSTEM WORKING PROPERLY?				
8- ARE ALL THE DIE COMPONENTS FUNCTIONAL AND WITHOUT INTERFERENCES ?				
9- IS THE PART DISCHARGED CORRECTLY TO THE CONVEYOR ?				
10- IS THE DIE IN THE APPROPRIATE PRESS ACCORDING TO THE TONNAGE REQUIRED BY THE PART ?				
11- DOES THE PART REQUIRES LUBRICATION ?				
12- ARE EACH PUNCH AND BUTTON DIE ALIGNED CORRECTLY? CHECK ALL HOLES AND TRIMS IN THE PART.				
2 QUALITY	YES	NO	COMMENTS / NOTES	
1- PART QUALITY APPEARANCE IS ACCEPTABLE RESPECT TO:				
A) FREE OF WRINKLES				
B) FREE OF BURRS				
C) PART EDGES WITHOUT DAMAGE				
D) FREE OF SPLITS				
E) FREE OF DRAGGING				
F) FREE OF MARKS OR HITS				
2- IS THE PART QUALITY DIMENSIONAL, ACCEPTABLE ACCORDING TO THE CHECKING FIXTURE ?				
3- THE PART COMPLIANCE WITH A 1.68 CP AND 1.33 CPK, ACCORDING TO CMM MEASURES ?				
4- IS THE PART AT THE LATEST ENGINEERING LEVEL ?				
5- IS THE MATERIAL SPECIFICATIONS ACCORDING TO THE APL ?				
6- VERIFY(CHECK WITH MICROMETER) DRAWS &/OR FORMINGS WITH RISK OF THINING, SPLITS OR CRACKS USING LIQUIDS OR SECTION CUTS FOR BETTER INSPECTION.				
3 STATIC	YES	NO	COMMENTS / NOTES	
UPPER DIE				
1 HAS THE DIE LIFTING HOOKS (THREAD HOLES FOR EYE BOLTS IF IS NESCESSARY)?				
2 IS THERE AN INTERFERENCE WHEN OPENING THE DIE				
3 IS THERE A DAMAGED COMPONENT ON THE DIE				
4 ARE STRIPPERS ARE PROPERLY ATTACHED, BALANCED, AND LEVELED?				
5 WHEN STRIPPERS ARE BEING DISASSEMBLED, IS THERE ANY INTERFERENCE?				
6 ARE THE STRIPPER PADS GUIDED WITH AMPCO GUIDES AND STANDARD LIFTER OR DADCO RETAINER?				
7 WEAR PLATES : STEEL OVER BRONZE WITH GRAPHITE PLUGS				
8 ARE THE NYTRO CONTROL PANEL PLACED IN A SAFETY PLACE AND				
9 WITH STANDARD CONEXIÓN, AND ALL NYTRO CLINDERS COMPONENTS ARE DADCO BRAND ?				
10 DOES EXIST A PLATE WITH NYTRO FLL INFORMATION EACH DIE STATION (CAN BE ENGRAVED ON DIE SHOE)?				
11 ARE NYTRO CYLINDERS PROPERLY ATTACHED WITH SCREWS OR MOUNTING FLANGES ?				
12 ARE THE NYTRO CYLINDER FULL, AND WITHOUT LEAKS ?				
13 ARE NYTRO CYLINDERS USING 90% OF STROKE?				
14 DOES EXIST ANY DIE COMPONENTS IN BAD CONDITIONS (PUNCHES, DIES BLADES, FORMING INSERTS, ETC.)				
15 HAS IT PUNCHS BALL LOCK TYPE, AND ARE THEY WELL LOCKED ?				
16 ARE ALL THE FORM, DRAW AND BENT SECTIONS WELL POLISHED ?				
17 DOES EXIST A GAP BETWEEN THE INSERTS JOINS ?				
18 ARE THE CAMS MADE WITH POSITIVE RETURN ARM ?				
19 DO WE HAVE CORRECT SCREW SIZE AND PROPERLY TIGHTEN?				
20 HAS THE STRIPPER SPRING PLUNGERS TO PREVENT THE PART STICKING ?				
21 IS THERE ANY FRICTION BETWEEN THE STRIPPER AND THE DIE COMPONENTS ?				
22 ARE THE PUNCH HOLDERS IN WELL CONDITIONS AND DOWELED PINS ?				
23 HAVE THE PUNCHES SHEAR ANGLE AND EJECTORS ?				
24 ARE ALL THE DIE COMPONENTS FREE OF WEAR?				
25 IN DRAW, OR FORMING STATIONS, ARE THERE ACCESS FOR THE LUBE PIPING? Ø8 0MM HOLE SIZE.				

- INFO PLATE:

Include Pictures showing the die and information plate or information engraved according customer requirement.

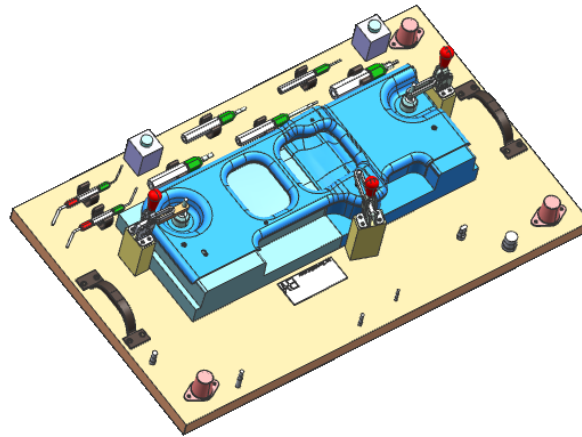
When Property of Tag is used, pocket is needed to prevent tag from damage.





- CHECKING FIXTURE:

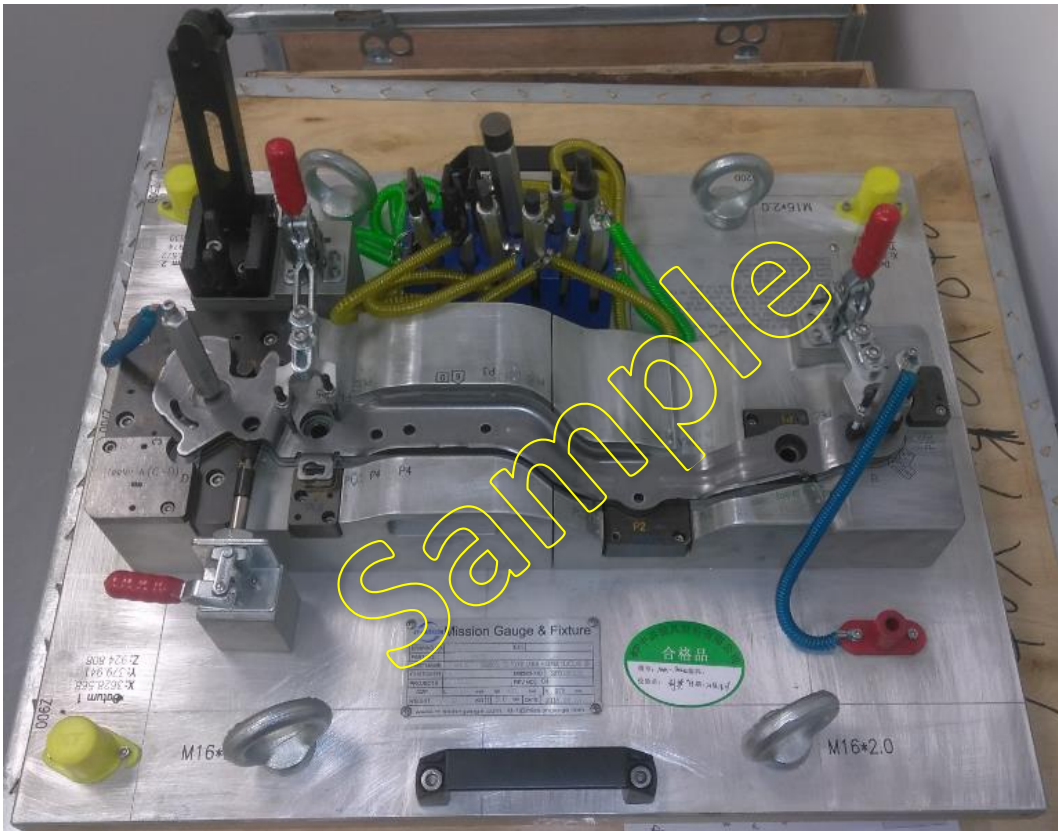
Include the checking fixture design in STEP and native format, in 3D and metric system, including certification, operation manual, R&R report and all information relating to the checking fixture.



Checking Fixture's Certification MUST BE by 3rd. Party.

CERTIFICATE OF MEASUREMENTS	
<u>FIXTURE CERTIFICATION</u>	
CUSTOMER:	Matcor
PART NAME:	
PART NUMBER:	FC00AAY27005_008_BRKT-3
DATE CERTIFIED:	7-2-18
E/C LEVEL:	
FIXTURE NUMBER:	F171207
TEMPERATURE AT TIME OF TEST:	18.2°C
TESTED ITEMS CONDITION:	NEW FIXTURE
All units are in metric unless otherwise specified. The results relate only to the items tested. For the results refer to the report attached with this certificate ☒ Roadmap ☒ CMM Printout Report ☐ Other	
The equipment used is traceable to National Standards as follows: COORDINATE MEASURING MACHINE: SERIAL#I010836 SOFTWARE: PC-DMIS 2010 MR1 CAD++ CALIBRATED : 3:00 PM TRACEABILITY #: N0.1508005	
SIGNED:	DATE: 7-2-18
Fangyuan Measurement(Quality Manager)	

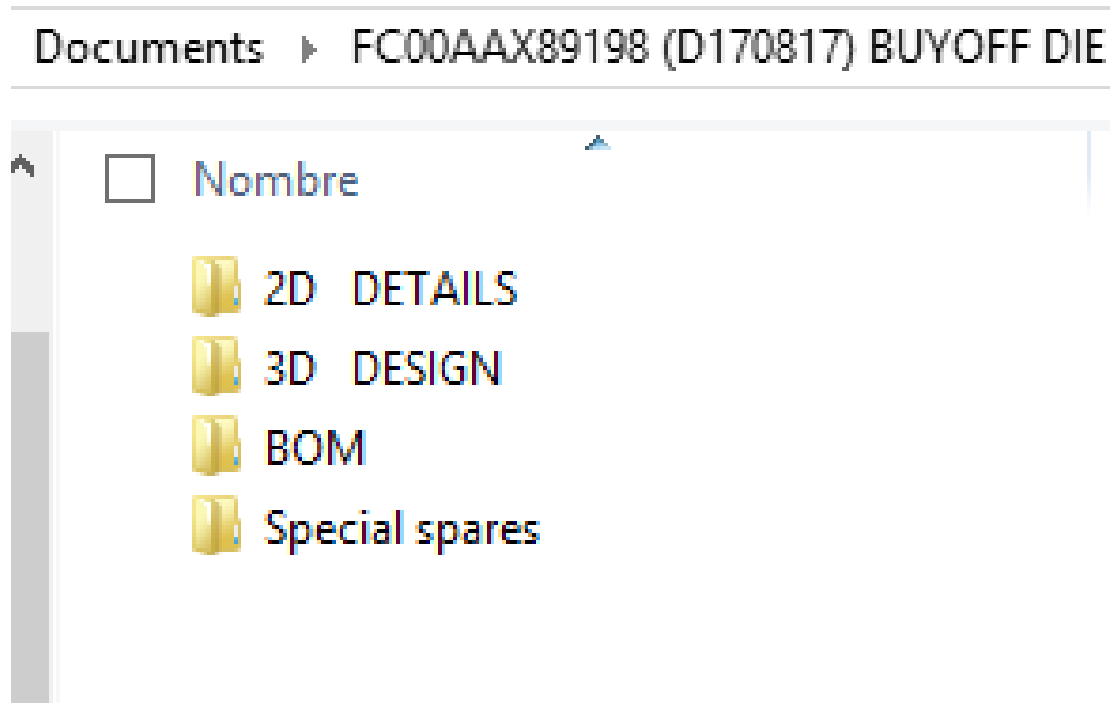
Checking fixture.



X.Y.Z.		Gauge & Fixture			
DRAWING NO.			ECL		
PART NO.	L0554250AA				
PART NAME	BRACKET - FERROUS; T1 FLOOR LATCH - OVER HINGE				
CUSTOMER	Matcor		MISSION NO.	SMP 2012	
PROJECTS	T1XX		REV NO.	04	
SIZE	L 600	mm	W 400	mm	H 100 mm
WEIGHT	43	KG	T 3.0	mm	DATE 2012-05-20

10. DIE DESIGN INFORMATION

Danbro Tool & Die Inc. Require Die Design Updated after Buy Off and Engineering Changes implemented, in STEP and Native Format, the Folders should be in order based in the next list:



- **Die design Checklist**
(can be downloaded from Danbro supplier portal)

DIE DESIGN CHECK LIST				DANBRO Tool & Die	
PART NUMBER:		PROJECT:		ASSIGNED PRESS: QUOTED PRESS:	
PART NAME:		DIE PROCESS:		SHUT HEIGHT: FEED HEIGHT:	
FINAL BLANK SIZE:		QUOTED BLANK SIZE:		PRESS BED SIZE:	
1 SIMULATION REVIEW					
		YES	NO	NOTES	
1 Did supplier use Yield and Tensile strength values given by DANBRO Tool & Die?					
2 Does the FLD graphic show all point in safety zone?					
3 Does the tonnage calculation ensure the die can work on assigned press?					
4 Is the blank size equal or less than the quoted ?					
5 Can the part be made with the quoted material spec without danger of splitting or are there needed design modifications to the part geometry needed					
6 Is the part at the latest engineering level ?					
7 Do critical zones are in the range less than 20% of thinning?					
8 If formability simulation shows splits, wrinkles, thinning, or another issue, does suplier have an action plan?					
2 DIE PROCESS / LAY OUT					
		YES	NO	COMMENTS / NOTES	
9 Are all dimensions and components in metric system?					
10 Has supplier confirmed that received the latest die standards?					
11 Are the shut height and feed height the correct for the assigned press?					
12 Is the bolster printed behind the strip layout?					
13 Does the Process ensure projected production volume ?					
14 Are the french stop and sensor fingers (cut-off and initial sensor) showed?					
15 Is the start line indicated?					
16 Isn't coil width wider than max coil feeder opening?					
17 Do pilot holes are made before start line?					
18 Are mating brims, datum and tight tolerance holes made after re-strike station?					
19 Are the datum holes pierced perpendicular to cad date surface ?					
20 Are estimated tonnage showed station by station and total tonnage?					
21 Is date stamp showed at the beging of the process and each station?					
22 Does process layout shows:					
a) Material spec.					
b) Material thickness					
c) Coil width					
d) Pitch					
e) Primary press					
f) Auxiliary press					
g) Feed direction					
h) Lifting height					
23 Are Forming, trim and pierce indicated with different colors?					
24 If process has a center carrier, is it wide enough and guided with U flange 10mm height?					
25 Is de process developed to achieve tolerances and requirements according the GD&T?					
3 DIE DESIGN REVIEW					
GENERAL REVIEW		YES	NO	COMMENTS / NOTES	
27 Is the die size and weight correct according the press?					
28 Is the shut height and feed height ok according the press?					
29 Is the blank size equal or less than the quoted? (same used in process layout)					
30 Die location:					
31 Is die locating system according the press?					
32 Do centering holes, V-Blocks or keys match on the bolster?					
33 Is the total die weight less than maximum crain capacity?					
34 Are the lifting bars machined on the die shoes? (⌀45-50mm, window 100x100mm)					
35 Are the scrap chutes designed to avoid scrap jump to the bolster?					
36 Is the die guided as follow?					
Small dies= guide post and bushing ⌀63mm + 2 heel blocks					
Medium and large dies= guide post and bushing ⌀80mm + 4 heel blocks					
37 Is the die parallels thickness as follow?					
Clamping parallels= 80mm					
Flat parallels= 60-80mm					
38 Is the die shoe thickness 90mm? (80mm can be used for small dies)					
39 Is a guide post/bushing misaligned as error proof?					
40 Do clamping slots match with bolster and ram slots?					
41 Does the die has storage cylinders?					
42 Does the die has quick change date stamp holders?					
43 Is the Control Panel protected between parallels and have a safety guard?					

11.SPARE PARTS

- Cost of one set of standard punches, Buttons and Trim Steels , Trim Punches, need to be quoted at the time of sourcing and ship with die after buy off.
- Cost of one set of extrusion sections, if applicable, need to be quoted at the time of sourcing and ship with die after buy off.
- Cost of other Critical spares (forming sections, additional copies of trim section. etc.) need to be quoted upon request by Danbro Tooling Engineer at the time of final design review, and ship with die after buy off.
- All spare parts need to be clearly indicated in BOM with visual aid.

