Photo: ZS 1200 CN with optional parking desk and 3 C-frame tools

Specimen punches (C-shape frame)

ZS400 | 650 | 1200 | 1500 | 2000 (kN)

- C-frame for single tool
- C-frame with double tool – no tool change required
- C-frame with beside parking desk for changing tools

- Also available: TWIN / TRIPPLE / QUATRO punches with 4 cylinder (several cylinder / working area which avoid tool change

Tensile specimen punches (C-shape frame) ZS400 | 650 | 1200 | 1500 | 2000 CN

Our hydraulic presses are the first choice in quality and price ratio in the world of testing since 1970. Especially for this application we developed this presses, blanking tools and a unique specimen grinding machine PSM 2000 (grinding machine to remove the damaged zone in parallel length (Lc).

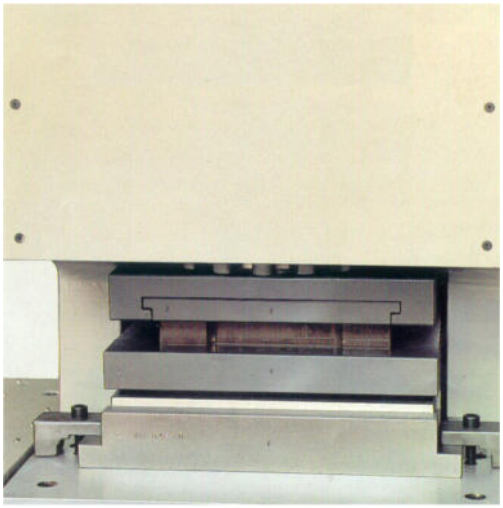
Comparing this press with other principles

Our presses are especially designed for the requirements of the world of test in sheet metal industry and will be manufactured (even they are standard products) customized to your requirements. Because of reduced functions we are able to manufacture these presses for reasonable prices – often less expensive than a used press from second hand machine dealers. This limit in functional use (only designed for this job) also gives the advantage that your production won't be occupy this machine for other jobs - the punch is available for quality department 100%.

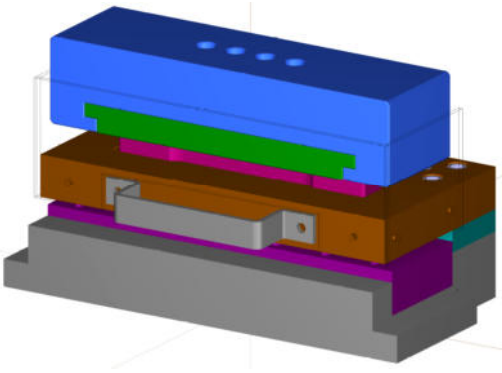
Advantages of our presses

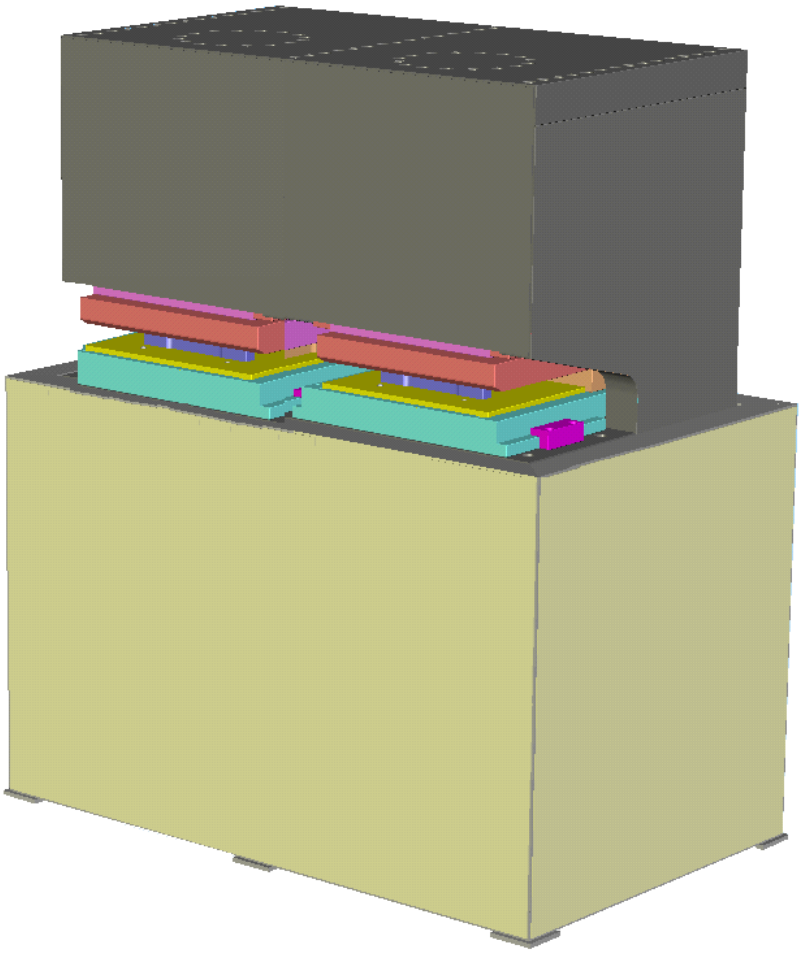
The tensile specimens are punched out by slow cutting. Unlike an eccentric punch, edge damage / work hardening of the edge zone is limited here to 10% of the sheet thickness (per side) (provided the sheet thickness range is designed accordingly). Please do not use an eccentric punch for these tasks. In the case of impact punching, the strain hardening / damage amounts to up to 35% of the sheet thickness. The immense damage cannot be removed by the sample grinding machine PSM 2000. New: With the fully automatic specimen grinder PSM2000-A with active cooling, newly developed in 2022, this is now possible after all: No heat is generated during long grinding.

Photo: Example c-shape specimen punch ZS 1200 with optional beside desk as parking tables for additional tools.



On the press table fixed blanking tool. In the top of the tool you may find the quick changing device (t-slot-connector): "Drawer" and adapter. The tool changed needs <90 seconds or less (standard tool types).





General information on the preparation of tensile specimens and samples made of sheet metal: Punching is the most economical way to produce a tensile specimen from sheet metal. Performing a tensile test on a tensile specimen that has only been punched is usually pointless and does not conform to standards. Even the best tensile testing machine can only deliver false results if the damaged punched edge (strain hardening due to edge compression) is not removed (ground / milled). The ISO 6892 standard (ASTM, JIS ... or other) state:
"The production of these specimens by stamping can lead to significant changes in the material properties, especially the yield / proof stresses. Materials that harden strongly should always be finished by milling, grinding".
Furthermore, the elongation of only punched specimens is reduced (usually 1/4 to 1/2 less). Work hardening initiates cracks that lead to premature fracture (especially in hard sheets >1000 MPa). According to customer statements, certain steels / sheets (magan steels - press hardening) cannot be milled because already during the first milling operation a compaction / work hardening is generated by blunt cutter cutting edges. The finishing of these extremely tough sheets is only possible by means of the unique sample grinding machine PSM2000 or the new PSM2000-A (automatic machine with cooling).

Special features of our system:

- from sheet metal to tensile test <3 minutes
- can be operated by anyone (semi-skilled workers) and in between (while a tensile test is running...)
- 1A sample quality due to worldwide unique sample grinding machine PSM 2000:
  a "must have" for R+N-value / indispensable for hardened sheet metal (press hardening / hot forming)
- world's largest know how: 100s of punches, tools + grinding machines
- Customers state: “Yor delivery list is like the "Who is Who" in the sheet metal industry..."

Sheets with extreme tensile strength (hardened): Punching is based on the principle that the punch is much harder than the material to be punched. Punch + cutting plates (dies) are approx. 60 - 62 HRC hard (~ 2,260 - 2,335 MPa). The service life of the cutting punch and die decreases exponentially the harder the sheets to be punched are.

Max. Max. punching strength: <1200 MPa: standard tools|>1200 - 1800 MPa require secial tools: Made of extremely alloyed punching steel + PVD coating. Stainless steels (high toughness + elongation) and very soft deep-drawing sheets require double the number of punching tools (less burr formation and edge deformation, that grinding is mandatory

Formula punching force calculation:
Circumference x sheet thickness x tensile strength Rm x shear value 0.8 x factor shear angle 0.6 - 0.8 (tool shear angle slope). → Conversion N kN (divisor 1000) | Conversion N → tons punching force: divisor 9.810)

Punching tool thickness ranges: In terms of testing technology and the service life of the punching tools (cutting sharpness until the next sharpening), it does not make sense to punch all sheet thicknesses with only one punching tool. If the cutting gap is too large, a large burr will form as the punching edge is drawn into the cutting gap. The burr formation is the smaller problem: soft sheets (< below 500 MPa) compress extremely due to the force effect on the edge (cold compressed / cold strengthened edge zone). This edge deformation must be removed (by grinding). If the strain-hardening is too great (laterally penetrated too deeply into the material), too much must be ground off. This takes too long and can heat up the sample unacceptably. In this case, only the newly developed specimen grinder PSM 2000-A (with integrated, active cooling) can be used.

Specimen shape for punching tools and specimen grinding machine: Punching must be carried out with oversize in order to remove the work hardening with the specimen grinding machine (punching oversize **b+**). The allowance depends on the sheet thickness.

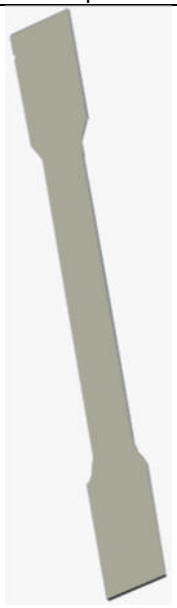
YouTube videos:
ZS1200CN specimen punch for interchangeable tools www.youtube.com/watch?v=i2wtM7F9bDE

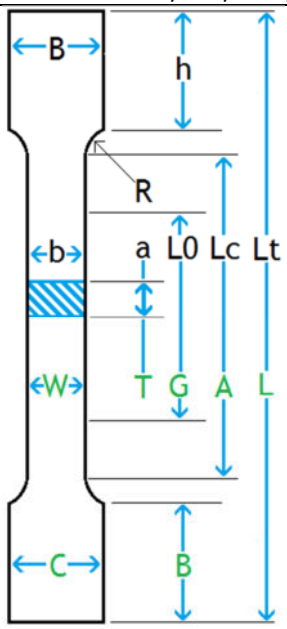
Specimen grinding machine PSM2000 www.youtube.com/watch?v=tIGCg53MMuI

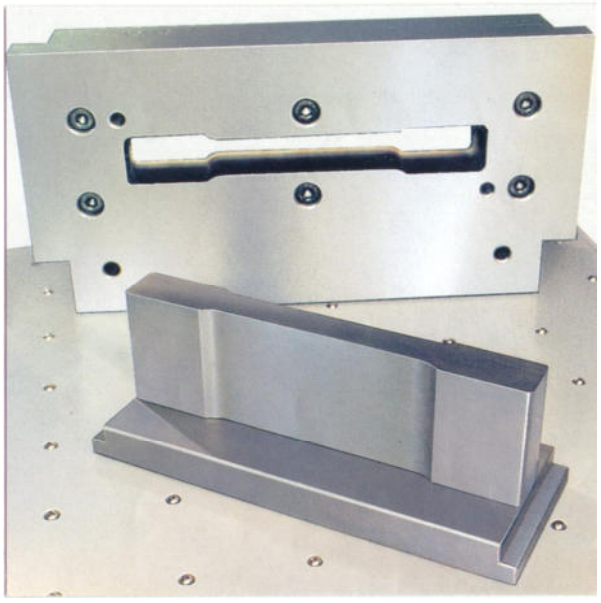
YouTube video: Specimen grinder PSM2000-A fully automatic with cooling (aluminium tensile specimens / bake hardening steels / high specimen volume)

https://youtu.be/djoGD5ddddo

ZS	400	650	1200	1500	2000
Punching force kN Tons ~	400 kN 40 t	650 65 t	1200 kN 120 t	1500 kN 150 t	2000 200 t
Drive	electro-hydraulic				
Power supply	400V - 50/60Hz - please indicate your power supply at order / other on request				
Power consumption	5,5	5,5	7,5	7,5	7,5
Fuse power supply	16A slow	16A slow	32A slow	32A slow	32A slow
Stroke mm	35 (or depending on different application)				
Strokes per minute	6	6	4	3	3
Oil pressure bar	245	293	304		
Weight approx. kg no table				3.380	3.780
Weight approx. kg with table	1150	1200	1750	4.100	4.500
Dimensions (cm):					
without parking desks	64	64	70	90	90
with optional tables	182	182	193	239	239
Parking space each				780 x 820	780 x 820
depth mm	81	81	90	94	94
height mm	163	163	171	180	180
working height mm	107	107	107	107	107
specimen max. Lt / L mm	300	300	300	300	300
Specimen shape	ISO / EN / DIN / AFNOR / BS / ASTM / JIS / GHOST / customer sketch				







Dismantled punch tool for sheet metal tensile specimens (on tool parking desk)

Technical changes reserved

Other models and capacities available, please contact us