

Materials for Trimming and Punching Dies in Hot Forging

Trimming takes the flash off a forging and punching clears the material inside a hole. The published selection below gives the punch and blade material for each group of work metal and for each type of trim.

Reference only. This is a reference summary of published practice and it is not a specification of ours. The grades and hardnesses are reproduced from the source table, and a different press, a different flash thickness or a different trim temperature will move the choice. Final selection is made against the part drawing and the press it runs on.

Typical materials for trimming and punching dies

Material to be trimmed	Type of trim	Punch	Blade
Carbon and alloy steels	Cold, normal trim	6F2 or 6G at 341 to 375 HB	D2 at 54 to 56 HRC
Carbon and alloy steels	Cold, close trim	Generally hot trim	Generally hot trim
Carbon and alloy steels	Hot trimming	6F2 or 6G at 341 to 375 HB	Hard facing alloy 4A on 1035 steel(b); or D2 at 58 to 60 HRC
Stainless steels and heat-resisting alloys	Cold, normal trim	Generally hot trim	Generally hot trim
Stainless steels and heat-resisting alloys	Cold, close trim	Generally hot trim	Generally hot trim
Stainless steels and heat-resisting alloys	Hot trimming	6F2 to 6G at 388 to 429 HB	D2 at 58 to 60 HRC
Aluminum, magnesium, and other nonferrous metals	Cold, normal trim	6150 at 461 to 477 HB	Hard facing alloy 4A on 1020 steel(b); or O1
Aluminum, magnesium, and other nonferrous metals	Cold, close trim	D2 at 58 to 60	D2 at 58 to 60
Aluminum, magnesium, and other nonferrous metals	Hot trimming	1020 soft	Hard facing alloy 4A on 1020 steel(b)

Typical materials for trimming and punching dies, reproduced from Table 3 of Dies and Die Materials for Hot Forging. (a) Both normal and close trimming. (b) Hard facing alloy 4A has a nominal composition of Co-1C-30Cr-4.5W-3Ni-1.5Fe.

How to read the table

For carbon and alloy steels trimmed cold, the punch in the table is a low-alloy block steel at a bulk hardness of 341 to 375 HB, and the blade is D2 at 54 to 56 HRC.

Once the part is trimmed hot, or once the work metal is stainless or heat-resisting, the punch moves to 6F2 or 6G at 341 to 375 HB for carbon and alloy steels, and to 6F2 to 6G at 388 to 429 HB for the stainless and heat-resisting group.

The nonferrous row works the other way round. Cold normal trimming uses a 6150 punch at 461 to 477 HB against a blade of hard faced 1020 steel or O1, and close trimming puts D2 on both sides at 58 to 60 HRC. Hot trimming of the same group uses a soft 1020 punch and a hard faced blade, because the punch is there to push the part through and not to cut it.

Aobo Steel, tool steel supplier

Aobo Steel supplies tool steel to distributors and mold, tool and die shops, including D2, D3, O1, O2, A2, S7, H13, H11, H10, H21, M2, M42, L6, P20, P20+Ni and 420 and 440C stainless. Forged or hot rolled, annealed or pre-hardened, cut to your sizes, with test certificates. Source, Table 3 of Dies and Die Materials for Hot Forging, in ASM Handbook, Volume 14, Forming and Forging, ASM International, 1988.

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