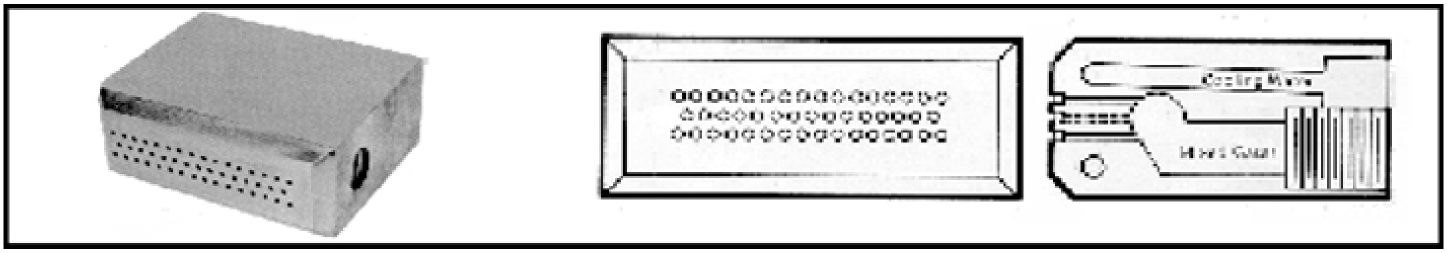
STANDARD FLAME HARDENING HEADS

WATER-COOLED HEADS FOR FLAME TECH GOOSENECKS

Water is circulated through the head for cooling purposes only. Quenching of the work piece must come from another source. Internal threads are provided at the back of each head for mounting purposes.

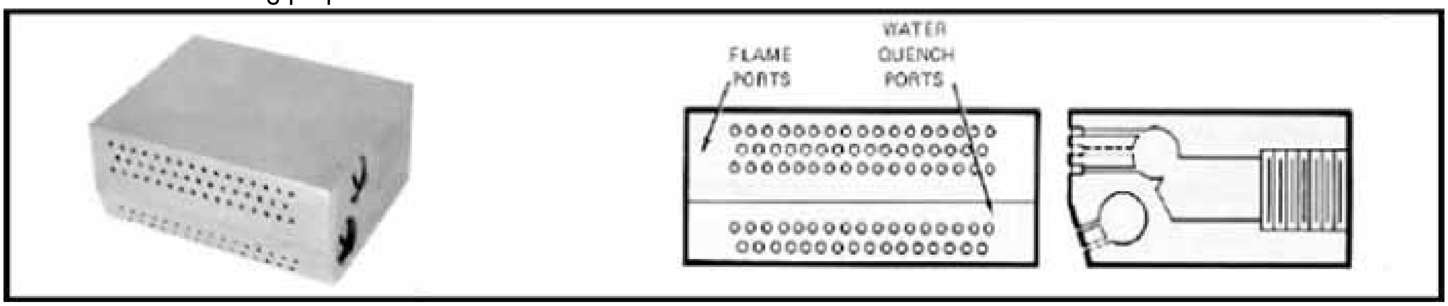


FUEL GAS INLET IS 1/4" NPT – WATER INLET IS 1/8" NPT (NOTE: TO MOUNT ON A FLAME TECH GOOSENECK, USE UAD-10 ADAPTOR.)

ITEM NUMBER	HEATING AREA WIDTH	HEAD SIZE	NUMBER OF FLAME PORTS	OXYGEN FLOW (CFH)	FUEL FLOW (CFH)
WC 10	1"	1 x 2 x 1 3/4"	23	130-155	35-50
WC 15	1 ½"	1 x 2 x 2 1/4"	35	200-235	50-80
WC 20	2"	1 x 2 x 2 3/4"	47	270-315	70-110
WC 25	2 ½"	1 x 2 x 3 1/4"	59	340-400	80-135
WC 30	3"	1 x 2 x 3 3/4"	71	400-475	110-165
WC 35	3 ½"	1 x 2 x 4 1/4"	83	475-560	125-190
WC 40	4"	1 x 2 x 4 3/4"	95	550-640	140-220

WATER-QUENCHING HEADS TO FIT FLAME TECH GOOSENECKS

Water is provided to quench the work piece as well as cooling the head. Internal threads are provided at the back and at each side of the head for mounting purposes.



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NON-STANDARD FLAME HARDENING HEADS

Non-standard heads for any flame hardening application and gas are quoted on an individual basis. Submit customer drawing and specifications of head and/or work piece to be hardened. Our on-staff engineering department is available to help design specialty products to meet customer needs.

ABOUT FLAME HARDENING

WHAT IS FLAME HARDENING

Flame hardening includes any process that uses an oxy-fuel gas flame to heat carbon or alloy steel, tool steel, cast iron or a hardenable stainless steel above a certain "critical" temperature. A rapid quench follows, causing the material to harden to some depth below its surface. Flame hardening works in a depth range of 1/64 to ¼ inch. The success of any flame hardening process depends on several variables, including the type of iron or steel selected, the fuel, the design and operation of the flame head, the quenching medium and how it's used.

WHY USE FLAME HARDENING

It is a rapid, economical method for selectively hardening specific areas on the surface of a part. The process is applied only to the flame hardenable materials, principally carbon and alloys steels, certain stainless steels and cast irons. Flame hardening differs from other heat treating processes because only the surface, and a thin layer of the work piece below the surface, are hardened.

Flame hardening is more economical than induction hardening, because equipment and maintenance costs are lower. Operating costs are about the same for both methods depending on the size of the production run and work piece configuration. It is also more versatile than induction hardening.

EXAMPLES FOR SELECTING FLAME HARDENING

- Parts are too large for conventional furnace heating and quenching. Typical examples include large gears, machine ways, large dies and mill rolls.
- Only a small segment of a work piece requires heat treatment, because heating the entire part would be detrimental.

DIFFERENT QUENCHING PROCESSES

Cooling speed during the quenching depends on the type and temperature of quenching medium used and how fast it is agitated.

Self-quenching is the slowest method and produces the lowest surface hardness. Self-quenching occurs when a part has a sufficiently large, cool mass to draw heat away from the surface, causing the part to quench itself.

Forced air is a mild quench that rapidly cools the work piece with minimum risk of surface cracking, especially in higher-carbon steels.

Oil and soluble-oil mixtures give relatively high hardness without too severe of a cooling rate.

Water is a severe quenchant, and brine is even more severe. They produce high hardness, but also may cause surface cracking if not used carefully. Water gives a higher hardness than oil when surface cracking is not likely to be a problem—as it is in very high carbon steels.