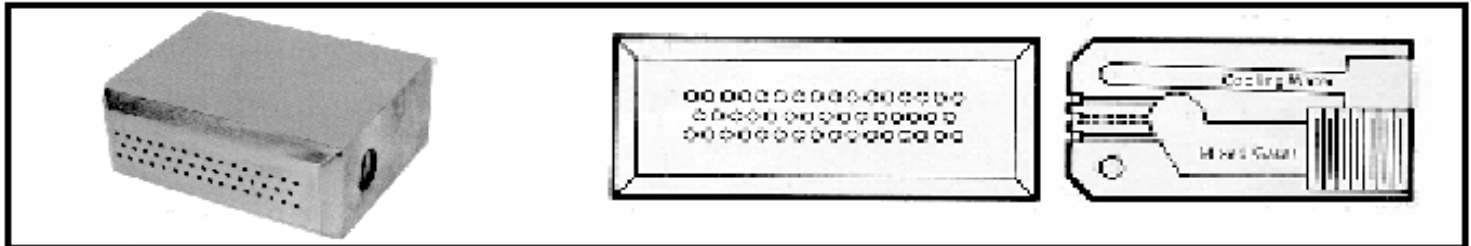


STANDARD FLAME HARDENING HEADS

WATER COOLED HEADS TO FIT 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.

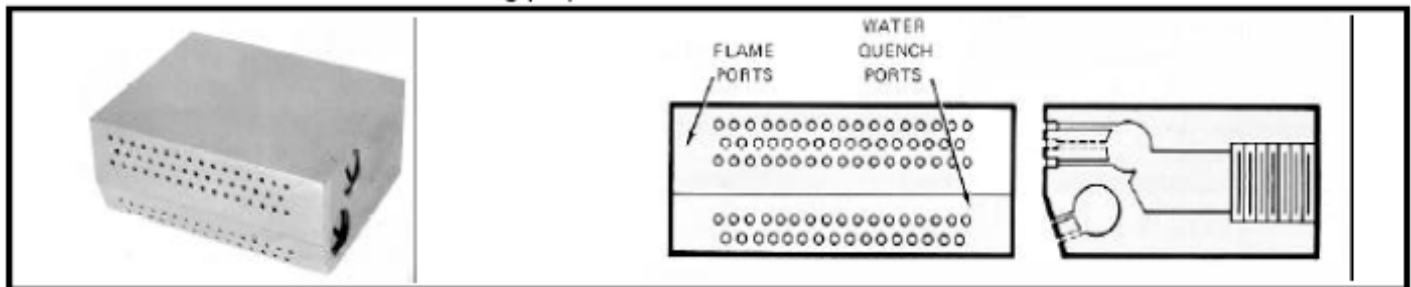


FUEL GAS INLET IS 1/4" NPT - WATER INLET IS 1/8" NPT (NOTE: to mount on a Flame Tech Gooseneck use UAD-10 Adaptor)

ITEM NUMBER	WIDTH OF HEATING CAPABILITY	HEAD SIZE	NUMBER OF FLAME PORTS	FLOW (CFH) OXYGEN	FLOW (CFH) FUEL
WC 10	1"	1 x 2 x 1 3/4"	23	130-155	35-50
WC 15	1 1/2"	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 1/2"	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 1/2"	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.



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

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 place to be hardened. Our on-staff engineering department is available to help design speciality products to meet customer needs.

HOW FLAME HARDENING WORKS

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 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. Flame Hardening is also more versatile than induction hardening.

FLAME HARDENING

Flame hardening 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 alloy steels, certain stainless steels and cast irons.

Some reasons for selecting flame hardening are:

Parts are too large for conventional furnace heating and quenching. Typical examples include large gears, machineways, large dies and mill rolls.

Only a small segment of a workpiece requires heat treatment, because heating the entire part would be detrimental.

Flame hardening is used to harden parts to depths of 1/64 to 1/4 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.

QUENCHING

Cooling speed during the quenching depends on the type and temperature of quenching medium use, 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 workpiece with minimum risk of surface cracking, especially in higher-carbon steels.

Oil and soluble-oil mixtures give relatively high hardness without too severe 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.