

# CASTINGS FOR HEAT TREATMENT PLANTS

## CAST HEAT-RESISTING STEEL JIGS, FIXTURES, AND TOOLING

### For All Furnaces

Pit Type Furnaces  
Box Type Furnaces  
Sealed Quench Furnaces  
Continuous Pusher Furnaces  
Shaker Hearth Furnaces  
Salt Bath Furnaces  
Roller Hearth Furnaces  
Bogie Hearth Furnaces  
Bell Furnaces  
Cast Link Belt Furnaces  
Mesh Belt Conveyor Furnaces  
Overhead Conveyor Furnaces  
Rotary Hearth Furnaces  
Rotary Retort Furnaces  
Walking Beam Furnaces  
Continuous Strip Furnaces  
Vacuum Furnaces  
Ceramic Kilns  
Cement Kilns

### For All Processes

Annealing  
Carburizing  
Nitriding  
Hardening  
Tempering  
Carbo-Nitriding  
Normalizing  
Stress Relieving  
Brazing  
Patenting  
Enamelling  
Sintering

## HEAT TREATMENT JIGS AND FIXTURES

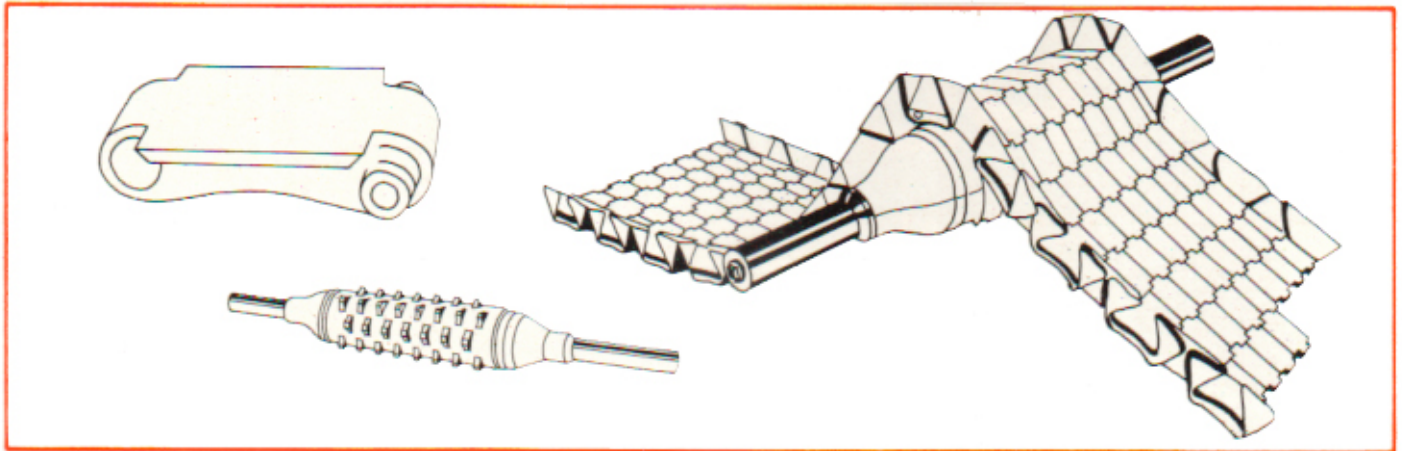
Economic utilization of heat treatment furnaces calls for jigs with low weight coupled with long service life.

Furnaces consume the same amount of energy to heat every pound (kilo) of jiggling as they do for the components to be heat treated. Reduction of deadweight is added productivity.

Design criteria for long service life has changed from bulk and rigidity to:

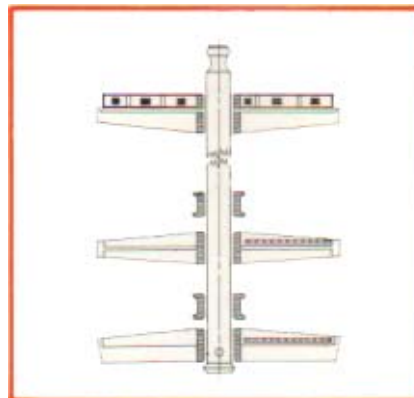
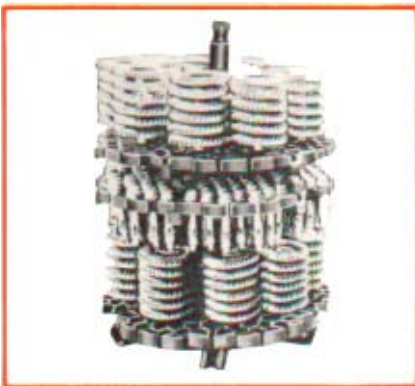
- Alloy selection
- Uniform distribution of thermal stresses
- Dimensional accuracy
- Weight distribution
- Ease of loading
- Uniform quenching and diffusion
- Multi-part assemblies for ease and economy of replacement

AVAILABLE  
IN ALL ALLOYS



Cast link belt and Sprocket for continuous cast link furnaces—designed for life long under shearing stress, friction and high temperature conditions.

## PIT FURNACE STACKING FIXTURES



Size-weight-capacity values\*

Furnace inner dimensions		Approx. rack weight kg.	Approx. load carried at 950°C. kg.
Ø	D		
500	800	50	200
600	1000	140	300
700	1100	220	380
900	1800	530	830
1200	2000	750	1800

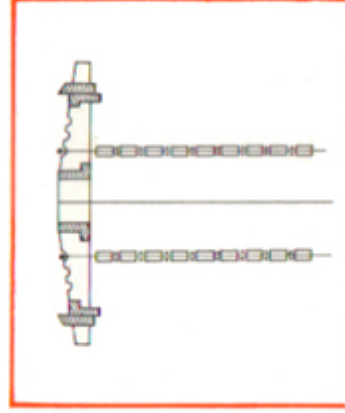
The parts of the stacking fixture are shown here. The exact shape and mass of the components to be treated will dictate the design and size of each part.

CUSTOM  
ENGINEERED  
TO SUIT YOUR  
EVERY COMPONENT

## SOME POPULAR ALLOYS\*

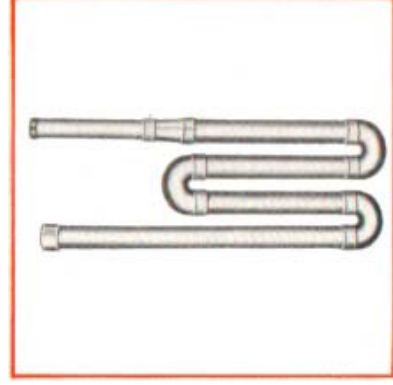
Alloy casting Institute Designation	CHEMISTRY						Nearest specifications			Characteristics	Typical process and parts
	Ni	Cr	C Max	Mn Max	Si Max	Mo Max	IS 4522 Grade	ASTM	AISI		
HH	11-14	24-28	0.2-0.5	2	2	0.5	8	A-297	309	High Creep strength. Low ductility. Useful for load bearing at constant elevated temperature at 870°C	Load bearing members in continuous hardening furnaces & cement kilns.
HK	18-22	24-28	0.2-0.6	2	2	0.5	9	A-297	310	High strength and surface stability at 1050°C. Unsuitable for thermal cycling.	Furnace doors, hearth plates, cement kilns.
HL	18-22	28-32	0.2-0.6	2	2	0.5	10	-	-	Excellent resistance to oxidation, flue gas and sulphur corrosion up to 980°C	Furnace skids, radiant tubes, enameling fixture in oil fired furnaces.
HN	23-27	19-23	0.2-0.5	2	2	0.5	11	A-297	311	Good service up to 1150°C in special atmospheres.	Brazing and gas nitriding furnace parts.
HT	33-37	13-17	0.35-0.75	2	2.5	0.5	12	A-297	330	Most popular—Resistance to thermal shock, oxidation and carburization up to 1040°C	Load bearing members in carburizing and other atmosphere furnaces.
HU	37-41	17-21	0.35-0.75	2	2.5	0.5	13	A-297	330	Similar to HT but with enhanced creep strength and resistance to thermal fatigue up to 1000°C	Quenching jigs and fixtures.
HW	58-62	10-14	0.35-0.75	2	2.5	0.5	-	-	-	High degree of non-scaling. High electric resistivity. Poor sulphur resistance.	Enameling fixtures, cast heating elements.
HX	64-68	15-19	0.35-0.75	2	2.5	0.5	14	-	-	High resistance to flue gas corrosion up to 1150°C. Resistance of thermal fatigue.	Quenching fixtures for Carburizing—Nitriding—Hardening furnaces & Oil fired high temperature furnace parts.

## HANGING FIXTURES



This type is of particular use for long parts such as shafts, pipes, rolls etc., and for parts so designed that they may deform under their own weight.

These hanging fixtures may be placed on the rim of a gas guide cylinder or they may hang from a bearing ring fitted either to the lid or to the retort.



Radiant tube assembly for use in gas and oil fired furnaces.



Size-weight-capacity values\*

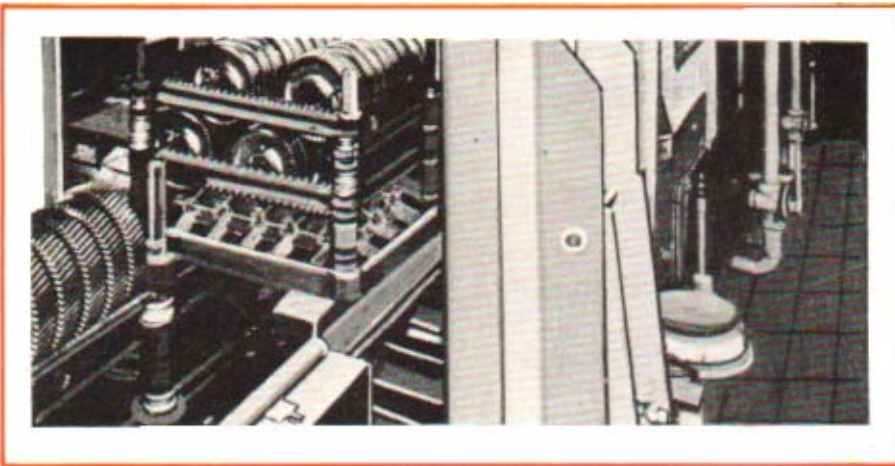
Inner dimensions	Approx. fixture weight kg.	Approx. load carried at 950°C. kg.
500	30	220
600	50	500
900	160	1250

\*Other Alloys: There are various other specifications and proprietary alloys, some with Tungsten, Molybdenum, etc. additions for specialized applications.

\*INFORMATION PROVIDED HERE IS SECONDARY DATA FROM RELEVANT PUBLICATIONS.

## CONTINUOUS PUSHER FURNACES TRAYS

Castings for continuous furnaces are designed from a failure point of view—considering the consequences of down-time. Special considerations on continuous furnace tray design and manufacture are:



We offer design refinement on heat treatment jigs and fixtures—To increase the economy and productivity of your furnaces.

Call us or write us your problems—or if you decided to review the total performance of your shop, supply us the following details for each of your furnaces. There is no way that we cannot increase your profits.

- \* Furnace Type
- \* Sketch and weight of components
- \* Present capacity
- \* Working hours per day.
- \* Process
- \* Cycle (Heating, soaking and cooling)
- \* Annual requirement needed

**SPACE UTILIZATION:** Placing of parts directly on trays—except in the case of large parts—will result in non-utilization of head room. Stacking assemblies can be designed for effective space utilization.

**THERMAL STRESS DESIGN:** Good design by way of equal sectional dimensions and uniform weight distribution contributes to long tray life.

**DIMENSIONAL ACCURACY:** Depending upon furnace output, there are between 20 to 80 trays, in line, inside the furnace at any point of time. Small tolerances on each tray build up to considerable distances when multiplied by many trays and interfere with door closing and pusher action.

Dimensional accuracy is maintained on all individual members of the stacking assemblies to ensure that components are held exactly on the horizontal, vertical or desired plane.

**LOW WEIGHT:** As bulk has little to do with service life up to a point, every kilo reduction in deadweight contributes to an addition to productivity—A significant percentage of output when compared on a Kg/hr basis.

Size	L	W	Head-room	Tray weight Kg.	Carrying capacity Kg.
1	500	500	500	25-30	up to 160
2	550	550	600	30-40	Up to 180

