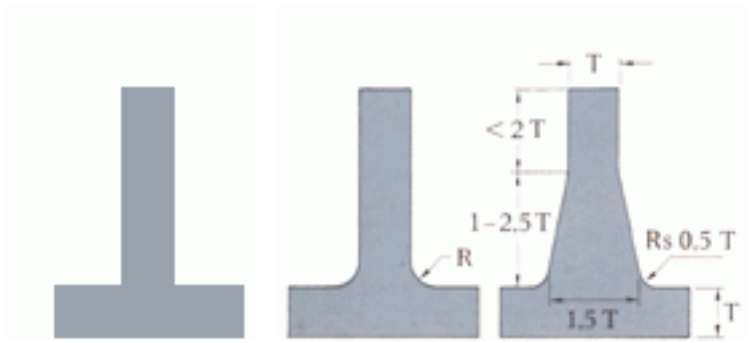


Guide Lines For The Designer



Avoid Sharp Corners and edges.

This design is easier to cast.

This is a T-Section which is correctly designed for Investment Casting. Avoid different Sizes of radius.



Cores Should be supported for example as shown here, through holes.

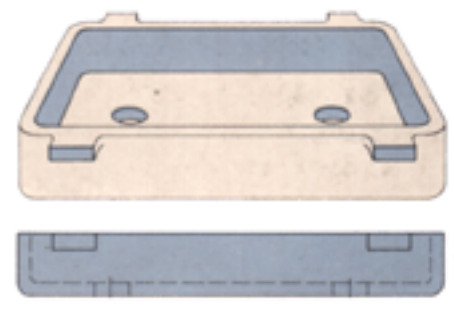
Unsupported core can give such results.



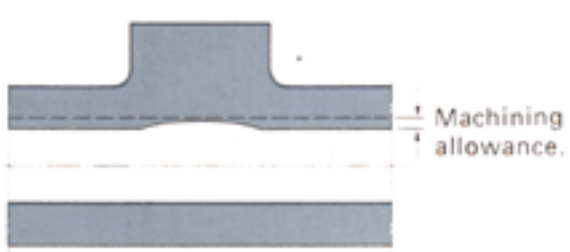
Easier to cast

Easy.

Dificult.



Big straight surfaces are difficult to cast without small defects. Break the surface with Ribs, Holes and so on.



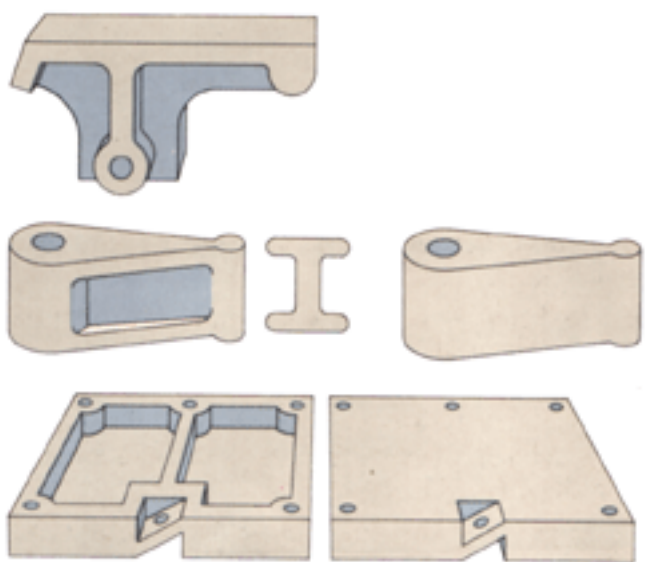
Thick sections in Connection to thin sections can cause contraction. Therefore design the part to leave sufficient allowance to machining.



Text can be cast in parts, than raised leters.



Sunken letters are easier.



The design must be as light as possiible. Remove unnecessary material.



Here the hole is so designed so that we can use removable cores.



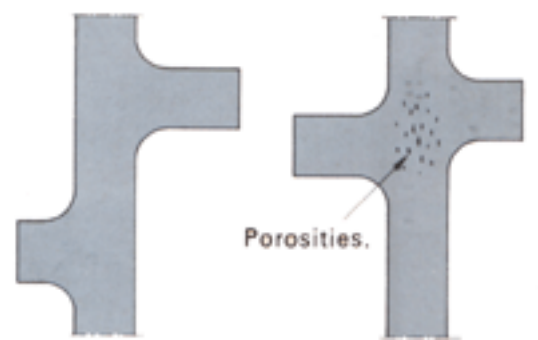
This Design demands special tools.



Smooth material distribution improves the quality.



Therefore avoid unsuitable material distribution.



Goos Material distribution.

Unsuitable material distribution.



Good.



Very good.



Good.



Not good.



Good .



Not good.

Some of the alloy used in Investment Castings



	Quality Designation		Principal Analysis				Condition in which supplied	Mechanical strength in condition in which supplied				Range of use, etc	N=Normalised; G=Annealed or Quenched; OH=Oil Hardened; H=Air Hardened; A=Tempered
	Our Standard	Equivalent Foreign standard	C	Cr	Ni	Other alloy substances		Yield point Kg/mm2 min.	Tensile strength Kg/mm2 min.	Elongation 5 x d % min.	Brinell hardness		
Structural steel	1306	EN1A	0.15				N	22	41	25	max.150	Non-alloy structural steel for low stresses. Can be case-hardened.	
	1505	EN5	0.35				N	25	50	18	max 180	Non-alloy structural steel for medium stresses. Can be hardened and tempered.	
	1606	EN9	0.60				N	30	65	10	max.225	Non-alloy structural steel for high stresses. Can be induction and flame-hardened.	
	2225	AISI 4130 DIN 25 Cr Mo4	0.25	1.00		Mo=0.20	N+A	30	55	20	max.230	Toughened steel for parts subjected to high stresses. Also used for parts which have to operate at temperature upto 500°C(932°F) 2225 is suitable for welding.	
							OH+A	55	75	12	225-275		
	2244	EN19	0.40	1.00		Mo=0.20	N+A	30	65	12	max.240		
OH+A							70	90	8	270-310			
2511	EN352 EN353	0.15	0.85	1.40		OH+A	105	120	6	350-400			
						G	45	60	10	max. 220	Carburizing steel		
Tool Steel	2092	EN31	1.00	1.00		Si=1.50	N OH+A	45 90	70 105	4 3	max. 325 350-400	Tool Steel for oil hardening.	
	2242	SAE H13	0.40	5.25		Si=1.00 Mo=1.40 V=1.00	G	40	70	8	max 300	Tool Steel for oil hardening. Non-contracting.	
							OH+A	-	130	-	425-525		
2312	WERK STOFF 2436	2.00	13.00		W=1.30	G	-	55	-	max. 300	High alloy tool steel for air or oil hardening. For tools requiring high degree of hardness, highest possible durability and maximum dimensional stability when hardening. Has a Certain amount of resistance to corrosion.		
Stainless Steel	2302	AISI410 EN56A	0.12	12.50			H + A	40	55	10	max 250	Martensitic steel. Supplied in a hardened and tempered condition for parts subjected to moderate stresses.	
	2303	AISI420 EN56C	0.2	13.00			H + A	55	75	8	250-300		
	2304	AISI420 EN56D	0.3	13.50			H + A	65	85	4	275-325		Martensitic steel. Supplied in a hardened and tempered condition for parts subjected to high stresses.
	2324		.008	25.00	5.0	Mo=1.50	G	45	65	20	180-230	Ferritic-austenitic steel. Non-hardening. Good workability for cutting tool. Very good anti-corrosive properties.	
	2333	AISI304 EN58A	0.08	19.00			G	20	45	20	150-190		

												Austenitic Steel.
	2338	AISI347 EN58G	0.08	18.00		$\frac{Nb+1/2Ta}{\text{min } 10xc}$	G	20	45	25	130-170	Austenitic Steel. type 18/10. Non hardening. Suitable for welding.
	2343	AISIE316 EN58J	0.06	18.00		Mo=2.70	G	20	45	25	130-170	Austenitic Steel. type 18/12. Non hardening. Weldable. More corrosion- resistant than 2338.
	Quality Designation		Principle Analysis				Condition in Which Supplied	Mechanical Strength in condition in which Supplied			Range of use. etc.	N = Normalised G=Annealed or quenched OH = Oil hardened H = Air Hardened A=Tempered
	Our Standard	Equivalent Foreign Standard	C	Cr	NI	Other alloy substances		Yield Point kg/mm2 min.	Tensile strength kg/mm2 min.	Elongation 5 x d % min		
Heat Resistant Steel	2390	Rolls Royce 102	0.15	23.00	12.00	W=3.00	G	35	50	20	150-200	Ferritic-austenitic steel with good weldability and very good anti-corrosive properties.
	2393	Rolls Royce 133 Nimocast 242	0.35	20.00	Rest	Mo=10.00 Co=10.00		-	-	-	-	Austenitic steel with high resistance to sudden changes of temperature and good anti-contraction properties at 1000-1050 °C (1832-1922 °F).
	2395	Armco 17-4PH	0.06	15.50-16.70	3.60-4.60	Cu=3		90	100	6	360-410	Precipitation-hardening stainless steel with good anti-corrosive properties, good high temperature resistance and strength.
	2382	Haynes Stellite 31	0.50	25.00	10.00	W=7.50 Co=Rest	-	44	67	8	Max 330	Steel with high creep resistance. Suitable for parts operating at high temperatures, e.g. impellers and vanes for gas turbines.
	6609	3	2.20	29.00	-	W=16.00 Co=Rest		-	-	-	-	Steel Suitable for parts requiring a high degree of durability and high temperature strength, e.g. extrusion dies.
	6619	6B	1.10	30.00	-	W=4.5 Co=Rest		-	60	2	380-420	
	6629	-	1.70	29.00	-	W=17.00 Co=Rest		-	-	-	-	
Cast Iron	0125		3.50			Si=2.0		25	-	-	230	Grey iron with good durability.
Aluminium	4244	Alcoa 356 G-Alsi 10Mg	Al Bal	Si 6.50-7.50	Mg 0.20 0.40		H	14 8	22 17	3 2	75 55	Precipitation hardenable alloy with high mechanical properties. Appl. aircraft parts.
Tin Bronze	5443	Din 1705	Cu	Sn			As Cast	14-21	28-37	25-65	85-105	
		G-CuSn 10Zn	Bal	0.90 11.00			G	15-18	30-37	55-69	70-110	