## HELPFUL HINTS ON INVESTMENT CASTING: TROUBLESHOOTING CASTING PROBLEMS

DEFECT	CAUSE	SOLUTION
Cracking	Quenching too soon	Wait 15-20 minutes
		Increase casting
Cracking	Metal cast too soon	temperature
		Increase flask
Cracking	Flask too cold	temperature
Cracking	Incorrect sprueing	Modify sprueing
<u> </u>	, , , , , , , , , , , , , , , , , , ,	, , ,
O a a l l a a	Contamination of gold	Define
Cracking	or alloy	Refine metal
	Oxide build up in	
Cracking	metal, over-use	Refine metal
	Hydrochloric acid di-	Use alternative di-
Cracking	vesting	vestor
		Increase casting
Incomplete fill	Metal too cold	temperature
		Increase flask
Incomplete fill	Flask too cold	temperature
·		
Incomplete fill	Insufficient vacuum	Check vacuum for leaks and seal
Incomplete fill	Insumcient vacuum	leaks and seal
	Wrong speed on	
Incomplete fill	centrifugal caster	Adjust speed
Incomplete fill	Insufficient burn out	Modify sprue
·		, ,
In complete fill	Incomplete burn out	Use proper burn out
Incomplete fill	Incomplete burn out	schedule
Inclusions in	Sharp corners or	Round out sharp
castings	bends in sprueing	corners and bends
Inclusions in	Crucible old and	
castings	deteriorating	Replace crucible
Inclusions in	Oxide build up in	Clean or replace
castings	crucible	crucible

Inclusions in castings    Foreign particles or oxides in metal			
castings oxides in metal Refine metal  Inclusions in castings breakdown Investment erosion or breakdown Investment manufacturer's mixing instructions  Brittle prongs on castings Improperly alloyed metal Pre-allay gold and master alloy  Brittle prongs on castings Incorrect sprue to cold Increase flask temperature  Shrinkage prorsity Inadequate sprueing Use larger sprue or multiple sprues  Shrinkage porosity Flask too hot Increase flask temperature  Castings too close to sprue button Use lower flask temperature  Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Gas porosity Metal overheated Increase top end burn out time  Inadequate air supply during burn out  Gas porosity Flask too hot Reduce flask temperature  Castings too close to sprue button  Reduce casting temperature  Increase top end burn out time  Reduce flask temperature  Castings too close to sprue button  Reduce flask temperature  Castings too close to sprue button  Reduce flask temperature  Casting temperature  Increase top end burn out time  Castings too close to sprue button  Reduce flask temperature  Castings too close to sprue button  Reduce flask temperature  Castings too close to sprue button  Increase top end burn out time  Castings too close to sprue button  Castings too close to sprue button  Reduce flask temperature  Castings too close to sprue button  Increase top end burn out time  Castings too close to sprue button  Castings too close to sprue button  Castings too close to sprue or multiple spr			
Inclusions in Investment erosion or breakdown Inclusions in Castings Investment erosion or breakdown Instructions  Brittle prongs on Castings Improperly alloyed Pre-allay gold and master alloy  Brittle prongs on Castings Incorrect sprue to Cold Increase flask temperature  Shrinkage prorsity Incorrect sprueing Incorrect sprueing Inadequate sprueing Inadequate sprueing Incorrect sprueing Incorrect sprueing Incorrect sprueing Incorrect sprueing Incorrect sprueing Inadequate sprueing Incorrect sprueing Inadequate sprueing Inadequate Incorrect sprueing Inadequate Incorrect sprueing Incorrect sprueing Inadequate Incorrect sprueing Incorrect sprue or multiple sprues Incorrect sprueing Inadequate Incorrect Incorrect sprueing Incorrect sprue or multiple sprue or mult	Inclusions in		
Inclusions in castings	castings	oxides in metal	Refine metal
Inclusions in castings			
castings breakdown instructions  Brittle prongs on castings metal Pre-allay gold and master alloy  Brittle prongs on castings Cold Pre-allay gold and master alloy  Brittle prongs on castings Cold Increase flask temperature  Shrinkage prorsity Incorrect sprueing Sprue to heaviest area of casting  Shrinkage porosity Inadequate sprueing Use larger sprue or multiple sprues  Shrinkage porosity Flask too hot temperature  Castings too close to sprue button  Castings too close to sprue button  Brittle prongs on casting Use larger sprue or multiple sprues  Use lower flask temperature  Leave 1" space on tree above main sprue button  Reduce casting temperature  Gas porosity Metal overheated Increase top end burn out time  Inadequate air supply Assure oven has good air supply & exhaust  Gas porosity Flask too hot temperature  Scrap reused too many times Refine metal  Too much oxygen on torch flame when melting  Remove investment residue on Remove investment residue before			Follow investment
Brittle prongs on castings   Improperly alloyed metal   Pre-allay gold and master alloy    Brittle prongs on castings   Flask temperature too cold   Increase flask temperature    Shrinkage prorsity   Incorrect sprueing   Sprue to heaviest area of casting    Shrinkage porosity   Inadequate sprueing   Use larger sprue or multiple sprues    Shrinkage porosity   Flask too hot   Leave 1" space on tree above main sprue button    Shrinkage porosity   Metal overheated   Reduce casting temperature    Gas porosity   Inadequate burn out   Increase top end burn out time    Inadequate air supply during burn out   Reduce flask temperature    Gas porosity   Flask too hot temperature    Gas porosity   Flask too hot temperature    Gas porosity   Flask too hot temperature    Gas porosity   Reduce flask temperature    Gas porosity   Reduce flask temperature    Gas porosity   Reduce flask temperature    R	Inclusions in	Investment erosion or	manufacturer's mixing
Brittle prongs on castings   Improperly alloyed metal   Pre-allay gold and master alloy    Brittle prongs on castings   Flask temperature too cold   Increase flask temperature    Shrinkage prorsity   Incorrect sprueing   Sprue to heaviest area of casting    Shrinkage porosity   Inadequate sprueing   Use larger sprue or multiple sprues    Shrinkage porosity   Flask too hot   Leave 1" space on tree above main sprue button    Shrinkage porosity   Metal overheated   Reduce casting temperature    Gas porosity   Inadequate burn out   Increase top end burn out time    Inadequate air supply during burn out   Reduce flask temperature    Gas porosity   Flask too hot temperature    Gas porosity   Flask too hot temperature    Gas porosity   Flask too hot temperature    Gas porosity   Reduce flask temperature    Gas porosity   Reduce flask temperature    Gas porosity   Reduce flask temperature    R	castings	breakdown	
Brittle prongs on castings  Flask temperature too cold  Flask temperature too cold  Flask temperature  Sprue to heaviest area of casting  Use larger sprue or multiple sprues  Use lower flask temperature  Castings too close to sprue button  Shrinkage porosity  Flask too hot  Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Gas porosity  Metal overheated  Inadequate burn out  Inadequate air supply during burn out  Flask too hot  Reduce flask temperature  Reduce casting temperature  Increase top end burn out time  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature	<u> </u>		
Brittle prongs on castings  Flask temperature too cold  Flask temperature too cold  Flask temperature  Sprue to heaviest area of casting  Use larger sprue or multiple sprues  Use lower flask temperature  Castings too close to sprue button  Shrinkage porosity  Flask too hot  Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Gas porosity  Metal overheated  Inadequate burn out  Inadequate air supply during burn out  Flask too hot  Reduce flask temperature  Reduce casting temperature  Increase top end burn out time  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Increase top end burn out fine when metal  Reduce flask temperature	Brittle prongs on	Improperly alloyed	Pre-allay gold and
Brittle prongs on castings  Flask temperature too cold  Flask temperature  Sprue to heaviest area of casting  Incorrect sprueing  Sprue to heaviest area of casting  Use larger sprue or multiple sprues  Use lower flask temperature  Leave 1" space on tree above main sprue button  Reduce casting  Gas porosity  Metal overheated  Flask too hot  Reduce casting temperature  Increase top end burn out time  Increase top end burn out time  Reduce flask temperature  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature			
castings cold temperature  Shrinkage prorsity Incorrect sprueing of casting  Shrinkage porosity Inadequate sprueing Use larger sprue or multiple sprues  Shrinkage porosity Flask too hot Use lower flask temperature  Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Gas porosity Inadequate burn out Increase top end burn out time  Inadequate air supply during burn out  Gas porosity Flask too hot  Reduce flask temperature  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  Remove investment residue on Remove investment residue before	J. J.		,
castings cold temperature  Shrinkage prorsity Incorrect sprueing of casting  Shrinkage porosity Inadequate sprueing Use larger sprue or multiple sprues  Shrinkage porosity Flask too hot Use lower flask temperature  Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Gas porosity Inadequate burn out Increase top end burn out time  Inadequate air supply during burn out  Gas porosity Flask too hot  Reduce flask temperature  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  Remove investment residue on Remove investment residue before	Brittle prongs on	Flask temperature too	Increase flask
Shrinkage prorsity  Incorrect sprueing  Sprue to heaviest area of casting  Use larger sprue or multiple sprues  Use lower flask temperature  Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Gas porosity  Inadequate burn out  Increase top end burn out time  Inadequate air supply during burn out  Gas porosity  Flask too hot  Reduce flask temperature  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Casting temperature  Increase top end burn out time  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Refine metal  Too much oxygen on torch flame  Remove investment residue before			
Shrinkage prorsity Inadequate sprueing Of casting  Shrinkage porosity Inadequate sprueing Use larger sprue or multiple sprues  Use lower flask temperature  Leave 1" space on tree above main sprue button  Shrinkage porosity Metal overheated Emperature  Gas porosity Inadequate burn out Increase top end burn out time  Inadequate air supply during burn out air supply & exhaust  Gas porosity Flask too hot English temperature  Reduce casting temperature  Increase top end burn out time  Reduce flask temperature  Reduce flask temperature  Scrap reused too many times Refine metal  Too much oxygen on torch flame when melting  Remove investment residue before	- Caemings		10
Shrinkage prorsity Inadequate sprueing Of casting  Shrinkage porosity Inadequate sprueing Use larger sprue or multiple sprues  Use lower flask temperature  Leave 1" space on tree above main sprue button  Shrinkage porosity Metal overheated Emperature  Gas porosity Inadequate burn out Increase top end burn out time  Inadequate air supply during burn out air supply & exhaust  Gas porosity Flask too hot English temperature  Reduce casting temperature  Increase top end burn out time  Reduce flask temperature  Reduce flask temperature  Scrap reused too many times Refine metal  Too much oxygen on torch flame when melting  Remove investment residue before			Sprue to heaviest area
Shrinkage porosity  Inadequate sprueing  Use larger sprue or multiple sprues  Use lower flask temperature  Leave 1" space on tree above main sprue button  Reduce casting temperature  Gas porosity  Inadequate burn out  Inadequate air supply during burn out  Gas porosity  Flask too hot  Reduce flask temperature  Increase top end burn out time  Assure oven has good air supply & exhaust  Reduce flask temperature  Reduce flask temperature  Increase top end burn out time  Inadequate air supply & exhaust  Reduce flask temperature  Too much oxygen on torch flame  Investment residue on  Remove investment residue before	Shrinkage prorsity	Incorrect sprueing	
Shrinkage porosity	Criminago profoto	incorrect oprusing	or odoling
Shrinkage porosity			Use larger sprue or
Shrinkage porosity  Flask too hot  Castings too close to sprue button  Gas porosity  Metal overheated  Inadequate burn out  Inadequate air supply during burn out  Gas porosity  Flask too hot  Reduce casting temperature  Increase top end burn out time  Inadequate air supply during burn out  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature  Increase top end burn out time  Reduce flask temperature  Increase top end burn out time  Inadequate air supply Assure oven has good air supply & exhaust  Reduce flask temperature  Reduce flask temperature  Increase top end burn out time	Shrinkage porosity	Inadequate sprueing	
Shrinkage porosity  Castings too close to sprue button  Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Reduce casting temperature  Increase top end burn out time  Inadequate burn out  Inadequate air supply during burn out  Gas porosity  Inadequate air supply during burn out  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Cas porosity  Flask too hot  Cas porosity  Reduce flask temperature  Cas porosity  Refine metal  Too much oxygen on torch flame  Too much oxygen on torch flame  Remove investment residue before	Offinikage porosity	madequate sprucing	multiple spraes
Shrinkage porosity  Castings too close to sprue button  Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Reduce casting temperature  Increase top end burn out time  Inadequate burn out  Inadequate air supply during burn out  Gas porosity  Inadequate air supply during burn out  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Cas porosity  Flask too hot  Cas porosity  Reduce flask temperature  Cas porosity  Refine metal  Too much oxygen on torch flame  Too much oxygen on torch flame  Remove investment residue before			Llea lower flack
Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Increase top end burn out time  Inadequate air supply during burn out  Gas porosity  Inadequate air supply during burn out  Reduce flask temperature  Reduce flask temperature  Cas porosity  Inadequate air supply Assure oven has good air supply & exhaust  Reduce flask temperature  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  Remove investment residue before	Chrinkaga paracity	Floor too hot	
Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Increase top end burn out time  Inadequate burn out  Inadequate air supply during burn out  Cas porosity  Inadequate air supply during burn out  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Increase top end burn out time  Inadequate air supply during burn out  Reduce flask temperature  Increase top end burn out time  In adequate air supply during burn out  Reduce flask temperature  In a supply & exhaust  Reduce flask temperature  In a supply & exhaust  Reduce flask temperature  Refine metal  In a supply & exhaust  Refine metal  Remove investment residue before	Sillinkage polosity	Flask too not	temperature
Castings too close to sprue button  Castings too close to sprue button  Reduce casting temperature  Increase top end burn out time  Inadequate burn out  Inadequate air supply during burn out  Cas porosity  Inadequate air supply during burn out  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Reduce flask temperature  Increase top end burn out time  Inadequate air supply during burn out  Reduce flask temperature  Increase top end burn out time  In adequate air supply during burn out  Reduce flask temperature  In a supply & exhaust  Reduce flask temperature  In a supply & exhaust  Reduce flask temperature  Refine metal  In a supply & exhaust  Refine metal  Remove investment residue before			Loove 1" appear on troc
Shrinkage porosity sprue button button  Gas porosity Metal overheated Reduce casting temperature  Increase top end burn out time  Inadequate burn out sire supply during burn out air supply & exhaust  Gas porosity Flask too hot Reduce flask temperature  Scrap reused too many times Refine metal  Too much oxygen on torch flame When melting  Remove investment residue before		Continue too along to	•
Gas porosity  Metal overheated  Reduce casting temperature  Increase top end burn out time  Inadequate burn out out time  Inadequate air supply during burn out air supply & exhaust  Reduce flask temperature  Reduce flask temperature  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  Too much oxygen on torch flame  Remove investment residue before	Obside to a second site.	_	· ·
Gas porosity  Metal overheated temperature  Increase top end burn out time  Inadequate burn out air supply during burn out  Reduce flask temperature  Scrap reused too many times  Gas porosity  Too much oxygen on torch flame  Remove investment residue on  Remove investment residue burn out  Increase top end burn out time  Assure oven has good air supply & exhaust  Reduce flask temperature  Use reducing flame when melting	Shrinkage porosity	sprue button	button
Gas porosity  Metal overheated temperature  Increase top end burn out time  Inadequate burn out air supply during burn out  Reduce flask temperature  Scrap reused too many times  Gas porosity  Too much oxygen on torch flame  Remove investment residue on  Remove investment residue burn out  Increase top end burn out time  Assure oven has good air supply & exhaust  Reduce flask temperature  Use reducing flame when melting			Poduce costing
Gas porosity  Inadequate burn out out time  Inadequate air supply during burn out  Gas porosity  Flask too hot  Scrap reused too many times  Fash porosity  Too much oxygen on torch flame  Remove investment residue on Refore  Remove investment residue burn out  Increase top end burn out time  Assure oven has good air supply & exhaust  Reduce flask temperature  Refine metal  Too much oxygen on torch flame  Remove investment residue before	Cooperacity	Motel everbeeted	_
Gas porosity  Inadequate burn out out time  Inadequate air supply during burn out air supply & exhaust  Reduce flask temperature  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  Too much oxygen on torch flame  Remove investment residue on Refore	Gas porosity	ivietai overneated	temperature
Gas porosity  Inadequate burn out out time  Inadequate air supply during burn out air supply & exhaust  Reduce flask temperature  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  Too much oxygen on torch flame  Remove investment residue on Refore			Ingrasas tan and hurn
Inadequate air supply during burn out  Gas porosity  Flask too hot  Gas porosity  Flask too hot  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  Gas porosity  Remove investment residue on  Remove investment residue before	0	la a da acceta la coma accet	
Gas porosity  Gas porosity  Flask too hot  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  When melting  Remove investment residue on Residue before	Gas porosity	inadequate burn out	out time
Gas porosity  Gas porosity  Flask too hot  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  When melting  Remove investment residue on Residue before			
Gas porosity  Gas porosity  Flask too hot  Scrap reused too many times  Refine metal  Too much oxygen on torch flame  When melting  Remove investment residue on Residue before		leader at all and	A
Gas porosity  Flask too hot  Scrap reused too many times  Refine metal  Too much oxygen on torch flame when melting  Remove investment residue on  Remove investment residue before	0		
Gas porosity  Flask too hot temperature  Scrap reused too many times  Refine metal  Too much oxygen on torch flame when melting  Remove investment residue on residue before	Gas porosity	during burn out	air supply & exnaust
Gas porosity  Flask too hot temperature  Scrap reused too many times  Refine metal  Too much oxygen on torch flame when melting  Remove investment residue on residue before			Dadwa flact
Scrap reused too Gas porosity  Too much oxygen on torch flame When melting  Remove investment residue on Refine metal  Too much oxygen on when melting	0	Floorists ( )	
Gas porosity many times Refine metal  Too much oxygen on torch flame when melting  Remove investment residue on residue before	Gas porosity	riask too hot	temperature
Gas porosity many times Refine metal  Too much oxygen on torch flame when melting  Remove investment residue on residue before		10	
Too much oxygen on Use reducing flame when melting  Remove investment residue on residue before	<u>.</u> .		
Gas porosity torch flame when melting  Remove investment residue on residue before	Gas porosity	many times	Refine metal
Gas porosity torch flame when melting  Remove investment residue on residue before		<u> </u>	
Remove investment Investment residue on residue before			_
Investment residue on residue before	Gas porosity	torch flame	when melting
Investment residue on residue before			_
Gas porosity remelted scrap remelting scrap	1		
	Gas porosity	remelted scrap	remelting scrap

Rough castings	Flasks not cured before burnout loading	Let flasks set 1-2 hrs. before burnout loading
	Incorrect water-	Follow investment
Rough castings	powder ratio in invest.	manufacturer's instructions
Rough castings	Flasks heated too rapidly	Follow investment manufacturer's instructions
Bubbles/nodules on castings	Investment not mixed, vacuumed or vibrated sufficiently	Follow investment manufacturer's instructions
Bubbles/nodules on castings	Vacuum pump not working properly	Check vacuum pump oil level and
Bubbles/nodules on castings	Wax patterns not coated with wetting agent	Coat wax patterns with wetting agent