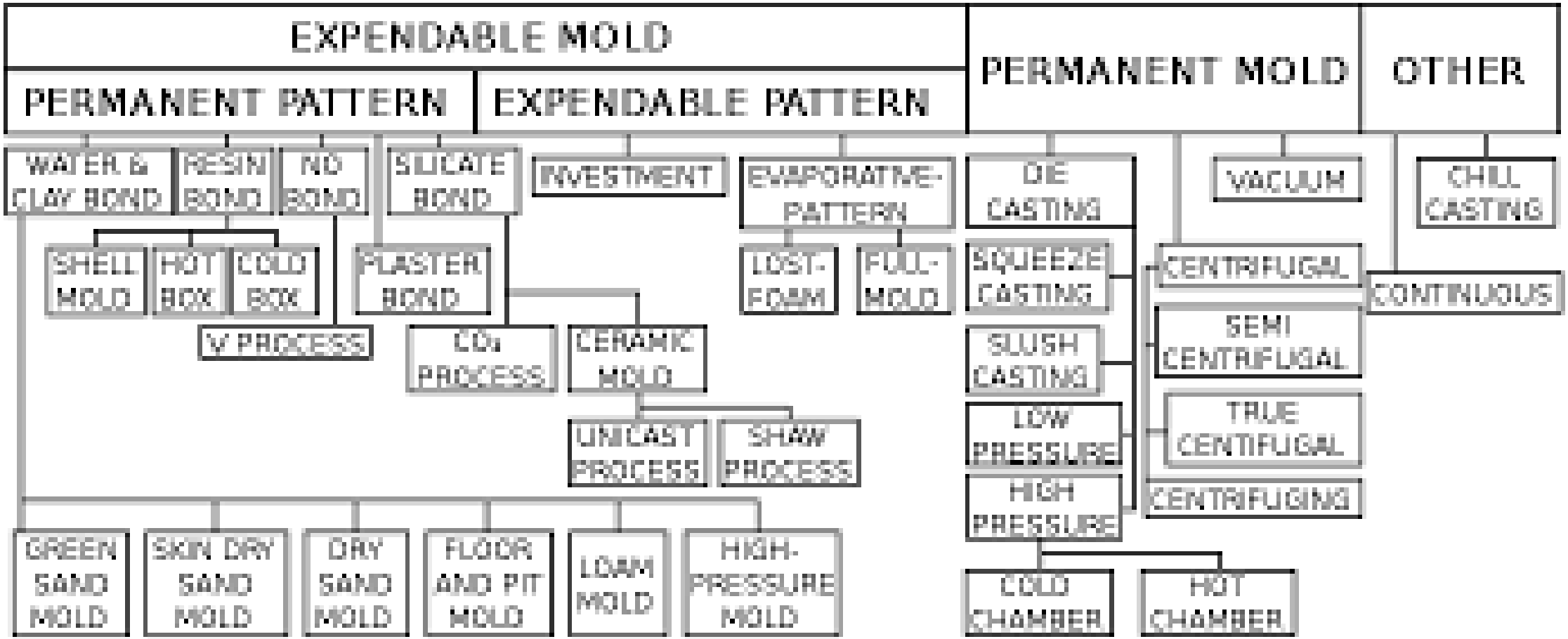
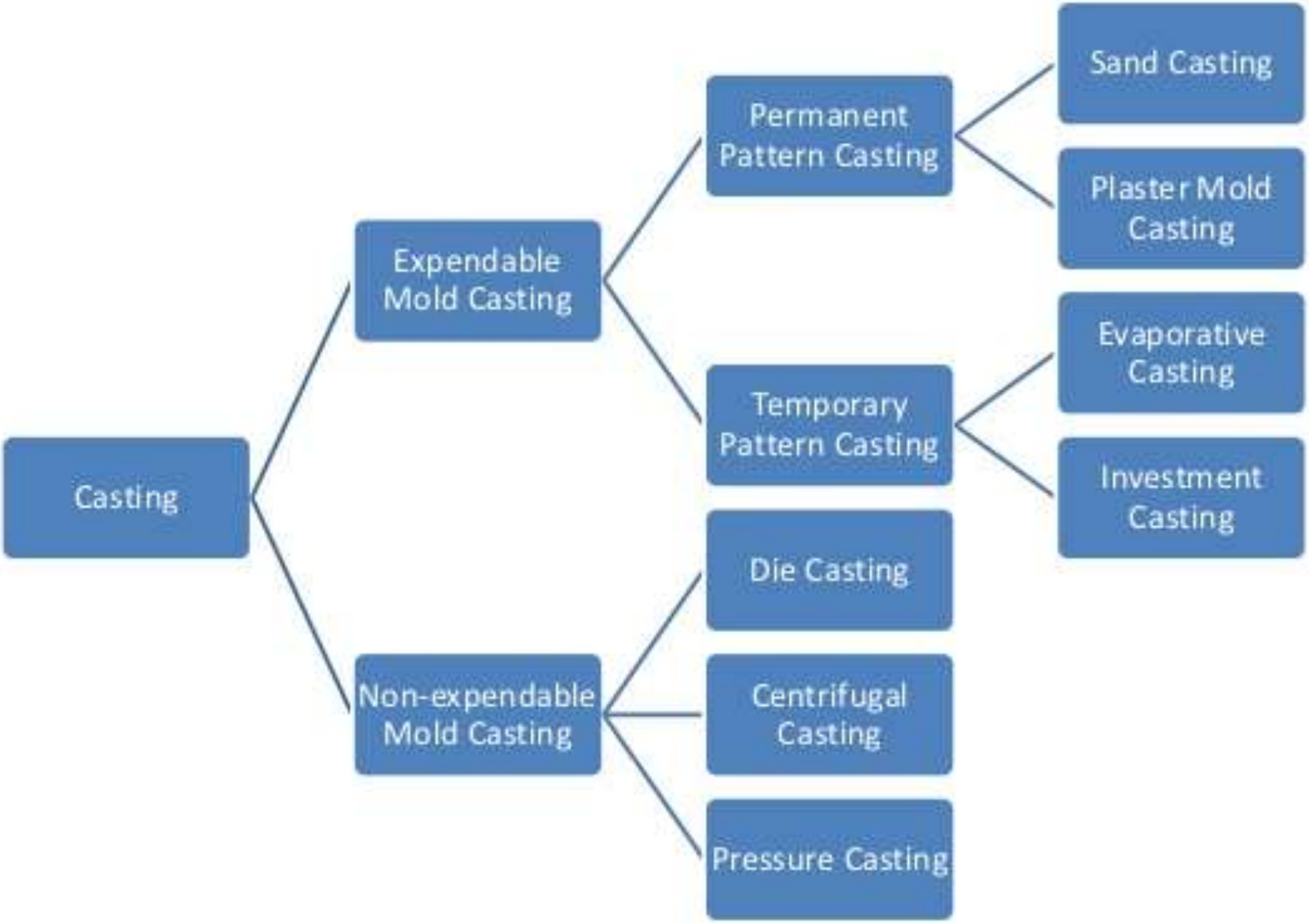
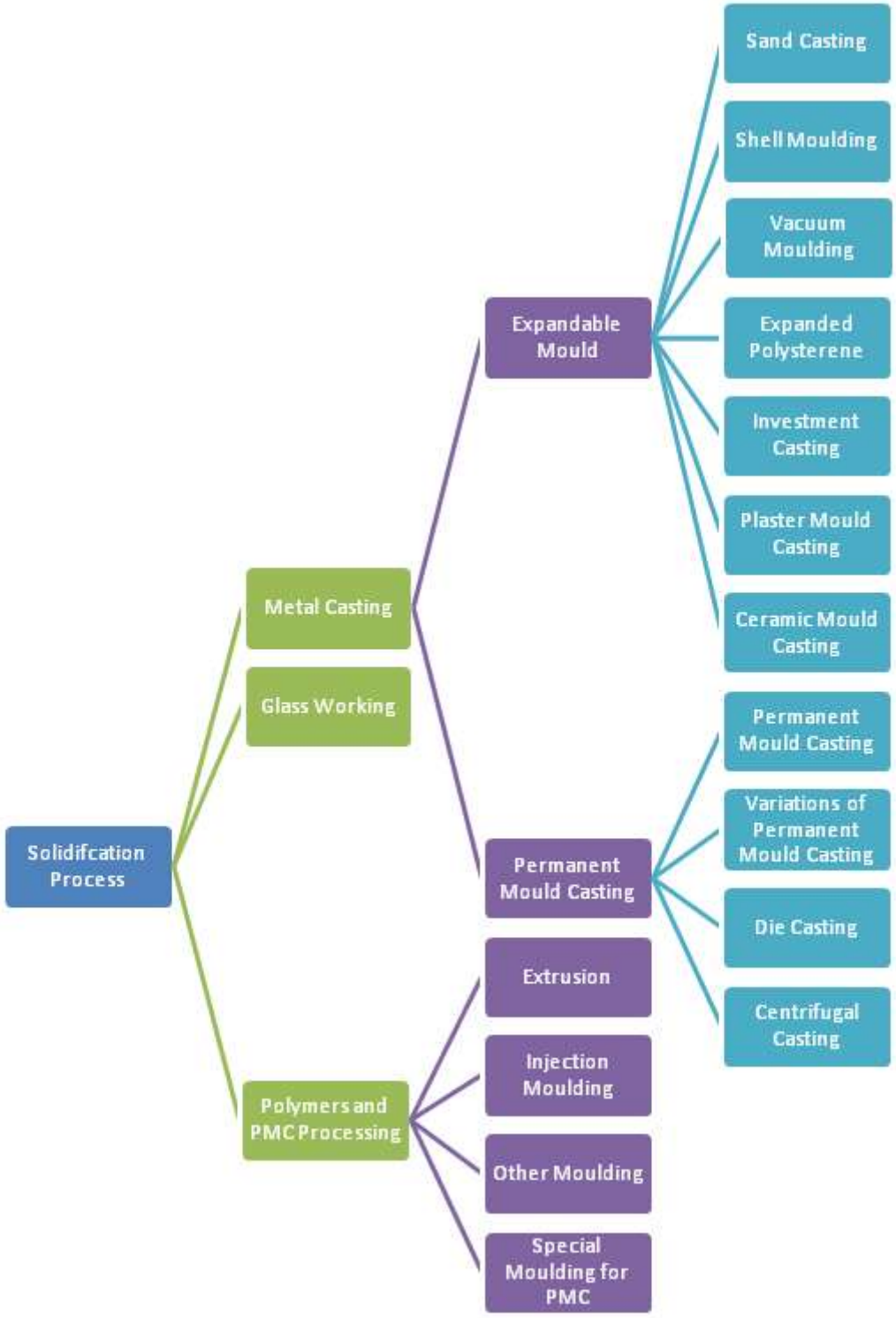
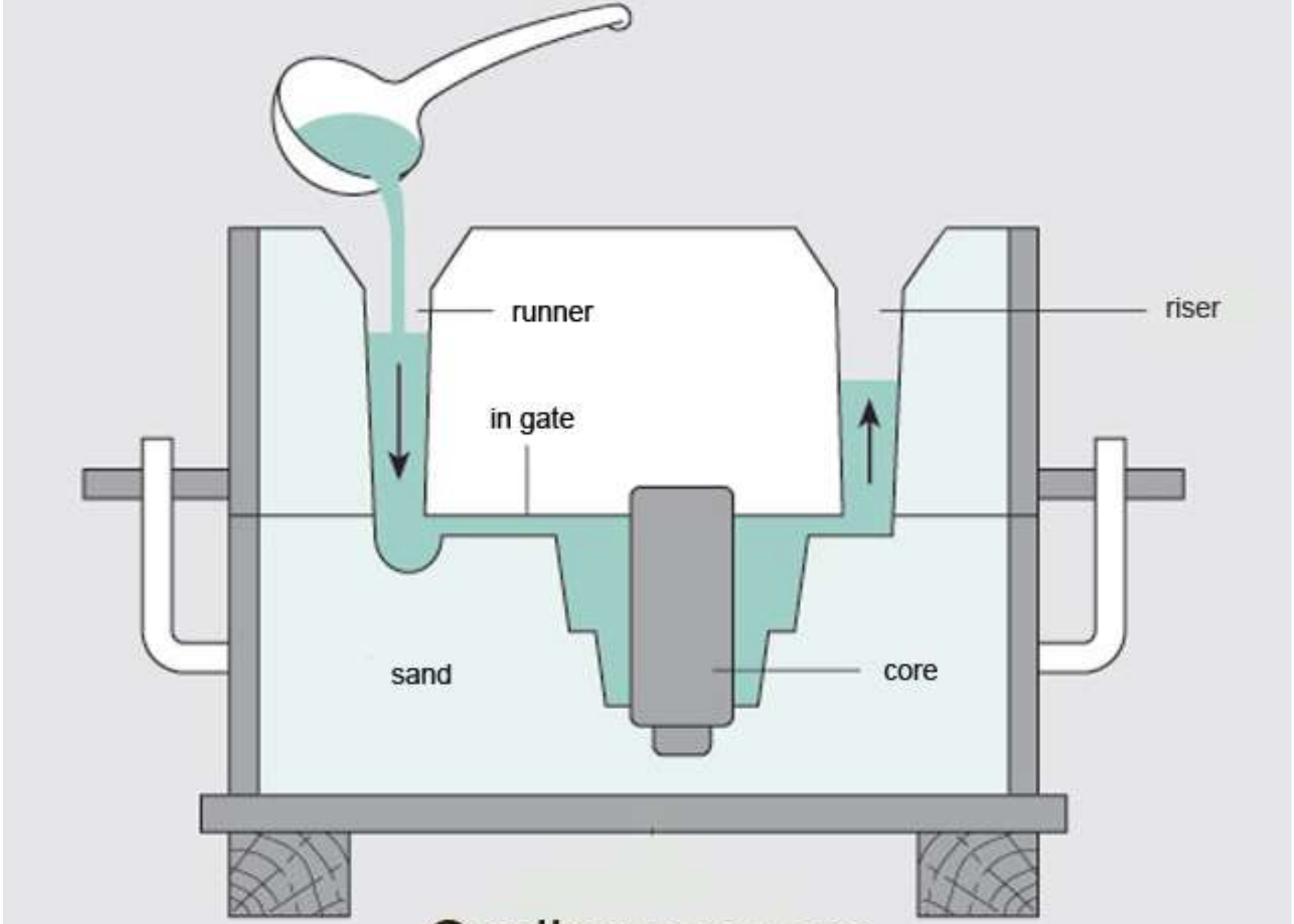

EXPENDABLE MOLD
PERMANENT MOLD
OTHER
PERMANENT PATTERN
EXPENDABLE PATTERN
WATER & CLAY BOND
RESIN BOND
NO BOND
SILICATE BOND
INVESTMENT
EVAPORATIVE-PATTERN
DIE CASTING
VACUUM
CHILL CASTING
SHELL MOLD
HOT BOX
COLD BOX
V PROCESS
PLASTER BOND
CO2 PROCESS
CERAMIC MOLD
UNICAST PROCESS
SHAW PROCESS
LOST-FOAM
FULL-MOLD
SQUEEZE CASTING
SLUSH CASTING
LOW PRESSURE
HIGH PRESSURE
COLD CHAMBER
HOT CHAMBER
CENTRIFUGAL
SEMI CENTRIFUGAL
TRUE CENTRIFUGAL
CENTRIFUGING
CONTINUOUS
GREEN SAND MOLD
SKIN DRY SAND MOLD
DRY SAND MOLD
FLOOR AND PIT MOLD
LOAM MOLD
HIGH-PRESSURE MOLD

Types of Casting



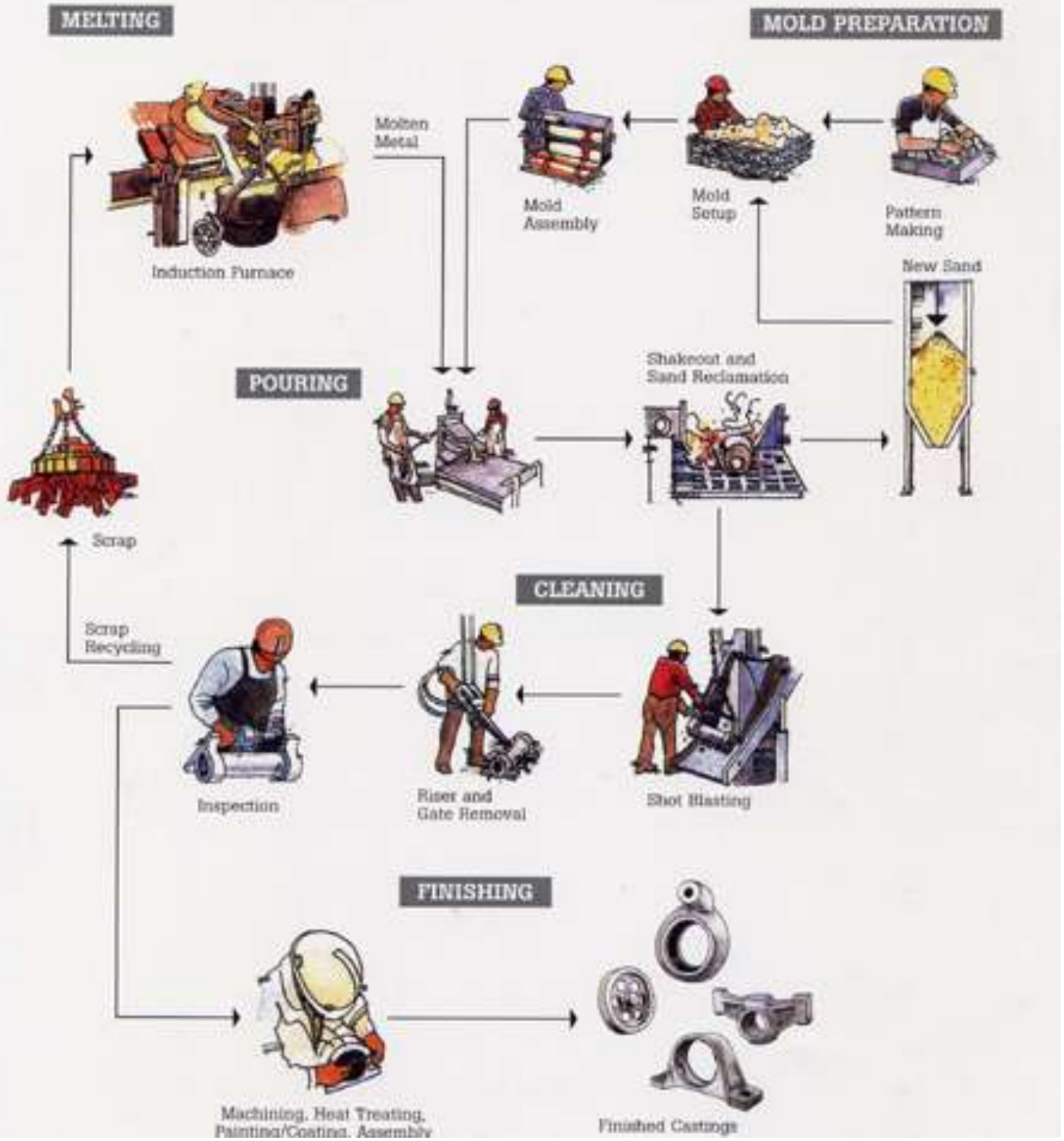

Solidifcation Process
Metal Casting
Glass Working
Polymers and PMC Processing
Expandable Mould
Permanent Mould Casting
Extrusion
Injection Moulding
Other Moulding
Special Moulding for PMC
Sand Casting
Shell Moulding
Vacuum Moulding
Expanded Polysterene
Investment Casting
Plaster Mould Casting
Ceramic Mould Casting
Permanent Mould Casting
Variations of Permanent Mould Casting
Die Casting
Centrifugal Casting

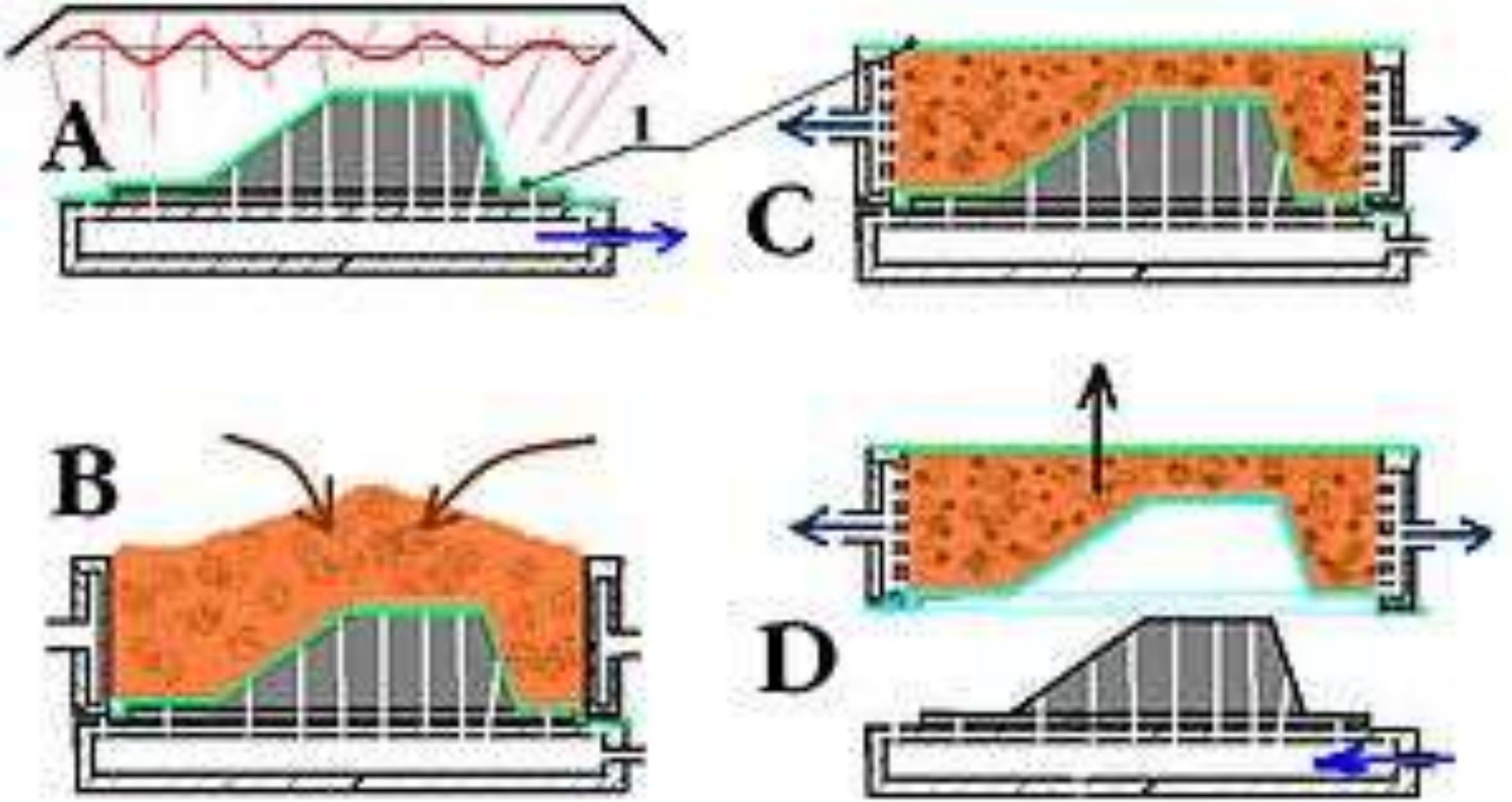


Casting process

https://www.slideshare.net/vicky937/casting-its-types
https://www.slideshare.net/tayyabwarraich/7casting-ppt
https://www.slideshare.net/manojmama22/casting-27298833
http://www.themetalcasting.com/casting-process.html

The Metal Casting Process





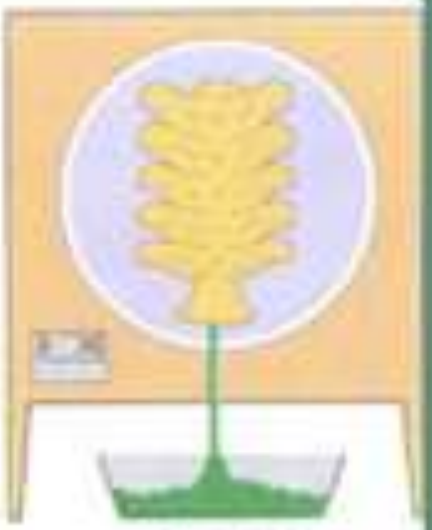
Sand Casting

Die and pattern

Pattern assembly

Investing

Stuccoing



Dewaxing

Firing

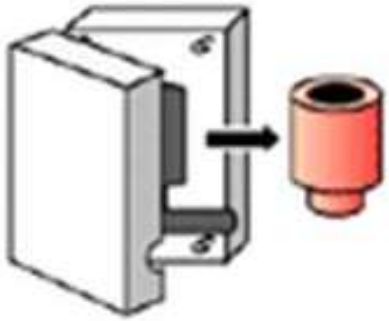
Casting

Knock-out

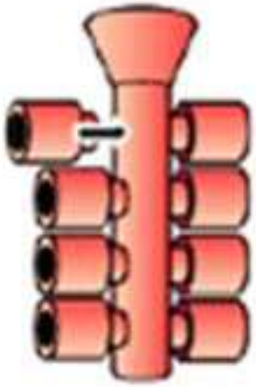
Finishing

Inspection

The Basic Steps in the Investment Casting Process

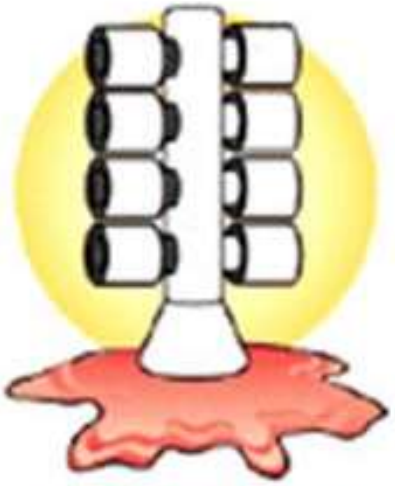


Wax Injection



Assembly

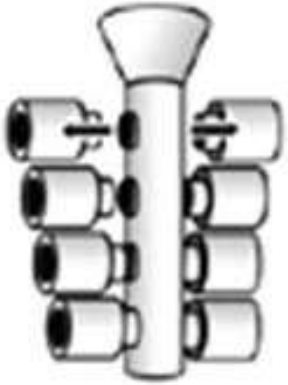
Shell Buildiing



Dewax/Burnout

Gravity Pouring

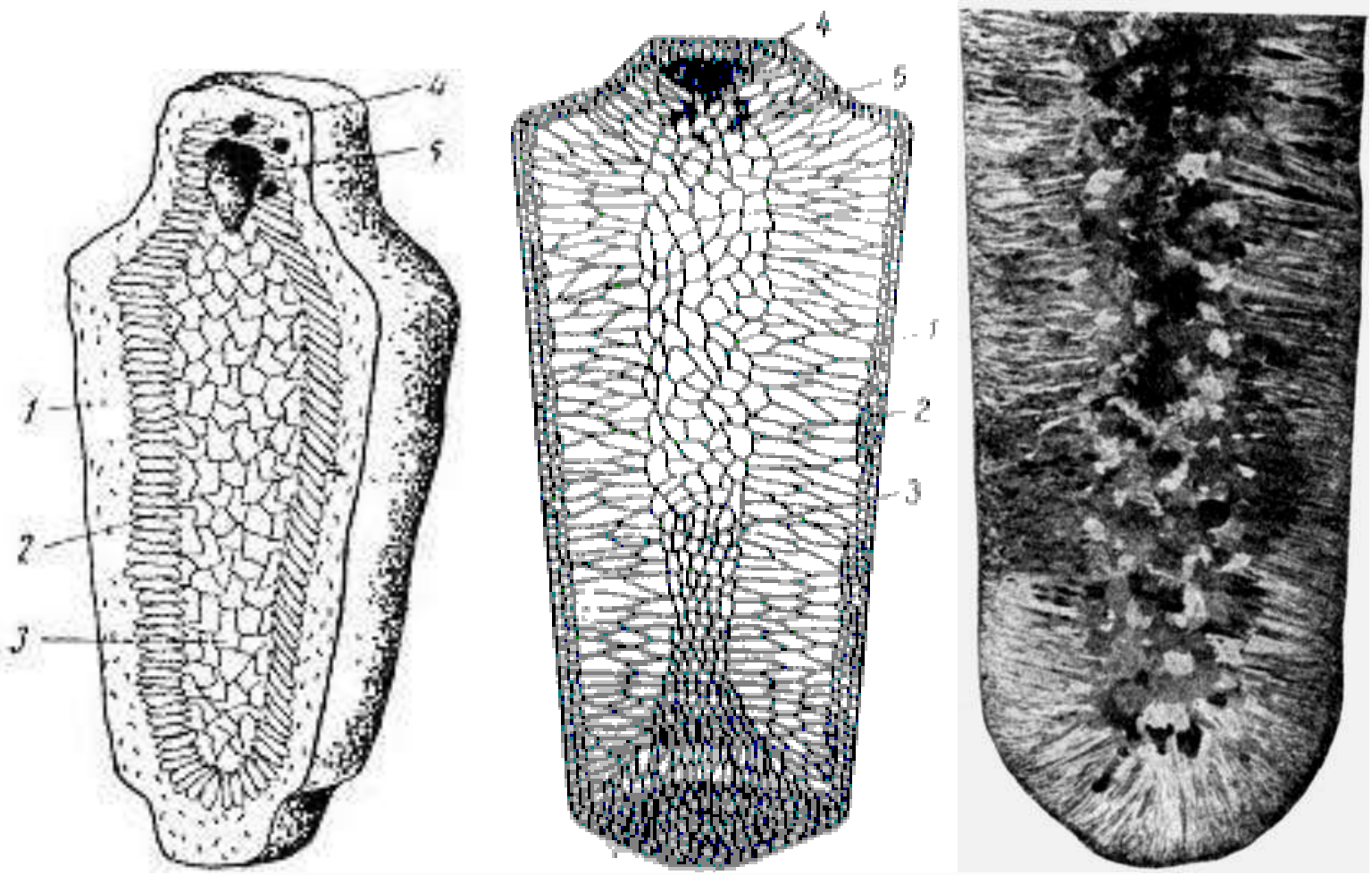
Knock Out

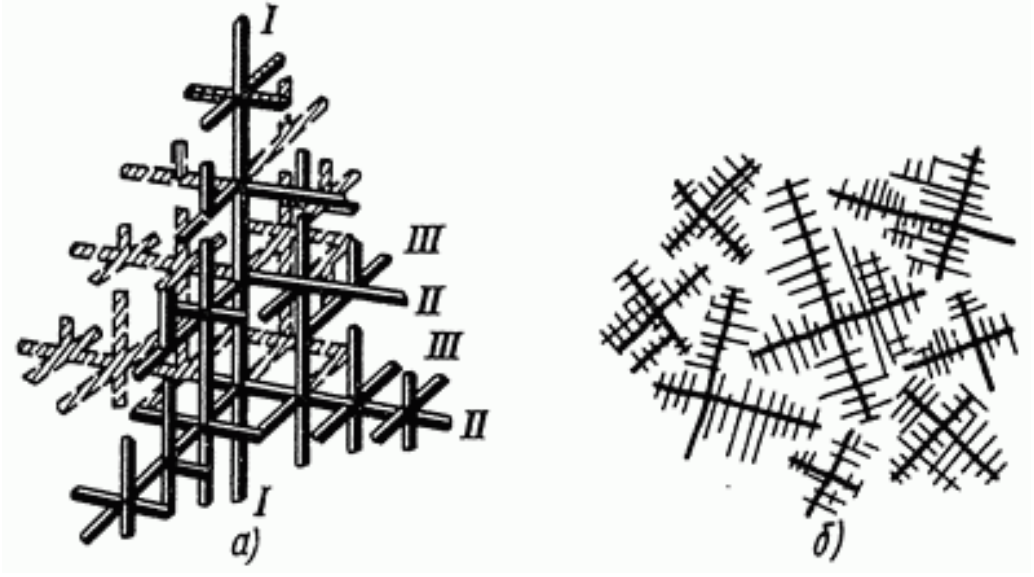


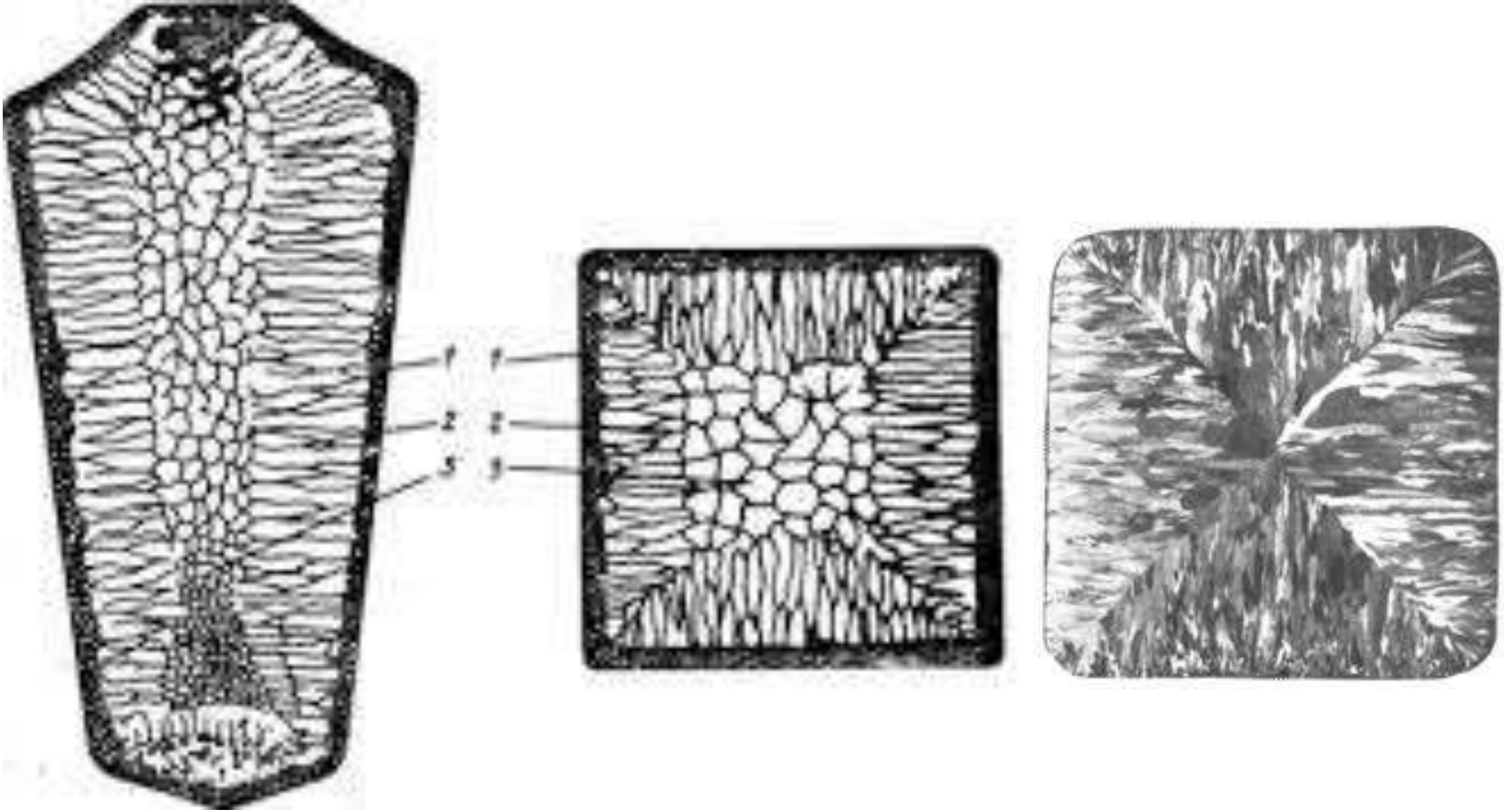
Cut-off

Finished Castings

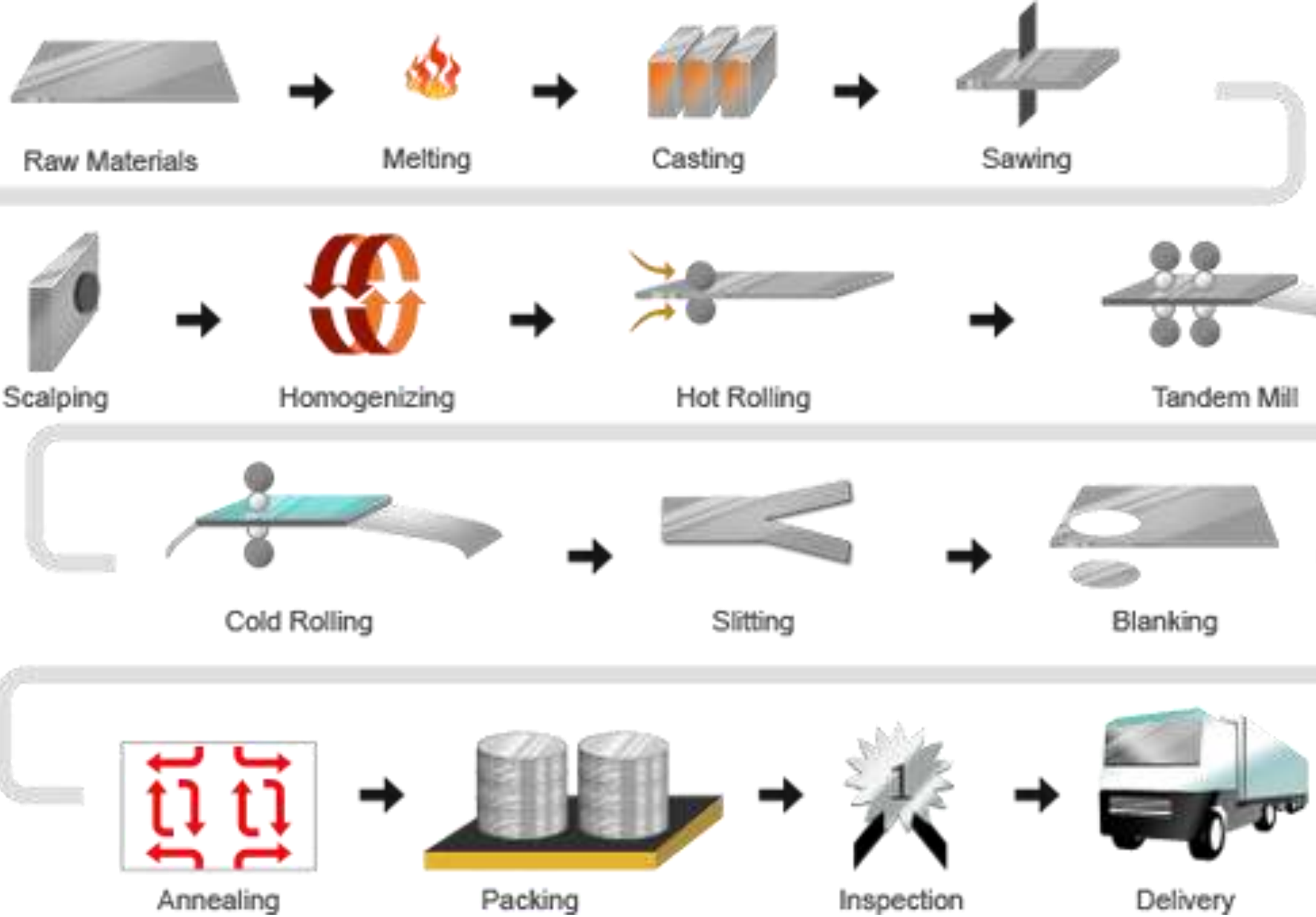
Investment Casting

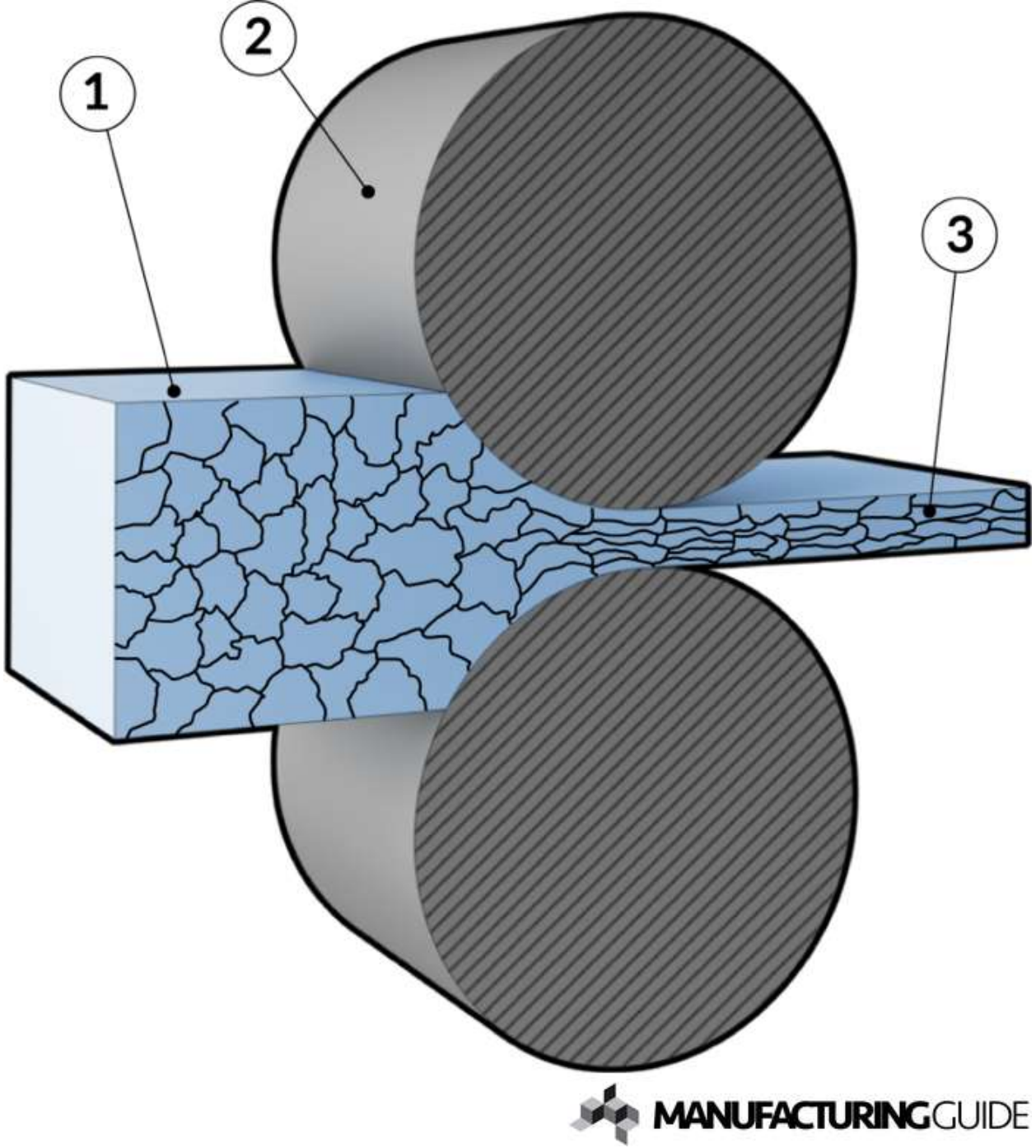

4
5
1
2
3


I
III
II
III
II
I
а)
б)



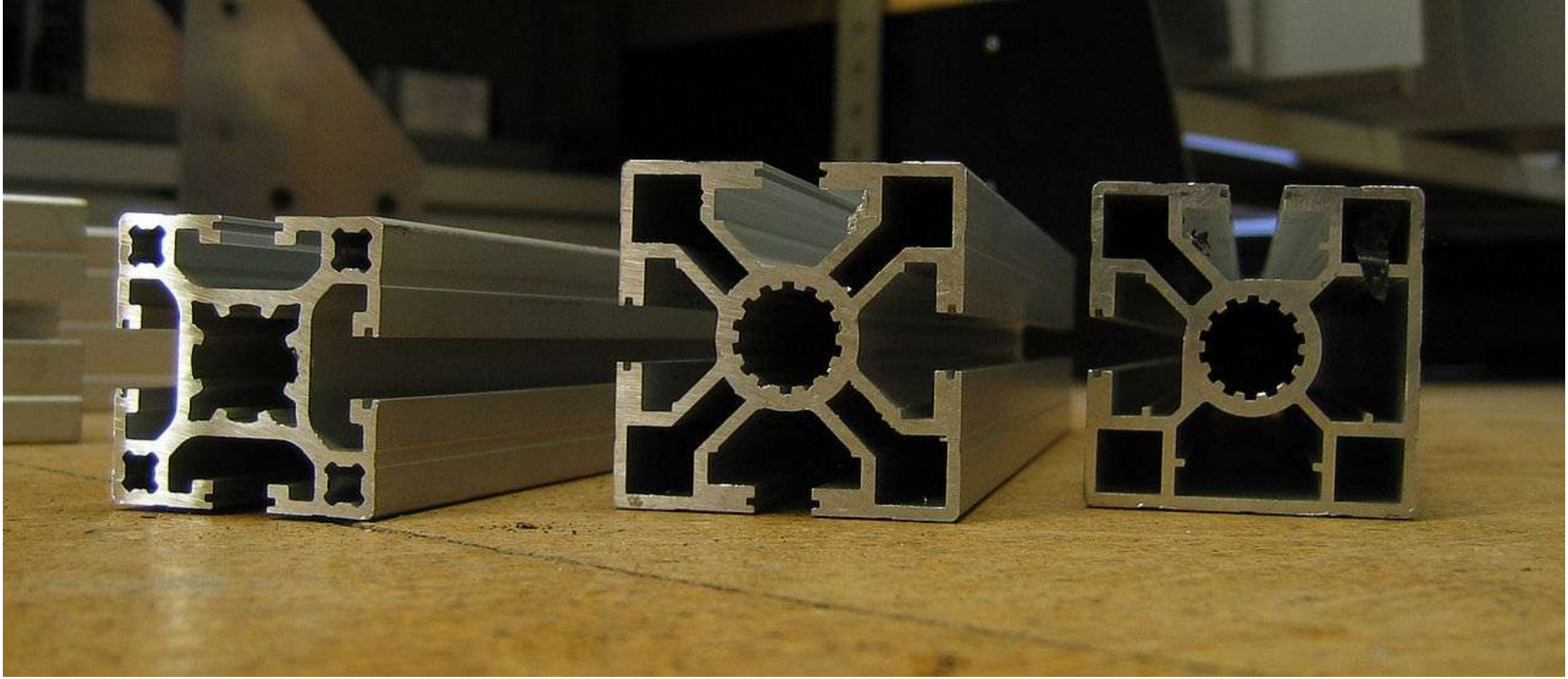
Grain Structure of Caseted Ingots


Raw Materials
Melting
Casting
Sawing
Scalping
Homogenizing
Hot Rolling
Tandem Mill
Cold Rolling
Slitting
Blanking
Annealing
Packing
Inspection
Delivery



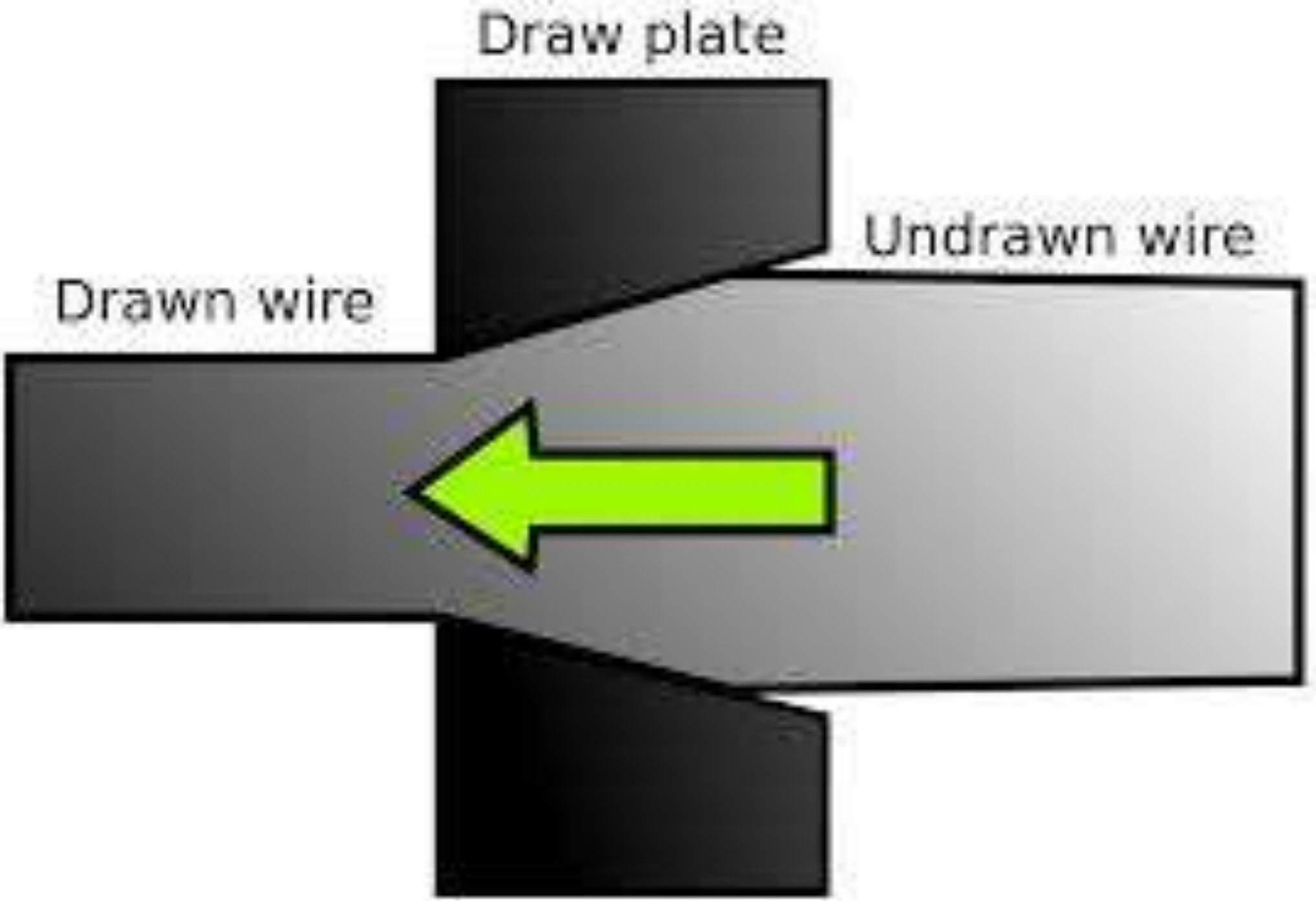
Cold rolling of sheets

https://www.manufacturingguide.com/en/cold-rolling-sheets

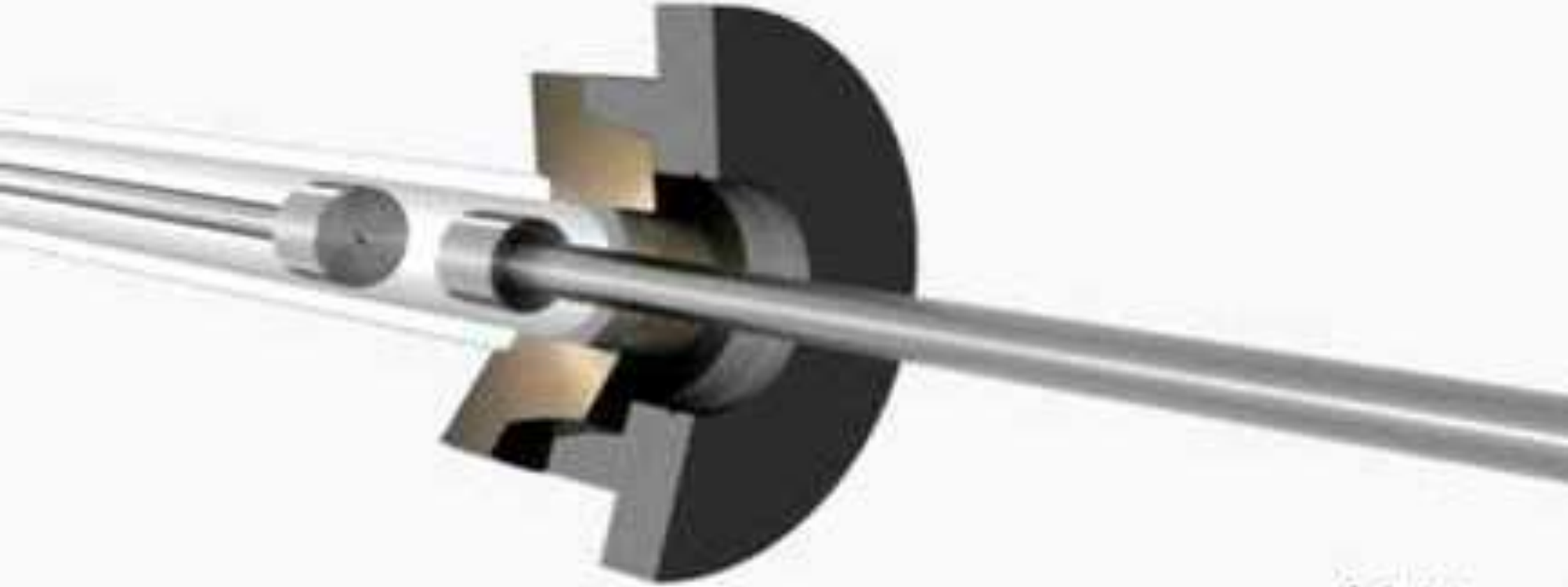


Extruded aluminium profile

Extruded aluminium with several hollow cavities; T slots allow bars to be joined with special connectors.



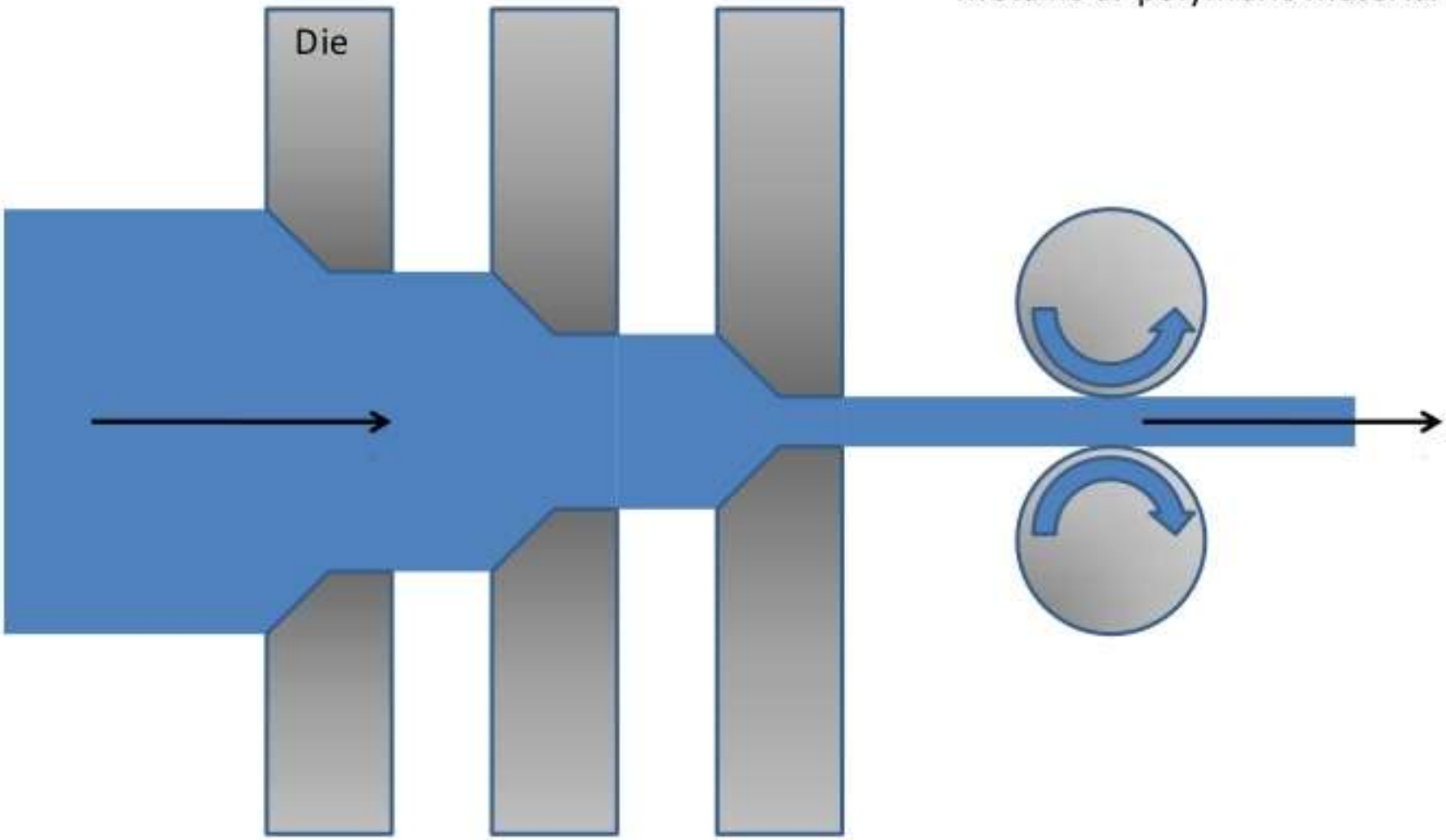
Drawing (Wire Dragging) Process



ALUnna

Wire Drawing:

Produces rods / bars from metallic or polymeric material



UNIVERSITY OF LIVERPOOL

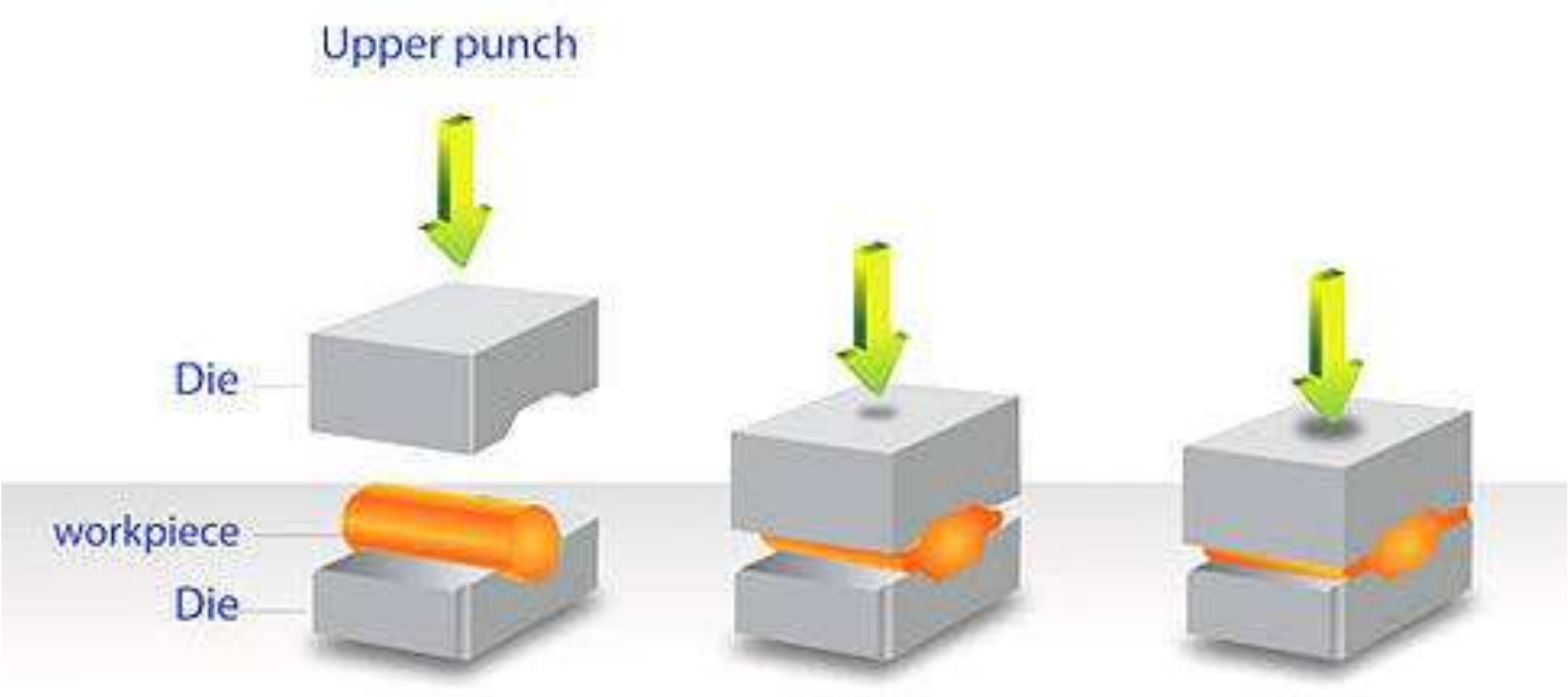
https://www.slideshare.net/corematerials/drawing-types
https://www.slideshare.net/pateljy/drawing-processes-in-manufacturing
https://www.slideshare.net/govindakumar2/extrusion-and-drawing

http://www.dropforging.net/types-of-forging-processes.html

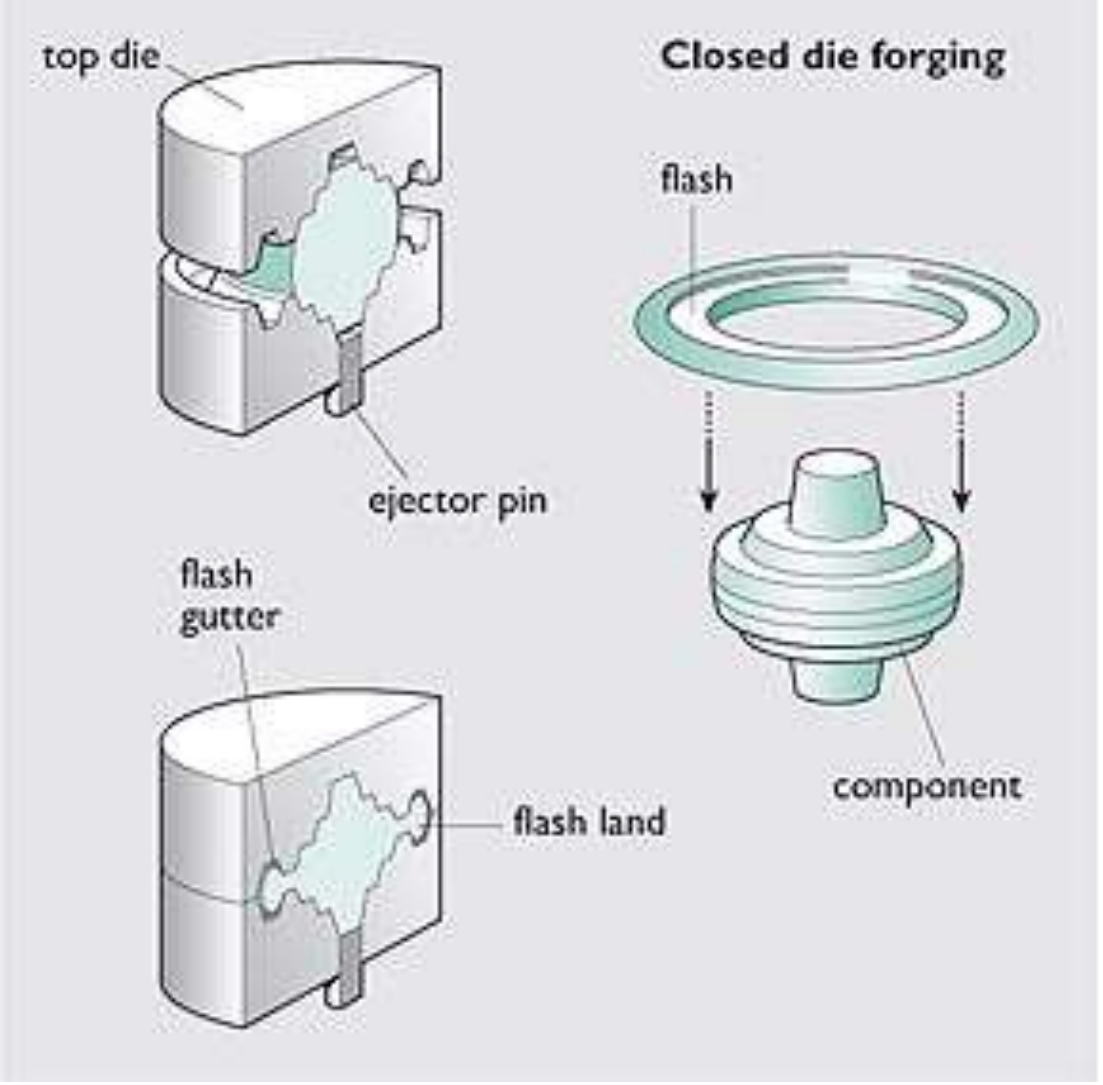
Grain Structure of forged part

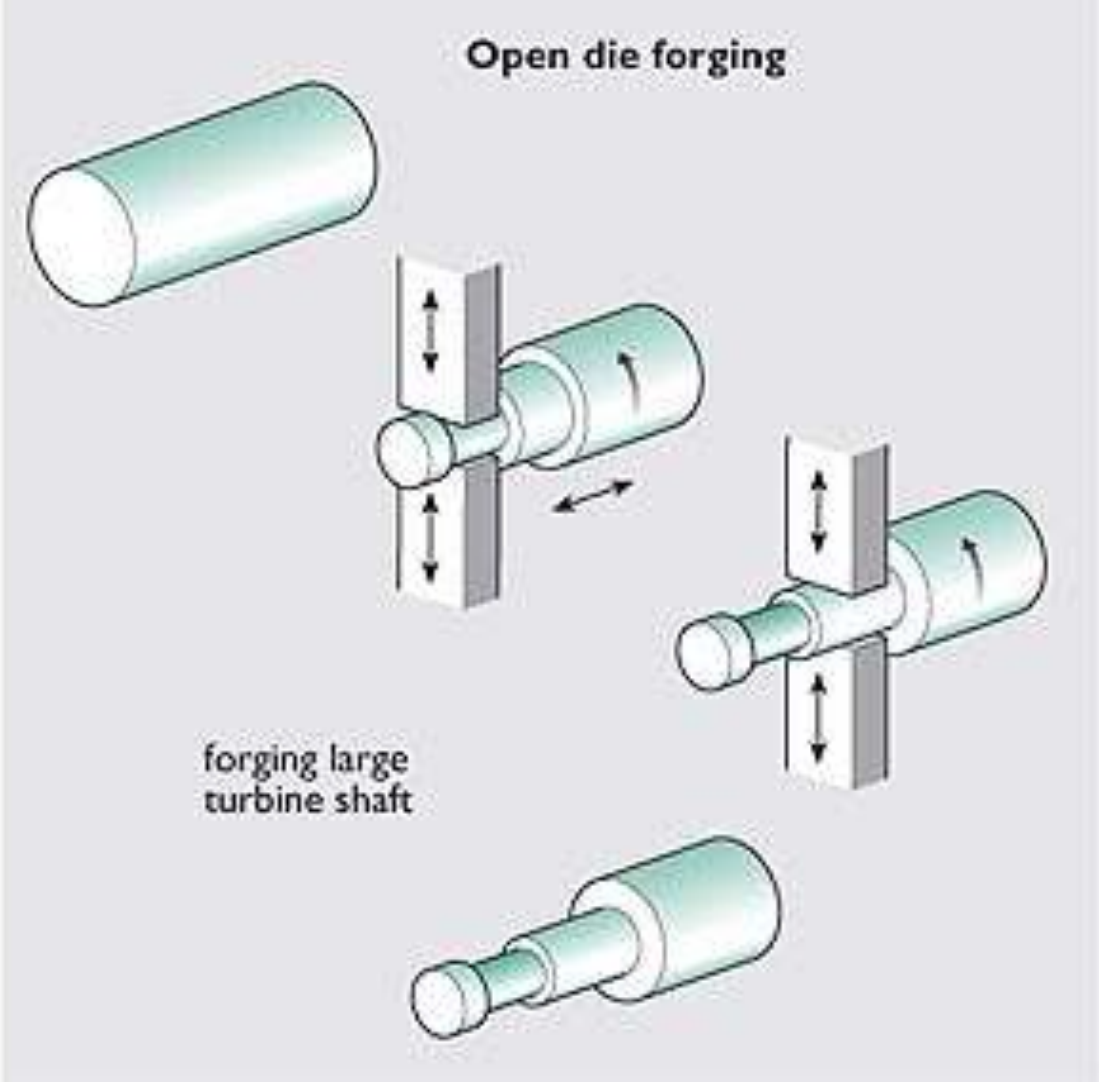
Grain flow is a directional orientation of metal grains and any inclusions that have been deformed by forging. Individual grains are elongated in the direction of the metal flow or plastic deformation.

Closed die forging dies



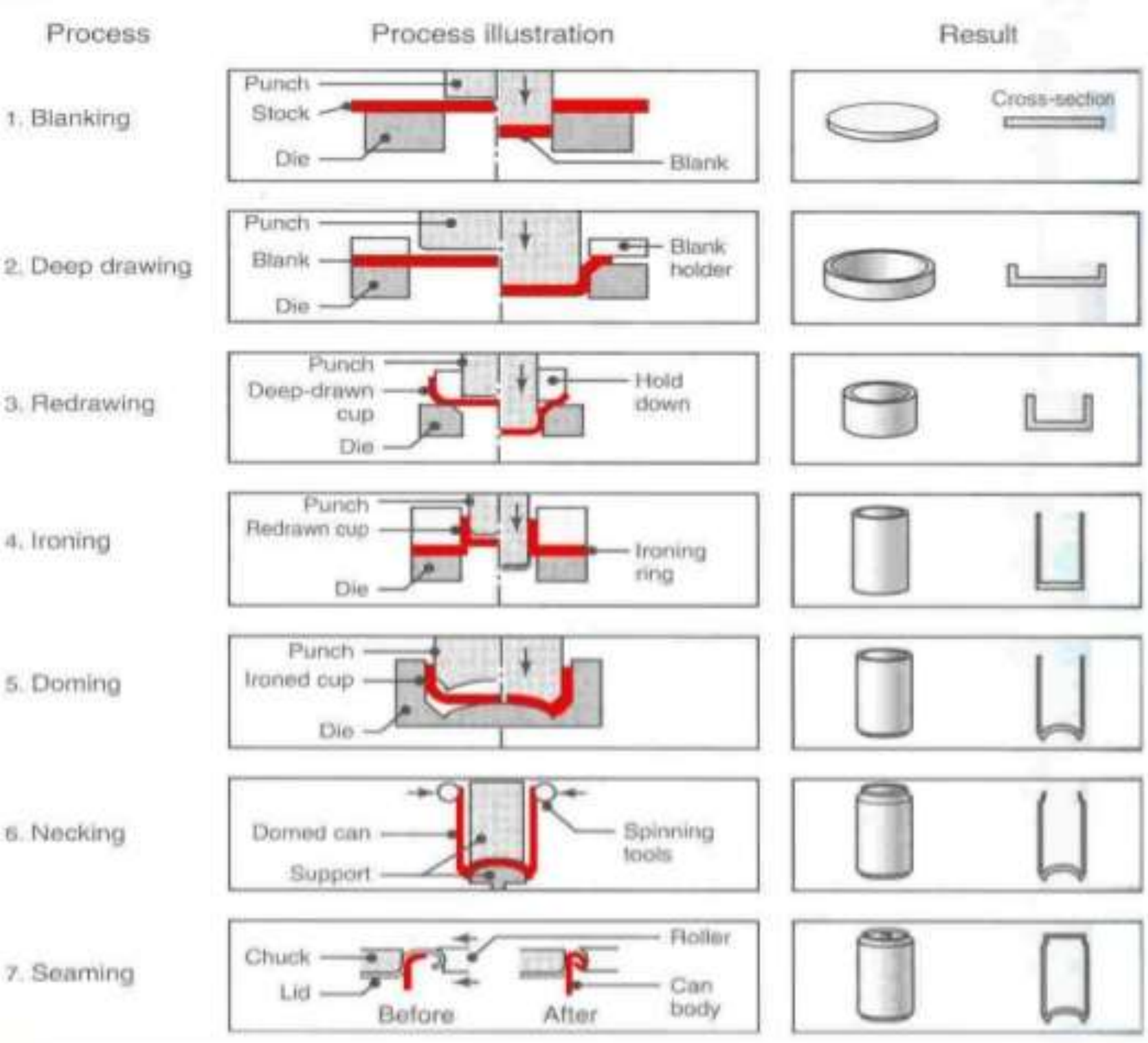
Closed die forging process





Differences between closed die forging & open die forging

http://www.dropforging.net/image/closed%20die%20forging-5204.gif
https://www.forging.org/types-of-forging-processes
http://engineeringhut.blogspot.com/2010/10/forging-and-its-types.html


Process
Process illustration
Result
1. Blanking
Punch
Stock
Die
Blank
Cross-section
2. Deep drawing
Punch
Blank
Die
Blank holder
3. Redrawing
Punch
Deep-drawn cup
Die
Hold down
4. Ironing
Punch
Redrawn cup
Die
Ironing ring
5. Doming
Punch
Ironed cup
Die
6. Necking
Domed can
Support
Spinning tools
7. Seaming
Chuck
Lid
Roller
Can body
Before
After

All Types Of Saws

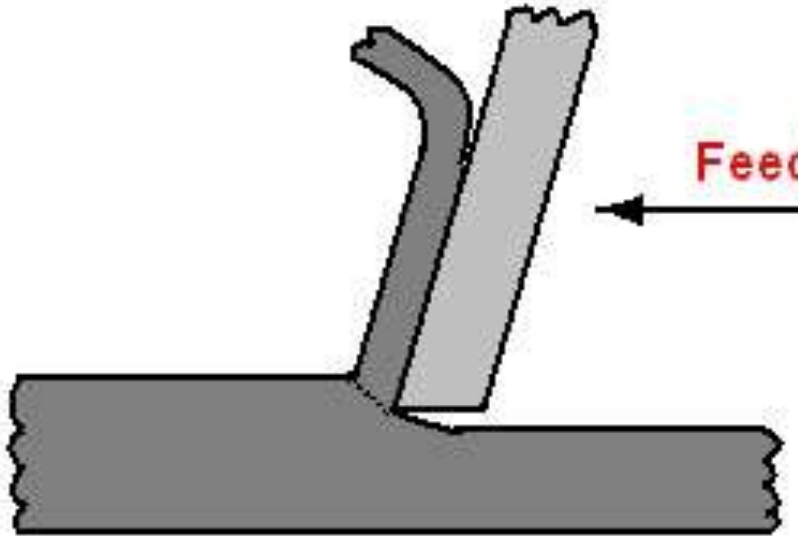
Oscillating (Dremel™)	Jig	Reciprocating (Sawzall™)	Circular	Miter/Chop	Band	Table
						

SIDE-BY-SIDE SAW COMPARISON

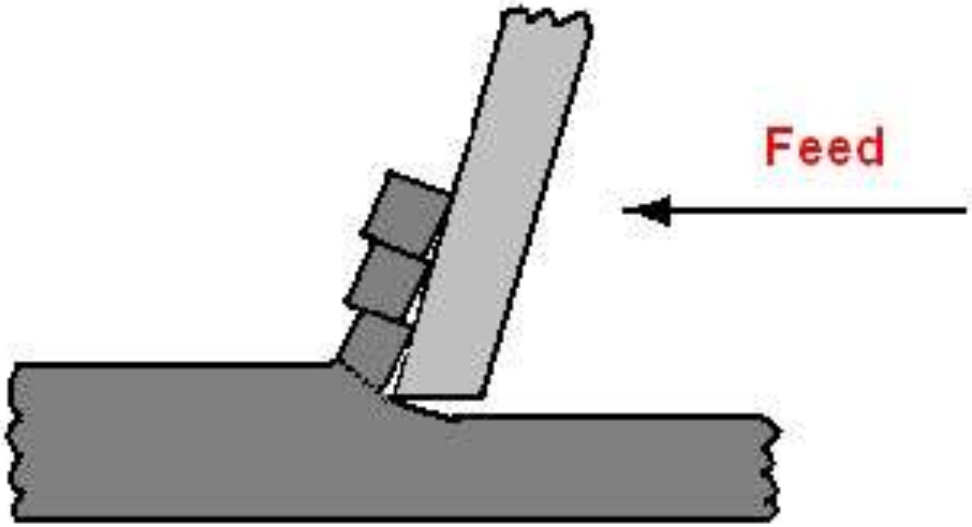
SAW NAME	Oscillating (Dremel™)	Jig	Reciprocating (Sawzall™)	Circular	Miter/Chop	Band	Table
PIC							

Circular Saw	
Table Saw	
Radial Arm Saw	
Miter Saw	
Rotary Saw/Roto Zip	

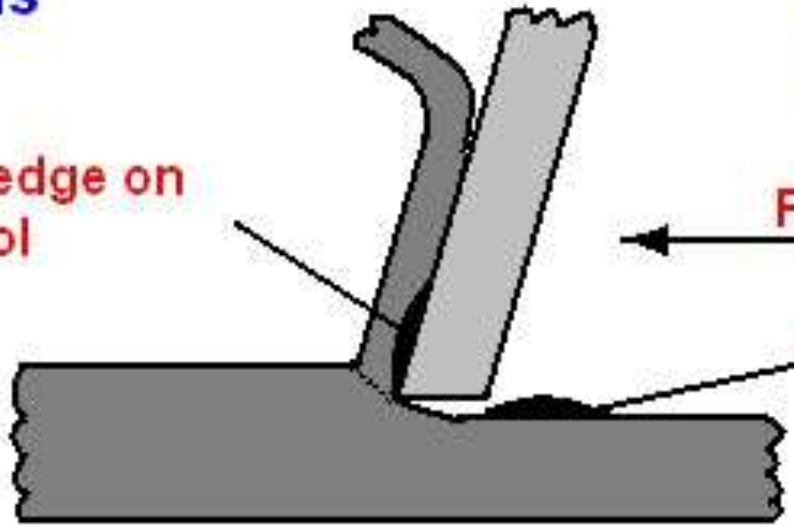
Types of Chips



Continuous Chip

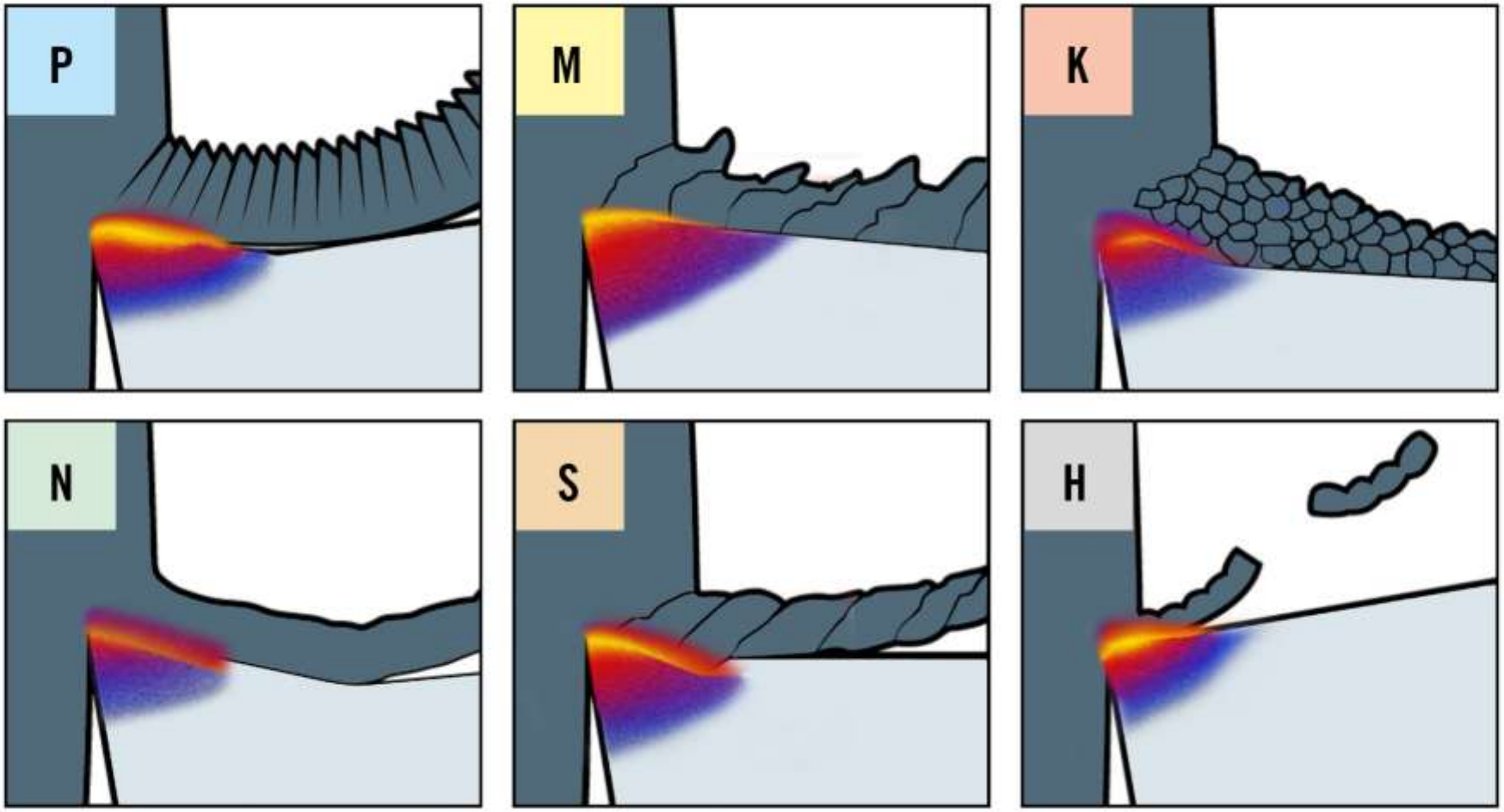


Discontinuous Chip



Built up Chip

CHIP FORMATION AND CUTTING TEMPERATURES IN DIFFERENT WORKPIECE MATERIALS



Each workpiece material type affects the chip formation process differently, everything from chip type to heat generation to cutting temperatures varies.

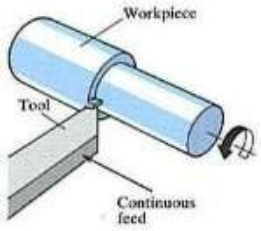
https://www.slideshare.net/NamanDave/metal-cutting-1
http://slideplayer.com/slide/10286132/
https://www.slideshare.net/NamanDave/metal-cutting-2

bwc33028197 Barewalls ©

Introduction

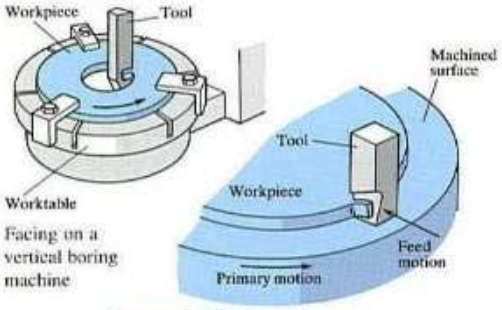
Single point Cutting Tool

- Removal of the metal from the workpiece by means of cutting tools which have one major cutting edge.

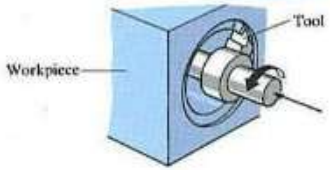


Cylindrical turning on a lathe

Turning

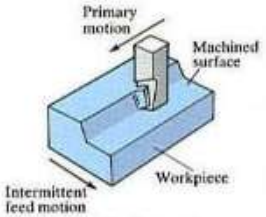


Facing on a vertical boring machine

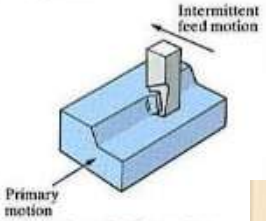


Internal boring on a horizontal boring machine

Boring



Production of a flat surface on a planer



Production of a flat surface on a shaper

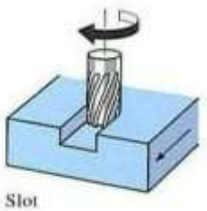
Planing/shaping

Introduction

Multi- point Cutting Tool

- Removal of the metal from the workpiece by means of cutting tools which have more than one major cutting edge.

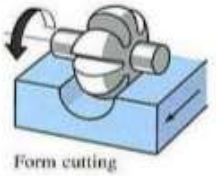
Surface



Slot

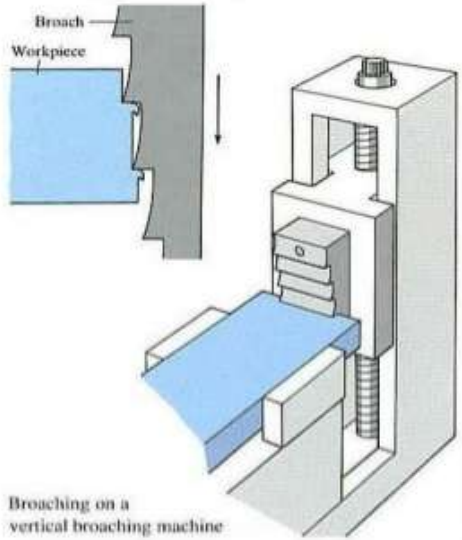
Blind or through hole drilling

Dovetail



Form cutting

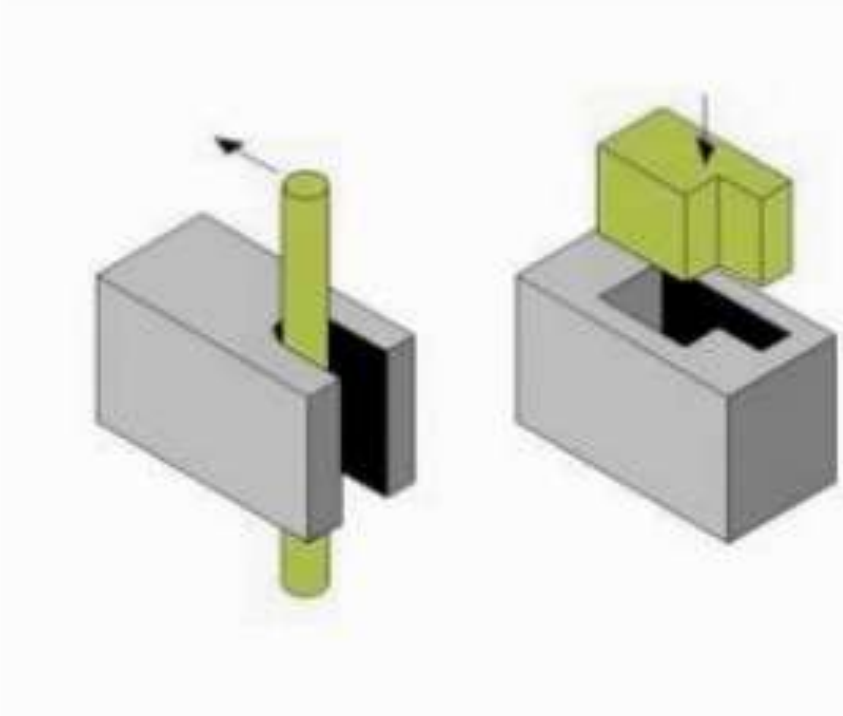
Reaming



Broaching on a vertical broaching machine

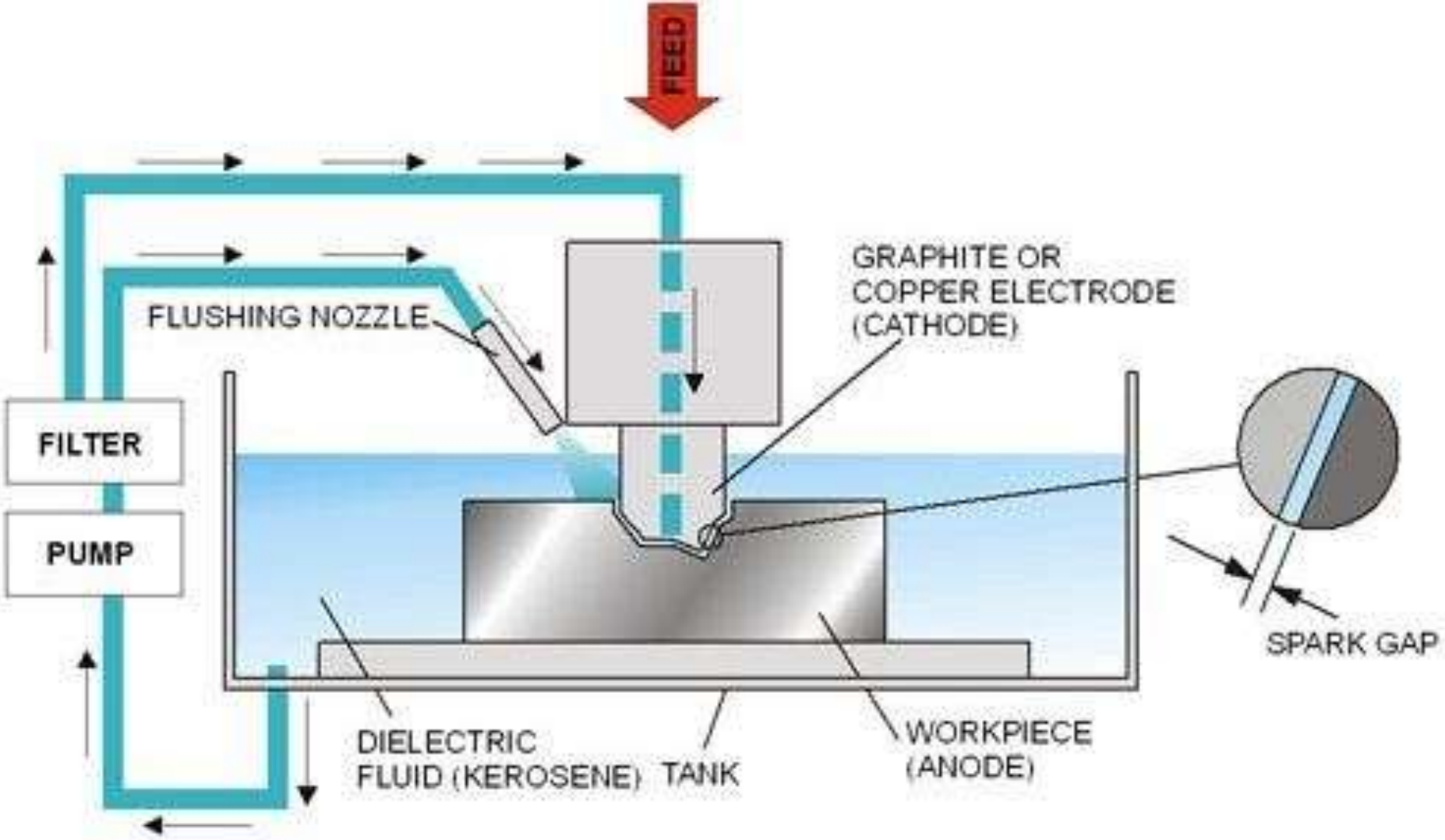
Types of EDM

- Wire Machining
- Ram Machining



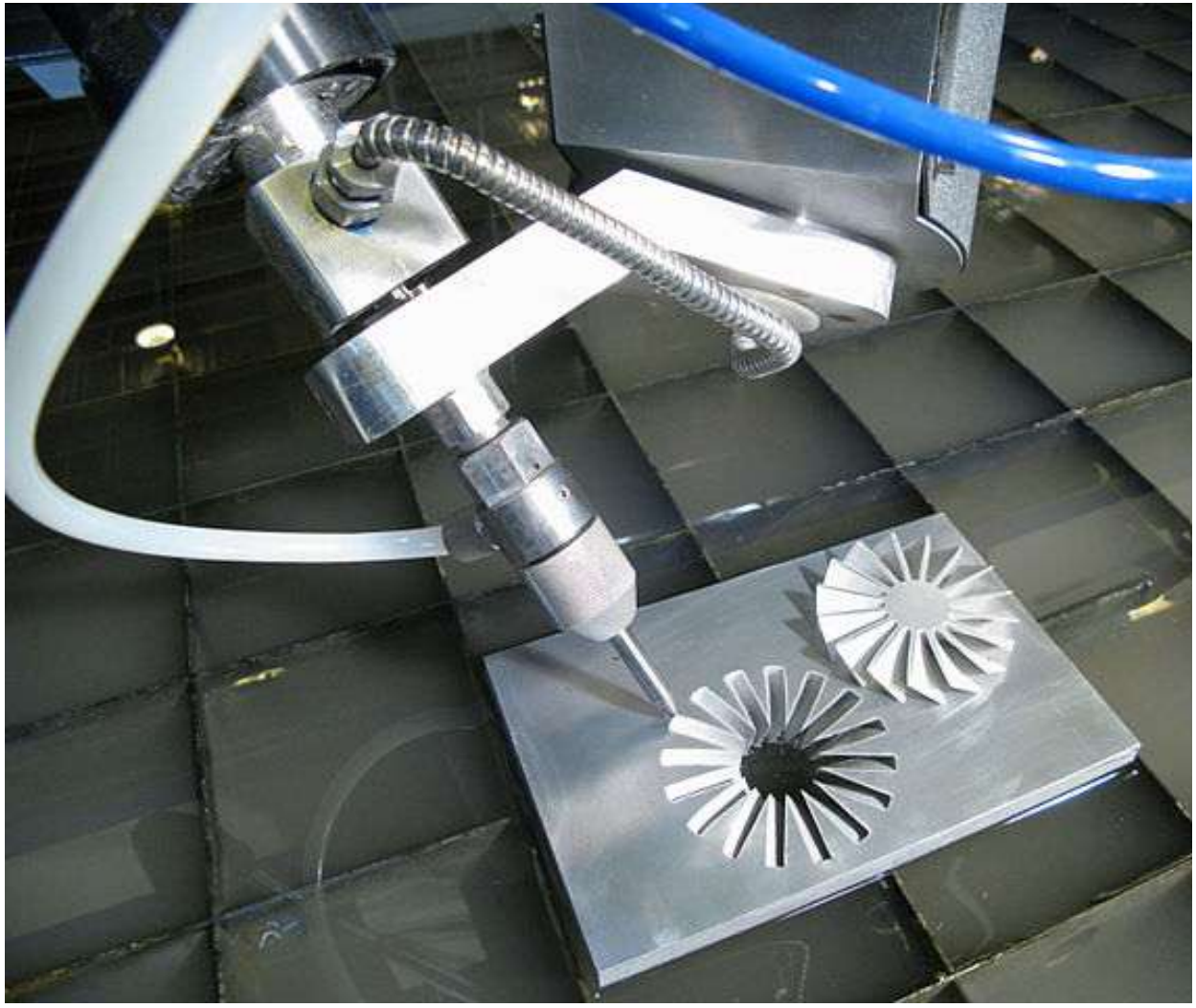
Other EDM Processes

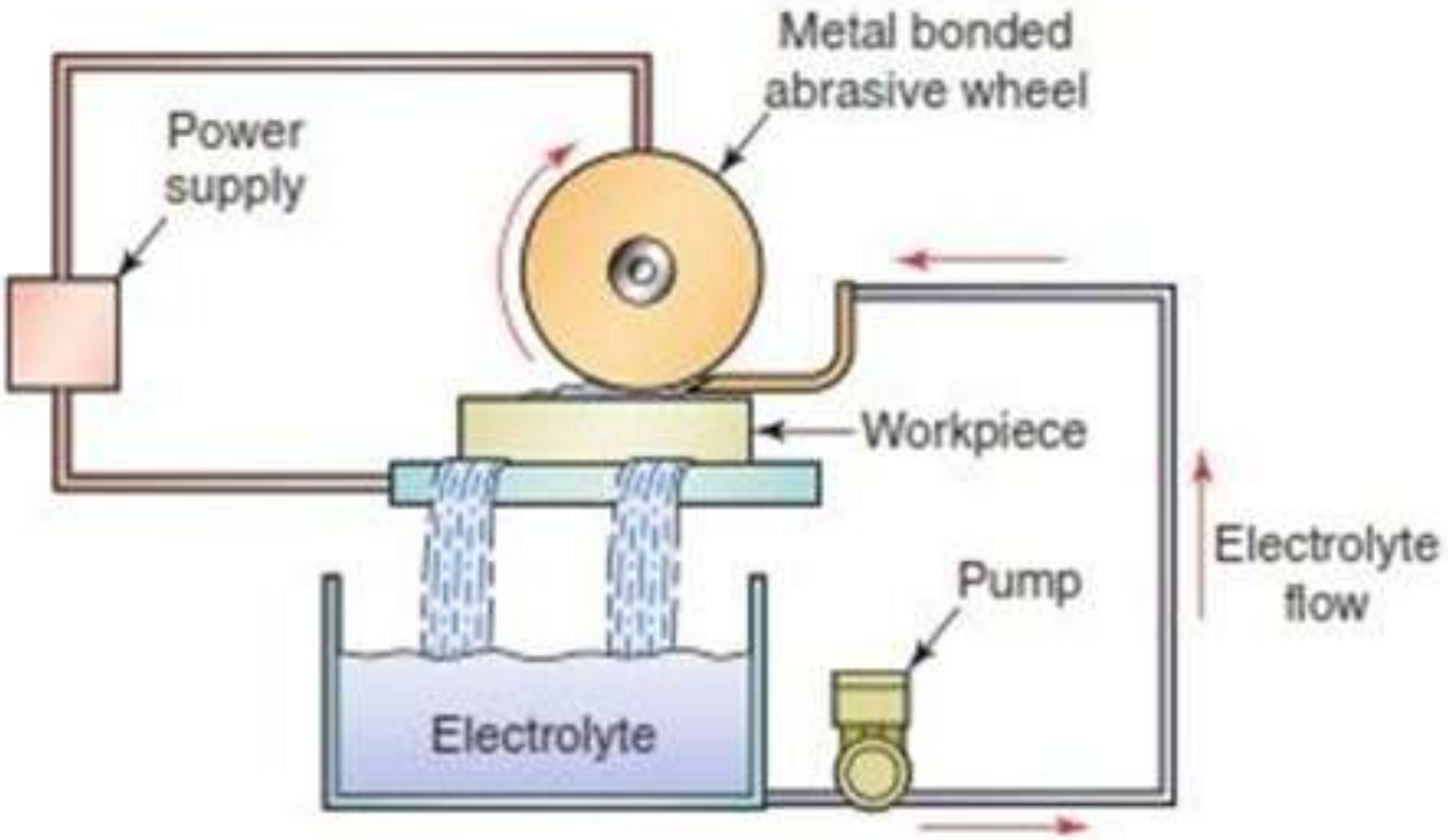
- Electrical Discharge Milling
- Electrical Discharge Grinding
- Electrical Discharge Dressing
- Ultrasonic Aided EDM
- Abrasive Electrical Discharge Grinding
- Micro Electrical Discharge Machining
- Micro Wire EDM
- Mole EDM
- Double Rotating Electrodes EDM



ELECTRIC DISCHARGE MACHINING

https://www.slideshare.net/aslam1992/electric-discharge-machining-45188713





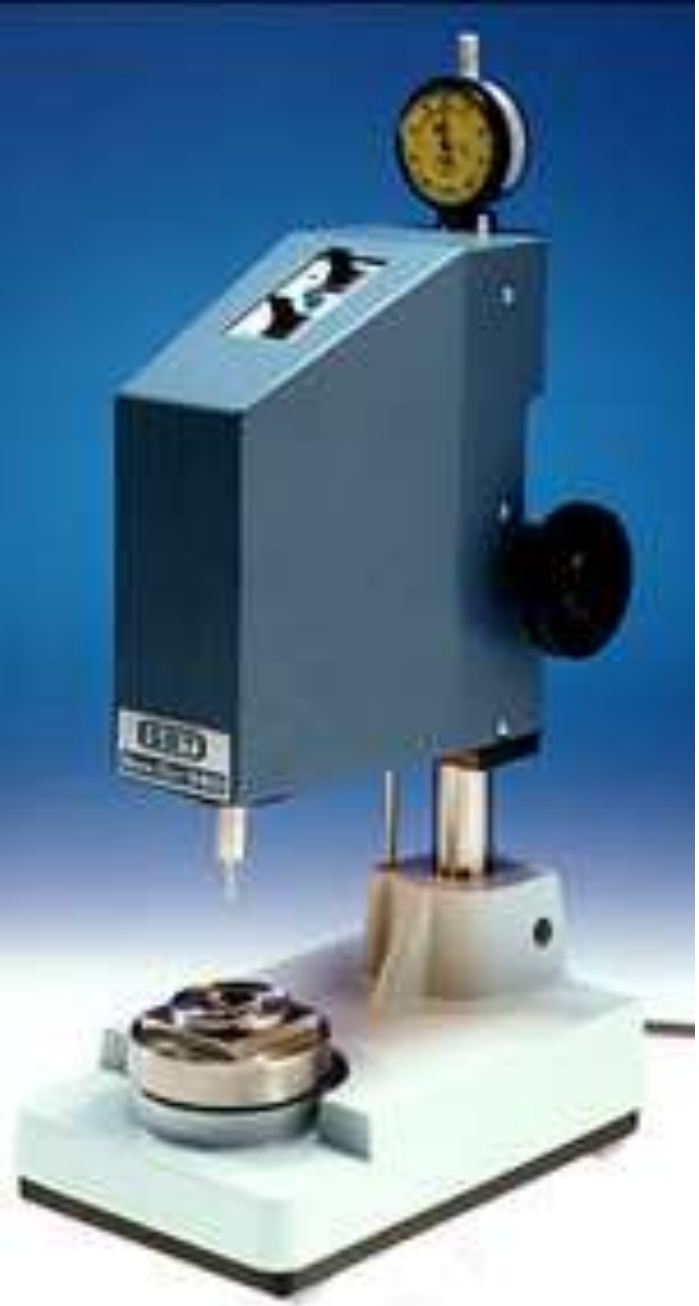
WORKING OF ECG

Electro Chemical Grinding

Sheet Metal Laser Cutting

CNC Plasma Cutting

Ultrasonic Cutting Conveyors



Ultrasonic Cutting