Process Valves

- Types
- Classification
- Materials of Construction
- Operations
- Identification
- Uses and Limitations
- Faults
- Variations

What are Valves used for ?

- **Regulating** – Control of flow, pressure or volume
- **Isolation** – Complete shut off
- **Non return** – Allow flow in one direction and prevent back flow
- **Safety relief** – Safe discharge to prevent over pressurisation of equipment (eg: boilers and compressed air systems)

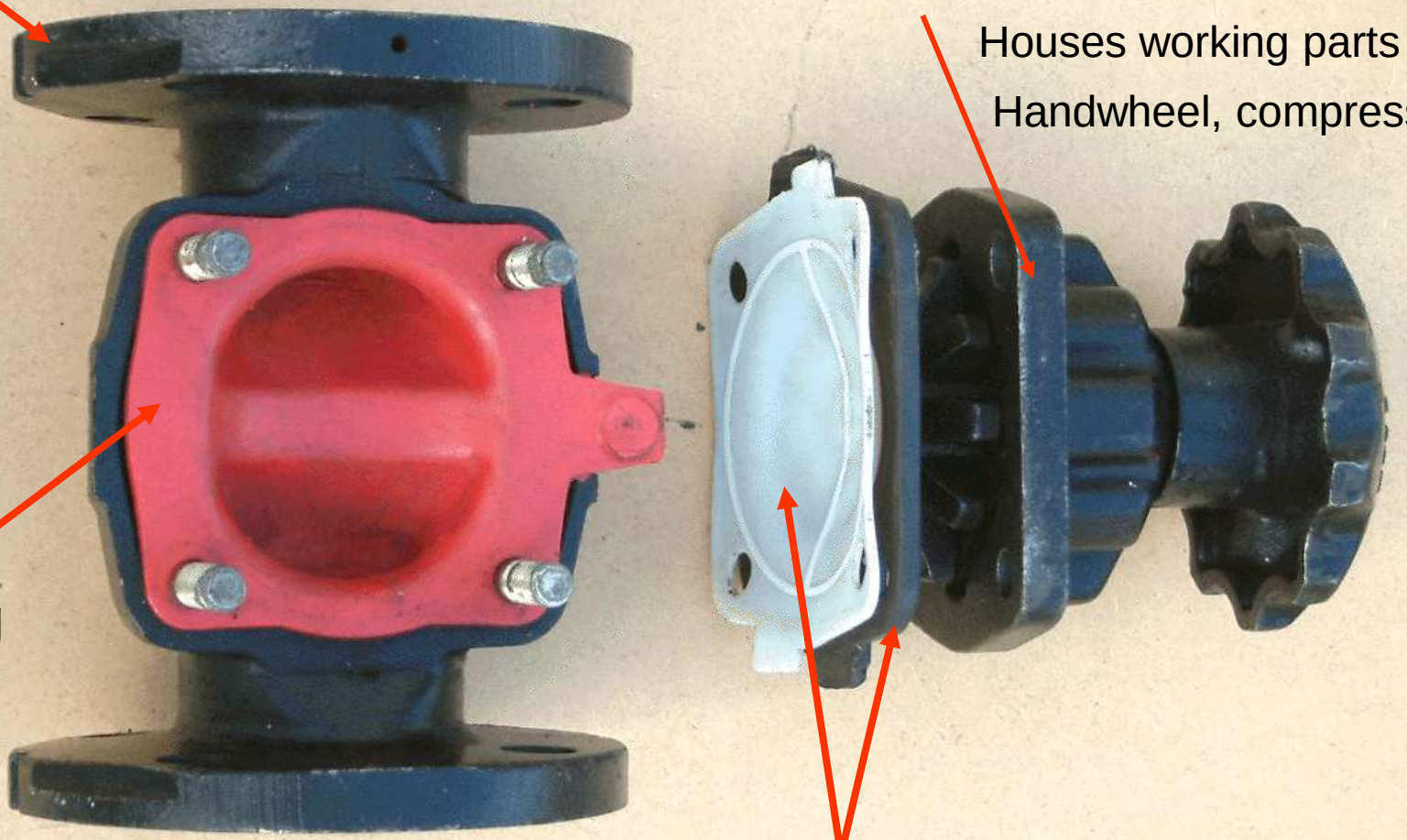
Valve selection criteria

- **Temperature** – Refrigeration, superheat, ambient
- **Pressure** – Positive, vacuum,
- **Volume** – amount of product flow
- **Product** – Liquid, gaseous, slurry, powder, solid – Acidic, abrasive, corrosive
- **Method of operation** – Manual, automatic
- **Environment** – Access to operate, position (horizontal, vertical)
- **Size** – May restrict access or operability, space availability
- **Weight** – May require extra or independent support

Valve types - manual

1) Diaphragm
2) Plug
3) Slide
4) Globe
5) Ball
6) Butterfly
7) Needle
8) Check – non return
9) Safety relief
10) Rotary - Star

Diaphragm valve



Body

Cast iron, Steel, Alloy, Plastic

Flow direction - any

Bonnet

Houses working parts

Handwheel, compressor

Lining

Diaphragm

Flexible element

Forms seal against seat

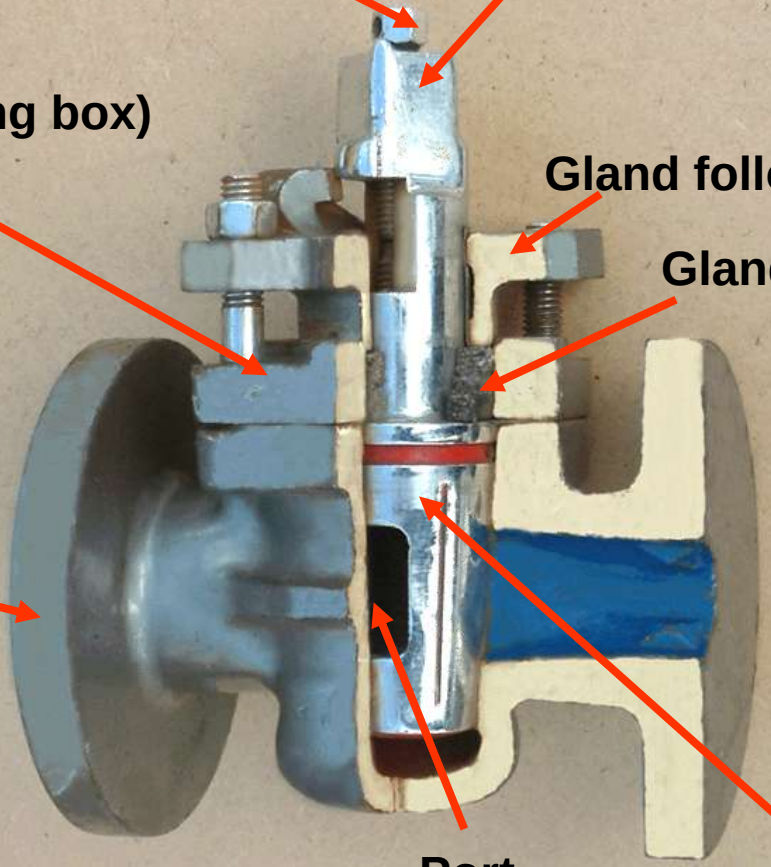
Uses

Regulation of flow

Can be used on range of products

Limited by high temp and pressure

Plug Valve



Spindle (90 deg open/close)
Indicator on top

Lubricator screw

Bonnet (stuffing box)

Gland follower

Gland packing seal

Body

Heavy weight material

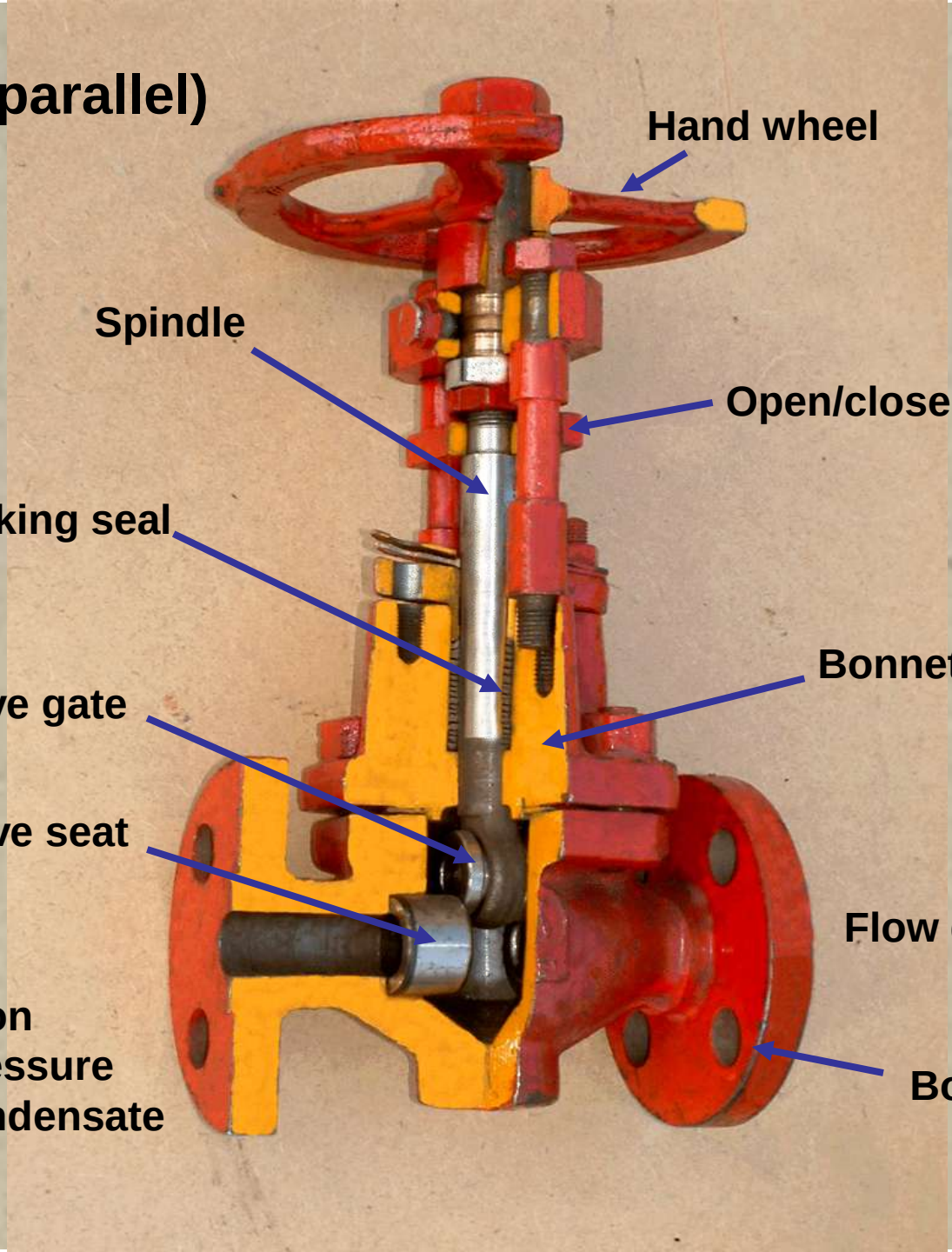
Flow direction - any

Port

Plug (tapered)

Quick isolation
High pressure
High temperature
Range of variations

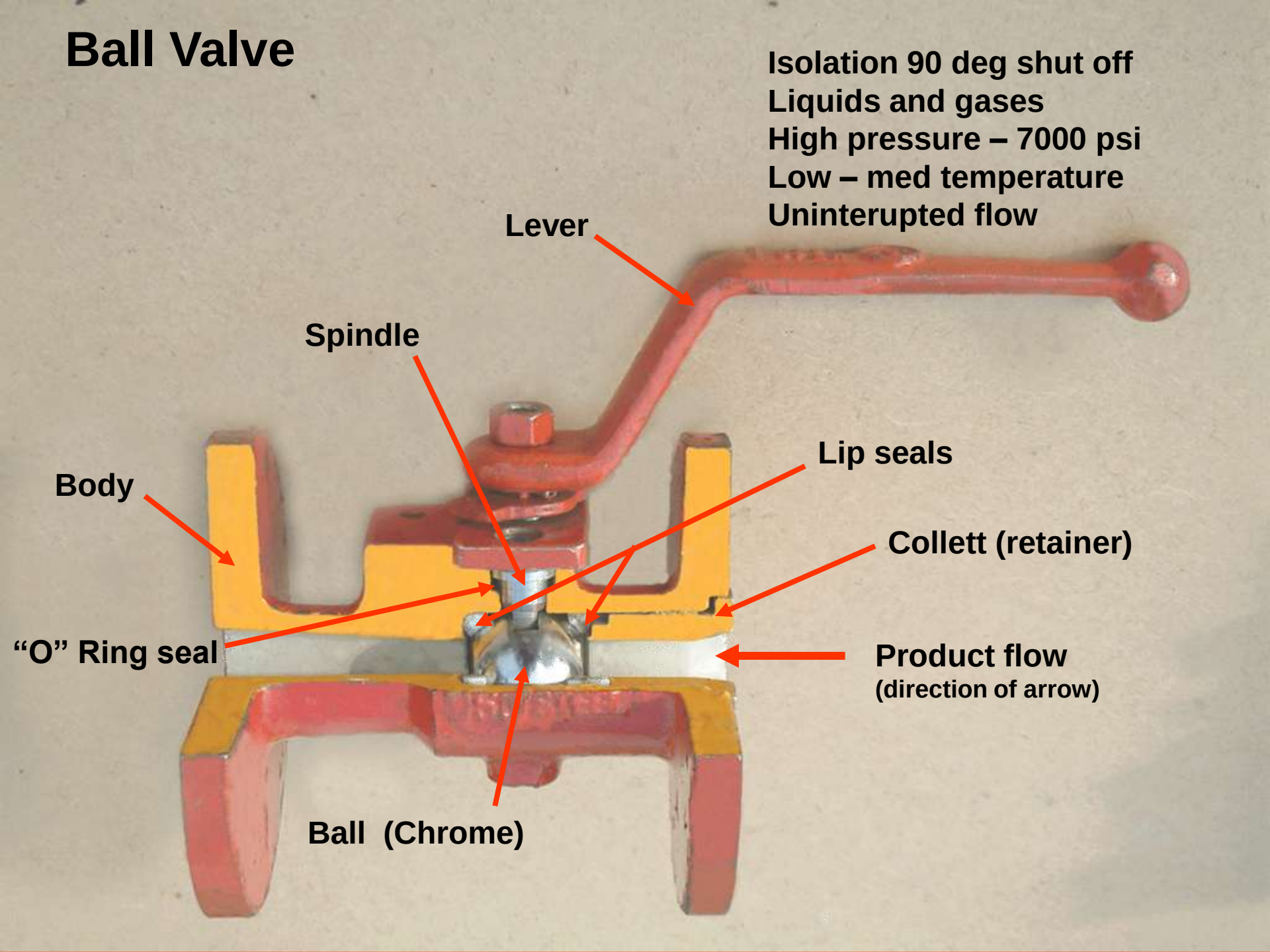
Slide valve (parallel)



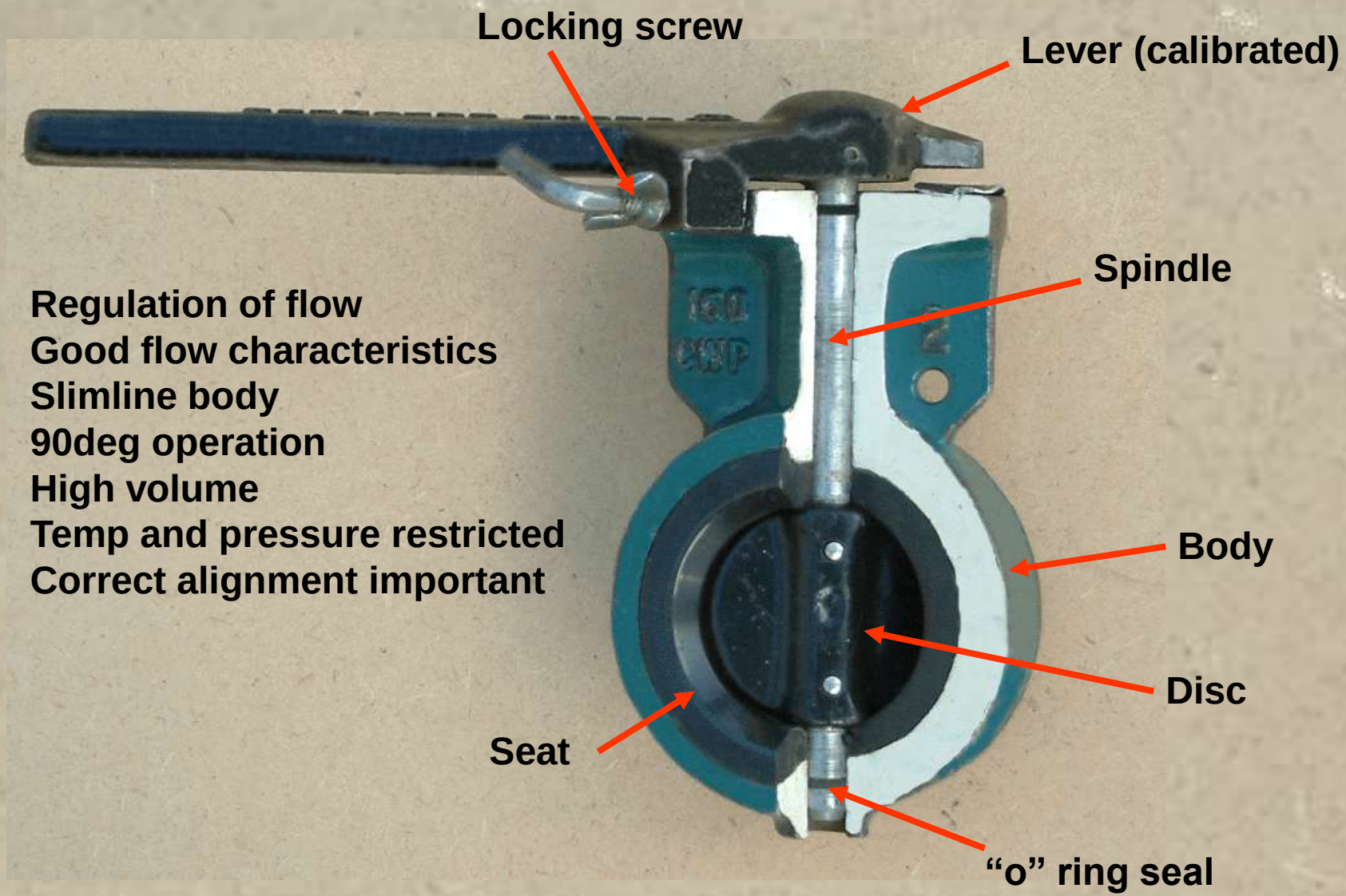
Slow acting isolation
High temp/High pressure
Liquids/ steam/ condensate

Ball Valve

Isolation 90 deg shut off
Liquids and gases
High pressure – 7000 psi
Low – med temperature
Uninterupted flow



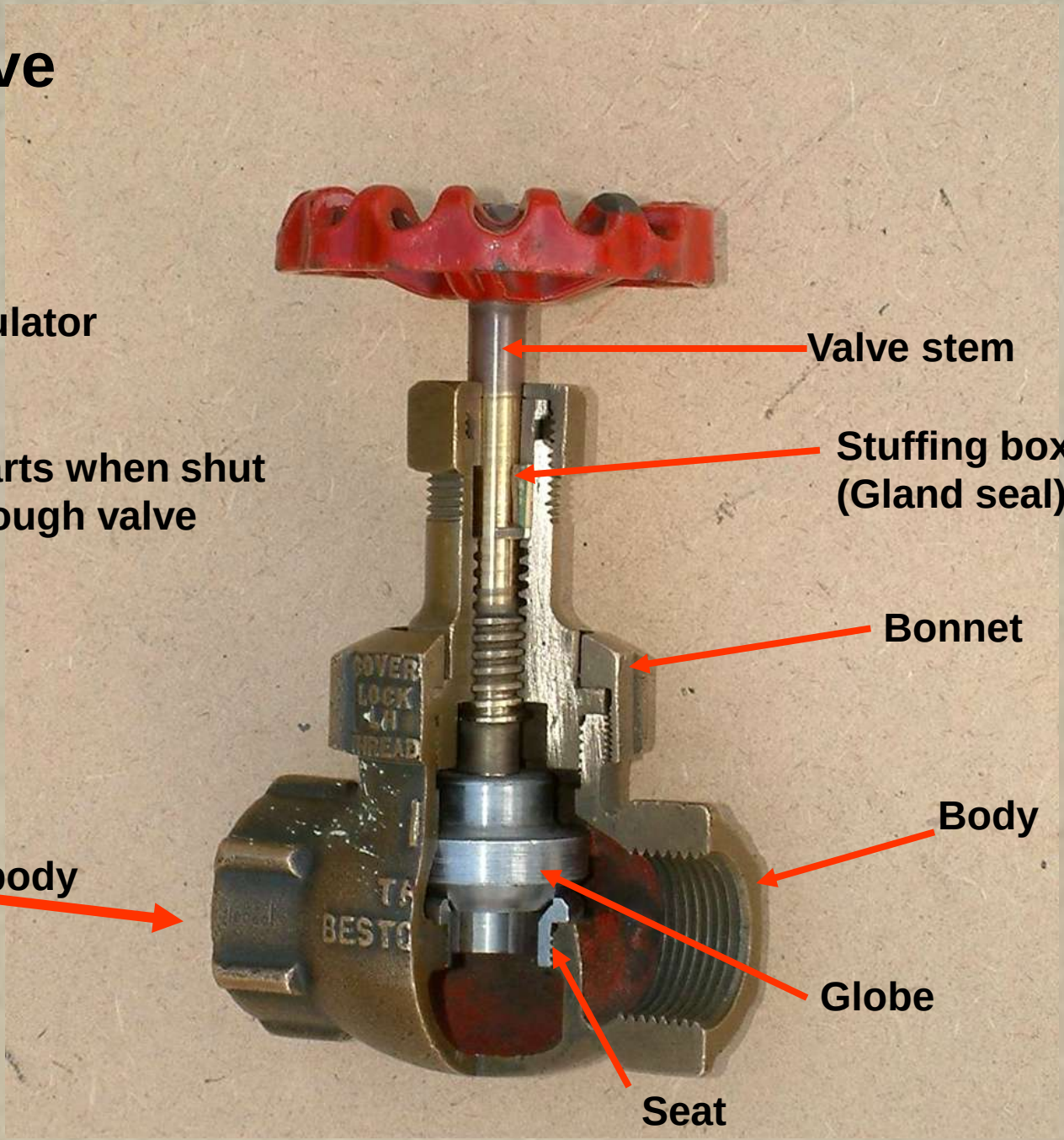
Butterfly Valve



Regulation of flow
Good flow characteristics
Slimline body
90deg operation
High volume
Temp and pressure restricted
Correct alignment important

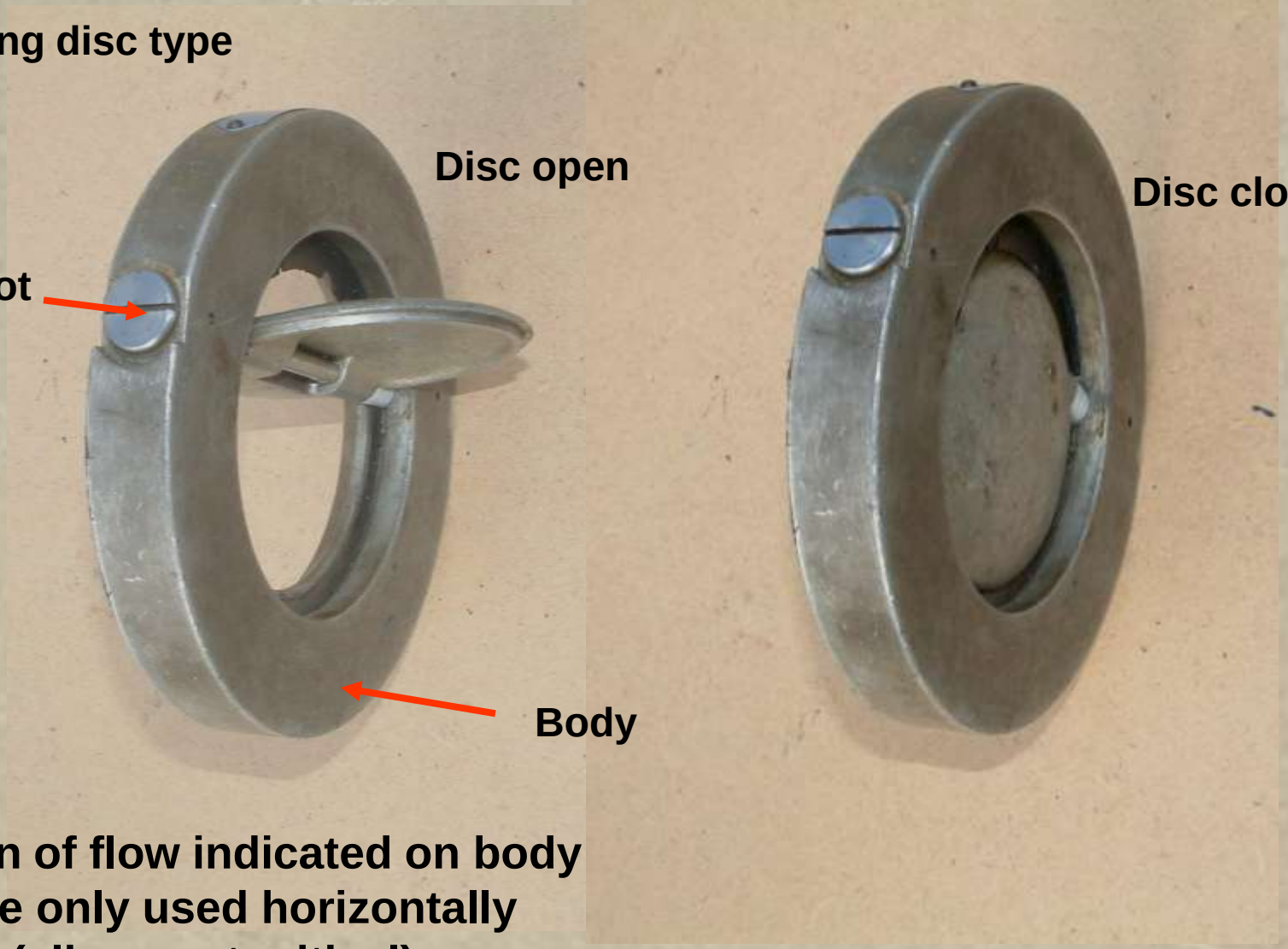
Globe valve

Slow opening regulator
Liquids or gases
Good control
No pressure on parts when shut
Pressure drop through valve
Expensive



Check or Non – return valves

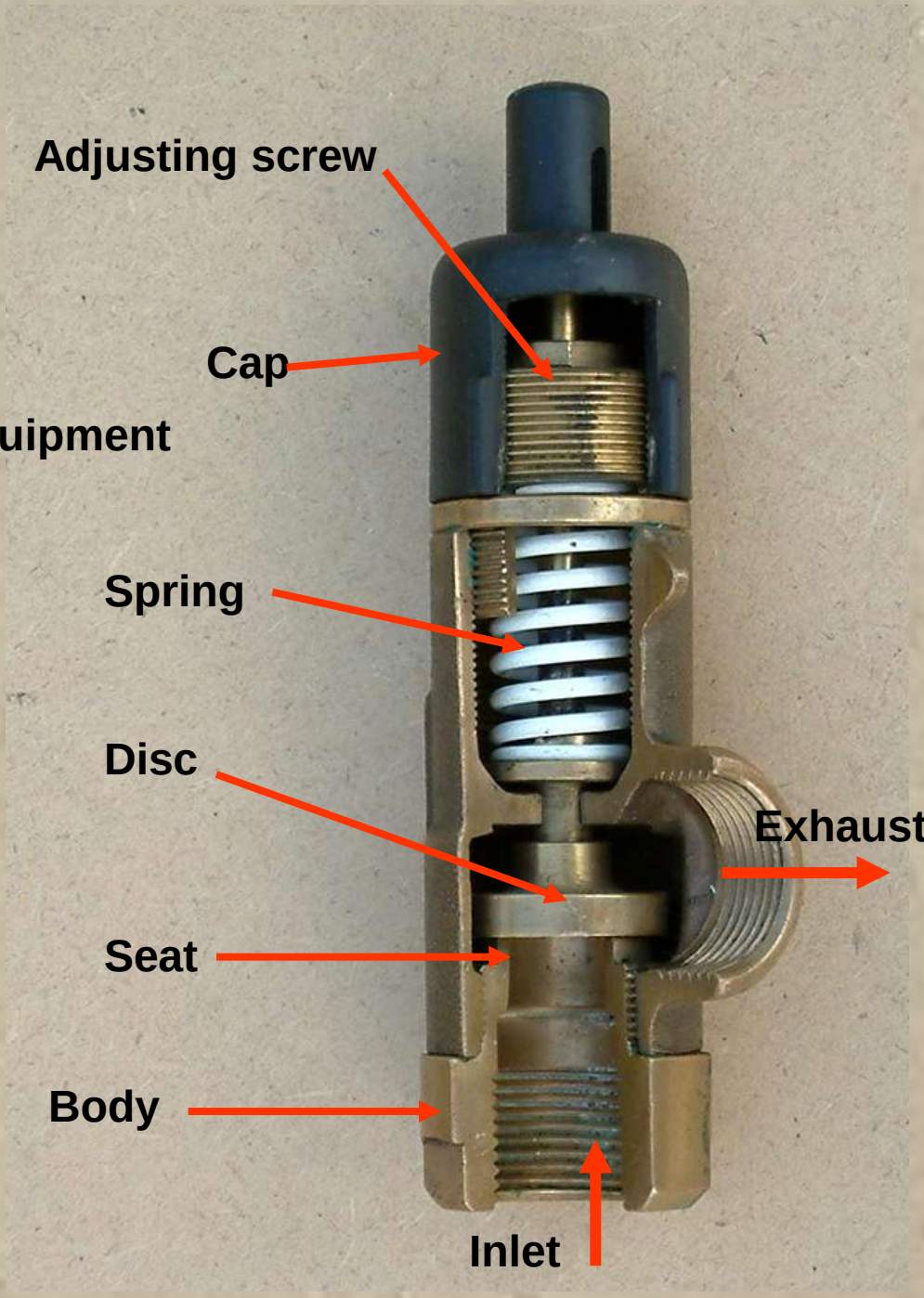
Swinging disc type



Direction of flow indicated on body
This type only used horizontally
Slimline (alignment critical)

Safety relief valve

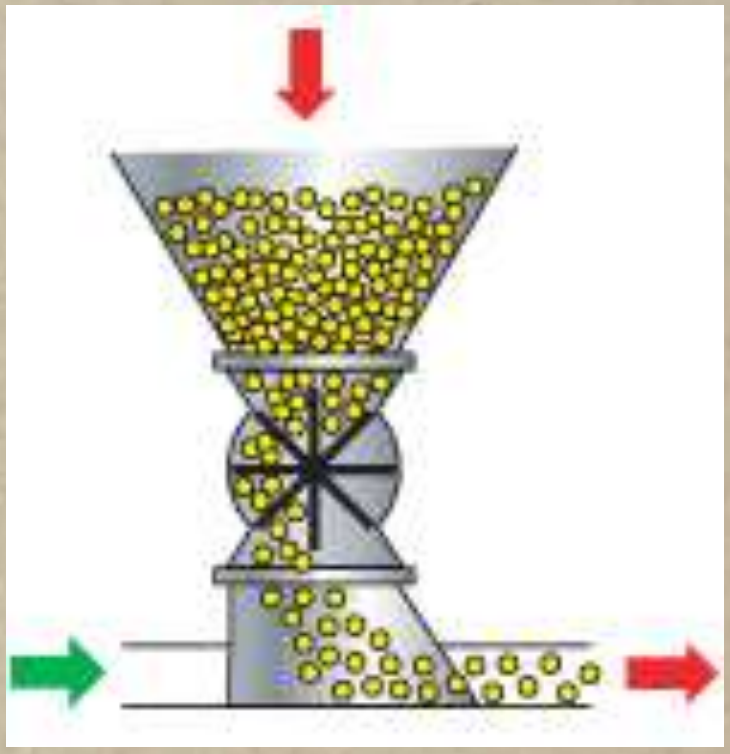
Protection device on pressurised equipment
Gas or Fluid systems
Automatic operation
Quick response
Precision set up
Registered and calibrated
Individual and independent test
Statutory overhaul



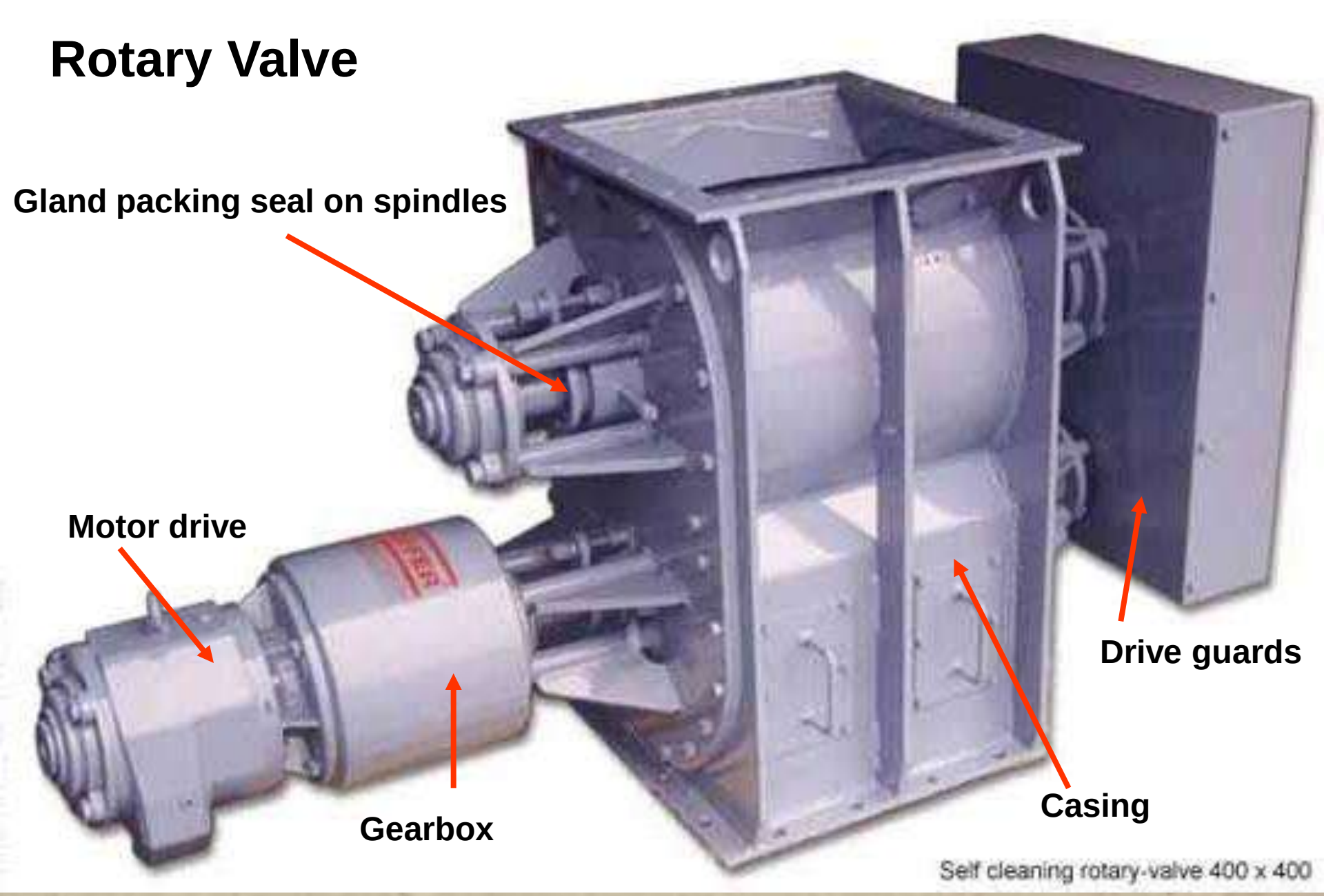
ROTARY VALVES

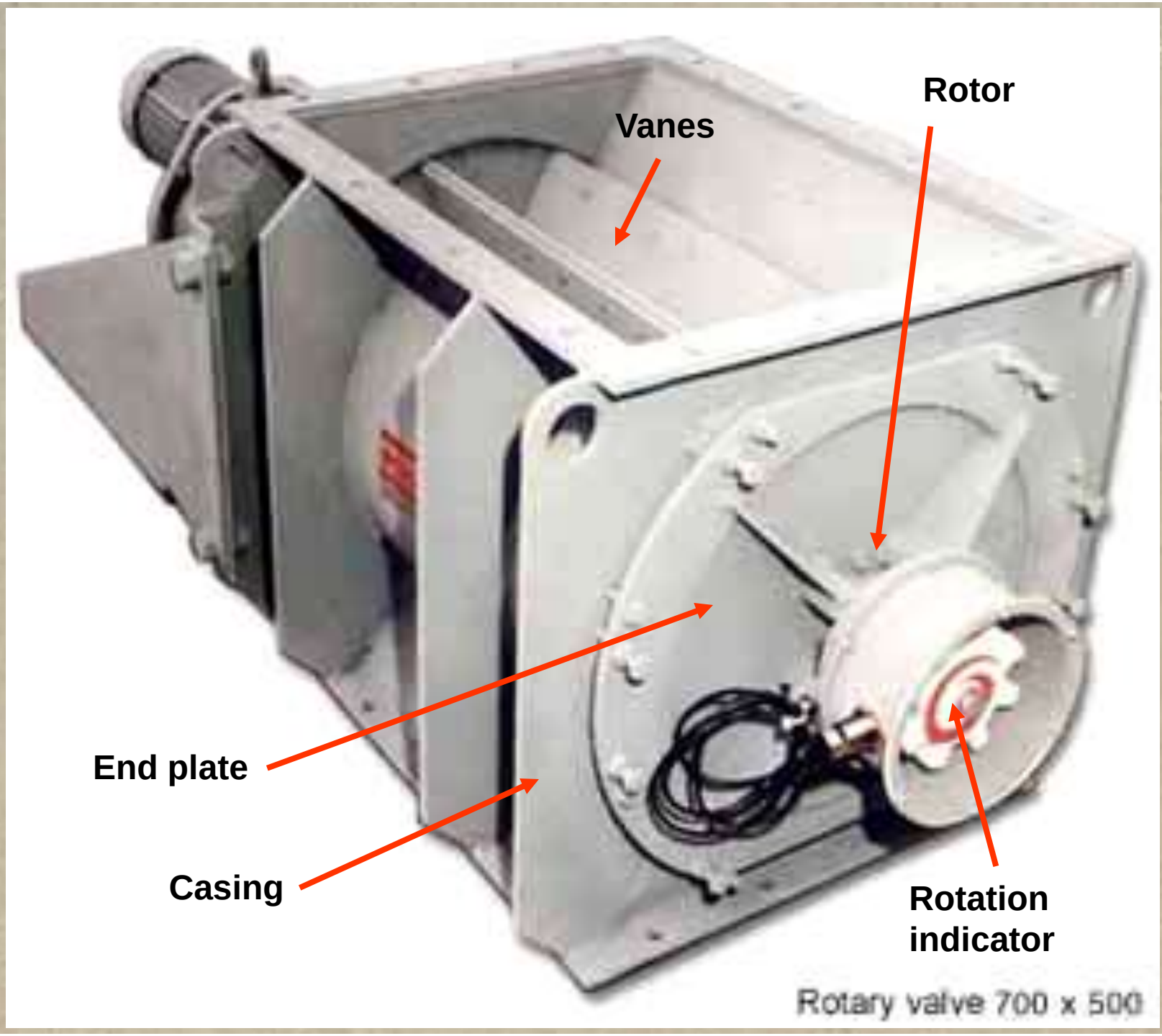
Rotary valves are used in applications such as pneumatic conveying and dust filtration, particularly where air leakage needs to be minimised and the material requires metering at an even, quick speed.

They are ideally suited to control delivery or discharge of powder or pelletized products to and from conveying systems, bag filters and centrifugal separators.



Rotary Valve




Vanes
Rotor
End plate
Casing
Rotation indicator
Rotary valve 700 x 500