KURSUS PENGENALAN SISTEM PEMAMPAT UDARA

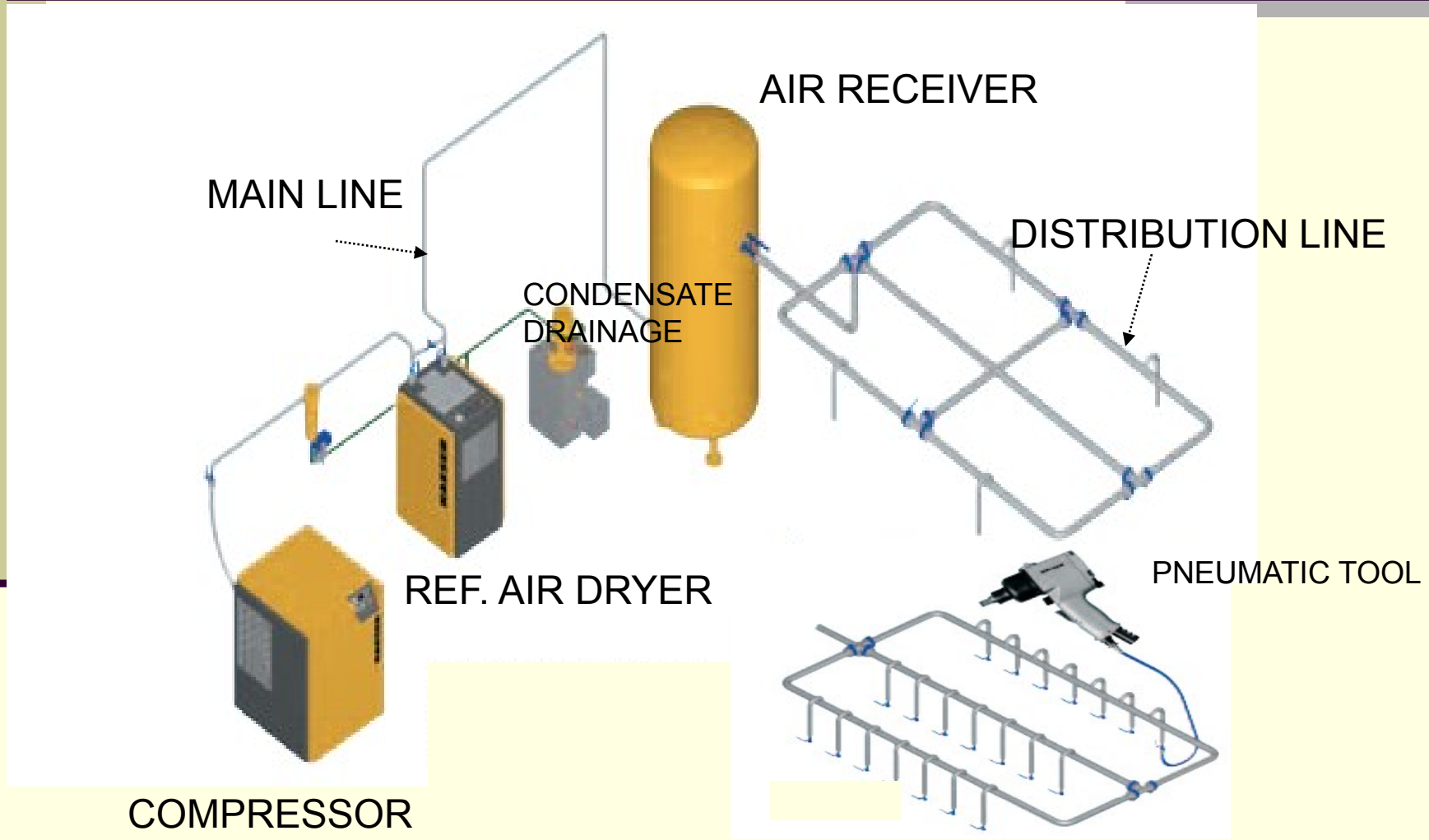
CAWANGAN KEJURUTERAAN MEKANIKAL

Prepared by : Mohamad Zaini Bakar

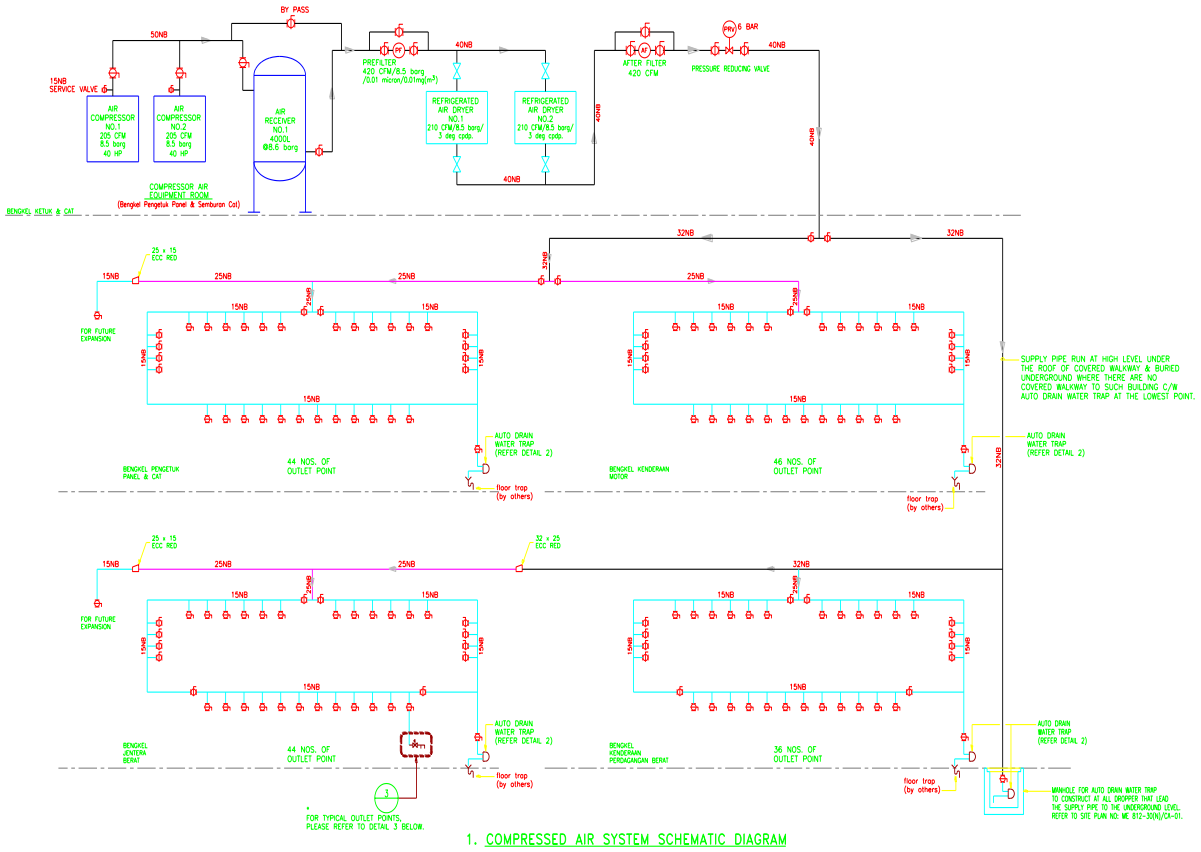
BASIC EQUIPMENT

- Compressor
- Air Receiver
- Air Filter
- Air Dryer
- Piping
- Pneumatic tool/machinery
- Control system

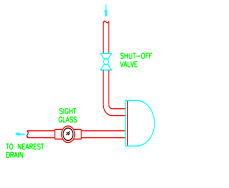
COMPRESSED AIR SYSTEM



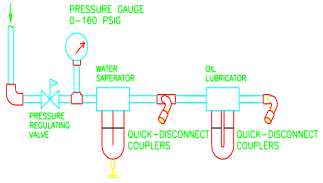
SCHEMATIC PIPING DIAGRAM (COMPRESSED AIR)



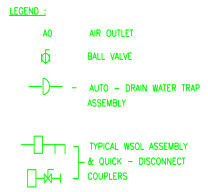
1. COMPRESSED AIR SYSTEM SCHEMATIC DIAGRAM



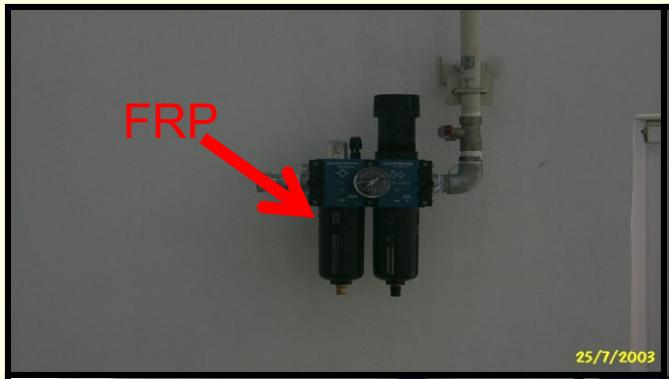
2. TYPICAL DETAIL OF AUTO DRAIN WATER TRAP

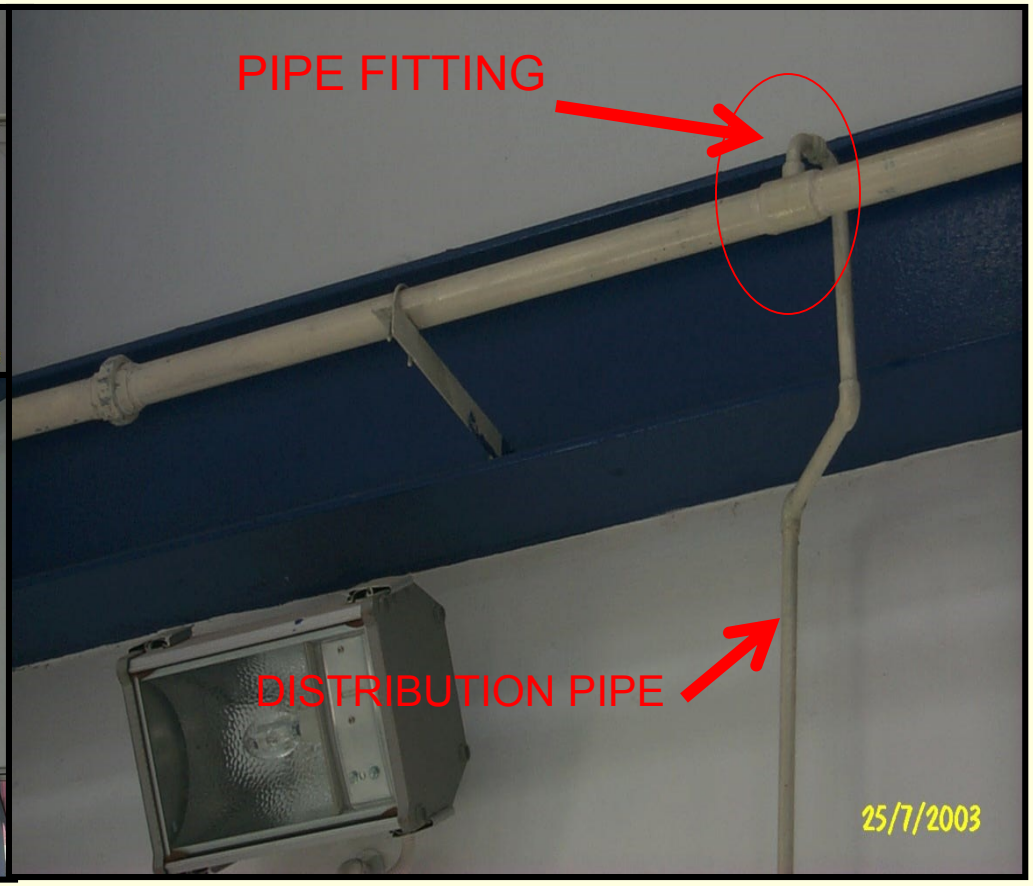


3. TYPICAL DETAIL COUPLER OUTLETS



PIPE AIR LINE

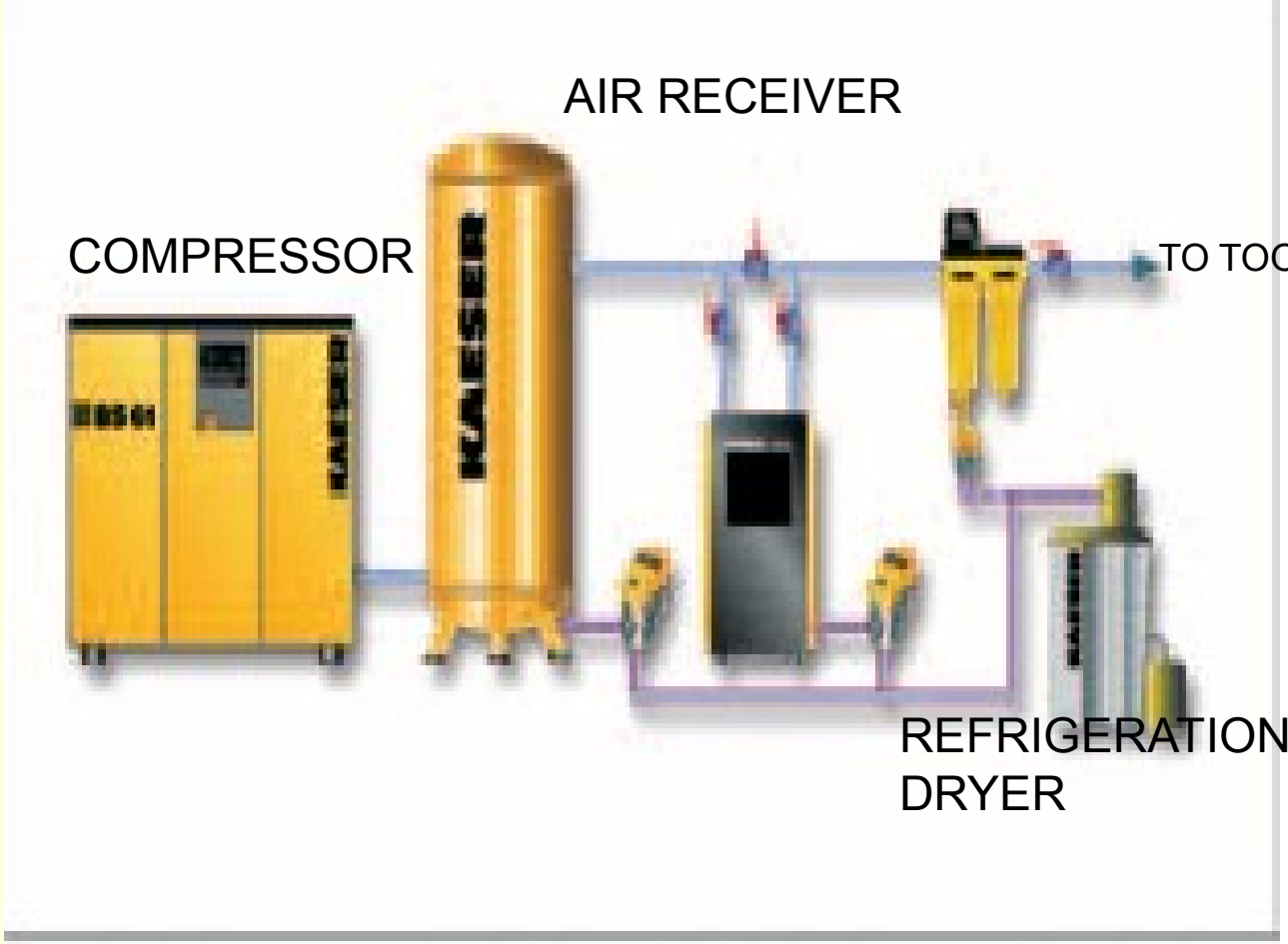




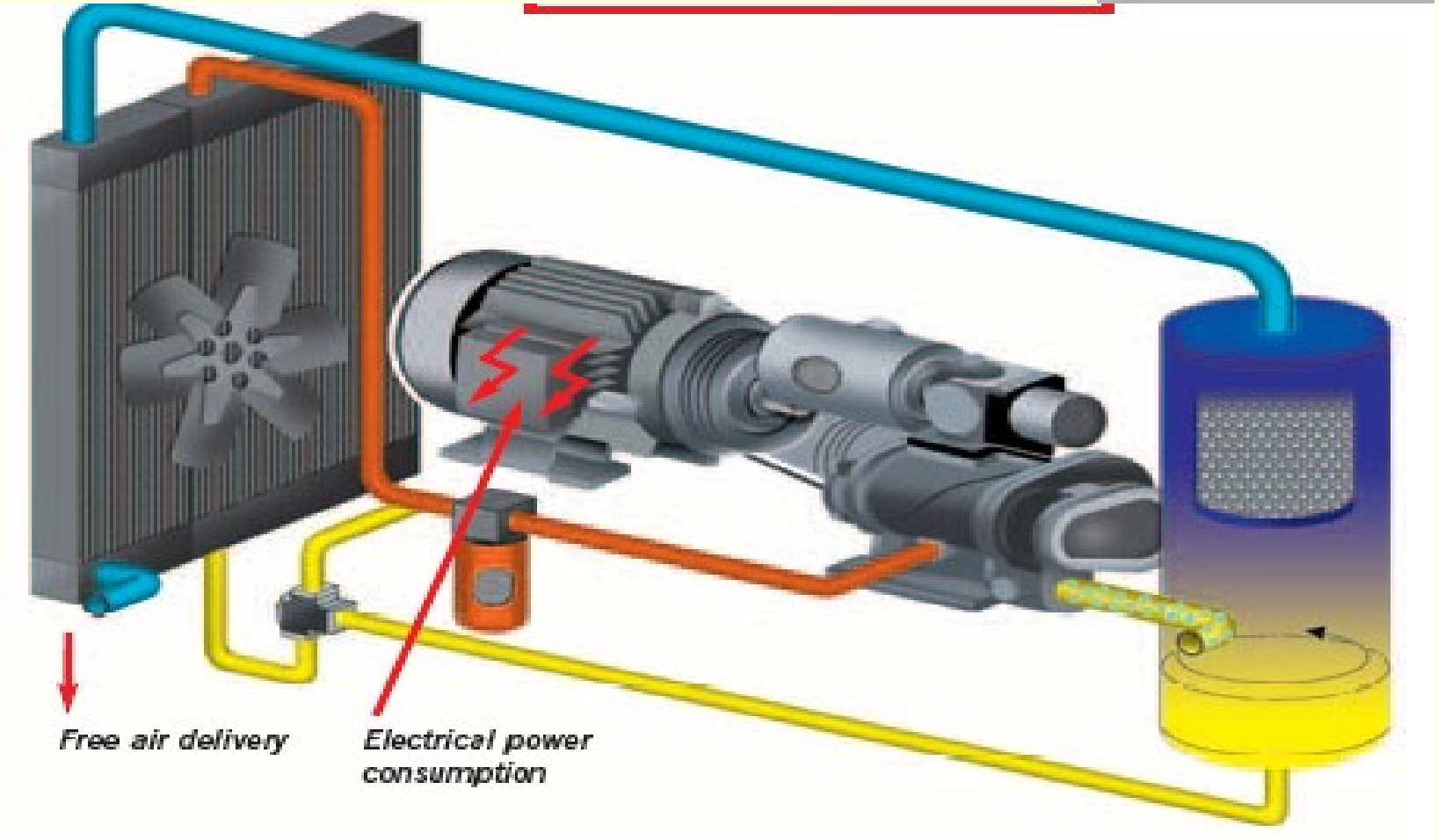
PLANT ROOM & TERMINATION POINT

COMPRESSORS

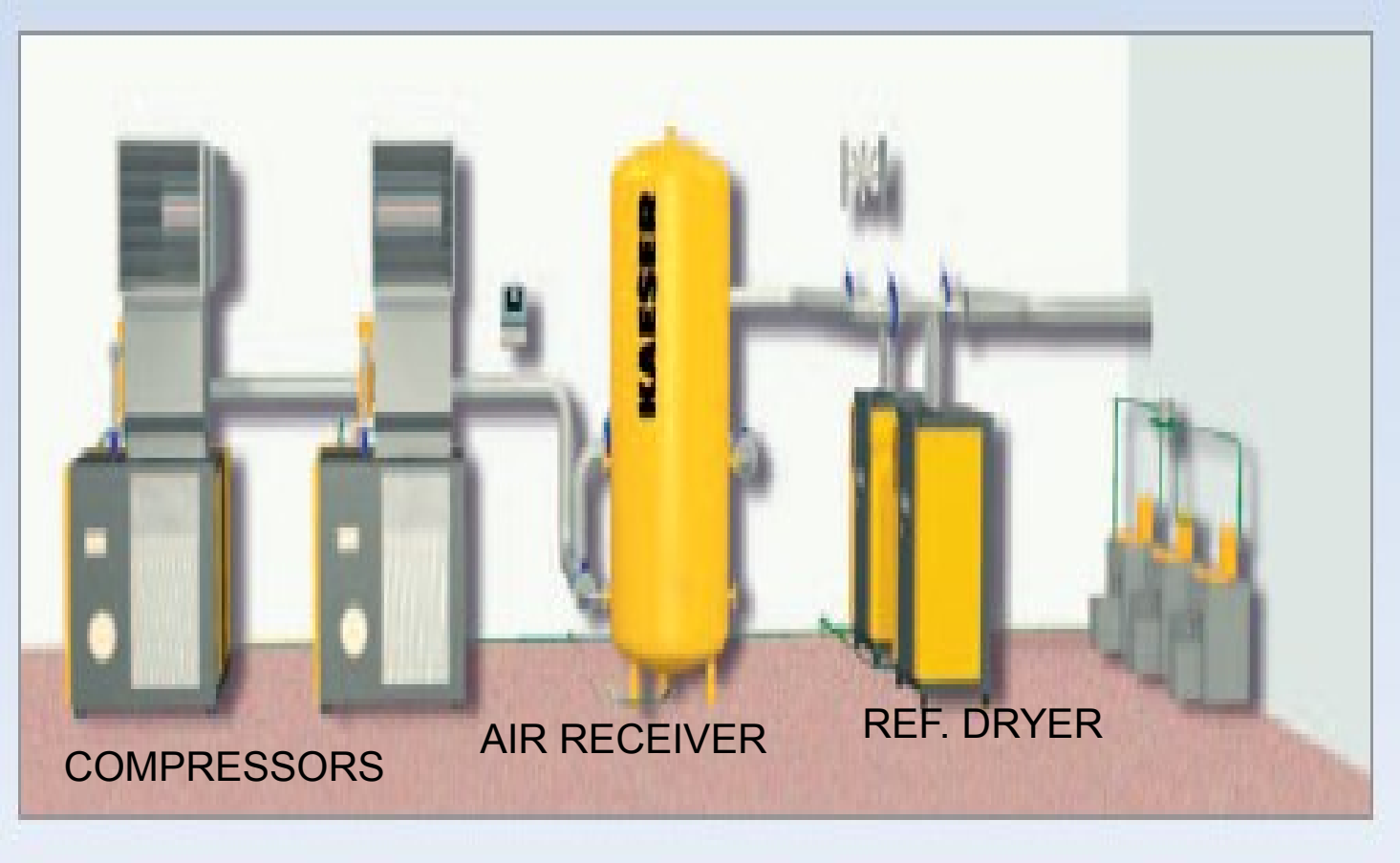
SYSTEM LAYOUT



BASIC COMPONENT IN THE COMPRESSOR



SYSTEM LAYOUT



SIZING COMPRESSOR

- Air Demand (Liter/minute)
- Working Pressure(bar)
- Number of pneumatic tool/equipments
- Utilazation factor (10%-50%)
- Effective air demand (Liter/minute)

Type of tool and size give different air consumption

Air tools and accessories

Example: Selection of Compressor

Operational Data	Spray gun	Wrench	Blow gun	Screw driver
Air demand	150 L/m	320L/m	240L/m	400L/m
Working pressure	2.5 bar	5 bar	6 bar	6 bar
Number off units	2	1	1	1
Utilazation factor (duty time)	50%	25%	10%	20%
Effective air demand	(2x150x.5) =150 L/m	320 x0.25 =80 L/m	240L x0.1 =24L/m	400 x 0.2 =80L/m

Total air demand=150+80+24+80 =334 L/m

Required volume= {334+334(10%leakage +15%error+15%reserve)} =467L/m at 6 bar

Then refer catalogue

AIR RECEIVER

- Required in almost of compressed air system
- To act as buffer and air storage
- Standard range available 90 – 10000 litres
- Working pressure 11 – 50 bar

AIR RECEIVER

STANDARD FITTING
- Ball valve
- Pressure relief valve
- Pressure gauge
- Drain tap

AIR TREATMENT/FILTER

- To remove dirt particles and the majority pollution
- Pure air reduces down time of the pneumatic machines
- To save servicing maintenance and repair cost
- Particle retention 1-3 micron m

REFRIGERANT DRYER

- To remove water vapour from the compressed air.
- Reduce break down, production down time, maintenance and repair cost
- Consist heat exchanger
- IP 52-54 class of protection
- Refrigerant circuit is seal and incorporates a scroll compressor type.

PIPE SIZING AND SELECTION OF PIPEWORK

Bore size of the pipeline selection depend on:-

- Air consumption
- Length of the air line
- Working pressure
- Pressure drop

e.g:- FAD =1 m3/min,

W.pressure =7.5 bar,

Pine length =50m length

=1” bore diameter. (from table :kaeser)

PIPE MATERIAL

- Steel or plastic ?
  - Galvanised
  - Stainless steel
  - Copper
  - Polymer

Example of the filter

AIR FILTER

STANDARDS

- BS 1042 – Method OF Measurement of Fluid Flow in Closed Conduits
- BS 1710 – Identification of Pipelines
- BS 6244 – Code of Practice for Stationery Compressor
- ASME code - SECTION 8-11

THANK YOU
TERIMA KASIH