

LIST OF ABBREVIATIONS

| | |
|-----------------|---|
| - | minus |
| % | percent |
| ± | plus or minus |
| + | plus |
| < | less than |
| > | more than |
| ° | degree |
| °C | degree Celsius |
| AABC | Associated Air Balance Council |
| ac | alternating current |
| Ac/h | air changes per hour |
| AFFF | aqueous film forming foam |
| AHU | air handling unit |
| ANSI | American National Standard Institute |
| API | American Petroleum Institute |
| ARI | American Refrigeration Institute |
| ARU | automatic run-up and loading |
| ASCE | American Society of Civil Engineers |
| ASHRAE | American Society of Heating, Refrigeration and Air-conditioning Engineers |
| AASHTO | American Association of State Highway and Transportation Officials |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society for Testing and Materials |
| AVR | automatic voltage regulator |
| AWWA | American Water Works Association |
| B&W | black and white |
| BFP | boiler feed pump |
| BMCR | boiler maximum continuous rating |
| BOD | biological oxygen demand |
| BOP | balance of plant |
| BS | British Standard |
| Btu | British thermal unit |
| BWRO | brackish water reverse osmosis |
| I&C | instrumentation and control |
| CCB | central control building |
| CCD | charged couple device |
| CCR | central control room |
| CCTV | closed circuit television |
| CD ROM | compact disk read only memory |
| CEMS | continuous emissions monitoring system |
| CFC | chloro-fluoro carbons |
| CFD | computational fluid dynamics |
| CIF | carriage, insurance and freight |
| CIP | clean in place |
| CO | carbon monoxide |
| CO ₂ | carbon dioxide |
| COD | chemical oxygen demand |
| COI | Critical Oxygen Index |
| Cr/SS | chromium/stainless steel |
| cos | Cosine |
| CPP | condensate polishing plant |
| cSt | centistokes |
| CT | current transformer |
| CV | curriculum vitae |
| CW | circulating water |
| CCCW | closed circuit cooling water |
| dB(A) | decibel (audio) |
| db | dry bulb |

| | |
|------------------|--|
| dc or DC | direct current |
| DCS | distributed control system |
| DEH | digital electro hydraulic |
| DEHG | digital electro hydraulic governor |
| DFO | distillate fuel oil |
| DFR | design flow rating |
| DGP | data gathering panel |
| DIM | design intent memorandum |
| DIN | Deutsches Institut für Normung |
| DL | dead load |
| DLT | digital linear type |
| DM | dual media |
| DNB | departure from nucleate boiling |
| EEC | European Economic Community |
| EHV | extra high voltage |
| EIA | Environmental Impact Assessment |
| EN | Euro Norm |
| EOTC | electric overhead travelling crane |
| EPC | engineer, procure and construct |
| EPR | ethylene propylene rubber |
| EPRI | Electrical Power Research Institute |
| EPRS | effective projected radiant heat absorbing surface |
| ESP | electrostatic precipitator |
| ESV | emergency stop valve |
| EVER | epoxy vinyl ester resin |
| EWS | engineer's workstation |
| FAC | Final Acceptance Certificate |
| FAT | Factory Acceptance Test |
| FCB | fast cut back |
| FD | forced draft |
| AFFP | aqueous forming fluoro-protein |
| FGD | flue gas desulphurization |
| FM | Factory Mutual |
| FOC | fibre optic cables |
| FOPH | fuel oil pump house |
| FTIR | Fourier Transform Infra Red |
| g | gauge (pressure) |
| G/Y | green/yellow |
| GCB | generator circuit breaker |
| GE | generator end |
| GGH | gas/gas heater |
| GIS | gas insulated switchgear |
| GR | gas recirculating |
| GRP | glass reinforced plastic |
| GT | gas turbine |
| GTMDO | gas transfer membrane de-oxygenation |
| H&S | health and safety |
| H ₂ | hydrogen |
| H ₂ O | water |
| HAZAN | hazard analysis |
| HAZID | hazard identification |
| HAZOP | hazard and operability |
| HB | Brinell Hardness |
| HCFC | hydrochlorofluorocarbon |
| HCISS | High Commission for Industrial Safety and Security |
| HCL | hydrochloric acid |
| HDPE | high density polyethylene |
| HEI | Heat Exchange Institute |
| HFO | heavy fuel oil |
| HMI | human machine interface |

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|--------------------|--|
| H-OH | hydrogen-hydroxide cycle |
| HP | high pressure |
| HRC | high rupture current |
| HV | high voltage |
| HVAC | heating, ventilation and air conditioning |
| Hz | hertz |
| I/O | input/output |
| ICEA | Insulated Cable Engineers Association |
| ID | induced draft |
| IBC | intermediate bulk container |
| IEC | International Electrotechnical Commission |
| IEEE | Institute of Electrical and Electronic Engineers |
| IMS | information management system |
| IP | Index of Protection |
| IPB | isolated phase busbar |
| ISO | International Standards Organization |
| ITP | Inspection and Test Plan |
| JIS | Japanese Industrial Standards |
| SSPP | Shuqaiq Steam Power Plant |
| KCl | potassium chloride |
| kg | kilogram |
| kg/cm ² | kilogram per square centimeter |
| kg/m ³ | kilogram per cubic meter |
| kg/s | kilogram per second |
| kJ/kg | kilojoules per kilogram |
| kJ/kWh | kilojoules per kilowatt hour |
| KKS | Kraftwerk Kennzeichen System |
| km | kilometer |
| KSA | Kingdom of Saudi Arabia |
| kV | kilovolt |
| kVA | kilovolt amperes |
| kVAr | kilovar |
| kW | kilowatt |
| kWh | kilowatt-hour |
| lb | pounds (Imperial weight) |
| l/s | liter per second |
| LAN | local area network |
| LCD | liquid crystal display |
| LED | light emitting diode |
| LHV | lower heating value |
| LL | live load |
| LP | low pressure |
| LSF | low smoke and fume |
| LTSA | long term service agreement |
| LV | low voltage |
| m | meter |
| m/sec | meter per second |
| m ³ | meters cubed |
| m ³ /h | cubic meter per hour |
| mA | milli ampere |
| MCB | miniature circuit breaker |
| MCC | motor control centre |
| MCR | maximum continuous rating |
| MCWP | main cooling water pump |
| MDF | main distribution frame |
| MDI | methylene diphenyl diisocyanate |
| MDPE | medium density polyethylene |
| MFT | master fuel trip |
| mg/m ³ | milligram per cubic meter |
| mg/Nm ³ | milligram per normal cubic meter |

| | |
|--------------------|--|
| MICC | mineral insulated cables |
| MIG | metal inert gas |
| min | minute |
| MJ | mega joule |
| mm | millimeter |
| mm ² | millimeter squared |
| MOV | motor operated valve |
| MSL | minimum stable load |
| MV | medium voltage |
| MVA | megavolt-ampere |
| MVA _r | megavolt ampere reactive |
| MW | megawatt |
| MWh | megawatt-hour |
| MW _{th} | megawatt (thermal) |
| N ₂ | nitrogen |
| NACE | National Association of Corrosion Engineers |
| NaOH | sodium hydroxide |
| NB | nominal bore |
| NC | noise criteria |
| NCR | non-conformance report |
| NDT | non-destructive testing |
| NEC | National Electrical Code |
| NEMA | National Electrical Manufacturers Association |
| NER | neutral earth resistor |
| NFPA | National Fire Protection Association |
| ng/J | nanogram per joule |
| NH ₄ OH | ammonium hydroxide |
| Ni-Cd | nickel-cadmium |
| nm | nanometer |
| NO ₂ | nitrogen dioxide |
| NO _x | oxides of nitrogen |
| NPSH | net positive suction head |
| NTP | normal temperature and pressure |
| NWL | normal water level |
| O&M | operation and maintenance |
| O ₂ | oxygen |
| ODAF | oil directed air forced |
| OFNR | optical fibre non-conductive riser |
| OFWF | oil forced water forced |
| ONAF | oil natural air forced |
| ONAN | oil natural air natural |
| OPC | OLE (object linking and embedding) for process control |
| OSHA | Occupational Safety and Health Administration |
| P&ID | pipng and instrumentation diagram |
| Pa | Pascal |
| PABX | private automatic branch exchange |
| PAC | provisional acceptance certificate |
| PC | personal computer |
| PDF | portable document file |
| PED | Pressure Equipment Directive |
| PF | power factor |
| pH | potential hydrogen |
| PIMS | plant information management system |
| PLC | programmable logic controller |
| PME | Presidency of Meteorology and the Environment |
| ppb | parts per billion |
| ppm | parts per million |
| PPTB | pounds per thousand barrels |
| PSA | Pressure Swing Adsorption |
| PTFE | polytetrafluoroethylene |

| | |
|-----------------|--|
| PTZ | pan/tilt/zoom |
| pu | per unit |
| PVC | polyvinyl chloride |
| PWM | pulse width modulated |
| QCC | Quality Control Certificate |
| QCR | Quality Control Record |
| RAH | regenerative air heater |
| rms | root-mean-square |
| RO | reverse osmosis |
| rpm | revolution per minute |
| RSA | rolled steel angle |
| RTD | resistance temperature detector |
| RTR | reinforced thermosetting resin |
| RTU | remote terminal unit |
| SAC | strong acid cation |
| SAH | steam air heater |
| SASO | Saudi Arabia Standards Organization |
| SAT | site acceptance test (or saturation) |
| SBA | strong basic anion |
| SCADA | supervisory control and data acquisition |
| SCR | selective catalytic reduction or silicon controlled rectifier |
| SDI | silt density index |
| SDR | standard dimensional ratio |
| SE | steam end |
| SEC-WOA | Saudi Electricity Company – Western Operating Area |
| SF ₆ | sulfure hexafluoride (insulating gas) |
| SFC | static frequency converter |
| SI | International Systems of Units |
| SLD | single line diagram |
| SMACNA | Sheet Metal and Air-conditioning Contractors National Associated |
| SNCR | selective non catalytic reduction |
| SO ₂ | sulfure dioxide |
| SOE | sequence of events |
| SSD | Safety and Security Directive |
| STG | steam turbine generator |
| SUS | saybolt universal seconds |
| swg or SWG | standard wire gauge |
| SWRO | seawater reverse osmosis |
| t | tone |
| TDS | total dissolved solids |
| T/G | turbine generator |
| t/h | tone per hour |
| TDH | total differential head |
| TDI | toluene disocyanate |
| TEMA | Tubular Exchanger Manufacturers Association |
| TFC | thin film composite |
| TI | temperature index |
| TIG | tungsten inert gas |
| TIMS | Tank Inventory Management System |
| TKN | total kjeldahl nitrogen |
| TL | thermal load |
| TMCR | turbine maximum continuous rating |
| TOC | total organic carbon |
| TP | terminal points |
| TSI | turbine supervisory instrumentation |
| TSS | total suspended solids |
| TSV | turbine stop valve |
| UBC | Uniform Building Code |
| UF | ultra filtration / ultra filter |
| UHF | ultra high frequency |

| | |
|------|---|
| UL | Underwriters Laboratories |
| UPS | uninterruptible power supply |
| UV | ultra violet |
| V | volt |
| VA | volt-ampere |
| VDU | visual display unit |
| VGB | Technische Vereinigung der Gaskraftswerks Betreiber (Technical Association of Large Power Plant Operators) |
| VOC | volatile organic compounds |
| VSD | variable speed drive |
| VT | voltage transformer |
| VWO | valves wide open |
| WAN | wide area network |
| wb | wet bulb |
| wc | water closet |
| WHO | World Health Organization |
| WL | wind load (or water level) |
| wt | weight |
| WTI | winding temperature indicator |
| WTP | water treatment plant |
| XLPE | cross-linked polyethylene |